North River Canal Corridor
Transportation Study
Preliminary Recommendations
Salem, Massachusetts
Purpose

• Identify *cumulative* impacts of developments over next five years (2016)

• Determine *transportation system* improvements

• Provide *order of magnitude* costs

• Identify *implementation* priorities
Comments on Options: (1/19/12 Meeting)

- Are enough intersections included in the NRCC Study Area?
- How do the newly regionalized Ruane Court/MBTA parking expansion affect the background traffic for this study?
- Why don’t all 2003 NRCC Master Plan recommendations still apply?
Study Area Overview

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Key Redevelopment Parcels

Note: The 3 approved developments represent approximately 72% of potential new traffic to be added.
Programmed Mitigation

North River Canal Corridor Transportation Plan

Legend:
- Approved Site Plan
- Site Plan Under Review
- Future Site Plan
- Potential Site Drive
- Future Multiuse Path

Add Right turn lane
Flashing hazard beacon
Optimize Signal
New Traffic Signal
Dynamic speed sign
30' Commercial Street Extension Reservation
Chapter 90 Improvements
Bridge Street Widening
EVALUATED MITIGATION LEGEND

- Make one-way
- Make two-way
- Two-way connector road
- New Traffic Signal
- Remove Traffic Signal
- Modify intersection signal
- Flashing hazard beacon
- New mini-roundabout
- Add right turn lane
- New all-way Stop
- New channelization
- New Bike Lanes
- New Sharrows
- Consider Curb Extensions
- Flush median
- Mason St Traffic Calming
- Stripe 3’ Interim Shoulders
- Multiuse Path Extension

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North River Canal Corridor Transportation Plan
PRELIMINARY RECOMMENDATIONS SUMMARY
Preliminary Recommendations Overview

Phase I

- Install 5-10 year Horizon Modifications
- Add right turn lane and install Mason Street at Tremont Street all-way stop; consider raising intersection 2-3 inches with enhanced crosswalks
- If new Goodhue/Bridge Connector is constructed, install coordinated signal with pedestrian and bike accommodations
- If Goodhue/Bridge Connector is implemented, either restrict Goodhue to right in or close a portion & create a hammerhead turnaround

Phase 2

- With Riverview Place, either make Flint Street one-way eastbound between Mason and Riverview Place Main entrance or relocate Flint Street on-street parking to an off-street location at Riverview Place Drive
- With future Bridge Street widening, mirror recommended south treatment, but with three 12’ lanes and 5’ bike lanes
- Consider new Goodhue/Bridge Connector to facilitate arrival across Mason Street

Potential Measures

- Convert Flint Street to one-way eastbound
- Flashing hazard beacon
- All-way stop control
- Optimize Signal
- New Traffic Signal
- New mini-roundabout
- New two lane road with adjacent multi-use path
- Mason St. Traffic Calming

Legend

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5-10 year Horizon Modifications
North end of Mason Street Study Area Tremont to North Streets
Mason Street
Traffic Calming Options Evaluated

• All-way stops

• More visible pavement markings or possibly slightly-raised crosswalks

• Alternating block to block on-street parking with sidewalk enhancements

• Safety improvements at the Mason Street curve near Friend Street
Strategy: Alternate Curbside Parking on Mason Street Jogged Centerline Between North (Route 114) and Tremont Streets
Could be tested, as only two short blocks affected
Recommendation: Mason Street Modifications – North (114) to Barr Streets

Potential high visibility crosswalks to further enhance visibility and cross-hatch markings for intersection ‘jogs’ w/6’ parking shoulder.

Add high visibility crosswalks.

6’ parking lane marking.
Potential Mason Street Modifications Between Dunlap and Barr Streets

- Consider moving on-street parking to north side, net gain 1 space.
- Potential high visibility crosswalk with ADA enhancements or raising crosswalk 2-3 inches.
- Consider centerline markings with 2-way raised plowable yellow markers and corner cross-hatching near crossovers and near intersections and driveways.
Recommendations: Mason Street modifications between Tremont and Dunlap Sts

- Add right turn only lane; guard rail repair and add wheelchair ramps
- Potential All-way stop -- add high visibility cross-walks and raise intersection or crosswalk 2-3 inches; consider 3’ curb extension
- Add high visibility cross-walk and raise 2-3 inches; consider 3’ curb extension
- New markings
Mason Street looking southwest to Buffum Street
Looking west on Mason Street east of Tremont Street

Retain north side parking for block between Tremont and Barstow Streets
Mason Street looking southwest to Barr Street

Relocate centerline for one block with relocated parking to slow traffic along Mason Street
Consider moving parking from south to north side between Barstow and Barr Streets & modify Mason Street markings.
Looking east on Mason Street to Dunlap Street

Marked ‘neckdown’ to define north side 6’ parking lane

Potential ADA Enhancements
Looking east on Mason Street south side west of Tremont Street

All-way stop. Wall impairs Tremont Street sight line for exiting traffic looking east & intersection with steep downgrade on Tremont Street approaching Mason Street is the reason for the guard rail which needs repair.
Consider Tremont Street edge needs repair from utility pole to Mason Street corner striping two 10’ lanes for the the exclusive right and left lanes approximately 150 feet Widening \textit{not} needed.
Mason Street from Flint Street to Harmony Grove Road

- Must fix Flint Street High Crash location at Mason Street
- Pedestrian Crossings at Mason needs improvement Flint Street
- Access to Riverview Place between Bridge and Flint Street should be retained to minimize Mason Street impacts
- Mason Street at Friend Street curve needs better definition
Flint at Mason Streets
What’s wrong with this picture??

No stopping, close buildings & parking zones (esp. @night) = poor sight lines

±28’
Flint Street Looking South From Mason Street

What’s wrong with this picture??
Flint at Mason Streets

• Options
  – Do nothing
  – Hazard beacons (flashing yellow Mason; flashing red Flint)
  – All-way stop hazard beacons (flashing red all approaches)
  – Signal control (residential parking removed & relocated)
  – Relocate parking with crossing accommodations
  – Convert Flint to one-way eastbound with parking off sidewalk
    • Mason to Bridge Streets
    • Mason to Riverview Place Main Drive
Recommendation: Flint at Mason Streets

Phase I - All way Stops with 3-foot curb extensions & flashing Red on all approaches 22’ for traffic; 6’ shoulder marked

Phase II - one way southbound to Riverview Place Drive with left side parking off sidewalk
Recommendation: Flint at Mason Streets

Phase 2 - one way southbound to Riverview Place Drive with left side parking off sidewalk

Phase 2 - Add channelization to Riverview Entrance with slight widening to accommodate bike lane to Leslie’s Retreat Path & Riverview Place

Concept Only: Not to Scale
Mason at Friend Street Curve

Looking south on Mason Street to Friend Street
Recommendation: Mason at Friend Streets Curve

- Curve Hazard Warnings
- Raised Plowable Markers
- Better Curve Definition
- Retain south side Parking
Mason at Grove Streets and Harmony Grove Road

Looking south on Grove Street
To Harmony Grove Road and Mason Street

Looking north on Grove Street
To Mason Street
Recommendation: Mason Street at Harmony Grove Road

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Alternate: Mason Street at Harmony Grove Road

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Grove Street Between Harmony Grove Road and Beaver Streets

West side of Grove Street
Looking north to Harmony Grove Road and Mason Street
Grove Street Between Harmony Grove Road and Beaver Streets

Grove Street railroad crossing looking east
Grove Street Between Harmony Grove Road and Beaver Streets

East side of Grove Street
Looking north to Harmony Grove Road and Mason Street
Grove Street Between Harmony Grove Road and Beaver Streets

West side of Grove Street
Looking south just north of railroad crossing
Grove Street Between Harmony Grove Road and Beaver Streets

East side of Grove Street
Looking south to parking area and Flynntan site
Recommendation: Improve Grove Street Between Harmony Grove Road and Beaver Streets

- Generally needs infrastructure upgrade – sidewalks & railroad crossing not up to current standards
- Repave Grove Street
- Replace missing sidewalk on east – 28 Goodhue site north to Harmony Grove Road
- Replace dilapidated concrete sidewalks on the west
- Assume developments will fix sidewalks abutting sites
- Make sure adequate sight lines are provided where future driveways intersect Grove and Goodhue Streets
- Keep sidewalks continuous as much as possible; use ‘in-laid’ concrete sidewalks across driveway curb cuts
Grove Street corridor - Complying with ADA
‘In-laid’ Sidewalk with Head-in Parking or Across Drives

Existing bituminous concrete section

Two ways for proposed bituminous concrete section with inlaid concrete sidewalks at driveways

Example - In-laid concrete sidewalk

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Beaver at Grove and Goodhue Streets

- Large cross-sloping parking area used by random trucks and autos – not conducive to pedestrian flow

- Confusing traffic operations

- Start of one way pattern may need to change to handle access to future redevelopment sites

West side of Grove Street
Looking south to large parking area
Recommendation: Reconfigure Goodhue/Grove at Beaver Streets

• If necessary, design to accommodate on-street parking sufficient to accommodate non-trucking demands
Alternate: Maximize Flood Storage Retention of Goodhue/Grove at Beaver Streets

• If necessary, design to accommodate on-street parking sufficient to accommodate non-trucking demands
Recommendation: Explore Potential Grove / Goodhue Streets to Bridge Street Connector

- Results in better operations than Hanson Street Connector
- Better grades than Hanson Connector
- Allows shrinking of Boston/Bridge Intersection
- Does not involve building takings
- Requires a public easement or taking
Recommendation: Explore Goodhue to Bridge Streets Connector with Multiuse Path & Signal at Bridge Street

- Flood retention & green space maximization with ‘T’ intersection, but more costly mini-roundabout (previous slide) is workable with financing possible

Refer to Boston Street Intersection Recommendations
2-way Goodhue Street @ Boston Bridge and Proctor Streets?

- Not recommended
- Too many conflicts
- Hazardous sight lines from Goodhue
- Pedestrian, bike, and traffic unfriendly
Phase I Recommendation: Boston Street & Bridge/Goodhue/Proctor Streets with New Connector

- Right lane/left lane phase overlaps increase efficiency; reduce queuing
- Shorter pedestrian crossings
- More green space
Phase 2 Recommendation: Boston Street & Bridge/Goodhue/Proctor Streets with New Connector

- Right lane/left lane phase overlaps increase efficiency; reduce queuing
- Shorter pedestrian crossings with fewer conflicts
- Even more green space than Phase 1
Aborn at Boston Streets

Looking north from Aborn Street across Boston Street

Looking west at Aborn Street south side of Boston Street

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**Minimum Action: Aborn at Boston Streets**

Pavement Markings Only
Phase 1 Recommendation: Aborn at Boston Streets

Geometric Changes & Overhead Hazard Beacon
Phase 2 Recommendation: Aborn at Boston Streets

Geometric Changes Full Signal and Bike Lanes
Boston Street

North side of Boston Street looking east from Grove Street to narrower segment near Hanson Street
Boston Street

North side of Boston Street looking west from Dunkin Donuts Driveway at narrowest Boston Street segment
North side of Boston Street looking west from Grove Street to wider Boston Street segment
South side of Boston Street looking north at crosswalk east of Grove Street
Boston /Bridge Street Corridors
- Recommended, but will take longer than 5 years -

- Boston Street – Peabody Line to Essex Street
  - Not yet on State’s Transportation Improvement Program
  - Recent MAPC Joint Peabody/Salem Main/Boston Streets Corridor Study made excellent recommendations
  - Follow up recommendations:
    - General sidewalk ADA compliance/signal upgrades/pedestrian crossings need attention
    - Bike lanes vs. ‘sharrows’ on Boston Street

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Boston Street – Typical Signalized Crosswalk

Boston Street looking east to Rawlins Street Pedestrian Signal
Boston Street – Typical Crosswalk Suggestion
(overhead view)

Typically 52-54’ curb to curb
Preliminary Recommendations Overview

City of Salem

Harmony Grove Cemetery

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5-10 year Horizon Modifications

**LEGEND**
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**POTENTIAL MEASURES**
- Convert Flint Street to one-way eastbound
- Flashing hazard beacon
- All-way stop control
- Optimize Signal
- New Traffic Signal
- New mini-roundabout
- New two lane road with adjacent multi-use path
- Mason St. Traffic Calming
- Bike Lanes
- Bike Sharrows
- Consider Curb Extensions
- New curb alignments for pedestrian enhancements
- Flush median

**Phase 1**
- Install Mason Street stop and signal, along with pedestrian and bicycle friendly weathering
- Update hazard pedestrian and bicycle enhancements

**Phase 2**
- If geometry alone is unsuccessful, consider fully actuated signals

**Preliminary Recommendations Overview**
- Provide well-marked Grove Street section with sidewalks on both sides, minimum curb-to-curb width of 28 feet plus 5-foot sidewalks. Provide chairmans from future multi-use path to Mason Street.
- Add compensatory flood storage and bio-retention/green-space area where possible plus potential mountainable mini-roundabout with crosswalks and raised splitter islands. Add 6' on-street parking lanes south of multi-use path, if necessary on roundabout approaches.

**Future Multiuse Path**
- Make Boston Street more pedestrian and bicycle friendly – add bike lanes between Harmony and City of Peabody line; new ADA compliant sidewalks with neck-downs at crosswalks with flush 4-foot median at three crosswalks.
- Provide well-marked Grove Street section with sidewalks on both sides, minimum curb-to-curb width of 28 feet plus 5-foot sidewalks. Provide chairmans from future multi-use path to Mason Street.
- Add compensatory flood storage and bio-retention/green-space area where possible plus potential mountainable mini-roundabout with crosswalks and raised splitter islands. Add 6' on-street parking lanes south of multi-use path, if necessary on roundabout approaches.

**Phase 1 – Improve signs and markings**
- Phase 2 – If all-way stop proves to be ineffective, design mini-roundabout if feasible with truck apron and possibly mountainable center island or 5 intersection with green-space, crosswalks

**Phase 1 – Mason Street**
- All-way stop with hazard beacon and complementary pavement markings

**Phase 2 – Riverview Place**
- Either make Flint Street one-way eastbound between Mason and Riverview Place; Main entrance or relocate Flint Street on-street parking to an off-street location at Riverview Place Drive

**Phase 1 – Optimize Signal**
- Add right turn lane and install Mason Street at Tremont Street all-way stop; consider raising intersection 2-3 inches with enhanced crosswalks

**Phase 1 – Restripe Bridge Street**
- Convert Flint Street to one-way eastbound
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5-10 year Horizon Modifications
Next Steps

• Receive and review comments
• Refine Recommendations
• Identify priorities for implementation
• Estimate Order of Magnitude Costs
Planning Board
and Public Comments

1) Mason Street Calming
2) Flint Street
3) Harmony Grove Road, Grove, and Goodhue Streets
4) Bridge Street
5) Boston Street
6) Aborn at Boston Streets