

Pedestrian & Bike Access Study

North and Bridge Streets Approaches to Salem MBTA Station

City of Salem, Massachusetts

Mayor Kimberley Driscoll



FAY, SPOFFORD & THORNDIKE

April 2013

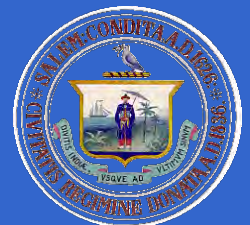


TABLE OF CONTENTS

I	OVERVIEW	1
II	PURPOSE	1
III	STUDY AREA	3
	Pedestrian Corridor I – East Side of North Street	6
	Pedestrian Corridor II - West Side of North Street	7
	Pedestrian Corridor III - Bridge Street between Flint and MBTA	8
IV	OPTIONS	14
	Pedestrian Corridor I – East Side of North Street	14
	Pedestrian Corridor II - West Side of North Street	18
	Pedestrian Corridor III - Bridge Street between Flint and MBTA	23
V	PRELIMINARY RECOMMENDATIONS	28
	Pedestrian Corridor I – East Side of North Street	28
	Pedestrian Corridor II – West Side of North Street	30
	Pedestrian Corridor III – Bridge Street between Flint and MBTA	31

LIST OF FIGURES

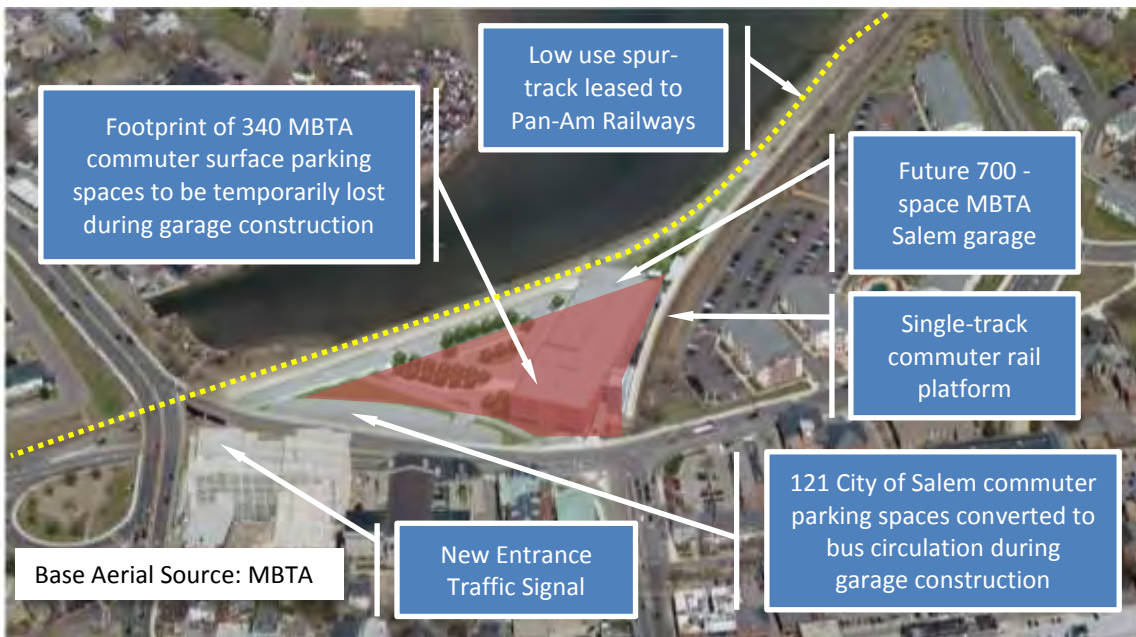
<u>Figure</u>		<u>Page</u>
1	Salem Station Pedestrian Access Routes	4
2	Salem Station Pedestrian/Bike Count Locations 1/15/13	5
3	Pedestrian Corridor I Alternate Route Comparisons Summary	11
4	Pedestrian Corridor I Alternate Route Comparisons Summary	12
5	Pedestrian Corridor I Alternate Route Comparisons Summary	13
6	Pedestrian Corridor I Option I-2	15
7	Pedestrian Corridor II Option II-2	21
8	Pedestrian Corridor III Option III-2	25

Appendix

2013 Pedestrian Count Summary Sheets

2013 Pedestrian Count Data

I. Overview



Pedestrian and bicycle access to the MBTA Salem Station from the north and west has been problematic for a long time. While the 700-space MBTA Salem Station parking garage is undergoing construction starting this spring, the MBTA's existing 340 surface parking space parking supply will temporarily be closed to commuter use. The City's 121-space lot is proposed by the MBTA to be closed as well. Therefore, a total of up to 461 displaced commuters will need to alter their commuting patterns. These motorists will either have to use other parking areas within walking distance of the MBTA or walk/bike to the Station. Hence, during the short term, already high existing walk/bike demands to Salem Station via North (State Route 114) and Bridge (State Route 107) Streets from the north and west, respectively, will *increase significantly*. The proposed MBTA garage location and surface parking impact area is illustrated above. A new signal is proposed to control the only combined vehicle/pedestrian entrances to the new garage complex. The completion date of the new signal is unknown at this time.

This report documents a study to evaluate enhancements to existing and future pedestrian and bicycle access to the Salem Commuter Rail Station (the Station) via North and Bridge Streets. It discusses the pros and cons of options for 'formalizing' distinct informal routes and recommends an action plan to address necessary pedestrian and bicycle enhancements.

II. Purpose

For many years, pedestrians and bicyclists from North Salem/Mack Park neighborhoods have been using public and private informal walking accesses to reach the Salem Commuter Rail Station and downtown Salem. Motorists and passengers as well as neighborhood residents routinely cross an active, but very low use, MBTA-owned spur rail track in doing so. The track in question is leased to the Pan Am Railways (formerly

Guilford Railways) that has freight haul rights to the track. Pan Am Railway Company will use the track or one of its sidings to store freight cars perhaps once a week.

Observed walking corridors for users of remote commuter parking spaces to and from the Station were evaluated for potential improvements. Potential improvements were evaluated within the context of the proposed future Bridge Street widening between Washington and Flint Streets as well as interim use while the new MBTA Salem Garage is under construction and possible long term use. Specific objectives of the study are to:

- 1) Improve the safety and quality of movement for pedestrians using existing and future temporary parking spaces to access the Station. This study identifies the extent of pedestrian circulation difficulties to and from the Station and an appropriate extent of public easements and facilities to accommodate them. It evaluates the magnitude of the problem with the current pedestrian access facilities and identifies the pros and cons of alternative strategies, focusing on those that could be implemented relatively quickly.
- 2) Identify differences in pedestrian travel times and convenience to the Station using the Station accesses that do not involve railroad track crossings.
- 3) Identify the level of control and design of the informal on-street parking spaces located on the west side of Bridge Street between the Bait & Tackle Shop and Flint Street as well as the newly created Commercial Street commuter parking area and the new Universal Steel commuter parking area under construction. Address the need for parking or other treatments of Bridge Street between Flint Street and the Salem Station. Identify the approximate number of existing and temporary parking spaces that will be used by nearby residents or commuters. Identify pros and cons of alternative parking control measures that should be considered vis-à-vis their pedestrian circulation patterns.
- 4) Identify preferred actions associated with enhancing pedestrian and bike access to the Station especially from the north and west and the costs of actions within the public layout. For example, should existing head-in parking be formalized and retained, or converted to parallel on-street parking or are any other measures needed to enhance the circulation safety of pedestrians who will be using the Universal Steel lot.

This study takes into consideration conversion of the Universal Steel site into a temporary 116-space public use surface commuter parking lot as partial compensation for the temporary loss of the 461 spaces on the MBTA site. On the west side of North Street, the City has also increased the availability of parking on Commercial Street by creating an additional approximately 25 temporary parking spaces to serve displaced commuters.

III. Study Area

Figure 1 illustrates the study area, defined as the North Street between Franklin and Bridge Streets as well as Bridge Street between the MBTA Salem Commuter Rail Station and Flint Street. It also illustrates existing pedestrian access routes, both informal and formal, serving the MBTA Station as well three pedestrian access corridors. Figure 2 illustrates (4) locations within three access corridors, also illustrated that are:

Pedestrian Corridor I – The east side of North Street between Franklin Street and the MBTA Station

Pedestrian Corridor II --The west side of North Street between Commercial Street and the MBTA Station

Pedestrian Corridor III -- Bridge Street between Flint Street and the MBTA Station

Figure 2 also highlights relevant affected parking supplies within the study area.

Pedestrian/bicycle counts were taken at the four focus areas to provide recent context for discussions of the pedestrian access routes from 6-9 AM. Refer to the Appendix for summary the bike/pedestrian volumes during taken at the four focus areas. Related raw count data is also provided in the Appendix.

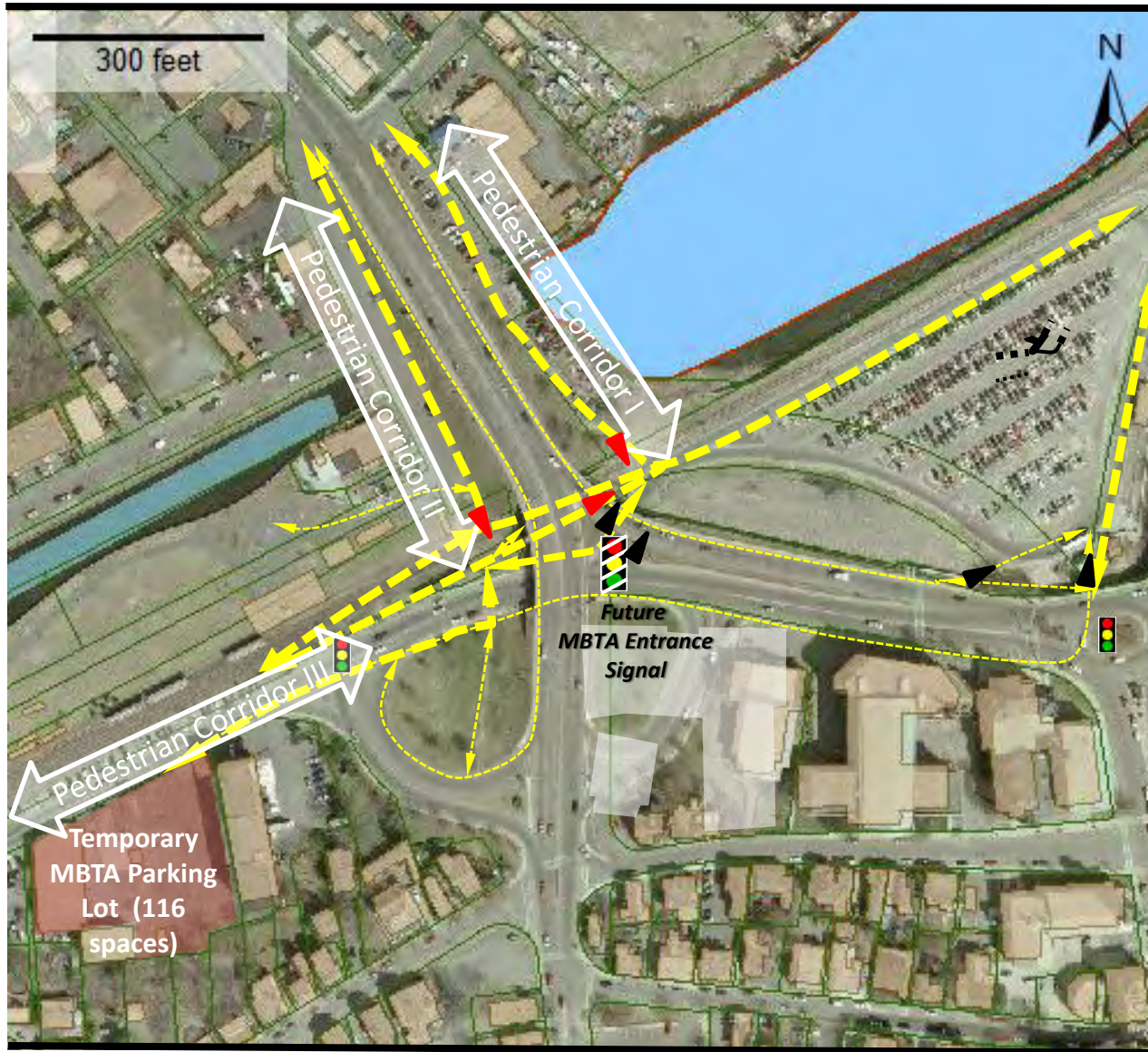
During our recent observations, the three pedestrian/bike access corridors studied accounted for ***nearly half of all pedestrian and bicycle trips to the Station between 6-9 AM***, with the other half occurring via the Washington Street at Bridge Street entrances.

The two informal entrances to the Station, requiring crossings of the rail siding track, accounted for approximately ***1/3 of walking trips to and from the Station between 6-9 AM on a typical weekday***.

Given that the City's Universal Steel site parking lot containing 116 commuter parking spaces will soon open, it is anticipated that ***more than half of all walk/bike trips to and from the Station will occur via the three cited pedestrian corridors shown on Figure 2***.

It is important that walkability/bicycling issues pertaining to the three studied corridors be addressed as soon as possible. Though highly used, the ripping hazards and the walking environment are unacceptably poor under existing conditions.

Figure 1

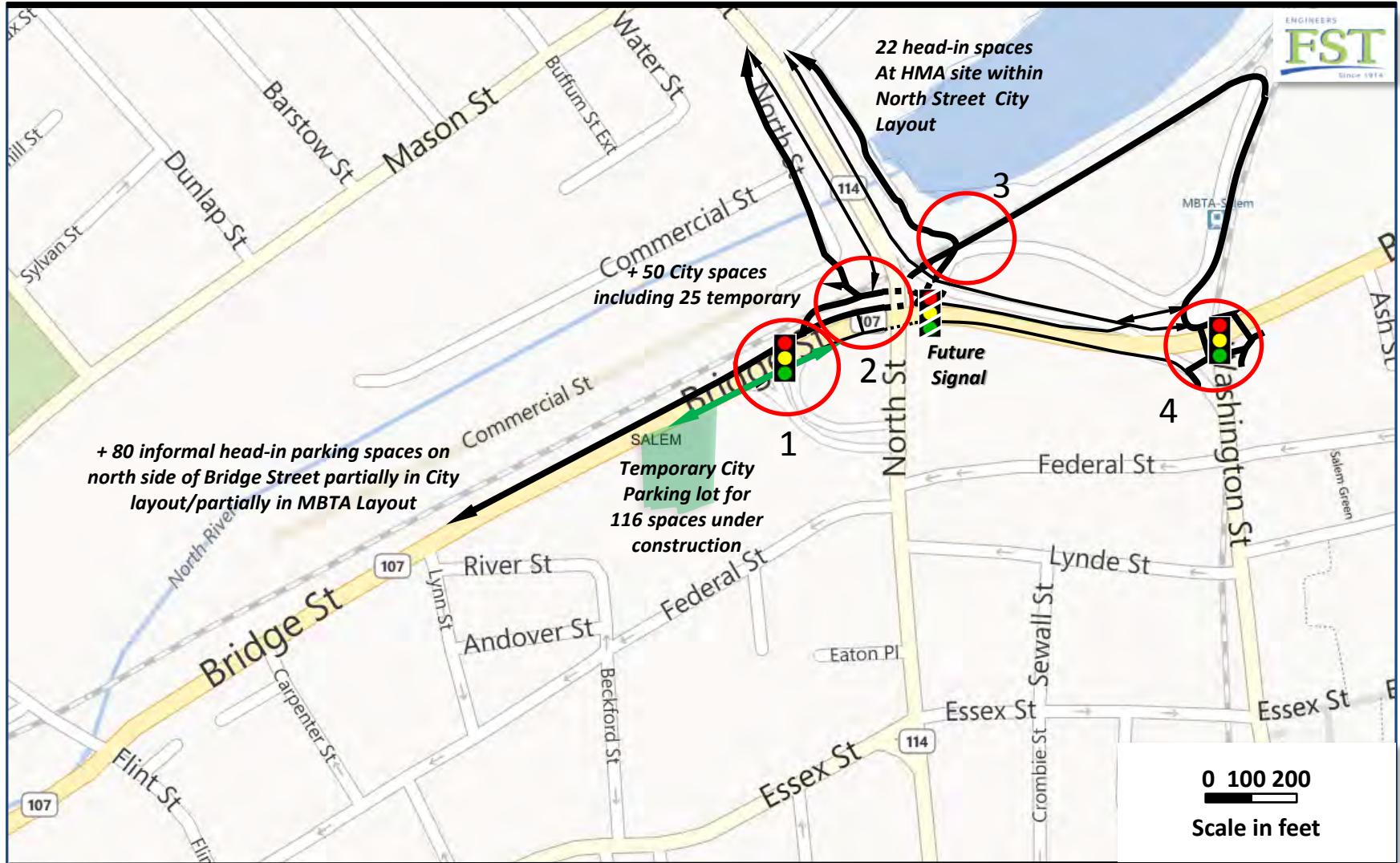


Legend

- Less busy, grade - challenged pedestrian routes
- Busier, but problematic pedestrian routes with safety/ADA/rail crossing or private trespassing issues
- Focus pedestrian access corridors
- Existing formal pedestrian access point
- Existing informal pedestrian access point

Salem Station Pedestrian Access Routes

Figure 2



Base Map Source: MassGIS EOEA

Salem Station

1/15/13 6-9 AM

Pedestrian/Bike Count Locations

Legend

- 6-9 AM Pedestrian/Bike Count Location
- Busy existing pedestrian access routes
- Future busy pedestrian access route
- Lightly travelled /steep pedestrian access routes

Pedestrian Corridor I - East Side of North Street between Franklin Street and the MBTA Station



The existing pedestrian environment on North Street consists of relatively new sidewalks on both sides of North Street with a long 5-6% grade uphill for pedestrians walking toward the Station.

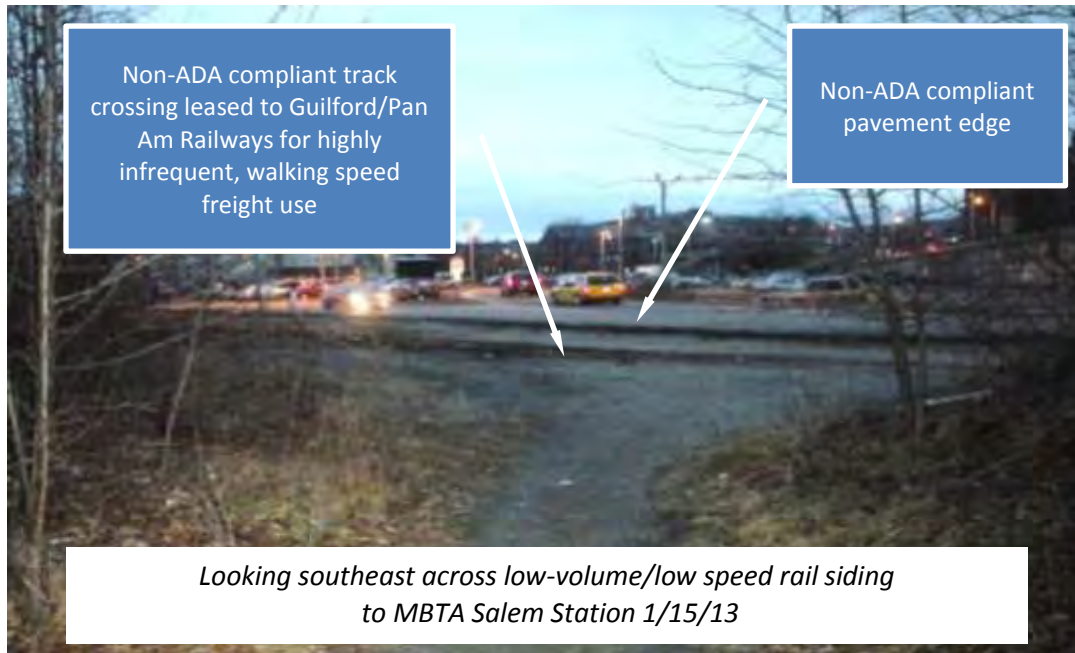
As shown on the above photo to the right, between the HMA parking lot and the MBTA Station is a well-worn unpaved pathway, a portion of which is located within a privately-owned parcel of land that is used as a tidal metal salvage site. City of Salem information indicates the existing path directly abuts the City's North Street right-of-way layout. The City's layout extends on a steep embankment toward North Street.



As measured during a three hour 6-9 AM period, 81 pedestrians, 86% heading toward the Station, used this path traveling to or from the Station while 3 bicyclists were observed on the pathway compared to fewer than 5 users of the sidewalk on the east side of North Street entering the site via the existing Bridge Street stair/ramp access points. While well-used, between the salvage yard and the MBTA Station, the path has a short hill above a sewer easement on MBTA property that

creates a non-ADA compliant path (see photo above).

Continuing toward the Station, the unpaved walkway that is otherwise typically 6-7 feet in width narrows to approximately 3 feet and crosses a low-volume, poor quality track siding owned by the MBTA (see photo on the next page) and leased to Pan Am Railways for freight service.

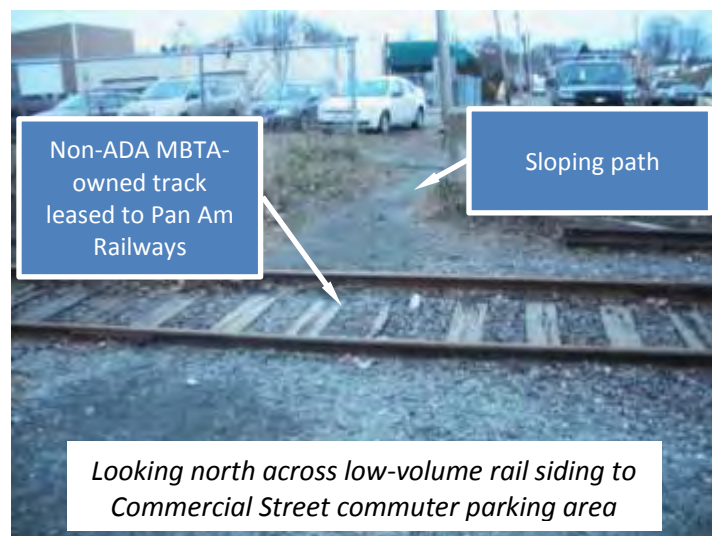


While the off-road pathway adjacent to the east side of North Street is more desirable to pedestrians than staying on its sidewalk, use of the pathway is a formidable challenge for those with disabilities and cyclists who must dismount and carry their bikes across the tracks and onto the Station's bituminous concrete sidewalk.

The pathway also has no lighting on the segment between the HMA site and the Station's sidewalk.

Pedestrian Corridor II - West Side of North Street between Commercial Street and the MBTA Station

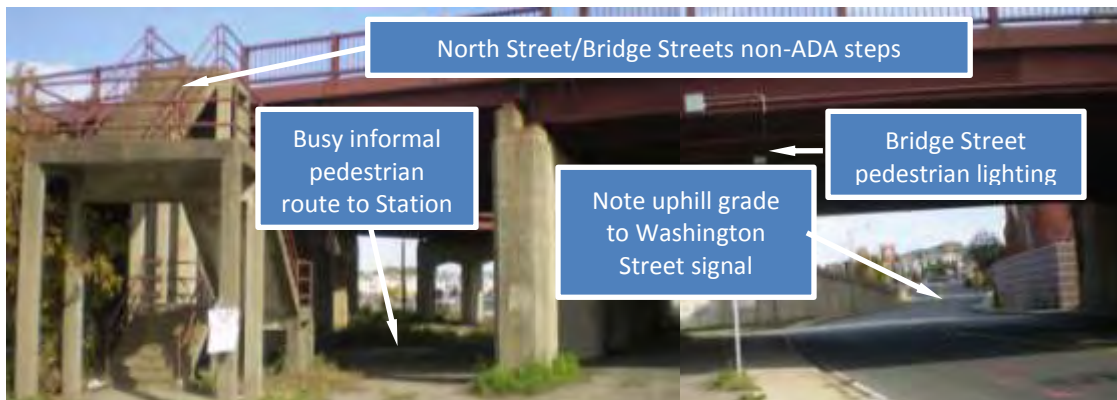
Like the east side of North Street, pedestrians and cyclists who desire to walk to and from the Station on the west side of North Street have a more convenient alternative to the relatively-steep uphill North Street west sidewalk. They have an informal path that takes them across the same MBTA rail siding, but approximately 300 feet to the west. Pedestrians from the Mack Park neighborhood including cyclists and walkers from nearby Leslie's Retreat Park and North Street walkers filter down to this opening. From the January 15, 2013 photo above, the new Commercial Street head-in parking area is visible, as is the well-worn pedestrian path between Commercial Street and the MBTA track siding that must be crossed to gain access to the Station.



Once pedestrians who are traveling to the Station emerge between the wall and fence, they have many choices of how they can access the Station. A few choose not to cross the track at this location, opting to walk along the north side of the track along a concrete barrier to cross in the vicinity of the informal crossing discussed on the previous page after passing under the North Street Bridge. Based on the worn paths between the bridge piers in the photo below, it is clear that pedestrians choose any of several routes travelling to and from the Station from the west side of North Street.

Pedestrians who choose to stay on the steep west North Street sidewalk on the viaduct can access the Station via a seldom-used two-level stairway between Bridge and North Streets (see photo on page 7). During a recent 3-hour 6-9 AM period, a total of 100 pedestrians and 5 cyclists were observed as crossing the North Street west side rail siding alternative, vs. only 3 pedestrians who were observed as using the steep sidewalk and the non-ADA compliant stairs shown on the previous page.

From the photo below, the north side of Bridge Street has a lighted sidewalk, but requires pedestrians going to the Station to travel slightly further than if they use the more-direct worn paths behind the viaduct bridge piers.



Looking east on north side of Bridge Street to stairs and North Street viaduct

The south side of Bridge Street also has a sidewalk, but crossing requires pedestrians who desire to access the Station either to cross at an unsignalized crosswalk with poor visibility due to the nearby viaduct and the horizontal curvature of Bridge Street, as can be seen in the photo above. Refer ahead to page 10 for a photo of this crosswalk.

Or, as indicated above, pedestrians must walk uphill to cross at the Washington Street traffic signal. After crossing at the signal, they must either backtrack to use by a downhill ramp or take stairs to the Station platform. Only 4 pedestrians actually continued on the south side of Bridge Street during the 6-9 AM period when observations were performed rather than cross at the unsignalized crosswalk.

Pedestrian Corridor III - Bridge Street between Flint Street and the MBTA Station

The north side of Bridge Street has neither a marked paved shoulder nor a raised sidewalk. It is informally used by pedestrians and residents who travel from approximately 75-80 head-in parking spaces mainly to and from the Station (see photo right).

The recent 6-9 AM count indicated that approximately 67 pedestrians used the north side of Bridge Street during the morning peak period.



*Looking east on Bridge Street to
North Street ramps traffic signal 1/15/13*



*Looking east on Bridge Street to
Bridge Street Sports building 1/15/13*

As pedestrians on the north side of Bridge Street walk closer to the Station, they must traverse the Bridge Street Sports shop. As shown in the photo to the left, this wood building juts out into the public layout and creates a pinch point for pedestrians traveling to and from the Station or downtown Salem. In the absence of a sidewalk, each pedestrian must choose to either go around the rear of the building near the rail right-of-way or enter the westbound Bridge Street travel lane. During the 3-hour morning peak period count, ***approximately 2/3 of the pedestrians opted to go behind the building rather than the 1/3 who took their chances with the high-volume oncoming travel lane heading southbound on Bridge Street.***

In the future, as part of the programmed Bridge Street widening project, we understand that the Commonwealth of Massachusetts has agreed to purchase and remove the Bridge Street Sports building to create four-lane cross-section. All track sidings but the

northernmost MBTA track leased to Pan Am Railways for the continuation of low speed infrequent/low speed freight use will be eliminated.

Pedestrians who are, or will be, accessing the Station from the west side of North Street and the south side of Bridge Street do not have a much better walking environment than those on the north side of Bridge Street. They are forced either to use the *unsignalized* crosswalk at the west side of the North Street viaduct with visibility issues or walk uphill to the signal at Washington Street and down either a long pedestrian ramp or a staircase down to the Station platform.

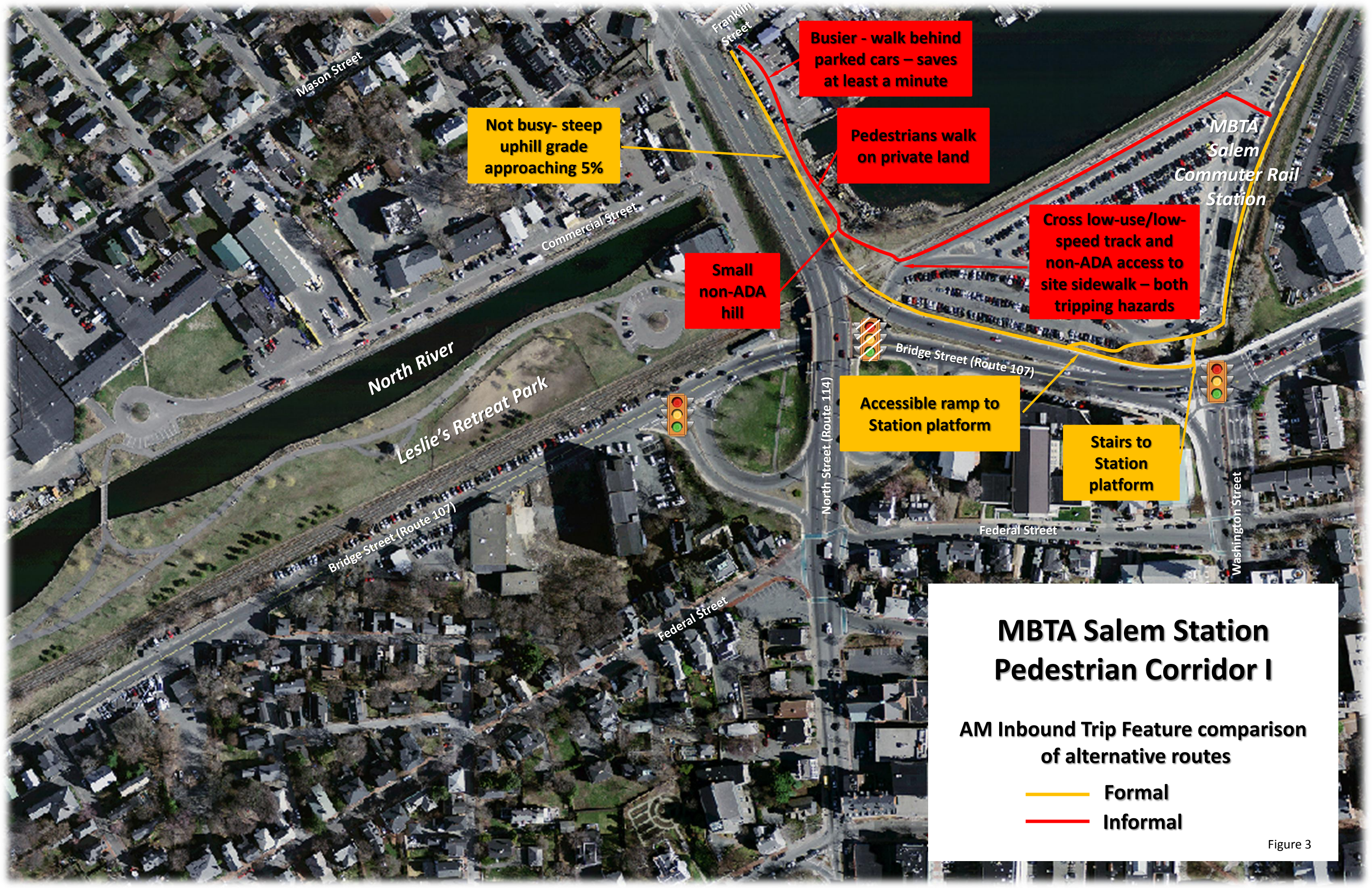
During a recent 3-hour morning peak period, a total of 54 pedestrians used the crosswalk vs. 4 who walked up the street to the signal. Most of these pedestrians came from the sidewalk on the diagonal between the North Street eastbound on/off-ramps.

In the near future, the Universal Steel commuter surface parking site will be finished and opened for 116 commuter parking spaces. Because this new surface parking lot is expected to reach its capacity, without enhancements to the walking environment, there are likely to be at least an *additional* 116 pedestrians a day who will be inclined to cross at this unsignalized crosswalk in the inbound direction, rather than walk uphill to the Washington Street traffic signal.



*Looking east on south side of Bridge Street to
Unsignalized crosswalk at North Street viaduct*

Figures 3-5 provide summary comparisons of alternate walking routes along the three pedestrian corridors to the MBTA Salem Station cited above.

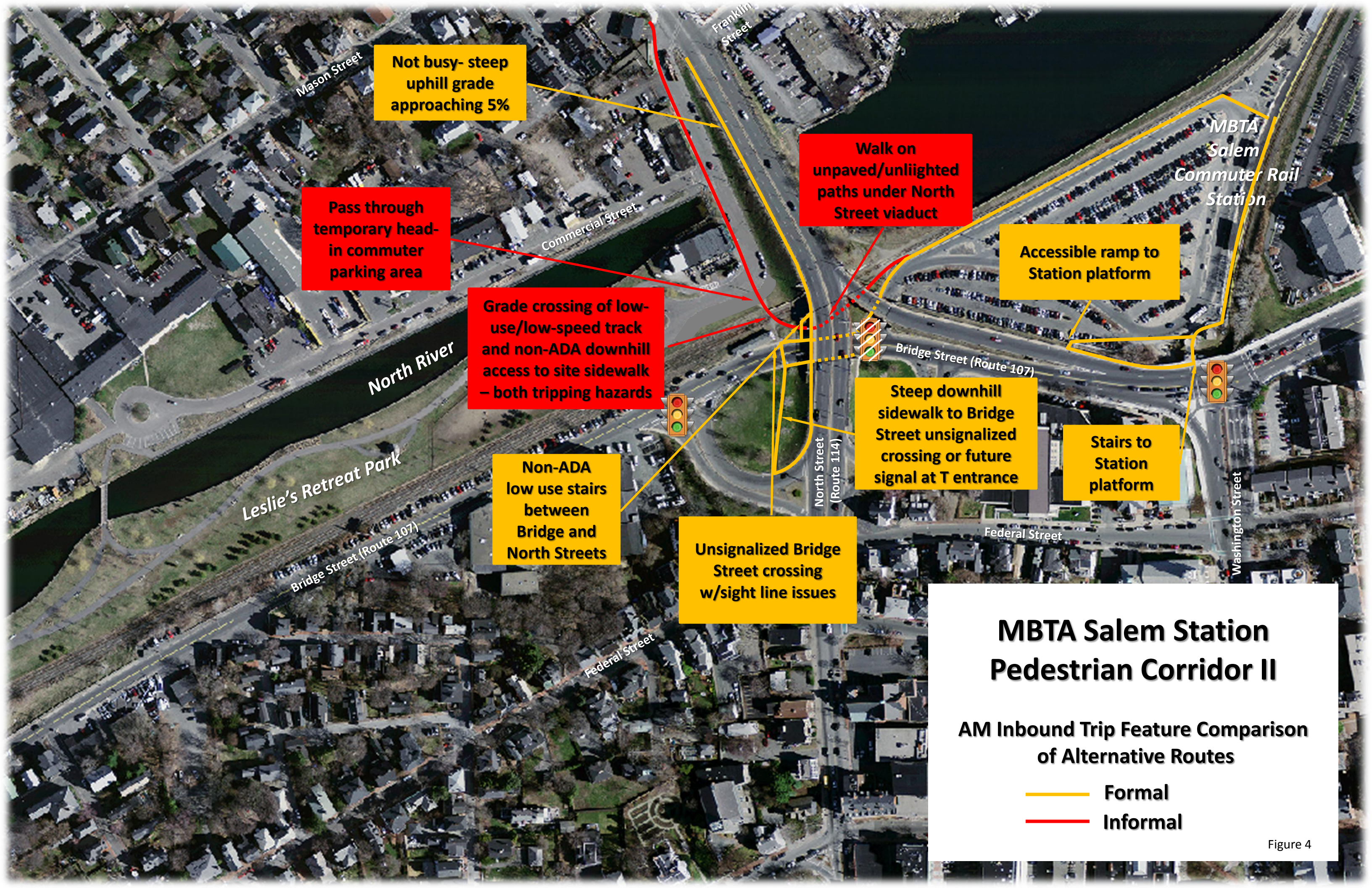


MBTA Salem Station Pedestrian Corridor I

AM Inbound Trip Feature comparison
of alternative routes

- Formal
- Informal

Figure 3



Not busy- steep uphill grade approaching 5%

Pass through temporary head-in commuter parking area

Grade crossing of low-use/low-speed track and non-ADA downhill access to site sidewalk – both tripping hazards

Walk on unpaved/unlighted paths under North Street viaduct

Accessible ramp to Station platform

Steep downhill sidewalk to Bridge Street unsignalized crossing or future signal at T entrance

Stairs to Station platform

Non-ADA low use stairs between Bridge and North Streets

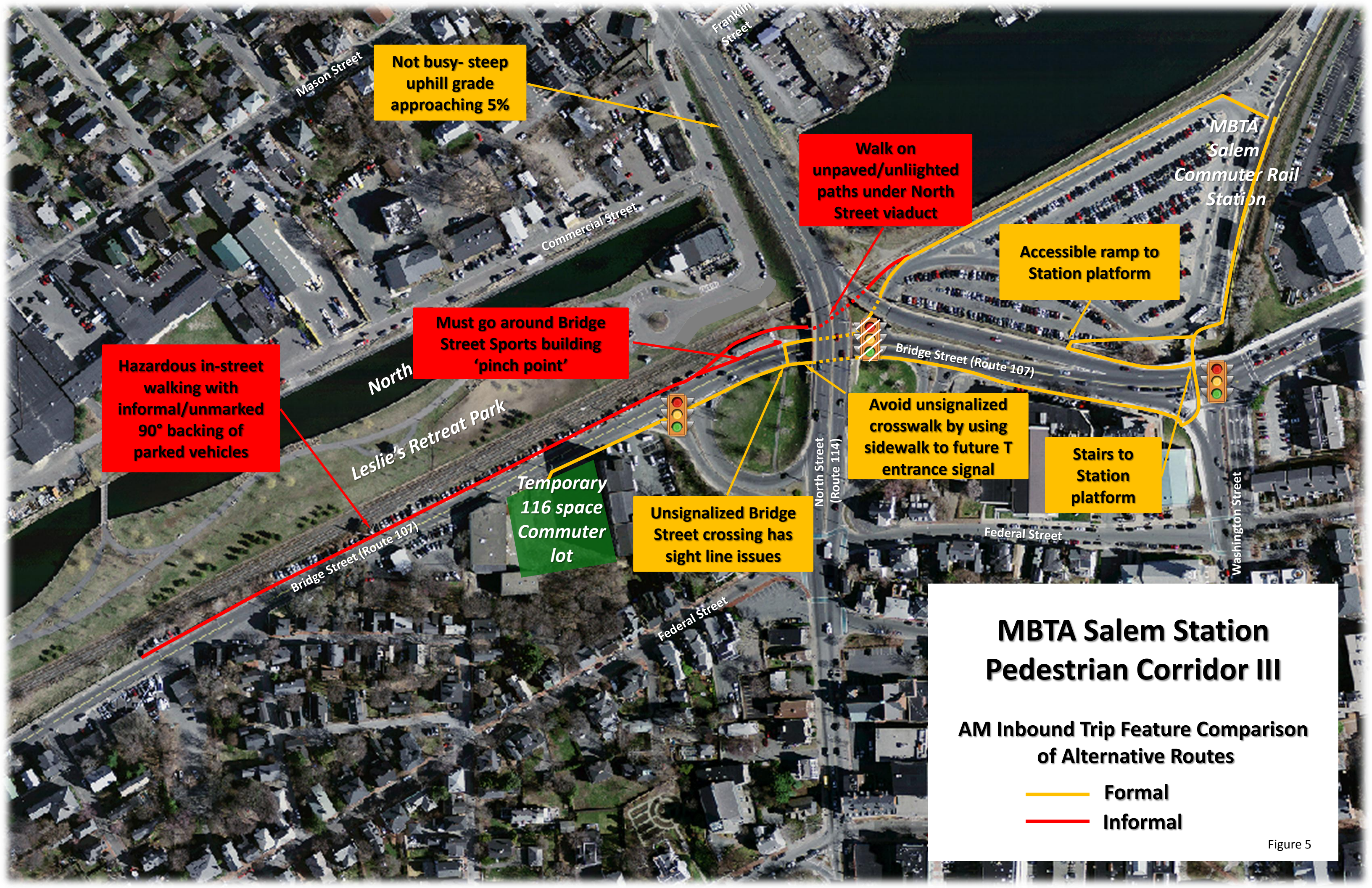
Unsignalized Bridge Street crossing w/sight line issues

MBTA Salem Station Pedestrian Corridor II

AM Inbound Trip Feature Comparison
of Alternative Routes

- Formal
- Informal

Figure 4



Not busy- steep uphill grade approaching 5%

Walk on unpaved/unlighted paths under North Street viaduct

Accessible ramp to Station platform

Hazardous in-street walking with informal/unmarked 90° backing of parked vehicles

Must go around Bridge Street Sports building 'pinch point'

Avoid unsignalized crosswalk by using sidewalk to future T entrance signal

Stairs to Station platform

Leslie's Retreat Park

Temporary 116 space Commuter lot

Unsignalized Bridge Street crossing has sight line issues

**MBTA Salem Station
Pedestrian Corridor III**

AM Inbound Trip Feature Comparison
of Alternative Routes

— Formal
— Informal

Figure 5

IV. Options

Pedestrian Corridor I - East side of North Street between Franklin Street and the MBTA Station

Based on observations, users of Pedestrian Corridor I primarily are residents of North Salem who live east of North Street. Some of the vehicles parked in the 22 head-in parking spaces within the City's North Street layout of the HMA lot may be commuters, though HMA has placed signs indicating the parking is for their customers only. Of the pedestrians who approach the Station from this direction, most are inclined to walk south from Franklin Street by passing through the HMA lot driveway using a combination of public and private land to access the Station. They choose to cross over the low-volume freight rail track rather than use the steeper, less-convenient North Street sidewalk during the morning peak hour. Pros and cons of two broad options for serving this corridor were identified including:

Option I-1 – Do Nothing

Continue to use the informal route as is and the North Street east sidewalk from Franklin Street to the MBTA Station entrance on Bridge Street.

Option I-1 Pros

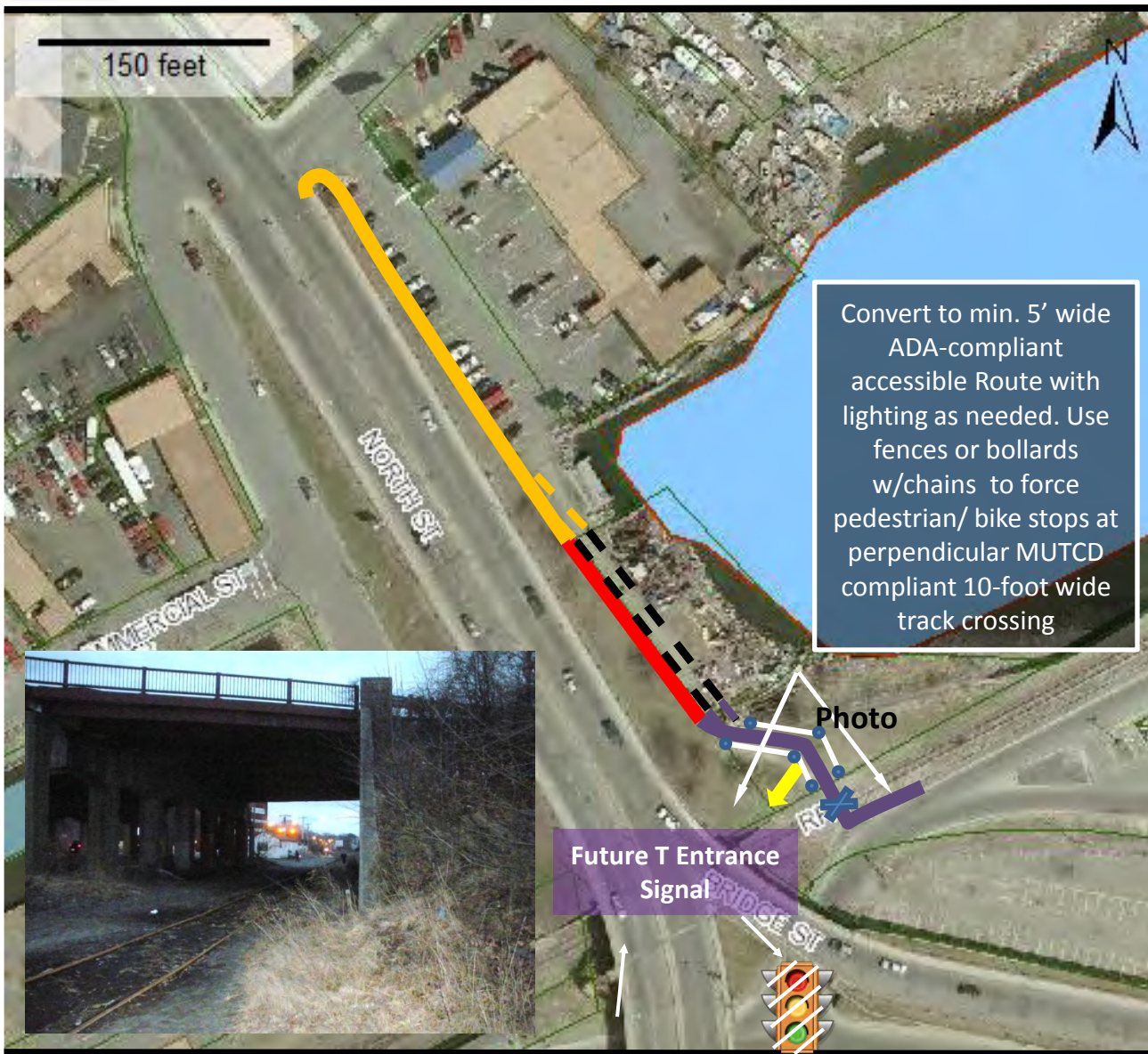
- No construction costs.
- Already available for use.

Option I-1 Cons

- Does not resolve existing ADA issues for the informal corridor or enhance the problematic pedestrian access to and from the Station for the vast majority of pedestrians who use this corridor.
- The sidewalk on the east side of North Street is not preferred for use by pedestrians, as far more pedestrians use the informal HMA lot access to the Station.
- Steep sidewalk grades approach the ADA maximum 5% running slope requirements on the North Street Bridge. Pedestrians find the HMA shortcut route to be more convenient, as its grades are generally not as severe and the existing sidewalk adds a minute of walking time to the Station platform from Franklin Street.

Option I-2 – Retrofit informal access via HMA lot under two sub-options with Option I-2A entirely on public rights of way or Option I-2B on combined public and private rights of way

Figure 6 provides an illustration of the components of Options I-2A and I-2B. Option 1-2 involves construction of a sidewalk or multiuse path connecting Franklin Street at North Street to the MBTA Station sidewalk, a total distance of under 600 linear feet. It would entail the following elements:



Base Map Source: Salem GIS

Legend

- New raised concrete sidewalk without retaining wall – City Layout
- New sidewalk with new lighting and retaining wall - City Layout – **Option 2A**
- New sidewalk with new lighting – private Layout w/ permanent easement - **Option 2B**
- New sidewalk with lighting – MBTA/Pan Am Railways layout
- New ADA rail crossing for pedestrians and bikes
- New fencing to control crossings outside train passage envelope

Figure 6
Option I-2

Option I-2 – Retrofit informal access via HMA lot under two sub-options with Option I-2A entirely on public rights of way or Option I-2B on combined public and private rights of way (Continued)

- Construct a new ADA compliant sidewalk/pathway 5'-10' wide through the HMA lot to the edge of the Burnham parcel.
- Construct a new ADA compliant 5' sidewalk within the North Street layout along the embankment adjacent to the Burnham parcel. This would require a costly retaining wall along the edge of the North Street Bridge embankment with Option I-2A. Option I-2B would conceivably involve a 5'-10' multiuse path, would not require a retaining wall and therefore would be less costly than Option I-2A, but it would require negotiating with the owner of the parcel for a permanent public use easement. Pedestrian scale lighting would be necessary.
- Adjust a short but steep hill to comply with ADA (refer back to page 5 for a photo of this obstruction) on the MBTA segment of the informal route. This segment would also require pedestrian-scale lighting.



*Sample ADA compliant track crossing
Source: MTA Long Island Railroad*

- Create an ADA compliant crossing at least 10 feet wide of MBTA track leased to Pan Am Railway. The new crossing could consist of bituminous concrete, or concrete (see right), but must allow continued freight car usage. Fencing, markings and signage would need to be employed to require both pedestrians and bicyclists to stop and look both directions before crossing. Pedestrian-scale lighting would also be needed. If, in the future, should the MBTA and Pan Am Railways discontinue this siding track for any reason, the crossing could be converted to a 'stop free' condition by removing the fencing and realigning the approaches and crossing with the track removal.



Option I-2 Pros

- Would enhance the observed preferred desire line route for existing pedestrians north of Franklin Street who travel to and from the Station.
- Would create a fully accessible travel route for

Looking southeast across low use MBTA-owned track

pedestrians with no motor vehicle conflicts and minimal freight rail conflicts.

- Would reduce motor vehicle traffic by encouraging more Salem pedestrians (or bike riders) who live in neighborhoods north of Bridge Street to consider walking or biking rather than driving to the Station or downtown Salem. This in turn would reduce parking demands while the Station parking garage is being constructed and after as well as benefit neighborhood pedestrian/bike access.
- Observations indicate that the affected rail siding has very low freight usage, which the City estimates as a couple of times per month. Formalizing the crossing would improve pedestrian safety related to existing tripping hazards.
- Work within the HMA lot can be done entirely on the public layout by converting the existing 90° parking to parallel parking along with a new 5 to 10-foot wide sidewalk adjacent to the existing embankment shown in a photo on page 3.
- A new sidewalk adjacent to the embankment would eliminate the backing hazard for pedestrians who currently walk behind parked cars when entering or leaving the informal pathway.
- Likely would be highly popular with the estimated 100+ pedestrians who use the informal route on typical weekdays and weekends.
- Besides providing a less-steep ADA compliant route, the HMA route reduces pedestrian travel times to and from the MBTA Station/Downtown Salem by slightly more than a minute and is more pedestrian friendly in that it does not involve a long continuous uphill climb and is further away from vehicular traffic than the North Street east sidewalk.
- Assumed implemented in accordance with current nationally-accepted pedestrian grade crossing standards, pedestrian/bike crossing alterations would have no adverse impact on the ability of Pan Am Railways to use the track in question as it is currently being used. There are no plans to upgrade this track in the foreseeable future.
- Operations on the track are low walking speed and are monitored by flaggers when they occur, as the quality of the track, as seen from recent photos, is poor. While observations indicate that Pan Am Railways occasionally uses this spur track, its usage seems to be primarily west of North Street to store old freight rail cars. Observed occasional freight car storage seems to take place out of the potential pedestrian crossing location discussed above. Put simply, a minimum number of freight users would be directly affected by making this existing crossing ADA-compliant. As evidenced by the worn pathway, an extensive amount of pedestrian/bike crossings have been happening for many years. It would seem that if either the MBTA or Pan Am Railways perceived a safety issue between pedestrians and rail cars, long ago they have taken steps to discontinue them. Pedestrian and bike crossings, estimated at more than 42,000 annually have been in existence many years with safety impacts limited to tripping hazards associated with the non-ADA compliant track crossing and site sidewalk access. We are unaware of any incidents involving conflicts between pedestrians and slow-moving freight rail cars.

Option I-2 Cons

- Implementation difficulty -- requires permission of *both* the MBTA and the Pan Am Railways to implement, as well as Conservation Commission approval with a Notice of Intent to construct in a 100-year floodplain. The track involved is not used by the MBTA for revenue service or maintenance, but is leased to Pan Am Railways for intermittent low speed, low-frequency freight car movements. City staff indicates this occurs a couple of times per month.
- There are no guarantees that the City will be able to obtain agreements from the MBTA and Pan Am Railways and the Conservation Commission in time to construct necessary elements within the MBTA right of way during the next few months.
- Environmental quality of the route that goes through the salvage area may need to be addressed as part of the Conservation Commission process.
- This route would have to be monitored, as it is subject to intermittent North River flooding.
- A new ADA-compliant track crossing would need to be designed and implemented such that it will not degrade the ability of the track to accommodate freight use and be acceptable to the MBTA and Pan Am Railways. The new crossing would need to be designed to deter motor vehicle crossings and require bike stops and must incorporate static track crossing warnings approaching in both directions with jogs to require cyclists to come to a full stop before crossing it in either direction.
- If other funding sources cannot be obtained, the City may need to fund installation of the pedestrian at-grade rail crossing and necessary sidewalk, lighting, and ADA elements needed to formalize the access route.
- Implementation involves the reduction of the public parking supply used, but not owned, by the HMA site. The 22-space parking supply in the City-owned portion of the HMA lot would decline by approximately 11 spaces.
- It is estimated that long term construction costs of this route could entail approximately \$100,000-\$250,000 depending on whether a retaining wall is required to keep the route on City property, whether bituminous concrete or concrete is used for the sidewalks, whether the route is a normal sidewalk or a wider multiuse path, the extent of necessary supplemental lighting, the extent of pedestrian/bike rail crossing construction issues, as well as potential environmental clean-up issues.

Option I-2A keeps construction on the City layout, while Option I-2B involves locating some of the construction on the privately-owned Burnham parcel assuming the owner will permit the City to obtain an easement for the existing pathway.

Option I-2A involves creating a minimum sidewalk width of approximately 5 feet, while Option I-2B could conceivably be up to a 10-foot wide multi-use path. Costs could be

lowered if the existing bituminous concrete parking area is restriped without constructing a new sidewalk, but this would not be recommended as a permanent solution.

Pedestrian Corridor II - West side of North Street between Commercial Street and the MBTA Station

Users of Pedestrian Corridor II likely include residents of North Salem who live northwest of North Street plus commuters who park in public commuter parking spaces in the vicinity of the Commercial Street 'elbow'. The City recently increased the number of parking spaces in this area by creating approximately 25 additional temporary 90° spaces north of the tracks. Based on observations and recent alterations to the parking area, up to ±50 commuters per day use this parking area. Virtually all of the motorists who park in this area to access the Station or downtown Salem cross the same freight rail siding cited under Option I-2, but approximately 300 feet to the west. Pedestrians who use this access experience similar possible tripping hazards. In this case, to avoid crossing the MBTA freight rail line, motorists who park at the Leslie's Retreat cul-de-sac off Commercial Street would need to back track along a steep upgrade to the sidewalk on the west side of Commercial Street, cross Commercial Street to the west side of North Street. From there, they would either have to walk down a steep staircase to Bridge Street or travel south to the signalized crossing at Federal Street. Not only are these routing options less convenient, but they involve hazardous potential conflicts with motor vehicles on Commercial, North and Bridge Streets. So, the vast majority of pedestrians are choosing to risk tripping hazards by crossing a low volume siding track over the longer street sidewalk options. Pros and cons of two broad options for serving this corridor were identified including:

Option II-1 – Do Nothing

Continue to use the informal track crossing route as is and the North Street west sidewalk between Commercial Street and either the staircase to Bridge Street or cross at Federal Street to the MBTA Station entrance on Bridge Street.

Option II-1 Pros

- No construction costs.
- Already available for use.

Option II-1 Cons

- Does not resolve existing rail crossing ADA and bike access issues or enhance the problematic pedestrian access to and from the Station for the vast majority of pedestrians who use this corridor.
- The sidewalk on the west side of North Street is not preferred for use by pedestrians, as far more pedestrians use the informal Commercial Street access near Leslie's Retreat to the Station.
- Steep sidewalk grades approach the ADA maximum 5% running slope requirements on the North Street Bridge. Pedestrians find the Commercial Street shortcut route to be more convenient than the North Street sidewalk alternative, as its grades are generally not as severe, and the existing sidewalk adds 4-6 minutes of walking time or from the Station platform.

Option II-2 – Retrofit the informal access via a new freight track spur rail crossing

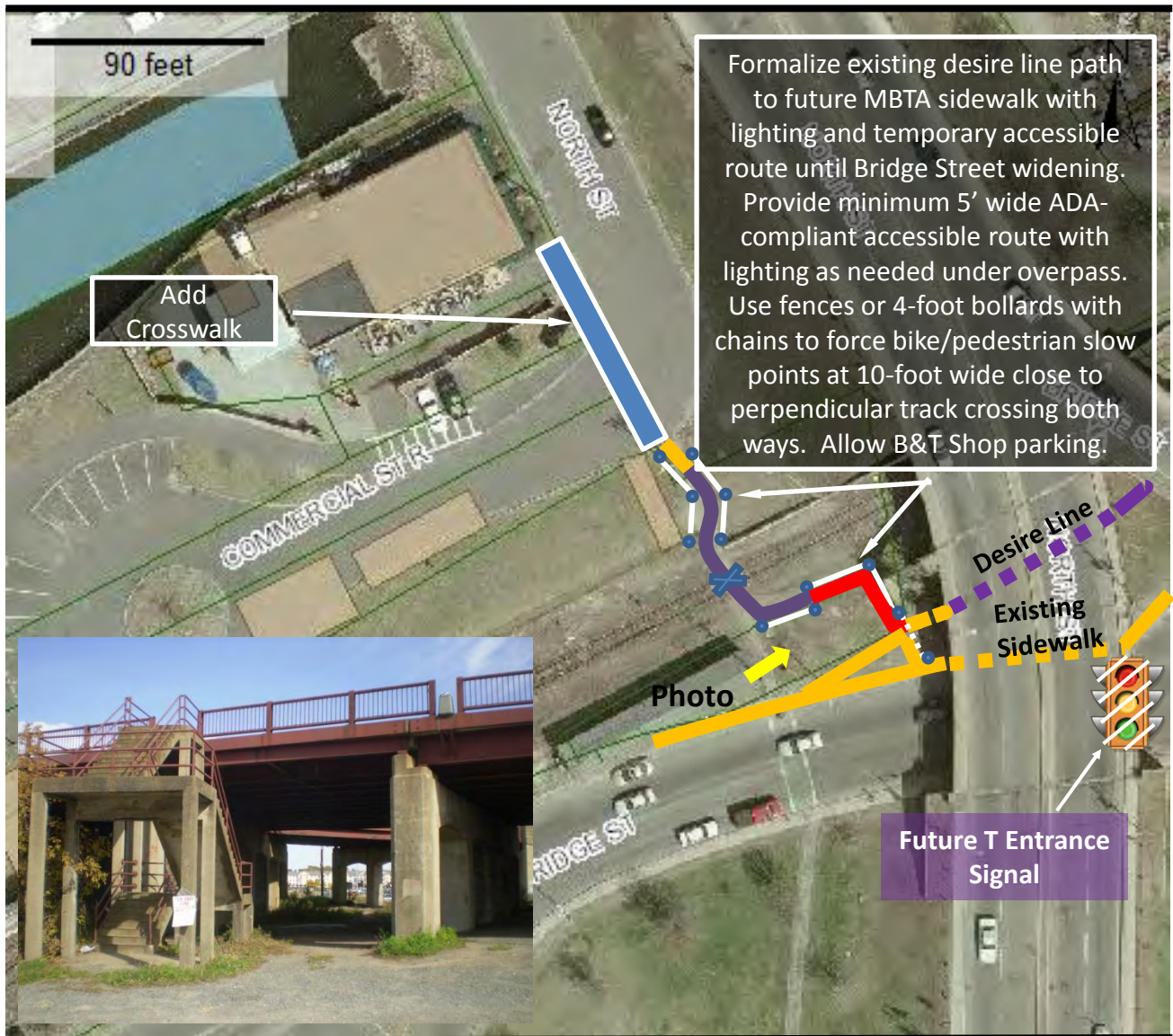
Figure 7 provides an illustration of the components of Option II-2, a relatively short sidewalk connection approximately 340 feet in length between Commercial and Bridge Streets to the MBTA Station sidewalk. Option II-2 involves the following elements:

- Provide an ADA-compliant sidewalk minimum of 5 feet in width between the parking elbow of Commercial Street and the MBTA rail right of way. Create an ADA compliant crossing of the MBTA track leased to Pan Am Railway at least 10 feet wide. The new crossing could consist of concrete (see page or rubberized, but must allow continued freight car usage on the track.
- Fencing would need to be employed on approaches from both directions to require both pedestrians and bicyclists to stop and look both directions before crossing from either direction. Pedestrian scale lighting would also be needed.
- Connect to a new sidewalk on the north side of Bridge Street between the new crossing and the existing Salem Station sidewalk under the North Street viaduct. This requires creation of a new temporary sidewalk with lighting under the viaduct. This would conceivably be shared by bicycles and pedestrians, so its width would preferably be 10 feet.

If, in the future, should the MBTA and Pan Am Railways discontinue this siding track for freight use, the crossing could be converted to a 'stop free' condition by removing the fencing and realigning the approaches and crossing with track removal, but retaining its usage by pedestrians and bicyclists only..

Option II-2 Pros

- Would enhance the preferred desire line route for existing pedestrians who travel to and from the Station on the west side of Commercial Street.
- As measured in the field, the Commercial Street connecting sidewalk enhancements to the Station is and would likely continue to be used by 50 times as many pedestrians than use the alternative steep sidewalk on the west side of North Street.
- Would create a fully accessible travel route for pedestrians with no motor vehicle conflicts and minimal low speed freight rail conflicts. Formalizing the crossing would *improve pedestrian/bike safety* over the alternative street crossings of Bridge and North Streets against higher speed, higher volume vehicle traffic.
- Would encourage more Salem pedestrians who live in neighborhoods northwest of Bridge Street to consider walking or biking rather than driving to the Station.
- Observations indicate that the affected rail siding has very low freight usage with very few conflicts; none at high speeds.
- Most of the sidewalk work can be done on public layouts. Required private layout work at the Bridge Street Sports site does not directly affect the building which is already being taken as part of the Bridge Street widening project.



Base Map Source: Salem GIS

Legend

- New raised concrete sidewalk – City Layout
- New sidewalk with lighting – MBTA/Pan Am Railways layout
- New sidewalk with lighting under viaduct – MBTA/Pan Am Railways layout
- New sidewalk with lighting – requires easement through private layout
- New ADA rail crossing for pedestrians and bikes
- New fencing to control crossings outside train passage envelope

Figure 7
Option II-2

Option II-2 Pros (Continued)

- Likely would be highly popular with the estimated 100+ pedestrians who use the informal route on typical weekdays. Enhancements to the Commercial Street walking route are consistent with the North River Canal Corridor studies and would likely attract even higher numbers of pedestrians from North Salem neighborhoods west of North Street. This in turn would reduce parking demands while the Station parking garage is being constructed as well as benefit neighborhood pedestrian/bike access to downtown and Salem Station.
- Use of Leslie's Retreat Park by pedestrians and bicyclists would increase with its improved connectivity to Salem Station.
- Besides providing a less-steep ADA compliant route, the new Commercial Street formal pedestrian route reduces pedestrian travel times to and from the MBTA Station/Downtown Salem by approximately 4-6 minutes compared to the existing alternative walking routes.
- If implemented in accordance with current nationally-accepted pedestrian grade crossing standards, pedestrian/bike crossing alterations would have minimal impact on the ability of Pan Am Railways to use the track in question. Rail crossing/pedestrian conflicts would remain minimal. As evidenced by the worn pathway between Commercial Street and the freight rail crossing location, pedestrian/bike crossings have been in existence for many years. It would seem that if either the MBTA or Pan Am Railways perceived a significant safety issue between pedestrians and rail cars at this crossing, long ago they have taken steps to discontinue them. Measured pedestrian and bike crossings have been in existence for many years with safety impacts limited to tripping hazards associated with the non-ADA compliant track crossing and site sidewalk access. We are not aware of incidents from direct pedestrian/rail conflicts at this crossing.

Option II-2 Cons

- Requires permission of *both* the MBTA and the Pan Am Railways to implement. The track involved is not used by the MBTA for revenue service or maintenance, but is leased to Pan Am Railways for intermittent low speed, low frequency freight use.
- A new ADA-compliant track crossing would need to be designed and implemented such that it will not degrade the ability of the track to accommodate freight use and would need to be designed to be acceptable to the MBTA and Pan Am Railways. A new crossing would require both pedestrians and bicyclists to stop and look both ways before crossing and would need to deter motor vehicle crossings.
- This route would have to be monitored, as it is subject to intermittent North River flooding.
- There are no guarantees that the City will be able to obtain agreements from both the MBTA and Pan Am Railways and the Boston Sporting Goods building in time to construct necessary elements in the vicinity of the single track spur.

- After checking the availability of State funding sources, the City may need to fund the installation of the pedestrian at-grade rail crossing and necessary sidewalk, lighting, and ADA elements needed to formalize the access route.
- It is estimated that the construction costs of this route could entail approximately \$75,000-\$120,000 depending on whether the route is simply a 5-foot sidewalk or a 10-foot multiuse pathway, the extent of necessary lighting, and the extent of pedestrian/bike rail crossing construction issues and whether the desire line pathway is enhanced.
- Maintenance responsibility of the new formalized route needs to be identified.

Pedestrian Corridor III - Bridge Street between Flint Street and the MBTA Station

Existing users of Pedestrian Corridor III likely include commuters and residents who park on the north side of Bridge Street between Flint and the North Street ramps and Salem residents who live close to the south side of Bridge Street. At this time, based on counts, there are approximately 75-85 head-in parking spaces on the north side of Bridge Street that are used during weekdays by commuters. Additionally, when the temporary Universal Steel site commuter lot opens for use on the south side of Bridge Street, approximately 116 spaces are expected to be occupied during typical weekdays. This will increase pedestrian walking demands on the south side of Bridge Street to the Station by at least 116 persons per weekday. While there is an existing unsignalized crosswalk just east of the North Street ramps, it is expected that most of these new pedestrians will remain on the south side of Bridge Street to access the Station at the new T Entrance signal just east of the North Street (Route 114) viaduct.

Pros and cons of two broad options for serving this corridor were identified including:

Option III-1 – Do Nothing

Continue to use the informal track crossing route as is and the North Street west sidewalk between Commercial Street and either the staircase to Bridge Street or cross at Federal Street to the MBTA Station entrance on Bridge Street.

Option III-1 Pros

- No construction costs.
- Already available for use.

Option III-1 Cons

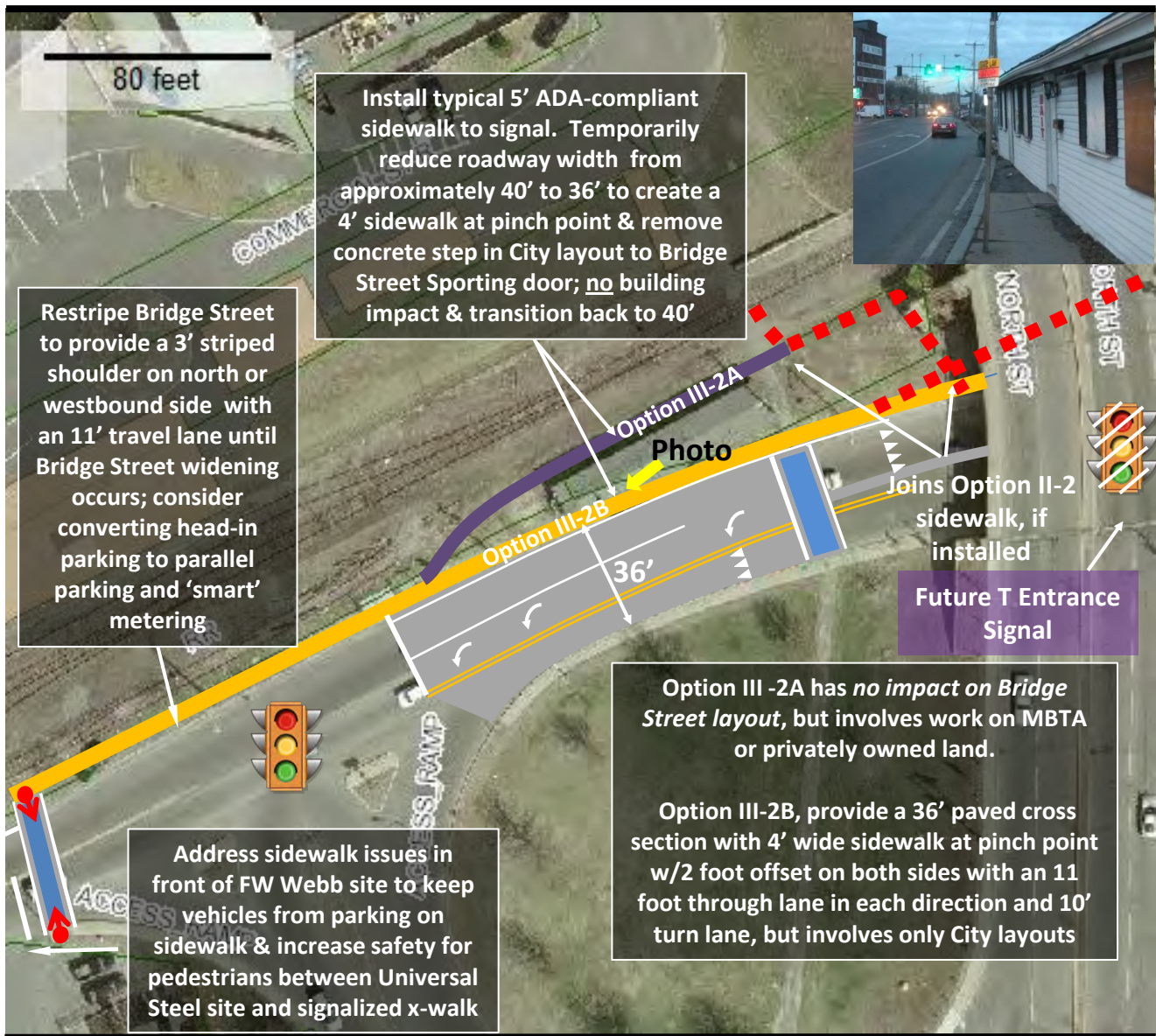
- In the absence of an ADA compliant sidewalk on the north side of Bridge Street, pedestrian access to and from the Station is severely impaired for the vast majority of existing pedestrians who use the north side of Bridge Street to access corridor.
- Approximately a third of pedestrians traversing the north side of Bridge Street are walking on the edge of the Bridge Street pavement without any kind of separation from motor vehicle traffic.

- Head-in parking on Bridge Street creates backing hazards and parking on the rails creates tripping hazards.
- Sight lines of the unsignalized Bridge Street crosswalk are impaired by the North Street viaduct structure and the curvature of Bridge Street.
- The signal of Bridge Street at the North Street ramps does not allow pedestrians on the south side of Bridge Street to cross to the north side as there is no pedestrian crossing phase nor is there an ADA-compliant landing on the north side of Bridge Street. This is due to the absence of a sidewalk Bridge Street approaching the Bridge Street Sports building from the west.

Option III-2 – Provide a new connecting sidewalk between the North Street ramps at Bridge Street signal and the Station; modify signal to accommodate a new pedestrian crossing. Sub-option III-2A would locate the sidewalk behind the Bridge Street Sports shop, while Sub-option III-2B locate it in front of the Bridge Street Sports shop

Refer to Figure 8 for an illustration of the components of Option III-2 that involves the following elements:

- Provide an ADA-compliant sidewalk on the north side of Bridge Street between the traffic signal at the Bridge Street ramps at North Street and the North Street viaduct either behind the Bridge Street Sports building (Option III-2A) or on the Bridge Street side (Option III-2B). It is estimated that the new sidewalk will entail approximately 300 linear feet of new sidewalk plus two new ADA compliant ramps on the west side of the Bridge Street /North Street ramps traffic signal.
- Stripe a 3- foot shoulder on the north side of Bridge Street to improve the definition of the pedestrian walking space in the absence of a new sidewalk.
- If funds permit and authorization obtained, prepare and pave the area between the edge of pavement and where existing approximately 80 vehicles park head in on the north side of Bridge Street. This would entail re-grading and creating a temporary paved parking area approximately 15,000 square feet in area primarily on the MBTA right of way that is leased for use by Pan Am Railways for freight use. It is important to note that new sidewalks are proposed on both sides of Bridge Street when the programmed Bridge Street widening between Flint and Washington Streets. This change is programmed to be implemented during the next 5-10 years and will eliminate all rail sidings but the northernmost. A 25% design of MassDOT Project #5399 was approved on October 14, 2005, with implementation scheduled before 2020.
- Upgrade the traffic signal at the intersection of Bridge Street with the North Street ramps to accommodate a new Bridge Street crosswalk at the signal. At this time it is envisioned that the crossing would be on the west side of the intersection where Bridge Street is narrowest, to provide the shortest crossing and would include count-down pedestrian signals joining.



Base Map Source: Salem GIS

Legend

- New raised concrete sidewalk – City Layout
- Or new sidewalk with lighting – MBTA/Pan Am Railways layout behind Bridge St. Sports
- May tie into potential sidewalk with Option II-2
- ➔ New countdown pedestrian signals at existing traffic signal

Figure 8
Option III-2

Option III-2 – Provide a new connecting sidewalk between the North Street ramps at Bridge Street signal and the Station; modify signal to accommodate a new pedestrian crossing. Sub-option III-2A would locate a new sidewalk behind the Bridge Street Sports shop, while Sub-option III-2B locates it in front of the Bridge Street Sports shop (Continued).

- Provide a new supplemental sidewalk with lighting on the north side of Bridge Street between the new crosswalk and the existing Salem Station sidewalk under the North Street viaduct plus a new high visibility one in line with observed greatest pedestrian desire lines. Even before widening Bridge Street, which will likely eliminate the on-street parking altogether, consider converting head-in parking to parallel parking when the MBTA Garage is completed. Half of the paving/stripping created for temporary head in parking use can then be converted to a sidewalk. Parallel parking arrangements provide an opportunity to create a better/safer environment for motorists and their passengers walking between vehicles and the Station.
- Enhance the existing sidewalk using high visibility crosswalk markings between the Universal Steel site and proposed pedestrian crossing. Require FW Webb traffic to stop for increased pedestrian crossings and eliminate sidewalk parking altogether. This requires a City action in cooperation with FW Webb.
- While we recognize the need to maximize the parking supply, the addition of the Universal Steel parking area creates an opportunity to replace the head-in parking on the north side of Bridge Street with parallel parking, thereby providing some space to create a better pedestrian walking environment, such as a 'hard' shoulder with a width of 10+ feet off the edge of the existing roadway may be possible. The installation of long term parking pay and display meters could be considered to help defer the costs of for temporary parking shoulder safety enhancements. It may be difficult to cover parking spaces with an impervious surface, so temporary pervious options should be considered.

Option III-2 Pros

- Would enhance the preferred desire line route for existing pedestrians who are or will be traveling to and from the Station on the north and south sides of Bridge Street.
- Likely would be highly popular with the estimated 80+ pedestrians who use the informal route to go back on forth to their vehicles on typical weekdays.
- Benefits neighborhood pedestrian/bike access to downtown and Salem Station while the Station parking garage is being constructed and for the period between when the garage is completed and the Bridge Street widening takes place sometime within the next several years.
- Use of Leslie's Retreat Park by neighborhood pedestrians and bicyclists would increase with its improved connectivity to Salem Station.
- Given its difficult sight line to the east, eliminating the existing sight line restricted unsignalized crosswalk on Bridge Street near the North Street viaduct would be possible. This is because it would be replaced by two

signal controlled crosswalks on Bridge Street; one at the new T Station driveway signal and a second at the existing ramps signal. The two new crosswalks should reduce the potential for hazardous vehicle/pedestrian conflicts, even if the unsignalized crosswalk is retained. If it is to be retained, its visibility should be enhanced through better lighting and high visibility markings and perhaps a flush 4-foot median.

- Would not adversely affect the future project to widen Bridge Street.
- Assuming the Universal Steel parking area will eventually become a development parcel, moving the pedestrian crossing to the signal will be beneficial in the long term to residents who live south of Bridge Street and walk to the Salem Commuter Rail Station. In the event the FW Webb building is converted to a future residential use, this would benefit pedestrians generated by it.
- Conversion of the head-in Bridge Street parking to parallel parking would enhance vehicle and pedestrian safety. It is estimated that the existing 75-80 head in spaces would be replaced by approximately 40 parallel spaces that could be managed by multiple space smart meters or smart meters.

Option III-2 Cons

- Sidewalk modifications close to the Bridge Street Sports building require Conservation Commission approval and, if constructed on MBTA property, the MBTA and Pan Am Railways approval.
- After checking the availability of State funding sources, the City may need to fund installation of necessary sidewalk, lighting, and necessary ADA elements to formalize the sidewalk extension on the north side of Bridge Street.
- Investments will be temporary, as the shoulder striping or possible parallel parking on the north side of Bridge Street will no longer be needed when the MassDOT Bridge Street widening project is undertaken and the MBTA Salem Station garage is completed.
- Construction costs of the temporary sidewalks, lighting and signal enhancements could entail approximately \$70,000 with Option III-2A and \$85,000 with Option III-2B, depending on whether the sidewalk behind the Bridge Street Sports building is simply a 5-foot sidewalk or a 10-foot multiuse pathway leading to the MBTA on-site sidewalk, and the extent and type of pedestrian scale lighting under the viaduct. This does not include any potential land acquisition costs related to use of the Bridge Street Sports building parcel.
- Construction costs for formalizing the parking on the north side of Bridge Street could be in the range of \$120,000-\$140,000. We assume the City would use parking fees to recoup these costs over time, assuming the land used can be leased from the MBTA for parking purposes, as it is used today. Once the T Garage is open for use, converting the Bridge Street head-in parking to parallel parking with a formal sidewalk will result in the loss of at least 40 of the 80 existing spaces, but the advantage of safer pedestrian and motor vehicle operations would be realized.

- The City would need to eliminate parking on the sidewalk in front of the FW Webb building between the Universal Steel site and the signal at Bridge Street and the North Street ramps that is being proposed.
- Like the sidewalk modifications, alterations would require Conservation Commission permitting, as the construction would be occurring within the 100-year floodplain.

V. Preliminary Recommendations

The Salem North/Bridge Streets study focuses on three pedestrian corridors between Salem Station and North Salem neighborhoods.

During FST's recent observations, the three pedestrian/bike access corridors studied accounted for ***nearly half of all pedestrian and bicycle trips to the Station between 6-9 AM.*** The other half occurred via the Washington Street at Bridge Street entrance connecting to downtown Salem.

Access from Pedestrian Corridors I and II, both major informal pedestrian entrances to the Station, require crossings of a rarely used rail siding track that is not involved in MBTA revenue service, but is leased to Pan Am Railways for freight use. These alone accounted for ***approximately 1/3 of walking trips to and from the Station between 6-9 AM on a typical weekday. Between the two informal track crossings, we estimate that nearly 100,000 annual pedestrian crossings occur, 50,000 in each direction. If one assumes 1 rail movement per week, which the City indicates is a high side estimate of rail movements on this freight siding, nearly 1,000 times as many pedestrians cross this track than train movements annually.***

Given that the City's Universal Steel site parking lot containing 116 commuter parking spaces will soon open, it is anticipated that ***more than half of all walk/bike trips to and from the Station will occur via the three cited pedestrian corridors shown previously on Figure 2.***

It is important that outstanding walkability/bicycling issues pertaining to the three studied corridors be addressed as soon as possible. Overall costs for making enhancements along the three corridors could range from \$255,000-\$465,000 without optional temporary Bridge Street parking enhancements. Temporary Bridge Street parking enhancements could range from \$60,000 for recommended parallel parking or up to \$140,000 for head-in parking to formalize the existing head-in parking. Potential parking control revenues may be used to offset some of the costs, assuming the City is able to implement them.

Pedestrian Corridor I - East side of North Street between Franklin Street and the MBTA Station

A fully ADA-compliant pedestrian and bicycle connection should be provided between Franklin Street and the existing MBTA site sidewalk to accommodate observed walking/biking patterns.

Pedestrian Corridor I is less than 600 feet in length between Franklin Street and the MBTA site sidewalk. During the 3-hour AM peak period, 81 pedestrians and 3 cyclists

were counted as using this crossing. During mid-day periods, observations indicate that crossings are made with regularity along this informal route.



*Potential Railroad Crossing Location
Pedestrian Corridor I*

Given the complexities of multiple jurisdictions and required permits, implementation of improvements to this corridor may need to be phased in, but it is recommended that they be completed as soon as possible given the urgent need to access the station as the garage is being constructed. Demands will not disappear after the garage is complete. Having this pedestrian/bike access corridor formalized for use will serve as a long term reduction in vehicle traffic to both the MBTA Station and downtown Salem and will improve the safety of

pedestrians who use it.

On its own, the City could create a new sidewalk that connects Franklin Street and the northern end of the privately-owned Burnham parcel. This segment is within the North Street City layout.

However, the value of improvements within the City layout are limited without first addressing ADA deficiencies along the route to and from the Station, obtaining MBTA/Pan Am Railways cooperation on the work, and that of the Burnham parcel owner to reduce the City's construction costs. Construction work within the Burnham parcel would be less costly than work within the City layout, but only if the land easements or acquisition costs are lower in aggregate than the wall that would be needed if work is done in the City's layout. A stable, ADA-compliant pervious trail would be appropriate as this is located in an area that floods regularly. Monitoring of the trail would be needed to address flooding.

Addressing the ADA deficiencies would entail:

- Re-grading a short, but steep hill connection where the private parcel meets an MBTA parcel. This will likely require some clean fill, as the steep hill pertains to a sewer line easement, so it would likely be more difficult to excavate than add fill.
- Creating a new ADA compliant crossing of the single freight use track and connecting it to the new MBTA sidewalk in an ADA compliant manner, thereby creating a formal pathway between the sidewalk at the intersection of Franklin and North Streets and the MBTA site.

The remainder of the pathway through the HMA site lot is either already or very close to being ADA-compliant between Franklin Street and the cited hill.

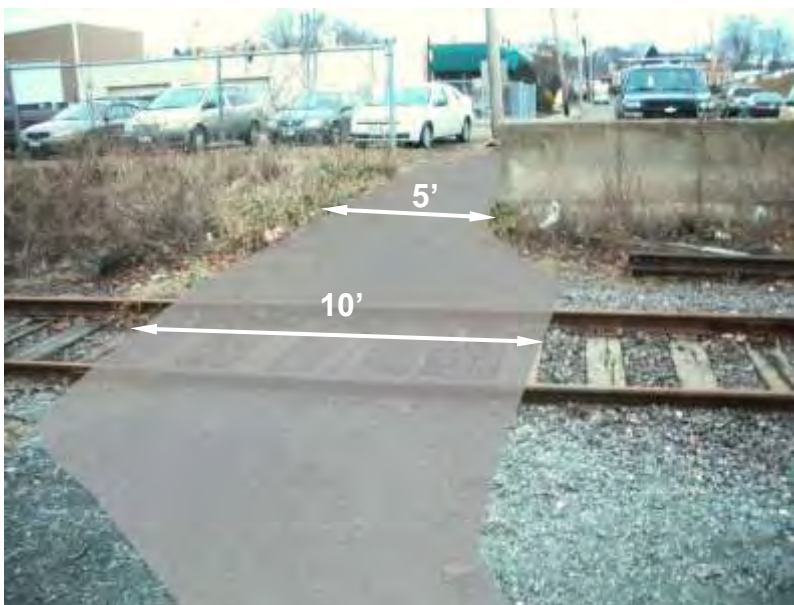
South of the hill, the pathway should be modified to create an ADA-compliant pedestrian/bike track crossing grading back up to the existing (and future) sidewalk on the MBTA site at no more than a 5% running grade to an ADA-compliant leveling area. Because these improvements require authorization by the MBTA and Pan Am Railways, it is important to determine early on whether there is any potential for cooperation to satisfy the observed pedestrian and bike access demands. The pedestrian crossings have been occurring for many years and their improvements are critical to ensuring the MBTA has good pedestrian and bike access from Salem's neighborhoods north of Bridge Street.

As envisioned, the sidewalk on the west side of the HMA lot at least 5 feet in width, preferably 10 feet in width to accommodate a multiuse path. Prior to the rail crossing, the design would need to require bikes and pedestrians to stop in both directions. Perhaps the use of bollards and chains could be considered. The rail crossing should be at 90°. Sidewalk materials could either be bituminous concrete or concrete, as available funds and City and MBTA policies on sidewalk materials will dictate the design. No vertical encroachments in the 'dynamic envelope' of rail crossings are assumed.

The rail crossing will likely need to be either be bituminous concrete, concrete, or rubberized (from lowest to highest cost) and must be MUTCD-compliant as well as ADA-compliant and consistent with MBTA design guidelines. Provide lighting as necessary to keep the pedestrian and bike environment well lit. Along this corridor, the HMA lot already has lighting; there might be a need for approximately 5-6 additional lights to serve under-lighted segments of Pedestrian Corridor I.

Construction costs of Pedestrian Corridor I enhancements could entail approximately \$100,000-\$250,000, depending on the strategy used.

Pedestrian Corridor II – West side of North Street between Commercial Street and the MBTA Station



This busy informal crossing should be addressed as soon as possible by implementing Option II-2. The walking connection between Commercial Street crossing the railroad track to and from the MBTA Station is estimated to involve approximately 55,000 annual pedestrian crossings traversing approximately 150 linear feet to meet the existing Bridge Street

*Potential Railroad Crossing Location
Pedestrian Corridor II*

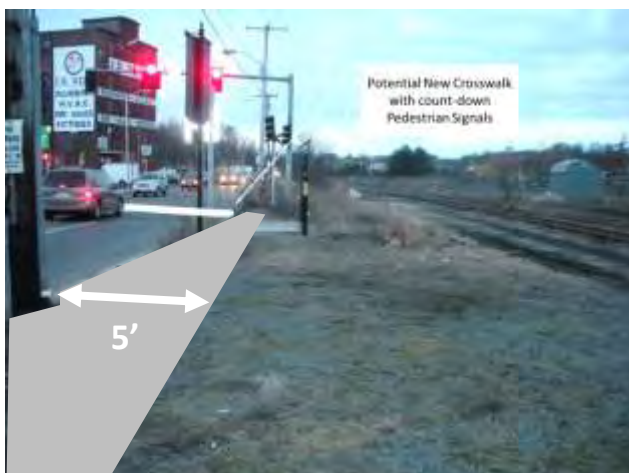
sidewalk system excluding connections to the existing sidewalk system or enhancements under the North Street viaduct. When Bridge Street is widened, this crossing will likely remain, but its freight utilization is very likely to remain very low.

Prior to the rail crossing, the sidewalk or multiuse path design would need to require bikes to stop in both directions via use of a horizontal 'S' shift approaching both directions. Fencing or bollards and chains might be involved, as indicated on Figure E-6. Grades approaching the track may need to be adjusted to create an ADA compliant environment with excavation. The proposed crossing should cross the track perpendicularly, to the maximum extent possible. Sidewalk materials could either be bituminous concrete or concrete, as available funds and City policy on sidewalk materials dictate. Similar to Pedestrian Corridor I, the rail crossing will likely need to be either bituminous concrete or concrete, depending on the MBTA/Pan Am Railways. Provide lighting as necessary to keep the pedestrian and bike environment well lit may entail installation of 4-5 pedestrian-scale lights. As with Pedestrian Corridor I, all work in the vicinity of the Pedestrian Corridor II rail crossing must acceptably incorporate the dynamic envelope of a typical freight train.

Costs of Pedestrian Corridor II enhancements could entail approximately \$70,000 - \$120,000 depending on the strategy used to create the new crossing and lighting under the viaduct.

Pedestrian Corridor III – Bridge Street (Route 107) between Flint Street and the T Station Entrance

While not as busy as Pedestrian Corridors I and II, Pedestrian Corridor III pedestrian demands will be increasing once the Universal Steel surface parking lot opens. Under existing conditions, pedestrians traveling to and from the parking lot need to cross Bridge Street at a sight line restricted unsignalized crosswalk. The MBTA plans to create a new crosswalk at the entrance to the T at Bridge Street that will be fully signalized. This should eliminate the need for the existing unsignalized crosswalk for pedestrians who need to access the MBTA Station. A new crosswalk should also be considered for



*Potential New Cross-walk/Sidewalk
on north side of Bridge Street
with Pedestrian Corridor III*

the signal at the bottom of the ramps from North Street to Bridge Street. Coupled with sidewalk enhancements, this will allow pedestrians another safer option for crossing Bridge Street than the existing unsignalized crosswalk provides, especially for persons who are using the crosswalk to traverse between downtown Salem and North Salem/Mack Park neighborhoods.

During the period before parking on the north side of Bridge Street is eliminated with the Bridge Street widening, consider striping a 3-foot shoulder on the north side of Bridge Street adjacent to the parking vehicles.

After the Salem garage is open, but prior to when Bridge Street is widened by MassDOT, parking at 90° should be eliminated and converted to parallel parking to create a safer walking area for pedestrians to enhance vehicle and pedestrian safety on Bridge Street. At that time it will be possible to provide a sidewalk on the north side of Bridge Street to separate pedestrians from the moving Bridge Street traffic. As the NRCC area develops, pedestrian demands along this sidewalk will increase, as more neighbors begin walking toward the Station.

It is our understanding that once the Bridge Street widening occurs, on-street parking on the north side of Bridge Street, depending on the final design parameters and City's needs, could be eliminated in its entirety. We are also aware that the Universal Steel site will eventually become a commercial development parcel.

Costs of Pedestrian Corridor III enhancements between the Pedestrian Corridor II improvements and the west side of the Bridge Street at the North Street ramps signal could entail approximately \$80,000-\$95,000, not including land acquisition or leasing costs but including provision of a 3-foot shoulder striping on the north edge of Bridge Street between the westerly end of the parking supply and the proposed new sidewalk. As a temporary sidewalk, it could be bituminous concrete to reduce costs. If the City pursues the angle parking enhancements on Bridge Street and obtains permission from the Commonwealth of Massachusetts to construct on its land, construction costs to re-grade and pave approximately 80 temporary head-in spaces could range from \$120,000-\$140,000 for 90° parking or from \$60,000 to \$70,000 for 40 parallel parking spaces. There is a potential for the City to charge parking fees to partially cover implementation and maintenance costs. Parking control equipment is not included in this estimate. If the temporary modifications are to be implemented, we would recommend replacing the head in parking with parallel parking, which would enhance the safety of users and walkers, but would reduce the supply of parking by 50% on the north side of Bridge Street.

APPENDIX 1
1/15/13 COUNTS
SUMMARY DISPLAYS

1/15/13 - 6-9 AM

N

1

Bridge Street
(Route 107)

North Street
(Route 114)
Ramps

0 50 100

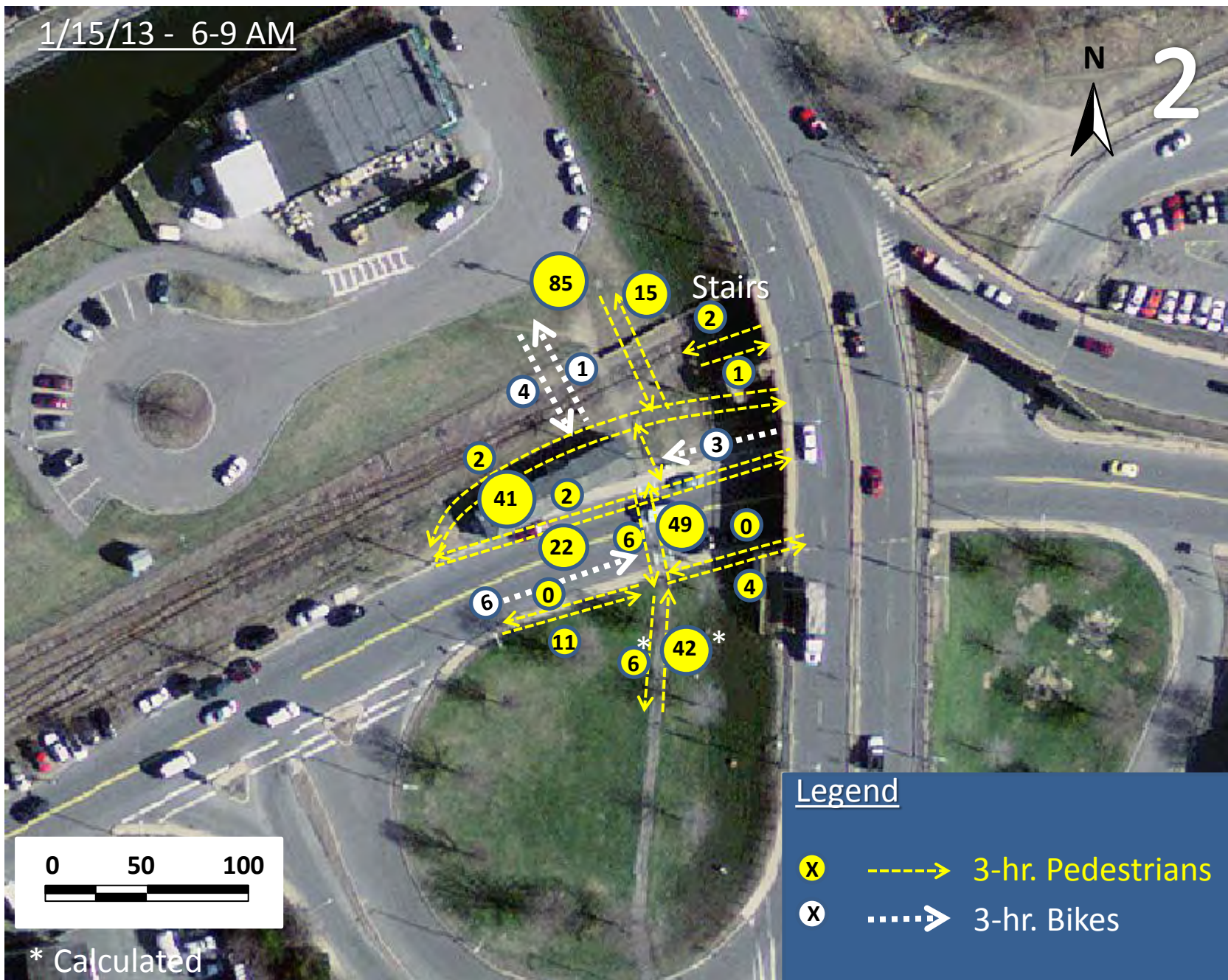


* Calculated

Legend

- 3-hr. Pedestrians
- 3-hr. Bikes

1/15/13 - 6-9 AM



1/15/13 - 6-9 AM

N

3

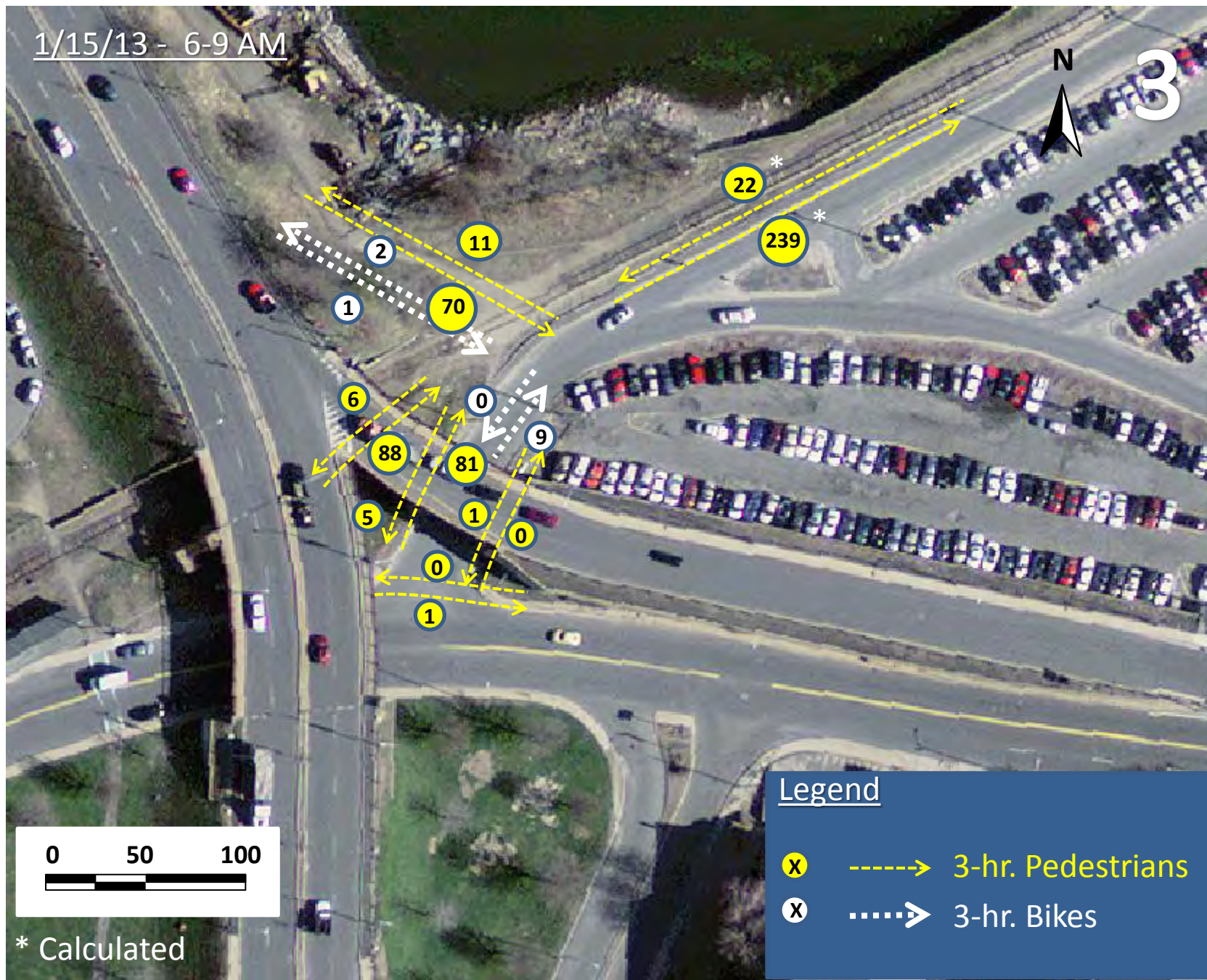
Legend

- (X) -----> 3-hr. Pedestrians
- (X)> 3-hr. Bikes

0 50 100



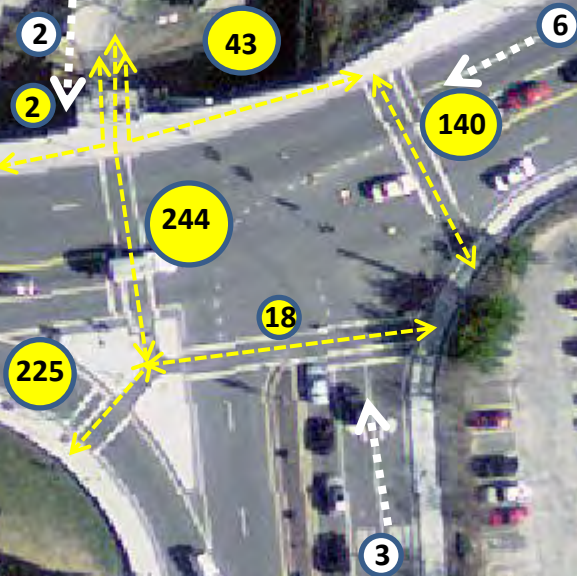
* Calculated



1/15/13 - 6-9 AM



4



Legend

- > 3-hr. Pedestrians
-> 3-hr. Bikes

APPENDIX 2
1/15/13 COUNTS
DATA

Accurate Counts

978-664-2565

Pedestrian & Bicycle Counts
at Location # 1
City/State : Salem, MA
Weather : Clear

File Name : LG410001
Site Code : LG410001
Start Date : 1/15/2013
Page No : 1

Groups Printed- PEDS

	From North		Bridge St From East		Route 114 Ramp From South		Bridge St From West		
Start Time	EB	WB	SB	NB	WB	EB	NB	SB	Int. Total
06:00 AM	8	0	0	0	0	0	0	0	8
06:15 AM	2	1	0	0	0	0	0	0	3
06:30 AM	4	0	0	0	0	0	0	0	4
06:45 AM	4	0	0	0	0	1	0	0	5
Total	18	1	0	0	0	1	0	0	20
07:00 AM	5	2	0	0	0	0	0	0	7
07:15 AM	15	0	0	0	0	1	0	0	16
07:30 AM	4	0	0	0	0	3	1	1	9
07:45 AM	4	0	0	0	0	1	0	0	5
Total	28	2	0	0	0	5	1	1	37
08:00 AM	4	1	0	0	0	3	0	0	8
08:15 AM	0	0	0	0	0	2	0	0	2
08:30 AM	0	1	0	0	0	0	0	3	4
08:45 AM	0	2	0	0	0	0	0	3	5
Total	4	4	0	0	0	5	0	6	19
Grand Total	50	7	0	0	0	11	1	7	76
Apprch %	87.7	12.3	0	0	0	100	12.5	87.5	
Total %	65.8	9.2	0	0	0	14.5	1.3	9.2	

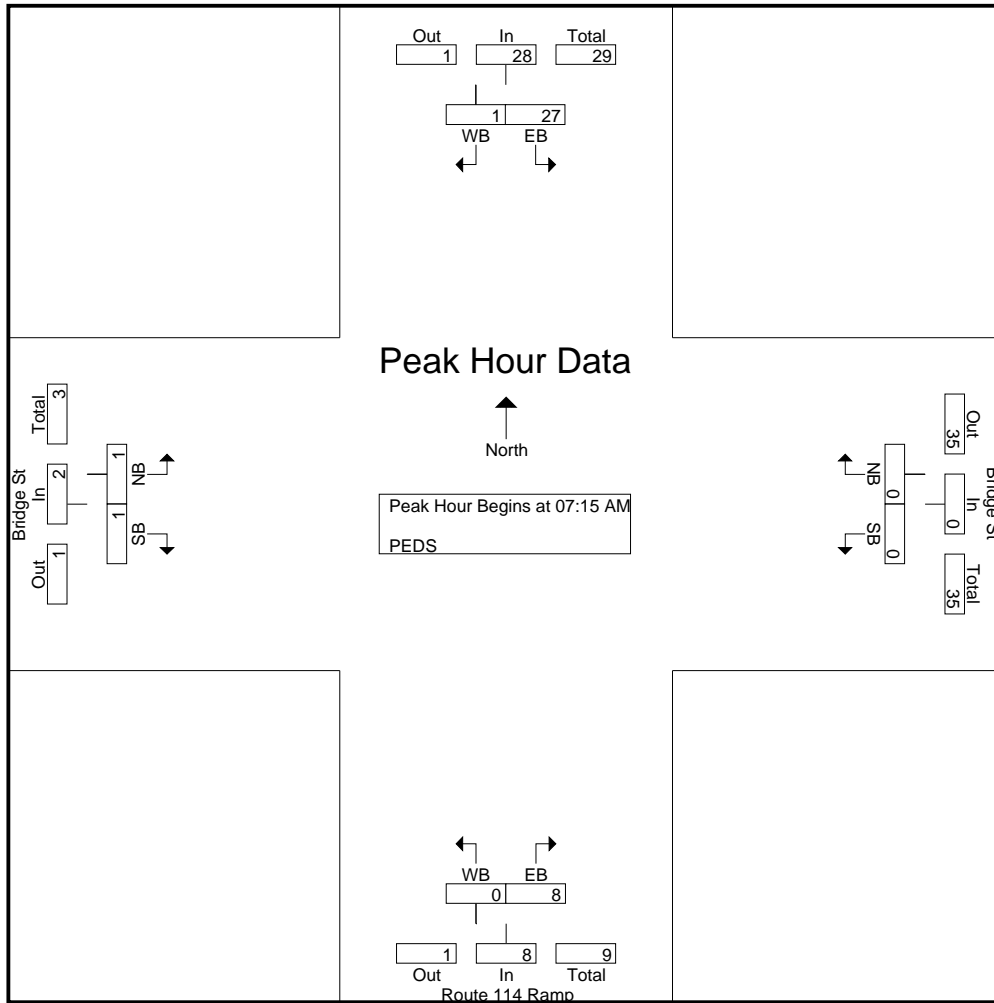
	From North			Bridge St From East			Route 114 Ramp From South			Bridge St From West			
Start Time	EB	WB	App. Total	SB	NB	App. Total	WB	EB	App. Total	NB	SB	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:15 AM													
07:15 AM	15	0	15	0	0	0	0	1	1	0	0	0	16
07:30 AM	4	0	4	0	0	0	0	3	3	1	1	2	9
07:45 AM	4	0	4	0	0	0	0	1	1	0	0	0	5
08:00 AM	4	1	5	0	0	0	0	3	3	0	0	0	8
Total Volume	27	1	28	0	0	0	0	8	8	1	1	2	38
% App. Total	96.4	3.6		0	0		0	100		50	50		
PHF	.450	.250	.467	.000	.000	.000	.000	.667	.667	.250	.250	.250	.594

Accurate Counts

978-664-2565

Pedestrian & Bicycle Counts
at Location # 1
City/State : Salem, MA
Weather : Clear

File Name : LG410001
Site Code : LG410001
Start Date : 1/15/2013
Page No : 2



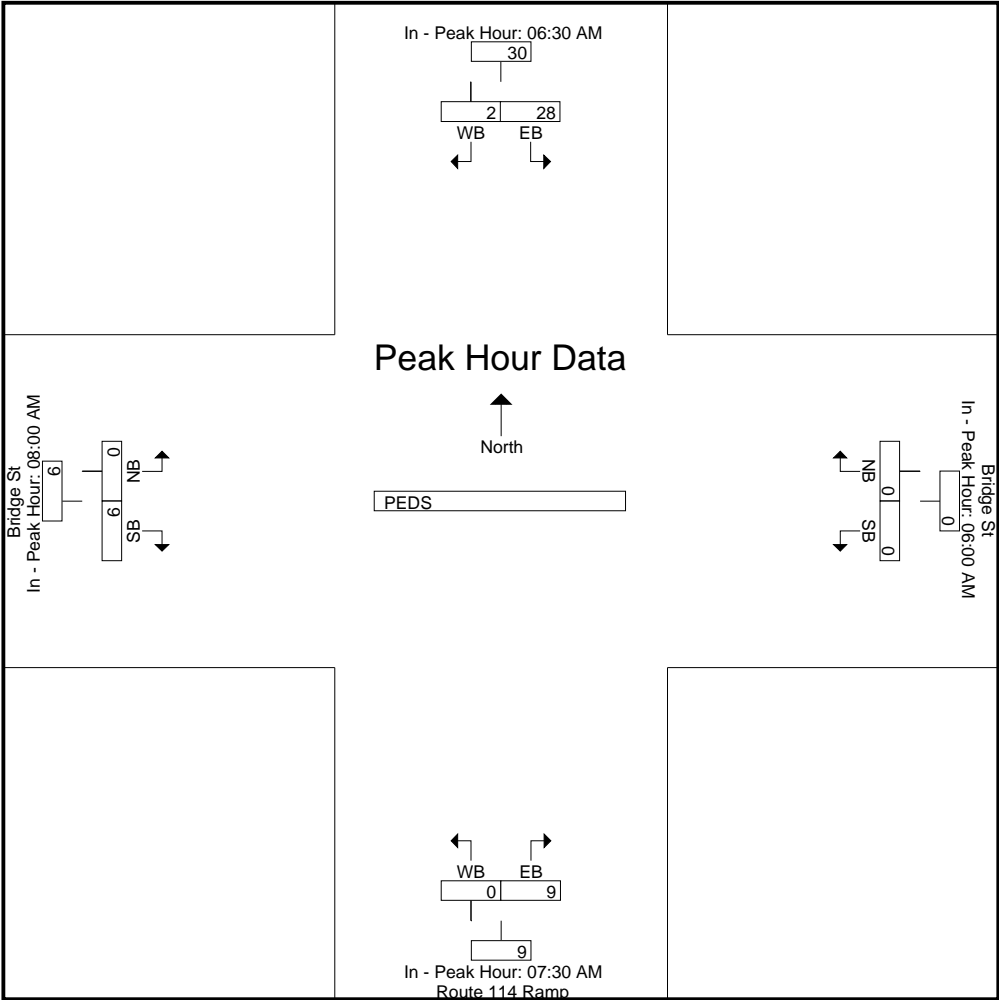
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	06:30 AM			06:00 AM			07:30 AM			08:00 AM		
+0 mins.	4	0	4	0	0	0	0	3	3	0	0	0
+15 mins.	4	0	4	0	0	0	0	1	1	0	0	0
+30 mins.	5	2	7	0	0	0	0	3	3	0	3	3
+45 mins.	15	0	15	0	0	0	0	2	2	0	3	3
Total Volume	28	2	30	0	0	0	0	9	9	0	6	6
% App. Total	93.3	6.7		0	0		0	100		0	100	
PHF	.467	.250	.500	.000	.000	.000	.000	.750	.750	.000	.500	.500

Accurate Counts
978-664-2565

Pedestrian & Bicycle Counts
at Location # 1
City/State : Salem, MA
Weather : Clear

File Name : LG410001
Site Code : LG410001
Start Date : 1/15/2013
Page No : 3



Accurate Counts

978-664-2565

Pedestrian & Bicycle Counts
at Location # 1
City/State : Salem, MA
Weather : Clear

File Name : LG410001
Site Code : LG410001
Start Date : 1/15/2013
Page No : 1

Groups Printed- Bikes

	Bridge St From East	Route 114 Ramp From South	Bridge St From West	
Start Time	Bikes	Bikes	Bikes	Int. Total
06:00 AM	0	0	0	0
06:15 AM	0	0	0	0
06:30 AM	0	0	0	0
06:45 AM	0	1	1	2
Total	0	1	1	2
07:00 AM	0	0	0	0
07:15 AM	0	0	2	2
07:30 AM	0	1	0	1
07:45 AM	0	0	0	0
Total	0	1	2	3
08:00 AM	0	1	3	4
08:15 AM	0	1	1	2
08:30 AM	0	0	0	0
08:45 AM	0	0	0	0
Total	0	2	4	6
Grand Total	0	4	7	11
Apprch %	0	100	100	
Total %	0	36.4	63.6	

	From North	Bridge St From East	Route 114 Ramp From South	Bridge St From West	
Start Time	App. Total	Bikes	App. Total	Bikes	App. Total
07:15 AM	0	0	0	2	2
07:30 AM	0	0	1	0	0
07:45 AM	0	0	0	0	0
08:00 AM	0	0	1	3	3
Total Volume	0	0	2	5	5
% App. Total		0	100	100	
PHF	.000	.000	.500	.417	.438

Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1

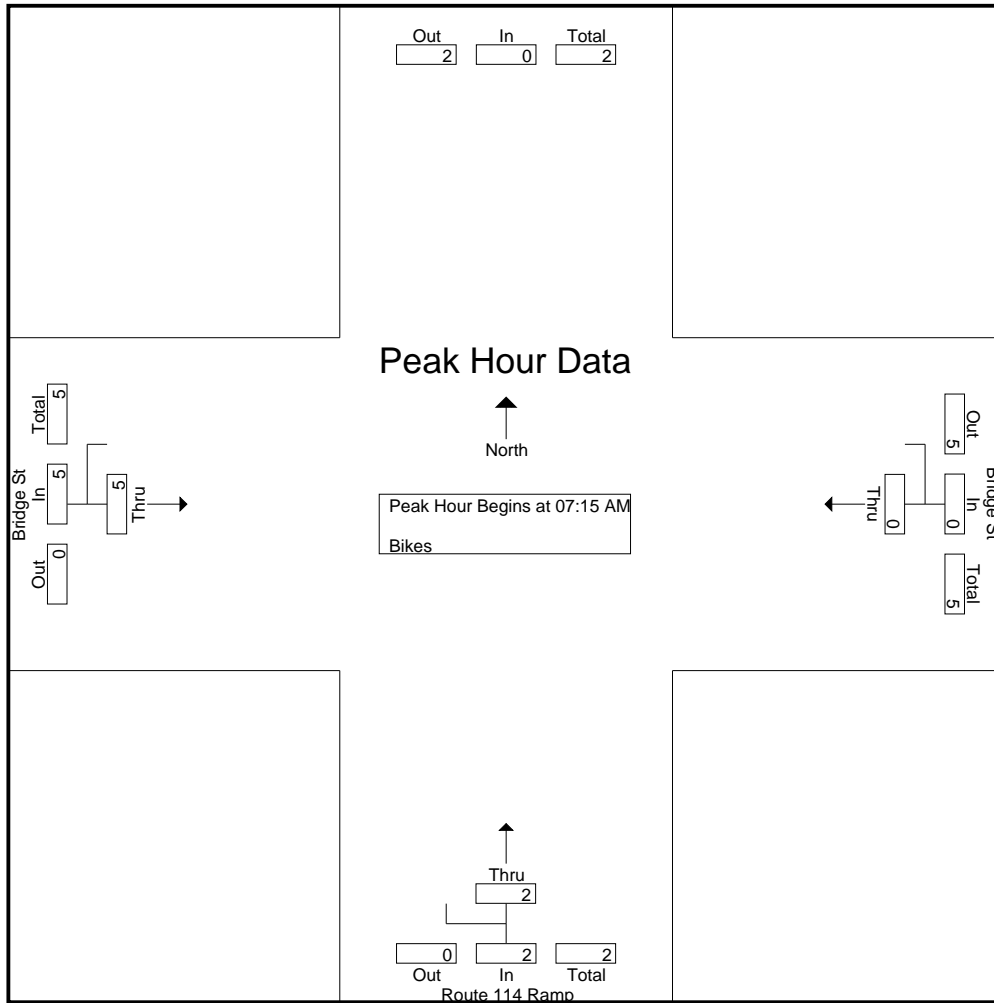
Peak Hour for Entire Intersection Begins at 07:15 AM

Accurate Counts

978-664-2565

Pedestrian & Bicycle Counts
at Location # 1
City/State : Salem, MA
Weather : Clear

File Name : LG410001
Site Code : LG410001
Start Date : 1/15/2013
Page No : 2



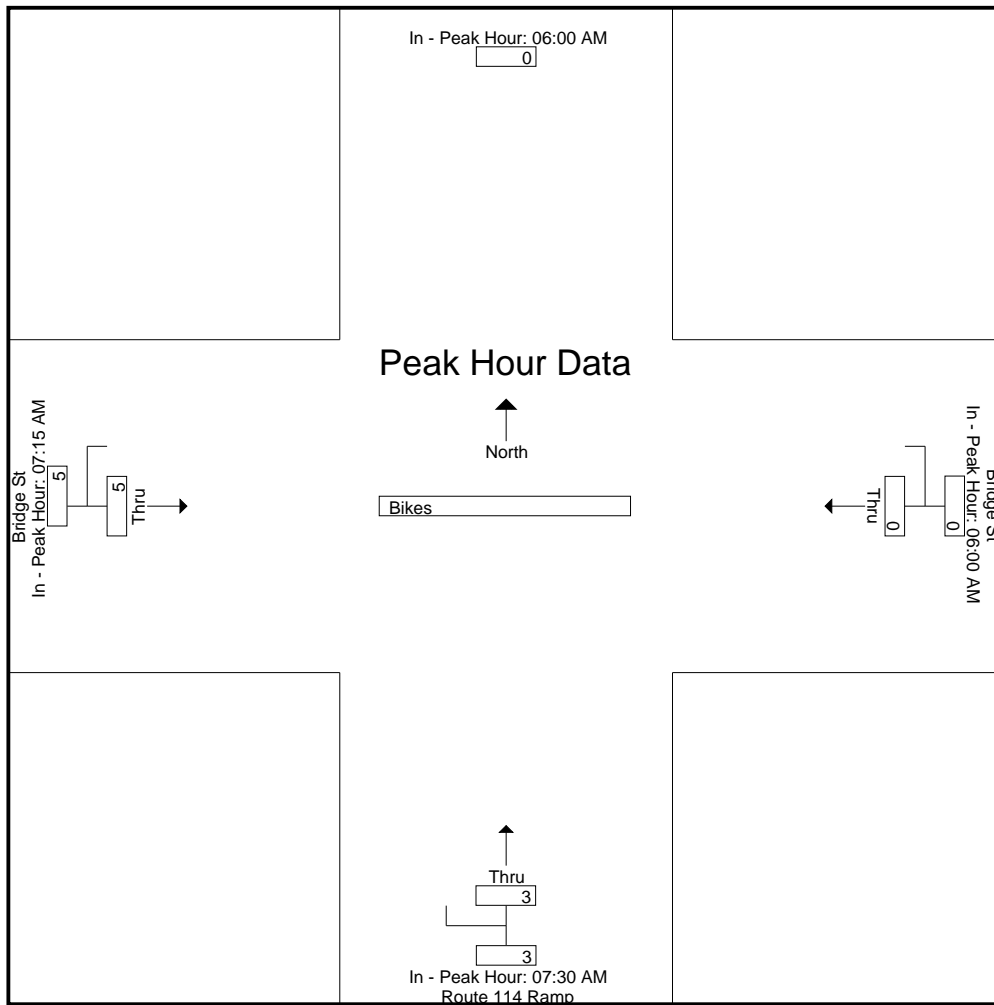
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	06:00 AM	06:00 AM	06:00 AM	07:30 AM	07:30 AM	07:15 AM	07:15 AM
+0 mins.	0	0	0	1	1	2	2
+15 mins.	0	0	0	0	0	0	0
+30 mins.	0	0	0	1	1	0	0
+45 mins.	0	0	0	1	1	3	3
Total Volume	0	0	0	3	3	5	5
% App. Total		0		100		100	
PHF	.000	.000	.000	.750	.750	.417	.417

Accurate Counts
978-664-2565

Pedestrian & Bicycle Counts
at Location # 1
City/State : Salem, MA
Weather : Clear

File Name : LG410001
Site Code : LG410001
Start Date : 1/15/2013
Page No : 3



Accurate Counts

978-664-2565

Pedestrian & Bicycle Counts
at Location #2
City/State : Salem, MA
Weather : Clear

File Name : LG410002
Site Code : LG410002
Start Date : 1/15/2013
Page No : 1

Groups Printed- PEDS

	From North				From East				From South				From West				
Start Time	4	3	2	1	8	7	6	5	12	11	10	9	16	15	14	13	Int. Total
06:00 AM	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	1	7
06:15 AM	0	0	0	1	0	0	0	0	3	0	3	1	0	0	0	1	9
06:30 AM	0	0	1	0	0	0	2	0	2	0	3	0	0	0	0	5	13
06:45 AM	0	0	7	0	0	0	4	0	3	1	5	0	0	0	0	8	28
Total	0	0	8	1	0	0	6	0	8	1	17	1	0	0	0	15	57
07:00 AM	0	0	1	0	0	0	1	0	0	1	4	0	1	0	0	1	9
07:15 AM	0	0	9	5	0	0	6	0	5	0	8	0	0	0	0	13	46
07:30 AM	1	0	3	1	1	0	1	1	1	1	4	0	0	0	1	5	20
07:45 AM	0	0	5	2	1	0	1	0	3	0	2	0	0	0	0	3	17
Total	1	0	18	8	2	0	9	1	9	2	18	0	1	0	1	22	92
08:00 AM	1	1	8	2	1	0	2	0	2	2	5	1	1	0	0	11	37
08:15 AM	4	0	6	1	1	0	2	0	2	0	1	0	0	0	1	11	29
08:30 AM	0	0	0	0	0	0	3	0	2	4	0	1	0	0	1	0	11
08:45 AM	0	0	2	3	0	0	0	1	3	2	0	0	1	0	1	0	13
Total	5	1	16	6	2	0	7	1	9	8	6	2	2	0	3	22	90
Grand Total	6	1	42	15	4	0	22	2	26	11	41	3	3	0	4	59	239
Apprch %	9.4	1.6	65.6	23.4	14.3	0	78.6	7.1	32.1	13.6	50.6	3.7	4.5	0	6.1	89.4	
Total %	2.5	0.4	17.6	6.3	1.7	0	9.2	0.8	10.9	4.6	17.2	1.3	1.3	0	1.7	24.7	

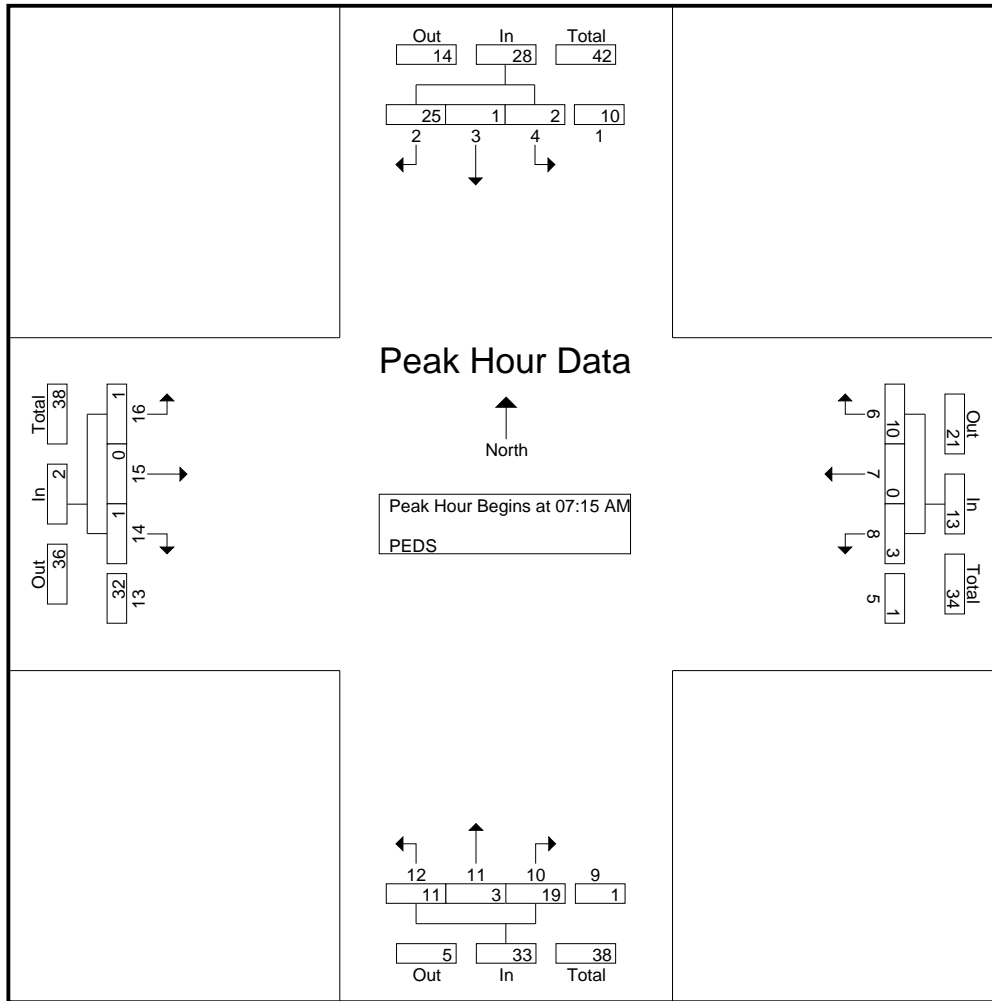
	From North					From East					From South					From West					
Start Time	4	3	2	1	App. Total	8	7	6	5	App. Total	12	11	10	9	App. Total	16	15	14	13	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	0	0	9	5	14	0	0	6	0	6	5	0	8	0	13	0	0	0	13	13	46
07:30 AM	1	0	3	1	5	1	0	1	1	3	1	1	4	0	6	0	0	1	5	6	20
07:45 AM	0	0	5	2	7	1	0	1	0	2	3	0	2	0	5	0	0	0	3	3	17
08:00 AM	1	1	8	2	12	1	0	2	0	3	2	2	5	1	10	1	0	0	11	12	37
Total Volume	2	1	25	10	38	3	0	10	1	14	11	3	19	1	34	1	0	1	32	34	120
% App. Total	5.3	2.6	65.8	26.3		21.4	0	71.4	7.1		32.4	8.8	55.9	2.9		2.9	0	2.9	94.1		
PHF	.500	.250	.694	.500	.679	.750	.000	.417	.250	.583	.550	.375	.594	.250	.654	.250	.000	.250	.615	.654	.652

Accurate Counts

978-664-2565

Pedestrian & Bicycle Counts
at Location #2
City/State : Salem, MA
Weather : Clear

File Name : LG410002
Site Code : LG410002
Start Date : 1/15/2013
Page No : 2



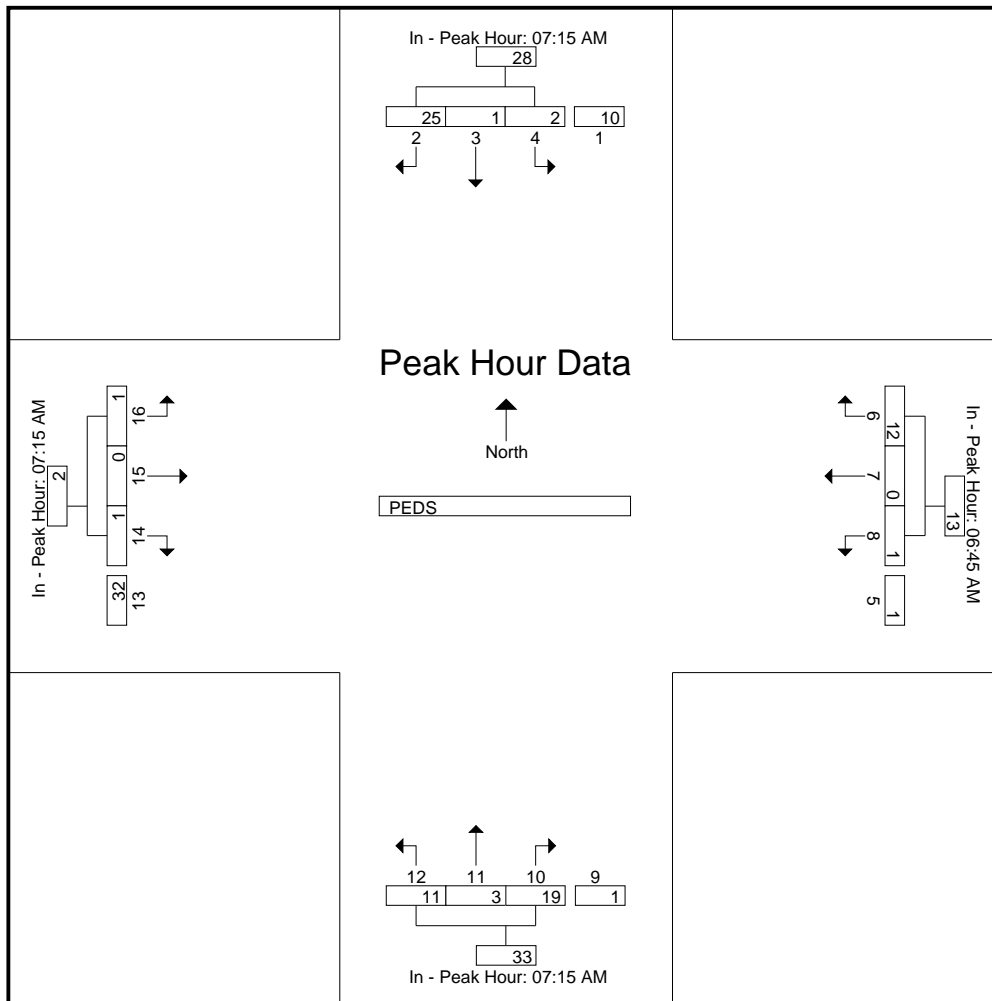
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:15 AM					06:45 AM					07:15 AM					07:15 AM				
+0 mins.	0	0	9	5	14	0	0	4	0	4	5	0	8	0	13	0	0	0	13	13
+15 mins.	1	0	3	1	5	0	0	1	0	1	1	1	4	0	6	0	0	1	5	6
+30 mins.	0	0	5	2	7	0	0	6	0	6	3	0	2	0	5	0	0	0	3	3
+45 mins.	1	1	8	2	12	1	0	1	1	3	2	2	5	1	10	1	0	0	11	12
Total Volume	2	1	25	10	38	1	0	12	1	14	11	3	19	1	34	1	0	1	32	34
% App. Total	5.3	2.6	65.8	26.3		7.1	0	85.7	7.1		32.4	8.8	55.9	2.9		2.9	0	2.9	94.1	
PHF	.500	.250	.694	.500	.679	.250	.000	.500	.250	.583	.550	.375	.594	.250	.654	.250	.000	.250	.615	.654

Accurate Counts
978-664-2565

Pedestrian & Bicycle Counts
at Location #2
City/State : Salem, MA
Weather : Clear

File Name : LG410002
Site Code : LG410002
Start Date : 1/15/2013
Page No : 3



Accurate Counts
978-664-2565

Pedestrian & Bicycle Counts
at Location #2
City/State : Salem, MA
Weather : Clear

File Name : LG410002
Site Code : LG410002
Start Date : 1/15/2013
Page No : 1

Groups Printed- Bikes

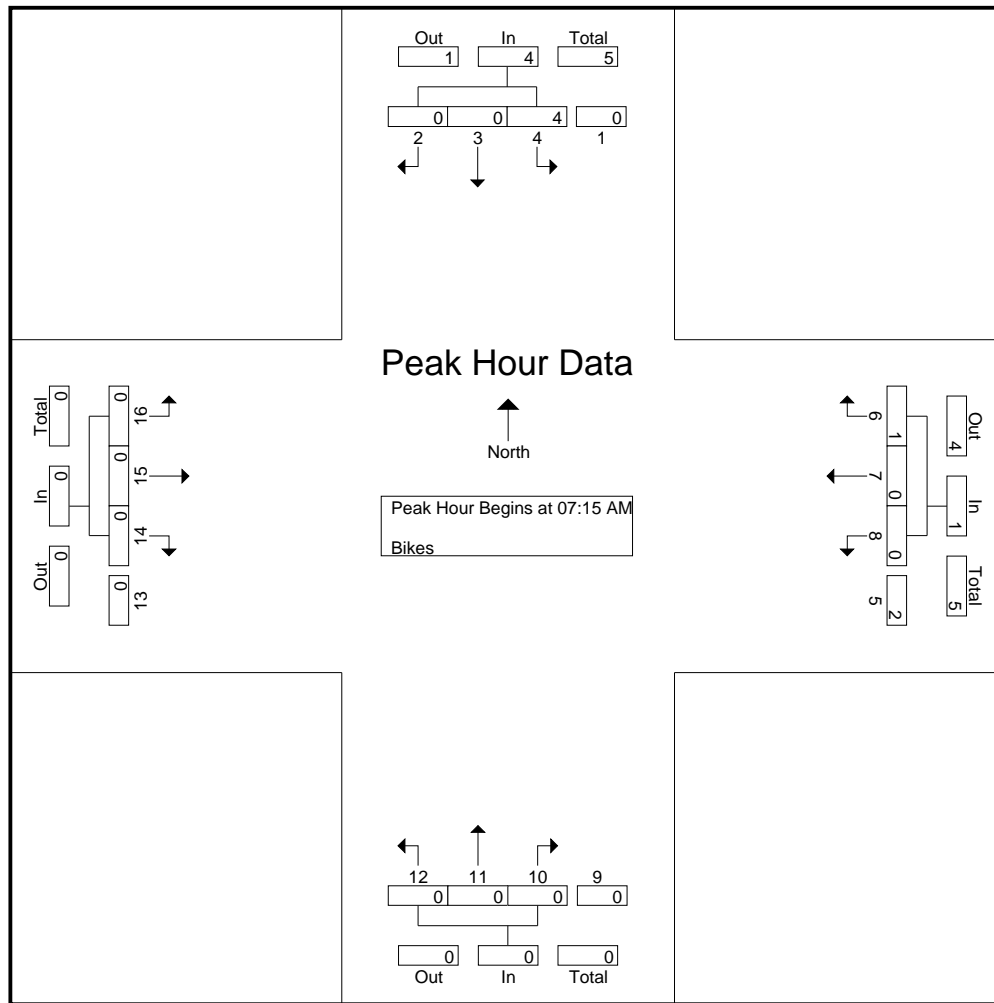
	From North				From East				From South				From West				
Start Time	4	3	2	1	8	7	6	5	12	11	10	9	16	15	14	13	Int. Total
06:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45 AM	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2
Total	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2
07:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
07:15 AM	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	2	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	4
08:00 AM	2	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	4
08:15 AM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	3	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	5
Grand Total	5	1	1	1	0	0	1	2	0	0	0	0	0	0	0	0	11
Apprch %	62.5	12.5	12.5	12.5	0	0	33.3	66.7	0	0	0	0	0	0	0	0	
Total %	45.5	9.1	9.1	9.1	0	0	9.1	18.2	0	0	0	0	0	0	0	0	

[illegible]

Accurate Counts
978-664-2565

Pedestrian & Bicycle Counts
at Location #2
City/State : Salem, MA
Weather : Clear

File Name : LG410002
Site Code : LG410002
Start Date : 1/15/2013
Page No : 2



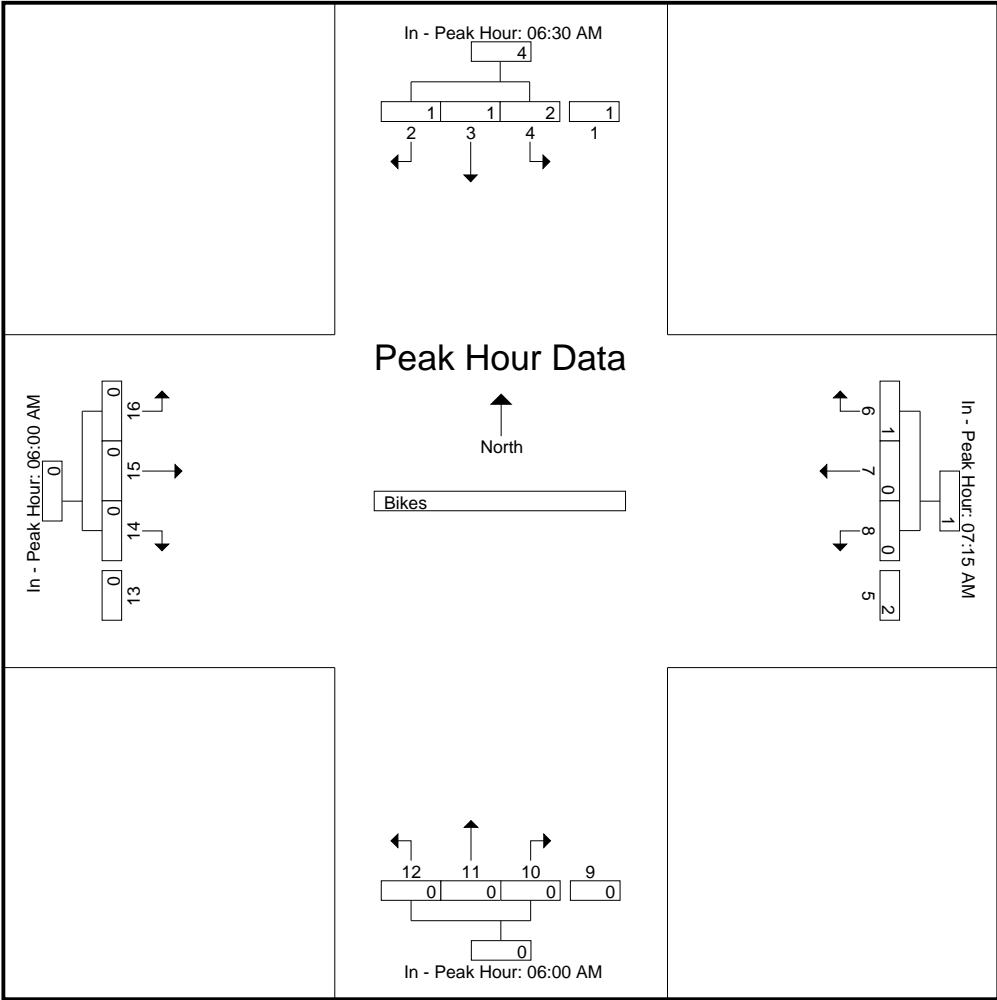
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

[illegible]

Accurate Counts
978-664-2565

Pedestrian & Bicycle Counts
at Location #2
City/State : Salem, MA
Weather : Clear

File Name : LG410002
Site Code : LG410002
Start Date : 1/15/2013
Page No : 3



Accurate Counts

978-664-2565

Pedestrian & Bicycle Count
at Location #3
City/State : Salem, MA
Weather : Clear

File Name : LG410003
Site Code : LG410003
Start Date : 1/15/2013
Page No : 1

Groups Printed- PEDS

	From North				From East				From South		
Start Time	4	3	2	1	8	7	6	5	10	9	Int. Total
06:00 AM	1	0	0	2	0	0	0	0	0	0	3
06:15 AM	0	2	0	3	8	0	0	0	0	0	13
06:30 AM	2	2	0	6	8	0	0	0	0	0	18
06:45 AM	1	7	0	12	8	0	0	0	0	0	28
Total	4	11	0	23	24	0	0	0	0	0	62
07:00 AM	1	1	0	3	7	0	0	0	0	0	12
07:15 AM	1	10	0	18	2	0	0	0	0	0	31
07:30 AM	2	6	1	11	17	0	0	1	0	0	38
07:45 AM	1	7	0	4	3	0	0	0	0	0	15
Total	5	24	1	36	29	0	0	1	0	0	96
08:00 AM	1	22	1	17	7	0	0	0	0	0	48
08:15 AM	0	12	3	11	10	0	0	0	0	0	36
08:30 AM	1	0	1	1	11	4	0	1	0	1	20
08:45 AM	0	1	0	0	0	1	0	0	0	0	2
Total	2	35	5	29	28	5	0	1	0	1	106
Grand Total	11	70	6	88	81	5	0	2	0	1	264
Apprch %	6.3	40	3.4	50.3	92	5.7	0	2.3	0	100	
Total %	4.2	26.5	2.3	33.3	30.7	1.9	0	0.8	0	0.4	

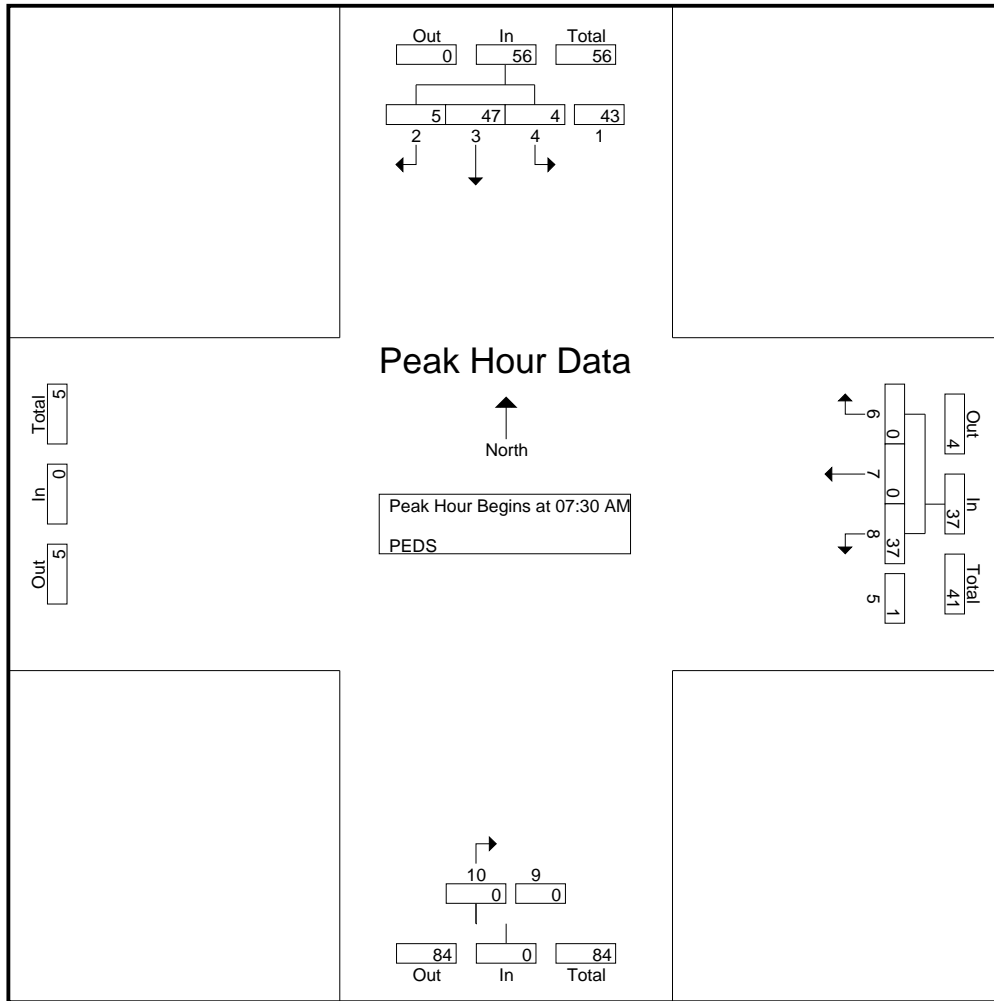
	From North					From East					From South			From West	
Start Time	4	3	2	1	App. Total	8	7	6	5	App. Total	10	9	App. Total	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1															
Peak Hour for Entire Intersection Begins at 07:30 AM															
07:30 AM	2	6	1	11	20	17	0	0	1	18	0	0	0	0	38
07:45 AM	1	7	0	4	12	3	0	0	0	3	0	0	0	0	15
08:00 AM	1	22	1	17	41	7	0	0	0	7	0	0	0	0	48
08:15 AM	0	12	3	11	26	10	0	0	0	10	0	0	0	0	36
Total Volume	4	47	5	43	99	37	0	0	1	38	0	0	0	0	137
% App. Total	4	47.5	5.1	43.4		97.4	0	0	2.6		0	0			
PHF	.500	.534	.417	.632	.604	.544	.000	.000	.250	.528	.000	.000	.000	.000	.714

Accurate Counts

978-664-2565

Pedestrian & Bicycle Count
at Location #3
City/State : Salem, MA
Weather : Clear

File Name : LG410003
Site Code : LG410003
Start Date : 1/15/2013
Page No : 2



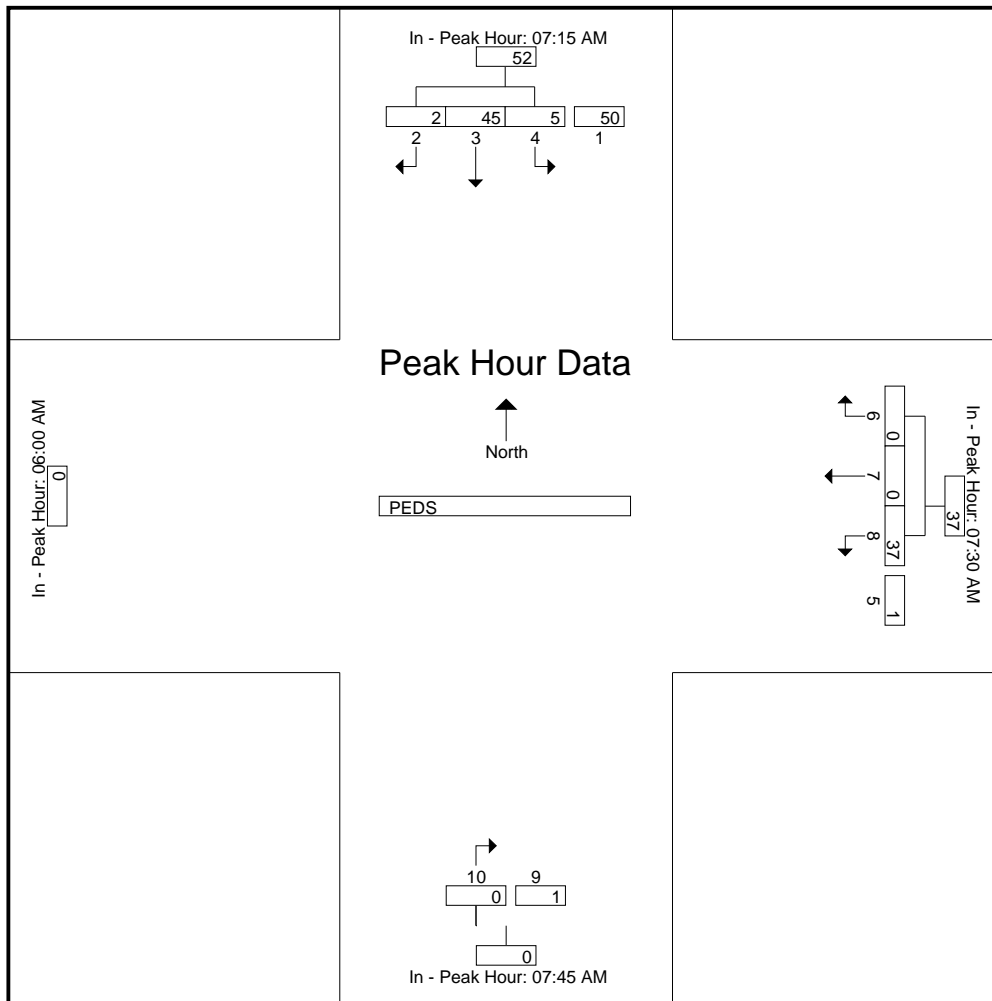
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:15 AM					07:30 AM					07:45 AM			06:00 AM
+0 mins.	1	10	0	18	29	17	0	0	1	18	0	0	0	0
+15 mins.	2	6	1	11	20	3	0	0	0	3	0	0	0	0
+30 mins.	1	7	0	4	12	7	0	0	0	7	0	0	0	0
+45 mins.	1	22	1	17	41	10	0	0	0	10	0	1	1	0
Total Volume	5	45	2	50	102	37	0	0	1	38	0	1	1	0
% App. Total	4.9	44.1	2	49		97.4	0	0	2.6		0	100		
PHF	.625	.511	.500	.694	.622	.544	.000	.000	.250	.528	.000	.250	.250	.000

Accurate Counts
978-664-2565

Pedestrian & Bicycle Count
at Location #3
City/State : Salem, MA
Weather : Clear

File Name : LG410003
Site Code : LG410003
Start Date : 1/15/2013
Page No : 3



Accurate Counts

978-664-2565

Pedestrian & Bicycle Count
at Location #3
City/State : Salem, MA
Weather : Clear

File Name : LG410003
Site Code : LG410003
Start Date : 1/15/2013
Page No : 1

Groups Printed- Bikes

	From North				From East				From South		
Start Time	4	3	2	1	8	7	6	5	10	9	Int. Total
06:00 AM	0	0	0	0	0	0	0	0	0	0	0
06:15 AM	0	0	0	0	0	0	0	0	0	0	0
06:30 AM	0	0	0	0	0	0	0	0	0	0	0
06:45 AM	0	0	0	0	1	0	0	0	0	0	1
Total	0	0	0	0	1	0	0	0	0	0	1
07:00 AM	1	0	0	0	0	0	0	0	0	0	1
07:15 AM	0	0	0	0	0	0	2	0	0	0	2
07:30 AM	0	0	0	0	0	0	1	0	0	0	1
07:45 AM	0	0	0	0	0	0	0	0	0	0	0
Total	1	0	0	0	0	0	3	0	0	0	4
08:00 AM	0	1	0	1	3	0	2	0	0	0	7
08:15 AM	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	1	0	0	0	0	0	0	0	0	0	1
08:45 AM	0	0	0	0	0	0	0	0	0	0	0
Total	1	1	0	1	3	0	2	0	0	0	8
Grand Total	2	1	0	1	4	0	5	0	0	0	13
Apprch %	50	25	0	25	44.4	0	55.6	0	0	0	
Total %	15.4	7.7	0	7.7	30.8	0	38.5	0	0	0	

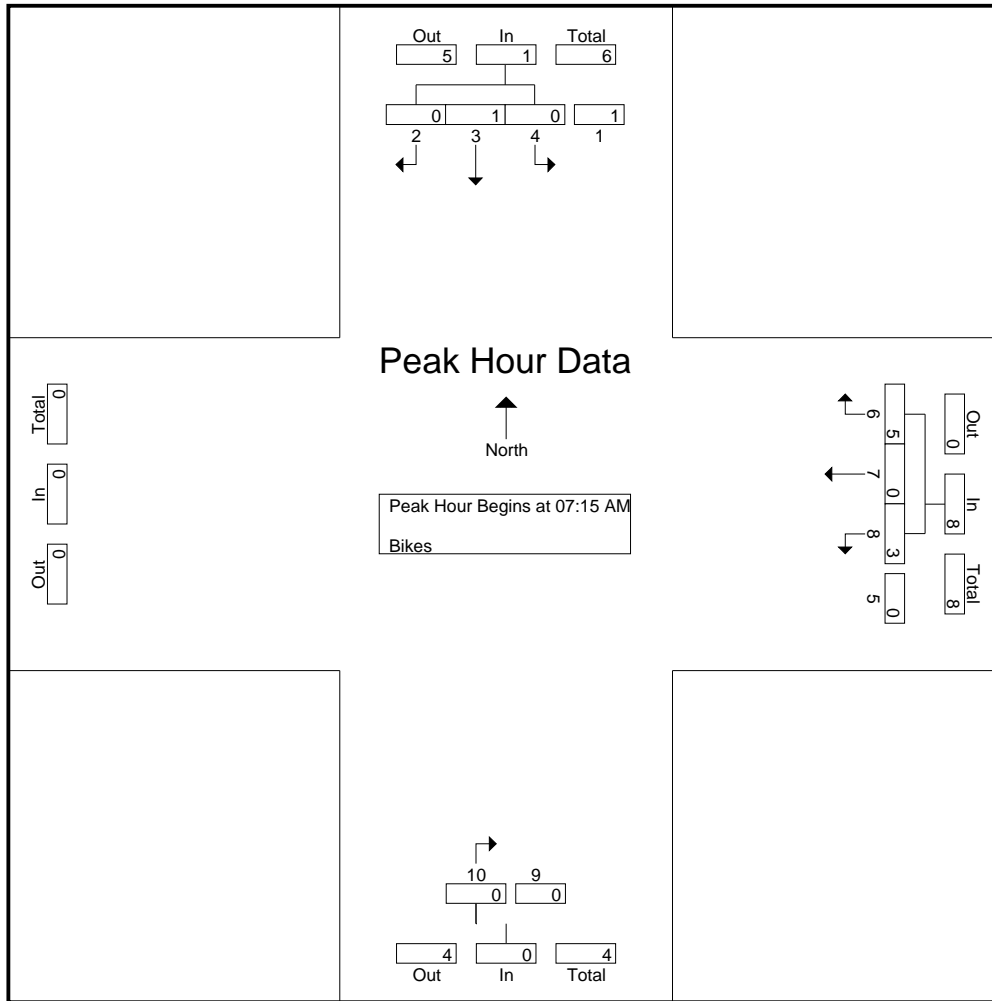
	From North					From East					From South			From West	
Start Time	4	3	2	1	App. Total	8	7	6	5	App. Total	10	9	App. Total	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1															
Peak Hour for Entire Intersection Begins at 07:15 AM															
07:15 AM	0	0	0	0	0	0	0	2	0	2	0	0	0	0	2
07:30 AM	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	1	0	1	2	3	0	2	0	5	0	0	0	0	7
Total Volume	0	1	0	1	2	3	0	5	0	8	0	0	0	0	10
% App. Total	0	50	0	50		37.5	0	62.5	0		0	0			
PHF	.000	.250	.000	.250	.250	.250	.000	.625	.000	.400	.000	.000	.000	.000	.357

Accurate Counts

978-664-2565

Pedestrian & Bicycle Count
at Location #3
City/State : Salem, MA
Weather : Clear

File Name : LG410003
Site Code : LG410003
Start Date : 1/15/2013
Page No : 2



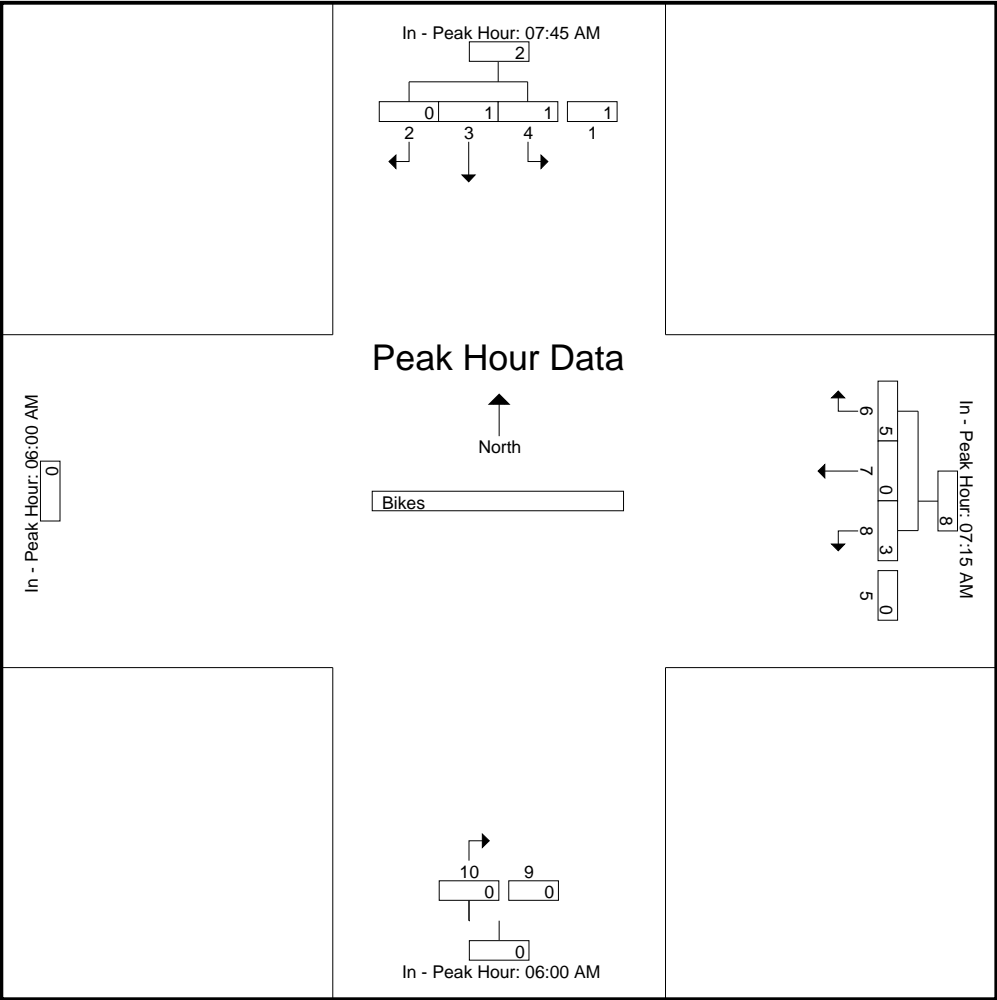
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:45 AM					07:15 AM					06:00 AM			06:00 AM
+0 mins.	0	0	0	0	0	0	0	2	0	2	0	0	0	0
+15 mins.	0	1	0	1	2	0	0	1	0	1	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	1	0	0	0	1	3	0	2	0	5	0	0	0	0
Total Volume	1	1	0	1	3	3	0	5	0	8	0	0	0	0
% App. Total	33.3	33.3	0	33.3		37.5	0	62.5	0		0	0		
PHF	.250	.250	.000	.250	.375	.250	.000	.625	.000	.400	.000	.000	.000	.000

Accurate Counts
978-664-2565

Pedestrian & Bicycle Count
at Location #3
City/State : Salem, MA
Weather : Clear

File Name : LG410003
Site Code : LG410003
Start Date : 1/15/2013
Page No : 3



Accurate Counts

978-664-2565

Pedestrian & Bicycle Counts
at Location #4
City/State : Salem, MA
Weather : Clear

File Name : LG410004
Site Code : LG410004
Start Date : 1/15/2013
Page No : 1

Groups Printed- PEDS

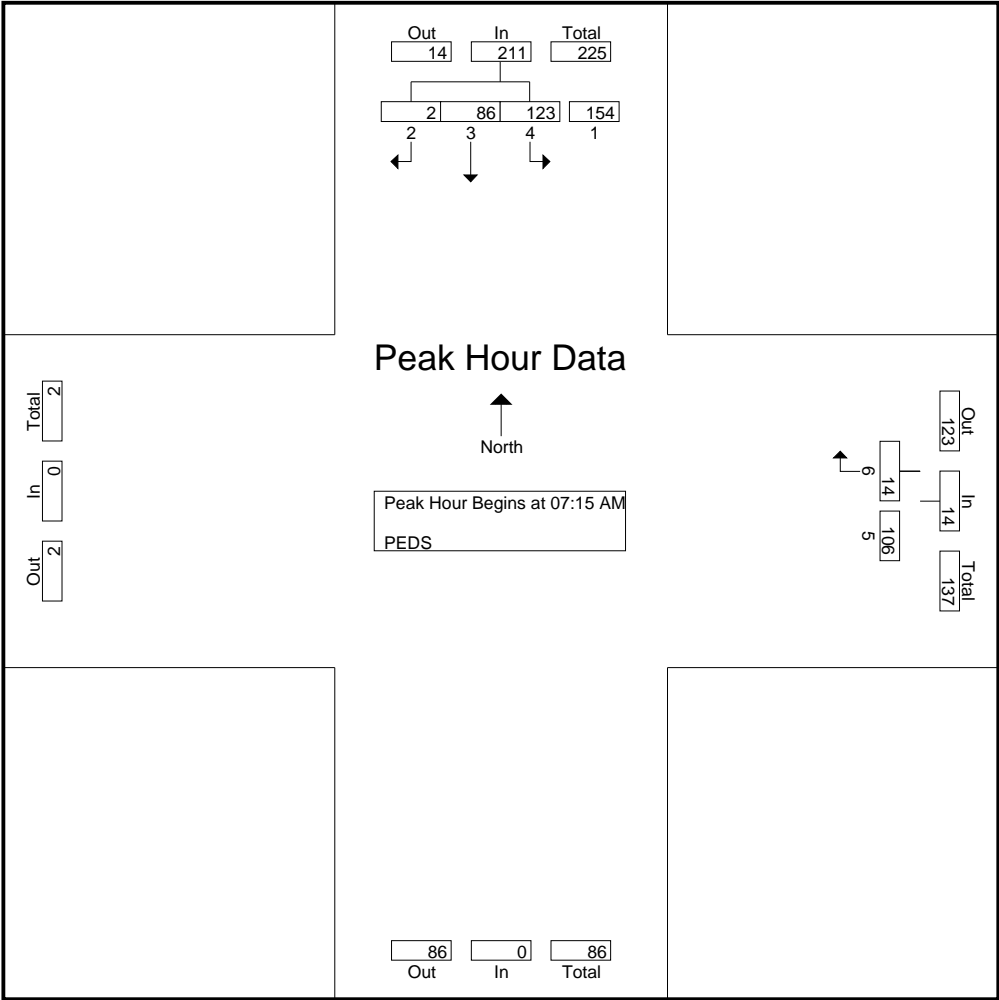
	From North				From East		
Start Time	4	3	2	1	6	5	Int. Total
06:00 AM	11	5	0	9	0	11	36
06:15 AM	12	11	0	8	0	14	45
06:30 AM	19	7	0	15	0	19	60
06:45 AM	22	5	0	22	1	21	71
Total	64	28	0	54	1	65	212
07:00 AM	11	5	0	15	1	12	44
07:15 AM	36	27	0	59	3	34	159
07:30 AM	28	21	2	41	6	24	122
07:45 AM	33	22	0	37	2	29	123
Total	108	75	2	152	12	99	448
08:00 AM	26	16	0	17	3	19	81
08:15 AM	14	9	2	9	0	16	50
08:30 AM	21	5	0	7	1	19	53
08:45 AM	11	7	0	10	1	7	36
Total	72	37	2	43	5	61	220
Grand Total	244	140	4	249	18	225	880
Apprch %	38.3	22	0.6	39.1	7.4	92.6	
Total %	27.7	15.9	0.5	28.3	2	25.6	

	From North					From East			From South	From West	
Start Time	4	3	2	1	App. Total	6	5	App. Total	App. Total	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 07:15 AM											
07:15 AM	36	27	0	59	122	3	34	37	0	0	159
07:30 AM	28	21	2	41	92	6	24	30	0	0	122
07:45 AM	33	22	0	37	92	2	29	31	0	0	123
08:00 AM	26	16	0	17	59	3	19	22	0	0	81
Total Volume	123	86	2	154	365	14	106	120	0	0	485
% App. Total	33.7	23.6	0.5	42.2		11.7	88.3				
PHF	.854	.796	.250	.653	.748	.583	.779	.811	.000	.000	.763

Accurate Counts
978-664-2565

Pedestrian & Bicycle Counts
at Location #4
City/State : Salem, MA
Weather : Clear

File Name : LG410004
Site Code : LG410004
Start Date : 1/15/2013
Page No : 2



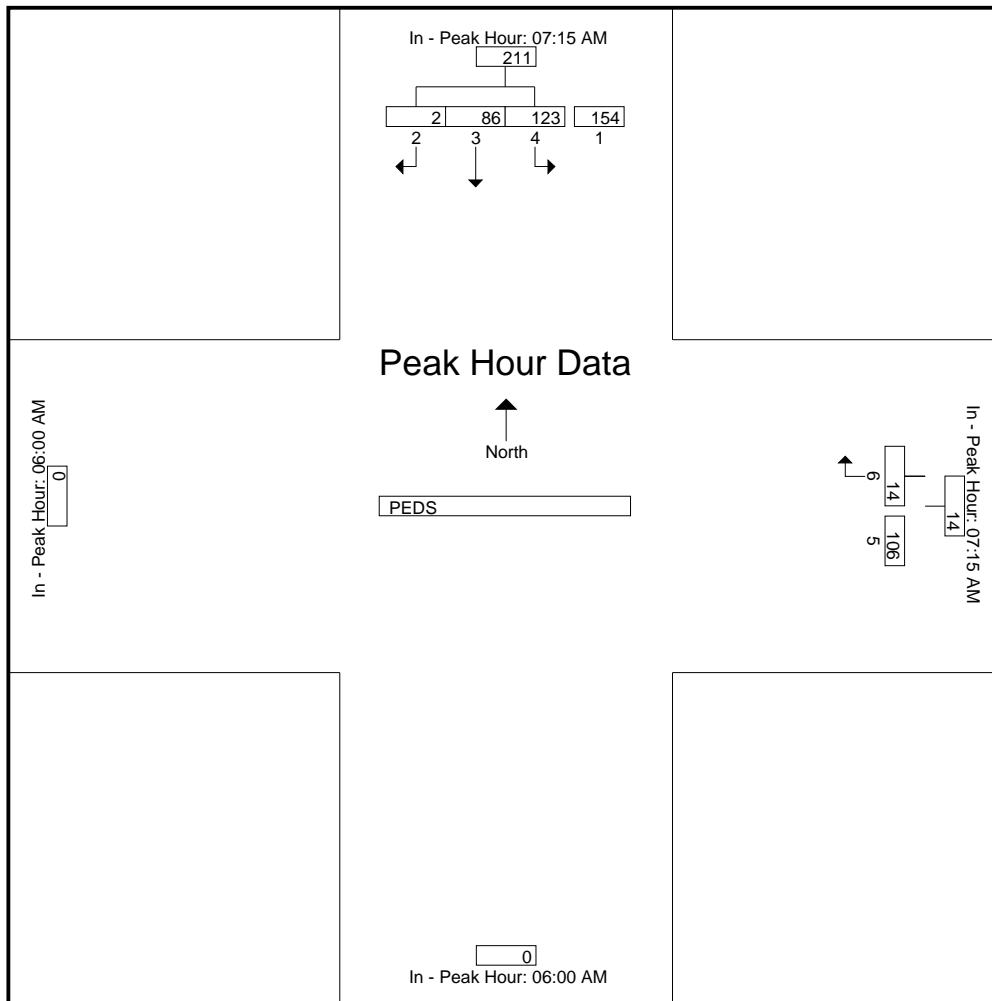
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:15 AM					07:15 AM			06:00 AM	06:00 AM
+0 mins.	36	27	0	59	122	3	34	37	0	0
+15 mins.	28	21	2	41	92	6	24	30	0	0
+30 mins.	33	22	0	37	92	2	29	31	0	0
+45 mins.	26	16	0	17	59	3	19	22	0	0
Total Volume	123	86	2	154	365	14	106	120	0	0
% App. Total	33.7	23.6	0.5	42.2		11.7	88.3			
PHF	.854	.796	.250	.653	.748	.583	.779	.811	.000	.000

Accurate Counts
978-664-2565

Pedestrian & Bicycle Counts
at Location #4
City/State : Salem, MA
Weather : Clear

File Name : LG410004
Site Code : LG410004
Start Date : 1/15/2013
Page No : 3



Accurate Counts

978-664-2565

Pedestrian & Bicycle Counts
at Location #4
City/State : Salem, MA
Weather : Clear

File Name : LG410004
Site Code : LG410004
Start Date : 1/15/2013
Page No : 1

Groups Printed- Bikes

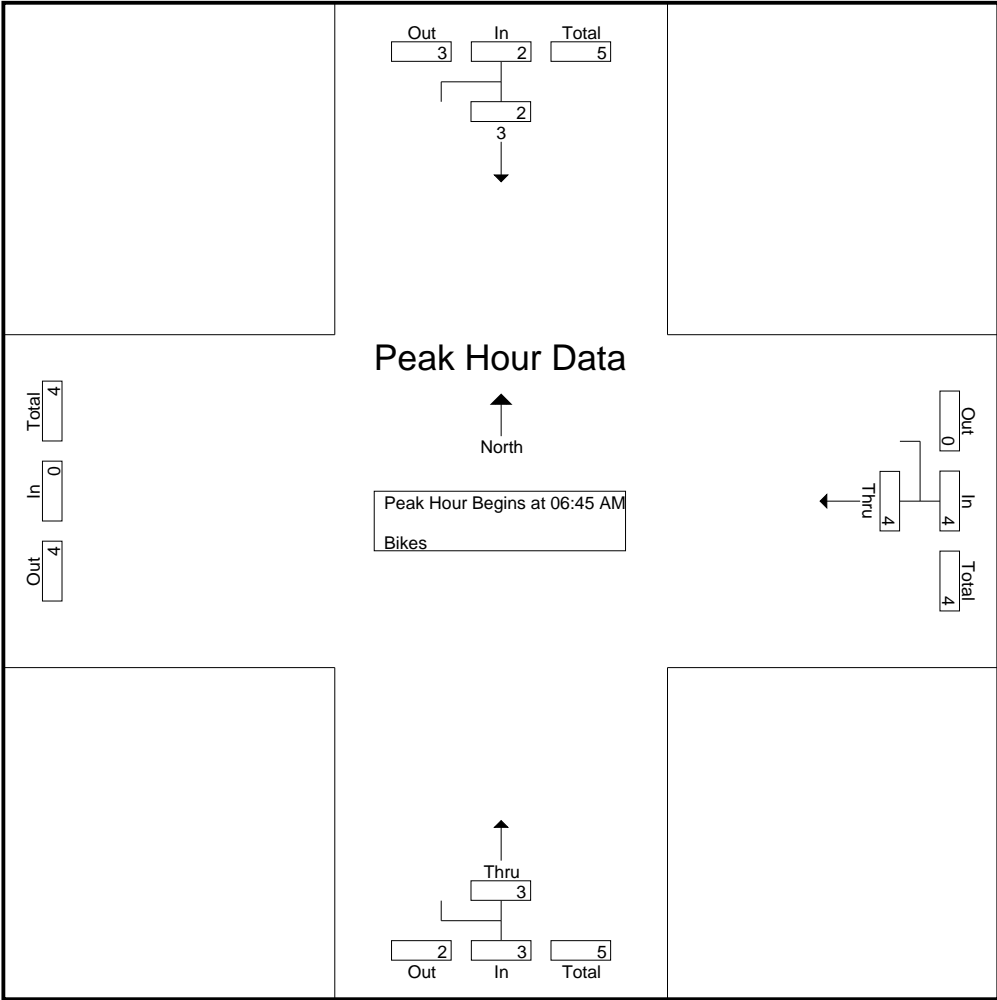
	From North	From East	From South	From West	
Start Time	Thru	Thru	Thru	Thru	Int. Total
06:00 AM	0	1	0	0	1
06:15 AM	0	0	0	0	0
06:30 AM	0	1	0	0	1
06:45 AM	0	1	1	0	2
Total	0	3	1	0	4
07:00 AM	1	0	0	1	2
07:15 AM	0	0	2	0	2
07:30 AM	1	3	0	1	5
07:45 AM	0	0	0	0	0
Total	2	3	2	2	9
08:00 AM	0	0	0	0	0
08:15 AM	0	0	0	0	0
08:30 AM	0	0	0	0	0
08:45 AM	0	0	0	0	0
Total	0	0	0	0	0
Grand Total	2	6	3	2	13
Apprch %	100	100	100	100	
Total %	15.4	46.2	23.1	15.4	

	From North	From East	From South	From West	
Start Time	Thru	App. Total	Thru	App. Total	App. Total
06:45 AM	0	0	1	1	2
07:00 AM	1	1	0	0	1
07:15 AM	0	0	2	2	2
07:30 AM	1	1	3	3	4
Total Volume	2	2	4	4	9
% App. Total	100		100		
PHF	.500	.500	.333	.333	.563

Accurate Counts
978-664-2565

Pedestrian & Bicycle Counts
at Location #4
City/State : Salem, MA
Weather : Clear

File Name : LG410004
Site Code : LG410004
Start Date : 1/15/2013
Page No : 2



Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	06:45 AM		06:45 AM		06:30 AM		06:00 AM	
+0 mins.	0	0	1	1	0	0	0	0
+15 mins.	1	1	0	0	1	1	0	0
+30 mins.	0	0	0	0	0	0	0	0
+45 mins.	1	1	3	3	2	2	0	0
Total Volume	2	2	4	4	3	3	0	0
% App. Total	100		100		100			
PHF	.500	.500	.333	.333	.375	.375	.000	

Accurate Counts
978-664-2565

Pedestrian & Bicycle Counts
at Location #4
City/State : Salem, MA
Weather : Clear

File Name : LG410004
Site Code : LG410004
Start Date : 1/15/2013
Page No : 3

