Walk Assessment

Newton, MA

January 19, 2015

Prepared for the Massachusetts Department of Transportation Bicycle and Pedestrian Safety Program in partnership with the Massachusetts Department of Public Health

Background

WalkBoston working with Toole Design Group (TDG) led a walk assessment in Newton, Massachusetts on Monday, November 24, 2014. The assessment is part of the Massachusetts Department of Transportation's (MassDOT) Bicycle and Pedestrian Safety Awareness and Enforcement Program, funded by the Federal Highway Safety Improvement Program (HSIP), in association with the Massachusetts Department of Public Health. The MassDOT program is a collaboration among Federal, State, regional, and local agencies, along with advocacy groups, MassBike and WalkBoston, to improve bicyclist and pedestrian safety in identified high-crash areas.

WalkBoston is a pedestrian advocacy organization whose mission is to make walking safer and easier in Massachusetts to encourage better health, a cleaner environment, and vibrant communities. The purpose of the walk assessment is to develop knowledge and awareness of the pedestrian environment at the State and municipal level.

This assessment report has been prepared by TDG based on comments and observations made by members of the assessment team during the assessment, as well as data collected by WalkBoston prior to the assessment. The report summarizes the observations made in the assessment area and makes recommendations for improvements to the built environment to increase walkability. The observations vary from specific infrastructure deficits, such as faded crosswalks or uneven sidewalks, to general comments on traffic speeds or land use patterns (e.g., vacant storefronts). Likewise, the recommendations range from specific fixes (e.g., paint crosswalk) to suggestions for further study (e.g., evaluate the feasibility of installing raised crosswalks).

The City of Newton is one of the twelve communities participating in MassDOT's multi-disciplined program to improve bicycle and pedestrian safety in Massachusetts. One of the components of the MassDOT program is to conduct walk assessments. The assessments have three goals:

1. Foster an awareness of the infrastructure elements which contribute to the walking environment;
2. Evaluate the safety and quality of the walking environment along the route; and
3. Recommend infrastructure improvements.

The assessment is not meant to be a complete inventory of infrastructure deficiencies, nor is it meant to provide specific designs for improvement. WalkBoston leads the assessments as a means to build local capacity for improving the built environment for walking. This report may be used as a resource for municipal staff, or for professionals who the City may engage to design and implement policies, programs, and infrastructure improvements.

Assessment Team

Representatives from the City of Newton, MassDOT, WalkBoston, and TDG participated in the walk assessment. The members and their affiliations are provided in **Table 1**.

Table 1 - Assessment Team

Team Member	Agency/Affiliation	Email Address
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The assessment took approximately two and a half hours and included a brief introduction about the process, walking the assessment route, and a discussion and summary session.

Assessment Location

WalkBoston coordinated with the City of Newton's Transportation Team to identify the assessment study area where pedestrian deficiencies are present and the number of crashes involving pedestrians are high. Transportation Team members include representatives from the Newton Police Department, who have been engaged in an enforcement/awareness program as part of the same MassDOT Bicycle and Pedestrian Safety Program.. The study area for the Newton walk assessment was determined to include Washington Street from Walker Street to Harvard Avenue. In addition, the walk assessment focused on the four intersections of:

- Washington Street @ Walker Street (unsignalized);
- Washington Street @ Lowell Avenue (signalized);
- Washington Street @ Walnut Street (signalized); and
- Washington Street @ Harvard Avenue (unsigalized, pedestrian beacon).

The Washington/Walnut intersection is one of the enforcement locations where Newton Police are instituting their enforcement/awareness campaign.

Washington Street is a four lane arterial roadway that continues into the Town of Wellesley located to the west and the Brighton neighborhood of Boston located to the east, including direct interchange connections to the Massachusetts Turnpike east and west of the study area. The roadway provides two lanes in each direction throughout the study area, with a posted speed limit of 35 miles per hour.

The study area is heavily served by the Massachusetts Bay Transportation Authority (MBTA) through Commuter Rail train service, express bus service, and local bus service. The Framingham/Worcester Commuter Rail line runs parallel to Washington Street within the study area, with a stop provided between Harvard Avenue and Walnut Street, including staircase access via the bridges on both roadways. The area is also served by the 553, 554, and 556 bus routes which provide local bus service through the area and express bus service via the Massachusetts Turnpike (Mass Pike) to Boston. The 59 bus also provides local service on Walnut Street.

Washington Street is a car-dominated corridor that parallels the Mass Pike. It is loud due to traffic noise from the highway, has a relatively wide right-of way, and fast moving traffic. Despite its obvious walkability challenges, pedestrians frequent this area – either crossing from the MBTA commuter rail stop, several MBTA bus stops, a Newtonville shopping district, or dining at one to the Washington Street restaurants, people cross this corridor at all times of day. Restaurants, retail establishments, car dealerships, office buildings and the United States Post Office line the north side of this section of Washington Street. The south side of the street is used for both short- and long-term parking. Commuters using the Newtonville MBTA commuter rail station use the long-term parking spaces. The one-sided development pattern and proximity to the Mass Pike is a challenge when thinking about creating safe, walkable places.

This walk assessment comes shortly after a draft CTPS-sponsored study suggested some safety and quality improvements for the Washington Street corridor. The CTPS study should be consulted in conjunction with the recommendations in this assessment report to ensure that the mutual goals of pedestrian safety and vibrant, pedestrian-friendly environments are met.

The assessment area is shown in **Figure 1**.

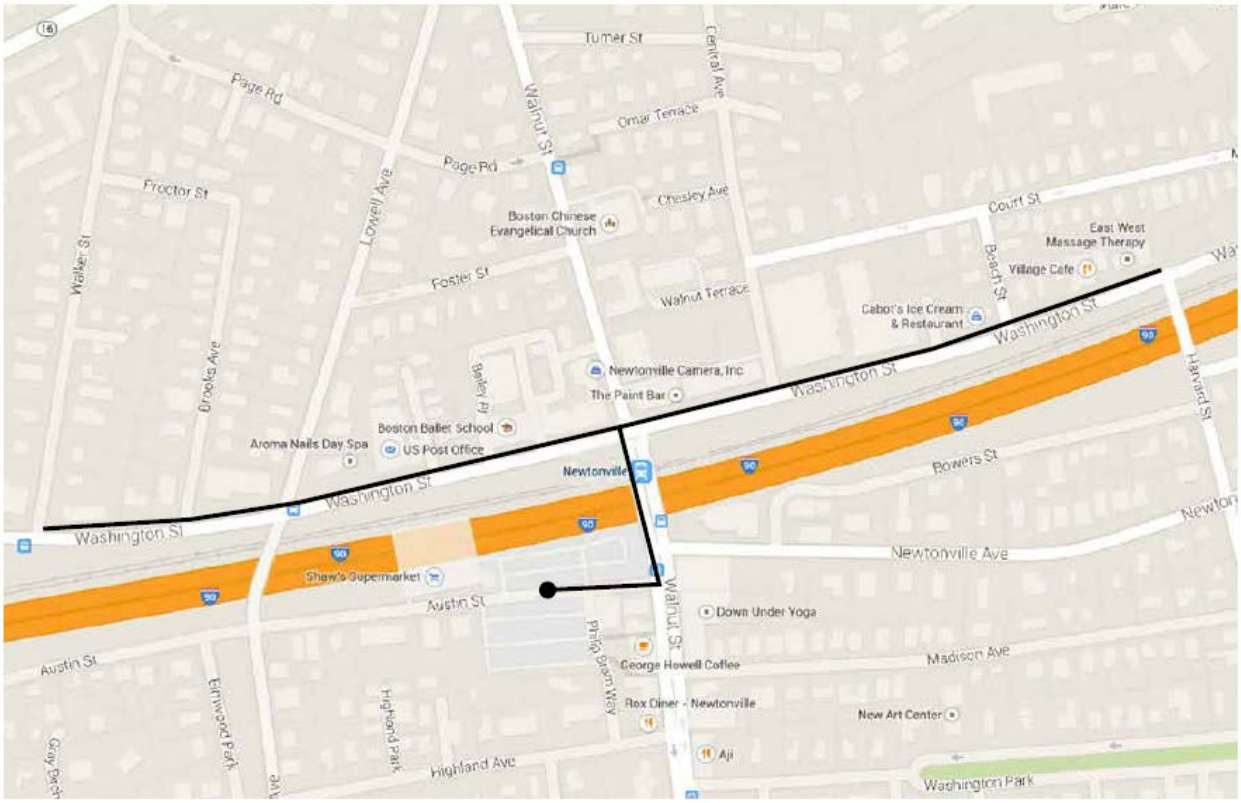


Figure 1 - Assessment Area Map

Assessment Observations and Recommendations

During the assessment the topics covered included the potential for narrowing and reducing the number of travel lanes, calming traffic, providing improved ADA accessibility at intersections, providing improved crossing opportunities throughout the corridor, and improving the quality and condition of existing sidewalk facilities. The following section describes both the observations and recommendations by location. The locations include area-wide recommendations as well as location specific recommendations.

Area-wide

During the assessment, the team noted observations that are applicable throughout the Washington Street corridor. It is important to note that similar issues exist on many corridors throughout the City of Newton, and recommendations included in this assessment are applicable city-wide in locations where similar issues exist.

The assessment team discussed the importance of maintaining clear sidewalks by locating utility poles, hydrants, signal posts, and other street furniture in order to maintain a minimum three foot clear width to comply with current ADA/AAB standards. In addition, the sidewalks should be clear of any potential tripping hazards and overgrown vegetation. The assessment team noted several locations along the south side of Washington Street where large trees reduced the clear sidewalk width below the minimum of three feet required for ADA accessibility. Additionally, there were many tripping hazards observed, including heaving sidewalk panels and improperly removed parking meter posts. Existing sidewalk materials are inconsistent and in poor condition, with frequent transitions between concrete and asphalt sidewalks as well as missing segments with gravel or earth paths.

Figure 2 - A tree blocks the sidewalk.

The team also noted that the existing trees and vegetation on the south side of the fence separating Washington Street from the Massachusetts Turnpike are dead and blighted. Several members noted that the walking environment may be improved with the installation of new trees or shrubbery to provide a visual barrier to the adjacent highway and reduce traffic noise.

The team also noted that intersections along Washington Street have inconsistent curb ramp locations and accessible features. Accessible pedestrian signals are not provided at any of the intersections along the assessment corridors.

The assessment team noted that drivers traveling on Washington Street frequently drive at high speeds, especially during off-peak hours. Newton staff indicated that the 85th percentile speed measured during a recent traffic count was 38 miles per hour. Team members noted that the road appears to provide excess capacity for the given traffic volumes, and that crossing the road at unsignalized locations can be difficult given the multiple threats presented by the two through lanes in each direction. The Central Transportation Planning Staff (CTPS) recently prepared a study for the Washington Street corridor that recommended implementing a road diet, reducing Washington Street to three lanes including a center turning lane. Members of the assessment team noted that frequent left turns at intersections often result in weaving, as the left through lane functions as a de-facto left-turn lane. The reduced travel lanes would encourage lower speeds and improve yielding behavior at unsignalized crosswalks.

The assessment team discussed the availability, type and location of parking along Washington Street. Before any of the recommendations are seriously considered, the City of Newton should conduct a parking utilization study. The results of the study could help validate the more comprehensive parking changes proposed for the corridor.

The assessment team discussed crosswalk standards for the City of Newton, which were recently revised to provide high visibility continental style crosswalks without parallel lines. Members of the blind community noted at a recent assessment in Watertown that this style of crosswalk may confuse Seeing Eye dogs, which are trained to follow the parallel lines in a marked crosswalk. The City should consider revising the standard crosswalk markings to include both the parallel lines and the high visibility continental markings.

The team also discussed lighting along the Washington Street corridor. Team members noted that there are segments where the spacing of the existing street lights creates dark spots, and the existing lighting is not at a pedestrian scale. The City should consider implementing pedestrian scale lighting in areas of high pedestrian use, with lights spaced appropriately to eliminate dark spots.

Short-term Recommendations:

- Provide ADA-compliant curb ramps at all crosswalks including detectable warning panels.
- Remove parking meter post stubs to eliminate tripping hazards.
- Maintain minimum ADA clearance on all sidewalks through the widening of sidewalks or removal of obstacles.
- Conduct parking utilization study

Long-term Recommendations:

- Replace the existing sidewalks with new, concrete sidewalks throughout the corridor.
- Provide trees or shrubbery to provide a visual and sound barrier between pedestrians on the south sidewalk and the Mass Pike.
- Install pedestrian countdown indications and accessible pedestrian pushbuttons at all signalized intersections.
- Locate APS pushbuttons adjacent to the curb ramps and clear of other street furniture wherever possible.
- Review the feasibility of a road diet to remove a travel lane, reducing the cross-section to a single travel lane in each direction with a center turning lane.
- Consider revising crosswalk standards to include parallel lines.
- Consider installing pedestrian scale lighting.

Washington Street at Walker Street

Washington Street at Walker Street is a three-leg unsignalized intersection, with stop-control provided on the Walker Street approach to Washington Street. No crosswalks are provided across Washington Street and the crosswalk across Walker Street is not marked. The existing curb ramps do not provide detectable warning panels. There are Massachusetts Bay Transportation Authority (MBTA) bus stops provided on both sides of Washington Street at Walker Street serving the 553 and 554 Express Bus routes.

The assessment team noted that riders using the inbound bus stop traveling to and from the adjacent residential neighborhoods are not provided with a crosswalk, and therefore must cross four travel lanes in order to access the bus stop. It was also noted that there is a second bus stop in close proximity at Lowell Avenue, approximately 400 feet to the east. The team also noted that the City has recently proposed constructing a dog park on the southwest side of the intersection. The MBTA should also consider consolidating with the adjacent bus stop to the west. If the Lowell Ave EB bus stop is moved to the far side of that intersection, the distance between stops will be increased, and consolidation may no longer be reasonable. If the bus stop remains in the current location, the City should consider installing a new crosswalk across Washington Street. City staff noted that this location provides sufficient room for a bus shelter, which would not be feasible at the bus stop at Lowell Avenue. Any new crosswalk treatment across Washington Street should include enhanced pedestrian features such as a rectangular rapid flashing beacon, curb extensions, high visibility markings, and/or signage.
The team noted that there are gaps in the sidewalk along the south side of the roadway in the vicinity of Walker Street. An asphalt sidewalk is provided within the limits of the bus stop, however there is a 150 foot gap where a gravel path is provided to the east, while no sidewalk is provided to the west. The City should construct a new sidewalk to provide a contiguous sidewalk, serving the adjacent on-street parking and facilitating future potential uses of the adjacent site. The City should also consider extending the sidewalk to the west, especially if a new dog park is constructed in that location.

Short-term Recommendations:

- Connect the sidewalk gap between the bus stop at Walker Street and points east.
- Stripe a new crosswalk across Walker Street.
- Install detectable warning panels at the existing curb ramps.

Long-term Recommendations:

- Extend the south side sidewalk to improve future use of the area.
- Coordinate with the MBTA to review the feasibility of consolidating the two bus stops and adding a bus shelter.
- If the existing bus stop at Walker Street remains and/or the area is designated for re-use, consider installing a high visibility crosswalk across Walker Street with enhanced features such as a rapid flashing beacon and curb extensions.

Washington Street at Lowell Avenue

Washington Street at Lowell Avenue is a four way signalized intersection. The City has recently constructed curb extensions, however the crosswalks are still long on the Lowell Ave legs due to the skew of the intersection and the large turning radii provided for trucks. The traffic signal provides a pushbutton activated exclusive pedestrian phase. The curb ramps at all four corners are ADA accessible and provide detectable warning panels.

Figure 3 - Curb ramps and pedestrian signals at Lowell Avenue

Members of the assessment team noted that the existing pedestrian pushbuttons do not provide accessible features including locator tones, vibrotactile walk indications, pushbutton locator tone, tactile arrows, and/or vibrating pushbuttons. The team also noted that the pedestrian signal indications do not include countdown timers. The City should install pedestrian countdown indications and accessible pedestrian signals to enhance the existing crosswalk facilities for all users.

The assessment team noted that there is no separation between the sidewalk and the parking lot of the adjacent service station on the northwest corner. The City should consider installing a raised divider, planters, or other forms of vertical separation in order to discourage drivers from parking on or driving on this segment of sidewalk.

Team members also noted drainage issues on the northwest corner, which causes ponding at the curb ramp. The City should consider installing a new catch basin or otherwise improving the drainage patterns at this corner in order to prevent stormwater from collecting in the crosswalk.

Team members noted that visitors to the adjacent United States Post Office east of Lowell Avenue frequently park on the south side of Washington Street and cross directly at the building rather than the nearby crosswalk at Lowell Avenue. The City should consider replacing the existing single space parking meters on the south side of the roadway with a multi-space meter located near Lowell Avenue, which would draw pedestrians towards the crosswalk to pay for parking before crossing to the Post Office.

The MBTA should consider relocating the eastbound bus stop from the near side to the far side of the intersection, which would even out the stop spacing in the study area. If a four-lane cross section is retained on Washington St, a bus bulb (curb extension) should be considered to minimize the length of the bus stop, increase sidewalk space for pedestrian travel and ADA compliance, and minimize delay to bus service.

Short-term Recommendations:

- Provide vertical separation between the sidewalk, such as curbing or planters, and the service station parking lot on the northeast corner.
- Upgrade drainage on the northwest corner to eliminate ponding issues.

Long-term Recommendations:

- Consider installing a multi-space parking meter on the south side of the roadway to encourage Post Office visitors to cross at the crosswalk.
- Install accessible pedestrian signals including pedestrian countdown indications.
- Coordinate with the MBTA to relocate the eastbound bus stop to the far side of the intersection.

Washington Street at Walnut Street

Washington Street at Walnut Street is a four leg signalized intersection. The existing traffic signal provides a pushbutton activated exclusive pedestrian phase with pedestrian countdown indications, however the existing pushbuttons do not provide accessible features. The existing apex pedestrian ramps do not meet current ADA standards and are in generally poor condition. City staff noted that there is a proposed plan to reconstruct all four corners at this intersection to provide curb extensions and new ADA accessible ramps, and is expected to be constructed within the next two years. There are three MBTA bus stops provided at the intersection, including two on Washington Street and one on Walnut Street. A large bus shelter is provided for the inbound bus stop on the southeast corner of the intersection. Direct access to the Newtonville Commuter Rail station is provided via a staircase on the east side of Walnut Street immediately south of Washington Street.

The assessment team noted that the existing ramps are in generally poor condition, with inconsistent curb reveal creating tripping hazards on the south corners. The curb ramp on the northeast corner does not connect with the east crosswalk. The team also noted the lack of accessible pushbuttons. It is recommended that if the intersection be reconstructed in order to provide curb extensions that separate ramps for each crosswalk on all four corners. Accessible pedestrian signals should be installed on all corners adjacent to the proposed ramps.

Assessment team members noted the high volume of right turns on the northbound approach results in occasional conflicts between drivers turning right on red during the exclusive pedestrian phase. The City should consider installing “NO TURN ON RED” signs in order to reduce potential conflicts. In order to address the potential traffic impacts related to the restriction, the City could alternatively consider installing dynamic LED signs that indicate “NO TURN ON RED” OR “NO RIGHT TURN” that would be activated during the exclusive pedestrian phase.

Short-term Recommendations:

- Install accessible pedestrian pushbuttons as part of the proposed curb extension project.
- Install individual accessible ramps for each crosswalk.
- Install a “NO TURN ON RED” restriction for the northbound Walnut Street approach.

Washington Street between Walnut Street and Harvard Avenue

Members of the assessment team noted that east of Walnut Street, parallel on-street parking is provided on the north side adjacent to local businesses while angle parking is provided on the south side. Drivers parking on the south side are frequently observed crossing the street midblock to access businesses. The City should consider reconfiguring this section of the roadway to shift the angle parking to the north side and reduce the need for pedestrians to cross between the parking and businesses. The revised roadway cross-section may consider the use of back-in angle parking, which is safer for all roadway users.

Members of the assessment team noted that there are insufficient crossing opportunities for pedestrians throughout the corridor. The segment of Washington Street between Walnut Street and Harvard Avenue extends over 1,300 feet between crosswalks. Given the dense commercial land use on the north side of the roadway, there is demand for an additional crosswalk to connect the on-street parking with adjacent businesses. The City should consider installing an additional crosswalk, including curb extensions and a rectangular rapid flashing beacon or a pedestrian hybrid (i.e. HAWK) signal if pedestrian volumes meet the appropriate guidance provided in the MUTCD. Alternatively, the City could consider reconfiguring the east segment of roadway to eliminate the parking on the south side and consolidate to a single lane of angled parking on the north side, which would eliminate the need to cross Washington Street.

Figure 4 - Angle parking and wide cross-section east of Walnut Street

Long-term Recommendations:

- Consider reconfiguring the roadway to provide back in angle parking on the north side and parallel parking on the south side.
- Consider installing a crosswalk with curb extensions and a rectangular rapid flashing beacon or a pedestrian hybrid signal.
- Consider consolidating the two parallel parking lanes to a single back-in angle parking lane on the north side of Washington Street.
- Consider removing single space parking meters and installing multi-space parking meters on the south side of the roadway at designated crosswalks to encourage pedestrians to cross at the crosswalk.

Washington Street at Harvard Avenue

Washington Street at Harvard Avenue is a three leg intersection with stop control provided on the northbound Harvard Avenue leg. A crosswalk is provided across Washington Street on the west leg of the intersection, including a curb extension on the southwest corner. Overhead mast-arm mounted rectangular rapid flash beacons are provided with pushbutton activation. Direct access to the Newtonville Commuter Rail station is provided via a staircase on the west side of Harvard Avenue immediately south of Washington Street.

The assessment team noted that yielding behavior has not improved sufficiently at this intersection since the recent installation of the rectangular rapid flash beacons. Team members suggested that this may be related to the positioning of the beacon indications or the brightness of the flashing lights. The team members also noted that there is no pedestrian confirmation light to allow users to know that the beacon is active. The City should consider lowering the height of the overhead mast arm to no more than 17 feet above the roadway surface. The beacon indications should be installed contiguous with the pedestrian warning sign in order to maximize visibility and provide improved shielding from sunlight. The City should also consider installing confirmation lights and accessible pushbuttons, including an audible message to alert users that the beacon is active and instructing them to wait for cars to stop before crossing.

The assessment team noted that no curb extension is provided on the north side of the roadway at the crosswalk. Given the vertical curvature of the roadway and the adjacent on-street parking, this limits the visibility of pedestrians for drivers approaching from the east. The City should construct a curb extension at this location to enhance visibility and yielding for pedestrians.

As a long term measure, the City should consider options to replace the rectangular rapid flash beacon with a pedestrian hybrid signal in order to increase compliance. It is not typically advisable to install a pedestrian hybrid signal at an intersection as it results in confusion for drivers approaching on the side street. As such, it is recommended that either the signal be located approximately 100 feet west of Harvard Avenue or that a left turn restriction be installed for the Harvard Avenue northbound approach.

The team also noted that the bus stop on the north side of the intersection is extremely short, forcing buses to stop in the crosswalk. The City should remove parking as necessary in order to provide an appropriate length bus stop on the far side of the crosswalk.

Short-term Recommendations:

- Remove parking to extend bus stop.
- Construct a curb extension on the north side of the roadway at the crosswalk.
- Modify rectangular rapid flash beacon indications to provide enhanced visibility for drivers, including adjusting the vertical mounting height and providing better shielding.
- Install accessible pushbuttons and confirmation lights for the rectangular rapid flash beacon.

Long-term Recommendations:

- Consider replacing the rectangular rapid flash beacon with a pedestrian hybrid beacon. Consider relocating the crosswalk 100 feet to the west or restrict left turns from Harvard Avenue.

Appendix A lists all the observations and recommendations that were discussed during the assessment and described in the previous sections. The observations and recommendations are divided by location. For each observation and recommendation, the appendix includes the estimated time frame for completion, estimated construction costs, and the responsible agency. The time frame is categorized as short-term (0 to 3 years) or long-term (>3 years). The costs are categorized as low (<$10,000), medium ($10,001 to $50,000), or high (>$50,000).

Appendix B provides a toolkit of pedestrian facilities that summarizes typical treatments and provides a description. The treatments may or may not be recommendations outlined in this report. This toolkit may be used by the City of Newton to assist in developing a pedestrian-friendly community.

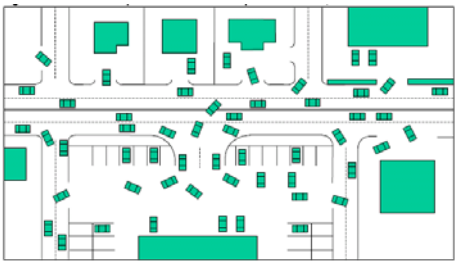
Appendix A: Table of Recommendations

Location	Observation	Recommendation	Time Frame	Cost	Responsible Agency
Area-wide	Intersections and sidewalks do not meet ADA accessibility standards.	Provide ADA-compliant curb ramps including detectable warning panels at all crosswalks.	Short-term	Medium	City of Newton
		Maintain minimum ADA clearance on all sidewalks through widening or removal of obstacles	Short-term	Medium	City of Newton
		Provide pedestrian countdown indications and accessible pedestrian signals.	Long-term	Medium	City of Newton
	Parking supply is often provided on the opposite side of the street from businesses	Conduct a parking utilization study.	Short-term	Low	City of Newton
	Travel speeds are high and roadway is difficult to cross.	Review the feasibility of a road diet to remove a travel lane.	Long-term	High	City of Newton
	Sidewalks are in poor condition	Replace sidewalks with new concrete sidewalks throughout the corridor	Long-term	Medium	City of Newton
	Sidewalks on south side of roadway are loud and unpleasant due to close proximity to the highway.	Provide trees or shrubbery to provide a visual and sound barrier between pedestrians and the highway.	Long-term	Medium	City of Newton
	Existing crosswalk standards cause difficulty for visually impaired pedestrians with Seeing Eye dogs.	Consider revising crosswalk standards to include parallel lines	Long-term	Medium	City of Newton
	Existing vehicle scale lighting causes dark spots along sidewalks	Consider installing pedestrian scale lighting.	Long-term	High	City of Newton

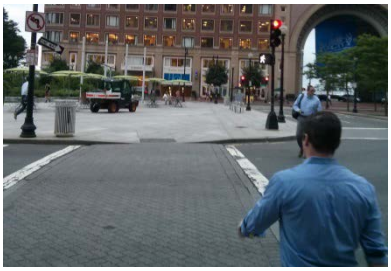
Location	Observation	Recommendation	Time Frame	Cost	Responsible Agency
Washington Street at Walker Street	Gaps in the sidewalk on the south side of Washington Street.	Connect the sidewalk gap between the bus stop at Walker Street and points east.	Short-term	Medium	City of Newton
		Extend the sidewalk west if future land use warrants.	Long-term	Medium	City of Newton
	No crosswalks provided.	Stripe a crosswalk across Walker Street	Short-term	Low	City of Newton
		Consider installing a high visibility crosswalk across Walker Street with enhanced features.	Long-term	Medium	City of Newton
	Existing curb ramps are not ADA compliant	Install detectable warning panels at existing curb ramps.	Short-term	Low	City of Newton
	Bus stops are closely spaced and lack shelters.	Work with the MBTA to review the feasibility of merging the two bus stops and adding a shelter.	Long-term	Low	City of Newton/MBTA
Washington Street at Lowell Avenue	Lack of separation between sidewalk and parking lot.	Install curb, planters, or other form of vertical separation.	Short-term	Low	City of Newton
	Ponding in curb ramps	Upgrade drainage	Short-term	Low	City of Newton
	Post Office visitors crossing midblock from south side parking spaces.	Install a multi-space meter near the Lowell Avenue crosswalk to encourage people to cross at the signal.	Long-term	Medium	City of Newton
	Accessible pedestrian signals not provided.	Install accessible pedestrian signals and countdown timer indications.	Long-term	Medium	City of Newton
	Bus stops are closely spaced	Work with the MBTA to relocate or consolidate the bus stop	Long-term	Low	City of Newton/MBTA

Location	Observation	Recommendation	Time Frame	Cost	Responsible Agency
Washington Street at Walnut Street	Accessible pedestrian signals not provided.	Install accessible pedestrian signals as part of the upcoming curb extension project.	Short-term	Medium	City of Newton
	Existing apex ramps are not ADA accessible	Install ADA accessible ramps (two per corner) as part of the upcoming curb extension project.	Short-term	Medium	City of Newton
	High volumes of right-turning vehicles result in pedestrian conflicts during the exclusive pedestrian phase.	Install NO TURN ON RED signage for the southbound approach.	Short-term	Low	City of Newton
Washington Street between Walnut Street and Harvard Avenue	South side parking forces people to cross to access businesses.	Consider reconfiguring roadway to provide back-in angle parking on the north side.	Long-term	Medium	City of Newton
	Limited crossing opportunities	Install a new crosswalk with a signal or beacon.	Long-term	High	City of Newton
	Pedestrians crossing roadway directly from parking spaces	Consider installing multi-space parking meters on the south side of the roadway near crosswalks	Long-term	Medium	City of Newton
Washington Street at Harvard Avenue	Short bus stop forces buses to stop in crosswalk.	Remove parking to extend bus stop.	Short-term	Low	City of Newton/MBTA
	Drivers have difficulty seeing the pedestrian beacon when backlit by the sun.	Adjust mounting of signal to reduce height and provide additional shielding.	Short-term	Low	City of Newton
	Pedestrians have difficulty knowing when signal is activated.	Install confirmation light and accessible push buttons.	Short-term	Low	City of Newton
	Yielding behavior for drivers is poor.	Consider replacing the beacon with a pedestrian hybrid signal.	Long-term	High	City of Newton

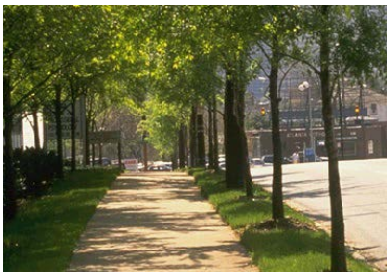
Appendix B: Pedestrian Facility Toolbox

Facility Type	Description	Sample Photo
Accessible Pedestrian Signals (APS)	Accessible pedestrian signals systems are the components used at a signalized intersection to alert pedestrians when they may cross a roadway. Accessible pedestrian signals include audible feedback during the pedestrian crossing phase, vibrotactile feedback, and locator tones to assist visually-impaired pedestrians.	
Access Management	Access management is the process to regulate the amount of driveways or median openings along a corridor. Access management can increase roadway capacity and limit conflicts with motorists and pedestrians.	
Chicanes	Chicanes are a traffic calming device that horizontally deflects motor vehicles resulting in reducing vehicular speeds. Chicanes are typically designed by the addition of a median or by shifting on-street parking from one side of the roadway to the other side of the roadway.	
Crosswalks	Crosswalks indicate to pedestrians the appropriate place to cross the street and inform drivers of potential pedestrian movements in the street. Crosswalk pavement markings may vary in styles; however, must follow the guidelines in the MUTCD. Additional enhancement measures should be used when the speed limit is greater than 40 mph, on multi-lane roadways, or based on engineering judgment.	

Facility Type	Description	Sample Photo
Curb Ramps	ADA-compliant curb ramps provide ramped access and detectable warning for persons with disabilities. Curb ramps are typically at least 5 feet wide with a level landing pad. Detectable warning panels should be a contrasting color to the adjacent surface.	
Curb Extensions	A curb extension is an extension of the sidewalk at intersections or mid-block to reduce the pedestrian crossing distance and provide greater visibility for pedestrians waiting to cross a street. Curb extension should not impede on bicycle travel along the roadway.	
Curb Radii Improvements	Curb radii improvements are modifications to existing curb lines or edges of the pavement at an intersection. These modifications typically are used to decrease crossing distances for pedestrians, increase pedestrian visibility, and/or to reduce vehicular speed by tightening the turning radii at the intersection corners.	
Edge Lines	Edge lines are solid white lines painted along the roadside curb that defines the driving lane and visually narrows the travel lane.	
In-Street Pedestrian Crossing Sign	A high-visibility sign placed on the centerline of a street prior to a crosswalk to alert motorists to yield when pedestrians are present in the crosswalk. When the sign is present, there tends to be an improved compliance of motorists yielding to pedestrians.	

Facility Type	Description	Sample Photo
Leading Pedestrian Interval (LPI)	A pedestrian crossing indication that permits pedestrians to move into the intersection 3-7 seconds before a green light is given to turning motorists that may cross the crosswalk. This increases visibility of pedestrians and reduces conflicts.	
Parklet	Temporary gathering area installed in the street adjacent to the curb as an extension of sidewalk space. This is temporary retrofit until a permanent curb extension is installed.	
Pedestrian Hybrid Beacon	An overhead pedestrian activated signal that requires traffic to stop during the pedestrian walk phase. When the beacon is not activated, the signals are dark.	
Pedestrian Crossing Island	Raised median or island that provides in-street refuge at a pedestrian crossing. The island reduces the amount of exposure time for the pedestrian.	
Pedestrian-Scale Lighting	Light fixtures used to illuminate a sidewalk or pathway typically closer to the ground and placed closer together than roadway lighting.	

Facility Type	Description	Sample Photo
Raised Crosswalk	A crosswalk raised from street-level to sidewalk-level. This elevated crosswalk increases pedestrian priority and visibility and slows approaching vehicles.	
Raised Intersection	An entire intersection raised from street-level to sidewalk-level. This elevated intersection slows approaching vehicles and increases pedestrian visibility.	
Rectangular Rapid Flash Beacon (RRFB)	An on-demand activated flashing beacon with a strobe "wig-wag" pattern that alerts motorists to pedestrians in the crosswalk. The RRFB is currently an interim approved device in the MUTCD.	
Shared Street	The road surface is typically at the same level as the sidewalk surface to create a continuous pedestrian space. A shared street is for motorists, pedestrians, bicyclists, and heavy vehicles.	
Shared-use Path	A two-way path that is open for bicyclists, pedestrians, and other non-motorized users. The path wide may vary depending on demand according to AASHTO guidelines.	

Facility Type	Description	Sample Photo
Sidewalk	A concrete pathway adjacent to the roadway. A sidewalk must meet minimum dimensions and smoothness for ADA-compliance. Sidewalks may have decorative paving or plantings as a buffer from the roadway and should be wider where high pedestrian volumes are present or desired.	
Suggested References & Design Guidance	FHWA *Manual on Uniform Traffic Control Deveices* – 2009 Edition AASHTO *Guide for Planning, Design, and Operation of Pedestrian Facilities* – 1st Edition – 2004 MassDOT *Project Development & Design Guide* – 2006 Edition NACTO *Urban Bikeway Design Guide* – 2nd Edition – 2014 NACTO *Urban Street Design Guide* – 1st Edition – 2013 ITE *Designing Walkable Urban Throughfares: A Context Sensitive Approach* – 2010 Edition U.S. Access Board – www.access-board.gov ITE Traffic Calming Library – www.ite.org/traffic Pedestrian and Bicycle Information Center – www.pedbikeinfo.org	