APPENDIX A

The Six E's

The Six E's

Engineering, Education, Encouragement, Enforcement, Equity, and Evaluation: What Boston Bikes and its partners are doing now.

Introduction

The Boston Bicycle Network Plan is designed to substantially shift the percentage of people who use cycling as a mode of transportation – from approximately 2% in 2013 to 10% in 2020. The American Community Survey shows more than an 80% increase in commute trips from 2007 to 2012. While the increase in ridership was due in part to the installation of bicycle facilities and the establishment of Hubway (Boston's bikeshare system) during this time, supporting programs played a key role in increasing bicycling levels.

As the bicycle network is implemented, Boston Bikes will continue to expand efforts to support bicycling engineering, education, encouragement and enforcement, ensure equity and conduct evaluations of program effectiveness. The following is summary of efforts in these six areas:

Engineering

The Boston Bicycle Network Plan focuses on the core component the engineering strategy – creating safe and comfortable places to bicycle. Two other import and aspects of engineering are the provision of bicycle parking and bike share.

Parking

- Per zoning guidelines in Boston, any residential project with at least nine dwelling units in a single building should include a secure bicycle parking area, and any non-residential project shall include a bicycle rack near each public entrance.
- More than 2,700 bike parking spaces were installed between 2008 and 2013.

- The City is committed to adding an additional 250 spaces each year at locations with high demand.
- Boston began piloting on-street bike parking corrals in 2012.

Hubway Bikeshare

- The New Balance Hubway bike share launched in July 2011 and expanded within Boston and into the neighboring municipalities of Cambridge, Brookline, and Somerville in July 2012. Within two years the system saw more than one million trips taken. The system:
    - Is a low-cost, low-commitment introduction to cycling.
    - Offers cycling as one leg of a commute or instead of transit or driving.
    - Provides a bike to interested riders who do not have their own.
    - Provides a fun mode for visitors to explore the city with conveniently located stations.

Education

Each year, Mayor Menino's Boston Bikes conducts educational campaigns and programs for bicyclists and drivers in the Boston area. Expanding the bicycle network in Boston requires that all road users understand the rules for sharing the road.

Information for the General Public

Maps

- Boston Bikes publishes a free map of Boston's existing bike facilities and bike routes (www.cityofboston.gov/images_documents/bike%20map_tcm3-14074.pdf).
- The Metropolitan Area Planning Council also publishes a map of the bike facilities in the greater Boston area (trailmap.mapc.org/).
- Hubway kiosks include maps that show bike lanes and bike paths along with station locations and helmet vending locations.
- Private organizations such as Ride the City (www.ridethecity.com/boston) and Google Maps (www.maps.google.com) use data from the city to identify safe routes for bicyclists.

Excise Tax Inserts

- In 2013, Boston Bikes included information on rules of the road related to cycling in excise tax mailings to nearly 500,000 Boston car owners.

- Past excise tax mailings, in 2011 and 2012, have included explanation of pavement markings, and ways for cars to reduce vehicle/bicycle collisions.

Fleet Vehicles

- The City of Boston added "Look for Bicycle" stickers to all Boston cabs, 1825 in total, to reduce dooring incidents.
- The City of Boston added side guards on 19 Public Works heavy vehicles in June of 2013. This is the largest pilot to date of this safety measure in the United States.

Instruction for Bicyclists

Programs

- **Youth Cycling Program**
  Each year the City of Boston offers comprehensive bicycle safety classes to 4,000 youth in grades K-12. Each course is taught by a team of trained instructors, who supply the class with a variety of bicycles to accommodate participants who may not own their own bicycle. The majority of the class time takes place on bicycles.
- **Urban Cycling Campaign**
  In 2013, Boston is rolling out its first urban cycling campaign as part of an effort to decrease the cyclist crash injury rate 50% by 2020. The campaign targets bicyclists aged 18-30. The data-driven campaign aims to educate bicyclists on key causes of crashes and how to avoid them.
- **Hubway Safety Classes**
  Boston Bikes partners with MassBike to offer classes for new Hubway users that include both classroom and on-bike training.

Partners

- **MassBike** offers bicycle safety and advocacy classes on a regular basis massbike.org/education/.
- **Bike Safe Boston** published and distributed a wallet-sized "Bicyclist's Accident Report" which bicyclists can use to collect important information following a traffic collision. Bike Safe Boston also maintains a blog about riding safely and legally at bikesafeboston.com.
- **The Registry of Motor Vehicles** driver's manual includes 2011 updates on laws regarding bikes.

- **The Boston Public Health Commission's** safety campaigns promote helmet use and safe driving.

Encouragement

Ridership can be increased in part by actively encouraging residents and visitors to use a bike for a variety of trips and purposes.

Events

- Each September, **Hub on Wheels** attracts nearly 5,000 riders to bike their choice of a 10, 30, or 50 mile loop through Boston. The City closes Storrow Drive, allowing bicyclists to take over the iconic street for this event.
- **Bike Week** in May and **Bike Fridays** include bike convoys from 20 neighborhoods to City Hall Plaza. On the plaza, Boston Bikes and the surrounding expo provide free breakfasts, product samples, bike tune-ups, and information about cycling.
- **Circle the City** summer events across the city close streets to cars for one day in the summer in order to promote healthy, active living along corridors near city parks. Boston Bikes provides tours, bike rentals, a children's bike rodeo, and information to encourage bicyclists at these events.

Bike to Market

- A partnership between the City of Boston and the Boston Cyclists Union provides free bicycle maintenance at farmers markets around the city during the summer.

Bike Friendly Business Awards

- Boston Bikes recognizes businesses who encourage bicycling among employees and customers. Eligible activities include providing racks and showers, participating in Boston Bikes events, guaranteeing rides home for bike commuters, providing bike commuter training sessions, and offering Hubway corporate memberships.

Helmets and Lights Distribution

- Boston Bikes distributes helmets and educates bicyclists about lights, promoting year-round cycling and helping more bicyclists comply with the law. Chapter 85, Section 11 B, clause 8 requires bicyclists to use a white headlight and rear red reflector or light at night.

Partners

Across the city, other government agencies, businesses, organizations, and individuals are doing the following to encourage cycling:

- Massachusetts Bay Transit Authority (MBTA) offers bike parking and secure, access-controlled bike storage at major commuter T stations, allows riders to bring bikes on the T during off-peak hours on the Red, Orange, and Blue lines, and provides bike racks on the front of most buses. As demand grows, expanded accommodations for bicyclists should be considered.
- Transportation management associations (TMAs) in Boston work to ease traffic congestion by promoting transit use, walking, carpooling, and cycling. Boston area TMAs include: A Better City TMA, Seaport TMA, the Charles River TMA, and MASCO.
- MassCommute's annual Bicycle Challenge encourages communities, neighborhoods, and businesses to compete by logging the greatest number of miles bicycled during Bike Week.
- MassBike distributes T-shirts, bells, and reflective leg bands during Bike Week.
- Bicycle Benefits provides $5 helmet stickers for discounts at participating retailers,
- NuRide and Endomondo provide rewards for cycling for transportation.
- The Metropolitan Area Planning Commission organizes the Bicycle and Pedestrian Professionals Working Group, which holds quarterly group meetings to facilitate idea sharing between municipalities in the Greater Boston area. This forum may be used for professional feedback and evaluation of plans and programs in Boston as well as to expose planners to new ideas and innovative design solutions.

Enforcement

Massachusetts' bike laws, revised in 2009, are among the most aggressive in the nation in terms of protecting bicyclists. For example, in Massachusetts, bicycles are allowed on all public roadways, bicyclists can take the full lane, cars are at fault in all dooring incidents, etc. Enforcement, especially when it targets high-risk behaviors and maximizes educational benefits, will help to make road users more compliant and make both driving and bicycling behaviors more predictable.

- **Police Stops**
  Boston police annually target bicyclists running red lights in the spring and fall. At these stops, officers may issue a warning citation or fine and often offer helmets to those offenders not wearing one. These have been guided by a "stop and educate" philosophy and have been conducted primarily in the Back Bay, Downtown Crossing, and Allston neighborhoods.
- **Ticketing**
  Boston police regularly ticket motor vehicles parked in bike lanes. The fine was increased

to the equivalent of parking in a handicapped spot ($100) rather than the lower penalty incurred by a double parking violation ($45).

- **Data-driven Enforcement**
  Based on the 2013 Cyclist Safety Report, which included police and EMS incident reports, with crowd-sourced reporting of ridership, the City can identify the areas with the highest incidence of collisions and the high risk behaviors that cause them. With this information, resources can be targeted towards the areas most in need of enforcement. Additionally, the issuing of tickets and improved reporting of accidents by police provide better quality data for future decision making.

- **Bicycle Theft**
  The Boston Police Department offers a service to register bikes and record serial numbers. Victims of bike theft have a simple and efficient way to report the crime and theft may be deterred over time.

Equity

Several of Boston Bikes' educational and encouragement programs are targeted towards low-income families, particularly the Youth Cycling Program, Roll it Forward, the low-cost helmet initiative, Subsidized Hubway memberships, and Bike to Market.

- **Low-Cost Helmets**
  In order to facilitate safe cycling for Boston residents and Hubway users, Boston Bikes offers low-cost helmets throughout the City. These helmets cost as little as $7.99 and are available at CVS, Walgreens, and other participating stores near Hubway stations. Additionally helmets can be purchased online for less than $20. Free helmets are often provided to low income residents at events and trainings.

- **Roll it Forward**
  Roll It Forward is an innovative program which collects, repairs, and distributes bikes to low-income Boston residents who might not otherwise have access to a bike, in collaboration with local organizations. Each bicycle recipient is fitted with a helmet and provided instruction on safe bicycle handling skills. More than 2,000 bikes have been donated in three years.

- **Subsidized Hubway memberships**
  More than 800 subsidized memberships were distributed to low income residents in a program which started in partnership with the Boston Public Health Commission.

- **Women's Cycling Initiative**
  Bicycle count data showed that even as overall bike ridership levels increased during 2011 and 2012, transport cycling remained was more common among men than women.

Boston Bikes piloted an initiative to support women who already bike and to encourage more women to bike in Boston.

Evaluation

The City of Boston regularly evaluates the state of bicycling through the following means:

- **Annual Bike Counts**
  Each year, Boston Bikes conducts annual counts in the fall at more than 20 intersections and bridges. These counts have shown a steady increase across the previous five years. Additionally, the Central Transportation Planning Staff for the Boston Region Metropolitan Planning Organization collates all of the data collected by bike and pedestrian counts throughout the greater Boston area.

- **Safety Data**
  Using data compiled and analyzed in the 2013 Cyclist Safety Report, Boston Bikes and BTD will continue to redesign intersections that experience high frequencies of crashes. The combination of BPD, BEMS, and self-reported incidents clearly indicate which areas of the city have the have the highest demand for new infrastructure. Corridors with large numbers of crashes will therefore be prioritized in the implementation of the network plan. Subsequent studies will also look at roadway treatments that have successfully reduced the incidence of accidents.

- **Research**
  During the planning phase of the network plan, Boston Bikes commissioned a study of priority shared lanes. With oversight by the Federal Highway Administration, the experiment is determining how different combinations of additional road markings can improve conditions for bicyclists on Brighton Avenue in Allston. The results of the study will inform the design of treatments on other streets.

APPENDIX B

Facility Types

Facility Types

The Boston Bicycle Network Plan consists of a variety of facility types which respond to the context and character of Boston's streets, whether on the road, alongside the road, or through parkland. This variety is important – some bicyclists prefer to ride away from traffic, while other bicyclists are more comfortable riding on the street.

The following types of bicycle facilities are included in the Network Plan. These bicycle facilities are consistent with guidance developed by Boston Complete Streets Design Guidelines, the National Association of City Transportation Officials (NACTO), and the American Association of State Highway and Transportation Officials (AASHTO). Recommendations for bicycle facilities were developed with consideration for minimum travel and parking lane widths included in the Boston Complete Streets Design Guidelines.

The following facility types are used in the Bike Network Plan:

1. Shared Use Path
2. Cycle Track
3. Bicycle Lane
4. Buffered Bicycle Lane
5. Contraflow Bicycle Lane
6. Bus-Bicycle Lane
7. Shared Lane Marking
8. Advisory Bicycle Lane
9. Priority Shared Lane
10. Shared Street
11. Recommended Local Route
12. Neighborway

1. Shared Use Path

Shared use paths are physically separated from traffic and designated for shared use by

bicyclists and pedestrians. They often extend through parkland or along waterways. Shared use paths are popular with bicyclists of all skill levels because they provide protection from traffic. To support the vision and goals of the plan, shared use paths should be hard surfaced, maintained year round, well lit, and resurfaced and/or graded regularly to ensure a smooth, safe surface. Shared use paths should have a minimum width of 11', and should be 12'-14' wide for higher volume paths. Along high volume corridors, it may be beneficial to provide a designated and/or separate bicycle travel path from the pedestrian path. While there are many existing shared use paths in Boston, some may need to be upgraded to meet these current standards.

2. Cycle Track

Cycle tracks are bicycle facilities physically separated from adjacent travel lanes. They can be designed at the same level of the sidewalk separate from pedestrian travel, or on the roadway separated from motorist travel through the use of a raised median, on-street parking, flexible bollards or other vertical barrier. Cycle tracks are for the exclusive use of bicyclists and provide added separation that enhances the experience of bicycling on urban streets. Cycle tracks can either be one-directional or two-directional, and can be provided on both sides of two-way streets or on one side of one-way streets.

Cycle tracks are typically installed on streets with higher traffic volumes and/or speeds, and streets with longer blocks or fewer intersections. Cycle tracks can be useful on streets that provide connections to off-street trails, since bicyclists on these streets may be more accustomed to riding in an area separated from traffic. The minimum width of a one-way cycle track is 5' to 7', and a two-way is 8'. When adjacent to on-street parking, a minimum 2' to 3' buffer should be provided between parking and the cycle track; the buffer serves as a pedestrian loading and unloading zone and helps keep bicyclists out of the door zone of parked vehicles.

3. Bicycle Lane

Bicycle lanes are on-road facilities designated for the exclusive use of bicyclists through pavement markings and signs. Bicycle lanes are one-way lanes comprised of a minimum width of 5' distinguished by a pavement stripe. In low speed locations, 4' is acceptable against a curb without parking. They are located in between a travel lane and on-street parking or next to the curbside when parking is not presented. Because they offer less protection from traffic than cycle tracks, bicycle lanes may not be comfortable for all types of users, particularly on streets with high speeds or volumes. In some cases, they can serve as an interim design treatment until a more protective facility like a cycle track can be built.

4. Buffered Bicycle Lane

Buffered bicycle lanes are bicycle lanes with an additional painted buffer to provide more

separation from motor vehicles. The buffer can either be placed between the bicycle lane and the adjacent travel lanes, or between the bicycle lane and the adjacent on-street parking lane (typically in areas with high rates of parking turnover and lower vehicle speeds).

5. Contraflow Bicycle Lane

A contraflow bicycle lane is used when there is a need to provide two-way travel for bicyclists on a one-way street for motor vehicles. Bicyclists traveling in the contraflow direction are provided with a bicycle lane that is clearly indicated for this purpose with pavement markings and signs. Contraflow bicycle lanes require special provisions at intersections to ensure bicyclists can cross legally and safely. Contraflow bicycle lanes can be beneficial in locations where bicyclists would otherwise be unable to access important destinations and routes without traveling out of the way along an indirect route.

6. Bus-Bicycle Lane

Bus-bicycle lanes are on-road travel lanes designated exclusively for bus and bicycle use. Pavement markings and signs are used to indicate the bus-bicycle lane. Colored paint may also be used to distinguish the bus-bicycle lane from other travel lanes. Motor vehicles may be permitted to use the bus-bicycle lane at intersections to allow for turning movements, or to cross the bus-bicycle lane to access parking. Bus-bicycle lanes may be uncomfortable for some bicyclists because they require riding with large vehicles and mixing with motor vehicle traffic at intersections.

7. Shared Lane Marking

Shared lane markings, also known as "sharrows," are another solution on streets where there is insufficient room to stripe a bicycle lane. They can help to position bicyclists in the proper location on the street; on some streets it is safer for the bicyclist to ride in the center of the lane, on others, it may be safer to ride on the side of the road. They are also a visible reminder to motorists to yield to bicyclists. Shared lane markings accommodate experienced bicyclists who are comfortable riding with motor vehicle traffic; however, they are not a preferred facility type for less-experienced bicyclists.

8. Advisory Bicycle Lane

Advisory bicycle lanes are used on low volume, low speed, two-way streets that are not sufficiently wide to provide full bicycle lanes. The bicycle lane line is dashed and no centerline stripe is provided on the street. When two motor vehicles going in opposite directions meet in the center of the street, they are able to move into the adjacent bicycle lanes to pass each other – similar to the way motorists negotiate space on narrow residential streets with on-street parking. This provides a place for bicyclists to ride while also calming traffic.

9. Priority Shared Lane

Priority shared lanes are typically used when there is insufficient room to install bicycle lanes or cycle tracks. They are typically designated with shared lane markings, which are supplemented with dashed lane lines on either side and/or green-colored pavement. Signs are used to alert motorists to pass bicyclists with care. They can be used as a temporary design solution while a more permanent solution is sought. Priority shared lanes are installed in the outermost travel lane on multi-lane roads (two or more travel lanes per direction).

10. Shared Street

On a shared street, extremely low traffic speeds and volumes enable all modes of travel to share one space. Sidewalks are blended with the roadway, and separated bicycle lanes are not necessary. Shared streets are typically curbless and use a combination of pavement materials, street furniture, planters, parking, and other features to reduce travel speeds to less than 15 miles per hour. Shared streets are appropriate for bicyclists of all ages and abilities.

11. Recommended Local Route

Local recommended routes are quiet residential street that provide connectivity to neighborhood destinations and primary routes. These routes may need wayfinding treatments to direct cyclists to use these streets but do not require additional infrastructure or pavement markings.

12. Neighborway

Also known as bicycle boulevards, neighborways are quiet, low-volume residential streets designed for slower speeds which give priority to bicyclists and pedestrians. Neighborways are designated with pavement markings, signs, and traffic calming devices. They provide an alternative route away from high volume and high speed streets and are appropriate for bicyclists of all ages and abilities.

Treatments for Intersections and Traffic Calming

The Bike Network Plan includes design recommendations to facilitate bicyclists safety at intersections and to calm traffic. These include bicycle boxes, two-stage left turn queue boxes, pavement markings through intersections, bicycle signal heads, signal design that ensures bicyclists are detected and accommodated at intersections, and other bicycle-friendly traffic calming treatments.

1. Bicycle Boxes
2. Bicycle Facility Pavement Markings through Intersections
3. Bicycle-Friendly Traffic Calming
4. Bicycle Signal Heads
5. Signal Detection
6. Signal Timing
7. Stair Rails
8. Two Stage Left Queue Boxes

Intersection Treatments

While, the Bike Network Plan does not recommend specific intersection treatments at specific locations, the plan includes a toolbox of bicycle intersection improvements. These intersection treatments will help create safe and seamless links that will attract new riders seeking comfortable facilities. Intersections are particularly important because they are the site of the majority of crashes and additional treatments at intersections were emphasized by participants at public meetings. Below is a brief description of intersection treatments that should be used throughout the bicycle network:

1. Bicycle Boxes

Bicycle boxes provide bicyclists a dedicated space between the crosswalk and stop line at signalized intersections. This space aids bicyclists in making turning movements ahead of traffic at the beginning of a green phase and makes them more visible to motorists.

2. Bicycle Facility Pavement Markings through Intersections

Where space for bicycles needs to be provided through an intersection, green paint enclosed in between dashed white lines alerts cyclists to potential conflicts and indicates that vehicles turning right should give precedence to cyclists going straight, just as they would yield to pedestrians in a parallel crosswalk.

3. Bicycle-Friendly Traffic Calming

Traffic calming measures should be designed to accommodate bicyclists. Particularly along neighborways, traffic calming is strongly encouraged by the network plan and the

Boston Complete Streets Guidelines. Examples of traffic calming treatments include curb extensions, speed tables, chicanes, and diverters.

4. Bicycle Signal Heads

Bicycle specific signal heads can be installed at intersections to minimize conflicts between bicyclists and other modes of transportation. These are particularly valuable along cycle tracks, contra-flow bicycle lanes, and where shared-use paths intersect high volume and speed roadways with signalization.

5. Signal Detection

In the Commonwealth of Massachusetts, design codes require that additional loop detectors and pavement markings be installed at signalized intersections to indicate where bicyclists should wait in order to be detected. Consideration should be given to new technologies in detection for bicyclists, such as infra-red and video detection.

6. Signal Timing

Along major bicycle routes within the network, changes to signal timing should take into account minimum green times for bicyclists to navigate an intersection. Signal progression should also consider bicyclists speeds (typically 12 mph).

7. Stair Rails

Where bicycle facilities are separated by steep grades and connections require navigating stairs, bicycle friendly rails or stair channels should be installed to facilitate easier access for bicyclists at stairs. While an ideal bicycle route does not typically involve dismounting, it is important to provide this connection when a route without stairs is not feasible.

8. Two-Stage Left Queue Boxes

A two-state queue box is provided at a signalized intersection to assist bicyclists making turns. The two-stage queue box allows bicycles to pull to the right and wait to proceed through the intersection without having to cross multiple travel lanes and merge with traffic. They are particularly useful at wide intersections where there is a large demand for bicycles making left turn movements.

APPENDIX C

Process & Methodology

PROCESS

The Network Plan was developed over a three-year period through an extensive consultation process with the public and internal stakeholders. Their input was coupled with data collected in the field, existing databases, and planning studies.

Working Group

A citizen's working group was created for the Bike Network Plan to provide guidance and feedback for the development of the study network, recommendations, and priorities. The working group included twenty representatives from neighborhood organizations, local advocacy groups, universities, and business associations.

Invited members of the Working Group were:

Diane Baldelomar *East Boston*
Joe Beggan *Harvard University*
Charlotte Burger *Allston Brighton, AB Bikes*
Bob Dizon *Jamaica Plain, JP Bikes*
Jackie Douglas *LivableStreets*
Peter Furth *Northeastern University*
Ann Gleason *Neighborhood Association of the Back Bay*
Webb Lancaster *Boston University*
Jennifer Johnson *Charlestown*
Joe Johnson *Roxbury*
Theresa Jordan *Mattapan, Mattapan Food and Fitness Coalition*
Meg Mainzer-Cohen *Back Bay Association*
Jessica Mink *Roslindale, W Roxbury, Hyde Park, Rozzie Bikes*
Deb Munson *Dorchester, DotBike*
Herb Nolan *Solomon Foundation*
Christine Poff *Franklin Park Coalition*
Pete Stidman *Boston Cyclists Union*
Leroy Watkins *South Boston*
David Watson *MassBike*
Stephen Young *Beacon Hill Civic Association*

The working group met six times between January 2011 and August 2013.

- January 2011: **Kick-off and Overview**

- June 2011: **Study Network and Facility Types**
- September 2011: **Goals, Findings, Preliminary Network**
- February 2012: **Draft Network and Facility Recommendations**
- December 2012: **Prioritization and Publishing**
- August 2013: **Final Draft and Next Steps**

Public Input

Boston Bikes hosted two community open houses and web-based tools to gather input and feedback from the general public during the development of the Bike Network Plan.

Open House #1: April 2011 at Madison Park High School in Roxbury

The first open house included a presentation about the project and facility types, a mapping exercise, and group discussion about network qualities. This meeting was also the kick-off for the online mapping tool for the Boston Bike Network Plan.

Participants were given time to look at maps of the city, highlight routes that needed to be addressed, and ensure that destinations were well-linked within the network. They also uncovered the best hidden bike routes being used today and identified missing links. These maps provided input for the study network for data collection.

Participants worked in groups to identify the most important qualities of "everyday" and "recreational" trips.

Everyday trips needed routes with consistency and simplicity, a sense of safety or low traffic volumes, directness and convenience, and safe intersections. Recreational trips needed smooth pavement, inter-city routes, natural surroundings, and parking at the destination.

Open House #2: November 2011 at Boston Public Library in Copley Square

The second open house was an opportunity for the public to comment on the draft network and to prioritize routes. Community members identified the top two essential routes in each area of Boston in order to guide future phasing and prioritization. Participants were also asked to add missing routes to maps and comment on the recommended routes and facilities already established.

Online Input

In addition to the open houses, the City used crowd-sourcing to gather comments about where people currently bike and dangerous or difficult spots. By logging into www.communitywalk.com/bostonbikes or participating in a collective project on Google Maps,

riders illustrated the routes with the greatest demand. Some riders also wrote directly to Boston Bikes, posted notes about problem areas on Boston Bikes Facebook page, and drew their regular routes on city bike maps handed out by volunteers.

Internal Stakeholders

Parallel with the public process, stakeholders from city departments, state agencies, and other partners were updated and consulted about related projects and Network Plan recommendations and implementation.

Bike Network Meetings were attended by representatives from city departments including the Mayor's Office, Public Works Department, Transportation Department, Parks and Recreation Department, Boston Public Health Commission, Mayor's Office of Neighborhood Services, Environment Department, Boston Police Department, the Department of Information and Technology, and the Boston Redevelopment Authority.

Meetings were also held with the Massachusetts Department of Transportation, the Department of Conservation and Recreation, Massport, Metropolitan Area Planning Council, Medical Academic Scientific Community Organization (MASCO), City of Cambridge, City of Somerville, and City of Newton to discuss the Network Plan overall and specific projects.

Data Collection

The initial study network considered approximately 400 miles of potential bike facilities throughout the city of Boston. The project team conducted field work by visiting all these streets in the proposed study network. For each roadway, data was collected on travel lanes, one-way operations, key bus routes, observed parking regulations, land use context, and overall characteristics in regards to the proposed network.

In addition to data collection, the team also met with project managers and reviewed existing planning studies and engineering projects for corridors throughout Boston. These included (among others):

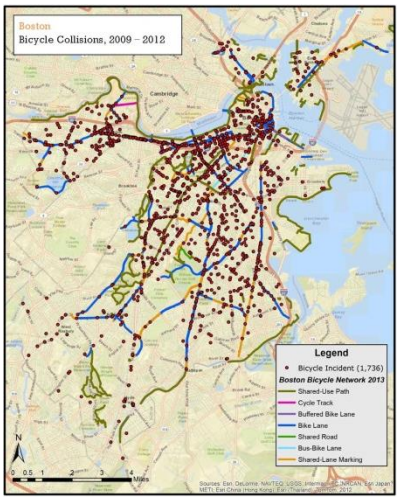
- The Charles River Basin Pedestrian and Bicycle Study
- The Neponset River Trail
- The Fairmount Greenway
- Emerald Necklace Parks: Crosswalk and Pathway Treatment Guidelines
- The East Boston Greenway Extension
- The Casey Arborway Project
- The Muddy River Restoration Project
- Various development projects

METHODOLOGY

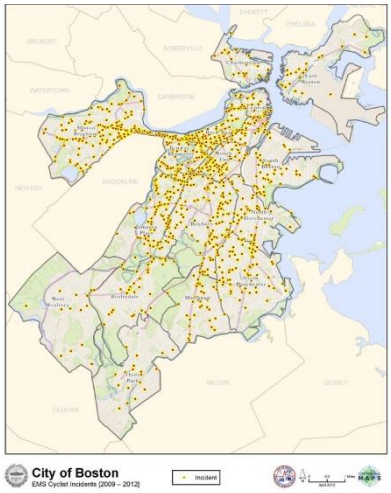
Each street in the study network was reviewed by a team of engineers and planners to determine 1) whether it should be included in the Bike Network; 2) if so, whether it should be a primary or secondary route; and 3) to assign a preliminary recommendation for a facility type. Every street was evaluated in the context of the network as a whole and within the context of its own characteristics and setting.

Network-wide considerations included the relative value of the segment to the network and the proximity of the segment to other streets in the network. Primary routes connect neighborhood centers, regional multi-use paths, transit hubs, major employment centers and institutional destinations. Secondary routes stretch into neighborhoods and provide access to local businesses and neighborhood destinations.

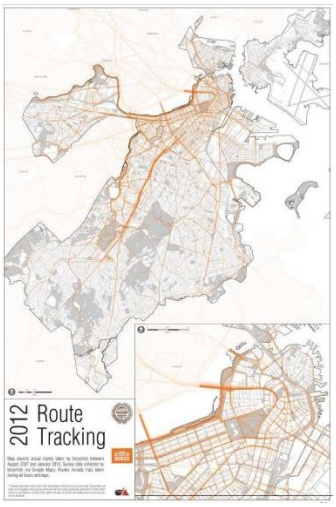
A segment's value within the network is a qualitative assessment based on the degree to which a route serves primary destinations such as employment, transit, amenities, regional paths, and/or other communities; secondary route local destinations; and availability of other parallel routes. The 2012 Boston Bikes route map provided information on the current popularity of a route. The Police and EMS collision and crash maps provided information regarding the greatest needs for safety improvements, as well as a secondary measure of popularity.



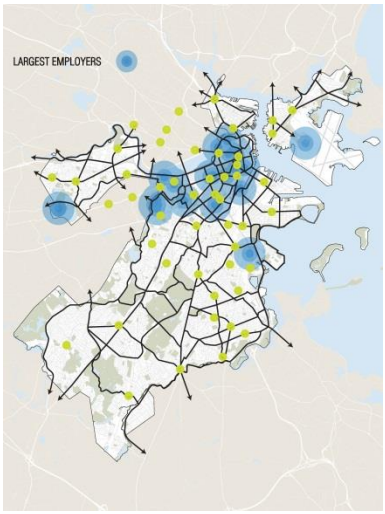
Source: Boston Police Department



Source: Boston Emergency Management Services



Source: Boston Bikes Survey



Source: Boston Bike Network Plan (2012)

Against the backdrop of overall network value, each segment was evaluated based on its dimensions and characteristics collected during fieldwork. These characteristics included:

- curb-to-curb width
- curbside operation
- frequency of curb cuts
- number of travel lanes
- lane widths
- speed limit
- bus operations
- land use
- road classification
- vehicular volume, if available
- potential impact to other modes of installing a particular facility type

In order to guide facility selection, the following general guidelines were utilized:

1. Preference was given to exclusive bicycle facilities where feasible.
2. Primary routes required protected or separated facilities.
3. Buffered or separated were preferred where space was available.
4. Exclusive facilities were seen as particularly important on high-value segments and were more likely to justify travel lane removal, parking removal, or reconstruction.
5. Neighborways were only considered on quiet streets with no existing centerline and where traffic calming would have a significant impact on bicycle accommodation.
6. “Suggested Local Routes” were recommended for quiet streets that provided a connection to the network for local users but where traffic calming would have limited impact on bicycle accommodation.
7. Shared lane markings were considered on roadways where exclusive facilities and alternate routes were not feasible but where the roadway serves as a unique secondary

network connection. Shared lane markings were not recommended for roadways with a speed limit of 35 MPH or higher.

All referenced maps and documents available at the City of Boston's Bikes website: www.cityofboston.gov/bikes/.