

# APPENDIX H: QUICK-BUILD BIKEWAY PROJECT SELECTION, CONCEPT DEVELOPMENT, AND PRIORITIZATION PROCESS

## BACKGROUND

The 2015 Cambridge Bicycle Plan and the 2020 Update include an ambitious Bicycle Network Vision containing well over 100 miles of existing, in-progress, and proposed bikeways. Proposed bikeways include three primary categories: off-street paths, streets proposed for increased separation, and streets proposed as Bicycle Priority Streets, with lower volume and/or speeds of motor vehicle traffic. By being included in the Bicycle Network Vision, a corridor is inherently seen as important due to its ability to provide connections to destinations or transit, connectivity with the existing high-comfort network, surrounding land uses, public comments, ability to address safety concerns, and equity considerations.

In general, bike facilities have been constructed as opportunities arise, such as through street resurfacing or as components of major City roadway and utility projects. While this approach is effective, progress towards implementing the full network has been modest. In 2017, the City started implementing stand-alone “quick-build” facilities<sup>1</sup> using City funds allocated through, for example, the City’s Participatory Budgeting process.<sup>2</sup> Several projects have been completed as quick-build facilities, including separated bike lanes on Cambridge Street, Brattle Street, Inner Mt. Auburn Street, and portions of Massachusetts Avenue.

Completing the Network Vision will continue to involve a combination of methods, including through planned roadway reconstruction (Five-Year Sidewalk and Street Reconstruction Plan), development-related work, and quick-build projects. The Cycling Safety Ordinance identifies specific time frames for some streets. For quick-build projects without a mandated timeframe or where the time frame affects multiple streets similarly, a process for the order in which they will be implemented was needed. That process is explained here.

## PROJECT SELECTION

To address gaps in the high-comfort bike network, 15 opportunity corridors for quick-build bikeway implementation were identified as part of the 2020 Update. This determination was made based on the following factors:

- + Corridor is proposed to have separated bike facilities on the Bicycle Network Vision Map;
- + Corridor is under City of Cambridge jurisdiction;
- + Bike facilities for the corridor are not currently in design, under construction, or slated for reconstruction by any other means, such as through private development or within the Five-year Plan for Sidewalk and Street Construction; and
- + Corridor was determined to be eligible for quick-build implementation based on prior high-level analysis.

Feasibility for quick-build separated bicycle facilities was then determined based on the following factors:

- + **Roadway curb lines generally remain the same (projects necessitating very minor changes, e.g., to existing curb extensions, are acceptable);**
- + **Directionality of the motor vehicle travel lanes is maintained (e.g. two-way streets remain two-way)<sup>3</sup>;**
- + **Project is implementable with minimal traffic signal modifications; and**
- + **Context-appropriate minimum widths for bike lanes, buffers, curbside lanes, and travel lanes with and without buses are achievable.**

## CONCEPT DEVELOPMENT

For each corridor, one or two quick-build concepts for separated bike facility implementation were developed. Quick-build separated bike facilities generally make use of flexposts<sup>4</sup> and/or curb use rearrangement as the primary means to achieve separation. However, constructed elements (curb extensions, drainage improvements, or floating bus islands, etc.) may be incorporated during detailed design to maximize the high-comfort network.

Through the concept development process, the following implementation challenges were highlighted:

- + **Physical features (e.g., MBTA catenary wires, right of way constraints, drainage and utility infrastructure, trees)**
- + **Street usage (e.g., major bus routes, heavy traffic, removal of curb access for vehicles (on-street parking, deliveries, ride hail, and commercial loading))**

Quick-build concepts identify the general approach to reallocating roadway space for each project. Complete corridor development will be determined during the design process.

## PRIORITIZATION PROCESS

While each quick-build bike facility project is important for different reasons, resource availability (funds, staff availability, time for public review and ability for the City to manage additional construction projects) preclude all projects being constructed at once. Therefore, a three-step prioritization process was developed to identify the general order in which projects will be implemented.

**Step 1** consists of a data-driven analysis of factors selected to advance the City's mode shift and safety objectives as well as address the goal of more equitable access.<sup>5</sup> In addition to these goal-oriented factors, public comments received via online engagement and in-person outreach and an assessment of implementation feasibility were considered. This results in a ranked list of projects in each of five areas, based on merged neighborhood boundaries (see page 6).

In **Step 2**, projects from Step 1 are divided into three implementation phases. The top-ranked project from each neighborhood in Step 1 is included in the first phase, the second-ranked projects are included in the second phase, and the remaining projects are included in the third phase. The intent is that all projects in the first phase will receive priority for implementation before projects in the second and third phases.

Finally, **Step 3** occurs each year as implementation is beginning. At that point, the City will consider other factors that may impact phasing (e.g., currently unanticipated road work due to infrastructure or development exigences).

The purpose of this prioritization process is to inform decision-making while also helping to explain why the City is focusing on some projects while deferring other projects to later implementation timelines.

## STEP 1: DATA-DRIVEN RANKING

The table below illustrates the factors, associated plan goals, and the scoring approach for the first step of prioritization.

Associated Goal	Factor	Ranking	Description
Mode Shift	Connectivity (extent of impact on improving connectivity)	High	Completes a missing link to otherwise connected high-comfort facilities, both existing and in design
		Medium	Extends existing or in-design high-comfort facilities
		Low	Does not connect to or extend existing or in-design high-comfort facilities
Mode Shift	Key route to schools (how closely connected to school routes)	High	School located directly on corridor (K-12 schools)
		Medium	School located within ¼ mile of corridor (K-12 schools)
		Low	No schools located within ¼ mile of corridor (K-12 schools)
Mode Shift	Key route to major destinations (how closely connected to major destinations)	High	Among top third of corridors ranked by major destination with ¼ mile of corridor
		Medium	Among middle third of corridors ranked by major destination with ¼ mile of corridor
		Low	Among bottom third of corridors ranked by major destination with ¼ mile of corridor
Safety	Crashes (extent of impact on improving safety)	High	Among top third of corridors ranked by bicycle crashes <sup>6</sup> per mile of corridor
		Medium	Among middle third of corridors ranked by bicycle crashes per mile of corridor
		Low	Among bottom third of corridors ranked by bicycle crashes per mile of corridor
Safety	Comfort (level of impact on addressing safety)	High	Existing comfort level on corridor is BLOC <sup>7</sup> 4 or 5 (using highest BLOC on corridor)
		Medium	Existing comfort level on corridor is BLOC 3 (using highest BLOC on corridor)
		Low	Existing comfort level on corridor is BLOC 1 or 2 (using highest BLOC on corridor)
More Equitable Access	Increasing access for focus populations <sup>8</sup>	High	Among top third of corridors ranked by focus population proximity
		Medium	Among middle third of corridors ranked by focus population proximity
		Low	Among bottom third of corridors ranked by focus population proximity

Associated Goal	Factor	Ranking	Description
n/a	Community input (how much input received on the particular corridor)	High	Among top third of corridors ranked by comments received
		Medium	Among middle third of corridors ranked by comments received
		Low	Among bottom third of corridors ranked by comments received
n/a	Simplicity of implementation (high = less complicated, low = more complicated)	High	No travel lane removal, minimal parking impacts, minimal construction needs, etc.
		Medium	Travel lane removal on roadway with no bus routes, removal of some curbside uses, parking moderately utilized, moderate amount of construction needed, etc.
		Low	Travel lane removal on roadway with bus routes, removal of all curbside uses, parking heavily utilized, large amount of construction needed, etc.

## Major destinations

The following types of destinations are used to calculate the Key Route to Major Destination factor in Step 1:

- + Parks and Playgrounds
- + Recreational Facilities
- + Community Centers, Youth Centers, and Senior Centers
- + Libraries
- + Hospitals
- + Retail Districts
- + University and College Facilities
- + Major Job Centers
- + MBTA Stations

## Step 1 Results (2020 Prioritization): Corridor Ratings (grouped by neighborhood)

### Mid-Cambridge, Wellington-Harrington, Area Four & East Cambridge Merged Neighborhood Area

Merged Neighborhood Area and Segment Name	Connectivity	Key Route to Schools	Key Route to Major Destinations	Crashes	Comfort	More Equitable Access	Community Input	Simplicity of Implementation
Cambridge St	High	High	High	High	High	High	High	Medium
Broadway	High	High	High	High	High	Medium	Medium	Low
Hampshire St	High	High	High	High	Medium	High	Medium	Low
Main St (Sydney to Vassar)	High	High	Medium	High	Medium	High	Medium	Medium

### Neighborhood Nine and Agassiz Merged Neighborhood Area

Merged Neighborhood Area and Segment Name	Connectivity	Key Route to Schools	Key Route to Major Destinations	Crashes	Comfort	More Equitable Access	Community Input	Simplicity of Implementation
Garden St (Mason to Huron)	Medium	Medium	Medium	Medium	High	Low	High	Medium

### North Cambridge and Cambridge Highlands Merged Neighborhood Area

Merged Neighborhood Area and Segment Name	Connectivity	Key Route to Schools	Key Route to Major Destinations	Crashes	Comfort	More Equitable Access	Community Input	Simplicity of Implementation
Steel Pl	High	Low	Low	Low	Low	High	Low	Medium

### West Cambridge and Strawberry Hill Merged Neighborhood Area

Merged Neighborhood Area and Segment Name	Connectivity	Key Route to Schools	Key Route to Major Destinations	Crashes	Comfort	More Equitable Access	Community Input	Simplicity of Implementation
Brattle St (FPP to Mason)	Medium	Medium	Medium	Medium	Medium	Low	Low	Medium
Brattle St (Mt Auburn to FPP)	Low	Medium	Low	Medium	High	Low	Low	Medium
Huron Ave (Grove to Glacken)	Medium	Low	Low	Low	High	Medium	Low	Medium
Aberdeen Ave	Medium	Low	Low	Low	Medium	Medium	Low	Medium
Huron Ave (FPP to Concord)	Medium	Low	Medium	Low	Low	Low	Low	Low

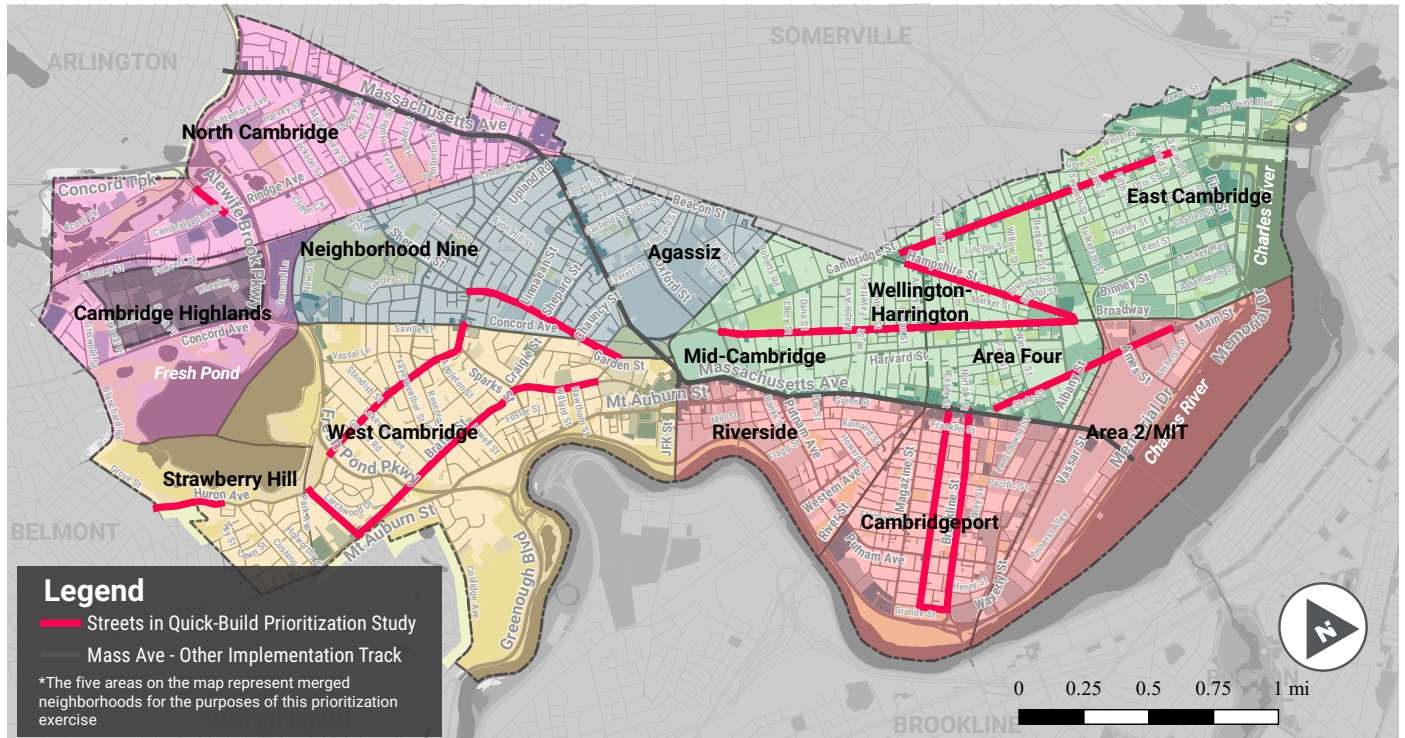
### Riverside, Cambridgeport, and Area 2/MIT Merged Neighborhood Area

Merged Neighborhood Area and Segment Name	Connectivity	Key Route to Schools	Key Route to Major Destinations	Crashes	Comfort	More Equitable Access	Community Input	Simplicity of Implementation
Main St (Vassar to Third)	High	Low	Medium	Low	Medium	High	Low	Medium
Pearl St	Low	Low	High	Low	Medium	Medium	Low	Medium
Brookline St	Low	Low	High	Low	Low	Medium	Low	Medium
Granite St	Low	Low	Low	Low	Medium	Low	Low	High

## STEP 2: PROJECT PHASING

The second step in the prioritization process is used to ensure that projects are distributed as evenly as practicable across the city. The traditional 13 neighborhoods of Cambridge were merged into five (5) distinct neighborhood areas for simplicity. The top ranked corridor in each merged neighborhood area is selected and added to the first implementation phase. The second-ranked corridor in each neighborhood area is added to the second implementation phase, and so on.

### Consolidated Neighborhoods used for Step 2 Prioritization



### Step 2 Results (2020 Prioritization): Implementation Phases

First Phase	Second Phase	Third Phase
Cambridge St	Broadway	Hampshire St
Garden St (Mason to Huron)	Brattle St (Mt Auburn to FPP)	Main St (Sydney to Vassar)
Steel Pl	Pearl St	Huron Ave (Grove to Glacken)
Brattle St (FPP to Mason)		Aberdeen Ave
Main St (Vassar to Third)		Huron Ave (FPP to Concord)
		Brookline St
		Granite St

### STEP 3: ADDITIONAL CONSIDERATIONS

There are other factors that may influence the implementation phasing, some of which are as yet unknown, but which will need to be evaluated each year to potentially adjust the order in which the quick-build projects are undertaken. Among these are:

**Transit Opportunities or needs.** Several of these corridors also have bus routes. The City is continuously evaluating ways in which streets and signals can be changed so that transit can be made more reliable. Should there be an opportunity identified in a specific corridor, that corridor may receive higher priority.

**Opportunistic scenarios,** such as unanticipated improvements to a roadway in connection with a development project.

**Response to COVID-19 planning.** As the City responds to evolving needs and conditions in terms of planning and managing public streets to address the challenges presented by COVID-19, adjustments will need to be made. Elements that were modified in 2020-21 include:

- + **Expanded curbside area – some curb space may be dedicated to uses such as expanded transit queuing areas, expanded outdoor dining areas, or for people walking.**
- + **Delivery/pick-up needs – retailers are providing goods via curbside pick-up.**



## ENDNOTES

- 1 Quick-build facilities are vertically and/or horizontally separated bicycle lanes, typically at roadway level, which are established with materials requiring minimal or no construction. These facilities are implemented in a shorter time frame than standard roadway reconstruction. See Chapter 4 of the Cambridge Bicycle Plan for more information.
- 2 Through the City's Participatory Budgeting process, residents have a direct voice in designating a portion of the City's annual capital budget to selected projects. <https://pb.cambridgema.gov/>
- 3 Two-way bicycle facilities (two-way bicycle travel on one side of a street) were only considered where appropriate (e.g. corridors with minimal crossing traffic)
- 4 Plastic vertical posts that are hollow and mounted to pavement surfaces with adhesive, bolts, or both. They are flexible enough to bend and spring back if driven over by a vehicle, but rigid enough to discourage driving over.
- 5 Innovate and be an early adopter of best practices in bicycle infrastructure—but since it applies to all bikeway projects, it does not influence prioritization.
- 6 2019 crash data were used during the initial scoring analysis, results of which are displayed on the following page. When prioritization scores are recalculated in the future, the latest available crash data should be considered.
- 7 Bicycle Level of Comfort, a measure of the level of comfort that a person bicycling is likely to perceive while riding on any street or path. Defined and explained in Chapter 5.
- 8 People of color, people under 18, people 65 or older, households without a motor vehicle, households below 200% of the poverty level, people with disabilities, and people with no or limited English proficiency. This was measured by creating a composite index of the percent of population in each Census tract associated with each of the seven variables.