

CHAPTER 9

OPERATION AND MAINTENANCE

OPERATION & MAINTENANCE PROGRAM

Proper maintenance helps protect the investment of public funds in bicycle facilities – as well as all public infrastructure – and allow their safe use and enjoyment. Careful construction management allows people to continue to travel safely by bicycle when roadwork is being done or road access is otherwise disrupted.

Street Cleaning. Cambridge operates a street cleaning program from April through December that includes bikeways. Travelway litter – such as broken glass, sand, gravel, and leaves – is a safety and environmental hazard demanding regular pickup and sweeping. All roadways in the city are swept monthly during the program period, with the April, July and November sweepings including the use of a vacuum sweeper in addition to mechanical sweepers to remove excess debris. As the number of separated bicycle facilities in the city has increased, the City has modified its sweeping protocols accordingly. Separated facilities, whether raised or at street-level, are swept twice per month during the April through December period, and vacuum sweepers are used where needed for these cleanings.

Roadway Surface. The City performs yearly maintenance paving through the Department of Public Works (DPW) Miscellaneous Paving contract; more substantial roadway and sidewalk construction activities are completed per the City’s Five Year Plan for Sidewalk and Street Reconstruction. DPW also maintains paved surfaces through asphalt patches and crack sealing. Where utilities cuts occur, permanent patches are made per DPW specifications. All new asphalt paving will be flush with utility covers. Traffic control during maintenance activities will include providing safe passage for bicyclists, including clearly marked raised castings and signed detours when bikeways are obstructed.

Signs and Markings. Signs and pavement markings should be inspected regularly and kept in good condition. Every spring the Traffic, Parking, and Transportation Department (TP&T) prepares a pavement marking plan; bicycle facility markings include bicycle lanes, shared lane markings and colored (green) special areas.

Paths. Off-road facilities require specific plans. For example, the path along Fresh Pond Parkway/ Fresh Pond Reservation and the path around the Reservation are maintained by the Cambridge Water Department.



Crew working on bike lanes on Massachusetts Avenue.

UNIQUE CHARACTERISTICS & NEEDS OF USERS

A roadway surface that appears to be adequate for automobiles may actually be treacherous for people riding bicycles. Small rocks can deflect a bicycle wheel, a minor ridge in the pavement can cause a crash, or a pothole can cause a wheel rim to bend. Wet leaves are slippery and can cause a bicyclist to fall. Gravel and sand that are blown off the travel lane by automobile traffic accumulate near the edge of the road, where bicyclists usually ride.



Commonwealth Connect (powered by SeeClickFix) helps residents reach the City online or via their smartphone to request services or get help fixing issues. People may report issues such as potholes, snowy or icy bike lanes or sidewalks, bike lane obstructions broken bike racks, and many other concerns.

<http://commowealthconnect.io>



From restriping to filling potholes, taking care of roadways and bike facilities is critical to maintaining safe conditions for biking in Cambridge.



Since buying an e-bike in June 2020, I've been using my car to run errands or visit friends (outdoors of course) so much less. I've loved biking home in the dark empty streets after an autumn dinner in a friend's backyard, or to pick up bagels from Mamaleh's on a weekend morning. Best of all, my toddler, who does not always appreciate being loaded into a car seat, LOVES going for a bike ride. It has truly made our lives better, and being able to ride in streets that feel safe is a huge part of it.

– Parent, Cambridgeport

WINTER MAINTENANCE

Snow management poses particular challenges in a dense urban environment with limited space for snow storage. The City's first priorities are to ensure that emergency vehicles are able to get where they need to go. Toward that end, DPW will clear the streets as soon as possible after a storm event. The goals are to chemically treat all major arteries within three hours of when snow begins, to keep main arteries plowed during all stages of a storm, and to clear all streets and the sidewalks bordering City property once a storm has stopped.

An essential element of ensuring safe travel during and after snow events is proactively reminding the traveling public the importance of sharing the roadway. This is extremely important given that the roadways are typically narrowed during and after a snow event. DPW often deploys variable message boards around the city to highlight these messages.

Special bicycle facilities such as raised separated bicycle lanes are addressed as soon as possible after the essential public ways, including key sidewalks, have been treated. Some of these facilities are maintained under separate agreements; Vassar Street, for example, is maintained by the Massachusetts Institute of Technology (MIT), which clears the separated bicycle lane with the same equipment they use on the adjoining sidewalks. As each of these facilities are designed, snow operations will be a critical consideration in the design details and long-term maintenance expectations.



The City uses a variety of tools to clear snow from streets and separated bike lanes.

CONSTRUCTION MANAGEMENT

GUIDELINES FOR BICYCLE ACCOMMODATION DURING CONSTRUCTION

APPLICABILITY

These guidelines shall apply to all construction projects in the City of Cambridge, whether the work is being undertaken by the City, public and private institutions, developers, contractors, utility companies, or state agencies. The types of projects include:

- + **Street reconstruction and new street construction.**
- + **Sewer, storm drainage and water projects.**
- + **Private site development, involving work within a City street (e.g., utility connections, temporary occupancy of parking or traffic lanes).**
- + **Utility construction.**

GENERAL

As bicycles are legal vehicles on all the streets of Cambridge, through bicycle movement must be maintained during construction and other projects that disrupt travel (e.g., special events), subject to the approved construction management plan. People riding bicycles are particularly susceptible to disruptions in their normal travel routes because of their slower speeds and exposure to noise, dirt, and fumes. Temporary lane restrictions, detours and other traffic control measures instituted during construction or other travel disruptions should be designed to accommodate non-motorized travelers.

For all construction projects, an approved Traffic Management Plan must meet these guidelines for bicycle accommodations.



LED signs placed around Cambridge remind road users to share the road during construction or after major snowfall events.



Construction zone featuring temporary bike lane.



Installation of a new flex post on a separated bike lane.

PAVEMENT SURFACE QUALITY AND STRUCTURE

People riding bicycles, particularly those riding on narrow, high-pressure tires, need to have pavement as free of defects and debris as possible to ensure control of their bicycles. As most road bikes do not have a suspension system, high-pressure tires transmit every bump to the rider. Loss of control on deteriorated pavement with loose aggregates, potholes, litter, etc. is also a major risk.

Pavement seams parallel to the roadway should not be located on the portion of the road where bicycling is expected. Utility covers and drainage grates should be flush with the pavement surface and should be

adjusted with pavement overlays. Approaches to railroad crossings should be improved as necessary to provide for safe bicycle crossings.

Pavement surfaces should be smooth, and the edge of the pavement should be uniform. Narrow slots in the surface that could catch a bicycle wheel, such as a gap in the longitudinal joint between two concrete slabs, should not be more than 1/2 inch wide. Ridges in the pavement that could cause people riding bicycles to lose control should not be more than 3/8 inch high when parallel to travel or 3/4 inch high when perpendicular to travel.

When pavement is overlaid, the edge of the overlay should be matched to the height of the adjacent pavement or smooth transitions should be provided.



BICYCLE TRAVEL THROUGH CONSTRUCTION ZONES

The following general considerations apply to accommodating bicyclists in construction zones:

- + Where construction is occurring on a street that already has a bicycle lane, the area through which the construction is occurring should maintain that space if width is available.
- + Every effort should be made to avoid using bicycle lanes for staging of site construction work or temporary construction signage.
- + Minimize the time that construction work occupies bicycle lanes. For example, if the added work space is only needed for operation of a crane for a limited number of days, that will be the only time that occupancy of the bicycle lane is permitted.
- + Where bicycles lanes are not present, provide a shared vehicle lane as wide as physically feasible.
- + If a bicycle lane is taken or if the area used by bicyclists is impacted by construction, contractors must use the “Bikes May Use Full Lane” sign, standard R4-11 MUTCD sign. Orange signage in construction zones is preferred.



“Bikes May Use Full Lane” sign, MUTCD R4-11

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- + Type II or II Barricades (see MUTCD for description) with flashers should be placed at least 20 feet in advance.
- + Steel plates should have a non-slippery textured surface; this is required within an intersection or a crosswalk.



Street repaving zone featuring manholes painted with reflective pink paint.

Construction excavations or depressions should never be left without physical barriers preventing bicyclists from falling in.

- + The preferred treatment is the provisions of temporary fill and a temporary bituminous concrete patch.
- + Where the excavation is outside the motor vehicle and bicycle lanes, provide traffic barriers (concrete barriers, barricades, or where the depression is less than 18 inches, cones or barrels may be used).
- + If the excavation must be maintained for more than two days and it is located within lanes to be used by bicyclists, temporary steel plates may be used. See guidelines for the use of metal plates above.

Narrow cuts that are parallel with the direction of travel create an extreme hazard for bicyclists, whose tires could get caught. These should never be made and left in an area where bicyclists will be traveling. If necessary, they should be blocked off and bicyclists routed around the hazard.

- + When performing advance pavement cutting for trenching or other roadway excavation, use only saw cutting (approximately 1/4 inch or narrower).

Site access and ramps: Temporary (usually asphalt) ramps are sometimes proposed to access a site from a sidewalk where no driveway or other vehicle access exists. The creation of ramps in the roadway is not desirable unless being created in an area that is otherwise used by on-street parking. If necessary for pedestrian accessibility reasons, the ramp edge will be painted pink and/or a barricade placed alongside so a person bicycling does not inadvertently run into it.

Raised castings: After cold planing of pavement is performed, utility castings (e.g., manhole covers, valve box covers, and catch basin grates) will be 1 to 2 inches higher than the surrounding pavement. This presents a hazard for bicyclists and motor vehicles alike. This condition will also occur during roadway construction just before the next lift of pavement is to be placed. Wherever raised casting are present, the following should be provided:

- + Provide advance warning signs saying: "Caution – Raised Castings Ahead."
- + Spray paint reflective pink on the raised portions of the castings.

Cold planing and pavement installation: After cold planing, there is a vertical lip at the limits of pavement removal. A smooth bituminous

transition slope should be provided to eliminate the jarring hazard of hitting the vertical lip. In roadway construction, there may be a similar vertical lip between the different lifts of pavement installed. In these conditions, a similar transition is also needed.

- + Provide advance warning signs saying: “Bump” at these transitions.
- + Paint the transition sloped area in reflective pink.

Pavement Sweeping and Debris Removal: Road surfaces in construction zones may experience a greater build-up of debris than other roadway segments. Special attention must be given to keeping roadway surfaces free of debris, including sand, gravel, stones, trash, and miscellaneous construction debris. Pavement in construction zones should be swept to maintain a reasonably clear riding surface in bicycle lanes and in the outer 5 or 6 feet of roadway.

Potholes: Potholes are more likely to be found in construction zones due to the impact of construction equipment and due to temporary pavement patching. Special attention must be given to monitoring for the development of potholes and for promptly filling in and patching potholes.

Temporary Traffic Sign Placement: The placement of advance construction signs must not obstruct bicyclists’ path. In particular, temporary signs shall not be placed in bicycle lanes.

Restoration of Pavement Markings: As soon as reasonably possible after paving, install pavement markings, particularly bicycle lanes markings and other markings associated with bicycle facilities.



Crew installing bicycle decal and green pavement markings.