



## TECHNICAL MEMORANDUM

**DATE:** January 18, 2018  
**TO:** Town of Framingham  
**FROM:** Casey Claude, Boston Region MPO Staff  
**RE:** Bicycle Network Gaps Feasibility Evaluations – Sudbury Aqueduct

### 1 INTRODUCTION

Local, regional, and state government agencies in the Boston region are actively working on improving bicycling infrastructure to enhance safety, provide more connectivity between bicycle facilities, and increase the use of bicycling as a mode of transportation. Many bicycle facilities, such as shared-use paths, on-road bike lanes, and barrier-separated bike lanes (also called cycle tracks), were constructed as a result of these efforts. Consequently, a regionwide network of bicycle facilities connecting key destinations in the region, such as town centers and transit locations, has already been developed.

However, within this network, there are gaps in continuity (a gap within one bicycle path) and connectivity (a gap between two paths or between a path and a roadway or transit service). These gaps necessitate that bicyclists use circuitous travel routes, reducing the efficiency of travel between key origins and destinations. These gaps exist for a number of reasons: a lack of coordinated planning; a lack of funding; right-of-way (ROW) constraints; competition for ROW space; difficulties related to coordinating efforts across multiple jurisdictions; and physical obstructions, such as waterways, bridges, roadways, and railroads.

#### 1.1 2014 Bicycle Network Evaluation

In 2014, the Boston Region Metropolitan Planning Organization (MPO) staff conducted the Bicycle Network Evaluation, a regional study that resulted in a list of locations designated as “high-priority” gaps based on how they scored against criteria used to assess their potential to improve bicycle connectivity.<sup>1</sup> The gaps identified as the highest priority were those where an improvement project would have the greatest potential to improve the Boston region’s bicycle network.

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<sup>1</sup> Beth Isler, *Bicycle Network Evaluation* (Boston Region Metropolitan Planning Organization, May 2014). [http://www.ctps.org/data/pdf/programs/livability/MPO\\_0515\\_Bicycle\\_Network.pdf](http://www.ctps.org/data/pdf/programs/livability/MPO_0515_Bicycle_Network.pdf).

For the evaluation, gaps were organized into three categories: small gaps, less than a half mile long; medium gaps, between a half mile and a mile and a half long; and long gaps, over a mile and half long. Since long gaps would tend to score higher than small or medium gaps—because of the likelihood of there being more amenities or possibilities for making connections along a longer stretch of roadway or trail—the evaluation identified the highest scoring gaps in each length category. So, while a small gap may have scored lower than some long gaps, the small gap could still be identified as a “high-priority” gap based on the high score it received relative to other small gaps.

This memorandum reports on a detailed feasibility evaluation that was conducted for one of the highest-priority, medium length gaps identified in that study. (The evaluation of the highest-priority small and long gaps are detailed in other memoranda.) Potential improvements identified in the evaluation may be eligible for design and construction funding in future Transportation Improvement Program (TIP) cycles.

The Bicycle Network Evaluation identified the Sudbury Aqueduct gap in Framingham, which is located between Framingham Station on the MBTA commuter rail line and Summit Street, as one of the 11 highest-priority gaps in the Boston region’s bicycle network.<sup>2</sup> The Sudbury Aqueduct was characterized as an unimproved path with a terminus at Summit Street in the Bicycle Network Evaluation. The evaluation scored gaps using several criteria: whether the addition of bicycle facilities would provide access to destinations such as places of employment, schools, open space, and town centers; whether facilities would serve areas expected to have high numbers of bicycle and pedestrian trips; and whether facilities would address existing safety issues by providing safe routes through or around high crash locations.

The highest possible score that a gap could receive was 25.<sup>3</sup> The Somerville Community Path—a long gap—earned the highest score with 24 points. The Canal Street Bikeway gap in Salem—a medium gap—and the Massachusetts Central Rail Trail gap in Waltham—a long gap—both earned 20 points, surpassing the score of 18 earned by the Sudbury Aqueduct gap. When MPO staff began this study, efforts were already underway to secure funding for construction along Canal Street that would address the gap in the bikeway; thus the Canal Street Bikeway gap was not eligible for this study. The Sudbury Aqueduct gap received the second highest score among the 96 medium gaps

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<sup>2</sup> Beth Isler, *Bicycle Network Evaluation* (Boston Region Metropolitan Planning Organization, May 2014), 21. [http://www.ctps.org/data/pdf/programs/livability/MPO\\_0515\\_Bicycle\\_Network.pdf](http://www.ctps.org/data/pdf/programs/livability/MPO_0515_Bicycle_Network.pdf).

<sup>3</sup> *Ibid.*, 7.

assessed. As action had not yet been taken to address this gap, the Sudbury Aqueduct gap was selected as the medium length gap location most in need of further evaluation.

The Bicycle Network Evaluation identified the constrained ROW caused by encroachment from properties neighboring the Sudbury Aqueduct as a potential challenge to addressing this gap. In addition, MPO staff identified concerns regarding maintenance of the proposed new Sudbury Aqueduct Trail segment as another impediment to closing this gap in the Boston region's bicycle network.

## 1.2 Sudbury Aqueduct

The Sudbury Aqueduct passes through Framingham, Sherborn, Natick, Wellesley, Needham, and Newton.<sup>4</sup> The aqueduct, built between 1875 and 1878 by the Boston Water Works, carried 90 million gallons of drinking water a day 17.4 miles from Farm Pond in Framingham, in the Sudbury River watershed, to Chestnut Hill Reservoir in Newton, providing water to Boston and the surrounding communities. In 1978, regular service along the aqueduct stopped, and the facility now serves as part of the emergency backup system of the Massachusetts Water Resources Authority (MWRA). In January 1990, the aqueduct route, along with its associated structures and buildings, was added to the National Register of Historic Places. The open space along the aqueduct is now available for public access.<sup>5</sup> Currently, the only section of the Sudbury Aqueduct open for public access in Framingham is between Winter Street and Farm Pond. According to Framingham Parks and Recreation, the MWRA has recommended not opening the aqueduct segment running from 350 Irving Street to Sherborn until the site has been cleared by the Health Department.

## 1.3 MWRA Aqueduct Lands for Trails Policy

On May 22, 2012, the Massachusetts Executive Office of Energy and Environmental Affairs, the MWRA, and the Metropolitan Area Planning Council (MAPC) announced a policy to improve the public accessibility of trails along several MWRA aqueducts that are no longer in active service. The policy increased MWRA control over public access activities on MWRA-controlled land and made partnerships between the MWRA and local municipalities possible.

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<sup>4</sup> *Aqueduct Trail Network* (Metropolitan Area Planning Council, July 22, 2015).  
<http://www.mapc.org/aqueducts>.

<sup>5</sup> *Sudbury Aqueduct History* (Massachusetts Water Resources Authority, April 23, 2014).  
<http://www.mwra.state.ma.us/04water/html/history-sudbury-aqueduct.html>.

Such partnerships now allow the public to enjoy the natural resources along MWRA-controlled land.<sup>6</sup>

Through the partnerships, the MWRA will work with parties interested in a specific parcel to develop permits that address the public access details at each location, including the types of uses allowed on the parcel and the allocation of costs prior to opening the land. By creating rules and regulations that address potential issues before public access to the land is officially granted, the permitting process ensures safe and fair governance of each parcel. Some locations will require physical improvements in addition to parcel permits before they can be opened because gates, fences, and “no trespassing” signs currently block public access. In such cases, the permittee and the MWRA work together to modify the gates and fences, install trail markers, and provide information to the general public about proper use of the resource.<sup>7</sup>

## 2 SUDBURY AQUEDUCT GAP

MPO staff met with representatives from the Town of Framingham on November 6, 2015. At the meeting, Framingham staff explained that the Town considered the Bruce Freeman Rail Trail a much higher priority than the Sudbury Aqueduct Trail. In spite of the relatively low level of public awareness about the Sudbury Aqueduct gap, residents living on the south side of town would benefit from this new segment of the trail. At the meeting, Framingham staff identified the greatest impediment to closing the gap as the overall lack of knowledge about whether owners of parcels along the aqueduct hold private permits from the MWRA; this information would allow Framingham staff to identify whether abutters are illegally encroaching on Sudbury Aqueduct land. In order to address this concern, MPO staff contacted the MWRA and received information about which parcels along the Sudbury Aqueduct gap possess private permits. The locations of these parcels are illustrated in Figure 1. (All figures are at the end of this document.)

MPO staff communicated with MWRA staff to determine the next steps that would need to be taken to close the gap. MWRA staff explained that when the Town of Framingham is fully prepared to open and maintain the new segment of the Sudbury Aqueduct Trail and address the concerns of abutters, the MWRA will enter into negotiations with the Town and property owners in the area. The MWRA will work with those who currently hold MWRA land permits to start

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<sup>6</sup> *New Policy on Using MWRA Aqueduct Lands for Trails* (Massachusetts Water Resources Authority, June 1, 2012). <http://www.mwra.state.ma.us/projects/access/aqueducts/aqueducts.html>.

<sup>7</sup> *MWRA Aqueduct Trails – Frequently Asked Questions* (Massachusetts Water Resources Authority, February 24, 2014). <http://www.mwra.state.ma.us/projects/access/aqueducts/aqueducts-faq.html>.

conversations about modifying their permits to allow public access. Any access agreements will need to consider each parcel's current use and the impact that the access agreement could have on surrounding parcels.

The MWRA emphasized that the Town of Framingham would need to be prepared to address concerns about hazardous chemicals along the new Sudbury Aqueduct Trail segment. There is speculation that coal ash and other hazardous materials were dumped in the area in the past; these circumstances have presented a considerable impediment to opening the land for public access.

### 3 PUBLIC ACCESS CONSIDERATIONS

A considerable impediment to access, which the Town of Framingham and the MWRA will need to address, exists along the section of the Sudbury Aqueduct located east of Arlington Street. At this location, the aqueduct corridor narrows because of encroachment by the driveway and fenced-in backyard of an abutter. As seen in Figure 2, the aqueduct is the narrow strip of land with a row of trees. The location of the encroached land along the entire length of the proposed trail segment is documented in Figure 3.

The proximity of the encroached land to parcels with MWRA permits indicates that the simplest solution for creating a connection from Framingham Station to Summit Street would be to route the Sudbury Aqueduct Trail north to Irving Street along Alexander Street on the parcels' east side and Arlington Street on their west side (Figure 4).

Another access issue exists on two separate aqueduct land parcels west of Arlington Street; one of the parcels has an MWRA permit while the other does not. The route along the Sudbury Aqueduct is impeded by fencing on both parcels. At the unpermitted parcel, which is located between Arlington Street and Hollis Street (Figure 5), fencing at the southeastern edge of the Amazing Things Arts Center property prohibits the public from traveling along the Sudbury Aqueduct (Figure 6). This encroachment presents a significant physical barrier to access and will need to be resolved before the new trail segment can be opened to the public. Another fence on the permitted parcel, where Auto Bright Car Wash is located, impedes travel on the northwest side of Hollis Street (Figures 7 and 8).

In spite of the similarity of the impediments, the difference between the circumstances surrounding the two parcels suggests that two separate solutions may be necessary. In regards to the unpermitted parcel, where the Amazing Things Arts Center is located, the Town of Framingham would need to work with the parcel owner and the MWRA to establish a plan for opening the fence that

would be reasonable for all parties and allow bicyclists and pedestrians to travel along the Sudbury Aqueduct. While these negotiations occur, signs could be posted for an interim route that would take bicyclists and pedestrians along Gordon Street, a parallel route northeast of the Sudbury Aqueduct. The most direct on-street path would travel up Arlington Street on the east side of the parcel and along Hollis Street on its west side (Figure 9).

In order for the Sudbury Aqueduct Trail to reach Framingham Station – west of Hollis Street – without passing through the permitted parcel, where the Auto Bright Car Wash is located, the trail could be routed north along Hollis Street and west on Hollis Court (Figure 10). If the parcel owner works with Framingham and the MWRA to open the path of the Sudbury Aqueduct to bicycle and pedestrian travel, it is possible that the issues with the fence causing this bicycle network impediment could be resolved.

Although some Sudbury Aqueduct parcel owners hold permits, MWRA staff explained that private owners often construct fences and encroach on land without the MWRA's permission. Unfortunately, as discussed above, addressing such issues complicates the process of opening MWRA aqueduct land to public access. Due to the encroachment of abutters, it may prove necessary to provide an interim, on-road route from Framingham Station to Summit Street while the Town of Framingham and the MWRA work to address the encroachment issues. The path around the obstructed sections of the trail, illustrated in Figure 11, is a combination of the three alternative routes proposed above.

While addressing encroachment by abutters introduces an additional obstacle to closing the Sudbury Aqueduct gap, it should be noted that every parcel along the gap is held in fee by the Commonwealth and managed by the MWRA. Thus, the MWRA ultimately determines the use of each of the parcels along the Sudbury Aqueduct gap. Since there is a single entity managing all the parcels, the process of closing the gap should be more straightforward than it would be if multiple entities had to coordinate. It is, therefore, theoretically possible to open the remainder of the Sudbury Aqueduct to public access with sufficient coordination between the MWRA and the municipalities in which the trail segments are located.

## 4 CONCLUSION

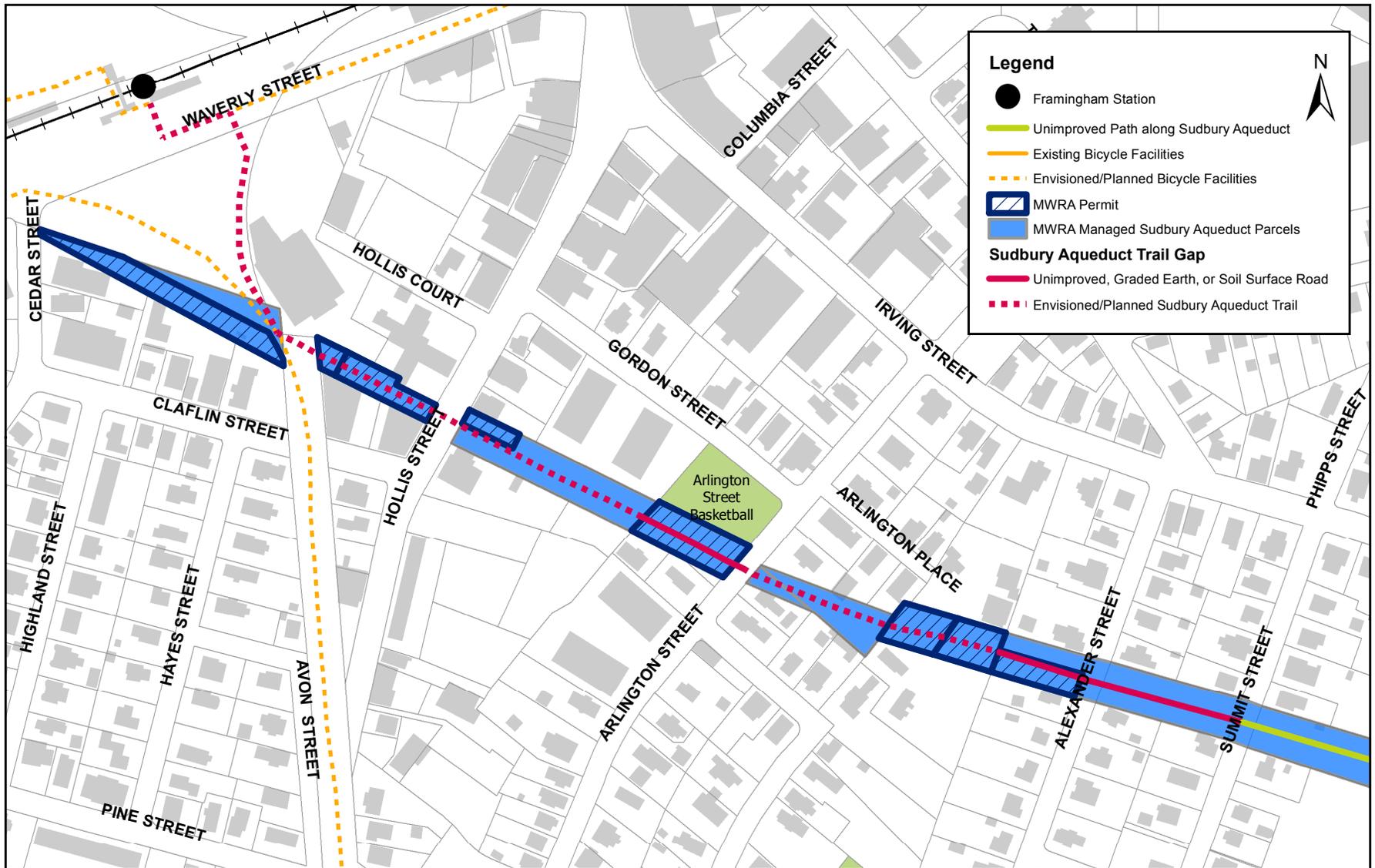
Prior to opening the bicycle network gap for public use, the Town of Framingham will need to address the possibility that the proposed Sudbury Aqueduct Trail segment contains hazardous chemicals. These concerns may prove to be unfounded, but it is crucial that Framingham deals appropriately with any safety concerns before inviting residents and visitors to use the corridor.

Once these concerns are addressed, the greatest impediment to providing a connection between Framingham Station and Summit Street along the Sudbury Aqueduct in Framingham is the need to address abutters' encroachment onto aqueduct land held in fee by the Commonwealth and managed by the MWRA. In order to resolve the problems introduced by such encroachment, the following steps should be taken:

1. The Town of Framingham must accept the responsibility of opening the trail segment for public access.
2. The Town of Framingham and the MWRA must work together to communicate with the land owners of the parcels with fences that border the Amazing Things Arts Center and the Auto Bright Car Wash to modify the impediments in such a way as to allow public access along the aqueduct parcels.
3. The Town of Framingham and the MWRA should collaborate to install trail markers and provide information to the general public about the proper use of the resource.

Once these steps have been completed, the Town of Framingham will be able to open a segment of the Boston region bicycle network that has great potential to increase the continuity and connectivity of the bicycle network. As each new segment opens, the network becomes more complete and routes for bicyclists continue to grow safer and more comfortable. By improving the route options for cyclists, continued development of the Boston region bicycle network contributes to the viability of the bicycle as a travel mode throughout the metropolitan area.

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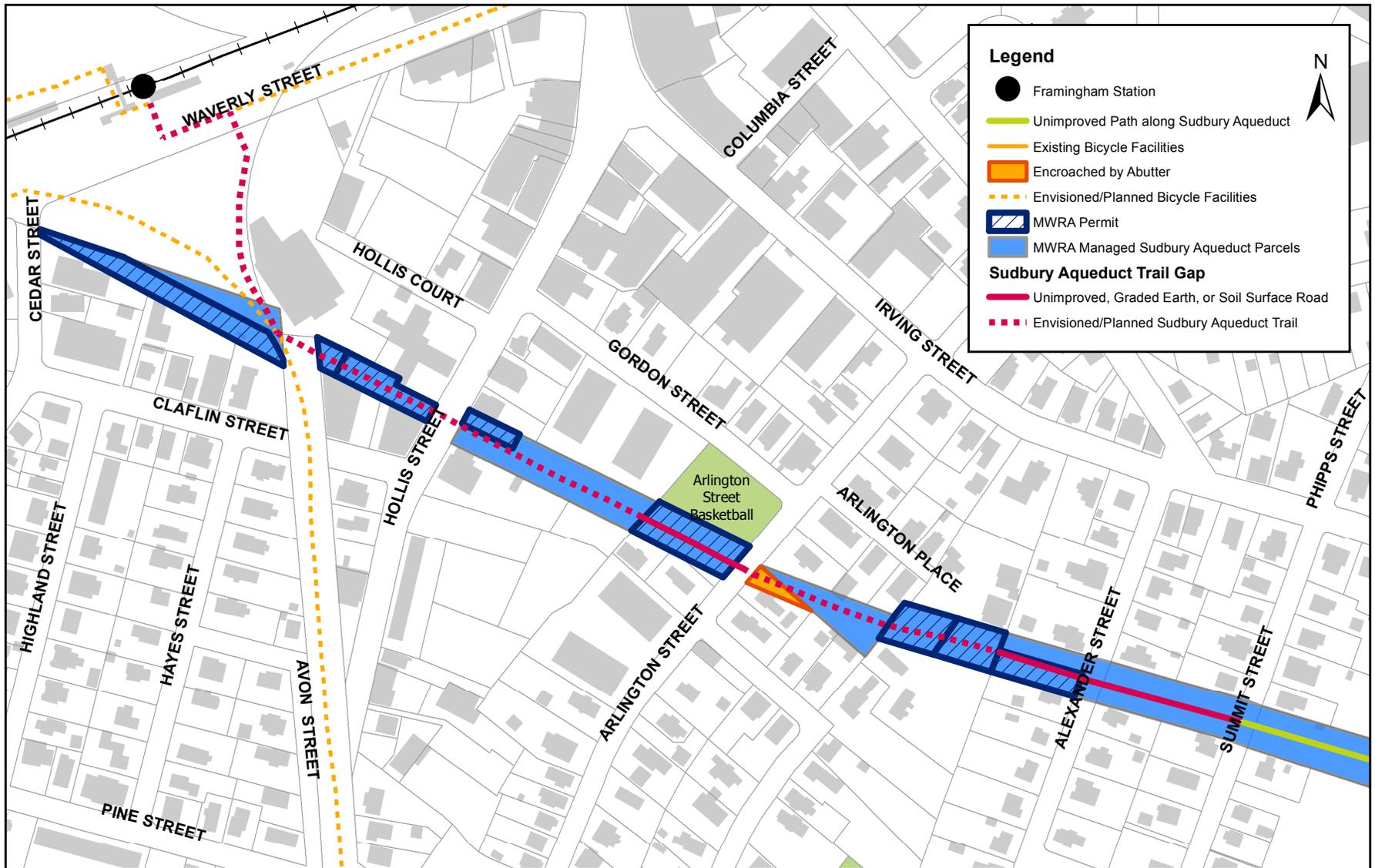
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**Figure 1**  
**MWRA Permitted Parcels: Sudbury Aqueduct Trail Gap**  
**Framingham, Massachusetts**

*Bicycle Network*  
*Gaps: Feasibility*  
*Evaluation*

**Figure 2**  
**Abutter Encroachment on Sudbury Aqueduct Parcel**

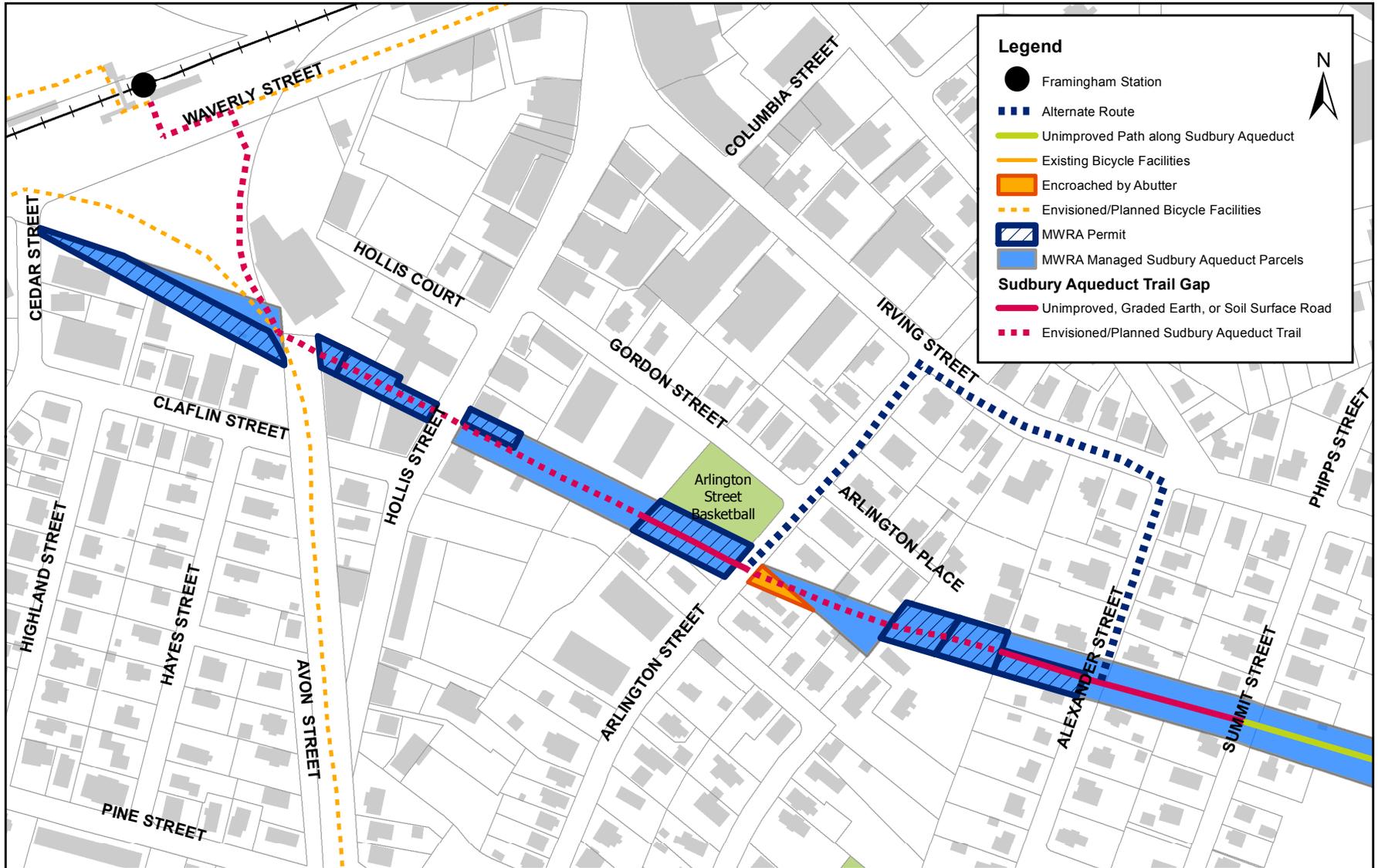




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**Figure 3**  
**Encroached Parcel East of Arlington Street**  
**Framingham, Massachusetts**

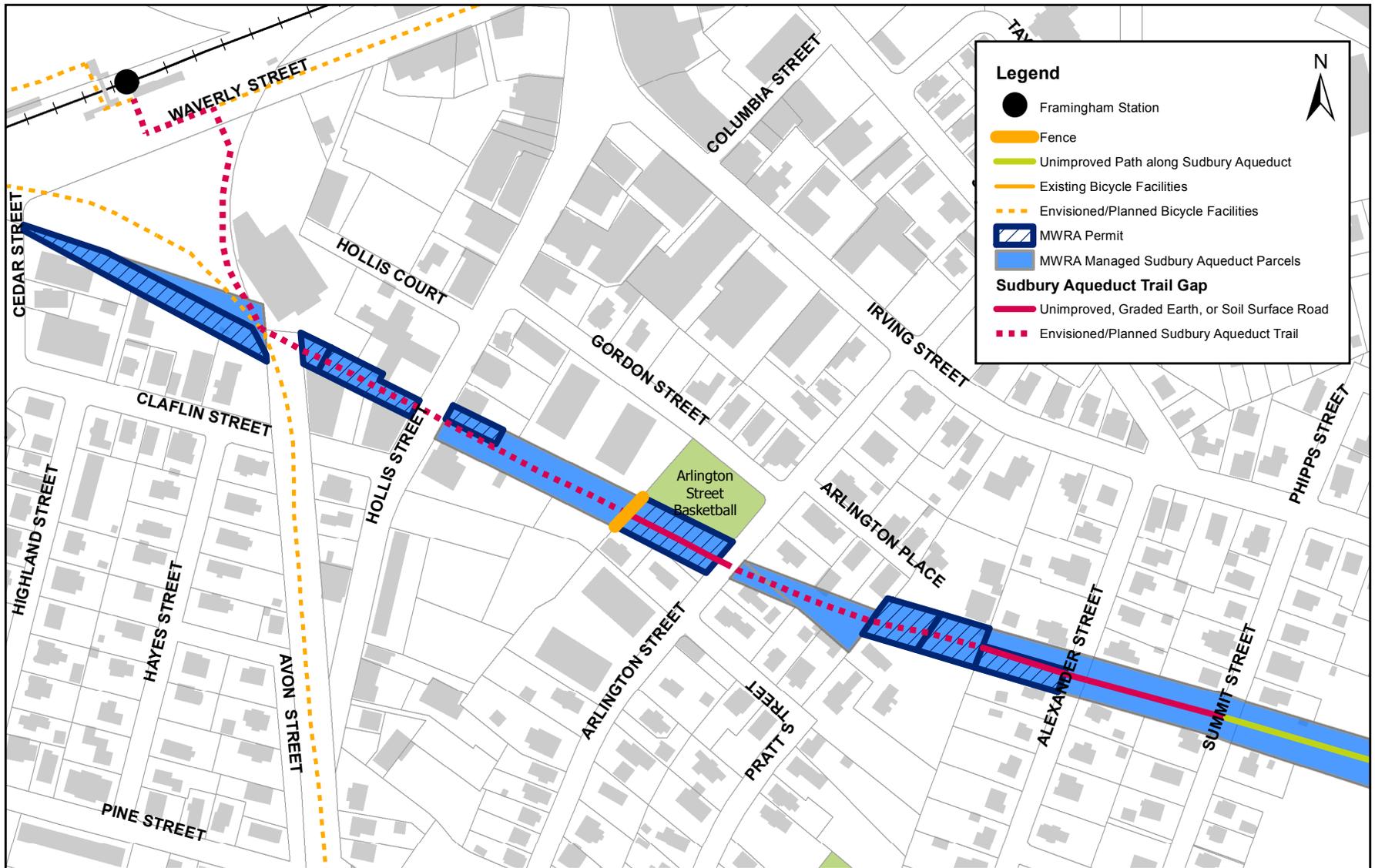
*Bicycle Network*  
*Gaps: Feasibility*  
*Evaluation*



**CTPS**

**Figure 4**  
**Alternate Route without Access Impediments**  
**Framingham, Massachusetts**

*Bicycle Network*  
*Gaps: Feasibility*  
*Evaluation*



**CTPS**

**Figure 5**  
**Fence near Arlington Street Basketball Park**  
**Framingham, Massachusetts**

*Bicycle Network*  
*Gaps: Feasibility*  
*Evaluation*

**Figure 6**  
**Fence on Parcel without MWRA Permit (Amazing Things Arts Center)**

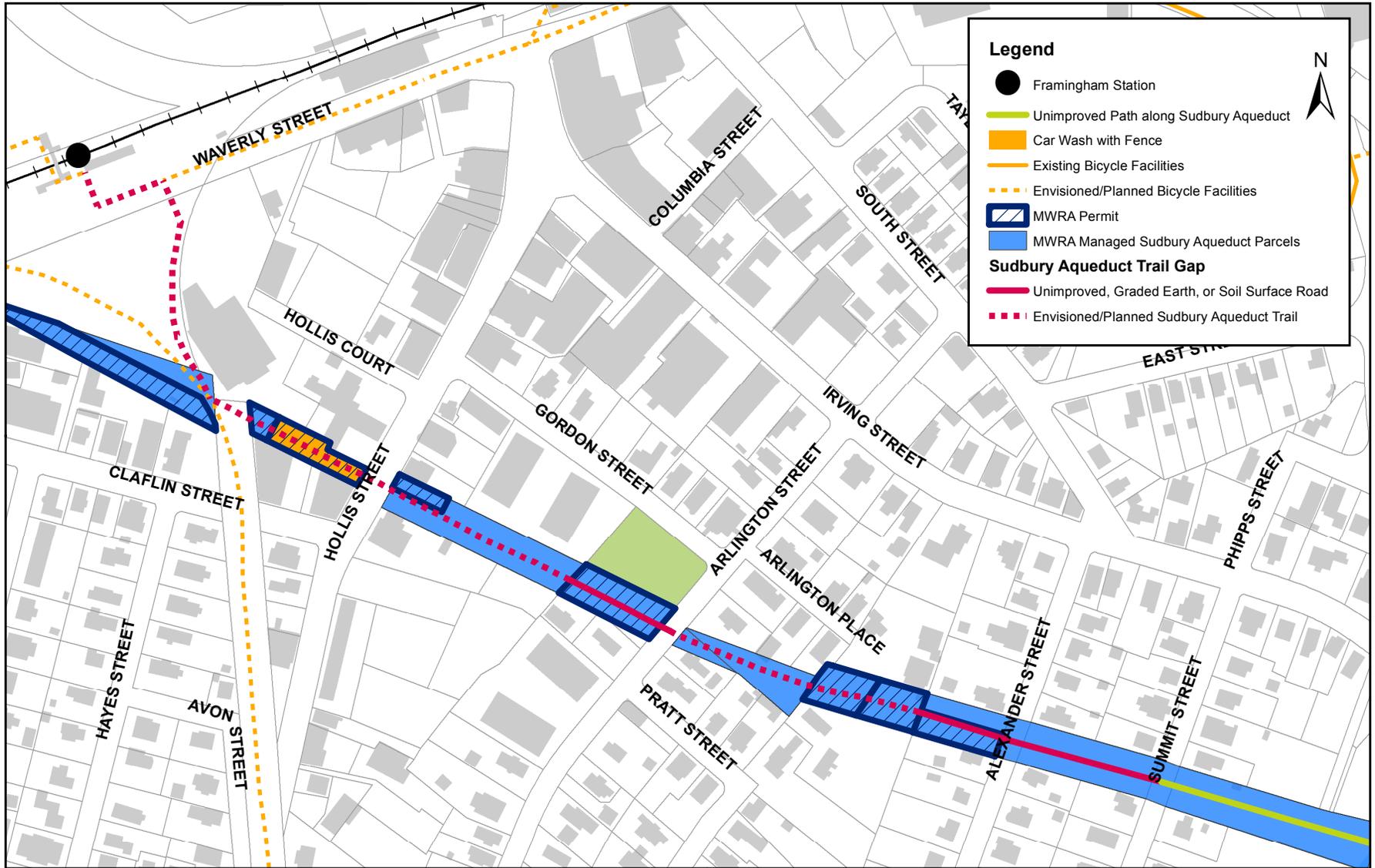


Source: Google Street View

**Figure 7**  
**Fence on Parcel with MWRA Permit (Auto Bright Car Wash)**



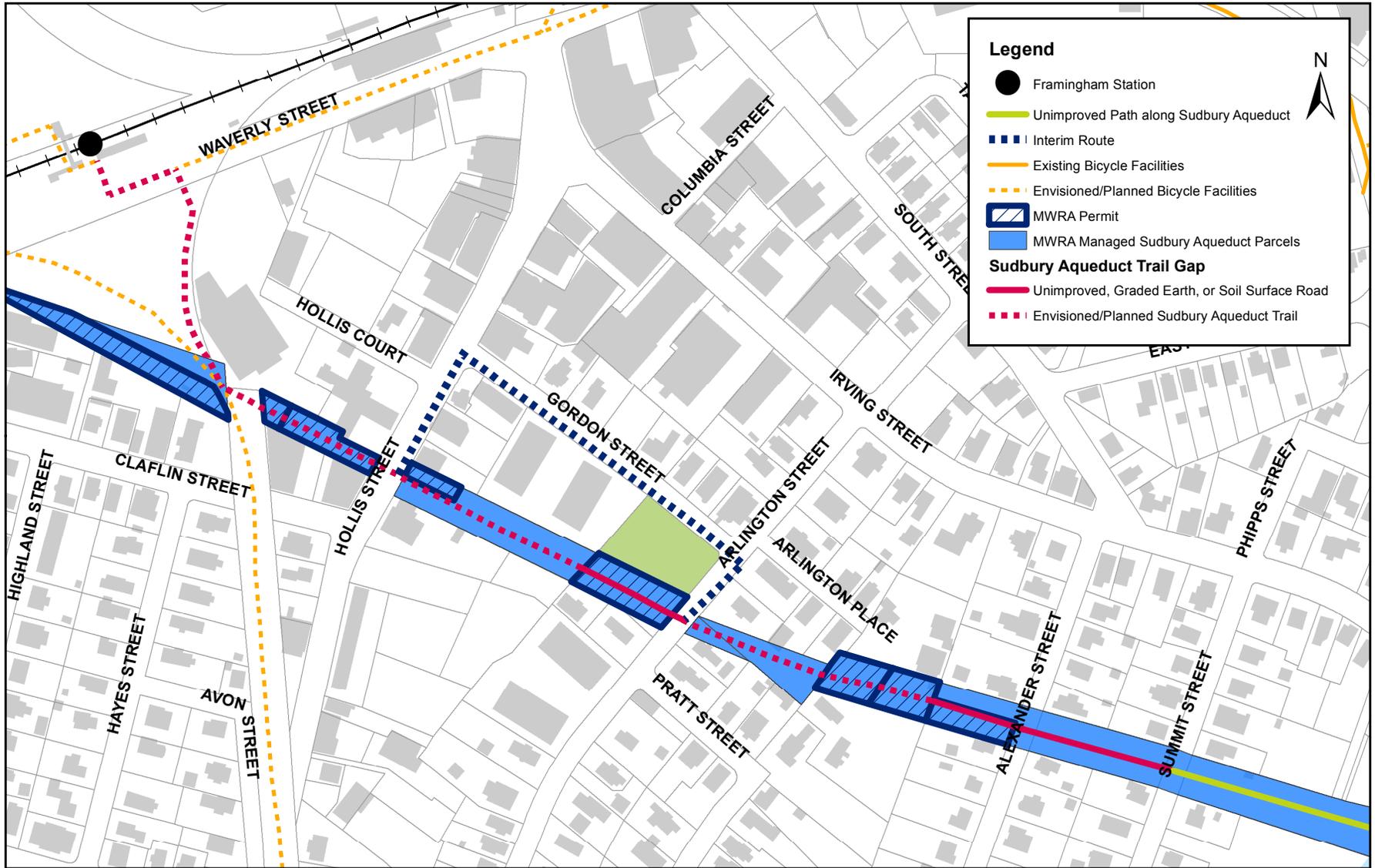
Source: Google Street View



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**Figure 8**  
**Auto Bright Car Wash Parcel with Fence**  
**Framingham, Massachusetts**

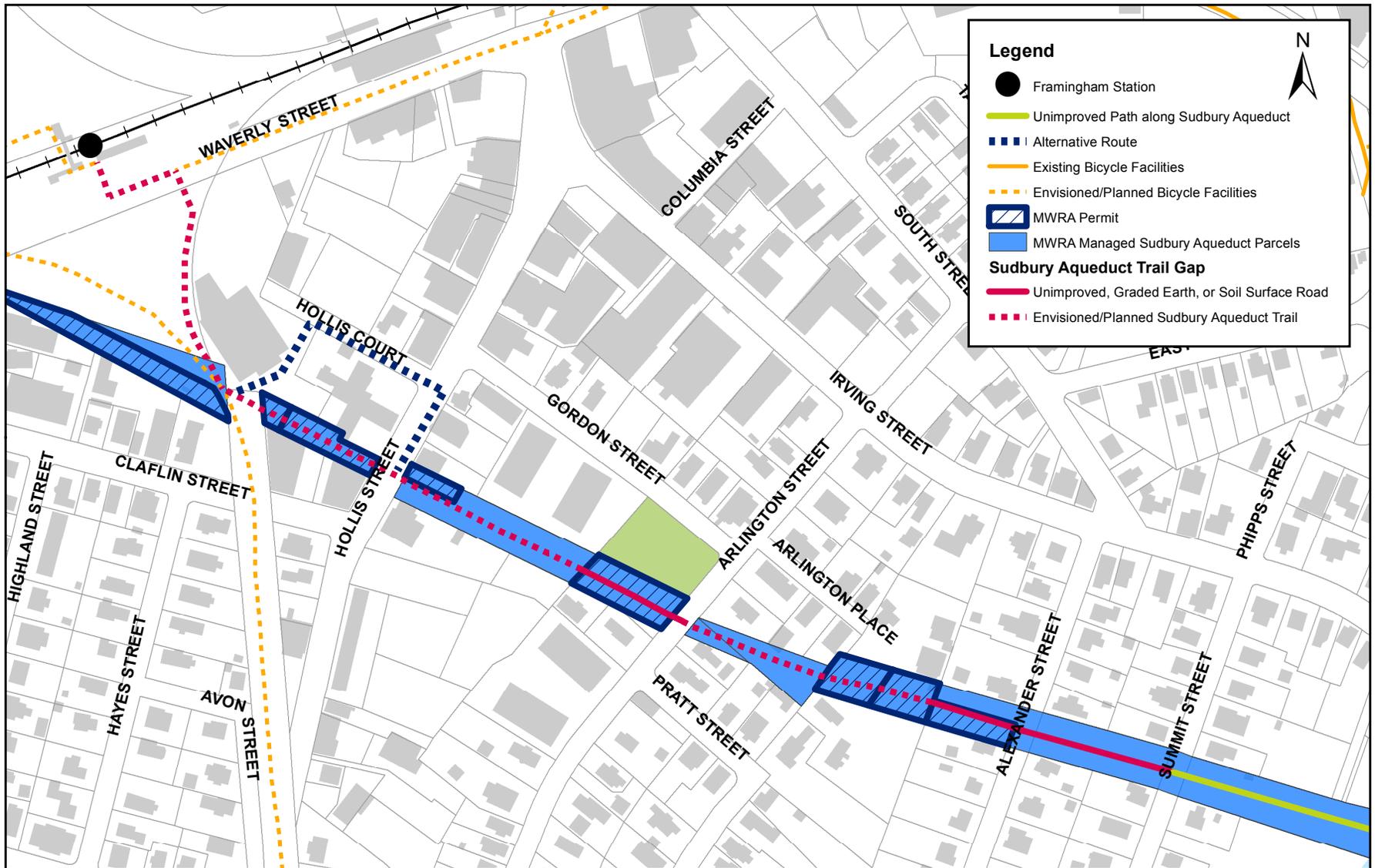
*Bicycle Network*  
*Gaps: Feasibility*  
*Evaluation*



**CTPS**

**Figure 9**  
**Interim Route Prior to Fence Removal from Encroached Parcel**  
**Framingham, Massachusetts**

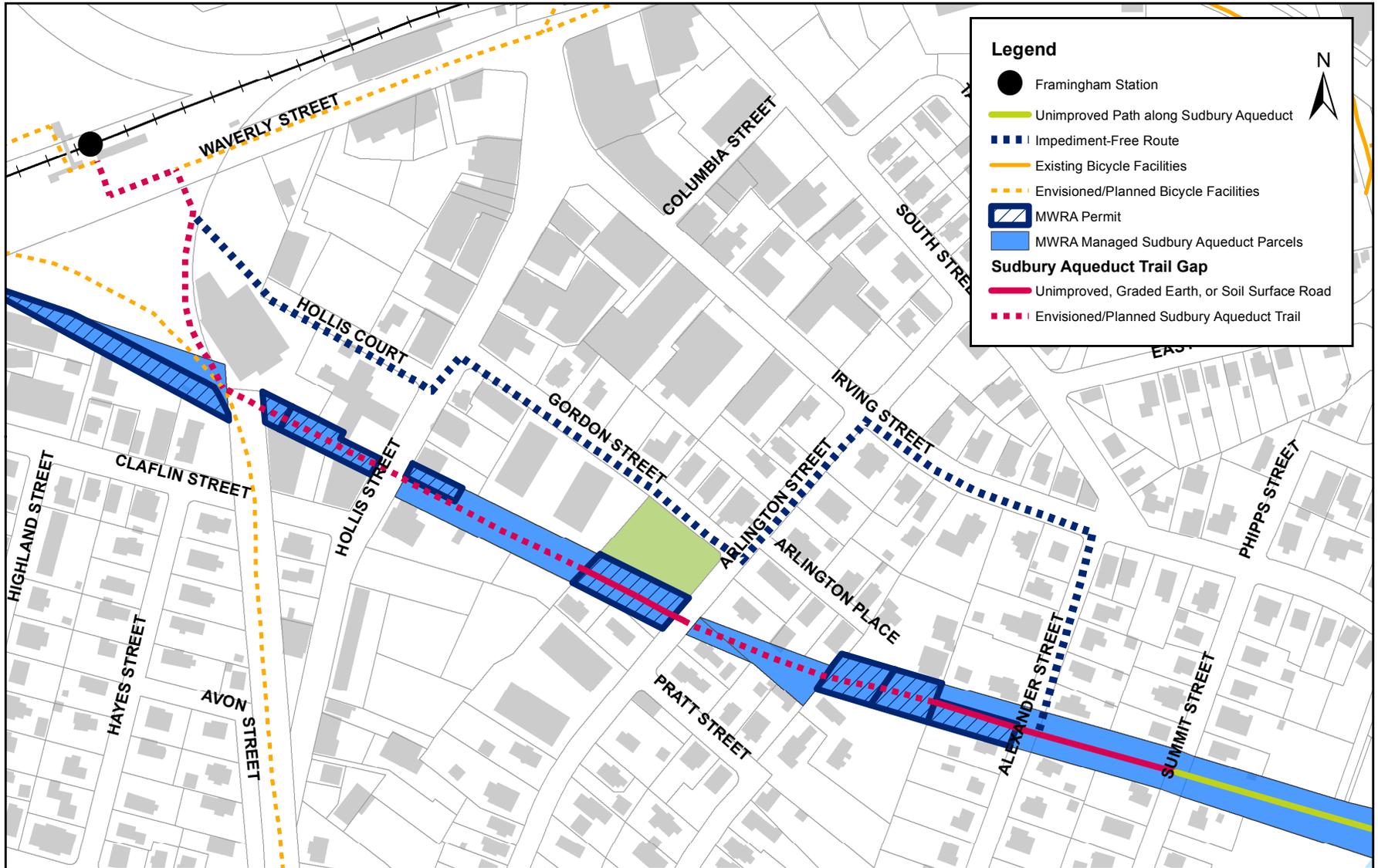
*Bicycle Network*  
*Gaps: Feasibility*  
*Evaluation*



**CTPS**

**Figure 10**  
**Alternate Route around Auto Bright Car Wash Parcel**  
**Framingham, Massachusetts**

*Bicycle Network*  
*Gaps: Feasibility*  
*Evaluation*



**CTPS**

**Figure 11**  
**Alternate Route without Access Impediments**  
**Framingham, Massachusetts**

*Bicycle Network*  
*Gaps: Feasibility*  
*Evaluation*