



To: Adam Shulman, AICP
Cambridge Traffic, Parking, and
Transportation Department
344 Broadway
Cambridge, MA 02139

Date: December 6, 2023

Memorandum

Project #: 14968.03

From: Sean Manning, PE, PTOE
Matt Burmeister

Re: Alewife Station Access Road Bus Lane Feasibility Study

On behalf of IQHQ REIT (the "Proponent"), VHB has prepared this memorandum to document transportation mitigation commitments made to the City of Cambridge in support of the proposed development of 36-64 Whittemore Avenue (i.e., Alewife Park). This memorandum focuses specifically on the commitment outlined in the Planning Board's Special Permit 387 Decision, Condition 11(a)ii., which states that the Proponent shall commence a feasibility study for the widening of the arched tunnel under Alewife Brook Parkway to accommodate safer bicycle facilities connecting from the Minuteman Bikeway to the Project Site.¹

This memorandum presents an evaluation of the feasibility of this potential improvement action, as it was documented in a presentation shared by VHB during a meeting with the City of Cambridge and other transportation stakeholders on September 21, 2023 (**Attachment A**). Note that it does not present an in-depth analysis of alternatives, impacts to signals or intersections, environmental permitting implications, traffic, or safety. If the tunnel widening is determined to be feasible by the City of Cambridge, MassDOT, MBTA, DCR, and the Cambridge Conservation Commission, the Proponent will be responsible to develop 100% design plans for review by these delineated agencies.

The findings of this feasibility study indicate that a widening of the arched tunnel would not be possible without a full replacement of its precast concrete sections, likely requiring closure of the Access Road and lane closures along the bridge during construction. However, modest additional width could be gained for a pedestrian, bicycle, or shared-use facility by removing two existing non-structural concrete barriers within the existing arched tunnel.

Feasibility Determination

In the Summer of 2023, VHB commenced the feasibility assessment for the tunnel widening. Using engineering survey plans obtained in April 2023 and structural plans of the bridge cross-section obtained from MassDOT, VHB evaluated the feasibility of widening the arched tunnel superstructure. VHB also evaluated the feasibility of working within the existing tunnel cross-section to provide dedicated pedestrian and bicycle infrastructure for the short stretch of roadway between the bridge overpass and the access driveway for the Alewife Park Development.

Structural Review of Arched Tunnel Superstructure

VHB obtained existing conditions bridge design plans from MassDOT, including original design plans from July 1984, and a standard MassDOT structural inspection report from January 2021. The existing cross-section of the tunnel includes a 22-foot travel lane with 1-foot shoulders on either side, as well as a 2.5-foot concrete jersey barrier on

¹ Condition 11(a)ii. *Special Permit Decision 387*, City of Cambridge Planning Board, p 13. 08/16/2022. Available online at: https://www.cambridgema.gov/-/media/Files/CDD/ZoningDevel/SpecialPermits/sp387/sp387_decision_20220816.pdf

either side of the roadway. The total width between structural elements of the arch is approximately 27 feet. The maximum height of the tunnel is 16 feet, 5 inches.

Based on a desktop review of the available structural information, to widen the arched tunnel superstructure would require a full replacement of the circular precast concrete sections with “square” precast concrete sections. The construction would have significant impacts to both the Access Road and Alewife Brook Parkway, likely requiring closures of the Access Road and a temporary reduction of lanes on Alewife Brook Parkway.

An additional challenge with widening of the tunnel superstructure is the physical constraints on either side of the overpass, which limit the potential width of the roadway cross-section. On the west side of the overpass, the Access Road abuts a 10-foot shared-use extension of the Minuteman Bikeway (which crosses the road to the south to connect to the Alewife Linear Path). On the north side of the shared-use path is Yates Pond, while on the south side of the roadway is the Alewife Station parking garage. The minimum width between the pond and the façade of the garage structure is 35 feet.

Structural Evaluation of Jersey Barriers

Based on a desktop review, the concrete barriers on either side of the existing tunnel appear to have been added at some point after the structure was constructed and are not part of the structural system (see **Attachment A, page 8**). VHB’s assessment is that either or both barriers can be removed without affecting the structural integrity of the tunnel. The additional roadway width from removing these two jersey barriers would be approximately 5 feet, to bring the roadway cross-section to a total of approximately 27 feet.

To provide a less costly and intrusive option for a pedestrian or bicycle facility, VHB studied placing a pathway in the additional right-of-way gained by the removal of these concrete barriers. As part of this assessment, VHB developed two alternative roadway treatments for the segment between the bridge overpass and the access driveway for the Alewife Park Development (depicted on **pages 6-7 of Attachment A**).

Considerations for Future Study & Design

The tunnel and adjoining segment of the Access Road present an opportunity to provide a key link within the regional trail network, connecting the Minuteman Bike Path and Fitchburg Cutoff in the west to the Alewife Linear Path and Somerville Community Path in the east, via the Alewife Park Development (**Attachment A, pages 3-4**). This section outlines several considerations for the design and configuration of a future bicycle and/or pedestrian facility within the existing tunnel superstructure and the subsequent roadway segment between the bridge overpass and the access driveway to the Alewife Park development.

Comparison of the Two Options

The two alternatives presented in **Attachment A** explore two options: one using the expanded roadway cross-section to accommodate one-way bicycle facilities on either side of the roadway (**Page 6**), and a second option with a 10-12-foot two-way shared-use path on the south side of the roadway (**Page 7**). VHB identified several advantages with the shared-use path option, as outlined below:

- › Bidirectional movements for both bicyclists and pedestrians would be accommodated under the tunnel.

- › Given that the path connections on the Alewife Park property and west of the tunnel are both a two-way shared-use path, the shared-use path option provides an intuitive connection for people walking and cycling.
- › Locating the facility entirely on the south side will allow for a simpler intersection treatment at the Alewife Park access driveway and minimal driveway widening.
- › Locating the facility on the south side also simplifies the connection between this link and the proposed shared-use facility within the Alewife Park development, which runs north-south through the Site.

Height Clearances

During the feasibility evaluation, VHB evaluated the height clearance implications of removing the concrete barriers, which currently serve to channel buses and shuttles into the center of the travel lane. By providing a two-way shared-use facility on one side of the road, a bus may shift towards the opposite edge of the arched tunnel. As shown in **Page 9 of Attachment A**, the removal of one concrete barrier should provide enough width to incorporate a 10-foot, two-way shared-use path into the roadway cross-section while maintaining the other concrete barrier and 12.5 feet for a general travel lane. This would provide, at minimum, 13 feet 4 inches of clearance for a bus or shuttle. The vertical clearance on the pathway side of the tunnel would be approximately 10 feet 2 inches, which would meet the MassDOT guidelines for shared use path facilities (10 feet).²

Safety

As part of future design considerations, the safety elements of each configuration should be carefully evaluated. On the west side of the tunnel, an existing crossing with RRFB treatment is provided; this crossing may need modifications to accommodate a path connection under the tunnel. Similarly, the intersection treatment at the Alewife Park access driveway may need modifications to provide optimal safety for pedestrians and bicyclists. Any facilities under the tunnel should provide horizontal and vertical separation from vehicular traffic to the extent possible. Additionally, lighting and visibility within the tunnel should be evaluated to ensure the safety of vulnerable road users.

Operations

During the feasibility evaluation, VHB used the traffic operations evaluation presented in the 2021 Alewife Park TIS (which used December 2018 count data) to assess the current volume of pedestrians and bicyclists along the Minuteman Path extension (**Attachment A, page 5**). For future design, the pedestrian and bicycle travel patterns along the Access Road should be reevaluated with current count data, which would be required by both MassDOT and the DCR as part of a Functional Design Report (FDR) in connection with their required design review processes. Count data should be collected during a spring or fall month, when pedestrian and bicycle activity will be at its peak.

Environmental Permitting

Any roadway widening in or around the tunnel superstructure will require an environmental permitting effort, as most of the roadway is located within a 100-foot wetland zone buffer.

² *MassDOT Design Guide, Shared Use Paths and Greenways*, p. 11-9. MassDOT Highway Division, January 2006. Available online at: <https://www.mass.gov/doc/massdot-design-guide-chapter-11-shared-use-paths-and-greenways/download>



Alewife Park: Offsite Mitigation

Alewife Station Access Road
Bicycle Infrastructure Study

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August 14, 2023



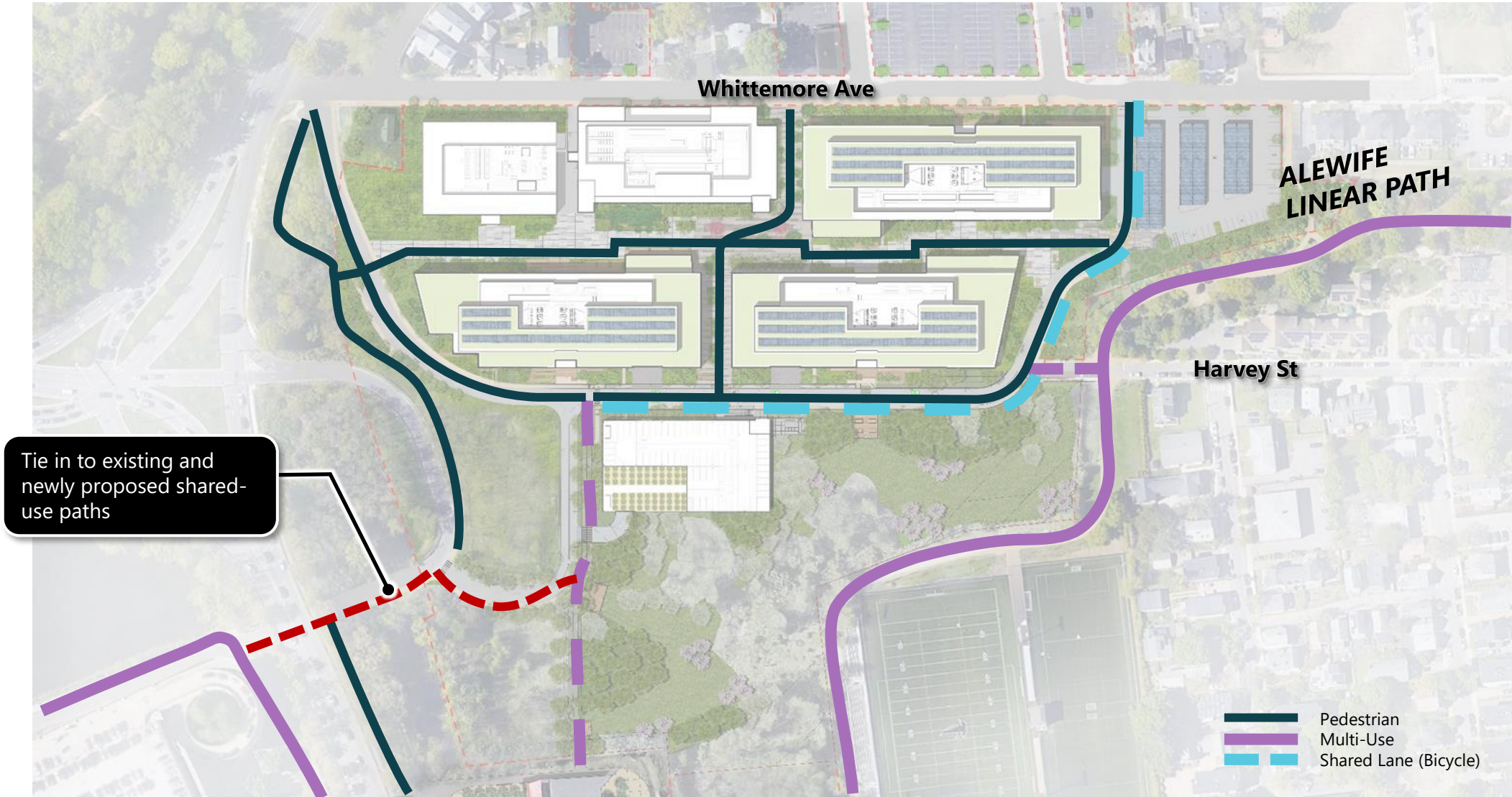
Introduction/Project Goals

- Cambridge SP 387, Condition 11a
- Feasibility Study for the widening of the arched tunnel under Alewife Brook Parkway to accommodate safer bicycle facilities connecting from the Minuteman Bikeway to the Project site. The Permittee shall provide 100% design plans for review by the City, MassDOT, MBTA, DCR, and Cambridge Conservation Commission. The Permittee shall not be responsible for construction.
- Conceptual plans for a connecting bike/pedestrian path on IQHQ property to provide a more direct connection between the Linear Path to the east with the Fitchburg Bypass path to the west, and with the Minuteman Path to the north.

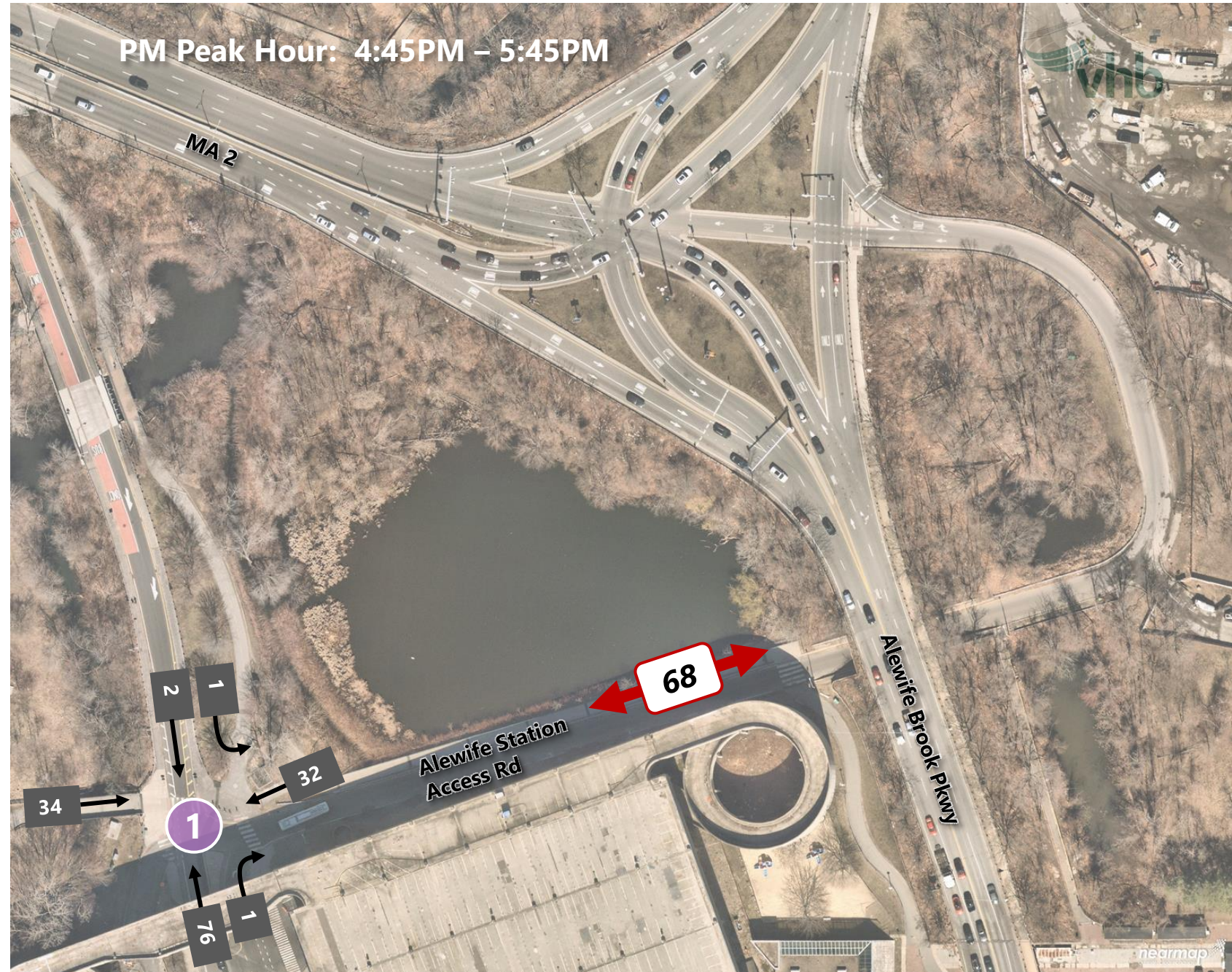
Regional Bicycle Connections



Local/Site Bicycle Connections



Existing (2021*) Bicycle Volumes

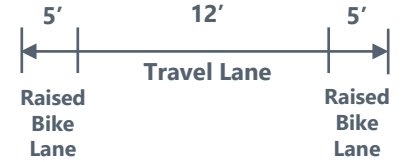
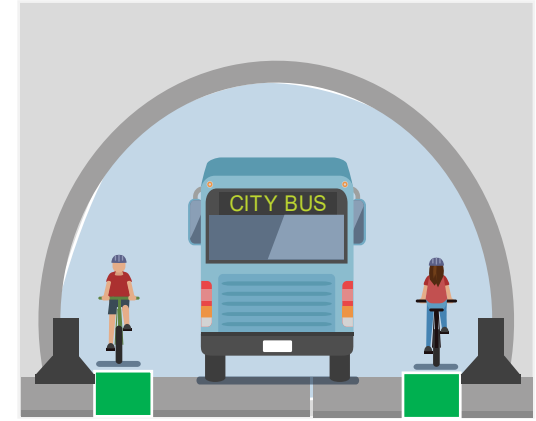


*Counts conducted December 2018, used as the basis for Existing (2021) Conditions in the Alewife Park TIS.

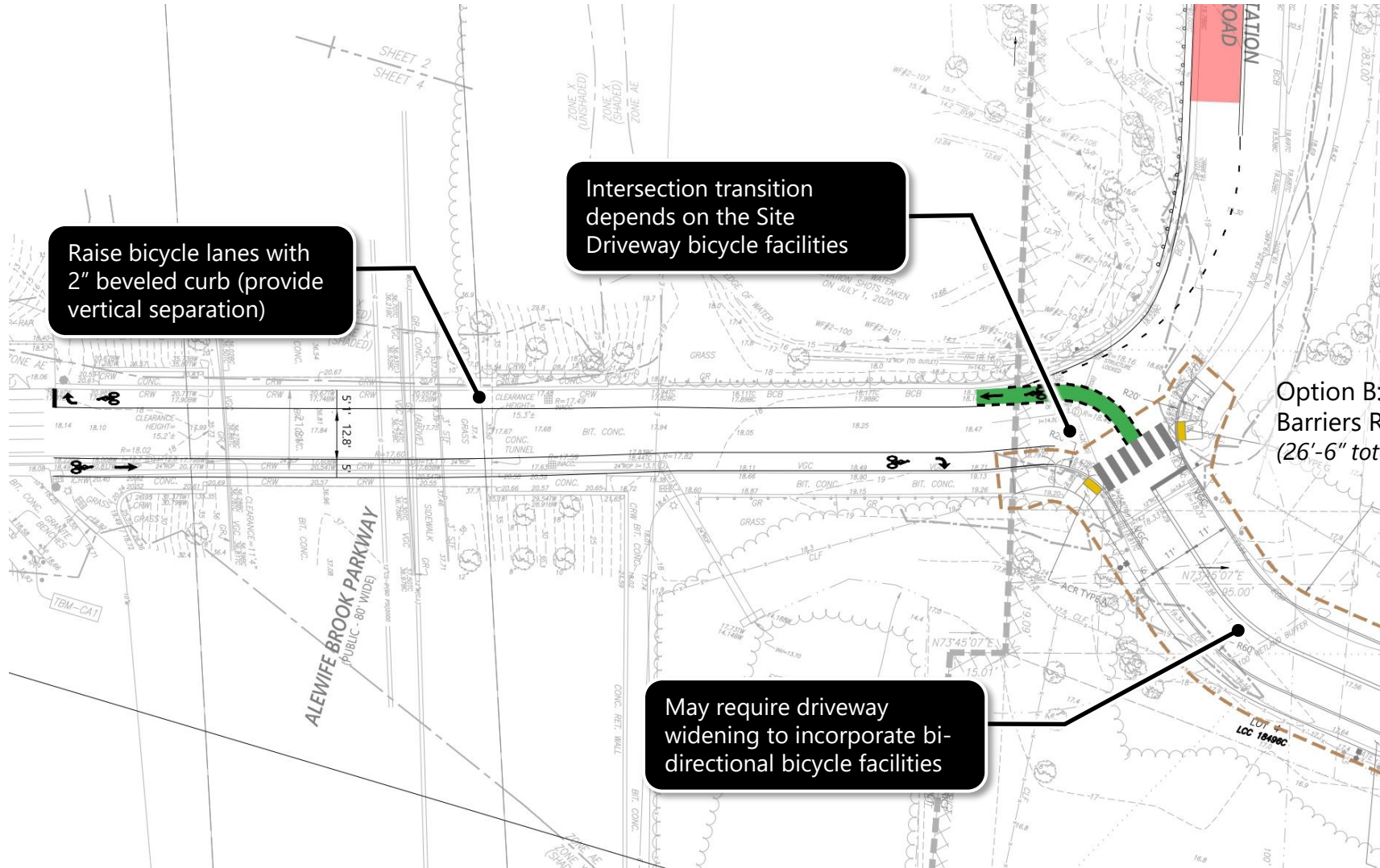
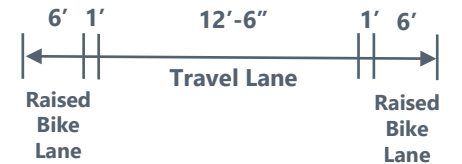
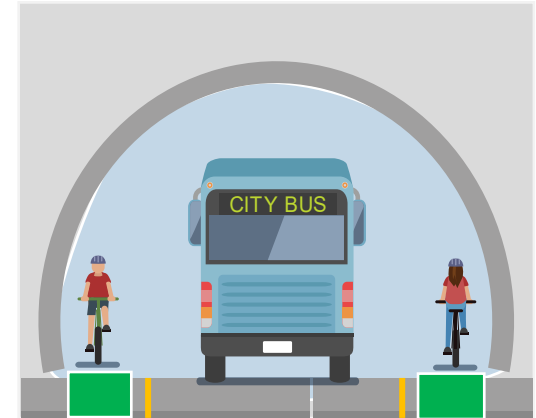
Note: No seasonal adjustment was made to the bicycle volume counts; thus, it is likely that the volumes presented here are less than typical.

Bicycle Concept 1: One-way Facilities

Option A: Jersey Barriers Intact
(22' total)

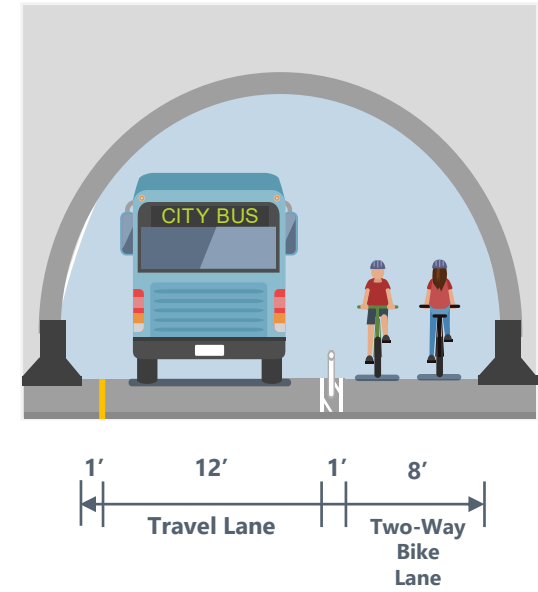


Option B: Jersey Barriers Removed
(26'-6" total)

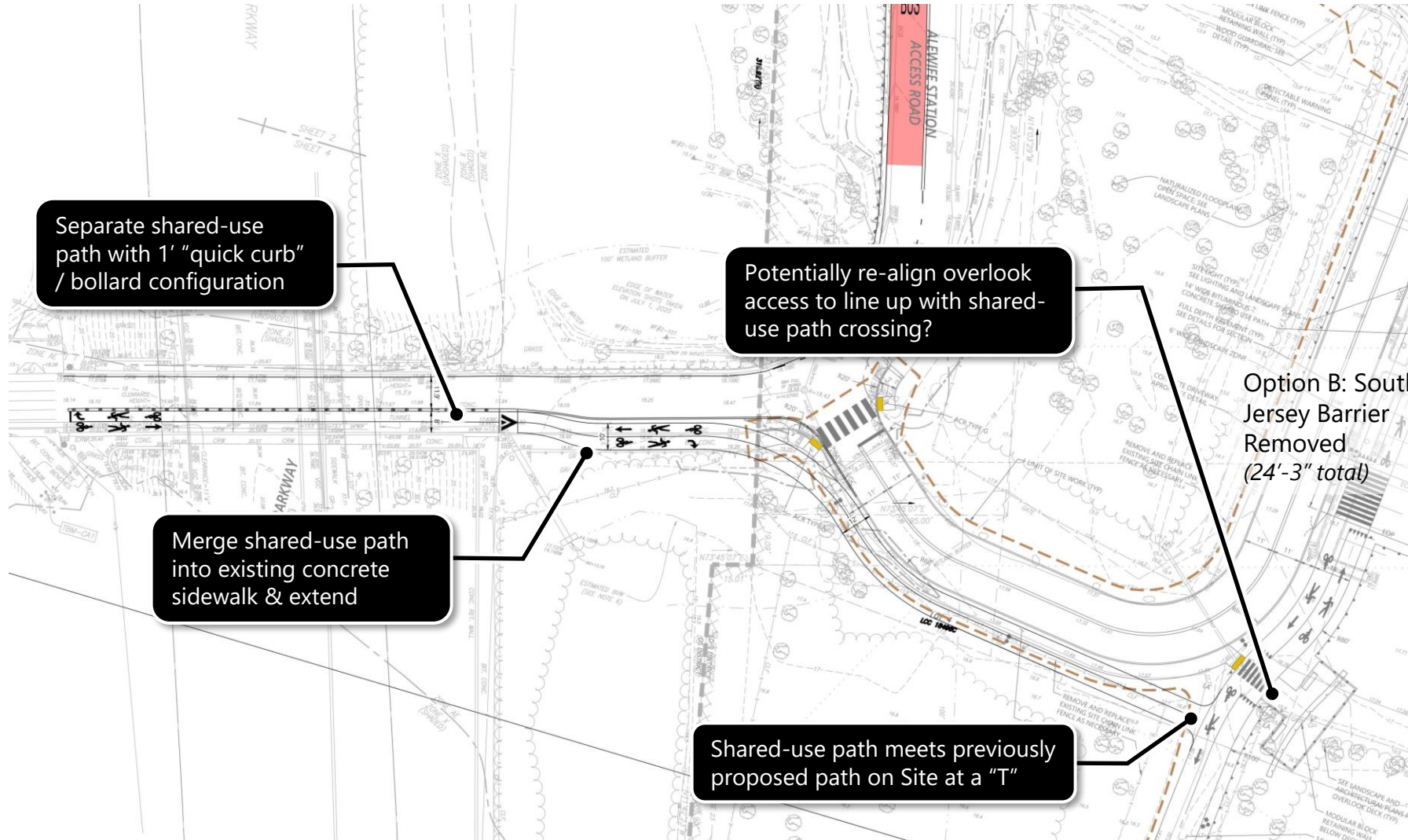
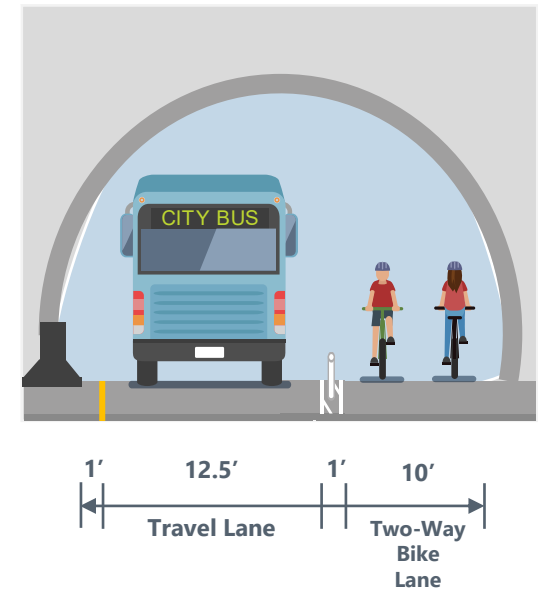


Bicycle Concept 2: Two-Way Facility

Option A: Jersey Barriers Intact (22' total)



Option B: South Jersey Barrier Removed (24'-3" total)



Arch Tunnel: Potential Widening

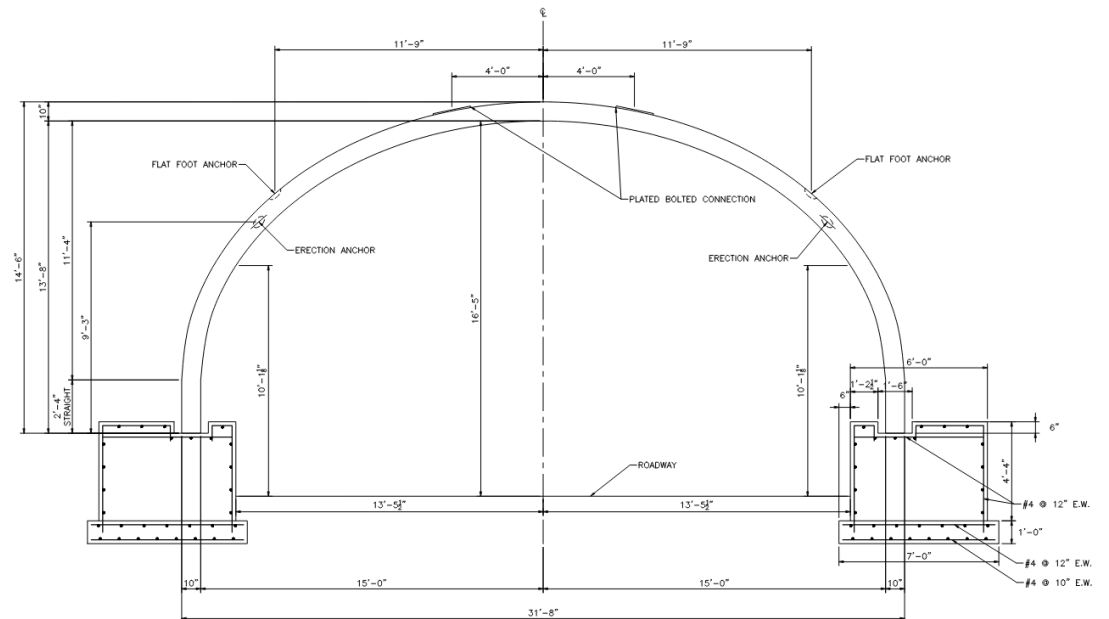


Preliminary Structural Review:

- Concrete barriers appear to have been added at some point after the structure was built
- Either or both may likely be removed without affecting the structural integrity of the tunnel



Existing Tunnel Cross-Section



Note: This section was drawn based on original 1984 plans and 2021 bridge inspection report.





Pros and Cons: Bike Feasibility Options

Option 1:

Pros:

- Makes sure vehicles are centered in the tunnel to prevent clearance issues
- Both directions of cyclists accommodated separately with raised treatment

Cons:

- Removal of both jersey barriers
- **Does not accommodate pedestrians with desire to cross under tunnel**
- Requires intersection treatment at Site Driveway
- **May require adding dedicated bicycle lanes / redesign of Site Driveway**

Option 2:

Pros:

- Removal of only one jersey barrier
- **Accommodates both cyclists and pedestrians**
- **Requires minimal widening on Site Driveway because shared-use path can merge with sidewalk / maintains Site Driveway design**
- Simpler connection to proposed on-Site shared-use path facility

Cons:

- Vehicles are not centered in the tunnel and favor the North side – more potential for clearance issues
- May warrant re-alignment of Jerry's Pond Overlook