BEACON-HOPEWELL
RAIL TRAIL
STUDY

Beacon-Hopewell Rail Trail Study

Existing Conditions Report

DUTCHESS COUNTY
TRANSPORTATION COUNCIL
Better ways from here to there

October
2024

Disclaimer

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Contents

Existing Conditions Inventory and Assessment

This report describes the existing infrastructure and environmental conditions along the nearly 13-mile stretch of Metro-North Railroad's Beacon Line that extends from the Hudson River in the City of Beacon to the hamlet of Hopewell Junction in the Town of East Fishkill. It also highlights key design challenges for a potential trail, including road crossings, bridge rehabilitation needs, utility coordination, and environmental constraints.

The corridor features standard railroad infrastructure, including steel rails and hardware, wooden railroad ties, ballast, drainage pipes and culverts, six bridges, and three overpasses. Understanding the condition of this infrastructure and the corridor's environmental resources is crucial for assessing the feasibility of two potential trail options: converting the railroad corridor into a trail (rail trail) or constructing a trail adjacent to the existing railroad tracks (rail with trail). A detailed analysis of those two options will follow in a separate report.

The railroad corridor was generally found to be in good condition, especially given that trains have not been running on the corridor. The study team did not find any issues that would preclude the conversion of the corridor to a trail.

Railroad Corridor

Data Collection Methodology

The study team visited the railroad corridor in March-April 2024 to assess and document existing conditions. ESRI's ArcGIS Survey 123 tool was used to collect field data and record key features, including the geospatial location, of the following items:

- Available width
- Width, composition, and suitability of the existing ballast (track bed material)
- Railroad track and tie conditions
- Existing stormwater flow patterns
- Swale sizes, locations and conditions
- Washouts
- Stream crossings
- Existing culvert conditions
- Potential access locations for:
    - Construction/staging
    - Trailheads
    - Emergency services
    - Local access
- Potential scenic overlook locations
- Historical interpretation opportunities

- Pedestrian and bicyclist safety concerns, including locations that would need fencing
- Connections to existing trails
- Existing tree and vegetation removal needs
- Visible underground and overhead utilities
- Roadway and driveway crossings

An overview map of key features (bridges, overpasses, culverts, washouts, road crossings, and informal access points) is included at the end of this report and in Appendix A. The study team subsequently performed a separate site visit in April 2024 to assess the environmental characteristics of the corridor, which are discussed in the Natural Resources section. Beyond creating an accurate understanding of the corridor, this data will help inform preliminary construction estimates for the possible construction of a trail.

Physical Dimensions and General Characteristics

The study team measured the vertical clearance, clear width, ballast width, and the embankment width along the corridor (see Figure 1). These measurements will be used to develop the conceptual designs and preliminary cost estimates.

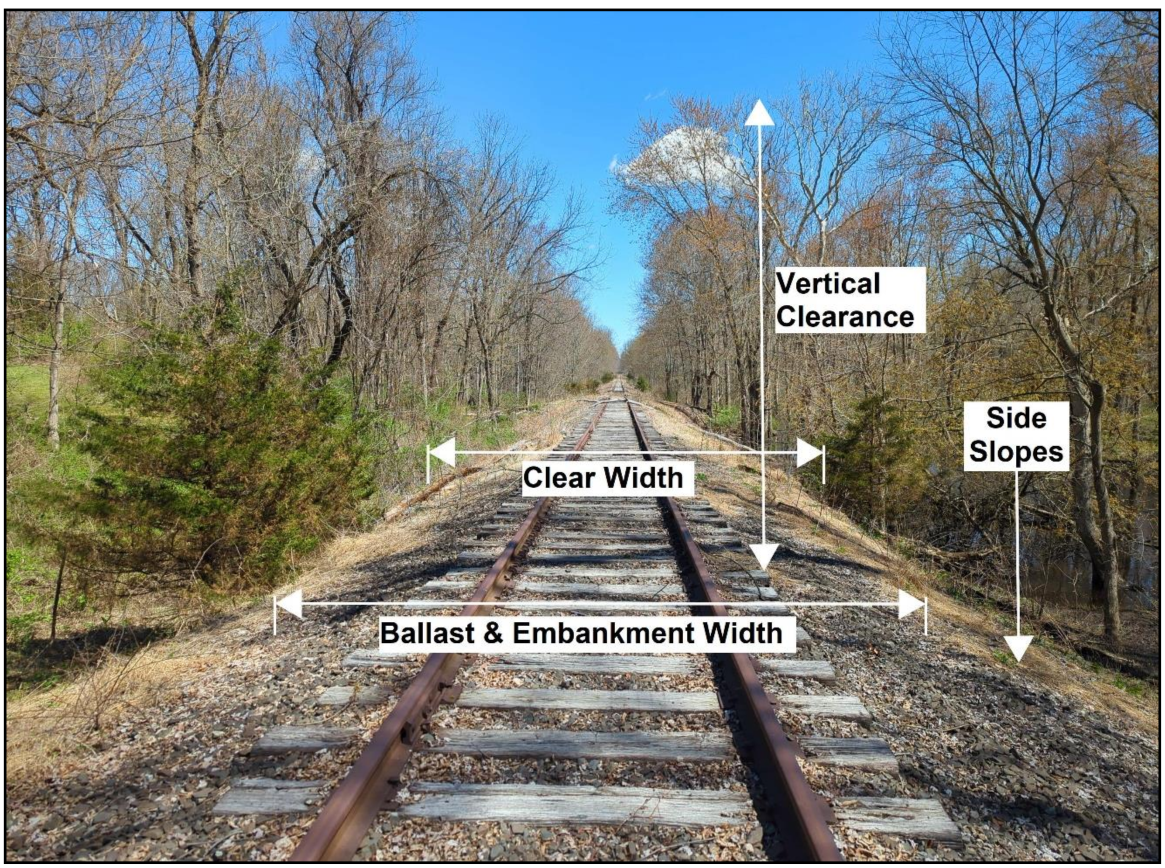


Figure 1: Corridor Dimensions & Measurements.

The corridor consists of typical railroad infrastructure such as steel rails, steel rail hardware, wooden railroad ties, and ballast stone. Additionally, the corridor includes six standing bridges and multiple drainage culverts and swales. A detailed assessment of this additional infrastructure is included in later sections.

The narrow, single-track railroad corridor traverses the City of Beacon, crosses the Fishkill Creek twice and runs along the banks of the Creek for approximately two miles before ending into the hamlet of Hopewell Junction in the Town of East Fishkill. The westernmost part of the railroad is approximately sea level (elevation zero feet) at the Hudson River and ascends to an elevation of 200 feet just east of the Beacon City limits, approximately four miles east of the River. The average grade over these four miles is approximately 1.0%, which is relatively steep for a railroad. From there, the grade of the railroad is generally level through mile 10, at the Fishkill/East Fishkill town line, where it then begins to rise and fall, gradually ending at an elevation of approximately 260 feet in Hopewell Junction, 12.5 miles from the beginning of the railroad line. In some locations, the side slopes (embankments) supporting the tracks are very steep on one or both sides, constructed at a 1.5 Feet Horizontal:1 Foot Vertical (66%) slope.

The railroad ballast is in generally good condition throughout the corridor. The railroad ballast consists of fractured angular stone ranging from 1-3" in diameter with very few smaller stones between the larger stones. The stones help distribute the load of trains evenly to the ground below, and the open voids between the stones allow water to filter through. This helps prevent vegetation growth between stones by limiting organic soils, which are necessary to facilitate plant growth. Areas with poor ballast conditions were found but were not common. A condition rating from 1 (poor) to 5 (excellent) was assigned to the ballast, as described below, along with the approximate length of each rating along the study corridor.

Ballast Condition 1 (Poor) – 416 feet (1%) within corridor. Exhibits high fines (small rock fragments) content, silt or sediment, or no or minimally visible ballast stone. Sediment within the ballast is saturated. Heavy vegetation overgrowth. Ballast may no longer support foot traffic.

Ballast Condition 2 – 2,831 feet (5%) within corridor. Exhibits fines content, silt or sediment within the ballast stone. Ballast stone is visible. Sediment within the ballast may be saturated. Some vegetation growth. Ballast is firm underfoot.

Ballast Condition 3 – 11,462 feet (18%) within corridor. Exhibits minor fines or organic content within the ballast stone. Ballast stone is mostly visible, no saturation within the ballast. Minor vegetation growth within or at the edge of ballast.

Ballast Condition 4 – 24,330 feet (39%) within corridor. Exhibits no fines or organic content within the ballast stone. Ballast stone is highly visible. Minor vegetation growth encroachment at the edge of ballast.

Ballast Condition 5 (Excellent) – 23,491 feet (37%) within corridor. Ballast stone is highly visible with no fines or organic content, no vegetation growth, or encroachment at the edge of ballast.


Figure 2: "W" Post (left) and railroad switch (right).

Most of the ballast stone was fully intact, clear of fines and organic content, and appeared to be at least 1-2 feet in depth. The existing railroad track infrastructure generally appeared to be in good condition, although there were three separate sections where the tracks had been removed for various construction activities.

Vegetation was generally clear and offset from the tracks by at least five feet. There were two eroded areas along the corridor (see Washouts section) and areas of minor vegetation growth within and adjacent to the tracks.

Other railroad infrastructure included six "W" posts (most likely whistle posts), two railroad switches, and two sections of double tracks (see Figure 2). The double track sections are located just west of Washington Ave in the Town of Fishkill and Jackson St on the Town/Village of Fishkill line, and the switches are just west of Washington Ave and near the sub-station, about one mile south of the Route 82 crossing. This infrastructure would not inhibit the construction of a trail. See the existing condition maps in Appendix A for the locations of the existing railroad infrastructure.

The useable width of the railroad corridor was measured as the width of the corridor that is generally flat, as centered on the railroad tracks. This measurement is important to determine the feasibility and amount of work necessary to add a trail and if safety railing is needed to shield trail users from steep slopes. In general, approximately 60% of the corridor (7.5 miles) had a flat area of 20 feet or more centered on the railroad tracks.

Drainage Characteristics

The drainage assessment of the corridor was organized into five categories: large box culverts, small culverts (pipes), swales, washouts, and uncontrolled stream crossings. Bridge structures were also included in this study and an in-depth assessment of the bridges is included in the Structures section. In general, the large box culverts are rectangular or square in shape with stacked stone and mortar or concrete walls. The small culvert pipes are smooth or corrugated steel and generally less than three feet in diameter, with some larger diameter pipes also observed.

The swales adjacent to the tracks are not well defined, and the stream characteristics along the corridor vary. The corridor includes both perennial and intermittent streams (refer to the Streams section of the report for details). Some culverts seem to be installed in areas that have since dried up, suggesting that they may no longer be needed. An assessment of the existing culvert conditions and potential repairs is included in Appendix B.

A detailed stream and wetland delineation will need to be performed in the field before disturbance to these streams occurs as they could be regulated by the United States Army Corps of Engineers (USACE) or New York State Department of Environmental Conservation (NYSDEC). Information on wetlands and other potential regulated resources is covered in the Natural Resources section of this report.

There was no additional ground erosion, embankment failures, or sinkholes other than the ones noted in this section.

Large Culverts

There are 14 large box culverts within the corridor, constructed from various materials including stone blocks with mortar joints, concrete, and corrugated or smooth steel, forming rectangular or arched openings (see Figure 3). The widths of these culverts range from 2 to 11 feet, and their heights ranged from 3 to 6 feet. Overall, the condition of the large culverts is generally good, with only minor repairs likely needed. These may include adding stone fill at the inlet or outlet, repointing stones, adding mortar between stones, or replacing top slabs.

For six of the stacked stone culverts, the top slabs appear to be made of railroad ties laid side by side across the culvert's walls. Some of other stone culverts had large stone top slabs spanning the full width of the structure. These top slabs should be further investigated during the design phase of any potential trail, particularly if the rail-to-trail option is selected, to ensure they can support a trail and withstand construction; replacements may be needed.

Figure 3: Stacked stone culvert with steel railroad rail top slab (left) and inlet of 9-foot-wide corrugated steel three-sided arch structure (right).

Some of the large culverts exhibited evidence of large volume flows and erosion or overtopping. A hydraulic analysis of each culvert should be performed during the design phase of any potential trail to determine if the culvert should be replaced to improve its hydraulic capacity and future resilience. Almost the entire railroad corridor is constructed on the north side of the Fishkill Creek. An undersized culvert or blocked culvert could cause a significant buildup of stormwater and severe erosion or property damage to structures along the corridor.

One large, stacked stone culvert located about midway between Fishkill Ave (Route 52) and Bridge #3 (Fishkill Creek) should be rehabilitated or replaced. This culvert is a side-by-side (double barrel) system constructed of stacked stone and mortar culverts with both originally measuring 3x2 feet at the outlet. The inlet side is almost completely blocked with wood debris and sediment that appear to severely restrict the flow of water into the pipes (see Figure 4). Evidence of water backing up and pooling at the inlet of the culvert was found, as were erosion and floatable wooden debris noticed above the inlet to the culvert. Rehabilitation to improve water flow through this culvert could be feasible by cleaning the debris at the inlet to restore the hydraulic opening. The interior of this culvert is stacked stone, which is a rough surface and slows water as it flows through the culvert. Lining the culvert with a smooth interior pipe would reduce the hydraulic opening but would increase the velocity of the water through the culvert.

A hydraulic analysis should be performed to determine the appropriate rehabilitation method during the design phase of any potential trail. Replacing the culvert would be the best approach to improve stormwater flow and provide future resilience. However, the culvert is approximately 25 feet below the grade of the railroad and would require a significant amount of earthwork to replace.

Figure 4: Blocked inlet of double barrel stone culvert surrounded by wooden debris (left) and outlet of double barrel stone culvert flowing under railroad (right).

Figure 5: Small smooth steel culvert pipes representative of those found throughout the corridor.

Small Culverts

The nine small culvert pipes found along the railroad corridor vary in diameter from 12 to 36 inches and are made of reinforced concrete, round plate steel, corrugated steel, or High-Density Polyethylene (HDPE) (see Figure 5). Most of these pipes are in good condition and appear to be functioning properly. However, some show signs of erosion at the inlet or outlet and should be rehabilitated with stone aprons to reduce water velocity and prevent further erosion.

The headwalls at the end of these small culverts, which provide erosion protection, are primarily made of stacked stone and are in fair condition (headwalls are concrete or masonry walls, typically built at the inlet or outlet of a drainpipe or culvert, essentially acting as a retaining wall to protect against erosion and direct water flow properly). The headwalls should be re-stacked or replaced (see Appendix B). Some culvert pipes were noticeably undersized or partially blocked by debris and should be replaced with larger pipes. Replacement of the failed or undersized pipes with larger, more durable HDPE pipes would ensure a long lasting, functional drainage system. A hydraulic analysis of each culvert pipe to be replaced should be performed during the design phase of any potential trail to determine the appropriate size for the new pipes, considering changes in drainage patterns and rainfall since the original installation.

Swales

Swales or drainage ditches are critical components of any transportation corridor. They help carry stormwater runoff away from the roadway or trail and intercept drainage from outside the corridor before it reaches these areas. Drainage swales are present through portions of the railroad corridor but are poorly defined. Most swales are dry, filled with leaf litter, and do not exhibit signs of recent flowing water (see Figure 6). Active streams are within swales in some locations, but in most cases, stormwater is directed into the corridor from developments outside the corridor. See the Uncontrolled Drainage Crossings section for a description of the locations where stormwater is directed into the railroad corridor.


Figure 6: Defined swale on the right side of the tracks (left photo) and both sides of the tracks (right photo) with no visible signs of drainage flows.

Washouts

Two moderate sized washouts were found within the corridor (see Figure 7). Both appear to be caused by drainage flows that originated outside of the railroad corridor. The source of the flow that caused the washouts should be further investigated during the design phase and either mitigated at the source or accommodated in a repair. In areas where the washout occurs in an active drainage channel, or within a clear seasonal drainage channel, a culvert pipe or box culvert should be installed to convey any future drainage flows that may re-enter the corridor.

Figure 7: Washout 0.25 miles west of Washington Ave (left) and large washout 0.20 miles east of Route 9 (right).

The left photo of Figure 7 was taken just west of the Washington Ave crossing in the Town of Fishkill, where it appears that a series of storm events have washed out the culvert several times. There is evidence of repairs being performed here, such as newer railroad ties attached to the steel rails and smaller ballast stone under two inches in diameter that does not match the rest of the stone along the corridor. There is a large drainage channel or ravine upstream of the washout that appears to originate from houses on Washington Ave. The existing 24-inch diameter steel culvert could have become blocked, or the drainage flows could have exceeded the capacity of the culvert and overtopped the railroad tracks.

The photo on the right of Figure 7 shows a large washout approximately 20 feet in length measured along the tracks. This washout also appears to have been repaired in the past. The active stream that runs parallel and then across the corridor appears to originate at the housing development at Vandidoort Dr in the Village of Fishkill. It is possible that changes to the housing development resulted in this washout.

A watershed and hydraulic analysis should be performed during the preliminary design phase to determine the flow rates of the streams at the washout locations. Depending on the results of the watershed analysis, installation of a large culvert pipe or a small concrete box culvert may be needed.

Uncontrolled Drainage Crossings

In addition to the washouts and controlled drainage crossings found along the corridor, there are several locations where active streams flow directly through the railroad corridor without a defined ditch or swale. These uncontrolled drainage crossings may be subject to USACE and NYSDEC review. Culverts or pipes installed to control the stream may need to be 1.25 times the bank full width of the stream (the distance from the ordinary high-water mark from one stream bank to the other), which could result in the need for large culvert crossings.

Figure 8 (left photo) shows an uncontrolled stream crossing running perpendicular to the railroad rails, where a drainage outlet from an adjacent developed property is discharged into the railroad corridor in Beacon. The water flows across the railroad tracks and then flows west parallel to the rails toward Main St. Sediment observed between the railroad ties had filled in the voids in the ballast in this section. Evidence of past drainage flows adjacent to and within the railroad rails was also observed downstream of this drainage outlet.

Figure 8 (right photo) shows a similar situation where stormwater runoff from Tioronda Ave in Beacon has been discharged and collected along the railroad corridor. The stormwater in this area does not seem to flow as well and has formed a potential wetland within the tracks. A wetland delineation should be performed during the preliminary design phase of any future trail to determine if a USACE or NYSDEC permit is needed for construction. These were the only two locations within the corridor where stormwater flows were observed within the railroad tracks and had caused the subgrade of the tracks to become saturated.

Figure 8: Uncontrolled stream crossing 500 feet east of Main Street (left) and possible wetland area 300 feet east of the Route 9D (Wolcott Ave) overpass.

Informal Access Locations

There are six dirt, grass, or gravel paths that lead from nearby residences and neighborhoods to the corridor (see Table 1). These paths are generally narrow in width (1-5 feet) and are only accessible by people walking or bicycling. These paths often cross private property and were likely formed by residents accessing the corridor (see Figure 9).

Table 1: Existing Access Locations

Nearest Road	Municipality	Crosses Private Property?	Notes
Newlins Mill Rd.	C/Beacon	No	Direct access from road to corridor
Fishkill Ave.	C/Beacon	Yes	Private access to corridor from Business
Van Steuben Rd.	T/Fishkill	No	Direct access from end of Van Steuben Rd
Fishkill Glen Dr.	T/Fishkill	Yes	Access from the Fishkill Glen Condominiums
Crestwood Ct.	T/Fishkill	Yes	Access from the Elm Crest Development
Fishkill Rd.	T/East Fishkill	No	Access from Hopewell Glen to the corridor and nearby shopping center

Figure 9: Existing narrow dirt footpath from Van Steuben Rd (left) and a wider and more heavily used gravel/dirt footpath from Hopewell Glen to the ACME Unity Plaza (right).

Utility Crossings

The existing railroad corridor was observed for visible utility infrastructure (such as gas, electric, telephone, cable TV, and water/sewer lines) within or crossing the corridor. In general, overhead electric distribution and communication lines were encountered at each of the major and minor roadway crossings (28 total). Underground gas and water utility markers were observed at four of the roadway crossings throughout the corridor (see Figure 10).

A buried utility conduit runs parallel to the railroad tracks for the entire length of the study corridor. Mostly buried, it was observed in locations where the ballast had been washed out. Across the six bridge structures and some of the large culverts, the conduit is carried within a protected casing along the surface of the ballast. Several large plastic pullboxes were also observed adjacent to the railroad tracks throughout the corridor with “MNR Communication” printed on the cover. Additionally, concrete posts, which are assumed to be related to the installation of the conduit and communication lines, are scattered throughout the corridor. Metro-North will be contacted to confirm the purpose of these posts.

Figure 10: An underground gas pipeline marker along Main St. in the City of Beacon (left) and overhead electric transmission lines and a sewer pipeline marker east of Washington Ave (right).

There are several locations where electric distribution and high-voltage electric transmission lines run parallel to the railroad corridor: from Newlins Mill Rd to Tioronda Ave in the City of Beacon, and from Washington Ave to east of Sarah Taylor Park in the Town of Fishkill. (see Figure 11).

Figure 11: Metro-North fiber optic pullbox (left), exposed fiber-optic conduit from a washout (middle), and conduit hanger on Bridge #5 (right).

Additionally, there are perpendicular crossings of the electric distribution and transmission lines in the vicinity of the Washington Ave crossing in the Town of Fishkill, the US Route 9 crossing in the Village of Fishkill, and east of the Broadway crossing in the Town of East Fishkill. There are multiple lines that cross over the railroad corridor in the Town of East Fishkill just east of the Broadway crossing and then enter the Central Hudson Gas & Electric (CHG&E) sub-station (see Figure 12).

Figure 12: Overhead electric transmission lines near the CHG&E sub-station (left) and overhead electric transmission lines east of Washington Ave (right).

On July 31, 2024, a meeting was held with representatives from CHG&E, DCTC, and B&L to discuss utility infrastructure adjacent to and within the study corridor, and to address any potential concerns or conflicts related to the development of a potential trail. CHG&E requested to be informed of any future developments concerning the potential trail, particularly during the design phase. They confirmed that the electric transmission and distribution lines are installed with the necessary clearances for trains to operate along the corridor. Additionally, CHG&E may have existing maintenance agreements with Metro-North to use the rail corridor to maintain their infrastructure, and these agreements should remain in place if a trail is added in the future.

Steep Slope Assessment

In some locations, the slopes (embankments) supporting the tracks are very steep on both sides of the corridor (constructed at 1.5 Feet Horizontal:1 Foot Vertical or 66% slope) (see Figure 13). Based on the field assessment, there are also 7.2 miles of steep fill slopes (50% or greater)

Figure 13: Steep fill slopes and a narrow railroad corridor (left) and rock cut and narrow railroad corridor (right).

adjacent to the railroad tracks -- these slope downward from the tracks. No notable slope failures were found within the railroad corridor, only relatively small washouts caused by meandering streams or failed culverts (see the Washouts section for a description of the washouts).

In addition to the steep downward fill slopes, there are also sections of the corridor that have steep upward slopes, known as cut slopes. Based on the field assessment, there were approximately 1.6 miles of segments that were cut through rock and had nearly vertical slopes. These rock cuts appeared to be stable.

At-grade Roadway Crossings

For this report, the at-grade roadway crossings are organized into two categories, Major and Minor, based on the Average Annual Daily Traffic (AADT) of the crossing. Major crossings have an AADT of more than 1,000 vehicles per day (vpd) on the road, and Minor Crossings have an AADT of fewer than 1,000 vpd. Existing railroad infrastructure at the crossings consists of steel rails running through the pavement and Railroad Crossing "X" signs (R15-1) with Yield (R1-2) and Exempt (R15-3) signs on the same posts. The crossings do not contain warning features such as flashing red lights, gates, RXR (Railroad Crossing) pavement markings, or RXR signs (W10-1), all of which would typically be found at an active railroad crossing (see Figure 14).

Figure 14: Typical signage found at the roadway crossings.

Major Roadway Crossings

The rail line crosses seven major roadways with volumes ranging from about 1,000 to 38,000 vehicles per day and crossing distances ranging from 22 feet to 140 feet. These crossings are listed in the table below:

Table 2: Major Road Crossings

Road Name	Municipality	AADT	Posted Speed Limit (mph)	Crossing Length (feet)	Notes
Churchill St	C/Beacon	1,631	30	22	
E. Main St	C/Beacon	5,163	30	55	Queue conflict
Washington Ave	T/Fishkill	5,735	30	25	
US Route 9	T/V/Fishkill	38,198	40	140	High crash location; Queue conflict
NYS Route 52	T/Fishkill	12,801	45	44	High crash location
NYS Route 82	T/East Fishkill	18,364	35	85	Queue conflict
NYS Route 376	T/East Fishkill	6,219	35	35	

AADT Source: ATR data, collected October 2023

As noted in Table 2, the E. Main St, US Route 9, NYS Route 52, and NYS Route 82 crossings have the potential for queue conflicts or are in areas identified as high crash locations. A queue conflict is noted if traffic from the adjacent intersection may back up across the crossing of the rail line. The high crash locations were identified at intersections that have 10 crashes or more per year. See Appendix C for a detailed analysis of the existing traffic conditions including volume data, Level of Service (LOS) analysis, crash analysis, vehicle queue analysis, and roadway descriptions at each of the major roadway crossings.

The most challenging location for a trail crossing is at NYS Route 9 in the Village of Fishkill. The high volumes, exceeding 38,000 vehicles a day, long crossing distance of 140 feet, and six lanes of vehicle traffic make any at-grade trail crossing a challenge. The nearby signalized intersection of Route 9 with Loudon Dr and Elm St experiences queue lengths that extend through the railroad crossing, as shown in Figure 15. Additionally, this intersection was classified by the study team as a high vehicle crash location, with more than 15 reported crashes per year between 2017 and 2020. A detailed analysis of options for a trail crossing at this and the other major road crossings will be included in a separate report.

Figure 15: Railroad Crossings at US Route 9 (left) and NYS Route 82 (right).

Minor Roadway Crossings

The rail line crosses 21 minor roadways or driveways with daily volumes fewer than 1,000 vehicles and crossing distances ranging from 10 feet to 47 feet. Many of these crossings do not have readily available traffic volumes associated with them, as many are driveways or maintenance paths that cross the railroad tracks. These roadways are listed in Table 3 below, and some shown in Figures 16 and 17.

Table 3: Minor Road Crossings

Road Name	Municipality	Crossing Type	AADT	Crossing Length (feet)	Notes
Dennings Ave	C/Beacon	Minor Road	-	19	
n/a	C/Beacon	Driveway	-	47	248 Tioronda Development
n/a	C/Beacon	Driveway	-	25	Park driveway
Mill St	C/Beacon	Minor Road	692	25	
n/a	C/Beacon	Commercial Driveway	-	30	
Petticoat Ln	T/Fishkill	Minor Road	500	32	
Pump House Rd	T/Fishkill	Maintenance Road	-	20	
Blodgett Rd	V/Fishkill	Maintenance Road	-	12	
n/a	V/Fishkill	Driveway	-	10	
Jackson St	V/Fishkill	Driveway	-	14	
Old Main St	T/Fishkill	Driveway	-	30	Entrance to Sarah Taylor Park
Pardy Ln	T/Fishkill	Commercial Driveway	-	12	
McGrath Terr	T/Fishkill	Minor Road	108	21	
Mountain View Rd	T/Fishkill	Minor Road	161	24	
n/a	T/Fishkill	Driveway	-	16	
Lomala Ln	T/East Fishkill	Minor Road	74	19	
Fishkill Creek Rd	T/East Fishkill	Minor Road	61	17	
Broadway	T/East Fishkill	Minor Road	120	17	
n/a	T/East Fishkill	Maintenance Road	-	12	Utility Maintenance Road
n/a	T/East Fishkill	Maintenance Road	-	10	Solar Farm Maintenance Road
Helin Rd	T/East Fishkill	Minor Road	41	20	

AADT source: NYSDOT data, 2023 (includes estimates)

Figure 16: Railroad Crossings at Petticoat Ln (left) and Lomala Ln (right).

Figure 17: Railroad Crossings at Commercial Driveway (left) and a gravel maintenance road (right).

Structures

The study team also completed an assessment of the six bridges and three overpasses along the corridor. Structural engineers completed a field inspection of the bridges on April 25, 2024. A bridge is defined as a structure that carries the existing railroad or trail over a crossing. All loads from the bridge deck are carried by steel girders. The girders sit on abutments, which transmit the loads to the foundation. There are two types of bridges along the study corridor: conventional girder bridges and through girder bridges.

A conventional girder bridge is one where the girders are located below the deck. For longer span bridges, or where there are overhead clearance limitations under the bridge, a through girder bridge is typically used. This type of bridge uses deep girders at the edge of the deck. An overpass is defined as an existing bridge that spans over the trail. All overpasses owned and maintained by other agencies were reviewed during the site visit to ensure they did not conflict with a possible trail. See Figures 18 and 19 below for more information on specific bridge components.

Figure 18: Through Girder Bridge Components.

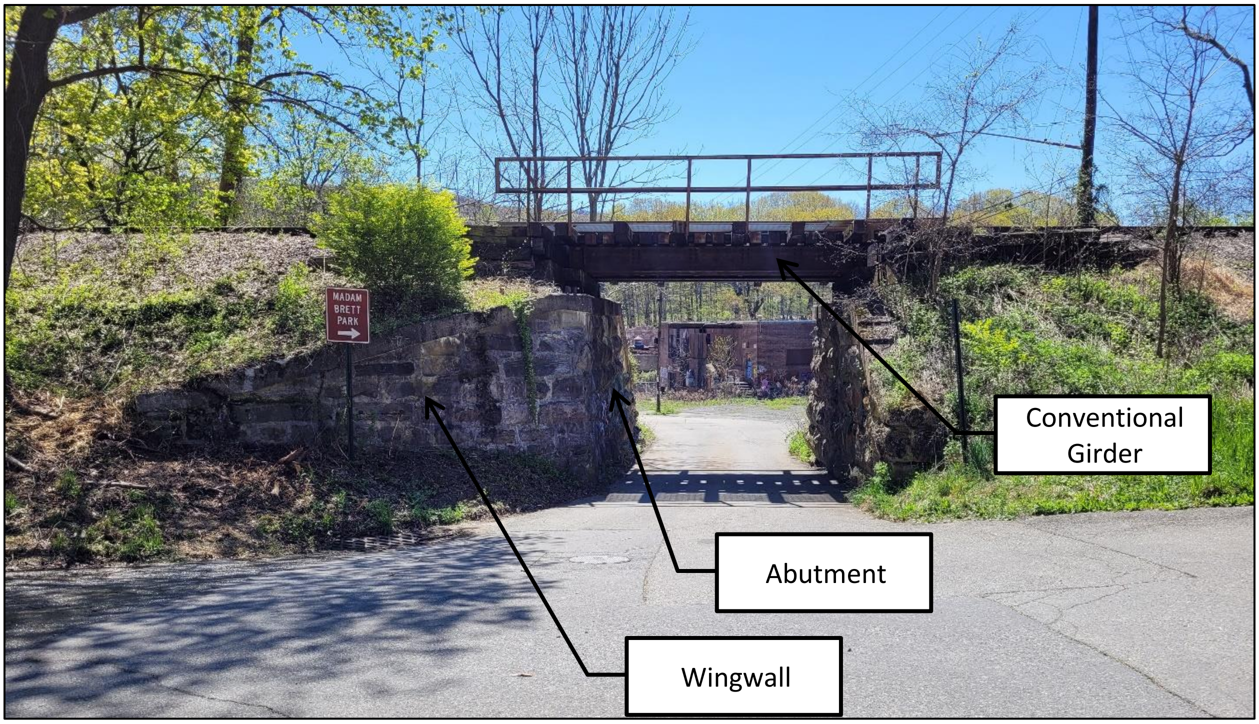


Figure 19: Conventional Girder Bridge Components.

Load Ratings for each bridge structure were completed by Metro-North in 2012 and obtained from NYSDOT. The load ratings were based on a Cooper E-80 loading, which simulates the live load from a train. It assumes two locomotives, with 80 kips (80,000 lbs) per axle, pulling a train weighing 8 kips per foot over the length of the entire bridge. For reference, the Cooper E-80 loading is significantly heavier than any assumed trail loading. The rating assigned to each bridge can be interpreted as the maximum load that each structure can carry in its existing condition. For example, a rating of E-85 would indicate that the bridge has the capacity to carry locomotives with up to 85,000 lbs per axle, exceeding the typical railroad loading.

Metro-North also performed bridge inspections in 2023 that documented the existing condition of each structure and scored it on different factors such as condition and loading. The Condition Score is a cumulative assessment taken from averaging the scores from specific elements of the superstructure, substructures, and waterway. The Load Score indicates the overall load carrying capacity of the entire bridge structure in comparison to the like-new condition. The scores range from 0 (poor) to 100 (excellent).

Table 4 below summarizes the bridge conditions and ratings. Overall, there is moderate deterioration at all bridges; this is reflected in the condition scores. Despite the condition scores, the load scores of all bridges are still high. This suggests that much of the deterioration is cosmetic and does not affect the structural capacity of the bridges. Generally, the condition and load ratings from the 2023 and 2012 reports were consistent with field observations. Each bridge structure is described in more detail in this section, and the Inspection Reports are available in Appendix D.

Table 4: Summary of Bridge Conditions and Ratings

Bridge #	Condition Score*	Load Score*
Bridge 1 (BEA-0.63)**	11	99
Bridge 2 (BEA-0.98)	62	90
Bridge 3 (BEA-3.74)	36	99
Bridge 4 (BEA-4.21)	49	96
Bridge 5 (BEA-9.51)	41	96
Bridge 6 (BEA-12.03)	43	86

**Condition and Load Scores out of a possible 100.*
*** BEA = Beacon Line; 0.63 refers to distance in miles from the start of the line.*

Bridge No. 1 (BEA-0.63)

This bridge was constructed at an unknown date and carries the inactive Beacon Line over the active Hudson Line in the City of Beacon. The structure consists of a 107-foot, single span through girder bridge with stone masonry abutments and steel sheet pile wingwalls installed behind the original stone masonry wingwalls (see Figure 20). The deck consists of timber rail ties and steel rail tracks. The total out-to-out width of the bridge (distance from the outermost points of the superstructure) is 20 feet. At both through girders, various locations exhibit moderate to heavy corrosion and section loss. The girder web stiffeners exhibit up to 100% section loss at their base.

There is a large amount of railroad ballast covering the bridge seat and obstructing the view of the bearings at both abutments. There is moderate deterioration to the mortar between the stone masonry blocks at both abutments. The west abutment has spalling up to 6" deep along the concrete cap of the stone abutment stem. The wingwalls at both abutments have moderate horizontal cracking and exhibit areas of spalling up to 6" deep, most notably at the top of the northwest and southeast wingwalls.

The bridge was given an overall Condition Score of 11/100 and a Load Score of 99/100 in the 2023 Metro-North Bridge Inspection. The 2012 Metro-North Rating indicates a rating of E-85.

Figure 20: Bridge No. 1 through girder superstructure (left) and stone masonry substructures (right).

Bridge No. 2 (BEA-0.98)

This bridge was constructed at an unknown date and carries the Beacon Line over South Ave in Beacon (see Figures 21 and 22). The structure consists of stone masonry abutments and wingwalls with a 19’-6” simple span steel multi-girder superstructure carrying an open deck of timber rail ties and steel rail tracks. There is a steel open grate walkway carried on the north side of the bridge. At both abutments, the girders bear on stacked timber ties that sit on the concrete bridge seat. The clear span between the masonry abutments is 14’-6” with a 12-foot minimum vertical clearance between the roadway and the low beam. The total out-to-out superstructure width is approximately 12 feet. There are brackets mounted on the south fascia girder supporting a utility conduit being carried over the bridge.

Figure 21: Bridge No. 2 superstructure (left) and stone masonry substructures (right).

Figure 22: Bridge No. 2 concrete spalling at abutment (left) and rotated fascia girder due to utility hanger (right).

The girders appear to be in good condition; however, the south fascia girder appears to be rotating outward due to the load from the utility conduit and hanger brackets. The west abutment backwall and bridge seat have full height cracks, up to 1” and ½”, respectively. The north side of the west abutment backwall is displaced up to 1”. The east abutment bridge seat has two spalls, 2 square feet each, beneath the girders. Both the east and west abutment bridge stems have isolated areas of mortar loss between the stone masonry blocks. The northeast and southeast wingwalls have areas of spalling along the concrete cap up to 1’ and 4” deep, respectively. Along the north side of the tracks at both approaches, there are timber retaining walls supporting the tracks and ballast. At the northwest approach, the wall is failing and is leaning outward.

The bridge was given an overall Condition Score of 62/100 and a Load Score of 90/100 in the 2023 MNR Bridge Inspection. The 2012 MNR Load Rating indicates a rating of E-64.

Bridge No. 3 (BEA-3.74)

This structure was constructed at an unknown date and carries the Beacon Line over Fishkill Creek in the Town of Fishkill (see Figures 23 and 24). The structure consists of a 78-foot single span concrete spandrel arch with concrete abutments and wingwalls. The total structure length is approximately 171 feet with an out-to-out superstructure width of approximately 22 feet. The superstructure consists of a concrete slab topped with railway ballast, timber rail ties and steel rail tracks. A utility conduit is carried on the south edge of the bridge deck. The underside of the bridge was inaccessible during the field visit due to the steep terrain along the banks of the Fishkill Creek. The existing conditions of the concrete arch are based on previous inspections, as indicated in the 2023 Metro-North Bridge Inspection Report.

Figure 23: Bridge No. 3 superstructure (left) and concrete spandrel arch substructures (right).

There are scattered cracks with heavy efflorescence throughout the underside of the deck and along the spandrel walls. The north and south deck fascia have areas of hairline cracking and efflorescence. Efflorescence is the migration of water, salts, and minerals from inside the concrete to the surface of the concrete. Efflorescence is not a structural defect, but it does signify there are cracks in the concrete. The bottom of the deck along the north edge is spalled for several feet above a column near the west abutment. The south fascia has several shallow spalls up to six square feet around mid-span.

Figure 24: Bridge No. 3 north spandrel wall cracking and efflorescence (left) and south spandrel wall cracking (right).

The north spandrel exhibits fine to medium size cracks with moderate efflorescence, delaminated concrete, and vegetation growing on the structure. There are large, spalled areas with exposed reinforcement with moderate section loss throughout. Column 1 of the north arch rib is in the worst condition and has full height spalling along the north face up to six inches deep, with exposed reinforcing bars. There are scattered areas of spalls throughout the arches.
The southwest wingwall footing is exposed due to scour. At the time of fieldwork and per the bridge inspection report, the water was too deep to determine the extent of scour conditions at either abutment. In-depth inspections (that include divers) should be performed during a potential design phase to verify the extent of scour conditions and determine what repairs are needed. The wingwalls at both abutments have cracks and efflorescence staining throughout, with several spalls.

The bridge was given an overall Condition Score of 36/100 and a Load Score of 99/100 in the 2023 Metro-North Bridge Inspection. The 2012 Metro-North Load Rating indicates a rating of E-88.

Bridge No. 4 (BEA-4.21)

This structure was constructed at an unknown date and carries the Beacon Line over Fishkill Creek in the Town of Fishkill (see Figures 25 and 26). The structure consists of a three span, simple span superstructure with stone masonry abutments, wingwalls and two piers, carrying an open deck of timber rail ties and steel rail tracks. The west and east spans, Spans 1 and 3 respectively, have span lengths of 28 feet and consist of two built-up steel plate conventional girders. The middle span, Span 2, has a span length of 100 feet and has a through girder configuration with steel floor beams and stringers. The total structure length is approximately 156 feet with an out-to-out width of 16 feet. There are brackets mounted on the south fascia girder supporting a utility conduit being carried over the bridge.

There is surface corrosion throughout all spans of the bridge. The gusset plates connecting the bottom lateral bracing in Span 2 to the girders have section loss and corrosion holes up to seven inches long and two inches wide. However, since the lateral bracing is a secondary member that does not support any loads, this issue constitutes a relatively minor repair. The first knee brace in Span 2 on Girder G1 is also bent.

The west abutment bearings exhibit moderate to heavy corrosion and minor section loss on the anchor bolts. There are isolated areas of small spalls and medium sized cracks on the west abutment bridge seats.

Figure 25: Bridge No. 4 superstructure (left) and concrete spandrel arch substructures (right).

Figure 26: Bridge No. 4 pier 2 rotated stones (left) and surface corrosion at steel girders (right).

Both piers exhibit areas of concrete spalling, cracking, and missing mortar at various locations. The worst areas at the pier cap and at the east face of Pier 2, where some of the stones appear to be rotating inward. The east abutment has isolated areas of missing mortar up to one inch deep. There is a full height crack and signs of separation between the east abutment stem and the southeast wingwall. There are also missing stones and large voids up to one foot wide at the southeast wingwall.

The bridge was given an overall Condition Score of 49/100 and a Load Score of 96/100 in the 2023 Metro-North Bridge Inspection. The 2012 Metro-North Load Rating indicates a rating of E-71.

Bridge No. 5 (BEA-9.51)

This structure carries the Beacon Line over Sprout Brook in East Fishkill and consists of a two span, simple span, conventional girder superstructure with stone masonry abutments, and one steel pile bent pier (see Figures 27 and 28). The existing abutments and pier were constructed at an unknown date; however, steel mill identification plates on the girders indicate the west span (Span 1) girders were manufactured in 1948 and the east span (Span 2) girders were manufactured in 1927. Span 1 is 52 feet and Span 2 is 47 feet in length. The existing superstructure carries an open deck of timber rail ties and steel rail tracks. The total structure length is approximately 99 feet with an out-to-out width of approximately 12 feet. There are brackets mounted on the south fascia girder supporting a utility conduit carried over the bridge.

There is up to 100% section loss to the lower portion of web stiffeners along the south side of Girder G1, and the last two intermediate web stiffeners on the north side of Girder G2. All other areas of the steel exhibit minor areas of corrosion throughout their surfaces.

There are voids throughout the west abutment backwall, up to one foot deep at the south fascia side, and up to seven inches deep between the girders. The east abutment backwall has up to two foot deep voids between the girders. At the south fascia side, there are up to nine inch deep voids.

There is a buildup of debris on the west abutment seat which obstructs the view of the bearings. The exterior anchor bolts are tilted or bent at the east abutment, and the east abutment bearings exhibit minor corrosion throughout. The bridge seat stones at the top of the west abutment are undermined up to 1.5 feet deep due to missing mortar. The lower section of the pile bent pier exhibits heavy to severe delaminating corrosion, pitting, and section loss. There is an accumulation of branches and debris at the base of the pier.

Figure 27: Bridge No. 5 superstructure (left) and stone masonry abutment and pile bent substructures (right).

Figure 28: Bridge No. 5 west abutment backwall – missing mortar (left) and east abutment stem – missing mortar (right).

There is minor erosion along the southwest embankment. The northwest embankment is undercut up to four feet high with exposed tree roots. There is a sandbar north of the pier which directs flows primarily under Span 1. The stream flows against the northwest bank and is redirected under Span 1 and along the west abutment.

The bridge was given an overall Condition Score of 41/100 and a Load Score of 96/100 in the 2023 Metro-North Bridge Inspection. The 2012 Metro-North Load Rating indicates a rating of E-72.

Bridge No. 6 (BEA-12.03)

This structure was constructed at an unknown date and carries the Beacon Line over Whortlekill Creek in East Fishkill (see Figures 29 and 30). The structure consists of stone masonry abutments and wingwalls with a 19’-0” simple span steel conventional multi-girder superstructure carrying an open deck of timber rail ties and steel rail tracks. The total out-to-out superstructure width is approximately 12 feet. There are brackets mounted on the south fascia girder supporting a utility conduit that is carried over the bridge.

The existing girders are in good condition. Both abutment seats are covered in up to 12 inches of ballast, obstructing the view of the bearings. The bearing under Girder G2 at the west abutment is missing a nut on the anchor bolt.
The east abutment bridge seat beneath Girders G1, G2, and G3 is spalled in various locations. There are several voids in the east abutment, up to 22 inches deep. The east abutment footing is exposed throughout, with areas of missing mortar and voids. The largest void is full height by 14 inches deep at the north end of the stem. There is heavy mortar loss in isolated areas of the west abutment stem. The west abutment footing is exposed throughout by up to 25 inches high. There is scour along both abutments.

The northwest wingwall footing is undermined at the north fascia end for 2 feet long by 1.5 feet deep horizontally, which has led to minor displacement of the footing and bottom stone. There is no undermining elsewhere along the abutment. There are scattered voids elsewhere throughout the each of the wingwalls, up to one foot deep due to missing mortar.

The bridge was given an overall Condition Score of 43/100 and a Load Score of 86/100 in the 2023 Metro-North Bridge Inspection. The 2012 Metro-North Load Rating indicates a rating of E-61.

Figure 29: Bridge No. 6 superstructure (left) and substructure (abutment and wingwall) (right).

Figure 30: Bridge No. 6 west abutment – void in footing stone (left) and east abutment – missing mortar (right).

Overpass No. 1

This overpass (BIN 1006350) carries Wolcott Ave (NYS Route 9D) over the Beacon Line in Beacon (see Figure 31). The structure was reconstructed in 1998 and appears to be in good condition. It is owned and maintained by the City of Beacon. The vertical clearance between the tracks and the low chord of the bridge is more than 15 feet. The clear span between abutments is approximately 37 feet.

Figure 31: Overpass No. 1.

Overpass No. 2

This overpass (BIN 1032480) carries I-84 over the Beacon Line in the Town of Fishkill (see Figure 32). The structure was reconstructed in 2018 and appears to be in excellent condition. It is owned and maintained by NYSDOT. The vertical clearance between the tracks and the low chord of the bridge is at least 15 feet. The clear span between abutments is approximately 80 feet.

Figure 32: Overpass No. 2.

Overpass No. 3

This overpass (BIN 1032300) carries NYS Route 82 over the Beacon Line in East Fishkill (see Figure 33). The structure was constructed in 1936. The superstructure is in poor condition with visible deterioration. The abutments appear to be in fair condition. It is owned and maintained by NYSDOT. The vertical clearance between the tracks and the low chord of the bridge is at least 15 feet. The clear span between abutments is approximately 100 feet. NYSDOT intends to remove this bridge and make Route 82 at grade, with the project currently scheduled to start in 2026.

Figure 33: Overpass No. 3.

The concept design section of the study will discuss the implications of these bridges and overpasses on a potential trail.

Natural Resources

This section provides a summary of the natural resources present in the corridor, including wetlands, threatened and endangered species and habitats, and other important environmental factors. The data was initially collected through desktop research using databases from regulating agencies like the New York State Department of Environmental Conservation (NYSDEC). The presence of these resources was then verified in the field.

Vegetation and Tree Density

Vegetation along the corridor and within the immediate vicinity of the railroad tracks has mostly been well maintained by Metro-North. There are several locations where trees are within the footprint of the ballast and would need to be cut. These trees are small (less than 3 inches diameter at breast height.) There are also a few downed trees within the corridor. In general, the railroad corridor is wooded outside of developed areas and areas within the floodplain of the Fishkill Creek.

Scenic Viewsheds

Despite running adjacent to the Fishkill Creek and the nearby Hudson Highlands State Park Preserve, the corridor offers few locations for scenic vistas of the area. The corridor runs through several diverse settings including urban, residential, commercial, forest, wetlands, and floodplains. Three locations along the corridor could be selectively cleared of trees to expose views of the falls and dams along the Fishkill Creek, such as within Madam Brett Park in the City of Beacon. These locations are noted in the mapping included in Appendix A. Additionally, there are several locations where the Fishkill Creek is easily visible, especially within Beacon and just east of the Village of Fishkill. The Fishkill Creek valley, as seen from the south side of Bridge 3, offers picturesque views.

Streams

There are three named watercourses and three unnamed perennial watercourses within the corridor. The watercourses are shown in Appendix A and are described from west to east below (see also Table 5).

Fishkill Creek:

Fishkill Creek is a moderate sized, perennial warm water stream that generally flows from east to west to the Hudson River just south of Beacon. All watercourses described below are tributaries to Fishkill Creek. Except for a short segment, Fishkill Creek is on the south side of the study corridor. Fishkill Creek crosses under the rail line twice, approximately 0.10 miles east and 0.35 miles west of Washington Ave in the Town of Fishkill. The Fishkill Creek crosses under Bridges 3 (east) and 4 (west). The creek is approximately 120 feet wide at the east crossing and 70 feet wide at the west crossing. The depth is unknown at the crossings but appears to be at least five feet. There is moderate flow at the crossings and the banks are wooded. There is a dam in Fishkill Creek between these two crossings. In total, there are five dams in Fishkill Creek within the study corridor. New York waterbodies are assigned a “best use” classification. Fishkill Creek has a State Standard and Classification of C where it crosses the study corridor. The best uses for Class C waters are fishing and non-contact activities (i.e., they do not support swimming).

Sprout Creek:

Sprout Creek crosses the study corridor approximately 250 feet west of Country Ln. Sprout Creek forms the border between the towns of Fishkill and East Fishkill. The crossing over Sprout Creek is bridge No. 5. Sprout Creek is the largest tributary to Fishkill Creek and is approximately 40 feet wide and less than three feet deep at the crossing. There is moderate flow at the crossing and the banks are wooded. Sprout Creek is annually stocked with trout, but also maintains its own natural population of trout. Sprout Creek has a State Standard of C(T) and a Classification C. The “T” Standard indicates that it can support trout.

Unnamed Tributary #1 to Fishkill Creek:

This unnamed watercourse crosses the study corridor approximately 0.15 miles east of Lomala Ln in East Fishkill. The crossing is a single span fixed bridge that is approximately 100 feet from abutment to abutment. The watercourse is approximately 75 feet wide and less than three feet deep. The substrate is sand, gravel and boulders. The watercourse is mostly shaded where it crosses the study corridor, and has a State Standard and Classification of C.

Unnamed Tributary #2 to Fishkill Creek:

This small unnamed watercourse crosses the study corridor approximately 0.15 miles east of Broadway in East Fishkill. The crossing is a box culvert. The watercourse is less than 20 feet wide and less than two feet deep. The substrate is sand, gravel, and boulders. The watercourse is mostly shaded where it crosses the study corridor and has a State Standard and Classification of C.

Unnamed Tributary #3 to Fishkill Creek:

This small unnamed watercourse crosses the study corridor three times between Palen Rd and Helin Rd in East Fishkill. The eastern crossing is Bridge #6 (described above), and the other two crossings are box culverts. The watercourse is approximately 20 feet wide and less than two feet deep for all three crossings. The substrate is sand, gravel, and boulders. The watercourse is mostly shaded where it crosses the study corridor, and has a State Standard and Classification of C.

Whortlekill Creek:

This watercourse crosses the study corridor approximately 0.25 miles west of Bridge Street (Route 376) in East Fishkill. Whortlekill Creek is approximately 15 feet to 20 feet wide, 3 feet to 4 feet deep, and includes riffles (shallower, faster moving sections) where the watercourse crosses the study corridor. The substrate is sand, gravel, and boulders and is partially shaded. Whortlekill Creek has a State Standard of C(T) and a Classification C.

Table 5: Streams

Name	State Classification & Standard	Width	Depth	Notes
Fishkill Creek	Class C	70-120 feet	5 feet	
Sprout Creek	Class C (T)	40 feet	3 feet	Stocked with trout
Unnamed Tributary #1 to Fishkill Creek	Class C	75 feet	3 feet	
Unnamed Tributary #2 to Fishkill Creek	Class C	20 feet	2 feet	
Unnamed Tributary #3 to Fishkill Creek	Class C	20 feet	2 feet	
Whortlekill Creek	Class C (T)	15-20 feet	3-4 feet	Can support trout

Wetlands

The Federally regulated NWI wetlands and State-regulated wetlands mapped in the vicinity of the study corridor from online sources are depicted in Appendix A. The general locations of the mapped wetlands were confirmed during a ground truthing in the spring of 2024. The wetlands would need to be field delineated during the design phase of any potential trail project.

Wetlands exist at several locations in the eastern two thirds of the study corridor in the towns of East Fishkill and Fishkill. The wetlands are typically associated with the surface waters described above. Most of the wetlands are forested wetlands with smaller components of shrub-dominated wetlands (i.e., scrub-shrub) and/or wetlands dominated by herbaceous species (i.e., emergent wetlands). Typical vegetation in the wetlands includes Red Maple (*Acer rubrum*), American Elm (*Ulmus americana*) and Ironwood (*Carpinus caroliniana*) trees and saplings, Spicebush (*Lindera benzoin*), Winterberry (*Llex verticillata*), Multiflora Rose (*Rosa multiflora*) and Japanese Barberry (*Berberis thunbergii*) shrubs along with Skunk Cabbage (*Symplocarpus foetidus*), Tussock Sedge (*Carex stricta*), Garlic Mustard (*Allaria petiolata*) and Poison Ivy (*Toxicodendron radicans*). The larger wetland systems are floodplain forested wetlands associated with Fishkill Creek, with the largest system occurring to the west of where Interstate 84 crosses the study corridor. Other than Fishkill Creek and the Hudson River, no wetlands are mapped adjacent to the study corridor in the City of Beacon.

All wetlands in the study corridor are federally regulated by the United States Army Corps of Engineers (USACE). In addition, four State-regulated wetlands are mapped in or adjacent to the study corridor. These include, from east to west:

- HJ-75 (Class 2)
- HJ-77 (Class 2)
- HJ-37 (Class 2)
- WF-23 (Class 3)

These State-regulated wetlands are also regulated by the USACE. In addition to the wetland itself, NYSDEC regulates a 100-foot buffer from the delineated boundary of State-regulated wetlands. The USACE does not regulate a buffer area for wetlands.

Historic & Cultural Resources

A review of the New York State Office of Historic Preservation's (SHPO) Cultural Resource Information System (CRIS) was also completed. Portions of the study corridor are located within archeologically sensitive areas, primarily within the City of Beacon, Village of Fishkill, and the town line between Fishkill and East Fishkill. Additionally, the corridor is within the Upper Main Street and Groveville Mill Historic Districts, both in the City of Beacon. Within these historic districts are several National Register Listed or Eligible buildings. The railroad corridor contains several features which could be considered historic such as the bridge structures and the corridor itself. Often, a preservation plan and historical interpretation plan are sufficient to allow for a trail to be built in a historic corridor. A query will be submitted through the CRIS system to initiate coordination with SHPO. However, SHPO typically cannot progress reviews until the SEQR process and a Lead Agency have been established, or until coordination with a permitting agency requiring SHPO coordination, such as NYSDEC or USACE, has begun.

Threatened & Endangered Species

Federally Protected Species

The potential presence of federally protected threatened and endangered species in the study corridor was evaluated based on coordination with the United States Fish & Wildlife Service (USFWS) through the Information for Planning and Consultation (IPaC) online tool. According to the USFWS IPaC official species list dated February 23, 2024 (see Appendix E), the following species have the potential to occur in the study corridor:

- Indiana Bat (*Myotis sodalis*, Endangered)
- Northern Long-eared Bat (*Myotis septentrionalis*, Endangered)
- Bog Turtle (*Glyptemys muhlenbergii*, Threatened)
- Tricolored Bat (*Perimyotis subflavus*, Proposed Endangered)

- Monarch Butterfly (*Danaus plexippus*, Candidate Species)

The listed bat species may require time of year restrictions on tree cutting. The USFWS IPaC report states that there are no designated critical habitats in the study corridor. The official species list is valid for 90 days and would need to be updated in the design phase of any potential project for compliance with the Endangered Species Act (ESA). Species-specific studies may also be required during the design phase.

State Protected Species

A request was made to the New York State Department of Environmental Conservation (NY DEC) regarding the Natural Heritage Program (NY NHP) records of State-listed animals and plants in, or in the vicinity of, the study corridor. The response letter dated March 19, 2024 (see Appendix F) indicates the following State-listed animals and plants are known to occur in the vicinity of the study corridor:

- Indiana Bat (federal and NY Endangered)
- Blanding's Turtle (*Emydoidea blandingii*, NY Threatened)
- Timber Rattlesnake (*Crotalus horridus*, NY Threatened)
- Davis' Sedge (*Carex davisii*, NY Threatened)
- Estuary Beggar Ticks (*Bidens bidentoides*, NY Rare)
- Smooth Beggar Ticks (*Bidens laevis*, NY Threatened)

The following State-listed species have been documented near the study corridor along the Hudson River, or in the Hudson River:

- Pied-billed Grebe (*Podilymbus podiceps*, NY Threatened)
- Bald Eagle (*Haliaeetus leucocephalus*, NY Threatened)
- Atlantic Sturgeon (*Acipenser oxyrinchus*, federal and NY Endangered)
- Shortnose Sturgeon (*Acipenser brevirostrum*, federal and NY Endangered)

An ecological community is a variable assemblage of interacting plant and animal populations that share a common environment. Significant natural communities are defined by the NY NHP as either occurrence of a community type that is rare in New York State, or a high-quality example of a more common community type. By meeting specific, documented criteria, the NY NHP considers these community occurrences to have high ecological and conservation value. The following significant natural community from a statewide perspective by the NY NHP occurs in, or in the vicinity of, the study corridor:

- Floodplain Forest (high quality occurrence of rare community type)

The floodplain forest habitats are associated with Fishkill Creek in the Towns of Fishkill and East Fishkill and are depicted in Appendix A.

Floodplain Analysis

Sections of the corridor navigate through different flood zones. Federal Emergency Management Agency (FEMA) Guidance for Flood Risk Analysis and Mapping (from 2020) provides guidance for floodway analyses and mapping and links to revise existing Floodway Analysis models. This document, along with National Flood Insurance Program (NFIP) materials, should be referenced and utilized to avoid impacts to the flood risk and floodway areas.

The maps in Appendix A provide an overview of the different zones. These would need to be analyzed during the preliminary design of any potential trail project. These zones include the 1% flood risk area, also referred to as the "100 year" storm, the 0.2% Flood Risk area, also referred to as the "500 year" storm, and the regulatory floodway of the Fishkill Creek and tributaries. A 1% flood risk (AE Zone) means that there is a 1% chance that, during any given year, flooding will occur in the area. A 0.2% flood risk means that there is a 0.2% chance in any given year that the area would be flooded. The regulatory floodway is defined as the channel of a watercourse, and the adjacent land that is reserved from encroachment, that allows the base flood to flow or discharge without cumulatively increasing the water-surface elevation by more than a designated elevation. In general terms, the regulatory floodway for this corridor is the area reserved for the Fishkill Creek to flow when it overruns its banks.

Approximately 3.2 miles of the study corridor are designated as having a 1% flood risk (AE Zone), 1.4 miles are designated as having a 0.2% flood risk, and 0.3 miles are within the Regulatory Floodway. This makes about five miles of the corridor located in some type of flood risk area.

Floodway requirements are not a prohibition on development within the floodway, but they do establish a performance standard that is intended to avoid increasing damage to adjacent and upstream property owners by restricting storm flow in the designated floodway. Trails for hiking, biking, and walking are identified in the NFIP guidance as an economic use that can be conducted in floodways if they do not impact flood stages.

NYSDEC states that any development within a regulatory floodway, as indicated on a community's Flood Insurance Rate Map (FIRM) or Flood Boundary and Floodway Map, requires a hydraulic analysis to demonstrate "no-rise" in flood levels as a result of a project before a floodplain development permit can be issued. They help in modeling, per the NYSDEC website.

For 1% and 0.2% flood risk areas, new projects must meet the "no adverse affect" criteria and can be developed in accordance with FEMA standards and local law. Under "no adverse affect", a proposed development should cause a rise in the base flood elevation of no more than one foot.

Hazardous Materials

Hazardous materials may exist along the corridor due to its previous use as a railroad. Railroad corridors typically demonstrate minor contamination from polycyclic aromatic hydrocarbons (PAHs). These contaminants are often attributable to slag (a waste product created when metals are refined or smelted) and ballast materials and/or residuals from diesel locomotive exhaust. Railroad ties treated with creosote, which consists predominately of PAHs, often leach into the surrounding soils. As such, soils should be sampled during the design phase at various locations throughout the corridor to investigate and characterize the chemical composition of the surface and shallow subsurface soils that could be disturbed during construction of a rail trail and associated trailheads.

According to NYDEC records, there are also several remediation sites adjacent to the corridor, including two "active sites" (sites of environmental cleanup): the Beacon Terminal site south of the rail line just west of South Ave in Beacon; and the Texaco Research Center site, which includes remediation parcels on both sides of the rail line near Washington Ave and Old Glenham Rd in Fishkill. There are some "no-action sites" (potential sites that did not represent a significant threat to human health or the environment), and "closed sites" (remediation sites where all cleanup activity has been completed), primarily in Beacon.

Any excavated soil material that is to be transported off site should be analytically tested and characterized to determine if it satisfies the Part 375 Unrestricted Use Soil Cleanup Objectives. This would determine if the soil can be used as clean fill material or if it must be properly disposed of at a permitted solid waste facility, in accordance with State and Federal regulations.

Sampling of composite materials should be spaced throughout the corridor, focusing on areas where large amounts of soil may be disturbed. The samples should be submitted to a qualified lab for analysis of Volatile-Organic Compounds (VOCs) using EPA Method 8260C, Semi-Volatile Organic Compounds (SVOCs) using EPA Method 8270D, pesticides using EPA Method 8081B, Herbicides using EPA Method 8151A, Polychlorinated Biphenyls (PCBs) using EPA Method 8082A, target analyte list (TAL) metals using EPA Method 6010C, and total mercury using EPA Method 7471B.

In accordance with the provisions of NYCRR Part 360.13(c), the on-site reuse and/or disposal of previously excavated and stockpiled soil material may be acceptable, as long as the stockpiled soil is placed above the groundwater table and covered with a minimum 12-inch thick layer of clean fill material (or in some cases, a layer of asphalt or other impermeable material). If possible, it is recommended that contaminated soils be reused on-site for grading purposes. However, the onsite reuse of disturbed soils is subject to the results and recommendations of the soil testing program.

Anticipated Permits

The construction of a trail would likely require a Nationwide Section 404 permit, a Section 401 Water Quality Certification, an Article 15 stream protection permit, an Article 24 state wetland disturbance permit, and a State Pollutant Discharge Elimination System (SPDES) Permit (see Table 6). A NYSDOT Highway Work Permit (HWP) would be required for any work that occurred within the boundary of a State highway (e.g., NYS Route 52, 82, 376, and US Route 9). A floodplain impact permit from all four municipalities would be required for impacts to the floodplain within that municipality.

NYSDEC regulates disturbances to pre-determined streams and wetlands within the state. These streams and wetlands have designated names and numbers and are inventoried on the NYSDEC Environmental Resource Mapper. USACE regulates disturbances to streams and wetlands that meet federal jurisdictional criteria. USACE jurisdictional streams and wetlands are identified through a site visit by trained personnel. The construction of a recreational trail through the corridor would likely cause disturbances to both NYSDEC and USACE regulated stream and wetland resources, requiring the submission of a Joint Application package to both regulating agencies.

All the streams within the study corridor flow into the Fishkill Creek, which then flows into the Hudson River, a Traditionally Navigable Water. It is likely that these hydrologic connections qualify the identified stream resources as Waters of the United States (WOTUS), which would require a disturbance permit from the USACE. Under Section 404 of the Clean Water Act, a Nationwide Permit (NWP) 14 for Linear Transportation Projects would likely be provided by USACE if the requirements of the permit are met for the federally jurisdictional wetlands and streams. Projects within New York that require stream permits from the USACE under the NWP Program also require Water Quality Certification from NYSDEC under Section 401 of the Clean Water Act. In addition, an Article 15 permit would be required from NYSDEC for project work disturbing State-protected streams, which were noted in the Wetlands Section. Ground disturbance to or within a 100 foot buffer around a state designated wetland requires an Article 24 permit from NYSDEC under the Environmental Conservation Law.

A trail project would also require the preparation of a SWPPP because the project would disturb more than one acre of land. This is also a requirement of the NYSDEC's Statewide Pollution Discharge Elimination System (SPDES) permit. The construction of bicycle and pedestrian trails is exempt from the inclusion of post construction stormwater controls. The SWPPP would require erosion and sediment control practices such as silt fencing, fiber logs, temporary seed and mulch, and rolled erosion control blankets. However, any parking facilities constructed for a possible trail would require post-construction stormwater controls to mitigate stormwater generated by impervious areas at that site.

Table 6: Anticipated Permits

Permit Name	Permitting Agency	Permit Need
Nationwide Section 404: NWP 14	USACE	Stream and Wetland disturbance
Section 401 Water Quality Certification: Article 15 (streams) Article 24 (Wetlands)		Stream and Wetland disturbance to NYSDEC jurisdictional waters
Highway Work Permit	NYSDOT	Work within State highway ROW
Floodplain Permits	T/V/Fishkill, T/East Fishkill, and C/Beacon	Work within a floodplain
SPDES Permit	NYSDEC	Ground disturbance greater than one acre

Time of Year Restrictions

Time of year construction restrictions are determined by the relevant permitting agencies and put in place to protect endangered species found within or adjacent to the corridor. Based on the species present within the study area, the most likely restrictions would be a restriction on cutting trees greater than a two-inch diameter at breast height between April 1 and October 31. In-stream work may also be restricted between October 1 and April 30.

Additional Detailed Environmental Assessments Needed

In general, the following detailed environmental assessments should be performed prior to construction of a potential trail within the corridor:

- Wetland & Stream assessment
- Threatened & Endangered Species assessment
- Hazardous soil sampling program

DCTC Vulnerability Assessment (Transportation Resilience Improvement Plan)

The DCTC's Vulnerability Assessment, the Resilient Ways Forward Transportation Resilience Improvement Plan (RWF TRIP), was developed to further our understanding of future climate trends and to better prepare the transportation system for climate change. The TRIP identifies where the transportation system is most vulnerable to climate hazards (flooding, extreme heat, landslides, drought, winter weather, and wind), and recommends ways to reduce those impacts. The study uses a two-phased, risk-based assessment: the Phase 1 System-Level analysis assesses the sensitivity of the transportation system to climate hazards, and the Phase 2 Asset-Level analysis identifies specific assets and locations where the system is most vulnerable to those hazards.

The TRIP includes sensitivity ratings for multiple transportation assets. In the case of rail trails, flooding was determined to have a high impact on both the physical trail infrastructure and the user experience. Extreme heat was also found to have a high impact on trail users. Landslides were found to have a moderate impact on rail trails, while the other climate hazards (drought, wind, and winter conditions) have less of an impact.

The study corridor includes 3.5 miles within a 1% flood risk zone (see the Floodplain Analysis), so any potential trail would require mitigation and resilience designs to minimize the impacts of flooding. Strategies to mitigate flooding will be discussed in the final report, where potential design concepts will be discussed.

Transportation Equity

The DCTC is committed to advancing equity through its transportation planning process, whether in setting policy, progressing projects, or completing planning studies. In this study, considering equity ensures that the needs and concerns of vulnerable communities and populations are recognized, and that any proposed recommendations or design concepts do not negatively or disproportionately impact these communities.

There are several equity datasets at the federal, state, and local levels that can be used to identify disadvantaged communities. For this study, we looked at the DCTC's Equity Assessment from its long range transportation plan (Moving Dutchess Forward), the NYS Climate Act and its assessment of disadvantaged communities, and the federal Justice40 program (see Table 7):

- DCTC's Moving Dutchess Forward: For its long-rang plan, the DCTC developed a transportation equity index to assess potential transportation inequalities across the county. The assessment assigned equity scores to each census tract, based on how it compared to the county average for nine focus populations (Black, Asian, Hispanic, Older Adults, Youth, Disabled, Foreign Born, Low-income, and Limited English). These scores were combined into a single Equity Index for each tract, with scores ranging from a high of 16 to a low of one. In the study corridor, two tracts (603.02 in Fishkill and 2102.01 in Beacon) scored above the county average of five.
- New York State Climate Act: New York State identified disadvantaged communities as part of the NYS Climate Act to ensure that these communities are protected from the effects of climate change. Over 45 environmental and demographic indicators were evaluated to assess communities. In the study corridor, six census tracts were identified as disadvantaged by the State's Climate Justice Working Group (CJWG). At least one disadvantaged tract is in each of the four study municipalities.
- Federal Justice40 Prorgam: This federal initiative requires that 40% of the benefits of certain federal investments benefit disadvantaged communities. This includes some federal transportation programs, some of which could support the construction of the Beacon-Hopewell Rail Trail. However, based on the federal Climate and Economic Justice Screening Tool (CEJST), there are no Justice40 tracts in the study corridor.

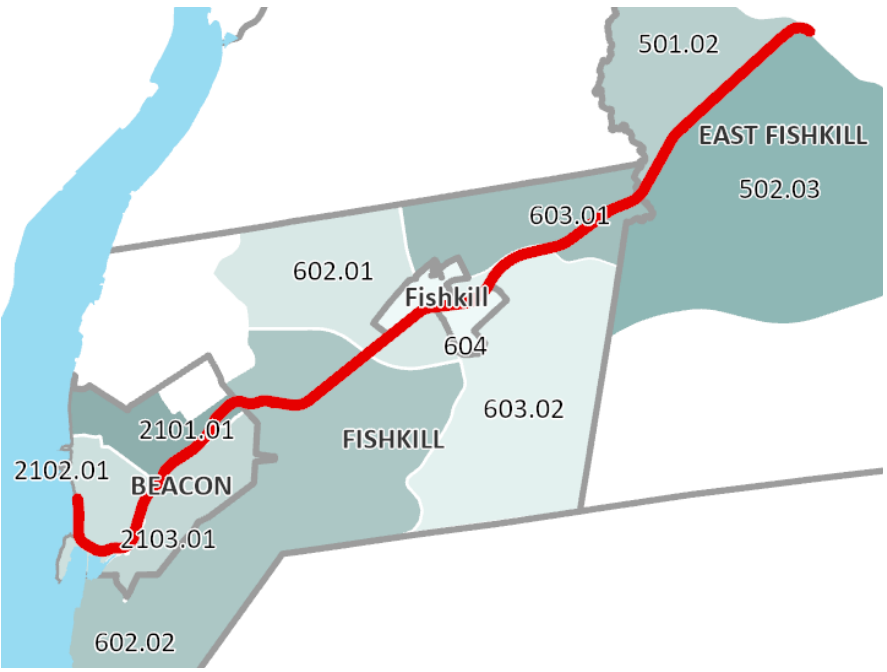
Additional Considerations

The study corridor touches ten census tracts within the four municipalities (City of Beacon, Towns of Fishkill and East Fishkill, and Village of Fishkill) (see Figure 34). There are noticeable variations among these tracts in the share of vulnerable populations. In particular, the 2020 Census shows that 23% of the population in tract 2102.01 (the southwest area of Beacon) identifies as Black, the highest of all ten tracts in the corridor; similarly, 23% of this tract's population identifies as Hispanic, which is also the highest in the corridor. The 2018-2022 ACS also shows that this tract has the highest share of people living in poverty (14%) in the corridor. Considering these factors, the team should carefully review the study's recommendations so that vulnerable populations in this tract are not negatively impacted by a potential rail trail.

Table 7: Equity Summary by Census Tract

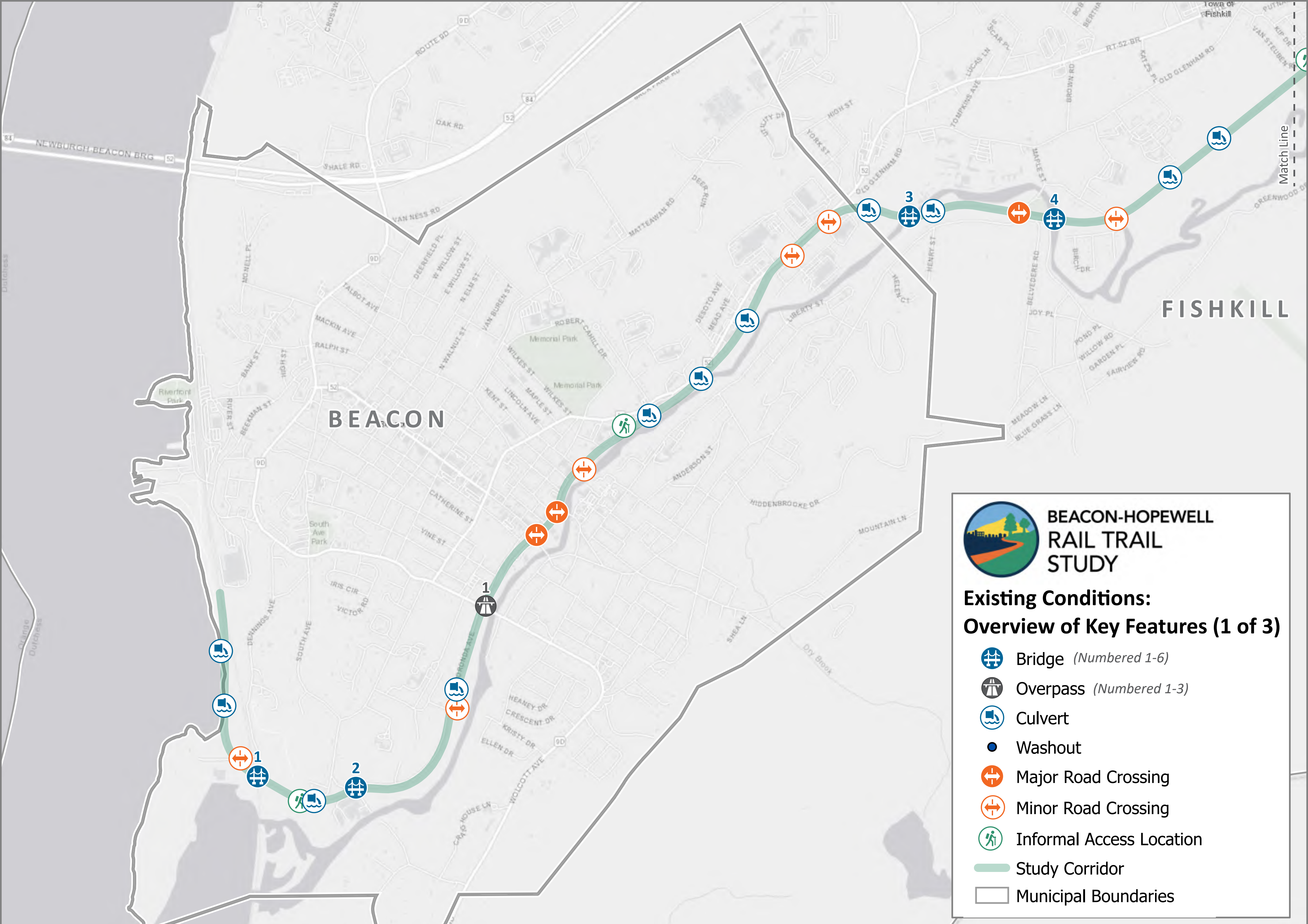
Census Tract	Municipality	MDF Equity Index	NYS Disadvantaged Community	Justice40 Community (CEJST)
502.02	T/East Fishkill	3	No	No
502.03	T/East Fishkill	1	Yes	No
602.01	T/Fishkill	4	Yes	No
602.02	T/Fishkill	3	Yes	No
603.01	T/Fishkill	3	No	No
603.02	T/Fishkill	8	No	No
604.00	V/Fishkill	4	Yes	No
2101.01	C/Beacon	4	Yes	No
2102.01	C/Beacon	6	Yes	No
2103.01	C/Beacon	4	No	No

Figure 34: Study Corridor Census Tracts



Conclusion

As stated in the introduction, the study team found the railroad corridor to be in good overall condition, with no insurmountable barriers preventing the creation of a trail. This does not mean that significant challenges do not exist, nor does it imply that developing a trail would be trouble free. However, based on this assessment, a trail is feasible given current conditions. The next phase of this study will look at potential trail concepts, their costs, funding options, and a possible phasing plan.



DUTCHESS COUNTY TRANSPORTATION COUNCIL

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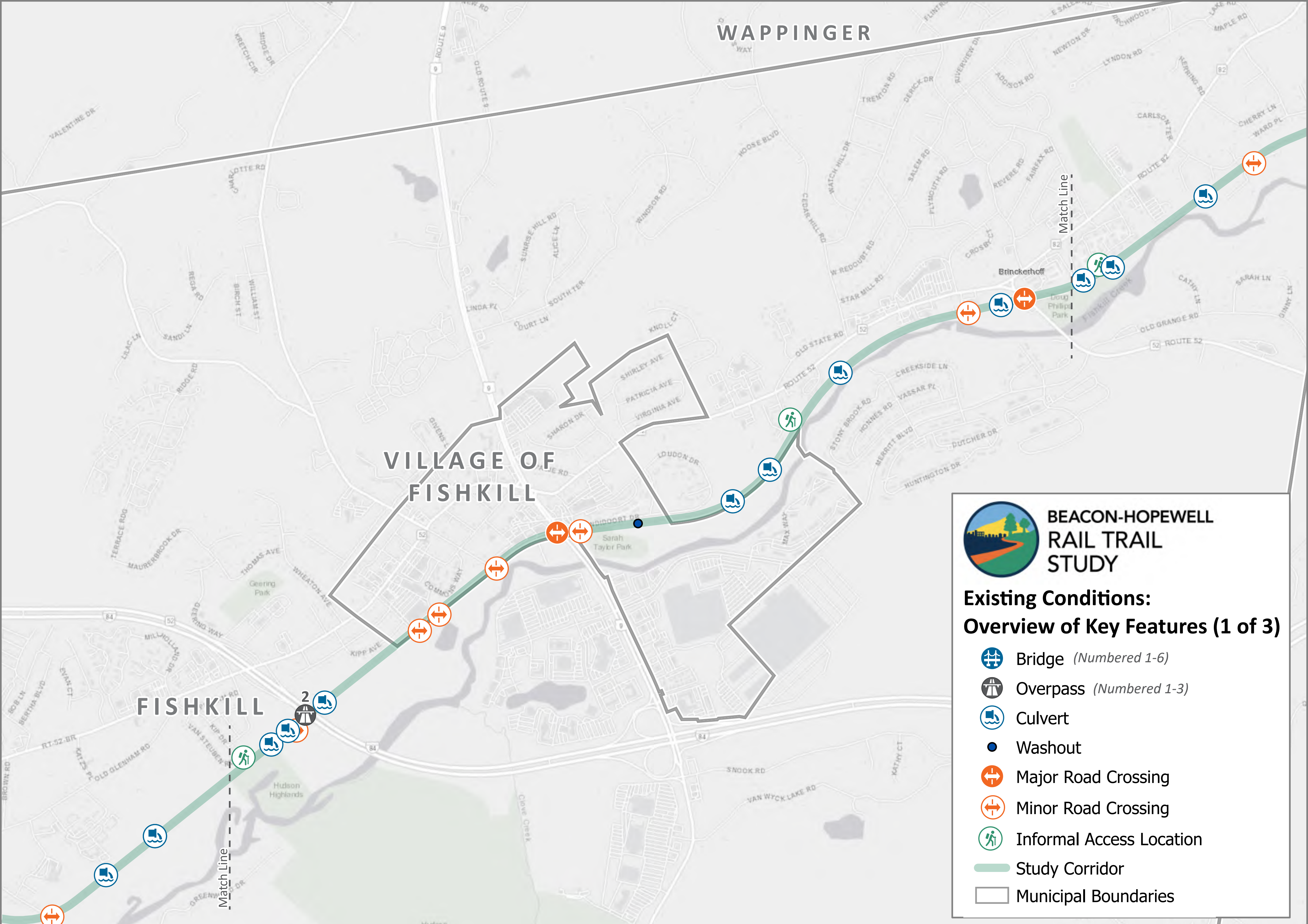

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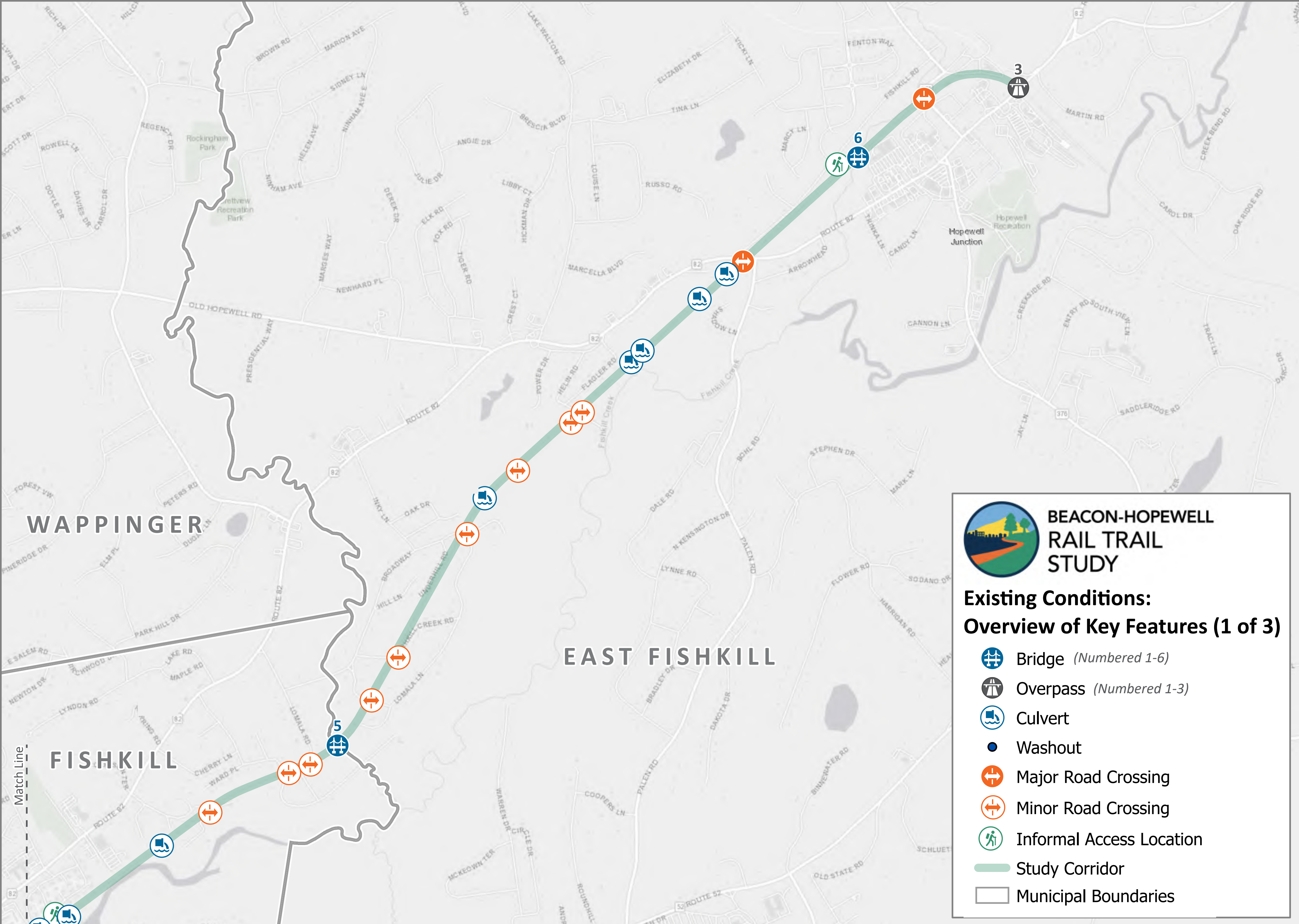

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