

Comprehensive Analysis of Undesignated Section of U&D Corridor

July 1, 2026

DRAFT



Ulster County Legislature
Housing & Transportation
Committee



**Barton
&Loguidice**

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**1.8-mile undesignated section of the Ulster & Delaware (U&D) Corridor between
Route 28A and Basin Road**

**Ulster County Legislature
Housing & Transportation Committee**

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Table of Contents

1. Executive Summary	4
2. Introduction	6
2.1 Background and Context	6
2.2 Study Purpose and Objectives	7
2.3 Study Methodology Overview	8
3. Data Collection & Inventory (Existing Conditions)	8
3.1 Physical Corridor Conditions	10
3.2 Land Use Property Rights Deeds	14
3.3 Environmental Conditions	21
4. Engineering and Feasibility Analysis	25
4.1 Engineering Constraints	25
4.2 Scenario Development Methodology	26
Standards & Concepts	26
4.3 Trail Only Scenario Analysis	28
Typical Section	29
Trail Construction	30
Structure Modifications	30
Potential Environmental Impacts and Mitigation Measures	30
Summary	33
Cost	34
4.4 Rail-Only Alternative Analysis	34
Structure Modifications	36
Potential Environmental Impacts and Mitigation Measures	36
Summary	37
Cost	37
4.5 Rail-with-Trail Scenario Analysis	38
Typical Rail With Trail Section	38
.....	39

Design Constraints	39
Rail-with-Trail Construction.....	40
Structure Modification	45
Potential Environmental Impacts and Mitigation Measures	45
Summary	46
Cost.....	46
5. Summary	48
6. Comments and Input	49
This section is reserved for the post comment period of this DRAFT Submission	49

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1. Executive Summary

Barton and Loguidice, D.P.C. ("B&L") has been retained by Ulster County to prepare a feasibility study for the Undesignated Ulster & Delaware Railroad (U&D) Corridor from NY Route 28A to the eastern end of the Basin Road bridge in the Towns of Kingston, Hurley, and Woodstock NY. This study assesses conditions of the corridor and evaluates the feasibility of three potential alternatives. Trail only development, Rail only development and combined Rail with Trail development.

The U&D corridor consists of typical railroad infrastructure, including steel rails, rail hardware, wooden railroad ties, and ballast stone. Additional existing features include the bridge structure that carries the corridor over Beesmer Road, as well as drainage infrastructure such as culverts and swales. The corridor is characterized by steep embankments, rock cuts, steep slope conditions with wetlands and natural habitat throughout the study area. The usable corridor width is a relatively flat area centered along the former track alignment. At the base of embankment sections, localized ponding of water and wetland areas are present.

The Trail Only alternative evaluates the full conversion of the existing railroad corridor into a multi-use recreational trail. The existing rail infrastructure would be removed, and the corridor would be regraded and developed to accommodate pedestrian and bicycle use including the installation of stone subbase topped with asphalt or a stone aggregate surface course. A parking area and trailhead kiosk was also included in this alternative. Property research and property acquisitions will likely be required.

Rail Only alternative considers the rehabilitation of the existing railroad corridor for FRA Class 1 Tourist Rail (under 15 mph) use. The work would include full replacement of railroad ties, partial replacement of rail (10%), associated hardware as required, and the addition of new ballast stone throughout the corridor. Drainage improvements and minor rehabilitation of the Beesmer Road Bridge would also be incorporated to support long-term rail operations. It is not expected that property acquisitions would be required under this alternative although some legal research is included in the estimated cost.

The Rail with Trail alternative evaluates the feasibility of conducting Class 1 Tourist rail service while also accommodating a parallel multi-use trail within the same corridor. This option would require significant earthwork and rock excavation in constrained areas to achieve the necessary corridor width for both uses. Drainage improvements, the relocation of the existing stream, a new pedestrian bridge at Beesmer Road, and minor rehabilitation of the Beesmer Road Bridge are also included with this alternative. This alternative includes the combined infrastructure needs of both rail and trail systems within a shared right-of-way. Property research and property acquisitions will likely be required due to the trail inclusion in this alternative.

Cost estimates were developed for each alternative based on field data, development of actual plan level cross sections and quantities, horizontal and vertical profiles, engineering experience in trail design, and coordination with the Catskill Mountain Railroad and other contractors. The costs presented include engineering, permitting, construction, construction inspection, contingencies, and inflation to 2030 dollars at 3% per year. The estimated total project costs are:

- \$4.08 million for the Trail Only alternative,
- \$4.45 million for the Rail Only alternative,
- \$16.31 million for the Rail with Trail alternative.

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2. Introduction

2.1 Background and Context

The Ulster and Delaware Railroad Corridor was constructed in the late 1800's and early 1900's and provided rail transportation from Kingston to Oneonta, NY. New York City residents frequented the route to access the many luxurious hotels and resorts in the Catskill Mountains. The route was also used for freight hauling operations to transport raw materials such as lumber, stone, and even water into the Hudson Valley and to points south such as New York City. Commercial rail service on the corridor ended in the 1970s, and rail activity has since been limited to tourist and excursion operations on select segments. The Ulster County-owned portion of the corridor extends approximately 38.6 miles and has been under county ownership since 1979, when it was acquired from Penn Central.

In December 2015, Ulster County adopted Resolution No. 488, which established a policy framework for future use of the corridor. The resolution identified segments for continued rail operations, segments for trail development, and segments with undetermined future use under a "Rail with Trail" policy approach. Several portions of the corridor have since been converted to recreational trails. The Ashokan Rail Trail, an approximately 11.5-mile shared-use trail extending west from Basin Road, opened in October 2019. In Kingston, approximately 0.8 miles of the former railroad corridor was converted into the Kingston Midtown Linear Park, a paved multi-use trail extending from Cornell Street to Westbrook Lane.

Additional trail development is planned along the corridor. Approximately 2.5 miles at the western end of the county have received funding for trail design and construction and are currently under development and additional segments have been studied. Pedal-powered railbikes operate along the U&D near Phoenicia along parts of the Esopus Creek and through the woods on the original rail line.

Rail operations continue on a portion of the corridor through the Catskill Mountain Railroad (CMRR), which operates under county permit, approximately 4.7 miles of track between Kingston Plaza and Route 28A for excursion and tourism purposes.

Today, the U&D Corridor contains a combination of active rail operations, completed trail facilities, and undeveloped segments. As a result, the corridor continues to be evaluated for future transportation, recreational, tourism, and economic development opportunities.

2.2 Study Purpose and Objectives

The purpose of this study is to provide the Ulster County Legislature with a clear, impartial, and comprehensive feasibility evaluation of three (3) alternatives of use for the remaining undesignated 1.8-mile segment of the Ulster & Delaware (U&D) Corridor between Route 28A and Basin Road. The alternatives are: Class 1 Tourist Rail Only, Trail Only, and the combination of Rail with Trail. This analysis is intended to provide informed engineering-based decision-making regarding the future use of the corridor by examining its existing physical, environmental, implementation costs, and logistical conditions. The study has developed feasible solutions to implementing each alternative including sub-options when applicable. Planning efforts, regulatory constraints, and stakeholder input can collectively influence potential redevelopment options; however, this study presents balanced, engineering-based assessment that identifies feasible alternatives and their associated challenges, implications and, in some cases, the need for more in-depth study for environmental regulation compliance

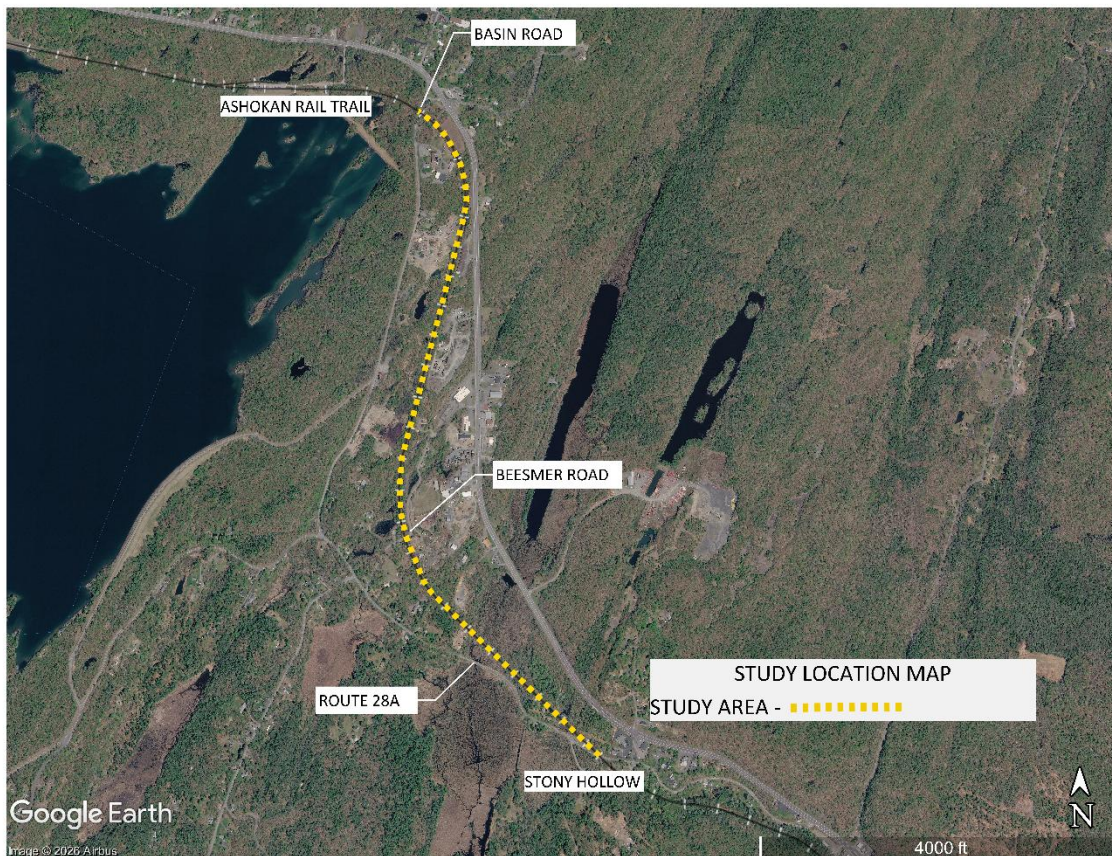


Figure 1 - Study Location Map

2.3 Study Methodology Overview

This study follows a structured, multi-step methodology integrating document review, GIS and LiDAR analysis, field investigation, engineering evaluation, construction costs estimates, environmental assessment, and overall feasibility to assess the 1.8-mile U&D Corridor segment. The approach was designed to ensure consistent, comparable evaluation of the Trail Only, Rail Only and Rail-with-Trail alternatives with full objectivity and to provide a feasible constructible direction for each alternative.

The process began with a comprehensive review of existing materials, including prior engineering studies, environmental reports, documents, and compiled stakeholder and public input. Applicable local, state, and federal regulations were also reviewed to identify legal and permitting constraints governing potential corridor uses.

Pre-fieldwork analysis included the use of existing GIS datasets and LiDAR-derived terrain data to develop an initial understanding of corridor topography, surface elevations, and site conditions. This information was used to identify key features and focus areas for field verification and where refined data to be used in the analysis was required to be obtained.

Field investigations were conducted in April 2026 using GPS-based data collection methods to verify and supplement the desktop findings. Engineering and environmental analyses were subsequently completed for each alternative, with each scenario developed independently to assess feasibility, constructability, and environmental impacts consistently.

Quantities of materials and operations associated with construction were analyzed, designed, calculated and subsequently utilized for detailed cost estimates for each alternative. The cost evaluation considered major project elements, including construction and engineering costs, environmental impact minimization and mitigation measures, permitting and regulatory compliance costs, site access, materials and equipment needs, emergency service provisions during and after construction, and required restoration activities.

3. Data Collection & Inventory (Existing Conditions)

B&L staff used traditional data collection methods such as measurements, visual observations, topographic maps, observation of wetland plants, water courses, rock and soil characteristics and utilized the software system Survey123 to collect data electronically. This data supplements the existing LiDAR-derived terrain data to produce preliminary mapping of the existing conditions, develop feasible alternatives, and develop preliminary cost estimates. The primary data collected includes the following:

- Existing clear width within the railroad corridor, including measurements through constrained areas such as rock cuts and narrow embankment sections using tape measures and laser distance measuring devices for the higher rock sections.
- Existing ballast width, composition, condition, and potential for reuse depending on the future corridor use alternative being considered
- Side slopes, and general corridor geometry
- Existing track conditions, including rail, tie, spike, and fastening system conditions
- Visible utility infrastructure and potential utility conflicts
- Environmental features and potential constraints, including streams, wetlands, drainage features, and adjacent structures
- Existing drainage infrastructure and conditions, including culverts, swales, washouts, and stream crossings
- Pedestrian and bicyclist safety considerations, including potential fencing locations
- Existing vegetation and tree removal requirements
- Verification of wetland limits and other Waters of the US

B&L also conducted an environmental field assessment during the same site visit to document existing environmental characteristics within the corridor. The data and measurements collected during these field investigations were used for a preliminary assessment of the environmental

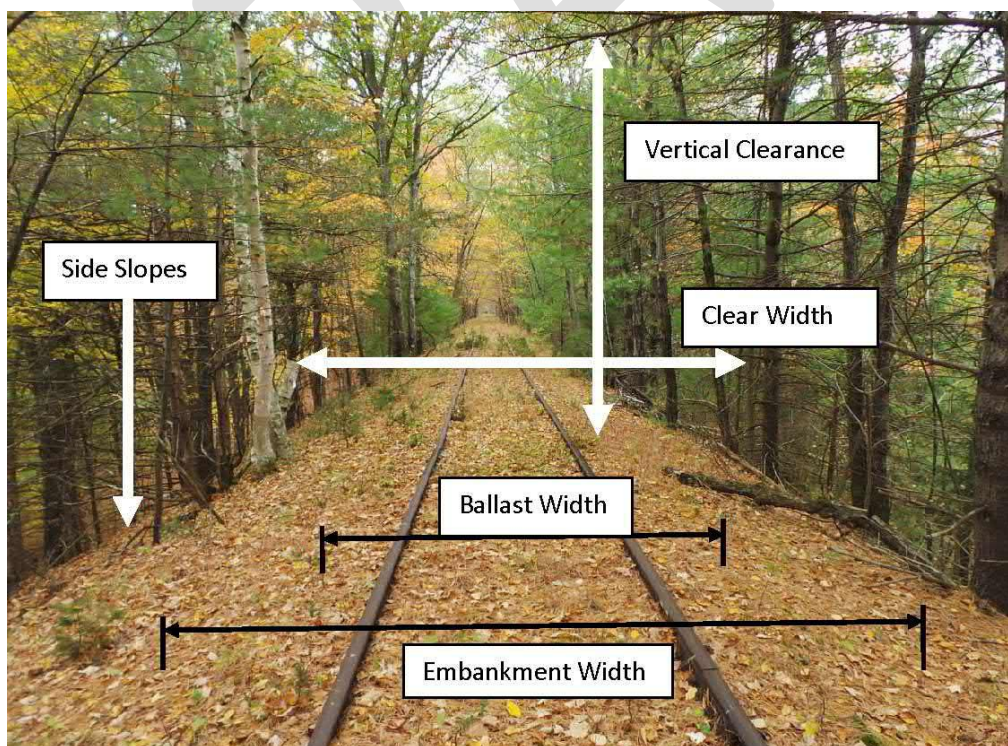


Figure 2 - Corridor Typical Dimensions & Measurements

conditions on the site. Data such as the vertical clearance, clear width, ballast width, and the embankment width generally correlate with the image below.

3.1 Physical Corridor Conditions

Overall, the corridor consists of typical railroad infrastructure such as steel rails, steel rail hardware, wooden railroad ties, and ballast stone. Additionally, the corridor includes the bridge that crosses Beesmer Road, drainage culverts and swales.

The existing railroad ballast is generally in poor conditions, with most sections showing little to no visible ballast stone due to vegetation overgrowth, organic matter and other sediment accumulation. The corridor drains moderately well in most areas, however, there are several low points where the ballast and organic matter is saturated. The drainage conveyance improvements under each of the alternatives studied are not a major challenge. Railroad ties require complete replacement as they are severely deteriorated, rotted, saturated, or are missing entirely (See Figure 3). Rail tie bar fasteners and spikes were observed to be loosening or dislodged from the ties. Rail tie-bars, steel anchor plates, and the occasional gauge bars appear to be re-usable, whereas, spikes and bolts are not reusable.



Figure 3 –Missing / Buried Ties

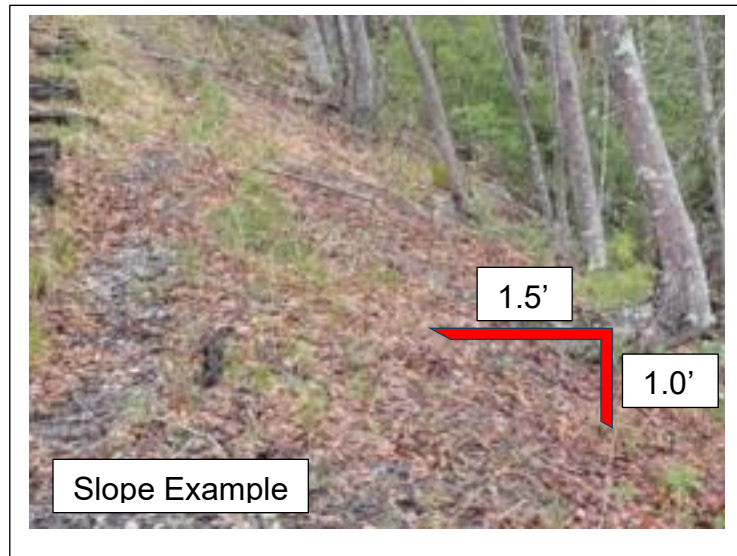


Figure 4 – Deteriorated Ties and Loosening Spikes



Figure 5 – High Fill Section “Stony Hollow Fill” and Wetland (right)

The usable corridor width is the relatively flat area centered along the former track alignment varying from 10 ft. to 12 ft. in width. In general, slopes on both sides of the corridor are steep, commonly on the order of approximately 1.5 ft. Horizontal to 1.0 ft. Vertical (a 66% slope) See Inset picture. This construction is typical for the era, in this corridor, and for this type of railroad infrastructure. Approximately 2100 ft. of the corridor known as the “Stony Hollow Fill” consists of high fill sections where the rail alignment is elevated 25 ft. or more above surrounding grade (See Figure 5). Approximately 2,250 ft. of the corridor passes through rock cuts, with rock walls ranging primarily from 25 to 35 ft. in height with an available corridor width of 30 to 35 ft. between cut faces (See Figure 6). The remainder of the corridor consists of lower fills and cut sections that are less ominous, however, they do include steep slopes and limit the usable corridor width, without modification, for the Rail with Trail Alternative.



The existing grade between Route 28A and Basin Road is relatively consistent, ranging from 1.5% to a maximum of 2.5%. The corridor includes an earthen driveway crossing, as well as a bridge structure carrying the rail over Beesmer Road consisting of concrete abutments, supporting steel girders, and a steel deck. The vertical clearance for Beesmer Road is posted at 10 ft. - 7 in. with approximately 14 ft. in horizontal clearance between the abutments. The deck is overlaid with subgrade fill material, followed by ballast, designed to support the track system. See Figure 7.

The existing grade between Route 28A and Basin Road is relatively consistent, ranging from 1.5% to a maximum of 2.5%. The corridor includes an earthen driveway crossing, as well as a bridge structure carrying the rail over Beesmer Road consisting of concrete abutments, supporting steel girders, and a steel deck. The vertical clearance for Beesmer Road is posted at 10 ft. - 7 in. with approximately 14 ft. in horizontal clearance between the abutments. The deck is overlaid with subgrade fill material, followed by ballast, designed to support the track system. See Figure 7.



Figure 6 - High Rock Cut Section and Stream Looking West



Figure 7 - Beesmer Road Railroad Bridge looking East

Corridor drainage is accomplished primarily by sheet flow conveyed over vegetated embankment slopes. Preservation of these drainage patterns and the vegetated slopes is a major goal in the development of alternatives since disturbance would increase environmental impacts, permitting requirements, and construction costs associated with the evaluated alternatives. At the base of the embankment sections, low-lying ponding of water and wetlands can be observed and represent environmental resources that may influence the feasibility and permitting requirements of the alternatives.

In the rock cut areas, stormwater is collected in shallow swales initially cut into the rock. The swales require cleaning to remove ballast and organic material that have accumulated over time. On the west side of the corridor, where flow continues south, the conveyed water is considered an unmapped intermittent stream, as discussed in Section 3.3.

3.2 Land Use Property Rights Deeds

Ulster County acquired 38.6 miles of the former Ulster and Delaware (U&D) Railroad corridor from the Penn Central Transportation Company estate in 1979 under a Quit Claim Deed. Key elements regarding the transaction and ownership nature of the corridor include:

- The county acquired the line easements and right-of-way for \$1.5 million.
- Railroad corridors were often surrendered via Quit Claim Deeds since the historic underlying property interests were complex, fragmented, or poorly documented. In this case, a Quit Claim deed transferred whatever title interest Penn Central held at the time without guaranteeing a clear title.
- Following public acquisition, Ulster County initially leased the corridor to the Catskill Mountain Railroad (CMRR) for tourist train operations. In September 2014, the legislature first adopted Resolution No. 275 of 2014, establishing a conceptual, segmented framework to convert the U&D corridor into a rail trail between Kingston and Boiceville, while supporting tourist rail operations west of the reservoir.
- In December 2015, the legislature passed Resolution No. 488 of 2015, which officially finalized the segmented rail and trail compromise policy. This resolution preserved specific segments for railroad tourism operations (such as in Midtown Kingston and Phoenicia/Mount Tremper) while designating the 11.5-mile stretch along the reservoir for full conversion into the non-motorized public Ashokan Rail Trail.
- The Undesignated Section, the subject of this study, was left undecided for further study as part of Resolution No. 488 in 2015.

U&D Corridor Valuation Maps

Between 1913 and 1920 “Valuation” Maps were mandated by the Interstate Commerce Commission (ICC) which was the former federal regulatory agency that oversaw U.S. railroads.

The Valuation Maps provide parcel by parcel information on the U&D Railroad disposition of property, and they were divided into two major types.

1. Right of Way Agreement - These usually stated the property was for railroad purposes only with no underlying land ownership by the railroad where the property owner retains fee simple ownership.
2. Underlying Land Ownership – Generally survives RR abandonment such as:
 - Warranty Deed
 - Quit Claim Deed
 - Covenant Against Grantor
 - Guardians Deed

Regarding the deeds, property conveyed by Warranty Deed, Quit Claim Deed, Covenant against Grantor or Guardians Deed typically can be utilized for trail without further action. However, if any of these deeds contain the phrase "for railroad right-of-way" or "for railroad purposes only," the County may need to still negotiate a purchase or utilize eminent domain. Further title work will be needed if trail or rail with trail is the direction selected for the corridor.

For properties that were conveyed by Right of Way Agreement, the County will need to acquire the property for trail use and rail with trail use as the easement along the corridor was designated for railroad purposes only. These acquisitions can be complicated as described below

The sale of properties along the corridor continued following acquisition by the Railroad. During that process, some instances the rail corridor was assumed to be owned by the railroad, when, in fact the property interest was only an easement for railroad purposes. Lands conveyed with the assumption of being owned by the railroad leave the true ownership of the underlying lands in the corridor in question. This discontinuity in "Title" will need to be investigated through Title searches, which will, in some cases, turn out to reveal the lands are owned not by the abutting property owner but by a former owner, their ancestors or heirs. Based on the data provided in the Valuation Maps there are approximately eight (8) properties that were conveyed by Right-of-Way Agreement concentrated in the Route 28A corridor crossing area. The exact number of parcels would be positively identified once Title work was performed. Appraisals would be conducted and where owners could not be found, funds would be set aside with the NYS Comptroller for an heir to come forward to claim the funds if any. This situation occurred on multiple properties during the property acquisition phase of the development of the County's Midtown Linear Park. An easement for railroad purposes only also exists near Basin Road but here the question of title appears resolved and trail use would require some form of acquisition.

The accompanying parcel maps include the current property information as noted on the Ulster County GIS based Parcel Viewer and the numbered properties included as part of the Valuation Maps. Properties with a red background and boxed out in red in a clip from the maps, are underlying properties where Right of Way Agreements were the instrument the Ulster and Delaware Railroad utilized to acquire the specific legal instrument to install tracks, clear the land, build embankments, remove rock, and operate on the property in approximately 1867-1868.

Acquiring the land for trail or rail with trail use

A property acquisition from initial title search, appraisal, various certifications, document filing, and closings average \$8,000 to \$10,000 each under a State and Federal-aid type project process. The time period these properties were conveyed and the minimal data available can be challenging for the title investigation and deed chain process and then to find the rightful heir to the property agreement potentially under imminent domain. Court proceedings will also likely be required and the escrow of the funds to be held by the NYS Comptroller's office will require a process. For this cost estimate, B&L is including an estimated cost of \$18,000 per property, which includes the appraisal value of the property.

Near Basin Road, Parcel 38.4-3-50 is one of the larger parcels where, by right of way agreement, the railroad sits on property originally acquired by New York City for the construction of the Ashokan Reservoir. Trail use here would require some form of acquisition.

In summary, the title and legal access for a trail, or rail with trail, is not automatic for approximately eight (8) properties with the likely potential for underlying ownership that needs to be satisfied. However, the satisfaction of this underlying ownership is not a major challenge or insurmountable task. Time will need to be allotted for the required research and likely court review and rulings. The County has experience with this process, and it is not a roadblock for a trail or rail with trail project.

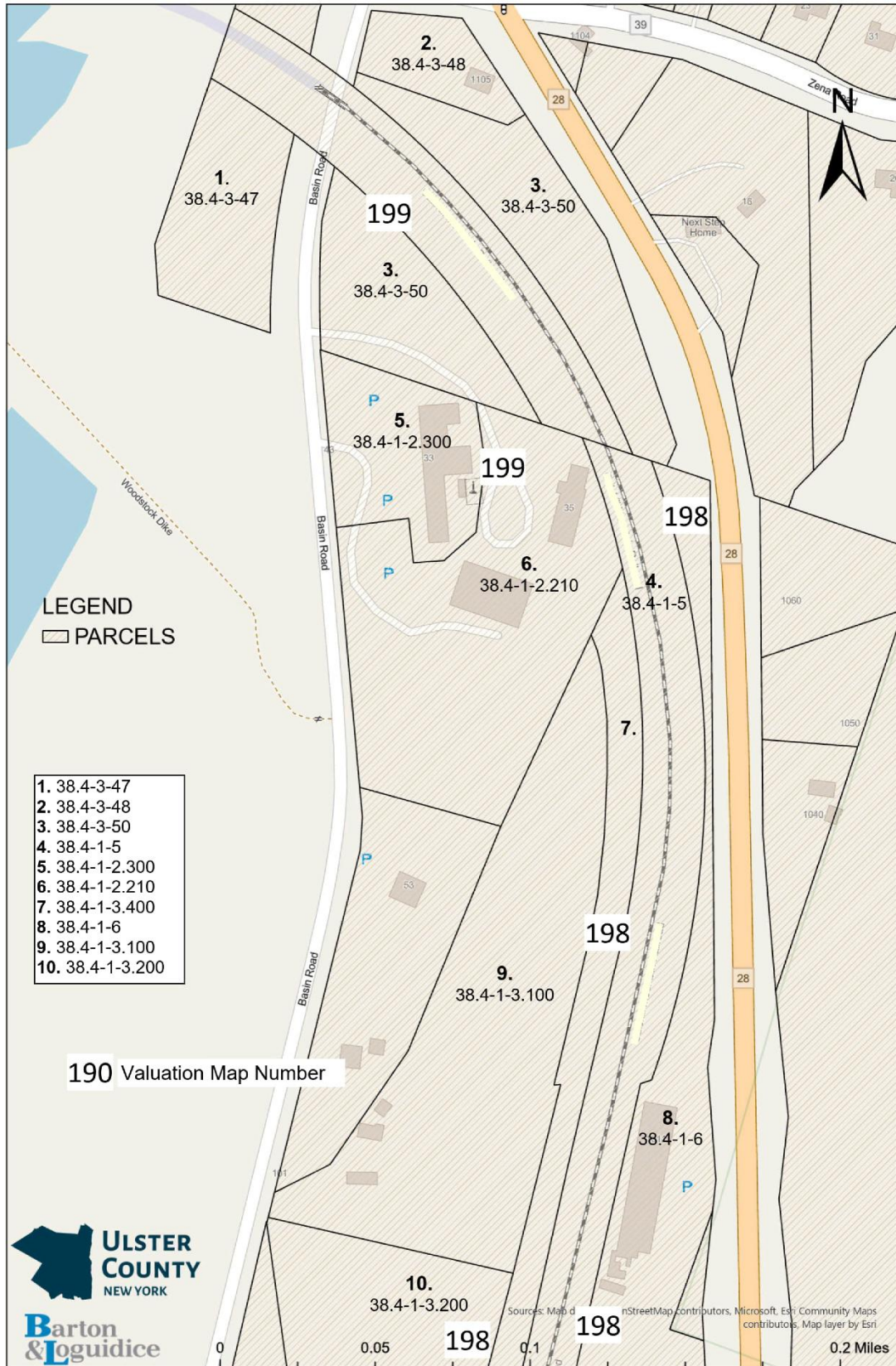


Figure 8 - Tax Map

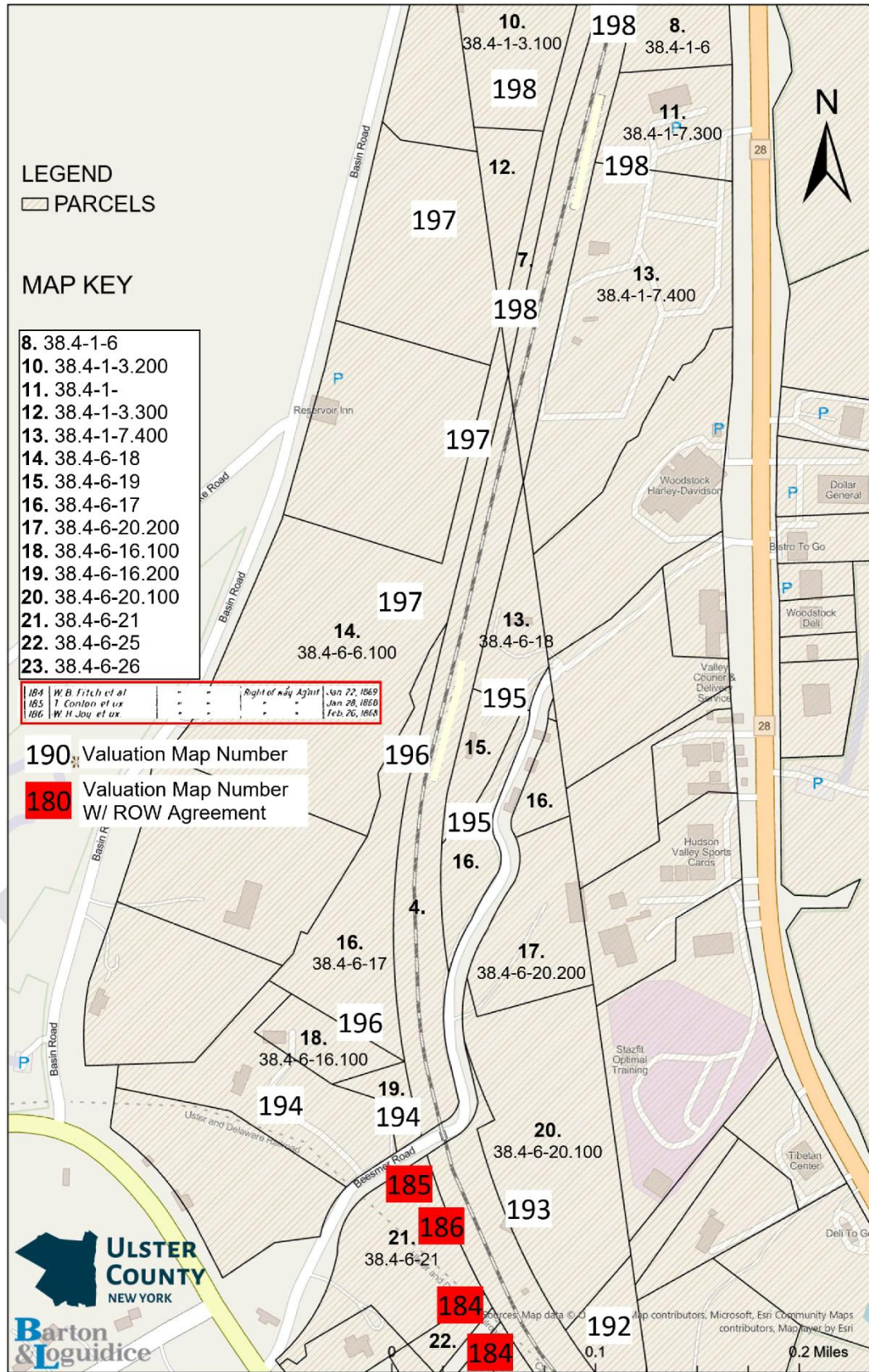


Figure 8.1 - Tax Map

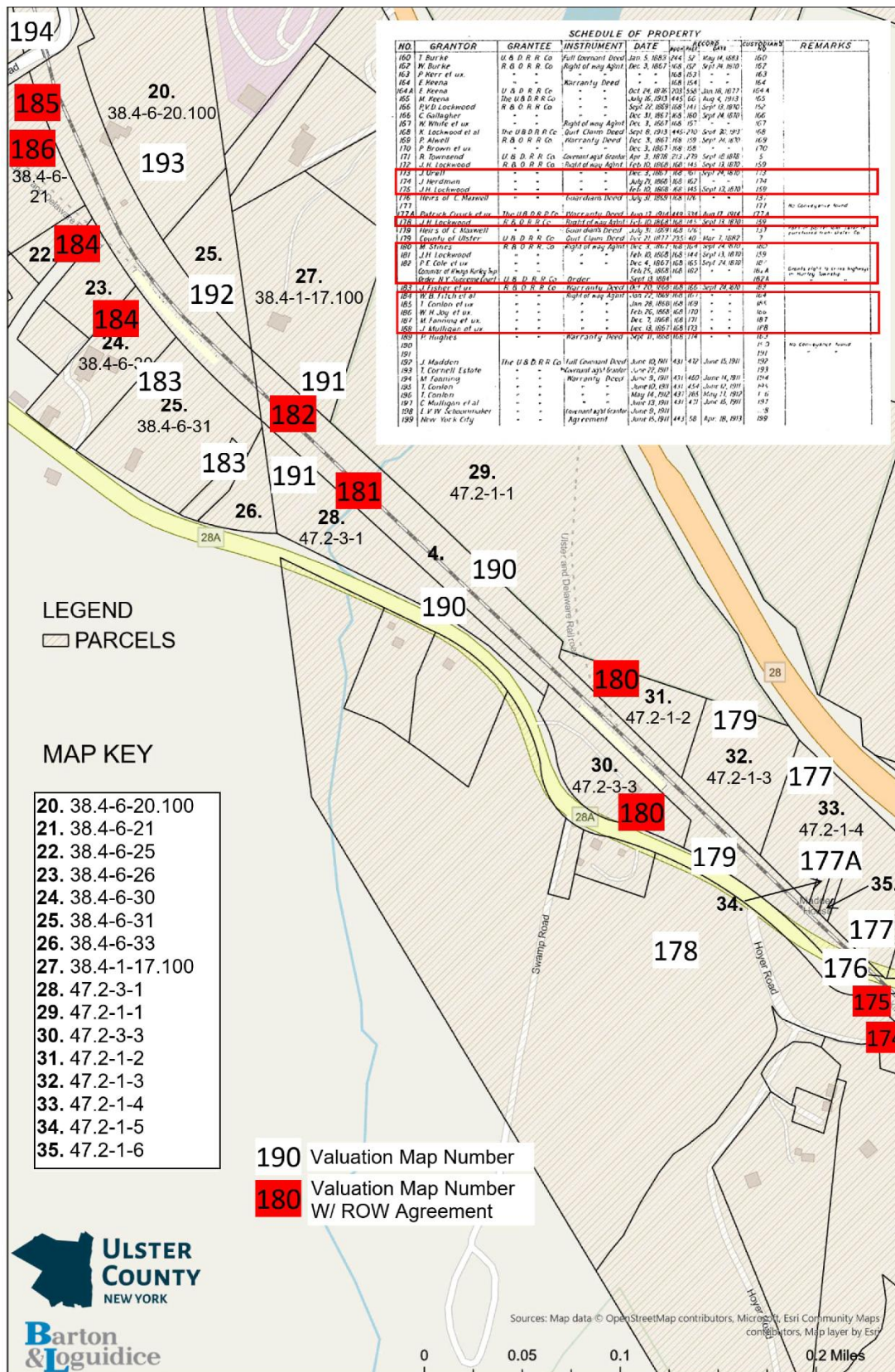


Figure 8.2 - Tax Map

Parcel Reference Key				
Map Label	Parcel ID	Reputed Owner	Address	Notes
1	38.4-3-47	City of New York - DEP	Route 28	
2	38.4-3-48	One Thousand One Hundred	1105 Route 28	
3	38.4-3-50	FAI LLC	Route 28 & Kingston Line	
4	38.4-1-5	County Of Ulster	off Route 28	U&D Corridor
5	38.4-1-2.300	FAI LLC	33 Basin Rd	
6	38.4-1-2.210	FAI LLC	35-39 Basin Rd	
7	38.4-1-3.400	Trust David Gutierrez	off Basin Rd	
8	38.4-1-6	Matthew E Beesmer	484 Route 28	
9	38.4-1-3.100	David Gutierrez	63 Basin Rd	
10	38.4-1-3.200	Anthony Russo	73 Basin Rd	
11	38.4-1-7.300	Vonn Wilhelm LLC	Route 28	
12	38.4-1-3.300	Anthony Russo	81 Basin Rd	
13	38.4-1-7.400	Eastern Materials LLC	Route 28	
14	38.4-6-18	Erik L Rockwell	89 Beesmer Rd	
15	38.4-6-19	Charles D Banks	75 Beesmer Rd	
16	38.4-6-17	Gregory P Mapstone	70-80 Beesmer Rd	
17	38.4-6-20.200	Beesmer LLC	50 Beesmer Rd	
18	38.4-6-16.100, 33	Matthew Foley	33 Beesmer Rd	
19	38.4-6-16.200	Matthew Foley	33 Beesmer Rd	
20	38.4-6-20.100	Blue Rock West LLC	30 Beesmer Rd	
21	38.4-6-21	Charles As Successor Kilmer Trustee	Beesmer Rd	
22	38.4-6-25	Charles As Successor Kilmer Trustee	Krom Rd	
23	38.4-6-26	Gerald Guthenberg	Krom Rd	
24	38.4-6-30	Joel Bluestein	326 Route 28A	
25	38.4-6-31	Nancy Fitzsimmons	320 Route 28A	
26	38.4-6-33	Michael Diamond	Route 28A	
27	38.4-1-17.100	LTD. SJS EQUITIES	861 Route 28	
28	47.2-3-1	Michael Diamond	Route 28A	
29	47.2-1-1	New York State Land		State forest
30	47.2-3-3	Cristiana Circeanu	256 Route 28A	
31	47.2-1-2	Richard W Alberstadt	Route 28	
32	47.2-1-3	Richard W Alberstadt	Route 28	
33	47.2-1-4	New York State Land		State forest
34	47.2-1-5	County Of Ulster		Non-ceil. rr
35	47.2-1-6	County of Ulster	OFF Route 28	Rural vac<10

Table 1 – Parcel Reference Key

3.3 Environmental Conditions

B&L staff completed an environmental assessment of the study area on April 22, 2026 to investigate possible environmental constraints. Publicly available information was also reviewed to determine whether records of threatened and endangered species exist for the study area. The topography, aerial imagery, mapped soils, and mapped resources in the study area were also researched and reviewed.

The land use surrounding the study area is primarily rural residential (single family homes) and industrial use properties, forest, and wetlands. The study area extends approximately 40 feet from the center of the railroad bed and encompasses the project site's limits of disturbance.

Updated studies, highly dependent on the funding sources, would be needed for each topic mentioned below if the project were to progress. This is due to naturally changing conditions and the timelines for regulatory reviews require frequent updates to gain approvals. Final determinations of wetland and stream jurisdictions are submitted to the NYSDEC and USACE during the permit process and they concur with or comment on the submitted findings, meet at the project site, and a consensus is typically reached on the determination of wetland and other studies.

Wetlands

The New York State Department of Environmental Conservation's (NYSDECs) Environmental Resource Mapper (ERM) was reviewed for locations of state-regulated previously mapped NYSDEC wetlands within the study area. NYSDEC mapped wetlands are shown in Appendix B. There is one previously mapped NYSDEC wetland (KW-3) located within the study area designated as KW-3. The wetland is classified as a Class 2 wetland that is 106.2 acres in size and is located in the Stony Hollow Fill area within the study area at the base of the steep slopes.

The U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) mapping was also reviewed to identify mapped wetland and surface water locations within the Study area as shown in Appendix B. There is one NWI-mapped wetland that overlaps with the NYSDEC Wetland KW-3.

The wetlands observed during the field visit are outside the impact area for each of the alternatives.

Surface Waters

The NYSDEC ERM was reviewed for locations of mapped surface waters within the Study area. The closest NYSDEC mapped stream crosses under the corridor approximately 1,690 feet northwest (measured along the corridor) from the southern terminus of the study area at State

Route 28A. The Praymaher Brook (NYSDEC Waters Index No. H-171-25) is a Class C stream with C(T) Standards and meets the NYSDEC's definition of a protected stream and is also listed by the NYSDEC on the Section 303(d) list as impaired due to turbidity. The brook flows north toward the Esopus Creek, it cuts perpendicular to the old railroad right-of-way just south of Pickerel Pond and Onteora Lake and will not be impacted by the project alternatives.

During the site assessment an unmapped intermittent stream was observed flowing south along the west side of the railroad tracks (see Figure 9). This stream begins on the west side of the tracks approximately 1,200 ft. north of the Beesmer Road bridge and continues along the railroad tracks for an approximate total length of 3,700 ft.

This stream will need to be investigated further and discussed with regulatory agencies for disposition. Re-direction of the stream has been accounted for in each of the alternative cost estimates if it would become necessary. The intent would be to retain this stream against the rock cut and at the bottom of the fill slopes maintaining its existing location as much as possible. The estimates include water protection funds that are intended to accommodate this stream if it is deemed jurisdictional as a Water of the US.

Floodplains

The Study area is not located in any floodways, 100-year floodplains, or 500-year floodplains as mapped by the Federal Emergency Management Agency (FEMA).

Endangered and Threatened Species

A review of the USFWS New York Field Office's Information, Planning, and Consultation (IPaC) System was conducted to determine whether any federally listed endangered, threatened, or candidate species are reported for the Study area or adjacent areas. The USFWS' IPaC reported four federally listed species, including Indiana bat (*Myotis sodalis* - endangered), northern long-eared bat (*Myotis septentrionalis* – endangered), Tricolored bat (*Perimyotis subflavus* – proposed endangered), and monarch butterfly (*Danaus plexippus* – Proposed Threatened). No suitable habitat for the Monarch Butterfly was observed within or adjacent to the study area. Suitable habitat is present for all of the listed bat species.

The NYSDEC ERM stated that the Study area is within the vicinity of bats listed as endangered or threatened and rare dragonflies and damselflies (not listed by NYS). The New York Natural Heritage Program (NHP) was contacted for additional information regarding state-listed endangered or threatened species, species of special concern, and significant natural communities within the Study area. A response was received on June 2, 2026. The NHP letter identified a bald eagle (*Haliaeetus leucocephalus*) nesting area located approximately 0.25 miles from the Study area. The NHP also reported an Indiana bat summer roost located approximately

1 mile from the Study area. No other occurrences of rare plants, animals, or significant natural communities were identified.

Cultural and Historic Resources

The Cultural Resource Information System (CRIS) on the State Historic Preservation Office's (SHPO) website was consulted for the presence of archeological sensitive areas and National Register listed historic and cultural sites. According to the website, the study area is not located within an archeological sensitive area. Additionally, there are no structures listed on the National Register of Historic Buildings in the vicinity of the study area. However, the portion of the U&D Railroad Corridor from Shokan to Arkville is listed, or eligible for listing, on the National and State Registers of historic places. As this segment of the U&D Railroad corridor exhibits many of the same characteristics as that portion of corridor does, this segment may also be eligible for listing on the SR and NR. Coordination with SHPO to address Section 106 or 14.09, depending on funding obligations for the project is required. Funding sources, including grants will have an impact on this process.

Hazardous and Contaminated Materials

Residual contamination is an inherent risk present as a result of the former railroad operations. Common contaminants that may be encountered along historically used railroad corridors include heavy metals, herbicides, pesticides, petroleum products, creosote, lead, and arsenic. In addition, the NYSDEC info Locator shows an inactive solid waste landfill near Beesmer Road.

Tie removal will be required. The cost for removal and disposal were obtained from a company with experience in removing and disposing of "seasoned" railroad ties within 100 miles of the project study area. The cost is an estimate and meant to reflect the order of magnitude for the process of removing and disposing of fragmented used ties in 2026. This cost estimate is carried through each alternative consistently.

Additional Environmental Discussions specific to each alternative is included in the subsequent sections for each alternative.

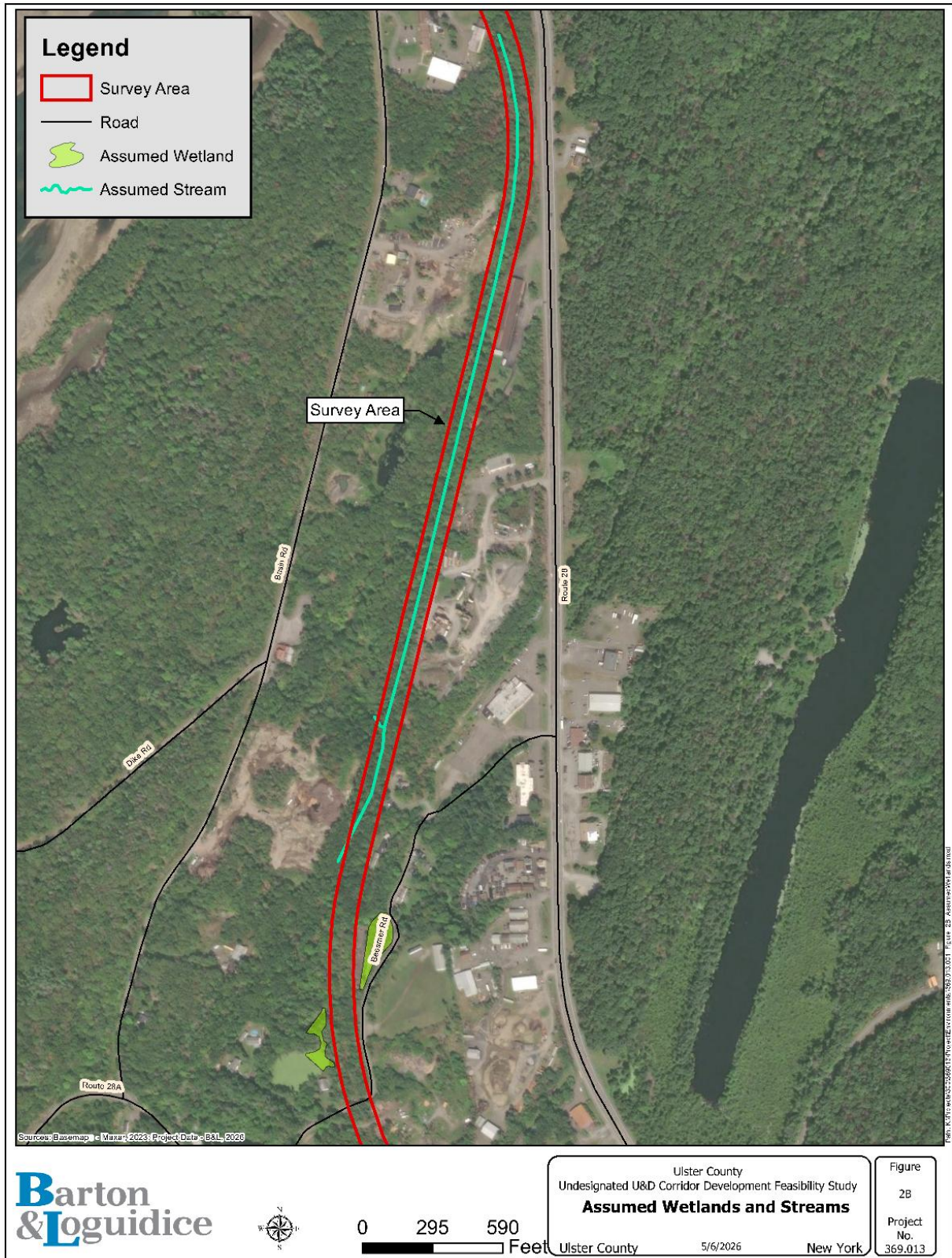


Figure 9 –Wetlands and Streams

4. Engineering and Feasibility Analysis

The analysis provides a planning-level assessment of constraints, required improvements, and general constructability considerations for each alternative. Each alternative was evaluated considering existing physical, structural, and environmental conditions, as well as applicable design standards, and corridor access limitations. The analysis also considers the scope of work required for each alternative and outlines the general approach for implementation of each proposed configuration.

4.1 Engineering Constraints

Engineering constraints can be described as challenges to implementation of a goal or project or as hard fast limitations that would require unreasonable methods of construction, litigation, or environmental impacts, or economic requirements to achieve the goal or project. The description of “unreasonable” can be subjective and it is important to assess constraints in the context of the project, benefits, and drawbacks when determining what may be reasonable or unreasonable. This study presents constraints and solutions and does not attempt to make a statement on what is reasonable or unreasonable.

For the alternatives studied for this corridor, the high fill areas, wetlands, habitat, and rock cut sections throughout the corridor are the most prominent constraints. Access to the corridor is limited due to the linear nature of the railroad alignment and the presence of surrounding natural terrain and the railroad corridor itself. The steep slopes, wetlands, natural habitat, and adjacent private properties reduce the number of viable construction access points. As a result, construction staging, equipment mobilization, material delivery, and emergency access will require planning and coordination.

The existing railroad bridge within the corridor represents a constraint applicable to each of the alternatives studied and may require varying degrees of rehabilitation and additional safety improvements depending on the selected use of the corridor. Structural condition evaluations would be required during the design phase of future project phases (if any).

In addition to site-specific constraints, each alternative must be developed in accordance with applicable railroad, trail, and safety design standards. These requirements influence minimum widths, clearances, grades, structural elements, and other design criteria, which in turn affect the feasibility and extent of improvements required throughout the corridor. The alternatives developed under this study adhere to these applicable standards.

4.2 Scenario Development Methodology

Standards & Concepts

Trail Standards

Design standards for the multi-use trail on this corridor, including either the Trail Only or Rail With Trail alternative, follows standards such as:

- American Association of State Highway and Transportation Officials (AASHTO) 2024 Guide for the Development of Bicycle Facilities 5th Edition
- Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD) 2023, 11th Edition
- New York State Department of Transportation (NYSDOT) Highway Design Manual (“HDM”)
- Engineering Judgement, where applicable, is utilized where design standards do not fully address the circumstance

Standards and recommendations from these guides were used to develop the feasible alternatives as many of the funding sources (Federal and State) available will require these design guidelines as a stipulation in utilizing the funds granted and will ensure basic consistency with similar facilities in the area.

The Americans with Disabilities Act (ADA) requires that new pedestrian facilities be accessible for people with a mobility impairment, such as those who use a wheelchair. ADA standards applicable to the trail design include having no greater than a 2.0% cross slope and a 5.0% running slope, while also providing a trail surface that is firm and stable. The feasible alternatives were developed to accommodate users of all abilities. Table 2 below shows the recommended design standards and recommendations for the trail on this corridor utilizing our experience and the design guidelines.

Setting a basis for the design through Design Criteria is important when comparing various alternatives, previous studies, and to investigate conformance with potential funding sources.

Table 2 – Trail Design Elements

Design Element	Standards / Recommendations
Minimum Design Speed	18 MPH
Multi-use Trail Width:	8 ft. (Min.) when constrained by environmental conditions and property availability 10ft. (Recommended) 14ft. when available and based on volume and use
Multi-use Trail Shoulder Width (without railings) Slope of 1V:6H Slope of 1V:3H	2 ft. (Min.) 3-5 ft. (Rec.) 5 ft.
Distance between edge of trail and top of slope without barrier	5 ft.
Maximum Grade (ADA Compliance)	4.5%
Minimum Horizontal Curve Radius	120 ft.
Design Cross Slope (ADA Standard):	1.5% (Max.)
Stopping Sight Distance	300 ft.
Lateral Clearance (from edge of trail)	1 ft. (to fence) 2 ft. (to obstruction)
Vertical Clearance	8 ft. (Min.) 1 ft. (Rec.)
Bridge Structure Capacity (Emergency vehicles)	H-20
Pedestrian Safety Rail Height	42 in. (Min.) 54 in. (Rec. overwater features)

Bridge Loading Standards

New or rehabilitated bridges (including pedestrian bridges over roadways) should follow NYSDOT and AASHTO standards for bridge design. This ensures compliance with current engineering practices and quality of materials and for consistency with Federal and State guidelines. The recommended minimum loading for a trail, both for new and rehabilitated structures, is H-10 loading for vehicle and pedestrian loads. The H-10 loading standard can be referred to as a two-axle, 20,000-pound (10 ton) vehicle, with 16,000 pounds loaded on the rear axle and 4,000 pounds on the front axle. Structures designed to carry an H-10 loading can support light maintenance vehicles (pick-up trucks) and emergency service vehicles (such as ambulances, rescue vehicles and small firefighting apparatus). For pedestrian crossings over roadways, H-10 loading or pedestrian loading of 90 pounds per square foot on the entire bridge deck surface is recommended as a minimum as the long-term sustainability of the bridge goes up with the increased loading capabilities for a relatively low increase in cost. Additionally, an H-15 loading (30,000 lbs. (15 tons)) is sometimes employed to accommodate construction vehicles. In this case, access can also be provided at Beesmer Road and Route 28A to reduce the need for construction vehicles to cross bridges.

Trail Fencing

A trail fence to help delineate drop-offs and re-direct errant users should be considered at specific locations along a trail and have been included in the proposed feasible alternatives. AASHTO recommends that a railing with a minimum height of 42 in. be included when a clear area of 5 ft. at a maximum slope of 1:6 cannot be achieved and one of the following conditions is present:

- Slope is equal to or steeper than 1:3 for a vertical drop greater than 6 ft.
- Slope is equal to or steeper than 1:2 for a vertical drop greater than 4 ft.
- Slope is equal to or steeper than 1:1 for a vertical drop greater than 1 ft.
- Slope is equal to or steeper than 1:3 adjacent to a parallel body of water or other substantial obstacle.

Engineering judgement should be used when determining the placement of fencing by balancing the cost to install and maintain the fence particularly in areas with steep slopes that have natural barriers already in place such as a heavy tree line close to the top of the slope. Wider offsets to the steep slopes should be included wherever reasonable and feasible.

Railroad Standards

Design standards for Rail-Only and Rail-with-Trail Alternatives should follow applicable federal regulations and industry standards, including:

- Title 49 Code of Federal Regulations (CFR) Part 213 Track Safety Standards
- American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual for Railway Engineering
- Federal Railroad Administration (FRA) regulations applicable to track rehabilitation and railroad operation

Compliance with FRA regulations establishes the minimum safety requirements for track construction, inspection, and maintenance, while AREMA provides the accepted engineering practices for the design, rehabilitation, and maintenance of railroad infrastructure. Utilizing these standards ensures that the proposed improvements are consistent with current industry practices and provides a basis for evaluating future funding opportunities and operational requirements.

4.3 Trail Only Scenario Analysis

The Trail Only option consists of re-purposing the railroad corridor by removing the railroad tracks, hardware, and ties and constructing a multi-use trail within the former footprint of the tracks. Essentially, this option uses the existing railroad corridor footprint to construct a trail.

Typical Section

B&L recommends a width of 10 ft. for the trail where multi-use trails generally range from 10-14 ft., with 2 ft. to 5ft. shoulders (or graded areas) on each side depending on the adjacent slopes. The total graded width (trail + shoulder) should be 14 ft. to 20 ft. to accommodate the main trail surface and varying width based on location and the physical characteristics (slopes) adjacent to the trail. The trail sections that are in a 'cut' (where the ground rises above the trail) should utilize 2 ft. wide shoulders under the trail only alternative (See Figure 7 and 8).

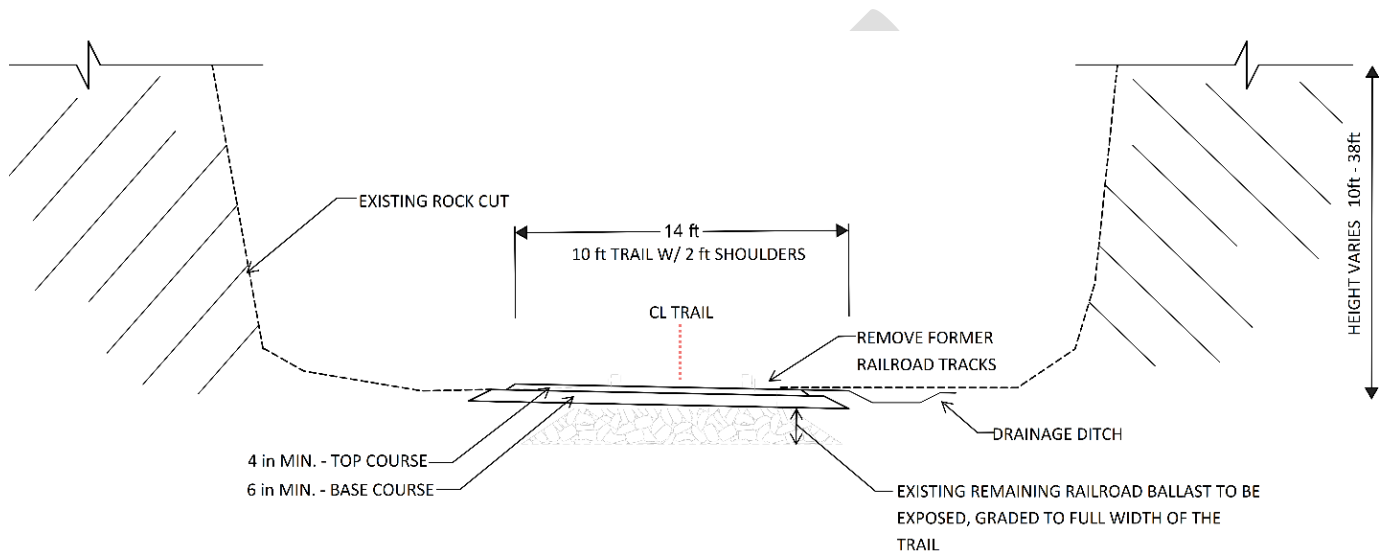


Figure 10 - Predominant Trail Only Rock Cut Section

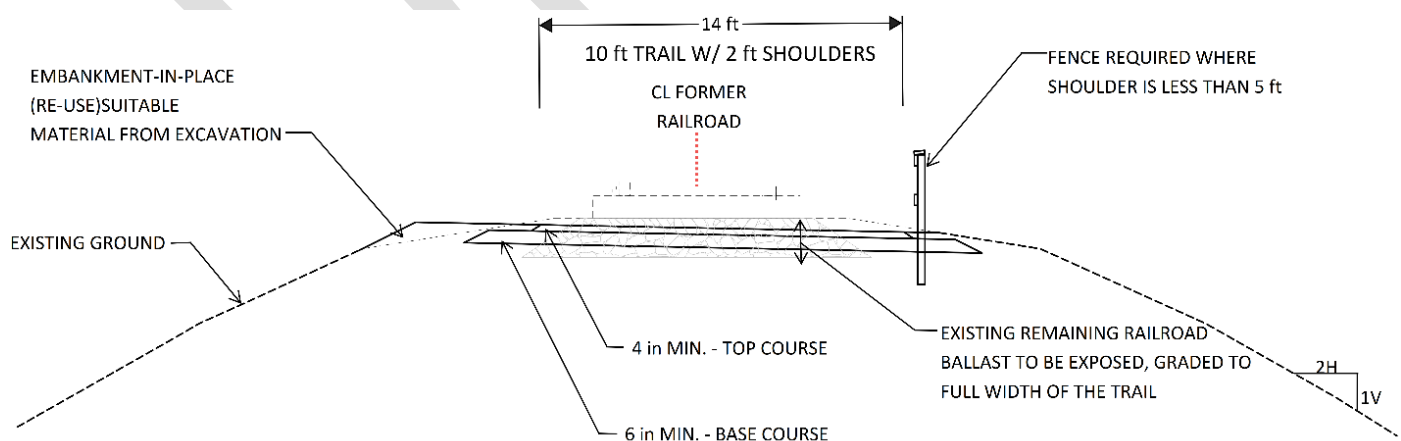


Figure 11 - Predominant Trail Only Fill Section

Trail Construction

Based on field observations conducted during the site visit, the existing ballast is in poor condition loaded with soil and other organic matter. As a result, it is not suitable for reuse as the trail base course, however, it can be utilized to support the base course and should be graded to the proposed trail width required to support the base and top courses. The recommended trail section would consist of a 6-inch layer of stone (of gradation to be determined) and topped with a 4-inch finer surface course similar to the ART. While a crushed stone surface is assumed for this alternative, asphalt could also be considered as an alternative surface treatment.

With moderate distance of 0.63 miles between the access points at 28A and Beesmer Road construction access will require backing in and one-way operation, however, this distance is not a major challenge and is typical for linear trail projects.

Structure Modifications

The railroad bridge within the study corridor crossing over Beesmer Road is approximately 14 ft. wide and consists of a steel and concrete deck supported by steel girders. To accommodate a multi-use trail, the existing railroad tracks and timber ties would need to be removed, and pedestrian safety railings would be installed. Additional structural evaluation would be required to verify the bridge's condition, load-carrying capacity, and suitability for conversion to trail use. An estimated rehabilitation cost is included and is assumed to be crack filling, minor restoration of steel elements, and other preservation preventative maintenance.

Potential Environmental Impacts and Mitigation Measures

Wetlands and Surface Waters

Praymaher Brook, is a mapped NYSDEC stream, that passes under the corridor flowing to a NWI-mapped forested wetland described in Section 3. An unmapped intermittent stream was observed flowing south along the existing railroad tracks for approximately 3,670 feet during the site assessment, which may be disturbed to install the trail. Shifting the trail to the east should avoid all impacts to this stream and can be reasonably accomplished. If impacts are necessary and exceed 3/100 of an acre, mitigation at a minimum one-for-one ratio would be required. This alternative will not directly impact the wetlands due to the higher elevation of the existing railroad in comparison to the elevation of surrounding wetlands. Since Praymaher Brook flows within an existing culvert underneath the corridor it is not expected to be impacted by this alternative. This assumes no culvert work is necessary, which could change at the time a design alternative is progressed. However, minor repairs are not typically a challenge when seeking environmental approval as long as the repair process is restorative.

Endangered and Threatened Species

According to the USFWS IPaC database, the Study area is within the range of four federally listed species, the Indiana bat, northern long-eared bat, tricolored bat, and monarch butterfly. The NYSDEC ERM reported the Study area is within the vicinity of bats listed as endangered or threatened and rare dragonflies and damselflies (not listed by NYS). The NHP identified a bald eagle nesting area located approximately 0.25 miles from the Study area. The NHP also reported an Indiana bat summer roost located approximately 1 mile from the Study area.

The main impacts of concern to the protected bat species are the removal of potential roost trees, addition of artificial light to previously unlit forest habitat, and increase in nighttime noise levels. Any tree clearing or trimming will need to be completed between November 1 and March 31 while the bats are in hibernation to avoid adverse impacts to bats.

The most significant impacts to the bald eagle would be associated with tree clearing and loud construction noise near active nests. Tree clearing should be limited to the smallest extent possible and should be done during the winter to prevent potential impacts to nesting/breeding. An Eagle Disturbance Take (General Permit) may also be required under the Bald and Golden Eagle Protection Act (BGEPA) if a nest is found during the habitat assessment and the Study area is within 660 feet of an active bald eagle nest.

Cultural and Historic Resources

The Study area was not within an archaeologically sensitive area. In addition, there was no buildings listed on the National Register of Historic Buildings shown in the vicinity of the Study area. Project details would be submitted to SHPO for review during the project's design phase. Coordination with SHPO must be completed during the project's design phase in order to ensure that potential adverse impacts to archeological and historic resources are avoided.

Hazardous and Contaminated Waste

Due to the likelihood of encountering residual contamination from the former railroad operations, it is likely that contaminated soils will be encountered and the removal, handling, and disposal of soils and materials will be regulated. Additionally, the study area should be surveyed for the presence of asbestos containing materials (ACMs). Contaminated materials should be disposed of in accordance applicable state regulations. Soils should be sampled at various locations throughout the corridor to characterize and determine the need for disposal in accordance with State and Federal regulations.

B&L collected composite surface soil samples along the (Ashokan) Rail Trail Corridor. The composite soil samples were collected at three 50-foot intervals along the corridor with the intent of characterizing the soils, within the requested location, to the maximum extent

possible. The sample was submitted to a SGS Accutest for the analysis of semi-volatile organic compounds (SVOCs), using EPA Method 8270D, PCBs using EPA Method 8082A, and RCRA Metals using EPA Method 6010B. Chemical parameter concentrations were compared to the Part 375 Restricted Residential Use Soil Cleanup Objectives (SCOs).

In the analyzed surface sample, the following parameters exceeded the applicable NYSDEC Part 375 SCOs for Restricted-Residential Use:

Surface Soil Exceedances:

- Benzo(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Chrysene
- Dibenzo(a,h)anthracene
- Ideno(1,2,3-cd)pyrene

There were no PCB detections in the sample.

The result of this sampling was to keep the soil / materials on site and to cap the soil. It is expected this situation will exist along this section of the corridor.

Disposition of soil that may contain contaminants

During the preliminary design of this alternative, if progressed, detailed survey and design care would provide the designer with more precise quantities that need to be removed and locate areas where this material could remain on-site. Options include berms to aid in noise abatement from Route 28 and to shield the trail from trailside properties such as the recording studio where concern of trail noise has been raised during legislative discussions. This methodology was employed as part of the construction of the ART, saving disposal costs and providing effective natural appearing shielding of traffic noise from Route 28.

Stormwater Management

Given the proposed project would disturbance over 1 acre, it would require conformance with the NYSDEC's State Pollutant Discharge Elimination System (SPDES) General Permit GP-0-25-001 program for stormwater discharges for construction activities. A site specific Stormwater Pollution Prevention Plan (SWPPP) for erosion and sediment control during construction will be required for this project. Under the NYSDEC Construction General Permit (GP-0-25-001),

specific types of trails are categorized under Appendix B, Table 1, meaning they only require an Erosion and Sediment Control SWPPP during construction, rather than a full SWPPP with permanent, post-construction water quality or quantity controls. The Trail Only alternative falls into this category. The Study area is also located within a Municipal Separate Storm Sewer System (MS4) of the towns of Kingston, Woodstock, Hurley, and Ulster. The Towns would review the plan and provide comment and/or approve the plan by signing the MS4 SWPPP Acceptance Form once they are satisfied.

Environmental Permit Summary

The following list includes the permits that are expected to be required if this alternative is pursued. Further coordination with all permitting agencies must be pursued during the design stage to confirm the need of these permits, and the potential for others not listed.

- USACE Section 404 Permit and corresponding NYSDEC Section 401 Water Quality Certification for any disturbances to the unmapped stream
- NYSDEC Article 24 Permit for disturbance to the 100 ft. buffer of NYSDEC Wetland KW-3.
- Eagle Disturbance Take (General Permit) may also be required if it is found during the habitat assessment that the Study area is within 660 feet of an active bald eagle nest.
- NYSDEC SPDES (General Permit 0-25-001) Permit for ground disturbance greater than 1 acre. Including MS4 SWPPP Acceptance by the local municipalities.

Summary

The Trail Only alternative repurposes the existing railroad corridor into a multi-use trail by removing the existing railroad infrastructure and constructing the trail within the existing railroad footprint. The corridor generally provides sufficient width to accommodate the proposed trail, with localized excavation and grading is required in fill sections where additional width is needed. Construction would primarily consist of rehabilitating the existing railroad prism, widening the top of the Stony Hollow Fill section by removing approximately 3 ft' of material, installing a new trail base and top course, and modifying the existing railroad bridge over Beesmer Road for pedestrian use. Additional structural evaluation would be required to verify the bridge's condition, load-carrying capacity, and suitability for conversion to trail use. Environmental impacts are anticipated to be limited and can generally be avoided or minimized through standard design and construction practices. Primary environmental considerations include seasonal tree-clearing restrictions to protect federally listed bat species, coordination with SHPO, management of residual railroad-related contaminated materials encountered during construction, implementation of erosion and stormwater controls, and environmental permitting for work within wetland buffers and near the unmapped intermittent stream, if required.

Cost

The cost of this alternative is estimated to be \$4,076,600 including preliminary and detailed engineering, design reports, permitting, construction and construction inspection in 2030 dollars. As with each alternative, cost estimates are based on prevailing wage labor and public bid material pricing for consistency. See Table 3 below.

Table 3 – Trail Only Estimation Summary

Construction Items	Trail Only
Clearing and Grubbing	\$50,000
Rail, Hardware and Tie Removal and Disposal	\$384,000
Earthwork	\$494,000
Trail Base & Top Course, Geotextile	\$710,000
Drainage/ Storm Water Management	\$102,000
Fencing/ Landscaping/Benches/interpretive panels	\$175,000
Stream and Water Protection	\$143,000
Beesmer Road Railroad Bridge Minor Rehab	\$150,000
Parking Area/ Trailhead, Kiosk, approx. 12 - 14 Pking. Spaces	\$210,000
Subtotal Construction Costs	\$2,418,000
Right of Way – Subject to Deed and Title Research	\$225,000
Contingencies, Field Change Payment, and Mobilization (20%)	\$483,600
Subtotal (2026 Dollars)	\$3,126,600
Engineering/Survey	\$250,000
Construction Inspection/ Administration	\$250,000
Inflation (2030) at 3% Per Year (approx.)	\$450,000
TOTAL ESTIMATED COST	\$4,076,600

4.4 Rail-Only Alternative Analysis

The Rail-Only alternative consists of rehabilitating the existing railroad tracks and ties to support rail operations while maintaining the corridor exclusively for railroad use. This alternative assumes that the existing track infrastructure would remain in its existing location and be restored and/or improved to meet the requirements of an FRA Class 1 track. In accordance with Title 49 Code of Federal Regulations (CFR) Part 213 Track Safety Standards, an FRA Class 1 track is a regulatory track classification limited to a maximum operating speed of 15 mph for passenger trains and 10 mph for freight trains. Tourists and excursion railroads frequently use

this type of track classification for scenic operations. The cost estimates, proposed improvements, and design parameters for this alternative will be consistent with FRA Class 1 designation and American Railway Engineering and Maintenance-of-Way Association (AREMA). The work analyzed and estimated is based on fully restoring the tracks and infrastructure for long term sustainable use by any Class 1 operation.

Railroad Rehabilitation

Based on field observations, future rail operations would require track rehabilitation, including replacement of 100% of the ties, approximately 10% of the rail, spikes, bolts and associated hardware, ballast and base course stone, drainage improvements, and minor rehabilitation of the Beesmer Road Bridge.

For planning-level cost estimating, the following assumptions were applied:

- 100% of existing wood ties will be replaced, including associated hardware (spikes) and rail tie bar hardware. Replacement ties are assumed to be quality-controlled recycled ties obtained from authorized suppliers, consistent with industry practice. The use of recycled ties brings in recycling opportunities for 1/3 of the price of new ties and the associated environmental benefit. This was discussed with the Catskill Mountain Railroad who then provided sources and pricing of the ties and spikes. B&L verified the information, cross referenced with NYSDOT data, and included these items in the cost estimate.
- Approximately 10% of the rail and steel plate tie bars and anchor plates will require replacement. This includes all bolts, nuts and washers. The remaining 90% of the existing rail is assumed to be suitable for reuse following rehabilitation. Based on discussions with representatives of the Catskill Mountain Railroad, the corridor primarily consists of 90-lb and 105-lb rail, with approximately 3,200 ft. of 105-lb rail at the eastern end of the section. Where rail replacement is required, 115-lb rail is preferred and replacement rail could be obtained, at no charge, from existing Ulster County stockpiles or salvaged from other sections of the U&D Corridor as available. The County, by resolution, has rail stockpiled for this purpose.
- Existing ballast will remain in-place with new ballast topping the original material.
- 100% of the existing track materials will be removed and stored during construction. Following placement and compaction of the stone ballast base course, reusable rail and associated hardware will be reinstalled. Replacement materials will be furnished and installed in accordance with the rehabilitation assumptions outlined above.

Structure Modifications

The structural condition and load-carrying capacity of the Beesmer Road bridge should be further evaluated to determine its suitability for continued rail service and identify any rehabilitation needs. Concrete coring or non-destructive testing are typical for bridges of this style and age but not part of this feasibility study. For purposes of this study, a line item for minor rehabilitation will be included in the cost estimate.

Potential Environmental Impacts and Mitigation Measures

The Rail Only alternative has the least potential to impact the environment as the impacts will focus around maintaining and improving the existing railroad infrastructure. However, many of the potential impacts remain the same as Trail Only alternative.

Wetlands and Surface Waters

No impacts to the Praymaher Brook crossing are anticipated unless the culvert needs to be repaired or replaced. The unmapped intermittent stream observed flowing directly adjacent to the existing railroad tracks may be impacted temporarily by construction under this alternative to improve drainage flow through the rock cut areas.

Endangered and Threatened Species

The least number of trees would need to be cut to progress the Rail Only alternative as the Stony Hollow Fill area would not require the removal of the top few feet of material to widen the section. All restrictions from discussed in the Trail Rail Only alternative apply for to the Rail Only alternative as well.

Environmental Permit Summary

The following list includes the permits that are expected to be required if this alternative is pursued. Further coordination with all permitting agencies must be pursued during the design stage to confirm the need of these permits, and others not listed.

- USACE Section 404 Permit and corresponding NYSDEC Section 401 Water Quality Certification for any disturbances to the unmapped stream
- NYSDEC Article 24 Permit for disturbance to the 100 ft. buffer of NYSDEC Wetland KW-3.
- Eagle Disturbance Take (General Permit) may also be required if it is found during the habitat assessment that the Study area is within 660 feet of an active bald eagle nest.
- NYSDEC SPDES (General Permit 0-25-001) Permit for ground disturbance greater than 1 acre.

Summary

The Rail-Only alternative rehabilitates the existing railroad corridor while maintaining the corridor exclusively for railroad operations. Construction would primarily consist of removing the existing track infrastructure, replacing 100% of the railroad ties and associated hardware, replacing approximately 10% of the rail and associated track hardware, providing new ballast, and reinstalling the reusable rail along with the new rail and associated track components. The rehabilitation is intended to restore the corridor for the long term to meet the requirements of an FRA Class 1 track in accordance with applicable FRA and AREMA standards. Additional structural evaluation would be required to verify the bridge's condition, load-carrying capacity, and identify any rehabilitation needs for continued rail service. Potential impacts can largely be avoided or mitigated through standard design and construction practices. Environmental permitting and agency coordination would be required for work near wetlands, the unmapped stream, and any protected wildlife habitat.

Cost

The preliminary cost for the Rail-Only alternative is estimated at \$4,446,850 in 2030 dollars, including engineering, permitting, construction, and construction inspection. The estimate is based on the assumptions and conceptual improvements described throughout this section. Costs are based on prevailing wage labor rates and public bid material pricing to provide a consistent basis for comparison. The primary cost driver is railroad rehabilitation, including replacement of railroad ties, selective rail and track hardware replacement, with additional costs associated with track removal and reinstallation, drainage improvements, and minor rehabilitation of the existing Beesmer Road railroad bridge See Table 4 below.

Table 4 – Rail Only Estimation Summary

Construction Items	Rail Only
Clearing and Grubbing	\$50,000
Track and Hardware Remove and Store	\$143,000
Tie Removal and Disposal	\$250,000
Earthwork	\$141,000
Railroad Rehabilitation	\$2,100,000
Drainage/ Storm Water Management	\$95,000
Stream and Water Protection	\$50,000
Beesmer Road Railroad Bridge Minor Rehab	\$150,000
Subtotal Construction Costs	\$2,979,000
Right of Way – Assumed to be minor clerical discrepancies	25,000

Contingencies and Field Change Payment and Mobilization (15%)	\$446,850
Subtotal (2026 Dollars)	\$3,450,850
Engineering/Survey	250,000
Construction Inspection/ Administration	250,000
Inflation (2030) at 3% Per Year	\$496,000
TOTAL ESTIMATED COST	\$4,446,850

4.5 Rail-with-Trail Scenario Analysis

The Rail-with-Trail Alternative consists of constructing a multi-use trail and a rehabilitated railroad within the same corridor. Under this alternative, railroad may be relocated within the existing corridor width to accommodate both facilities while maintaining the necessary safety clearances between rail operations and trail users. In general, the proposed concept centers the railroad and trail within the existing corridor to maximize use of the existing rail bed while minimizing impacts to adjacent features.

At the Beesmer Road crossing, the railroad would use the existing alignment to utilize the existing railroad bridge. Because the bridge width is insufficient to accommodate both the railroad and a multi-use trail, a separate pedestrian trail bridge would be required to be constructed adjacent to the railroad bridge.

Beyond this crossing heading west, three (3) Rail-with-Trail alignment options were developed for comparative evaluation. Each alternative represents a different approach to accommodating both the railroad and trail within the corridor while balancing constructability, environmental impacts, and overall project cost. The option with the rail on the west side, was deemed the most feasible and cost effective.

Typical Rail With Trail Section

The typical Rail-with-Trail section consists of the railroad located on the west side of the corridor and the multi-use trail on the east side. The trail generally follows the typical section described previously, consisting of a 10 ft. wide multi-use trail with 2-foot shoulders on each side.

Beginning at Route 28A and heading west the corridor climbs in elevation approaching the high fill area known as the Stony Hollow Fill. In these elevated sections, drainage ditches adjacent to the corridor at the top of the fill are generally not required; however, a minimum 5 ft. setback is recommended to ensure the track is not located directly adjacent to a steep embankment slope. On the trail side, a shoulder or graded recovery area is required where steep fill slopes

are present if no physical barrier can shield an errant user from the slope. If sufficient space cannot be accommodated due to site constraints, a safety fence or barrier should be considered along the trail edge in accordance with applicable design standards.

In the rock cut areas, the design width is set at 40 ft. This width was determined by the B&L team and confirmed during discussions with the CMRR as for the rock cut areas. The rock cut section width is broken down as follows with a figure to help visualize.

- 15 ft. wide dynamic train envelope
- A 4ft. wide clearance area between the railroad dynamic envelope and the rock cut face,
- A minimum 10 ft. horizontal clearance from the railroad track centerline to the edge of the trail mainline.
- A 10 ft. wide multi-use trail with 2ft. shoulders.
- A 4 ft. wide buffer east of the trail for drainage features and buffer space.

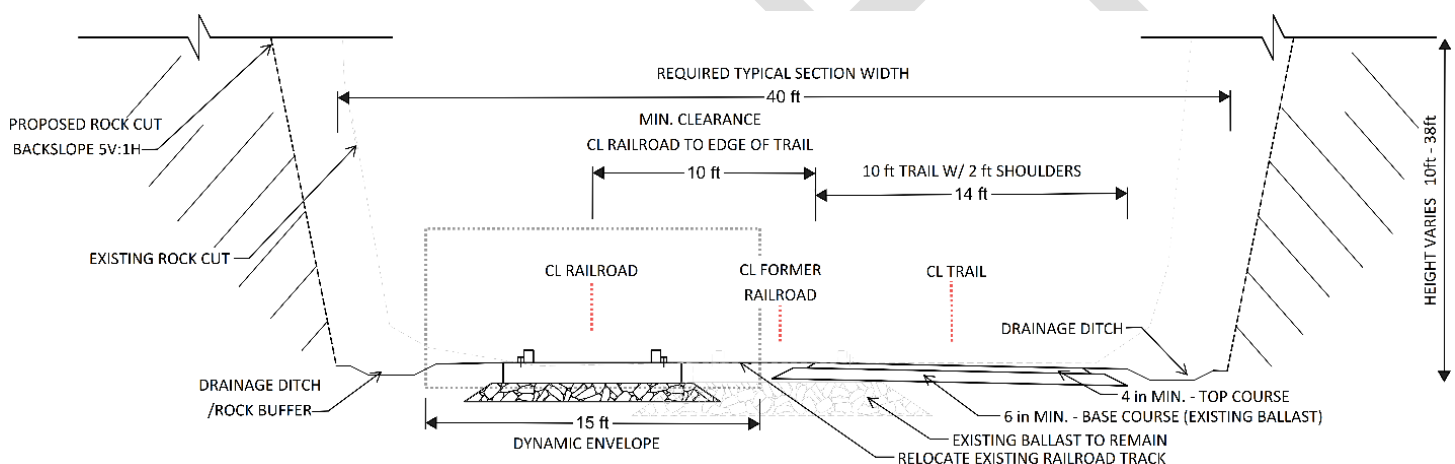


Figure 12 – Rail with Trail Typical Section (Rock Cut Section)

Design Constraints

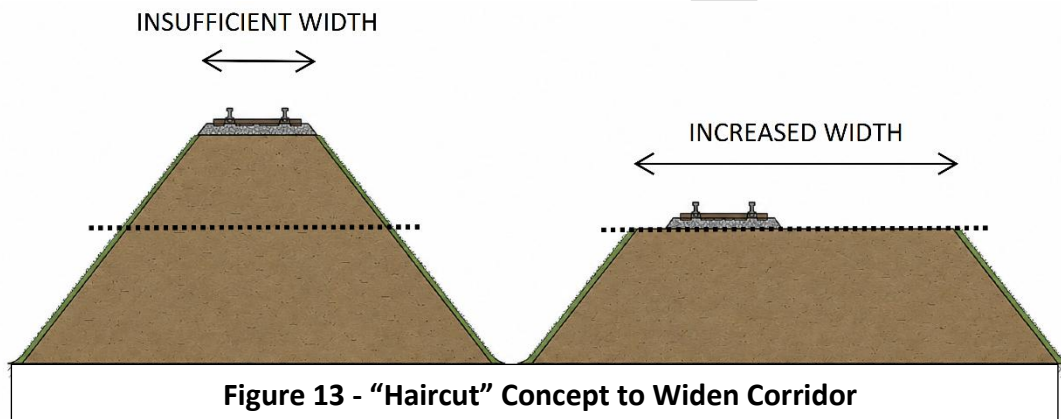
The Rail-with-Trail alternative is constrained by railroad geometric and operational requirements, available corridor width, and adjacent corridor physical features. These factors limit the ability to adjust alignment and require context-specific design solutions to accommodate both rail and trail within the existing corridor.

To address these constraints, several location-specific work strategies would be required along the corridor, they are:

Rail-with-Trail Construction

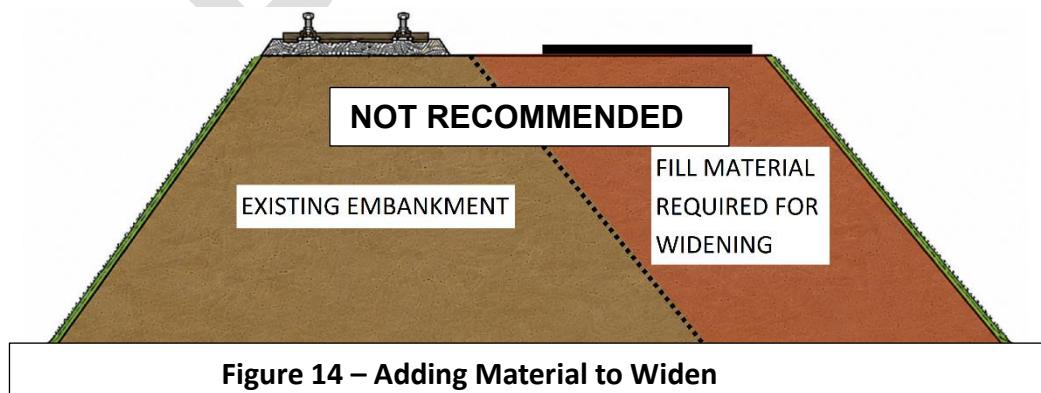
High Fill areas (Stony Hollow):

In the Stony Hollow area, additional corridor width would be achieved by excavating the existing embankment and lowering the elevation, thereby, increasing the width. This “haircut,” approach would require removing approximately 5 ft. up to 8 ft. in material to gain additional usable width for the Rail-with-Trail configuration see Figure 13. This approach works within the existing built-up geometry and eliminates wetland impacts on both sides of the elevated section and allows the existing vegetation to remain in place. To the extent practicable, excavated



material would be retained on site for potential reuse elsewhere within the project corridor such as the approaches to Beesmer Road to provide the material needed to install a new pedestrian bridge and widen the corridor.

Adding material to widen the existing footprint at the existing elevation is not prudent and was dismissed early in the analysis see Figure 14. Significant reasons this option was dismissed include wetland impacts at the bottom of the slope, the need to strip established vegetation and trees from top of the slope to the bottom, embankment stability, and need for material to be trucked in resulting in excess cost and potential environmental impacts.



Beesmer Road Crossing

Horizontal (Lateral) Alignment

Approaching the Beesmer Road crossing, the rail and trail alignments would align with the existing bridge to accommodate the railroad on the existing bridge and the trail would transition eastward. The existing railroad bridge would be retained for rail use; however, due to insufficient width to accommodate a combined rail-with-trail configuration, a separate pedestrian bridge would be required, located adjacent and parallel to the existing railroad. This configuration provides opportunities to make a connection or access point to the system via Beesmer Road, helping to serve the local residents and businesses alike. Bridge See Figure 15. Proceeding north towards Basin Road the rail and trail alignments transition back to the standard 10 ft. offset.

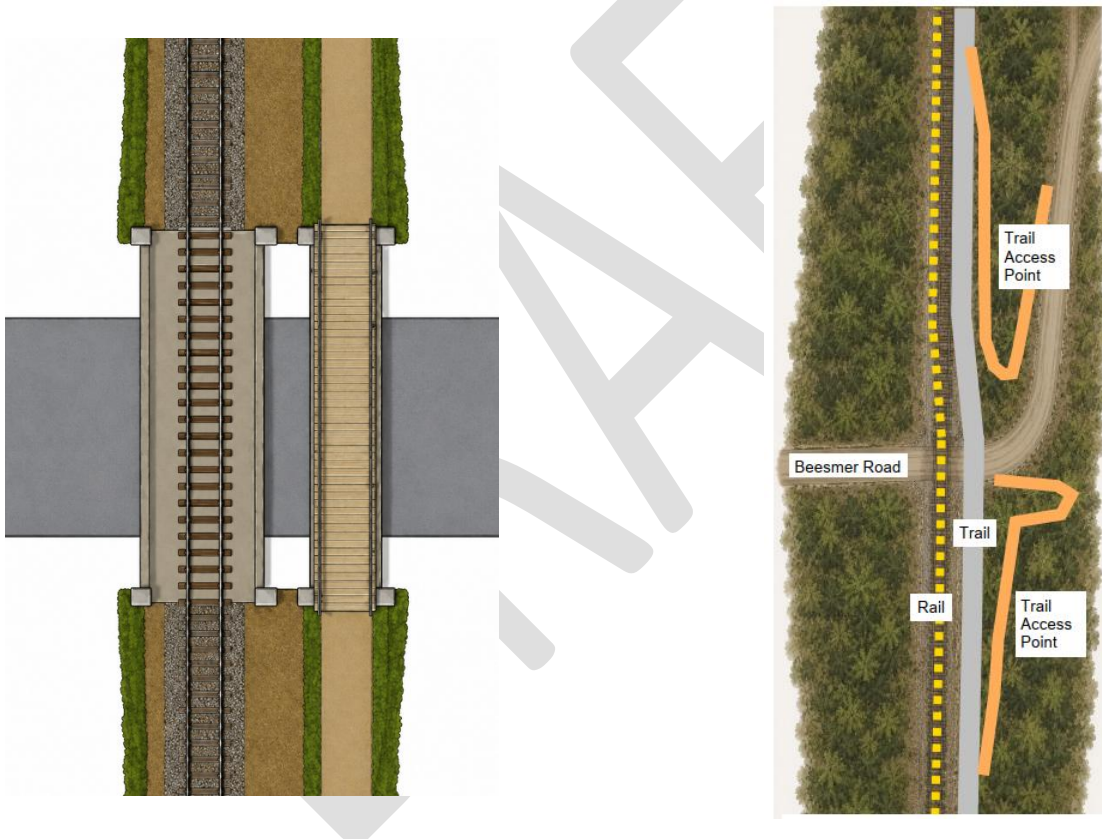


Figure 15 – Plan View Concept at Beesmer Road

Elevation (Vertical)

Approaching Beesmer Road, the rail and trail alignments, lowered by the “haircut,” would need to regain elevation in order to meet the existing bridge retained for the crossing and to navigate a new pedestrian bridge crossing Beesmer Road. In order to route trail users to the new bridge, embankment (or fill) material would be needed to widen the width of the corridor and increase the elevation of the trail to and from the new bridge. The material removed from the Stony

Hollow Fill section would be used to provide this material keeping it on-site for a more efficient and less costly construction. The slopes created by this fill can be constructed at a more forgiving (flatter) grade making it easier to stabilize the material and establish vegetation with no wetlands to impact at the bottom of the fill. Once the trail portion crosses Beesmer Road, the trail will transition horizontally closer to the rail. The concept design maintains a maximum railroad and trail grade of 2.5%.

B&L investigated lowering the track and trail to the elevation of Beesmer Road to eliminate the bridges entirely. With low traffic volumes and low speeds, an at-grade crossing, with additional safety improvements, is viable. However, the maximum grade for tourist rail is 2.5%, and there is not enough distance to make up the change in elevation prior to reaching the rock cut area. Consequently, the recommended action is to utilize the existing structure, install a new pedestrian bridge, and re-purpose the fill material excavated on the corridor.

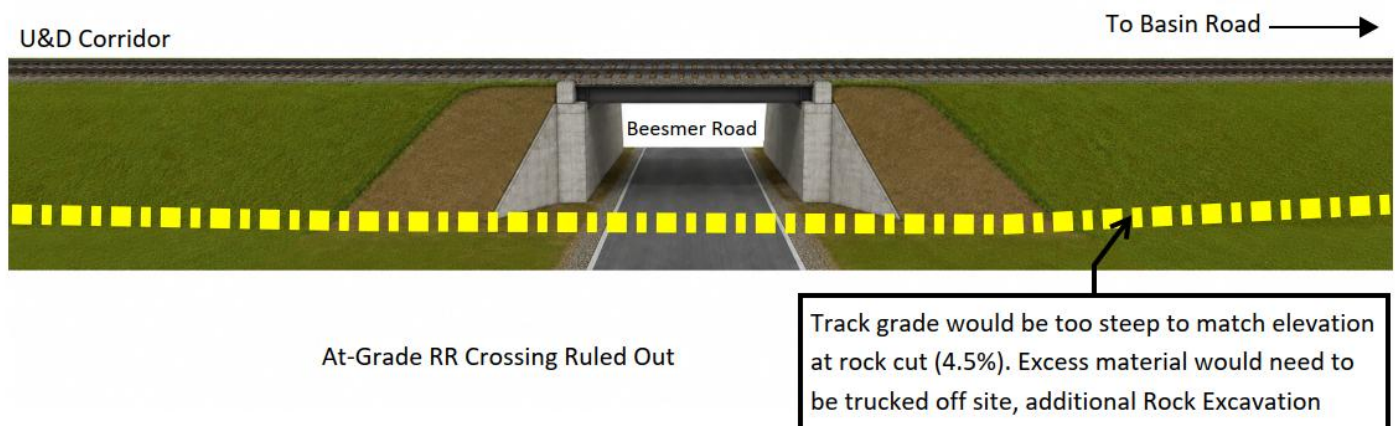


Figure 16 – At-Grade Crossing at Beesmer Road – Not Recommended

Rock Cut Sections:

In the rock cut area, controlled blasting and rock excavation was the selected operation to widen the corridor to accommodate the width necessary for the Rail with Trail configuration. B&L measured the rock width in intervals as short as 15 ft., taking measurements where the existing width changed in order to develop accurate cross sectional data to be used in determining removal requirements. Based on the field measurements portions of the existing rock cut will require widening by 5-10 ft. and include vertical heights of 15 ft. to 38 ft. The rock removal will also require appropriately designed angled backslopes (known as rock cut “batter” of typically 5 ft. vertical to 1 ft. horizontal) to maintain rock stability. Understanding that the cost of rock removal is a relatively high cost, B&L looked at three different alignments and allocation of space in order to minimize rock removal quantities and cost.

Rock Removal Options

Three (3) Rail-with-Trail alignment options were evaluated to determine the most feasible, cost effective, and option that minimized impacts navigating through the constrained rock cut segment. From field observations, and a geologist review, the rock to be removed was determined to be an interbedded shale and sandstone. Based on the New York Department of State Geographic Information Gateway, the geologic map confirms that it is primarily dark gray shale, dark gray sandstone with traces of limestone, bluestone and dolomite within the Platteville - Ashokan formation.

As part of this evaluation, rock excavation volumes were calculated for each option to quantify the amount of material that would need to be removed and to compare the associated construction costs.

Option 1 – Proposed railroad shifted 8.5 ft. east of the existing track centerline

To achieve the minimum required corridor width of 40 ft., rock excavation would be required on both sides of the corridor, with approximately 3 ft. of rock removal on each side. While this option results in a moderate volume of rock excavation, a disadvantage is that work would be required on both sides of the corridor, increasing the construction effort, requiring twice the effort to achieve access to the top of the rock face, double the number of drilled blasting holes, increased timeline, and disturbance. In addition, rock removal on both sides would require the construction of two (2) rock cut backslopes to meet stability requirements, further increasing excavation quantities, construction complexity, and therefore cost. See Figure 17. The existing shale and sandstone matrix of rock will also likely fracture much deeper than the 3 ft. design removal depth during blasting resulting in additional unintended rock removal. This would

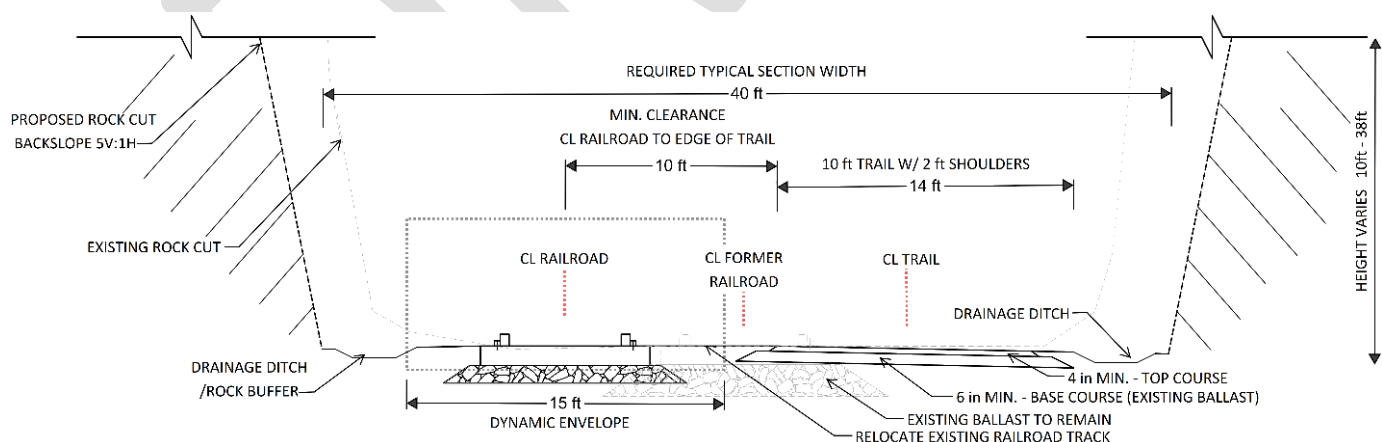


Figure 17 – Railroad Shifted 8.5 ft. West of the Existing Track Centerline

require hauling this excess rock off-site increasing bid prices and increasing the risk for high cost change orders. The height of the rock prohibits removal by ground based machinery in most

cases, so drilling and blasting has been assumed necessary for efficient rock removal and safety reasons. Blasting professionals were consulted to assist in these assumptions.

Option 2 – Railroad remains on existing railroad centerline

To accommodate the necessary corridor width of 40 ft., approximately 10 ft. of rock excavation would be required on one side of the corridor (east side). While this option requires rock removal only from the east side and avoids relocation of the existing railroad, it does not efficiently utilize the available space on the west side of the corridor, resulting in a greater volume of rock excavation see Figure 18.

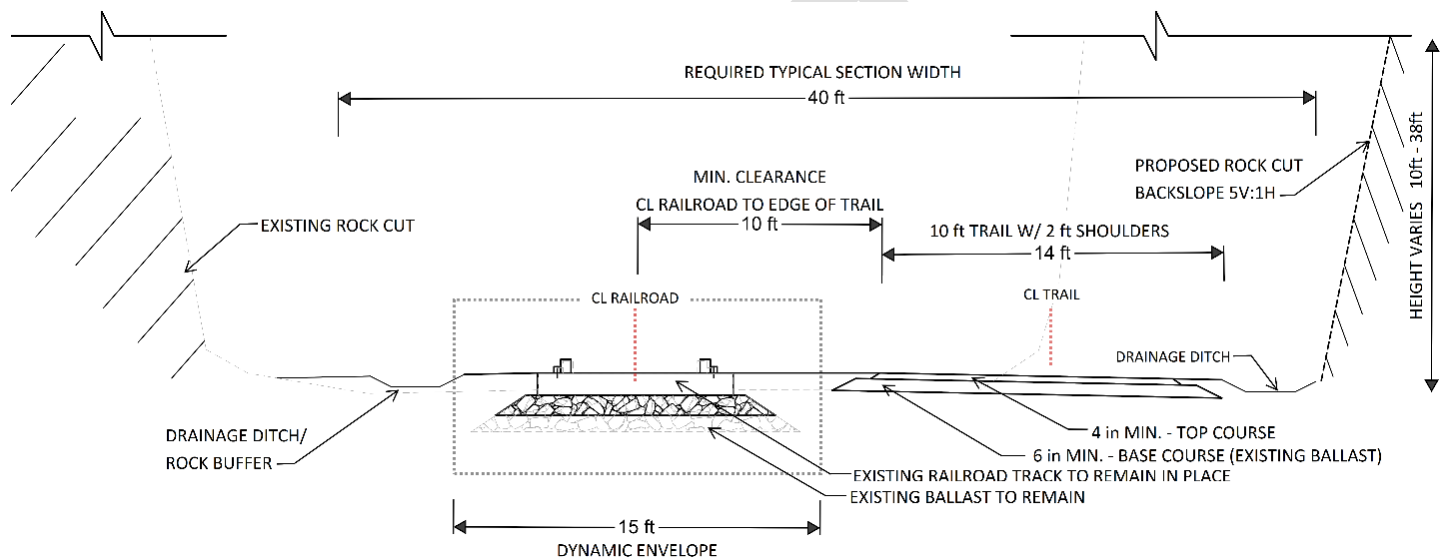


Figure 18 – Proposed Railroad Remains on Existing Railroad Centerline

Option 3 – Proposed railroad shifted 6 ft west of the existing railroad centerline

Under this option, the Rail-with-Trail configuration shifts the tracks approximately 6 ft. west of the existing centerline to better utilize the available corridor width and reduce rock excavation. This adjustment allows the railroad to take advantage of available space on the west side of the corridor and similar to Option 2, requires rock excavation only on the east side of the corridor. Based on field measurements, approximately a 6 ft. width of rock removal will be required. This is the most balanced and least expensive option in terms of rock removal and is the recommended approach. See Figure 19.

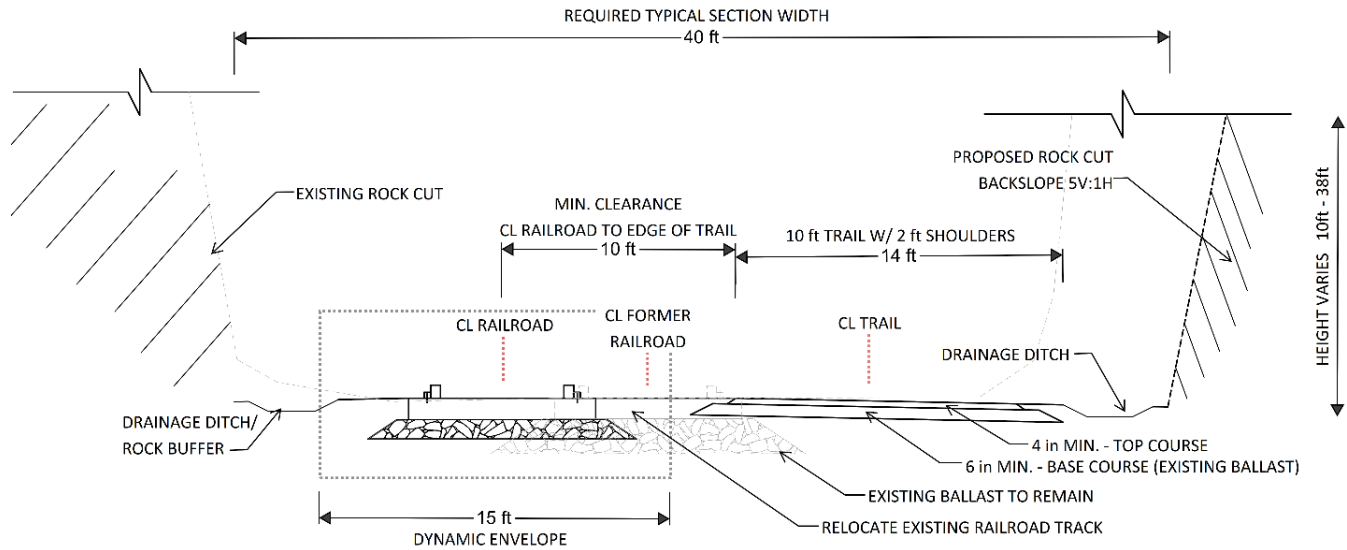


Figure 19 – Proposed Railroad Shifted 6 ft West of the Existing Railroad Centerline

Structure Modification

Potential Environmental Impacts and Mitigation Measures

This alternative has the largest potential environmental impact.

Wetlands and Surface Waters

No impacts to Praymaher Brook are anticipated unless the culvert needs to be repaired or replaced. The culvert appeared to be flowing well and in good condition at the time of this study. The unmapped intermittent stream observed flowing directly adjacent to the existing railroad tracks will be impacted by construction under this alternative. The 100 ft. buffer of NYSDEC Wetland KW-3 will also be directly impacted by this alternative for work to lower the elevation of the railroad and trail. A NYSDEC and USACE joint application permit for stream impacts should be submitted during the design phase of the project to obtain the stream and wetland impact permits.

Endangered and Threatened Species

A significantly greater number of trees would be needed to be cut to progress the Rail with Trail alternative. All impacts and mitigation measures from Trail Only apply to this alternative.

Environmental Permit Summary

The following list includes the permits that are expected to be required if this alternative is pursued. Further coordination with all permitting agencies will need to be pursued during the design stage to confirm the need of these permits, and others not listed.

- USACE Section 404 permit and corresponding NYSDEC Section 401 Water Quality Certification for any disturbances to the unmapped stream.
- NYSDEC Article 24 Permit for disturbance to the 100 ft. buffer of NYSDEC Wetland KW-3.
- Eagle Disturbance Take (General Permit) may also be required if it is found during the habitat assessment that the Study area is within 660 feet of an active bald eagle nest.
- NYSDEC SPDES (General Permit 0-25-001) Permit for ground disturbance greater than 1 acre.

Summary

The Rail-with-Trail alternative accommodates both railroad operations and a multi-use trail within the existing corridor by rehabilitating the railroad and constructing a parallel trail while maintaining appropriate clearances between the two facilities. Construction would primarily consist of rehabilitating the existing railroad infrastructure, constructing a new multi-use trail, modifying the corridor through extensive excavation in the high fill sections and rock cut areas, tree removal, water course impacts, and constructing a new pedestrian bridge over Beesmer Road. Three alignment options were evaluated for the rock cut section, with Option 3, which shifts the railroad approximately 6 ft. west of the existing centerline, identified as the preferred alternative because it minimizes rock excavation and construction costs. Additional structural evaluation would be required to verify the condition and load-carrying capacity of the existing railroad bridge, while the new pedestrian bridge would require final engineering design. Primary environmental considerations include impacts to the unmapped intermittent stream and the NYSDEC wetland buffer, seasonal tree-clearing restrictions to protect federally listed bat species and other protected wildlife, and the implementation of erosion and stormwater controls, environmental permitting, and agency coordination to minimize and mitigate construction-related impacts.

Cost

The estimated cost for Rail with Trail alternative is \$16,314,400 in 2030 dollars, including engineering, permitting, construction, and construction inspection. The estimate is based on the assumptions and conceptual improvements described throughout this section and incorporates the recommended Option 3 for the rock cut removal. The costs are based on prevailing wage labor rates and public bid material pricing to provide a consistent basis for comparison. The primary cost drivers include rock excavation, construction of the new pedestrian bridge at Beesmer Road, railroad rehabilitation, and earthwork associated with widening the corridor. See Table below.

Table 5 – Rail with Trail Estimation Summary

Construction Items	Rail With Trail
Clearing and Grubbing, Tree Removal	\$480,000
Track and Hardware Remove and Store	\$143,000
Tie Removal and Disposal	\$250,000
Earthwork	\$1,440,000
Rock Excavation and Disposal, Permits, Trucking	\$4,242,000
Trail Base & Top Course	\$710,000
Railroad Rehabilitation	\$2,089,000
Drainage/ Storm Water Management	\$102,000
Water Impact Mitigation and Avoidance	\$293,000
Fencing	\$188,000
Beesmer Road Railroad Bridge Minor Rehab	\$150,000
Beesmer Road Pedestrian Bridge	\$1,100,000
Subtotal Construction Costs	\$11,187,000
Right of Way	\$225,000
Contingencies and Field Change Payment and Mobilization (20%)	\$2,237,400
Subtotal (2026 Dollars)	\$13,649,400
Engineering/Survey	\$450,000
Construction Inspection/ Administration	\$400,000
Inflation (2030) at 3% Per Year	\$1,815,000
TOTAL ESTIMATED COST	\$16,314,400

5. Summary

Cost estimates for the alternatives were developed based on recent construction costs for prevailing wage publicly bid projects, NYSDOT standard pay items, Barton & Loguidice's experience in construction costs and required quantities for construction. For rail rehabilitation, unit costs were based on multiple sources including NYSDOT standard pay items, discussions with contractors and material suppliers, and assistance, information, and materials sources, with thanks, to the Catskill Mountain Railroad. Each unit price and material quantity was further supported by internal assumptions and applicable standards and our own B&L backup research.

Trail-Only Cost Estimate - \$4.08 M

Rail-Only Cost Estimate - \$4.45 M

Rail-with-Trail Cost Estimate - \$16.31 M

A few key points of the study include:

- Each alternative, and the options within each, were developed with full objectivity and engineering decisions developed to provide a real solution to the challenges faced.
- Each alternative is feasible to be constructed without environmental factors providing a significant roadblock. In ALL cases, care to protect the environmental resources in this corridor must be a top priority. The designs proposed in this study do their best to protect these resources.
- No influence from outside sources, municipal, media, individuals, advocacy groups or anything else was a factor in the study, its development, estimated costs, etc.
- No wetlands would be impacted as a result of the implementation of any of the alternatives as proposed in this study.
- Earthwork surplus will be placed within the corridor to provide access points, sound barriers, fill material for a pedestrian bridge at Beesmer Road, and other elements.
- Recommendations on the selection of an alternative is not and will not be part of this study.
- Property Impacts will need to be addressed under the alternatives that involve Trail and are discussed in the study. Property Acquisitions will be required under the Trail Only

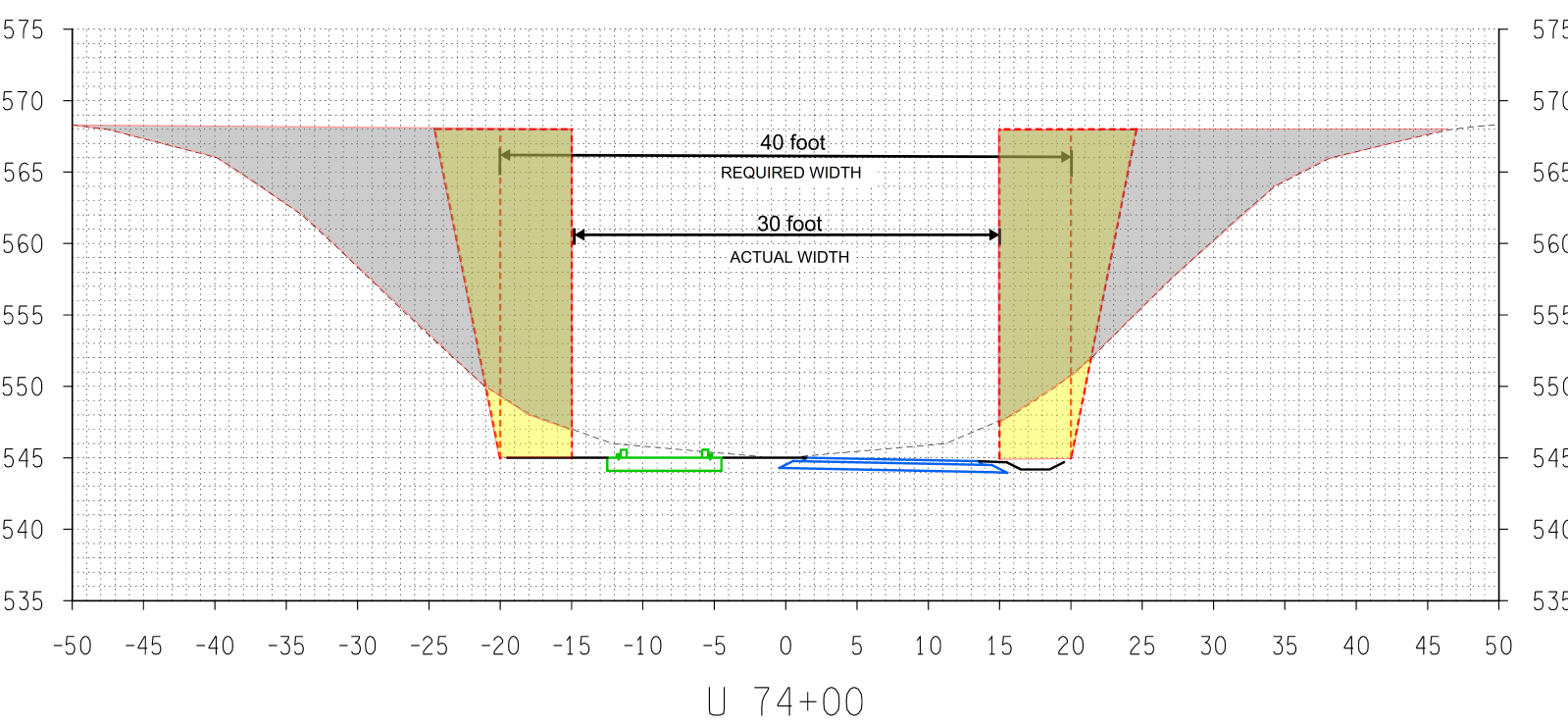
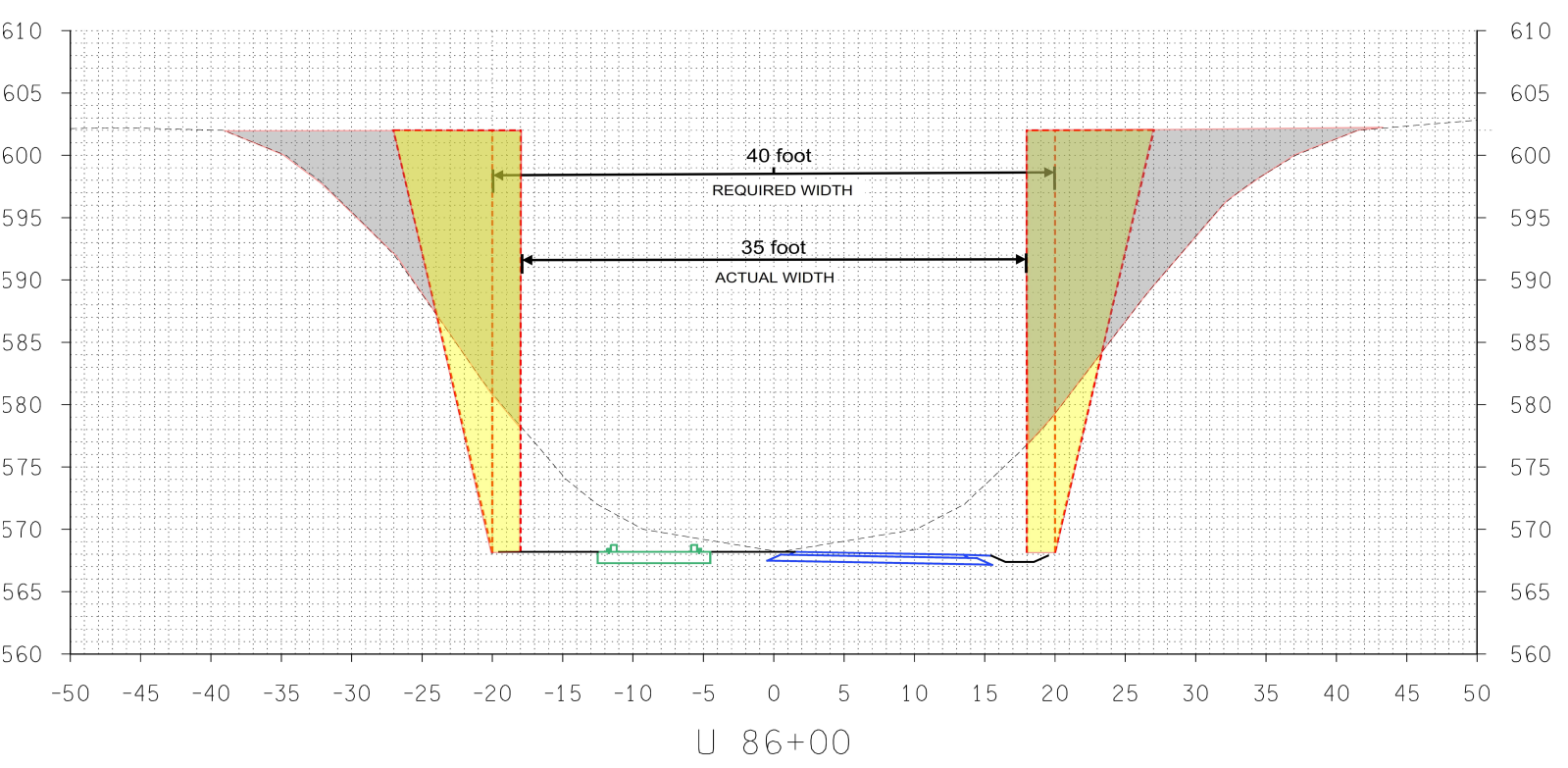
and Rail With Trail alternatives, however, these are relatively straightforward despite the potential research that will be required.

- It is understood by the B&L Team that there may be methods, agreements, grants, in-kind services, volunteers, donations, recycled materials beyond our proposed items, and other factors that could reduce the cost of the implementation of any one alternative. Since these various scenarios and sources are extremely dynamic, the study utilized a common basis for the development of unit prices by using public bid prices based on prevailing wages and funding that includes state and/or federal sources. A few exceptions include the use of recycled ties, rail hardware, and recycled rail.

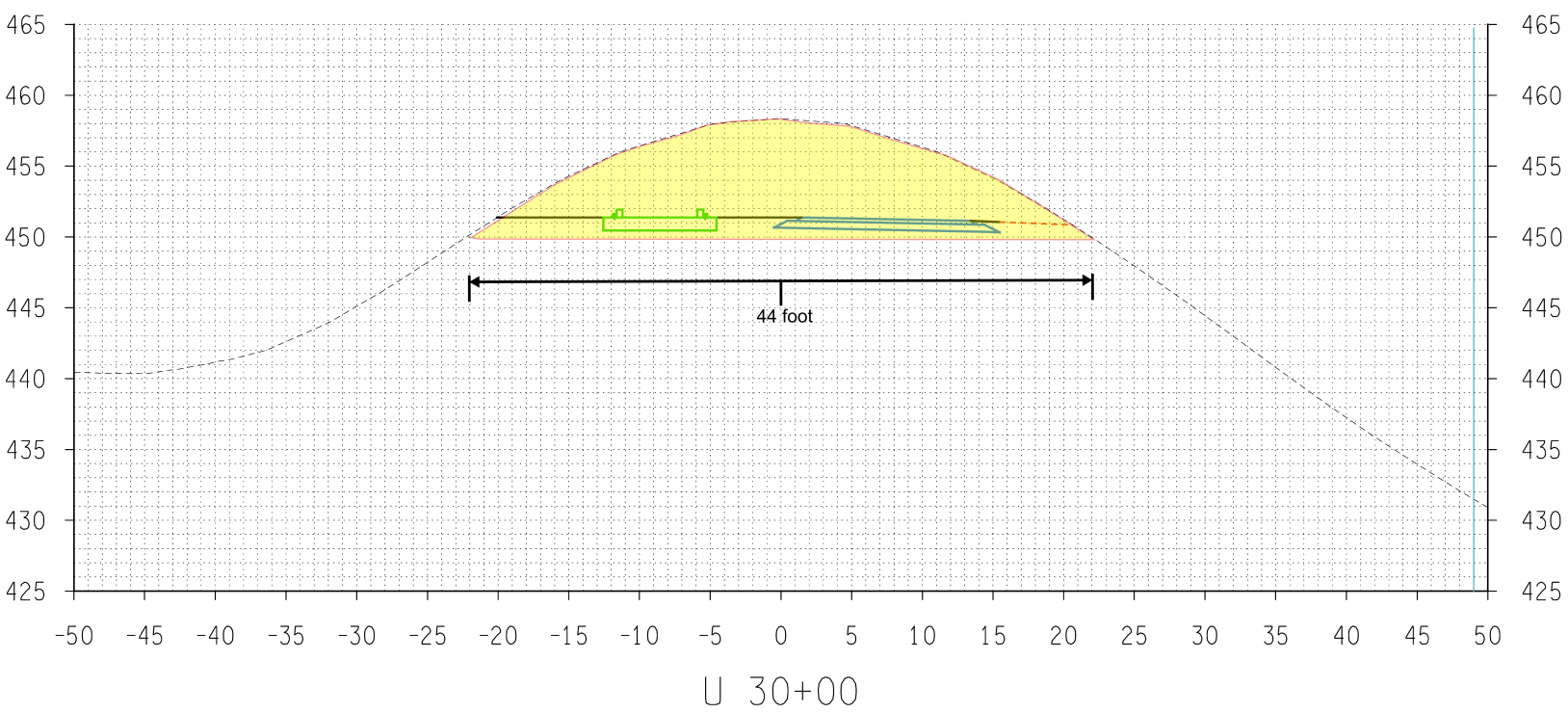
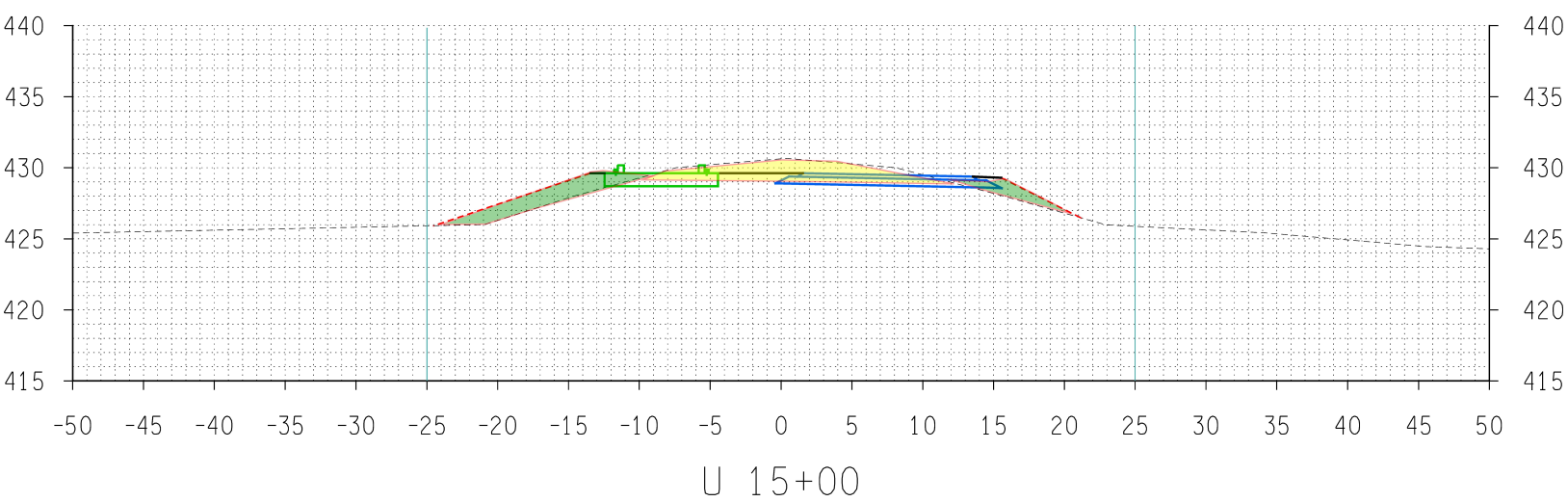
6. Comments and Input

This section is reserved for the post comment period of this DRAFT Submission

APPENDIX A – SAMPLE CROSS SECTIONS (EARTH/ROCK EXCAVATION VOLUMES)



STA	SIDE	H(FT)	W(FT)	A(FT^2)	L	V(FT^3)	CY
60+50	RT	20	6	120	50	6000	222
61+00	RT	28	6	168	200	33600	1244
63+00	RT	15	6	90	50	4500	167
68+00	RT	12	6	72	200	14400	533
70+00	RT	12	6	72	100	7200	267
71+00	RT	17	6	102	300	30600	1133
74+00	RT	23	6	138	100	13800	511
75+00	RT	17	6	102	300	30600	1133
78+00	RT	15	6	90	200	18000	667
80+00	RT	22	6	132	500	66000	2444
85+00	RT	38	6	228	100	22800	844
86+00	RT	34	6	204	200	40800	1511
88+00	RT	30	6	180	50	9000	333

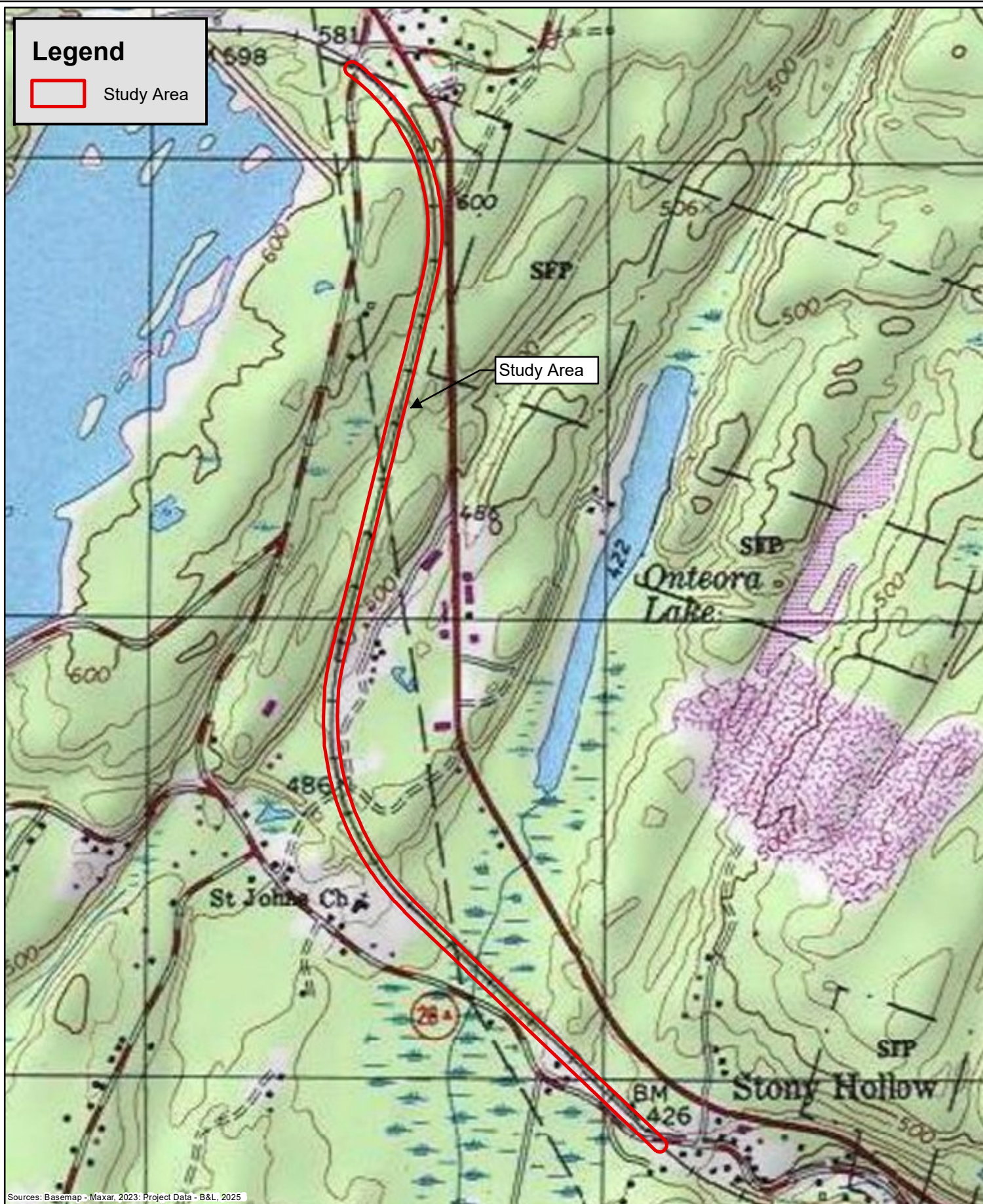


STA	Cut Area SF	Fill Area SF	L ft	Cut Volume CY	Fill Volume CY
10+00	6.16	3	100	23	11
11+00	0	18	50	0	33
11+50	3	20	50	6	37
12+00	19	14	50	35	26
12+50	153	0	100	567	0
13+50	0	37	150	0	206
15+00	17	41	50	31	76
15+50	8	34	100	30	126
16+50	257	0	100	952	0
17+50	663	0	150	3683	0
19+00	419	0	100	1552	0
20+00	244	0	50	452	0
20+50	133	14	50	246	26
21+00	90	57	50	167	106
21+50	88	102	150	489	567
23+00	131	0	50	243	0
23+50	105	0	200	778	0
25+50	161	0	200	1193	0
28+00	146	0	250	1352	0
30+50	125	0	100	463	0
31+50	95	0	250	880	0

APPENDIX B - ENVIRONMENTAL MAPS

Legend

 Study Area



Sources: Basemap - Maxar, 2023; Project Data - B&L, 2025

**Barton
&Loguidice**



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Feet

Ulster County
Undesignated U&D Corridor Development Feasibility Study

Topographic Study Area Map

Ulster County

4/20/2026

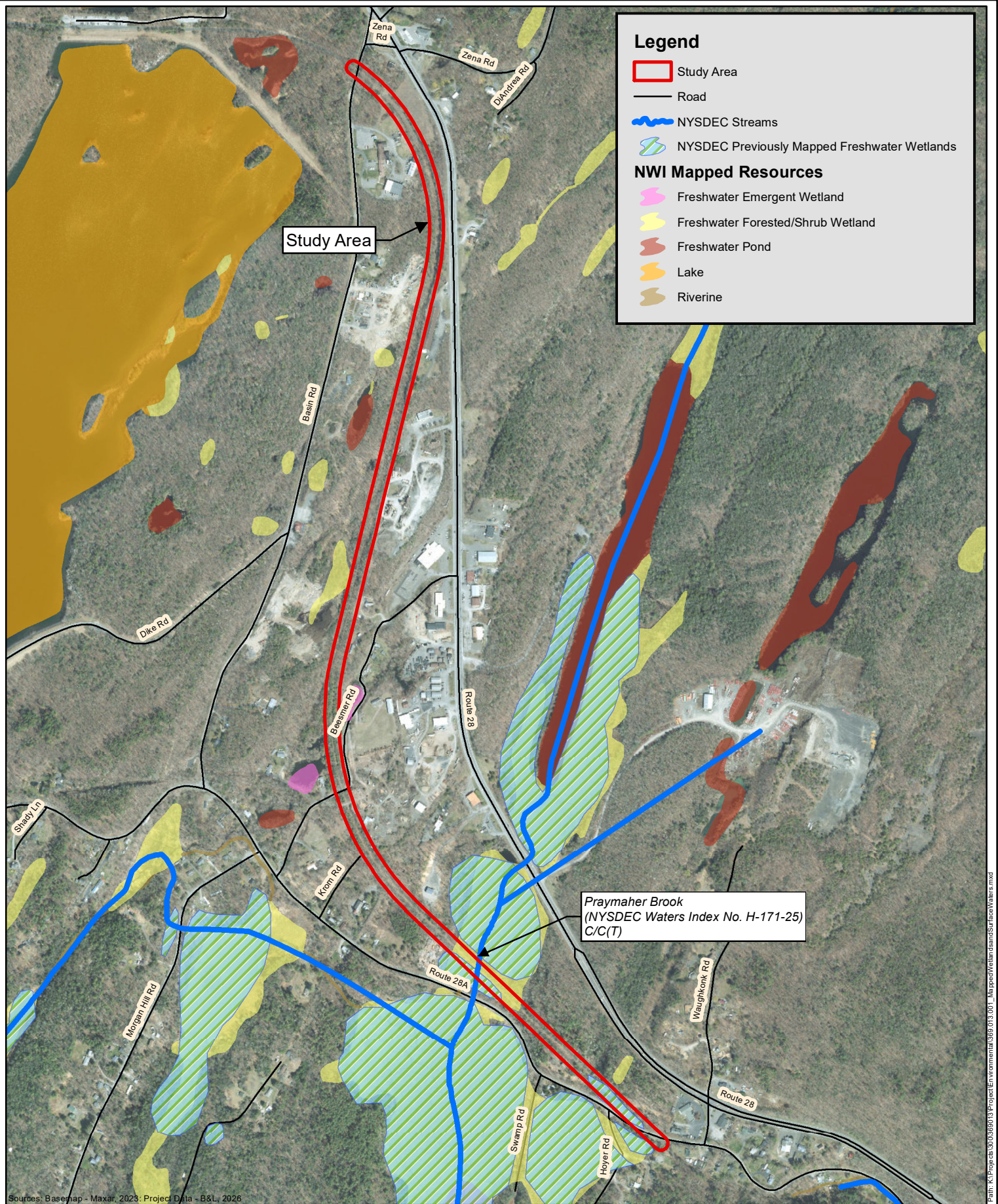
New York

Figure

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Project
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369.013

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Legend

-  Survey Area
-  Road
-  Assumed Wetland
-  Assumed Stream

Survey Area

Bash Rd

Dike Rd

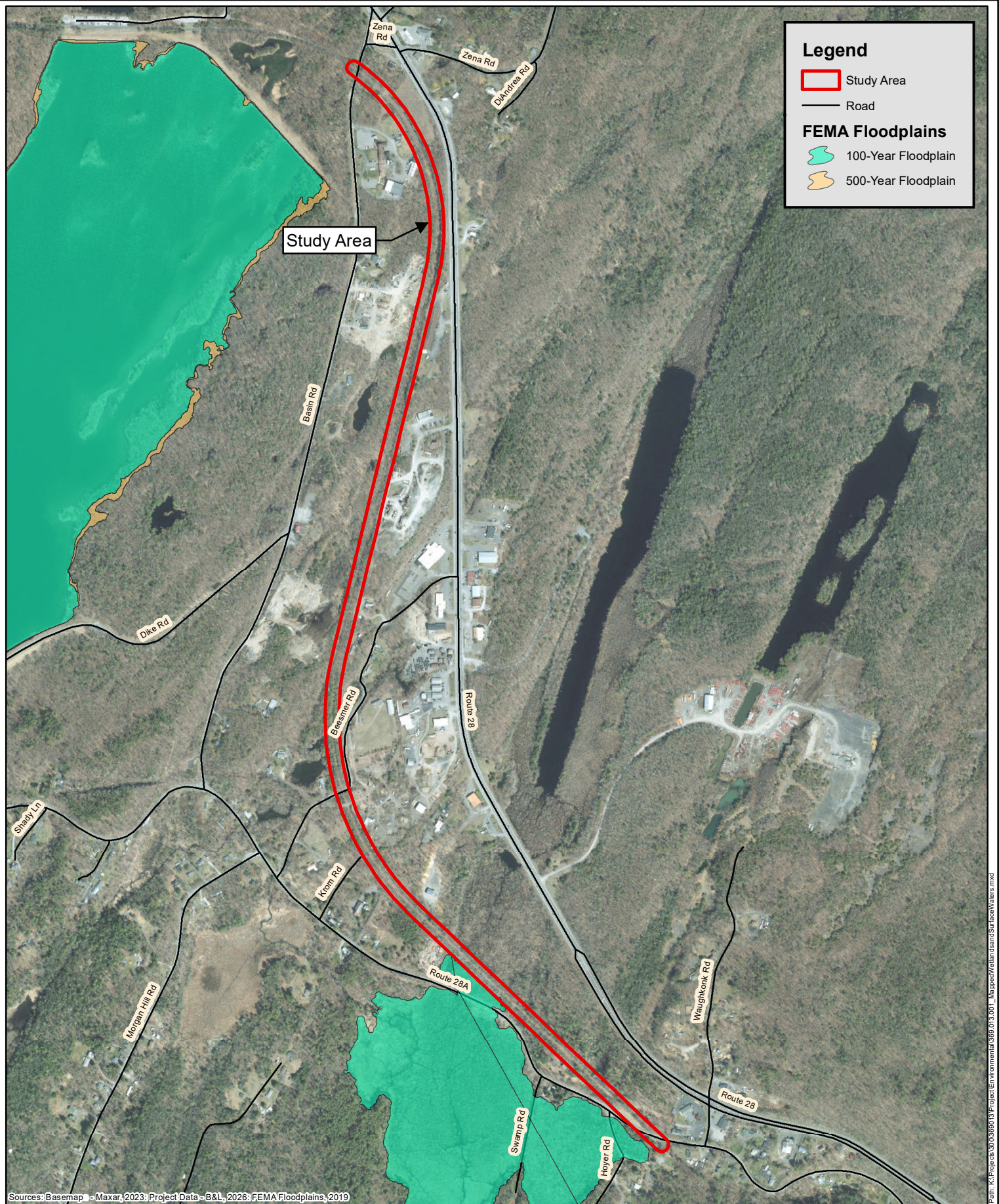
Route 28

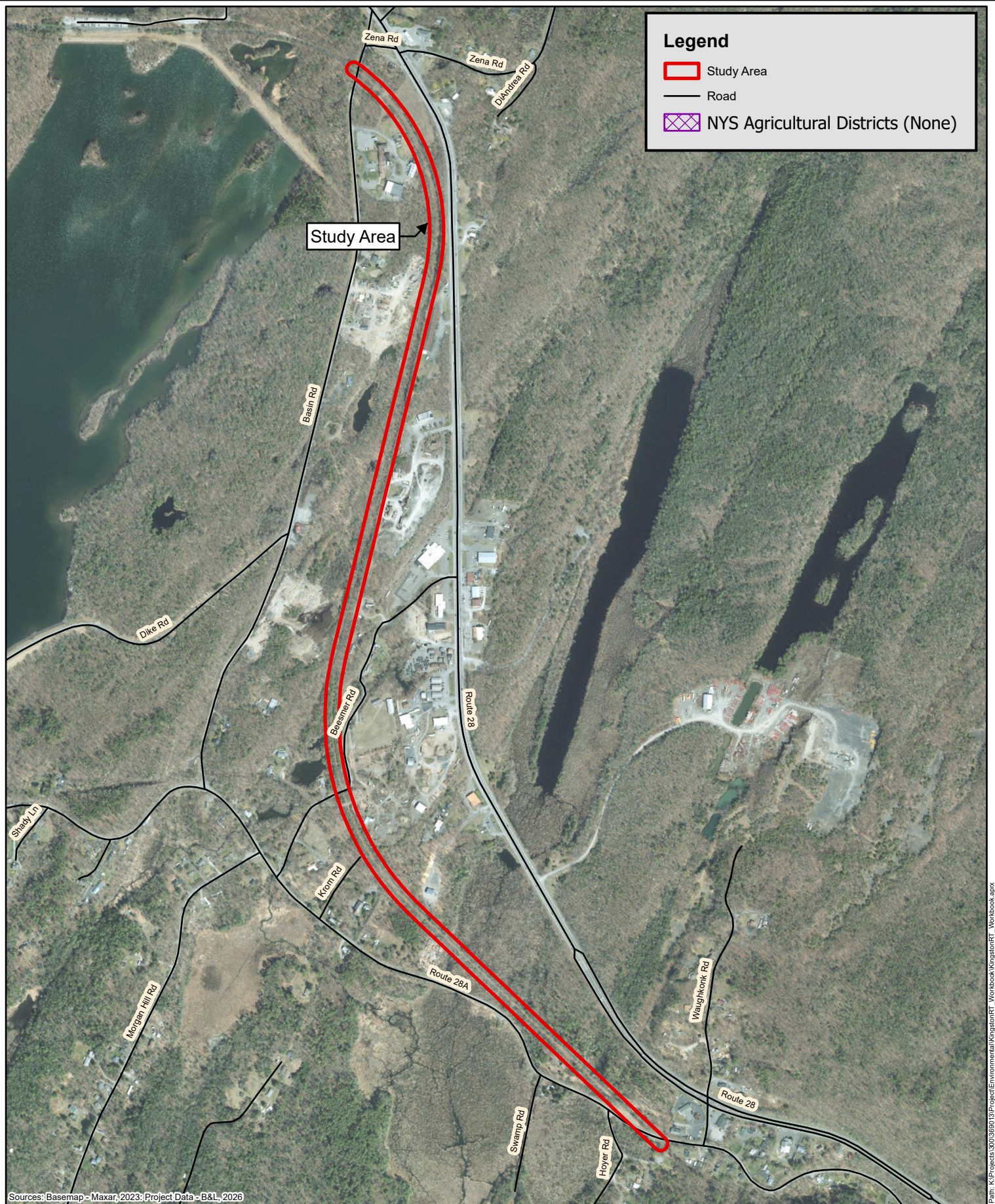
Beecher Rd

Route 28A

Sources: Basemap - Maxar, 2023; Project Data - B&L, 2026





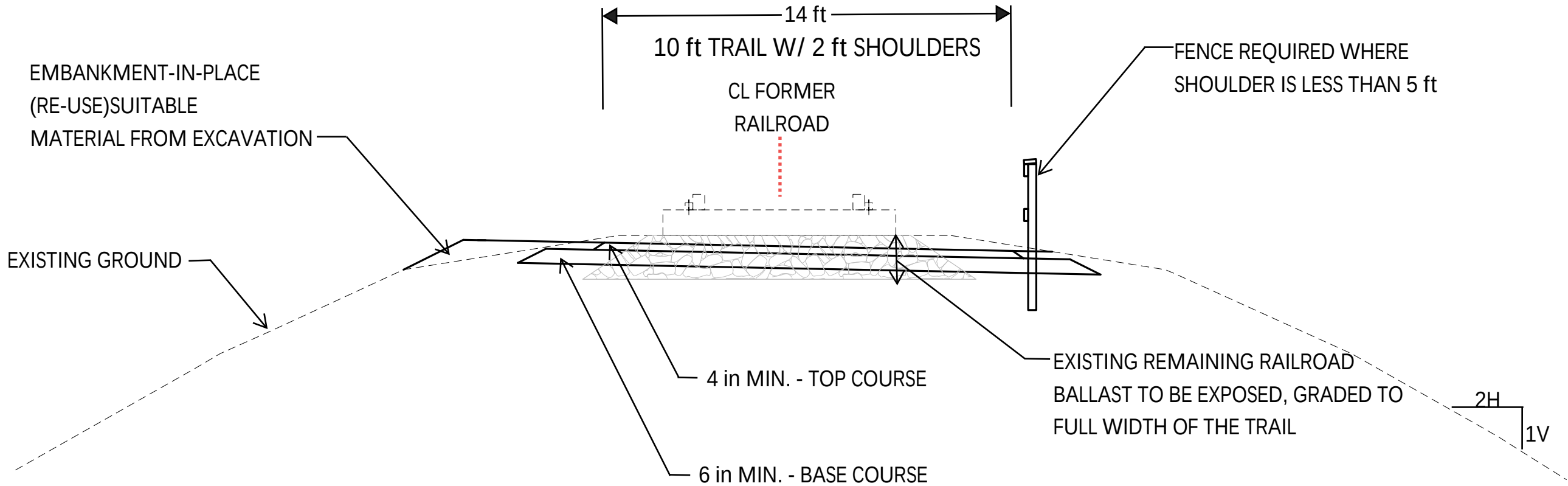


Sources: Basemap - Maxar, 2023; Project Data - B&L, 2026



APPENDIX C – TYPICAL SECTIONS

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ULSTER COUNTY			
TRAIL ONLY FILL SECTION			
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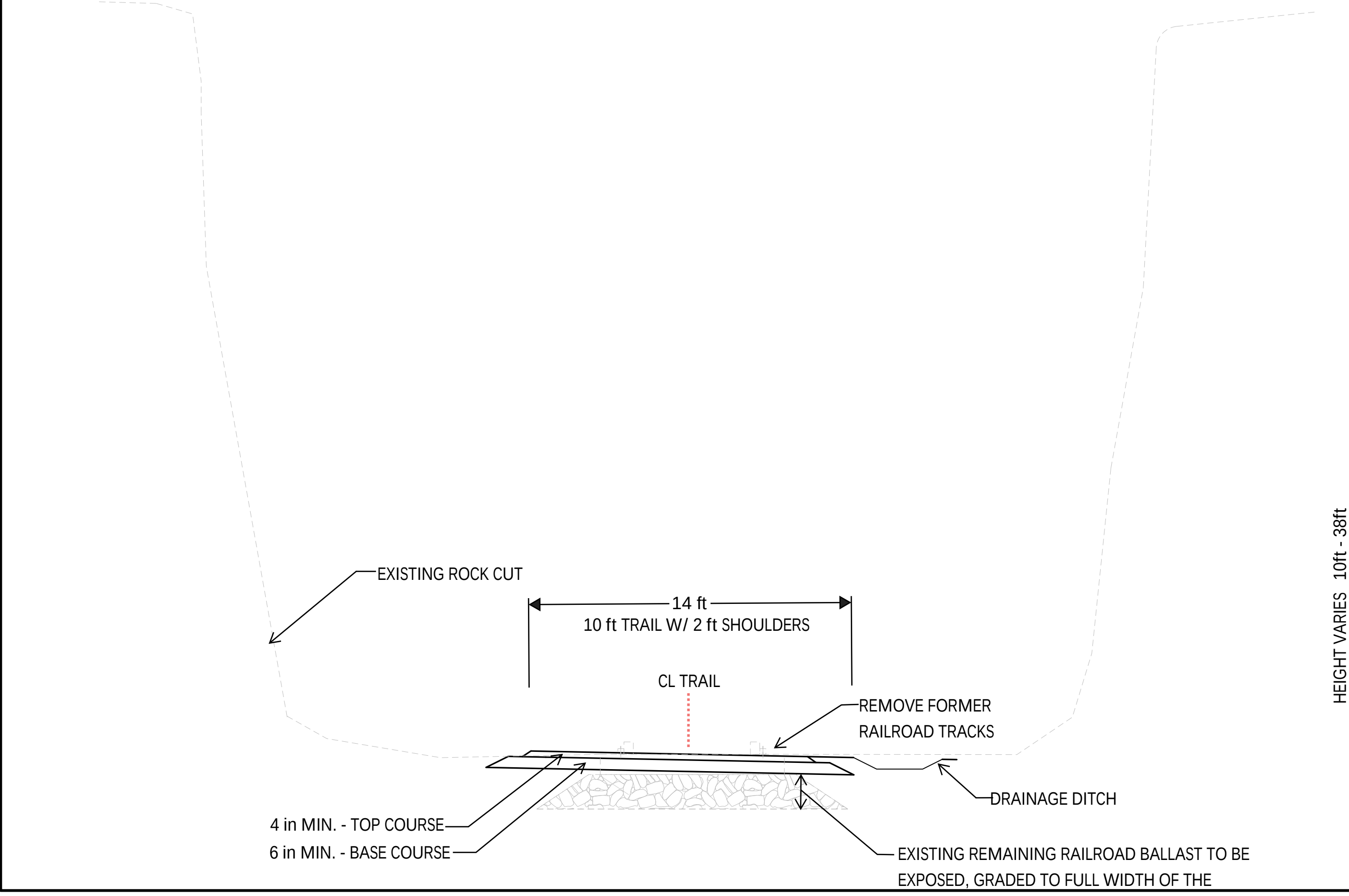


Seal of Ulster County, New York

Barton & Loguidice

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ULSTER & DELAWARE STUDY

TOWN OF ULSTER

ULSTER COUNTY

TRAIL ONLY CUT SECTION

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DATE ISSUED: 06/17/26

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ULSTER COUNTY

SEAL OF ULSTER COUNTY

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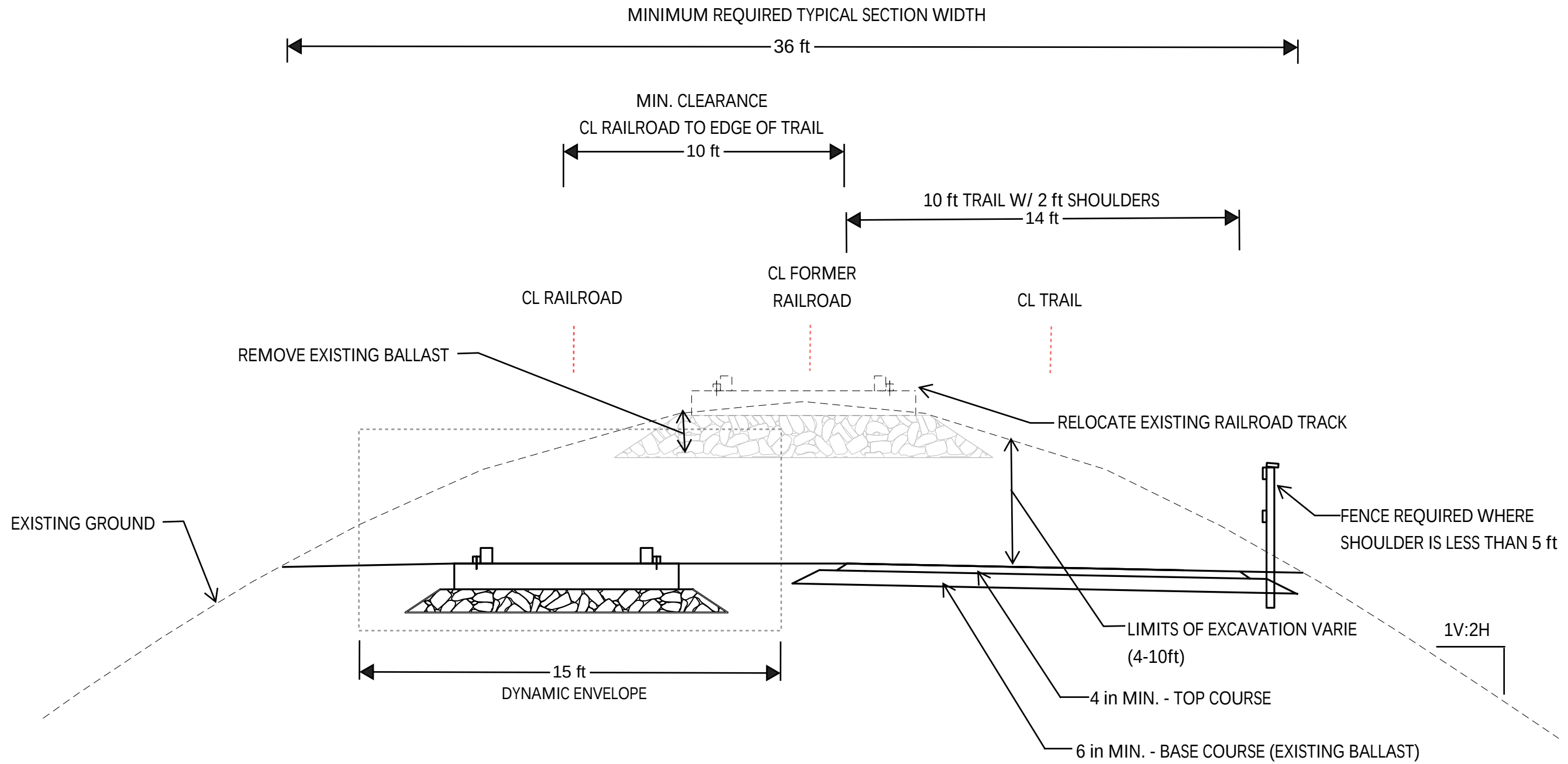
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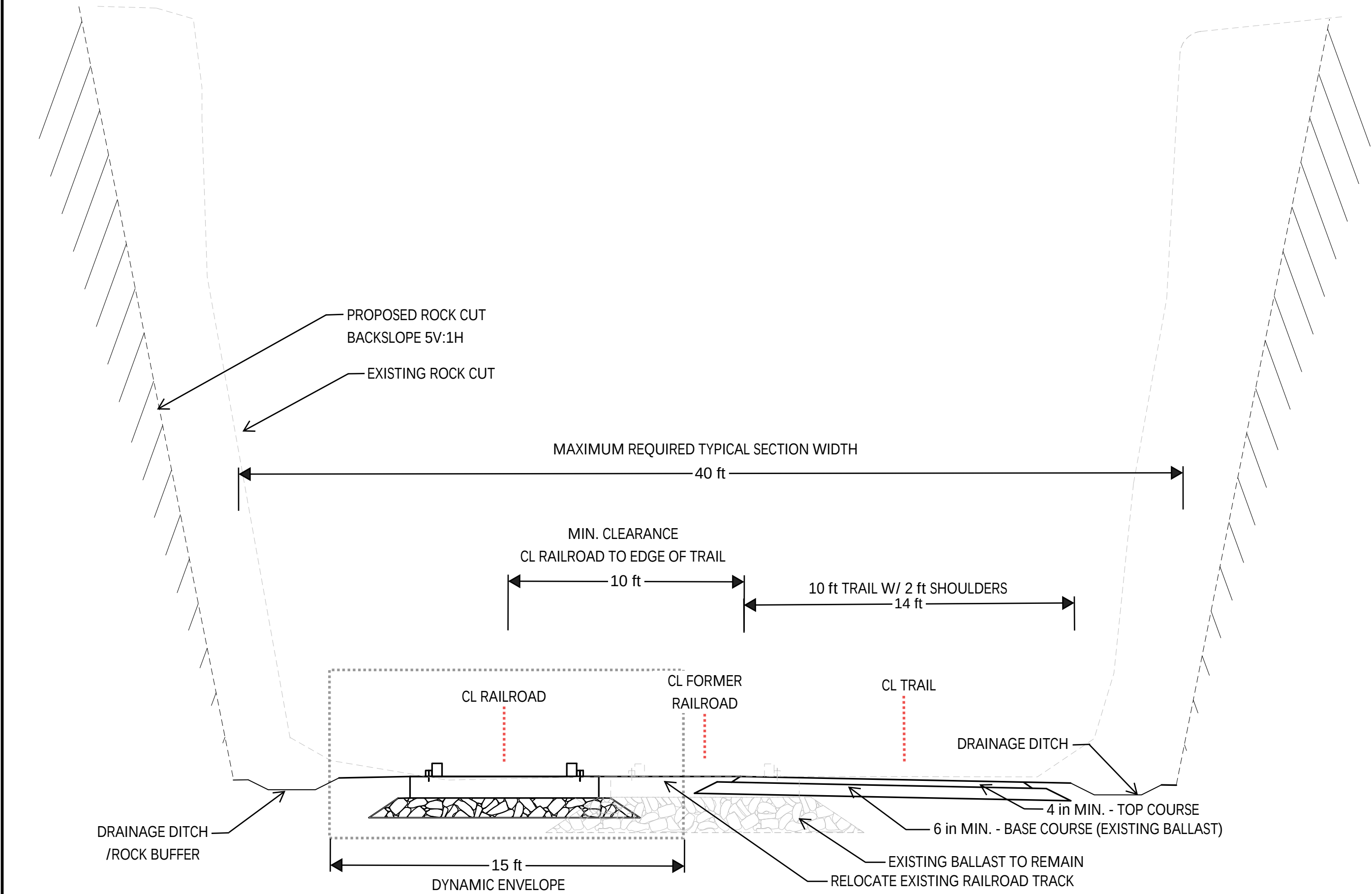
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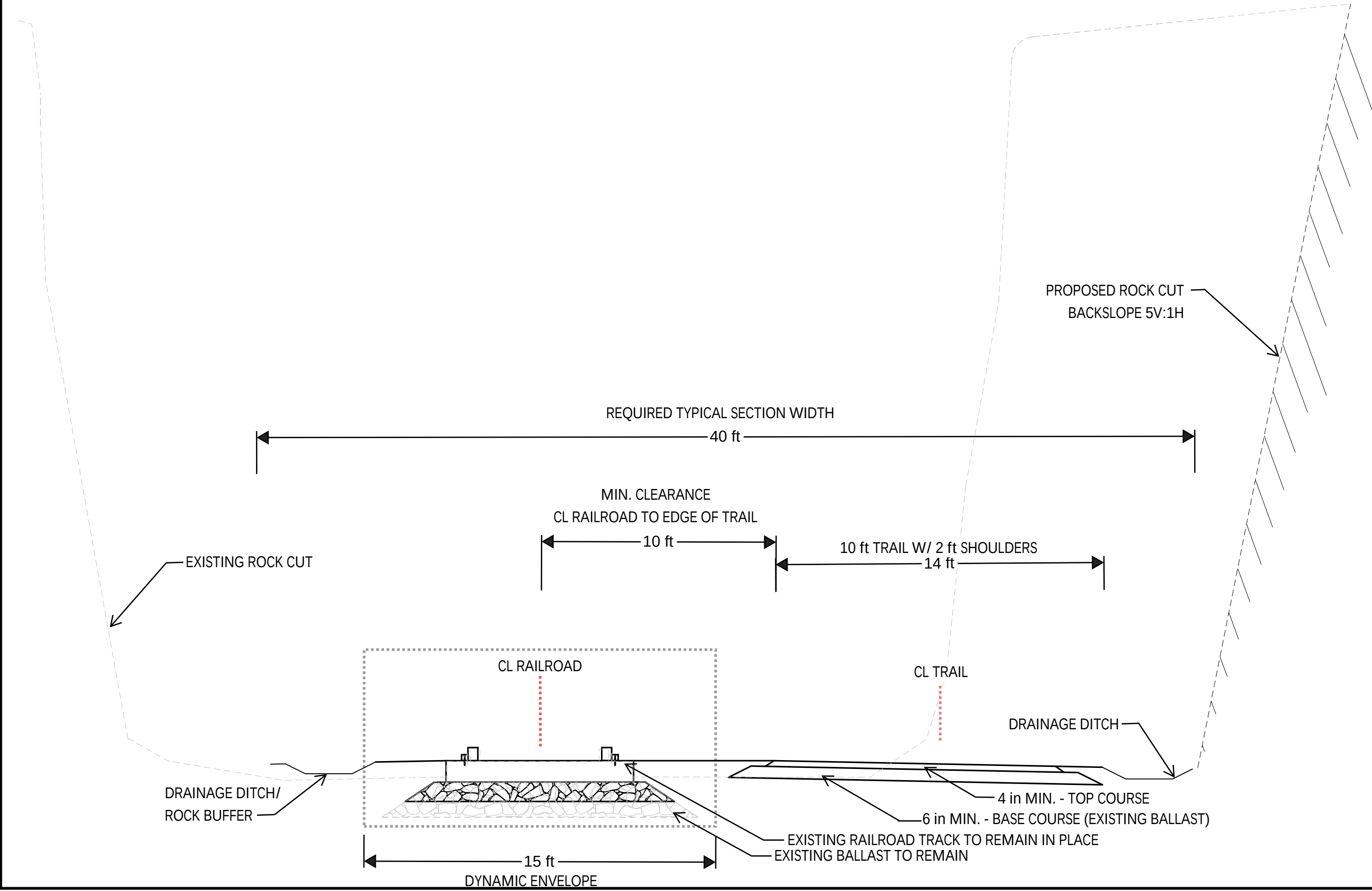
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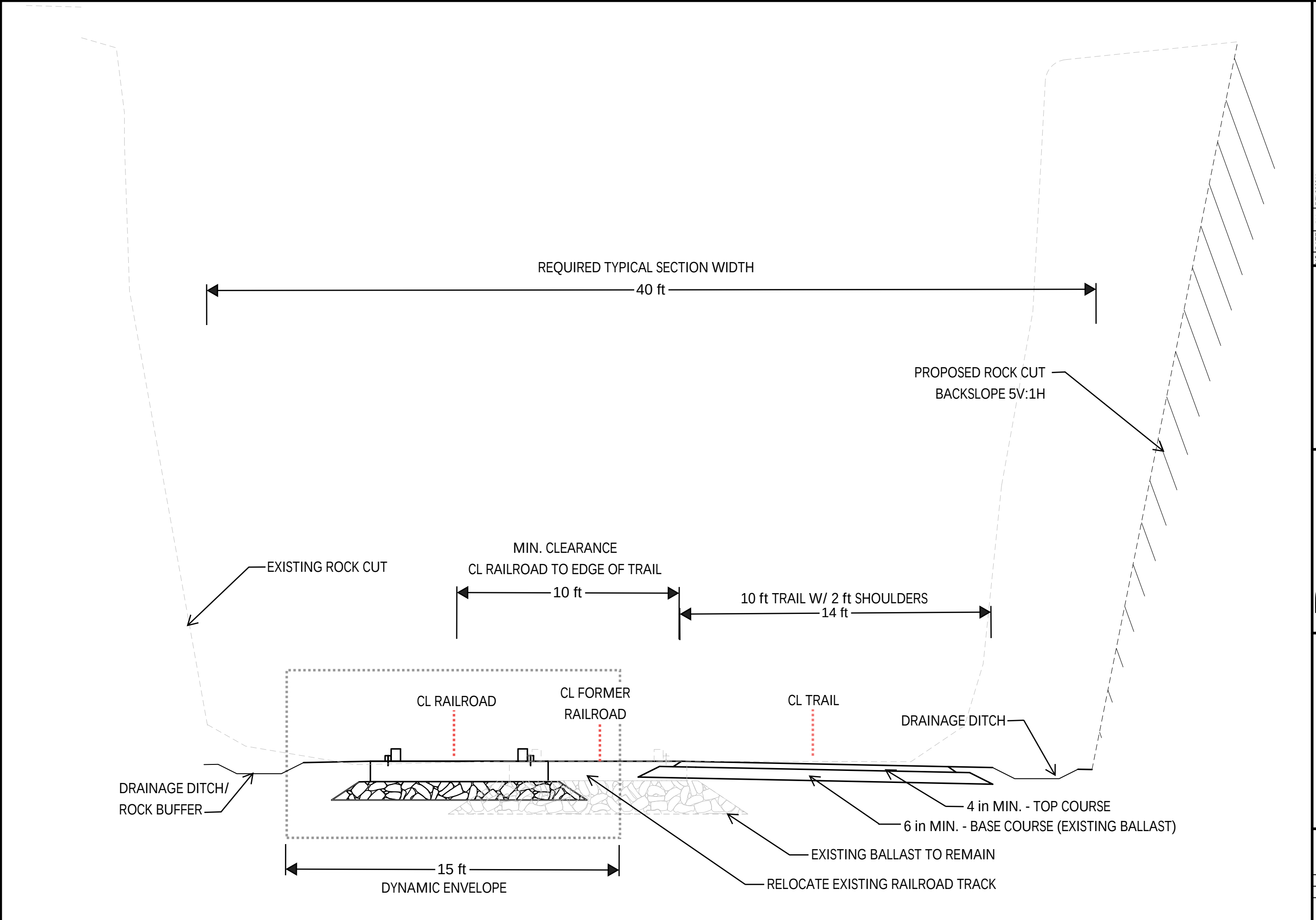
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