



# SULLIVAN O&W RAIL TRAIL

LIVINGSTON MANOR TO PARKSVILLE RAIL TRAIL SEGMENT FEASIBILITY  
ANALYSIS

TOWNS OF ROCKLAND AND LIBERTY, SULLIVAN COUNTY, NY

August 25, 2022



Prepared for:



Town of Rockland

Prepared by:



With support from:



## TABLE OF CONTENTS

---

### INTRODUCTION

PROJECT OVERVIEW	2
------------------	---

### PROJECT PHASING

PHASE 1: PARKSVILLE TRAILHEAD TO SONOMA FALLS GATE	5
--	---

PHASE 2: ROTARY PARK TO THE LITTLE BEAVER KILL TRAIL GAP	13
--	----

PHASE 3: LITTLE BEAVER KILL GAP TO SONOMA FALLS	19
---	----

### IMPLEMENTATION

CONSTRUCTION PHASING	38
----------------------	----

FUNDING	39
---------	----

### APPENDICES

APPENDIX A: COST ESTIMATE

APPENDIX B: PLAN VIEW DRAWINGS

APPENDIX C: IDENTIFIED FRESHWATER FORESTED/SHRUB WETLAND AREA



A photograph of a rocky stream flowing through a forest of bare trees, overlaid with a semi-transparent orange filter. The stream is the central focus, with water cascading over numerous dark, jagged rocks. The surrounding forest consists of tall, thin trees without leaves, their branches creating a dense, intricate pattern against the sky. The overall atmosphere is quiet and somewhat somber due to the lack of foliage and the monochromatic orange tint.

# INTRODUCTION



## PROJECT OVERVIEW

### PROJECT BACKGROUND

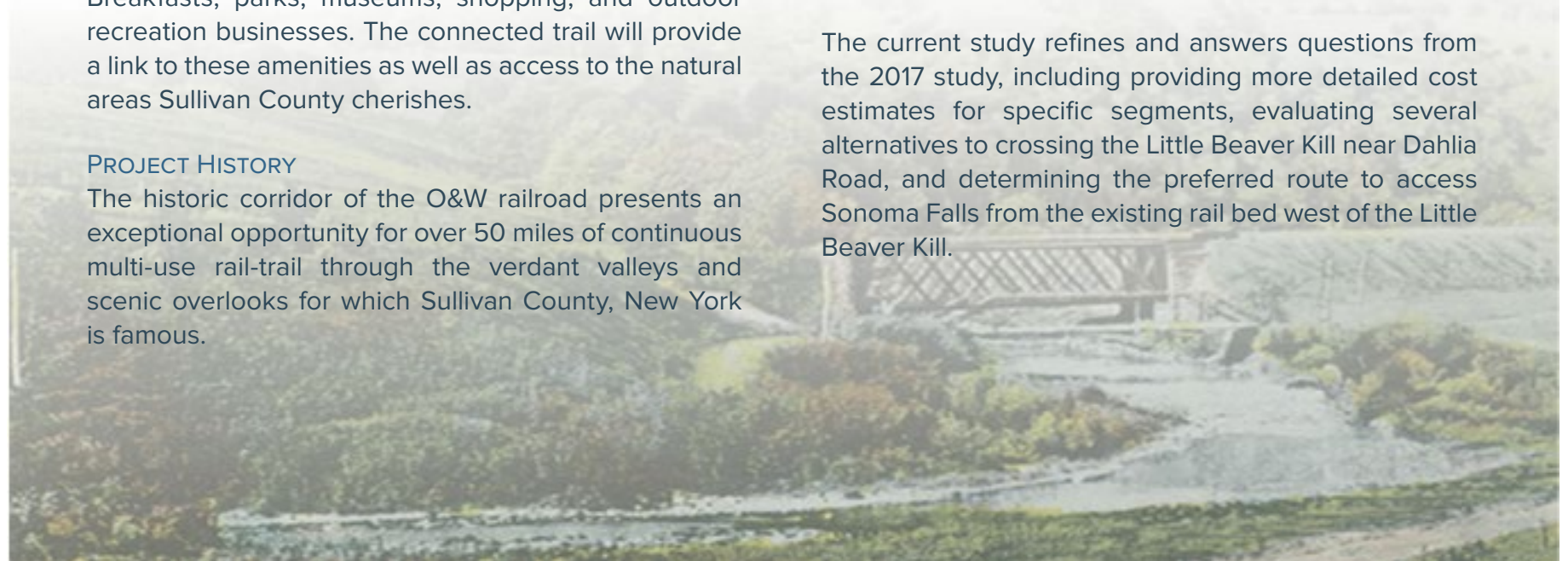
Sullivan County is located in southeastern New York, approximately 60 miles northwest of New York City. The area is home to approximately 75,500 residents but is also a summer getaway for NY Metro Area dwellers. Because of this, Sullivan County presents a unique opportunity to provide a multi-use trail that accommodates a wide range of needs and users. Located within the southern portion of the Catskills, Sullivan County offers mountains, woodlands, lakes, and rivers for residents and visitors to traverse and explore. The communities along the trail provide multiple destinations and amenities for residents and visitors such as ski resorts, boating, Inns and Bed and Breakfasts, parks, museums, shopping, and outdoor recreation businesses. The connected trail will provide a link to these amenities as well as access to the natural areas Sullivan County cherishes.

### PROJECT HISTORY

The historic corridor of the O&W railroad presents an exceptional opportunity for over 50 miles of continuous multi-use rail-trail through the verdant valleys and scenic overlooks for which Sullivan County, New York is famous.

In 2017, a feasibility study was begun to investigate and determine a preferred route to create a non-motorized trail through Sullivan County using the O&W Railroad route. Alta completed that study on behalf of Sullivan County, which included field visits of the unbuilt segments of the 50 miles of rail-trail. The initial feasibility study had a limited scope and provided cost estimates on a Town-wide basis rather than breaking cost estimates into specific projects. The initial study did not determine preferred construction methods or further evaluate the off-road alternatives including whether the bridge abutments could or should be used to reuse the existing rail bed alignment for a new non-motorized use..

The current study refines and answers questions from the 2017 study, including providing more detailed cost estimates for specific segments, evaluating several alternatives to crossing the Little Beaver Kill near Dahlia Road, and determining the preferred route to access Sonoma Falls from the existing rail bed west of the Little Beaver Kill.



O&W Railroad bridge over the Little Beaver Kill (proposed west bridge location)



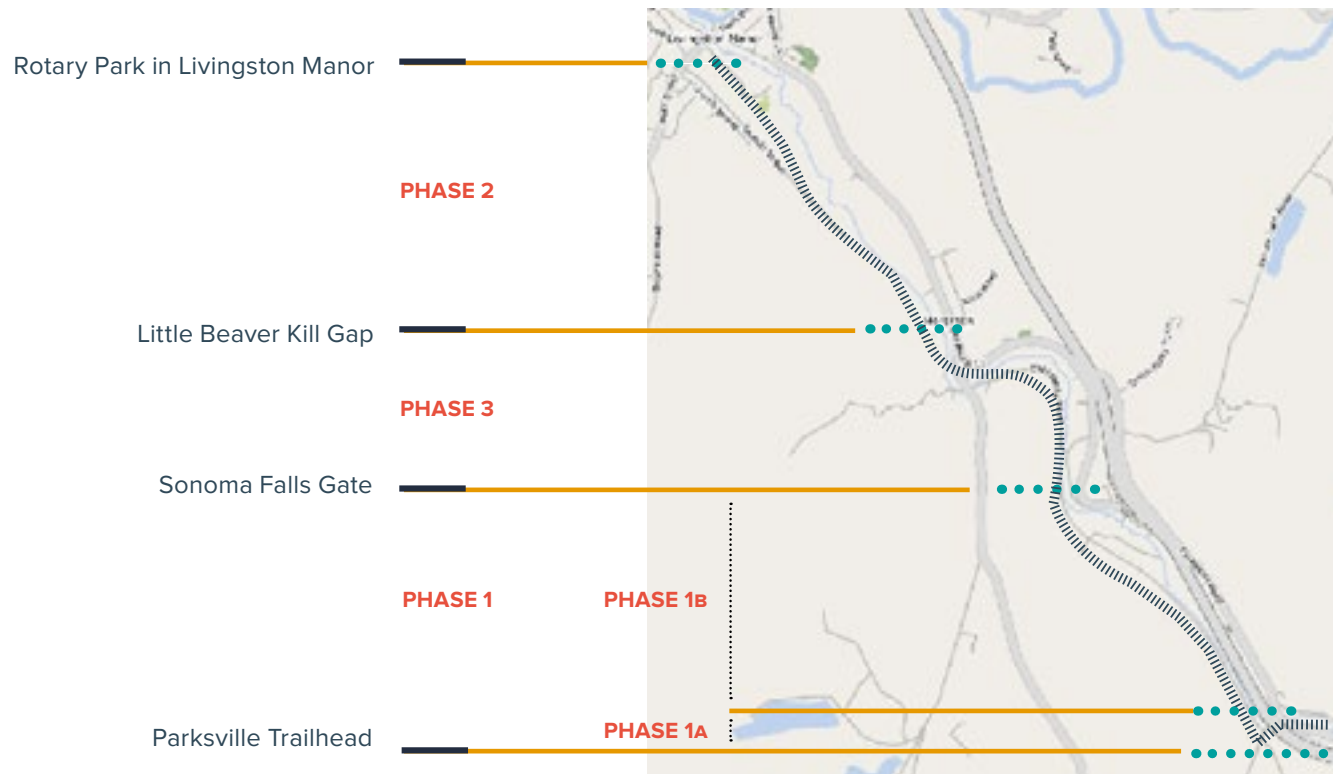


# PROJECT PHASING



This project, while broken into three (3) primary construction phases, is a priority for the Sullivan O&W because it is the northern terminus of the Sullivan O&W Rail Trail. Moreover, by completing this segment of the Sullivan O&W, the existing completed mileage of the trail will be extended for another 3.9 miles (Parksville to Livingston Manor) thus totaling 5.1 complete miles of open trail. In addition, the implementation of this segment of the O&W will add recreational opportunities for residents and visitors of Livingston Manor, where dedicated recreational and non-motorized transportation facilities are currently scarce.

The extents of each of the three segments was determined in collaboration with Sullivan County, the Towns of Liberty and Rockland, and the Sullivan O&W Rail Trail Alliance. Factors that shaped segment extents and the phasing included the perceived ease of construction and permitting, available funding, and the timing required to complete each phase. To align with available funding sources, Phase 1 has been broken into two smaller phases; 1A and 1B. While phases 1 and 2 could be implemented independently from phase 3, it would be best to implement all three phases to provide maximum access for trail users. The phases are identified as follows:



## PHASE 1: PARKSVILLE TRAILHEAD TO SONOMA FALLS GATE

### INTRODUCTION

The Parksville Trailhead is the current northern terminus of the Parksville Rail Trail, a co-branded segment of the Sullivan O&W Rail Trail. This phase of the project has been identified as ready for implementation before the others due to the current condition of the existing O&W rail bed from Fox Mountain Road to the Sonoma Falls Gate. This segment of the rail trail is within both the Towns of Liberty and Rockland and is approximately 1.6 miles long.

Due to funding constraints and permitting needs, Phase 1 has been broken down even further into two smaller segments; phase 1A and 1B. Phase 1A includes extending the trail from the Parksville trailhead along Fox Mountain Road and approximately 415 feet onto the existing O&W rail bed. Phase 1B is entirely within the existing rail bed and continues from the abutment near Fox Mountain Road to the Sonoma Falls gate.

### EXISTING CONDITION

The southern terminus of this phase of the project starts at the existing Parksville Trailhead located on Old Route 17 (Service Road) adjacent to the NY Route 17 (future I-86) overpass over Fox Mountain Road. The trailhead features a wheelchair accessible paved parking area with informational signage and is the current northern terminus of the Parksville Rail Trail segment of the Sullivan O&W Rail Trail.

Just north of the trailhead, at the intersection of Fox Mountain Road and Old Route 17 (Service Road), there are no pedestrian accommodations. The Fox Mountain Road leg of the intersection is stop controlled and is flanked by a native grass area and box beam guide railing to the northwest. Several of the adjacent areas were reconstructed by the New York State Department of Transportation (NYSDOT) as part of the NY Route 17 to I-86 conversion project.



Parksville Rail Trail trailhead





View looking from the original O&W bridge abutment above Fox Mountain Road



Looking northeast towards the bridge on Fox Mountain Road (BIN 2229030) over the Little Beaver Kill tributary

Areas include Fox Mountain Road to the intersection of Benton Hollow Road, and the area surrounding the NY Route 17 bridges crossing over the Little Beaver Kill and Fox Mountain Road. Features within the reconstructed areas are relatively new and in good condition.

Fox Mountain Road provides 11-foot travel lanes in each direction and does not have a posted speed limit. It is a local road that connects Old Route 17 near the Parksville Trailhead to NY Route 52 and has an estimated 2019 AADT of 336 vpd with 8% of those being trucks. The portion of Fox Mountain Road that was reconstructed is in good condition with some signs of wear.

The bridge on Fox Mountain Road over the Little Beaver Kill near the intersection with Benton Hollow Road (BIN 2229030) was built in 1994 and is a prestressed concrete multi-beam structure that has a rail-to-rail width of approximately 23 feet. The bridge is assumed



The existing O&W rail bed abutment is still present. A bypass route has been created to traverse to Fox Mountain Road

to be owned and maintained by the Town of Liberty. It is composed of a concrete deck with an asphalt wearing course that is in fair condition. The existing bridge railings are two-rail bridge rail connected to box beam guide rails.

Beyond the bridge, Fox Mountain Road is in fair to poor condition with increased signs of pavement wear and deterioration. Spot pavement repairs are evident throughout the roadway to heavy silt deposits are also observed, likely a result of winter roadway maintenance operations.

Crossing over Fox Mountain Road are the bridges that carry NY Route 17 eastbound and westbound over the Little Beaver Kill (BINs 1079021 and 1079022). These bridges were built in 2011 and each feature three-column pier supporting substructures adjacent to Fox Mountain Road. The westbound pier is located further away from Fox Mountain Road than the eastbound pier.



The locked gate at the Sonoma Falls entrance off of Old Liberty Road



The southeast side of Fox Mountain Road includes a large retaining wall and supporting structure for these bridges. Given the bridges and supporting structures were constructed as part of the bridge replacement project, these structures are anticipated to be in good to excellent condition.

At the intersection of Fox Mountain Road and Benton Hollow Road is an access point to the O&W rail bed. At this access point there is a box beam guide rail for Fox Mountain Road. Beyond the railing the former railroad bridge abutment remains. While the original railroad would have traversed over this abutment likely through a truss-style structure, a bypass route has been formed. The bypass route provides direct access to the original O&W rail bed.

The O&W railbed from the access point near Fox Mountain Road to the Sonoma Falls gate near Old Liberty Road is in good condition. However, the rail bed changes character near Sonoma Falls. From Fox Mountain Road to Sonoma Falls, the ballast is generally not visible, as the rail bed is covered with organic material throughout the majority of this segment. The rail corridor has also narrowed over time due to tree growth along this southern end of the segment. Near Sonoma Falls and north towards Old Liberty Road and the Sonoma Falls gate, the railbed becomes much wider, the ballast is exposed, and tree growth has been limited. This change in character seems to be a direct result of the corridor being used by vehicular traffic on a more regular basis. While the Sonoma Falls

attraction has been closed to vehicular access for quite some time, the impacts of its use are still evident. A gate is present at the Sonoma Falls entrance off of Old Liberty Road and seems to be controlled by the owners of the Sonoma Falls property.

#### PROPOSED SCOPE OF WORK FOR TRAIL SEGMENT CONSTRUCTION

The scope of work for this segment of rail-trail includes recommendation for both off and on-road treatments. Phase 1A consists of both on and off-road treatments, while Phase 1B consists of off-road treatments only.

##### PHASE 1A

From the Parksville trailhead, a ten (10) foot wide stone dust trail connection is proposed to be approximately 5 feet from the edge of the Old Route 17 edge of pavement. Maintaining at least 5 feet of separation will reduce the need for a vertical element to separate the roadway from the trail.

At the intersection with Old Route 17 and Fox Mountain Road, a new high-visibility crosswalk with appropriate pedestrian and bicycle warning signs is proposed to be added. The crossing should be ADA compliant and include detectable warning surfaces on both sides of Fox Mountain Road detectable warning surfaces on both sides of Fox Mountain Road.

From the intersection crossing, a new stone dust sidepath is recommended on the west side of Fox Mountain Road. Where there is additional horizontal space, the sidepath will meander through the native

grass area reducing the need for a vertical element to separate the road from sidepath. As noted previously, the westbound NY Route 17 bridge pier is located closer to Fox Mountain Road at a distance of approximately 21 feet from the existing white lane line. While preliminary analysis indicates there is adequate room to fit a sidepath with 5 feet of separation from Fox Mountain Road, it is anticipated that a fill-type retaining wall will be required to limit impact to the Little Beaver Kill stream bank the bridge piers.

Beyond the bridge piers, it is recommended that both a long-term and short-term implementation plan for the rail trail be considered. Until the bridge on Fox Mountain Road is due for replacement, the Sullivan O&W Rail Trail sidepath should transition to a shared roadway condition on the bridge over the Little Beaver Kill tributary. The bridge railings should be replaced to meet the minimum railing height requirements established by the American Association of Highway Transportation Officials (AASHTO) and the NYSDOT.

The existing bridge is approximately 23 feet wide which limits the space available for a dedicated trail. Since the bridge beams are composed of prestressed concrete, the potential for cantilevering off of the existing structure is likely not feasible due to the complications in connecting to concrete beams. To facilitate the transition from sidepath to shared roadway, additional signage and pavement markings will be included as appropriate to warn motorists of the presence of non-motorized trail users.

The long-term recommendation is for a sidepath to be included in the bridge design for the replacement bridge over Fox Mountain Road. As the existing structure was built in 1994, it is anticipated that a new bridge will be built there for between 2044 and 2069; (50 and 75 years from the original bridge construction date).

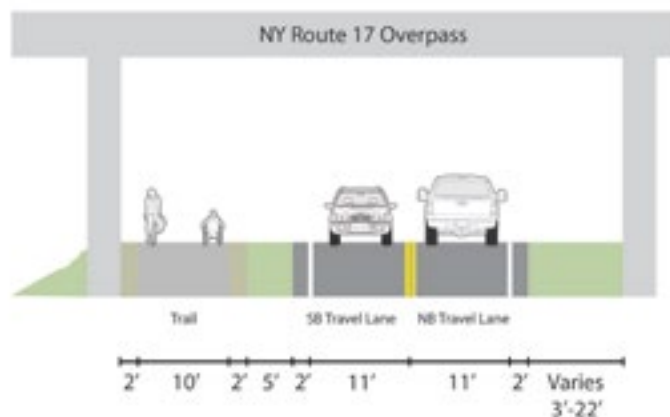


Existing bridge piers of the Route 17 WB overpass



Just beyond the intersection with Benton Hollow Road, the sidepath is proposed to transition to an off-road trail. Adjacent to the roadway, the trail is of level grade, but quickly transitions to a grade exceeding the maximum 5% profile grade required for ADA compliant facilities. This section of trail should be redesigned to accommodate the significant grade change to provide an accessible route that ties into the existing rail bed.

From the Parksville trailhead to the shared roadway condition near the bridge over the Little Beaver Kill tributary, the trail should be 10 feet wide with a 2 inches stone dust top course supported by a 6 inches subbase course and stone dust shoulders. Given the grades of the trail from Fox Mountain Road up to the existing rail bed will likely exceed 3%, the trail should be composed of asphalt supported by subbase. Consistent with other segments of the Sullivan O&W, the proposed trail construction consists of debris removal, clearing and grubbing operations, removal of



Fox Mountain Road Sidepath

organics, horizontal and vertical alignment adjustments, and regrading of the trail.

#### PHASE 1B

This segment includes reconstructing the existing rail bed from the abutment bypass route included in phase 1A to the Sonoma Falls gate near Old Liberty Road.

Given the flat terrain and rural nature of the trail from Fox Mountain Road to the Sonoma Falls attraction, the trail is proposed to be 10 feet wide with a 2 inches stone dust top course supported by a 6 inches subbase course and stone dust shoulders. Where trail grades exceed 3% it is recommended that the trail be constructed using a 4 inches asphalt top course supported by a 6 inches subbase course.

The trail segment from the Sonoma Falls attraction to the existing gate near Old Liberty Road is anticipated to support both trail users and vehicles in a shared trail condition. Therefore, the path should be constructed at a minimum width of 12 feet (desired 14 feet) with 2 foot shoulders on either side to minimize trail edge degradation due to vehicle loading. Under this shared trail condition, additional signage and pavement markings will be included as appropriate to warn motorists of the presence of non-motorized trail users and to clearly indicate that trail users be given precedence over vehicular traffic. In addition, to trail reconstruction, the Sonoma Falls gate should remain open to encourage usage of the trail. Coordination with the landowner, the Town of Liberty, and the Sullivan O&W Rail Trail Alliance should be ongoing

through planning, implementation, and maintenance to manage expectations and usage of the trail.

### COST

This planning level cost estimate is based on a preliminary engineering review conducted as part of this study and includes elements noted in the scope previously discussed. While a preliminary design has been prepared, this design is not complete, therefore a 30% contingency has been added to the cost estimate to account for minor items and features not known at the time of preparation. The cost for this segment of the trail is approximately \$4.3M.

The cost for Phase 1A is approximately \$1.1M and the cost for Phase 1B is approximately \$2.0M. Note that the cost for Phase 1A includes additional wayfinding signage to direct trail users from the Sonoma Falls gate to Livingston Manor via on-road routes until such a time when the subsequent phases of the full project have been implemented.



Former vehicular use near the Sonoma Falls attraction has widened the former rail bed corridor

Note that Alta has no control over the final design of the project, the cost of labor, materials, equipment, or services furnished by others, over the Contractor(s) methods of determining prices, and/or over competitive bidding, or market conditions. Alta's planning cost estimate is made on the basis of Alta's experience and qualifications and represents Alta's best judgment familiar with the construction industry and the proposed project concept; but Alta cannot and does not guarantee that proposals, bids or actual project costs will not vary from this planning level cost estimate prepared by Alta.

### NEXT STEPS

The successful implementation of this phase of the overall project will follow several steps after the publication of this report. These steps include:

- Identifying potential funding sources
- Environmental investigations
- Design and Permitting
- Trail construction

The following provides further detail and strategies to implement these steps.

A cursory review of the NYSDEC Environmental Mapper indicated that wetlands are not present within the project corridor. However, a site visit to confirm the lack of wetlands is suggested followed by coordination with NYSDEC for checking the presence of protected plant and wildlife species.



Leading up to the future bridge replacement of the bridge on Fox Mountain Road over the Little Beaver Kill tributary, coordination with both the Town and NYSDOT should occur to increase the likelihood that the replacement bridge will include accommodations for the Sullivan O&W Rail Trail. This coordination would also include retrieval of the as-built records for both the bridge replacement project for the NY Route 17 bridges and the Fox Mountain Road bridge. These as-built records will confirm assumptions about the makeup of the bridge(s) and the supporting substructures and pavement composition of Fox Mountain Road.

Additional coordination is expected with NYSDOT for the sidepath along Fox Mountain Road. Early discussions are encouraged to understand constraints and challenges with the sidepath installation along Fox Mountain Road beyond what has been documented within this report. It is anticipated that a Use and Occupancy Permit may be required for the sidepath and retaining wall along Fox Mountain Road. Confirmation of this permit should be obtained early in the planning process to minimize project implementation delays.

While this trail segment does not anticipate impacting the Little Beaver Kill or its tributaries, the flood zones should be confirmed to understand potential areas of impact for flooding.

In addition to the segment specific recommendations, all segments of the project should follow the State Environmental Quality Review (SEQR) and National Environmental Policy Act (NEPA) processes. This would include documenting the results of the environmental review in the Federal Environmental Approvals Worksheet. Elements expected to require review

and concurrence include:

- Section 106 review and clearance from the NYS Office of Parks, Recreation, and Historic Preservation (NYS OPRHP).
- ESA Section 7 Threatened and Endangered Species review from US Fish and Wildlife (USFWS).
- Wetland inventory and documentation from NYSDEC and ACOE.

## PHASE 2: ROTARY PARK TO THE LITTLE BEAVER KILL TRAIL GAP

### INTRODUCTION

This phase of the project will connect Rotary Park in the Town of Livingston Manor to the western Little Beaver Kill bridge abutments within the Town of Rockland. This segment has been identified as phase 2 due to the increased effort needed to address the condition of the existing O&W Rail bed, additional permitting needs, and the additional cost required to implement this segment. The trail is approximately 1.2 miles long and uses the existing O&W Rail bed for the entire segment.

### EXISTING CONDITION

A site visit was conducted on April 28, 2022, to investigate the condition of the rail bed from Rotary Park to the existing abutment on the west side of the Little Beaver Kill. The purpose of the site visit was to determine the condition of the rail corridor, identify the scope of work to bring the rail corridor up to shared use off-road trail standards as identified in the Sullivan O&W Rail Trail Feasibility Study (2017), and conduct a preliminary structural assessment of the existing elements within the project study area.

At the time of the site visit, the existing rail bed within this segment of the O&W Rail Trail was observed to be in fair to good condition. The ballast of the original O&W Railroad is exposed in some locations but generally is covered with organic material throughout the majority of this segment. Near the entrance to the trail from

Rotary Park, there is a significant presence of Japanese Knotweed, a known invasive species. The land in and around the trail within this same area was wet with evidence of grasses. This area has been identified on the New York State Department of Environmental Conservation (NYSDEC) Environmental Resource Mapper as part of the National Wetland Inventory and thus might require additional attention and additional permitting during the design phase.

Beyond this section of the railbed, the trail traverses upland, dries out, and becomes less encumbered by vegetation. In some locations along the existing alignment, earth disturbance or regrading was noted, such as through heavy equipment (i.e., excavators, skid-steers, or similar) or by repetitive ATV or other vehicular use.

There is also a portion of the trail that is being used by adjacent landowners for storage of personal effects which include sheds, lumber, aged lawn equipment, and a few fenced gardens.

There were also four washout areas observed during the site visit. The washouts were further examined during the field view to try to determine the root cause of the erosion.

It appears that runoff originates mostly from Dubois Street cross culverts that collect off-site drainage from



the mountain west of the rail bed and Dubois Street. While the culverts under Dubois Street are successful at collecting the water under the roadway, the outfalls on the east side of Dubois Street remain unprotected and exposed to the effects of concentrated water flow. In one case there are two smooth interior polyethylene plastic pipes (SICPPP) that at one time appeared to be connected and have since become disconnected and partially buried in the ground, therefore are no longer conveying water. As a result, the water is seeking its own path and has washed out the area downstream of the roadway cross culvert on Dubois Street. None of the washouts appeared to be a result of subsurface groundwater, vernal pools, or other subsurface sources. At one of the washouts, the off-site drainage eventually finds itself traversing under the existing rail bed via a laid-up stone box culvert structure. This structure appears to be original to the railroad and to be in good condition given it was likely constructed in the late 1800s.



Personal effects stored on the rail bed



Original O&W stone culvert

Beyond the washouts heading south towards the Little Beaver Kill, the trail levels out and is consistent in grade, width, and vegetation. This portion of the trail is easily visible and appears to be used on occasion by locals to access the Little Beaver Kill and other areas surrounding the rail bed. While visible and in generally good conditions, it is also covered with organic matter with little evidence of the railbed ballast. There was evidence of poor drainage collection on the west side of the trail where off-site drainage from the mountain above remains between the upland areas and the rail bed. At the approach to the western abutment of the Little Beaver Kill structure, the rail bed ends and turns east towards the existing abutment.



Existing rail bed beyond the washouts is consistent in grade, width, and condition

## PROPOSED SCOPE OF WORK FOR TRAIL SEGMENT CONSTRUCTION

While the rail ballast is present, it has been overgrown with vegetation requiring a full removal of organic material prior to constructing the new trail. The removal of organics shall include clearing and grubbing operations as well as a full removal or remediation of the existing Japanese Knotweed. Addressing the Japanese Knotweed will be a critical element to be completed early on in the construction process, as it is located at the northern terminus of the proposed rail trail which will be the primary point of access for construction activities for the duration of the project. Given the plant's highly invasive nature, handling of this plant and the treatment to address its presence will need to be done by professionals experienced with the plant and the most current removal techniques.

The trail will also require minor horizontal and vertical alignment adjustments to maximize opportunities for drainage improvements and to minimize future washouts. Three (3) of the four (4) washouts should be addressed by installing closed drainage adjacent to Dubois Street to carry runoff to and under the proposed trail. The closed system should include a drainage structure on the east side of Dubois Street to reduce the velocity of the water from the upland side of the roadway. Water will then exit into another series of closed drainage pipes with slopes not exceeding 4% buried underground. On the outlet side of the closed drainage system, stone-lined aprons will be critical to reducing the velocity of



the water in addition to allowing the water to infiltrate. The aprons will also serve as a stabilization treatment for the side slopes adjacent to the trail. Geotextile installation is recommended under the stone aprons to minimize the migration of soil fines into the larger stone aprons. In addition to the closed drainage network, the area should be restored using suitable fill material and then reestablished with an initial erosion sediment control practice followed by native vegetation mixes to promote regrowth of the area.

For the largest of the existing washouts, it is recommended that a precast concrete four-sided box culvert be constructed to convey the storm event level flows of the tributary. The culvert is expected to have



One of the existing washouts that will be addressed with a new closed drainage system.

an approximate opening of 4 feet high by 6 feet wide. In accordance with best practices for stream restoration, it is recommended that the bottom of the box culvert be buried and re-established as a natural bottom. This will promote the passage of wildlife while also reducing water velocity through the culvert. Precast concrete flared end sections and cut-off walls should be provided on the inlet and outlet to prevent future washout of the culvert. The culvert should be backfilled with the proposed trail constructed on the backfill similarly to the approach trail section. The precast sections should be fabricated small enough to easily ship and install at the project site with conventional trucks and excavators. To facilitate construction in the dry, a temporary pipe culvert should be used as a water diversion around the proposed culvert location.

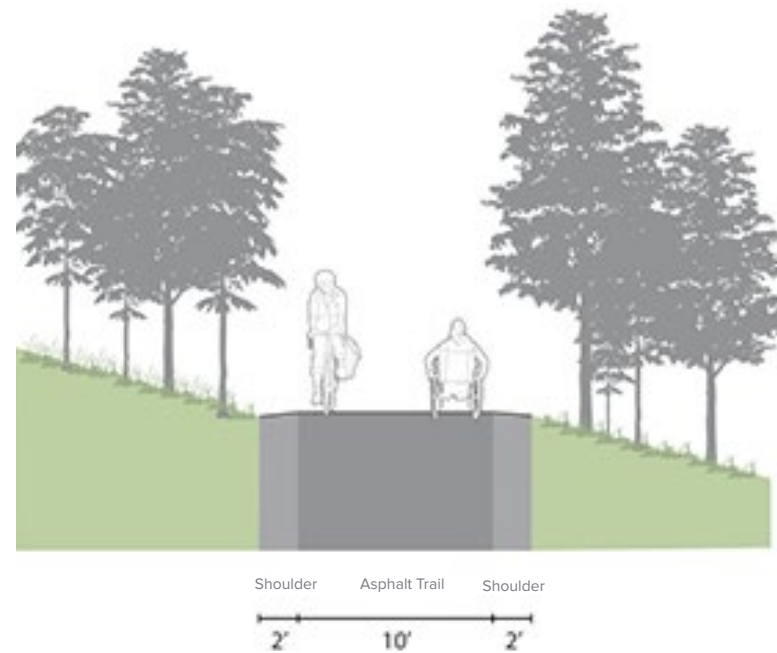


Example of four-sided box culvert recently installed and ready for backfill



Looking east towards where the rail bed has been washed out. This area to be replaced with a box culvert.

Prior to the placement of the trail finished surfaces, it is anticipated that man-made debris adjacent to the rail bed will be removed. Consistent with other segments of the Sullivan O&W, the trail should be paved with 4 inches of asphalt on top of a new 6 inches of subbase material. Shoulders should be composed of stone dust to promote trail edge stabilization as well as provide a barrier to vegetative growth in the future. While stone dust was considered as a material for the entire trail, it is not recommended on this segment due to the presence of significant upland slopes, increasing the potential for trail erosion.



Proposed trail section along Phase II - off-road Asphalt Trail

An additional enhancement throughout this segment of trail is the introduction of shallow ditches on the west side of the trail. This will aid in the collection of off-site drainage preventing it from traversing over the trail. Cross culverts are recommended at regular intervals to carry the collected water under the trail towards the Little Beaver Kill. Culvert crossings should include stone-lined aprons similar to the washout areas.

Finally, timber safety railing should be installed where slopes towards the Little Beaver Kill are 1V:2H fill slopes where the drop off from edge of trail is greater than 4 feet in elevation.



## COST

This planning level cost estimate is based on a preliminary engineering review conducted as part of this study and includes all elements noted in the scope previously discussed. While a preliminary design has been prepared, this design is not complete, therefore a 30% contingency has been added to the cost estimate to account for minor items and features not known at the time of preparation. The cost for this segment of the trail is approximately \$3.4M.

Note that Alta has no control over the final design of the project, the cost of labor, materials, equipment, or services furnished by others, over the Contractor(s) methods of determining prices, and/or over competitive bidding, or market conditions. Alta's planning cost estimate is made on the basis of Alta's experience and qualifications and represents Alta's best judgment familiar with the construction industry and the proposed project concept; but Alta cannot and does not guarantee that proposals, bids or actual project costs will not vary from this planning level cost estimate prepared by Alta.

## NEXT STEPS

The successful implementation of this phase of the overall project will follow several steps after the publication of this report. These steps include:

- Identifying potential funding sources
- Environmental and geotechnical investigations
- Design and Permitting
- Trail construction

The following provides further detail and strategies to implement these steps.

A cursory review of the NYSDEC Environmental Mapper identified two freshwater forested/shrub wetland areas (PSS1E) part of the National Wetland Inventory. The first is located near Rotary Park while the other area is located near the end of Dubois Street (See Appendix C). A wetland investigation will be required to confirm the extent of the wet areas and determine whether any additional wetland areas exist and aid in the determination of whether the wetlands are regulated by either the New York State Department of Environmental Conservation (NYSDEC) or the Army Corps of Engineers (ACOE).

During the environmental investigation, an evaluation of the extent of the Japanese Knotweed should be conducted. In addition, a removal and remediation plan should be prepared given the high probability for Japanese Knotweed to spread outside of the project area during construction if not handled appropriately.

As a result of the washout evaluation during the site visit a geotechnical investigation is not anticipated, However, should soil borings be required for the structure placement near the Little Beaver Kill west bridge, it would be appropriate to take an additional soil boring near the largest washout area to confirm soil composition. This information will aid engineers in determining a preferred proposed trail section and backfilling requirements for the box culvert.

In addition to the segment-specific recommendations, all segments of the project should follow the State Environmental Quality Review (SEQR) and National Environmental Policy Act (NEPA) processes. This would include documenting the results of the environmental review in the Federal Environmental Approvals Worksheet. Elements expected to require review and concurrence include:

- Section 106 review and clearance from the NYS Office of Parks, Recreation, and Historic Preservation (NYS OPRHP).
- ESA Section 7 Threatened and Endangered Species review from US Fish and Wildlife (USFWS).
- Wetland inventory and documentation from NYSDEC and ACOE.
- Executive Order (EO) 13112 Invasive Species.

## PHASE 3: LITTLE BEAVER KILL GAP TO SONOMA FALLS GATE

### INTRODUCTION

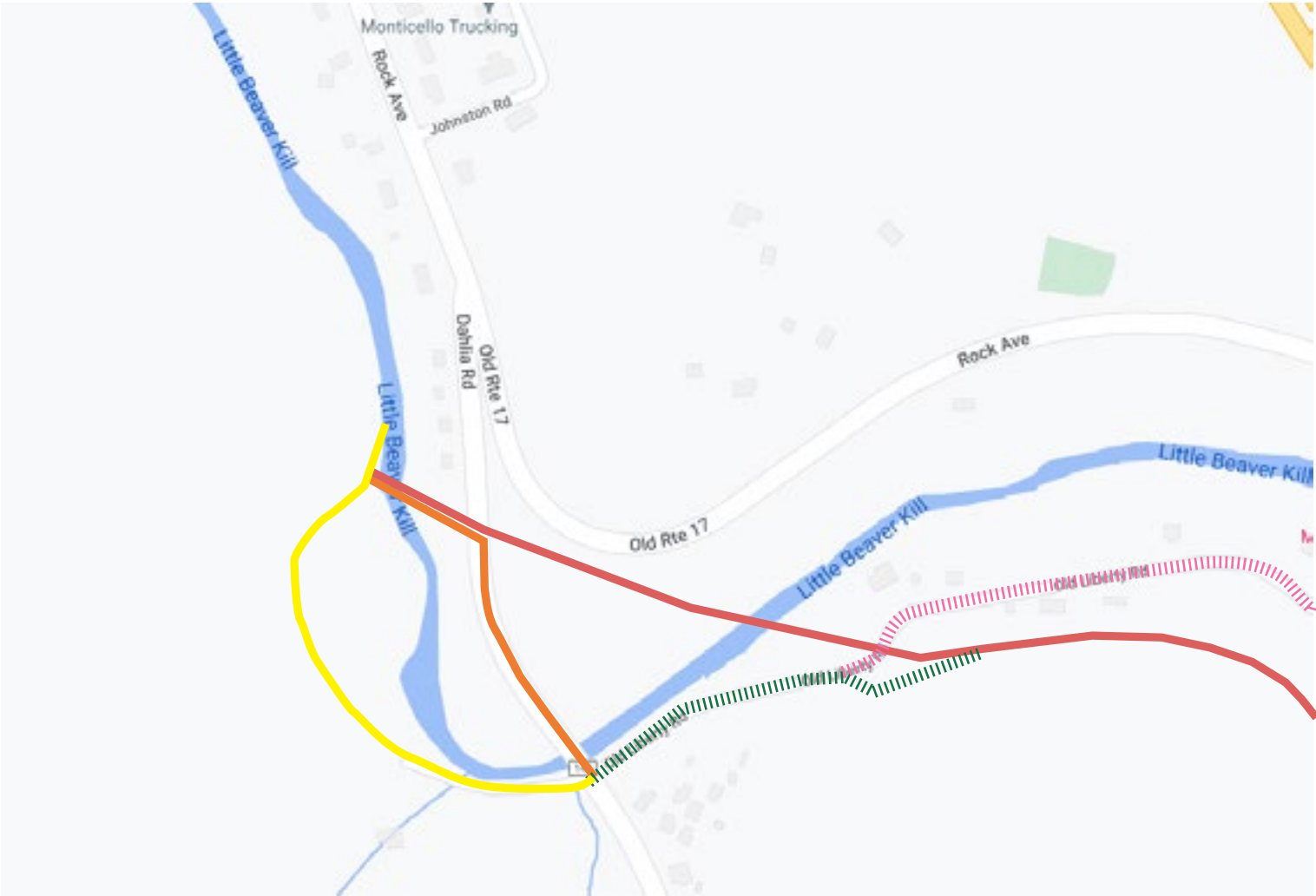
This phase of the project connects Phases I and II of the overall project together by connecting the existing rail bed on the western side of the Little Beaver Kill to the Sonoma Falls Gap. This segment has been identified as phase 3 due to the cost of implementation, level of permitting and design effort required to cross the Little Beaver Kill, and potential right-of-way needs.

Three main alternatives were identified to traverse the Little Beaver Kill Gap with two sub-alternatives providing direct connectivity to Old Liberty Road. The main alternatives are as follows:

- Alternative A: Original O&W Rail route
- Alternative B: Off-Road/On-Road Hybrid
- Alternative C: Little Beaver Kill Bypass

Two sub-alternatives were considered to providing access from Old Liberty Road to the Sonoma Falls Gate. These sub-alternatives mostly apply to Alternatives B and C, as Alternative A does not use any portion of Old Liberty Road. However, if Alternative A were selected, sub-alternative 2 could be included as an additional access point from Old Liberty Road to the trail. (See Figure at right).





- Alternative A: Original O&W Rail route
- Alternative B: Off-Road/On-Road Hybrid
- Alternative C: Little Beaver Kill Bypass
- - - - - Sub Alt. 1 - Old Liberty Rd
- - - - - Sub Alt. 2 - Old Liberty Rd Ramp

## ALTERNATIVE A:

### OVERVIEW

Alternative A utilizes the existing and original O&W railbed through the project area. As the Sullivan O&W comes to fruition one segment at a time, the Trail Alliance and others have an interest in utilizing the original O&W route as much as possible for both practical reasons and to reflect on the history the O&W provides to the area. Further, by utilizing the existing structures remaining on the corridor, there is an opportunity to be good stewards of the environment by minimizing of construction impacts and by reducing the impact new materials have on the environment.

### EXISTING CONDITION

This route includes a combination of off-road trail, two (2) crossings over the Little Beaver Kill, one (1) crossing over Dahlia Road, and one (1) crossing over Old Liberty Road. The two crossings over the Little Beaver Kill are no longer present, however, the abutments for these structures are present. Both sets of abutments are in similar condition. The existing abutment is a mortared stone gravity abutment with concrete facing, founded on rock. The facing is in poor condition with surficial concrete repair expected on all exposed surfaces to remain.

The original O&W rail-trail also had a bridge that connected the rail bed east of Dahlia Road (CR 146) to the western bridge over the Little Beaver Kill. During the site visit, remnants of the former structure were not

visible. The rail bed itself, however, was present and in a similar condition to other segments of the rail corridor through the project area with the exception of a large amount of garbage and residual waste that has been disposed of over time on the corridor. The rail corridor appears to be a disposal site for local residents with access to the land. There was evidence of recent activity indicating that if no action is taken by the Town or Rail Trail Alliance, the debris field will continue to grow. Due to the presence of petroleum fuel tanks, cars/trucks, boats, and refrigerators, there are concerns that any one of these items could be leaking hazardous waste into the rail corridor.



Debris residual waste, and abandoned vehicles on the existing rail bed east of Dahlia Road



East of the Little Beaver Kill crossing is the bridge over Old Liberty Road. The existing bridge over Old Liberty Road is a concrete frame structure, spanning approximately 25 ft. with a 60 ft. width. The existing structure is approximately 100 years old, and although the structure was designed to carry significant live loads from the railroad, years of abandonment and neglect have led to leaking, cracking, and spalling of the structure, to a level that indicates the structure is near the end of its service life.



Existing bridge over Old Liberty Road

Beyond the structure, trail users can use Old Liberty Road or the existing rail bed. At the time of the site visit, the existing rail bed within this segment of the O&W Rail Trail was observed to be in fair to good condition. The ballast of the original O&W Railroad is exposed in some locations but generally is covered with organic material throughout the majority of this segment. There are some downed trees on the rail bed.

Old Liberty Road is an approximate 20 foot wide low-volume dead-end roadway in good condition. The existing roadway shows evidence of distress in the form of potholes, alligator cracking, and some raveling likely as a result of freeze/thaw action and potential heavy loading from when the roadway was open to through traffic. The areas of potholing are not contiguous to one another and indicate localized areas of stress. The areas of alligator, transverse, and longitudinal cracking are minor and expected. The edges of pavement are experiencing raveling, especially near the Sonoma Falls gate where vehicles have been turning off of the paved road onto the gravel area to Sonoma Falls.



Old Liberty Road pavement distress near the bridge



Raveling of the existing pavement is evident due to turnarounds near the Sonoma Falls gate



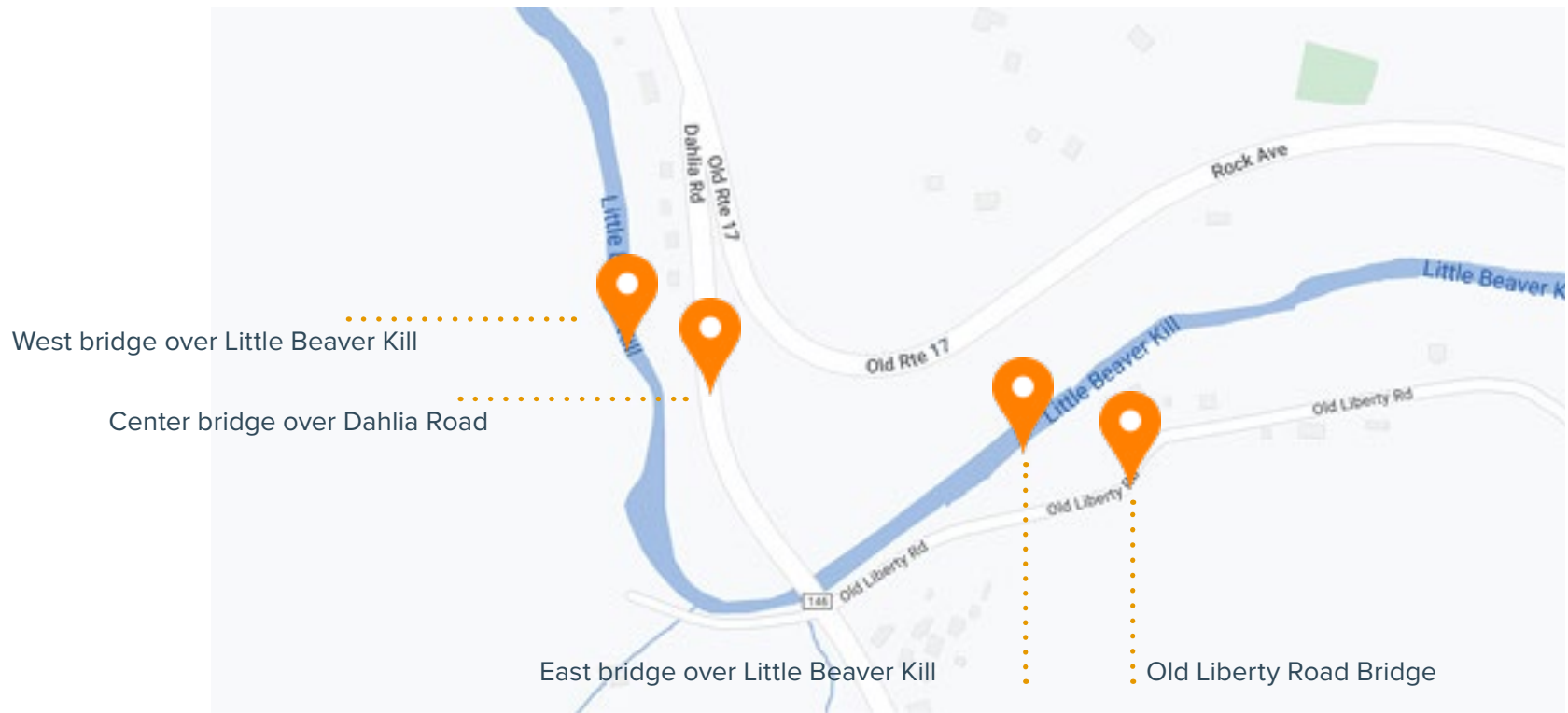
## PROPOSED SCOPE OF WORK FOR TRAIL SEGMENT CONSTRUCTION

This alternative on the original O&W Railroad alignment involves the construction or rehabilitation of four (4) bridge structures within the scoped project limits. From west to east along the proposed alignment, the first three (3) structures are new bridges where removed bridges once existed. The fourth bridge is an existing concrete frame

over Old Liberty Road. The bridges are:

- West bridge over Little Beaver Kill on the west side of Dahlia Road.
- Center bridge over Dahlia Road.
- East bridge over Little Beaver Kill.
- The fourth bridge is an existing concrete frame over Old Liberty Road.

The proposed West bridge over Little Beaver Kill for



this alternative would span from the existing railroad abutment on the west side of Little Beaver Kill, to a new shallow spread foundation on a fill-type wall connecting the West bridge and Center bridge at trail elevation. The proposed superstructure would be a 195 feet long single span prefabricated steel truss. Weathering steel is the proposed protective coating as it is the most cost-effective solution given the bridge parameters, such as clearance to water below and preventing deck leakage and runoff. The superstructure would provide a 13 foot wide concrete deck with a 12 foot wide trail and 6 inches wide raised curbs on each side. The cast-in-place concrete deck would provide an extended service life of the bridge, preventing leakage through the deck to the supporting superstructure members. The raised curbs prevent drainage from running off the deck onto the superstructure. Bridge rail and pedestrian fencing would be provided in accordance with current AASHTO guidance. In order to construct the bridge, a temporary causeway and shoring tower(s) would be needed protruding into the Little Beaver Kill, to temporarily support erection of the bridge.

To accommodate the proposed trail alignment and reduce the lateral earth pressure on the existing abutment, the west abutment backwall, approximately 12 feet in height, will be removed down to the bridge seat elevation. Approximately 2 feet in height of the existing bridge seat will be removed to construct a new cast-in-place concrete bridge seat and backwall anchored into the existing abutment. The existing

abutment is a mortared stone gravity abutment with concrete facing, founded on rock. The facing is in poor condition with surficial concrete repair expected on all exposed surfaces to remain. The east abutment would consist of a cast-in-place concrete shallow spread foundation with backwall.

A fill-type retaining wall structure would be constructed to carry the trail between the Little Beaver Kill west bridge and the bridge required to traverse over Dahlia Road (CR 146). This retaining structure would support the abutments on the respective end of the two bridges. The wall structure would be four-sided, approximately 110 feet long, 24 feet wide, and approximately 19 feet high. The wall structure would limit impacts to the adjacent parking area for recreational fishing and prevent encroachment onto adjacent property.

The proposed Center bridge over Dahlia Road spans from the fill-type wall structure to the top of the existing embankment on the east side of Dahlia Road, for a span length of 168 ft. The proposed superstructure, deck, and appurtenances are the same as the West bridge. The proposed west abutment within the fill-type structure would be the same as the east abutment of the west bridge. There are no remnants of the original O&W abutment on the east side of Dahlia Road. A new cast-in-place concrete shallow spread foundation with backwall is proposed at the top of the existing embankment on the east end of the bridge. In accordance with AASHTO and State standards, a 14 feet 6 inches minimum vertical clearance would be provided over Dahlia Road. The

existing overhead utilities along Dahlia Road will need to be relocated underground between poles on either side of the proposed bridge location.

The proposed East bridge over Little Beaver Kill spans from the existing railroad abutment on the west side of Little Beaver Kill to the existing railroad abutment on the east side of Little Beaver Kill, for a span length of 170 feet. The proposed superstructure, deck, and appurtenances are the same as the west bridge, except the superstructure and substructures would be skewed approximately 40 degrees to match the skew of the existing abutments. To reduce the lateral earth pressure on the existing abutment, the west and east abutment backwalls, approximately 12 feet in height, would be removed down to the bridge seats. Approximately 2 feet of the existing bridge seats would be removed to construct new cast-in-place concrete bridge seats and backwalls anchored into the existing abutments. The existing abutments are mortared stone gravity abutments with concrete facing, founded on rock. The facings are in poor condition with surficial concrete repair expected on all exposed surfaces to remain. In order to construct the bridge, a temporary causeway and shoring tower(s) will be needed protruding into the Little Beaver Kill, to temporarily support the erection of the bridge.

For the bridge over Old Liberty Road, extensive concrete surficial repairs will be required to adequately rehabilitate the structure. This assumes the internal concrete and reinforcement are sound, but ongoing deterioration and costly maintenance will lead to a required replacement, likely prior to a 25-year service life, which is typical for a bridge rehabilitation. The rigid concrete frame of the existing structure relies on the moment

connection between the top slab and legs for stability. In order for the top slab to be removed, the frame legs will have to be excavated to remove the lateral earth pressure, and progress with removal of the top slab and legs. The existing frame legs are unable to support a new structure for this reason. For the purpose of this project, it is assumed only rehabilitation of the existing structure will occur, but a replacement will be needed in the near future.

Trail construction consists of debris removal, clearing and grubbing operations, removal of organics, horizontal and vertical alignment adjustments, regrading of the trail, placement of a 6 inches subbase course and a 4 inches asphalt top course, stone dust shoulders, and the installation of safety rail on the segment leading from the Little Beaver Kill east bridge to the bridge over Old Liberty Road.



### ALTERNATIVE A ANALYSIS:

The existing route was evaluated using the criterion illustrated in the evaluation matrix and was dismissed for the following reasons:

- Lack of existing abutments east of Dahlia Road (CR 146) thereby increasing construction costs due to the need to create new abutments or piers to replace what was originally built.
- Presence of potentially hazardous waste debris on the existing rail bed.
- Presence of overhead utility wires on Dahlia Road (CR 146) that would require burial and would further increase the project construction cost.
- High cost of implementation as the second bridge over the Little Beaver Kill near Old Liberty Road has a significant span length to reach the existing abutments similar to the main bridge over the Little Beaver Kill.



Several abandoned vehicles are placed on the existing rail bed



Looking north on Dahlia Road where overhead utility wires would be in direct conflict with the proposed bridge over Dahlia Road

## ALTERNATIVE B:

### OVERVIEW

This route utilizes the existing abutments for the western Little Beaver Kill crossing similar to Alternative A. After crossing the Little Beaver Kill, the alignment follows Dahlia Road (CR 146) with a sidepath treatment. At the intersection of Dahlia Road (CR 146) and Old Liberty Road the trail then transitions from a dedicated protected/off-road route to an on-road shared roadway along Old Liberty Road. At the bridge over Old Liberty Road the trail can continue on-road as a shared roadway or traverse on a switchback ramp to reach the existing O&W railbed.

### EXISTING CONDITION

Dahlia Road (CR 146) provides 10-foot-wide lanes in each direction and does not have a posted speed limit. Dahlia Road has an estimated 2019 AADT of 561 vpd with 7% trucks. The roadway is in very good condition with little signs of wear. The existing bridge over the Little Beaver Kill (BIN 3356060) near the intersection of Old Liberty Road, was built in 1995 and is a steel multi-girder structure that has a rail-to-rail width of 29 feet. The bridge is owned and maintained by Sullivan County. It is composed of a concrete deck with an asphalt-wearing course. As noted under Alternative A, Old Liberty Road, is generally in good condition.



Dahlia Road bridge over the Little Beaver Kill

### PROPOSED SCOPE OF WORK FOR TRAIL SEGMENT CONSTRUCTION

This alternative requires the construction of One (1) pre-fabricated pedestrian bridge, a sidepath along Dahlia Road, and a shared roadway along Old Liberty Road. Details for each portion of the project are as follows:

This alternative involves one (1) new bridge structure on the original O&W railroad alignment over the Little Beaver Kill, on the west side of Dahlia Road. The proposed trail alignment turns off of the original railroad alignment at the east end of the bridge to follow a new alignment alongside Dahlia Road and Old Liberty Road. The bridge structure would be a new bridge where a removed bridge once existed.

The proposed bridge over Little Beaver Kill spans from the existing railroad abutment on the west side of Little Beaver Kill, to a new shallow spread foundation directly behind the remains of the existing bridge foundation. The proposed superstructure is a 195 feet long single span prefabricated steel truss.

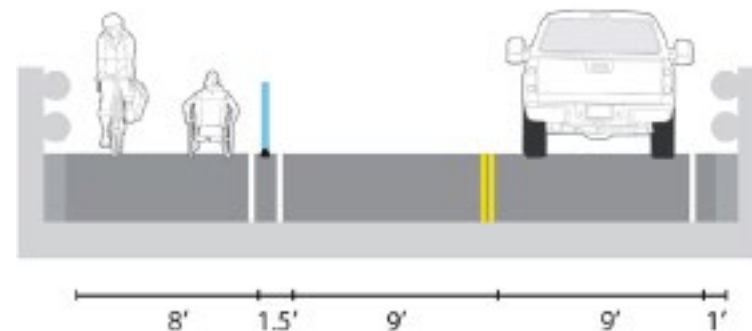
Weathering steel is the proposed protective coating as it is the most cost-effective solution given the bridge parameters, such as clearance to the water below and preventing deck leakage and runoff. The superstructure would provide a clear trail width of 12 feet, carried by an approximately 13 foot wide deck within the truss superstructure. A cast-in-place concrete deck is proposed to extend the service life of the bridge, preventing leakage through the deck to the supporting superstructure members. The deck would be curbed to prevent drainage from running off the deck onto the superstructure. Bridge rail and pedestrian fencing would be provided in accordance with current AASHTO guidance. To construct the bridge, a temporary causeway and shoring tower(s) will be needed protruding into the Little Beaver Kill, to temporarily support erection of the bridge.

To accommodate the proposed trail alignment and reduce the lateral earth pressure on the existing abutment, the west abutment backwall, approximately 12 feet in height, would be removed down to the bridge seat elevation. Approximately 2 feet in height of the existing bridge seat would be removed to reconstruct a new cast-in-place concrete bridge seat and backwall

anchored into the existing abutment.

The concrete facing is in poor condition with surficial concrete repair expected on all exposed surfaces to remain. The east abutment would consist of a cast-in-place concrete shallow spread foundation with backwall.

Following the pedestrian bridge, this alignment would include the construction of a 10 foot separated sidepath on the west side of Dahlia Road (CR 146) from the end of the proposed bridge to the bridge near Old Liberty Road. It is at this location where the sidepath will narrow to 8 feet.



Proposed section at the Dahlia Road Bridge crossing



## ALTERNATIVE B ANALYSIS

This hybrid route was evaluated using the criterion illustrated in the evaluation matrix. As a result of the analysis, this route has been deemed as the preferred route for the following reasons:

- Provides a unique user experience crossing over the Little Beaver Kill.
- Most feasible for constructability.
- Provides an opportunity for locals to access the trail without having to go to Livingston Manor or other non-designated entrance/exit locations.
- Enhances the visibility of the NYSDEC trout stream access area.
- Environmental permitting outside of the proposed bridge is minimal with little potential for hazardous waste issues.

Using Old Liberty Road as a shared roadway (sub-alternative A) is recommended as the preferred route for continuing the trail to the Sonoma Falls gate due to the Old Liberty Road being a dead-end, have low vehicular volumes, and be in good condition.

## ALTERNATIVE C:

### OVERVIEW

During the feasibility study (2017), this route was identified as an alternative to traveling on-road from Sonoma Falls to Livingston Manor. While sending trail users on an on-road route was not ideal, it was beyond the scope of the 2017 feasibility study to fully evaluate the potential of this route. In 2020, this route was evaluated to determine if the alignment could be ADA compliant with grades less than 5%.

The route connects Dahlia Road to the western Little Beaver Kill abutments via a private access driveway followed by a new trail. The route would be approximately 0.3 miles.

### PROPOSED SCOPE OF WORK FOR TRAIL SEGMENT CONSTRUCTION

This alternative would requires the construction of:

Four (4) vehicle rated bridges/large culverts for both motorized and non-motorized access. The bridges/culverts would convey water flows from tributaries to the Little Beaver Kill and would replace cross culverts and an existing bridge near Dahlia Road. The bridges would range in size and would require new abutments at each location. Dewatering operations would be required to build the structures in addition to extensive permitting, since the Little Beaver Kill is a trout stream and the tributaries are similarly regulated.



Looking north on Dahlia Road where overhead utility wires would be in direct conflict with the proposed bridge over Dahlia Road

Beyond the bridges, the remaining segment of the route would consist of typical trail construction including clearing and grubbing operations, removal of organics and rock (blasting potential), new grading to create an ADA compliant horizontal and vertical alignment, placement of a 6 inches subbase course and a 4 inches asphalt top course, stone dust shoulders, and the installation of safety rail for nearly the entire route from the intersection with Old Liberty Road to the existing rail bed near the Little Beaver Kill west abutment.

Given this route would be a shared access drive for both the landowner(s) and trail users, appropriate shared roadway signage would be required in addition to a wider trail section to accommodate vehicular traffic. It is recommended the trail be a minimum of 12 feet wide through this segment until the trail leaves shared access and traverses towards the existing rail bed.

## ALTERNATIVE C ANALYSIS

While an ADA-accessible route was identified, there are several complications to this route which include the following:

- The route traverses private property resulting in the need for additional right-of-way. This would not only increase the project cost but also increase the risk that individual parcels may not be available for purchase or donation.
- The primary trail route is located on the existing driveway to the homes that are on the private land needed for the trail. This shared use (trail and private access) presents a challenge for maintenance and ownership of the land. Additional agreements between the Town and landowner would be required prior to construction of the trail.
- During the site visit, the terrain was observed to have rock outcroppings. This observation coupled with the knowledge that the existing Little Beaver Kill western abutment is partially integrated with existing bedrock further supports the assumption that bedrock is present throughout the trail alignment. While further investigations would be needed to confirm and determine the extent of bedrock through the alignment, it is assumed that bedrock is present, requiring the need for blasting operations.
- The proposed trail alignment would cut through a portion of the existing mountainside west of the

trail. There are concerns that these operations may destabilize the upland side of the trail. Without a full geotechnical investigation of the area, the impact the trail would have on the mountain is unknown.

- Approximately four (4) bridges or large culverts would be required to traverse tributaries to the Little Beaver Kill including a replacement to the existing structure near the intersection of Dahlia Road (CR 146) and Old Liberty Road. These structures increase the project costs and present a challenge with ownership and maintenance for both the Town and adjacent landowners.

For the reasons noted, this trail alignment has been dismissed.



## EVALUATION CRITERIA

### OVERVIEW

Evaluation and screening of the alignment options was accomplished by constructing a decision-matrix that scores each alignment segment by agreed upon criteria. The matrix below shows a color-coded system indicating the level of ease or difficulty for each alternative within the respective categories.

Evaluation follows a good, better, best rating system for each alternative with green equating to best, yellow equating to good, and orange equating to poor.

The criteria within the table were determined based on discussions with the Towns and Sullivan County. The criteria are listed left to right with those criteria to the left side of the table having the greatest importance to the Town of Rockland and the County. As a result, the criteria that greatly affect which alternative was selected as the preferred are the Relative cost, environmental permitting, and private property impacts. These criteria have fiscal impacts to the Towns and County that dramatically affect the Towns' financial burdens and the speed at which the project can be implemented. A brief description of each of the criteria is as follows:

**Environmental Permitting:** Anticipated environmental impacts on the surrounding land and the associated permitting needed for successful project implementation.

**Relative Cost:** Project cost of the alternative. Alternatives that are least expensive will rank better than those with higher project costs.

**Implementation:** Anticipated ease of construction with consideration given to the availability of construction staging areas and access. Alternatives that have multiple staging areas available, multiple access points minimizing the number of one-way trucking that will occur will rank better than those that have limited contractor construction options.

**User Experience:** Projected experience of the user considering the design treatments suggested for each alternative. This includes the proposed vertical grades, exposure to traffic, access to historical elements (such as bridges), availability for vistas, points of interest, and anticipated level of comfort for a variety of users. Alternatives that have are expected to feel more comfortable will rank better than those that may not offer comfort or points of interest.

**Accessibility:** Ease of a trail user to get on or off the trail. Alternatives that have a higher number of potential access points will rank better than those that provide limited access points.

**Private property impacts:** The number of property impacts will greatly impact the successful implementation of the project. Therefore, projects where all necessary right-of-way is already owned or in the process of being acquired will rank better than those where right-of-way is needed and discussions with landowners haven't started.

**Maintenance:** This includes both long and short term maintenance of the infrastructure, which could include repaving, bridge inspections, re-striping, erosion control for stone dust segments, and eventual full replacements of failing infrastructure. Alternatives that require the least maintenance will rank better than the projects where maintenance is more frequent or has a higher cost for repair or replacement.

**PREFERRED ALTERNATIVE:**

Based on the analysis presented and reflected upon in the evaluation matrix and discussions with the Town of Rockland, Alternative B in conjunction with sub-alternative 1 have been deemed the preferred alternative. This route includes a new bridge over the Little Beaver Kill, a sidepath along Dahlia Road, and a shared roadway condition along Old Liberty Road to the Sonoma Falls gate.

	Alternatives	Relative cost	Environmental permitting	Private property impacts	Implementation	User experience	Maintenance	Compliance with Accessibility Requirements
	Alternative A	✓	✓	✓	✓	✓	✓	✓
✓ Preferred Alternative	Alternative B	✓	✓	✓	✓	✓	✓	✓
	Alternative C	✓	✓	✓	✓	✓	✓	✓
	Sub Alt 1	✓	✓	✓	✓	✓	✓	✓
	Sub Alt 2	✓	✓	✓	✓	✓	✓	✓



Proposed bridge and sidepath along Dahlia Road as part of the preferred Alternative B.

## COST OF THE PROJECT

This planning level cost estimate is based on a preliminary engineering review conducted as part of this study and includes the elements noted in the scope previously discussed. The cost of the prefabricated bridges was determined by coordinating with several bridge manufacturers and adjusting the price based on historical costs for bridge erection and finishing. While a preliminary design has been prepared, this design is not complete, therefore a 30% contingency has been added to the cost estimate to account for minor items and features not known at the time of preparation. The cost for this segment of trail is approximately \$4.2M.

Note that Alta has no control over the final design of the project, the cost of labor, materials, equipment or services furnished by others, over the Contractor(s) methods of determining prices, and/or over competitive bidding or market conditions. Alta's planning cost estimate is made on the basis of Alta's experience and qualifications and represents Alta's best judgment familiar with the construction industry and the proposed project concept; but Alta cannot and does not guarantee that proposals, bids, or actual project costs will not vary from the planning level cost estimate prepared by Alta.



## NEXT STEPS

The successful implementation of this phase of the overall project will follow several steps after the publication of this report. These steps include:

- Identifying potential funding sources (see Implementation).
- Environmental, geotechnical, and structural investigations as described below.
- Design and Permitting.
- Trail construction.
- The following provides further detail and strategies to follow these steps.
- While a preliminary structural assessment was conducted during the site visit, a more detailed analysis will be required to determine the specific areas of improvement on the abutments.
- As-built records of the Dahlia Road Bridge over the Little Beaver Kill to confirm assumptions about the makeup of the abutments.
- Environmental assessment of the Little Beaver Kill including flood zone information.
- Coordination with NYSDEC Natural Heritage program to identify trout stream restrictions and coordinate on the trout stream access adjacent to Dahlia Road.

In addition to the segment specific recommendations, all segments of the project should follow the State Environmental Quality Review (SEQR) and National Environmental Policy Act (NEPA) processes. This would include documenting the results of the environmental review in the Federal Environmental Approvals Worksheet. Elements expected to require review and concurrence include:

- Section 106 review and clearance from the NYS Office of Parks, Recreation, and Historic Preservation (NYS OPRHP).
- ESA Section 7 Threatened and Endangered Species review from US Fish and Wildlife (USFWS).
- Wetland inventory and documentation from NYSDEC and ACO.

# IMPLEMENTATION

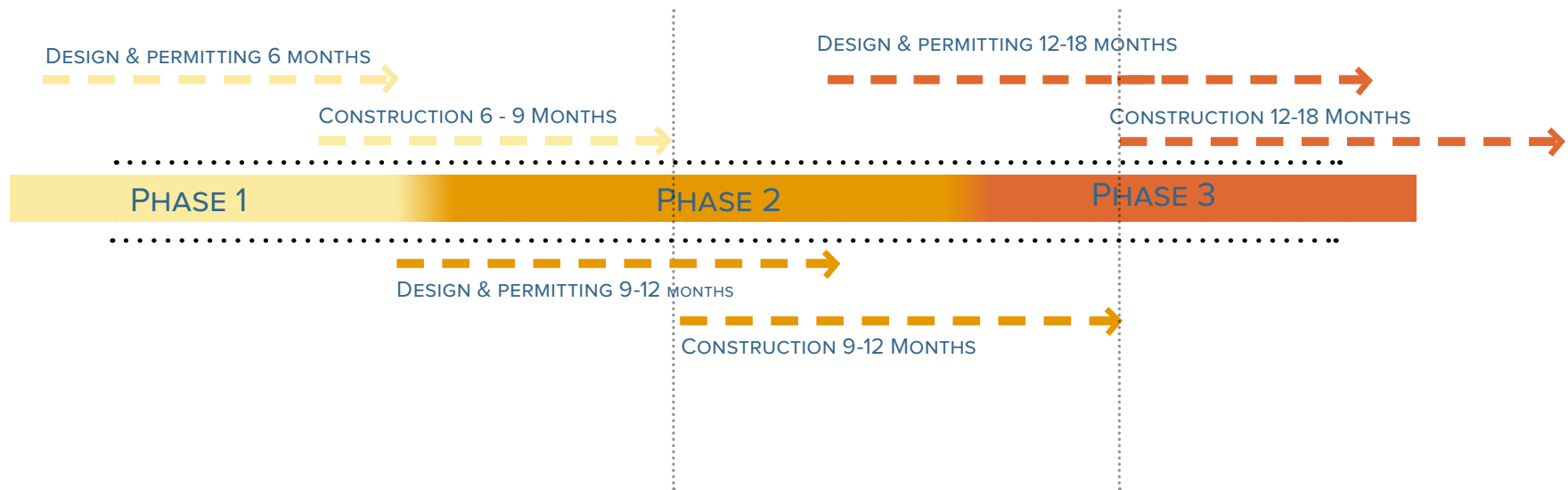
A landscape photograph showing a river with a person in a green vest standing on the bank. The scene is framed by bare trees in the foreground and a clear blue sky. The word 'IMPLEMENTATION' is overlaid in white text.

## CONSTRUCTION PHASING:

### METHODOLOGY

In coordination with the Sullivan County O&W Trail Alliance, the Towns of Rockland and Liberty, and based on the benefits each individual phase provides. The phasing strategy affords each subsequent phases the time needed to secure funding as well as design and permit each phase. Phase 3 has the most design and permitting effort required of the three phases. Additionally, it is the most expensive of the three phases and is currently not funded. By building phases 1 and 2 first, trail users would be able to continue from Parksville Rail Trail to Livingston Manor using the on-road route from Dahlia Road into Town.

It is assumed that the County and other project partners will begin securing funding as early as Summer 2022.





## FUNDING

There are a variety of funding resources available for trail projects. Due to the scale and phasing of this project, it is likely that a multi-year effort using multiple funding sources will be needed to complete the three phases of the Sullivan O&W Rail Trail covered in this report. This chapter provides a summary of various funding sources, and which funding sources apply to the specific recommendations of this analysis. It should be noted that this list is not all inclusive. New programs are created, others renamed, and funding allocations and limitations often change with new reauthorizations of transportation funding at the state and federal levels.

### FEDERAL FUNDING

Federal funding is secured through grant programs administered by state agencies, such as New York State Parks (NYS Parks) and the New York State Department of Transportation (NYSDOT) and occasionally directly from federal agencies, such as RAISE grants from USDOT and brownfield cleanup funds from the EPA. Federal transportation programs provide the largest percentage of funding needed for bicycle and pedestrian infrastructure. Generally, state and local governments will match the federal funds using their own programs. While the local match varies between grants, most federal grants provide 80% and require a 20% local match. Successful grant allocation is generally competitive. Support of both state and federal officials, and local representation at state agencies, will help to make grant applications more successful.

### STATE FUNDING

State funds vary in match requirements but commonly are a 50/50 match and are smaller amounts relative to federal funds. State transportation funding is primarily secured through grant programs run by the state, such as NYS Parks and NYSDOT. Most grants can be applied for through the Consolidated Funding Application (CFA), typically due in mid-summer each year. In some cases, state funds can be used as match to federal funding.

The CFA process streamlines the process for municipalities and interested parties to secure project funding. The single application is typically due at the end of July every year and grants are awarded the following Spring. NYS Parks Matching Grants, Historic Preservation Grants, Heritage Areas, Acquisition, and LWRP programs are accessed through the CFA process.

## DESCRIPTION OF FEDERAL FUNDING SOURCES OVERVIEW

Activity	TAP	RTP	RAISE	HSIP	STBG
PHASE 1: Parksville Trailhead to Sonoma Falls Gate	✓	✓		✓	✓
PHASE 2: Rotary Park to the Little Beaver Kill Trail Gap	✓	✓	✓		
PHASE 3: Little Beaver Kill Trail Gap to Sonoma Falls Gate	✓	✓		✓	✓

## FEDERAL FUNDING

Federal funding can help implement a project by either direct allocations to eligible agencies, or by grant awards to eligible partners. These options are listed below.

## GRANT STREAMS AVAILABLE

**RAISE:** Rebuilding American Infrastructure with Sustainability and Equity

Funds multi-modal and multi-jurisdictional surface transportation projects that will provide a significant local or regional impact.

Application deadline: Typically May

Website: <https://www.transportation.gov/RAISEgrants>

Facilitated by: FHWA

**CMAQ:** Congestion Mitigation and Air Quality Improvement Program

Funds projects that provide an air quality benefit, including transit, bicycle, and pedestrian projects.

Application deadline: Typically October

Website: [https://www.fhwa.dot.gov/environment/air\\_quality/cmaq/](https://www.fhwa.dot.gov/environment/air_quality/cmaq/)

Facilitated by: NYSDOT

**TA:** Transportation Alternatives Set-Aside

A set aside of STBG funding, these funds are specific to on and off road bicycle and pedestrian facilities.

Application deadline: Yearly

Website: [https://www.fhwa.dot.gov/environment/transportation\\_alternatives/overview/](https://www.fhwa.dot.gov/environment/transportation_alternatives/overview/)

Facilitated by: NYSDOT

**RTP:** Recreational Trails Program

A set aside of TA funding, these funds are available to maintain and construction recreational motorized and non-motorized trails.

Application deadline: Mid-Summer, every other year

Website: [https://www.fhwa.dot.gov/environment/recreational\\_trails/](https://www.fhwa.dot.gov/environment/recreational_trails/)

Facilitated by: NYS OPRHP

### STANDARD FUNDING STREAMS AVAILABLE

HSIP: Highway Safety Improvement Program

Funds safety projects, consistent with New York's strategic highway safety plan and address safety problems.

Application deadline: Rolling

Website: <https://safety.fhwa.dot.gov/hsip/about.cfm>

Facilitated by: NYSDOT

STBG: Surface Transportation Block Grant Program

Funds maintenance and enhancement of surface transportation, including highway, transit, intercity bus, bicycle and pedestrian projects.

Application deadline: Occurs every other year

Website: <https://www.fhwa.dot.gov/specialfunding/stp>

Facilitated by: NYSDOT



## DESCRIPTION OF STATE FUNDING SOURCES

Activity	CHIPS	CDBG	CTG	EPF	LWRP	CSC
PHASE 1: Parksville Trailhead to Sonoma Falls Gate		✓	✓	✓		
PHASE 2: Rotary Park to the Little Beaver Kill Trail Gap		✓	✓	✓		
PHASE 3: Little Beaver Kill Trail Gap to Sonoma Falls Gate	✓	✓	✓			

## STATE FUNDING

State funding can help implement a project by either direct allocations to eligible agencies, or by grant awards to eligible partners. These options are listed below.

## STANDARD FUNDING STREAMS AVAILABLE

**CHIPS:** Consolidated Local Street and Highway Improvement Program

Funds roadway resurfacing and associated pedestrian and bicycle improvements.

Annual funding allocation

Website: <https://www.dot.ny.gov/programs/chips>

Facilitated by: NYSDOT

## GRANT STREAMS AVAILABLE

**CDBG:** Community Block Grant Program

Funds infrastructure improvements that prevent or eliminate blight and/or address community development in low-moderate income areas.

Application Deadline: CFA application - typically July each year

Website: <https://hcr.ny.gov/community-development-block-grant>

Facilitated by: NYS Housing and Community

**CTG:** Conservancy Trail Grants

Funds are available for trail construction, improvement, education or interpretation projects. Grants are available to assist with planning efforts.

Application Deadline: Quarterly

Website: <https://hudsongreenway.ny.gov/grants-funding>

Facilitated by: Hudson River Valley Greenway

EPF: Environmental Protection Fund Grants Program for Parks, Preservation and Heritage

Funds planning and development of parks and recreational facilities.

Application Deadline: CFA application - typically July each year

Website: <https://parks.ny.gov/grants/grant-programs.aspx>

Facilitated by: NYS OPRHP

### OTHER FUNDING STREAMS AVAILABLE

While the LWRP and CSC grants are available, there is a lower likelihood of funding a major portion of the project. However, these funding streams could be useful additions to the funding package if written into a larger grant proposal.

LWRP: Local Waterfront Revitalization Program

EPF Funding is available to assist communities with implementation of an approved LWRP.

Application Deadline: CFA application - typically July each year

Website: <https://www.dos.ny.gov/opd/programs/lwrp.html>

Facilitated by: NYSDOS

CSC: Climate for Smart Communities Grant Program

Funds climate change adaptation and mitigation projects, including corridor projects that increase bicycle and pedestrian travel and reduce greenhouse gas emissions.

Application Deadline: CFA application - typically July each year

Website: <https://www.dec.ny.gov/energy/109181.html>

Facilitated by: NYS DEC

### SMALLER GRANTS

This small sampling of grants typically provide smaller funding allotments, but are useful to close funding gaps to supplement already secured larger grants. These not-for-profit agencies can serve as project champions and ambassadors for projects which also aides in securing project funding, recognition, and visibility.

- Sullivan Renaissance
- Sullivan 180
- Laura Jane Musser Fund
- American Hiking Society National Trails Fund
- Bikes Belong Coalition Grants
- Conservation Alliance Grants
- Ben & Jerry's Foundation

# APPENDICES



# APPENDIX A:

## COST ESTIMATE

**Sullivan O&W Rail Trail Parksville to Livingston Manor**

*Phase I: Parksville Trailhead to Sonoma Falls Gate*

July 28, 2022

**Description of Major Improvements:**

New Construction 7,590 feet of 10' wide shared use path

New Construction 840 feet of 10' wide sidepath

Retaining wall with safety fence adjacent to Little Beaver Kill

ITEM DESCRIPTION	UNITS	PRICE	QUANTITY	TOTAL
UNCLASSIFIED EXCAVATION AND DISPOSAL / EMBANKMENT IN PLACE	CY	\$60.00	5900	\$354,000
TRAIL - STONE DUST	CY	\$160.00	1160	\$185,600
TRAIL - ASPHALT	SF	\$7.50	4130	\$30,975
TRAIL - SUBBASE	CY	\$90.00	1570	\$141,300
STONE DUST SHOULDERS	CY	\$160.00	220	\$35,200
CLEARING AND GRUBBING	LS	\$100,000.00	1	\$100,000
LANDSCAPING (INCLUDING TOPSOIL AND SEED)	LS	\$55,000.00	1	\$55,000
RETAINING WALL	SF	\$125.00	930	\$116,250
SIGNING	EA	\$735.00	28	\$20,580
DRAINAGE PIPE	LF	\$70.00	200	\$14,000
DRAINAGE END WALLS	EA	\$500.00	16	\$8,000
SAFETY RAILING	LF	\$115.00	1300	\$149,500
BOX BEAM GUIDERAIL	LF	\$70.00	280	\$19,600
EROSION CONTROL	LS	\$150,000.00	1	\$150,000
WORK ZONE TRAFFIC CONTROL	LS	5%	1	\$69,900
SURVEY AND STAKEOUT	LS	6%	1	\$82,900

CONSTRUCTION SUB-TOTALS	\$	1,381,000
MINOR ITEMS (5%)	\$	691,000
<b>SUBTOTAL (2022 DOLLARS):</b>	\$	2,072,000
CONTINGENCY (30%)	\$	622,000
<b>SUBTOTAL (2022 DOLLARS):</b>	\$	2,694,000
FIELD CHANGE PAYMENT	\$	135,000
<b>SUBTOTAL (2022 DOLLARS):</b>	\$	2,829,000
MOBILIZATION (4%)	\$	114,000
<b>SUBTOTAL (2022 DOLLARS):</b>	\$	2,943,000
EXPECTED AWARD AMOUNT (7.0% INFLATION)	\$	3,370,000
DESIGN AND ENGINEERING (10%)	\$	337,000
CONSTRUCTION INSPECTION (18%)	\$	607,000
ROW COSTS (2022 DOLLARS)	\$	-
<b>TOTAL ALTERNATIVE COSTS (2024 DOLLARS):</b>	\$	4,314,000

**Sullivan O&W Rail Trail Parksville to Livingston Manor**

*Phase IA: Parksville Trailhead to Existing O&W Rail Bed*

July 28, 2022

**Description of Major Improvements:**

New Construction 415 feet of 10' wide shared use path

New Construction 840 feet of 10' wide sidepath

Retaining wall with safety fence adjacent to Little Beaver Kill

ITEM DESCRIPTION	UNITS	PRICE	QUANTITY	TOTAL
UNCLASSIFIED EXCAVATION AND DISPOSAL / EMBANKMENT IN PLACE	CY	\$60.00	2700	\$162,000
TRAIL - STONE DUST	CY	\$160.00	110	\$17,600
TRAIL - ASPHALT	SF	\$7.50	4130	\$30,975
TRAIL - SUBBASE	CY	\$90.00	240	\$21,600
STONE DUST SHOULDERS	CY	\$160.00	40	\$6,400
CLEARING AND GRUBBING	LS	\$20,000.00	1	\$20,000
LANDSCAPING (INCLUDING TOPSOIL AND SEED)	LS	\$15,000.00	1	\$15,000
RETAINING WALL	SF	\$125.00	930	\$116,250
SIGNING	EA	\$735.00	24	\$17,640
DRAINAGE PIPE	LF	\$70.00	25	\$1,750
DRAINAGE END SECTIONS	EA	\$500.00	2	\$1,000
SAFETY RAILING	LF	\$115.00	370	\$42,550
BOX BEAM GUIDERAIL	LF	\$65.00	270	\$17,558
EROSION CONTROL	LS	\$25,000.00	1	\$25,000
WORK ZONE TRAFFIC CONTROL	LS	7%	1	\$34,700
SURVEY AND STAKEOUT	LS	6%	1	\$29,800

CONSTRUCTION SUB-TOTALS	\$	496,000
MINOR ITEMS (5%)	\$	25,000
<b>SUBTOTAL (2022 DOLLARS):</b>	\$	521,000
CONTINGENCY (30%)	\$	157,000
<b>SUBTOTAL (2022 DOLLARS):</b>	\$	678,000
FIELD CHANGE PAYMENT	\$	34,000
<b>SUBTOTAL (2022 DOLLARS):</b>	\$	712,000
MOBILIZATION (4%)	\$	29,000
<b>SUBTOTAL (2022 DOLLARS):</b>	\$	741,000
EXPECTED AWARD AMOUNT (7.0% INFLATION)	\$	849,000
DESIGN AND ENGINEERING (13%)	\$	110,400
CONSTRUCTION INSPECTION (18%)	\$	153,000
ROW COSTS (2022 DOLLARS)	\$	-
<b>TOTAL ALTERNATIVE COSTS (2024 DOLLARS):</b>	\$	<b>1,113,000</b>





**Sullivan O&W Rail Trail Parksville to Livingston Manor**

*Phase IB: Existing O&W Rail Bed to Sonoma Falls Gate*

July 28, 2022

**Description of Major Improvements:**

New Construction 7,180 feet of 10' wide shared use path

ITEM DESCRIPTION	UNITS	PRICE	QUANTITY	TOTAL
UNCLASSIFIED EXCAVATION AND DISPOSAL / EMBANKMENT IN PLACE	CY	\$60.00	3200	\$192,000
TRAIL - STONE DUST	CY	\$160.00	1050	\$168,000
TRAIL - SUBBASE	CY	\$90.00	1330	\$119,700
STONE DUST SHOULDERS	CY	\$160.00	180	\$28,800
CLEARING AND GRUBBING	LS	\$80,000.00	1	\$80,000
LANDSCAPING (INCLUDING TOPSOIL AND SEED)	LS	\$40,000.00	1	\$40,000
SIGNING	EA	\$735.00	4	\$2,940
DRAINAGE PIPE	LF	\$70.00	175	\$12,250
DRAINAGE END SECTIONS	EA	\$500.00	14	\$7,000
SAFETY RAILING	LF	\$115.00	900	\$103,500
EROSION CONTROL	LS	\$125,000.00	1	\$125,000
WORK ZONE TRAFFIC CONTROL	LS	4%	1	\$35,200
SURVEY AND STAKEOUT	LS	6%	1	\$52,800

CONSTRUCTION SUB-TOTALS	\$	880,000
MINOR ITEMS (5%)	\$	44,000
<b>SUBTOTAL (2022 DOLLARS):</b>	\$	924,000
CONTINGENCY (30%)	\$	278,000
<b>SUBTOTAL (2022 DOLLARS):</b>	\$	1,202,000
FIELD CHANGE PAYMENT	\$	61,000
<b>SUBTOTAL (2022 DOLLARS):</b>	\$	1,263,000
MOBILIZATION (4%)	\$	51,000
<b>SUBTOTAL (2022 DOLLARS):</b>	\$	1,314,000
EXPECTED AWARD AMOUNT (7.0% INFLATION)	\$	1,505,000
DESIGN AND ENGINEERING (13%)	\$	195,700
CONSTRUCTION INSPECTION (18%)	\$	271,000
ROW COSTS (2022 DOLLARS)	\$	-
<b>TOTAL ALTERNATIVE COSTS (2024 DOLLARS):</b>	\$	<b>1,972,000</b>

**Sullivan O&W Rail Trail Parksville to Livingston Manor**

*Phase II: Little Beaver Kill Trail Gap to Rotary Park*

**June 29, 2022**

**Description of Major Improvements:**

New Construction 6,400 feet of 10' wide shared use path

Address 3 washout areas with closed drainage

Four-sided box culvert for major washout

ITEM DESCRIPTION	UNITS	PRICE	QUANTITY	TOTAL
UNCLASSIFIED EXCAVATION AND DISPOSAL / EMBANKMENT IN PLACE	CY	\$60.00	6100	\$366,000
TRAIL - ASPHALT AND SUBBASE	SF	\$7.50	64100	\$480,750
STONE DUST SHOULDERS	CY	\$160.00	200	\$32,000
CLEARING AND GRUBBING	LS	\$85,000.00	1	\$85,000
LANDSCAPING (INCLUDING TOPSOIL AND SEED)	LS	\$50,000.00	1	\$50,000
SIGNING	EA	\$735.00	4	\$2,940
KIOSK	EA	\$6,000.00	1	\$6,000
DRAINAGE BASINS	EA	\$5,000.00	3	\$15,000
DRAINAGE PIPE	LF	\$70.00	400	\$28,000
DRAINAGE END SECTIONS	EA	\$500.00	12	\$6,000
BOX CULVERT	EA	\$107,445.00	1	\$107,445
SAFETY RAILING	LF	\$115.00	600	\$69,000
WOOD BOARD FENCE	LF	\$115.00	200	\$23,000
EROSION CONTROL	LS	\$135,000.00	1	\$135,000

CONSTRUCTION SUB-TOTALS	\$	1,407,000
MINOR ITEMS (5%)	\$	71,000
<b>SUBTOTAL (2022 DOLLARS):</b>	\$	1,478,000
CONTINGENCY (30%)	\$	444,000
<b>SUBTOTAL (2022 DOLLARS):</b>	\$	1,922,000
FIELD CHANGE PAYMENT	\$	97,000
<b>SUBTOTAL (2022 DOLLARS):</b>	\$	2,019,000
MOBILIZATION (4%)	\$	81,000
<b>SUBTOTAL (2022 DOLLARS):</b>	\$	2,100,000
EXPECTED AWARD AMOUNT (7.0% INFLATION)	\$	2,573,000
DESIGN AND ENGINEERING (10%)	\$	257,300
CONSTRUCTION INSPECTION (20%)	\$	515,000
ROW COSTS (2022 DOLLARS)	\$	-
<b>TOTAL ALTERNATIVE COSTS (2025 DOLLARS):</b>	\$	<b>3,346,000</b>

**Sullivan O&W Rail Trail Parksville to Livingston Manor**

Phase III: Little Beaver Kill Trail Gap

July 28, 2022

**Description of Major Improvements:**

New prefabricated pedestrian bridge

Construction 590 feet of 10' wide shared use sidepath along Dahlia Road

Signage along Old Liberty Road

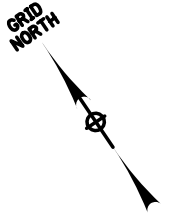
ITEM DESCRIPTION	UNITS	PRICE	QUANTITY	TOTAL
UNCLASSIFIED EXCAVATION AND DISPOSAL / EMBANKMENT IN PLACE	CY	\$60.00	1500	\$90,000
MILLING AND OVERLAY OF DAHLIA ROAD	SF	\$34.25	1976	\$67,678
DAHLIA ROAD SIDEPATH AND CROSSING	SF	\$6.00	6607	\$39,644
STONE DUST SHOULDERS	CY	\$160.00	11	\$1,760
PEDESTRIAN BRIDGE	LS	\$1,205,070.00	1	\$1,205,070
BOX BEAM GUIDE RAILING	LF	\$70.00	466	\$32,620
CLEARING AND GRUBBING	LS	\$50,000.00	1	\$50,000
LANDSCAPING (INCLUDING TOPSOIL AND SEED)	LS	\$30,000.00	1	\$30,000
SIGNING	EA	\$735.00	8	\$5,880
STRIPING	LF	\$2.55	2627	\$6,700
FLEXIBLE DELINEATORS	EA	\$100.00	32	\$3,200
EROSION CONTROL	LS	\$60,000.00	1	\$60,000

CONSTRUCTION SUB-TOTALS	\$	1,593,000
MINOR ITEMS (10%)	\$	160,000
<b>SUBTOTAL (2022 DOLLARS):</b>	\$	1,753,000
CONTINGENCY (30%)	\$	526,000
<b>SUBTOTAL (2022 DOLLARS):</b>	\$	2,279,000
FIELD CHANGE PAYMENT	\$	114,000
<b>SUBTOTAL (2022 DOLLARS):</b>	\$	2,393,000
MOBILIZATION (4%)	\$	96,000
<b>SUBTOTAL (2022 DOLLARS):</b>	\$	2,489,000
EXPECTED AWARD AMOUNT (7.0% INFLATION)	\$	3,263,000
DESIGN AND ENGINEERING (10%)	\$	326,300
CONSTRUCTION INSPECTION (20%)	\$	653,000
ROW COSTS (2022 DOLLARS)	\$	-
<b>TOTAL ALTERNATIVE COSTS (2026 DOLLARS):</b>	\$	<b>4,243,000</b>

## APPENDIX B:

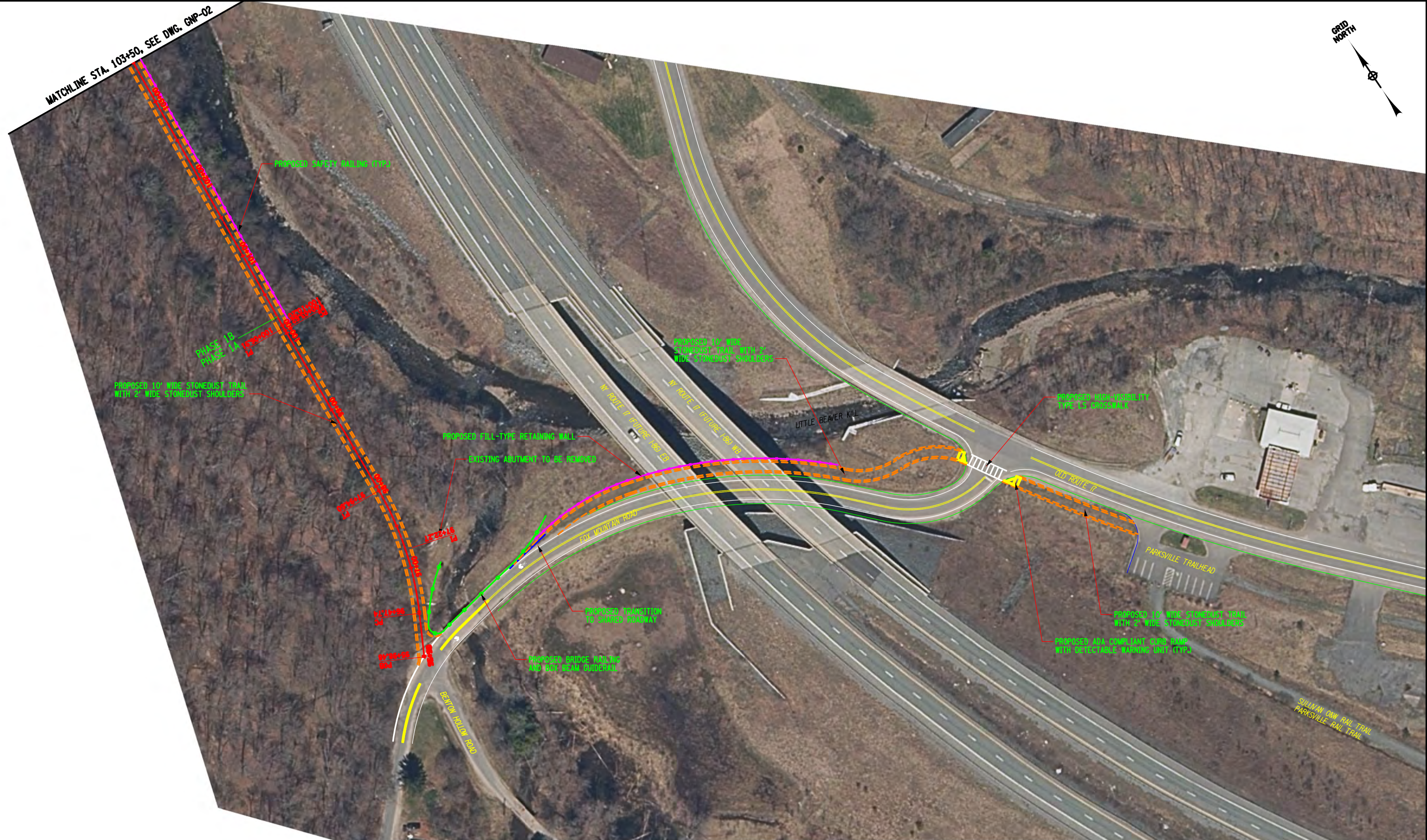
### PLAN VIEW DRAWINGS





MATCHLINE STA. 103+50, SEE DWG. GNP-02

PROJECT MANAGER K. DI COCCO  
CHECK M. REPSCH  
DRAFTING K. DI COCCO  
CHECK M. REPSCH  
DESIGN K. DI COCCO  
JOB MANAGER K. DI COCCO  
DESIGN SUPERVISOR M. REPSCH  
FILE NAME = 28-JUL-2022 14:27  
DATE/TIME =  
USER = KristelDiCocco



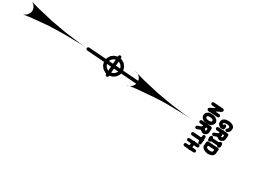
AS-BUILT REVISIONS
DESCRIPTION OF ALTERATIONS:

COUNTY: SULLIVAN	REGION: 9

<b>alta</b> www.altago.com 1801 6th Avenue, Suite 204 Troy, NY 12180 518-874-4211	<b>H+Z</b> Engineering • Landscape Architecture, OPC 1801 6th Avenue, Suite 204 Troy, NY 12180 518-874-4211
---	--

CULVERTS	ALL DIMENSIONS IN FT UNLESS OTHERWISE NOTED	CONTRACT NUMBER
	GENERAL PLAN PHASE 1A / PHASE 1B	DRAWING NO. GNP-01 SHEET NO. 01





MATCHLINE STA. 103+50, SEE DWG. GNP-02

MATCHLINE STA. 118+50, SEE DWG. GNP-02

AS-BUILT REVISIONS DESCRIPTION OF ALTERATIONS: ----- ----- -----	COUNTY: SULLIVAN		REGION: 9		<b>alta</b> <small>www.altago.com</small> 1801 6th Avenue, Suite 204 Troy, NY 12180 518-874-4211	<b>H+Z</b> <small>Engineering • Landscape Architecture, P.C.</small> 1801 6th Avenue, Suite 204 Troy, NY 12180 518-874-4211	CULVERTS	ALL DIMENSIONS IN FT UNLESS OTHERWISE NOTED	CONTRACT NUMBER
								GENERAL PLAN PHASE 1B	DRAWING NO. GNP-02
									SHEET NO. 02



FILE NAME = 28-JUL-2022 14:28  
 DATE/TIME = KristelDiCocco  
 USER = KristelDiCocco

DESIGN SUPERVISOR M. REPSCH  
 JOB MANAGER K. DI COCCO  
 DESIGN K. DI COCCO  
 CHECK M. REPSCH  
 DRAFTING K. DI COCCO  
 CHECK M. REPSCH  
 PROJECT MANAGER K. DI COCCO

MATCHLINE STA. 118+50, SEE DWG. GNP-02



MATCHLINE STA. 133+00, SEE DWG. GNP-04

AS-BUILT REVISIONS DESCRIPTION OF ALTERATIONS:

COUNTY: SULLIVAN	REGION: 9
------------------	-----------

**alta**  
 www.altago.com  
 1801 6th Avenue, Suite 204  
 Troy, NY 12180  
 518-874-4211

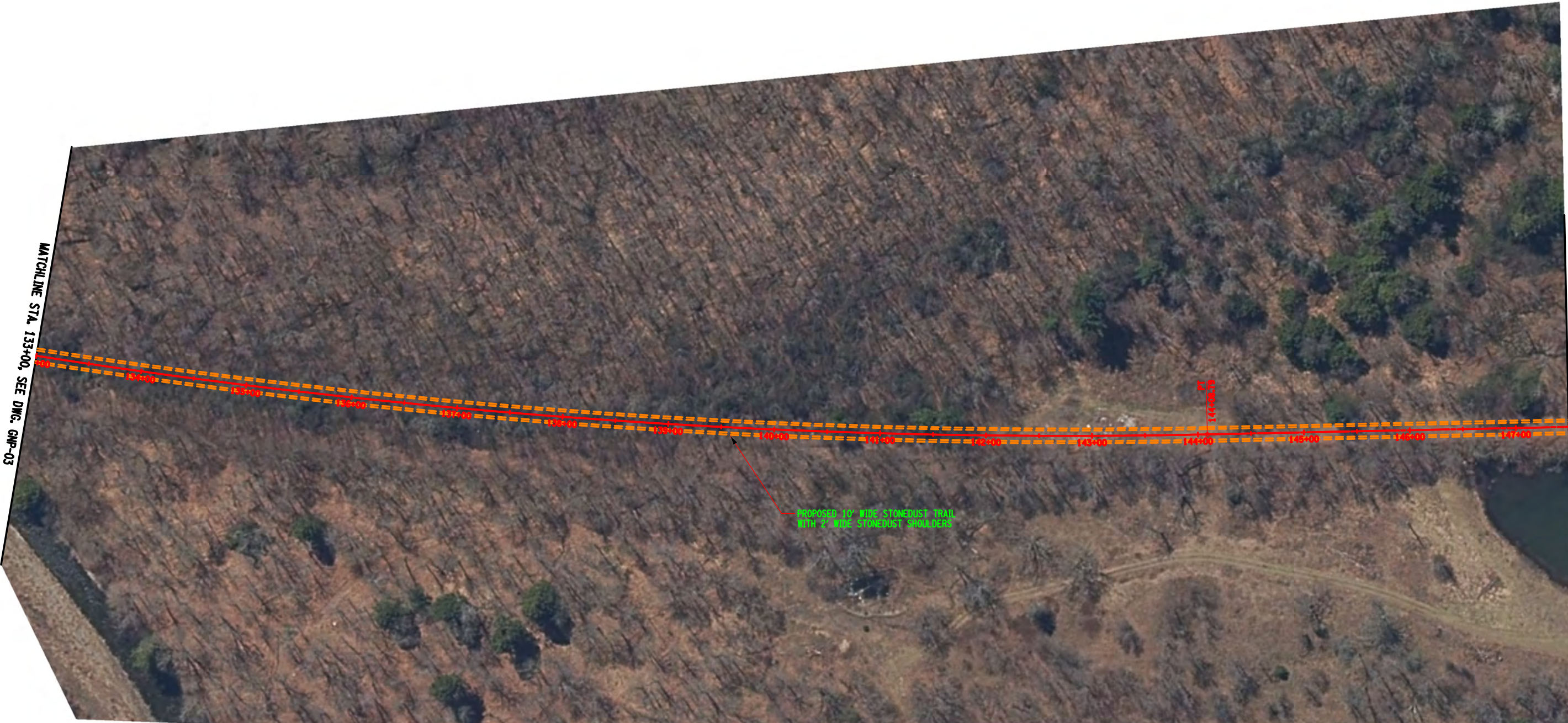
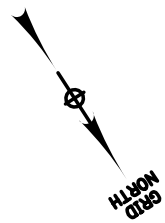
**H+Z**  
 Engineering • Landscape  
 Architecture, OPC  
 1801 6th Avenue, Suite 204  
 Troy, NY 12180  
 518-874-4211

CULVERTS

ALL DIMENSIONS IN FT UNLESS OTHERWISE NOTED  
 GENERAL PLAN  
 PHASE 1B

CONTRACT NUMBER  
 DRAWING NO. GNP-03  
 SHEET NO. 03





MATCHLINE STA. 133+00, SEE DWG. GNP-03

MATCHLINE STA. 147+50, SEE DWG. GNP-05

PROPOSED 10' WIDE STONEDUST TRAIL WITH 2' WIDE STONEDUST SHOULDERS

PT 51.73(20.72)

FILE NAME = 28-JUL-2022 14:28  
DATE/TIME =  
USER = KristelDiCocco

DESIGN SUPERVISOR M. REPSCH JOB MANAGER K. DI COCCO DESIGN K. DI COCCO CHECK M. REPSCH DRAFTING K. DI COCCO CHECK M. REPSCH PROJECT MANAGER K. DI COCCO

AS-BUILT REVISIONS DESCRIPTION OF ALTERATIONS:

COUNTY: SULLIVAN	REGION: 9
------------------	-----------

**alta**  
www.altago.com  
1801 6th Avenue, Suite 204  
Troy, NY 12180  
518-874-4211

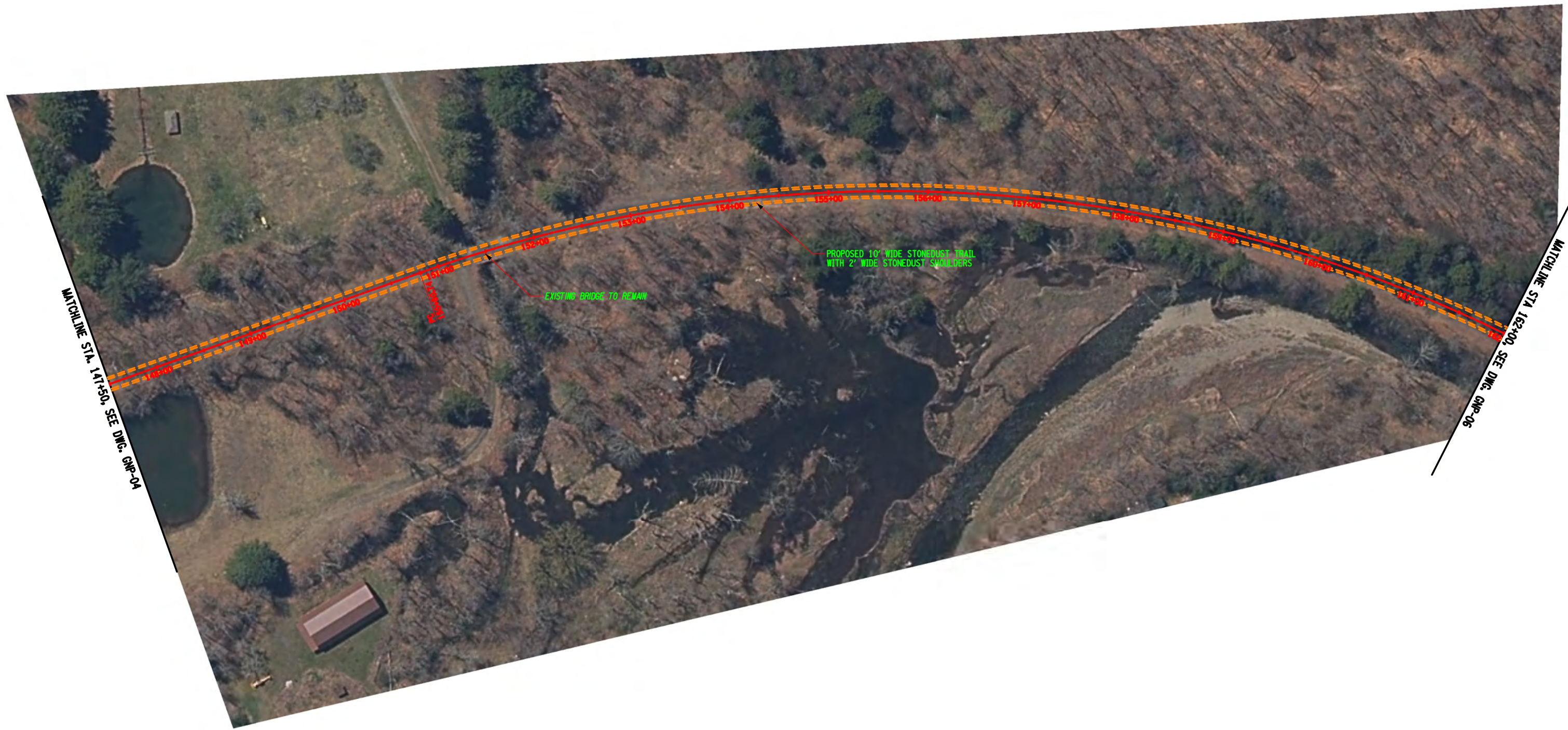
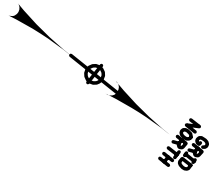
**H+Z**  
Engineering • Landscape  
Architecture, OPC  
1801 6th Avenue, Suite 204  
Troy, NY 12180  
518-874-4211

CULVERTS

ALL DIMENSIONS IN FT UNLESS OTHERWISE NOTED  
**GENERAL PLAN  
PHASE 1B**

CONTRACT NUMBER  
DRAWING NO. GNP-04  
SHEET NO. 04





MATCHLINE STA. 147+50. SEE DWG. GNP-04

MATCHLINE STA 182+00. SEE DWG. GNP-06

FILE NAME = 28-JUL-2022 14:28  
 DATE/TIME =  
 USER = KristelDiCocco

DESIGN SUPERVISOR M. REPSCH JOB MANAGER K. DI COCCO DESIGN K. DI COCCO CHECK M. REPSCH DRAFTING K. DI COCCO CHECK M. REPSCH PROJECT MANAGER K. DI COCCO

AS-BUILT REVISIONS DESCRIPTION OF ALTERATIONS:

COUNTY: SULLIVAN	REGION: 9
------------------	-----------

**alta**  
 www.altago.com  
 1801 6th Avenue, Suite 204  
 Troy, NY 12180  
 518-874-4211

**H+Z**  
 Engineering • Landscape  
 Architecture, OPC  
 1801 6th Avenue, Suite 204  
 Troy, NY 12180  
 518-874-4211

CULVERTS

ALL DIMENSIONS IN FT UNLESS OTHERWISE NOTED  
 GENERAL PLAN  
 PHASE IB

CONTRACT NUMBER  
 DRAWING NO. GNP-05  
 SHEET NO. 05





FILE NAME = 28-JUL-2022 14:28  
DATE/TIME = 28-JUL-2022 14:28  
USER = KristelDiCocco  
DESIGN SUPERVISOR M. REPSCH  
JOB MANAGER K. DI COCCO  
DESIGN K. DI COCCO  
CHECK M. REPSCH  
DRAFTING K. DI COCCO  
CHECK M. REPSCH  
PROJECT MANAGER K. DI COCCO



MATCHLINE STA 162+00. SEE DWG. GNP-05

MATCHLINE STA 177+00. SEE DWG. GNP-07

AS-BUILT REVISIONS DESCRIPTION OF ALTERATIONS:

COUNTY: SULLIVAN	REGION: 9
------------------	-----------

**alta**  
www.altago.com  
1801 6th Avenue, Suite 204  
Troy, NY 12180  
518-874-4211

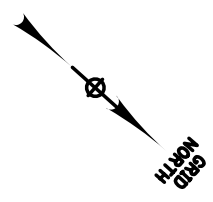
**H+Z**  
Engineering • Landscape  
Architecture, OPC  
1801 6th Avenue, Suite 204  
Troy, NY 12180  
518-874-4211

CULVERTS

ALL DIMENSIONS IN FT UNLESS OTHERWISE NOTED  
**GENERAL PLAN  
PHASE IB / PHASE III**

CONTRACT NUMBER  
DRAWING NO. GNP-06  
SHEET NO. 06





FILE NAME = 28-JUL-2022 14:28  
 DATE/TIME = 28-JUL-2022 14:28  
 USER = KristelDiCocco  
 DESIGN SUPERVISOR M. REPSCH  
 JOB MANAGER K. DI COCCO  
 DESIGN K. DI COCCO  
 CHECK M. REPSCH  
 DRAFTING K. DI COCCO  
 CHECK M. REPSCH  
 PROJECT MANAGER K. DI COCCO

AS-BUILT REVISIONS DESCRIPTION OF ALTERATIONS:

COUNTY: SULLIVAN	REGION: 9

**alta**

www.altago.com

1801 6th Avenue, Suite 204  
Troy, NY 12180  
518-874-4211

**H+Z**

Engineering • Landscape  
Architecture, OPC

1801 6th Avenue, Suite 204  
Troy, NY 12180  
518-874-4211

CULVERTS	ALL DIMENSIONS IN FT UNLESS OTHERWISE NOTED
	GENERAL PLAN PHASE III

CONTRACT NUMBER
DRAWING NO. GNP-07
SHEET NO. 07





AS-BUILT REVISIONS DESCRIPTION OF ALTERATIONS:

COUNTY: SULLIVAN	REGION: 9

**alta**

www.alta.com

1801 6th Avenue, Suite 204  
 Troy, NY 12180  
 518-874-4211

**H+Z**

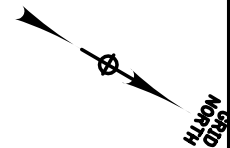
Engineering • Landscape  
 Architecture, OPC

1801 6th Avenue, Suite 204  
 Troy, NY 12180  
 518-874-4211

CULVERTS	ALL DIMENSIONS IN FT UNLESS OTHERWISE NOTED
	GENERAL PLAN PHASE III

CONTRACT NUMBER
DRAWING NO. GNP-08
SHEET NO. 08





FILE NAME = 28-JUL-2022 14:30  
 DATE/TIME = 28-JUL-2022 14:30  
 USER = KristelDiCocco

DESIGN SUPERVISOR M. REPSCH  
 JOB MANAGER K. DI COCCO  
 DESIGN K. DI COCCO  
 CHECK M. REPSCH  
 DRAFTING K. DI COCCO  
 CHECK M. REPSCH  
 PROJECT MANAGER K. DI COCCO

AS-BUILT REVISIONS DESCRIPTION OF ALTERATIONS:

COUNTY: SULLIVAN	REGION: 9
------------------	-----------

<b>alta</b> <small>www.altago.com</small> <small>1801 6th Avenue, Suite 204        Troy, NY 12180        518-874-4211</small>	<b>H+Z</b> <small>Engineering • Landscape        Architecture, OPC</small> <small>1801 6th Avenue, Suite 204        Troy, NY 12180        518-874-4211</small>
---	--

CULVERTS	ALL DIMENSIONS IN FT UNLESS OTHERWISE NOTED
GENERAL PLAN PHASE III / PHASE II	

CONTRACT NUMBER	DRAWING NO. GNP-09
	SHEET NO. 09



FILE NAME = 28-JUL-2022 14:28  
 DATE/TIME =  
 USER = KristelDiCocco

DESIGN SUPERVISOR M. REPSCH  
 JOB MANAGER K. DI COCCO  
 DESIGN K. DI COCCO  
 CHECK M. REPSCH  
 DRAFTING K. DI COCCO  
 CHECK M. REPSCH  
 PROJECT MANAGER K. DI COCCO



AS-BUILT REVISIONS DESCRIPTION OF ALTERATIONS:	

COUNTY: SULLIVAN	REGION: 9
------------------	-----------

**alta**  
 www.altago.com  
 1801 6th Avenue, Suite 204  
 Troy, NY 12180  
 518-874-4211

**H+Z**  
 Engineering • Landscape  
 Architecture, OPC  
 1801 6th Avenue, Suite 204  
 Troy, NY 12180  
 518-874-4211

CULVERTS

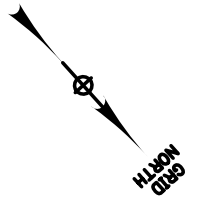
ALL DIMENSIONS IN FT UNLESS OTHERWISE NOTED  
 GENERAL PLAN  
 PHASE II

CONTRACT NUMBER  
 DRAWING NO. GNP-10  
 SHEET NO. 10



FILE NAME = 28-JUL-2022 14:28  
 DATE/TIME = 28-JUL-2022 14:28  
 USER = KristelDiCocco

DESIGN SUPERVISOR M. REPSCH  
 JOB MANAGER K. DI COCCO  
 DESIGN K. DI COCCO  
 CHECK M. REPSCH  
 DRAFTING K. DI COCCO  
 CHECK M. REPSCH  
 PROJECT MANAGER K. DI COCCO



AS-BUILT REVISIONS DESCRIPTION OF ALTERATIONS:

COUNTY: SULLIVAN	REGION: 9
------------------	-----------

**alta**  
 www.altago.com  
 1801 6th Avenue, Suite 204  
 Troy, NY 12180  
 518-874-4211

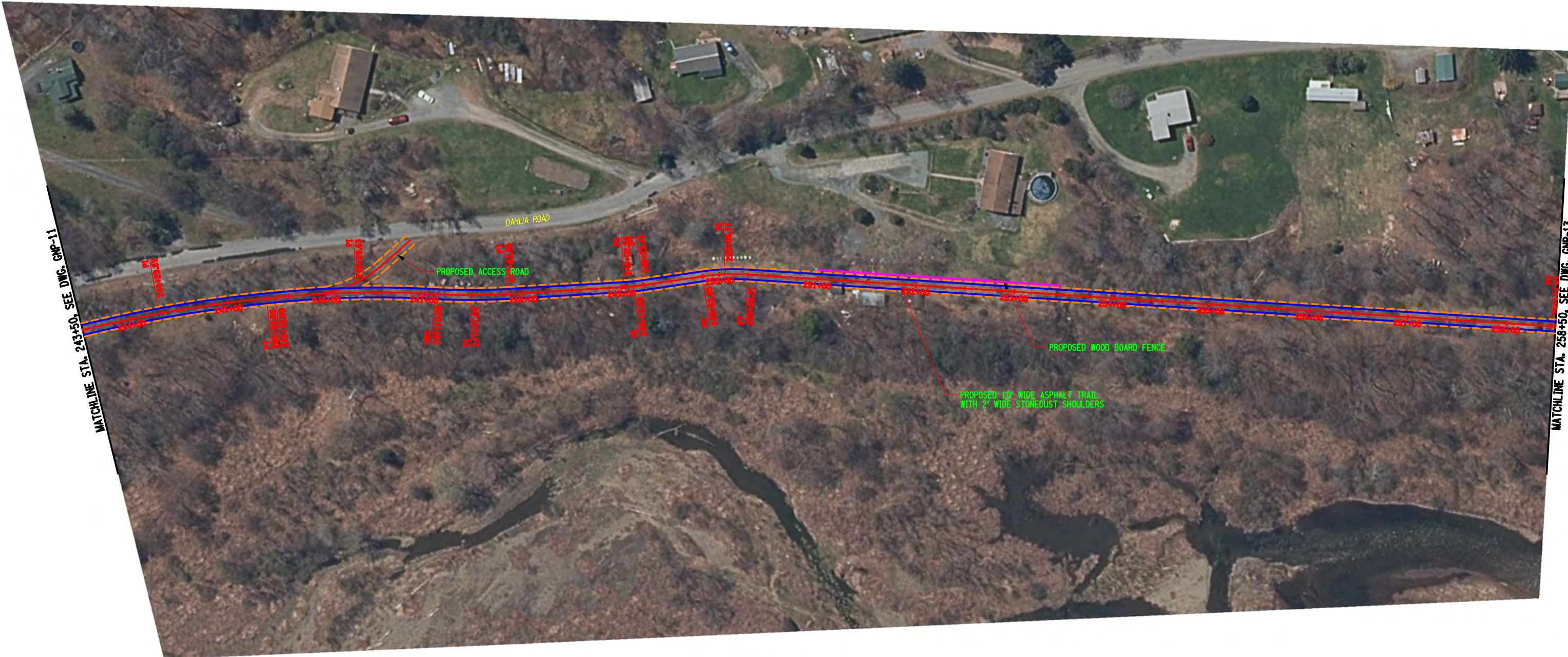
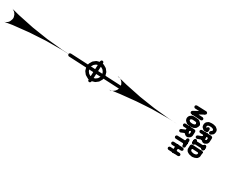
**H+Z**  
 Engineering • Landscape  
 Architecture, OPC  
 1801 6th Avenue, Suite 204  
 Troy, NY 12180  
 518-874-4211

CULVERTS

ALL DIMENSIONS IN FT UNLESS OTHERWISE NOTED  
 GENERAL PLAN  
 PHASE II

CONTRACT NUMBER  
 DRAWING NO. GNP-11  
 SHEET NO. 11





FILE NAME = 28-JUL-2022 14:28  
 DATE/TIME = KristelDiCocco  
 USER =  
 DESIGN SUPERVISOR M. REPSCH  
 JOB MANAGER K. DI COCCO  
 DESIGN K. DI COCCO  
 CHECK M. REPSCH  
 DRAFTING K. DI COCCO  
 CHECK M. REPSCH  
 PROJECT MANAGER K. DI COCCO

AS-BUILT REVISIONS  
 DESCRIPTION OF ALTERATIONS:  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

COUNTY: SULLIVAN REGION: 9

**alta**  
 www.altago.com  
 1801 6th Avenue, Suite 204  
 Troy, NY 12180  
 518-874-4211

**H+Z**  
 Engineering • Landscape  
 Architecture, OPC  
 1801 6th Avenue, Suite 204  
 Troy, NY 12180  
 518-874-4211

CULVERTS

ALL DIMENSIONS IN FT UNLESS OTHERWISE NOTED

GENERAL PLAN  
 PHASE II

CONTRACT NUMBER

DRAWING NO. GNP-12  
 SHEET NO. 12





MATCHLINE STA. 258+50, SEE DWG. GNP-12

PROPOSED 10' WIDE ASPHALT ROAD WITH 2' WIDE STONEDUST SHOULDERS

AS-BUILT REVISIONS DESCRIPTION OF ALTERATIONS:

COUNTY: SULLIVAN	REGION: 9
------------------	-----------

**alta**  
 www.altago.com  
 1801 6th Avenue, Suite 204  
 Troy, NY 12180  
 518-874-4211

**H+Z**  
 Engineering • Landscape  
 Architecture, OPC  
 1801 6th Avenue, Suite 204  
 Troy, NY 12180  
 518-874-4211

CULVERTS

ALL DIMENSIONS IN FT UNLESS OTHERWISE NOTED  
 GENERAL PLAN  
 PHASE II

CONTRACT NUMBER  
 DRAWING NO. GNP-13  
 SHEET NO. 13



FILE NAME = 28-JUL-2022 14:28  
 DATE/TIME =  
 USER = KristelDiCocco

DESIGN SUPERVISOR M. REPSCH  
 JOB MANAGER K. DI COCCO  
 DESIGN K. DI COCCO  
 CHECK M. REPSCH  
 DRAFTING K. DI COCCO  
 CHECK K. DI COCCO  
 M. REPSCH  
 PROJECT MANAGER K. DI COCCO

MATCHLINE STA. 0 215+50, SEE DWG. GNP-10



AS-BUILT REVISIONS DESCRIPTION OF ALTERATIONS:

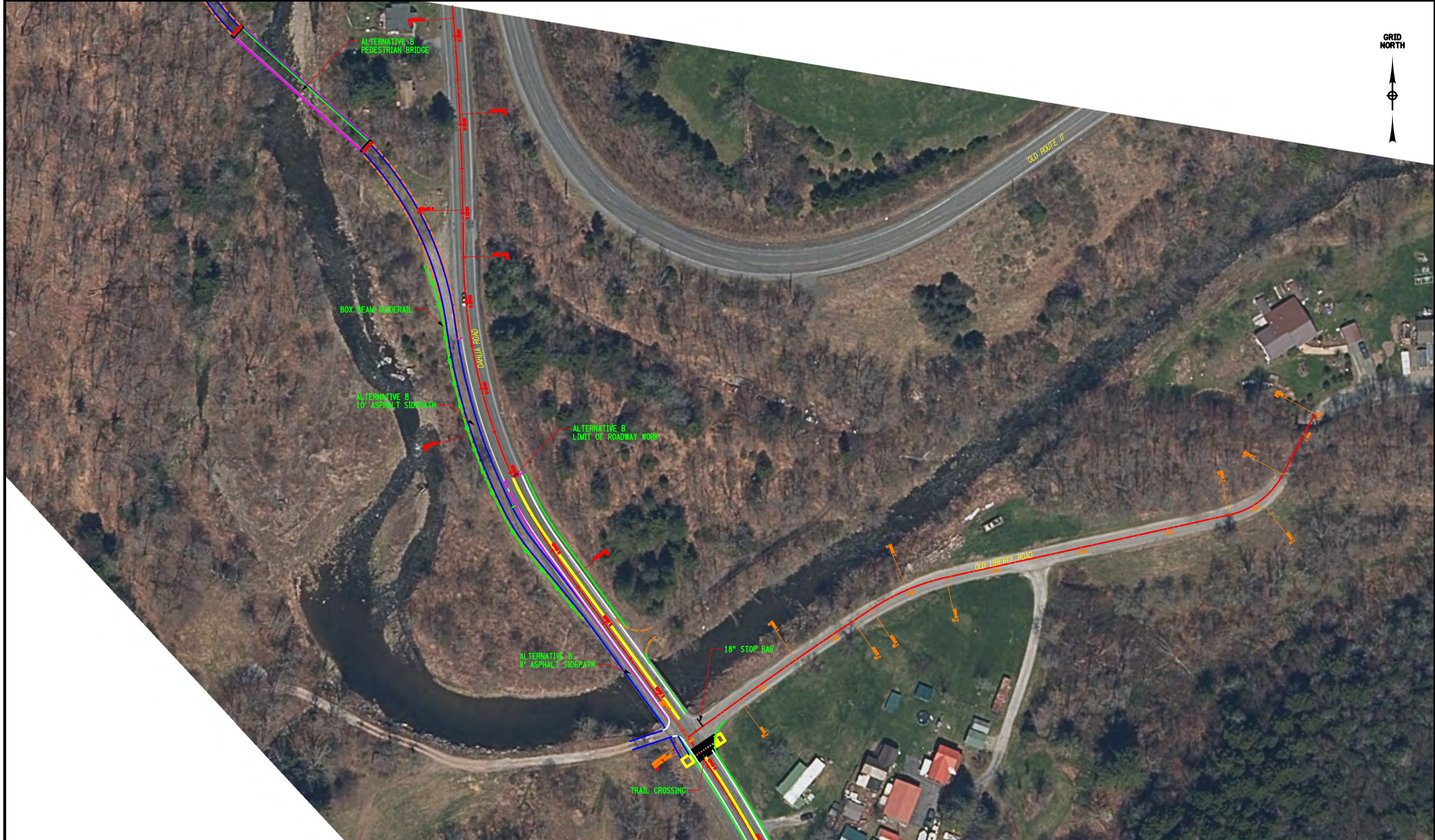
COUNTY: SULLIVAN	REGION: 9

 <small>www.altago.com</small> <small>1801 6th Avenue, Suite 204        Troy, NY 12180        518-874-4211</small>	 <small>Engineering • Landscape        Architecture, OPC</small> <small>1801 6th Avenue, Suite 204        Troy, NY 12180        518-874-4211</small>
--	--

CULVERTS	ALL DIMENSIONS IN FT UNLESS OTHERWISE NOTED
	GENERAL PLAN PHASE III ALTERNATIVE A

CONTRACT NUMBER
DRAWING NO. GNP-09A
SHEET NO. 14





AS-BUILT REVISIONS DESCRIPTION OF ALTERATIONS:

COUNTY: SULLIVAN	REGION: 9

**alta**  
www.altago.com  
1801 6th Avenue, Suite 204  
Troy, NY 12180  
518-874-4211

**H+Z**  
Engineering • Landscape  
Architecture, OFC  
1801 6th Avenue, Suite 204  
Troy, NY 12180  
518-874-4211

CULVERTS	ALL DIMENSIONS IN FT UNLESS OTHERWISE NOTED	CONTRACT NUMBER
	GENERAL PLAN PHASE III ALTERNATIVE B	DRAWING NO. GNP-09B SHEET NO. 15



GRID NORTH



PROPOSED 10' WIDE ASPHALT TRAIL WITH 2' SIDE STONEWALL STRUCTURES

PROPOSED TRAIL CROSSING

DAHLIA ROAD

OLD ROUTE 77

OLD LIBERTY ROAD

FILE NAME = 28-JUL-2022 14:28  
DATE/TIME =  
USER = KristelDiCocco

DESIGN SUPERVISOR M. REPSCH JOB MANAGER K. DI COCCO DESIGN K. DI COCCO CHECK M. REPSCH DRAFTING K. DI COCCO CHECK M. REPSCH PROJECT MANAGER K. DI COCCO

AS-BUILT REVISIONS DESCRIPTION OF ALTERATIONS:

COUNTY: SULLIVAN	REGION: 9
------------------	-----------

**alta**  
www.altago.com  
1801 6th Avenue, Suite 204  
Troy, NY 12180  
518-874-4211

**H+Z**  
Engineering • Landscape  
Architecture, OPC  
1801 6th Avenue, Suite 204  
Troy, NY 12180  
518-874-4211

CULVERTS

ALL DIMENSIONS IN FT UNLESS OTHERWISE NOTED  
  
GENERAL PLAN  
PHASE III  
ALTERNATIVE C

CONTRACT NUMBER
DRAWING NO. GNP-09C
SHEET NO. 16

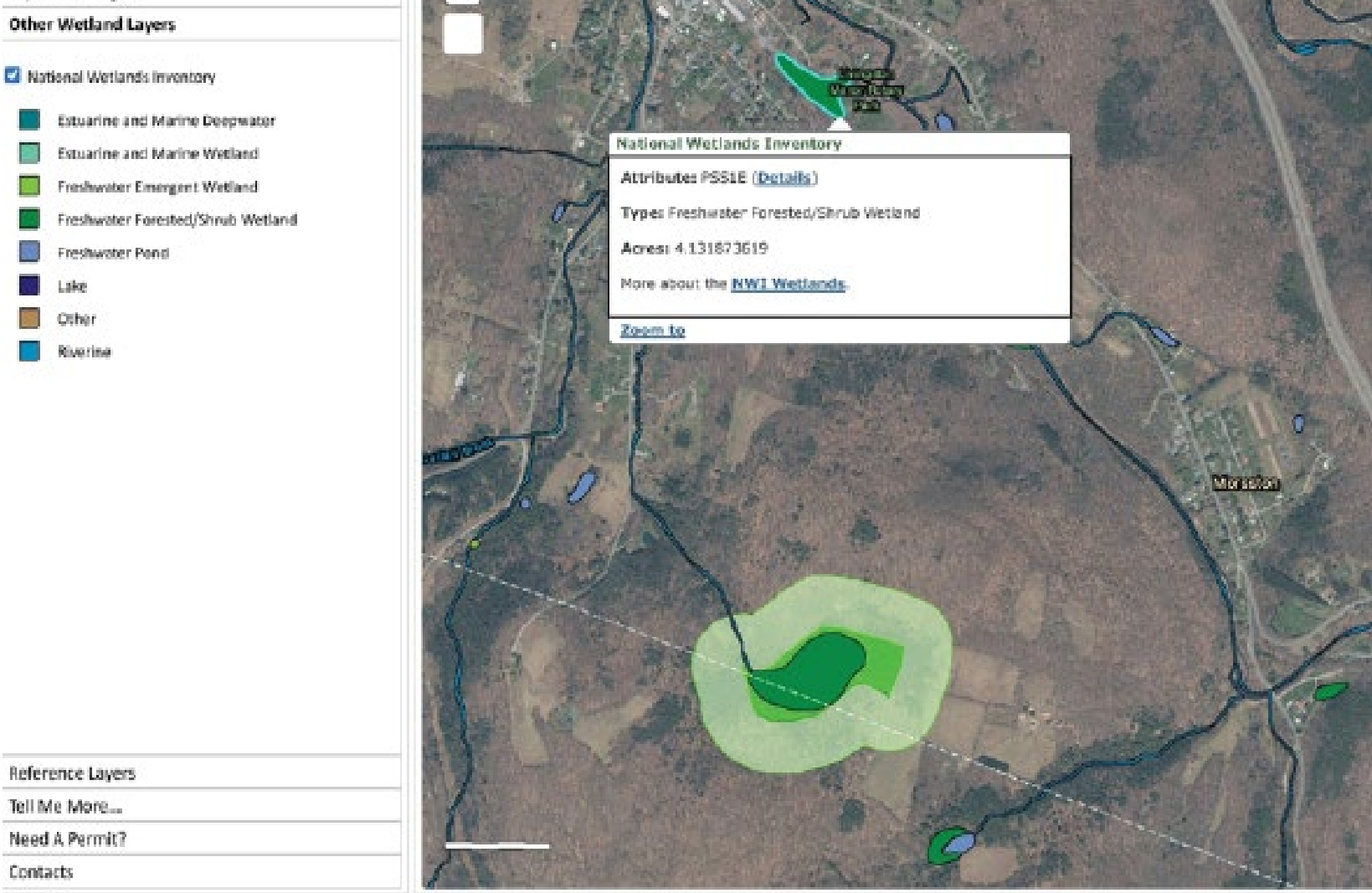


## APPENDIX C:

### IDENTIFIED FRESHWATER FORESTED/SHRUB WETLAND AREA



The identified freshwater forested/shrub wetland area (PSS1E) part of the National Wetland Inventory near the end of Dubois Street



Identified freshwater forested/shrub wetland area (PSS1E) part of the National Wetland Inventory near Rotary ParkStreet



