

9.4 TOWN OF OLIVE

9.4.1 TOWN OF OLIVE PROJECT DESCRIPTION

The Town of Olive is located in Ulster County, New York on the western side of the Hudson River. It is bounded by the Towns of Woodstock to the north, Shandaken to the northwest, Denning to the west, Rochester to the southwest, Marbletown to the southeast, and Hurley to the northeast. The Town of Olive encompasses approximately 65 square miles. General boundaries of locations where activities associated with the repair and rehabilitation of the Catskill Aqueduct would occur within the Town of Olive are shown on **Figure 9.4-1**.

The Catskill Aqueduct stretches for approximately 2.3 miles in a southerly direction through the Town of Olive. Notable sites along the Catskill Aqueduct within the town include Ashokan Reservoir, Ashokan Screen Chamber, the Esopus Steel Pipe Siphon North and South Chambers, the Tongore Steel Pipe Siphon North and South Chambers, and Tongore Bridge. Proposed activities in the Town of Olive would occur within three study areas as shown in **Table 9.4-1**.

Table 9.4-1: Schedule of Work Activities within the Town of Olive

Work Activity	Study Area		
	Ashokan Screen Chamber	Beaverkill Road	Atwood-Olivebridge Road
Staging and Access Improvements	-	-	✓
Primary Staging Area Management	✓	-	-
Chlorination Facility Construction and Operation	✓	-	-
Chlorination Facility Start-up and Testing	✓	-	-
Biofilm Removal and Condition Assessment	✓	✓	✓
Streambank Restoration and Protection	-	✓	-
Blow-off Chamber Reconstruction	-	✓	✓
Boathole Preparation	-	✓	✓
Boathole Installation	-	✓	✓
Small-scale Wash Water Treatment	-	✓	✓
Bridge Repair	-	-	✓
Notes:			
- = Work activity not proposed.			
✓ = Work activity proposed.			

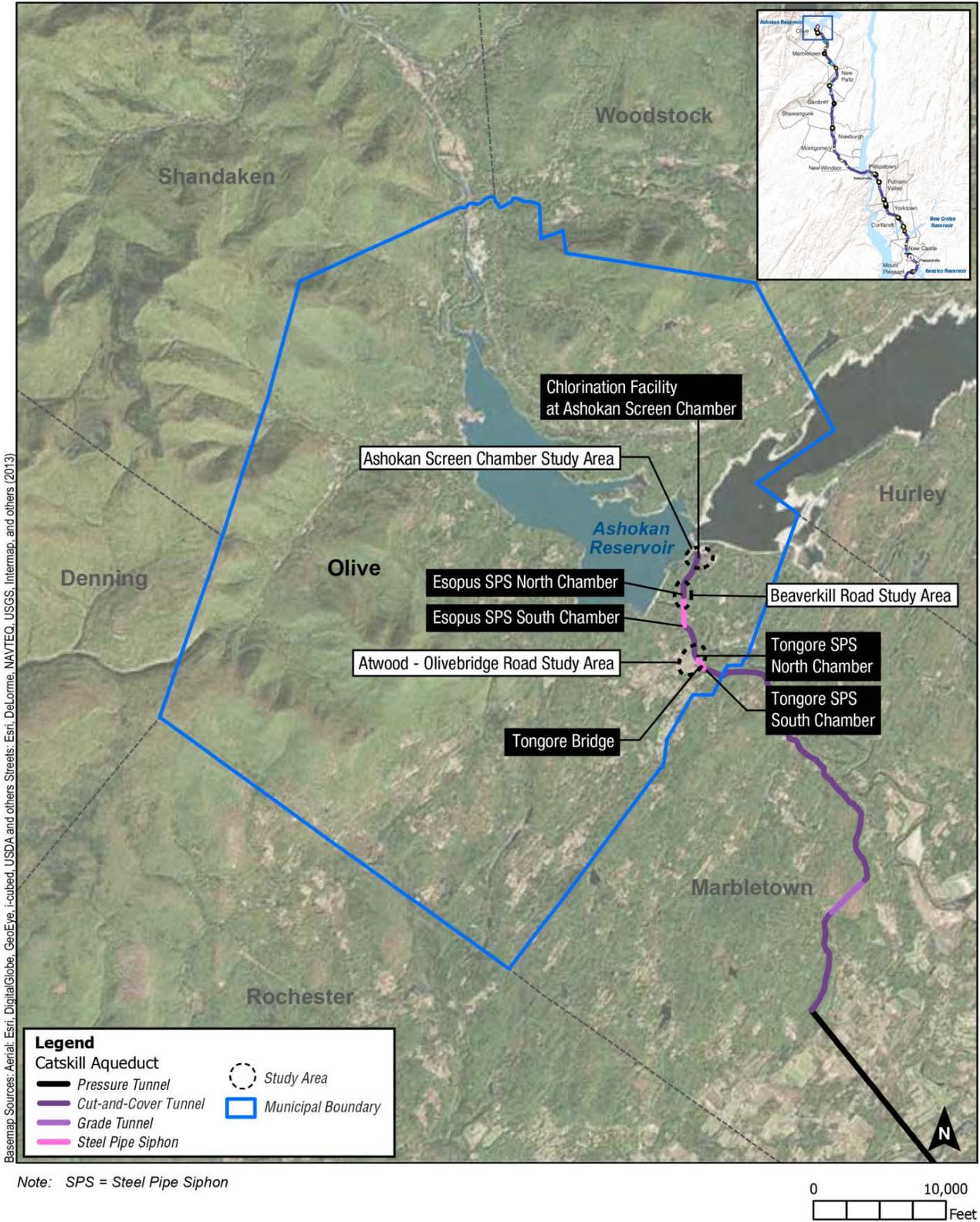


Figure 9.4-1: Town of Olive Study Areas



These three study areas in the Town of Olive encompass the majority of work that would occur as part of the repair and rehabilitation in this municipality. Additional work activities in the town do not warrant further analysis. Work sites located outside the study area include activities that would primarily be conducted within the aqueduct interior (see Section 9.3, “Screening Assessment and Impact Analysis Methodology”). In the Town of Olive, they include biofilm removal and condition assessment at access manholes not located in these study areas. See Section 9.2, “Project Description,” for an overall project description of the repair and rehabilitation. Section 9.4.2, “Town of Olive Impact Analysis” provides a discussion of local regulations in the Town of Olive’s jurisdictional limits. The following sections provide a description of the study area, proposed activities, and impact analysis for the three study areas:

- Section 9.4.3 – Ashokan Screen Chamber Study Area Impact Analysis
- Section 9.4.4 – Beaverkill Road Study Area Impact Analysis
- Section 9.4.5 – Atwood-Olivebridge Road Study Area Impact Analysis

9.4.2 TOWN OF OLIVE IMPACT ANALYSIS

9.4.2.1 Public Policy

Because local public policies would not vary for study areas in the same town, public policies were evaluated on a town-wide basis. As discussed in Section 9.3.3, “Land Use, Zoning, and Public Policy,” the repair and rehabilitation’s consistency with the applicable policies of the Ulster County Open Space Plan (Ulster County 2007) within the Ashokan Screen Chamber, Beaverkill Road, and Atwood-Olivebridge Road study areas are analyzed below.

Ulster County Open Space Plan (2007)

The Ulster County Open Space Plan establishes a framework for the management and protection of open space resources identified by Ulster County. These include water resources, working landscapes, landforms and natural features, ecological communities, cultural and historic resources, and recreational resources. To provide guidance on these open space resources, Ulster County has established the 10 “Principles of the Open Space Plan” that seek to safeguard the open space values of Ulster County. Of those 10 principles, two principles are applicable to the repair and rehabilitation. The potential effects of the repair and rehabilitation within the Ashokan Screen Chamber, Beaverkill Road, and Atwood-Olivebridge Road study areas are evaluated for compatibility with the two applicable principles below:

- (1) *Preserve and protect open space, unique natural areas and heritage areas and sites, wetlands, water and woodland resources, scenic views, areas of natural beauty and the rural character of Ulster County.*

No open spaces, unique natural areas and heritage areas and sites, wetlands, water and woodland resources, scenic views, or areas of natural beauty and rural character are located within the Ashokan Screen Chamber Study Area. The Beaverkill Road and Atwood-Olivebridge Road study areas contain open spaces and water resources.

Under this principle, the Open Space Plan recommends protecting valuable landforms and natural features in order to benefit residents and preserve the rural character of Ulster County. This principle was analyzed for the repair and rehabilitation as work in the study areas would potentially impact existing open space, visual resources, historic resources, and natural resources, directly or indirectly, depending on the study area.

Construction within the Beaverkill Road Study Area would occur along the relic channel of Esopus Creek that flows over the Catskill Aqueduct between the Esopus Steel Pipe Siphon North and South Chambers. Tongore Creek passes under the Tongore Bridge, where repairs and temporary discharges would be conducted in the Atwood-Olivebridge Road Study Area. When repairs to these sites are conducted, flows would be maintained. Effects to hydrology and water quality of these waterways would be limited through Best Management Practices (BMPs), regulatory coordination, and would not adversely affect these water resources. The potential for impacts to these resources in the Beaverkill Road and Atwood-Olivebridge Road study areas are analyzed in detail in the respective “Natural Resources” sections.

One DEP-owned and managed open space resource is located within both the Beaverkill Road and Atwood-Olivebridge Road study areas: the Acorn Hill DEP Watershed Recreational Land, which is located in the southern and northern portions of these study areas, respectively. Activities associated with repair and rehabilitation would not disrupt the use of the Acorn Hill DEP Watershed Recreational Land. Use of this open space would remain active during construction and operation activities associated with the repair and rehabilitation. Construction activities would not take place in the Acorn Hill DEP Watershed Recreational Land or on its wooded trails. No impacts to the Acorn Hill DEP Watershed Recreational Land would occur during the repair and rehabilitation within the Beaverkill Road and Atwood-Olivebridge Road study areas (see the respective “Open Space and Recreation” sections).

As such, the repair and rehabilitation within the Ashokan Screen Chamber, Beaverkill Road and Atwood-Olivebridge Road study areas would not affect open space resources, unique natural areas and heritage areas and sites, wetlands, water and woodland resources, scenic views, or areas of natural beauty or the rural character of Ulster County and would be consistent with this principle.

- (2) *Protect and enhance the county’s most valuable open space landforms and natural features with coordinated planning and safeguard policies.*

As described above, the Acorn Hill DEP Watershed Recreational Land is an open space resource within the Beaverkill Road and Atwood-Olivebridge Road study areas.

Under this principle, the Open Space Plan recommends preserving the visual or ecological values of significant landforms and natural features in order to protect against inappropriate development. This principle was analyzed for repair and rehabilitation as work in the study areas would potentially impact existing open space, visual resources, historic resources and natural resources, directly or indirectly, depending on the study area.

Repair and rehabilitation work activities would not disrupt recreational use of this open space resource. The limits of construction would occur in previously disturbed areas and would be

separated from the Acorn Hill DEP Watershed Recreational Land by a buffer of trees. Since no trails are maintained on the recreational land within the study areas, there would be no changes to recreational use or visual and aesthetic conditions of the Acorn Hill DEP Watershed Recreational Land. The potential for impacts to these resources is analyzed in detail in the respective “Open Space and Recreation,” and “Natural Resources” sections for the Beaverkill Road and Atwood-Olivebridge Road study areas.

As such, the repair and rehabilitation within the Ashokan Screen Chamber, Beaverkill Road and Atwood-Olivebridge Road study areas would not affect open space landforms and natural features within Ulster County and would be consistent with this principle.

Repair and rehabilitation would therefore be consistent with the Ulster County Open Space Plan and would not result in significant adverse impacts to public policy within the Ashokan Screen Chamber, Beaverkill Road, and Atwood-Olivebridge Road study areas.

9.4.3 ASHOKAN SCREEN CHAMBER STUDY AREA IMPACT ANALYSIS

Within the Ashokan Screen Chamber Study Area the aqueduct consists of the Esopus Cut-and-Cover Tunnel (the first segment of the aqueduct), and the Ashokan Screen Chamber, which houses mechanical screens to capture debris from raw water drawn from Ashokan Reservoir before it continues downstream through the aqueduct. The Ashokan Release Channel, a concrete-lined man-made channel, is also located within the study area (see **Figure 9.4-2**).

Work activities within the Ashokan Screen Chamber Study Area would include: establishment and use of a primary staging area; construction, start-up, testing, and operation of a new chlorination facility to provide temporary addition of chemical oxidants to the aqueduct; and biofilm removal and condition assessment.

9.4.3.1 Study Area Location and Description

The Ashokan Screen Chamber Study Area is located along the upper Catskill Aqueduct in the Town of Olive. The Catskill Aqueduct traverses the western portion of the study area in a general north to south direction. State Route 28A traverses the eastern portion of the study area, and Ashokan Reservoir’s East and West Basins are located to the north and northwest, respectively. Proposed work sites within the study area include one surrounding the Ashokan Screen Chamber, and one consisting of two smaller staging areas south of State Route 28A, which would collectively serve as a primary staging area location. Access to both sites would be from State Route 28A onto DEP driveways – one originating across from the Ben Nesin Laboratory and connecting to the screen chamber (BWS [Bureau of Water Supply] Road), and another beginning to the southwest of Ben Nesin Laboratory and providing access to the primary staging area. The study area boundary is located approximately 400 feet beyond the outermost areas of disturbance related to the work sites.

Figure 9.4-2 shows an aerial photograph of the study area, including the path of the aqueduct, the limits of construction for each work site, and the proposed access routes. **Figure 9.4-3** shows photographs of the study area.

Land use in the study area is primarily public services, with some vacant and residential areas along its southeastern portion. The limits of construction for both work sites are located within a public services parcel which is owned and maintained by DEP. Portions of the DEP-owned land surrounding the Ashokan Screen Chamber facility include open grassy areas, a number of structures associated with DEP facilities (e.g., police precinct, fleet garage), and paved driveways and parking areas. With the exception of the sparsely populated residential area, the remainder of the study area is generally wooded. The open space is accessible to the public, who utilize these same roadways and the parking area north of Ben Nesin Laboratory. **Figure 9.4-4** shows a map of the land uses in the study area and its surroundings.

The Ashokan Screen Chamber Study Area is primarily zoned as residential/conservation (R/C-10A) with a small area in the southeast portion zoned as residential/exurban (R/E-1A), as designated by the Town of Olive Zoning Code (see **Figure 9.4-5**). The Catskill Aqueduct and limits of construction for the work sites are entirely located within the residential/conservation (R/C-10A) zoning district, which provides for residential development with no more than one dwelling unit per 10 acres, among other permitted uses. The Catskill Aqueduct is a permitted use as a public utility facility structure within the residential/conservation (R/C-10A) zoning district.

The portion of State Route 28A that traverses the study area and a segment of the connecting BWS Road are part of the proposed Catskill Mountains Scenic Byway, a NYSDOT designation given to this transportation corridor as representative of the region's scenic and historic significance. Additionally, the Ben Nesin Laboratory is eligible for listing on the National Register of Historic Places. There are no other federal, State, or local designated landmarks, historic districts, or known archeological resources within the study area.

9.4.3.2 Proposed Activities within the Ashokan Screen Chamber Study Area

For construction of the chlorination facility, two staging areas would be established: one in a grassy area adjacent to the Ashokan Screen Chamber and a second on BWS Road for contractor trailers. For the repair and rehabilitation, three staging areas, two to the south of State Route 28A and one on BWS Road, would collectively form a primary staging area for contractor trailers and parking to support construction activities along the first 18 miles of the aqueduct. The primary staging area would be established in ~~2018~~2017 and would be available for the duration of the repair and rehabilitation. Erosion and sediment control measures, such as silt fencing and hay bales, would be installed at the perimeter of the work sites as needed. A site plan showing a layout of the limits of construction for the work sites, which would occupy a total of approximately 8.8 acres, is shown on **Figure 9.4-6**. The schedule for work within the study area is shown in **Table 9.4-2**. The duration of active construction within the Ashokan Screen Chamber Study Area is estimated to total approximately 100 weeks over 3 years, with some overlapping work activities. During this time, the aqueduct would continue to be operated in accordance with the Interim Ashokan Release Protocol (or its successor).

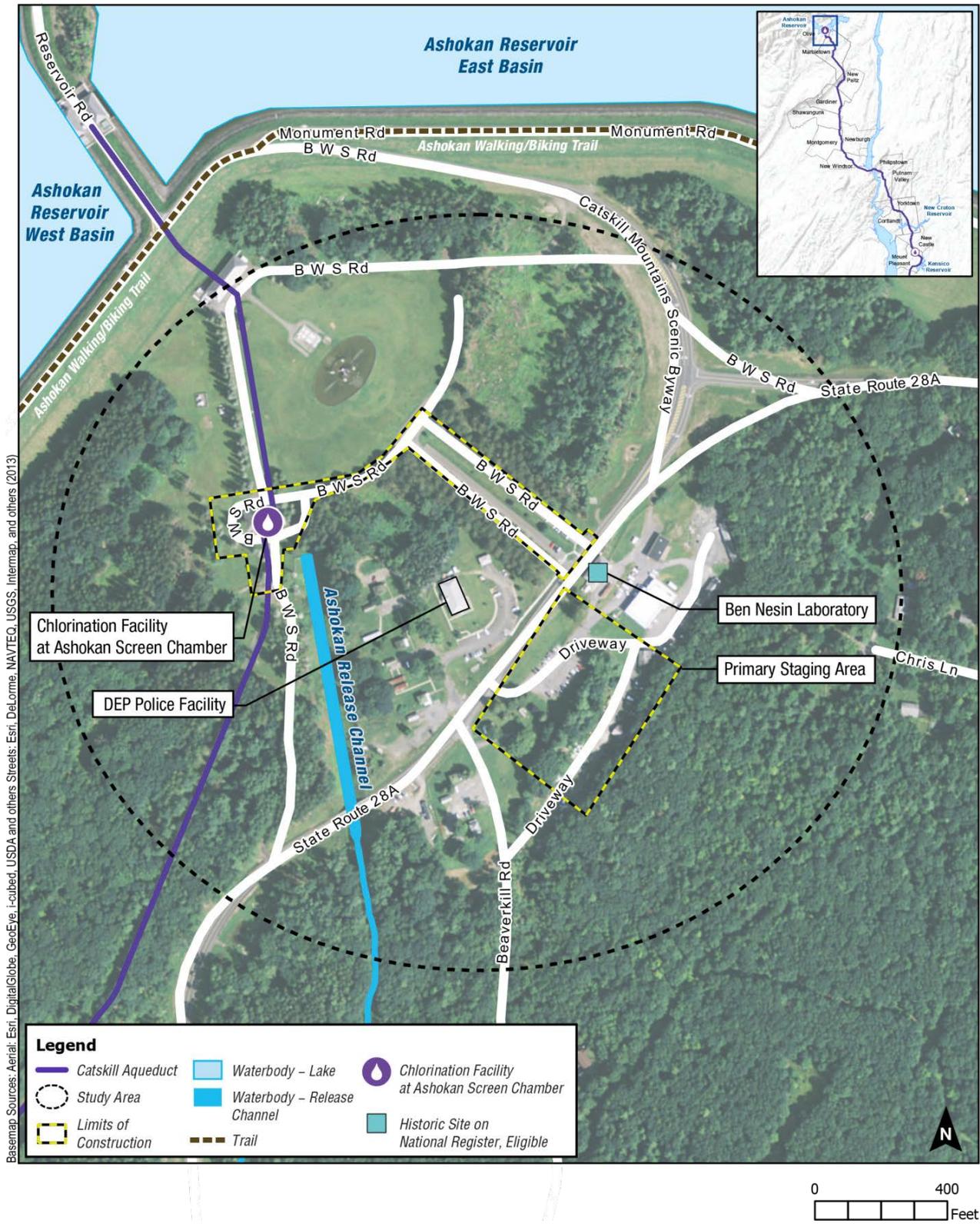


Figure 9.4-2: Study Area – Ashokan Screen Chamber





Photograph 1: Bureau of Water Supply (BWS) Road to the east of the Screen Chamber. Taken from the southeast corner of the building looking northeast.



Photograph 2: Access driveway to the screen chamber site. Taken looking southeast at the Ben Nesin Laboratory.

Figure 9.4-3: Photographs – Ashokan Screen Chamber Study Area



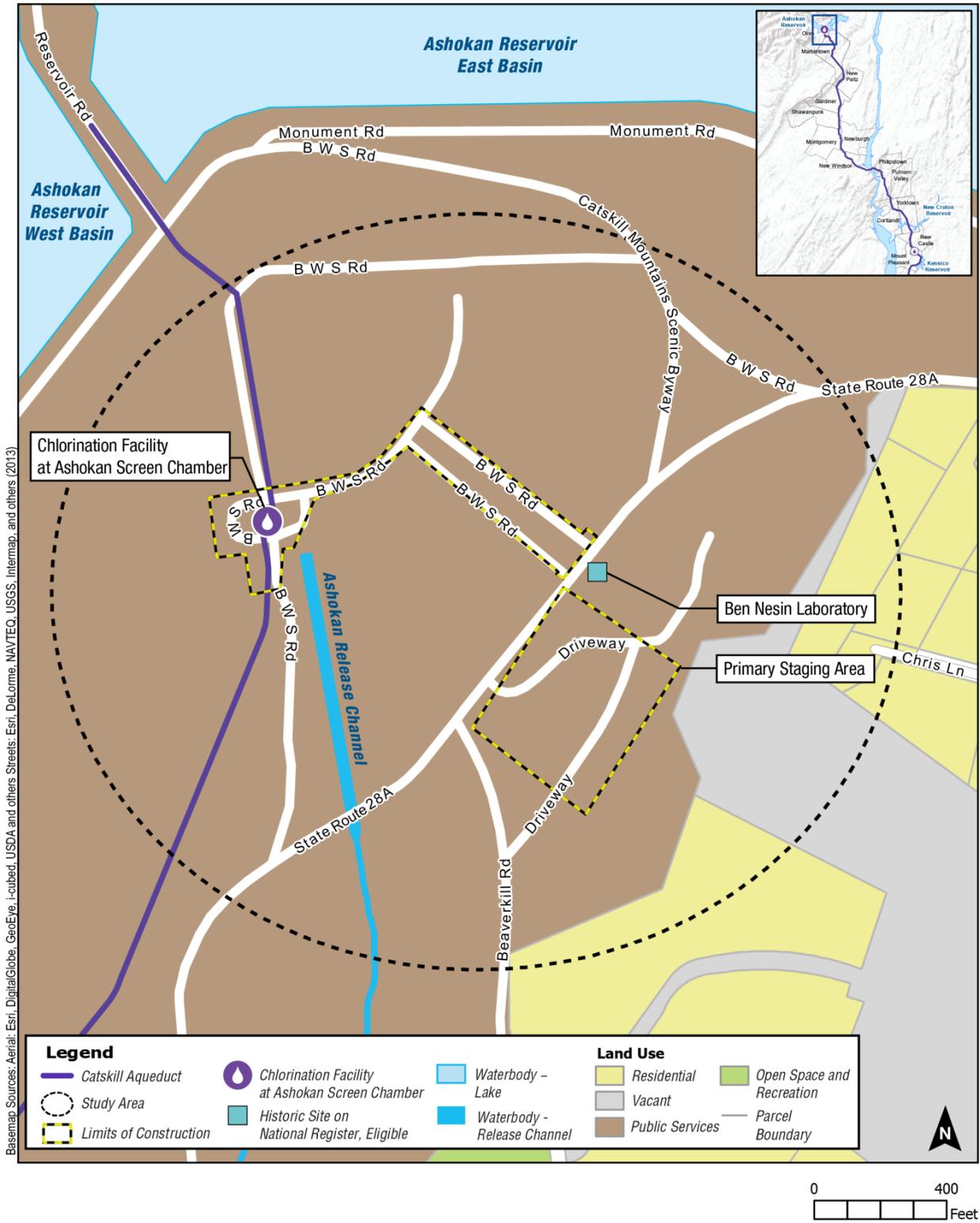


Figure 9.4-4: Land Use – Ashokan Screen Chamber Study Area



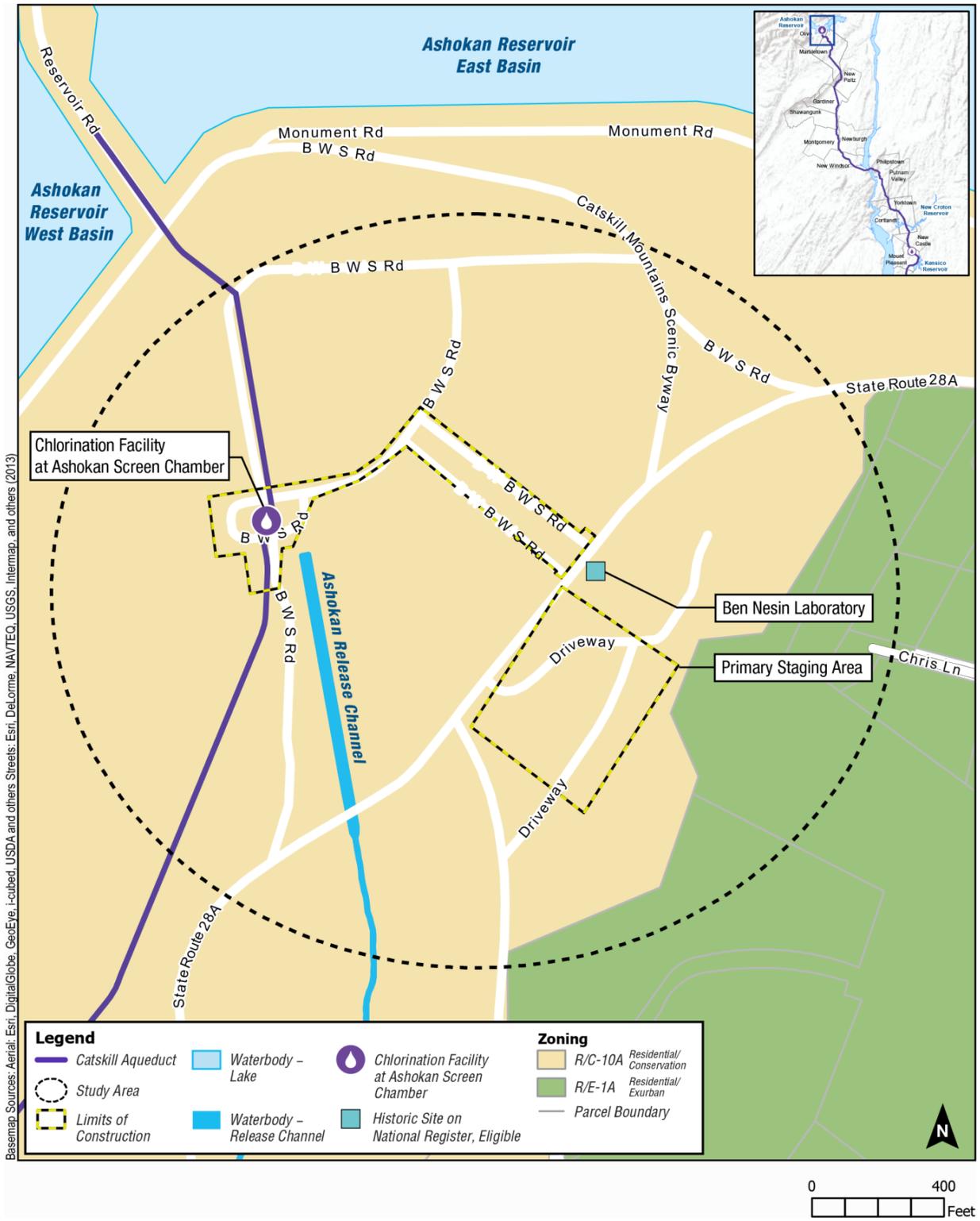


Figure 9.4-5: Zoning – Ashokan Screen Chamber Study Area



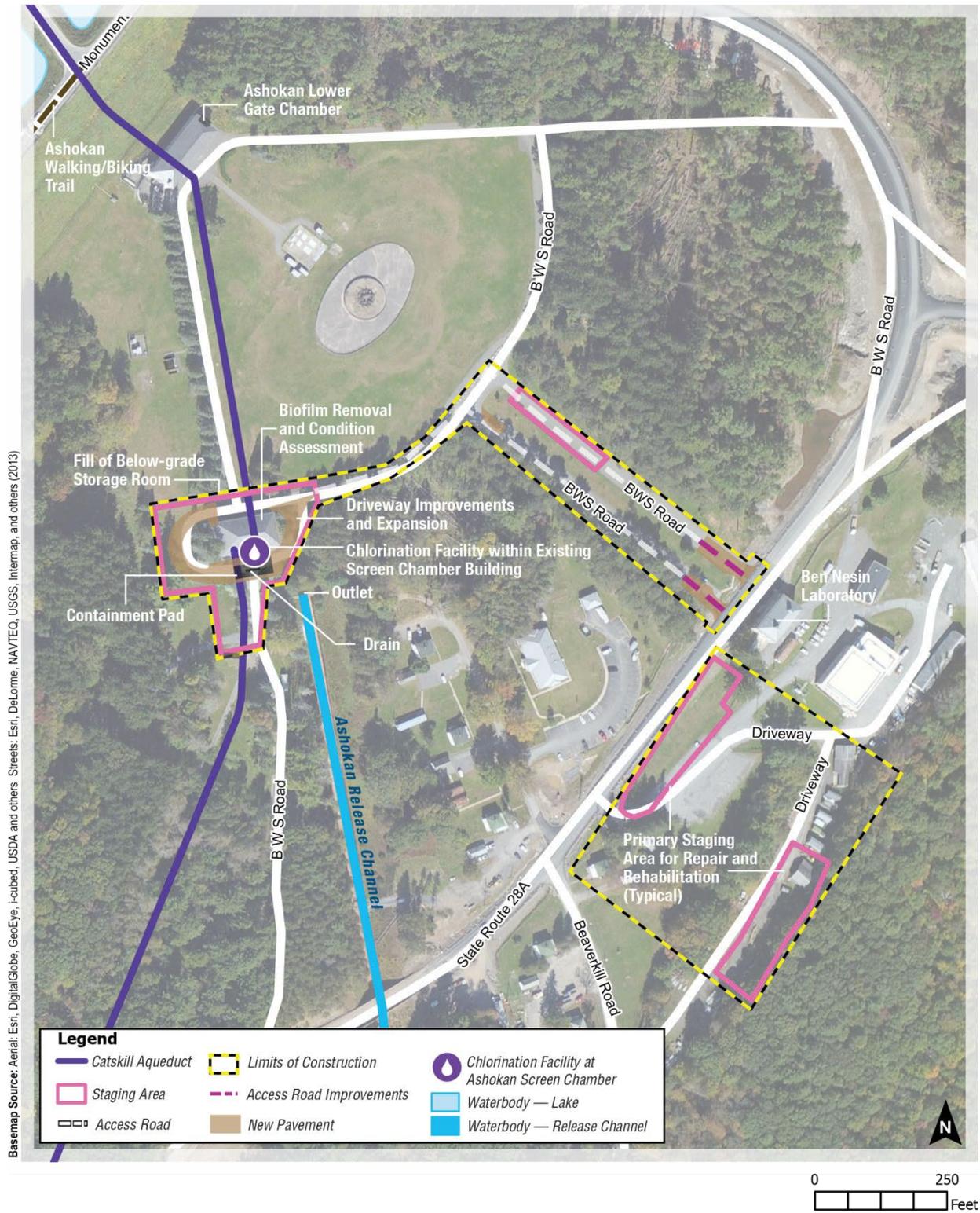


Figure 9.4-6: Site Plan – Ashokan Screen Chamber Study Area



Table 9.4-2: Schedule of Work Activities within the Ashokan Screen Chamber Study Area

Work Activity	Dates	Duration	Work Hours	Crew Size ¹
Primary Staging Area Management ²	2018 2017 – 2020	Less than 2 years	7 days a week, 24 hours per day (shutdowns) Monday to Friday, 7 AM to 5 PM (all other times)	12
Chlorination Facility Construction ^{2,3}	2018 2017 – 2019 2018	Less than 2 years	Monday to Friday, 7 AM to 3:30 PM	10
Chlorination Facility Start-up and Testing ²	Spring – Summer 2020 2019	Up to 4 months	7 days a week, 24 hours per day	2
Biofilm Removal and Condition Assessment ²	Fall 2020 2019 (Third 10-Week Shutdown)	2 weeks	7 days a week, 7 AM to 7 PM	21
Chlorination Facility Operation	2019 – 2023	4+ years	7 days a week, 24 hours per day	2 ⁴
Notes:				
¹ Crew size refers to the number of people anticipated at the work site(s).				
² Overlapping activities are estimated to total 100 weeks.				
³ Tree removal would be conducted from November 1 through March 31 to avoid impacts to Indiana bats (<i>Myotis sodalis</i>) and northern long-eared bats (<i>Myotis septentrionalis</i>).				
⁴ Chlorination facility would be operated by DEP staff.				

Construction of the chlorination facility would begin in ~~2018~~2017. The majority of the work would occur inside the existing Ashokan Screen Chamber, which would be retrofitted to house injection systems, bulk storage tanks, and chemical vacuum feeders to support the temporary addition of sodium hypochlorite or chlorine dioxide into the aqueduct. As described in Section 9.2, “Project Description,” temporary addition of these chemicals is necessary to maintain the aqueduct’s improved capacity following biofilm removal for the duration of the Rondout-West Branch Tunnel (RWBT) temporary shutdown. Outside the building, a chemical offloading pad would be installed and fitted with concrete containment pad. The containment pad would include a drain to routinely capture stormwater or contain chemicals in the event of a spill. A stormwater outlet would discharge to the Ashokan Release Channel and would include a gate valve that would be closed during deliveries to prevent spills from flowing into the Release Channel.

Additional improvements associated with construction of the chlorination facility would include filling in a below-grade storage room on the northern side of the screen chamber to provide structural support for vehicular traffic, expansion of on-site driveways to accommodate the turning radius requirements of delivery trucks, and improvements to the on-site driveway sub-base and asphalt at several locations. Newly asphalted road surfaces would be sloped to direct stormwater flows to surrounding pervious areas and a grass lined drainage ditch with an erosion control mat. These improvements would require excavation of approximately 250 cubic yards of soil, which would be disposed of at a permitted facility. Five trees would be removed to allow for expansion of the driveways.

Start-up and testing of the chlorination facility would be conducted as early as spring ~~2020~~2019 for a period of several months prior to biofilm removal. Biofilm removal and condition assessment would occur during the third 10-week shutdown in fall ~~2020~~2019, with the Ashokan Screen Chamber providing access into the aqueduct. The screen chamber would also serve as a collection point for biofilm, which would be transported for disposal at a registered, permitted, or otherwise authorized facility. Although the aqueduct would be unwatered during this shutdown, any residual water would be diverted through an internal bypass pipe around the work segments within the aqueduct for discharge to the aqueduct downstream. Any wash water generated from biofilm removal would be transported to a temporary treatment system, where it would be treated to meet water quality standards for discharge back into the aqueduct or to a nearby waterbody (see Section 9.2, “Project Description”).

Following the third 10-week shutdown, chlorination would continue in order to maintain improved capacity of the aqueduct until the bypass tunnel is connected to the RWBT in 2023. Operation of the chlorination facility would require the delivery of chemicals by tanker trucks to the offloading station of the Ashokan Screen Chamber. Chlorine dioxide would be made by blending two chemicals on site: sulfuric acid and Purate®. Chemicals would be stored within the southeastern section of the screen chamber in storage tanks approximately 8 feet in diameter and up to approximately 17 feet high.

As stated in Section 9.2, “Project Description” and Section 9.19, “Project-wide Impact Analysis,” one of two chlorine-based chemicals (i.e., only one chemical would be added at a given time) would be added to the aqueduct under two operating conditions: a maximum dose for potentially reducing the extent of the biofilm in advance of biofilm removal; and a lower dose for maintaining the increased Catskill Aqueduct capacity after biofilm removal to limit regrowth. At the maximum dose, sodium hypochlorite deliveries to the Ashokan Screen Chamber would be approximately 14 per week in 5,000-gallon tanker trucks. Alternatively, sulfuric acid and Purate® deliveries would each be approximately 5 to 6 per week in 3,200-gallon and 3,800-gallon tanker trucks, respectively. At a lower dose, sodium hypochlorite would be delivered approximately twice per week, or sulfuric acid and Purate® would each be delivered once per week.

Upon completion of the repair and rehabilitation in 2020, all trailers, equipment, and materials associated with the primary staging area would be removed, and any areas requiring temporary disturbance would be restored to baseline conditions. Following connection of the RWBT bypass in 2023, chlorination of the aqueduct would no longer be required, and the chlorination facility would no longer be operated.

Impact categories analyzed for the Ashokan Screen Chamber Study Area are presented in Sections 9.4.3.3, “Open Space and Recreation Resources” through 9.4.3.10, “Neighborhood Character” and include open space and recreation resources, visual resources; natural resources including terrestrial resources and federal/State Threatened and Endangered Species and State Species of Special Concern; hazardous materials; water and sewer infrastructure; transportation; stationary noise; and neighborhood character. Additionally, the study area’s compatibility with applicable public policies was analyzed on a town-wide basis in Section 9.4.2, “Town of Olive Impact Analysis.” As described in Section 9.3, “Screening Assessment and Impact Analysis Methodology,” an impact analysis related to land use and zoning; socioeconomic conditions;

community facilities and services; historic and cultural resources; the remaining natural resources subcategories, including geology and soils, water resources, aquatic and benthic resources, wildlife, federal/State Candidate Species, and unlisted rare and vulnerable species; energy; air quality; and mobile noise within the study area is not warranted. Finally, impacts related to project-wide natural resources, water and sewer infrastructure, and public health were analyzed within Section 9.19, “Project-wide Impact Analysis.”

9.4.3.3 Open Space and Recreation Resources

As shown on **Figure 9.4-7**, one open space and recreation resource exists within the Ashokan Screen Chamber Study Area: the DEP Ashokan Day Use Area. The Ashokan Day Use Area is a DEP recreational area that includes a fountain, picnic area, and a 2.7-mile long multi-use trail along the southern shoreline of Ashokan Reservoir. The trail is not located within the study area.

DEP has consulted with the Town of Olive and Ulster County, and it is DEP’s understanding that no plans to expand or create new open space or recreational resources are anticipated within the Ashokan Screen Chamber Study Area within the timeframe of the impact analysis. Users of the Ashokan Day Use Area are anticipated to continue. Therefore, in the future without the repair and rehabilitation, it is assumed that open space and recreation within the Ashokan Screen Chamber Study Area would be the same as baseline conditions.

During construction, the repair and rehabilitation work activities within the Ashokan Screen Chamber Study Area would be short-term (approximately 100 weeks over 3 years; see **Table 9.4-2**). The repair and rehabilitation work activities would not disrupt the use of the open space, and would not affect views looking north and west towards the Ashokan Reservoir, although, the reservoir is not visible from this area. The work activities may only temporarily affect views looking south and east from the Ashokan Day Use Area. However, staging and rehabilitation activities would occur on DEP property and would be temporary in nature. During construction, recreational use within the Ashokan Day Use Area would be unaffected.

Following construction, all equipment would be removed from the Ashokan Screen Chamber Study Area and staging areas would be restored to baseline conditions. Operation of the Catskill Aqueduct would be consistent with baseline conditions and would not disrupt recreational use of adjacent open spaces. As such, the repair and rehabilitation would not encroach upon, cause a loss of open space, or affect the use or physical character of the Ashokan Day Use Area.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to open space and recreation resources within the Ashokan Screen Chamber Study Area.

9.4.3.4 Visual Resources

The study area for the visual resources analysis is the area within the Ashokan Screen Chamber Study Area. It also includes view corridors that extend beyond the study area based on the locations that are publicly accessible.

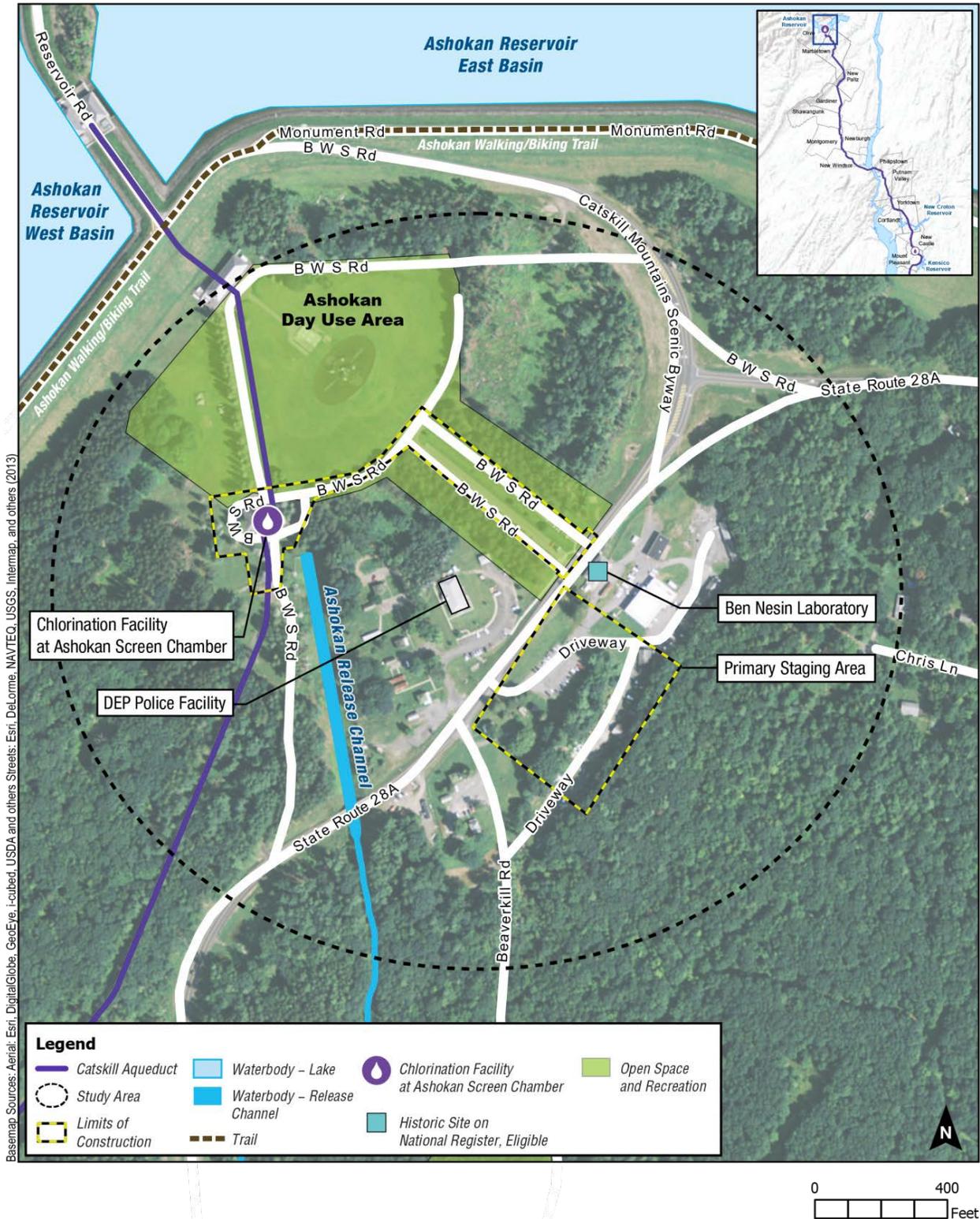


Figure 9.4-7: Open Space Resources - Ashokan Screen Chamber Study Area



As shown on **Figure 9.4-8**, there are three visual resources consisting of: one site listed as a State Park, the Catskill Park; one site eligible for listing on the National Register of Historic Places, the Ben Nesin Laboratory; and one proposed scenic highway, the proposed Catskill Mountains Scenic Byway.

The Catskill Park consists of approximately 700,000 acres with approximately 287,500 acres preserved as New York State Forest. The Catskill Park includes mountainous areas of public and private lands in Ulster, Greene, Delaware, and Sullivan counties, New York. The entire Ashokan Screen Chamber Study Area is located within the Catskill Park near the perimeter of the Park boundary.

The study area is not located in a section of the Park dedicated to tourism or recreation or within State forest lands. There are no view corridors or viewsheds specific to this study area.

Built in 1961, Ben Nesin Laboratory is a yellow brick DEP laboratory building located at Ashokan Reservoir. The laboratory has played a critical role in monitoring and maintenance of the water quality for the City water system supplied by the Catskill and Delaware waters.

The proposed Catskill Mountains Scenic Byway is also known as State Route 28A. The byway is under the purview of NYSDOT. Of the approximately 65 miles of the scenic byway, approximately 2,400 feet of State Route 28A passes through the southern portion of the Ashokan Screen Chamber Study Area.

DEP has consulted with the Town of Olive and Ulster County, and it is DEP's understanding that no new projects or structures that would alter views from visual or aesthetic resources are anticipated within the Ashokan Screen Chamber Study Area within the timeframe of the impact analysis. Natural processes, such as changes in habitat due to natural vegetative succession, are anticipated to continue. Therefore, in the future without the repair and rehabilitation, it is assumed that visual resources within the Ashokan Screen Chamber Study Area would be the same as baseline conditions.

The chlorination facility at Ashokan Screen Chamber would be located approximately 900 feet from Ben Nesin Laboratory. A proposed temporary staging area would be located less than 100 feet from the laboratory, as shown in **Figure 9.4-6**.

In the future with the repair and rehabilitation, the addition of the proposed chlorination facility would not affect the identified visual resources to the existing Ashokan Screen Chamber. The temporary staging areas would be visible from the Ben Nesin Laboratory, although the laboratory is not open to the public. Publicly accessible views of Ben Nesin Laboratory would not be affected by the staging areas, as they are not located between the publicly accessible roadways and the laboratory. The repair and rehabilitation work activities in the study area would be minimal and would not alter the site's character. Views from State Route 28A are limited due to the dense vegetation along the roadway, with no views of the proposed chlorination facility. Views of the construction staging areas could be visible, but would consist of a glancing view, looking west, as traveling north or south along State Route 28A.

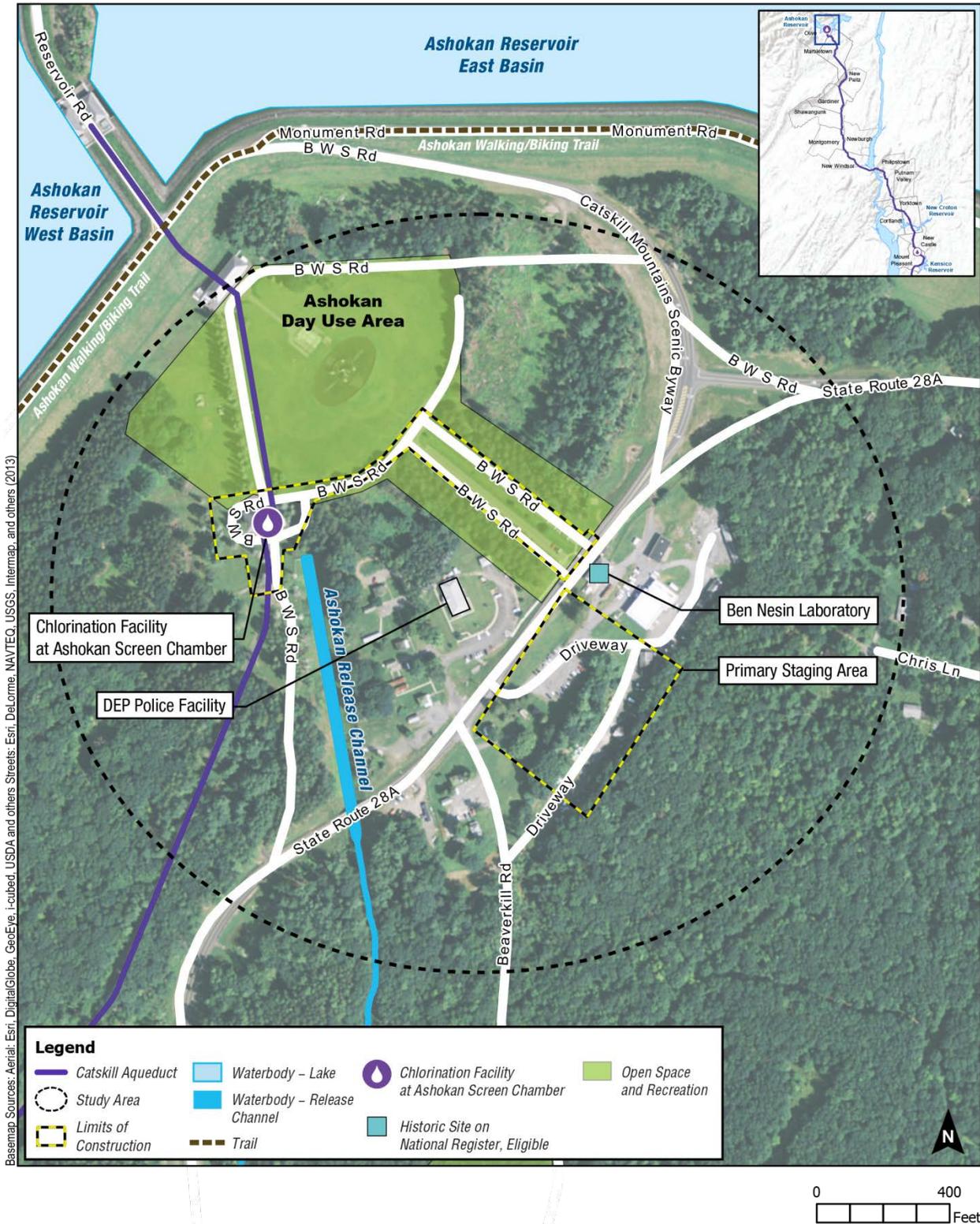


Figure 9.4-8: Visual Resources - Ashokan Screen Chamber Study Area



Following construction, all equipment would be removed from the Ashokan Screen Chamber Study Area and staging areas would be restored to baseline conditions. Temporary chlorination of the Catskill Aqueduct would take place from 2019 through 2023, but the study area would not be visibly different from baseline operations. Following the repair and rehabilitation within the Ashokan Screen Chamber Study Area, operation of the Catskill Aqueduct would be consistent with baseline conditions and would not result in changes to the future visual and aesthetic resource conditions of the views from Catskill Park, the Catskill Mountain Scenic Byway, or the Ben Nesin Laboratory.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to visual resources within the Ashokan Screen Chamber Study Area.

9.4.3.5 Natural Resources

The study area for the natural resources analysis is the area surrounding the limits of construction, including the chlorination facility and the primary staging area (see **Figure 9.4-9**). Based on a field visit conducted on September 23, 2014, the ecological community (Edinger et al. 2014) is mowed lawn, but also contains a paved road/path. The Ashokan Screen Chamber is surrounded by a forested community best characterized as hemlock-northern hardwood forest. These habitats have the potential to support terrestrial resources and protected wildlife species, and an analysis of the potential effects to natural resources that could result from the repair and rehabilitation activities is presented below.

Terrestrial Resources

There are a few ornamental spruce trees around the Ashokan Screen Chamber. The edge of a forested community best characterized as hemlock-northern hardwood forest is located within the primary staging area. The hemlock-northern hardwood forest observed during field visits is not mapped as a significant natural community by the NYNHP database. While the Town of Olive does not regulate the removal of trees associated with the repair and rehabilitation, these terrestrial resources within the study area warrant an analysis.

DEP has consulted with the Town of Olive and Ulster County, and it is DEP's understanding that no new projects or developments that would affect terrestrial resources are anticipated within the Ashokan Screen Chamber Study Area within the timeframe of the impact analysis. Natural processes, such as changes in habitat due to natural vegetative succession, are anticipated to continue. Therefore, in the future without the repair and rehabilitation, it is assumed that terrestrial resources within the study area would be the same as baseline conditions.



Figure 9.4-9: Natural Resources - Ashokan Screen Chamber Study Area



In the future with the repair and rehabilitation, work activities would include minor tree clearing at the Ashokan Screen Chamber to expand the driveways for chemical deliveries. Five ornamental spruce trees adjacent to the building, with an average diameter at breast height (dbh) of 21 inches, may be removed. All tree removal would be conducted from November 1 through March 31 to avoid impacts to Indiana bats (*Myotis sodalis*) and northern long-eared bats (*Myotis septentrionalis*). Removal of these ornamental trees would not affect terrestrial resources in the study area, therefore, tree replacement is not proposed. The area is currently developed as a DEP facility for operating the Catskill System. Grading of the areas outside of the driveway and in the primary staging area would be conducted in a manner that limits disturbance to nearby trees.

Following construction, all equipment would be removed from the study area, and staging areas would be restored to natural conditions. Vegetated areas temporarily cleared during construction would grow back with similar communities. Following construction, temporary chlorination would not affect terrestrial resources because all treatment would occur within the screen chamber and the aqueduct. Operation of the Catskill Aqueduct would be consistent with baseline conditions and natural reforestation and vegetative succession of aqueduct areas not routinely maintained would continue to occur over time.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to terrestrial resources within the Ashokan Screen Chamber Study Area.

Federal/State Threatened and Endangered Species and State Species of Special Concern

This section includes an analysis of potential impacts to federal/State Threatened and Endangered Species and State Species of Special Concern identified in Section 9.3.9, “Natural Resources,” as having the potential to be affected by activities within the natural resources study area. Species that could be affected within the natural resources study area and species that could occur up to 0.25 mile from the work sites were determined in consultation with USFWS, USACE, NYNHP, and NYSDEC, as well as county and local offices, as applicable.

As discussed in Section 9.3.9, “Natural Resources,” six species were identified to have the potential to be affected by the repair and rehabilitation within the natural resources study area. Therefore, conditions in the future without the repair and rehabilitation, an analysis of the potential for impacts to these six species, and a summary of conclusions on the potential effects resulting from the repair and rehabilitation are provided below.

In the future without the repair and rehabilitation, it is assumed that federal/State Threatened and Endangered Species and State Species of Special Concern within the study area would largely be the same as baseline conditions, other than possible changes in habitat due to natural vegetative succession and general anthropogenic influences.

An analysis of the potential for disturbance to federal/State Threatened and Endangered Species and State Species of Special Concern from the repair and rehabilitation within the natural resources study area is shown in **Table 9.4-3**. The analysis included an evaluation of the repair and rehabilitation work activities within the study area and field visits, as applicable.

Table 9.4-3: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern and Habitats within the Ashokan Screen Chamber Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Amphibians and Reptiles					
Eastern Box Turtle	<i>Terrapene carolina</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visit on September 23, 2014. Potential habitat exists within the open grassy areas and adjacent hardwood forest. While work activities would be largely confined to previously disturbed areas, if any isolated areas of potential habitat exist at the sites, as a highly mobile species, any eastern box turtles that might otherwise use these areas are expected to instead utilize similar, adjacent habitats during construction. Furthermore, perimeter silt fencing would limit disturbance to adjacent habitat and prevent individual turtles from entering the work sites during construction. Finally, upon construction completion, the staging areas would be restored to natural conditions. Therefore, there are no effects anticipated and no further analysis for eastern box turtles is warranted for this study area.	No
Wood Turtle	<i>Glyptemys insculpta</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visit on September 23, 2014. Potential habitat is present in the open grassy areas and surrounding wooded area. However, disturbance is limited to a small footprint within a previously disturbed area. Furthermore, perimeter silt fencing would limit disturbance to adjacent habitat and prevent individual turtles from entering the work sites during construction. Finally, upon construction completion, the staging areas would be restored to natural conditions. Therefore, there are no effects anticipated and no further analysis for wood turtles is warranted for this study area.	No
Birds					
Bald Eagle	<i>Haliaeetus leucocephalus</i>	BGPA/ MBTA	Threatened	NYNHP identified the nearest nest to be less than a half of mile from the work sites, well beyond the USFWS and DEP recommended buffer restriction of 330 and 660 feet, respectively. The Ashokan Screen Chamber and primary staging areas are located inland, but in proximity to potential flight paths. However, the study area is outside the direct flight path between the dam and the nest and activities would predominantly occur on previously disturbed land. Therefore, there are no effects anticipated and no further analysis for Bald Eagles is warranted for this study area.	No

Table 9.4-3: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern and Habitats within the Ashokan Screen Chamber Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Whip-poor-will	<i>Antrostomus vociferus</i>	MBTA	Special Concern	No individuals were incidentally observed during the field visit on September 23, 2014. Potential habitat exists in the adjacent open canopy areas, which may be suitable for nesting and foraging. However, work activities would be largely confined to DEP facilities and previously disturbed areas. Construction would take place primarily during daytime hours, thereby avoiding direct disturbance to potential roosting, nesting, and foraging habitat. Should any potential habitat exist at the sites, a variety of habitats would be available for the species use in the vicinity during construction. If there are active ground nests when construction commences, these would be located in forested areas beyond the construction limits such that the trees and local topography would naturally attenuate construction noises and no direct disturbance or mortality is anticipated. Moreover, individuals in these areas are acclimated to human activity and ambient noise due to the proximity of access roads and State Route 28A. Finally, upon construction completion, the staging areas would be restored to natural conditions. Therefore, there are no effects anticipated and no further analysis for Whip-poor-wills is warranted for this study area.	No
Mammals					
Indiana Bat	<i>Myotis sodalis</i>	Endangered	Endangered	No bats were incidentally observed during the field visit on September 23, 2014. Work activities would predominantly occur on previously disturbed areas at the DEP facilities south of Ashokan Reservoir. Five spruce trees would be removed from November 1 through March 31 to avoid impacts to Indiana bats. There may be temporary noise that discourages bats from roosting in the immediate vicinity of the work sites; however, this work would not occur over an extended period of time and there is abundant suitable habitat in the surrounding areas within which bats could roost. Repair activities would not adversely affect bat foraging within the study area. Construction lighting would be used as needed during the 10-week shutdowns, and because these would occur during the fall (October through December), it would be unlikely that bats would be in the area and, therefore, no disturbance from nighttime lighting is anticipated. Therefore, there are no effects anticipated and no further analysis for Indiana bats is warranted for this study area.	No

Table 9.4-3: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern and Habitats within the Ashokan Screen Chamber Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	Threatened	Threatened Unlisted	No bats were incidentally observed during the field visit on September 23, 2014. There were no signs of roosting bats at the facilities. Should any bats or their guano be observed in these structures indicating roosting during work activities, USFWS and NYSDEC would be contacted immediately to determine the best course of action. Five spruce trees would be removed from November 1 through March 31 to avoid impacts to northern long-eared bats. There may be temporary noise that discourages bats from roosting in the immediate vicinity of the work sites; however, this work would not occur over an extended period of time and there is abundant suitable habitat in the surrounding areas within which bats could roost. Repair activities would not adversely affect bat foraging within the study area. Construction lighting would be used as needed during the 10-week shutdowns, and because these would occur between October and March, it would be unlikely that bats would be in the area and, therefore, no disturbance from nighttime lighting is anticipated. Therefore, there are no effects anticipated and no further analysis for northern long-eared bats is warranted for this study area.	No
<p>Notes: BGPA: Bald and Golden Eagle Protection Act MBTA: Migratory Bird Treaty Act</p>					

Federal/State Threatened and Endangered Species and State Species of Special Concern Conclusions

Based on the impact analysis, no take is anticipated. There would be no effects to eastern box turtles (*Terrapene carolina*), wood turtles (*Glyptemys insculpta*), Bald Eagles (*Haliaeetus leucocephalus*), Whip-poor-wills (*Antrostomus vociferus*), Indiana bats, or northern long-eared bats associated with the repair and rehabilitation within the natural resources study area. Therefore, the repair and rehabilitation would not result in significant adverse impacts to federal/State Threatened and Endangered Species or State Species of Special Concern within the Ashokan Screen Chamber Study Area.

9.4.3.6 Hazardous Materials

To evaluate the potential presence of hazardous materials within the Ashokan Screen Chamber Study Area, a Phase I Environmental Site Assessment (ESA) was conducted in general conformance with the scope and limitations of American Society for Testing and Materials (ASTM) Practice E 1527-13 and City Environmental Quality Review (CEQR) requirements to identify Recognized Environmental Conditions (RECs). The Phase I ESA included site reconnaissance, research on current/historical use, and review of federal and State regulatory listings for both the site itself and for its neighboring properties within the appropriate search distance defined in the ASTM standard. The findings from the Phase I ESA investigation and results from DEP's legacy files for the work sites, including an environmental health and safety data gap analysis and sampling, were collectively reviewed to assess the potential presence of and potential for disturbance to hazardous materials in the study area.

Based on the Phase I ESA investigations, there was no indication of an environmental impact that would rise to the level of a REC as defined under the ASTM standard to affect activities at the proposed construction staging areas. However, previous DEP investigations included a review of the results of legacy fieldwork conducted for DEP in connection with the Ashokan Upper Gate, Lower Gate, and Screen Chambers. In addition, an environmental health and safety data gap analysis and sampling was undertaken of items suspected of containing asbestos, lead paint, mercury paint and other contaminants of concern including volatile and semivolatile organics, polychlorinated biphenyls (PCBs), and total petroleum hydrocarbons in the study area. Specifically, previous investigation and legacy data revealed asbestos-containing material located in window caulk, interior roof, conduit, and ceiling beams. Lead-based paint was identified on windows, piping, doors, concrete shutters, concrete wall/floors located within the boiler, old chlorinator, generator, the injector, and storage areas inside the screen chamber. Mercury was identified in paint inside the screen chamber walls and column base located inside the Ashokan Screen Chamber. Peeling paint inside the screen chamber may also contain PCBs based on the previous identification of PCBs within the screen chamber.

DEP has consulted with the Town of Olive and Ulster County, and it is DEP's understanding that no development or structures that would introduce hazardous materials to the environment are anticipated within the Ashokan Screen Chamber Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that the

presence of hazardous materials within the Ashokan Screen Chamber Study Area would be the same as baseline conditions.

In the future with the repair and rehabilitation, construction of the chlorination facility at the Ashokan Screen Chamber would require demolition of some of the structures located within the chamber building to accommodate the installation of sodium hypochlorite, sulfuric acid and Purate® bulk storage tanks and chemical vacuum feeders. The chlorination facility would be installed and operated as a temporary facility. The bulk storage tanks would consist of fiberglass reinforced plastic, specially lined carbon steel tanks which would be provided with secondary containment protected with chemical resistant lining. Chemical truck delivery area would also be provided with secondary containment.

Hazardous materials identified within the Ashokan Screen Chamber would be managed in accordance with the appropriate NYSDEC and OSHA regulations. All positively identified and presumed or suspect asbestos-containing materials, lead-containing paint, mercury-containing and PCB-containing paint that would be disturbed would be handled, removed and disposed of in accordance with applicable governmental regulations and guidelines prior to any demolition activities. Additionally, demolition activities associated with potential disturbance of lead-containing paint, mercury-containing and PCB-containing paint would be conducted in accordance with OSHA 29 CFR 1926.62 - Lead Exposure in Construction. Universal waste or suspected PCB-containing fluorescent lighting fixtures, building materials, and other electrical equipment and fluorescent lights that could contain mercury or asbestos, along with the disposal of any chemicals or empty drums would be conducted in accordance with all applicable federal, State and local regulations and guidelines.

The proposed construction and operation of the chlorination facility and primary staging area at the Ashokan Screen Chamber would require the storage and use of a variety of petroleum and other chemical products. These products include diesel fuel for back-up power, lubricating oil for construction vehicles, and miscellaneous cleaning and maintenance chemicals during construction. The use and storage of these would be in accordance with applicable regulatory requirements and guidelines including those relating to: federal Spill Prevention, Control, and Countermeasures requirements; and State petroleum bulk storage, chemical bulk storage and spill reporting requirements. Work activities would meet the applicable regulatory limits for hazardous waste handling and disposal prior to chlorination activities. Following construction, equipment and chemical storage at the staging areas would be removed. Following the repair and rehabilitation, the chlorination facility would no longer be operated and chemical storage for the chlorination facility would no longer be required and operation of the Catskill Aqueduct would be consistent with baseline conditions.

Therefore, the repair and rehabilitation would not result in significant adverse impacts from the presence or disturbance of hazardous materials within the Ashokan Screen Chamber Study Area.

9.4.3.7 Water and Sewer Infrastructure

The repair and rehabilitation has the potential to affect water supply and stormwater management associated with staging and access improvements and construction and operation of the chlorination facility in the study area. Wastewater that would be generated by chlorinating the

aqueduct is discussed in Section 9.19, “Project-wide Impact Analysis.” The study area for the water and sewer infrastructure analysis is the Ashokan Screen Chamber Study Area (see **Figure 9.4-2**). The Catskill Aqueduct provides water supply in the study area. There is existing water supply infrastructure at Ashokan Screen Chamber, DEP Police Precinct, and Ben Nesin Laboratory buildings that are located in the study area. These facilities are visited on a daily basis by several employees. Because infrastructure changes would occur in the vicinity of the Ashokan Screen Chamber, the assessment below focuses on the western portion of the study area. There are approximately 25,000 square feet of impermeable surfaces at Ashokan Screen Chamber (i.e., pavement, concrete, roofing), around which stormwater generally flows over the surface to adjacent pervious areas where it infiltrates into the ground. There are four existing catch basins and stormwater piping that discharge to the Ashokan Release Channel. Facilities in the study area do not have a sewer connection. Septic systems are used for wastewater collection.

DEP has consulted with the Town of Olive and Ulster County, and it is DEP’s understanding that no new projects or structures that would affect water and sewer infrastructure are anticipated within the study area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that water and sewer infrastructure would be the same as baseline conditions.

In the future with the repair and rehabilitation, modifications to the existing driveways to accommodate chemical deliveries would result in approximately 3,600 square feet of additional impervious surface, representing an approximate 14 percent increase. During construction, stormwater would be temporarily diverted from the existing drainage network and treated. Stormwater BMPs would be implemented to enhance the natural runoff paths from the screen chamber into the study area, including sloping the driveways to promote infiltration, constructing two new catch basins to replace two existing basins, and improving yard piping. Additionally, the containment pad, proposed to be installed south of the screen chamber as part of the chemical offloading pad, would serve dual functions as chemical containment and for stormwater collection. Stormwater collected within this small stormwater system would be directed to a network of yard piping, and would be discharged to the Ashokan Release Channel similar to baseline conditions. By employing these BMPs, the increased impervious surface would not affect the quantity or quality of stormwater runoff.

Construction of the chlorination facility would be completed within the existing screen chamber building. Testing and operation of the chlorination system would not begin until the necessary leak repairs and/or local dechlorination systems are in place. Once the system is operational by mid-~~2020~~2019, temporary chlorination would commence. The new chlorination facility would operate from testing until of the RWBT bypass tunnel connection is complete. As a result, DEP has also developed recommendations aimed at reducing the potential for changes from the temporary chlorination to Outside Community Connections, the City’s distribution systems, and private drinking water supply wells (see Section 9.19.3, “Chlorination and Dechlorination”).

Upon completion of the repair and rehabilitation in 2023, operation of the Catskill Aqueduct would be consistent with baseline conditions. The chlorination facility at Ashokan Screen Chamber would no longer be required and would no longer be operated.

Therefore, given the temporary nature of the chlorination and stormwater BMPs constructed at the facility, the repair and rehabilitation would not result in significant adverse impacts to water and sewer infrastructure within the Ashokan Screen Chamber Study Area.

9.4.3.8 Transportation

The study area for the transportation analysis consists of the major convergent roadways that would potentially be used by employee and construction vehicles associated with repair and rehabilitation work activities en route to and from the Ashokan Screen Chamber Study Area.

As shown on **Figure 9.4-10**, access to the repair and rehabilitation limits of construction for the work sites within the Ashokan Screen Chamber Study Area would be via State Route 28 around the western half of Ashokan Reservoir, to State Route 28A which leads directly to a DEP access road. This route would also be used for chemical deliveries to the Ashokan Screen Chamber during temporary chlorination. More direct truck access routes are not practical as these are narrow roads that wind through steep terrain. To the extent available, construction vehicles would travel on truck-permitted roadways directly to and from the Ashokan Screen Chamber Study Area.

State Route 28A is a two-lane, two-way rural minor collector roadway, and carries approximately 670 vehicles per day, based on 2009 traffic counts (NYSDOT Traffic Data Viewer). Under baseline conditions, there are approximately 50 vehicles in the morning peak hour and 60 vehicles in the afternoon peak hour along this road. There is no public transportation and nominal pedestrian activity in the immediate vicinity of the study area, although this area is adjacent to parkland that is accessible to the public, which can utilize the same roadways. Under current operations, the existing DEP-owned property consists of a DEP police precinct, the Ben Nesin Laboratory, the existing Ashokan Screen Chamber, and other DEP-related activities associated with Ashokan Reservoir operations. There are DEP employees who work at and visit the work sites on a daily basis. These DEP employee vehicles would access the site via State Route 28A.

DEP has consulted with the Town of Olive and Ulster County, and it is DEP's understanding that no changes in land use or an increase in traffic due to outside developments are anticipated within the Ashokan Screen Chamber Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that traffic, public transportation, and pedestrian activities within the study area would be similar to baseline conditions.

In the future with the repair and rehabilitation, the Ashokan Screen Chamber Study Area would serve as a primary staging area to support work activities at the Ashokan Screen Chamber, Beaverkill Road, Atwood-Olivebridge Road, Vly Atwood Road, Pine Bush Road, Lucas Turnpike, Canal Road, Mossybrook Road, Lower Knolls Road, Mountain Rest Road, and New Paltz-Minnewaska Road study areas. The primary staging area would be used for contractor's office trailers and equipment storage. However, it would only be accessed for short periods (i.e., several weeks coinciding with spring/summer construction and the 10-week shutdowns) for parking, deliveries, and other activities. If the destination work site associated with these study areas is also a secondary staging area and if sufficient parking capacity exists at the destination work site, then the construction workers would proceed directly to the work site to park their personal vehicles. Otherwise, if the destination work site is not a staging area with sufficient

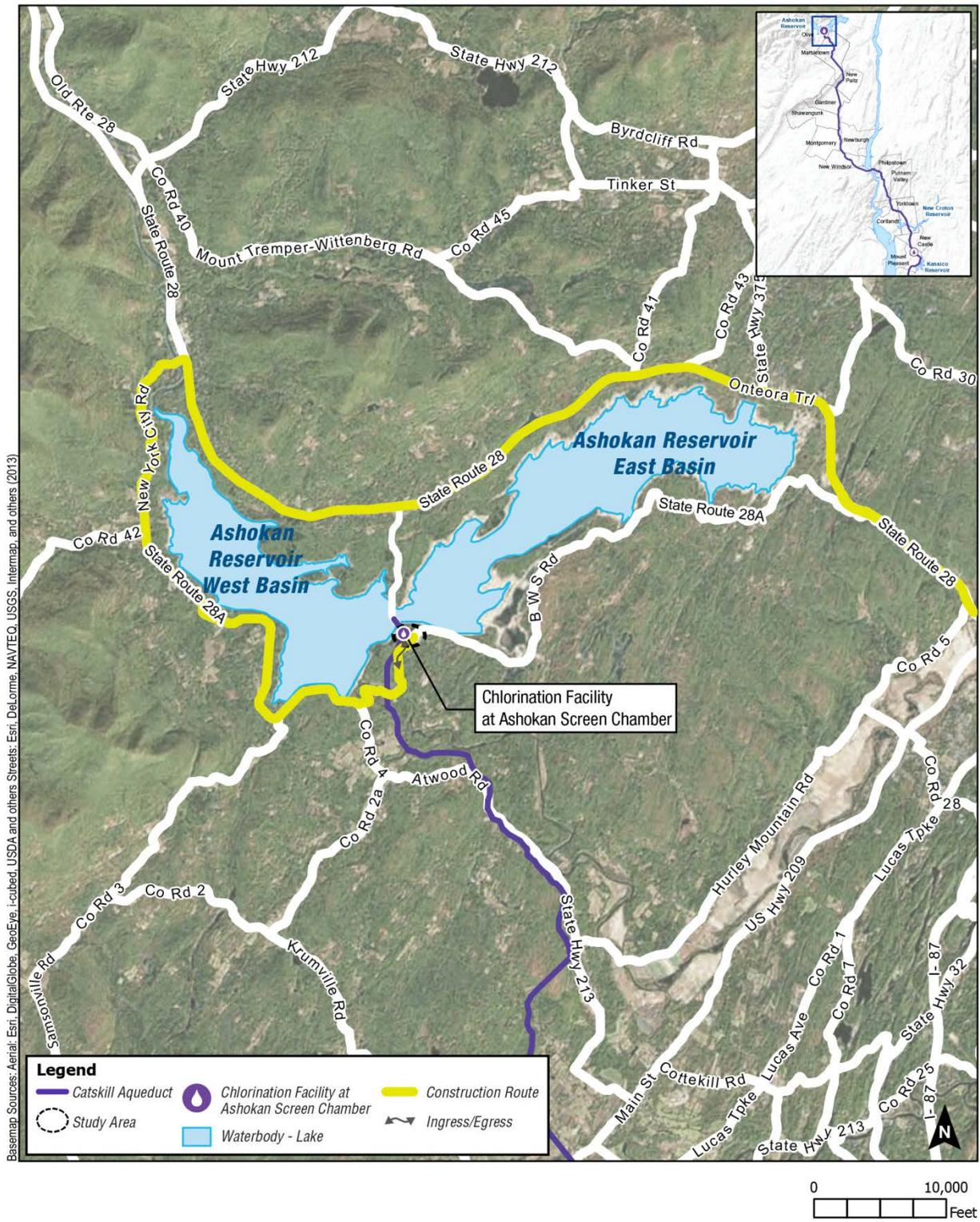


Figure 9.4-10: Transportation – Ashokan Screen Chamber Study Area



parking capacity, all construction workers for these study areas would drive to either this primary staging area or to a secondary/supplemental staging area, and would then be shuttled from the staging area to the study area work sites. Shuttle capacity is based on an average occupancy of six construction workers per shuttle vehicle.

Use of this primary staging area would span the duration of construction (~~2018~~2017 to 2020), with peak staging area activity during the three 10-week shutdowns when work could take place up to 24 hours per day, 7 days a week. Construction of the chlorination facility would be concurrent with the staging area activities at the Ashokan Screen Chamber Study Area. Public parking would not be affected because the peak construction use would coincide with the 10-week shutdowns when there would be low demand for public parking. There would also be sufficient parking outside of these peak activity periods, as the staging areas would not exceed available parking capacity for construction vehicles.

Repair and rehabilitation work activities within the Ashokan Screen Chamber Study Area were evaluated to determine which activities would have the potential to generate the most vehicle trips and, therefore, form the basis of this transportation analysis. Of these activities, use of the primary staging area within the study area during the third 10-week shutdown would generate the most vehicle trips. Therefore, peak-day and peak-hour calculations were conducted for vehicles that would travel to and from the primary staging area during this peak period.

Project-generated vehicles for the primary staging area would converge on State Route 28A on a peak day. The estimated number of peak-day one-way vehicle trips associated with the Ashokan Screen Chamber Study Area is 70 vehicles, or approximately 140 peak-day vehicle round trips that would travel to and from the Ashokan Screen Chamber Study Area. Approximately 68 vehicle round trips or 68 Passenger Car Equivalents (PCEs), would be workers traveling to and from the Ashokan Screen Chamber Study Area. The remaining 72 peak-day vehicle round trips (103 PCEs) would be trucks or other construction vehicles. After the completion of the chlorination facility construction in ~~2020~~2019, the operation of the chlorination facility would generate vehicle trips consisting of delivery of chemicals by tanker trucks to the unloading station of the Ashokan Screen Chamber through year 2023. The number of vehicles associated with operation of the chlorination facility, which would include staff that work at and visit the chlorination facility on a daily basis and chemical delivery trucks, would not deviate significantly from baseline conditions. The chemical deliveries would generate fewer than the *CEQR Technical Manual* screening threshold of 50 peak-hour PCEs.

During a peak day, the estimated number of peak-hour vehicle trip ends associated with the Ashokan Screen Chamber Study Area is approximately 70 peak-hour vehicle trip ends (87 PCEs). This includes approximately 34 vehicle trip ends (34 PCEs) from workers and approximately 36 vehicle trip ends (53 PCEs) from trucks or other construction vehicles. For the purpose of this analysis, the peak-hour project-generated vehicles are anticipated to coincide with typical construction hours for employee vehicles entering the site. Assuming two 12-hour shifts, this would be during the 6 AM to 7 AM, and 6 PM to 7 PM hours, and would be unlikely to coincide with the peak hour for non-project-related traffic.

The repair and rehabilitation work activities would result in approximately 87 peak-hour PCEs along State Route 28A, which is above the *CEQR Technical Manual* screening threshold of

50 peak-hour PCEs as described in Section 9.3.13, “Transportation.” Work activities in the Ashokan Screen Chamber Study Area associated with the construction of the chlorination facility would occur for less than 2 years. While use of this study area as a primary staging area would span the duration of construction (~~2018~~2017 through 2020), concentrated activities would occur during the three 10-week shutdowns (see **Table 9.4-2**). Construction would not generate public parking, transportation demands, or pedestrian activity within the Ashokan Screen Chamber Study Area. Following completion of the repair and rehabilitation, traffic patterns would be similar to baseline conditions.

Therefore, although there would be a minor temporary increase in traffic, the repair and rehabilitation would not result in significant adverse impacts to transportation within the Ashokan Screen Chamber Study Area.

9.4.3.9 Noise

Per Section 9.3.15, “Noise,” mobile noise associated with the repair and rehabilitation within the Ashokan Screen Chamber Study Area does not warrant analysis. This section includes an analysis of potential impacts from stationary noise associated with the repair and rehabilitation to sensitive receptors within the Ashokan Screen Chamber Study Area.

The study area for the stationary noise analysis is the area within 1,500-feet of the of the repair and rehabilitation work activities, as shown on **Figure 9.4-11**.

The Ashokan Screen Chamber Noise Study Area includes a recreational trail, located in the western portion of the study area, and residential parcels, located in the eastern portion of the study area, which are considered noise-sensitive receptors for this analysis. The temporary work activities were evaluated to disclose potential noise levels at the nearest noise-sensitive land uses. While the Town of Olive does not have a noise code applicable to the Ashokan Screen Chamber Study Area, there are noise-sensitive receptors within the study area that warrant an analysis.

Existing ambient noise levels within the Ashokan Screen Chamber Study Area are influenced by vehicular traffic on State Route 28A and other local roadways. The existing noise levels within the study area are comparable to a very quiet suburban and rural residential environment based on the proximity to major transportation corridors, the population density of the area. Typical noise levels (measured as L_{eq}) for very quiet suburban and rural communities are 40 dBA during the daytime and 34 dBA during the nighttime.

DEP has consulted with the Town of Olive and Ulster County, and it is DEP’s understanding that no major projects that would result in a change in land use, or new noise-generating sources that would contribute to an increase in ambient noise levels, are anticipated within the Ashokan Screen Chamber Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that ambient noise levels within the Ashokan Screen Chamber Study Area would be similar to baseline conditions.

In the future with the repair and rehabilitation, stationary noise-producing work activities within the Ashokan Screen Chamber Study Area would occur at two sites (see **Table 9.4-4**). Other noise-producing equipment would also be utilized within the study area for a limited period during temporary chlorination. However, this equipment is not expected to be louder than the equipment associated with the primary staging area and the chlorination facility.

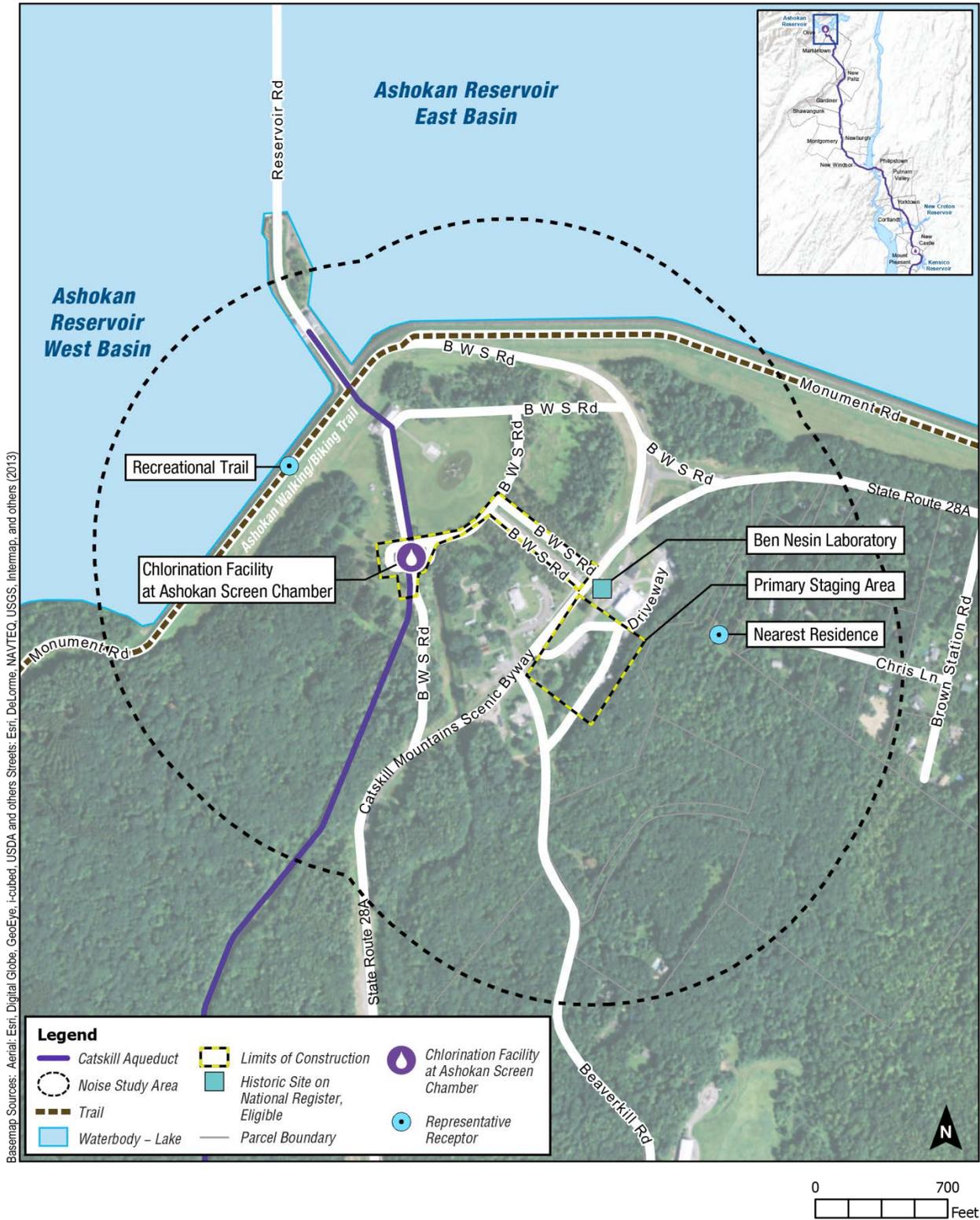


Figure 9.4-11: Noise - Ashokan Screen Chamber Study Area



Table 9.4-4: Stationary Source Construction Equipment Modeled at the Ashokan Screen Chamber Study Area Noise Analysis and Reference Noise Levels (L_{eq})

Equipment Type	Reference Noise Level (L_{eq}) at 50 feet (dBA)	Source
Chlorination Facility		
Mounted Impact Hammer	83	CEQR ¹
Pneumatic Tools	82	CEQR ¹
Paver	82	CEQR ¹
Primary Staging Area		
Generator	82	CEQR ¹
Light Plant	58	Vendor
Note: ¹ City Environmental Quality Review (CEQR) Technical Manual, Chapter 22.		

The primary stationary noise-producing activities for the construction of the chlorination facility would occur during normal work hours, from 7 AM to 3:30 PM, Monday through Friday. The construction of the chlorination facility would occur for less than two continuous years between 2018~~2017~~ and 2019~~2018~~.

Use of this study area as a primary staging area would span the duration of construction (2018~~2017~~ through 2020), with concentrated activities occurring during the three 10-week shutdowns when work could take place for 24 hours per day, 7 days a week. The staging area would be used for contractor’s office trailers and equipment storage. However, it would only be accessed intermittently and for short periods (i.e., several weeks coinciding with the 10-week shutdowns) for parking, deliveries, and other activities.

The noise analysis focused on up to the three loudest stationary noise-generating equipment types necessary for the construction of the chlorination facility and use of the primary staging area. Equipment reference noise levels are shown in **Table 9.4-4**. The types of noise-generating equipment analyzed were conservatively based on peak construction operating conditions.

Construction of the chlorination facility in the Ashokan Screen Chamber Study Area during the repair and rehabilitation would emit a noise level (L_{eq}) of approximately 63 dBA during daytime hours at the nearest noise-sensitive receptor (a recreational trail) approximately 800 feet away from the chlorination facility. No residences were identified within 1,500 feet of the proposed chlorination facility. Stationary noise levels associated with the use of the primary staging area within the Ashokan Screen Chamber Study Area during repair and rehabilitation work activities were also evaluated due to nighttime operations and the proximity to residences. The primary staging area is not a work site, so no heavy construction equipment was considered. However, the contractor’s office trailers may require generators. During the 10-week shutdowns, the primary staging area could be used up to 24 hours per day, so light plants would also be used. Staging area activities would emit a noise level (L_{eq}) of approximately 64 dBA during daytime and nighttime hours at the nearest noise-sensitive receptor (a residence) approximately 400 feet away from the staging area. The generators are the dominant noise source for the primary staging

area, so similar noise levels are expected throughout daytime and nighttime hours. Although there would be an increase in stationary noise levels during 24-hour construction periods during the 10-week shutdowns, work would primarily occur in the fall and winter months when residents typically have windows closed. Noise levels inside would be further reduced to an interior noise level (L_{eq}) of approximately 40 dBA.

Following completion of the repair and rehabilitation work activities, the construction equipment and vehicles would be removed from the Ashokan Screen Chamber Study Area. During temporary chlorination, noise-producing equipment would be located indoors. Noise outside of the building from the equipment inside the facility would be limited due to the masonry construction of the facility. Exterior noise sources during the operation of the chlorination facility would be limited and consist of chemical deliveries and other mobile sources (e.g., employee vehicles). Following the repair and rehabilitation, operation of the Catskill Aqueduct within the study area would be consistent with baseline conditions.

Therefore, although there would be a temporary increase in noise levels associated with construction of the chlorination facility and activity at the primary staging area, noise from the repair and rehabilitation would not result in significant adverse impacts to sensitive receptors within the Ashokan Screen Chamber Study Area.

9.4.3.10 Neighborhood Character

The character of the Ashokan Screen Chamber Study Area is largely defined by a mix of public services, with some residential and vacant (open space) areas along its southeastern portion and its physical setting within a rural location (see **Figure 9.4-4**). The Catskill Aqueduct traverses the western portion of the study area in a general north to south direction. State Route 28A traverses the eastern portion of the study area. The limits of construction for the work sites are located within a public services parcel which is owned and maintained by DEP. Access to both sites would be from State Route 28A onto DEP driveways.

DEP has consulted with the Town of Olive and Ulster County, and it is DEP's understanding that no changes in land use and no new projects or structures are anticipated within the Ashokan Screen Chamber Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that neighborhood character within the study area would be similar to baseline conditions.

As described in Section 9.3.16, "Neighborhood Character," there would be no potential for the repair and rehabilitation to affect shadows and urban design. In addition, based on the screening assessment for land use and zoning; socioeconomic conditions; open space and recreation; and historic and cultural resources, an impact analysis for the Ashokan Screen Chamber Study Area is not warranted, as discussed in the following sections: Section 9.3.3, "Land Use, Zoning, and Public Policy," Section 9.3.4, "Socioeconomic Conditions," Section 9.3.6, "Open Space and Recreation," and Section 9.3.7, "Historic and Cultural Resources," respectively. As described in Section 9.4.3.4, "Visual Resources," the work activities would not affect visual resources in the Ashokan Screen Chamber Study Area. Furthermore, the public policy impact analysis provided in Section 9.4.2, "Town of Olive Impact Analysis," concluded the work activities were consistent with applicable plans.

As described in Section 9.4.3.8, “Transportation” and Section 9.4.3.9, “Noise,” the work activities in the Ashokan Screen Chamber Study Area associated with the construction of the chlorination facility would occur for less than 2 years. Use of this study area as a primary staging area would span the duration of construction (~~2018~~2017 through 2020), with concentrated activities occurring during the three 10-week shutdowns and would result in a temporary increase in traffic and noise. Following completion of the repair and rehabilitation, the construction equipment would be removed, vehicles associated with operation of the chlorination facility would no longer access the study area, and traffic patterns would return to baseline conditions. These temporary increases in traffic and noise levels would not result in a density of activity or service conditions that would affect the overall character of the study area.

The repair and rehabilitation would not generate significant adverse effects in land use, zoning, and public policy; socioeconomic conditions; open space and recreation; shadows; historic and cultural resources; urban design and visual resources; transportation; or noise.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to neighborhood character within the Ashokan Screen Chamber Study Area.

9.4.4 BEAVERKILL ROAD STUDY AREA IMPACT ANALYSIS

In the upper portion of the Beaverkill Road Study Area, the aqueduct consists of the Esopus Cut-and-Cover Tunnel, which transitions to the Esopus Steel Pipe Siphon at the Esopus Steel Pipe Siphon North Chamber (North Siphon Chamber). At the relic channel of Esopus Creek, the Esopus Steel Pipe Siphon includes three blow-off valves within the Esopus Steel Pipe Siphon Blow-off Chambers (Blow-off Chambers). In the lower portion of the study area, the aqueduct transitions back to the Esopus Cut-and-Cover Tunnel at the Esopus Steel Pipe Siphon South Chamber (South Siphon Chamber). Two sets of access manholes are also located within the study area (see **Figure 9.4-12**).

Work activities within the Beaverkill Road Study Area would include: blow-off chamber reconstruction and associated streambank restoration and protection; boathole preparation and installation; biofilm removal and condition assessment; and small-scale wash water treatment.

9.4.4.1 Study Area Location and Description

The Beaverkill Road Study Area is located along the upper Catskill Aqueduct within the Town of Olive. The Catskill Aqueduct traverses the study area in a general north to south direction. The study area is bisected by State Route 28A and the relic channel of Esopus Creek. Proposed work sites within the study area include the North Siphon Chamber, the Blow-off Chambers, and the South Siphon Chamber. Access to the North Siphon Chamber work site would be provided by a paved access road that parallels the aqueduct and connects to State Route 28A at a point north of the study area. The Blow-off Chambers and South Siphon Chamber would be accessed by driving over the aqueduct from entrances off State Route 28A. The study area boundary is located approximately 500 feet beyond the outermost areas of disturbance related to the work sites. **Figure 9.4-12** shows an aerial photograph of the study area, including the path of the aqueduct, the limits of construction work site, and the proposed access routes. **Figure 9.4-13** shows photographs of the Blow-off Chambers and North Siphon Chamber in the study area.

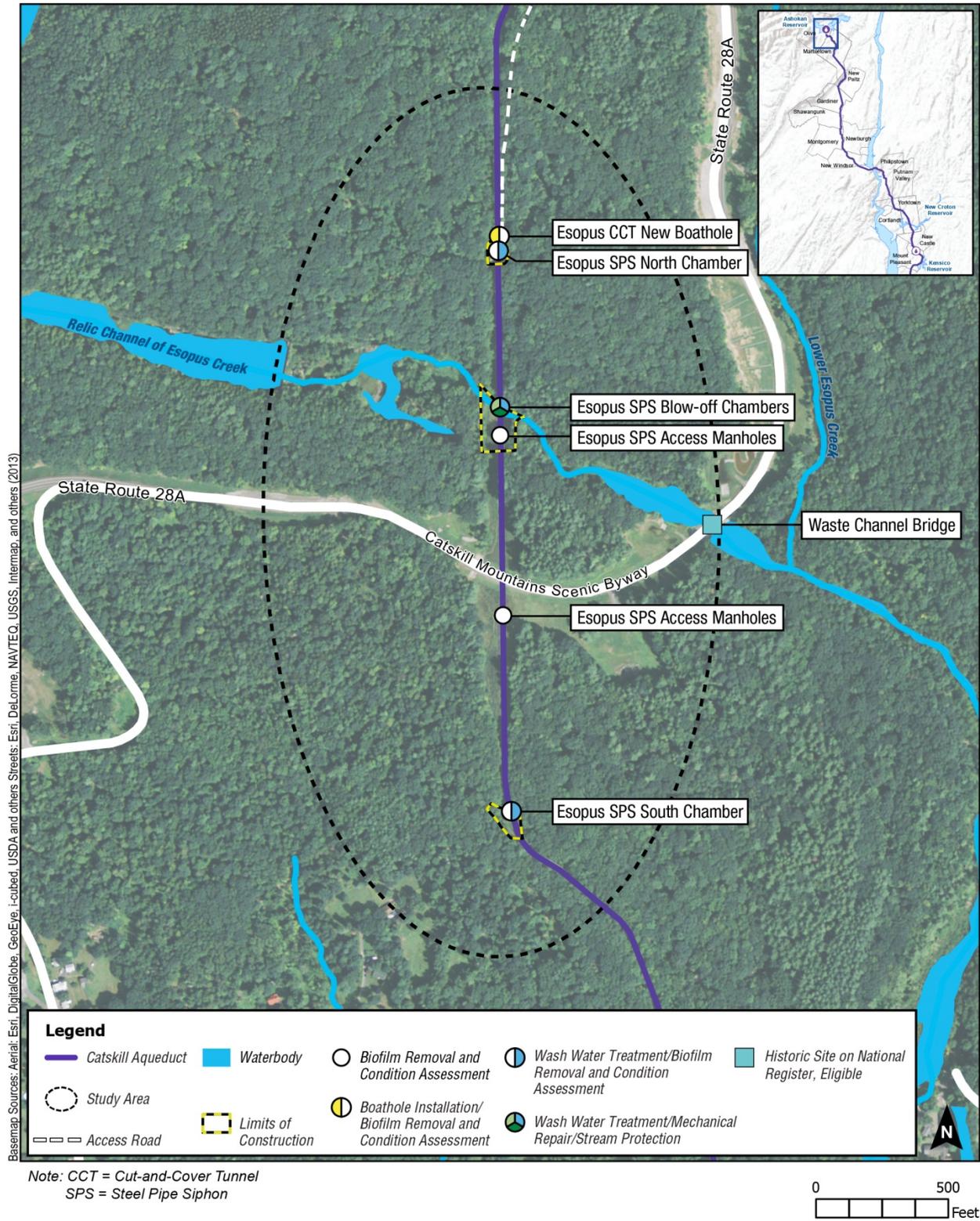


Figure 9.4-12: Study Area – Beaverkill Road





Photograph 1: West and middle siphon blow-off chambers in the relic channel of Esopus Creek. Existing stream crossing located between the two blow-off chambers.



Photograph 2: Looking north toward North Siphon Chamber from siphon blow-off chambers.

Figure 9.4-13: Photographs – Beaverkill Road Study Area



The study area consists almost entirely of public service land uses, with small areas of open space, vacant, and residential land uses in the southern half. The limits of construction for the work sites and associated access routes are located in a public services corridor with grassy cover, which is owned and maintained by DEP and separated from adjacent land by a forested zone. **Figure 9.4-14** shows a map of the land uses in the study area and its surroundings.

Zoning in the study area is primarily residential/conservation (R/C-10A), with small areas in the southern half zoned as residential/exurban (R/E-1A) and business/village (B/V-1/2), as designated by the Town of Olive Zoning Code (see **Figure 9.4-15**). The Catskill Aqueduct north of State Route 28A is located within the residential/conservation (R/C-10A) zoning district, which provides for residential development with no more than 1 dwelling unit per 10 acres, among other permitted uses. The Catskill Aqueduct south of State Route 28A is located within the residential/exurban (R/E-1A) zoning district, which allows all uses permitted under the residential/rural (R/R-3A) and residential/conservation (R/C-10A) district. The Catskill Aqueduct is a permitted use as a public utility structure within the residential/conservation (R/C-10A) zoning district.

State Route 28A is proposed for designation as the Catskill Mountains Scenic Byway, a NYSDOT designation given to this transportation corridor as representative of the region's scenic and historic significance. Additionally, the Waste Channel Bridge is eligible for listing on National Register of Historic Places. There are no other federal, State, or local designated landmarks, historic districts, or known archeological resources within the study area.

9.4.4.2 Proposed Activities within the Beaverkill Road Study Area

To support activities within the Beaverkill Road Study Area, the Ashokan Screen Chamber would serve as a primary staging area from which workers would be transported to the site daily. Several secondary staging areas, including one at the Blow-off Chambers, would provide additional parking. Equipment and materials would be staged on site. No staging or access improvements would be necessary other than underbrush clearing and gravel placement for leveling and erosion control. Erosion and sediment control measures, such as silt fencing and haybales, would be installed at the perimeter of the work sites as needed. Site plans showing layouts of the limits of construction for the work sites, which would occupy a total of approximately 1.0 acre, are shown on **Figure 9.4-16**, **Figure 9.4-17**, and **Figure 9.4-18**. The schedule for work within the study area is shown in **Table 9.4-5**. The duration of active construction within the Beaverkill Road Study Area is estimated to total 21 weeks over 1.5 years.

Work in the study area would begin in summer ~~2019~~²⁰¹⁸ with restoration and protection of the portion of the relic channel of Esopus Creek adjacent to the Blow-off Chambers. The work would include regrading, permanent riprap aprons, and ~~a~~ retaining walls to repair bank erosion and minimize future bank erosion at this location. To ensure a dry working environment, a temporary stream diversion would be installed, serving to partially divert the stream around the work area. A turbidity curtain would be installed to prevent sediment from moving downstream. Reconstruction of the Blow-off Chambers, including replacement of the blow-off valves, discharge pipes, and chamber covers, repair of the concrete walls, and removal of the access ladders, would also take place in summer ~~2019~~²⁰¹⁸ (small portions of the work that require shutdowns would be performed in spring and fall of that year). In total, the work would require the excavation of approximately 90 cubic yards of soil and approximately 300 cubic yards of soil, resulting in a net fill of approximately 210 cubic yards of soil.

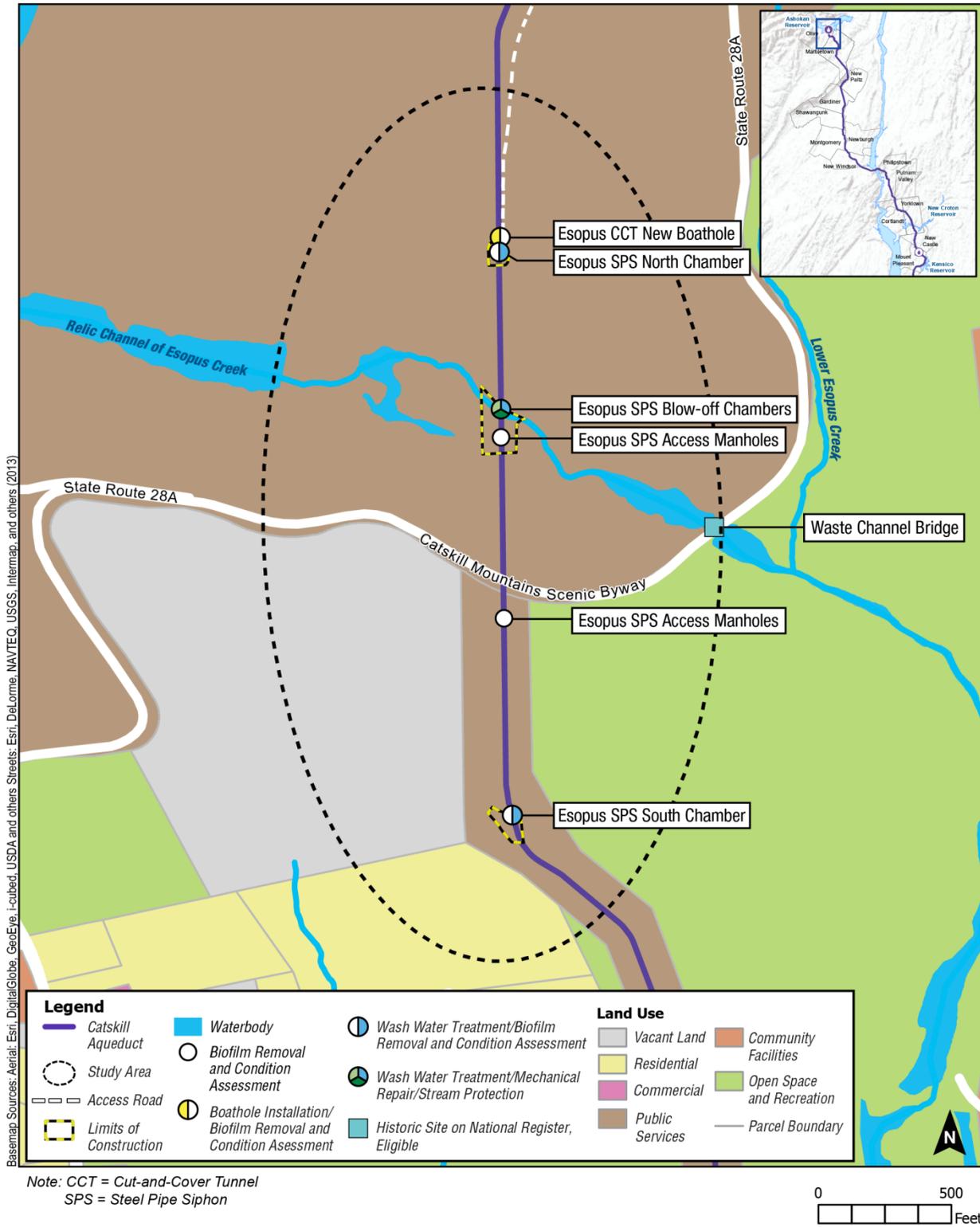


Figure 9.4-14: Land Use – Beaverkill Road Study Area



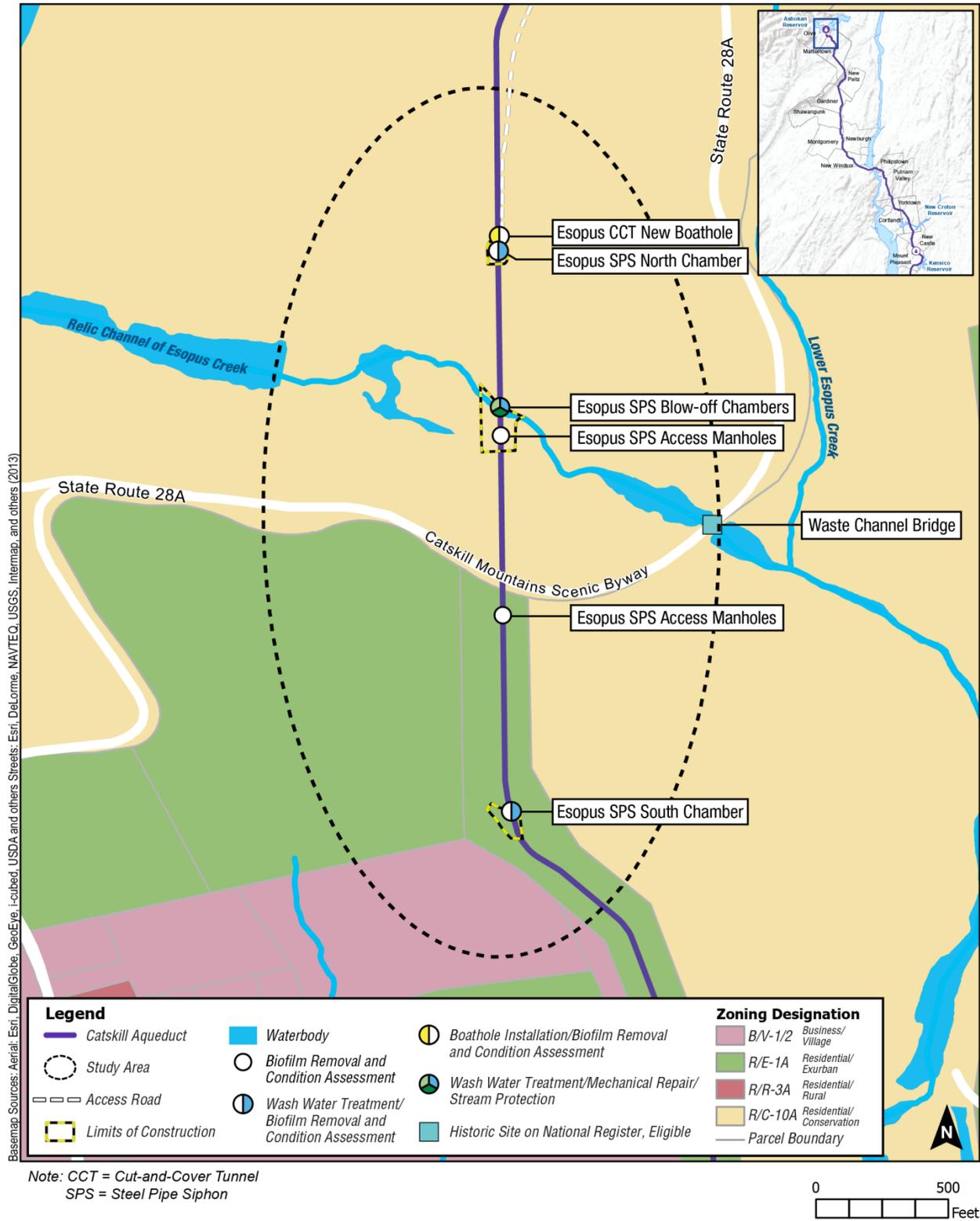


Figure 9.4-15: Zoning – Beaverkill Road Study Area



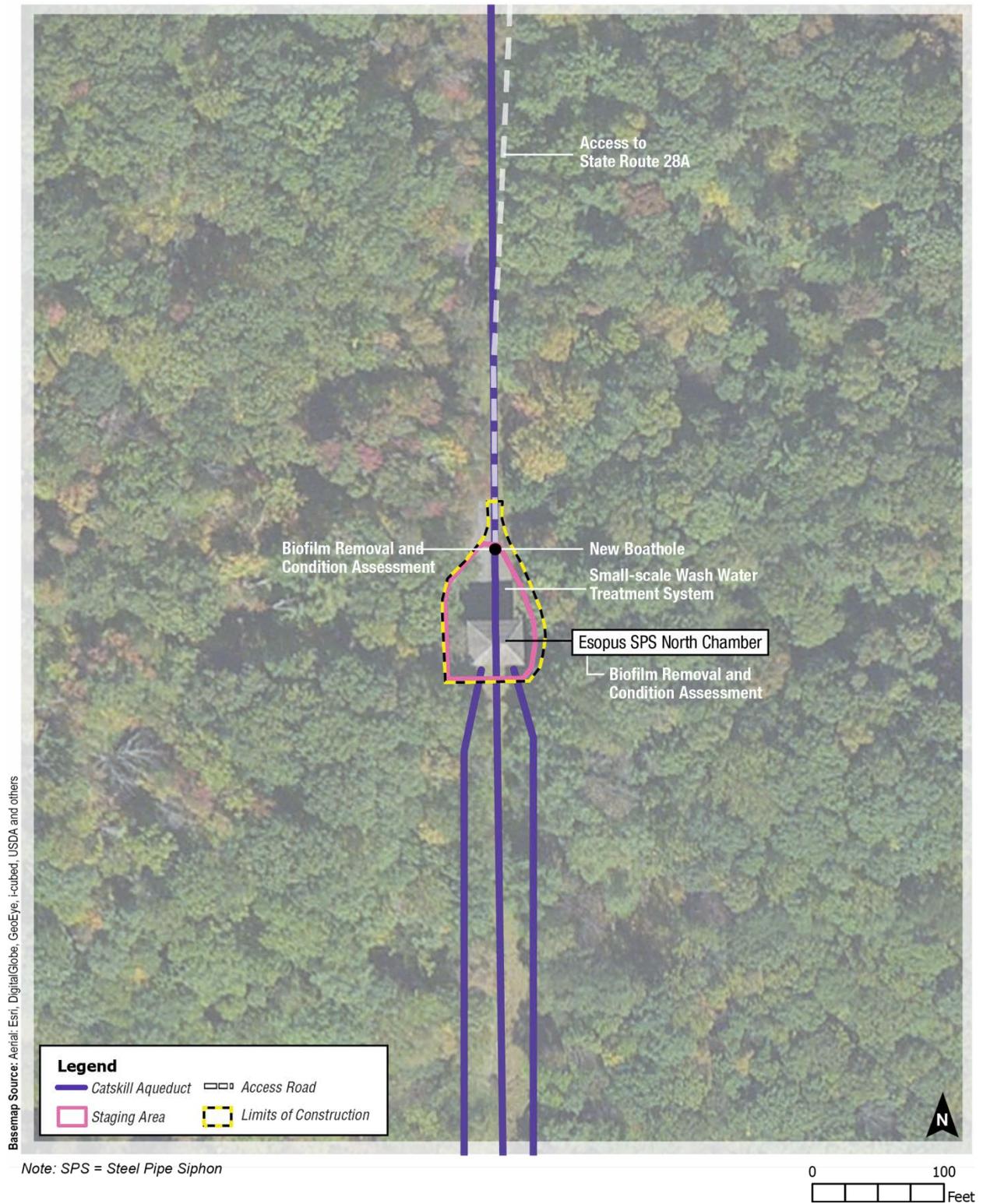


Figure 9.4-16: Site Plan for Esopus SPS North Chamber – Beaverkill Road Study Area



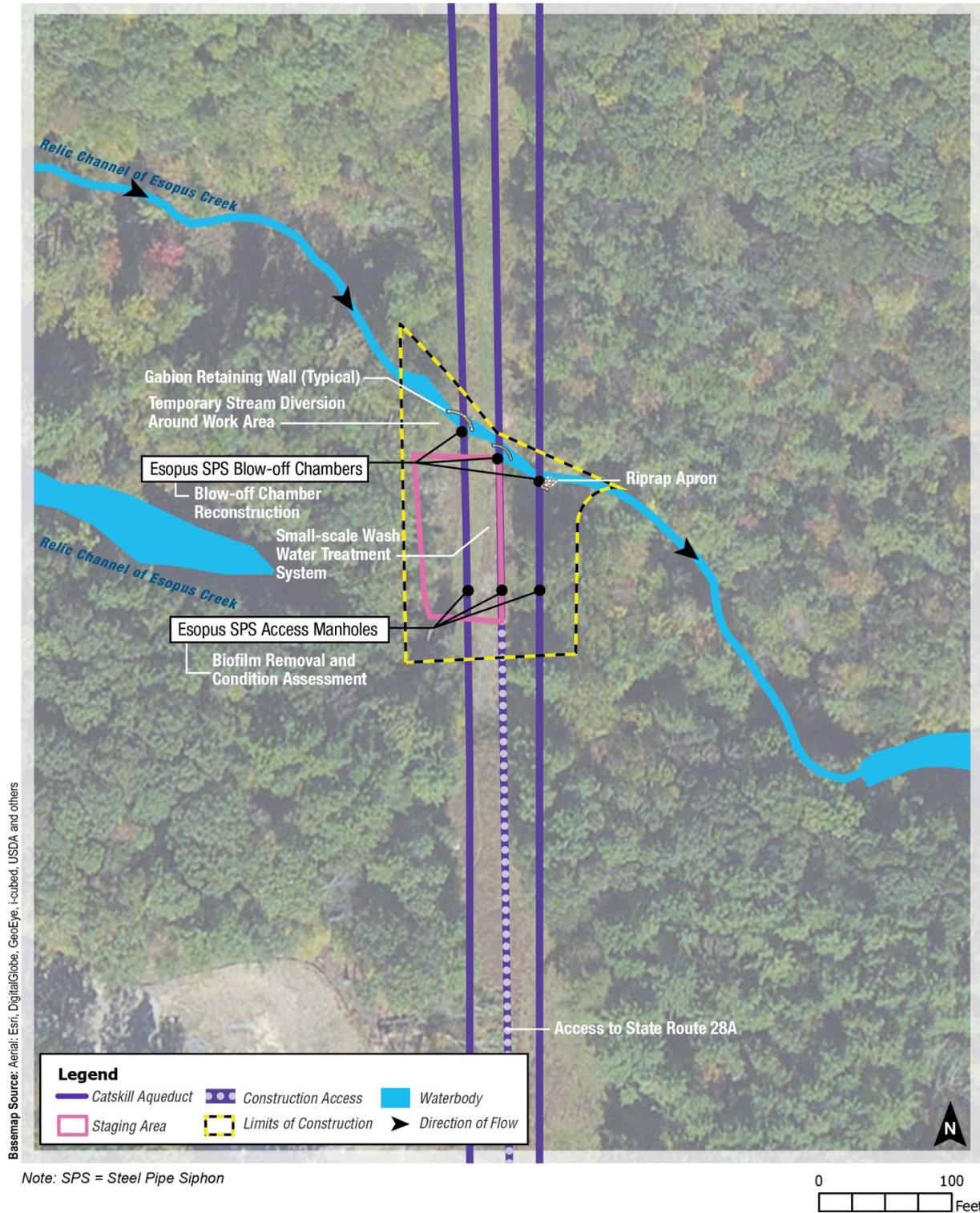


Figure 9.4-17: Site Plan for Esopus SPS Blow-off Chambers – Beaverkill Road Study Area



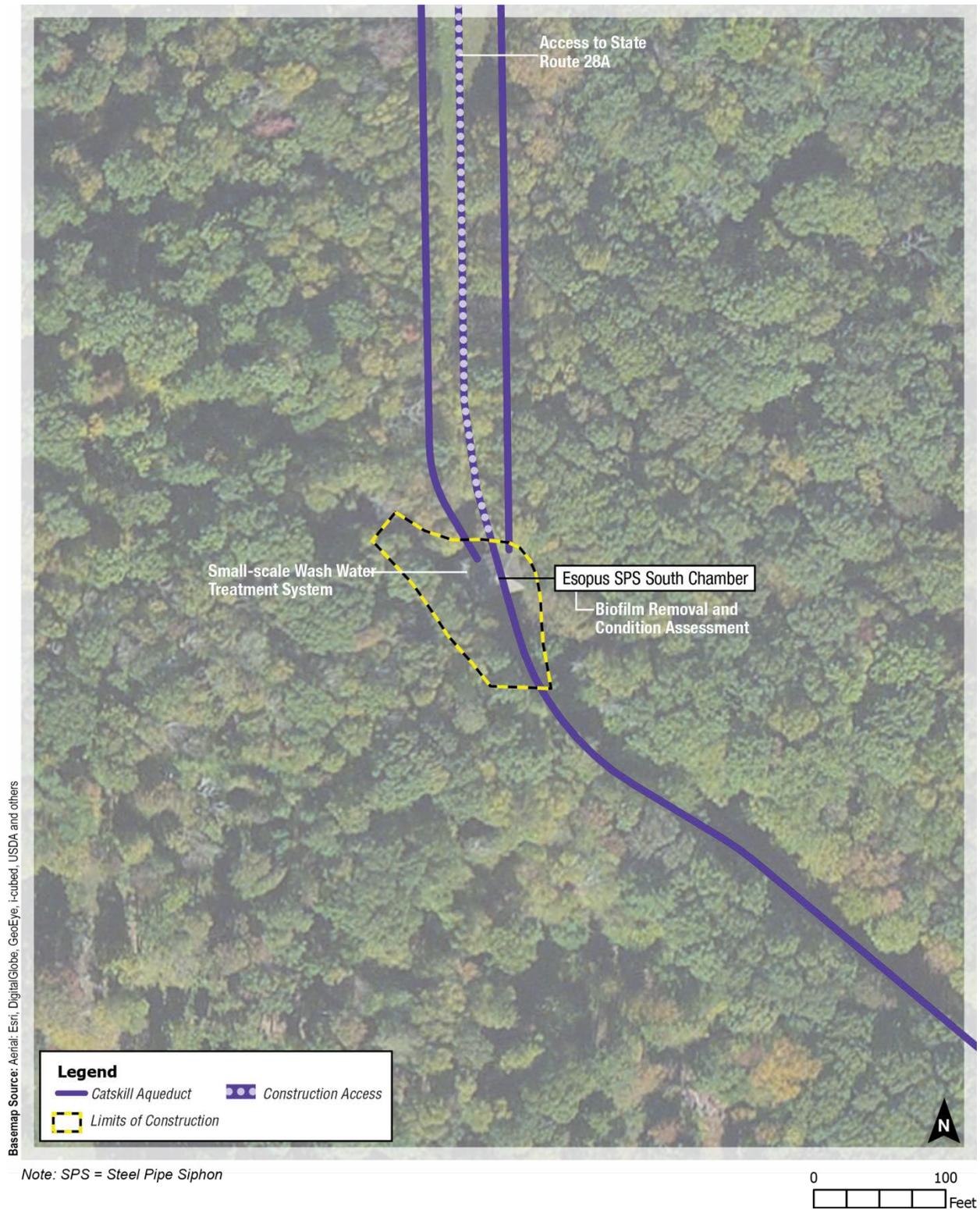


Figure 9.4-18: Site Plan for Esopus SPS South Chamber – Beaverkill Road Study Area



Table 9.4-5: Schedule of Work Activities within the Beaverkill Road Study Area

Work Activity	Dates	Duration	Work Hours	Crew Size ¹
Streambank Restoration and Protection	Summer 2019 2018	3 weeks	Monday to Friday, 7 AM to 5 PM	10
Blow-off Chamber Reconstruction	Summer 2019 2018	9 weeks	Monday to Friday, 7 AM to 5 PM	12
Boathole Preparation	Summer 2019 2018	3 weeks	Monday to Friday, 7 AM to 5 PM	10
Boathole Installation	Fall 2019 2018 (Second 10-week shutdown)	2 weeks	7 days a week, 7 AM to 7 PM	8
Biofilm Removal and Condition Assessment/ Small-scale Wash Water Treatment	Fall 2020 2019 (Third 10-week shutdown)	4 weeks	7 days a week, 7 AM to 7 PM	21
Note: ¹ Crew size refers to the number of people anticipated at the work site(s).				

Temporary in-stream disturbance would cover a total area of approximately 750 square feet, and permanent in-stream disturbance would cover approximately 40 square feet. Afterwards, the blow-off valves would be used to unwater the aqueduct for future shutdowns during the repair and rehabilitation and future maintenance.

Preparation of the new boathole upstream of the North Siphon Chamber would also take place in summer ~~2019~~2018. The work would consist of the excavation of approximately 45 cubic yards of soil and construction of a cast-in-place concrete collar. Boathole installation, which requires unwatering of the aqueduct to tie into the crown of the cut-and-cover tunnel, would take place during the second 10-week shutdown in fall ~~2019~~2018.

Lastly, biofilm removal and condition assessment would occur during the third 10-week shutdown in fall ~~2020~~2019. Access into the aqueduct would be provided by the new boathole, the two sets of access manholes, the North Siphon Chamber, and the South Siphon Chamber. These locations would also serve as collection points for biofilm, which would be transported for disposal at a registered, permitted, or otherwise authorized facility. Following unwatering, the blow-off valves would remain open for the duration of this shutdown to reduce the flow of residual water to downstream portions of the aqueduct. Any remaining residual water would be diverted through an internal bypass pipe around the work segments within the aqueduct for discharge to the aqueduct downstream. Any residual water that does not meet water quality standards and, and any wash water generated from biofilm removal, would then be transported to a temporary treatment system, where it would be treated to meet water quality standards for discharge back into the aqueduct or to a nearby waterbody (see Section 9.2, “Project Description”). Potential treatment locations within the study area include the North Siphon Chamber, the South Siphon Chamber, and the Blow-off Chambers, at which small-scale wash

water treatment systems could be established. Upon completion of biofilm removal and condition assessment, all equipment and materials would be removed, and any areas requiring temporary disturbance would be restored to baseline conditions.

Impact categories analyzed for the Beaverkill Road Study Area are presented in Sections 9.4.4.3, “Open Space and Recreation” through 9.4.4.8, “Neighborhood Character” and include open space and recreation; visual resources; natural resources, including water resources and federal/State Threatened and Endangered Species and State Species of Special Concern; hazardous materials; transportation; and neighborhood character. Additionally, the study area’s compatibility with applicable public policies was analyzed on a town-wide basis in Section 9.4.2, “Town of Olive Impact Analysis.” As described in Section 9.3, “Screening Assessment and Impact Analysis Methodology,” an impact analysis related to land use and zoning; socioeconomic conditions; community facilities and services; historic and cultural resources; the remaining natural resources subcategories, including geology and soils, aquatic and benthic resources, terrestrial resources, wildlife, federal/State Candidate Species, and unlisted rare and vulnerable species; energy; air quality; and noise within the study area is not warranted. Finally, impacts related to project-wide natural resources, water and sewer infrastructure, and public health were analyzed within Section 9.19, “Project-wide Impact Analysis.”

9.4.4.3 Open Space and Recreation

As shown on **Figure 9.4-19**, one open space and recreation resource exists within the Beaverkill Road Study Area. Approximately 14 acres of the Acorn Hill DEP Watershed Recreational Land are located in the southeastern portion of the Beaverkill Road Study Area. The Acorn Hill DEP Watershed Recreational Land is approximately 219 acres, and provides outdoor activities such as hiking and hunting to the public on designated portions of the land. DEP allows recreational uses of City-owned water supply lands, but does not construct or maintain hiking trails or formal recreational uses.

DEP has consulted with the Town of Olive and Ulster County, and it is DEP’s understanding that no plans to expand or create new open space or recreational resources are anticipated within the Beaverkill Road Study Area within the timeframe of the impact analysis. Natural processes, such as changes in habitat due to natural vegetative succession, are anticipated to continue. Use of the identified open space is anticipated to continue. Therefore, in the future without the repair and rehabilitation, it is assumed that open space and recreation within the Beaverkill Road Study Area would be the same as baseline conditions.

In the future without the repair and rehabilitation, work activities within the Beaverkill Road Study Area would be short-term (intermittently over 1.5 years; see **Table 9.4-5**). The repair and rehabilitation work activities would not disrupt the use of the open space, and may only temporarily affect views looking southwest from the Acorn Hill DEP Watershed Recreational Land. However, staging and rehabilitation activities would occur on DEP property, would be separated by a buffer of trees, and would be temporary in nature. During construction, recreational use within the Acorn Hill DEP Watershed Recreational Land would be unaffected.

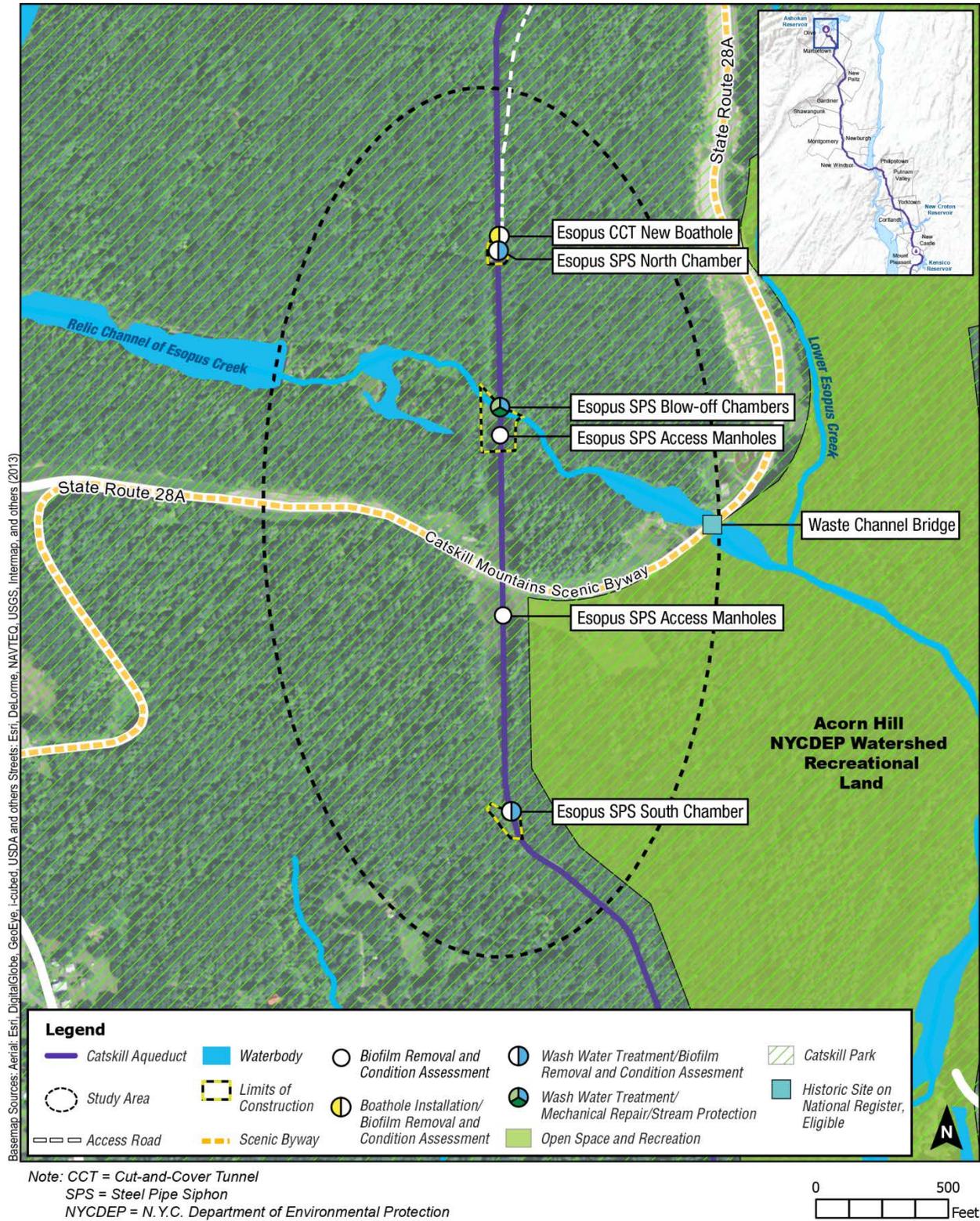


Figure 9.4-19: Open Space and Visual Resources - Beaverkill Road Study Area



Following construction, all equipment would be removed from the Beaverkill Road Study Area and staging areas would be restored to baseline conditions. Operation of the Catskill Aqueduct would be consistent with baseline conditions and would not disrupt recreational use of adjacent open spaces. As such, the repair and rehabilitation would not encroach upon, cause a loss of open space, or affect the use or physical character of the Acorn Hill DEP Watershed Recreational Land.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to open space and recreation resources within the Beaverkill Road Study Area.

9.4.4.4 Visual Resources

The study area for the visual resources analysis is the area within the Beaverkill Road Study Area. It also includes view corridors that extend beyond the study area based on the locations that are publicly accessible.

As shown on **Figure 9.4-19**, four visual resources were identified within the Beaverkill Road Study Area. One visual resource is a State Park, the Catskill Park. One site is eligible for listing on the National Register of Historic Places, the Waste Channel Bridge. There is one proposed scenic highway, the proposed Catskill Mountains Scenic Byway. There is one locally significant resource, the Acorn Hill DEP Watershed Recreational Land.

The Catskill Park consists of approximately 700,000 acres, with approximately 287,500 acres preserved as New York State Forest. The Catskill Park includes mountainous areas of public and private lands in Ulster, Greene, Delaware, and Sullivan counties, New York. The entire Beaverkill Road Study Area is situated near the perimeter of the Park's southeastern boundary. The Beaverkill Road Study Area is not located in a section dedicated to tourism, recreation, or within State forest lands. There are no view corridors or viewsheds specific to this site.

The Waste Channel Bridge, over the relic channel of Esopus Creek, along State Route 28A is eligible for listing on the National Register of Historic Places.

The proposed Catskill Mountains Scenic Byway, also known as State Route 28A in this area, is under the purview of NYSDOT. The byway is approximately 65 miles in length. Approximately 1,900 feet of State Route 28A passes through the central portion of the Beaverkill Road Study Area. Views from State Route 28A are limited due to the dense vegetation along the roadway.

The Acorn Hill DEP Watershed Recreational Land is approximately 219 acres and provides outdoor activities such as hiking and hunting to the public on designated portions of the land. DEP allows use of water supply lands but does not construct or maintain trails for formal recreational uses. Approximately 14 acres of the Acorn Hill DEP Watershed Recreational Land are located in the southeastern portion of the Beaverkill Road Study Area. Since no trails are maintained within the study area, it is not anticipated that this portion of the Acorn Hill DEP Watershed Recreational Land is used. The Acorn Hill DEP Watershed Recreational Land is densely forested with limited views to North Siphon Chamber, the Blow-off Chambers, and the South Siphon Chamber.

DEP has consulted with the Town of Olive and Ulster County, and it is DEP's understanding that no new projects or structures that would alter views from visual or aesthetic resources are anticipated within the Beaverkill Road Study Area within the timeframe of the impact analysis. Natural processes, such as changes in habitat due to natural vegetative succession, are anticipated to continue. Therefore, in the future without the repair and rehabilitation, it is assumed that visual resources within the Beaverkill Road Study Area would be the same as baseline conditions.

Existing views of the work locations at the North Siphon Chamber, the Blow-off Chambers, and the South Siphon Chamber are limited due to the dense vegetation within the Beaverkill Road Study Area, with the work locations not situated near any roads or mapped trails. Views from the Waste Channel Bridge to any of the work locations are limited due to the dense vegetation along the roadway.

In the future with the repair and rehabilitation, work activities would be minimal and short-term (intermittently over 1.5 years; see **Table 9.4-5**). Site preparation activities at the work sites would not include clearing of trees and shrubs, though some clearing of underbrush may be needed. Due to the dense vegetation within the study area, even though the entire study area is located within Catskill Park, the work sites in the Beaverkill Road Study Area are not visible from any other location within the Park. The North Siphon Chamber, the Blow-off Chambers, and the South Siphon Chamber are not visible from State Route 28A or the Waste Channel Bridge. The South Siphon Chamber is located adjacent to Acorn Hill DEP Watershed Recreational Land but would not include clearing of trees and shrubs. Therefore, work activities would not result in any permanent significant adverse impacts to visual resources.

Following completion of the repair and rehabilitation, equipment and vehicles would be removed from the study area and staging areas would be restored to baseline conditions. The new boathole at the North Siphon Chamber would be a permanent structure in addition to the streambank protection measures (i.e., riprap aprons) and remaining wall along the southern bank of the relic channel of Esopus Creek. Following the repair and rehabilitation within the Beaverkill Road Study Area, operation of the Catskill Aqueduct would be consistent with baseline conditions and would not result in changes to the future visual and aesthetic resource conditions of the views to the Catskill Park, the Waste Channel Bridge, the proposed Catskill Mountains Scenic Byway, or the Acorn Hill DEP Watershed Recreational Land.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to visual resources within the Beaverkill Road Study Area.

9.4.4.5 Natural Resources

As shown on **Figure 9.4-20**, the study area for the natural resources analysis is comprised of two sections. One of these sections includes the limits of construction, including the area required for staging, clearing and grading for boathole installation, wash water treatment and biofilm removal and condition assessment at the North Siphon Chamber. Another section to the south includes limits of construction for the area required for staging, streambank protection measures (i.e., riprap aprons), wash water treatment, and biofilm removal and condition assessment for the Blow-off Chambers. A third section of the study area located at the South Siphon Chamber

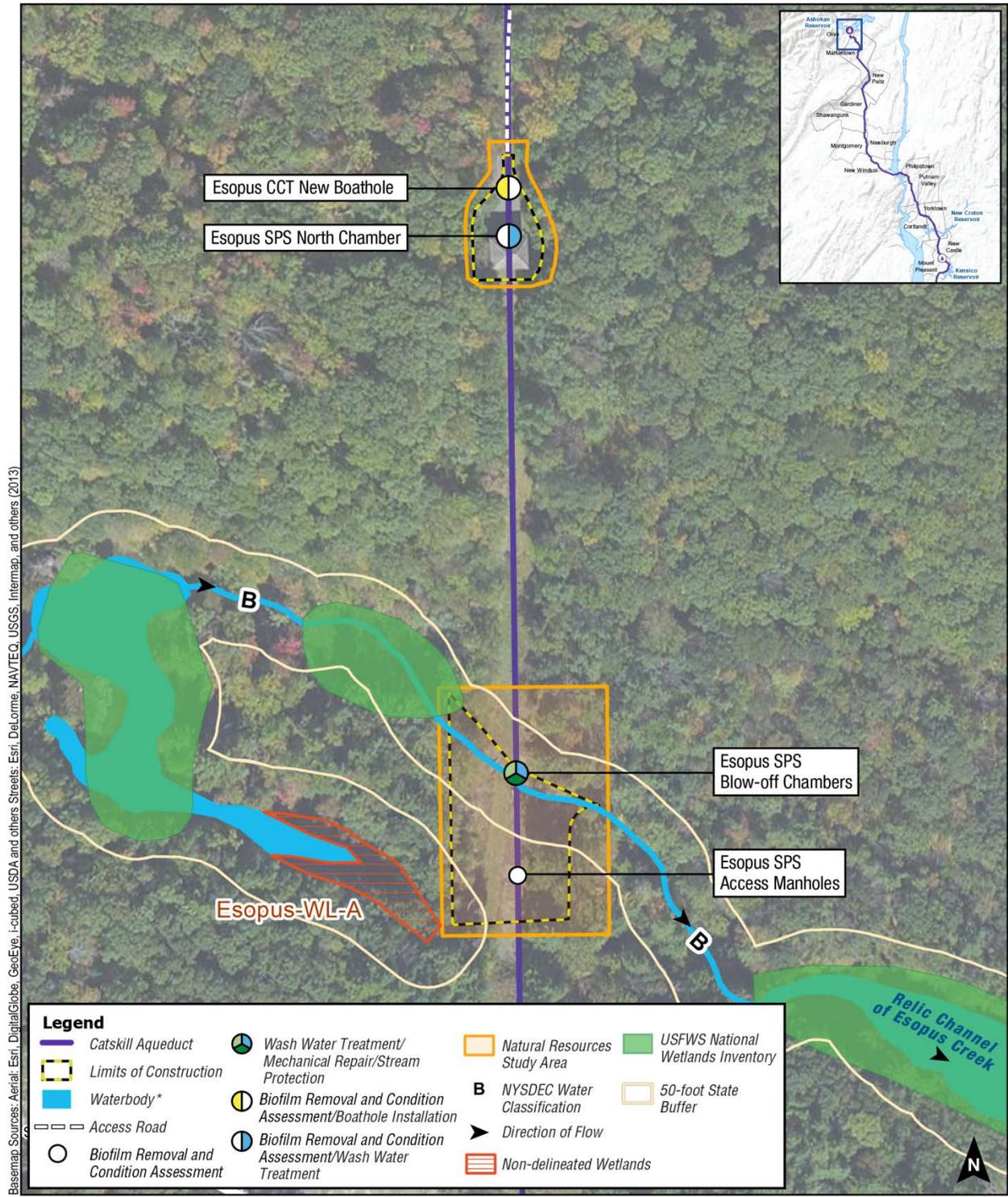


Figure 9.4-20: Natural Resources for Esopus SPS North Chamber and Blow-off Chambers - Beaverkill Road Study Area



corresponds to the limits of construction, which represent the area required for wash water treatment and biofilm removal and condition assessment (see Site Plan for Esopus SPS South Chamber, **Figure 9.4-18**).

Based on a field visit conducted on September 15, 2015, the natural resources study area runs along a mowed pathway that is bordered by mixed deciduous and coniferous forest. The southern section of the study area crosses a relic channel of Esopus Creek. Wetlands associated with the relic channel are also present along the western boundary of the study area at the Blow-off Chambers. Based on a desktop survey, the South Siphon Chamber is a cleared area surrounded by mixed deciduous and coniferous forest. The natural resources study area also has the potential to support protected wildlife species. An analysis of these resources is presented below.

Water Resources

The natural resources study area is within the Lower Hudson River drainage basin, more specifically within Ashokan Reservoir-Esopus Creek subwatershed (hydrologic unit code [HUC] 020200060905) of the Middle Hudson watershed (HUC 02020006).

The relic channel of Esopus Creek is subject to federal jurisdiction under Sections 401 and 404 of the Clean Water Act for proposed work activities. As a Class B stream, the relic channel of Esopus Creek is subject to State Protection of Waters regulations with a regulated 50-foot buffer to protect the streambed and banks. Based on consultations with NYSDEC, this watercourse supports wild trout and construction activities and would be subject to time of year restrictions similar to designated trout waters. In addition, the Town of Olive regulates activities within watercourses and wetlands, but does not have a regulatory buffer (Olive Town Code Chapter 89: Environmental Quality Review). However, because maintenance and repair are exempt activities, this local regulation may not be applicable to the proposed work.

Surface Water

The surface water delineations in the natural resources study area occurred on September 15, 2015. One surface water, the relic channel of Esopus Creek, was identified within the natural resources study area. The water resource name, length, area, and classifications are shown in **Table 9.4-6**.

Table 9.4-6: Water Resources and Classifications within the Beaverkill Road Natural Resources Study Area

Water Resource	Area (Square Feet)	Length (Feet)	Cowardin Classification
Relic Channel of Esopus Creek	1,050	320	Riverine, Lower Perennial, Unconsolidated Bottom (R2UB)
Esopus-WL-A	15,210	NA	Palustrine, Unconsolidated Bottom, Permanently Flooded (PUBh)
Note: NA = Not Applicable			

Relic Channel of Esopus Creek

The relic channel of Esopus Creek is fed by Ashokan Reservoir via the Ashokan Release Channel and a small local watershed (approximately 10 square miles). Historically, this reach would have conveyed flows from a much larger watershed upstream of the Ashokan Reservoir, which is approximately 255 square miles. Construction of the Ashokan Reservoir resulted in a hydraulic disconnect between the relic channel of Esopus Creek and the larger upstream watershed. Consequently, flow to this reach of the creek originates from groundwater baseflow, localized runoff, and reservoir releases. Ashokan Reservoir releases to the lower Esopus Creek are governed by the Interim Ashokan Release Protocol, which limits the maximum flow to approximately 417,000 gpm (600 mgd). This protocol is currently being analyzed as part of a separate environmental review.

The relic channel enters the western portion of the natural resources study area and flows eastward (see **Figure 9.4-20**). It is located immediately adjacent to the southern boundary of the study area. As listed on **Table 9.4-6**, the watercourse is best classified as a “Riverine, Lower Perennial, Unconsolidated Bottom” system based on the Cowardin System (Cowardin et al. 1979).

Wetlands

A desktop evaluation of NYSDEC freshwater wetlands maps, USFWS NWI maps, published soil survey maps, USGS topographic maps were reviewed, and a field survey was conducted to determine if wetlands were present within the natural resources study area. Wetlands associated with the NWI mapped wetlands were identified to the northwest and west of the study area and to the southeast of the study area as shown on **Figure 9.4-20**.

Fieldwork was conducted in September 15, 2015. As shown on **Figure 9.4-20**, a potential wetland was identified within the natural resources study area: Esopus-WL-A, located southwest of the Esopus Blow-off Chambers.

Wetland Esopus-WL-A

Wetland Esopus-WL-A was identified during field visits and GPS points were taken to identify the approximate boundary. However, this wetland is outside of the proposed limits of construction. Based on field observations, the wetland is a mix of open water and herbaceous vegetation located west of the work area. Estimated pond depth is 1 to 3 feet. Wetland Esopus-L-A is best classified as a “Palustrine, Unconsolidated Bottom, Permanently Flooded” system based on the Cowardin System (Cowardin et al. 1979).

Future Without the Repair and Rehabilitation

DEP has consulted with the Town of Olive and Ulster County, and it is DEP’s understanding that no projects or developments are anticipated to occur within the natural resources study area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that the future conditions of water resources within the Beaverkill Road Study Area would be the same as baseline conditions.

Analysis of Potential Effects

This section analyzes the potential for temporary and permanent disturbance to water resources associated with repair and rehabilitation and long-term operation of the Catskill Aqueduct in the Beaverkill Road Study Area.

Construction

Work activities related to the repair and rehabilitation at the Blow-off Chambers would temporarily disturb surface water and vegetated riparian areas, and have the potential to temporarily alter flows in the relic channel of Esopus Creek.

The Blow-off Chambers may be accessed multiple times during construction. As the relic channel of Esopus Creek supports trout and can be designated as a coldwater fishery, in-water construction activities are generally prohibited from October 1 to April 30, unless otherwise authorized. While DEP anticipates that the majority of in-water construction would occur during the summer months and outside of the October 1 to April 30 prohibition, construction activities may need to occur within the restricted period. If this is required, as presented within Section 9.19, "Project-wide Impact Analysis," DEP would implement additional measures to limit potential adverse impacts to trout.

Prior to commencing the repair and rehabilitation, temporary sediment and erosion control measures, such as silt fences, would be installed. Within the limit of construction, localized construction dewatering (i.e., installing a barrier and pump to keep the work area dry) may be necessary to facilitate excavation for replacement of blow-off chambers and discharge pipes. Blow-off chamber reconstruction would also require in-stream access and temporary stream protection. A temporary stream diversion and a downstream turbidity curtain would be installed. To protect the stream and its banks, aquatic life movement, and prevent sediment and other pollutants from entering the waterway, temporary measures would be designed in accordance with the State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity and other applicable regulatory requirements.

Reconstruction of the Blow-off Chambers and adjacent streambank restoration and protection would require regrading of the southern streambank and installation of permanent riprap aprons approximately 20 to 30 feet long. The re-contoured streambank would not increase the extent of impervious surface and would not alter runoff to the stream. The riprap aprons would be placed to repair previous bank erosion and minimize future bank erosion in the study area. The riprap would also protect the stream while the blow-offs are operated and limit scour and turbidity. To further protect the southern streambank, a gabion retaining walls, or similar structures, would be installed in an areas vulnerable to scour. The retaining walls would be a semi-circular arches aligned to the natural streambank, and would be total approximately 5040-feet in length. These This permanent structures would represent a new, hardened shoreline that would be a minor encroachment necessary to attenuate flows during unwatering events to protect the stream's bed and banks.

Anticipated temporary and permanent disturbances to water resources and regulated buffers were quantified based on the limits of construction and proposed work activities (see **Table 9.4-7**).

Construction staging would occur on top of the aqueduct and the temporary stream diversion would extend into the stream, resulting in approximately 750 square feet of temporary disturbance within the relic channel of Esopus Creek. Approximately 5,900 square feet associated with the State Protection of Waters buffer would also be temporarily affected due to staging. Upgrades and maintenance at the Blow-off Chambers would protect against future bank erosion and require approximately 40 square feet of permanent disturbance to the relic channel of Esopus Creek, and approximately 4,540 square feet within the State Protection of Waters buffer (see **Table 9.4-7**). Following construction, temporarily disturbed areas would be restored to natural conditions and planted with native riparian vegetation. Permanent disturbance is further analyzed in Section 9.19, “Project-wide Impact Analysis.”

Table 9.4-7: Estimated Disturbance to Water Resources within the Beaverkill Road Natural Resources Study Area

Water Resource	Baseline Conditions (Square Feet)	Temporary Effects (Square Feet)	Permanent Effects (Square Feet)
Relic Channel of Esopus Creek	1,050	750 <i>Temporary stream diversion and temporary downstream turbidity curtain</i>	40 <i>Riprap apron and gabion retaining wall</i>
50-foot State Protection of Waters Buffer	39,280	5,900 <i>Construction staging area</i>	4,540 <i>Riprap apron, gabion retaining walls, and regrading following blow-off chamber reconstruction</i>

The North and South Siphon Chambers and Blow-off Chambers have been identified as potential discharge points for treated wash water. Any wash water generated from the siphons would be treated to meet applicable discharge limits, water quality standards, and/or other requirements for reuse in the removal operation, or for discharge back to the Catskill Aqueduct or to the relic channel of Esopus Creek. No biofilm would be discharged to surface water. Treated wash water would be discharged at low flows that would not result in scour or other physical changes to the stream.

In the event alum is added as part of the treatment process, flocculated particles would primarily settle prior to treated wash water being discharged to the stream. After biofilm removal and condition assessment is completed in this study area, the Blow-off Chambers would remain open for the duration of biofilm removal (i.e., for the remaining 6 weeks during the 10 week shutdown) to discharge residual raw water. This would result in less water in the aqueduct affecting downstream biofilm removal operations. This is the only location where blow-off valves would remain open during the third 10-week shutdown because it is the northern-most point to discharge residual water downstream of the Ashokan Screen Chamber. Discharges of residual raw water would have low flows of approximately 700 to 1,400 gpm (1 to 2 mgd). With these low flows and the short-term, temporary nature of the discharges (approximately 10 weeks), discharges to the relic channel of Esopus Creek are not anticipated to cause turbidity or scouring, inundate the receiving stream, or affect stream substrate.

This study area has also been identified as a location for discharging raw aqueduct water while unwatering the aqueduct. Reconstruction of the Blow-off Chambers would require the siphons to be unwatered, and this initial unwatering of the siphons would occur with temporary measures in place to protect the stream from erosion. Unwatering events to surface water would also occur at any time after stream protection measures are in place during and following construction and, therefore, are described in “Operation” below.

Operation

Once the blow-off chamber repairs and streambank restoration and protection are complete, discharges of raw water to the relic channel of Esopus Creek could occur in the future during DEP’s typical operations, when the aqueduct is unwatered for maintenance or inspection. This is expected to occur infrequently.

During unwatering events, new blow-off valves would be operated to moderate discharge flows from the Blow-off Chambers. This would result in discharges from each chamber of approximately 6,300 gpm at initial valve opening to a maximum flow of approximately 22,000 gpm. It would take approximately 6 hours to unwater the Esopus Steel Pipe Siphon, as each siphon pipe would be unwatered separately.

Bankfull flow is the flow that just fills the channel to the top of its banks (i.e., stream capacity) and at the point in which water begins to flow onto the floodplain. If the discharge associated with an unwatering event is greater than the bankfull flow, indirect downstream effects, such as an increase in erosion and scouring over the baseline could be reasonably expected to occur. Bankfull flow could not be predicted for the relic channel of Esopus Creek because of an upstream flow control structure, and as such, it could not be determined whether unwatering would result in a bankfull event.

Operational controls would be used during unwatering to avoid a potential bankfull event. Flows would be moderated by throttling the valves and would be monitored by an on-site crew to prevent the receiving stream from becoming inundated or scoured by discharges of raw water. In the event that inundation begins to occur during unwatering, the on-site crew would have the ability to cease unwatering at any time to allow streamflows to subside to baseline flows. Moreover, DEP would restrict raw water discharges during an unwatering event from occurring within 24 hours of predicted rain events, during rain events, and for a period of 48 hours after rain events or after streamflow returns to normal. Therefore, the proposed raw water discharges, which would be short-term and temporary in nature (up to 6 hours total), are not anticipated to cause scouring, and would not alter stream capacity of the relic channel of Esopus Creek.

Unwatering flows would also not affect lower Esopus Creek, which receives flows from the relic channel (see **Figure 9.4-20**). The aqueduct would continue to be operated in accordance with the Interim Ashokan Release Protocol (or its successor). The short-term duration of aqueduct unwatering to the relic channel, which flows to lower Esopus Creek would be substantially less than flows experienced by lower Esopus Creek from the Ashokan Release Channel flows. Unwatering of the steel pipe siphon would occur at the beginning of any shutdown, and is anticipated to be on the order of 32 mgd for 6 hours. As a result, operation of the Catskill Aqueduct would have no anticipated impacts to water resources.

Water Resources Conclusions

Water resources in the study area are limited to those near the Blow-off Chambers, specifically the relic channel of Esopus Creek. While the majority of work activities would result in temporary disturbance, minor permanent disturbance would occur as part of blow-off chamber reconstruction and associated streambank restoration and protection. Discharges would be limited to raw aqueduct unwatering events. These would be infrequent and last several hours in duration. Treated biofilm wash water would be discharged over the course of 4 weeks during the third 10-week shutdown. Following construction, the site would be restored to natural conditions. Permanent fill (i.e., riprap aprons and a-retaining walls) would be minimal and would be beneficial in that it would repair historic bank erosion and minimize future scouring.

Restoring the historic function of the blow-offs to discharge raw aqueduct water would be a change in baseline conditions. However, based on the above assessment, there would be minimal indirect effects to water resources. Therefore, the repair and rehabilitation would not result in significant adverse impacts to water resources within the Beaverkill Road Study Area.

Federal/State Threatened and Endangered Species and State Species of Special Concern

This section includes an analysis of potential impacts to federal/State Threatened and Endangered Species and State Species of Special Concern identified in Section 9.3.9, “Natural Resources,” as having the potential to be affected by work activities within the natural resources. Species that could be affected within the study area and species that could occur up to 0.25 mile from the work sites were determined in consultation with USFWS, USACE, NYNHP, NYSDEC, as well as county and local offices, as applicable.

As discussed in Section 9.3.9, “Natural Resources,” four species were identified as having the potential be affected by the repair and rehabilitation within the natural resources study area. Therefore, conditions in the future without the repair and rehabilitation, an analysis of the potential for impacts to these four species, and a summary of conclusions on the potential effects resulting from the repair and rehabilitation are provided below.

In the future without the repair and rehabilitation, it is assumed that federal/State Threatened and Endangered Species and State Species of Special Concern within the study area would largely be the same as baseline conditions, other than possible changes in habitat due to natural vegetative succession and general anthropogenic influences.

An analysis of the potential for disturbance to federal/State Threatened and Endangered Species and State Species of Special Concern from the repair and rehabilitation within the Beaverkill Road natural resources study area is shown in **Table 9.4-8**. The analysis included an evaluation of the repair and rehabilitation work activities within the study area and field visits, as applicable.

Table 9.4-8: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern, and Habitats within the Beaverkill Road Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Amphibians and Reptiles					
Eastern Box Turtle	<i>Terrapene carolina</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visit on September 15, 2015. Potential habitat exists within the adjacent mixed deciduous forest, along the stream, and within adjacent open grassy areas. While work activities would be largely confined to previously disturbed areas, if any isolated areas of potential habitat exist at the sites, as a highly mobile species, any eastern box turtles that might otherwise use these areas are expected to instead utilize similar, adjacent habitats during construction. Furthermore, perimeter silt fencing would limit disturbance to adjacent habitat and prevent individual turtles from entering the work sites during construction. Finally, upon construction completion, the staging areas would be restored to natural conditions and the new boathole and streambank restoration measures that remain would not affect breeding, nesting, or foraging habitat. Therefore, there are no effects anticipated and no further analysis for eastern box turtles is warranted for this study area.	No
Wood Turtle	<i>Glyptemys insculpta</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visit on September 15, 2015. Potential habitat exists within the riparian areas along the relic channel of Esopus Creek. A number of work activities, including blow-off chamber reconstruction and associated streambank restoration and protection, aqueduct unwatering, and discharge of treated wash water during construction, have the potential to temporarily disturb wood turtle habitat in and along the relic channel of Esopus Creek. In particular, these activities could temporarily reduce streambank habitat, alter flows, and alter water quality. Streambank restoration would also be in place permanently. Therefore, further analysis is warranted for this study area.	Yes. See further analysis below.
Birds					
Bald Eagle	<i>Haliaeetus leucocephalus</i>	BGPA/ MBTA	Threatened	NYNHP identified the nearest nest to be less than 0.5 mile from the work sites, outside the study area and well beyond the recommended USFWS and DEP buffer restriction of 330 and 660 feet, respectively. Additionally, this nest is no longer active. Upon construction completion, the staging areas would be restored to natural conditions and the new boathole and streambank restoration measures that remain are not anticipated to affect Bald Eagle nesting, roosting, or foraging habitats; the study area is outside the Bald Eagle flight path between the dam and these habitats. Therefore, there are no effects anticipated and no further analysis for Bald Eagles is warranted for this study area.	No

Table 9.4-8: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern, and Habitats within the Beaverkill Road Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Whip-poor-will	<i>Antrastomus vociferus</i>	MBTA	Special Concern	No individuals were incidentally observed during the field visit on September 15, 2015. Potential habitat exists within the adjacent mixed deciduous forest; however, work activities would be largely confined to DEP facilities and previously disturbed areas. No tree removal would be needed and construction would take place primarily during daytime hours, thereby avoiding direct disturbance to potential roosting, nesting, and foraging habitat. Should any potential habitat exist at the sites, a variety of habitats would be available for the species use in the vicinity during construction. If there are active ground nests when construction commences, these would be located in forested areas beyond the construction limits such that the trees and local topography would naturally attenuate construction noises and no direct disturbance or mortality is anticipated. Moreover, individuals in these areas are acclimated to human activity and ambient noise due to the proximity of access roads and State Route 28A. Finally, upon construction completion, the staging areas would be restored to natural conditions and the new boathole and streambank restoration measures that remain would not affect potential habitat. Therefore, there are no effects anticipated and no further analysis for Whip-poor-wills is warranted for this study area.	No
<p>Notes: BGPA: Bald and Golden Eagle Protection Act MBTA: Migratory Bird Treaty Act</p>					

Wood Turtle (*Glyptemys insculpta*)

In the future with the repair and rehabilitation, work activities that could potentially affect wood turtles (*Glyptemys insculpta*) or their habitat would be limited to a short reach of stream and the adjacent riparian habitat at the Blow-off Chambers. However, a number of protective measures would be in place that would further limit the potential for effects. Specifically, perimeter silt fencing, temporary stream diversion, and an in-stream turbidity curtain would be erected, as required, for erosion and sediment control prior to commencing work. This would minimize impacts to potential habitat and prevent individual wood turtles from entering the work sites adjacent to the stream during construction. The excavation and regrading necessary to replace blow-off chambers and discharge pipes would not increase the extent of impervious surface. It would result in minor contour changes, but would not alter runoff to the stream. In addition, unwatering and treated wash water discharge flows would be moderated to ensure that the streambanks are not overtopped as a result of the repair and rehabilitation. Furthermore, all wash water would be treated to meet water quality standards for discharge to waterbodies and, therefore, no change in water quality is anticipated as a result of the repair and rehabilitation.

In addition to protective measures, the proposed schedule and duration for the in-stream work associated with streambank restoration is anticipated to minimize disturbance to wood turtles and their habitat. Specifically, this work would not occur when wood turtles are hibernating within the stream, but primarily during the summer and fall when the species travel through the creek. As a highly mobile species, they are anticipated to utilize adjacent habitat while these work activities take place. Furthermore, both treated wash water and raw water discharges would occur during the fall when wood turtles retreat to rivers and large streams for hibernation. This stream reach is susceptible to freezing during winter so it is not suitable for hibernation. Moreover, temporary or permanent streambank restoration (including installation of riprap aprons and gabion retaining walls) would be in place prior to aqueduct unwatering to limit scour and streambank erosion, and work activities at the blow-offs would be limited to a short duration (up to 9 weeks during summer ~~2019~~2018 and up to 6 weeks during fall ~~2020~~2019).

Once completed, the streambank restoration measures would dissipate flows during future unwatering events to protect downstream shorelines and riparian habitat. While in-stream and streambank habitat would be permanently altered, the upgrades and maintenance associated with blow-off chamber reconstruction would be limited to a small portion of the stream as a whole and there would therefore be minimal effects to potential wood turtle habitat along the relic channel of Esopus Creek.

While no wood turtle individuals were identified during the field visits, and the perimeter fencing is anticipated to prevent wood turtles from entering the work areas, any wood turtles encountered within the limits of construction would be moved by a DEP Wildlife Specialist to adjacent suitable habitat. Upon construction completion, the staging areas would be restored to natural conditions and planted with native vegetation, and the new boathole and streambank restoration measures that remain would not affect breeding, nesting, or foraging habitat. Vegetated riparian areas would be comparable to baseline conditions and would continue to provide habitat to wood turtles. In summary, given the range of protective measures that would be in place for the duration of construction, the schedule and temporary duration of the proposed

activities, as well as permanent stream protection that would benefit wood turtle habitat during future aqueduct unwatering, no significant effects are anticipated to wood turtles and their habitat. Therefore, the repair and rehabilitation may affect, but is unlikely to adversely affect, wood turtles in the natural resources study area.

Federal/State Threatened and Endangered Species and State Species of Special Concern Conclusions

Based on the impact analysis, no take is anticipated. There would be no effects to eastern box turtles (*Terrapene carolina*), Bald Eagles (*Haliaeetus leucocephalus*), or Whip-poor-wills (*Antrostomus vociferus*) associated with the repair and rehabilitation. Repair and rehabilitation may affect, but is not likely to adversely affect, wood turtles. Therefore, the repair and rehabilitation would not result in significant adverse impacts to federal/State Threatened and Endangered Species or State Species of Special Concern within the Beaverkill Road Study Area.

9.4.4.6 Hazardous Materials

To evaluate the potential presence of hazardous materials within the Beaverkill Road Study Area, a Phase I ESA was conducted in general conformance with the scope and limitations of ASTM Practice E 1527-13 and CEQR requirements to identify RECs. The Phase I ESA included site reconnaissance, research on current/historical use, and review of federal and State regulatory listings for both the site and neighboring properties within the appropriate search distance defined in the ASTM standard. The findings from the Phase I ESA investigation and results from DEP's legacy files for the work sites, including a geotechnical investigation and environmental health and safety sampling, were collectively reviewed to assess the potential presence of and potential for disturbance to hazardous materials in the study area.

Based on the Phase I ESA investigation within this study area, there was no indication of an existing environmental impact that would constitute a REC as defined by the ASTM standard that would affect activities in the study area.

Geotechnical environmental investigations and sampling were also undertaken for contaminants of concern including asbestos, lead, volatile and semivolatile organics, PCBs, and total petroleum hydrocarbons along the aqueduct within the study area. Chromium was noted in the soil sampling results. Total chromium was reported in the sample collected at the North Siphon Chamber. Chromium concentrations, however, were consistent over a widespread sampling area and are more likely associated with background concentrations. Along the Catskill Aqueduct, there are widespread occurrences of chromium, which are attributed to the existing geological formations. The legacy data also revealed that asbestos-containing materials are present on the ceiling beams of the North Siphon Chamber building. Materials sampled did not identify lead-containing paint, PCB-containing paint, or mercury-containing paint. In addition, gasoline range organic compounds and total petroleum hydrocarbons were also detected, but at low concentrations that are not considered to be indicative of contamination that warrants remedial actions.

Based on the results of the environmental investigations completed within the Beaverkill Road Study Area, no other hazardous materials are known to exist. The soil results support the reuse of

excavated materials associated with the new boathole and blow-off chamber reconstruction as backfill and do not suggest the need for special management, handling or health and safety measures at this time.

DEP has consulted with the Town of Olive and Ulster County, and it is DEP's understanding that no developments or structures that would introduce hazardous materials to the environment are anticipated within the Beaverkill Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that the presence of hazardous materials within the Beaverkill Road Study Area would be the same as baseline conditions.

In the future with the repair and rehabilitation, work activities would require the potential storage and use of a variety of petroleum and other chemical products, such as diesel fuel for back-up power, lubricating oil for construction vehicles, and miscellaneous cleaning and maintenance chemicals during construction. The use and storage of all of these would be in accordance with applicable regulatory requirements and guidelines including those relating to: federal Spill Prevention, Control, and Countermeasures requirements; and State petroleum bulk storage, chemical bulk storage and spill reporting requirements. Furthermore, excavation associated with the work activities for the installation of a new boathole and blow-off chamber reconstruction would occur on previously disturbed soils. As required, DEP would handle all materials in accordance with applicable federal, State and local regulations and guidelines. Following construction, all equipment and all chemical storage would be removed from the construction staging areas, and the areas would be restored and operation of the Catskill Aqueduct would be consistent with baseline conditions.

Therefore, the repair and rehabilitation would not result in significant adverse impacts from the presence or disturbance of hazardous materials within the Beaverkill Road Study Area.

9.4.4.7 Transportation

The study area for the transportation analysis consists of the major convergent roadways that would potentially be used by the employee and construction vehicles associated with repair and rehabilitation work activities en route to and from the Beaverkill Road Study Area.

Access to the North Siphon Chamber within the Beaverkill Road Study Area would be via State Route 28A to a paved single lane access road adjacent to the aqueduct on DEP property (see **Figure 9.4-12**). Access to the Blow-off Chambers and South Siphon Chamber would be via State Route 28A to the top of the aqueduct. State Route 28A is a two-lane, two-way rural minor collector roadway. To the extent available, construction vehicles would travel on truck-permitted roadways directly to and from the Beaverkill Road Study Area. There is no public transportation and little to no pedestrian activity in the immediate vicinity of the study area. There are no DEP employees who work at or visit the study area on a daily basis. The small number of DEP employee vehicles that visit the study area periodically has little to no effect on traffic conditions within the study area.

DEP has consulted with the Town of Olive and Ulster County, and it is DEP's understanding that no changes in land use or an increase in traffic due to outside developments are anticipated

within the Beaverkill Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that traffic, public transportation and pedestrian activities within the study area would be similar to baseline conditions.

Repair and rehabilitation work activities within the Beaverkill Road Study Area were evaluated to determine which would have the potential to generate the most vehicle trips and therefore be the basis of this transportation analysis. Of these activities, blow-off chamber reconstruction would generate the most vehicle trips. Blow-off chamber reconstruction would occur in summer ~~2019~~²⁰¹⁸ between the hours of 7 AM and 5 PM, Monday through Friday for approximately 9 weeks, with work that requires shutdowns being performed in spring or fall of that year.

In the future with the repair and rehabilitation, construction vehicles would travel along State Route 28A to the top of the aqueduct. The estimated number of peak-day one-way vehicle trips associated with blow-off chamber reconstruction is 101 vehicles, or approximately 202 peak-day vehicle round trips that would travel to and from the study area. Approximately 24 vehicle round trips or 24 PCEs, would be workers either traveling to and from the study area or traveling directly to and from the staging area (depending on parking capacity), with potentially 4 daily shuttle trips between the study area and the staging area. The remaining approximately 174 peak-day vehicle round trips (423 PCEs) would be trucks or other construction vehicles.

During a peak day, the estimated number of peak-hour vehicle trip ends associated with blow-off chamber reconstruction is approximately 37 peak-hour vehicle trip ends (66 PCEs). This includes approximately 12 vehicle trip ends (12 PCEs) from workers traveling directly to and from the staging area, approximately 2 peak-hour shuttle trips between the study area and the staging area, and approximately 23 vehicle trip ends (52 PCEs) from trucks or other construction vehicles. For the purpose of this analysis, the peak-hour project-generated vehicles are anticipated to coincide with typical construction hours for employee vehicles entering the site. Assuming one 12-hour shift, this would be from 6 AM to 7 AM, and would be unlikely to coincide with the peak hour for existing traffic.

The repair and rehabilitation would result in approximately 66 peak-hour PCEs along State Route 28A, which is above the *CEQR Technical Manual* screening threshold of 50 peak-hour PCEs as described in Section 9.3.13, "Transportation." The work activities at the Beaverkill Road Study Area would be short-term (approximately 21 weeks over 1.5 years; see **Table 9.4-5**) and would not generate public parking or transportation demands or pedestrian activity within the Beaverkill Road Study Area. Following completion of the repair and rehabilitation, traffic patterns would return to baseline conditions.

Therefore, although there would be a minor temporary increase in traffic, the repair and rehabilitation would not result in significant adverse impacts to transportation within the Beaverkill Road Study Area.

9.4.4.8 Neighborhood Character

The character of the Beaverkill Road Study Area is largely defined by a mix of public services, with some residential, vacant, and open space and recreation areas in the southern half and its physical setting within a rural location (see **Figure 9.4-14**). The study area is bisected by State

Route 28A and the relic channel of Esopus Creek. The limits for construction for the work sites and associated access routes are located in a public services corridor with grassy cover, which is owned and maintained by DEP and separated from adjacent land by a forested zone.

DEP has consulted with the Town of Olive and Ulster County, and it is DEP's understanding that no changes in land use and no new projects or structures are anticipated within the Beaverkill Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that neighborhood character within the study area would be similar to baseline conditions.

As described in Section 9.3.16, "Neighborhood Character," there would be no potential for the repair and rehabilitation to affect shadows and urban design. In addition, based on the screening assessment for land use and zoning; socioeconomic conditions; and historic and cultural resources, an impact analysis for the Beaverkill Road Study Area was not warranted, as discussed in the following sections: Section 9.3.3, "Land Use, Zoning, and Public Policy," Section 9.3.4, "Socioeconomic Conditions," and Section 9.3.7, "Historic and Cultural Resources," respectively. As described in Section 9.4.4.3, "Open Space and Recreation," and Section 9.4.4.4, "Visual Resources," the work activities would not affect open space and recreation and visual resources in the Beaverkill Road Study Area. Furthermore, the public policy impact analysis is provided in Section 9.4.2, "Town of Olive Impact Analysis," concluded the work activities were consistent with applicable plans. Furthermore, the public policy impact analysis, provided in Section 9.4.2, "Town of Olive Impact Analysis," concluded the work activities were consistent with applicable plans.

As described in Section 9.3.15, "Noise," noise associated with the repair and rehabilitation within the Beaverkill Road Study Area does not warrant analysis. As described in Section 9.4.4.7, "Transportation," the work activities in the Beaverkill Road Study Area would be short-term (intermittently over 1.5 years) and would result in a temporary increase in traffic. Following completion of the repair and rehabilitation, the construction equipment and vehicles would be removed from the study area and traffic patterns would return to baseline conditions. These temporary increases in traffic levels would not result in a density of activity or service conditions that would affect the overall character of the study area.

The repair and rehabilitation would not generate significant adverse effects in land use, zoning, and public policy; socioeconomic conditions; open space and recreation; shadows; historic and cultural resources; urban design and visual resources; transportation; or noise.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to neighborhood character within the Beaverkill Road Study Area.

9.4.5 ATWOOD-OLIVEBRIDGE ROAD STUDY AREA IMPACT ANALYSIS

Within the Atwood-Olivebridge Study Area, the aqueduct begins as the Esopus Cut-and-Cover Tunnel, transitioning to the Tongore Steel Pipe Siphon at the Tongore Steel Pipe Siphon North Chamber (North Siphon Chamber). At Tongore Creek, the siphon is housed in a reinforced concrete box that crosses over the stream (the Tongore Steel Pipe Siphon Bridge or Tongore

Bridge), adjacent to which are located three over-stream blow-offs and associated valves within the Tongore Steel Pipe Siphon Blow-off Chambers (Blow-off Chambers). An access manhole is located just north of the stream crossing. South of the stream crossing, the aqueduct transitions again from the Tongore Steel Pipe Siphon to another segment of the Esopus Cut-and-Cover Tunnel at the Tongore Steel Pipe Siphon South Chamber (South Siphon Chamber; see **Figure 9.4-21**).

Work activities within the Atwood-Olivebridge Road Study Area would include: staging and access improvements; bridge repair; blow-off chamber reconstruction; boathole preparation and installation; biofilm removal and condition assessment; and small-scale wash water treatment.

9.4.5.1 Study Area Location and Description

The Atwood-Olivebridge Road Study Area is located along the Catskill Aqueduct in the Town of Olive, with a small part of its southern end in the Town of Marbletown, Ulster County. The Catskill Aqueduct traverses the upper portion of the study area in a general northwest to southeast direction. In its lower portion, the study area includes State Route 213, known as Atwood-Olivebridge Road to the west of Down the Lane Road (a privately owned drive) and Atwood Road to the east. Tongore Creek, a fast-moving stream, traverses the study area from southwest to northeast, and an unnamed tributary to Tongore Creek enters the study area from the northwest.

Proposed work sites within the study area include the North Siphon Chamber, the Tongore Bridge and Blow-off Chambers, and the South Siphon Chamber. Access to the North Siphon Chamber would be provided by State Route 213 to a DEP access road and driving over the cut-and-cover tunnel. The other two work sites would be accessed via Down the Lane Road to a DEP access road. The study area boundary is located approximately 400 feet beyond the outermost areas of disturbance related to the work sites. **Figure 9.4-21** shows an aerial photograph of the study area, including the path of the aqueduct, the limits of construction for each work site, and the proposed access routes. **Figure 9.4-22** shows photographs of the Tongore Bridge and the Tongore North Siphon Chamber in the study area.

The study area consists of residential, commercial, open space, vacant land, and public service land uses. Land cover within the study area is generally wooded, with several large grassy fields to the west and south of the aqueduct. The limits of construction for the work sites are located within a public services corridor which is owned and maintained by DEP and separated from adjacent properties by a forested area. Access to the Blow-off Chambers and the South Siphon Chamber would require crossing private property with permission from the owner. **Figure 9.4-23** shows a map of the land uses in the study area and its surroundings.

Zoning in the study area is primarily residential/exurban (RE-1A), with some residential/conservation (R/C-10A) areas in its upper portion, as designated by the Town of Olive Zoning Code (see **Figure 9.4-24**). The Catskill Aqueduct is located within the residential/exurban (RE-1A) zoning district, which provides for a minimum of one acre per dwelling unit. The Catskill Aqueduct is a permitted use as a public utility structure within the residential/exurban (RE-1A) zoning district.

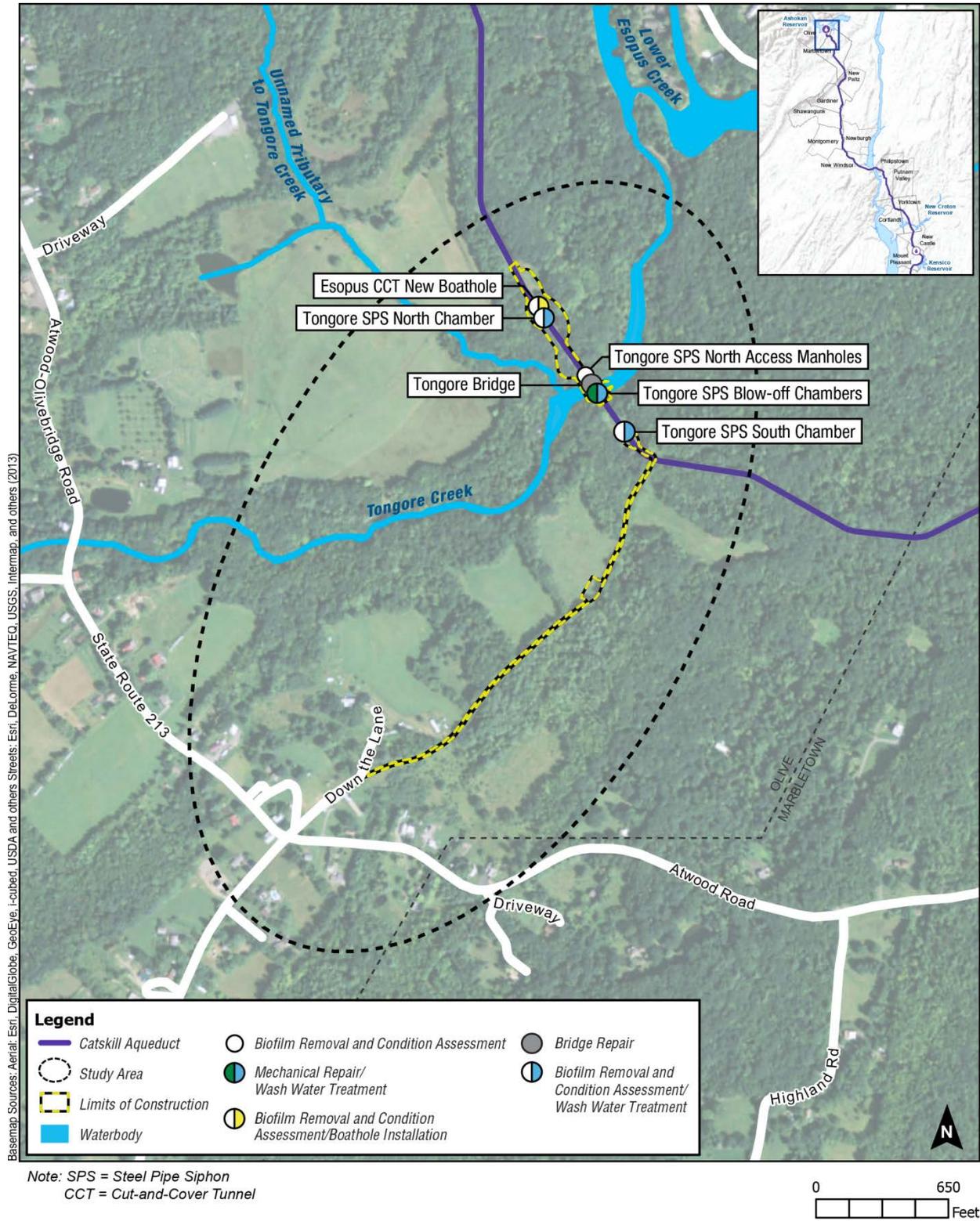


Figure 9.4-21: Study Area – Atwood-Olivebridge Road





Photograph 1: Grass-covered Tongore Bridge over Tongore Creek, looking east.



Photograph 2: Tongore North Siphon Chamber.

Figure 9.4-22: Photographs – Atwood-Olivebridge Road Study Area



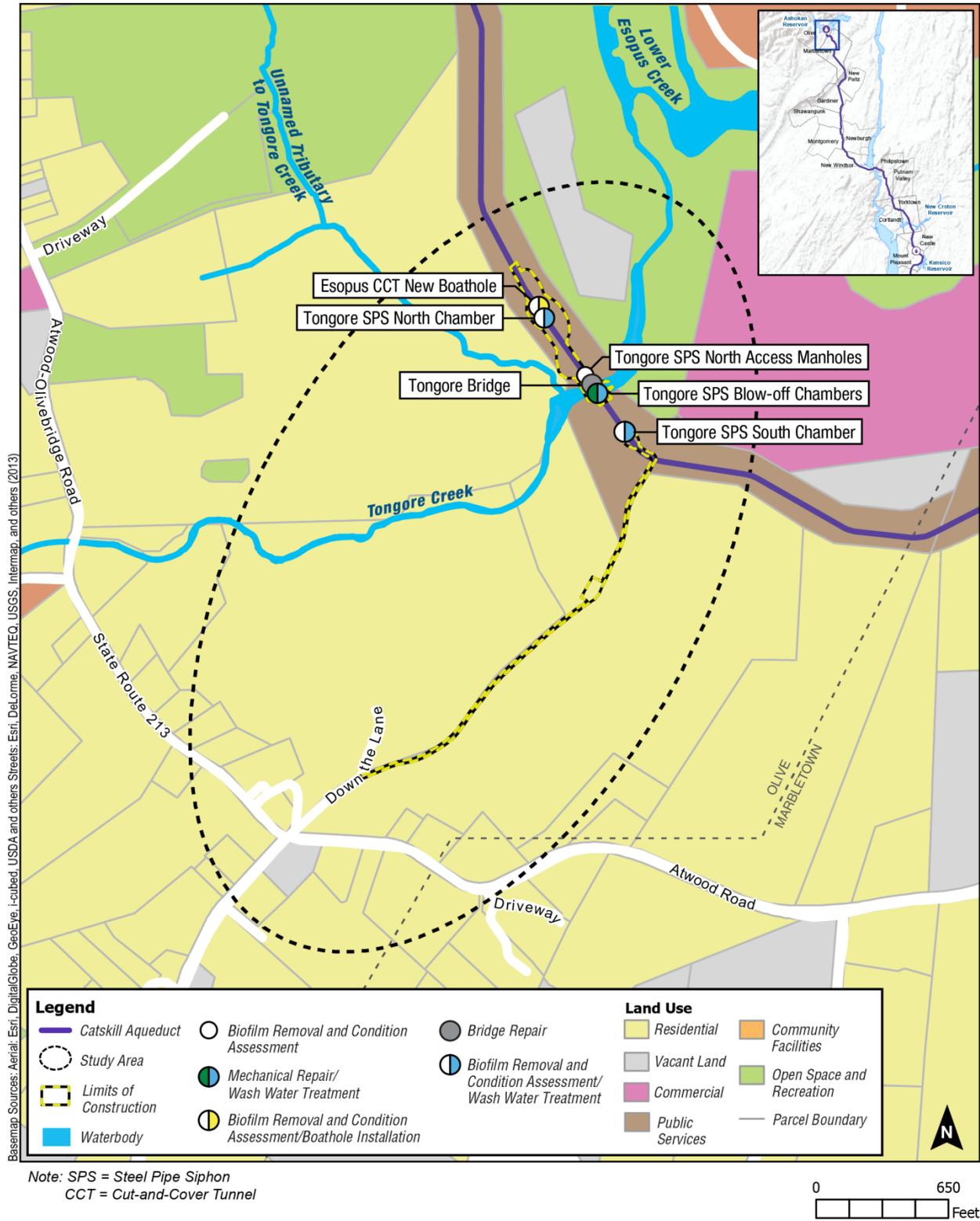


Figure 9.4-23: Land Use – Atwood-Olivebridge Road Study Area



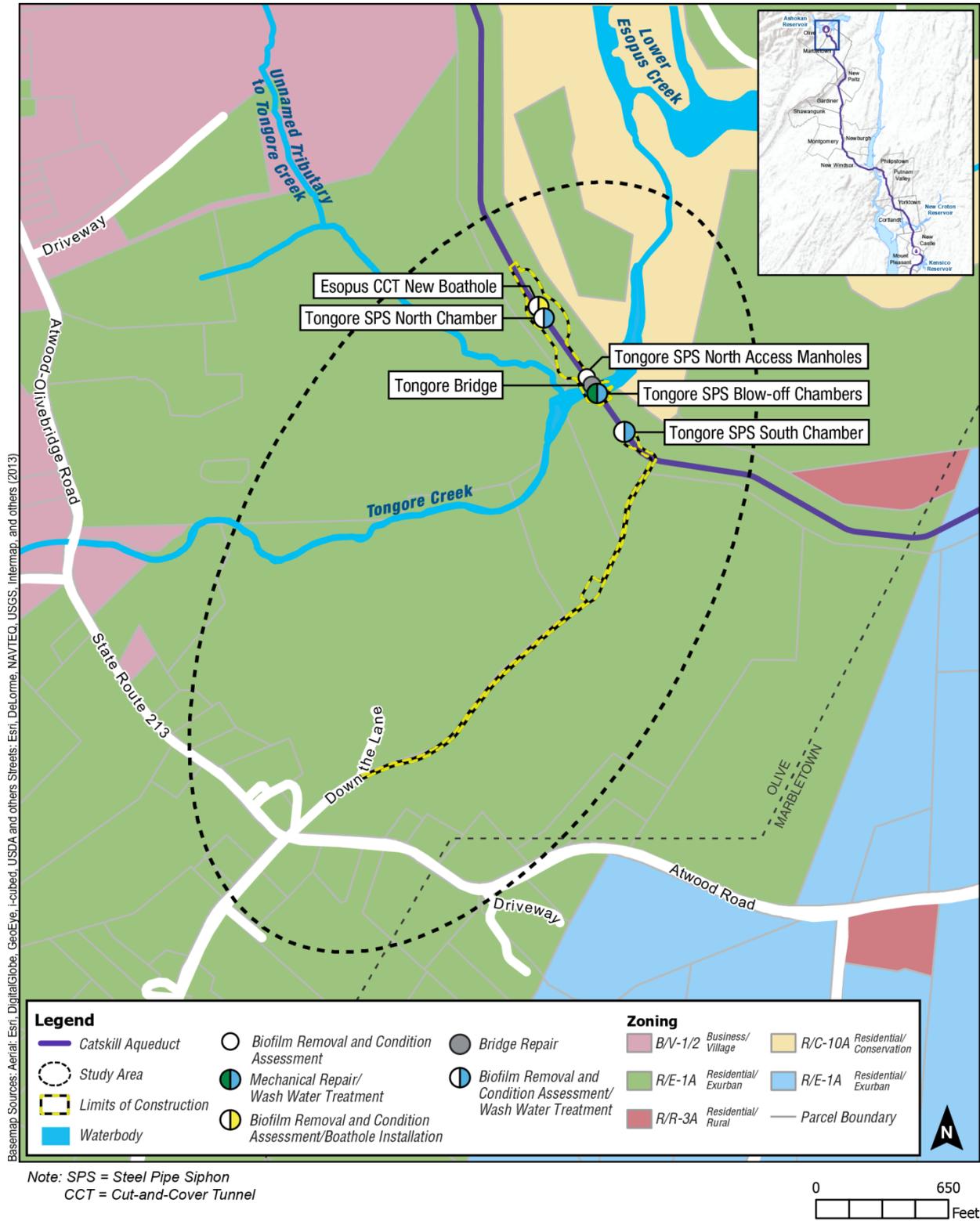


Figure 9.4-24: Zoning – Atwood-Olivebridge Road Study Area



There are no federal, State or local designated landmarks, historic districts, or known archeological resources within the study area.

9.4.5.2 Proposed Activities within the Atwood-Olivebridge Road Study Area

To support activities within the Atwood-Olivebridge Road Study Area, the Ashokan Screen Chamber Study Area would serve as a primary staging area from which workers would be transported to the site daily. Several secondary staging areas would provide additional parking, and equipment and materials would be staged on site. Erosion and sediment control measures such as silt fencing and hay bales would be installed at the perimeter of the limits of construction for the work sites as needed. Site plans showing layouts of the work sites, which would occupy a total of approximately 2.92-5 acres, are shown on **Figure 9.4-25** and **Figure 9.4-26**. The schedule for work within the study area is shown in **Table 9.4-9**. The duration of active construction within the Atwood-Olivebridge Road Study Area is estimated to total 24 weeks over 1.5 years.

Table 9.4-9: Schedule of Work Activities within the Atwood-Olivebridge Road Study Area

Work Activity	Dates	Duration	Work Hours	Crew Size ¹
Staging and Access Improvements ²	Summer 2019 2018	4 weeks	Monday to Friday, 7 AM to 5 PM	8
Bridge Repair	Summer 2019 2018	4 weeks	Monday to Friday, 7 AM to 5 PM	13
Blow-off Chamber Reconstruction	Summer 2019 2018	9 weeks	Monday to Friday, 7 AM to 5 PM	12
Boathole Preparation	Summer 2019 2018	3 weeks	Monday to Friday, 7 AM to 5 PM	10
Boathole Installation	Fall 2019 2018 (Second 10-week shutdown)	2 weeks	7 days a week, 7 AM to 7 PM	8
Biofilm Removal and Condition Assessment/ Small-scale Wash Water Treatment	Fall 2020 2019 (Third 10-week shutdown)	2 weeks	7 days a week, 7 AM to 7 PM	21

Notes:

¹ Crew size refers to the number of people anticipated at the work site(s).

² Tree removal would be conducted from November 1 through March 31 to avoid impacts to Indiana bats (*Myotis sodalis*) and northern long-eared bats (*Myotis septentrionalis*).

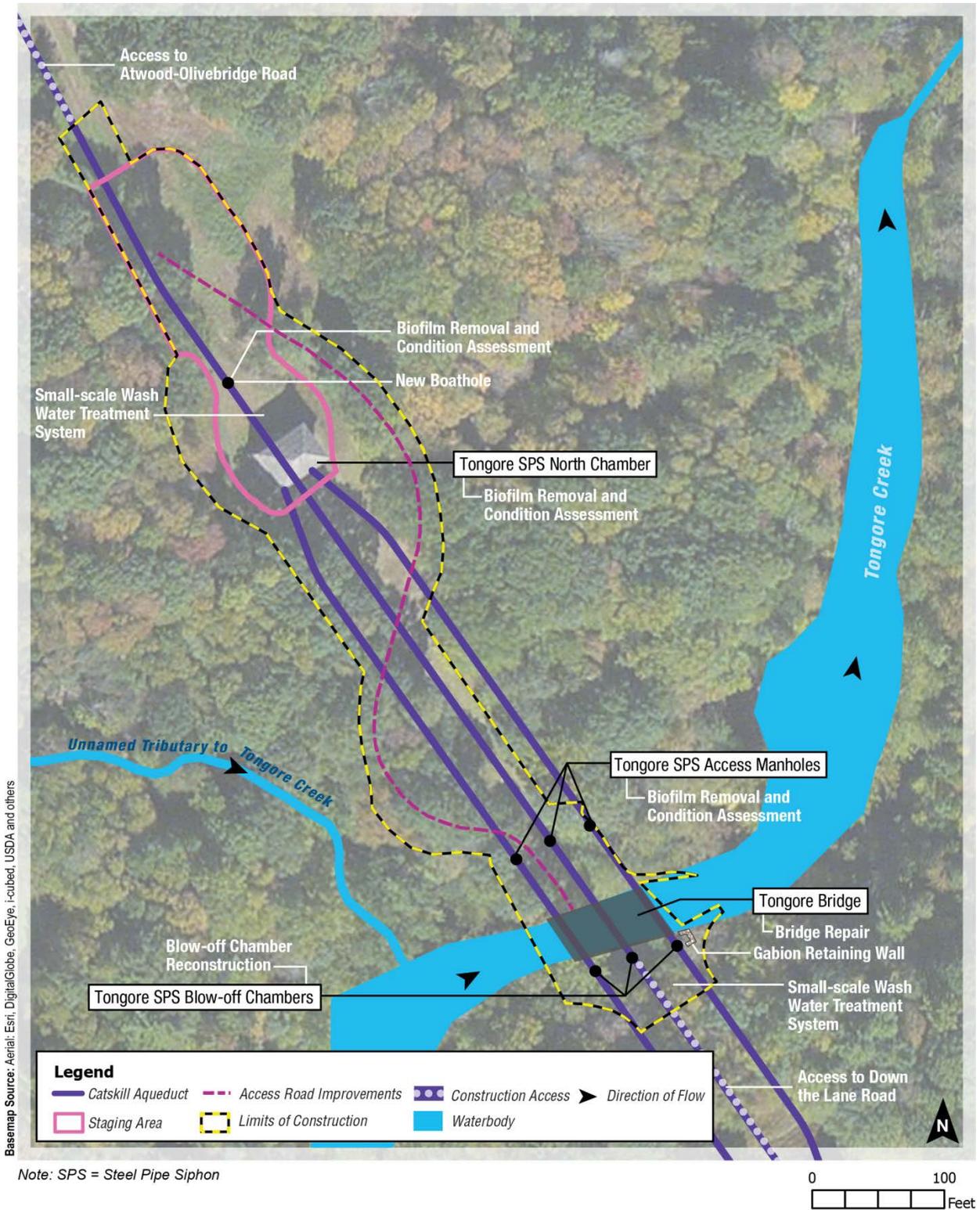


Figure 9.4-25: Site Plan for Tongore SPS North Chamber, Tongore SPS Bridge, and Tongore SPS Blow-off Chambers – Atwood-Olivebridge Road Study Area



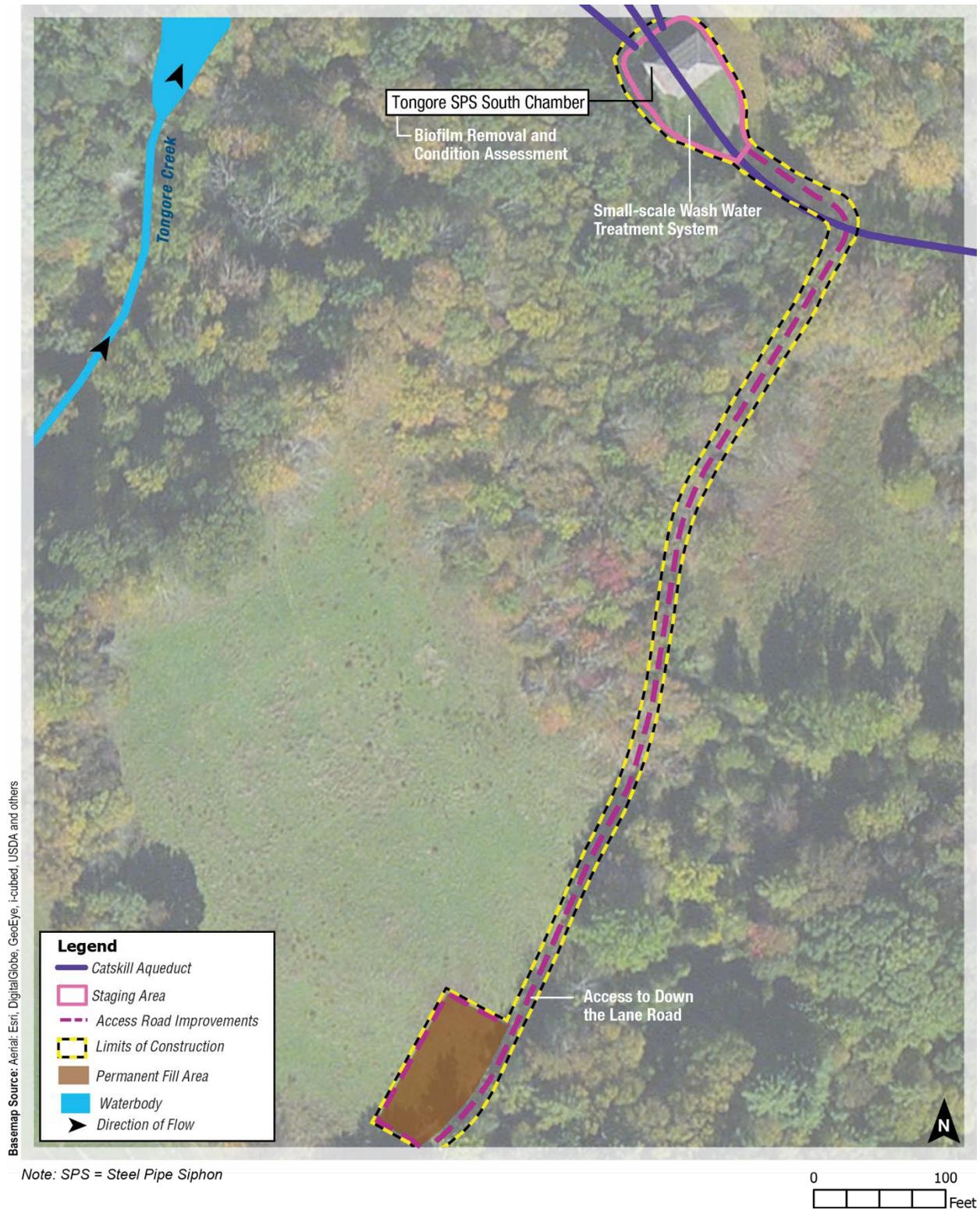


Figure 9.4-26: Site Plan for Tongore SPS South Chamber – Atwood-Olivebridge Road Study Area



Work in the study area would begin with staging and access improvements in summer ~~2019~~2018. In addition to underbrush clearing and gravel placement for leveling and sediment control, improvements would entail the removal of up to 32 trees for the construction of a permanent access road from the North Siphon Chamber to Tongore Bridge, the removal of up to 22 trees along the access road to Down the Lane Road, and the grading of approximately 5,600 square feet for a truck turnaround.

Following improvements to the access road, repairs to Tongore Bridge would be conducted. Work would entail inspection of the bridge structure and repairs to corroded support structures, deteriorated concrete, and other surface defects as described in Section 9.2, “Project Description.” All bridge repairs would be in-kind and would not alter the external appearance of the structure. Site modifications to support the bridge repair may require in-water work and include temporary protection of Tongore Creek. To ensure a dry working environment, a temporary stream diversion would be installed, serving to partially divert the creek around the work area. A turbidity curtain would be installed to prevent sediment from moving downstream. Temporary in-stream disturbance would cover a total area of approximately 3,420 square feet. There would be no permanent in-stream disturbance.

Blow-off chambers reconstruction, including replacement of the blow-off valves, discharge pipes, and chamber covers, repair of the concrete walls, ~~and~~ removal of the access ladders, and installation of gabion retaining walls would also take place in summer ~~2019~~2018 (small portions of the work that require shutdowns would be performed in spring and fall of that year). In total, the work would require the excavation of approximately 60 cubic yards of soil and approximately 50 cubic yards of soil for fill, resulting in a net cut of approximately 10 cubic yards of soil. Afterwards, the blow-off valves would be used to unwater the aqueduct for future shutdowns during repair and rehabilitation and future maintenance.

Preparation of the new boathole upstream of the North Siphon Chamber would occur during the same time period. The work would consist of the excavation of approximately 45 cubic yards of soil and construction of a cast-in-place concrete collar. Boathole installation, which requires unwatering of the aqueduct to tie into the crown of the cut-and-cover tunnel, would take place during the second 10-week shutdown in fall ~~2019~~2018.

Lastly, biofilm removal and condition assessment would occur during the third 10-week shutdown in fall ~~2020~~2019. Access into the aqueduct would be provided by the new boathole, the set of access manholes, the North Siphon Chamber, and the South Siphon Chamber. These locations would also serve as collection points for biofilm, which would be transported for disposal at a registered, permitted, or otherwise authorized facility. Although the aqueduct would be unwatered during this shutdown, any residual water would be diverted through an internal bypass pipe around the work segments within the aqueduct for discharge to the aqueduct downstream. Any residual water that does not meet water quality standards, and any wash water generated from biofilm removal would then be transported to a temporary treatment system, where it would be treated to meet water quality standards for discharge back into the aqueduct or to a nearby waterbody (see Section 9.2, “Project Description”). Potential treatment locations within the study area include the North Siphon Chamber, the South Siphon Chamber, and the Blow-off Chambers, at which small-scale wash water treatment systems could be established.

Upon completion of biofilm removal and condition assessment, all equipment and materials would be removed, and any areas requiring temporary disturbance would be restored to baseline conditions.

Impact categories analyzed for the Atwood-Olivebridge Road Study Area are presented in Sections 9.4.5.3, “Open Space and Recreation” through 9.4.5.8, “Neighborhood Character” and include open space and recreation; visual resources; natural resources, consisting of water resources, terrestrial resources, and federal/State Threatened and Endangered Species and State Species of Special Concern; hazardous materials; transportation; and neighborhood character. Additionally, the study area’s compatibility with applicable public policies was analyzed on a town-wide basis in Section 9.4.2, “Town of Olive Impact Analysis.” As described in Section 9.3, “Screening Assessment and Impact Analysis Methodology,” an impact analysis related to land use and zoning; socioeconomic conditions; community facilities and services; historic and cultural resources; the remaining natural resources subcategories, including geology and soils, aquatic and benthic resources, wildlife, federal/State Candidate Species, and unlisted rare and vulnerable species; energy; air quality; and noise within the study area is not warranted. Finally, impacts related to project-wide natural resources, water and sewer infrastructure, and public health were analyzed within Section 9.19, “Project-wide Impact Analysis.”

9.4.5.3 Open Space and Recreation

As shown on **Figure 9.4-27**, one open space and recreation resource exists within the Atwood-Olivebridge Road Study Area. Approximately 12.5 acres of the Acorn Hill DEP Watershed Recreational Land are located in the northeastern portion of the Atwood-Olivebridge Road Study Area. The Acorn Hill DEP Watershed Recreational Land is approximately 219 acres and provides outdoor activities such as hiking and hunting to the public on designated portions of the land. DEP allows recreational uses of City-owned water supply lands but does not construct or maintain hiking trails for formal recreational uses.

DEP has consulted with the Town of Olive and Ulster County, and it is DEP’s understanding that no plans to expand or create new open space or recreational resources are anticipated within the Atwood-Olivebridge Road Study Area within the timeframe of the impact analysis. Natural processes, such as changes in habitat due to natural vegetative succession, are anticipated to continue. Use of the identified open space is anticipated to continue. Therefore, in the future without the repair and rehabilitation, it is assumed that open space and recreation within the Atwood-Olivebridge Road Study Area would be the same as baseline conditions.

The repair and rehabilitation work activities within the Atwood-Olivebridge Road Study Area would be short-term (intermittently over 1.5 years; see **Table 9.4-9**). The repair and rehabilitation work activities would not disrupt the use of the open space, but may temporarily affect views looking southwest from the Acorn Hill DEP Watershed Recreational Land. Staging and rehabilitation activities would occur on DEP property and would be separated by a buffer of trees. Therefore, during construction, recreational use within Acorn Hill DEP Watershed Recreational Land would be unaffected.

Following construction, all equipment would be removed from the Atwood-Olivebridge Road Study Area and staging areas would be restored to baseline conditions. Operation of the Catskill Aqueduct would be consistent with baseline conditions and would not disrupt recreational use of

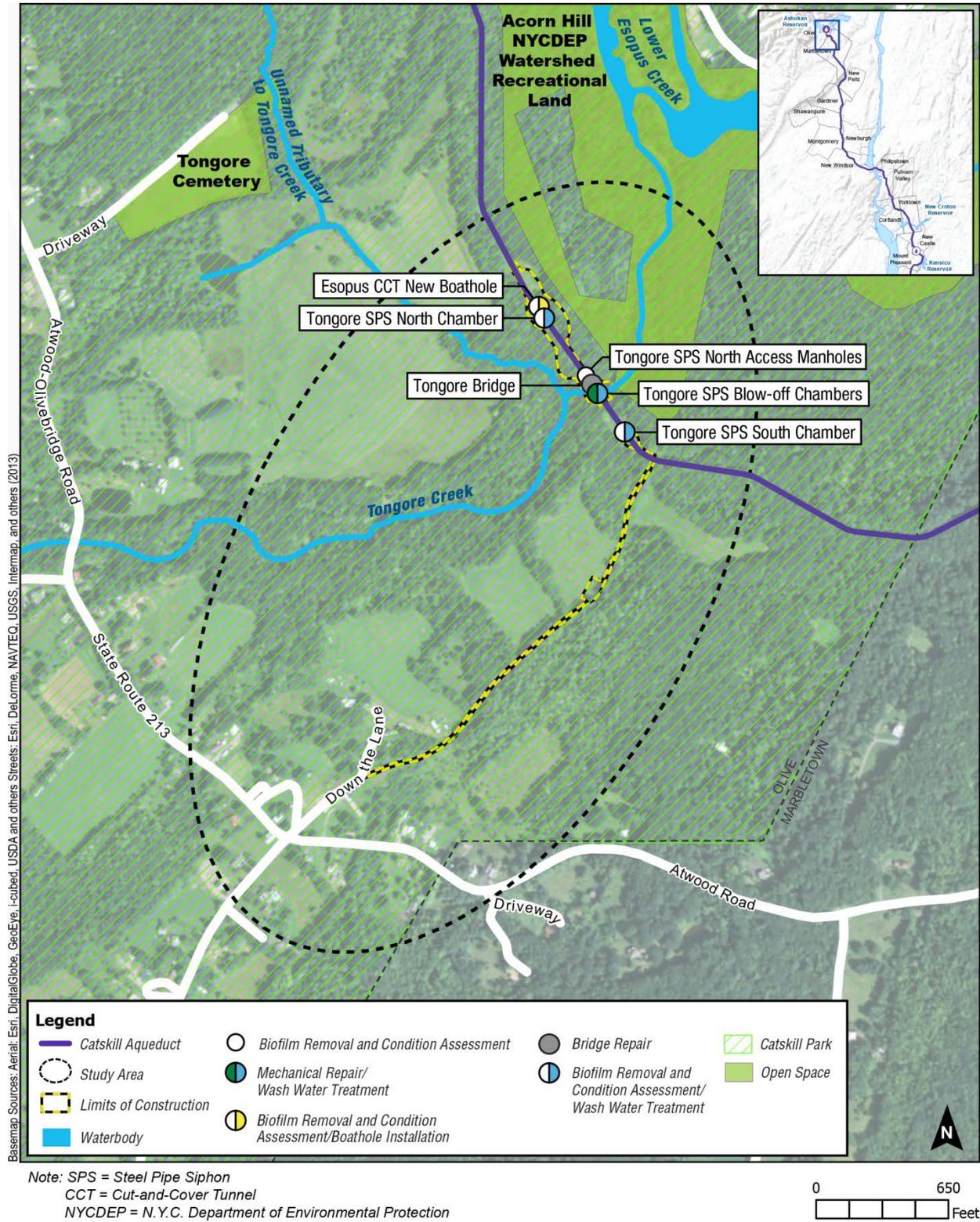


Figure 9.4-27: Open Space and Visual Resources - Atwood-Olivebridge Road Study Area



adjacent open spaces. As such, the repair and rehabilitation would not encroach upon, cause a loss of open space, or affect the use or physical character of the Acorn Hill DEP Watershed Recreational Land.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to open space and recreation within the Atwood-Olivebridge Road Study Area.

9.4.5.4 Visual Resources

The study area for the visual resources analysis is the area within the Atwood-Olivebridge Road Study Area, and also includes view corridors that extend beyond the study area based on the locations that are publicly accessible, as required.

As shown on **Figure 9.4-27**, two visual resources, consisting of one site listed as a State Park, the Catskill Park, and one locally significant resource, the Acorn Hill DEP Watershed Recreational Land, were identified within the Atwood-Olivebridge Road Study Area.

The Catskill Park consists of approximately 700,000 acres with approximately 287,500 acres preserved as New York State Forest. The Catskill Park includes mountainous areas of public and private lands in Ulster, Greene, Delaware, and Sullivan counties, New York. A majority of the Atwood-Olivebridge Road Study Area is situated within the perimeter of the Catskill Park's southeastern boundary. This area of the Catskill Park is not located in a section dedicated to tourism or recreation. There are no view corridors, State forest lands, or viewsheds specific to this site. Views of the North Siphon Chamber, Blow-off Chambers, Tongore Bridge, and the South Siphon Chamber are limited due to the dense vegetation within the Atwood-Olivebridge Road Study Area.

Approximately 12.5 acres of the Acorn Hill DEP Watershed Recreational Land are located in the northeastern portion of the Atwood-Olivebridge Road Study Area. The Acorn Hill DEP Watershed Recreational Land provides outdoor activities such as hiking and hunting to the public on designated portions of that land.

DEP has consulted with the Town of Olive and Ulster County, and it is DEP's understanding that no new projects or structures that would alter views from visual or aesthetic resources are anticipated within the Atwood-Olivebridge Road Study Area within the timeframe of the impact analysis. Natural processes, such as changes in habitat due to natural vegetative succession, are anticipated to continue. Therefore, in the future without the repair and rehabilitation, it is assumed that visual resources within the Atwood-Olivebridge Road Study Area would be the same as baseline conditions.

The repair and rehabilitation work activities would be minimal and short-term (intermittently over 1.5 years; see **Table 9.4-9**). The Atwood-Olivebridge Road Study Area is not visible from any section of Catskill Park dedicated to tourism or recreation and no trails exist within the Acorn Hill DEP Watershed Recreational Land near the work sites. Since no trails are maintained within the study area, it is not anticipated that this portion of the Acorn Hill DEP Watershed Recreational Land is used and would therefore have no impacts to visual resources. Therefore, work activities would not result in any significant adverse impacts to visual resources.

The repair and rehabilitation work site preparation activities at the proposed construction staging area would not include clearing of trees and shrubs and, therefore, would not change any views from the Acorn Hill DEP Watershed Recreational Land. Following completion of the repair and rehabilitation work activities, the proposed construction equipment and vehicles would be removed from the Atwood-Olivebridge Road Study Area and would be restored to baseline conditions. The new boathole at the Tongore North Siphon Chamber is a permanent structure that would remain following construction. Following the repair and rehabilitation within the Atwood-Olivebridge Road Study Area, operation of the Catskill Aqueduct would be consistent with baseline conditions and would not result in changes to the future visual and aesthetic resource conditions of the views to the Catskill Park or the Acorn Hill DEP Watershed Recreational Land.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to visual resources within the Atwood-Olivebridge Road Study Area.

9.4.5.5 Natural Resources

The study area for the natural resources analysis within the Atwood-Olivebridge Road Study Area is the limits of construction, including the area surrounding the Tongore Steel Pipe Siphon and Tongore Bridge (see **Figure 9.4-28**). Based on field visits conducted on September 17, 2014 and July 28, 2015, the natural resources study area follows the Catskill Aqueduct that is a successional old field surrounded by deciduous forest, crosses Tongore Creek, and follows Down the Lane Road towards Atwood-Olivebridge Road. The study area also includes a portion of an unnamed tributary to Tongore Creek. An analysis of the potential effect to natural resources that could result from the repair and rehabilitation activities are presented below.

Water Resources

The natural resources study area is within the Lower Hudson River drainage basin, more specifically within Ashokan Reservoir-Esopus Creek subwatershed (HUC 020200060905) of the Middle Hudson watershed (HUC 02020006).

Water resources in the natural resources study area is subject to jurisdiction under Sections 401 and 404 of the Clean Water Act for proposed activities. As a Class C(T) stream, Tongore Creek supports a trout population and is subject to State Protection of Waters regulations with a 50-foot buffer to protect the streambed and banks. In addition, the Town of Olive regulates activities within watercourses and wetlands, but does not have a regulatory buffer (Olive Town Code Chapter 89: Environmental Quality Review). However, because maintenance or repair are exempt activities, this local regulation may not be applicable to the proposed work activities.

Surface Water

The surface water delineations in the natural resources study area occurred on July 28, 2015. Tongore Creek and an unnamed tributary to Tongore Creek were identified (see **Figure 9.4-28**). The water resource name, length, area, and classifications are shown in **Table 9.4-10**.

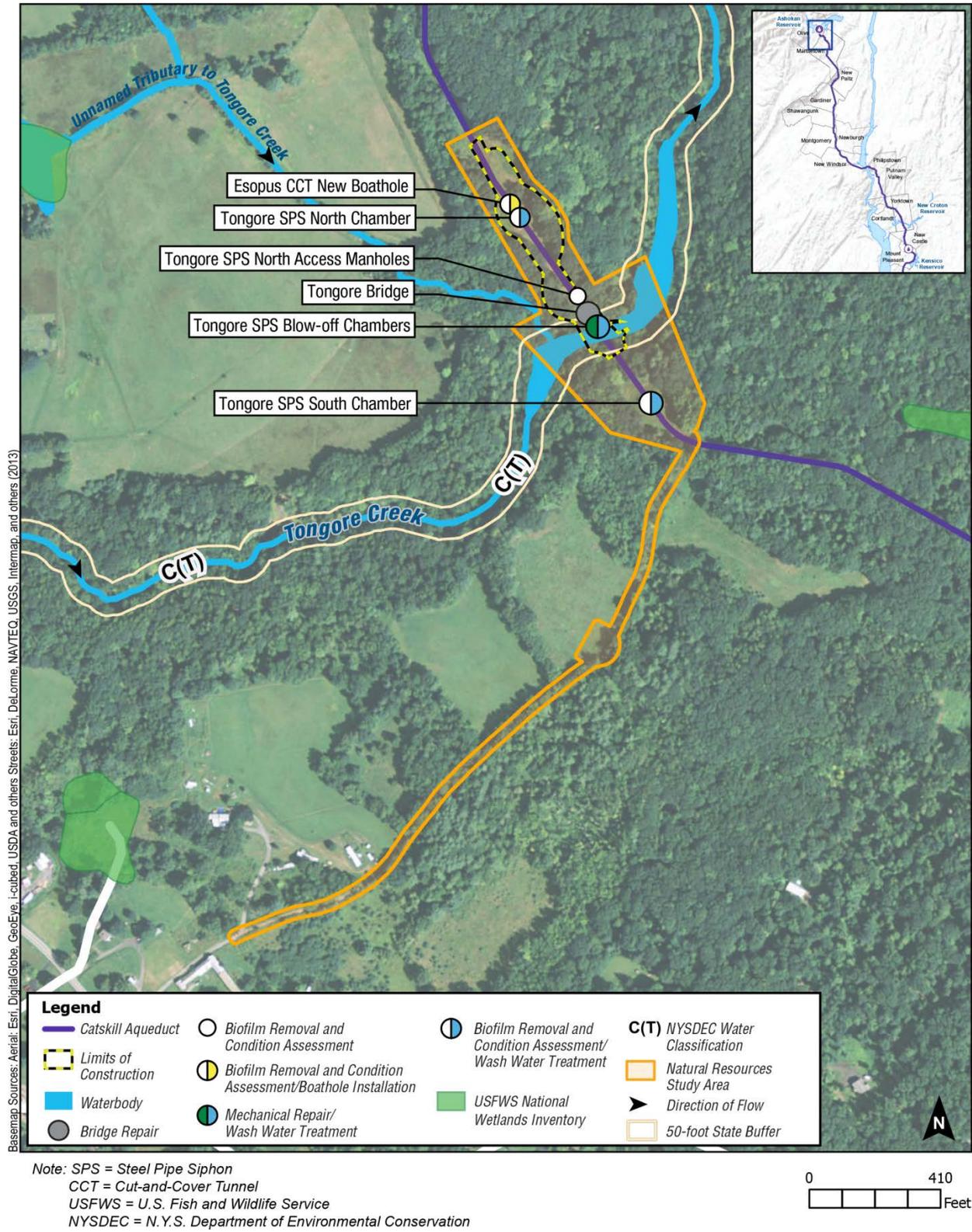


Figure 9.4-28: Natural Resources - Atwood-Olivebridge Road Study Area



Table 9.4-10: Water Resources and Classifications within the Atwood-Olivebridge Road Natural Resources Study Area

Water Resource	Area (Square Feet)	Length (Feet)	Cowardin Classification
Tongore Creek	24,440	590	Riverine, Upper Perennial, Rock Bottom, Bedrock (R3RB1)
Unnamed Tributary to Tongore Creek	220	120	Riverine, Intermittent, Unconsolidated Bottom, Cobble-Gravel Substrate (R4UB1)

Tongore Creek

Tongore Creek flows west to east across the northern portion of the study area and turns north, flowing under the Tongore Bridge to its eventual confluence with lower Esopus Creek. The stream has a moderate gradient with a series of shallow pools and riffles in the natural resources study area. The streambanks are scoured and there is an active bank slippage (i.e., erosion) immediately downstream of the existing bridge crossing. The stream substrate is cobbles and gravel. The flow was clear with no in-stream vegetation at the time of the field visit. There were several large debris piles (logs and branches) from flooding events. As listed on **Table 9.4-10**, the watercourse is best classified as a “Riverine, Upper Perennial, Rock Bottom, Bedrock” based on the Cowardin System (Cowardin et al. 1979).

Unnamed Tributary to Tongore Creek

An unnamed tributary enters Tongore Creek from the northerly side about 100 feet upstream of the Tongore Bridge. The watercourse was flowing at the time of the survey. The streambed is deeply incised and eroded. There are a number of exposed root masses and toppled trees along the watercourse. The tributary appears to be intermittent. No fish were observed during the time of the survey. As listed on **Table 9.4-10**, the watercourse is best classified as a “Riverine, Intermittent, Unconsolidated Bottom, Cobble-Gravel Substrate” based on the Cowardin System (Cowardin et al. 1979).

Future Without the Repair and Rehabilitation

DEP has consulted with the Town of Olive and Ulster County, and it is DEP’s understanding that no projects or developments are anticipated to occur within the natural resources study area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that the future conditions of water resources within the Atwood-Olivebridge Road Study Area would be the same as baseline conditions.

Analysis of Potential Effects

This section analyzes the potential for temporary and permanent disturbance to water resources associated with the repair and rehabilitation and long-term operation of the Catskill Aqueduct in the Atwood-Olivebridge Study Area.

Construction

Work activities related to the repair and rehabilitation at the Blow-off Chambers have the potential to temporarily reduce vegetated areas along the streambank and temporarily alter flows in Tongore Creek. No work is proposed along the unnamed tributary to Tongore Creek. Additionally, there is no surface water at the North and South Siphon Chambers, and no access improvements would be conducted within 50 feet of Tongore Creek.

The Blow-off Chambers may be accessed multiple times during construction. As Tongore Creek supports trout and can be designated as a coldwater fishery, in-water construction activities are generally prohibited from October 1 to April 30, unless otherwise authorized. While DEP anticipates that the majority of in-water construction would occur during the summer months and outside of the October 1 to April 30 prohibition, construction activities may need to occur within the restricted period. If this is required, as presented within Section 9.19, "Project-wide Impact Analysis," DEP would implement additional measures to limit potential adverse impacts to trout.

Prior to commencing the repair and rehabilitation, temporary sediment and erosion control measures, such as silt fences, would be installed. Within the limit of construction, localized construction dewatering (i.e., installing a barrier and pump to keep the work area dry) may be necessary to facilitate excavation for replacement of blow-off chambers and discharge pipes. Temporary protection of Tongore Creek would be provided around and under the Tongore Bridge during exterior repairs of the bridge and blow-off chamber reconstruction. A temporary stream diversion would be installed on the southern streambank for in-stream work and a temporary downstream turbidity curtain would be placed as a secondary measure to prevent sediment from entering the stream during land-based excavation. To protect the stream and its banks, aquatic life movement, and prevent sediment and other pollutants from entering the waterway, temporary measures would be designed in accordance with the State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity and other applicable regulatory requirements.

The blow-off chamber reconstruction would require streambank regrading. The Blow-off Chambers are located below ground adjacent to the stream and the larger replacement chambers would be similarly buried so there would be little change to streambank contours. Bridge repairs would be conducted from the top of the bridge crossing, but blow-off chamber reconstruction would require in-stream access and temporary stream diversions, as described in Section 9.19, "Project-wide Impact Analysis," to drill 24-inch holes in the bridge abutment for the new blow-off discharge pipes. Grading activities would not increase impervious surface and would not alter runoff to Tongore Creek.

Anticipated temporary and permanent disturbance to water resources and regulated buffers were quantified based on the limits of construction and proposed work activities (see **Table 9.4-11**). Construction activities and staging would occur on top of the aqueduct and the temporary stream diversion would extend into the stream, resulting in approximately 3,420 square feet of temporary disturbance within Tongore Creek and approximately 7,420 square feet of temporary disturbance within the State Protection Waters Buffer. Upgrades and maintenance at the Blow-off Chambers would require approximately 2,660 square feet of permanent disturbance within the State buffer. Following construction, temporarily disturbed areas would be restored to

natural conditions and planted with native vegetation. Permanent disturbance is further analyzed in Section 9.19, “Project-wide Impact Analysis.”

Table 9.4-11: Estimated Disturbance to Water Resources within the Atwood-Olivebridge Road Natural Resources Study Area

Water Resource	Baseline Conditions (Square Feet)	Temporary Effects (Square Feet)	Permanent Effects (Square Feet)
Tongore Creek	24,440	3,420 <i>Temporary stream diversion, temporary downstream turbidity curtain, construction equipment use and construction staging area</i>	0
Unnamed Tributary to Tongore Creek	220	0	0
50-foot State Protection of Waters Buffer	46,300	7,420 <i>Construction equipment use and construction staging area</i>	2,660 <i>Regrading following blow-off chamber reconstruction</i>

The North and South Siphon Chambers and Blow-off Chambers have been identified as potential discharge points for the treated wash water. Any wash water generated from the siphons would be treated to meet applicable discharge limits, water quality standards and/or other requirements for reuse in the removal operation, for discharge back into the Catskill Aqueduct or to Tongore Creek. No biofilm would be discharged to the surface water prior to treatment. Treated wash water would be discharged at low flows that would not result in scour or other physical changes to the stream.

In the event alum is added as part of the treatment process, flocculated particles would primarily settle prior to treated wash water being discharged to the stream. Given the short-term, temporary nature of the discharges (approximately 2 weeks), discharges to Tongore Creek are not anticipated to cause turbidity, scouring, inundate the receiving stream, or affect stream substrate.

This study area has also been identified as a location for discharging raw aqueduct water while unwatering the aqueduct. Reconstructing the blow-offs would require the siphons to be unwatered. This initial unwatering of the siphons would occur with temporary measures in place to protect the stream from erosion. Unwatering events to surface water could also occur at any time after stream protection measures are in place during and following construction and therefore are described in “Operation” below.

Operation

Once blow-off repairs are complete, the function of the Blow-off Chambers would be restored. Discharges of raw water to the Tongore Creek could occur in the future during DEP’s typical operations. The aqueduct could be unwatered via the Blow-off Chambers to conduct maintenance or inspection. This is expected to occur infrequently.

During unwatering events, new blow-off valves with larger discharge pipes would be operated to moderate discharge flows. This would result in discharges from each chamber of approximately 4,900 gpm at initial valve opening to a maximum flow of approximately 17,500 gpm. It would take approximately 2 hours to unwater each siphon, for a total of 6 hours of discharges.

An analysis was conducted to determine if the discharge associated with an unwatering event is greater than the bankfull stream flow. Bankfull flow is the flow that just fills the channel to the top of its banks (i.e., stream capacity) and at the point in which water begins to flow onto the floodplain. Bankfull flow was predicted for Tongore Creek using the USGS StreamStats Program. If the discharge associated with an unwatering event is greater than the bankfull flow, indirect downstream effects, such as an increase in erosion and scouring over the baseline could occur. The maximum discharge flows to Tongore Creek would be approximately 112,200 gpm when the blow-offs discharge during a 1.5-year storm event. This is less than the calculated bankfull flow of Tongore Creek of approximately 200,200 gpm, making it similar to baseline conditions. The discharge velocity would be relatively low for over-stream configurations, and because the stream is characterized by a rocky terrain, no streambank improvements are proposed at this location. Therefore, indirect downstream impacts such as increases in erosion and scouring would be minimal.

Additionally, flows would be moderated by throttling the valves. They would be monitored by an on-site crew to prevent the receiving stream from becoming inundated by discharges of raw water. In the event that inundation begins to occur during unwatering, the on-site crew would have the ability to cease unwatering at any time to allow streamflows to subside to baseline flows. Discharges would be limited to raw aqueduct unwatering events, which would be infrequent and last several hours in duration, are not anticipated to cause scouring, and would not result in a bankfull event or alter stream capacity of Tongore Creek.

Unwatering flows would also not affect lower Esopus Creek, which receives flows from Tongore Creek (see **Figure 9.4-20**). The aqueduct would continue to be operated in accordance with the Interim Ashokan Release Protocol (or its successor). The short-term duration of aqueduct unwatering to Tongore Creek, which flows to lower Esopus Creek would be substantially less than flows experienced by lower Esopus Creek from the Ashokan Release Channel flows. Unwatering of the steel pipe siphon would occur at the beginning of any shutdown, and is anticipated to be on the order of 25 mgd for approximately 6 hours. As a result, operation of the Catskill Aqueduct would have no anticipated impacts to water resources.

Water Resources Conclusions

Water resources in the natural resources study area consist of Tongore Creek and its unnamed tributary. Repair and rehabilitation activities would not affect the unnamed tributary to Tongore Creek. While the majority of work activities at Tongore Creek would result in temporary disturbance, minor permanent disturbance would occur as part of the blow-off chamber reconstruction. Repairs to the Tongore Bridge would bring the bridge crossing to current DEP standards. Treated biofilm wash water would be discharged over the course of 2 weeks during the third 10-week shutdown. There would be no permanent fill to Tongore Creek. Following construction, the site would be restored to natural conditions. Given that permanent disturbance would entail upgrades to existing infrastructure and be limited to a small portion of the

streambank that would be revegetated there would, therefore, be no long-term impacts to water resources.

Discharges, to conduct maintenance and inspection, would be limited to raw aqueduct unwatering events. These would be infrequent and last several hours in duration. Restoring the historic function of the blow-offs to discharge raw aqueduct water would be a change in baseline conditions. However, based on the above assessment, there would be minimal indirect effects to water resources.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to water resources within the Atwood-Olivebridge Road Study Area.

Terrestrial Resources

The natural resources study area (see **Figure 9.4-28**) consists of a successional old field surrounded by deciduous forest. Tree species include red maple (*Acer rubrum*), slippery elm (*Ulmus rubra*) and herbs and vines include Christmas fern (*Polystichum acrostichoides*), Japanese stiltgrass (*Microstegium vimineum*), fox grape (*Vitis labrusca*), and poison ivy (*Toxicodendron radicans*). While the Town of Olive does not regulate the removal of trees associated with the repair and rehabilitation, terrestrial resources within the study area warrant an analysis.

DEP has consulted with the Town of Olive and Ulster County, and it is DEP's understanding that no new projects or developments that would affect terrestrial resources are anticipated within the Atwood-Olivebridge Road Study Area within the timeframe of the impact analysis. Natural processes, such as changes in habitat due to natural vegetative succession, are anticipated to continue. Therefore, in the future without the repair and rehabilitation, it is assumed that terrestrial resources within the study area would be the same as baseline conditions.

In the future with the repair and rehabilitation, work activities would include minor tree clearing and shrub removal for the purpose of improving site access and staging areas. Within the natural resources study area, ~~2254~~ trees consisting of ~~1016~~ species with a range of average diameter at breast height of between ~~5.83.1~~ and ~~13.531.3~~ inches could be removed to establish staging areas at the North and South Siphon Chambers. ~~The ten~~ 16 species of trees that may be removed include one sweet birch (*Betula lenta*), one black oak (*Quercus velutina*), four eastern hemlock (*Tsuga canadensis*), ~~two~~ six eastern red-cedar (*Juniperus virginiana*), five sugar maple (*Acer saccharum*), three white ash (*Fraxinus americana*), ~~one~~ five white pine (*Pinus strobus*), ~~four~~ six American sycamore (*Platanus occidentalis*), two poplar (*Populus* spp.), ~~and~~ two yellow birch (*Betula alleghaniensis*), one pear (*Pyrus* spp.), eight grey birch (*Betula populifolia*), five red oak (*Quercus rubra*), two American elm (*Ulmus americana*), two American beech (*Fagus grandifolia*), and one unidentified dead maple (*Acer* spp.). Tree removal would occur in discrete locations along the densely forested areas east and west of the aqueduct and would not dramatically change the character of area or affect surrounding trees. Construction, staging areas would be restored to natural conditions. All tree removal would be conducted from November 1 through March 31 to avoid impacts to Indiana bats (*Myotis sodalis*) and northern long-eared bats (*Myotis septentrionalis*). No tree removal would occur at the South Siphon Chamber. Access to

the tunnel interior is possible without altering habitats since these work activities would occur in existing cleared areas.

Vegetated areas temporarily cleared during construction are anticipated to grow back with similar communities. Following the repair and rehabilitation, operation of the Catskill Aqueduct would be consistent with baseline conditions and natural reforestation and vegetative succession of aqueduct areas not routinely maintained would continue to occur over time.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to terrestrial resources within the Atwood-Olivebridge Road Study Area.

Federal/State Threatened and Endangered Species and State Species of Special Concern

This section includes an analysis of potential impacts to federal/State Threatened and Endangered Species and State Species of Special Concern identified in Section 9.3.9, “Natural Resources,” as having the potential to be affected by activities within the Atwood-Olivebridge Road natural resources study area. Species that could be affected within the study area and species that could occur up to 0.25 mile from the work sites were determined in consultation with USFWS, USACE, NYNHP, and NYSDEC, as well as county and local offices, as applicable.

As discussed in Section 9.3.9, “Natural Resources,” six species were identified as having the potential to be affected by the repair and rehabilitation within the natural resources study area. Therefore, conditions in the future without the repair and rehabilitation, an analysis of the potential for impacts to these six species, and a summary of conclusions on the potential effects resulting from the repair and rehabilitation are provided below.

In the future without the repair and rehabilitation, it is assumed that federal/State Threatened and Endangered Species and State Species of Special Concern within the study area would largely be the same as baseline conditions, other than possible changes in habitat due to natural vegetative succession and general anthropogenic influences.

An analysis of the potential for disturbance to federal/State Threatened and Endangered Species and State Species of Special Concern from the repair and rehabilitation within the natural resources study area is shown in **Table 9.4-12**. The analysis included an evaluation of the repair and rehabilitation work activities within the study area and field visits, as applicable.

Table 9.4-12: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern and Habitats within the Atwood-Olivebridge Road Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Amphibians and Reptiles					
Eastern Box Turtle	<i>Terrapene carolina</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visits on September 17, 2014 and July 28, 2015. Potential habitat exists within the adjacent deciduous forest and successional old field areas. While work activities would be largely confined to previously disturbed areas, if any isolated areas of potential habitat exist at the sites, as a highly mobile species, any eastern box turtles that might otherwise use these areas are expected to instead utilize similar, adjacent habitats during construction. Furthermore, perimeter silt fencing would limit disturbance to adjacent habitat and prevent individual turtles from entering the work sites during construction. Finally, upon construction completion, the staging areas would be restored to natural conditions. Therefore, there are no effects anticipated and no further analysis for eastern box turtles is warranted for this study area.	No
Wood Turtle	<i>Glyptemys insculpta</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visits on September 17, 2014 and July 28, 2015. Potential habitat exists within the adjacent deciduous forest and successional old field areas; however, construction would be largely confined to previously disturbed areas. Should any potential habitat exist at the sites, a variety of habitats would be available for the species use in the vicinity during construction. Furthermore, perimeter silt fencing would limit disturbance to adjacent habitat and prevent individual turtles from entering the work sites during construction. The excavation and regrading necessary to replace the blow-off chambers and discharge pipes would not increase the extent of impervious surface and would not alter runoff to the stream. Finally, upon construction completion, the staging areas would be restored to natural conditions. Therefore, there are no effects anticipated and no further analysis for wood turtles is warranted for this study area.	No
Birds					
Bald Eagle	<i>Haliaeetus leucocephalus</i>	BGPA/ MBTA	Threatened	NYNHP identified the nearest nest approximately 1 mile from the work sites, well beyond the USFWS and DEP recommended buffer restriction of 330 and 660 feet, respectively. The study area is located inland, outside of potential flight paths, and non-breeding individuals that may use the study area would not bring prey back to the nest. Therefore, there are no effects anticipated and no further analysis for Bald Eagles is warranted for this study area.	No

Table 9.4-12: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern and Habitats within the Atwood-Olivebridge Road Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Whip-poor-will	<i>Antrostomus vociferus</i>	MBTA	Special Concern	No individuals were incidentally observed during the field visits on September 17, 2014 and July 28, 2015. Construction would take place primarily during daytime hours, thereby avoiding direct disturbance to potential roosting, nesting, and foraging habitat. Should any potential habitat exist at the sites, a variety of habitats would be available for the species use in the vicinity during construction. If there are active ground nests when construction commences, these would be located in forested areas beyond the construction limits such that the trees and local topography would naturally attenuate construction noises and no direct disturbance or mortality is anticipated. Finally, upon construction completion, the staging areas would be restored to natural conditions. Therefore, there are no effects anticipated and no further analysis for Whip-poor-wills is warranted for this study area.	No
Mammals					
Indiana Bat	<i>Myotis sodalis</i>	Endangered	Endangered	No individuals were incidentally observed during the field visits on September 17, 2014 and July 28, 2015. Additionally, no trees with potential bat roosting habitat were identified during the tree survey conducted on July 28, 2015. NYNHP did not identify occurrences in the study area. There may be temporary noise that discourages bats from roosting in the immediate vicinity of the work sites; however, this work would not occur over an extended period of time and there is abundant suitable habitat in the surrounding areas within which bats could roost. Repair activities would not adversely affect bat foraging within the study area. Therefore, there are no effects anticipated and no further analysis for Indiana bats is warranted for this study area.	No

Table 9.4-12: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern and Habitats within the Atwood-Olivebridge Road Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	Threatened	<u>Threatened</u> None	No individuals were incidentally observed during the field visits on September 17, 2014 and July 28, 2015. Additionally, no trees with potential bat roosting habitat were identified during the tree survey conducted on July 28, 2015. NYNHP did not identify occurrences in the study area. There was no access to the chamber building interior to investigate signs of roosting bats at the facility. Should any bats or their guano be observed in these structures indicating roosting during work activities, USFWS and NYSDEC would be contacted immediately to determine the best course of action. Tongore Bridge is shaded and is likely not suitable roosting habitat; however, DEP would inspect the bridge prior to working to verify whether there are any roosting bats. There may be temporary noise that discourages bats from roosting in the immediate vicinity of the work sites; however, this work would not occur over an extended period of time and there is abundant suitable habitat in the surrounding areas within which bats could roost. Repair activities would not be anticipated to adversely affect bat foraging within the study area. Therefore, there are no effects anticipated and no further analysis for northern long-eared bats is warranted for this study area.	No
<p>Notes: BGPA: Bald and Golden Eagle Protection Act MBTA: Migratory Bird Treaty Act</p>					

Federal/State Threatened and Endangered Species and State Species of Special Concern Conclusions

Based on the impact analysis, no take is anticipated. There would be no effects to eastern box turtles (*Terrapene carolina*), wood turtles (*Glyptemys insculpta*), Bald Eagles (*Haliaeetus leucocephalus*), Whip-poor-wills (*Antrastomus vociferus*), Indiana bats, or northern long-eared bats associated with the repair and rehabilitation.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to federal/State Threatened and Endangered Species or State Species of Special Concern within the Atwood-Olivebridge Road Study Area.

9.4.5.6 Hazardous Materials

To evaluate the potential presence of hazardous materials on the Atwood-Olivebridge Road Study Area, a Phase I ESA was conducted in general conformance with the scope and limitations of ASTM Practice E 1527-13 and CEQR requirements to identify RECs. The Phase I ESA included site reconnaissance, research on current/historical use, and review of federal and State regulatory listings for both the site itself and for its neighboring properties within the appropriate search distance defined in the ASTM standard. The findings from the Phase I ESA investigation and results from DEP's legacy files for the work sites, including a geotechnical investigation and environmental health and safety sampling, were collectively reviewed to assess the potential presence of and potential for disturbance to hazardous materials in the study area.

Based on the Phase I ESA investigations, there was no indication of an existing environmental impact that would constitute a REC as defined by the ASTM standard that would affect activities in the study area.

Geotechnical environmental investigations and sampling were also undertaken for contaminants of concern including asbestos, lead, volatile and semivolatile organics, PCBs, and total petroleum hydrocarbons along the aqueduct within the study area. Chromium was noted in the soil sampling results. Total chromium was reported in the sample collected at the North Siphon Chamber. Chromium concentrations, however, were consistent over a widespread sampling area and are more likely associated with background concentrations. Along the Catskill Aqueduct, there are widespread occurrences of chromium, which are attributed to the existing geological formations. The legacy data also revealed that lead-containing paints are present on the brick wall and metal door of the Tongore Steel Pipe North and South Siphon Chamber buildings. Materials sampled did not identify asbestos-containing materials, PCB-containing paint, lead-containing paint or mercury-containing paint. In addition, gasoline range organic compounds and total petroleum hydrocarbons were also detected, but at low concentrations that would not warrant remedial actions.

Based on the results of the environmental investigations completed within the Atwood-Olivebridge Road Study Area, no other hazardous materials are known to exist. The soil results support the reuse of excavated materials associated with the boathole installation and blow-off chamber reconstruction as backfill and do not suggest the need for special management, handling or health and safety measures at this time.

DEP has consulted with the Town of Olive and Ulster County, and it is DEP's understanding that no developments or structures that would introduce hazardous materials to the environment are anticipated within the Atwood-Olivebridge Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that the presence of hazardous materials within the Atwood-Olivebridge Road Study Area would be the same as baseline conditions.

In the future with the repair and rehabilitation, work activities would require the potential storage and use of a variety of petroleum and other chemical products, such as diesel fuel for back-up power, lubricating oil for construction vehicles, and miscellaneous cleaning and maintenance chemicals. DEP would handle all materials in accordance with applicable federal, State, and local regulations and guidelines. The use and storage of all of these would be in accordance with applicable regulatory requirements and guidelines including those relating to: federal Spill Prevention, Control, and Countermeasures requirements; and State petroleum bulk storage, chemical bulk storage and spill reporting requirements. Furthermore, excavation associated with the work activities for the installation of a new boathole and blow-off chamber reconstruction would occur on previously disturbed soils. Following construction, all equipment and chemical storage would be removed from the construction staging areas, and the staging areas would be restored and operation of the Catskill Aqueduct would be consistent with baseline conditions.

Therefore, the repair and rehabilitation would not result in significant adverse impacts from the presence or disturbance of hazardous materials within the Atwood-Olivebridge Road Study Area.

9.4.5.7 Transportation

The study area for the transportation analysis consists of the major convergent roadways that would potentially be used by the employee and construction vehicles associated with repair and rehabilitation work activities en route to and from the Atwood-Olivebridge Road Study Area (see **Figure 9.4-21**).

Access to the repair and rehabilitation limits of construction for the work sites within the Atwood-Olivebridge Road Study Area would be via Atwood-Olivebridge Road (State Route 213) to a DEP access road and driving over the cut-and-cover tunnel for the North Siphon Chamber. The Tongore Bridge and Blow-off Chambers, and the South Siphon Chamber would be accessed via Down the Lane Road to a DEP access road. Atwood-Olivebridge Road is a two-lane, two-way rural major collector roadway. To the extent available, construction vehicles would travel on truck-permitted roadways directly to and from the Atwood-Olivebridge Road Study Area. There is no public transportation and little to no pedestrian activity in the immediate vicinity of the study area. There are no DEP employees who work at or visit the study area on a daily basis. The small number of DEP employee vehicles traveling in the area has little to no effect on traffic conditions within the study area.

DEP has consulted with the Town of Olive and Ulster County, and it is DEP's understanding that no changes in land use or an increase in traffic due to outside developments are anticipated within the Atwood-Olivebridge Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that traffic, public

transportation, and pedestrian activities within the study area would be similar to baseline conditions.

Repair and rehabilitation work activities within the Atwood-Olivebridge Road Study Area were evaluated to determine which would have the potential to generate the most vehicle trips and therefore be the basis of this transportation analysis. Of these activities, access road improvements would generate the most vehicle trips. Access road improvements would occur in summer of ~~2019~~2018 between the hours of 7 AM and 5 PM, Monday through Friday for approximately 4 weeks.

In the future with the repair and rehabilitation, construction vehicles would travel along Atwood-Olivebridge Road to a DEP access road, or to Down the Lane Road to reach a different DEP access road. The estimated number of peak-day one-way vehicle trips associated with access improvements is 27 vehicles, or approximately 54 peak-day vehicle round trips that would travel to and from the study area. Approximately 16 vehicle round trips or 16 PCEs, would be workers traveling directly to and from the staging area, with an additional 4 daily shuttle trips between the study area and the staging area. The remaining approximately 34 peak-day vehicle round trips (73 PCEs) would be trucks or other construction vehicles.

During a peak day, the estimated number of peak-hour vehicle trip ends associated with access improvements is approximately 27 peak-hour vehicle trip ends (48 PCEs). This includes approximately 8 vehicle trip ends (8 PCEs) from workers traveling directly to and from the staging area, approximately 2 peak-hour shuttle trips between the study area and the staging area, and approximately 17 vehicle trip ends (38 PCEs) from trucks or other construction vehicles. For the purpose of this analysis, the peak-hour project-generated vehicles are anticipated to coincide with typical construction hours for employee vehicles entering the site. Assuming one 10-hour shift, this would be from 6 AM to 7 AM, and would be unlikely to coincide with the peak hour for existing traffic.

The repair and rehabilitation would result in approximately 48 peak-hour PCEs along Atwood-Olivebridge Road which is below the *CEQR Technical Manual* screening threshold of 50 peak-hour PCEs as described in Section 9.3.13, "Transportation." The work activities at the Atwood-Olivebridge Road Study Area would be short-term (totaling 24 weeks over 1.5 years ; see **Table 9.4-9**) and would not generate public parking or transportation demands or pedestrian activity within the Atwood-Olivebridge Road Study Area. Following completion of the repair and rehabilitation, traffic patterns would return to baseline conditions.

Therefore, although there would be a minor temporary increase in traffic, the repair and rehabilitation would not result in significant adverse impacts to transportation within the Atwood-Olivebridge Road Study Area.

9.4.5.8 Neighborhood Character

The character of the Atwood-Olivebridge Road Study Area is largely defined by a mix of residential, commercial, open space, vacant land, and public service land uses and its physical setting within a rural location (see **Figure 9.4-23**). The Catskill Aqueduct traverses the upper portion of the study area in a general northwest to southeast direction. In its lower portion, the

study area includes State Route 213, known as Atwood-Olivebridge Road to the west of Down the Lane Road (a privately owned drive) and Atwood Road to the east. Tongore Creek traverses the study area from southwest to northeast, and an unnamed tributary to Tongore Creek enters the study area from the northwest. The limits of construction for the work sites are located within a public services corridor which is owned and maintained by DEP and separated from adjacent properties by a forested area.

DEP has consulted with the Town of Olive and Ulster County, and it is DEP's understanding that no changes in land use and no new projects or structures are anticipated within the Atwood-Olivebridge Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that neighborhood character within the study area would be similar to baseline conditions.

As described in Section 9.3.16, "Neighborhood Character," there would be no potential for the repair and rehabilitation to affect shadows and urban design. In addition, based on the screening assessment for land use and zoning; socioeconomic conditions; and historic and cultural resources, an impact analysis for the Atwood-Olivebridge Road Study Area was not warranted, as discussed in the following sections: Section 9.3.3, "Land Use, Zoning, and Public Policy," Section 9.3.4, "Socioeconomic Conditions," and Section 9.3.7, "Historic and Cultural Resources," respectively. As described in Section 9.4.5.3, "Open Space and Recreation," and Section 9.4.5.4, "Visual Resources," the work activities would not affect open space and recreation and visual resources in the Atwood-Olivebridge Road Study Area. Furthermore, the public policy impact analysis provided in Section 9.4.2, "Town of Olive Impact Analysis," concluded that work activities were consistent with applicable plans.

As described in Section 9.3.15, "Noise," noise associated with the repair and rehabilitation within the Atwood-Olivebridge Road Study Area does not warrant analysis. As described in Section 9.4.5.7, "Transportation," the work activities in the Atwood-Olivebridge Road Study Area would be short-term (intermittently over 1.5 years) and would result in a temporary increase in traffic. Following completion of the repair and rehabilitation, the construction equipment and vehicles would be removed from the study area and traffic patterns would return to baseline conditions. These temporary increases in traffic would not result in a density of activity or service conditions that would affect the overall character of the study area.

The repair and rehabilitation would not generate significant adverse effects in land use, zoning, and public policy; socioeconomic conditions; open space and recreation; shadows; historic and cultural resources; urban design and visual resources; transportation; or noise.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to neighborhood character within the Atwood-Olivebridge Road Study Area.

9.5 TOWN OF MARBLETOWN

9.5.1 TOWN OF MARBLETOWN PROJECT DESCRIPTION

The Town of Marbletown is located in Ulster County, New York on the western side of the Hudson River. It is bounded by the Towns of Hurley to the northeast, Rosendale to the east, New Paltz to the southeast, Rochester to the southwest, and Olive to the northwest. The Town of Marbletown is approximately 55 square miles. General boundaries of locations where activities associated with the repair and rehabilitation would occur within this town are shown on **Figure 9.5-1**. The areas where the project work would take place include public utilities, vacant, open space, residential, commercial, and agricultural land uses.

Within the Town of Marbletown, the Catskill Aqueduct stretches for approximately 12 miles in a southeasterly direction. Notable sites along the aqueduct within the Town of Marbletown that are associated with repair and rehabilitation work activities include the Rondout Pressure Tunnel Downtake Chamber, Rondout Pressure Tunnel Drainage Chamber, and Rondout Pressure Tunnel Uptake Chamber. The repair and rehabilitation work activities within the Town of Marbletown would occur within six study areas as shown in **Table 9.5-1**.

Table 9.5-1: Schedule of Work Activities within the Town of Marbletown

Work Activity	Study Area					
	Vly Atwood Road	Pine Bush Road	Lucas Turnpike	Canal Road	Mossybrook Road	Lower Knolls
Staging and Access Improvements	✓	✓	✓	-	✓	✓
Dechlorination Installation	✓	-	✓	✓	✓	-
Dechlorination Demobilization/ Site Restoration	✓	-	✓	✓	✓	-
Internal Leak Repair	✓	-	-	✓	-	-
Biofilm Removal and Condition Assessment	✓	✓	-	-	-	✓
Boathole Preparation	-	✓	-	-	-	-
Boathole Installation	-	✓	-	-	-	-
Air Vent Installation	-	✓	-	-	-	✓
Sluice Gate Removal	-	✓	-	-	-	-
Large-scale Wash Water Treatment	-	✓	-	-	-	-
Notes:						
- = Work activity not proposed.						
✓ = Work activity proposed.						

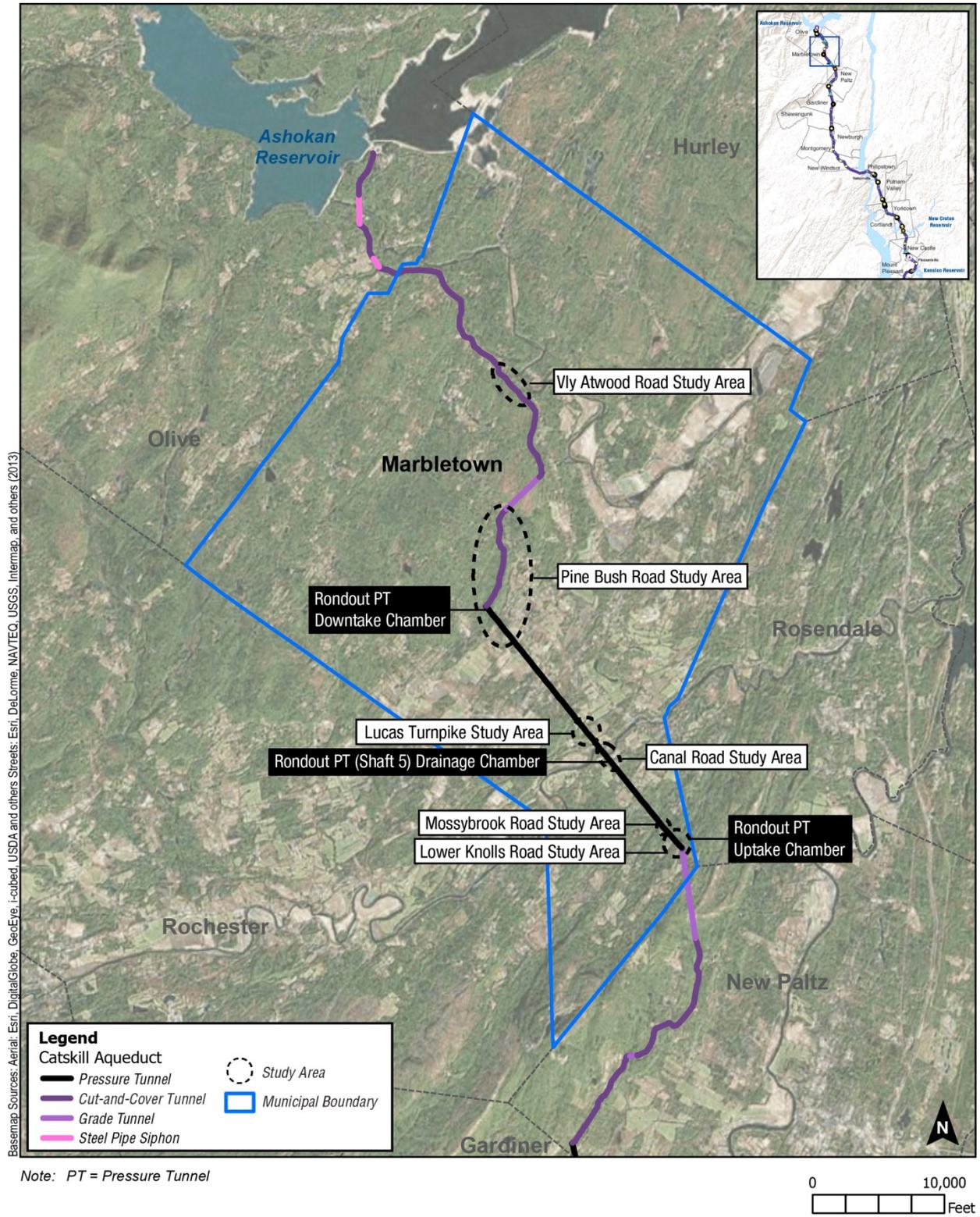


Figure 9.5-1: Town of Marbletown Study Areas



These six study areas in the Town of Marbletown encompass the work activities that warrant analysis. Additional work activities in the town do not warrant further analysis. Work sites located outside the study area include activities that would primarily be conducted within the aqueduct interior (see Section 9.3, “Screening Assessment and Impact Analysis Methodology”). In the Town of Marbletown, they include biofilm removal and condition assessment at access manholes not located in these study areas and permanently sealing three culvert drain sluice gates. See Section 9.2, “Project Description,” for an overall project description of the repair and rehabilitation. Section 9.5.2, “Town of Marbletown Impact Analysis” provides a discussion of local regulations in the Town of Marbletown jurisdictional limits. The following sections provide a description of the study area, proposed activities, and impact analysis for the six study areas:

- Section 9.5.3 – Vly Atwood Road Study Area Impact Analysis
- Section 9.5.4 – Pine Bush Road Study Area Impact Analysis
- Section 9.5.5 – Lucas Turnpike Study Area Impact Analysis
- Section 9.5.6 – Canal Road Study Area Impact Analysis
- Section 9.5.7 – Mossybrook Road Study Area Impact Analysis
- Section 9.5.8 – Lower Knolls Study Area Impact Analysis

9.5.2 TOWN OF MARBLETOWN IMPACT ANALYSIS

9.5.2.1 Public Policy

Since local public policies would not vary for study areas within the same town, public policies are evaluated on a town-wide basis. As discussed in Section 9.3.3.3, “Town Codes,” the repair and rehabilitation’s consistency with the applicable policies and regulations in the Town of Marbletown was reviewed. As discussed in Section 9.3.3, “Land Use, Zoning, and Public Policy,” the repair and rehabilitation’s consistency with the applicable policies of the Ulster County Open Space Plan (2007) within the Vly Atwood Road, Pine Bush Road, Lucas Turnpike, Canal Road, Mossybrook Road, and Lower Knolls Road study areas was analyzed below.

Ulster County Open Space Plan (2007)

The Ulster County Open Space Plan (Ulster County 2007) established a framework for the management and protection of open space resources identified by Ulster County, including: protected open space, water resources, working landscapes, landforms and natural features, ecological communities, cultural and historic resources, and recreational resources. To provide guidance on these open space resources, Ulster County established the 10 “Principles of the Open Space Plan” that seek to safeguard the open space values of Ulster County. Of those 10 principles, the potential effects of the repair and rehabilitation within Vly Atwood Road, Pine Bush Road, Lucas Turnpike, Canal Road, Mossybrook Road, and Lower Knolls Road study areas are evaluated relative to compatibility with the two applicable principles below:

- (1) *Preserve and protect open space, unique natural areas and heritage areas and sites, wetlands, water and woodland resources, scenic views, areas of natural beauty and the rural character of Ulster County.*

No open space resources, unique natural areas and heritage areas and sites, woodland resources, scenic views, or areas of natural beauty and rural character are located within the Vly Atwood Road, Pine Bush Road, and Lower Knolls Road study areas. Leaks within the Vly Atwood Road, Lucas Turnpike, Canal Road, and Mossybrook Road study areas contribute to naturally occurring streams or wetlands in the study areas. A portion of the Marbletown Ontario and Western (O&W) Rail Trail passes through the southern portion of the Lucas Turnpike Study Area. The primary use of the rail trail is for outdoor recreation such as horseback riding, biking, and jogging.

Under this principle, the Open Space Plan recommends protecting valuable landforms and natural features in order to benefit residents and preserve the rural character of Ulster County. This principle was analyzed for repair and rehabilitation as work in the study areas would potentially impact existing open space, visual resources and natural resources, directly or indirectly, depending on the study area.

As part of the repair and rehabilitation, leak repair would be conducted where feasible. This would restore receiving waterbodies to pre-leak conditions. If repair is not feasible, temporary dechlorination systems would be installed prior to chlorinating the Catskill Aqueduct. All discharges from local dechlorination systems would meet regulatory requirements. The following streams receive flows from the Catskill Aqueduct leaks in the Town of Marbletown: Hendricks Killitje, lower Esopus Creek, unnamed tributary 2 to Rondout Creek, and Rondout Creek. Additionally, wetlands at Lucas Turnpike and Mossybrook Road study areas are influenced by leak flows.

Access to the study areas vary and is discussed in greater detail within each respective impact analysis. Generally, site access would be provided by driving over the cut-and-cover aqueduct berm or via existing access roads. In some study areas, new access roads would be constructed by clearing trees and placing gravel for leveling and erosion control. Within the Lucas Turnpike Study Area, due to the proximity to the Marbletown O&W Rail Trail and a private residence, access to the southern portion of the study area would be provided via a private driveway. From this private driveway, a new access road would be built that parallels the rail trail to its north side before turning north to the leak sites.

Repair and rehabilitation activities would not disrupt the use of the Marbletown O&W Rail Trail. Vehicles using the private driveway during construction would intermittently cross the rail trail during construction. Operation of the local dechlorination systems would require less frequent vehicle use along the access road than during construction. This open space would remain accessible throughout construction and temporary dechlorination. When temporary chlorination is no longer required in 2023, the local dechlorination systems would be removed, and any areas temporarily disturbed would be restored to baseline conditions. No impacts to the Marbletown and Canal Road study areas are located adjacent to protected open space. O&W Rail Trail would occur during repair and rehabilitation within the Lucas Turnpike Study Area. The potential for impacts to these resources associated with the repair and rehabilitation is analyzed in detail in the

following sections: Vly Atwood Road Study Area (Section 9.5.3.7, “Natural Resources”); Lucas Turnpike Study Area (Section 9.5.5.7, “Open Space and Recreation,” Section 9.5.5.9, “Natural Resources”); Canal Road Study Area (Section 9.5.6.4, “Open Space and Recreation,” Section 9.5.6.6, “Natural Resources”); and Mossybrook Road Study Area (Section 9.5.7.6, “Natural Resources”). As such, the repair and rehabilitation within these study areas would not affect open space resources or the rural character of Ulster County and would be consistent with this principle.

- (2) *Protect and enhance the county’s most valuable open space landforms and natural features with coordinated planning and safeguard policies.*

Open space landforms and natural features are not present within the Vly Atwood Road, Pine Bush Road, Mossybrook Road, and Lower Knolls Road study areas. The Lucas Turnpike and Canal Road study areas are located adjacent to protected open space.

Under this principle, the Open Space Plan recommends preserving the visual or ecological values of significant landforms and natural features in order to protect against inappropriate development. This principle was analyzed for repair and rehabilitation as work in the study areas would potentially impact existing open space, visual resources, historic resources and natural resources, directly or indirectly, depending on the study area.

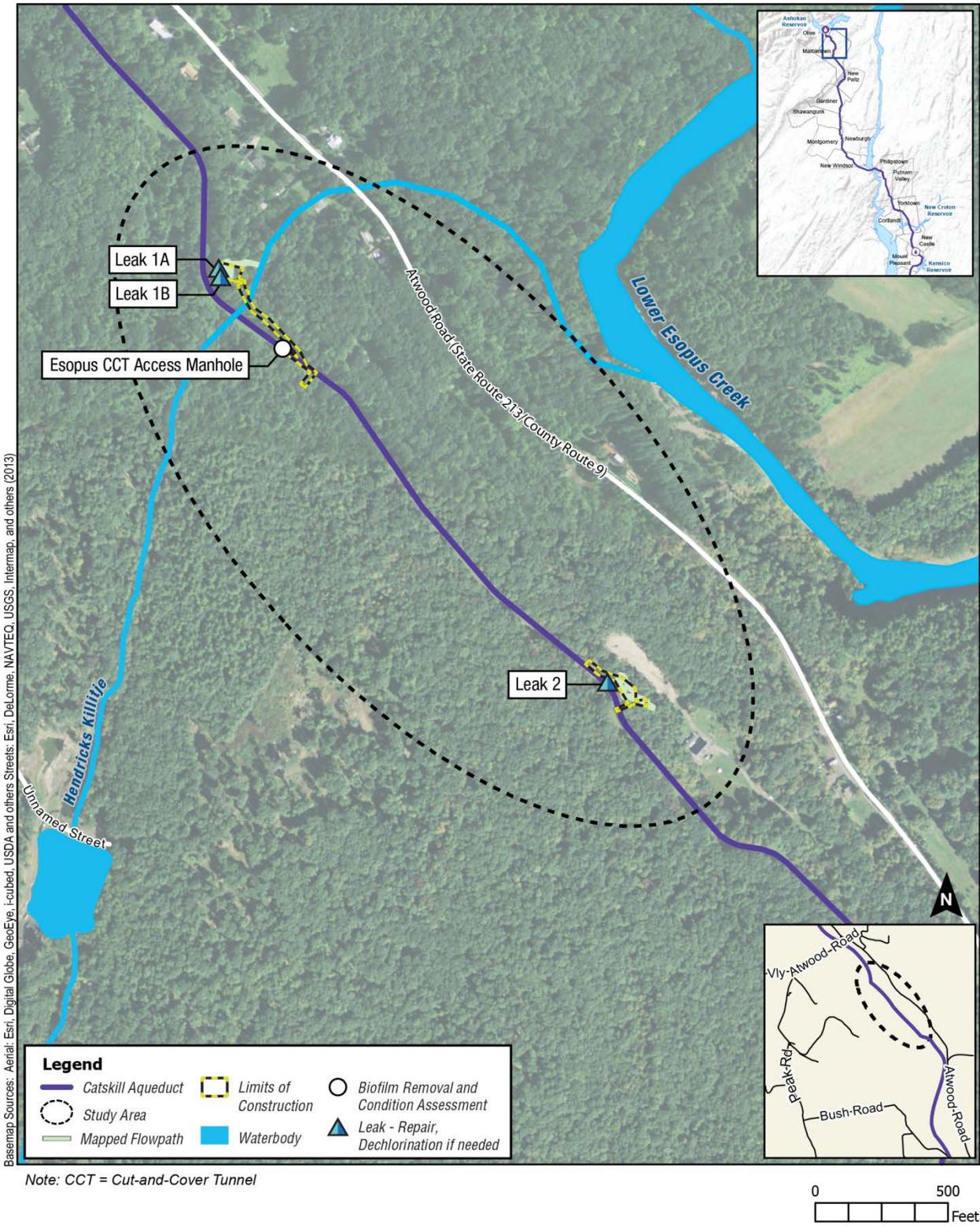
As described above and analyzed in detail in Section 9.5.5.7, “Open Space and Recreation,” the Marletown O&W Rail Trail in the Lucas Turnpike Study Area would not be adversely affected by work activities. As analyzed in detail in Section 9.5.6.4, “Open Space and Recreation,” the Rondout Creek in the Canal Road Study Area would not be adversely affected by work activities. Upon completion of the repair and rehabilitation, the recreational uses of the rail trail and Rondout Creek would return to baseline conditions and be unaffected. As such, the repair and rehabilitation within the Lucas Turnpike and Canal Road study areas would not affect open space landforms and natural features within Ulster County and would be consistent with the principle.

Repair and rehabilitation would therefore be consistent with the Ulster County Open Space Plan and would not result in significant adverse impacts to public policy within the Vly Atwood Road, Pine Bush Road, Lucas Turnpike, Canal Road, Mossybrook Road, and Lower Knolls Road study areas.

9.5.3 VLY ATWOOD ROAD STUDY AREA IMPACT ANALYSIS

Within the Vly Atwood Road Study Area, the aqueduct consists of the Esopus Cut-and-Cover Tunnel. Three toe-of-slope leaks (referred to as Leaks 1A and 1B, and Leak 2) have been identified within this segment. The leak water flows down-gradient from the base of the cut-and-cover berm before seeping into the surroundings. An access manhole is also located along this section (see **Figure 9.5-2**).

Work activities within the Vly Atwood Road Study Area would include: staging and access improvements; internal leak repair; biofilm removal and condition assessment; and, if necessary, the installation and operation of local dechlorination systems, which would also require staging and access improvements and site restoration following completion of aqueduct chlorination.



Basemap Sources: Aerial: Esri, Digital Globe, GeoEye, i-cubed, USDA and others Streets: Esri, DeLorme, NAVTEQ, USGS, Intermap, and others (2013)

Figure 9.5-2: Study Area – Vly Atwood Road



9.5.3.1 Study Area Location and Description

The Vly Atwood Road Study Area is located along the upper Catskill Aqueduct within the Town of Marbletown. The Catskill Aqueduct traverses the study area in a general northwest to southeast direction. Atwood Road (also known as State Route 213 and County Route 4) crosses the eastern portion of the study area paralleling the aqueduct. Hendricks Killitje, a tributary to lower Esopus Creek to the east of the study area, crosses the study area in a south to north direction in the vicinity of Leaks 1A and 1B.

Proposed work sites within the study area include the access manhole and, if necessary, dechlorination at Leaks 1A and 1B and at Leak 2. The access manhole, Leaks 1A, and 1B would be accessed via Vly Atwood Road and driving over the cut-and-cover tunnel and then by driving down an existing earthen access road located along the eastern side of the cut-and-cover berm. Leak 2 would be also be accessed via Vly Atwood Road and by driving over the cut-and-cover tunnel, and then down the sideslope of the cut-and-cover berm. Some construction vehicles may depart the work sites by driving south over the cut-and-cover tunnel and exiting outside the study area via Bush Road. The study area boundary is located approximately 400 feet beyond the outermost areas of disturbance related to the work sites. **Figure 9.5-2** shows an aerial photograph of the study area, including the path of the aqueduct and the limits of construction. There are no federal, State, or local designated historic districts, landmarks, or known archeological resources within the study area.

9.5.3.2 Description of Leaks 1A and 1B

Leaks 1A and 1B are toe-of-slope leaks that are the result of seepage at two locations along the eastern side of the rock sidewall at the base of the cut-and-cover berm. **Figure 9.5-3** shows photographs of these leaks and their surroundings. Both leaks express at the surface on a wooded, DEP-owned parcel.

As shown on **Figure 9.5-4**, Leak 1A is located approximately 1,800 feet south of Vly Atwood Road and approximately 750 feet west of Atwood Road, along the eastern side of the Catskill Aqueduct. The Leak 1A flowpath, 1A-FP, was observed emanating from the toe-of-slope of the aqueduct berm through a well-defined channel for approximately 40 feet, where it converges with flowpath 1B-FP. From this confluence, the combined leak flowpath, referred to as 1A-FP, travels onto private property approximately 45 feet before entering Hendricks Killitje.

Leak 1B is located approximately 30 feet south of Leak 1A, as depicted on **Figure 9.5-4**. The Leak 1B flowpath, 1B-FP, flows east approximately 15 feet within an undefined channel, then flows northward beneath a rock wall for approximately 40 feet before converging with the flow from 1A-FP and entering Hendricks Killitje.

After the leak flows merge with the Hendricks Killitje (see Photograph 2 on **Figure 9.5-3**), the watercourse flows eastward beyond the study area beneath a culvert under Atwood Road to lower Esopus Creek. The maximum observed flow of the combined leaks is approximately 12.7 gpm (or approximately 18,000 gpd).



Photograph 1: Leaks 1A and 1B merge near the rock boundary wall (red circle) and flow into Hendricks Killitje, a tributary of the lower Esopus Creek, visible in the background. Photograph facing east.



Photograph 2: Hendricks Killitje flowing through the culvert under the Catskill Aqueduct. Approximate location of the temporary stream crossing, upstream of the confluence with Leaks 1A and 1B.

Figure 9.5-3: Photographs – Leaks 1A and 1B - Vly Atwood Road Study Area



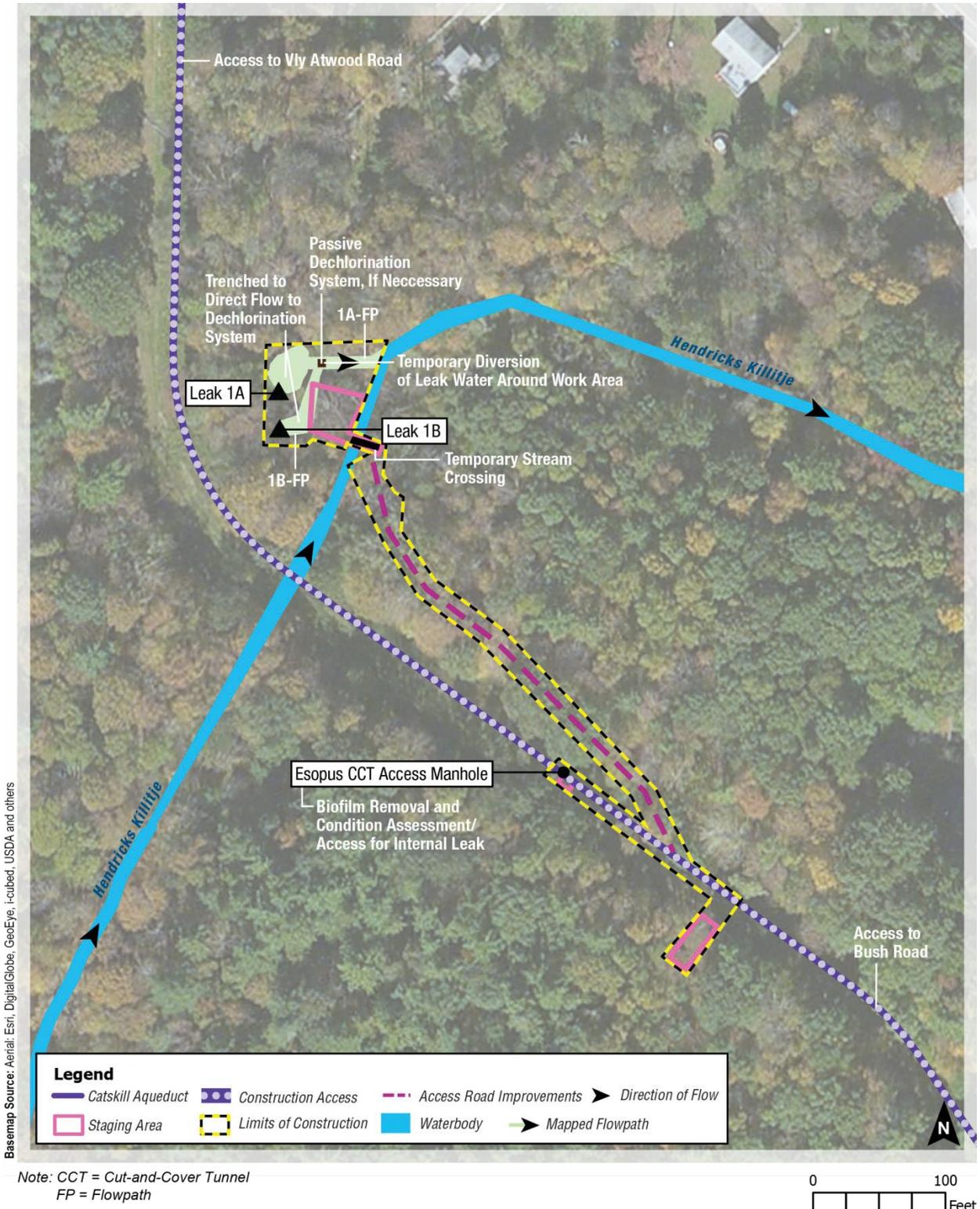


Figure 9.5-4: Site Plan for Leaks 1A and 1B - Vly Atwood Road Study Area



9.5.3.3 Description of Leak 2

Leak 2 is also a toe-of-slope leak along the eastern side of the Esopus Cut-and-Cover tunnel. It is approximately 2,200 feet southeast of Leaks 1A and 1B within a wooded DEP-owned parcel.

Figure 9.5-5 shows a photograph of the leak area and surrounding features.

The leak emanates from approximately four locations at the base of the cut-and-cover berm and forms a shallow pool of water. This pool of water is impounded by a wooden weir installed by DEP. The collected water flows over the weir and under a rock wall at the DEP property line (see **Figure 9.5-6**). The leak is assumed to flow southeast to Atwood Road before turning northeast and converging with lower Esopus Creek. The maximum observed flow of Leak 2 is approximately 2.8 gpm (or approximately 4,000 gpd).

9.5.3.4 Proposed Activities within the Vly Atwood Road Study Area

To support activities within the Vly Atwood Road Study Area, the Ashokan Screen Chamber (within the Ashokan Screen Chamber Study Area in the Town of Olive) would serve as a primary staging area from which workers would be transported to the site daily. Several secondary staging areas would provide additional parking. Equipment and materials would be staged on site. Erosion and sediment control measures such as silt fencing and hay bales would be installed at the perimeter of the work sites as needed. Site plans showing layouts of the limits of construction for the work sites, which would occupy a total of approximately 0.7 acre, are shown on **Figure 9.5-4** and **Figure 9.5-6**. The schedule for work within the study area is shown in **Table 9.5-2**. The duration of active construction within the Vly Atwood Road Study Area is estimated to total 16 weeks over 2.5 years, in addition to 2 weeks to demobilize and restore the site following temporary chlorination.

Work in the study area would begin with internal leak repair during the first 10-week shutdown in fall ~~2018~~2017. Although the aqueduct would be unwatered during this shutdown, any residual water would be diverted through an internal bypass pipe around the work segments within the aqueduct for discharge to the aqueduct downstream. For the repair work for Leaks 1A and 1B, which are caused by a limited number of small defects that can be repaired individually, grout would be applied following a small amount of localized biofilm removal and inspection of the tunnel wall for additional cracks. For Leak 2, which is caused by multiple defects spread over an approximately 100-foot length of tunnel, a more economical carbon fiber liner would be applied.

Once repaired, the leak contribution to the flowpaths is expected to permanently cease. The flowpaths would become dry (except for contributions from runoff and groundwater). The flowpaths for Leaks 1A and 1B would be filled to match pre-leak conditions in summer ~~2019~~2018 (approximately 42 cubic yards). Access to the leaks would require the removal of up to nine trees, along with the placement of a temporary stream crossing over Hendricks Killitje. Some tree trimming may also be required, in addition to minor grading, underbrush clearing, and gravel placement for leveling and erosion control.



Photograph 3: Ponded area at Leak 2 flowing towards the weir. Photograph taken facing north.

Figure 9.5-5: Photograph – Leak 2 – Vly Atwood Road Study Area



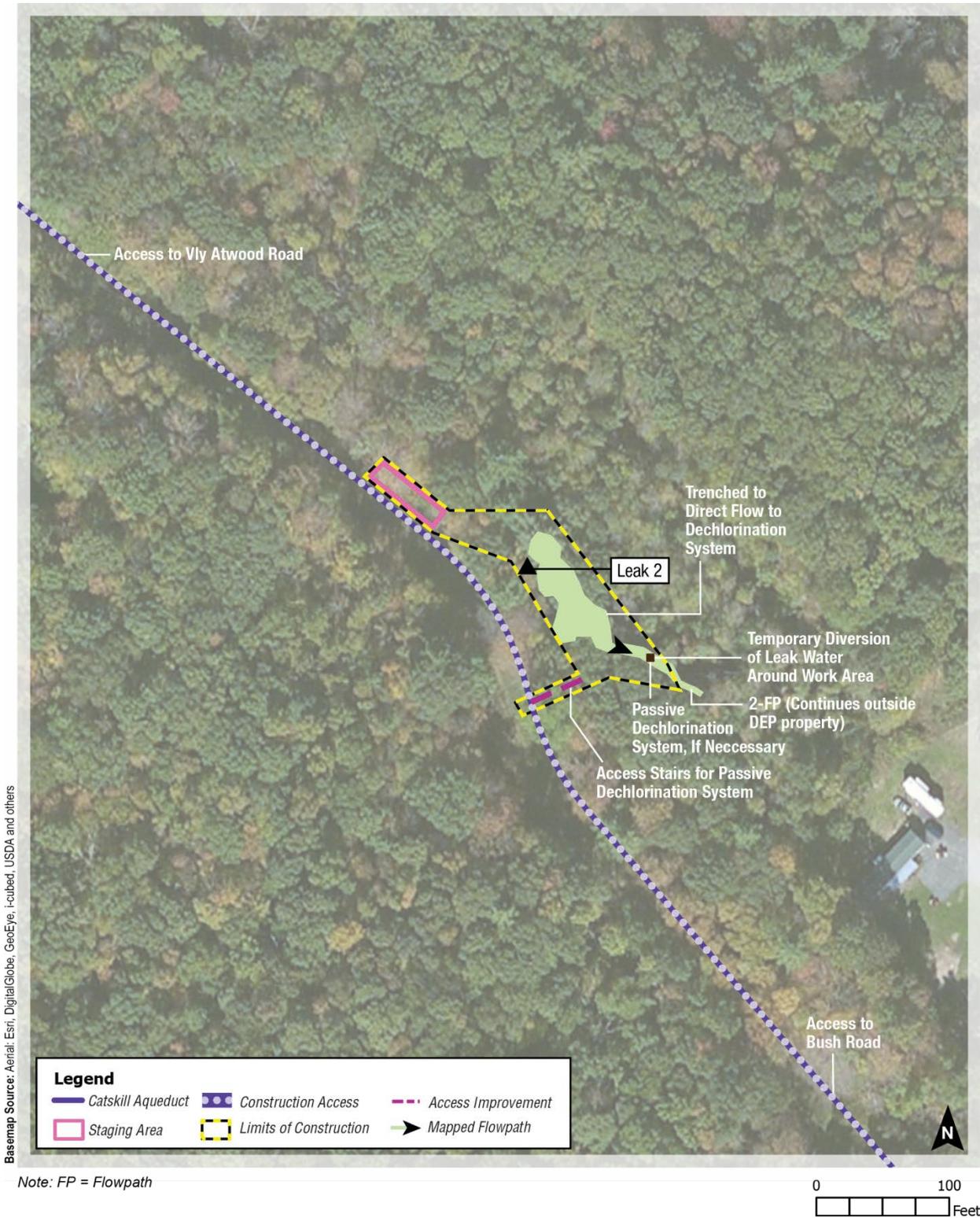


Figure 9.5-6: Site Plan for Leak 2 – Vly Atwood Road Study Area



Table 9.5-2: Schedule of Work Activities within the Vly Atwood Road Study Area

Work Activity	Dates	Duration	Work Hours	Crew Size ¹
Internal Leak Repair	Fall 2018 2017 (First 10-week shutdown)	5 weeks	7 days a week, 24 hours per day	20
Staging and Access Improvements (if necessary) ²	Summer 2019 2018	2 weeks	Monday to Friday, 7 AM to 5 PM	8
Dechlorination Installation (if necessary)	Summer 2019 2018	4 weeks	Monday to Friday, 7 AM to 5 PM	16
Biofilm Removal and Condition Assessment	Fall 2020 2019 (Third 10-week shutdown)	5 weeks	7 days a week, 7 AM to 7 PM	21
Dechlorination Demobilization/Site Restoration (if necessary) ³	2023	2 weeks	Monday to Friday, 7 AM to 5 PM	8
Notes:				
¹ Crew size refers to the number of people anticipated at the work site(s).				
² Tree removal would be conducted from November 1 through March 31 to avoid impacts to Indiana bats (<i>Myotis sodalis</i>) and northern long-eared bats (<i>Myotis septentrionalis</i>).				
³ Dechlorination demobilization and site restoration is not included in estimated duration of active construction.				

If leak repair is unsuccessful, two local temporary passive dechlorination systems would be installed in the study area, one at the confluence of 1A-FP and 1B-FP and the other in 2-FP. Temporary in-stream disturbance would cover a total area of approximately 50 square feet of the Hendricks Killitje, and there would be no permanent in-stream disturbance. Specifically, these would be temporary passive dechlorination systems installed east of the aqueduct where the leaks daylight, requiring temporary diversion of the leak water around the work area. At Leaks 1A and 1B, an activated carbon trench with a footprint of approximately 36 square feet would be installed downstream of their confluence.

For the passive dechlorination system at Leak 2, access improvements would involve the removal of up to 46 trees, grading and clearing to create a level staging area along the relatively steep cut-and-cover berm, and the construction of permanent stairs from the top of the berm to the leak site. To establish the passive dechlorination system at Leak 2, a channel would be dug within the ponded area to route flows to a trench with a footprint of approximately 17 square feet. The excavation of a total of approximately 10 cubic yards of soil would be required for channelization and trench installation. Both systems would be sized to treat the leak flows that would occur when the aqueduct is operated at its maximum capacity, and anticipated flow during temporary chlorination. Upon completion of installation, equipment and materials would be removed. The staging areas, access road, and access path would remain in place for future maintenance.

Biofilm removal and condition assessment would occur during the third 10-week shutdown in fall ~~2020~~2019. Access into the aqueduct would be via the access manhole. It would also serve as a collection point for biofilm, which would be transported for disposal at a registered, permitted, or otherwise authorized facility. Although the aqueduct would be unwatered during this shutdown, any residual water would be diverted through an internal bypass pipe around the work segments within the aqueduct for discharge to the aqueduct downstream. Any residual water that does not meet water quality standards, and any wash water generated from biofilm removal, would then be transported to a temporary treatment system, where it would be treated to meet water quality standards for discharge back into the aqueduct or to a nearby waterbody (see Section 9.2, “Project Description”).

As described in Section 9.2, “Project Description,” the local dechlorination systems would be in operation when chlorination of the aqueduct begins in ~~2020~~2019. While in operation, the system would be inspected and maintained on a regular basis, including monitoring chlorine residuals, as required. When chlorination of the aqueduct is no longer required in 2023, the passive dechlorination system and temporary stream crossing would be removed from the study area, and any areas temporarily disturbed would be restored to baseline conditions.

Impact categories analyzed for the Vly Atwood Road Study Area are presented in Sections 9.5.3.5, “Land Use and Zoning” through 9.5.3.11, “Neighborhood Character,” and include: land use and zoning; socioeconomic conditions; natural resources, including water resources, terrestrial resources, and federal/State Threatened and Endangered Species and State Species of Special Concern; hazardous materials; transportation; stationary noise; and neighborhood character. Additionally, the study area’s compatibility with applicable public policies was analyzed on a town-wide basis in Section 9.5.2, “Town of Marbletown Impact Analysis.” As described in Section 9.3, “Screening Assessment and Impact Analysis Methodology,” an impact analysis related to community facilities and services; open space and recreation; historic and cultural resources; visual resources; the remaining natural resources subcategories, including geology and soils, aquatic and benthic resources, wildlife, and federal/State Candidate species, unlisted rare and vulnerable species; energy; air quality; and mobile noise within the study area is not warranted. Finally, impacts related to project-wide natural resources, water and sewer infrastructure, and public health were analyzed within Section 9.19, “Project-wide Impact Analysis.”

9.5.3.5 Land Use and Zoning

The study area consists of public services, vacant land, and residential land uses. Land cover within the study area is generally wooded and rural in nature. The access manhole and Leak 2 are located in a public services corridor which is owned and maintained by DEP. Access to Leaks 1A and 1B are primarily located in the same public service corridor but the leaks flow onto private property, and require permission from the owner to access. **Figure 9.5-7** shows a map of the land uses in the study area and its surroundings.

Zoning in the Vly Atwood Road Study Area is within a residential (A-3) zoning district, as designated by the Town of Marbletown Zoning Code (see **Figure 9.5-8**). The Catskill Aqueduct is a permitted use as a water supply utility within the residential (A-3) zoning district.

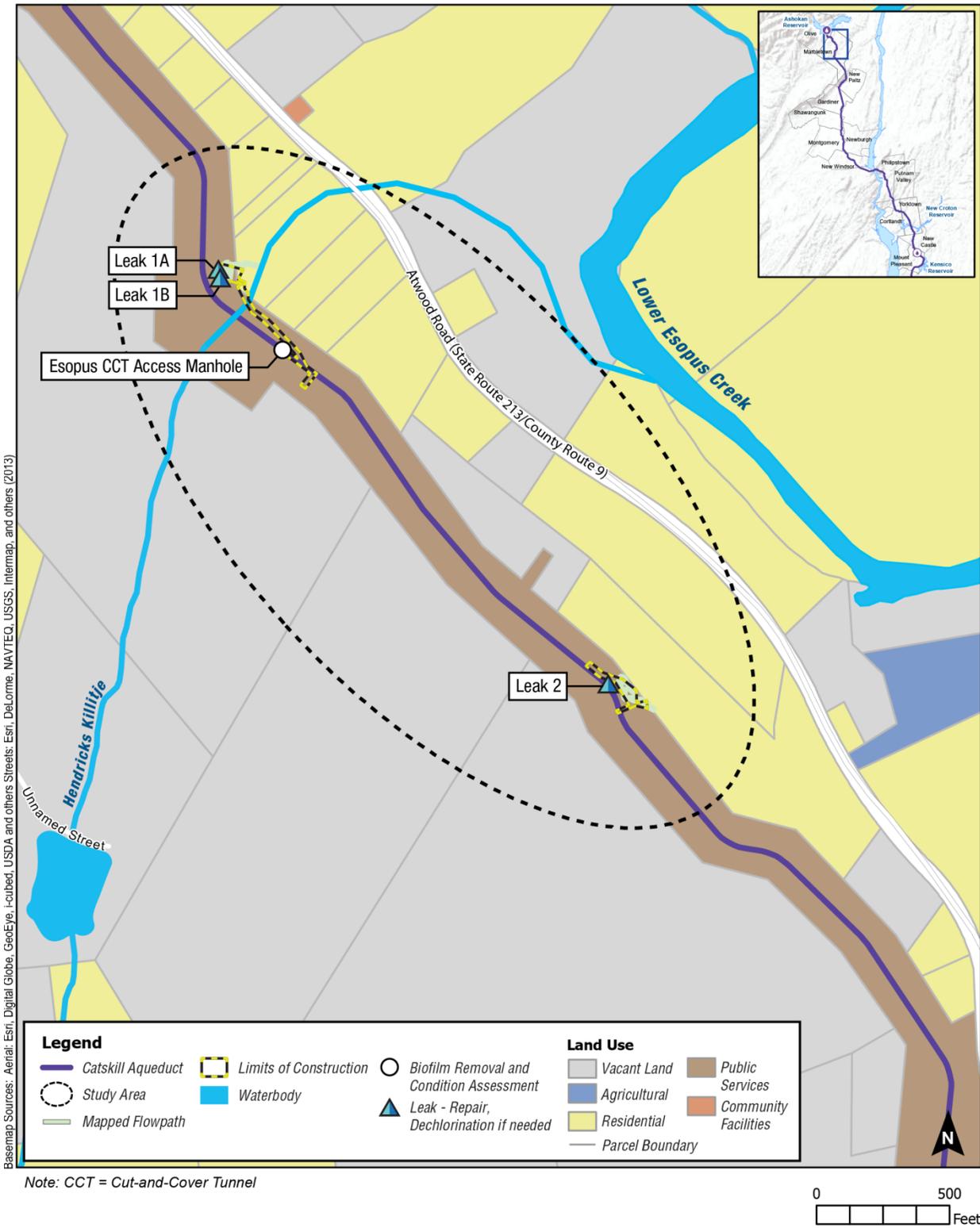


Figure 9.5-7: Land Use – Vly Atwood Road Study Area



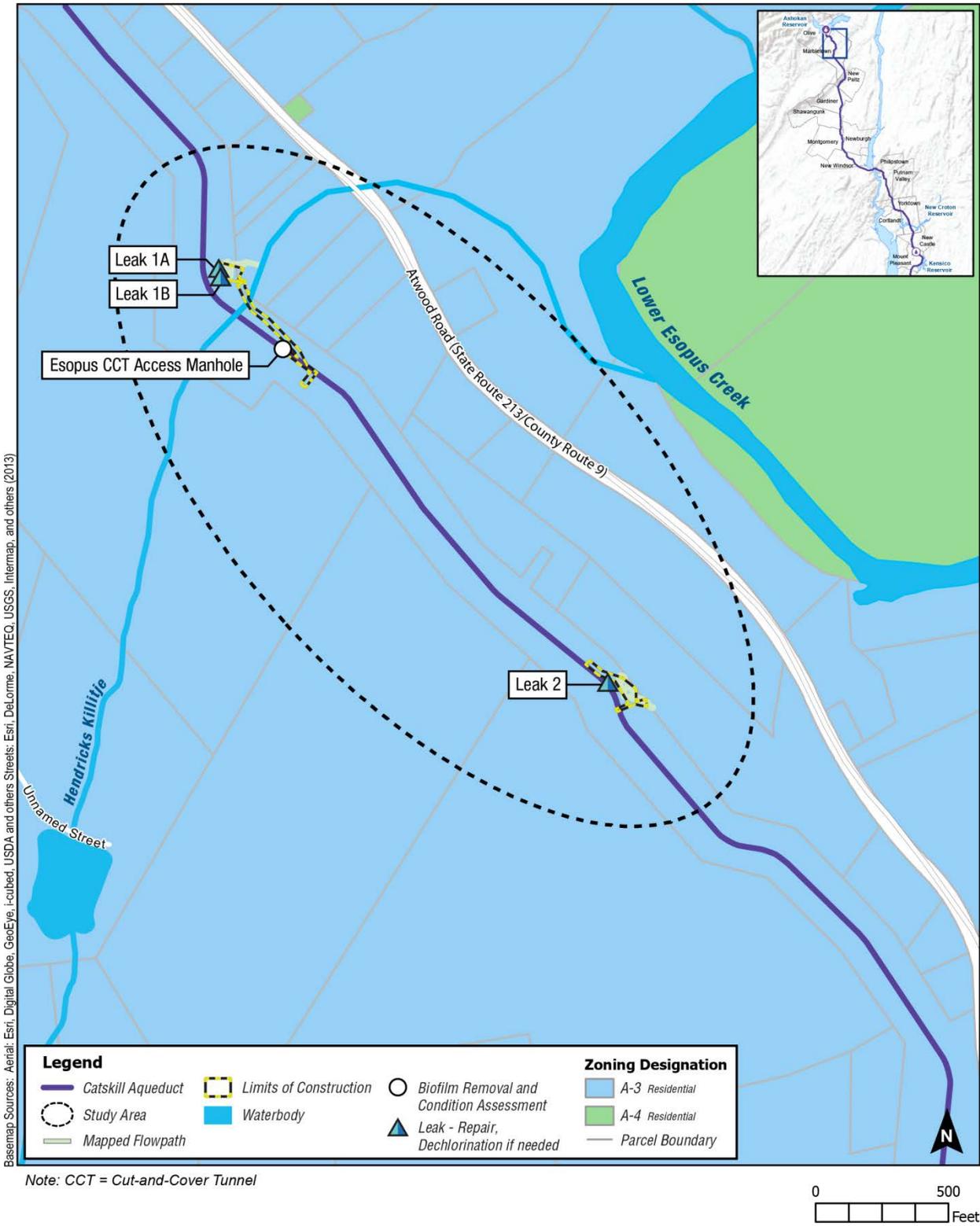


Figure 9.5-8: Zoning Map – Vly Atwood Road Study Area



DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP's understanding that no major projects or programs are planned that would change land use or zoning within the Vly Atwood Road Study Area within the timeframe of the repair and rehabilitation impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that land use and zoning within the Vly Atwood Road Study Area would be similar to baseline conditions.

The repair and rehabilitation would require the acquisition of an easement on approximately 0.4 acres of land within portions of a 3.2-acre residential parcel in the Town of Marbletown, identified on the Ulster County Tax Map as Tax ID 54.4-1-36. Under the residential (A-3) zoning designation, the minimum lot size required for a residential land use is 3 acres. Therefore, further subdivision of the lot would not be allowable under the current zoning. The property is currently improved with a single-family residence and detached garage, neither of which is located within the easement area. The portion of the property affected by the easement would not include any existing buildings. Access to the easement area would be from DEP-owned land (Tax ID 54.4-1-28), over an existing traveled way to the rear of parcel 54.4-1-36, and would not impact the residential use of the property. The easement would preclude the landowner from any activity that would interfere with or is inconsistent with the rights conveyed to the City but would not impose any restrictions on the landowner for normal recreational use. Acquisition of the easement on Atwood Road would be consistent with existing land uses, conforms to the existing zoning regulations, and would not result in residential or business displacement.

Following construction, all equipment would be removed from the Vly Atwood Road Study Area and staging areas would be restored to baseline conditions. Operation of the Catskill Aqueduct would be consistent with baseline conditions and would conform with adjacent land uses and zoning. In addition, the proposed acquisition of the 0.4-acre easement and the access requirements are not anticipated to result in a significant adverse land use impact to the owner. As such, the property affected by the easement is expected to be able to continue its existing uses after repair and rehabilitation. The permanent easement would not result in displacement of buildings and overall, the easement would be consistent with the existing land use and zoning.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to land use or zoning within the Vly Atwood Road Study Area.

9.5.3.6 Socioeconomic Conditions

The study area consists of public services, vacant land, and residential land uses (see **Figure 9.5-7**). Land cover within the study area is generally wooded and rural in nature.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP's understanding that no major developments or programs are planned within the Vly Atwood Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that land use, population, housing, and economic activity within the Vly Atwood Road Study Area would be similar to baseline conditions.

As described in Section 9.5.3.5, "Land Use and Zoning," the proposed repair and rehabilitation would require the easement acquisition of approximately 0.4 acres of land within a 3.2-acre

parcel (Tax ID 54.4-1-36). The easement acquisition would not alter the obligation for payment of property taxes on the parcel. The landowner would continue to pay taxes on the full-assessed value of the property, and there should be no significant impact to the tax base.

Construction of the repair and rehabilitation would occur within DEP-owned property and a small portion of private property. Following construction, all equipment would be removed and staging areas would be restored to baseline conditions. For the 0.4-acre easement, the private landowner is expected to be able to continue their existing uses after repair and rehabilitation. Thus, it is not anticipated that displacement of businesses or residences would occur as a result of the transfer of this property.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to socioeconomic conditions within the Vly Atwood Road Study Area.

9.5.3.7 Natural Resources

As shown on **Figure 9.5-9** and **Figure 9.5-10**, the study area for the natural resources analysis is comprised of two sections, including the limits of construction surrounding Leaks 1A, 1B, and Leak 2. The study areas also include downstream resources potentially influenced by the leaks. These sections are collectively referred to as the natural resources study area.

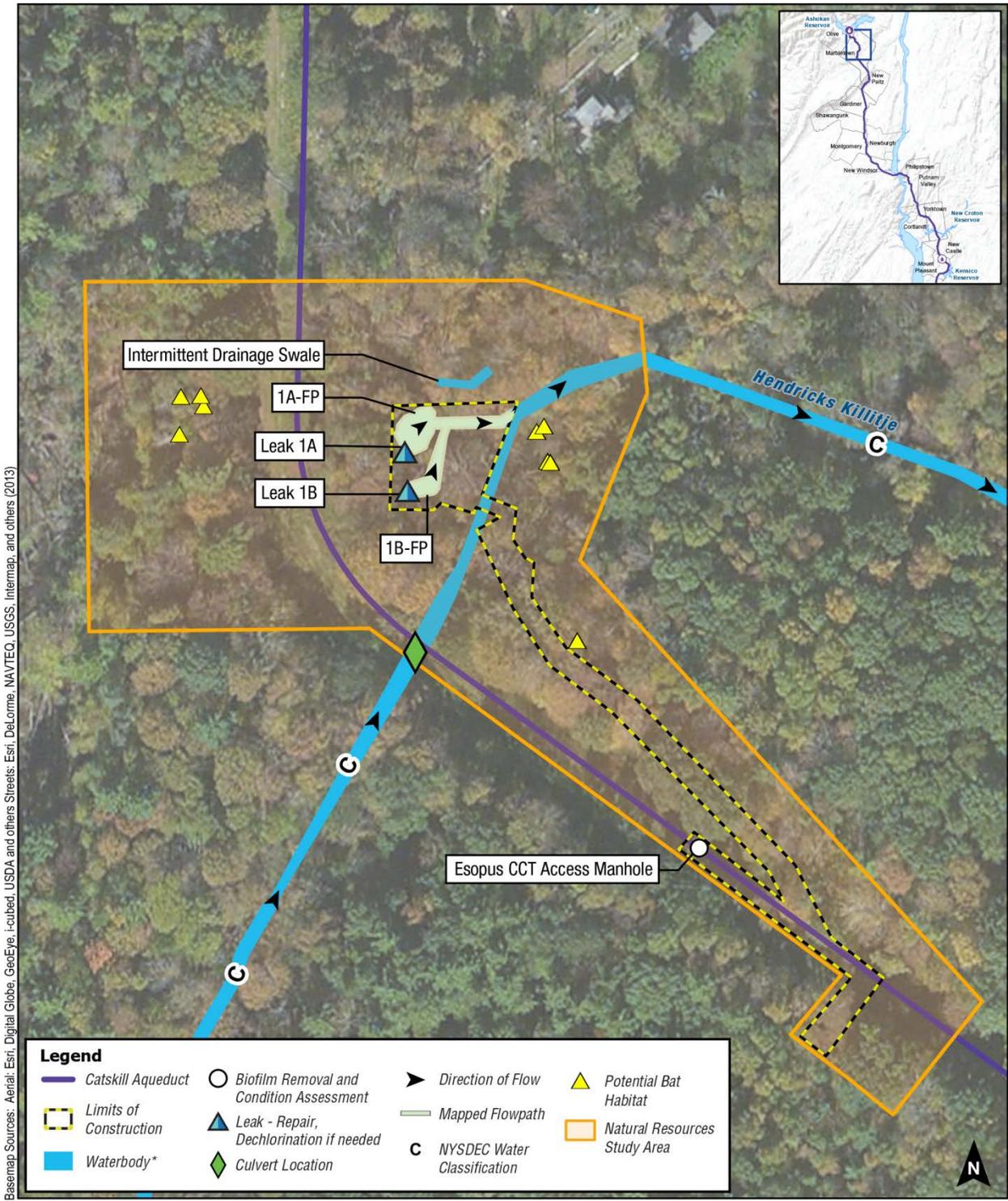
The general ecology of the natural resources study areas was based on field visits conducted on April 24, 2013 and July 7, 2015. The ecological community within the natural resources study area near Leaks 1A and 1B is a hemlock-northern hardwood forest. Hendricks Killitje, a tributary of the lower Esopus Creek, flows through the northern natural resources study area and crosses under the Catskill Aqueduct through a culvert. The ecological community identified within the natural resources study area near Leak 2 is also a hemlock-northern hardwood forest.

These habitats have the potential to support protected water resources, terrestrial resources, and wildlife species. Therefore, an analysis of the potential effects to natural resources that could result from the repair and rehabilitation activities is presented below. The potential for the repair and rehabilitation to result in changes to natural resources as a result of the proposed temporary chlorination at the Ashokan Screen Chamber is further analyzed in Section 9.19, “Project-wide Impact Analysis.”

Water Resources

The natural resources study area is within the lower Hudson River drainage basin, more specifically within the Stony Creek-Esopus Creek subwatershed (hydrologic unit code [HUC] 020200060906) of the Middle Hudson watershed (HUC 02020006).¹

¹ <http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/water/watersheds/dataset/>



Basemap Sources: Aerial: Esri, Digital Globe, GeoEye, i-cubed, USDA and others Streets: Esri, DeLorme, NAVTEQ, USGS, Intermap, and others (2013)

*Alignment based on field visit. The actual alignment of the Hendricks Killitje is different than as mapped by NYSDEC.
 Note: CCT = Cut-and-Cover Tunnel
 FP = Flowpath
 NYSDEC = N.Y.S. Department of Environmental Conservation

Figure 9.5-9: Natural Resources for Leaks 1A and 1B - Vly Atwood Road Study Area



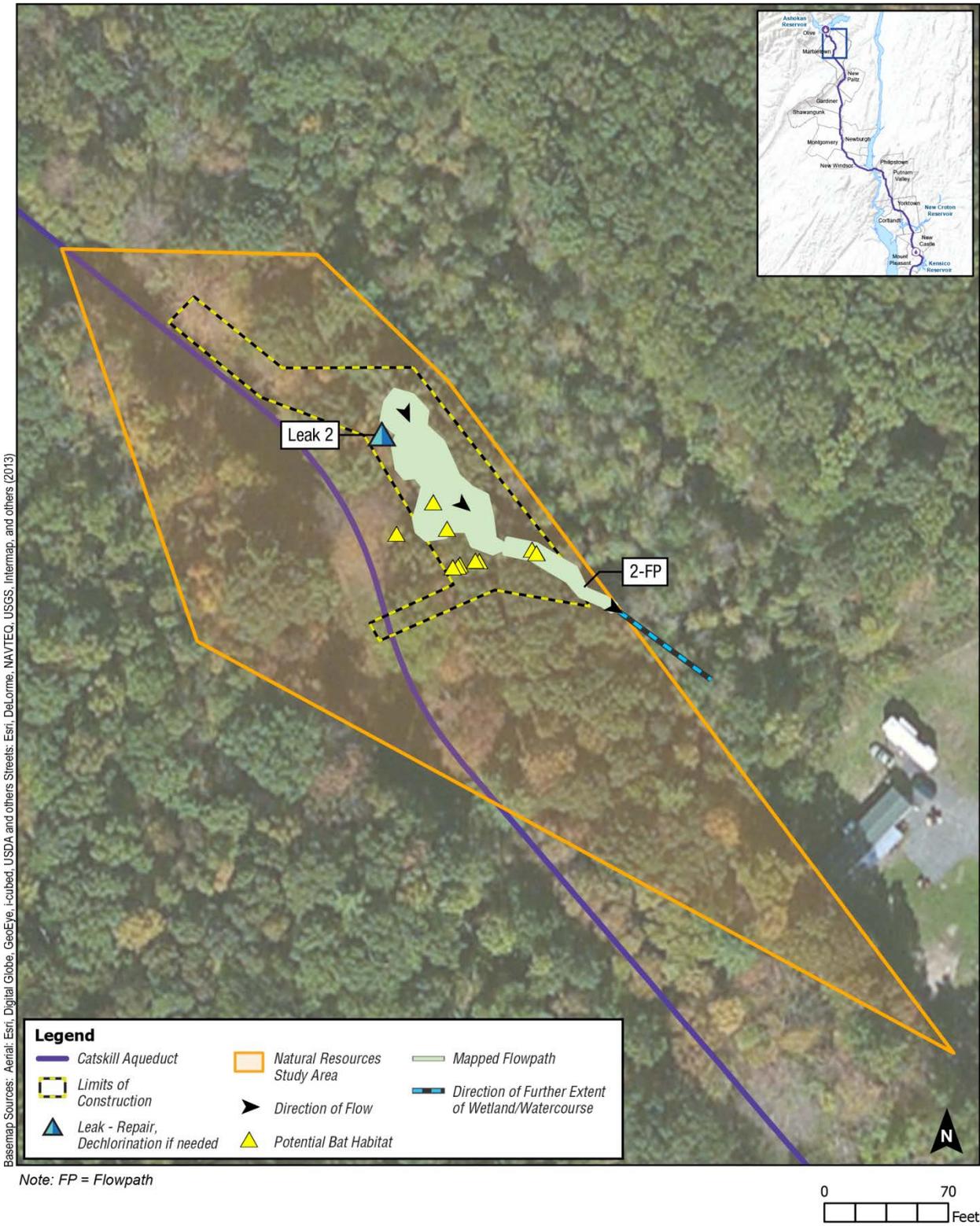


Figure 9.5-10: Natural Resources for Leak 2 - Vly Atwood Road Study Area



The naturally occurring surface water and wetlands in the natural resources study area are subject to federal jurisdiction under Sections 401 and 404 of the Clean Water Act for proposed work activities. Based on the jurisdictional determination by the New York District of the USACE dated January 21, 2015, flow from Leaks 1A, 1B, and 2 (referred to as 1A-FP, 1B-FP, and 2-FP) are not considered to be jurisdictional under Section 404 of the Clean Water Act. Hendricks Killitje is a naturally occurring watercourse with relatively permanent flows, and USACE determined that the Hendricks Killitje is considered to be Waters of the United States. As a Class C stream within the natural resources study area, Hendricks Killitje is not subject to State Protection of Waters regulations. Because the Town of Marbletown does not regulate streams, the activities associated with the repair and rehabilitation are not subject to local requirements (Marbletown Town Code Chapter 200: Zoning).

Surface Water

Surface water within the natural resources study areas was assessed over the course of several field visits. Delineations were conducted on April 24, 2013 and July 7, 2015. The water resource name, area, and length are shown in **Table 9.5-3**.

Table 9.5-3: Water Resources and Classifications within the Vly Atwood Road Natural Resources Study Area

Water Resource	Area (Square Feet)	Length (Feet)	Cowardin Classification
1A-FP	920	110	Riverine, Upper Perennial, Unconsolidated Bottom, Cobble-Gravel, Permanently Flooded (R3UB1H)
1B-FP	410	70	Riverine, Upper Perennial, Unconsolidated Bottom, Cobble-Gravel, Permanently Flooded (R3UB1H)
2A-FP	2,960	220	Riverine, Upper Perennial, Unconsolidated Bottom, Organic, Permanently Flooded (R3UB4H)
Hendricks Killitje	1,990	310	Riverine, Upper Perennial, Unconsolidated Bottom, Cobble-Gravel, Seasonally Flooded (R3UB1E)
Intermittent Drainage Swale	100	50	Palustrine, Unconsolidated Bottom, Cobble-Gravel, Intermittently Flooded (PUB1J)

Based upon a review of NYSDEC data, Hendricks Killitje is mapped within the Vly Atwood Road Study Area entering the southern portion of the natural resources study area near Leaks 1A and 1B. In addition to this mapped surface water, several unmapped features were observed during field delineations. Leaks 1A and 1B and their respective flowpaths, 1A-FP and 1B-FP, were delineated within the natural resources study area. An intermittent drainage swale was identified north of Leaks 1A and 1B within the natural resources study area, but beyond the proposed limits of construction. As shown on **Figure 9.5-10**, there is no surface water within the vicinity of Leak 2 except flowpath 2-FP. These leaks and their associated flowpaths diminish or cease to flow during occasional Catskill Aqueduct shutdowns. It was determined that these leaks may contribute to hydrology associated with the watercourses, wetlands, and flowpaths identified within the natural resources study area, and are, therefore, discussed with the applicable resource below.

Leaks 1A and 1B Flowpaths (1A-FP, 1B-FP)

As described above, Leak 1A is located approximately 1,800 feet south of Vly Atwood Road along the eastern side of the Catskill Aqueduct. Flowpath 1A-FP converges with flowpath 1B-FP, and enters Hendricks Killitje (see **Figure 9.5-9**).

The substrate of 1A-FP and 1B-FP consists of gravel and cobbles, and the water was observed to be clear. No in-stream vegetation was observed and the banks were moderately steep and sparsely vegetated within the natural resources study area. Flowpaths 1A-FP and 1B-FP are perennial due to permanent flows from leaks in the Catskill Aqueduct, and best classified as a “Riverine, Upper Perennial, Unconsolidated Bottom, Cobble-Gravel, Permanently Flooded” system based on the Cowardin System (Cowardin et al. 1979).

Leak 2 Flowpath (2-FP)

As described above, Leak 2 is located approximately 2,200 feet south of Leaks 1A and 1B, and starts as a shallow pond that flows off DEP’s property and is anticipated to continue to lower Esopus Creek (see **Figure 9.5-10**).

The flowpath has a slight gradient to the south and is densely shaded within the natural resources study area. No in-stream vegetation was observed. There were no well-defined banks or ordinary high water marks associated with the flowpath within the natural resources study area. No aquatic life was observed in the flowpath or the ponded area. The substrate at the toe-of-slope seeps was cobble and gravel, possibly from backfill used during the construction of the aqueduct berm. The ponded area is filled with leaf litter. The flowpath is perennial due to permanent flows from leaks in the Catskill Aqueduct, and best classified as a “Riverine, Upper Perennial, Unconsolidated Bottom, Organic, Permanently Flooded” system based on the Cowardin System (Cowardin et al. 1979).

Hendricks Killitje (Tributary of Lower Esopus Creek)

Hendricks Killitje, a tributary of the lower Esopus Creek, flows northeastward through a culvert under the Catskill Aqueduct. The combined flowpath 1A-FP and 1B-FP merges with the Hendricks Killitje. The Hendricks Killitje continues to flow eastward from this point. Hendricks Killitje continues through a second culvert under Atwood Road, and based on topography eventually converges with lower Esopus Creek. Field observations suggest that Hendricks Killitje is perennial.

The Hendricks Killitje’s substrate is gravel and cobble, and water was observed to be clear. Small fish were observed in several of the deeper pools downstream of the confluence with flowpath 1A-FP and flowpath 1B-FP. No in-stream vegetation was observed within the natural resources study area and the streambanks were moderately steep and sparsely vegetated. Drift lines of leaves and other dead plant material indicated a width of approximately 12 feet and an average depth less than approximately 6 inches. The streambed appeared scoured with exposed ledge rock and boulders downstream of the confluence of the flowpaths with the Hendricks Killitje. The stream was observed to be densely shaded. As shown in **Table 9.5-3**, Hendricks

Killitje is best classified as a “Riverine, Upper Perennial, Unconsolidated Bottom, Cobble-Gravel, Seasonally Flooded” system based on the Cowardin System (Cowardin et al. 1979).

Intermittent Drainage Swale

An intermittent drainage swale was identified north of 1A-FP in the natural resources study area on July 7, 2015. This area contained saturated soils, but no standing water or vegetation. The swale appeared to have formed from erosive forces during overland flow, but does not meet the definition of a watercourse or wetland. The drainage swale is best classified as a “Palustrine, Unconsolidated Bottom, Cobble-Gravel, Intermittently Flooded” system based on the Cowardin System (Cowardin et al. 1979).

Future Without the Repair and Rehabilitation

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP’s understanding that no projects or developments are anticipated to occur within the natural resources study area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that the future conditions of the water resources within the Vly Atwood Study Area would be the same as baseline conditions.

Analysis of Potential Effects

This section analyzes the potential for temporary and permanent disturbance to water resources associated with the repair and rehabilitation and long-term operation of the Catskill Aqueduct in the Vly Atwood Study Area.

Construction

Work activities related to the repair and rehabilitation have the potential to temporarily reduce vegetated areas along the banks of Hendricks Killitje during construction, and permanently alter flows to the lower Esopus Creek. Prior to commencing the repair and rehabilitation, temporary sediment and erosion control measures would be installed around each construction staging area and work site. Erosion and sediment control measures, such as silt fencing, would be installed and maintained through construction, and would be checked and reinstalled as necessary to adequately protect Hendricks Killitje. To protect the stream and its banks, and prevent sediment and other pollutants from entering the waterway, temporary measures would be designed in accordance with the State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity and other applicable regulatory requirements. Associated access and staging activities would occur in upland areas along the existing earthen access road or the top of the cut-and-cover berm of the Catskill Aqueduct.

Leak repairs would occur within the interior of the aqueduct during the first 10-week shutdown period. To complete repairs, this section of the aqueduct would be dewatered by gravity flow within the aqueduct. However, any residual water would be diverted using an internal bypass pipe which would carry residual water around the work segments and then discharge to the aqueduct downstream of the work segments. Once the work segment is prepared, the leaks would be repaired.

A non-toxic, quick-curing grout suitable for use in drinking water conduits would be used for Leaks 1A and 1B. It would expand upon contact with water to fill cracks and voids within the tunnel wall and along the exterior tunnel surface. If the grout comes in contact with subsurface flows along the exterior of the tunnel wall, it would cure in place and not migrate beyond the repair site. Because the grout would be quick curing, there would be limited potential for contamination to surface water from seepage through the cracks. In contrast, curing compounds used for lining the tunnel for Leak 2 would not be forced through the cracks. The viscous compounds would be applied to the tunnel wall where they would quickly cure and there would be no potential contact with surface water or groundwater. Any wastewater generated during leak repair or residual water in the tunnel would be managed using barriers to prevent wastewater from migrating downstream and would be treated, as necessary. Given these design considerations, there would be no physical disturbance to or potential for contamination of water resources near the leaks during construction. Permanent disturbance associated with leak repair is further analyzed in “Operation” below and on a project-wide basis in Section 9.19, “Project-wide Impact Analysis.”

If leak repairs are successful, the dry flowpaths would be filled to match the existing grade. If leak repairs are not successful two passive dechlorination systems (at Leaks 1A/1B and Leak 2) would be installed and the sites would be restored when dechlorination of the leaks is no longer needed. For either scenario, staging and access improvements would be needed to access Leaks 1A and 1B. Specifically, Leaks 1A and 1B would require the construction of a temporary stream crossing over Hendricks Killitje to remain in place through construction and temporary chlorination of the Catskill Aqueduct. The temporary stream crossing would be a prefabricated crossing brought on site, laid in place resting on the streambanks, and anchored to the ground. Installation would not require diversion of Hendricks Killitje. For Leak 2, staging and access improvements would only be undertaken in the event that leak repair is not successful.

Activities related to installation of passive dechlorination systems may result in temporary disturbance to these water resources. The passive dechlorination systems would be installed within the existing flowpaths so that treated water would continue to contribute to the natural system as it does under baseline conditions, and would not alter surficial or subsurface flows. Construction of the staging area and permanent stairs to access Leak 2 would not disturb water resources.

Once access is established to the passive dechlorination sites, temporary bypass pumping of the leaks would be used to dewater the flowpaths prior to them being graded. A temporary sump pit with bypass piping to a dewatering bag would be used to collect and divert water around the trenched location of the passive dechlorination system to keep the work area dry. It would also prevent sediment from entering downstream locations, specifically Hendricks Killitje and downstream reaches of 2-FP. Construction dewatering would be conducted in accordance with the *New York State Stormwater Management Design Manual* and other applicable regulatory requirements. No diversion of Hendricks Killitje would be needed, and there would be no work activities in the vicinity of the intermittent drainage swale.

Anticipated temporary and, if leak repair is successful, permanent disturbance to water resources was quantified based on the limits of construction and proposed work activities (see **Table 9.5-4**). The temporary stream crossing to access Leaks 1A and 1B would affect approximately 50 square

Table 9.5-4: Estimated Disturbance to Water Resources within the Vly Atwood Road Natural Resources Study Area

Water Resource	Baseline Conditions (Square Feet)	Temporary Effects (Square Feet)	Permanent Effects (Square Feet)
1A-FP	920	920 <i>Grading to channelize and passive dechlorination system installation (if needed)</i>	920 <i>Internal leak repair (if successful)</i>
1B-FP	410	410 <i>Passive dechlorination system installation (if needed)</i>	410 <i>Internal leak repair (if successful)</i>
2A-FP	2,960	2,810 <i>Passive dechlorination system installation (if needed)</i>	2,960 <i>Internal leak repair (if successful)</i>
Hendricks Killitje	1,990	50 <i>Temporary bridge crossing</i>	0
Intermittent Drainage Swale	100	0	0

feet of Hendricks Killitje. Grading to channelize 1B-FP, and installing the passive dechlorination system within 1A-FP would result in approximately 920 square feet of temporary disturbance to the flowpath. Additionally, temporary disturbance to flowpaths 1B-FP and 2A-FP, would occur during construction to trench and divert the flows. Once installed, the passive dechlorination systems would have a footprint of approximately 36 and 17 square feet in 1A-FP and 2-FP, respectively. Successful leak repair would result in the permanent cessation of flowpaths 1A-FP, 1B-FP, and 2A-FP. No permanent disturbance to Hendricks Killitje would occur. Following construction, staging areas would be restored to natural conditions and planted with native vegetation, but access would remain through temporary chlorination.

Temporary Chlorination

Temporary chlorination of the Catskill Aqueduct would occur from 2019 through 2023, and the passive dechlorination systems, if necessary, would be operated during this time. The systems would treat leak flows, and all discharges would meet regulatory requirements. Once the Catskill Aqueduct returns to typical operations in 2023, the passive dechlorination systems and the temporary stream crossing would be removed and the sites would be restored to natural conditions.

Operation

Successful leak repair would result in the elimination of leak flowpaths 1A-FP, 1B-FP, and 2-FP (see **Table 9.5-4**). It would also eliminate artificial leak flows to Hendricks Killitje, restoring the stream to natural, pre-leak conditions. Additionally, while it would be a permanent change, leak repair would result in similar flow changes that Hendricks Killitje currently experiences during occasional Catskill Aqueduct shutdowns when the leaks cease to flow. Because leak repair would permanently alter flows, the anticipated changes resulting from the repair and rehabilitation were analyzed by calculating the contribution of Leaks 1A and 1B to the Hendricks

Killitje during low flows, discussed below (see “Leak Contributions during Low Flow”). While repairs of Leaks 1A, 1B, and 2 would also result in the elimination of leak flow to lower Esopus Creek, this decrease would be negligible in comparison to the lower Esopus Creek’s flows and does not warrant further analysis. Access improvements, including installing a temporary stream crossing, would be needed to cross Hendricks Killitje to fill the dry flowpaths of 1A-FP and 1B-FP following leak repair.

Leak Contributions during Low Flow

To assess the contribution of Leaks 1A and 1B to Hendricks Killitje, desktop calculations of critical low flows (7Q10 and 7Q2 flows) were completed. The 7Q10 and 7Q2 flows are commonly used measures of low flow and represent the lowest 7 day average flow with return periods of 10 years and 2 years, respectively.

In the analysis of Leaks 1A and 1B, the 7Q10 and 7Q2 were adapted to understand conditions during critical low flow periods where further flow reductions from leak repair would result in the greatest potential impact to local hydrology. Average flow was also calculated to compare with typical baseline conditions.

The analysis indicated that Hendricks Killitje has a drainage area of approximately 446 acres where Leaks 1A and 1B enter the stream. This drainage area was calculated using the USGS StreamStats Program.² Flow estimates were calculated for Hendricks Killitje and compared to the measured leak flow as shown in **Figure 9.5-5**.

Table 9.5-5: Estimated Leak Contributions for Vly Atwood Road Study Area

Flow Scenario	Leaks 1A and 1B		
	Estimated Hendricks Killitje Flow ¹ (gpm)	Leak Flow (gpm) ²	Leak Flow to Hendricks Killitje Flow (%)
Average	689.9	12.7	1.8
7Q2	91.6	12.7	13.9
7Q10	48.5	12.7	26.2
Notes:			
¹ Based on USGS gauge 01363382 at Bush Kill and data for 2001 to 2014.			
² Leak flow is based on maximum flow measured on March 18, 2013 during typical Catskill Aqueduct operation.			

During average flow conditions, the leak flow would be a minor contributor to the unnamed tributary’s natural flow. The average daily flow for Hendricks Killitje at the confluence with Leaks 1A and 1B was estimated as approximately 690 gpm. The combined flow of Leaks 1A and 1B is measured to be approximately 12.7 gpm. During average flow conditions, the flow of the leaks is approximately 2 percent of the baseflow of Hendricks Killitje.³ During low flow conditions, the leak flow would be a moderate contributor to the 7Q2 flows of Hendricks Killitje (approximately 14 percent). This would approximate the flows necessary to maintain aquatic

² USGS 2014. http://water.usgs.gov/osw/streamstats/new_york.html.

³ This estimate assumes that leak flow is not part of the natural flow of Hendricks Killitje.

habitat. New York State defines a stream as intermittent if its 7Q10 is less than 45 gpm (0.1 cfs). Hendricks Killitje low flows (7Q10) were slightly higher than this metric, at approximately 48 gpm, and flows observed in Hendricks Killitje during field visits confirmed that it may be perennial. Based on the analysis, elimination of flow from Leaks 1A and 1B would represent a decrease of Hendricks Killitje's low flow from its current artificially elevated flow; however, it would remain a perennial stream.

Water Resources Conclusions

Repair and rehabilitation work activities would include internal leak repair and site improvements and a temporary stream crossing to fill the dry flowpaths 1A-FP and 1B-FP following leak repair. If local dechlorination is needed, activities would include: site improvements for additional construction staging and access and installation of up to two passive dechlorination systems. Leaks 1A, 1B, and 2 are artificial flows sourced from the Catskill Aqueduct that are non-jurisdictional based on a USACE determination dated January 21, 2015. Prior to commencement of the repair and rehabilitation, sediment and erosion control measures, such as silt fencing, would be installed around each construction staging area and work site to prevent the transport of sediment resulting from temporary disturbances into surface water features within the study area. Dechlorinated aqueduct water that would be temporarily discharged to the leak flowpaths would be treated in accordance with applicable regulatory requirements. Once the Catskill Aqueduct returns to typical operations in 2023, the passive dechlorination systems and temporary stream crossing would be removed, and the sites would be restored to natural conditions. Following the repair and rehabilitation, no permanent structures would remain.

Leak repair would not result in permanent physical disturbance to naturally occurring surface water. Leaks 1A, 1B, and 2 are artificial flows sourced from the Catskill Aqueduct. Following leak repair, leak flows would cease to contribute to Hendricks Killitje and lower Esopus Creek, respectively. While leak repair would decrease flow to Hendricks Killitje, the effect would be minor, as the repair would revert the stream to pre-leak conditions and it would remain a perennial stream. Additionally, elimination of leak flow to lower Esopus Creek would be a negligible change in comparison to the creek's flows.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to water resources within the Vly Atwood Road Study Area.

Terrestrial Resources

The natural resources study area consists of hemlock-northern hardwood forest and a mixed deciduous forest communities. The tree species at Leaks 1A and 1B consist of eastern hemlock (*Tsuga canadensis*), shagbark hickory (*Carya ovata*), white ash (*Fraxinus americana*), green ash (*F. pennsylvanica*), sugar maple (*Acer saccharum*), red maple (*A. rubrum*), sweet birch (*Betula lenta*), black oak (*Quercus velutina*), white pine (*Pinus strobus*), and scotch pine (*P. sylvestris*). Ground cover is sparse and dominated by partridge berry (*Mitchella repens*), helleborine orchid (*Epipactis palustris*), and garlic mustard (*Allaria petiolata*), while the shrub layer is dominated by Japanese barberry (*Berberis thunbergii*). The upland species at Leak 2 consist of species generally found in mixed hemlock-hardwood forest including eastern hemlock, white pine, white

snakeroot (*Ageratina altissima*), Robert geranium (*Geranium robertianum*), garlic mustard, and sticky willy (*Galium aparine*). Mature hemlocks along the edge of the ponded water in the study area were dead. These areas of hemlock-northern hardwood forest observed during field visits were not mapped as significant natural communities by the NYNHP database. While the Town of Marbletown does not regulate the removal of trees associated with the repair and rehabilitation, terrestrial resources within this study area warrant an analysis.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP's understanding that no new projects or developments that would affect terrestrial resources are anticipated within the Vly Atwood Road Study Area within the timeframe of the impact analysis. Natural processes, such as changes in habitat due to natural vegetative succession, are anticipated to continue. Therefore, in the future without the repair and rehabilitation, it is assumed that terrestrial resources within the study area would be the same as baseline conditions.

Work activities for leak repair would include tree removal and brush removal for the purpose of improving the staging area. The staging area would be established at an existing truck turnaround along the cut-and-cover berm.

Should passive dechlorination systems be required, additional staging areas and site improvements would be needed to access the locations where the leaks emanate from the aqueduct. The repair and rehabilitation has been designed to minimize the number of trees to be removed by limiting the area of disturbance to previously cleared locations along the aqueduct. Approximately nine trees may be removed at Leaks 1A and 1B. This would be needed to access and fill the dry flowpaths if leak repair is successful or to install a passive dechlorination system if repairs are not successful. No tree removal would be required at Leak 2 if repairs are successful. However, up to 46 trees may be removed for access and staging if dechlorination of Leak 2 becomes necessary.

Therefore, up to 55 trees consisting of seven distinct species with a range of average diameter at breast height (dbh) of between 5.5 and 15 inches located adjacent to the existing Catskill Aqueduct may need to be removed to establish access and staging areas in the vicinity of the leaks. The most common species of trees to be removed include 31 red maple and 6 eastern hemlock. Tree removal would occur in discrete locations along the densely forested areas east and northeast of the aqueduct and would not dramatically change the character of the area or affect surrounding trees. All tree removal would be conducted from November 1 through March 31 to avoid impacts to Indiana bats (*Myotis sodalis*) and northern long-eared bats (*Myotis septentrionalis*). Following construction, temporarily disturbed areas within the natural resources study area would be restored to natural conditions. Vegetated areas temporarily cleared during construction are anticipated to grow back with similar communities.

During temporary chlorination, chlorinated leak water would be treated. See Section 9.19, "Project-wide Impact Analysis," for an analysis of the potential impact at locations where chlorinated water from the aqueduct enters the surrounding environment. Following the repair and rehabilitation within the natural resources study area, operation of the Catskill Aqueduct would be consistent with baseline conditions and natural reforestation and vegetative succession of aqueduct areas not routinely maintained would continue to occur over time. This would include routine inspection and maintenance, with vehicles entering and exiting the sites.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to terrestrial resources within the Vly Atwood Road Study Area.

Federal/State Threatened and Endangered Species and State Species of Special Concern

This section includes an analysis of potential impacts to federal/State Threatened and Endangered Species and State Species of Special Concern identified in Section 9.3.9, “Natural Resources,” as having the potential to be affected by activities within the natural resources study area. To identify those species that could be affected within the study area, species that could occur up to 0.25 mile from the work sites were determined in consultation with USFWS, USACE, NYNHP, and NYSDEC, as well as county and local offices, as applicable.

As discussed in Section 9.3.9, “Natural Resources,” nine species were identified as having the potential to be affected by the repair and rehabilitation within the natural resources study area. Therefore, conditions in the future without the repair and rehabilitation, an analysis of the potential for impacts to these nine species, and a summary of conclusions on the potential effects resulting from the repair and rehabilitation are provided below.

In the future without the repair and rehabilitation, it is assumed that federal/State Threatened and Endangered Species and State Species of Special Concern within the study area would largely be the same as baseline conditions, other than possible changes in habitat due to natural vegetative succession and general anthropogenic influences.

An analysis of the potential for disturbance to federal/State Threatened and Endangered Species and State Species of Special Concern from the repair and rehabilitation within the natural resources study area is shown in **Table 9.5-6**. The analysis included an evaluation of the repair and rehabilitation work activities within the study area and observations during field visits, as applicable.

Table 9.5-6: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern, and Habitats within the Vly Atwood Road Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Amphibians and Reptiles					
Eastern Box Turtle	<i>Terrapene carolina</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visits on April 24, 2013 and July 7, 2015. Potential habitat exists within the hardwood forest, along the stream, and within the ponded area and open grassy areas. While work activities would be largely confined to previously disturbed areas, if any isolated areas of potential habitat exist at the sites, as a highly mobile species, any eastern box turtles that might otherwise use these areas are expected to instead utilize similar, adjacent habitats during construction. Furthermore, perimeter silt fencing would limit disturbance to adjacent habitat and prevent individual turtles from entering the work sites during construction. Finally, upon completion of temporary chlorination, the staging areas would be restored to natural conditions and would not affect breeding, nesting, or foraging habitat. Therefore, there are no effects anticipated and no further analysis for eastern box turtles is warranted for this study area.	No
Marbled Salamander	<i>Ambystoma opacum</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visits on April 24, 2013 and July 7, 2015. Potential habitat exists within the ponded area associated with Leak 2. The project may result in changes in hydrology, which could disturb salamander habitat. Therefore, further analysis is warranted for this study area.	Yes. See further analysis below.
Spotted Turtle	<i>Clemmys guttata</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visits on April 24, 2013 and July 7, 2015. Potential habitat exists within the ponded and open grassy areas. The project may result in the elimination of some surface water flows. However, anticipated changes in hydrology are expected to be minimal. Any spotted turtles that might use these areas are expected to instead utilize similar, adjacent habitats during construction. Furthermore, perimeter silt fencing would limit disturbance to adjacent habitat and prevent individual turtles from entering the work sites during construction. Finally, upon completion of temporary chlorination, the staging areas would be restored to natural conditions and would not affect breeding, nesting, or foraging habitat. Therefore, there are no effects anticipated and no further analysis for spotted turtles is warranted for this study area.	No

Table 9.5-6: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern, and Habitats within the Vly Atwood Road Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Wood Turtle	<i>Glyptemys insculpta</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visits on April 24, 2013 and July 7, 2015. Potential habitat exists within the riparian areas along the stream. However, staging and access would occur primarily in upland areas. Any wood turtles that might use these areas are expected to instead utilize similar, adjacent habitats during construction. Furthermore, perimeter silt fencing would limit disturbance to adjacent habitat and prevent individual turtles from entering the work sites during construction. Any change in surface water flows following leak repair is expected to be minimal. Therefore, there are no effects anticipated and no further analysis for wood turtles is warranted for this study area.	No
Mammals					
Indiana Bat	<i>Myotis sodalis</i>	Endangered	Endangered	Indiana bat summer habitat surveys were conducted on April 24, 2013 and July 7, 2015. No bats were incidentally observed during these field visits. NYNHP identified a maternity roost colony within 2.5 miles of the work sites and bat hibernacula within 5 miles of the work sites. Potential bat roosting habitat includes nine trees in the vicinity of Leaks 1A and 1B, and 10 trees in the vicinity of Leak 2. Disturbances to potential roosting trees may occur during construction. Therefore, further analysis is warranted for this study area.	Yes. See further analysis below.
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	Threatened	Threatened Unlisted	Northern long-eared bat summer habitat surveys were conducted on April 24, 2013 and July 7, 2015. No bats were incidentally observed during these field visits. Potential bat roosting habitat includes nine trees in the vicinity of Leaks 1A and 1B, and 10 trees in the vicinity of Leak 2. NYNHP identified a maternity roost colony within 2.5 miles of the work sites and bat hibernacula within 5 miles of the work sites. Disturbances to potential roosting trees may occur during construction. Therefore, further analysis is warranted for this study area.	Yes. See further analysis below.
Plants					
Alpine Cliff Fern	<i>Woodsia alpina</i>	Unlisted	Endangered	NYNHP noted current occurrences for roseroot and alpine cliff fern and historic occurrences for rhodora. No specimens or suitable habitat were located in the study area during habitat surveys conducted on June 18, 2013 and July 7, 2015. Survey dates generally corresponded to the peak growing season when these species would be most apparent. Therefore, there are no effects anticipated and no further analysis for these plant species is warranted for this study area.	No
Rhodora	<i>Rhododendron canadense</i>	Unlisted	Endangered		No
Roseroot	<i>Rhodiola rosea</i>	Unlisted	Endangered		No

Marbled Salamander (Ambystoma opacum)

Repair of Leak 2 or, if necessary, construction of the passive dechlorination system would eliminate the shallow pond formed by Leak 2 (approximately 2,960 square feet), potentially altering the available salamander habitat within the study area. While leak flows would persist if a passive dechlorination system were installed, the ponded area would be trenched and eliminated to route all flows to this system. Anticipated changes in hydrology once Leak 2 is repaired or the pond is trenched are expected to be minimal, resulting in only slight changes in surface water, soils, and vegetation. The pond is artificially created by Leak 2, and the repair and rehabilitation would not permanently affect naturally occurring waters. It is expected that marbled salamanders (*Ambystoma opacum*) would continue to utilize the site or readily relocate to alternative suitable habitats that are available nearby. Therefore, the repair and rehabilitation may affect, but is unlikely to adversely affect marbled salamanders in this study area.

Indiana Bat (Myotis sodalis)

Indiana bat summer habitat surveys were conducted at both work sites in the natural resources study areas on April 24, 2013 and July 7, 2015. At Leaks 1A and 1B, two distinct forest community types were identified within the natural resources study area. The area to the east of the leaks, which represents a mixed deciduous forest community dominated by shagbark hickory (*Carya ovata*), was investigated; 4 trees and 1 dead snag with dbh greater than 3 inches were identified as potential roost trees. An area west and upslope of Leaks 1A and 1B was also investigated to include the surrounding habitat and vegetative communities because a maternity colony is located within approximately 2.5 miles of the study area. This area represents a mixed hemlock-hardwood forest dominated by eastern hemlock and scotch pine (*Pinus sylvestris*), and 2 trees and 2 dead snags were identified as potential roost trees. These trees would not be removed.

The area southeast of Leak 2 was also evaluated for potential roosting trees within the natural resources study area. The area contains a mixed hemlock-hardwood forest community dominated by eastern hemlock and red maple, within which 6 trees and 4 snags were identified as potential roost trees. These trees are not proposed for removal. The forest communities adjacent to the Hendricks Killitje may provide additional roosting and foraging habitat for bats. Tree removal within the vicinity of Leaks 1A, 1B, and 2 may occur and include a shagbark hickory, a red maple, and an unidentified dead tree that provide potential roosting habitat.

In the future with the repair and rehabilitation, activities would predominantly occur on previously disturbed areas along the Catskill Aqueduct. Internal leak repair in ~~2018~~2017 would not require tree removal. Construction lighting would be used as needed during the 10-week shutdowns, and because these would occur between October and March, it would be unlikely that bats would be in the area; therefore, no disturbance from nighttime lighting is anticipated.

Following leak repair, minimal clearing of brush and limited tree removal at Leaks 1A and 1B would be needed to fill the dry flowpaths. Over time, no measurable effects of leak repair are anticipated to Hendricks Killitje or downstream resources and foraging habitat would continue to be available within the study area.

Should installation of passive dechlorination systems become necessary in ~~2019~~2018, tree clearing and shrub removal would be needed to improve site access and staging areas at Leaks 1A, 1B, and Leak 2. All tree removal would be conducted from November 1 through March 31 to avoid impacts to Indiana bats. In addition, repair and rehabilitation work activities would not result in significant loss or modification of forested habitat for roosting Indiana bats. The construction of a temporary stream crossing over Hendricks Killitje along with noise from work activities may discourage this bat species from roosting in the immediate vicinity of the work sites and foraging near the stream temporarily. However, there is abundant suitable habitat in the surrounding areas that Indiana bats could use for roosting and foraging. Foraging habitat would continue to be available outside the natural resources study areas in adjacent forested areas and near streams and open water. Therefore, the repair and rehabilitation may affect, but is unlikely to adversely affect Indiana bats in this study area.

Northern Long-eared Bat (*Myotis septentrionalis*)

Northern long-eared bat summer habitat surveys were conducted at both work sites in the natural resources study areas on April 24, 2013 and July 7, 2015. Northern long-eared bats have been documented to roost in man-made structures. However, there are no structures within the study area that could be used by roosting bats. They are more commonly known to roost in trees (see the potential roosting habitat results for Indiana bats, above).

Repair and rehabilitation work activities for leak repair in ~~2018~~2017, would occur with minimal clearing of brush and no tree removal. Should installation of passive dechlorination systems become necessary in ~~2019~~2018, minor tree clearing and shrub removal would be needed to improve site access and staging areas at Leaks 1A, 1B, and Leak 2. All tree removal would be conducted from November 1 through March 31 to avoid impacts to northern long-eared bats. Construction lighting would be used as needed during the 10-week shutdowns, and because these would occur between October and March, it would be unlikely for bats to use the area; therefore, no disturbance from nighttime lighting is anticipated.

In addition, repair and rehabilitation work activities would not result in significant loss or modification of roosting or foraging habitat for northern long-eared bats. Flows in Hendricks Killitje would decrease from their artificially elevated levels due to leak repair; however, a reduction in flow to the affected stream segments would not result in modification of the existing forest habitat adjacent to the stream segments or within upland forested habitats where trees that exhibit suitable roosting characteristics would be found.

The construction of a temporary crossing over Hendricks Killitje along with noise from work activities may discourage northern long-eared bats from roosting in the immediate vicinity of the work sites and foraging near the stream temporarily. However, there is abundant suitable habitat in the surrounding areas that northern long-eared bats could use for roosting and foraging. Foraging habitat would continue to be available outside the study area in adjacent forested areas and near streams and open water. Therefore, the repair and rehabilitation may affect, but is unlikely to adversely affect, northern long-eared bats in this study area.

Federal/State Threatened and Endangered Species and State Species of Special Concern Conclusions

Based on the impact analysis, no take is anticipated. There would be no effects to eastern box turtles (*Terrapene carolina*), spotted turtles (*Clemmys guttata*), wood turtles (*Glyptemys insculpta*), alpine cliff fern (*Woodsia alpina*), rhodora (*Rhododendron canadense*), or roseroot (*Rhodiola rosea*) associated with the repair and rehabilitation. Repair and rehabilitation may affect, but is not likely to adversely affect, marbled salamanders, Indiana bats, and northern long-eared bats.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to federal/State Threatened and Endangered Species or State Species of Special Concern within the Vly Atwood Road Study Area.

9.5.3.8 Hazardous Materials

To evaluate the potential presence of hazardous materials within the Vly Atwood Road Study Area, a Phase I Environmental Site Assessment (ESA) was conducted in general conformance with the scope and limitations of American Society for Testing and Materials (ASTM) Practice E 1527-13 and City Environmental Quality Review (CEQR) requirements to identify Recognized Environmental Conditions (RECs). The Phase I ESA included site reconnaissance, research on current/historical use, and review of federal and State regulatory listings for both the site itself and for its neighboring properties within the appropriate search distance defined in the ASTM standard. The findings from the Phase I ESA investigation and results from DEP's legacy files for the work sites, including a geotechnical investigation, were collectively reviewed to assess the potential presence of and potential for disturbance to hazardous materials in the study area. Based on the Phase I ESA investigation within this study area, there was no indication of an environmental impact that would constitute a REC as defined by the ASTM standard that would affect activities in the study area.

Geotechnical environmental investigations and sampling were undertaken for contaminants of concern including volatile and semivolatile organics, polychlorinated biphenyls (PCBs), and total petroleum hydrocarbons along the aqueduct within the study area. Several parameters were noted in the soil sampling results including acetone, total chromium, and mercury. Acetone is a common lab contaminant and was detected at concentrations indicative of laboratory contamination. Total chromium was reported in the samples collected at Leak 1A, 1B, and 2. Chromium concentrations, however, were consistent over a widespread sampling area and are more likely associated with background concentrations. Along the Catskill Aqueduct, there are widespread occurrences of chromium, which are attributed to the existing geological formations. Likewise, mercury was detected in one of the samples, but it is also naturally occurring in soils and is therefore likely to be the result of background concentrations. In addition, although gasoline range organic compounds were not detected, diesel range organic compounds were detected, but at low concentrations that would not warrant remedial actions.

Based on the results of the environmental investigations completed within the Vly Atwood Road Study Area, no other hazardous materials are known to exist. The soil results support the reuse of

excavated materials as backfill and do not suggest the need for special management, handling or health and safety measures at this time.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP's understanding that no developments or structures that would introduce hazardous materials to the environment are anticipated within the Vly Atwood Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that the presence of hazardous materials within the Vly Atwood Road Study Area would be the same as baseline conditions.

In the future with the repair and rehabilitation, work activities would potentially require storage and use of a variety of petroleum and other chemical products, such as diesel fuel for back-up power, lubricating oil for construction vehicles, and miscellaneous cleaning and maintenance chemicals. The use and storage of all of these would be in accordance with applicable regulatory requirements and guidelines including those relating to federal Spill Prevention, Control, and Countermeasures requirements; and State petroleum bulk storage, chemical bulk storage, and spill reporting requirements.

Leak repairs would consist of a combination of grouting (Leaks 1A and 1B) and lining the leaking and cracked areas with carbon fiber material (Leak 2), which are both inert, quick-curing, and suitable for use in drinking water supply systems. If repairs are not successful, passive dechlorination systems would be installed. Following construction, all equipment as well as chemical storage would be removed from the construction staging areas, and the areas would be restored to baseline conditions.

During temporary chlorination, activated carbon filters, which are inert and are used for treating drinking water, would be used as part of the passive dechlorination systems to treat chlorinated leak water. Following the repair and rehabilitation, passive dechlorination systems would be removed from Vly Atwood Road Study Area. The staging areas would be restored, and operation of the Catskill Aqueduct would be consistent with baseline conditions.

Therefore, the repair and rehabilitation would not result in significant adverse impacts from the presence or disturbance of hazardous materials within the Vly Atwood Road Study Area.

9.5.3.9 Transportation

The study area for the transportation analysis consists of the major convergent roadways that would potentially be used by the employee and construction vehicles associated with repair and rehabilitation work activities en route to and from the Vly Atwood Road Study Area.

Access to the repair and rehabilitation limits of construction for the work sites within the Vly Atwood Road Study Area would be via Atwood Road (State Route 213 and County Route 4) to Vly Atwood Road which leads directly to the aqueduct cut-and-cover berm which vehicles can drive along to the access manhole. Some construction vehicles may depart the work sites by driving south on top of the aqueduct and exiting via Bush Road (see **Figure 9.5-2**). Atwood Road is a two-lane, two-way major collector roadway. Vly Atwood Road is a two-way local roadway. Bush Road is a two-way local roadway. To the extent available, construction vehicles

would travel on truck-permitted roadways directly to and from the Vly Atwood Road Study Area. There is no public transportation and little to no pedestrian activity in the immediate vicinity of the study area. Under current operations, DEP employees periodically access the site. However, no DEP employees work at or visit the study area on a daily basis, and the small number of DEP employee vehicles has little to no effect on traffic conditions within the study area.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP's understanding that no changes in land use or an increase in traffic due to outside developments are anticipated within the Vly Atwood Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that traffic, public transportation, and pedestrian activities within the study area would be similar to baseline conditions.

Repair and rehabilitation work activities within the Vly Atwood Road Study Area would consist of internal leak repair of Leaks 1A, 1B, and 2. Therefore, this activity was the basis of this transportation analysis. Internal leak repairs would occur in fall ~~2018~~2017, for up to 24 hours per day, 7 days a week for approximately 5 weeks during the first 10-week shutdown period.

In the future with the repair and rehabilitation, construction vehicles would travel along Vly Atwood Road. The estimated number of peak-day one-way vehicle trips associated with the internal leak repairs is 32 vehicles, or approximately 64 peak-day vehicle round trips that would travel to and from the study area. The majority of the peak daily vehicle round trips, approximately 40 vehicle round trips or 40 Passenger Car Equivalents (PCEs), would be workers traveling directly to and from the staging area, with an additional 8 daily shuttle trips between the study area and the staging area. The remaining approximately 16 peak-day vehicle round trips (22 PCEs) would be trucks or other construction vehicles.

During a peak day, the estimated number of peak-hour vehicle trip ends associated with internal leak repairs is approximately 32 peak-hour vehicle trip ends (36 PCEs). This includes approximately 20 vehicle trip ends (20 PCEs) from workers traveling directly to and from the staging area, approximately 4 peak-hour shuttle trips between the study area and the staging area, and approximately 8 vehicle trip ends (12 PCEs) from trucks or other construction vehicles. For the purpose of this analysis, the peak-hour project-generated vehicles are anticipated to coincide with typical construction hours for employee vehicles entering the site. Assuming two 12-hour shifts, this would be during the 6 AM to 7 AM and 6 PM to 7 PM hours, and would be unlikely to coincide with the peak hour for existing traffic. Following construction, operation of the passive dechlorination systems would generate occasional vehicle trips as DEP employees periodically monitor and maintain the systems through 2023; however, fewer than the *CEQR Technical Manual* screening threshold of 50 peak-hour PCEs would be generated during this period.

In total, the repair and rehabilitation would result in approximately 36 peak-hour PCEs along Vly Atwood Road or Bush Road, which is below the *CEQR Technical Manual* screening threshold of 50 peak-hour PCEs as described in Section 9.3.13, "Transportation." The work activities at the Vly Atwood Road Study Area would be short-term (totaling 16 weeks over 2.5 years; see **Table 9.5-2**) and would not generate public parking or transportation demands or pedestrian activity within the

Vly Atwood Road Study Area. Following completion of the repair and rehabilitation, traffic patterns would return to baseline conditions.

Therefore, although there would be a minor temporary increase in traffic, the repair and rehabilitation would not result in significant adverse impacts to transportation within the Vly Atwood Road Study Area.

9.5.3.10 Noise

As described in Section 9.3.15, “Noise,” mobile noise associated with the repair and rehabilitation within the Vly Atwood Road Study Area does not warrant analysis. This section includes an analysis of potential impacts from stationary noise associated with the repair and rehabilitation to sensitive receptors within the Study Area.

The study area for the stationary noise analysis is the area within 1,500 feet of the repair and rehabilitation activities, as shown on **Figure 9.5-11**. The Vly Atwood Road Noise Study Area includes residential parcels within 1,500 feet of the repair and rehabilitation work sites that are considered noise-sensitive receptors for this analysis. The temporary work activities were evaluated to disclose potential noise levels at the nearest residence. While the Town of Marbletown does not have a noise code applicable to the Vly Atwood Road Study Area, there are noise-sensitive receptors within the study area that warrant an analysis.

Existing ambient noise levels within the Vly Atwood Road Study Area are influenced by vehicular traffic traveling on Atwood Road. The existing noise levels within the study area are comparable to a very quiet suburban and rural residential environment based on the distance from major transportation corridors, the population density of the area, and the presence of other noise-producing elements. Typical noise levels (measured as L_{eq}) for very quiet suburban and rural communities are 40 dBA during the daytime and 34 dBA during the nighttime.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP’s understanding that no major projects that would result in a change in land use, or new noise-generating sources that would contribute to an increase in ambient noise levels are anticipated within the Vly Atwood Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that ambient noise levels within the Vly Atwood Road Study Area would be similar to baseline conditions.

In the future with the repair and rehabilitation, stationary noise-producing work activities within the Vly Atwood Road Study Area would occur at two sites. The stationary noise-generating equipment that would be used within the Vly Atwood Road Study Area was evaluated to determine which work activity would have the potential to emit the most noise and, therefore, be the basis of this stationary noise analysis. Of the activities, the stationary noise-generating equipment associated with leak repair would emit the most noise. Internal leak repairs would occur in fall ~~2018~~2017, for up to 24 hours per day, 7 days a week, for approximately 5 weeks during the first 10-week shutdown (see **Table 9.5-2**).

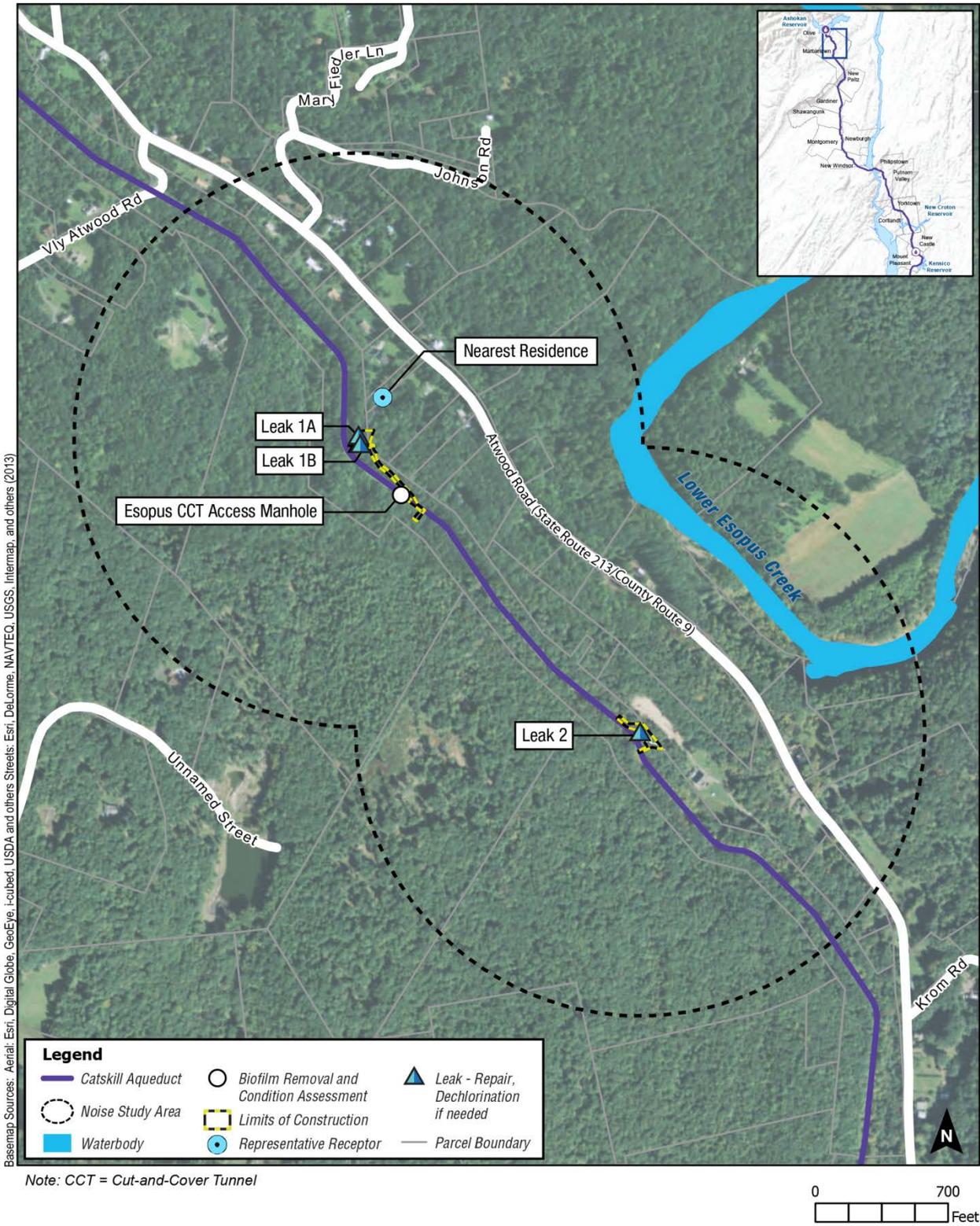


Figure 9.5-11: Noise – Vly Atwood Road Study Area



The noise analysis focused on the three loudest stationary noise-generating equipment types necessary for the leak repair. Associated equipment reference noise levels are shown in **Table 9.5-7**. The types of noise-generating equipment analyzed were conservatively based on peak construction operating conditions.

Table 9.5-7: Stationary Source Construction Equipment Modeled at the Vly Atwood Road Study Area - Noise Analysis and Reference Noise Levels (L_{eq})

Equipment Type	Reference Noise Level (L_{eq}) at 50 feet (dBA) ¹
Ventilation Fan	85
Generator	82
Backhoe	76
Note: ¹ City Environmental Quality Review (CEQR) Technical Manual, Chapter 22.	

Leak repair within the Vly Atwood Road Study Area during the repair and rehabilitation would emit a noise level (L_{eq}) of approximately 73 dBA at the nearest residence located approximately 250 feet away from the leak repair activities.

Although there would be an increase in stationary noise levels, work would primarily occur in the fall and winter months when residents typically have windows closed, and noise levels inside would be further reduced to an interior noise level (L_{eq}) of approximately 49 dBA.

Following completion of the repair and rehabilitation work activities, the construction equipment and vehicles would be removed from the Vly Atwood Road Study Area. The repair and rehabilitation work activities would be temporary with the peak work activities occurring during leak repair in fall ~~2018~~2017 for a limited period (5 weeks, see **Table 9.5-2**).

Therefore, although there would be a temporary increase in noise, noise from the repair and rehabilitation would not result in significant adverse impacts to sensitive receptors within the Vly Atwood Road Study Area.

9.5.3.11 Neighborhood Character

The character of the Vly Atwood Road Study Area is largely defined by a mix of public services, vacant land, and residential land uses, as well as its physical setting within a rural location (see **Figure 9.5-7**). The Catskill Aqueduct traverses the study area in a general northwest to southeast direction. Atwood Road crosses the eastern portion of the study area paralleling the aqueduct. Hendricks Killitje, a tributary to lower Esopus Creek to the east of the study area, crosses the study area in a north to south direction near Leaks 1A and 1B. The access manhole, Leaks 1A, 1B, and 2 are located in a public services corridor, which is owned and maintained by DEP. The access manhole would be accessed via Vly Atwood Road and driving over the cut-and-cover tunnel. Leaks 1A and 1B would be accessed by the same route and then driving down an existing earthen access road located along the eastern side of the cut-and-cover berm. Leak 2 would be accessed via Vly Atwood Road and driving over the cut-and-cover tunnel and down the cut-and-cover berm.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP's understanding that no changes in land use and no new projects or structures are anticipated within the Vly Atwood Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that neighborhood character within the study area would be similar to baseline conditions.

As described in Section 9.3.16, "Neighborhood Character," there would be no potential for the repair and rehabilitation to affect shadows and urban design. In addition, based on the screening assessment for open space and recreation, historic and cultural resources, and visual resources, an impact analysis for the Vly Atwood Road Study Area was not warranted, as discussed in the following sections: Section 9.3.6, "Open Space and Recreation," Section 9.3.7, "Historic and Cultural Resources," and Section 9.3.8, "Visual Resources." As described in Section 9.5.3.5, "Land Use and Zoning," and Section 9.5.3.6, "Socioeconomic Conditions," the work activities would not affect land use and zoning and socioeconomic conditions in the Vly Atwood Road Study Area. Furthermore, the public policy impact analysis provided in Section 9.5.2, "Town of Marbletown Impact Analysis," concluded the work activities were consistent with applicable plans.

As described in Sections 9.5.3.9, "Transportation," and 9.5.3.10, "Noise," during construction, the work activities in the Vly Atwood Road Study Area would be short-term (totaling 16 weeks over 2.5 years) and would result in a temporary increase in traffic and noise. Following completion of the repair and rehabilitation, the construction equipment and vehicles would be removed from the study area and traffic patterns would return to baseline conditions. These temporary increases in traffic and noise levels would not result in a density of activity or service conditions that would affect the overall character of the study area.

The repair and rehabilitation would not generate significant adverse effects in: land use, zoning, and public policy; socioeconomic conditions; open space and recreation; shadows; historic and cultural resources; urban design and visual resources; transportation; or noise.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to neighborhood character within the Vly Atwood Road Study Area.

9.5.4 PINE BUSH ROAD STUDY AREA IMPACT ANALYSIS

Within the Pine Bush Road Study Area, the aqueduct transitions from the Esopus Cut-and-Cover Tunnel to the Rondout Pressure Tunnel via a deep vertical shaft at the Rondout Pressure Tunnel Downtake Chamber (Rondout Downtake Chamber), which is equipped with a boathole to the north. An access manhole with a culvert drain is located within the northern portion of the study area (see **Figure 9.5-12**).

Work activities within the Pine Bush Road Study Area would include: staging and access improvements; biofilm removal and condition assessment; boathole preparation and installation; air vent installation; sluice gate removal; and large-scale wash water treatment.

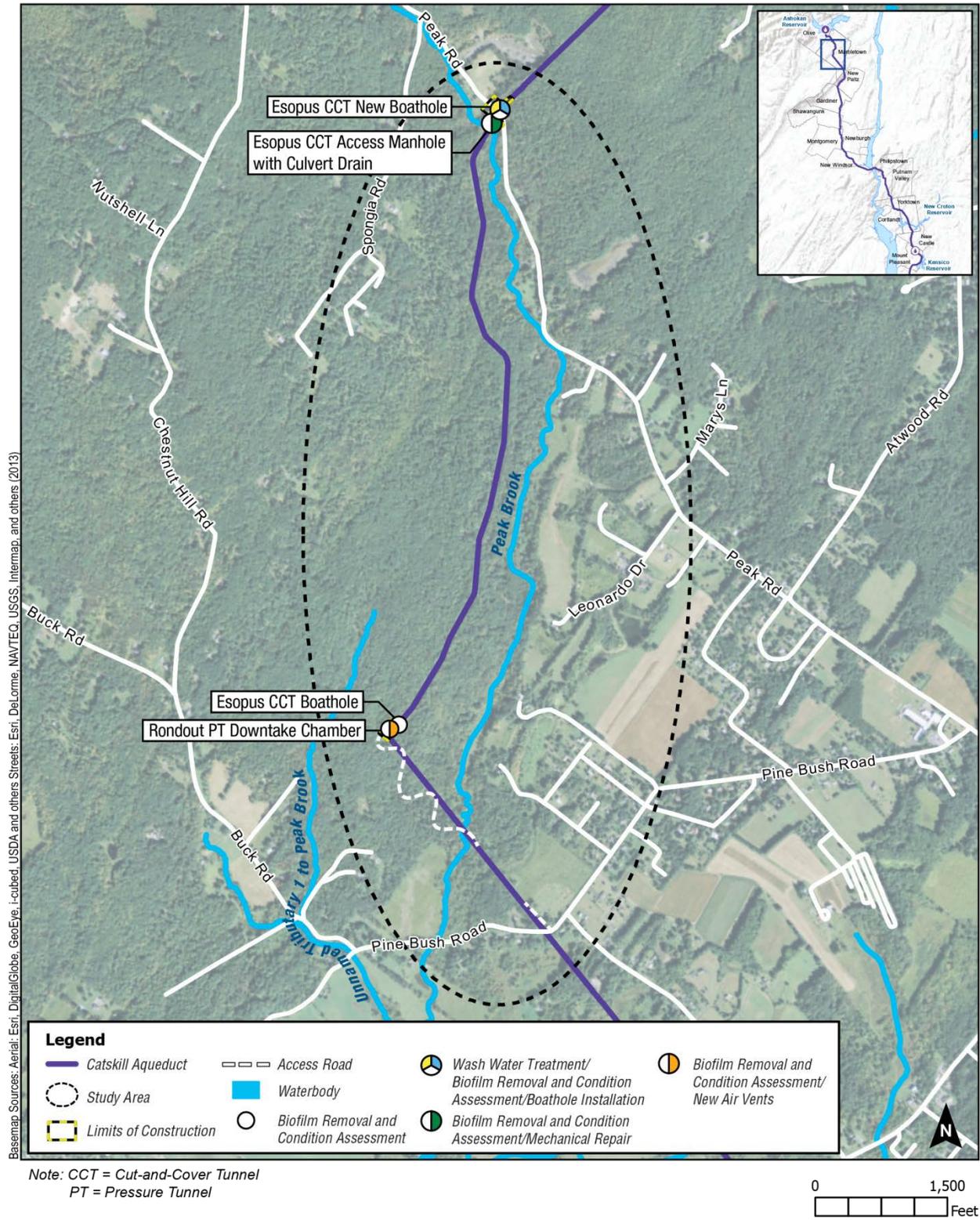


Figure 9.5-12: Study Area – Pine Bush Road



9.5.4.1 Study Area Location and Description

The Pine Bush Road Study Area is located along the upper Catskill Aqueduct within the Town of Marbletown. The Catskill Aqueduct traverses the study area in a general north to south direction. The study area is roughly bounded by Chestnut Hill Road to the west, Pine Bush Road to the south, and Peak Road to the northeast. Peak Brook traverses the study area longitudinally, paralleling the path of the aqueduct to its east. Proposed work sites within the study area include one at Peak Road and one at the Rondout Downtake Chamber. Access to the Peak Road work site would be provided directly from Peak Road. The Rondout Downtake Chamber would be accessed by a private driveway connecting to Pine Bush Road. The study area boundary is located approximately 400 feet beyond the outermost areas of disturbance related to the work sites. **Figure 9.5-12** shows an aerial photograph of the study area, including the path of the aqueduct and the limits of construction. **Figure 9.5-13** shows photographs of the study area.

Land use within the Pine Bush Road Study Area is primarily residential and vacant land, along with parcels designated as industrial, agricultural, and public services. The study area is generally wooded with some large grassy fields in its southeastern portion. The limits of construction for both work sites are located within a public services corridor which is owned and maintained by DEP. Access to the Rondout Downtake Chamber would require crossing private property with permission from the owner. **Figure 9.5-14** shows a map of the land uses in the study area and its surroundings.

The study area includes residential (R-3, A-2, and A-3) zoning districts, as designated by the Town of Marbletown Zoning Code (see **Figure 9.5-15**). The Catskill Aqueduct is primarily located within two different residential (R-3 and A-3) zoning districts, with a small portion in another residential zoning district (A-2) in the southeastern part of the study area. The Catskill Aqueduct is a permitted use as a water supply utility within these residential (R-3, A-2, and A-3) zoning districts.

There are no federal, State, or local designated landmarks, historic districts, or known archeological resources within the study area.

9.5.4.2 Proposed Activities within the Pine Bush Road Study Area

To support activities within the Pine Bush Road Study Area, the Ashokan Screen Chamber (within the Ashokan Screen Chamber Study Area in the Town of Olive) would serve as a primary staging area from which workers would be transported to the site daily. Several secondary staging areas, including one adjacent to Peak Road and one at the Rondout Downtake Chamber, would provide additional parking. Equipment and materials would be staged on site. Erosion and sediment control measures such as silt fencing and hay bales would be installed at the perimeter of the work sites as needed. Site plans showing layouts of the limits of construction for the work sites, which would occupy a total of 2.1 acres, are shown on **Figure 9.5-16** and **Figure 9.5-17**. The schedule for work within the study area is shown in **Table 9.5-8**. The duration of active construction within the Pine Bush Road Study Area is estimated to total 23 weeks over 1.5 years, with some overlapping work activities during the shutdowns.



Photograph 1: Access Road looking from the southwest at the Esopus Cut-and-Cover Tunnel Boathole.



Photograph 2: Staging area at Peak Road looking south

Figure 9.5-13: Photograph – Pine Bush Road Study Area



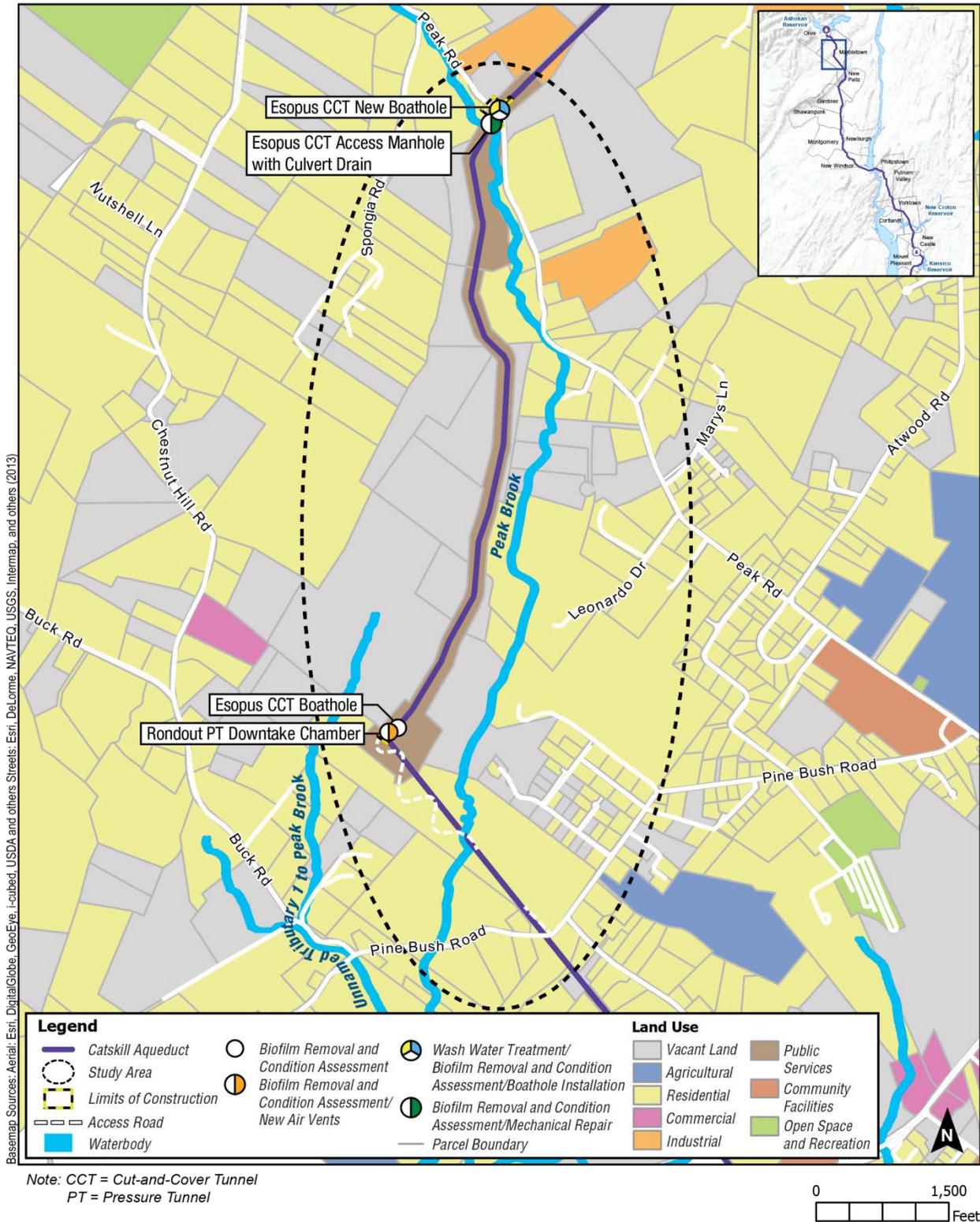


Figure 9.5-14: Land Use – Pine Bush Road Study Area



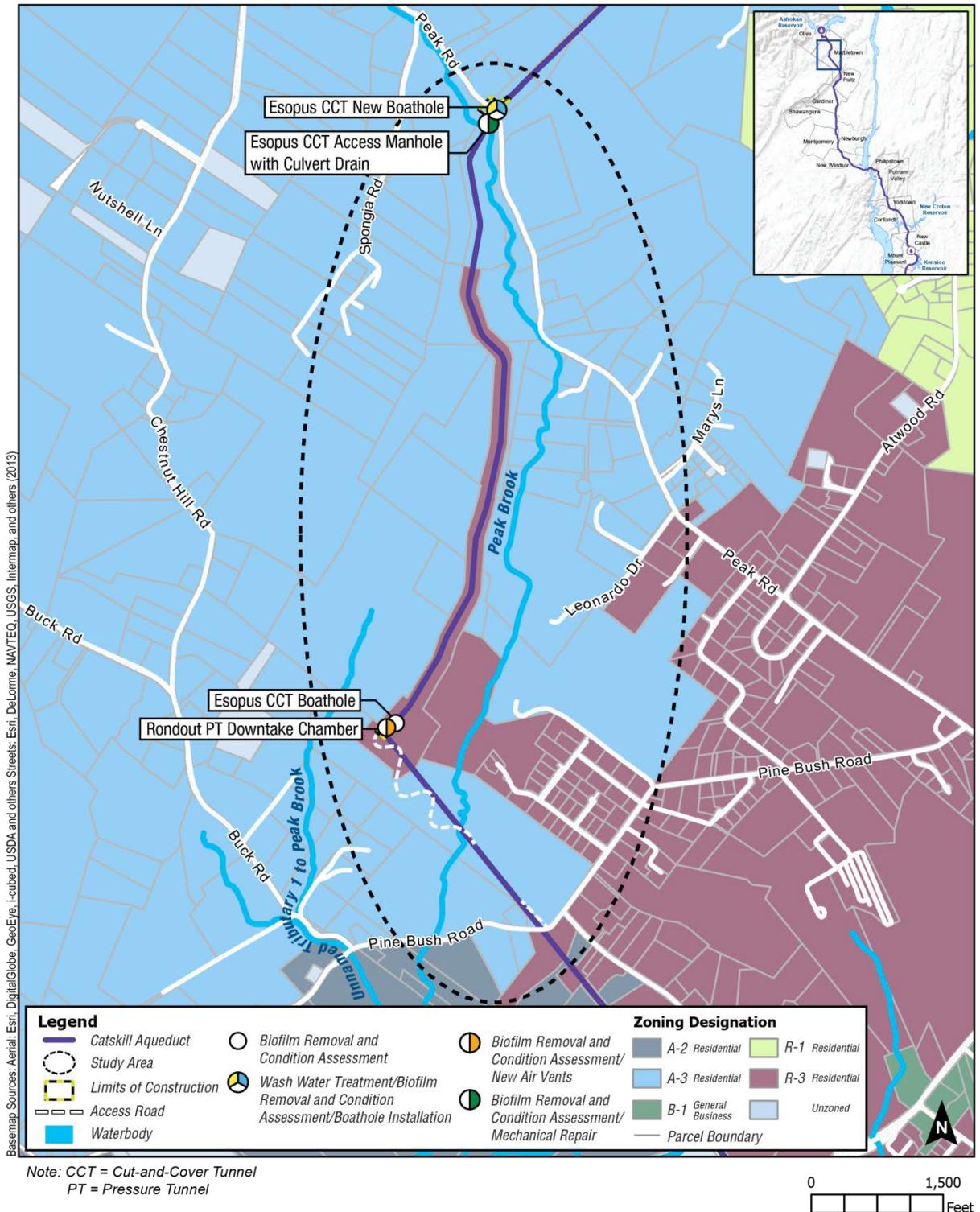


Figure 9.5-15: Zoning – Pine Bush Road Study Area



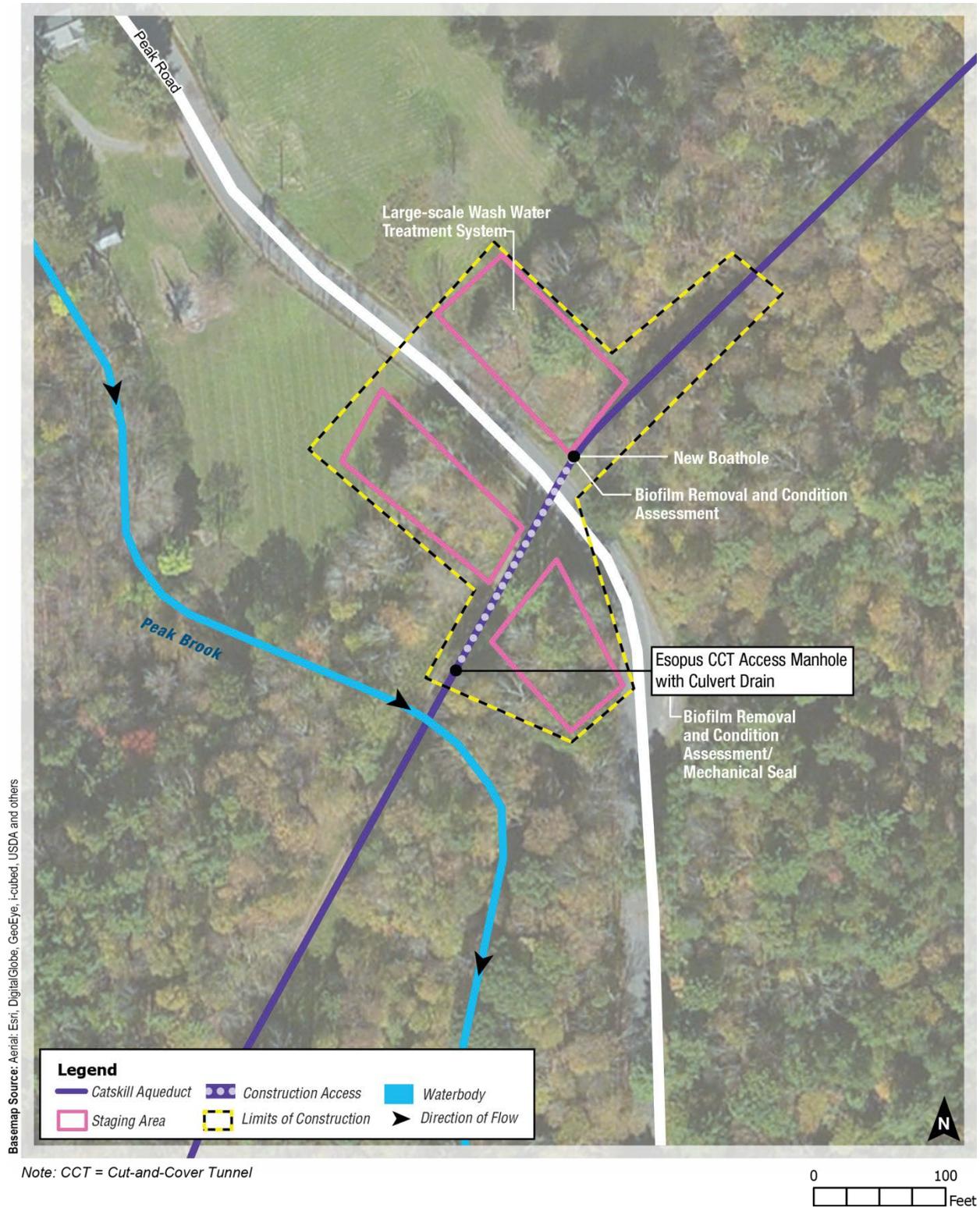
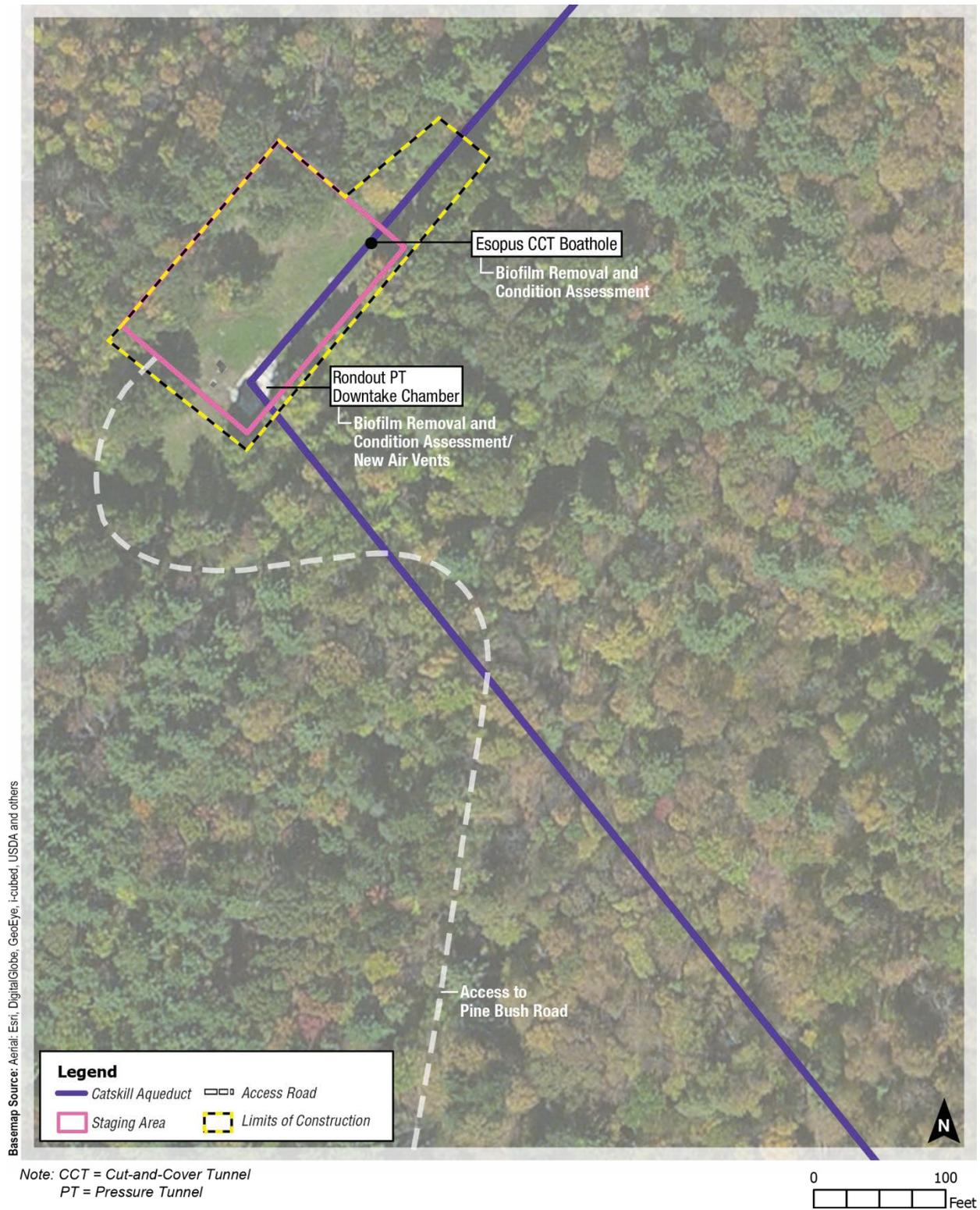


Figure 9.5-16: Site Plan for Esopus CCT at Peak Road – Pine Bush Road Study Area





Basemap Source: Aerial: Esri, DigitalGlobe, GeoEye, i-cubed, USDA and others

Figure 9.5-17: Site Plan for Rondout Pressure Tunnel Downtake Chamber – Pine Bush Road Study Area



Table 9.5-8: Schedule of Work Activities within the Pine Bush Road Study Area

Work Activity	Dates	Duration	Work Hours	Crew Size ¹
Staging and Access Improvements ²	Summer 2019 2018	2 weeks	Monday to Friday, 7 AM to 5 PM	8
Boathole Preparation	Summer 2019 2018	3 weeks	Monday to Friday, 7 AM to 5 PM	10
Boathole Installation	Fall 2019 2018 (Second 10-week shutdown)	2 weeks	7 days a week, 7 AM to 7 PM	8
Air Vent Installation	Fall 2019 2018 (Second 10-week shutdown)	3 weeks	7 days a week, 7 AM to 7 PM	8
Sluice Gate Removal	Fall 2019 2018 (Second 10-week shutdown)	3 weeks	7 days a week, 7 AM to 7 PM	12
Biofilm Removal and Condition Assessment ³	Fall 2020 2019 (Third 10-week shutdown)	9 weeks	7 days a week, 7 AM to 7 PM	21
Large-scale Wash Water Treatment ³	Fall 2020 2019 (Third 10-week shutdown)	10 weeks	7 days a week, 24 hours per day	7
Notes:				
¹ Crew size refers to the number of people anticipated at the work site(s).				
² Tree removal would be conducted from November 1 through March 31 to avoid impacts to Indiana bats (<i>Myotis sodalis</i>) and northern long-eared bats (<i>Myotis septentrionalis</i>).				
³ Overlapping activities are estimated to total 9 weeks and are not included in the duration of active construction.				

Work in the study area would begin with access improvements in summer ~~2019~~2018. In addition to underbrush clearing and gravel placement for leveling and erosion control, improvements would entail the removal of up to 16 trees along Peak Road for installation of the new boathole. No staging or access improvements would be necessary at the Rondout Downtake Chamber other than underbrush clearing and gravel placement for leveling and erosion control. These improvements would remain in place following construction so this area can continue to be utilized by DEP for future operations and maintenance activities. Following the access improvements, preparation of the new boathole would occur, including the excavation of approximately 45 cubic yards of soil and construction of a cast-in-place concrete collar. Boathole installation, which requires unwatering of the aqueduct to tie into the crown of the cut-and-cover tunnel, would take place during the second 10-week shutdown in fall ~~2019~~2018.

Air vent installation would occur during the second 10-week shutdown in fall ~~2019~~2018. Three air vent structures would be delivered to the site and mounted on a concrete slab, which would replace an existing removable concrete slab on top of the Rondout Downtake Chamber. Minor excavation of approximately 18 inches of soil may be required to access the existing opening. Also at this time, the sluice gate within the culvert drain access manhole at Peak Road would be

removed and replaced with a blind flange to seal the opening that is covered by the existing sluice gate.

Lastly, biofilm removal and condition assessment would occur during the third 10-week shutdown in fall ~~2020~~2019. Access into the aqueduct would be provided by the new boathole, the culvert drain access manhole, and the existing boathole at the Rondout Downtake Chamber. These locations would also serve as collection points for biofilm, which would be transported for disposal at a registered, permitted, or otherwise authorized facility. Although the aqueduct would be unwatered during this shutdown, any residual water would be diverted through an internal bypass pipe around the work segments within the aqueduct for discharge to the aqueduct downstream. Any residual water that does not meet water quality standards, and any wash water generated from biofilm removal would then be transported to a large-scale wash water treatment system that would be established at the new boathole. The wash water would be treated to meet water quality standards for discharge back into the aqueduct or to a nearby waterbody (see Section 9.2, “Project Description”). The treatment system would require 24-hour operation to process the anticipated volume of wash water. Upon completion of biofilm removal and condition assessment, all equipment and materials would be removed, and any areas requiring temporary disturbance would be restored to baseline conditions. There would be no temporary or permanent in-stream disturbance.

Impact categories analyzed for the Pine Bush Road Study Area are presented in Sections 9.5.4.3, “Natural Resources” through Section 9.5.4.7, “Neighborhood Character,” and include natural resources including water resources, terrestrial resources, and federal/State Threatened and Endangered Species and State Species of Special Concern; hazardous materials; transportation; stationary noise; and neighborhood character. Additionally, the study area’s compatibility with applicable public policies was analyzed on a town-wide basis in Section 9.5.2, “Town of Marbletown Impact Analysis.” As described in Section 9.3, “Screening Assessment and Impact Analysis Methodology,” an impact analysis related to land use and zoning; socioeconomic conditions; community facilities and services; open space and recreation; historic and cultural resources; visual resources; the remaining natural resources subcategories, including geology and soils, aquatic and benthic resources, wildlife, federal/State Candidate Species, and unlisted rare and vulnerable species; energy; air quality; and mobile noise within the study area is not warranted. Finally, impacts related to project-wide natural resources, water and sewer infrastructure, and public health were analyzed in Section 9.19, “Project-wide Impact Analysis.”

9.5.4.3 Natural Resources

The study area for the natural resources analysis is comprised of two sections. One section includes the area surrounding the limits of construction for the new boathole location at Peak Road, and the other section to the south includes the limits of construction surrounding the new air vent locations at the Rondout Downtake Chamber (see **Figure 9.5-18** and **Figure 9.5-19**). These sections are collectively referred to as the natural resources study area.

Based on field visits conducted on September 17, 2014 and January 23, July 28 and July 31, 2015, the natural resources study area is classified as a hemlock-northern hardwood forest near Peak Road within a ravine and chestnut oak forest surrounding the ravine. Ground cover over the Catskill Aqueduct and surrounding the Rondout Downtake Chamber consists

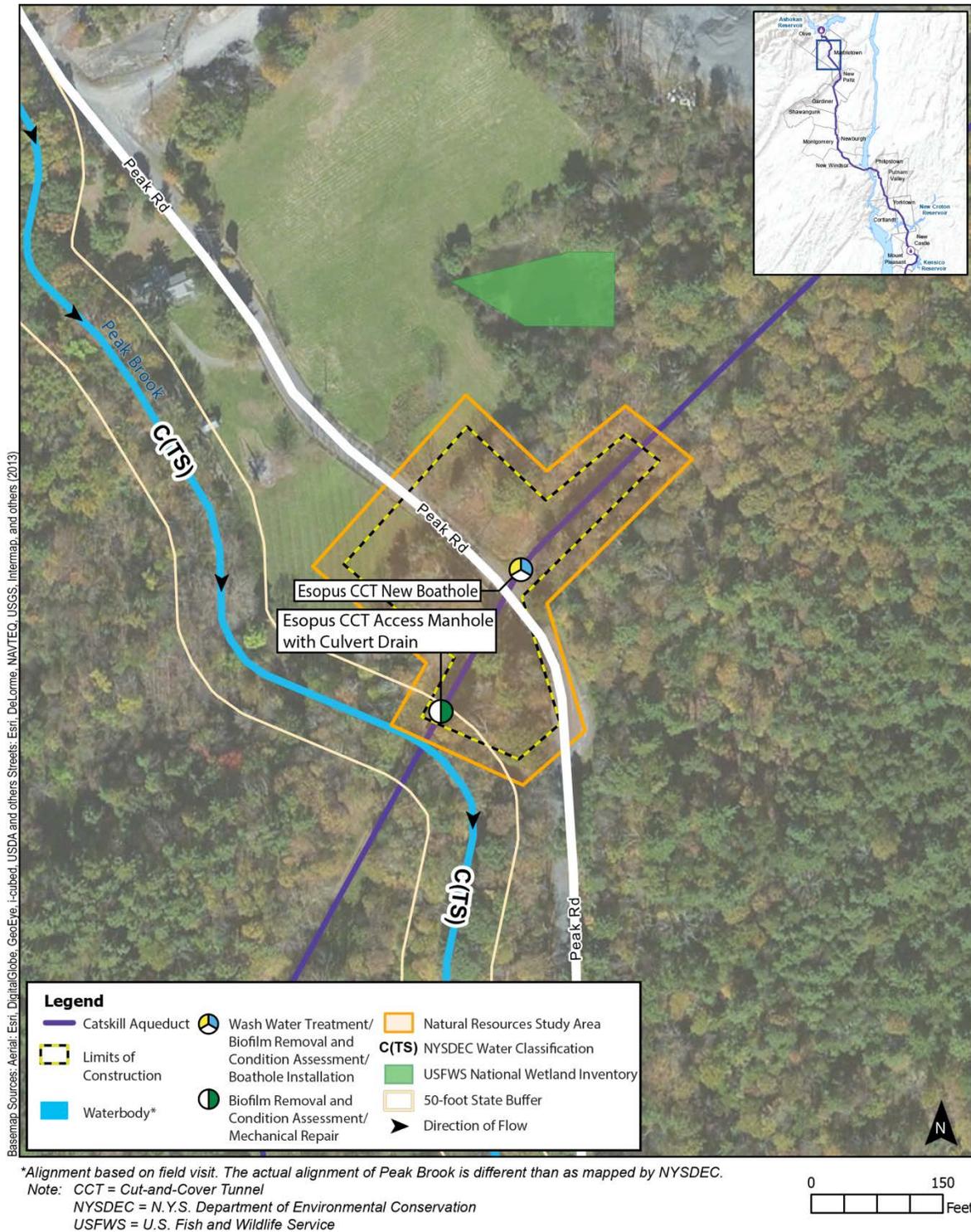


Figure 9.5-18: Natural Resources for Peak Road - Pine Bush Road Study Area



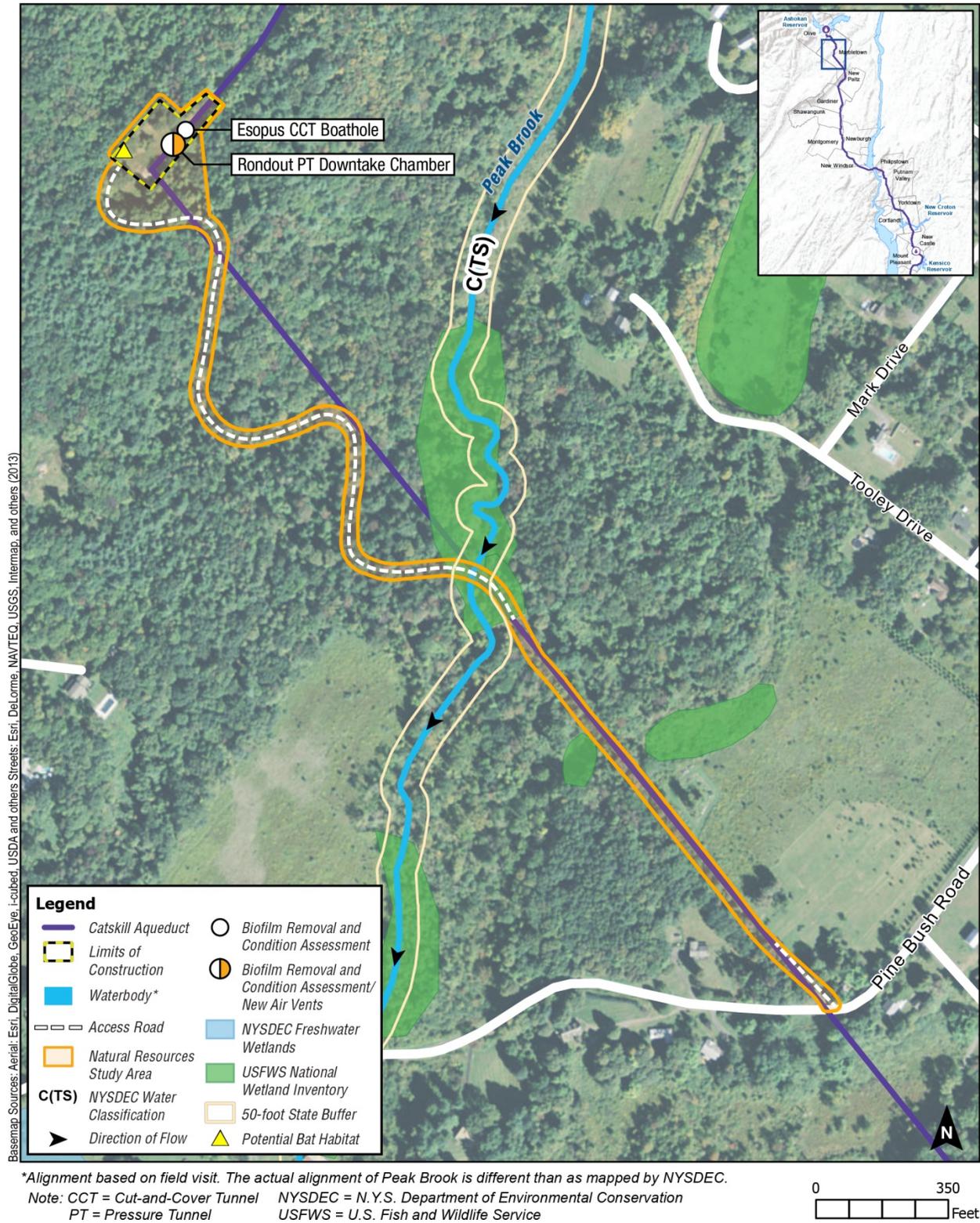


Figure 9.5-19: Natural Resources for Rondout Pressure Tunnel Downtake Chamber - Pine Bush Road Study Area



mostly of mowed lawn. These habitats have the potential to support protected water resources, terrestrial resources, and wildlife species. Therefore, an analysis of the potential effects to natural resources that could result from repair and rehabilitation activities is presented below.

Water Resources

The natural resources study area is within the lower Hudson River drainage basin, more specifically within the Rondout watershed (HUC 02020007) and the Coxing Kill-Rondout Creek subwatershed (HUC 020200070604).

Peak Brook could be subject to federal jurisdiction under Sections 401 and 404 of the Clean Water Act. There are no mapped wetlands within the natural resources study area. Peak Brook flows northwest to southwest and crosses under the aqueduct near Peak Road and the Rondout Downtake Chamber (see **Figure 9.5-12**). As a Class C(TS) stream, Peak Brook is subject to State Protection of Waters regulations with a regulated 50-foot buffer to protect the streambed and banks. Based on consultations with NYSDEC, this watercourse may support trout spawning and construction activities would be subject to time of year restrictions for trout spawning waters.

Additionally, because the Town of Marbletown does not regulate streams, the activities associated with the repair and rehabilitation are not subject to local requirements (Marbletown Town Code Chapter 200: Zoning).

Surface Water

Surface water within the natural resources study area was identified in the field and through a desktop evaluation of NYSDEC water classification data, historic USGS topographic maps, national hydrography data, and local topography. Based upon this review, Peak Brook was the only surface water identified in the natural resources study area (see **Figure 9.5-12**).

Peak Brook

Peak Brook flows from the northwest into the southwest portion of the study area. This water resource is located west of the limits of construction near Peak Road, then turns and exits the study area to the south (see **Figure 9.5-18**). Peak Brook continues to flow in a southerly direction where it crosses under the existing access road associated with the Rondout Downtake Chamber, outside the limits of construction, and continues outside of the study area in a southerly direction (see **Figure 9.5-19**).

Future Without the Repair and Rehabilitation

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP's understanding that no projects or developments are anticipated within the natural resources study area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that the future conditions of water resources within the Pine Bush Road Study Area would be the same as baseline conditions.

Analysis of Potential Effects

This section analyzes the potential for temporary and permanent disturbance to water resources associated with the repair and rehabilitation and long-term operation of the Catskill Aqueduct in the Pine Bush Road Study Area.

Construction

Work activities associated related to the repair and rehabilitation in the immediate vicinity of the Esopus Cut-and-Cover Tunnel at Peak Road would be limited to upland areas on top of and adjacent to the cut-and-cover tunnel. Clearing of some brush would be necessary for the staging areas at Peak Road, which would temporarily affect the State-regulated buffer to Peak Brook. The limits of construction at the Rondout Downtake Chamber would occur in upland areas, outside of the regulated water resource buffers. Prior to commencing the repair and rehabilitation, temporary sediment and erosion control measures, such as silt fences, would be installed to avoid indirect effects on Peak Brook. These temporary measures would be designed in accordance with the State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity and other applicable regulatory requirements.

Anticipated temporary disturbance to water resources and regulated buffers were quantified based on the limits of construction and proposed work activities (see **Table 9.5-9**). There would be no disturbance to Peak Brook. Construction staging and activities would result in approximately 1,280 square feet of temporary disturbance associated with the State Protection of Waters Buffer. Following construction, temporarily disturbed areas would be restored to natural conditions and planted with native vegetation. No effects to water resources are anticipated.

Table 9.5-9: Estimated Disturbance to Water Resources within the Pine Bush Road Natural Resources Study Area

Water Resource	Baseline Conditions (Square Feet)	Temporary Effects (Square Feet)	Permanent Effects (Square Feet)
Peak Brook	370	0	0
50-foot State Protection of Waters Buffer	17,200	1,280 <i>Construction staging area and access improvements</i>	0

Operation

Following the repair and rehabilitation, operation of the Catskill Aqueduct within the study area would be consistent with baseline conditions. Water resources would be unaffected by maintenance activities. Native vegetation planted in temporarily disturbed areas within the 50-foot State Protection of Waters Buffer would become established and surrounding vegetation would colonize the area, thereby providing a protected stream buffer consistent with baseline conditions.

Water Resources Conclusions

Repair and rehabilitation work activities would include construction staging, which would be located within the State Protection of Waters Buffer for Peak Brook. Work activities at the Rondout Downtake Chamber would not affect water resources. No wetlands were identified within the natural resources study area. Temporary sediment and erosion control measures would be implemented to protect Peak Brook during construction, and temporarily disturbed areas would be restored to natural conditions following construction.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to water resources within the Pine Bush Road Study Area.

Terrestrial Resources

The natural resources study area consists of a hemlock-northern hardwood forest within a ravine and chestnut oak forest surrounding the ravine near Peak Road, and mowed lawn surrounding the Rondout Downtake Chamber. The tree species at this study area consist of eastern red-cedar (*Juniperus virginiana*), slippery elm (*Ulmus rubra*), white ash (*Fraxinus americana*), white pine (*Pinus strobus*), eastern hemlock (*Tsuga canadensis*), red maple (*Acer rubrum*), red oak (*Quercus rubra*), black cherry (*Prunus serotina*), mockernut hickory (*Carya tomentosa*), and sweet birch (*Betula lenta*). These areas of hemlock-northern hardwood forest and chestnut oak forest observed during field visits are not mapped as significant natural communities by the NYNHP. Herbaceous species included switchgrass (*Panicum vergatum*), Indian strawberry (*Duchesnea indica*), red clover (*Trifolium pratense*), goldenrods (*Solidago* spp.), path rush (*Juncus tenuis*), and sweet white clover (*Melilotus albus*). While the Town of Marbletown does not regulate the removal of trees associated with the repair and rehabilitation, terrestrial resources within this study area warrant an analysis.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP's understanding that no new projects or developments that would affect terrestrial resources are anticipated within the Pine Bush Road Study Area within the timeframe of the impact analysis. Natural processes, such as changes in habitat due to natural vegetative succession, are anticipated to continue. Therefore, in the future without the repair and rehabilitation, it is assumed that terrestrial resources within the study area would be the same as baseline conditions.

Work activities would include minor tree clearing and shrub removal for the purpose of improving site access and staging areas. An estimated 16 trees, consisting of six species with a range of average dbh of between 5 and 17.7 inches, would be removed to facilitate access to the staging area. The most common species of trees to be removed include seven white ash and three white pine. These trees are primarily located to the north of the existing Catskill Aqueduct. Tree removal would occur in discrete locations along the densely forested areas northeast and southwest of Peak Road, and would not dramatically change the character of the natural resources study area or affect surrounding trees. All tree removal would be conducted from November 1 through March 31 to avoid impacts to Indiana bats (*Myotis sodalis*) and northern long-eared bats (*Myotis septentrionalis*). No tree removal is proposed at the Rondout Downtake Chamber. Following construction, temporarily disturbed areas would be restored to natural conditions.

Vegetated areas temporarily cleared during construction are anticipated to grow back with similar communities. Following the repair and rehabilitation, operation of the Catskill Aqueduct would be consistent with baseline conditions. Natural reforestation and vegetative succession of aqueduct areas not routinely maintained would continue to occur over time.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to terrestrial resources within the Pine Bush Road Study Area.

Federal/State Threatened and Endangered Species and State Species of Special Concern

This section includes an analysis of potential impacts to federal/State Threatened and Endangered Species and State Species of Special Concern identified in Section 9.3.9, “Natural Resources,” as having the potential to be affected by activities within the natural resources study area. To identify those species that could be affected, species that could occur up to 0.25 mile from the work sites were determined in consultation with USFWS, USACE, NYNHP, and NYSDEC, as well as county and local offices, as applicable.

As discussed in Section 9.3.9, “Natural Resources,” five species were identified to have the potential to be affected by the repair and rehabilitation within the natural resources study area. Therefore, conditions in the future without the repair and rehabilitation, an analysis of the potential for impacts to these five species, and a summary of conclusions on the potential effects resulting from the repair and rehabilitation are provided below.

In the future without the repair and rehabilitation, it is assumed that federal/State Threatened and Endangered Species and State Species of Special Concern within the study area would largely be the same as baseline conditions, other than possible changes in habitat due to natural vegetative succession and general anthropogenic influences.

An analysis of the potential for disturbance to federal/State Threatened and Endangered Species and State Species of Special Concern from the repair and rehabilitation within the natural resources study area is shown in **Table 9.5-10**. The analysis included an evaluation of the repair and rehabilitation work activities within the study area and observations during field visits, as applicable.

Table 9.5-10: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern, and Habitats within the Pine Bush Road Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Amphibians and Reptiles					
Eastern Box Turtle	<i>Terrapene carolina</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visits on September 17, 2014, and January 23, July 28, and July 31, 2015. Potential habitat exists within the mixed hardwood forests. Work activities would include minor tree clearing and shrub removal to improve site access and staging areas. Any eastern box turtles that might otherwise use these areas are expected to instead utilize similar, adjacent habitats during construction. Furthermore, perimeter silt fencing would limit disturbance to adjacent habitat and prevent individual turtles from entering the work sites during construction. Finally, upon construction completion, temporarily disturbed areas would be restored to natural conditions. Therefore, there are no effects anticipated and no further analysis for eastern box turtles is warranted for this study area.	No
Wood Turtle	<i>Glyptemys insculpta</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visits on September 17, 2014, and January 23, July 28, and July 31, 2015. Potential habitat exists within the mixed hardwood forests. Work activities would include minor tree clearing and shrub removal to improve site access and staging areas. Any wood turtles that might otherwise use these areas are expected to instead utilize similar, adjacent habitats during construction. Furthermore, perimeter silt fencing would limit disturbance to adjacent habitat and prevent individual turtles from entering the work sites during construction. Finally, upon construction completion, temporarily disturbed areas would be restored to natural conditions. Therefore, there are no effects anticipated and no further analysis for wood turtles is warranted for this study area.	No
Mammals					
Indiana Bat	<i>Myotis sodalis</i>	Endangered	Endangered	Summer habitat assessments were conducted on July 28 and July 31, 2015. However, no bats were incidentally observed. NYNHP identified a maternity roost colony within 2.5 miles of the work sites and bat hibernacula within 5 miles of the work sites. One tree, an eastern red-cedar, was identified as potential roosting habitat near the Rondout Downtake Chamber. The presence of adjacent forest areas and a potential roost tree within the survey area indicate potential summer habitat for bat species within the forested areas of the study area. Therefore, further analysis is warranted for this study area.	Yes. See further analysis below.

Table 9.5-10: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern, and Habitats within the Pine Bush Road Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	Threatened	Unlisted <u>Threatened</u>	Summer habitat assessments were conducted on July 28 and July 31, 2015. However, no bats were incidentally observed. NYNHP identified a maternity roost colony within 2.5 miles of the work sites and bat hibernacula within 5 miles of the work sites. One tree, an eastern red-cedar, was identified as potential roosting habitat near the Rondout Downtake Chamber. The presence of adjacent forest areas and a potential roost tree within the survey area indicate potential summer habitat for bat species within the forested areas of the study area. Therefore, further analysis is warranted for this study area.	Yes. See further analysis below.
Plants					
Rhodora	<i>Rhododendron canadense</i>	Unlisted	Endangered	NYNHP noted historic species occurrences for rhodora. No specimens or suitable habitat were located in the study area during habitat surveys conducted on July 28 and July 31, 2015. Survey dates generally correspond to the peak growing season when individuals would be most apparent. Therefore, there are no effects anticipated and no further analysis for rhodora is warranted for this study area.	No

Indiana Bat (Myotis sodalis)

Summer habitat surveys were conducted at both work sites in the natural resources study area. Potential bat roosting habitat was observed near the Rondout Downtake Chamber on July 28, 2015 (see **Figure 9.5-19**). One eastern red-cedar with a dbh of approximately 9 inches was identified in the vicinity of the proposed staging area. The tree was dead with longitudinal cracks.

Repair and rehabilitation work activities would predominantly occur on previously disturbed areas along the Catskill Aqueduct. They would be localized and confined to the immediate vicinity of the staging area at Peak Road and the Rondout Downtake Chamber. Tree removal could be required for access and staging, which would occur from November 1 through March 31 to avoid impacts to northern long-eared bats. Repair and rehabilitation would not result in significant loss or modification of forested habitat for roosting northern long-eared bats. Disturbance to in-stream habitat would be avoided, and foraging habitat would continue to be available in the canopy within the natural resources study area and in adjacent forested areas.

There may be temporary noise from repair and rehabilitation work activities that discourages northern long-eared bats from roosting in the immediate vicinity of the work sites. However, there is abundant suitable habitat within the surrounding areas where northern long-eared bats could roost. Construction lighting would be used as needed during the 10-week shutdowns. Because these would occur between October and March, it would be unlikely that bats would be in the area, and no disturbance from nighttime lighting is anticipated. Therefore, the repair and rehabilitation may affect, but is unlikely to adversely affect northern long-eared bats in the natural resources study area.

Northern Long-eared Bat (Myotis septentrionalis)

Summer habitat surveys were conducted at both work sites in the natural resources study area. Northern long-eared bats have been documented to roost in man-made structures. However, there are no structures within the study area that could be used by roosting bats. They are more commonly known to roost in trees (see the potential roosting habitat described for Indiana bats, above).

Repair and rehabilitation work activities would predominantly occur on previously disturbed areas along the Catskill Aqueduct. They would be localized and confined to the immediate vicinity of the staging area at Peak Road and the Rondout Downtake Chamber. Tree removal could be required for access and staging, which would occur from November 1 through March 31 to avoid impacts to northern long-eared bats. Repair and rehabilitation would not result in significant loss or modification of forested habitat for roosting northern long-eared bats. Disturbance to in-stream habitat would be avoided, and foraging habitat would continue to be available in the canopy within the natural resources study area and in adjacent forested areas.

There may be temporary noise from repair and rehabilitation work activities that discourages Indiana bats from roosting in the immediate vicinity of the work sites. However, there is abundant suitable habitat within the surrounding areas where northern long-eared bats could roost. Construction lighting would be used as needed during the 10-week shutdowns. Because

these would occur between October and March, it would be unlikely that bats would be in the area, and no disturbance from nighttime lighting is anticipated. Therefore, the repair and rehabilitation may affect, but is unlikely to adversely affect northern long-eared bats in the natural resources study area.

Federal/State Threatened and Endangered Species and State Species of Special Concern Conclusions

Based on the impact analysis, no take is anticipated. There would be no effects to eastern box turtles (*Terrapene carolina*), wood turtles (*Glyptemys insculpta*), or rhodora (*Rhododendron canadense*) associated with the repair and rehabilitation. Repair and rehabilitation may affect, but is not likely to adversely affect, Indiana bats and northern long-eared bats.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to federal/State Threatened and Endangered Species or State Species of Special Concern within the Pine Bush Road Study Area.

9.5.4.4 Hazardous Materials

To evaluate the potential presence of hazardous materials within the Pine Bush Road Study Area, a Phase I ESA was conducted in general conformance with the scope and limitations of ASTM Practice E 1527-13 and CEQR requirements to identify RECs. The Phase I ESA included site reconnaissance, research on current/historical use, and review of federal and State regulatory listings for both the work sites and neighboring properties within the appropriate search distance defined in the ASTM standard. The findings from the Phase I ESA investigation and results from DEP's legacy files for the work sites, including a geotechnical investigation, were collectively reviewed to assess the potential presence of and potential for disturbance to hazardous materials in the study area. Based on the Phase I ESA investigations, there was no indication of an environmental impact that would constitute a REC as defined by the ASTM standard that would affect activities in the study area. Additionally, there is no history of contamination at or in the vicinity of the Pine Bush Road Study Area.

Geotechnical environmental investigations and sampling were undertaken for contaminants of concern including volatile and semivolatile organics, PCBs, and total petroleum hydrocarbons along the aqueduct within the study area. Chromium, arsenic, nickel, and zinc were noted in the soil sampling results. Total chromium was reported in the samples collected at Rondout Downtake Chamber. Chromium concentrations, however, were consistent over a widespread sampling area and are more likely associated with background concentrations. Along the Catskill Aqueduct, there are widespread occurrences of chromium, which are attributed to the existing geological formations. Arsenic, nickel, and zinc, although naturally occurring in soils, are also likely to be the result of background concentration. Gasoline range organics were not detected in the sample. Total petroleum hydrocarbons were detected, but at low concentrations that would not warrant remedial actions.

Based on the results of the environmental investigations completed within the Pine Bush Road Study Area, no other hazardous materials are known to exist. The soil results support the reuse of

excavated materials associated with the new boathole and vents as backfill and do not suggest the need for special management, handling, or health and safety measures.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP's understanding that no developments or structures that would introduce hazardous materials to the environment are anticipated within the Pine Bush Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that the presence of hazardous materials within the Pine Bush Road Study Area would be the same as baseline conditions.

In the future with the repair and rehabilitation, work activities would require the potential storage and use of a variety of petroleum and other chemical products, such as diesel fuel for back-up power, lubricating oil for construction vehicles, and miscellaneous cleaning and maintenance chemicals. The use and storage of all of these would be in accordance with applicable regulatory requirements and guidelines including those relating to: federal Spill Prevention, Control, and Countermeasures requirements; and State petroleum bulk storage, chemical bulk storage and spill reporting requirements. Furthermore, excavation associated with the work activities for the installation of a new boathole and vents would occur on previously disturbed soils. Following the repair and rehabilitation, all equipment as well as chemical storage would be removed from the Pine Bush Road Study Area. Staging areas would be restored, and operation of the Catskill Aqueduct would be consistent with baseline conditions.

Therefore, the repair and rehabilitation would not result in significant adverse impacts from the presence or disturbance of hazardous materials within the Pine Bush Road Study Area.

9.5.4.5 Transportation

The study area for the transportation analysis consists of the major convergent roadways that would potentially be used by the employee and construction vehicles associated with repair and rehabilitation work activities en route to and from the Pine Bush Road Study Area.

Access to the repair and rehabilitation limits of construction for the work sites within the Pine Bush Road Study Area would be via Pine Bush Road to an existing access road or via Peak Road to the cut-and-cover tunnel (see **Figure 9.5-12**). Pine Bush Road is a two-way local roadway. Peak Road is a two-way local roadway. To the extent available, construction vehicles would travel on truck-permitted roadways directly to and from the Pine Bush Road Study Area. There is no public transportation and little to no pedestrian activity in the immediate vicinity of the study area. Under current operations, DEP employees periodically access the sites; however, no DEP employees work at or visit the study area on a daily basis, and the small number of DEP employee vehicles has little to no effect on traffic conditions within the study area.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP's understanding that no changes in land use or an increase in traffic due to outside developments are anticipated within the Pine Bush Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that traffic, public transportation, and pedestrian activities within the study area would be similar to baseline conditions.

Repair and rehabilitation work activities within the Pine Bush Road Study Area were evaluated to determine which would have the potential to generate the most vehicle trips and, therefore, be the basis of this transportation analysis. Of these activities, large-scale wash water treatment at Peak Road would generate the most vehicle trips. Large-scale wash water treatment would occur in fall ~~2020~~2019 for up to 24 hours per day, 7 days a week for approximately 10 weeks during the third 10-week shutdown period.

In the future with the repair and rehabilitation, construction vehicles associated with large-scale wash water treatment would travel along Peak Road to the cut-and-cover tunnel. The estimated number of peak-day one-way vehicle trips associated with the large-scale wash water treatment is 71 vehicles, or approximately 142 peak-day vehicle round trips that would travel to and from the study area. Approximately 42 vehicle round trips or 42 PCEs, would be workers either traveling to and from the study area or traveling directly to and from the staging area (depending on parking capacity), with potentially 8 daily shuttle trips between the study area and the staging area. The remaining approximately 92 peak-day vehicle round trips (103 PCEs) would be trucks or other construction vehicles.

During a peak day, the estimated number of peak-hour vehicle trip ends is approximately 50 peak-hour vehicle trip ends (57 PCEs). This includes approximately 14 vehicle trip ends (14 PCEs) from workers traveling directly to and from the staging area, approximately 4 peak-hour shuttle trips between the study area and the staging area, and approximately 32 vehicle trip ends (39 PCEs) from trucks or other construction vehicles. For the purpose of this analysis, the peak-hour project-generated vehicles are anticipated to coincide with typical construction hours for employee vehicles entering the site. Assuming three 8-hour shifts, this would be during the 6 AM to 7 AM, 2 PM to 3 PM, and 10 PM to 11 PM hours, and would be unlikely to coincide with the peak-hour for existing traffic. Additionally, the overnight shift could have fewer workers and result in lower peak-hour vehicle trip ends than other shifts.

The repair and rehabilitation would result in approximately 57 peak-hour PCEs along Peak Road, which is above the *CEQR Technical Manual* screening threshold of 50 peak-hour PCEs as described in Section 9.3.13, “Transportation.” The work activities at the Pine Bush Road Study Area would be short-term (totaling 32 weeks over 1.5 years; see **Table 9.5-8**) and would not generate public parking or transportation demands or pedestrian activity within the Pine Bush Road Study Area. Following completion of the repair and rehabilitation, traffic patterns would return to baseline conditions.

Therefore, although there would be a minor temporary increase in traffic, the repair and rehabilitation would not result in significant adverse impacts to transportation within the Pine Bush Road Study Area.

9.5.4.6 Noise

As described in Section 9.3.15, “Noise,” mobile noise associated with the repair and rehabilitation within the Pine Bush Road Study Area does not warrant analysis. This section includes an analysis of potential impacts from stationary noise associated with the repair and rehabilitation to sensitive receptors within the study area.

The study area for the stationary noise analysis is the area within 1,500 feet of the repair and rehabilitation activities as shown on **Figure 9.5-20**. The study area is split into two polygons, which together are considered the noise study area. Therefore, one worst-case receptor was analyzed for each type of receptor.

The Pine Bush Road Noise Study Area includes residential parcels within 1,500 feet of the repair and rehabilitation work sites that are considered noise-sensitive receptors for this analysis. The temporary work activities were evaluated to disclose potential noise levels at the nearest residence. While the Town of Marbletown does not have a noise code applicable to the Pine Bush Road Study Area, there are noise-sensitive receptors within the study area that warrant an analysis.

Existing ambient noise levels within the Pine Bush Road Study Area are influenced by vehicular traffic traveling on Pine Bush Road and local roads. The existing noise levels within the study area are comparable to a very quiet suburban and rural residential environment based on the distance from major transportation corridors, the population density of the area, and the presence of other noise-producing elements. Typical noise levels (measured as L_{eq}) for very quiet suburban and rural communities are 40 dBA during the daytime and 34 dBA during the nighttime.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP's understanding that no major projects that would result in a change in land use, or new noise-generating sources that would contribute to an increase in ambient noise levels are anticipated within the Pine Bush Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that ambient noise levels within the Pine Bush Road Study Area would be similar to baseline conditions.

In the future with the repair and rehabilitation, stationary noise-producing work activities within the Pine Bush Road Study Area would occur on two sites. The stationary noise-generating equipment that would be used within the Pine Bush Road Study Area was evaluated to determine which work activity would have the potential to emit the most noise and, therefore, be the basis of this stationary noise analysis. Of the activities, the stationary noise-generating equipment associated with the boathole installation would emit the most noise. Boathole installation would occur in fall ~~2019~~2018 from 7 AM to 7 PM, 7 days a week for approximately 2 weeks during the second 10-week shutdown. Repair and rehabilitation noise-producing activities also could include 24-hour work during large-scale wash water treatment (see **Table 9.5-8**).

The noise analysis focused on the three loudest stationary noise-generating equipment types necessary for the boathole installation and large-scale wash water treatment. Associated equipment reference noise levels are shown in **Table 9.5-11**. The types of noise-generating equipment analyzed were conservatively based on peak construction operating conditions.

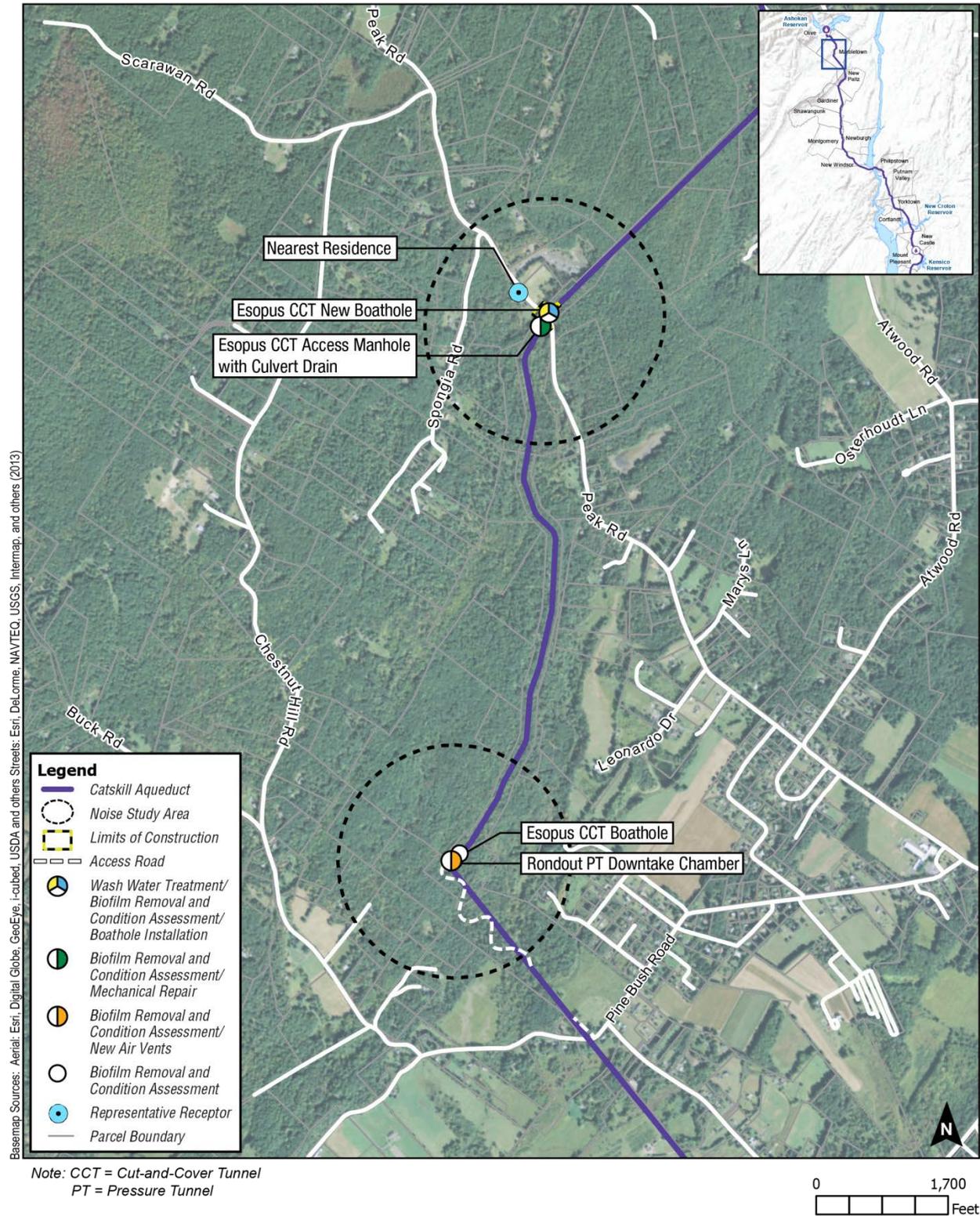


Figure 9.5-20: Noise – Pine Bush Road Study Area



Table 9.5-11: Stationary Source Construction Equipment Modeled at the Pine Bush Road Study Area - Noise Analysis and Reference Noise Levels (L_{eq})

Equipment Type	Reference Noise Level (L_{eq}) at 50 feet (dBA) ¹
Boathole Installation (7 AM to 7 PM, 7 days a week)	
Crane	77
Generator	82
Concrete Mixer	81
Large-Scale Wash Water Treatment (24 hours per day, 7 days a week)	
Generator	82
Crane	77
Backhoe	76
Note:	
¹ City Environmental Quality Review (CEQR) Technical Manual, Chapter 22.	

Boathole installation within the Pine Bush Road Study Area during the repair and rehabilitation would emit a noise level (L_{eq}) of approximately 66 dBA at the nearest residence approximately 480 feet away from the boathole installation activities. Large-scale wash water treatment within the study area would emit a noise level (L_{eq}) of approximately 64 dBA at the nearest residence located approximately 480 feet away from the large-scale wash water treatment activities. Other noise-producing equipment would also be utilized within the study area for a limited period during work activities. However, this equipment would not be expected to be louder than those associated with boathole installation and large-scale wash water treatment.

Following completion of the repair and rehabilitation work activities, the construction equipment and vehicles would be removed from the Pine Bush Road Study Area. The repair and rehabilitation work activities would be temporary in nature with the peak work activities occurring during fall ~~2019~~2018 and fall ~~2020~~2019 for limited periods (up to 10 weeks, see **Table 9.5-8**).

Therefore, although there would be a temporary increase in noise, noise from the repair and rehabilitation would not result in significant adverse impacts to sensitive receptors within the Pine Bush Road Study Area.

9.5.4.7 Neighborhood Character

The character of the Pine Bush Road Study Area is largely defined by a mix of residential and vacant land uses, along with parcels designated as industrial, agricultural, and public services, as well as its physical setting within a rural location (see **Figure 9.5-14**). The Catskill Aqueduct traverses the study area in a general north to south direction. The study area is roughly bounded by Chestnut Hill Road to the west, Pine Bush Road to the south, and Peak Road to the northeast. Peak Brook traverses the study area longitudinally, paralleling the path of the aqueduct to its east. Proposed work sites within the study area include one at Peak Road and one at the Rondout Downtake Chamber. The limits of construction for both work sites are located within a public services corridor which is owned and maintained by DEP. Access to the Peak Road work site

would be provided directly from Peak Road. The Rondout Downtake Chamber would be accessed by a private driveway connecting to Pine Bush Road.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP's understanding that no changes in land use and no new projects or structures are anticipated within the Pine Bush Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that neighborhood character within the study area would be similar to baseline conditions.

As described in Section 9.3.16, "Neighborhood Character," there would be no potential for the repair and rehabilitation to shadows and urban design. In addition, based on the screening assessment for land use and zoning; socioeconomic conditions; open space and recreation, historic and cultural resources, and visual resources, an impact analysis for the Pine Bush Road Study Area was not warranted, as discussed in the following sections: Section 9.3.3, "Land Use, Zoning, and Public Policy," Section 9.3.4, "Socioeconomic Conditions," Section 9.3.6, "Open Space and Recreation," Section 9.3.7, "Historic and Cultural Resources," and Section 9.3.8, "Visual Resources." respectively. Furthermore, the public policy impact analysis provided in Section 9.5.2, "Town of Marbletown Impact Analysis," concluded the work activities were consistent with applicable plans.

As described in Sections 9.5.4.5, "Transportation," and 9.5.4.6, "Noise," the work activities in the Pine Bush Road Study Area would be short-term (intermittently over 1.5 years) and would result in a temporary increase in traffic and noise. Following completion of the repair and rehabilitation, construction equipment and vehicles would be removed from the study area and traffic patterns would return to baseline conditions. These temporary increases in traffic and noise levels would not result in a density of activity or service conditions that would affect the overall character of the study area.

The repair and rehabilitation would not generate significant adverse effects in: land use, zoning, and public policy; socioeconomic conditions; open space and recreation; shadows; historic and cultural resources; urban design and visual resources; transportation; or noise.

Therefore, there would be no significant adverse impacts related to neighborhood character from the repair and rehabilitation within the Pine Bush Road Study Area.

9.5.5 LUCAS TURNPIKE STUDY AREA IMPACT ANALYSIS

Within the Lucas Turnpike Study Area, the aqueduct consists of the Rondout Pressure Tunnel. Four leaks have been identified within this study area (see **Figure 9.5-21**). These are referred to as Leaks 3A, 3B, 4, and a Private Well, which is a leak from a groundwater well on private property.

Work activities within the Lucas Turnpike Study Area would include: staging and access improvements to construct, maintain, and monitor the local dechlorination systems; the installation and operation of local dechlorination systems; and site restoration following completion of aqueduct chlorination.

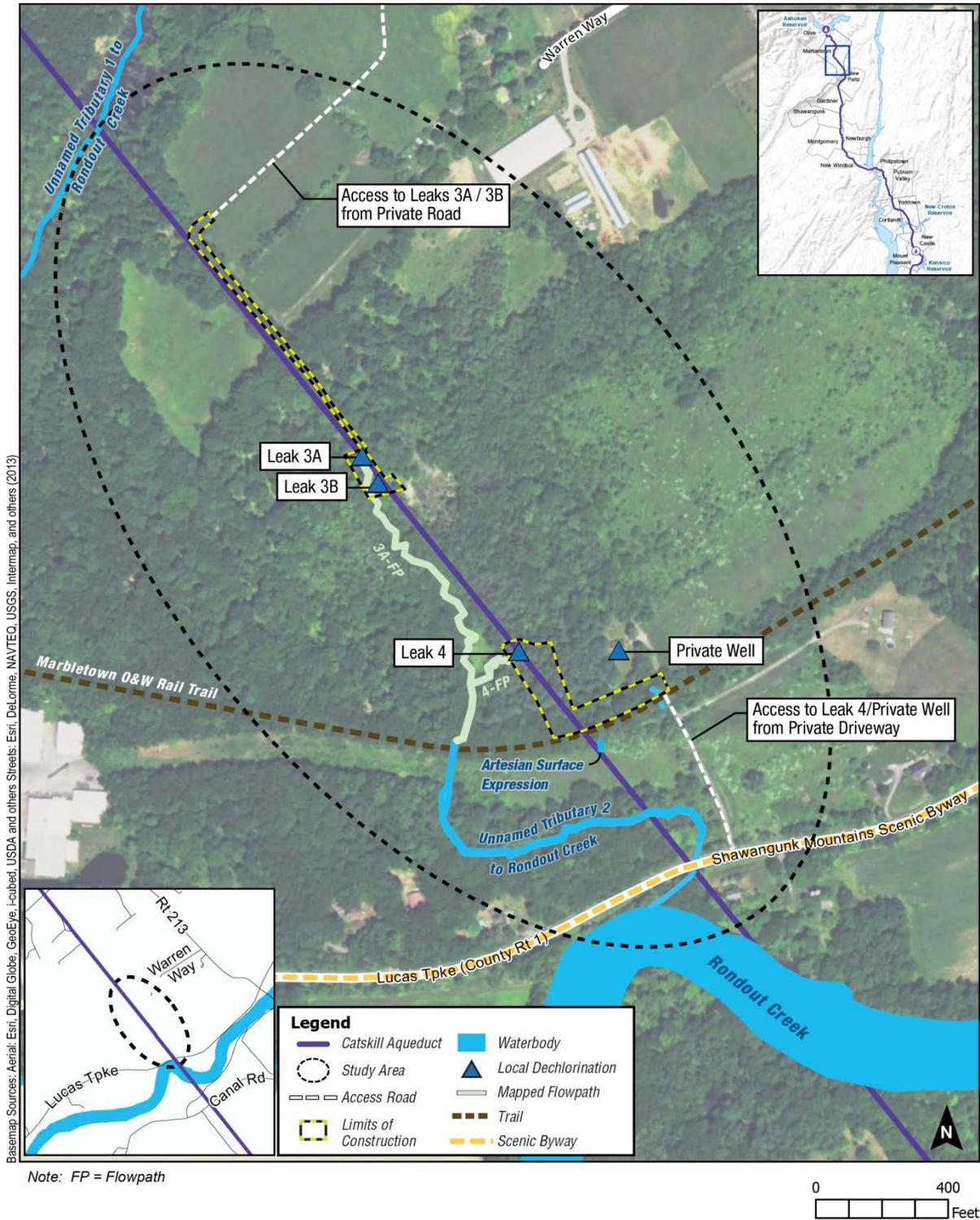


Figure 9.5-21: Study Area – Lucas Turnpike



9.5.5.1 Study Area Location and Description

The Lucas Turnpike Study Area is located along the upper Catskill Aqueduct in the Town of Marbletown. The Catskill Aqueduct traverses the study area in a general northwest to southeast direction. The study area is bounded by Lucas Turnpike (County Route 1) and Rondout Creek to the south. The Marbletown O&W Rail Trail, a linear park owned by the Town of Marbletown, traverses the lower portion of the study area in a general east to west direction.

Proposed work sites within the study area include one at Leaks 3A and 3B, one at Leak 4, and one at a groundwater well on private property (referred to as the Private Well). The study area boundary is located generally 400 feet beyond the outermost areas of disturbance related to the work sites and their associated access routes, with the exception of the southern boundary which includes a section of Rondout Creek. **Figure 9.5-21** shows an aerial photograph of the study area, including the path of the aqueduct, the limits of construction, and the proposed access routes.

Lucas Turnpike has been designated by NYSDOT as the Shawangunk Mountains Scenic Byway. There are no federal, State, or local designated landmarks, historic districts, or known archeological resources within the study area.

9.5.5.2 Description of Leaks 3A, 3B, and 4

Leaks 3A and 3B are located in forested areas along the Rondout Pressure Tunnel segment of the Catskill Aqueduct, which lies approximately 300 to 500 feet below grade at this location. Leaks 3A and 3B are located within a freshwater wetland west of the aqueduct. **Figure 9.5-22** shows photographs of these leaks and their surroundings.

Leak 3A bubbles to the surface from a pipe and has a faint sulfur smell. Catskill Aqueduct construction records note the presence of hydrogen sulfide dissolved in the groundwater as a result of geochemical reactions with bedrock minerals. Since the pipe was likely used as a boring hole or dewatering conduit during construction of the aqueduct, it is likely that the leak water is influenced by this bedrock mineralogy. Leak 3A flows from the pipe into a small pool impounded by a wooden weir. The leak flows over the weir (see Photograph 1 of **Figure 9.5-22**) and into a shallow channel that conveys the leak flowpath, 3A-FP, southeast. Flowpath 3A-FP then continues to travel southward toward Leak 4. The maximum observed flow of Leak 3A is approximately 104 gpm (150,000 gpd).

Leak 3B is located approximately 100 feet southeast of Leak 3A. Similar to Leak 3A, Leak 3B forms a ponded area at the surface (see Photograph 2 on **Figure 9.5-22**). However, no noticeable flow enters or exits the pond, and Leak 3B does not have an associated flowpath.

Similar to Leaks 3A and 3B, Leak 4 is located in a heavily wooded area and lies approximately 750 feet southeast of Leak 3A near Shaft 4 (sealed in 1912) of the Rondout Pressure Tunnel. Leak 4 has a strong sulfur smell and bubbles into a pond at the surface, which is impounded by a wooden weir (see Photograph 3 on **Figure 9.5-23**). The flowpath from Leak 4 (4-FP) flows over the weir before traveling southwest and combining with the flow from 3A-FP (see **Figure 9.5-21**). The maximum observed flow of Leak 4 is approximately 10.8 gpm (16,000 gpd).



Photograph 1: Leak 3A flows through weir into well-defined shallow channel, referred to as Flowpath 3A-FP.



Photograph 2: View of the ponded area at Leak 3B.

Figure 9.5-22: Photographs – Lucas Turnpike Study Area (Sheet 1)





Photograph 3: Leak 4 flows through weir.



Photograph 4: View of Flowpath 3A-FP, after merging with Flowpath 4-FP, from the southern portion of the natural resources study area (facing upstream). Wetlands are located along Flowpath 3A-FP.

Figure 9.5-23: Photographs – Lucas Turnpike Study Area (Sheet 2)



The combined flows from Leaks 3A and 4 (the continuation of 3A-FP) pass through a culvert under the existing Marbletown O&W Rail Trail, where 3A-FP joins an unnamed tributary to Rondout Creek (see **Figure 9.5-23**). The unnamed tributary then continues south through a second culvert under Lucas Turnpike and ultimately discharges to Rondout Creek. In addition to Leaks 3A and 4, surface water and groundwater in the vicinity the flowpath also contribute to 3A-FP.

9.5.5.3 Description of Private Well

The Private Well is a drilled well with a vertical polyvinyl chloride (PVC) pipe extending from the ground surface to direct artesian flow. It is part of a groundwater well for a private residence. The well is south of the private residence. The owners of the property, who have lived in this residence for approximately 25 years, indicated that they began noticing artesian flow from the PVC pipe around 2009. In a 2015 monitoring event during and immediately after a shutdown of the Catskill Aqueduct, leak water from the Rondout Pressure Tunnel was determined to be potentially influencing the Private Well.

9.5.5.4 Proposed Activities within the Lucas Turnpike Study Area

To support activities within the Lucas Turnpike Study Area, the Ashokan Screen Chamber (within the Ashokan Screen Chamber Study Area in the Town of Olive) would serve as a primary staging area from which workers would be transported to the site daily. Several secondary staging areas would provide additional parking, and equipment and materials would be staged on site. Erosion and sediment control measures such as silt fencing and hay bales would be installed at the perimeter of the work sites as needed. Site plans showing layouts of the limits of construction for the work sites, which would occupy a total of approximately 3.5 acres, are shown on **Figure 9.5-24** and **Figure 9.5-25**. The schedule for work within the study area is shown in **Table 9.5-12**. The duration of active construction within the Lucas Turnpike Study Area is estimated to total 10 weeks over 3 months, in addition to 2 weeks to demobilize and restore the site following temporary chlorination.

Table 9.5-12: Schedule of Work Activities within the Lucas Turnpike Study Area

Work Activity	Dates	Duration	Work Hours	Crew Size ¹
Staging and Access Improvements ²	Summer 2019 2018	6 weeks	Monday to Friday, 7 AM to 5 PM	8
Dechlorination Installation	Summer 2019 2018	4 weeks	Monday to Friday, 7 AM to 5 PM	16
Dechlorination Demobilization/ Site Restoration ³	2023	2 weeks	Monday to Friday, 7 AM to 5 PM	8
Notes:				
¹ Crew size refers to the number of people anticipated at the work site(s).				
² Tree removal would be conducted from November 1 through March 31 to avoid impacts to Indiana bats (<i>Myotis sodalis</i>) and northern long-eared bats (<i>Myotis septentrionalis</i>).				
³ Dechlorination demobilization and site restoration is not included in estimated duration of active construction.				

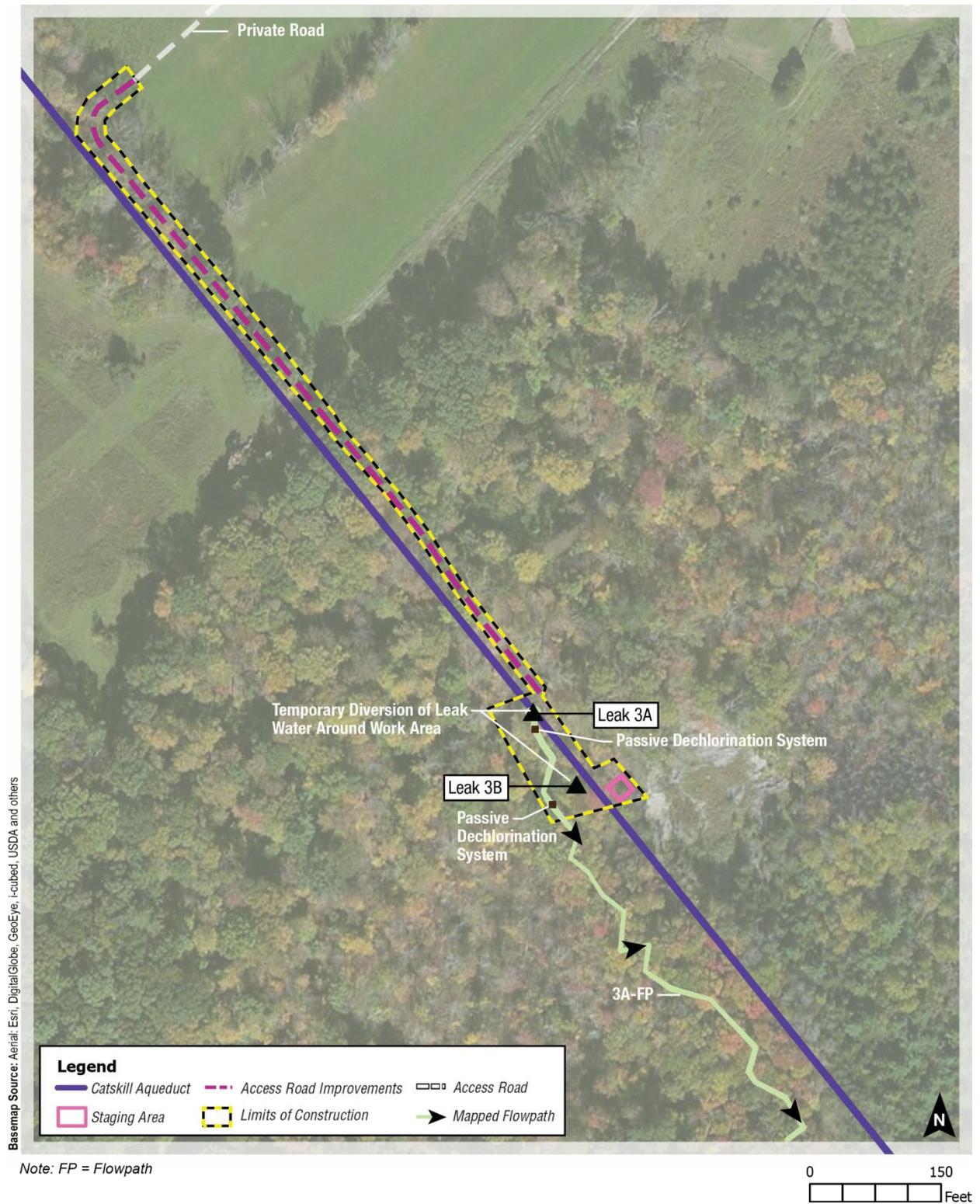


Figure 9.5-24: Site Plan for Leaks 3A and 3B – Lucas Turnpike Study Area



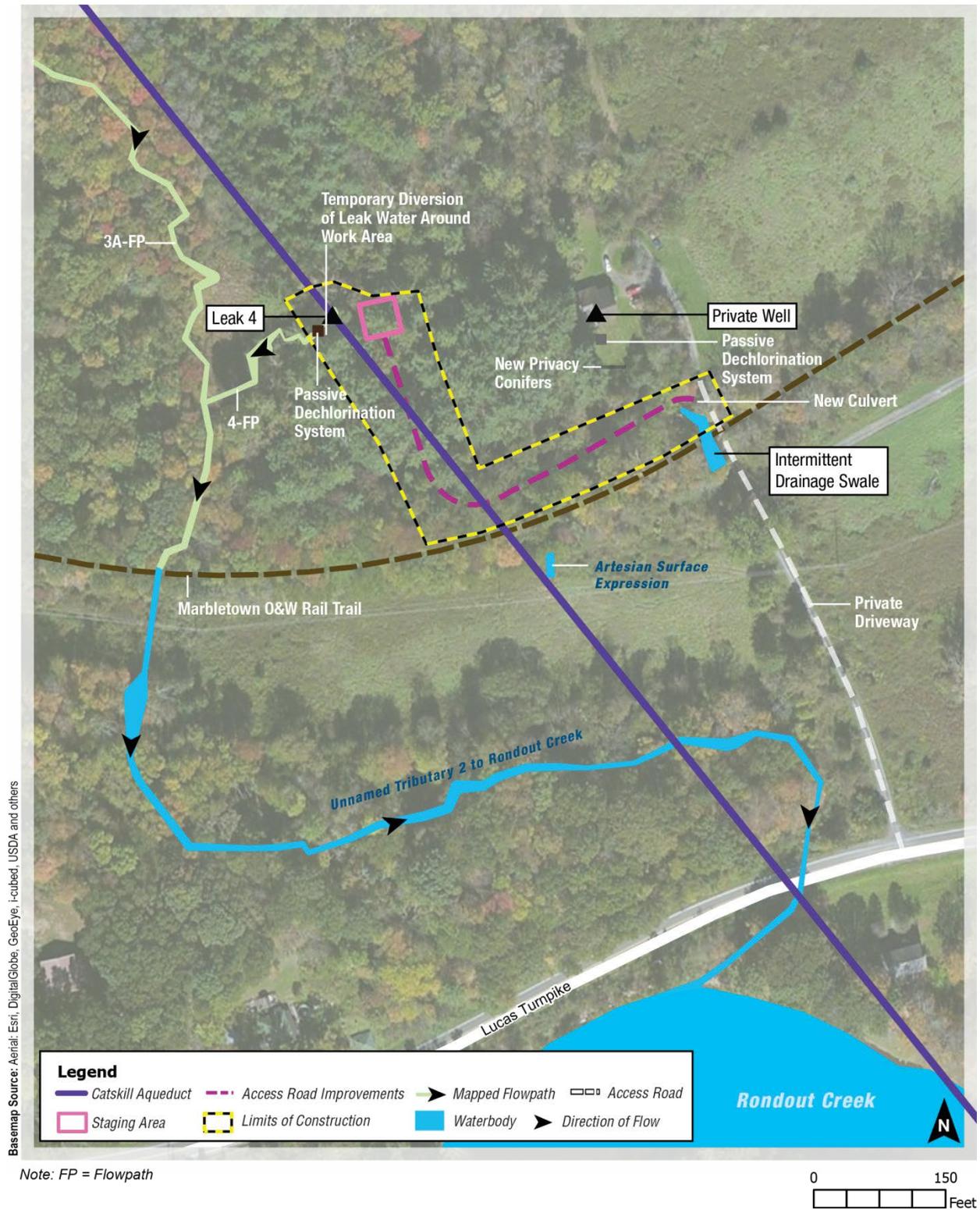


Figure 9.5-25: Site Plan for Leak 4 and Private Well – Lucas Turnpike Study Area



Work in the study area would begin in summer ~~2019~~2018 with staging and access improvements, including construction of the permanent access roads shown on **Figure 9.5-24** and **Figure 9.5-25**. Access to Leaks 3A and 3B would be from Warren Way to a private road to the north (Palomino Path), from which a new access road would be built paralleling the aqueduct to its east. Access to Leak 4 would be provided via a private driveway, from which a new access road and culvert would be built that parallels the rail trail to its north side before turning north to the leak sites. Access to the Private Well would be provided by a private driveway from Lucas Turnpike to the private property.

Local dechlorination systems would also be installed in summer ~~2019~~2018, specifically four temporary, passive dechlorination systems. Three activated carbon trenches, with footprints of approximately 67, 67, and 35 square feet, would be installed downstream of Leaks 3A, 3B, and 4, respectively. The excavation of a total of approximately 10 cubic yards of soil would be required for channelization and trench installation at all three leak sites. There would be no temporary disturbance to naturally occurring surface water; however, 590 square feet of permanent in-stream disturbance would be needed for the new culvert. In addition, a packaged unit containing activated carbon would be placed at the Private Well to dechlorinate any flows from the PVC pipe to the ground surface. The Private Well is not included in the limits of construction because this above-ground system does not require excavation to install. Temporary wetland disturbance would cover a total area of approximately 7,370 square feet, and there would be no permanent wetland disturbance. Temporary in-stream disturbance would cover a total area of approximately 590 square feet to the intermittent drainage swale, and there would be no permanent in-stream disturbance.

Since both work sites served by the access roads are in heavily wooded areas, grading and tree removal would be required, in addition to underbrush clearing and gravel placement for leveling and erosion control. Up to 40 trees were identified for removal along the new access road to Leak 4. This includes up to 15 trees directly parallel to the Marbletown O&W Rail Trail. Based on tree density along the access road to Leaks 3A and 3B, approximately 100 additional trees may be removed, for a total of up to 140 trees within the study area.

Following the staging and access improvements, the passive dechlorination systems would be installed. This would require temporary diversion of the leak water around the work areas. The passive dechlorination systems would be sized to treat the leak flows that would occur when the aqueduct is operated at its maximum capacity and anticipated flow during temporary chlorination. Field monitoring has suggested the potential presence of at least one additional leak in this study area (the artesian surface expression shown on **Figure 9.5-25**). If it is conclusively determined to be a leak, it would be similarly equipped with passive dechlorination systems. Upon completion of system installation, construction equipment and materials would be removed. The staging areas and access roads would remain in place for future maintenance.

As described in Section 9.2, “Project Description,” the local dechlorination systems would be in operation when chlorination of the aqueduct begins in ~~2020~~2019. While in operation, the systems would be inspected and maintained on a regular basis, including monitoring chlorine residuals, as required. When chlorination of the aqueduct is no longer required in 2023, the passive dechlorination systems would be removed from the study area, and any areas temporarily disturbed would be restored to baseline conditions.

Impact categories analyzed for the Lucas Turnpike Study Area are presented in Sections 9.5.5.5, “Land Use and Zoning,” through 9.5.5.15, “Public Health,” and include land use and zoning; socioeconomic conditions; open space and recreation; visual resources; natural resources including water resources, terrestrial resources, and federal/State Threatened and Endangered Species and State Species of Special Concern; hazardous materials; water and sewer infrastructure; transportation; stationary noise; neighborhood character; and public health. Additionally, the study area’s compatibility with applicable public policies was analyzed on a town-wide basis in Section 9.5.2, “Town of Marbletown Impact Analysis.” As described in Section 9.3, “Screening Assessment and Impact Analysis Methodology,” an impact analysis related to community facilities and services; historic and cultural resources; the remaining natural resources subcategories, including geology and soils, aquatic and benthic resources and wildlife, federal/State Candidate Species, and unlisted rare and vulnerable species; energy, air quality; and mobile noise within the study area is not warranted. Finally, impacts related to project-wide natural resources, water and sewer infrastructure, and public health were also analyzed within Section 9.19, “Project-wide Impact Analysis.”

9.5.5.5 Land Use and Zoning

The study area consists primarily of residential land use, with parcels of industrial, vacant land, public services, and open space and recreation land uses. The study area is mostly wooded, with some grassy fields to the east and north. All three work sites are located on private property and would require permission from the owner for access. **Figure 9.5-26** shows a map of the land uses in the study area and its surroundings.

The study area includes two residential (R-1 and R-3) zoning districts, as designated by the Town of Marbletown Zoning Code (see **Figure 9.5-27**). The Catskill Aqueduct is within both zoning districts. Leaks 3A, 3B, 4, and Private Well are all located within residential (R-1) zoning district. The Catskill Aqueduct is a permitted use as a water supply utility within residential (R-1 and R-3) zoning districts.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP’s understanding that a subdivision approval has been granted by the Town of Marbletown for the property located in the northern section of the study area. This subdivision was subject to a previous independent review and approval. However, the construction of the subdivision has not yet been completed. This subdivision, as approved, would be consistent with existing land uses and zoning. There are no other developments anticipated to occur within the timeframe of the impact analysis within the Lucas Turnpike Study Area. Therefore, in the future without the repair and rehabilitation, it is assumed that land use and zoning within the Lucas Turnpike Study Area would be similar to baseline conditions.

The repair and rehabilitation would require the acquisition of a utility easement on approximately 8 acres of land within a 68.5-acre parcel in the Town of Marbletown for access to Leak 3A and 3B. This parcel is identified on the Ulster County Tax Map as Tax ID 69.2-5-22.120. The land use within the proposed easement area is residential and zoned R-1 by the Town of Marbletown Zoning Code.

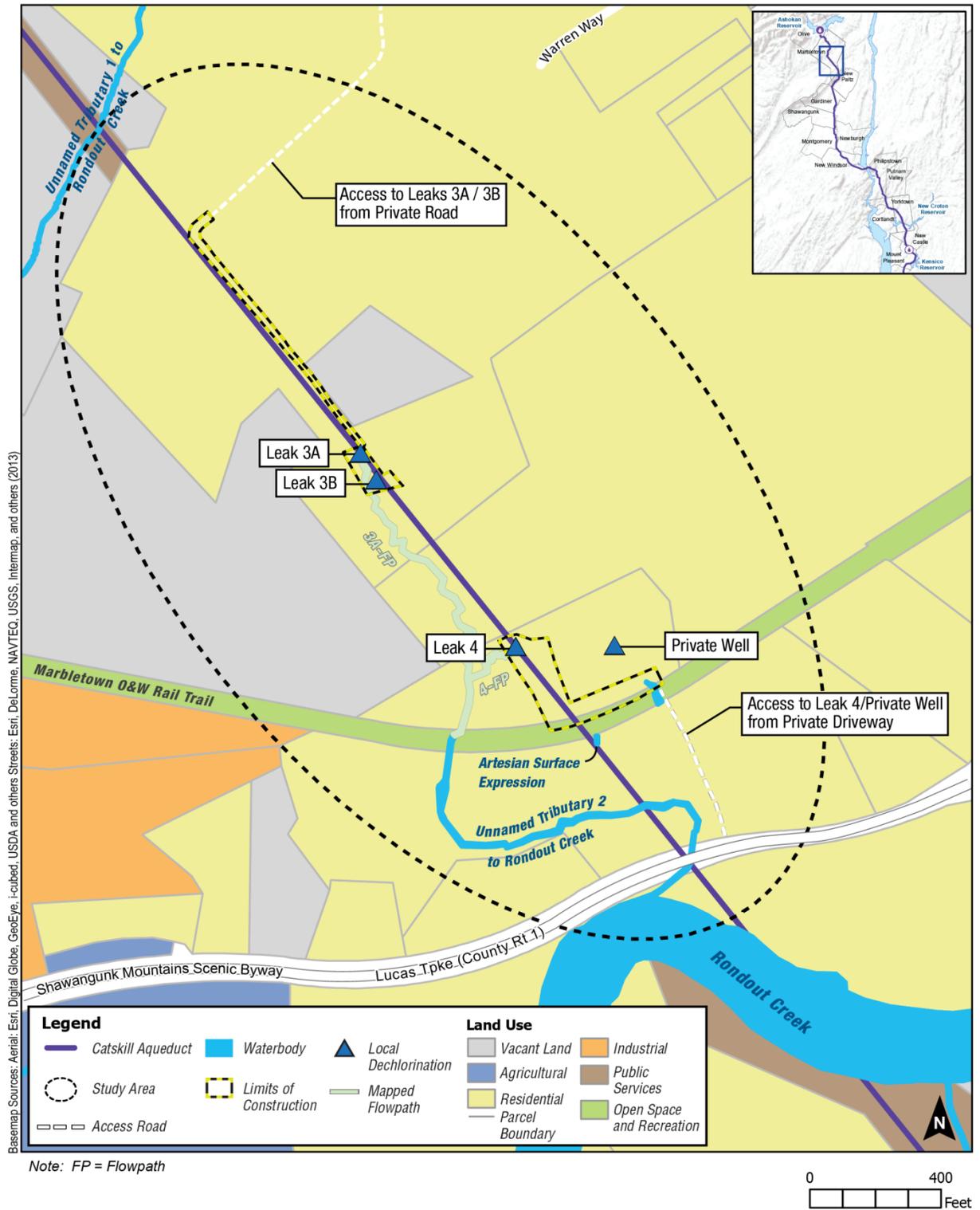


Figure 9.5-26: Land Use – Lucas Turnpike Study Area



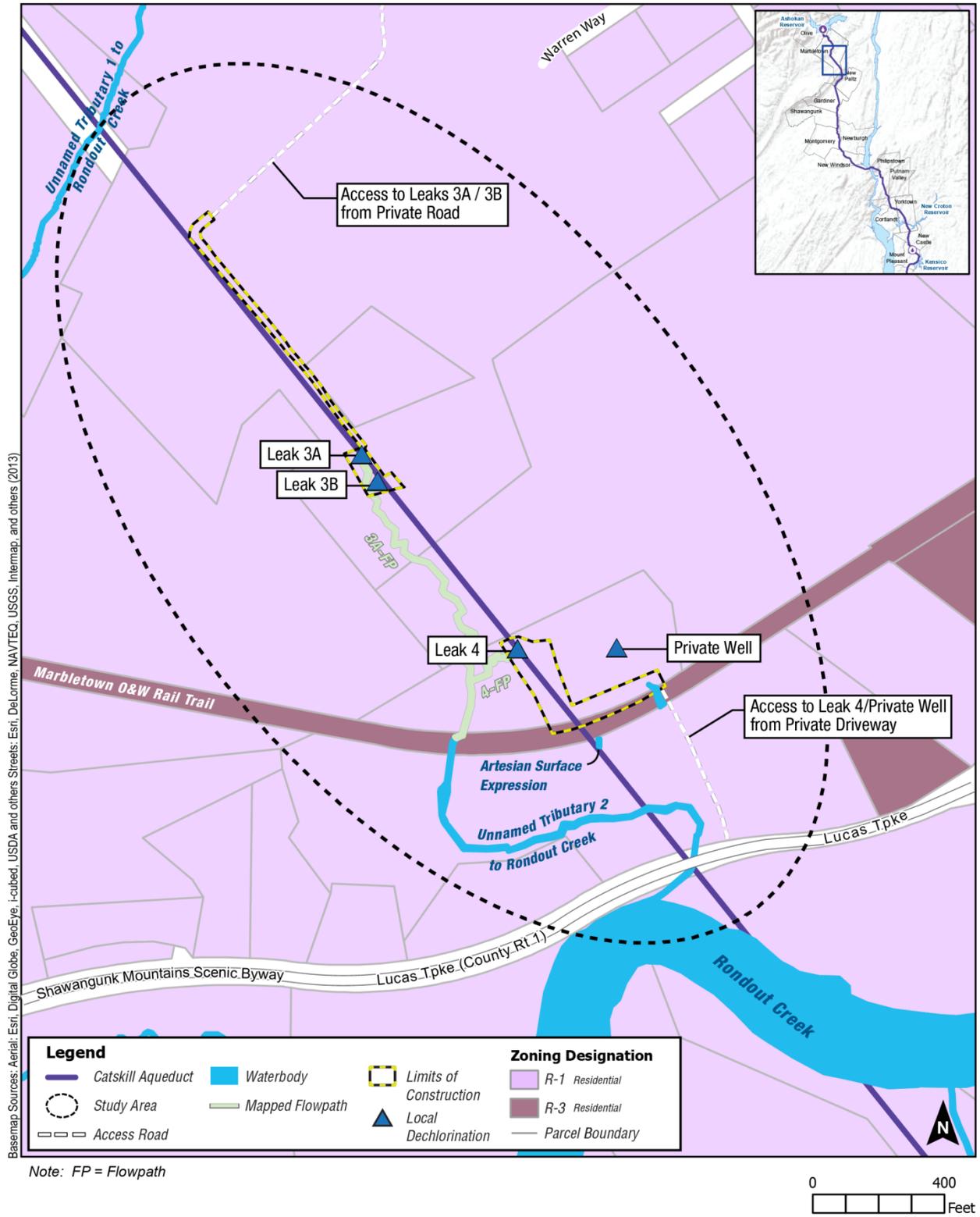


Figure 9.5-27: Zoning – Lucas Turnpike Study Area



The portion of the property affected by the easement would not include any existing buildings. The minimum lot size required for a residential land use, zoned R-1, is 1 acre. However, the subject parcel is part of protected area within an approved conservation subdivision. Therefore, further subdivision of Tax ID 69.2-5-22.120 would not be allowable under the current configuration and zoning regulations regardless of the proposed easement. The property is improved with a single-family residence and outbuildings, which are not located within or near the easement area. The protected area within the approved conservation subdivision is intended to be a permanent protected area. The easement precludes the landowner from any activity that would interfere or be inconsistent with the rights conveyed to the City. However, it does not impose any restrictions on the landowner for other uses. Further, the land use and zoning compliance is not anticipated to change as a result of the easement acquisition. Acquisition of the easement would be consistent with existing land uses, conform with the existing zoning regulations, and would not result in residential or business displacement.

A second easement is proposed for acquisition for access to Leak 4 within the Lucas Turnpike Study Area. The proposed repair and rehabilitation would include the acquisition of easements on approximately 7.37 acres of land within portions of parcels Tax ID 70.9-2-4.1 and Tax ID 69.4-1-61 in the Town of Marbletown. Together, these two parcels total approximately 106.18 acres, as identified on the Ulster County Tax Map. Land use within the proposed easement areas is residential and zoned R-1 by the Town of Marbletown Zoning Code. Tax ID 69.4-1-61 is identified on Ulster County Tax Map as 5.58 acres as “1-family,” containing a single-family residence. Tax ID 69.4-1-61 has no direct frontage on a public road, but is instead served by a right-of-way to Lucas Turnpike (County Route 1). Beyond the vicinity of the residence, Tax ID 69.4-1-61 contains land characteristic of a wetland in an area greater than one acre, and would not provide sufficient developable land beyond that currently used for the existing residence. The portion of the property affected by the easement would not include any existing buildings. Tax ID 69.4-1-61 is not anticipated to be able to support future subdivision or development, nor would a subdivision be allowed in the absence of direct road frontage. The easement acquisition would have no substantial effect on future subdivision possibilities.

Tax ID 70.9-2-4.100 is identified on Ulster County Tax Map as 100.60 acres and categorized as “residential with agriculture.” Tax ID 70.9-2-4.100 contains no known structures and consists of open fields, meadow, and second-growth forest. This parcel has extensive frontage on Lucas Turnpike and appears to have physical characteristics that could support future subdivision and development. However, the area proposed for the easement is not within a large contiguous area of the property. It is rather within a portion of the parcel that wraps around and behind Tax ID 69.4-1-61. In addition, the area that would be subject to the easement is generally covered with scrub and forest, and has no views. The remainder of the property outside the easement includes an open knoll with views. The easement would have minimal effect on future subdivision possibilities. Land use and zoning are not anticipated to change as a result of the easement acquisition. Acquisition of the easement would be consistent with existing land use, conform to the existing zoning regulations, and would not displace residential buildings or commercial businesses.

The repair and rehabilitation associated with Leak 4 would also require securing rights in the form of permit or easement to cross the Marbletown O&W Rail Trail, a recreational trail owned by the Town of Marbletown. DEP would acquire applicable rights to allow for this crossing. Crossing the Marbletown O&W Rail Trail would occur over an existing driveway on parcel Tax ID 70.9-2-12, which totals 16.3 acres in size. The land use of the area where the proposed crossing would occur is residential, and the zoning is R-1 and R-3. Although the parcel is over 16 acres in size, it is approximately 66 feet in width throughout almost its entire length. The linear nature of the parcel makes further subdivision unlikely. Land use and zoning are not anticipated to change. Acquisition of any required rights would be consistent with existing land use, conform to the existing zoning regulations, and would not result in residential or business displacement.

Following construction, all equipment would be removed from the Lucas Turnpike Study Area and staging areas would be restored to baseline conditions. Operation of the Catskill Aqueduct would be consistent with baseline conditions and would not disrupt land use and zoning. In addition, the proposed acquisition of easements on approximately 8 acres (Tax ID 69.2-5-22.120) and 7.37-acres (Tax ID 70.9-2-4.1 and Tax ID 69.4-1-61) are not anticipated to result in a significant adverse land use impact to the owners. As such, the properties affected by the easements are expected to be able to continue their existing uses after repair and rehabilitation. The permanent easements and/or acquired rights would not result in any displacement of residential homes and the change would be consistent with land use and zoning.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to land use or zoning within the Lucas Turnpike Study Area.

9.5.5.6 Socioeconomic Conditions

The study area consists primarily of residential land use, with parcels of industrial, vacant land, and open space land and recreation land uses (see **Figure 9.5-26**). The study area is mostly wooded, with some grassy fields to the east and north and low-density residential areas to the east. The leaks are accessed by crossing private property from the north and south.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP's understanding that an approved subdivision has been granted by the Town of Marbletown for the property located in the northern section of the study area. This subdivision was subject to a previous independent review and approval. However, the construction of the subdivision has not yet been completed. This subdivision, when constructed, would be consistent with existing land use, population, housing, and economic activity. There are no other developments anticipated to occur within the timeframe of the impact analysis within the Lucas Turnpike Study Area. Therefore, in the future without the repair and rehabilitation, it is assumed that land use, population, housing, and economic activity within the Lucas Turnpike Study Area would be similar to baseline conditions.

As described in Section 9.5.5.5, "Land Use and Zoning," the repair and rehabilitation would require the acquisition of an approximately 8-acre easement within a 68.5-acre parcel (Tax ID 69.2-5-22.120), the acquisition of an approximately 7.37-acre easement within portions of parcels Tax ID 70.9-2-4.100 and Tax ID 69.4-1-61, and securing permission to cross the

Marbletown O&W Rail Trail, a recreational trail owned by the Town of Marbletown on Tax ID 70.9-2-12. There are several single-family residences along the proposed access road within Tax ID 69.2-5-22.120. No residences would be directly impacted as part of the acquisition. No residents would be required to vacate their dwelling at any time, and no disruption to the local community is expected as a result of this acquisition. Easement acquisitions would not alter the obligation for payment of property taxes on the parcels. Landowners would continue to pay taxes on the full-assessed value of the properties, and there should be no substantive change to the tax base. Therefore, tax burdens would not shift as a result of this proposed acquisition. Thus, it is not anticipated that displacement of businesses or residences would occur as a result of the acquisition due to changes to tax base.

Construction and access would occur on portions within private properties. Following construction, all equipment would be removed and staging areas would be restored to baseline conditions. For the approximately 8 and 7.37-acre easements, the private landowners are expected to be able to continue their existing uses after repair and rehabilitation. The proposed acquisitions would not preclude future development of the remaining portion of the parcels. As a result, the repair and rehabilitation would not directly displace businesses (or employees) or residences.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to socioeconomic conditions within the Lucas Turnpike Study Area.

9.5.5.7 Open Space and Recreation

As shown on **Figure 9.5-28**, one open space resources, the Marbletown O&W Rail Trail, exists within the Lucas Turnpike Study Area. The entire length of the rail trail is approximately 8 miles. Approximately 0.5 mile of the rail trail, known as the State Route 213 to Rest Plaus Road segment, passes through the southern portion of the study area. The primary use of the rail trail is for outdoor recreation such as horseback riding, biking, and jogging.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP's understanding that an approved subdivision has been granted by the Town of Marbletown for the property located in the northern section of the study area. This subdivision was subject to a previous independent review and approval. However, the construction of the subdivision has not yet been completed. Upon completion of the subdivision, 44.6 acres of the approved conservation subdivision would be part of a protected area. While the protected area would be preserved as open space, it is not anticipated to be designated as a public recreational area. Therefore, this protected area, while open space, is not an open space and recreational resource for the purposes of this analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that open space and recreation within the Lucas Turnpike Study Area would be the same as baseline conditions.

During construction, the repair and rehabilitation work activities within the Lucas Turnpike Study Area would be short-term (intermittently over 3 months; see **Table 9.5-12**). Work activities related to the passive dechlorination systems would occur to the north of the Marbletown O&W Rail Trail. The temporary construction staging area and permanent new access road for Leaks 3A and 3B would be accessed from a private road, located in the northern

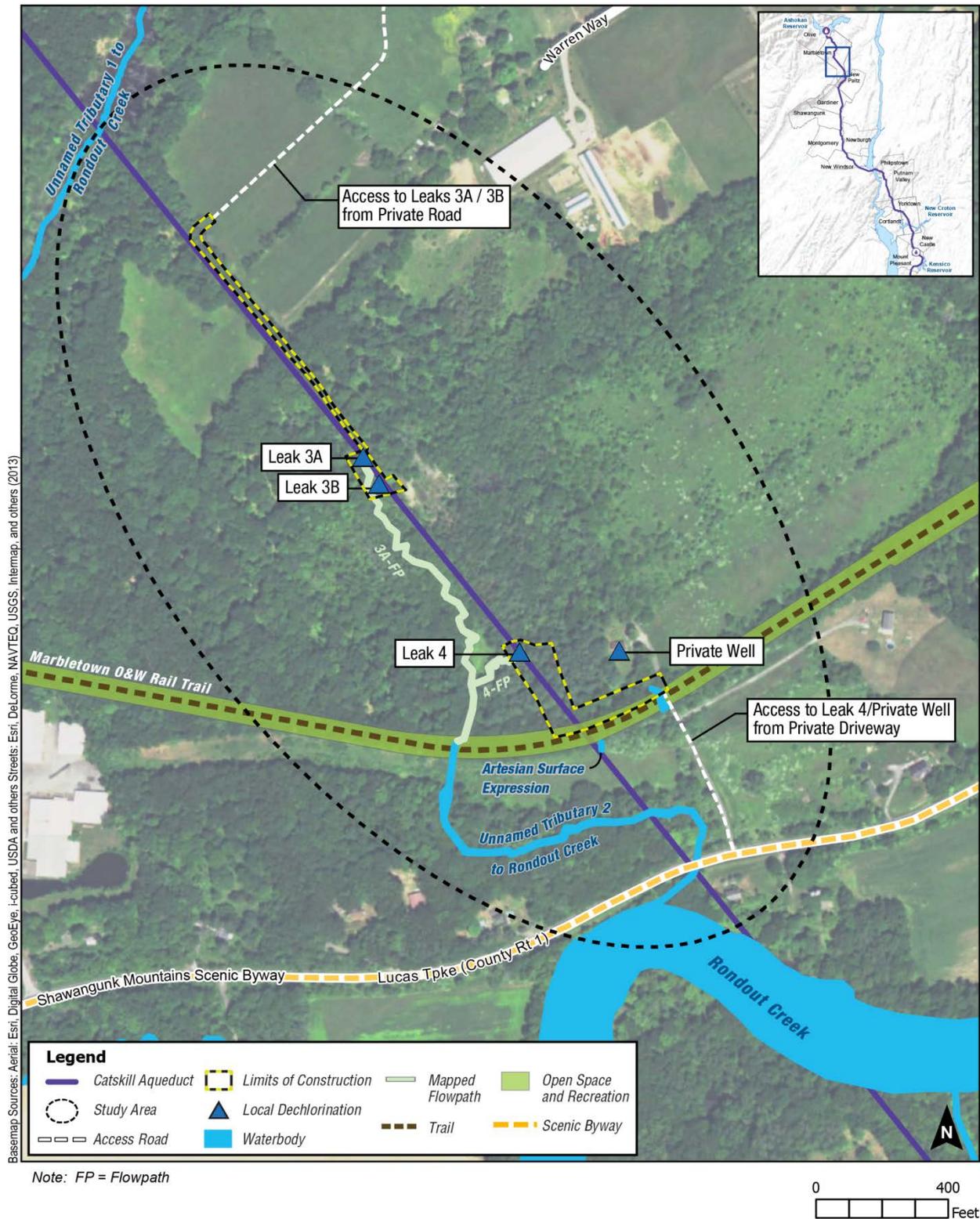


Figure 9.5-28: Open Space and Visual Resources – Lucas Turnpike Study Area



portion of the study area. This access road would not be accessible or visible from the rail trail. The proposed 0.08-acre temporary construction staging area for Leak 4 would be adjacent to a segment of the rail trail. Vehicle access for construction would be provided from an existing driveway off Lucas Turnpike. Up to 40 trees may be removed along the new access road to Leak 4. This includes up to 15 trees parallel to the Marbletown O&W Rail Trail.

Tree removal and/or tree trimming would be targeted within a narrow area for the construction access roads and at construction staging areas that, where possible, would be sited near existing clearings. Only those trees that lay in the footprint of the access road or staging areas would be removed, and all other trees would be protected or preserved. Thus, the trees to be removed would not affect the usage of the rail trail, although the access roads would be visible through the trees and underbrush from some vantage points. The repair and rehabilitation work activities related to the passive dechlorination systems would be located northeast of the rail trail near Leak 4 within the Lucas Turnpike Study Area. Therefore, repair and rehabilitation work activities, equipment, and vehicles within the Lucas Turnpike Study Area may disrupt views from the rail trail, but would not impact the use of the rail trail. Following completion of the repair and rehabilitation work activities, the construction equipment and vehicles would be removed from the Lucas Turnpike Study Area.

As discussed in Section 9.5.5.13, “Noise,” for the Lucas Turnpike Study Area, there may be temporary increases in noise levels due to the construction of the passive dechlorination systems within the study area that may affect users of the rail trail. However, use of the rail trail is passive, and noise generated by dechlorination activities would only occur during construction. Upon completion of the repair and rehabilitation, the recreational uses within the rail trail would return to baseline conditions and be unaffected. Occasional use of the access road would occur from 2019 through 2023 during the temporary chlorination period, which is anticipated to consist of one truck visiting the site every few weeks to conduct routine maintenance or sampling. Vehicles would proceed with caution while crossing the rail trail and yield to rail trail users. Following repair and rehabilitation, operation of the aqueduct would be consistent with baseline conditions. The passive dechlorination systems would be removed, and the study area would be restored to baseline conditions, with the exception of the permanent access road. As such, the repair and rehabilitation would not encroach upon, cause a loss, affect the use or physical character of, or disrupt views from the rail trail.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to open space and recreation within the Lucas Turnpike Study Area.

9.5.5.8 Visual Resources

The study area for the visual resources analysis is the area within the Lucas Turnpike Study Area. It also includes view corridors that extend beyond the study area, based on the locations that are publicly accessible.

Visual resources, consisting of one locally significant resource, Marbletown O&W Rail Trail, and one scenic byway, the Shawangunk Mountains Scenic Byway, were identified within the Lucas Turnpike Study Area (see **Figure 9.5-28**). Approximately 0.5 mile of the rail trail is located within the southern portion of the Lucas Turnpike Study Area.

The 88-mile Shawangunk Mountains Scenic Byway, under the purview of NYSDOT, was designated a visual resource based on the scenic, natural, historic, and recreational resources in the region, particularly the views of the Shawangunk Mountains. Approximately 825 feet of Lucas Turnpike, the northern-most roadway of the Shawangunk Mountains Scenic Byway, passes through the southern portion of the Lucas Turnpike Study Area. Views from this part of Lucas Turnpike are limited due to the vegetation along the both sides of the byway. Views to the Shawangunk Mountains occur looking south from Lucas Turnpike, with the majority of the Lucas Turnpike Study Area to the north, or behind the viewer. The byway's Corridor Management Plan (Shawangunk Mountains Scenic Byway 2005) identifies locations with views of the Shawangunk Mountains to the south. The Lucas Turnpike Study Area is not located in one of these view locations.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP's understanding that an approved subdivision has been granted by the Town of Marbletown for the property located in the northern section of the study area. However, this subdivision, when constructed, would not create or remove any visual resources. There are no other developments anticipated to occur within the timeframe of the impact analysis. Natural processes, such as changes in habitat due to natural vegetative succession, are anticipated to continue. Therefore, in the future without the repair and rehabilitation, it is assumed that visual resources within the Lucas Turnpike Study Area would be the same as baseline conditions.

During construction, the repair and rehabilitation work activities within the Lucas Turnpike Study Area would be minimal and short-term (intermittently over 3 months; see **Table 9.5-12**). Construction of the passive dechlorination systems would occur north of the rail trail and byway. The temporary construction staging area and permanent new access road for Leaks 3A and 3B would be adjacent to the aqueduct and accessed from a Private Drive off Warren Way, located in the northern portion of the study area and not be accessible or visible from the byway or trail. The temporary construction staging area and permanent new access road for Leak 4 would be adjacent to a segment of the rail trail and accessed from the byway. While the removal of approximately 40 trees is required for access to and the temporary construction staging area for Leak 4, this would not greatly detract from the aesthetics of the area because the staging areas and access road to Leak 4 would be screened from view by the surrounding forested land. Tree removal would be targeted within a narrow area for the construction access roads and at construction staging areas that, where possible, would be sited near existing clearings. Only those trees that lay in the footprint of the access road or staging area would be removed. All other trees would be protected or preserved.

The new access road to Leak 4 would not affect the use of the rail trail or byway. However, the access road to Leak 4 would be visible through the trees and underbrush from some vantage points. Installation of the passive dechlorination system at Leak 4 would be located northeast of the rail trail. The repair and rehabilitation work activities, equipment, and vehicles within the Lucas Turnpike Study Area may disrupt views looking north from the rail trail. However, construction would be short-term (intermittently over 3 months). The repair and rehabilitation work activities related to the passive dechlorination systems would be located north of the byway and would not be visible from the byway due to the existing vegetation. Following completion of the repair and rehabilitation work activities, the construction equipment and vehicles would be removed from the Lucas Turnpike Study Area.

The passive dechlorination systems would be low-profile and not visible from a distance due to the flat grade between the leak and the rail trail. Of the 0.5-mile length of the rail trail within the study area, approximately 150 feet of the rail trail may have views of the Leak 4 passive dechlorination system due to potential tree removal within the limits of construction. For the remaining length of the rail trail, the passive dechlorination systems would not be visible due to the existing trees. The other passive dechlorination systems would not be visible due to the existing trees along the rail trail. The passive dechlorination systems would not be visible from the Shawangunk Mountains Scenic Byway. Occasional use of the access road would occur from 2019 through 2023 during the temporary chlorination period. This would consist of one truck visiting the site every few weeks to conduct routine maintenance or sampling. Following the repair and rehabilitation, operation of the aqueduct would be consistent with baseline conditions. The passive dechlorination systems would be removed, and the study area would be restored to baseline conditions, with the exception of the permanent access road.

As such, the repair and rehabilitation would result in minor encroachment upon visual resources, but would not affect the use or physical character of, or disrupt views from the Marbletown O&W Rail Trail or Shawangunk Mountains Scenic Byway. In addition, based on this analysis, the repair and rehabilitation within the Lucas Turnpike Study Area would be compliant with the Town of Marbletown Code, Chapter 128, Heritage and Preservation, discussed in Section 9.3.3.3, "Town Codes."

Therefore, the repair and rehabilitation would not result in significant adverse impacts to visual resources within the Lucas Turnpike Study Area.

9.5.5.9 Natural Resources

The study area for the natural resources analysis is the area surrounding the limits of construction, including Leaks 3A, 3B, and 4 (see **Figure 9.5-29**). The natural resources study area also extends west and east of the immediate work areas to include the full extent of potential bog turtle (*Clemmys [=Glyptemys] muhlenbergii*) habitat within the study area. The natural resources study area also includes downstream resources potentially influenced by the leaks.

Based on natural resources surveys between 2013 and 2016, the northern portion of the natural resources study area surrounding Leaks 3A and 3B is dominated by red maple-hardwood swamp with areas of maple-basswood rich mesic forest. The maple-basswood rich mesic forest covers less than half of the natural resources study area.

The central portion of the natural resources study area surrounding Leak 4 is dominated by maple-basswood rich mesic forest with areas of red maple-hardwood swamp, and smaller areas of palustrine emergent wetland and a stand of white pine (*Pinus strobus*) that appears to have been planted to provide either wildlife habitat, soil erosion control, windbreaks, landscaping, or for cultivation.

The portion of the natural resources study area south of the Marbletown O&W Rail Trail was characterized as mowed lawn with trees and successional old field.

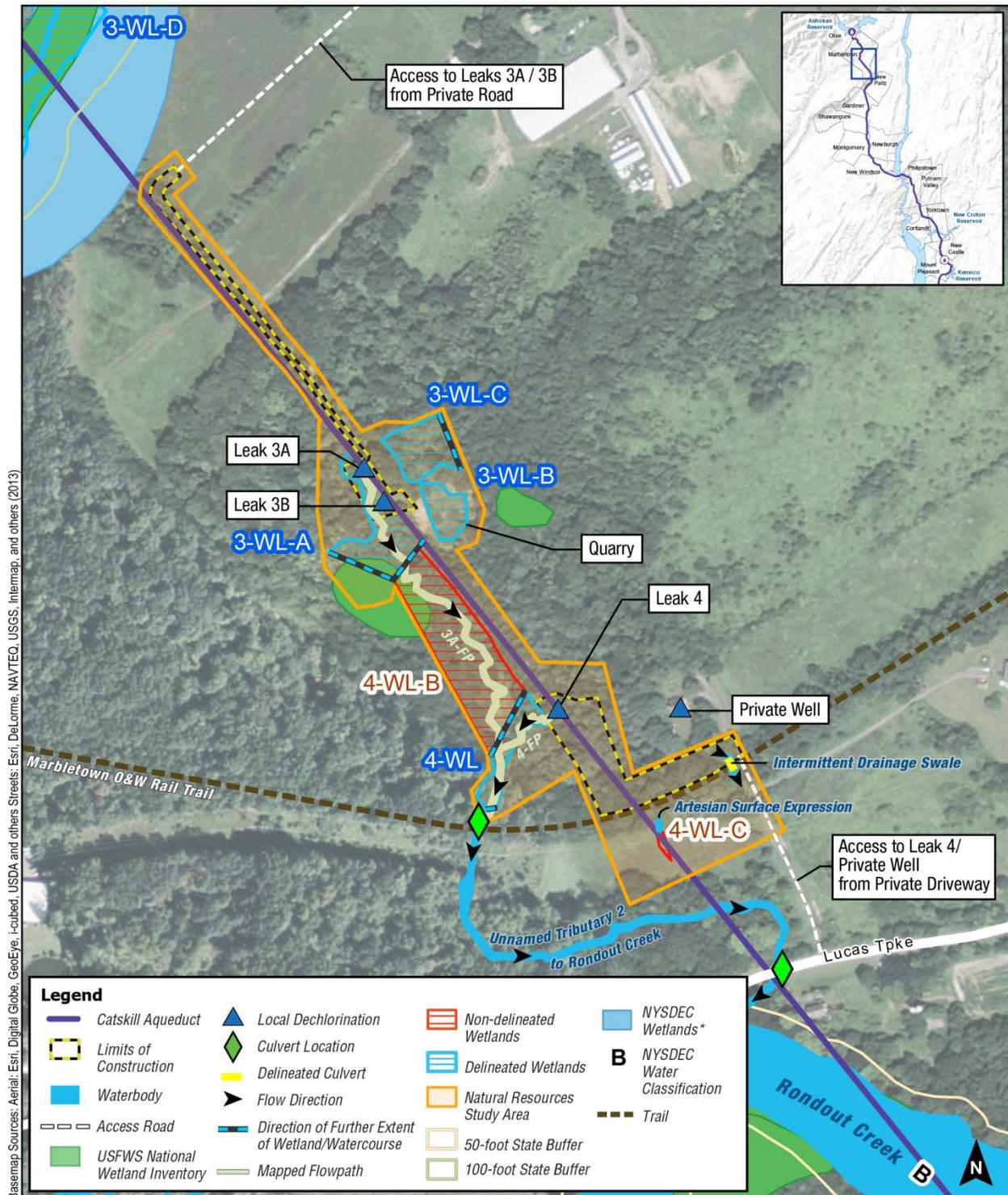


Figure 9.5-29: Watercourses and Wetlands – Lucas Turnpike Study Area



These habitats have the potential to support protected water resources, terrestrial resources, and wildlife species. An analysis of the potential effects to natural resources that could result from the repair and rehabilitation activities is presented below. The potential for the repair and rehabilitation to result in changes to natural resources as a result of the proposed temporary chlorination at the Ashokan Screen Chamber is further analyzed in Section 9.19, “Project-wide Impact Analysis.”

Water Resources

The natural resources study area is within the lower Hudson River drainage basin, more specifically within the Coxing Kill-Rondout Creek subwatershed (HUC 020200070604) of the Rondout watershed (HUC 02020007).

For this study area, groundwater was also assessed because leak repair is not feasible and water from the leaks in the Rondout Pressure Tunnel could migrate through bedrock fractures and faults to interact with the native groundwater in the bedrock aquifer.

Flowpaths 3A-FP and 4-FP are formed by an artificial water source, and may not be jurisdictional under Sections 401 and 404 of the Clean Water Act. There are some isolated surface waterbodies and wetlands within the natural resources study area. Other wetlands in the study area would be isolated from Rondout Creek if not for their nexus to the leak flowpaths. Therefore, the leak flowpaths and wetlands within the natural resources study area may not be subject to federal jurisdiction. The leak flowpaths are not classified waters and there are no State wetlands mapped within the natural resources study area. As a result, these water resources would not be subject to State Protection of Waters or Freshwater Wetlands regulations. Additionally, because the Town of Marbletown only regulates NYSDEC wetlands, the activities associated with the repair and rehabilitation are not subject to local requirements (Marbletown Town Code Chapter 200: Zoning).

Groundwater

An unconsolidated aquifer and a bedrock aquifer underlie the Lucas Turnpike Study Area. The unconsolidated aquifer is generally composed of groundwater held within permeable sand, gravel, and silt deposits, while the bedrock aquifer is generally composed of groundwater contained within fractures or pore-space of the bedrock.

The unconsolidated aquifer is the shallower of the two aquifers in the natural resources study area. The unconsolidated aquifer is approximately 6 to 54 feet thick, with a water table elevation estimated to be near the surface, according to the Marbletown Aquifer Protection Study (Mid-Hudson 2005). The unconsolidated aquifer is approximately 6 feet thick at Shaft 4. The unconsolidated aquifer thickens east of the leaks to over 200 feet in a buried valley that generally corresponds with the location of Rondout Creek.

The bedrock aquifer is the deeper and more extensive of the two aquifers in the study area. The bedrock at, and around the leak sites includes the Rondout Formation, Onondaga Limestone, and various undifferentiated sedimentary rocks (see **Figure 9.5-30**). As shown on **Figure 9.5-30**, the New York State Bedrock Geologic Map shows major formations but does not differentiate between the smaller, secondary bedrock units. Visual observations made during the construction

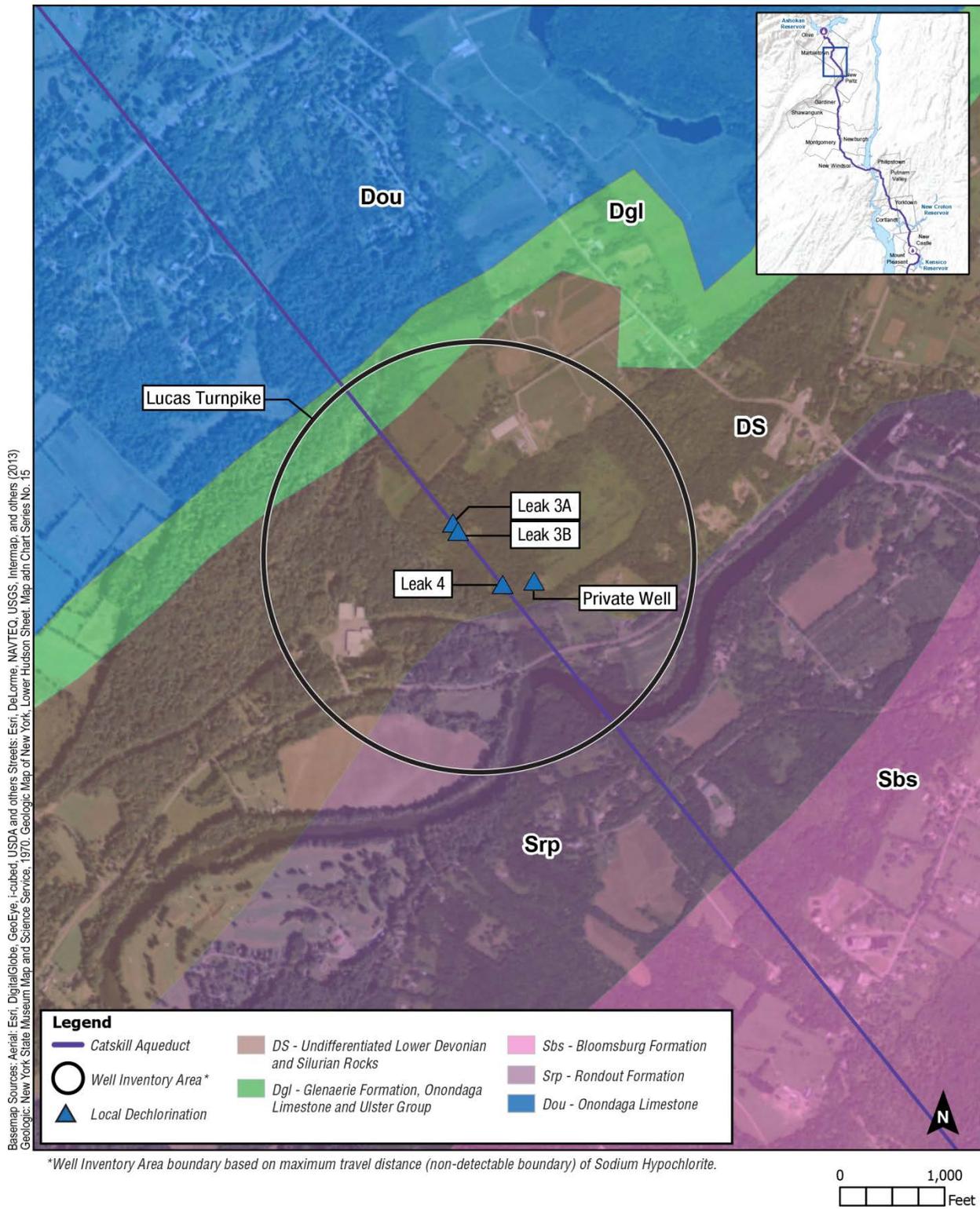


Figure 9.5-30: Bedrock Geology - Lucas Turnpike Study Area



of the Catskill Aqueduct provided a more detailed description of the bedrock geology, particularly those units that are only found at the depth of the aqueduct within the study area such as the Binnewater Sandstone and the Shawangunk Sandstone/Conglomerate (historically referred to as “grit”) (see **Figure 9.5-31**) (Berkey 1911).

Groundwater is found within the breaks, fractures and other openings in the rock that were formed as a result of tectonic forces that folded and faulted the bedrock in this area. The ability of the bedrock aquifer to transmit groundwater is largely a function of the location and orientation of the openings and breaks in the rock.

The Helderberg Limestone acts as a regional confining unit in most areas, which limits the vertical movement of groundwater to the ground surface. Groundwater from the aqueduct would generally not migrate through the bedrock aquifer and the unconsolidated aquifer to the ground surface. However, a hydraulic connection could be formed through a geologic structure such as a fault that could provide a direct connection between the tunnel and ground surface.

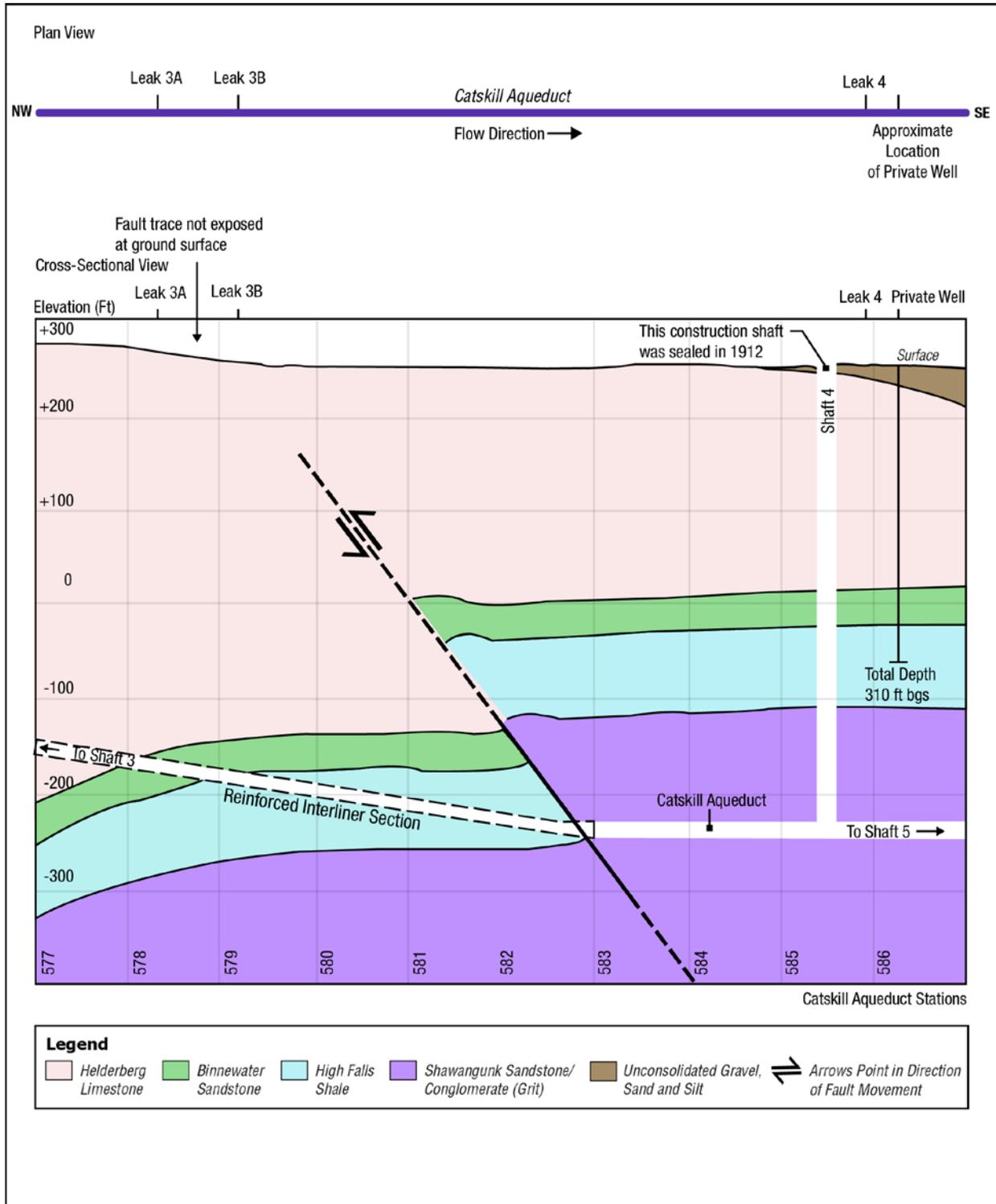
A number of borings were drilled to characterize the geology prior to constructing the Catskill Aqueduct. Some of these borings encountered a fault formed millions of years ago when tectonic stresses compressed the bedrock and caused it to fracture. The fault encountered in the borings was also encountered during the construction of the aqueduct. These geologic records show that water could be leaking from the aqueduct into the surrounding bedrock through this fault (see **Figure 9.5-31**). Although this fault is considered a blind fault with no visible indications of its presence at the ground surface, its orientation at the tunnel is known. In addition, due to the number of pre-tunnel construction borings in the study area, it is also possible that one or more of these construction borings could be a pathway for water movement.

The amount of water leaking from the aqueduct into the surrounding bedrock is related to the hydraulic grade line (HGL) in the aqueduct. As the HGL increases, the amount of water leaking into the bedrock could also be increasing. The opposite would be true when the HGL decreases. This is demonstrated by the reduction in leak flow that has been measured when flow in the aqueduct is shut down and the HGL decreases over time. The leaks in the natural resources study area are directly related to the fact that the HGL is typically above the existing ground surface in this area. The existence of unsealed borings, possibly aided by geologic fractures or faults, allows water to leak to the ground surface.

Groundwater in the natural resource study area is used as a drinking water supply for local residents using private drinking water supply wells. Therefore, groundwater use is also further described in Section 9.5.5.11, “Water and Sewer Infrastructure.”

Surface Water

The surface water identified within the natural resources study area is comprised of two leak flowpaths identified as 3A-FP and 4-FP, an intermittent drainage swale, and an artesian surface expression. Surface water in the study area was assessed over the course of several field visits. Delineations occurred in the study area on April 24, 2013, and separate visits on September 15, 2015 and February 12, 2016 were conducted to evaluate natural resources within the access road areas



Tunnel construction documents indicate the Binnewater Sandstone and High Falls Shale are wet strata, and that the Tunnel was originally reported to be wet near fault plane. 0 ft elevation is Mean Sea Level. Modified from Plate 106 in White (1913). Section view to the north.

Figure 9.5-31: Generalized Geologic Cross-Section - Lucas Turnpike Study Area



south of the rail trail. Leaks 3A, 3B, and 4 and their associated flowpaths diminish or cease to flow during occasional Catskill Aqueduct shutdowns. It was determined that these leaks may contribute to hydrology associated with the wetlands and flowpaths identified within the natural resources study area and are discussed with the applicable resource below. The water resource name, area, and length are shown in **Table 9.5-13**.

Table 9.5-13: Water Resources and Classifications within the Lucas Turnpike Natural Resources Study Area

Water Resource	Area (Square Feet)	Length (Feet)	Cowardin Classification
3A-FP	5,440	1,140	Riverine, Upper Perennial, Unconsolidated Bottom, Cobble-Gravel, Permanently Flooded (R3UB1H)
3-WL-A	27,590	NA	Palustrine Forested (PFO)
3-WL-B	10,540	NA	Palustrine Emergent (PEM)
3-WL-C	17,660	NA	Palustrine Forested (PFO)
4-FP	1,280	240	Riverine, Upper Perennial, Unconsolidated Bottom, Cobble-Gravel, Permanently Flooded (R3UB1H)
4-WL	13,020	NA	Palustrine Forested (PFO)
4-WL-B	60,690	NA	Palustrine Forested (PFO)
4-WL-C	1,050	NA	Palustrine Emergent (PEM)
Intermittent Drainage Swale	590	90	Riverine, Intermittent, Streambed, Mud (R4SB3)
Flow from Artesian Surface Expression	90	30	Riverine, Intermittent, Streambed, Vegetated (R4SB7)
Note: NA = Not Applicable			

Flowpath from Leak 3A (3A-FP)

Flowpath 3A-FP originates from Leak 3A and forms an incised, perennial channel with depths of approximately 1.0 to 1.5 feet. Flowpath 3A-FP travels southward toward Leak 4 (see **Figure 9.5-32**).

The substrate of the channel is a mix of sand, silt, gravel, and cobble. Water within 3A-FP was clear during the delineation. There is no in-stream vegetation and observed aquatic life consisted of rusty crayfish (*Orconectes rusticus*), dragonfly larvae (Suborder Anisoptera), and northern spring salamanders (*Gyrinophilus porphyriticus*). The flowpath has a slight gradient in the study area, which is steeper downstream of the rail trail crossing to the confluence with Rondout Creek.

The watercourse is densely shaded within the study area. Flowpath 3A-FP is considered perennial due to permanent flows from leaks in the Catskill Aqueduct, and is best classified as a “Riverine, Upper Perennial, Unconsolidated Bottom, Cobble-Gravel, Permanently Flooded” system based on the Cowardin System (Cowardin et al. 1979).

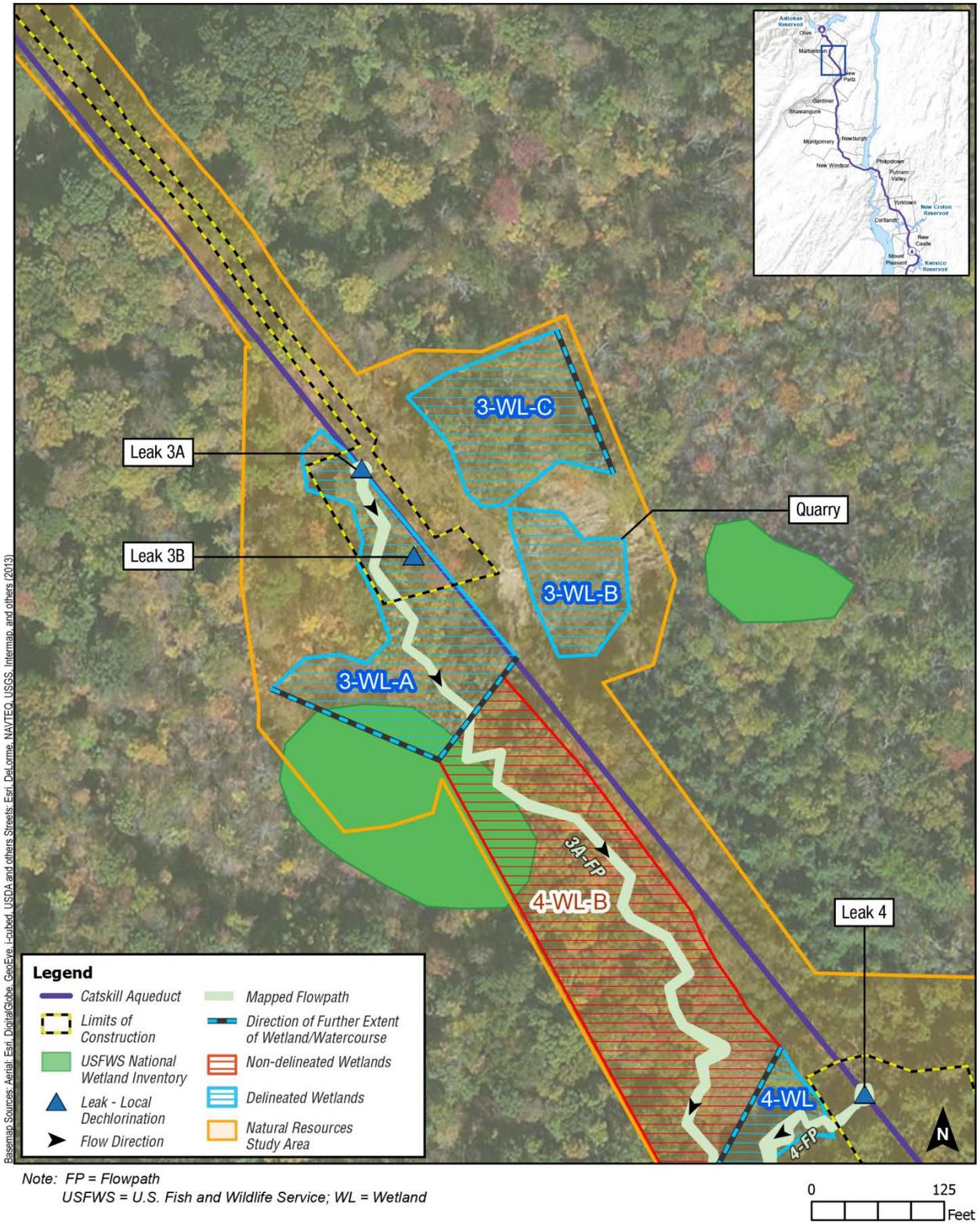


Figure 9.5-32: Watercourses and Wetlands at Leaks 3A and 3B – Lucas Turnpike Study Area



Flowpath from Leak 4 (4-FP)

Flowpath 4-FP originates from Leak 4 (see **Figure 9.5-33**). The substrate of the flowpath is a mix of sand, silt, gravel, and cobble. During the delineation, the first few feet of the flowpath were slightly turbid with a very strong hydrogen sulfide odor just below the leak. After this point, the flow within 4-FP was clear with no apparent odor to the confluence with flowpath 3A-FP. With the exception of the reach through the herbaceous wetland, the watercourse is densely shaded within the study area. No aquatic life was observed in 4-FP. Flowpath 4-FP would be considered perennial due to permanent flows from leaks in the Catskill Aqueduct, and best classified as a “Riverine, Upper Perennial, Unconsolidated Bottom, Cobble-Gravel, Permanently Flooded” system based on the Cowardin system (Cowardin et al. 1979).

Intermittent Drainage Swale

An earthen drainage ditch was identified during the delineation of the access road improvements, and is an intermittent drainage swale. The intermittent swale is an excavated, unvegetated ditch approximately 10 to 15 feet wide. It functions as a drainage feature running parallel to the existing private driveway off Lucas Turnpike and ends at the rail trail (see **Figure 9.5-33**). During the delineation in September 2015, there was no flow observed despite a recent rain event. The intermittent swale would be best classified as a “Riverine, Intermittent, Streambed, Mud” system based on the Cowardin system.

Artesian Surface Expression

An artesian surface expression was identified south of the Marbletown O&W Rail Trail (see **Figure 9.5-33**). This shallow flow is approximately 2 feet in width at its expression and gradually increases in width for approximately 25 feet until it flows into a small isolated wetland in a nearby open field. The surface expression is approximately 3 inches deep. While water quality testing indicates this location is not similar to water in the Catskill Aqueduct, a change in the flow of this surface expression was observed during a shutdown of the Catskill Aqueduct in 2015, indicating it may be influenced by the leak in the Rondout Pressure Tunnel. If the surface expression is naturally occurring, it may be intermittent because groundwater levels vary seasonally. The surface expression would be best classified as a “Riverine, Intermittent, Streambed, Vegetated” system based on the Cowardin System (Cowardin et al. 1979).

Wetlands

The wetlands identified within the study area are associated with leak flowpaths 3A-FP and 4-FP. An additional wetland was identified south of the artesian surface expression. Wetlands were assessed over the course of several field visits, with delineations occurring on April 24, 2013. Separate visits on September 15, 2015 and February 12, 2016 were conducted to evaluate natural resources within the access road areas south of the rail trail.

Two National Wetlands Inventory (NWI) wetlands are located east and west of the Catskill Aqueduct and are associated with wetlands in the natural resources study area. One NWI wetland is located 180 feet east of the aqueduct and 275 feet from Leak 3B. The other NWI wetland is located 80 feet west of the aqueduct and 140 feet from Leak 3B (see **Figure 9.5-32**).

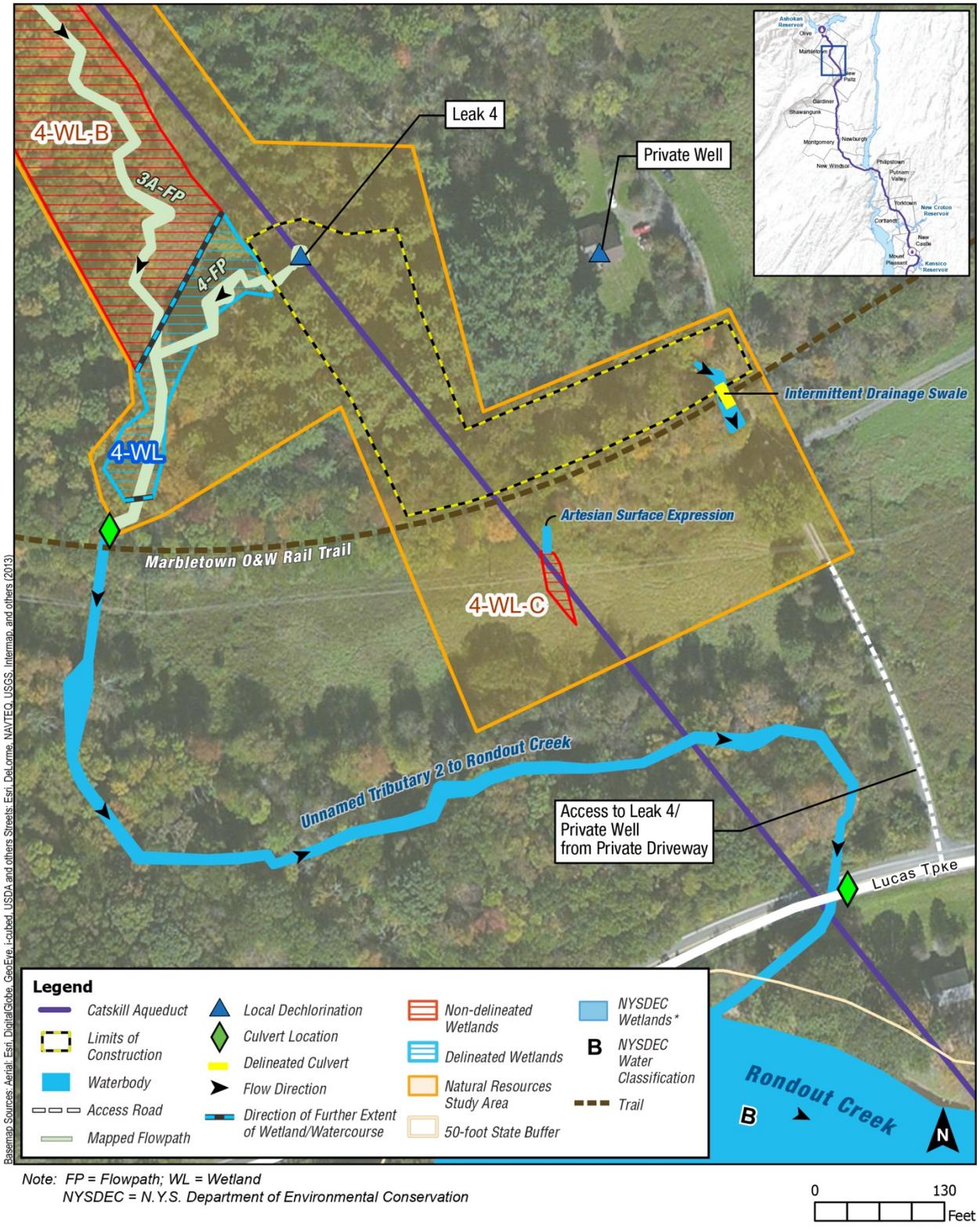


Figure 9.5-33: Watercourses and Wetlands at Leak 4 – Lucas Turnpike Study Area



As previously stated, there are no NYSDEC-mapped wetlands within the natural resources study area. However, Wetland 3-WL-D is a NYSDEC-mapped wetland (identified by NYSDEC as M-18), which is near the northern access road to Leaks 3A and 3B, outside of the natural resources study area. According to the delineation, the limits of the wetland are different than those mapped by NYSDEC and the wetland would not be affected by the project (Rother 2010). Therefore, 3-WL-D is not analyzed further. Field surveys identified six wetlands in the natural resources study area: Wetlands 3-WL-A, 3-WL-B, 3-WL-C, 4-WL, 4-WL-B, and 4-WL-C.

Wetland 3-WL-A

Wetland 3-WL-A is a palustrine forested wetland located in a low-lying area on the southwest side of a raised dirt road at Leak 3A (see **Figure 9.5-32**). This wetland is associated with a mapped NWI wetland west of the Catskill Aqueduct. Wetland 3-WL-A is the largest of the wetlands delineated within the natural resources study area, and is partially located outside of the study area to the southeast, along the southwestern toe of the raised dirt road. Wetland 3-WL-A is hydrologically connected to Wetlands 4-WL and 4-WL-B within the Lucas Turnpike Study Area. Dominant plant species identified during the wetland delineation at 3-WL-A include white ash (*Fraxinus americana*), basswood (*Tilia americana*), hophornbeam (*Ostrya virginiana*), northern spicebush (*Lindera benzoin*), dogtooth violet (*Erythronium americanum*), and spotted touch-me-not (*Impatiens capensis*). The presence of tree morphological adaptations, including trunk buttressing and exposed roots, were indicators of hydrology. Wetland 3-WL-A would be best classified as a “Palustrine Forested” system based on the Cowardin System (Cowardin et al. 1979) (see **Table 9.5-13**).

The upper 20 inches of soil is composed of silty clay and clay with a low chroma matrix and redoxomorphic features, which is indicative of wetland soils. Hydric soil indicators include the presence of a hydrogen sulfide odor. Primary indicators of wetland hydrology include a high water table and water-stained leaves.

Wetland hydrology is provided by contributions of surface runoff and groundwater flow from the surrounding forested area. Flowpath 3A-FP is a defined channel flowing through the wetland, and wetland areas abutting the flowpath receive hydrologic contributions from the leak flowpath. Wetland 3-WL-A extends to the south, connecting to 4-WL-B and joins with Wetland 4-WL (see **Figure 9.5-33**).

Wetland 3-WL-B

Wetland 3-WL-B is located on the eastern side of the Catskill Aqueduct and east of 3-WL-A (see **Figure 9.5-32**). This wetland is associated with a mapped NWI wetland east of the Catskill Aqueduct. Wetland 3-WL-B is a palustrine emergent wetland located in a low-lying area within the Lucas Turnpike Study Area. The area in the vicinity of 3-WL-B is a rock quarry and has been excavated to a lower grade than the surrounding area. Dominant plant species identified during the wetland delineation include tamarack (*Larix laricina*), broadleaf cattail (*Typha latifolia*), common reed (*Phragmites australis*), and common spikerush (*Eleocharis palustris*). Dominant species observed on site are classified as hydrophytic. In addition, common reed is a hydrophytic species that is usually associated with disturbed sites. Wetland 3-WL-B would be best classified

as a “Palustrine Emergent” system based on the Cowardin System (Cowardin et al. 1979) (see **Table 9.5-13**).

The upper 20 inches of soil is composed of silty clay with a low chroma and value matrix without redoxomorphic features, which is indicative of wetland soils. Hydric soil indicators observed during the investigation include the presence of a hydrogen sulfide odor and a redox dark surface. Primary wetland hydrology indicators observed within the wetland include the presence of the water table at the surface, sediment deposits, and aquatic fauna.

Similar to 3-WL-A, 3-WL-B hydrology is potentially supported by both surface water runoff and groundwater flow contributions from the surrounding forested area. Because this area has been previously used as a rock quarry, the lower elevation causes surface water to pool within Wetland 3-WL-B. Wetland 3-WL-B is isolated from Leaks 3A, 3B, and 4 by local topography, specifically the raised dirt road to the west and quarry to the south (see **Figure 9.5-32**). This wetland is also physically separated from Rondout Creek by the elevated Marbletown O&W Rail Trail and Lucas Turnpike.

Wetland 3-WL-C

Wetland 3-WL-C is located on the northeastern side of the Catskill Aqueduct, east of Wetland 3 WL-A and north of 3-WL-B (see **Figure 9.5-32**). Wetland 3-WL-C is a palustrine forested wetland located in a low-lying area east of Leak 3A. Dominant plant species identified during the wetland delineation at 3-WL-C include swamp white oak (*Quercus bicolor*), multiflora rose (*Rosa multiflora*) common winterberry (*Ilex verticillata*), Japanese barberry (*Berberis thunbergii*), dogtooth violet, spotted touch-me-not, sensitive fern (*Onoclea sensibilis*), and halberd-leaf tearthumb (*Polygonum arifolium*). Dominant species observed on site meet the criteria for hydrophytic vegetation. Wetland 3-WL-C would be best classified as a “Palustrine Forested” system based on the Cowardin System (Cowardin et al. 1979) (see **Table 9.5-13**).

The upper 20 inches of soil is composed of silty clay and clay with low chroma and value matrix without redoxomorphic features, which is indicative of wetland soils. Hydric soil indicators include the presence of a hydrogen sulfide odor. Primary wetland hydrology indicators present during the study include surface water, sediment deposits, aquatic fauna, hydrogen sulfide odor, and a high water table at approximately 0.5 inch below the ground surface.

Hydrology for Wetland 3-WL-C is likely provided by surface runoff and groundwater flow from the surrounding forested area. Wetland 3-WL-C continues outside the natural resources study area to the southeast and is hydrologically connected to a larger wetland complex. Wetland 3-WL-C is isolated from Leaks 3A, 3B, and 4 by local topography, specifically the raised dirt road to the west and fill to the south. This wetland is also physically separated from Rondout Creek by the elevated rail trail and Lucas Turnpike.

Wetland 4-WL and 4-WL-B

Wetland 4-WL is a palustrine forested wetland located approximately 500 feet downstream of Wetland 3-WL-A and continues south of the culvert along the unnamed tributary 2 to Rondout Creek outside the natural resources study area (see **Figure 9.5-29**). Wetland 4-WL-B is a non-delineated wetland located along 3A-FP, which connects these two wetlands, and is

described collectively with 4-WL because of its similar hydrology and vegetation characteristics (see **Figure 9.5-33**). Dominant plant species identified during the wetland delineation include red-osier dogwood (*Cornus sericea*), skunk cabbage (*Symplocarpus foetidus*), spotted touch-me-not, Queen Anne's lace (*Daucus carota*), field horsetail (*Equisetum arvense*), and sensitive fern, which meet the indicator status for hydrophytic vegetation. Wetland 4-WL and 4-WL-B would be best classified as "Palustrine Forested" systems based on the Cowardin System (Cowardin et al. 1979) (see **Table 9.5-13**).

The upper 20 inches of soil is composed of loam and clay loam with a low chroma and value matrix without redoxomorphic features, which is indicative of wetland soils. Observed hydric soil indicators include the presence of a hydrogen sulfide odor.

Primary wetland hydrology indicators include surface water, high water table at the surface, drift deposits, water-stained leaves, aquatic fauna, and hydrogen sulfide odor. Wetland hydrology is provided by surface drainage, and groundwater flow draining from the surrounding forested area. Flowpaths 3A-FP and 4-FP are defined channels flowing through the wetland, and wetland areas abutting the flowpath receive hydrologic contributions from the leak flowpath.

Wetland 4-WL-C

On February 12, 2016, the diffuse wet area in the open field south of the rail trail was identified as 4-WL-C (see **Figure 9.5-33**). This location is potentially a wetland. The area was dominated by watercress (*Nasturtium officinale*) in the upper portion that transitioned to common rush (*Juncus effusus*) toward its southern extent, which are both obligate wetland species. Hydrology for 4-WL-C appears to be provided by the artesian surface expression described above. If 4-WL-C is confirmed to be a wetland, it would be best classified as "Palustrine Emergent" system based on the Cowardin System (Cowardin et al. 1979) (see **Table 9.5-13**).

Future Without the Repair and Rehabilitation

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP's understanding that a subdivision approval has been granted by the Town of Marbletown for the property located in the northern section of the Lucas Turnpike Study Area. This subdivision was subject to a previous independent review and approval. However, the construction of the subdivision has not yet been completed, and, it is possible that up to 10 new houses could be constructed within the natural resources study area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that the future conditions of water resources in the Lucas Turnpike Study Area would be the same as baseline conditions with the exception that up to 10 new private supply wells could be developed as part of the previously approved subdivision.

Analysis of Potential Effect

This section analyzes the potential for temporary and permanent disturbance to water resources associated with the repair and rehabilitation and long-term operation of the Catskill Aqueduct in the Lucas Turnpike Study Area.

Construction

Groundwater

Localized construction dewatering may be necessary during construction to install the dechlorination systems. If needed, it would result in temporary depression of the water table in the immediate vicinity of the area where the presence of water would interfere with the dechlorination system installation. A temporary sump pit with bypass piping to a dewatering bag would be used to collect and divert water around the trenched location of the dechlorination system to keep the work area dry. It would also prevent sediment from entering downstream locations, specifically downstream reaches of flowpaths 3A-FP, 4-FP, and unnamed tributary 2 to Rondout Creek. Construction dewatering would be conducted with pumps in accordance with the State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity and other applicable regulatory requirements. Due to the short-term duration of construction within this study area (totaling 10 weeks over 3 months), there would be no measurable effect on shallow groundwater resources. The shallow excavation/work area would be kept dry during this time.

Surface Water and Wetlands

Work activities related to access improvements and installation of the passive dechlorination systems have the potential to temporarily reduce vegetated areas along the flowpaths and add temporary fill to flowpaths and wetlands.

Prior to commencing the repair and rehabilitation, temporary sediment and erosion control measures, such as silt fencing, would be installed and checked and reinstalled as necessary to adequately protect adjacent surface water and wetlands. To protect the stream and its banks, and prevent sediment and other pollutants from entering the waterway, temporary measures would be designed in accordance with the State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity and other applicable regulatory requirements. Tree removal would be conducted to construct the staging areas and access roads, and select tree removal may be required in Wetland 3-WL-A to access Leaks 3A and 3B. Tree removal would generally be avoided along the leak flowpaths. Because the flowpaths are influenced by leak water and groundwater from deep underground, water temperatures would be unaffected by any reductions in canopy cover from the removal of mature trees.

To construct the access road to Leak 4, a new culvert would be installed in the intermittent drainage swale. The remaining portions of the access roads would not disturb wetlands or watercourses (see **Figure 9.5-33**).

Additionally, staging at Leaks 3A and 3B would affect Wetland 3-WL-A. To approach these sites from the access road, temporary matting, likely made from lightweight aluminum grating, would be laid on the ground in the eastern portion of 3-WL-A. It would be driven on by construction equipment to access both Leaks 3A and 3B, which are almost 100 feet from one another. Heavy equipment would not be required during construction, and soil compaction within the surrounding wetland would be minimal.

Once staging and access is established, three passive dechlorination systems would be installed, one at each leak to capture and treat flow (not including the system that would be installed at the Private Well, outside the limits of construction). Installing the passive dechlorination systems at the start of the leak flowpath minimizes disturbance to the downstream flowpaths and adjacent wetlands and protects these resources from sodium hypochlorite, chlorine dioxide, and/or chlorine residuals. The matting near the staging areas would be removed after installation of the passive dechlorination systems. If additional sites are conclusively determined to be leaks, they would be similarly equipped with passive dechlorination systems.

Anticipated temporary and permanent disturbance to water resources was quantified based on the limits of construction and proposed work activities (see **Table 9.5-14**). Access to Leak 4 would result in approximately 590 square feet of permanent disturbance to install a new culvert in the intermittent drainage swale. Staging areas would result in temporary disturbance totaling approximately 7,370 square feet to Wetland 3-WL-A, and a portion of this area would remain disturbed through temporary chlorination while the passive dechlorination systems are operated. Temporary disturbance to leak flowpaths 3A-FP and 4-FP of approximately 870 and 280 square feet, respectively, would occur during construction to temporarily divert the flows and install the trenches. Once installed, the three activated carbon trenches would have footprints of approximately 67, 67, and 35 square feet at Leaks 3A, 3B, and 4, respectively. The Private Well would have an above-ground passive dechlorination system installed, that would not require ground disturbance. Following construction, the passive dechlorination systems would remain in place through temporary chlorination. When the passive dechlorination systems are no longer needed, temporarily disturbed areas would be restored to natural conditions and planted with native vegetation. Permanent disturbance is further analyzed in Section 9.19, “Project-wide Impact Analysis.”

Table 9.5-14: Estimated Disturbance to Water Resources within the Lucas Turnpike Natural Resources Study Area

Water Resource	Baseline Conditions (Square Feet)	Temporary Effects (Square Feet)	Permanent Effects (Square Feet)
3A-FP	5,440	870 <i>Passive dechlorination system installation</i>	0
3-WL-A	27,590	7,370 <i>Construction staging area and passive dechlorination system installation at Leak 3B</i>	0
3-WL-B	10,540	0	0
3-WL-C	17,660	0	0
4-FP	1,280	280 <i>Passive dechlorination system installation</i>	0
4-WL	13,020	0	0
4-WL-B	60,690	0	0
4-WL-C	1,050	0	0

Table 9.5-14: Estimated Disturbance to Water Resources within the Lucas Turnpike Natural Resources Study Area

Water Resource	Baseline Conditions (Square Feet)	Temporary Effects (Square Feet)	Permanent Effects (Square Feet)
Intermittent Drainage Swale	590	0	590 <i>Site access improvements, new culvert</i>
Flow from Artesian Expression	90	0	0

Temporary Chlorination

Temporary chlorination of the Catskill Aqueduct would occur from 2019 through 2023, and the passive dechlorination systems would be operated during this time. Groundwater quantity, level, and flow would be unchanged during temporary chlorination since the leaks in the Rondout Pressure Tunnel of the Catskill Aqueduct would not be repaired. However, groundwater quality could change as chlorinated leak water mixes with, and travels within the groundwater in the bedrock aquifer. Changes in groundwater quality could occur along the location of former borings and Shaft 4 which would provide a preferential pathway for water movement.

Further discussion of the effect of chlorinated water on private drinking water supply wells is found in Section 9.5.5.15, “Public Health.”

There would be no disturbance to wetlands during this time, or to leak flowpaths downstream of the passive dechlorination systems. The systems would treat leak flows, and all discharges would meet applicable regulatory requirements. Wetland hydrology is provided by the leak flowpaths, as well as contributions of surface runoff and groundwater. Installing passive dechlorination systems where the leaks express at the ground surface would prevent untreated leak water from entering wetlands. Additionally, the passive dechlorination systems would be installed within the existing flowpaths. The treated water would continue to contribute to the natural system as it does under baseline conditions, and would not alter surface or subsurface flows.

Operation

When temporary chlorination is no longer required, operation of the Catskill Aqueduct would be consistent with baseline conditions. Groundwater resources within the Lucas Turnpike Study Area would return to baseline conditions as any sodium hypochlorite, chlorine dioxide, and/or chlorine residuals would degrade relatively quickly as they react with native groundwater and migrate through the aquifer.

Water Resources Conclusions

Repair and rehabilitation work activities would include temporary and permanent disturbance to water resources in the natural resources study area. Site access would temporarily disturb the intermittent drainage swale. Construction staging, site access, and temporary dechlorination would temporarily affect the leak flowpaths 3A-FP and 4-FP, as well as Wetland 3-WL-A. Installation of the temporary dechlorination systems would account for less than 200 square feet of temporary disturbance.

Temporary chlorination of the Catskill Aqueduct would occur from 2019 through 2023, and the passive dechlorination systems would be operated during this time. All discharges would meet regulatory requirements. Groundwater quantity, level, and flow would be unchanged, but groundwater quality could be affected as chlorinated leak water mixes with, and travels within groundwater in the bedrock aquifer. The potential impacts associated with water quality changes to the existing water infrastructure (water supply wells) and public health (drinking water) are analyzed in Section 9.5.5.11, “Water and Sewer Infrastructure” and Section 9.5.5.15, “Public Health,” respectively.

Following the repair and rehabilitation, operation of the Catskill Aqueduct would return to baseline conditions. Groundwater quality in the natural resources study area would quickly return to a pre-chlorination baseline as any chlorine residual would degrade quickly as it reacts with native groundwater and soils. Therefore, the features characterizing the groundwater resources in the natural resources study area (i.e., groundwater levels and quantity, extent and connection between the aquifers, groundwater quality, and use of the groundwater resources for drinking water purposes) would be consistent with baseline conditions.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to water resources within the Lucas Turnpike Study Area.

Terrestrial Resources

In the vicinity of Leak 3A and 3B, the natural resources study area is dominated by red maple-hardwood swamp with areas of maple-basswood rich mesic forest. Red maple-hardwood swamps occur in poorly drained depressions or basins, usually on inorganic soil, but occasionally on muck or shallow peat, that are typically acidic to pH neutral (Edinger et al. 2014). Tree species within the red maple-hardwood swamp consist of red maple (*Acer rubrum*), black ash (*Fraxinus nigra*), white ash, basswood, slippery elm (*Ulmus rubra*), sugar maple (*Acer saccharum*), and cottonwood (*Populus deltoides*), chestnut oak (*Quercus prinus*), and black oak (*Quercus velutina*). The shrub and herbaceous layer consists of skunk cabbage, spotted touch-me-not, multiflora rose (*Rosa multiflora*), and Japanese barberry. The characteristics of a maple-basswood rich mesic forest community include a species-rich hardwood forest that typically occurs on well-drained, moist soils of approximately neutral pH (Edinger et al. 2014). The dominant species of a maple-basswood rich mesic forest community include white ash, black ash, basswood, sugar maple, red maple, and cottonwood.

The natural resources study area near Leak 4 is dominated by a maple-basswood rich mesic forest with areas of red maple-hardwood swamp, and smaller areas of palustrine emergent wetland and a white pine plantation (Edinger et al. 2014). Species present include red maple, basswood, American beech (*Fagus grandifolia*), hophornbeam, white pine, eastern red-cedar (*Juniperus virginiana*), white birch (*Betula papyrifera*), and shagbark hickory (*Carya ovata*). The understory contains Japanese barberry, ebony spleenwort (*Asplenium platyneuron*), striped wintergreen (*Chimaphila maculata*), skunk cabbage, clearweed (*Pilea pumila*), buttonbush (*Cephalanthus occidentalis*), broadleaf cattail (*Typha latifolia*), sensitive fern, multiflora rose, tatarian honeysuckle (*Lonicera tatarica*), garlic mustard (*Alliaria petiolata*), and Oriental bittersweet (*Celastrus orbiculatus*).

The portion of the natural resources study area south of the Marbletown O&W Rail Trail, characterized as mowed lawn with trees and successional old field consists of eastern red-cedar,

black walnut (*Juglans nigra*), red maple, multiflora rose, wineberry (*Rubus phoenicolasius*), and goldenrods (*Solidago* spp.). While the Town of Marbletown does not regulate the removal of trees associated with the repair and rehabilitation, terrestrial resources within this study area warrant an analysis.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP's understanding that an approved subdivision has been granted by the Town of Marbletown for the property located in the northern section of the natural resources study area. This subdivision was subject to a previous independent review and approval. However, the construction of the subdivision has not yet been completed. This subdivision has been approved as a conservation subdivision, with provisions to protect natural resources. As such, for the purposes of this analysis, it is assumed that terrestrial resources will be similar to baseline conditions. Natural processes, such as changes in habitat due to natural vegetative succession, are anticipated to continue. Therefore, in the future without the repair and rehabilitation, it is assumed that terrestrial resources within the study area would be the same as baseline conditions.

Work activities would include tree clearing and shrub removal for the purpose of improving site access and staging areas. Access to the Private Well would be provided by a private access road from Lucas Turnpike to the private property, and no improvements would be needed. Access to Leak 4 would be provided by a new access road parallel to the rail trail, and access to Leaks 3A and 3B would be from a new access road to the north (see **Figure 9.5-24** and **Figure 9.5-25**).

Up to 140 trees may be removed within the study area. Up to 40 trees were identified for removal along the new access road to Leak 4. Based on estimated tree density along the access road to Leaks 3A and 3B, approximately 100 additional trees may be removed. Species of trees in the limits of construction are predominantly white pine, eastern red-cedar, and black walnut. A tree survey conducted within the limits of construction at Leak 4 included a total of 13 tree species, with an average dbh of between 5 and 18 inches.

Tree removal would be targeted within a narrow area for the construction access road and at construction staging areas that, where possible, would be sited near existing clearings. Only those trees that lay in the footprint of the construction access road or temporary staging areas would be removed, and all other trees would be protected or preserved. Given the approximately 1,400 linear feet of new access roads proposed, approximately one tree every 10 feet would be removed. Thus, tree removal would occur in discrete locations and would not dramatically change the character of the area or affect surrounding trees. All tree removal would be conducted from November 1 through March 31 to avoid impacts to Indiana bats (*Myotis sodalis*) and northern long-eared bats (*Myotis septentrionalis*). Trees removed within the study area would be replaced, or landowners would be otherwise compensated.

Following construction, all equipment would be removed from the natural resources study area, and staging areas would be restored to natural conditions. Vegetated areas temporarily cleared during construction are anticipated to grow back with similar communities. During temporary chlorination, chlorinated water would be treated at the leaks. See Section 9.19. "Project-wide Impact Analysis" for an analysis of the potential impact at locations where chlorinated water from the aqueduct enters the surrounding environment. Following the repair and rehabilitation within the natural resources study area, operation of the Catskill Aqueduct would be consistent

with baseline conditions and natural reforestation and vegetative succession of aqueduct areas not routinely maintained would continue to occur over time.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to terrestrial resources within the Lucas Turnpike Study Area.

Federal/State Threatened and Endangered Species and State Species of Special Concern

This section includes an analysis of potential impacts to federal/State Threatened and Endangered Species and State Species of Special Concern identified in Section 9.3.9, “Natural Resources,” as having the potential to be affected by activities within the natural resources study area. To identify those species that could be affected within the study area, species that could occur up to 0.25 mile from the work sites were determined in consultation with USFWS, USACE, NYNHP, and NYSDEC, as well as county and local offices, as applicable.

As discussed in Section 9.3.9, “Natural Resources,” 10 species were identified to have the potential to be affected by the repair and rehabilitation within the natural resources study area. Therefore, conditions in the future without the repair and rehabilitation, an analysis of the potential for impacts to these 10 species, and a summary of conclusions on the potential effects resulting from the repair and rehabilitation are provided below.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP’s understanding that an approved subdivision has been granted by the Town of Marbletown for the property located in the northern section of the study area. This subdivision was subject to a previous independent review and approval. However, the construction of the subdivision has not yet been completed. This subdivision has been approved as a conservation subdivision, with provisions to protect natural resources. As such, for the purposes of this analysis, it is assumed that federal/State Threatened and Endangered Species and State Species of Special Concern resources will be similar to baseline conditions.

In the future without the repair and rehabilitation, it is assumed that federal/State Threatened and Endangered Species and State Species of Special Concern within the natural resources study area would largely be the same as baseline conditions, other than possible changes in habitat resulting from natural vegetative succession and general anthropogenic influences.

An analysis of the potential for disturbance to federal/State Threatened and Endangered Species and State Species of Special Concern from the repair and rehabilitation within the natural resources study area is shown in **Table 9.5-15**. The analysis included an evaluation of the repair and rehabilitation work activities within the study area and field visits, as applicable.

Table 9.5-15: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern, and Habitats within the Lucas Turnpike Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Amphibians and Reptiles					
Blue-spotted Salamander	<i>Ambystoma laterale</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visits on April 24-25, 2013, July 27, 2015, and September 15, 2015. Potential habitat exists within the wetland and vernal pool areas. Perimeter silt fencing would limit disturbance to adjacent habitat during construction. The passive dechlorination systems would treat leak flows and all discharges would meet applicable regulatory requirements. Potential effects to wetlands would be avoided to the maximum extent possible. Furthermore, sites would be restored to natural conditions following temporary chlorination. Therefore, there are no effects anticipated and no further analysis for blue-spotted salamanders is warranted for this study area.	No
Bog Turtle	<i>Clemmys</i> [= <i>Glyptemys</i>] <i>muhlenbergii</i>	Threatened	Endangered	A Phase I Habitat Assessment survey was conducted by USFWS-recognized qualified bog turtle surveyors on April 25, 2013. The results of the survey indicated that Wetland 3-WL-A, 3-WL-C, and Wetland 4-WL (see Figure 9.5-29) had potential bog turtle habitat. Therefore, further analysis is warranted for this study area.	Yes. See further analysis below.
Eastern Box Turtle	<i>Terrapene carolina</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visits on April 24-25, 2013, July 27, 2015, and September 15, 2015. Potential habitat exists within the upland and wetland areas. While work activities would be largely confined to previously disturbed areas, if any isolated areas of potential habitat exist at the sites, as a highly mobile species, any eastern box turtles that might otherwise use these areas are expected to instead utilize similar, adjacent habitats during construction. Furthermore, perimeter silt fencing would limit disturbance to adjacent habitat and prevent individual turtles from entering the work sites during construction. Finally, upon temporary chlorination, the staging areas would be restored to natural conditions. Therefore, there are no effects anticipated and no further analysis for eastern box turtles is warranted for this study area.	No

Table 9.5-15: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern, and Habitats within the Lucas Turnpike Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Jefferson Salamander	<i>Ambystoma jeffersonianum</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visits on April 24 and 25, 2013, July 27, 2015, and September 15, 2015. Potential habitat exists within the wetland and vernal pool areas. Perimeter silt fencing would limit disturbance to adjacent habitat during construction. The passive dechlorination systems would treat leak flows and all discharges would meet applicable regulatory requirements. Potential effects to wetlands would be avoided to the maximum extent possible. Furthermore, sites would be restored to natural conditions following temporary chlorination. Therefore, there are no effects anticipated and no further analysis for Jefferson salamanders is warranted for this study area.	No
Jefferson Salamander Complex	<i>Ambystoma jeffersonianum x laterale</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visits on April 24 and 25, 2013, July 27, 2015, and September 15, 2015. Potential habitat exists within the wetland and vernal pool areas. Perimeter silt fencing would limit disturbance to adjacent habitat during construction. The passive dechlorination systems would treat leak flows and all discharges would meet applicable regulatory requirements. Potential effects to wetlands would be avoided to the maximum extent possible. Furthermore, sites would be restored to natural conditions following temporary chlorination. Therefore, there are no effects anticipated and no further analysis for the Jefferson salamander complex is warranted for this study area.	No
Spotted Turtle	<i>Clemmys guttata</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visits on April 24 and 25, 2013, July 27, 2015, and September 15, 2015. Potential habitat exists within the red maple-hardwood swamp and wetland areas. Potential effects to wetlands would be avoided to the maximum extent possible. Perimeter silt fencing would limit disturbance to adjacent habitat and prevent individual turtles from entering the work sites during construction. Furthermore, sites would be restored to natural conditions following temporary chlorination. Therefore, there are no effects anticipated and no further analysis for spotted turtles is warranted for this study area.	No

Table 9.5-15: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern, and Habitats within the Lucas Turnpike Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Wood Turtle	<i>Glyptemys insculpta</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visits on April 24 and 25, 2013, July 27, 2015, and September 15, 2015. Potential habitat exists within the upland and wetland areas. Work activities would be largely confined to previously disturbed areas. If any isolated areas of potential habitat exist at the sites, wood turtles that might otherwise use these areas are expected to instead utilize similar, adjacent habitats during construction. Furthermore, perimeter silt fencing would limit disturbance to adjacent habitat and prevent individual turtles from entering the work sites during construction. Finally, upon temporary chlorination, the staging areas would be restored to natural conditions. Therefore, there are no effects anticipated and no further analysis for wood turtles is warranted for this study area.	No
Birds					
Bald Eagle	<i>Haliaeetus leucocephalus</i>	BGPA/ MBTA	Threatened	No individuals were incidentally observed during the field visits on April 24-25, 2013, July 27, 2015, and September 15, 2015. NYNHP identified the nearest nest on Rondout Creek to be approximately 750 feet south of the nearest work site, over the USFWS and DEP recommended 330 and 660-foot buffers, respectively. Bald Eagles could continue to forage along Rondout Creek generally located south and southeast of the study area. Disturbances would not adversely affect Bald Eagle nesting or foraging habitats. Therefore, there are no effects anticipated and no further analysis for Bald Eagles is warranted for this study area.	No
Mammals					
Indiana Bat	<i>Myotis sodalis</i>	Endangered	Endangered	Summer habitat surveys were conducted in the study area on April 25, 2013, July 27, 2015, and February 12, 2016. No bats were incidentally observed. Potential bat roosting habitat was identified. Noise from work activities could potentially affect foraging bats. Therefore, further analysis is warranted for this study area.	Yes. See further analysis below.
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	Threatened	<u>Threatened</u> <u>Unlisted</u>	Summer habitat surveys were conducted in the study area on April 25, 2013, July 27, 2015, and February 12, 2016. No bats were incidentally observed. Potential bat roosting habitat was identified. NYNHP identified occurrences within 5 miles of the study area. Noise from work activities could potentially affect foraging bats. Therefore, further analysis is warranted for this study area.	Yes. See further analysis below.
Notes: BGPA: Bald and Golden Eagle Protection Act MBTA: Migratory Bird Treaty Act					

Bog Turtle (Clemmys [=Glyptemys] muhlenbergii)

Wetlands, including unmapped wetlands, in the natural resources study areas were identified and evaluated for potential bog turtle habitat through a desktop analysis and/or field visits, including a Phase I Habitat Survey. As described further in Section 9.3.9, "Natural Resources," a Phase I Habitat Assessment survey was conducted at Wetlands 3-WL-A, 3-WL-B, 3-WL-C, and 4-WL by USFWS-recognized qualified bog turtle surveyors on April 25, 2013 (see **Figure 9.5-29**). The results of the survey indicated that Wetland 3-WL-A has a small pocket of emergent-scrub/shrub habitat consisting of sensitive fern, cinnamon fern (*Osmunda cinnamomea*), watercress, sphagnum moss (*Sphagnum* spp.), tussock sedge (*Carex stricta*), fox sedge (*Carex vulpinoidea*), and silky dogwood (*Cornus amomum*), and an area of forested wetland, which is potential bog turtle habitat. The area of potential bog turtle habitat identified as Habitat 3-H-A is approximately 0.24 acre in size (see **Figure 9.5-34**). Wetland 3-WL-B does not provide suitable substrate for bog turtles since it is composed of gravel, cobbles, and boulders.

Wetland 3-WL-C contains a forested area with a sparse canopy, allowing growth of pale touch-me-not, buttercup (*Ranunculus* spp.), golden ragwort (*Senecio aureus*), common rush, skunk cabbage, musclewood (*Carpinus caroliniana*), hophornbeam, and spicebush. This area contains a muck substrate; most of the mucky parts of this wetland can be probed 3 to 5 inches. This area of potential bog turtle habitat within Wetland 3-WL-C, is identified as Habitat 3-H-C as it meets the criteria for bog turtle habitat (see **Figure 9.5-34**). Potential habitat at Habitat 3-H-C is marginal, primarily because the hydrology appears to be driven by the leak rather than from a natural seep/groundwater.

Potential bog turtle habitat is also located within Wetland 4-WL in an area consisting of an emergent wetland community dominated by narrowleaf cattail (*Typha angustifolia*), skunk cabbage, spotted touch-me-not, sensitive fern, cinnamon fern, watercress, scouring rush (*Equisetum* spp.), sphagnum moss, and a liverwort (*Marchantia* spp.). Soils are primarily organic muck in the top 4 to 6 inches underlain by a mineral silt substrate. Soils can be probed to depths ranging from 3 to 18 inches. However, most of the mucky parts can be probed 6 to 8 inches. The area of potential bog turtle habitat, identified as Habitat 4-H, is approximately 0.23 acre in size (see **Figure 9.5-34**). Habitat 4-H has better habitat characteristics than Habitats 3-H-A and 3-H-C; however its hydrology is at least partially driven by the leak. No bog turtles were identified during the Phase II visual surveys completed during 2013 in potential bog turtle habitats identified as Habitats 3-H-A, 3-H-C, and 4-H.

Based on the Phase I and II bog turtle surveys, a review of topographic maps and recent aerial photographs, there appears to be corridors of riparian floodplain, wetland, and open areas (such as wet meadows and stream valleys) that historically could have been used by bog turtles, if these extant populations were present within normal dispersal range of the study area. However, these potential corridors have been fragmented by roads, residential and industrial areas, and disturbed habitats; and, in general, they lack the suitable habitat necessary to facilitate dispersal. Therefore, if bog turtles were present outside of the 1-mile radius, it is unlikely they could access the habitat within the study area due to the lack of potential movement corridors. Based on the results of the Phase I and II bog turtle surveys and the desktop analysis, no known historic or extant bog turtle populations occur nearby (within 1 mile of these wetlands) and the lack of any

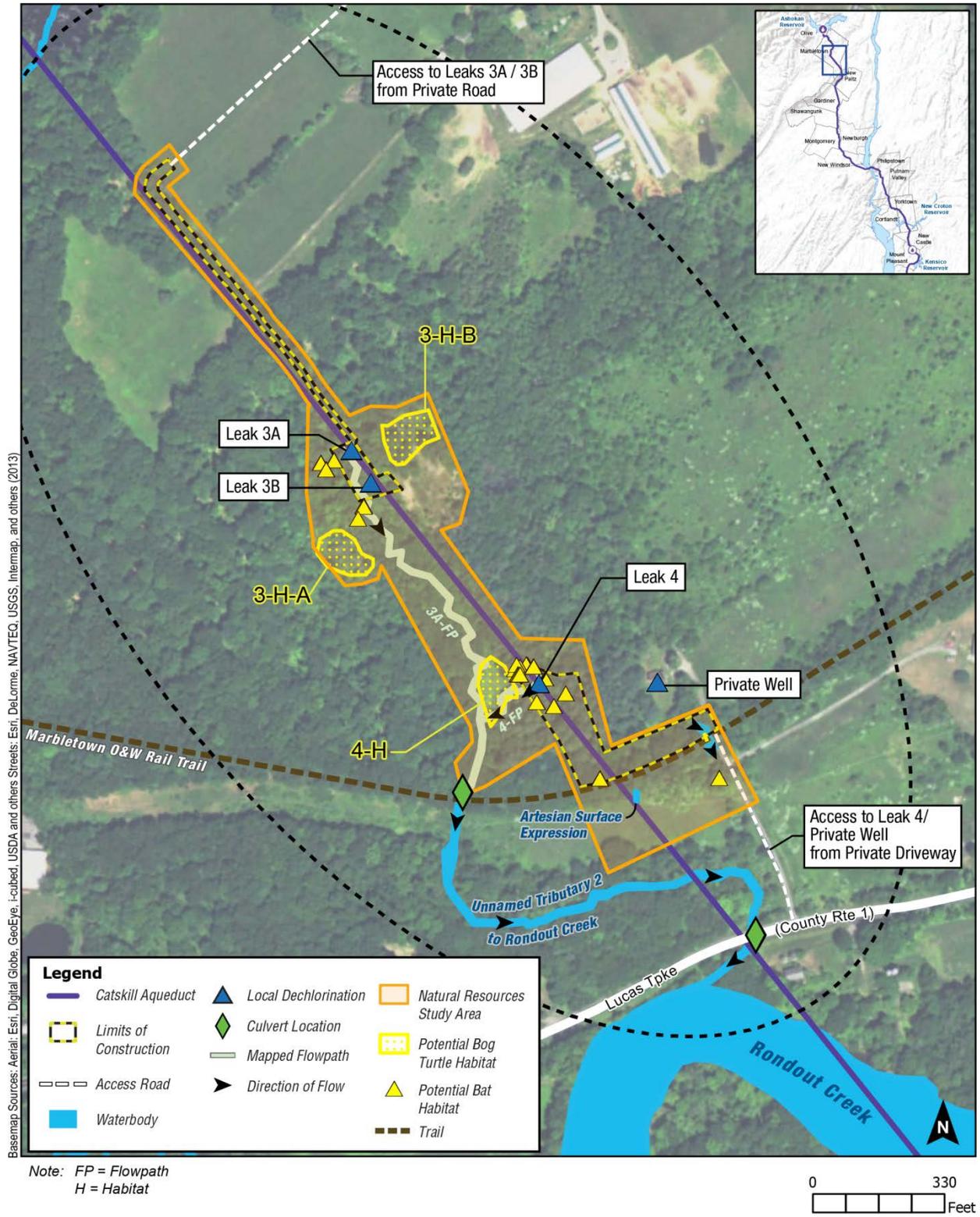


Figure 9.5-34: Natural Resources - Lucas Turnpike Study Area



continuous travel corridors between on-site potential habitats and off-site wetlands suggest it is unlikely that bog turtles are present within the potential habitats surveyed within the study area.

Repair and rehabilitation work activities would predominantly occur on previously disturbed areas along the Catskill Aqueduct, and would be localized to the work sites. Although bog turtles are not anticipated to be present, work activities have been designed to minimize potential project-related disturbance to wetlands. They include siting the access road outside of wetlands and using temporary mats where construction staging is needed in wetlands to access the leaks. Prior to commencing work, perimeter soil and erosion control measures would be installed and would reduce runoff from the construction area. Silt fences would reduce sedimentation and prevent seeds and other organic materials from entering wetland habitats. Additionally, there would be no anticipated changes in hydrology (i.e., no changes in flows proposed that could affect potential habitat such as soils and vegetation) during construction of the passive dechlorination systems. Staging areas have been sited to minimize encroachment on wetlands, thereby minimizing disturbance to potential bog turtle habitat.

Wetland hydrology is provided by the leak flowpaths, as well as contributions of surface runoff and groundwater. Installing passive dechlorination systems where the leaks express at the ground surface would prevent untreated leak water from entering wetlands.

In summary, based on the small areas of potential bog turtle habitat, the Phase II visual surveys, and the lack of any known population within 1 mile of the study area, it is unlikely that bog turtles would occur in any of the study area wetlands. The hydrology would not be modified by the installation of temporary dechlorination systems. There would be no changes to flows that could affect potential habitat such as soils and vegetation and a Phase III trapping survey was not warranted. Therefore, the repair and rehabilitation may affect, but is unlikely to adversely affect bog turtles in this study area.

Indiana Bat (*Myotis sodalis*)

Summer habitat surveys were conducted in the study area on April 25, 2013, July 27, 2015, and February 12, 2016. Potential bat roosting habitat was identified near Leaks 3A and 3B and includes cottonwood, slippery elm, white ash, chestnut oak, swamp white oaks, and black oak. Potential bat roosting habitat identified within the limits of construction at Leak 4 includes eastern red-cedar, white birch, cottonwood, shagbark hickory, and white pine.

In the future with the repair and rehabilitation, activities would predominantly occur on previously disturbed areas along the Catskill Aqueduct. They would be localized and confined to the immediate vicinity of Leaks 3A, 3B, and 4, and their respective access roads. Repair and rehabilitation work activities to construct the access road and passive dechlorination systems would occur where there are potential roosting trees. However, repair and rehabilitation work activities would not result in significant loss or modification of roosting or foraging habitat for Indiana bats. Approximately five trees with potential roosting habitat occur within the limits of construction near Leak 4, and disturbance would be avoided where possible. Potential effects to streams and wetlands would be avoided to the furthest extent possible and foraging habitat would continue to be available in the canopy within the study area and in adjacent forested areas. Temporary noise may discourage Indiana bats from roosting in the immediate vicinity of the

work sites. However, there is abundant suitable habitat in the surrounding areas in which Indiana bats could roost. Any tree removal that is required would be conducted from November 1 through March 31 to avoid impacts to Indiana bats. Therefore, the repair and rehabilitation may affect, but is unlikely to adversely affect Indiana bats in this study area.

Northern Long-eared Bat (*Myotis septentrionalis*)

Summer habitat surveys were conducted in the study area on April 25, 2013, July 27, 2015, and February 12, 2016. Survey results are described above under Indiana bat (see **Figure 9.5-34**).

In the future with the repair and rehabilitation, work activities would result in tree removal where there are few potential roosting trees. However, there would be no significant loss or modification of roosting or foraging habitat for northern long-eared bats within the study area. Potential effects to streams and wetlands would be avoided to the furthest extent possible, and foraging habitat would continue to be available in the canopy within the study area and in adjacent forested areas. Temporary noise may discourage northern long-eared bats from roosting in the immediate vicinity of the work sites. However, there is abundant suitable habitat in the surrounding areas that northern long-eared bats could use for roosting and foraging. Tree removal would be conducted from November 1 through March 31 to avoid impacts to northern long-eared bats. Therefore, the repair and rehabilitation may affect, but is unlikely to adversely affect, northern long-eared bats in this study area.

Federal/State Threatened and Endangered Species and State Species of Special Concern Conclusions

Based on the impact analysis, no take is anticipated. There would be no effects to blue-spotted salamanders (*Ambystoma laterale*), eastern box turtles (*Terrapene carolina*), Jefferson salamanders (*Ambystoma jeffersonianum*), Jefferson salamander complex (*Ambystoma jeffersonianum x laterale*), spotted turtles (*Clemmys guttata*), wood turtles (*Glyptemys insculpta*), or Bald Eagles (*Haliaeetus leucocephalus*) associated with the repair and rehabilitation. Repair and rehabilitation may affect, but is not likely to adversely affect, bog turtles, Indiana bats, and northern long-eared bats.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to federal/State Threatened and Endangered Species or State Species of Special Concern within the Lucas Turnpike Study Area.

9.5.5.10 Hazardous Materials

To evaluate the potential presence of hazardous materials within the Lucas Turnpike Study Area, a Phase I ESA was conducted in general conformance with the scope and limitations of ASTM Practice E 1527-13 and CEQR requirements to identify RECs. The Phase I ESA included site reconnaissance, research on current/historical use, and review of federal and State regulatory listings for both the site itself and for its neighboring properties within the appropriate search distance defined in the ASTM standard. The findings from the Phase I ESA investigation and results from DEP's legacy files for the work sites, including a geotechnical investigation, were

collectively reviewed to assess the potential presence of and potential for disturbance to hazardous materials in the study area.

Based on the Phase I ESA investigation within this study area, RECs as defined by the ASTM standard that would affect activities in the study area were identified. The RECs include an abandoned car located adjacent to the proposed staging area. Additionally, the historic use of the Marbletown O&W Rail Trail as a railroad bed constitutes a REC due to the nature of rail maintenance operations and potential related discharges. Furthermore, an abandoned underground storage tank with no information is located on the southern portion of the access point where Lucas Turnpike and the privately owned access road intersect. The Phase I ESA concluded that this underground storage tank site is not likely to impact the repair and rehabilitation work activities because of its topographically down-gradient location and distance from the site. Furthermore, research on current/historical use of the access improvement area along the northern section of the study area, indicates that the proposed access road has been, and is currently being used for agricultural purposes.

Geotechnical environmental investigations and sampling were undertaken for contaminants of concern including volatile and semivolatile organics, PCBs, and total petroleum hydrocarbons along the aqueduct within the study area. Chromium and arsenic were noted in the soil sampling results. Total chromium was reported in the samples collected at Leak 4. Chromium concentrations, however, were consistent over a widespread sampling area and are more likely associated with background concentrations. Along the Catskill Aqueduct, there are widespread occurrences of chromium, which are attributed to the existing geological formations. Both diesel and gasoline range organics were not detected in the sample collected for analysis. Arsenic, although naturally occurring in soils, is also likely to be the result of background concentration.

Based on the results of the environmental investigations completed within the Lucas Turnpike Study Area, no other hazardous materials are known to exist. The soil results support the reuse of excavated materials as backfill and do not suggest the need for special management, handling, or health and safety measures at this time.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP's understanding that an approved subdivision has been granted by the Town of Marbletown for the property located in the northern section of the study area. This subdivision was subject to a previous independent review and approval. However, the construction of the subdivision has not yet been completed. It is not anticipated that any additional new developments would occur within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that the presence of hazardous materials within the Lucas Turnpike Study Area would be the same as baseline conditions.

In the future with the repair and rehabilitation, if potential contaminants of concern are identified within the access roads and staging area, any excavation associated with those areas would be conducted in accordance with applicable federal, State, and local regulations and guidelines. The subsurface soil sampling would be conducted to ensure that contaminated soil is not reused as backfill (per 6 NYCRR IV B Part 375). All waste material would be temporarily secured using non-permeable base material and covered with plastic or geotextile to prevent soil loss and removed from the construction areas within the Lucas Turnpike Study Area at the end of each

workday. All soils to be removed as part of the repair and rehabilitation would be transported off site and disposed of in accordance with all federal, State, and local regulations and guidelines.

During construction, work activities would potentially require storage and use of a variety of petroleum and other chemical products, such as diesel fuel for back-up power, lubricating oil for construction vehicles, and miscellaneous cleaning and maintenance chemicals. The use and storage of these products would be in accordance with applicable regulatory requirements and guidelines including those relating to: federal Spill Prevention, Control, and Countermeasures requirements; and State petroleum bulk storage, chemical bulk storage, and spill reporting requirements. Passive dechlorination systems would be installed and maintained. Any uncontaminated excavated soil would be stockpiled within the staging area in accordance with applicable requirements, and if needed, a silt fence would be installed to prevent migration of stockpiled soils. Following construction, all equipment as well as chemical storage would be removed from the construction staging areas, and the areas would be restored to baseline conditions.

During temporary chlorination, activated carbon filters, which are inert and are used for treating drinking water, would be used as part of the passive dechlorination systems to treat chlorinated leak water. Following the repair and rehabilitation, passive dechlorination systems would be removed from the Lucas Turnpike Study Area. Staging areas would be restored to baseline conditions, and operation of the Catskill Aqueduct would be consistent with baseline conditions.

Therefore, the repair and rehabilitation would not result in significant adverse impacts from the presence or disturbance of hazardous materials within the Lucas Turnpike Study Area.

9.5.5.11 Water and Sewer Infrastructure

The repair and rehabilitation has the potential to affect private water supply systems within the Lucas Turnpike Study Area. Discharges generated from the repair and rehabilitation are discussed in Section 9.19, “Project-wide Impact Analysis.”

Residents in the study area rely on private water supply wells, as there are no municipal water supply systems serving these residents. A typical home in Ulster County uses an individual supply well in either the unconsolidated or bedrock aquifer. Although less common, it is not unusual to find shallower sources of drinking water in older homes in rural areas, such as shallow dug wells, shallow well points, or springs.

An inventory of private supply wells was completed to estimate the number of wells that may be affected by the leak. The well inventory was completed in the area defined by the maximum distance that sodium hypochlorite, chlorine dioxide, and/or chlorine residuals may be found in the groundwater during temporary chlorination of the aqueduct (the methodology for estimating the distance is described further in Section 9.3.11.2, “Impact Analysis Methodology”).

Forty-three parcels were identified within the area that contain known, potential or future wells based on a review of GIS aerial imagery and town tax billing information. Twenty-seven parcels were identified to contain or may contain privately owned drinking water supply wells (see **Figure 9.5-35**). An additional 16 vacant parcels were identified that have the potential for future wells if the parcel was developed. Most wells on these parcels are presumed to be in the bedrock aquifer as the

bedrock aquifer is capable of yielding adequate quantities of groundwater, and the unconsolidated aquifer is thin and lower yielding than the bedrock aquifer (Mid-Hudson 2005).

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP's understanding that a subdivision approval has been granted by the Town of Marbletown for the property located in the northern section of the study area. This subdivision was subject to a previous independent review and approval. However, the construction of the subdivision has not yet been completed, and it is possible that up to 10 new houses could be developed within the natural resources study area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that the water supply infrastructure would be the same as baseline conditions, with the exception that up to 10 new private wells could be developed as part of the previously approved subdivision.

In the future with the repair and rehabilitation, internal leak repair is not proposed for this study area because the leaks are located in a pressure tunnel where accessibility is limited, and repairs would be challenging due to the depth of the aqueduct and the need to contain a highly pressurized leak at this location. During temporary chlorination, changes to groundwater quality could occur as chlorinated water would enter the bedrock aquifer. This could have a temporary effect on groundwater quality in private water supply wells. Private water supply wells could potentially require treatment to lower the concentration of sodium hypochlorite, chlorine dioxide, and/or chlorine residuals to non-detectable levels. Further discussion of the effect of chlorinated water on private drinking water supply wells is found in Section 9.5.5.15, "Public Health."

Following temporary chlorination, groundwater quality in the Lucas Turnpike Study Area would quickly return to a pre-chlorination baseline condition since any sodium hypochlorite, chlorine dioxide, and/or chlorine residuals would degrade quickly as they react with native groundwater and soils. Operation of the Catskill Aqueduct within the study area would be consistent with baseline conditions.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to water and sewer infrastructure within the Lucas Turnpike Study Area.

9.5.5.12 Transportation

The study area for the transportation analysis consists of the major convergent roadways that would potentially be used by the employee and construction vehicles associated with repair and rehabilitation work activities en route to and from the Lucas Turnpike Study Area.

Access to the repair and rehabilitation limits of construction for the work sites within the Lucas Turnpike Study Area would be via Lucas Turnpike (County Route 1) and State Route 213. Access to Leaks 3A and 3B sites would be via State Route 213 to Warren Way, then to a private road. The new access road to Leaks 3A and 3B would extend to the aqueduct, and would then run along the aqueduct south to Leaks 3A and 3B. Access to Leak 4 would be via Lucas Turnpike to a private driveway. The new access road to Leak 4 would be parallel to and north of the rail trail, and would then run parallel to the aqueduct to Leak 4. Access to the Private Well would be via Lucas Turnpike to a private driveway. **Figure 9.5-21** show the locations of the access routes to the work sites.

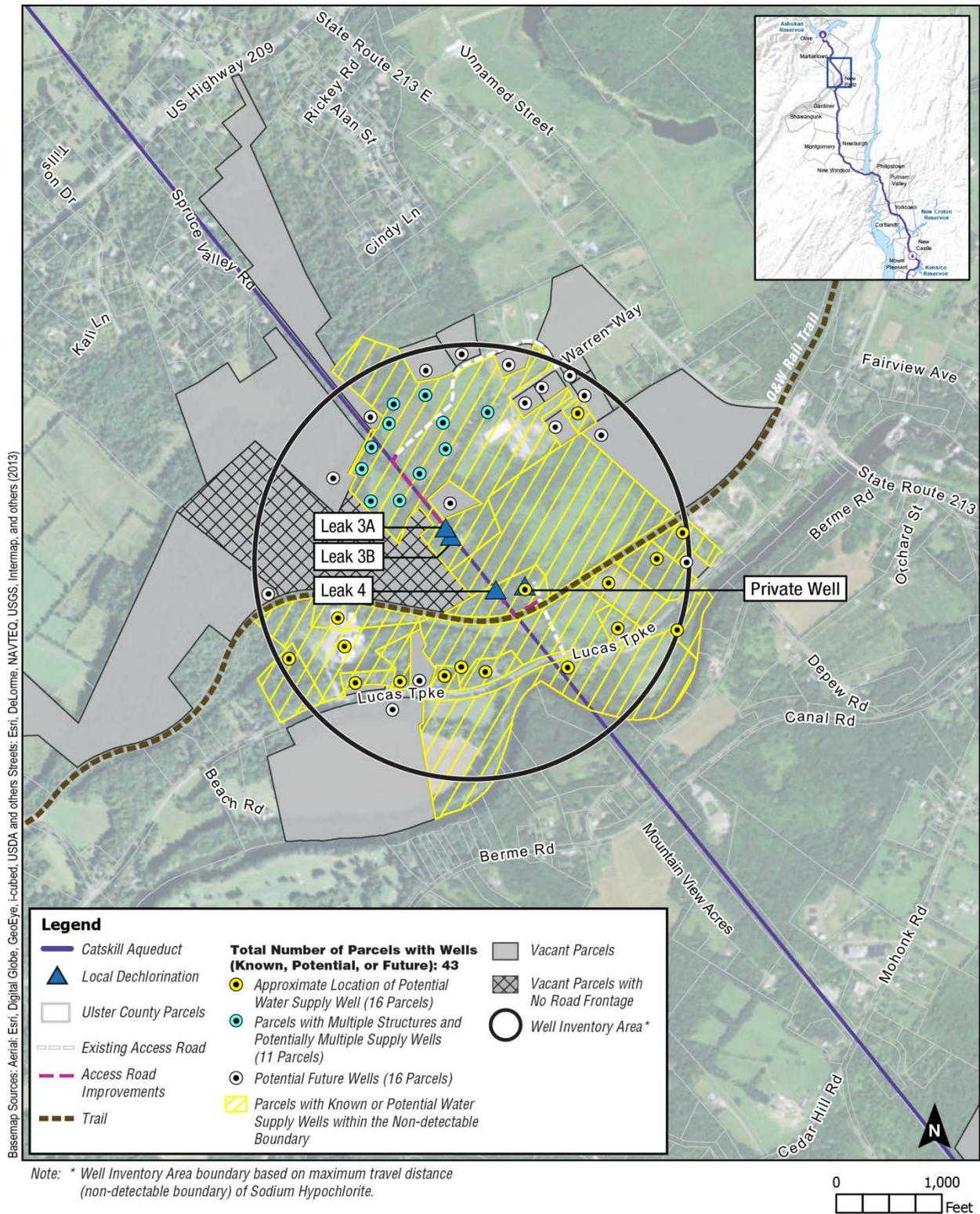


Figure 9.5-35: Area Well Inventory - Lucas Turnpike Study Area



Lucas Turnpike and State Route 213 are two-lane, two-way major collector roadways. To the extent available, construction vehicles would travel on truck-permitted roadways directly to and from the Lucas Turnpike Study Area. There is no public transportation and little to no pedestrian activity in the immediate vicinity of the study area. Under current operations, DEP employees periodically access the site. However, no DEP employees work at or visit the study area on a daily basis, and the small number of DEP employee vehicles has little to no effect on traffic conditions within the study area.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP's understanding that an approved subdivision has been granted by the Town of Marbletown for the property located in the northern section of the study area. This subdivision was subject to a previous independent review and approval. However, the construction of the subdivision has not yet been completed. It is not anticipated that any additional new developments would occur within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that traffic, public transportation, and pedestrian activities within the study area would be similar to baseline conditions.

Repair and rehabilitation work activities within the Lucas Turnpike Study Area were evaluated to determine which would have the potential to generate the most vehicle trips and, therefore, be the basis of this transportation analysis. Of these activities, the installation of passive dechlorination systems would generate the most vehicle trips. Passive dechlorination system installation would occur in the summer of ~~2019~~2018 from 7 AM and 5 PM, Monday through Friday and would be limited to 4 weeks prior to the second 10-week shutdown period.

In the future with the repair and rehabilitation, construction vehicles would access the site via Lucas Turnpike or Route 213. The estimated number of peak-day one-way vehicle trips associated with the passive dechlorination system installation is 17 vehicles, or approximately 34 peak-day vehicle round trips that would travel to and from the study area. Approximately 16 vehicle round trips or 16 PCEs, would be workers traveling directly to and from the staging area, with an additional 4 daily shuttle trips between the study area and the staging area. The remaining approximately 14 peak-day vehicle round trips (23 PCEs) would be trucks or other construction vehicles.

During a peak day, the estimated number of peak-hour vehicle trip ends associated with passive dechlorination system installation is approximately 17 peak-hour vehicle trip ends (22 PCEs). This includes approximately 8 vehicle trip ends (8 PCEs) from workers traveling directly to and from the staging area, approximately 2 peak-hour shuttle trips between the study area and the staging area, and 7 vehicle trip ends (12 PCEs) from trucks or other construction vehicles. For the purpose of this analysis, the peak-hour project-generated vehicles are anticipated to coincide with typical construction hours for employee vehicles entering the site. Assuming one 10-hour shift, this would be from 6 AM to 7 AM, and would be unlikely to coincide with the peak hour for existing traffic. Following construction, operation of the passive dechlorination systems would generate occasional vehicle trips as DEP employees periodically monitor and maintain the systems through 2023; however, fewer than the *CEQR Technical Manual* screening threshold of 50 peak-hour PCEs would be generated during this period.

In total, the repair and rehabilitation would result in approximately 22 peak-hour PCEs along Lucas Turnpike or Route 213, which is below the *CEQR Technical Manual* screening threshold of 50 peak-hour PCEs as described in Section 9.3.13, “Transportation.” The work activities at the Lucas Turnpike Study Area would be short-term (totaling 10 weeks over 3 months; see **Table 9.5-12**) and would not generate public parking or transportation demands or pedestrian activity within the Lucas Turnpike Study Area. Following completion of the repair and rehabilitation, traffic patterns would return to baseline conditions.

Therefore, although there would be a minor temporary increase in traffic, the repair and rehabilitation would not result in significant adverse impacts to transportation within the Lucas Turnpike Study Area.

9.5.5.13 Noise

As described in Section 9.3.15, “Noise,” mobile noise associated with the repair and rehabilitation within the Lucas Turnpike Study Area does not warrant analysis. This section includes an analysis of potential impacts from stationary noise associated with the repair and rehabilitation to sensitive receptors within the study area.

The study area for the stationary noise analysis is the area within 1,500 feet of the repair and rehabilitation activities as shown on **Figure 9.5-36**.

The Lucas Turnpike Noise Study Area includes residential parcels within 1,500 feet of the repair and rehabilitation work sites. The study area also includes a recreational trail, the Marbletown O&W Rail Trail, in the southern portion of the study area. These are considered noise-sensitive receptors for this analysis. The temporary work activities were evaluated to disclose potential noise levels at the nearest noise-sensitive land uses. While the Town of Marbletown does not have a noise code applicable to the Lucas Turnpike Study Area, there are noise-sensitive receptors within the study area that warrant an analysis.

Existing ambient noise levels within the Lucas Turnpike Study Area are influenced by vehicular traffic traveling on Lucas Turnpike and other local roadways. The existing noise levels within the study area are comparable to a very quiet suburban and rural residential environment based on the distance from major transportation corridors, the population density of the area, and the presence of other noise-producing elements. Typical noise levels (measured as L_{eq}) for very quiet suburban and rural communities are 40 dBA during the daytime and 34 dBA during the nighttime.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP’s understanding that an approved subdivision has been granted by the Town of Marbletown for the property located in the northern section of the study area. This subdivision was subject to a previous independent review and approval. However, the construction of the subdivision has not yet been completed. Therefore, in the future without the repair and rehabilitation, it is assumed that ambient noise levels within the Lucas Turnpike Study Area would be similar to baseline conditions.

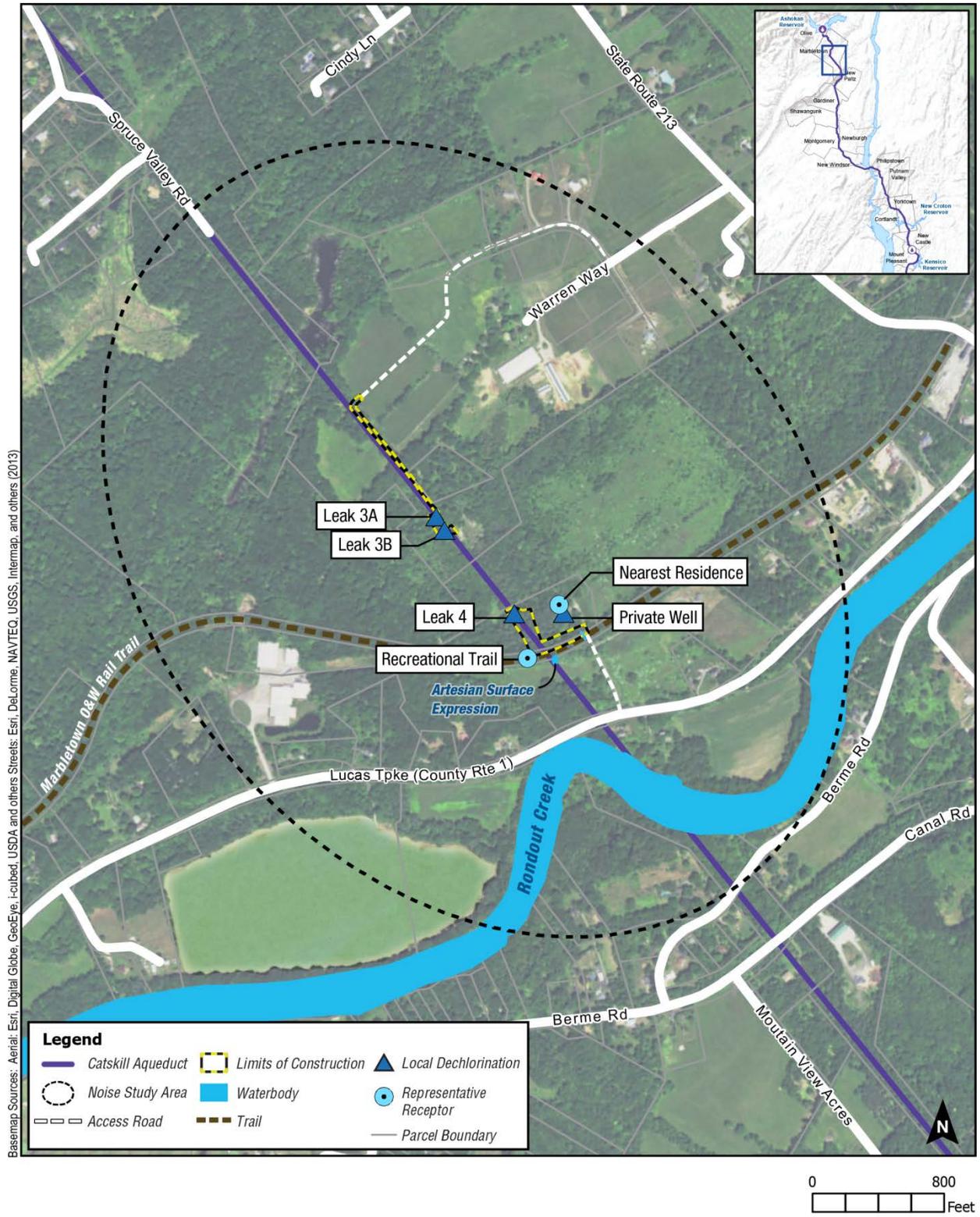


Figure 9.5-36: Noise - Lucas Turnpike Study Area



In the future with the repair and rehabilitation, stationary noise-producing work activities within the Lucas Turnpike Study Area would occur on two work sites. The stationary noise-generating equipment that would be used within the Lucas Turnpike Study Area was evaluated to determine which work activity would have the potential to emit the most noise and, therefore, be the basis of this stationary noise analysis. The staging and access improvements would emit the most noise at the rail trail and the dechlorination installation would emit the most noise at the nearest residence, so both were included in the stationary noise analysis. Staging and access improvements and dechlorination installation would occur in summer ~~2019~~2018 between 7 AM and 5 PM, Monday through Friday. Staging and access improvements would occur for approximately 6 weeks and dechlorination installation would occur for approximately 4 weeks prior to the second 10-week shutdown.

The noise analysis focused on the three loudest stationary noise-generating equipment types necessary for the staging and access improvements and the installation of the passive dechlorination systems. Associated equipment reference noise levels, are shown in **Table 9.5-16**.

Table 9.5-16: Stationary Source Construction Equipment Modeled at the Lucas Turnpike Study Area - Noise Analysis and Reference Noise Levels (L_{eq})

Equipment Type	Reference Noise Level (L _{eq}) at 50 feet (dBA) ¹
Staging and Access Improvements	
Generator	82
Grubbing / Clearing Machine	82
Dozer	81
Dechlorination Installation	
Excavator	81
Generator	82
Backhoe	76
Note: ¹ City Environmental Quality Review (CEQR) Technical Manual, Chapter 22.	

Staging and access improvements within the Lucas Turnpike Study Area during the repair and rehabilitation would produce a noise level (L_{eq}) of approximately 86 dBA at a distance of 50 feet along the recreational trail. Dechlorination installation within the Lucas Turnpike Study Area during the repair and rehabilitation would produce a noise level (L_{eq}) of approximately 83 dBA at the nearest residence located approximately 60 feet away from the dechlorination installation activities.

Following completion of the repair and rehabilitation, the construction equipment and vehicles would be removed from the Lucas Turnpike Study Area. The repair and rehabilitation work activities would be temporary with the peak work activities occurring in summer ~~2019~~2018 for limited periods (up to 6 weeks, per activity).

Therefore, although there would be a temporary increase in noise, noise from the repair and rehabilitation would not result in significant adverse impacts to sensitive receptors within the Lucas Turnpike Study Area.

9.5.5.14 Neighborhood Character

The character of the Lucas Turnpike Study Area is largely defined by a mix of residential land use, with parcels of industrial, vacant land, open space and recreation, and public services land uses, as well as its physical setting within a rural location (see **Figure 9.5-26**). The Catskill Aqueduct traverses the study area in a general northwest to southeast direction. The study area is bounded by Lucas Turnpike (County Route 1) and Rondout Creek to the south. U.S. Route 209 (Main Street) is located to the north of the study area, with State Route 213 to the east. There are three proposed work sites within the study area: Leaks 3A and 3B that would be accessed from Warren Way to a private road; Leak 4 that would be provided by a private driveway from Lucas Turnpike; and a Private Well that would be accessed from the same private driveway from Lucas Turnpike to the private property.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP's understanding that a subdivision approval has been granted by the Town of Marbletown for the property located in the northern section of the study area. This subdivision was subject to a previous independent review and approval. However, the construction of the subdivision has not yet been completed. There are no other new developments anticipated to occur within the timeframe of the impact analysis. Use of the rail trail is anticipated to continue. Therefore, in the future without the repair and rehabilitation, it is assumed that neighborhood character within the Lucas Turnpike Study Area would be the same under baseline conditions.

As described in Section 9.3.16, "Neighborhood Character," there would be no potential for the repair and rehabilitation to affect shadows and urban design. In addition, based on the screening assessment for historic and cultural resources, an impact analysis for the Lucas Turnpike Study Area was not warranted, as discussed in Section 9.3.7, "Historic and Cultural Resources." As described in Section 9.5.5.5, "Land Use and Zoning," Section 9.5.5.6, "Socioeconomic Conditions," Section 9.5.5.7, "Open Space and Recreation," and Section 9.5.5.8, "Visual Resources," the work activities would not affect land use and zoning, socioeconomic conditions, open space and recreation, and visual resources in the Lucas Turnpike Study Area. Furthermore, the public policy impact analysis provided in Section 9.5.2, "Town of Marbletown Impact Analysis," concluded the work activities were consistent with applicable plans.

As described in Sections 9.5.5.12, "Transportation," and 9.5.5.13, "Noise," the work activities in the Lucas Turnpike Study Area would be short-term (intermittently over 3 months) and would result in a temporary increase in traffic and noise. Following completion of the repair and rehabilitation, the construction equipment and vehicles would be removed from the study area and traffic patterns would return to baseline conditions. These temporary increases in traffic and noise levels would not result in a density of activity or service conditions that would affect the overall character of the study area.

The repair and rehabilitation would not generate significant adverse effects in: land use, zoning, and public policy; socioeconomic conditions; open space and recreation; shadows; historic and cultural resources; urban design and visual resources; transportation; or noise.

Therefore, there would be no significant adverse impacts related to neighborhood character from the repair and rehabilitation within the Lucas Turnpike Study Area.

9.5.5.15 Public Health

As described in Section 9.5.5.9, “Natural Resources,” and Section 9.5.5.11, “Water and Sewer Infrastructure,” the repair and rehabilitation would not result in significant adverse impacts to water levels and quantity.

Baseline groundwater chemistry from 2013 sampling indicated that the groundwater contains measurable levels of calcium, iron, manganese, magnesium, sodium, strontium, chloride, and sulfate. The baseline groundwater chemistry found in the natural resources study area is typical of groundwater found elsewhere in Ulster County as described in the USGS Water Supply Paper 1985, Ground-Water Resources of Orange and Ulster Counties, New York.

Repair and rehabilitation work activities could result in a temporary increase in levels of sodium hypochlorite, chlorine dioxide, and/or chlorine residuals in the local groundwater during the temporary chlorination period.

Sodium hypochlorite and chlorine dioxide (the two oxidants that would be used in for chlorination of aqueduct water) are widely used disinfectants in municipal water supply systems. These compounds would be used at doses that are below the NYSDOH maximum residual disinfectant levels of 0.8 mg/L of chlorine dioxide and 4.0 mg/L of chlorine as sodium hypochlorite. However, private residential wells are currently not disinfected by either oxidant. Sodium hypochlorite, chlorine dioxide and chlorine residuals are regulated in drinking water. Therefore, the distance that sodium hypochlorite or chlorine dioxide could travel from a leak was analyzed to assess potential effects on private drinking water supply wells. As described in Section 9.3.17, “Public Health,” an analytical solution was used to determine the distance that chlorinated water would travel in a fracture in the bedrock.

In addition to the presence of sodium hypochlorite, chlorine dioxide, and/or chlorine residuals, private wells may also be affected by disinfection by-products (DBPs) present in leak water that has been chlorinated. The primary DBPs formed as a result of sodium hypochlorite addition are trihalomethanes (THMs) and haloacetic acids (HAAs) while those associated with the addition of chlorine dioxide are chlorite and chlorate. Concentrations of these DBPs would vary depending on the oxidant, its dose, and water quality conditions but would remain below any applicable regulatory levels. Some, like HAAs, would be anticipated to biodegrade as water moves through the aquifer before reaching the private wells. Use of chlorine dioxide may also result in the presence of chloride in leak water. In addition, the presence of these compounds in the water does not present a taste or odor concern. Further analysis of DBPs and the measures aimed at monitoring and minimizing any potential changes to characteristics of Catskill Aqueduct water as a result of temporary chlorination are presented in Section 9.19, “Project-wide Impact Analysis.”

The maximum doses of sodium hypochlorite or chlorine dioxide that would be introduced at the chlorination facility at the Ashokan Screen Chamber are 1.25 mg/L and 0.8 mg/L, respectively. However, it should be noted that the maximum doses of these chemicals would be used for a short time period after the initiation of chlorination to reduce existing levels of biofilm, and lower doses between 0.25 and 0.50 mg/L would subsequently be used to limit the biofilm reoccurrence.

Also, use of sodium hypochlorite is anticipated during the winter, and use of chlorine dioxide is anticipated during the summer to reduce the formation of DBPs.

Using the seasonal-dependent decay rates computed for the nearby High Falls Community Tap (selected due to its proximity to the leak sites), residual levels of sodium hypochlorite and chlorine dioxide in the aqueduct at the leaks would be approximately 0.79 mg/L and 0.54 mg/L, respectively, based upon the maximum doses of these two chemicals that would be used. The minimum concentration of chlorine that can be measured by conventional analytical techniques is 0.01 mg/l. Any remaining concentrations below that value are undetectable in drinking water.

Results of the analytical solution indicate that at a leak rate of 1,200 gpm, a sodium hypochlorite concentration of 0.01 mg/l could travel a maximum of approximately 2,050 feet. A chlorine dioxide concentration of 0.01 mg/L at the same leak rate could travel a maximum of approximately 1,725 feet (see **Figure 9.5-37**). If the actual leak rate is less, the distances at which either oxidant travels will be less. For example, a leak of 600 gpm would result in detectable levels of sodium hypochlorite or chlorine dioxide at maximum distances of approximately 1,450 and 1,220 feet, respectively, from the aqueduct (see Section 9.3.17, “Public Health” for a discussion of the leak flow at depth). These distances were based upon the maximum doses of sodium hypochlorite (1.25 mg/L) and chlorine dioxide (0.8 mg/L). As noted previously, these maximum doses would be short term. Much lower doses would be used to limit the reoccurrence of biofilm and, therefore, would be anticipated to travel lesser distances from the aqueduct leaks.

These distances would be the furthest likely extent of chlorinated groundwater flow. Although sodium hypochlorite, chlorine dioxide, and/or chlorine residuals may be reliably measured at very low levels if present at this distance, no adverse health effects would occur at those concentrations since they are well below acceptable limits for drinking water. In addition, these estimates are likely conservative. Since the geology of the Lucas Turnpike Study Area contains a complex series of interconnected fractures, the groundwater is anticipated to move slower than indicated by the analytical solution, allowing more time for any sodium hypochlorite, chlorine dioxide, and/or chlorine residuals to break down. Likewise, these distances were also calculated based upon the maximum doses of sodium hypochlorite and chlorine dioxide that would be used.

During temporary chlorination, sodium hypochlorite and chlorine dioxide (as well as chlorine residuals) could be measured in groundwater up to 2,050 feet and 1,725 feet, respectively, outward from the leak location, depending on the leak flow. Based on these estimates, several private drinking water supply wells could exhibit elevated levels of sodium hypochlorite, chlorine dioxide, and/or chlorine residuals, including the Private Well that is currently recognized as a leak. The Private Well, with a depth of 310 feet, is located approximately 300 feet due east of Leak 4 (Mid-Hudson 2005). With the Catskill Aqueduct at approximately 500 feet below ground surface, the bottom of this well would be approximately 350 feet away from the leak (along a straight-line distance). As shown on **Figure 9.5-37**, in total there is the potential for sodium hypochlorite, chlorine dioxide, and/or chlorine residuals to migrate at detectable levels to up to 43 parcels with known, potential, or future potential private drinking water supply wells in the Lucas Turnpike Study Area. Seventeen of these parcels currently have structures with potential wells. Sixteen of these parcels are vacant parcels that may be developed in the future and could require a private drinking water supply well. One parcel will be subdivided to include ten additional parcels and future wells.

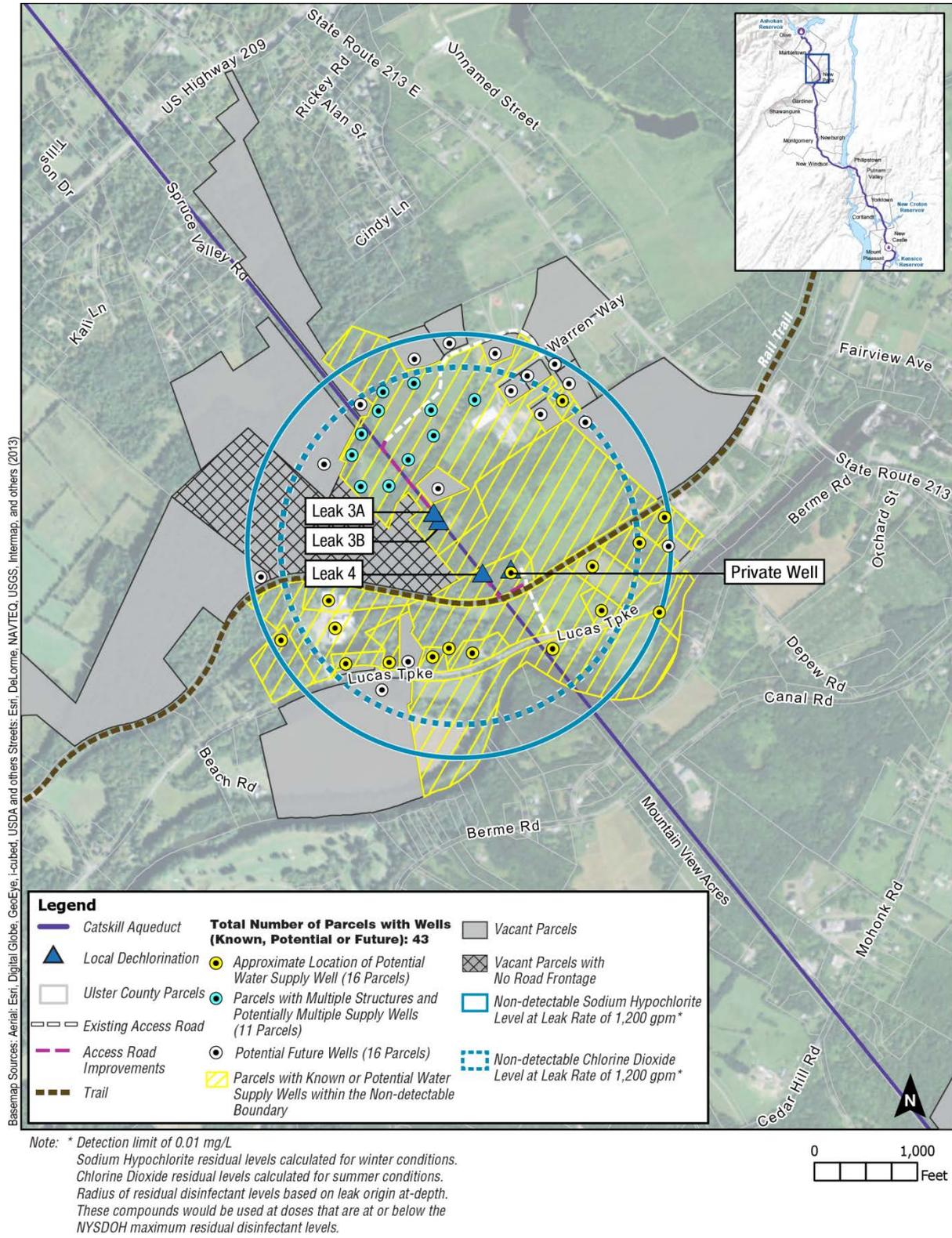


Figure 9.5-37: Potential Travel Distance of Chlorinated Water from Aqueduct Leaks at Depth – Lucas Turnpike Study Area



Once the chlorinated leak water reaches the bedrock aquifer, it would react chemically with the native groundwater. Water chemistry analysis conducted in 2013 for Leak 3A, Leak 3B, and Leak 4 indicated measurable quantities of manganese, iron, and sulfide at each leak. Furthermore, slightly elevated concentrations of sulfate were also found, indicating a source of sulfide from which another naturally occurring reaction is taking place. Since both the historical and analytical data indicate the presence of compounds that serve to react with chlorine, those compounds would likely accelerate the breakdown of any sodium hypochlorite, chlorine dioxide, and/or chlorine residuals and slow the transport of residuals in the groundwater. The rate at which the breakdown would occur and how it affects the migration would depend on many factors, including the concentration of sodium hypochlorite, chlorine dioxide, and/or chlorine residuals in leak water.

Because the quality of groundwater in the study area could change as a result of the chlorination of aqueduct water and potentially affect drinking water supply wells, DEP commits to implementing a Well Action Plan. See Section 9.19, “Commitments,” for details on the Well Action Plan for Lucas Turnpike Study Area. DEP would coordinate with property owners to implement the elements of the Action Plan, as applicable and necessary. The Action Plan would include obtaining well characteristics, monitoring and providing treatment or alternate water supply, if needed. DEP would also coordinate with current and/or future landowners of vacant parcels that could contain, or be developed to contain, private drinking water supply wells that could be developed before or during the temporary chlorination of the aqueduct.

Following temporary chlorination, the passive dechlorination systems at the leaks and any point-of-use treatment systems for drinking water supply wells that were installed as part of the Action Plan would be removed. The aqueduct would no longer contain chlorinated water that could leak into the bedrock aquifer groundwater in the Lucas Turnpike Study Area, and operation of the Catskill Aqueduct would be consistent with baseline conditions. Groundwater would return to baseline conditions as any sodium hypochlorite, chlorine dioxide, and/or chlorine residuals would degrade relatively quickly as these react with native groundwater and migrate through the aquifer.

Based on the analyses above, the repair and rehabilitation would not result in significant adverse impacts to groundwater.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to public health within the Lucas Turnpike Study Area.

9.5.6 CANAL ROAD STUDY AREA IMPACT ANALYSIS

Within the Canal Road Study Area, the aqueduct consists of the Rondout Pressure Tunnel. One valve leak (Leak 5) has been identified in this study area at the Rondout Pressure Tunnel (Shaft 5) Drainage Chamber (Rondout Drainage Chamber) (see **Figure 9.5-38**).

Work activities within the Canal Road Study Area would include internal leak repair and, if necessary, the installation and operation of a local dechlorination system, which would also require site restoration following completion of aqueduct chlorination.

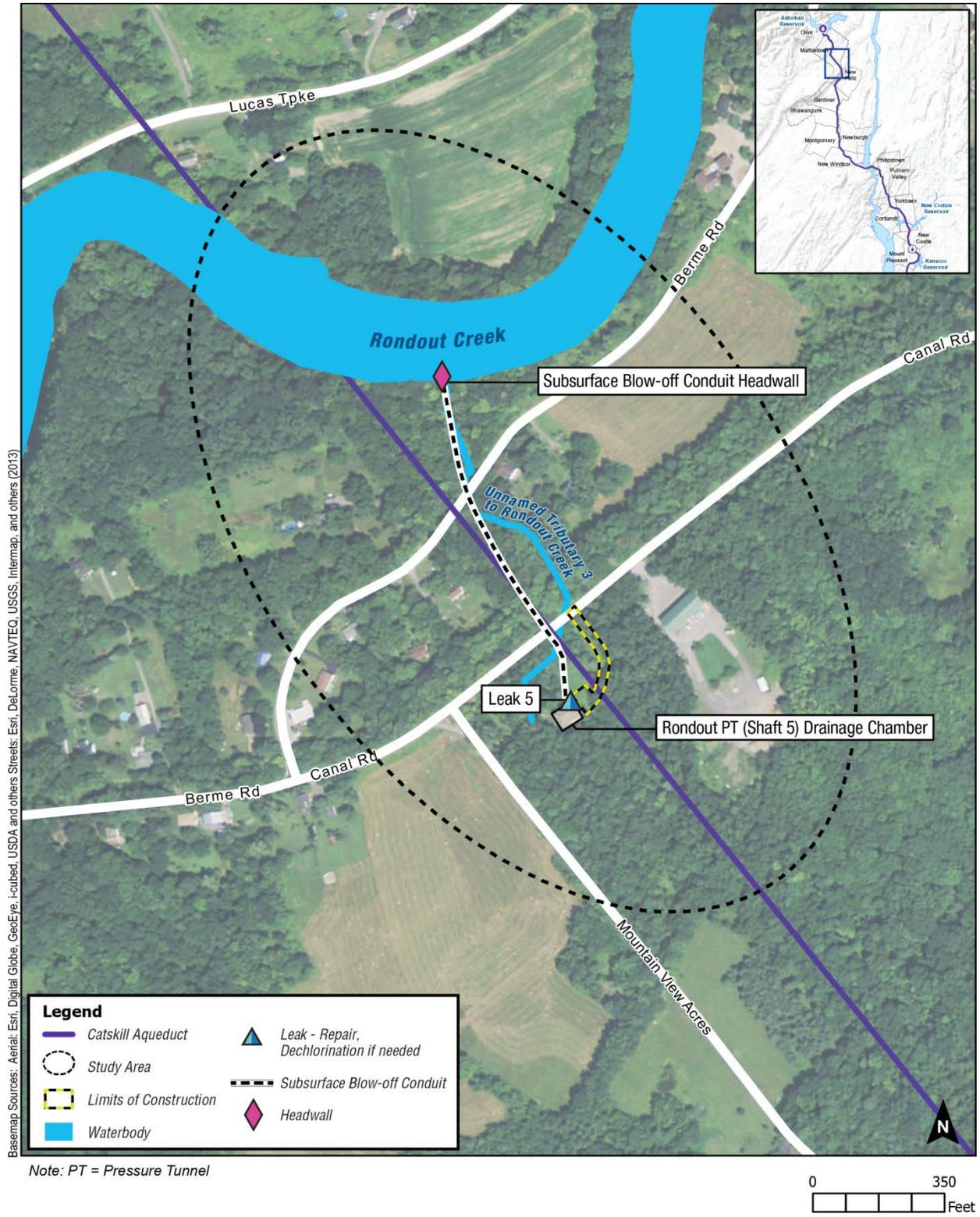


Figure 9.5-38: Study Area - Canal Road



9.5.6.1 Study Area Location and Description

The Canal Road Study Area is located along the upper Catskill Aqueduct in the Town of Marbletown. The Catskill Aqueduct traverses the study area in a general northwest to southeast direction. Rondout Creek flows through the northern portion of the study area, and Canal Road and Berme Road bisect it from southwest to northeast. The proposed work site within the study area is located in the area surrounding the Rondout Drainage Chamber and Leak 5. Access to the work site would be provided by an existing dirt access road off Canal Road. The study area boundary is located approximately 400 feet beyond the outermost areas of disturbance related to the work site. **Figure 9.5-38** shows an aerial photograph of the study area, including the path of the aqueduct and the limits of construction. **Figure 9.5-39** shows photographs of Leak 5 at Rondout Creek and the Rondout Drainage Chamber in the study area.

The study area consists of residential, vacant land, agricultural, public services, and commercial land uses. Land cover within the study area is generally wooded with some portions of grassy fields and smaller residential properties to the northwest and southwest. The limits of construction for the work site and associated access route are located within a public services corridor which is owned and maintained by DEP. **Figure 9.5-40** shows a map of the land uses in the study area and its surroundings.

Zoning in the study area is residential (R-1 and R-3) zoning district and unzoned, as designated by the Town of Marbletown Zoning Code (see **Figure 9.5-41**). The Catskill Aqueduct is located within the residential (R-1) zoning district, which provides for a higher density residential use, and is a permitted use as a water supply utility within this zoning district.

There are no federal, State, or local designated landmarks, historic districts, or known archeological resources within the study area.

9.5.6.2 Description of Leak 5

Leak 5 is located at the bottom of the drainage shaft of the Rondout Drainage Chamber (see **Figure 9.5-39**). An existing subsurface blow-off conduit connects Rondout Drainage Chamber to a headwall along the southern bank of Rondout Creek where aqueduct water can be discharged (see **Figure 9.5-38**). The leak is created by an inoperable valve in the Rondout Drainage Chamber that diverts a small portion of aqueduct water to the blow-off conduit, and conveys that flow underground through the conduit before it daylights at the concrete headwall (see Photograph 1 on **Figure 9.5-39**). While Leak 5 is the largest of the aqueduct leaks (with a flow of approximately 2,100 gpm, or approximately 3 mgd), no flowpaths or surface expressions appear in the surrounding environment since the leak flows through a conduit directly into Rondout Creek.

9.5.6.3 Proposed Activities within the Canal Road Study Area

To support activities within the Canal Road Study Area, the Ashokan Screen Chamber (within the Ashokan Screen Chamber Study Area in the Town of Olive) would serve as a primary staging area from which workers would be transported to the site daily. Several secondary staging areas would provide additional parking, and equipment and materials would be staged on site. No staging area or leveling and erosion control. Erosion and sediment control measures such as silt fencing and hay access improvements would be necessary other than underbrush clearing and gravel placement for



Photograph 1: View of Leak 5 at Rondout Creek, with bubbles indicating the location of the submerged conduit pipe. Concrete headwall is visible in the upper right-hand corner.



Photograph 2: View looking north from Rondout Drainage Chamber superstructure. The weir chamber is in front of the large evergreen tree.

Figure 9.5-39: Photographs - Canal Road Study Area



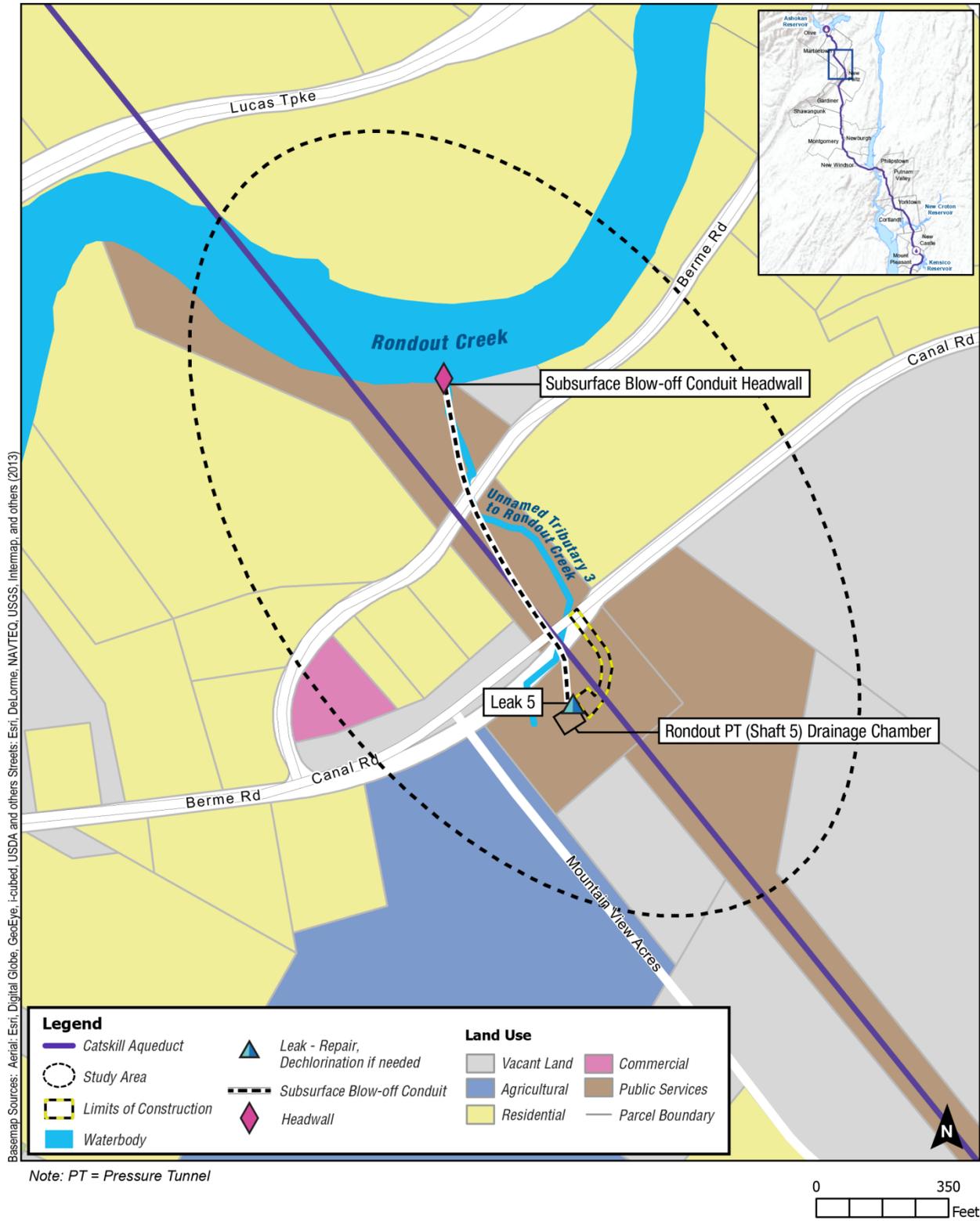


Figure 9.5-40: Land Use - Canal Road Study Area



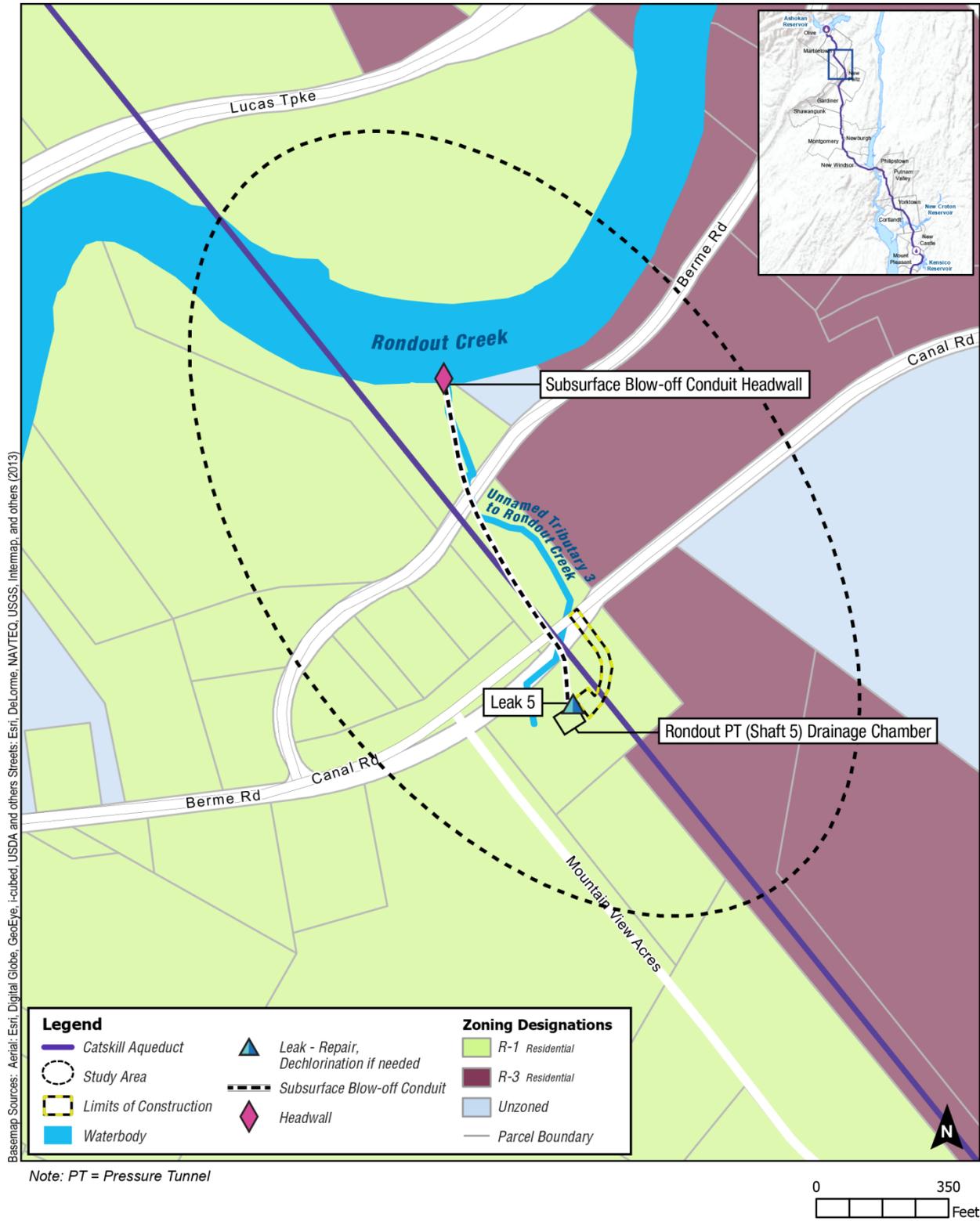


Figure 9.5-41: Zoning – Canal Road Study Area



bales would be installed at the perimeter of the work site. A site plan showing a layout of the limits of construction for the work site, which would occupy a total of 9,300 square feet, is shown on **Figure 9.5-42**. The schedule for work within the study area is shown in **Table 9.5-17**. The duration of active construction within the Canal Road Study Area is estimated to total 10 weeks over 10 months.

Table 9.5-17: Schedule of Work Activities within the Canal Road Study Area

Work Activity	Dates	Duration	Work Hours	Crew Size ¹
Internal Leak Repair	Fall 2018 2017 (First 10-week shutdown)	4 weeks	7 days a week, 24 hours per day	10
Dechlorination Installation (if necessary)	Summer 2019 2018	6 weeks	Monday to Friday, 7 AM to 5 PM	10
Dechlorination Demobilization/ Site Restoration ²	2023	1 week	Monday to Friday, 7 AM to 5 PM	4
Note: ¹ Crew size refers to the number of people anticipated at the work site(s). ² Dechlorination demobilization and site restoration is not included in estimated duration of active construction.				

Work in the study area would begin with internal leak repair during the first 10-week shutdown in fall ~~2018~~2017. Since the aqueduct is pressurized at this location, the vertical shaft below the Rondout Drainage Chamber would be filled with water even during the shutdown, requiring a certified diver to perform the repairs. The diver would enter the shaft, remove the existing leaking 16-inch flap valve, and install a pipe plug, which would be reinforced with placement of an additional security flange. There would be no temporary or permanent in-stream disturbance.

Once installed, the pipe plug is expected to permanently repair Leak 5. However, if leak repair is unsuccessful, a local dechlorination system would be installed in summer ~~2019~~2018.

Specifically, the Rondout Drainage Chamber would be retrofitted to house an active chemical injection system, which would be necessary due to the magnitude of flow from Leak 5. The system would include metering pumps, small storage tanks or totes, and secondary containment for liquid sodium bisulfite, and would be sized to treat the leak flow that would occur when the aqueduct is operated at its maximum capacity and anticipated flow during temporary chlorination. Sodium bisulfite totes would be 330-gallon capacity, equivalent to an approximately 10-day supply for a potential maximum use of 26 gpd. Electrical power and heating would be required to prevent chemical crystallization. A water line extending from the water main on Canal Road to the dechlorination system would also be installed for an eyewash station. Upon completion of construction, all equipment and materials would be removed.

As described in Section 9.2, “Project Description,” the local dechlorination systems would be in operation when chlorination of the aqueduct begins in ~~2020~~2019. While in operation, the system would be inspected and maintained on a regular basis, including monitoring chlorine residuals, as required. One to three deliveries of sodium bisulfite per month would be made to the site

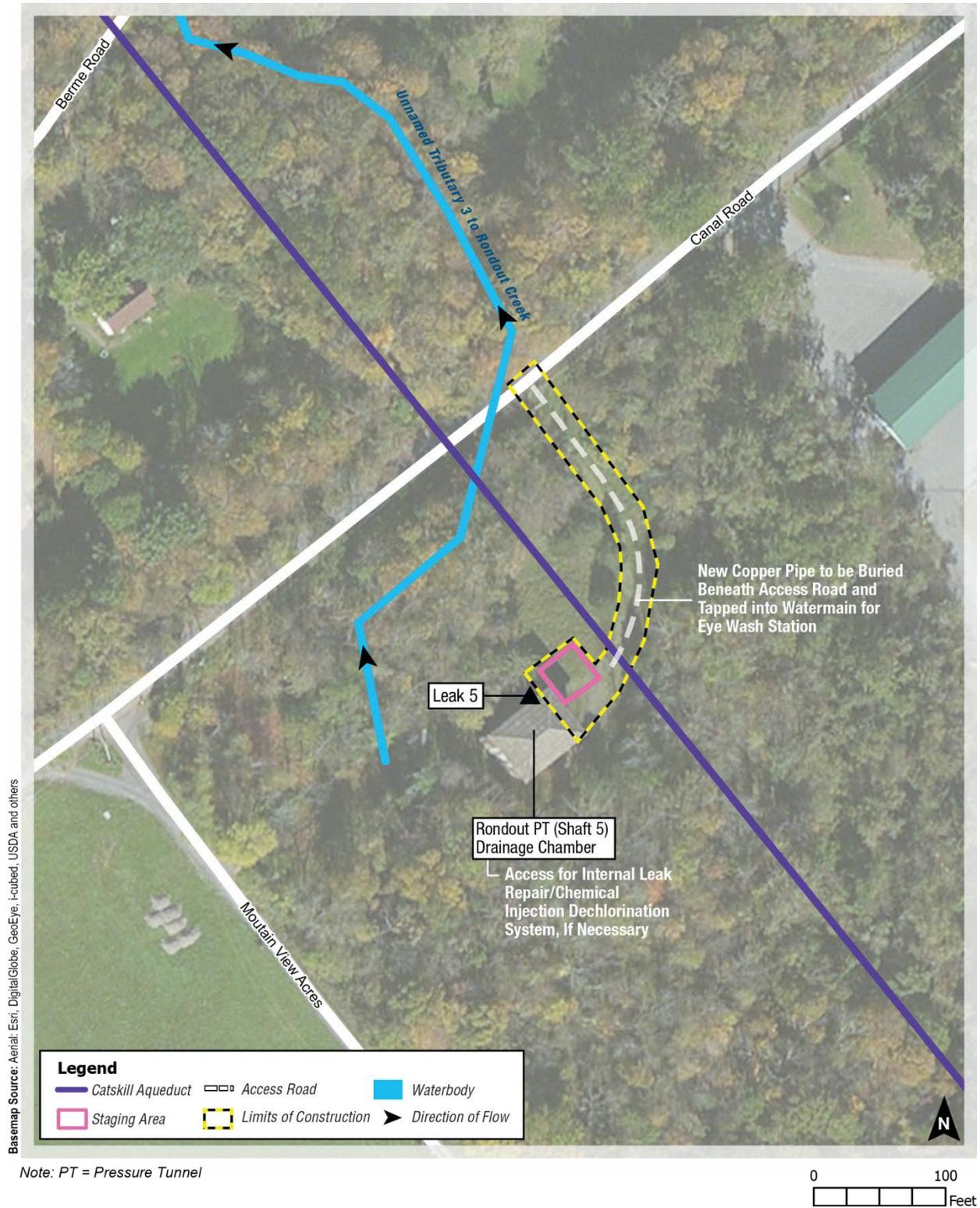


Figure 9.5-42: Site Plan – Canal Road Study Area



during temporary chlorination. When chlorination of the aqueduct is no longer required in 2023, the local dechlorination system would no longer be operated in the study area, and any areas temporarily disturbed would be restored to baseline conditions.

Impact categories analyzed for the Canal Road Study Area are presented in Sections 9.5.6.4, “Open Space and Recreation,” through 9.5.6.10, “Neighborhood Character,” and include open space and recreation; visual resources; natural resources including water resources, and federal/State Threatened and Endangered Species and State Species of Special Concern; hazardous materials; transportation; stationary noise; and neighborhood character. Additionally, the study area’s compatibility with applicable public policies was analyzed on a town-wide basis in Section 9.5.2, “Town of Marbletown Impact Analysis.” As described in Section 9.3, “Screening Assessment and Impact Analysis Methodology,” an impact analysis related to land use and zoning; socioeconomic conditions; community facilities and services; historic and cultural resources; the remaining natural resources subcategories, including geology and soils, aquatic and benthic resources, terrestrial resources, wildlife, federal/State Candidate Species, and unlisted rare and vulnerable species; energy; air quality; and mobile noise within the study area is not warranted. Finally, impacts related to project-wide natural resources, water and sewer infrastructure, and public health were analyzed within Section 9.19, “Project-wide Impact Analysis.”

9.5.6.4 Open Space and Recreation

As shown on **Figure 9.5-38**, one open space and recreation resource exists within the Canal Road Study Area: Rondout Creek. Approximately 1,300 feet of Rondout Creek is located within the northern portion of the Canal Road Study Area. In total, Rondout Creek is approximately 45 miles and flows from Rondout Reservoir through Ulster County to the Hudson River. Rondout Creek provides recreational fishing and is stocked with trout by NYSDEC. There are no NYSDEC parking areas, Public Fishing Rights locations, or boat launches located in the Canal Road Study Area. Rondout Creek also provides recreational boating (e.g., canoe and kayak). No access to Rondout Creek is provided in the Canal Road Study Area.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP’s understanding that no plans to expand or create new open spaces or recreational resources are anticipated within the Canal Road Study Area within the timeframe of the impact analysis. Natural processes, such as changes in habitat due to natural vegetative succession, are anticipated to continue. Use of the identified open spaces is anticipated to continue. Therefore, in the future without the repair and rehabilitation, it is assumed that open space and recreation within the Canal Road Study Area would be the same as baseline conditions.

During construction, the repair and rehabilitation work activities within the Canal Road Study Area would be short-term (intermittently over 10 months; see **Table 9.5-17**), including the internal repair of Leak 5 at the Rondout Drainage Chamber. In the event that the leak repair was unsuccessful, a local dechlorination system would be installed to prevent chlorinated water from entering Rondout Creek and the surrounding environment. No land or in-water disturbance would take place near Rondout Creek. In addition, site preparation at the proposed construction staging area near Rondout Drainage Chamber would not include clearing of trees and shrubs near Rondout Creek, as the site is separated from the Rondout Creek by two local roadways.

Therefore, repair and rehabilitation work activities would not disrupt any recreational uses of Rondout Creek.

As discussed in Section 9.5.6.6, “Natural Resources,” leak repair could affect flows in Rondout Creek; however, given the Rondout Creek drainage area and other hydrologic inputs contributing to the creek, recreational use of the creek would be unaffected. As discussed in Section 9.5.6.9, “Noise,” there could be temporary increases in noise levels within the Canal Road Study Area which would take place in a location far from Rondout Creek; however, upon completion of the repair and rehabilitation work activities, recreational use of Rondout Creek would be unaffected.

Following construction, equipment and vehicles would be removed from the Canal Road Study Area and staging areas would be restored to baseline conditions. During temporary chlorination, the local dechlorination system, if installed, would treat the leak prior to discharging to Rondout Creek. Maintenance operations would not affect recreational use of Rondout Creek. Following the repair and rehabilitation within the Canal Road Study Area, operation of the Catskill Aqueduct would be consistent with baseline conditions and would not disrupt recreational use of adjacent open spaces. As such, the repair and rehabilitation would not encroach upon, cause a loss of open space, or impact the use or physical character of Rondout Creek.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to open space and recreation within the Canal Road Study Area.

9.5.6.5 Visual Resources

The study area for the visual resources analysis is the area within the Canal Road Study Area. It also includes view corridors that extend beyond the study area, based on locations that are publicly accessible.

As shown on **Figure 9.5-38**, one visual resource exists within the Canal Road Study Area: the Rondout Creek. Approximately 1,300 feet of Rondout Creek is located within the northern portion of the Canal Road Study Area. Rondout Creek is located approximately 900 feet from the Rondout Drainage Chamber. Views of the Rondout Drainage Chamber from Rondout Creek are screened by the existing forested lands surrounding the drainage chamber and along the banks of Rondout Creek.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP’s understanding that no new projects or structures that would alter views from visual or aesthetic resources are anticipated within the Canal Road Study Area within the timeframe of the impact analysis. Natural processes, such as changes in habitat due to natural vegetative succession, are anticipated to continue. Therefore, in the future without the repair and rehabilitation, it is assumed that visual resources within the Canal Road Study Area would be the same as baseline conditions.

During construction, the repair and rehabilitation work activities within the Canal Road Study Area would be short-term (intermittently over 10 months; see **Table 9.5-17**), including the internal repair of Leak 5 at the Rondout Drainage Chamber. In the event that the leak repair is unsuccessful, a local dechlorination system would be installed to prevent chlorinated water (from the upstream Ashokan Screen Chamber) from entering Rondout Creek and the surrounding

environment. The local dechlorination system would be installed within the Rondout Drainage Chamber building. No land or in-water disturbance near Rondout Creek would take place. In addition, site preparation at the proposed construction staging area near the Rondout Drainage Chamber would not include clearing of trees and shrubs near Rondout Creek, as the site is separated from Rondout Creek by two local roadways. Therefore, repair and rehabilitation work activities would not disrupt any views from Rondout Creek.

As discussed in Section 9.5.6.6, “Natural Resources,” leak repair could affect flows in Rondout Creek; however, given Rondout Creek’s large drainage area and other hydrologic inputs contributing flows to the creek, changes in leak flows to the creek would not be discernible to users of Rondout Creek. Therefore, views of the creek would be unaffected.

Following construction, equipment and vehicles would be removed from the Canal Road Study Area and staging area would be restored to baseline conditions. During temporary chlorination, the local dechlorination system, if installed, would treat the leak prior to discharging to Rondout Creek. Maintenance operations would not affect the view of Rondout Creek because the Rondout Drainage Chamber is located to the south, or behind the viewer. Following the repair and rehabilitation within the Canal Road Study Area, operation of the Catskill Aqueduct would be consistent with baseline conditions and would not result in changes to the future visual and aesthetic resource conditions of the views to Rondout Creek.

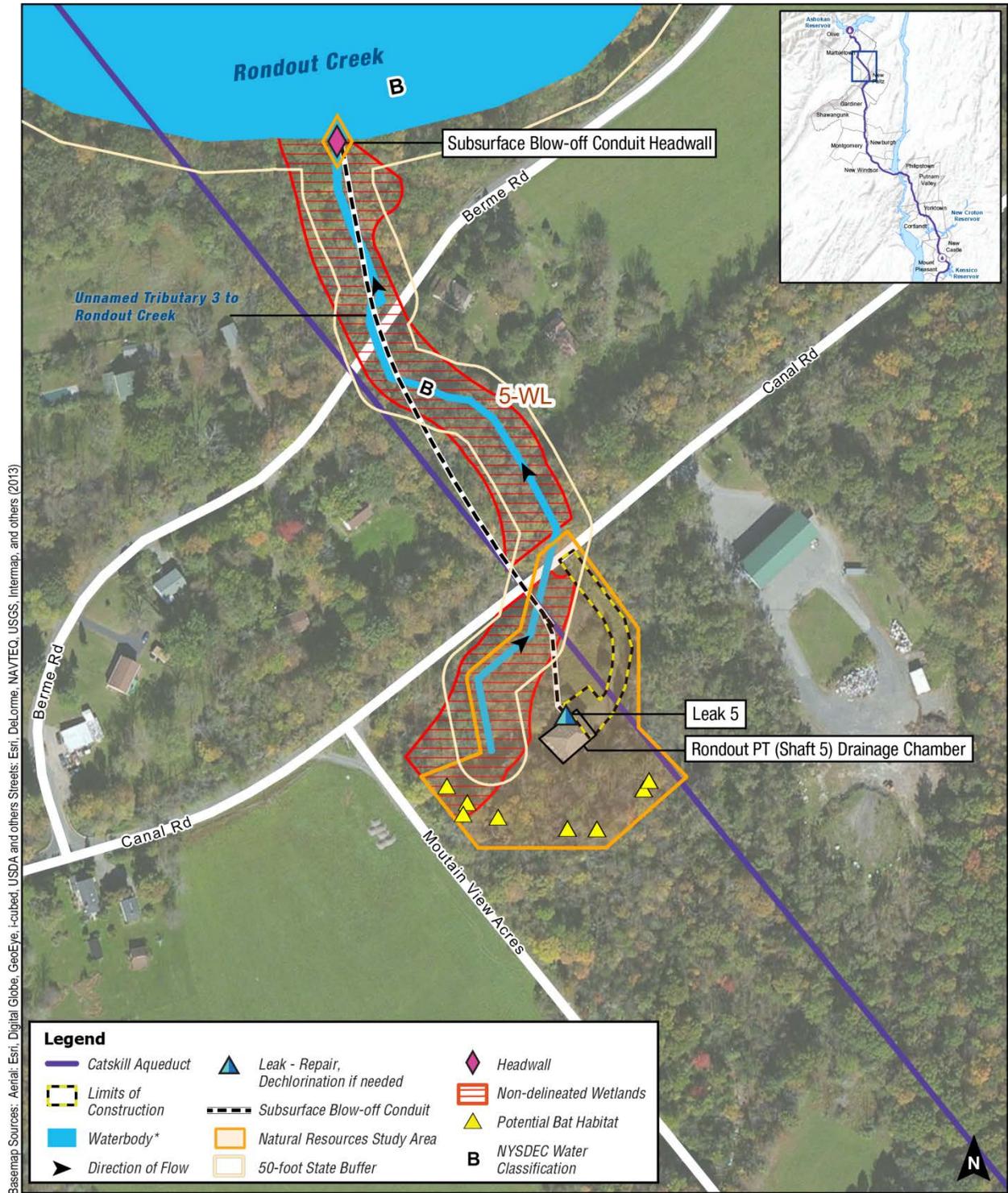
In addition, based on this analysis, the repair and rehabilitation within the Canal Road Study Area would be compliant with the Town of Marbletown Code, Chapter 128, Heritage and Preservation, discussed in Section 9.3.3.3, “Town Codes.”

Therefore, the repair and rehabilitation would not result in significant adverse impacts to visual resources within the Canal Road Study Area.

9.5.6.6 Natural Resources

The study area for the natural resources analysis includes two sections; primarily the limits of construction surrounding Leak 5 and the Rondout Drainage Chamber, and a small section representing the headwall of the subsurface blow-off conduit where Leak 5 enters Rondout Creek (see **Figure 9.5-43**). These boundaries are inclusive of downstream resources potentially influenced by the leak, and are collectively referred to as the natural resources study area.

Based on a June 17, 2013 field visit, the ecological communities within the natural resources study area are a maple-basswood rich mesic forest composed of hardwood forest with grassy meadow areas, red maple-hardwood swamp, and successional old field in previously disturbed areas near the Rondout Pressure Tunnel Drainage Chamber Building. An unnamed tributary to Rondout Creek (referred to as unnamed tributary 3 to Rondout Creek) flows through the wetlands in the natural resources study area. Rondout Creek is a NYSDEC Class B watercourse that is mapped as NWI riverine, upper perennial wetland. These habitats have the potential to support protected water resources and wildlife species. Therefore, an analysis of the potential effects to natural resources that could result from the repair and rehabilitation is presented below.



Basemap Sources: Aerial: Esri, Digital Globe, GeoEye, i-cubed, USDA, and others Streets: Esri, DeLorme, NAVTEQ, USGS, Intermap, and others (2013)

*Alignment is based on field visit. The actual alignment of the Unnamed Tributary 3 to Rondout Creek is different than as mapped by NYSDEC.
 Note: PT = Pressure Tunnel
 WL = Wetland
 NYSDEC = N.Y.S. Department of Environmental Conservation

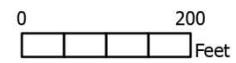


Figure 9.5-43: Natural Resources - Canal Road Study Area



The potential for the repair and rehabilitation to result in changes to natural resources as a result of the proposed temporary chlorination at the Ashokan Screen Chamber is further analyzed in Section 9.19, “Project-wide Impact Analysis.”

Water Resources

The natural resources study area is within the lower Hudson River drainage basin, more specifically within the Coxing Kill-Rondout Creek subwatershed (HUC 020200070604) of the Rondout watershed (HUC 02020007).

Rondout Creek, unnamed tributary 3 to Rondout Creek, and a wetland in the natural resources study area are subject to federal jurisdiction under Sections 401 and 404 of the Clean Water Act. As Class B streams within the natural resources study area, Rondout Creek and NYSDEC-mapped unnamed tributary 3 to Rondout Creek, are subject to State Protection of Waters regulations with a regulated 50-foot buffer to protect the streambed and banks. Additionally, because the Town of Marbletown only regulates NYSDEC wetlands, the activities associated with the repair and rehabilitation are not subject to local requirements (Marbletown Town Code Chapter 200: Zoning).

Surface Water

Surface water delineation in the natural resources study area occurred on June 17, 2013. The water resource name, area, and length are shown in **Table 9.5-18**.

Table 9.5-18: Water Resources and Classifications within the Canal Road Natural Resources Study Area

Water Resource	Area (Square Feet)	Length (Feet)	Cowardin Classification
Unnamed Tributary 3 to Rondout Creek	730	360	Riverine, Upper Perennial, Streambed, Cobble-Gravel, Seasonally Flooded (R3SB3C)
5-WL	28,360	NA	Palustrine Forested, Broad-Leaved Deciduous (PFO1)
Note: NA = Not Applicable			

Rondout Creek is located immediately north of the natural resource study area. During delineations, unnamed tributary 3 to Rondout Creek was observed in the study area flowing approximately south to north into Rondout Creek (see **Figure 9.5-43**). There is no flowpath for Leak 5 because the leak flow is contained within the existing subsurface blow-off conduit.

Unnamed Tributary 3 to Rondout Creek

This naturally occurring watercourse is not associated with Leak 5 (see **Table 9.5-18**). The watercourse has a steep gradient in its upper reaches and the stream channel is heavily scoured downstream of Berme Road. During the field visit, flow was clear and consisted of overland runoff from undeveloped forest, fields, and roadside ditches. The unnamed tributary is shaded and the substrate consists of cobbles and gravel with sand deposits. No in-stream aquatic

vegetation or aquatic life was observed in the stream. This natural watercourse would be best classified as a “Riverine, Upper Perennial, Streambed, Cobble-Gravel, Seasonally Flooded” system, based on the Cowardin System (Cowardin et al. 1979).

Wetlands

As described in Section 9.3.9, “Wetlands,” the wetlands identified within the study area are not associated with Leak 5. Wetlands were assessed on June 17, 2013. The results of the 2013 natural resources survey at the Canal Road Study Area indicated that several wetlands are present within the natural resources study area starting at the Rondout Drainage Chamber and continuing northward to Rondout Creek. These wetlands are associated with the unnamed tributary 3 to Rondout Creek identified flowing northwest within the natural resources study area. These wetlands are identified as 5-WL (see **Figure 9.5-43**) and would be best classified as a “Palustrine Forested, Broad-Leaved Deciduous” system, based on the Cowardin System (Cowardin et al. 1979).

Future Without the Repair and Rehabilitation

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP’s understanding that no projects or developments are anticipated within the natural resources study area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that the future conditions of water resources within the Canal Road Study Area would remain the same as baseline conditions.

Analysis of Potential Effect

This section analyzes the potential for temporary and permanent disturbance associated with the repair and rehabilitation and long-term operation of the Catskill Aqueduct in the Canal Road Study Area.

Construction

Work activities related to the repair and rehabilitation would not affect water resources during construction. Leak repair has the potential to permanently alter flows in Rondout Creek.

Prior to commencing the repair and rehabilitation, temporary sediment and erosion control measures, such as silt fences, would be installed, particularly at 5-WL and the unnamed tributary 3 to Rondout Creek. While no access improvements are needed to repair the leak, all work activities would occur in the immediate vicinity of the Rondout Drainage Chamber. If local dechlorination is needed, a 2-inch diameter water supply pipe would be installed from Canal Road to the Rondout Drainage Chamber building for an emergency eyewash station. The water pipe would be buried below the existing access road to avoid encroaching on existing wetlands and surface water identified in the northern and western portions of the study area.

Anticipated disturbance to water resources was quantified based on the limits of construction and proposed work activities (see **Table 9.5-19**). Approximately 960 square feet of temporary disturbance to the road in the State Protection of Waters Buffer may occur to install the water supply pipe for the eye wash station. No permanent disturbance to water resources would occur during construction. Following construction, temporarily disturbed areas would be restored to

natural conditions and planted with native vegetation. Given that construction would be limited to temporary disturbance to a small portion of the water resources in the study area, there would be minimal effects.

Table 9.5-19: Estimated Disturbance to Water Resources within the Canal Road Natural Resources Study Area

Water Resource	Baseline Conditions (Square Feet)	Temporary Effects (Square Feet)	Permanent Effects (Square Feet)
5-WL	28,360	0	0
50-foot State Protection of Waters Buffer	26,150	960 <i>Installation of pipe service for eye wash station (if needed)</i>	0
Unnamed Tributary 3 of Rondout Creek	730	0	0

Temporary Chlorination

Following construction, temporary chlorination of the Catskill Aqueduct would occur from 2019 through 2023, and a temporary dechlorination system would be operated, if needed. The system would treat the leak flows, and all discharges would meet applicable regulatory requirements. It would neither physically change nor eliminate any water resources in the study area. The site would be accessed for routine maintenance and inspection of the local dechlorination system. Water treatment chemicals would be stored inside the existing drainage chamber building and would not affect nearby water resources.

When temporary chlorination is no longer required, operation of the Catskill Aqueduct would be consistent with baseline conditions. The Catskill Aqueduct would no longer be chlorinated, and operation of the local dechlorination system would not be necessary. No physical changes to water resources would occur.

Operation

Because Leak 5 is diverted to the blow-off conduit that enters Rondout Creek at the headwall, the proposed leak repair would result in the elimination of leak flow to Rondout Creek, restoring the creek to its natural pre-leak conditions. Additionally, while it would be a permanent change, leak repair results in similar flow changes that Rondout Creek currently experiences during occasional Catskill Aqueduct shutdowns when the leak ceases to flow. Because leak repair would permanently alter flows, the potential effects on surface water were assessed by analyzing the contribution of Leak 5 to the receiving Rondout Creek during low flow conditions.

Leak Contributions during Low Flow

To assess the contribution of Leak 5 to Rondout Creek, desktop calculations of critical low flows (7Q10 and 7Q2 flows) were completed. The 7Q10 and 7Q2 flows are commonly used measures of low flow and represent the lowest 7-day average flow with return periods of 10 and 2 years,

respectively. In the analysis of Leak 5, the 7Q10 and 7Q2 were adapted to understand conditions during critical low flow periods where further flow reductions from leak repair would result in the greatest potential impact to local hydrology. Average flow was also calculated to compare with typical baseline conditions.

The drainage area was adjusted to represent the point where Leak 5 enters Rondout Creek using the USGS StreamStats Program. The adjusted drainage area is approximately 359 square miles.

During average flow conditions, the leak flow would be a minor contributor to the unnamed tributary’s natural flow. The average daily flow for Rondout Creek at the confluence with Leak 5 was estimated as approximately 274,000 gpm (see **Table 9.5-20**). During average flow conditions, the leak flow is less than 1 percent of the baseflow of Rondout Creek.⁴ During low flow conditions, the leak flow would be a minimal contributor to the 7Q2 flows for Rondout Creek (approximately 8 percent). Elimination of flow from Leak 5 would represent a minor decrease of the Rondout Creek’s low flow from baseline conditions. Therefore, leak flow does not represent a significant contribution to Rondout Creek. Due to the drainage area of Rondout Creek and variable contributions from upstream sources, neither flows nor water quality are anticipated to change due to repair of the leak. No meaningful effects of leak repair are anticipated to Rondout Creek or downstream resources.

Table 9.5-20: Estimated Leak Contributions for Canal Road Study Area

Flow Scenario	Leak 5		
	Rondout Creek Flow (gpm) ¹	Leak Flow (gpm) ²	Leak Flow to Rondout Creek Flow (%)
Average	273,787	2,100	0.8
7Q2	25,538	2,100	8.2
7Q10	15,036	2,100	14.0
Notes:			
¹ Based on USGS gauge 01367500 and data for 1983 to 2013.			
² Leak flow is based on maximum flow estimated from weir measurements at the Rondout Drainage Chamber during typical Catskill Aqueduct flows.			

Water Resources Conclusions

Repair and rehabilitation work activities would include internal leak repair and, if local dechlorination is needed, construction of a local dechlorination system within the Rondout Drainage Chamber, the installation of a water pipe below the access road. All equipment would be removed from the natural resources study area and the site would be restored to natural conditions when leak repair has been completed. If local dechlorination is necessary, minor temporary disturbance to the State Protection of Waters Buffer is anticipated for the water supply line. Discharges of dechlorinated water would meet regulatory requirements.

⁴ This estimate assumes that leak flow is not part of the natural flow of Rondout Creek.

Once the Catskill Aqueduct returns to typical operations in 2023, the local dechlorination system would cease to operate. Leak 5 is artificial flow sourced from the Catskill Aqueduct that travels to Rondout Creek within an existing conduit and is not defined as surface water. Following leak repair, leak flows would cease to contribute to Rondout Creek. Operation of the Catskill Aqueduct would be consistent with baseline conditions and no effects are anticipated to Rondout Creek or downstream resources.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to water resources within the Canal Road Study Area.

Federal/State Threatened and Endangered Species and State Species of Special Concern

This section includes an analysis of potential impacts to federal/State Threatened and Endangered Species and State Species of Special Concern identified in Section 9.3.9, “Natural Resources,” as having the potential to be affected by activities within the natural resources study area. To identify those species that could be affected, species that could occur up to 0.25 mile from the work site were determined in consultation with USFWS, USACE, NYNHP, and NYSDEC, as well as county and local offices, as applicable.

As discussed in Section 9.3.9, “Natural Resources,” 10 species were identified to have the potential to be affected by the repair and rehabilitation within the natural resources study area. Therefore, conditions in the future without the repair and rehabilitation, an analysis of the potential for impacts to these 10 species, and a summary of conclusions on the potential effects resulting from the repair and rehabilitation are provided below.

In the future without the repair and rehabilitation, it is assumed that federal/State Threatened and Endangered Species and State Species of Special Concern within the study area would largely be the same as baseline conditions, other than possible changes in habitat due to natural vegetative succession and general anthropogenic influences.

An analysis of the potential for disturbance to federal/State Threatened and Endangered Species and State Species of Special Concern from the repair and rehabilitation within the natural resources study area is shown in **Table 9.5-21**. The analysis included an evaluation of the repair and rehabilitation work activities within the study area and observations during field visits, as applicable.

Table 9.5-21: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern and Habitats within the Canal Road Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Amphibians and Reptiles					
Blue-spotted Salamander	<i>Ambystoma laterale</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visit on June 17, 2013. Potential habitat exists within the wetland areas. However, disturbance is limited to previously disturbed areas and leak repair would not alter local hydrology of Rondout Creek or adjacent water resources. Therefore, there are no effects anticipated and no further analysis for blue-spotted salamanders is warranted for this study area.	No
Bog Turtle	<i>Clemmys</i> [= <i>Glyptemys</i>] <i>muhlenbergii</i>	Threatened	Endangered	A wetland complex is present within the natural resources study area starting at the Rondout Drainage Chamber and continuing northward to Rondout Creek. The wetland is a forested red maple-hardwood swamp that lacks emergent vegetation, has a closed canopy, lacks basking areas, and lacks mucky substrate to support bog turtles. A Phase I bog turtle survey was not warranted since potential bog turtle habitat was not identified in this study area. Therefore, there are no effects anticipated and no further analysis for bog turtles is warranted for this study area.	No
Eastern Box Turtle	<i>Terrapene carolina</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visit on June 17, 2013. Potential habitat exists within the hardwood forest, grassy meadow areas, red maple-hardwood swamp, and successional old field areas. Work activities would be largely confined to previously disturbed areas. If any isolated areas of potential habitat exist at the site, as a highly mobile species, any eastern box turtles that might otherwise use these areas are expected to instead utilize similar, adjacent habitats during construction. Furthermore, perimeter silt fencing would limit disturbance to adjacent habitat and prevent individual turtles from entering the work site during construction. Finally, upon construction completion, the staging areas would be restored to natural conditions. Therefore, there are no effects anticipated and no further analysis for eastern box turtles is warranted for this study area.	No
Jefferson Salamander	<i>Ambystoma jeffersonianum</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visit on June 17, 2013. Potential habitat exists within the wetland areas. However, disturbance is limited to previously disturbed areas and leak repair would not alter local hydrology of Rondout Creek or adjacent water resources. Therefore, there are no effects anticipated and no further analysis for Jefferson salamanders is warranted for this study area.	No

Table 9.5-21: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern and Habitats within the Canal Road Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Jefferson Salamander Complex	<i>Ambystoma jeffersonianum x laterale</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visit on June 17, 2013. Potential habitat exists within the wetland areas. However, disturbance is limited to previously disturbed areas and leak repair would not alter local hydrology of Rondout Creek or adjacent water resources. Therefore, there are no effects anticipated and no further analysis for the Jefferson salamander complex is warranted for this study area.	No
Spotted Turtle	<i>Clemmys guttata</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visit on June 17, 2013. Potential habitat exists within the wetland areas. However, disturbance is limited to previously disturbed areas and leak repair would not alter local hydrology of Rondout Creek or adjacent water resources. Therefore, there are no effects anticipated and no further analysis for spotted turtles is warranted for this study area.	No
Wood Turtle	<i>Glyptemys insculpta</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visit on June 17, 2013. Potential habitat exists within the upland and wetland areas. While work activities would be largely confined to previously disturbed areas, if any isolated areas of potential habitat exist at the site, wood turtles that might otherwise use these areas are expected to instead utilize similar, adjacent habitats during construction. Furthermore, perimeter silt fencing would limit disturbance to adjacent habitat and prevent individual turtles from entering the work site during construction. Finally, upon construction completion, the staging areas would be restored to natural conditions. Leak repair would not alter local hydrology of Rondout Creek or adjacent water resources. Therefore, there are no effects anticipated and no further analysis for wood turtles is warranted for this study area.	No
Birds					
Bald Eagle	<i>Haliaeetus leucocephalus</i>	BGPA/ MBTA	Threatened	No individuals were incidentally observed during the field visit on June 17, 2013. NYNHP identified the nearest nest to be approximately 690 feet from the work area south of Canal Road, beyond the recommended buffer restriction of 330 and 660 feet, for USFWS and DEP, respectively. Noise would be unlikely to affect nesting birds due to distance. Additionally, as identified in Section 9.5.6.9, "Noise," leak repair would be the loudest work activity and would occur during fall, outside the nesting period. Therefore, there are no effects anticipated and no further analysis for Bald Eagles is warranted for this study area.	No

Table 9.5-21: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern and Habitats within the Canal Road Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Mammals					
Indiana Bat	<i>Myotis sodalis</i>	Endangered	Endangered	No bats were incidentally observed during the field visit on June 17, 2013. Tree removal would not be required. However, if tree removal becomes necessary it would be conducted from November 1 through March 31 to avoid impacts to roosting bats. Noise from work activities is possible but unlikely to adversely affect foraging bats. Leak repair would not alter local hydrology of Rondout Creek and foraging habitat would continue to be available within the study area. Therefore, there are no effects anticipated and no further analysis for Indiana bats is warranted for this study area.	No
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	Threatened	Threatened Unlisted	No individuals were incidentally observed during the field visit on June 17, 2013. NYNHP identified hibernacula within 5 miles of the study area. Tree removal would not be required. However, if tree removal becomes necessary it would be conducted from November 1 through March 31 to avoid impacts to bats. The Rondout Drainage Chamber building could provide potential roosting habitat. During the field visit on June 17, 2013, there was no access to the building interior to investigate signs of roosting bats at the facility. A local dechlorination system would be installed and operated during temporary chlorination, but would not permanently alter the structure. Should any bats or their guano be observed in these structures indicating roosting during work activities, USFWS and NYSDEC would be contacted immediately to determine the best course of action. Noise from work activities is possible but unlikely to adversely affect foraging bats. Therefore, there are no effects anticipated and no further analysis for northern long-eared bats is warranted for this study area.	No
Notes: BGPA: Bald and Golden Eagle Protection Act MBTA: Migratory Bird Treaty Act					

Federal/State Threatened and Endangered Species and State Species of Special Concern Conclusions

Based on the impact analysis, no take is anticipated. There would be no effects to blue-spotted salamanders (*Ambystoma laterale*), bog turtles (*Clemmys [=Glyptemys] muhlenbergii*), eastern box turtles (*Terrapene carolina*), Jefferson salamanders (*Ambystoma jeffersonianum*), Jefferson salamander complex (*Ambystoma jeffersonianum x laterale*), spotted turtles (*Clemmys guttata*), wood turtles (*Glyptemys insculpta*), Bald Eagles (*Haliaeetus leucocephalus*), Indiana bats (*Myotis sodalis*), and northern long-eared bats (*Myotis septentrionalis*) associated with the repair and rehabilitation.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to federal/State Threatened and Endangered Species or State Species of Special Concern within the Canal Road Study Area.

9.5.6.7 Hazardous Materials

To evaluate the potential presence of hazardous materials within the Canal Road Study Area, a Phase I ESA was conducted in general conformance with the scope and limitations of ASTM Practice E 1527-13 and CEQR requirements to identify RECs. The Phase I ESA included site reconnaissance, research on current/historical use, and review of federal and State regulatory listings for both the site itself and for its neighboring properties within the appropriate search distance defined in the ASTM standard. Additionally, as part of the Phase I ESA, a review of previous environmental investigation reports was completed, including EPA National Priorities List Fact Sheet and EPA Five-Year Review Report for the Mohonk Road Industrial Plant Superfund Site, and Department of Health & Human Services - Public Health Assessment for Mohonk Road Industrial Plant report. The findings from the Phase I ESA investigation and results from DEP's legacy files for the work site, including a geotechnical investigation and environmental health and safety sampling, were collectively reviewed to assess the potential presence of and potential for disturbance to hazardous materials in the study area.

Based on the Phase I ESA investigation within this study area, there was no indication of an environmental impact that would constitute a REC as defined by the ASTM standard that would affect activities in the study area. Contamination associated with surrounding property has been identified in connection with a former surrounding property use (Superfund Site). However based on information obtained from a Phase II environmental investigation documented in the EPA Fact Sheet and Five-Year Review reports, the surrounding property is currently undergoing remediation under the oversight of NYSDEC. Additionally, no contamination associated with the Superfund Site has been identified proximate to the Canal Road Study Area. Furthermore, the Phase II investigation documents that groundwater flow is away from the Canal Road Study Area work site and no excavation is planned at this study area.

Geotechnical environmental investigations and sampling were undertaken for contaminants of concern including volatile and semivolatile organics, PCBs, and total petroleum hydrocarbons along the aqueduct within the study area. Several parameters were noted in the soil sampling results including total chromium, mercury, and lead. Chromium concentrations, however, were consistent over a widespread sampling area and are more likely associated with background

concentrations. Along the Catskill Aqueduct, there are widespread occurrences of chromium, which are attributed to the existing geological formations. Lead and mercury, although naturally occurring in soils, are also likely to be the result of background concentrations. In addition, gasoline range organics were not detected in the samples. Diesel range organic compounds were detected, but at low concentrations that would not warrant remedial actions.

The legacy data also revealed that asbestos-containing materials are present on the ceiling beams and fire doors of the Rondout Drainage Chamber building. Additionally, the ceiling-mounted crane and crane motor (which were not accessible for sampling) were suspected of containing lead and PCB. Materials sampled did not identify mercury-containing paint.

Based on the results of the environmental investigations completed within the Canal Road Study Area, no other hazardous materials are known to exist. The soil results support the reuse of excavated materials as backfill. Based on the repair and rehabilitation work activities which do not include soil excavation, no need for special management, handling, or health and safety measures are warranted at this study area at this time.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP's understanding that no developments or structures that would introduce hazardous materials to the environment are anticipated within the Canal Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that the presence of hazardous materials within the Canal Road Study Area would be the same as baseline conditions.

In the future with the repair and rehabilitation, work activities would require the potential storage and use of a variety of petroleum and other chemical products, such as diesel fuel for back-up power, lubricating oil for construction vehicles, a bulk storage sodium bisulfate tank (a 600-gallon tank) that would be provided with a secondary containment and miscellaneous cleaning and maintenance chemicals. The use and storage of all of these would be in accordance with applicable regulatory requirements and guidelines including those relating to: federal Spill Prevention, Control, and Countermeasures requirements; and State petroleum bulk storage, chemical bulk storage, and spill reporting requirements. Repairs to the valve leak would be undertaken during construction, and if leak repair is ultimately not feasible, a local dechlorination system would be installed prior to temporary chlorination. Following repair and rehabilitation, equipment and vehicles would be removed from the study area. The staging area at Canal Road Study Area would be restored to baseline conditions, and the local dechlorination system would be operated.

During temporary chlorination, the local dechlorination system would treat the leak by injecting liquefied sodium bisulfite into the pressurized pipe segment. Sodium bisulfate is commonly used as a food additive and is typically used in drinks to kill microbes. DEP would handle all materials in accordance with applicable federal, State, and local regulations and guidelines. Following the repair and rehabilitation, and operation of the Catskill Aqueduct would be consistent with baseline conditions.

Therefore, the repair and rehabilitation would not result in significant adverse impacts from the presence or disturbance of hazardous materials within the Canal Road Study Area.

9.5.6.8 Transportation

The study area for the transportation analysis consists of the major convergent roadways that would potentially be used by the employee and construction vehicles associated with repair and rehabilitation work activities en route to and from the Canal Road Study Area.

Access to the repair and rehabilitation limits of the construction work site within the Canal Road Study Area would be via Canal Road directly to the work site (see **Figure 9.5-38**). Canal Road is a two-way local roadway. To the extent available, construction vehicles would travel on truck-permitted roadways directly to and from the Canal Road Study Area. There is no public transportation and little to no pedestrian activity in the immediate vicinity of the study area. Under current operations, DEP employees periodically access the site; however, no DEP employees work at or visit the study area on a daily basis, and the small number of DEP employee vehicles has little to no effect on traffic conditions within the study area.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP's understanding that no changes in land use or an increase in traffic due to outside developments are anticipated within the Canal Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that traffic, public transportation, and pedestrian activities within the study area would be similar to baseline conditions.

Repair and rehabilitation work activities within the Canal Road Study Area were evaluated to determine which would have the potential to generate the most vehicle trips and therefore be the basis of this transportation analysis. Of these activities, the internal leak repair at Leak 5 would generate the most vehicle trips. Internal leak repairs would occur in fall ~~2018~~2017 for up to 24 hours per day, 7 days a week for approximately 4 weeks during the first 10-week shutdown period.

In the future with the repair and rehabilitation, construction vehicles would travel along Canal Road directly to the site. The estimated number of peak-day one-way vehicle trips associated with the internal leak repair is 32 vehicles, or approximately 64 peak-day vehicle round trips that would travel to and from the study area. The majority of the peak daily vehicle round trips, approximately 40 vehicle round trips or 40 PCEs, would be workers traveling directly to and from the staging area, with an additional 8 daily shuttle trips between the study area and the staging area. The remaining approximately 16 peak-day vehicle round trips (21 PCEs) would be trucks or other construction vehicles.

During a peak day, the estimated number of peak-hour vehicle trip ends associated with internal leak repair is approximately 32 peak-hour vehicle trip ends (35 PCEs). This includes approximately 20 vehicle trip ends (20 PCEs) from workers traveling directly to and from the staging area, approximately 4 peak-hour shuttle trips between the study area and the staging area, and approximately 8 vehicle trip ends (11 PCEs) from trucks or other construction vehicles. For the purpose of this analysis, the peak-hour project-generated vehicles are anticipated to coincide with typical construction hours for employee vehicles entering the site. Assuming two 12-hour shifts, this would be from 6 AM to 7 AM and 6 PM to 7 PM, and unlikely to coincide with the peak hour for existing traffic. Following construction, operation of the local dechlorination system would generate occasional vehicle trips as DEP employees periodically monitor and

maintain the system through 2023; however, fewer than the *CEQR Technical Manual* screening threshold of 50 peak-hour PCEs would be generated during this period.

In total, the repair and rehabilitation would result in approximately 35 peak-hour PCEs along Canal Road, which is below the *CEQR Technical Manual* screening threshold of 50 peak-hour PCEs as described in Section 9.3.13, “Transportation.” The work activities at the Canal Road Study Area would be short-term (totaling 10 weeks over 10 months; see **Table 9.5-17**) and would not generate public parking or transportation demands or pedestrian activity within the Canal Road Study Area. Following completion of the repair and rehabilitation, traffic patterns would return to baseline conditions.

Therefore, although there would be a minor temporary increase in traffic, the repair and rehabilitation would not result in significant adverse impacts to transportation within the Canal Road Study Area.

9.5.6.9 Noise

As described in Section 9.3.15, “Noise,” mobile noise associated with the repair and rehabilitation within the Canal Road Study Area does not warrant analysis. This section includes an analysis of potential impacts from stationary noise associated with the repair and rehabilitation to sensitive receptors within the study area.

The study area for the stationary noise analysis is the area within 1,500 feet of the repair and rehabilitation activities as shown on **Figure 9.5-44**.

The Canal Road Noise Study Area includes residential parcels within 1,500 feet of the repair and rehabilitation work site that are considered noise-sensitive receptors for this analysis. The temporary work activities were evaluated to disclose potential noise levels at the nearest residence. While the Town of Marbletown does not have a noise code applicable to the Canal Road Study Area, there are noise-sensitive receptors within the study area that warrant an analysis.

Existing ambient noise levels within the Canal Road Study Area are influenced by vehicular traffic traveling on Berme Road, Canal Road, and other local roadways. The existing noise levels within the study area are comparable to a very quiet suburban and rural residential environment based on the distance from major transportation corridors, the population density of the area, and the presence of other noise-producing elements. Typical noise levels (measured as L_{eq}) for very quiet suburban and rural communities are 40 dBA during the daytime and 34 dBA during the nighttime.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP’s understanding that no major projects that would result in a change in land use, or new noise-generating sources that would contribute to an increase in ambient noise levels are anticipated within the Canal Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that ambient noise levels within the Canal Road Study Area would be similar to baseline conditions.

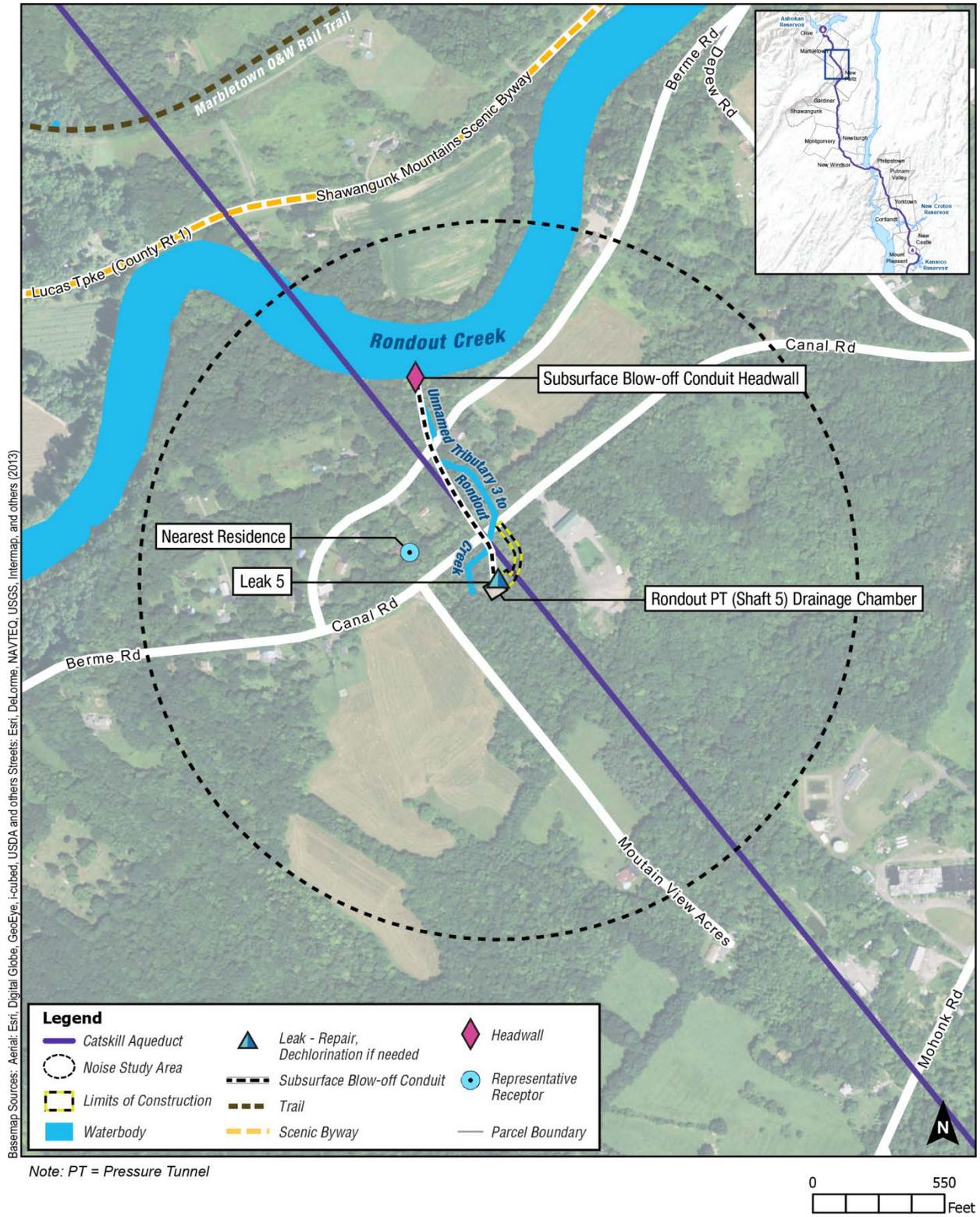


Figure 9.5-44: Noise - Canal Road Study Area



In the future with the repair and rehabilitation, stationary noise-producing work activities within the Canal Road Study Area would occur on one site. The stationary noise-generating equipment that would be used within the Canal Road Study Area was evaluated to determine which work activity would have the potential to emit the most noise and, therefore, be the basis of this stationary noise analysis. Of the activities, the stationary noise-generating equipment associated with the leak repair would emit the most noise. Internal leak repairs would occur in fall ~~2018~~2017 for up to 24 hours per day, 7 days a week for approximately 4 weeks during the first 10-week shutdown (see **Table 9.5-17**).

The noise analysis focused on the three loudest stationary noise-generating equipment types necessary for the leak repair. Associated equipment reference noise levels are shown in **Table 9.5-22**. The types of noise-generating equipment analyzed were conservatively based on peak construction operating conditions.

Table 9.5-22: Stationary Source Construction Equipment Modeled at the Canal Road Study Area Noise Analysis and Reference Noise Levels (L_{eq})

Equipment Type	Reference Noise Level (L_{eq}) at 50 feet (dBA) ¹
Generator	82
Crane	77
Pump	74
Note: ¹ City Environmental Quality Review (CEQR) Technical Manual, Chapter 22.	

Leak repair within the Canal Road Study Area would emit a noise level (L_{eq}) of approximately 66 dBA at the nearest residence approximately 390 feet away. Other noise-producing equipment could also be utilized within the study area for a limited period during work activities; however, this equipment would not be expected to be louder than those associated with leak repair. If needed, the local dechlorination system would operate until the Catskill Aqueduct returns to typical operations in 2023. The system would be located indoors, so noise outside the Rondout Drainage Chamber building would be minimal.

Although there would be an increase in stationary noise levels during 24-hour construction periods during the aqueduct shutdowns, work would primarily occur in the fall and winter months when residents typically have windows closed. Noise levels inside would be further reduced to an interior noise level (L_{eq}) of approximately 42 dBA at the nearest residence. Following completion of the repair and rehabilitation work activities, the construction equipment and vehicles would be removed from the Canal Road Study Area. The repair and rehabilitation work activities would be temporary, with the peak work activities occurring during leak repairs in fall ~~2018~~2017 for a limited period (up to 4 weeks, see **Table 9.5-17**).

Therefore, although there would be a temporary increase in noise, noise from the repair and rehabilitation would not result in significant adverse impacts to sensitive receptors within the Canal Road Study Area.

9.5.6.10 Neighborhood Character

The character of the Canal Road Study Area is largely defined by a mix of residential, vacant land, agricultural, public services, and commercial land uses, as well as its physical setting within a rural location (see **Figure 9.5-40**). The Catskill Aqueduct traverses the study area in a general northwest to southeast direction. Rondout Creek flows through the northern portion of the study area, and Canal Road and Berme Road bisect it from southwest to northeast. The proposed work site within the study area is located in the area near the Rondout Drainage Chamber and Leak 5. Access to the work site would be provided by an existing dirt access road that connects to Canal Road.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP's understanding that no changes in land use and no new projects or structures are anticipated within the Canal Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that neighborhood character within the study area would be similar to baseline conditions.

As described in Section 9.3.16, "Neighborhood Character," there would be no potential for the repair and rehabilitation to affect shadows and urban design. In addition, based on the screening assessment for land use and zoning; socioeconomic conditions; and historic and cultural resources, an impact analysis for the Canal Road Study Area was not warranted, as discussed in the following sections: Section 9.3.3, "Land Use, Zoning, and Public Policy," Section 9.3.4, "Socioeconomic Conditions," and Section 9.3.7, "Historic and Cultural Resources," respectively. As described in Section 9.5.6.4, "Open Space and Recreation," and Section 9.5.6.5, "Visual Resources," the work activities would not affect open space and recreation and visual resources in the Canal Road Study Area. Furthermore, the public policy impact analysis provided in Section 9.5.2, "Town of Marbletown Impact Analysis," concluded the work activities were consistent with applicable plans.

As described in Section 9.5.6.8, "Transportation," and Section 9.5.6.9, "Noise," the work activities in the Canal Road Study Area would be short-term (intermittently over 10 months) and would result in a temporary increase in traffic and noise. Following completion of the repair and rehabilitation, the construction equipment and vehicles would be removed from the study area and noise levels would return to baseline conditions. These temporary increases in traffic patterns and noise levels would not affect the overall character of the study area.

The repair and rehabilitation would not generate significant adverse effects in land use, zoning, and public policy; socioeconomic conditions; open space and recreation; shadows; historic and cultural resources; urban design and visual resources; transportation; or noise.

Therefore, there would be no significant adverse impacts related to neighborhood character from the repair and rehabilitation within the Canal Road Study Area.

9.5.7 MOSSYBROOK ROAD STUDY AREA IMPACT ANALYSIS

Within the Mossybrook Road Study Area, the aqueduct consists of the Rondout Pressure Tunnel. One leak has been identified within this study area at Rondout Pressure Tunnel Shaft 7 Leak (Shaft 7 Leak) (see **Figure 9.5-45**).

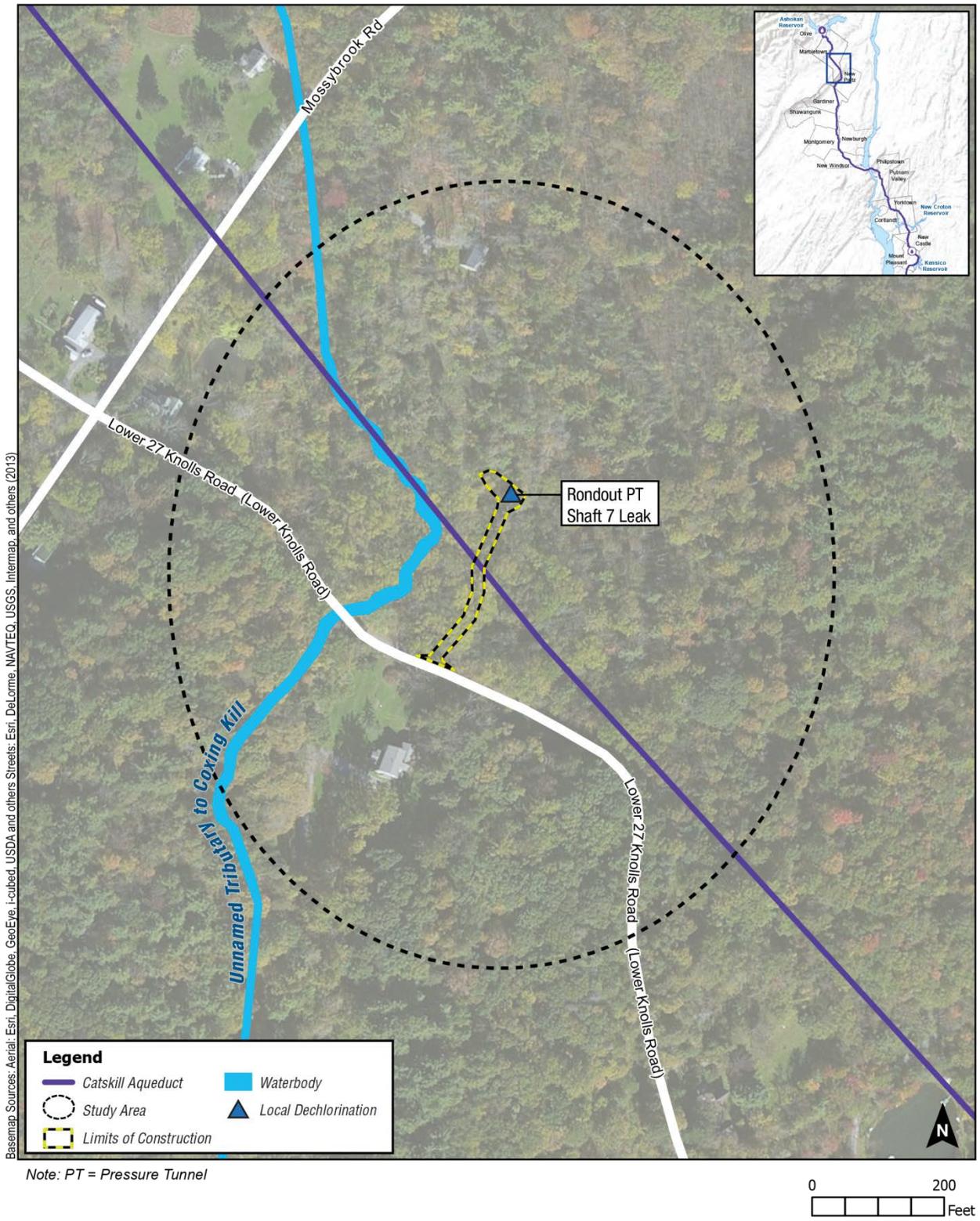


Figure 9.5-45: Study Area – Mossybrook Road



Work activities within the Mossybrook Road Study Area would include: the installation and operation of a local dechlorination system; associated staging and access improvements to construct, maintain, and monitor the local dechlorination system; and site restoration following completion of repair and rehabilitation.

9.5.7.1 Study Area Location and Description

The Mossybrook Road Study Area is located along the upper Catskill Aqueduct in the Town of Marbletown. The Catskill Aqueduct traverses the study area in a general northwest to southeast direction. The study area is bounded by Mossybrook Road to the north and traversed by Lower 27 Knolls Road (Lower Knolls Road), which roughly parallels the aqueduct. An unnamed tributary to Coxing Kill, itself a tributary to Rondout Creek, flows from south to north along the western side of the study area. The proposed work site within the study area is located in the area surrounding Shaft 7 Leak. Access to the work site would be provided by an existing access road connecting to Lower Knolls Road. The study area boundary is located approximately 400 feet beyond the outermost areas of disturbance related to the work site. **Figure 9.5-45** shows an aerial of the study area, including the path of the aqueduct and limits of construction.

There are no federal, State, or local designated landmarks, historic districts, or known archeological resources within the study area.

9.5.7.2 Description of Rondout Pressure Tunnel Shaft 7 Leak

The Shaft 7 Leak is located in a forested area along the Rondout Pressure Tunnel segment of the Catskill Aqueduct (see **Figure 9.5-46**). The aqueduct lies approximately 500 feet below grade at this location. The shaft is located approximately 290 feet northeast of Lower Knolls Road and was used to construct the pressure tunnel. Once construction was complete, the bottom 50 feet of the shaft (directly above the pressure tunnel) and the top few feet of the shaft were sealed with concrete, and the remainder of the shaft was backfilled with soil. The high water table in the area saturated this soil soon after. The leak water seeps through cracks in the pressure tunnel before flowing through either the concrete seal of Shaft 7 or a pre-existing geologic fault. It then moves upwards through the soil, expressing at the ground surface approximately 50 feet north of the shaft and continuing to the northwest. The flow of the Shaft 7 Leak has not been measured but is estimated to be less than 10 gpm.

9.5.7.3 Proposed Activities within the Mossybrook Road Study Area

To support activities within the Mossybrook Road Study Area, the Ashokan Screen Chamber (within the Ashokan Screen Chamber Study Area in the Town of Olive) would serve as a primary staging area from which workers would be transported to the site daily. Several secondary staging areas would provide additional parking, and equipment and materials would be staged on site. Erosion and sediment control measures such as silt fencing and hay bales would be installed at the perimeter of the work site as needed. A site plan showing a layout of the limits of construction for the work site, which would occupy a total of approximately 7,100 square feet, is shown on **Figure 9.5-47**. The schedule for work within the study area is shown in **Table 9.5-23**. The duration of active construction within the Mossybrook Road Study Area is estimated to total 2 weeks over 1 month, in addition to 1 week to demobilize and restore the site following temporary chlorination.



Photograph 1: Rondout Pressure Tunnel Shaft 7 Leak. Photograph taken facing northwest.



Photograph 2: Ponded area from Rondout Pressure Tunnel Shaft 7 Leak. Photograph taken facing north.

Figure 9.5-46: Photographs – Rondout Pressure Tunnel Shaft 7 Leak – Mossybrook Road Study Area



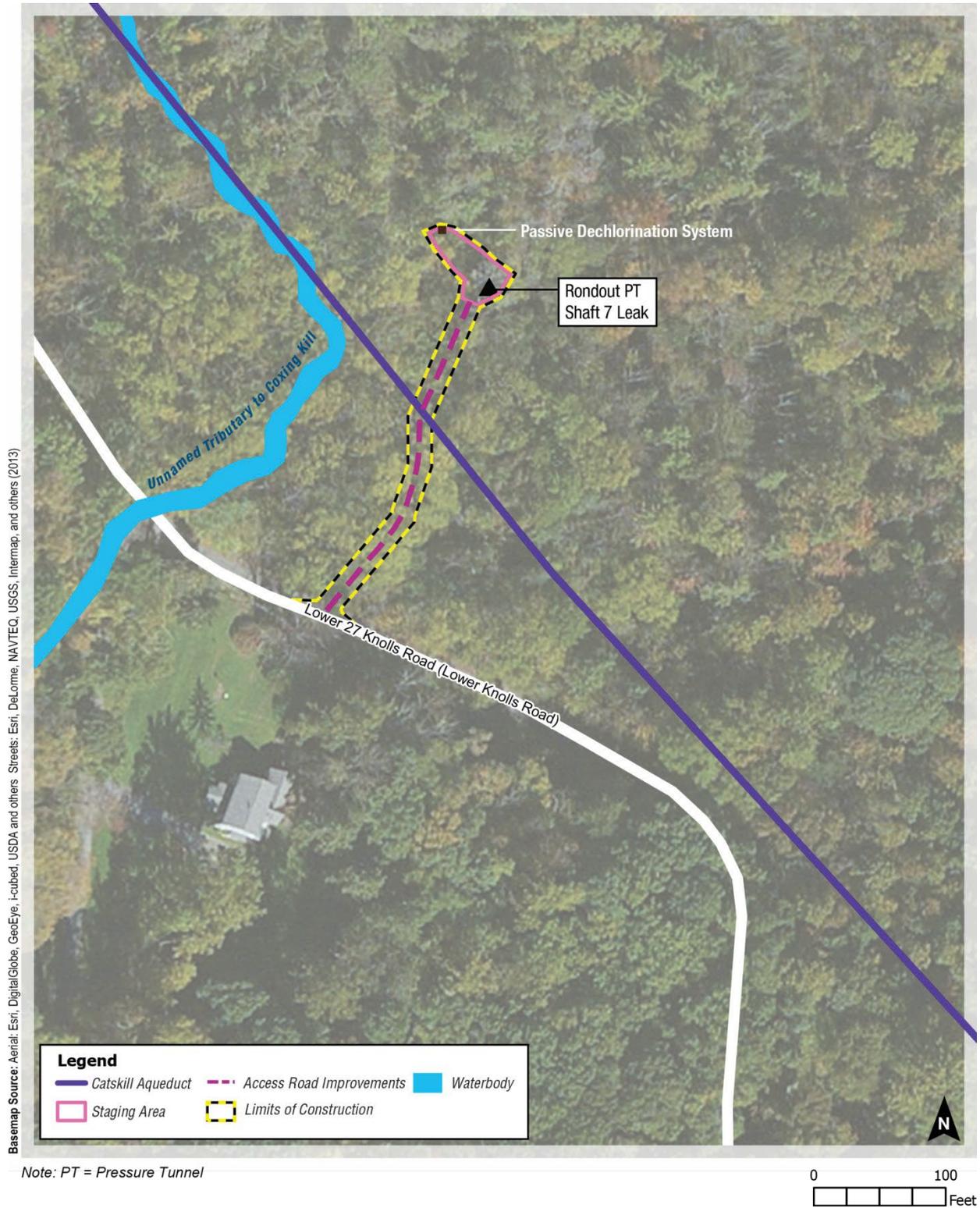


Figure 9.5-47: Site Plan – Mossybrook Road Study Area



Table 9.5-23: Schedule of Work Activities within the Mossybrook Road Study Area

Work Activity	Dates	Duration	Work Hours	Crew Size ¹
Staging and Access Improvements ²	Summer 2019 2018	1 week	Monday to Friday, 7 AM to 5 PM	4
Dechlorination Installation	Summer 2019 2018	1 week	Monday to Friday, 7 AM to 5 PM	2
Dechlorination Demobilization/ Site Restoration ³	2023	1 week	Monday to Friday, 7 AM to 5 PM	4
Notes:				
¹ Crew size refers to the number of people anticipated at the work site(s).				
² Tree removal would be conducted from November 1 through March 31 to avoid impacts to Indiana bat (<i>Myotis sodalis</i>) and northern long-eared bat (<i>Myotis septentrionalis</i>).				
³ Dechlorination demobilization and site restoration is not included in estimated duration of active construction.				

Work in the study area would begin with staging and access improvements in summer ~~2019~~2018. Improvements may entail minor grading and the removal of approximately 1 tree, in addition to underbrush clearing. It is estimated that one tree may be removed. Temporary wetland disturbance would cover a total area of approximately 1,880 square feet, and there would be approximately 90 square feet of permanent wetland disturbance.

Following the staging and access improvements, a local dechlorination system would be installed. This would require temporary diversion of the leak water around the work area. Specifically, this would be a temporary, passive dechlorination system comprised of a dechlorination mat containing tablets of sodium bisulfite, with a footprint of approximately 5 square feet. The passive dechlorination system would be installed downstream along the flowpath of the leak. The passive dechlorination system would be sized to treat the leak flow that would occur when the aqueduct is operated at its maximum capacity and anticipated flow during temporary chlorination. Upon completion of installation, equipment and materials would be removed. The access road would remain in place for future maintenance.

As described in Section 9.2, “Project Description,” the local dechlorination systems would be in operation when chlorination of the aqueduct begins in ~~2020~~2019. While in operation, the system would be inspected and maintained on a regular basis, including monitoring chlorine residuals, as required. When chlorination of the aqueduct is no longer required in 2023, the passive dechlorination system would be removed from the study area, and any areas temporarily disturbed would be restored to baseline conditions.

Impact categories analyzed for the Mossybrook Road Study Area are presented in Sections 9.5.7.4, “Land Use and Zoning,” through 9.5.7.12, “Public Health,” and include land use and zoning; socioeconomic conditions; natural resources, including water resources, terrestrial resources, federal/State Threatened and Endangered Species and State Species of Special Concern; hazardous materials; water and sewer infrastructure; transportation; stationary noise; neighborhood character; and public health. Additionally, the study area’s compatibility with applicable public policies was analyzed on a town-wide basis in Section 9.5.2, “Town of Marbletown Impact Analysis.” As described in Section 9.3, “Screening Assessment and Impact

Analysis Methodology,” an impact analysis related to community facilities and services; open space and recreation; historic and cultural resources; visual resources; the remaining natural resources subcategories, including geology and soils, aquatic and benthic resources, wildlife, federal/State Candidate Species, and unlisted rare and vulnerable species; energy; air quality; and mobile noise within the study area is not warranted. Finally, impacts related to project-wide natural resources, water and sewer infrastructure, and public health were also analyzed within Section 9.19, “Project-wide Impact Analysis.”

9.5.7.4 Land Use and Zoning

The study area consists primarily of residential land use, with parcels of vacant land and public services land uses. Land cover within the study area is entirely wooded, with a small wetland in the western portion of the study area. **Figure 9.5-48** shows a map of the land uses in the study area and its surroundings.

The study area is within a residential (A-4) zoning district, as designated by the Town of Marbletown Zoning Code (see **Figure 9.5-49**). The Catskill Aqueduct is a permitted use as a water supply utility within this residential (A-4) zoning district.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP’s understanding that no major developments or programs are planned within the Mossybrook Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that land use and zoning within the Mossybrook Road Study Area would be similar to baseline conditions.

The repair and rehabilitation would require an easement acquisition of approximately 0.3 acres of land within a portion of a 5-5-acre parcel in the Town of Marbletown, identified on the Ulster County Tax Map as Tax ID 70.3-6-41.110. The land use within the proposed easement area is residential and zoned A-4 by the Town of Marbletown Zoning Code. The minimum lot size required for a residential land use under residential A-4 zoning regulation is 4 acres. The property is currently improved with a single-family residence, which is located within the easement area. The portion of the property affected by the easement would not include any existing buildings. Acquisition of and proposed uses within the easement would be consistent with the existing land uses and zoning. The easement would preclude the landowner from any activity that would interfere with or is inconsistent with the rights conveyed to the City. Acquisition of the easement would be consistent with existing land use, conform to existing zoning regulations, and would not result in residential or business displacement.

Following construction, all equipment would be removed from the Mossybrook Road Study Area and the staging area would be restored to baseline conditions. Operation of the Catskill Aqueduct would be consistent with baseline conditions and would conform with adjacent land uses and zoning. The property affected by the easement is expected to be able to continue its existing uses after repair and rehabilitation. The permanent easement would not result in residential building displacement and overall, there would be no change to land use and zoning.

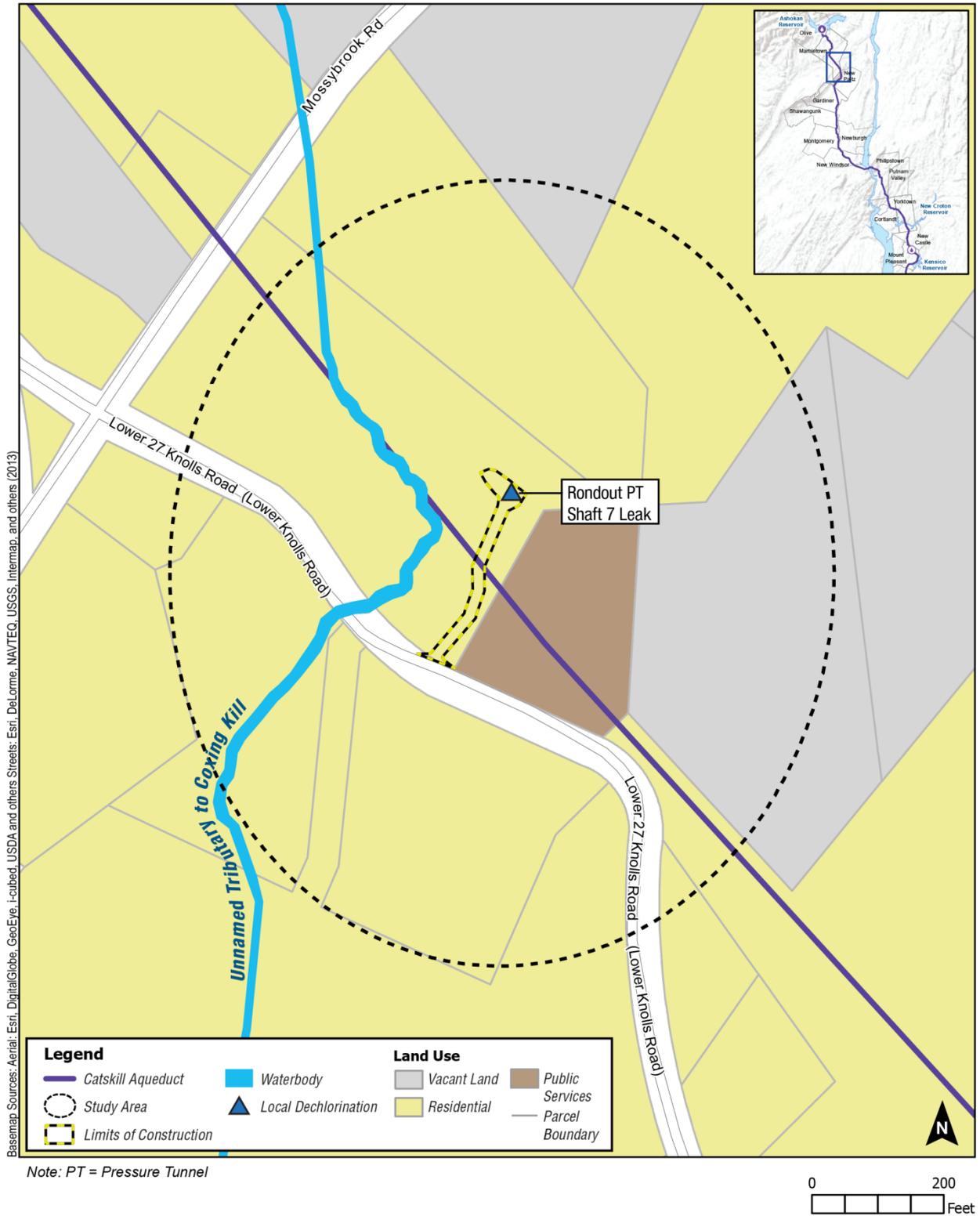


Figure 9.5-48: Land Use – Mossybrook Road Study Area



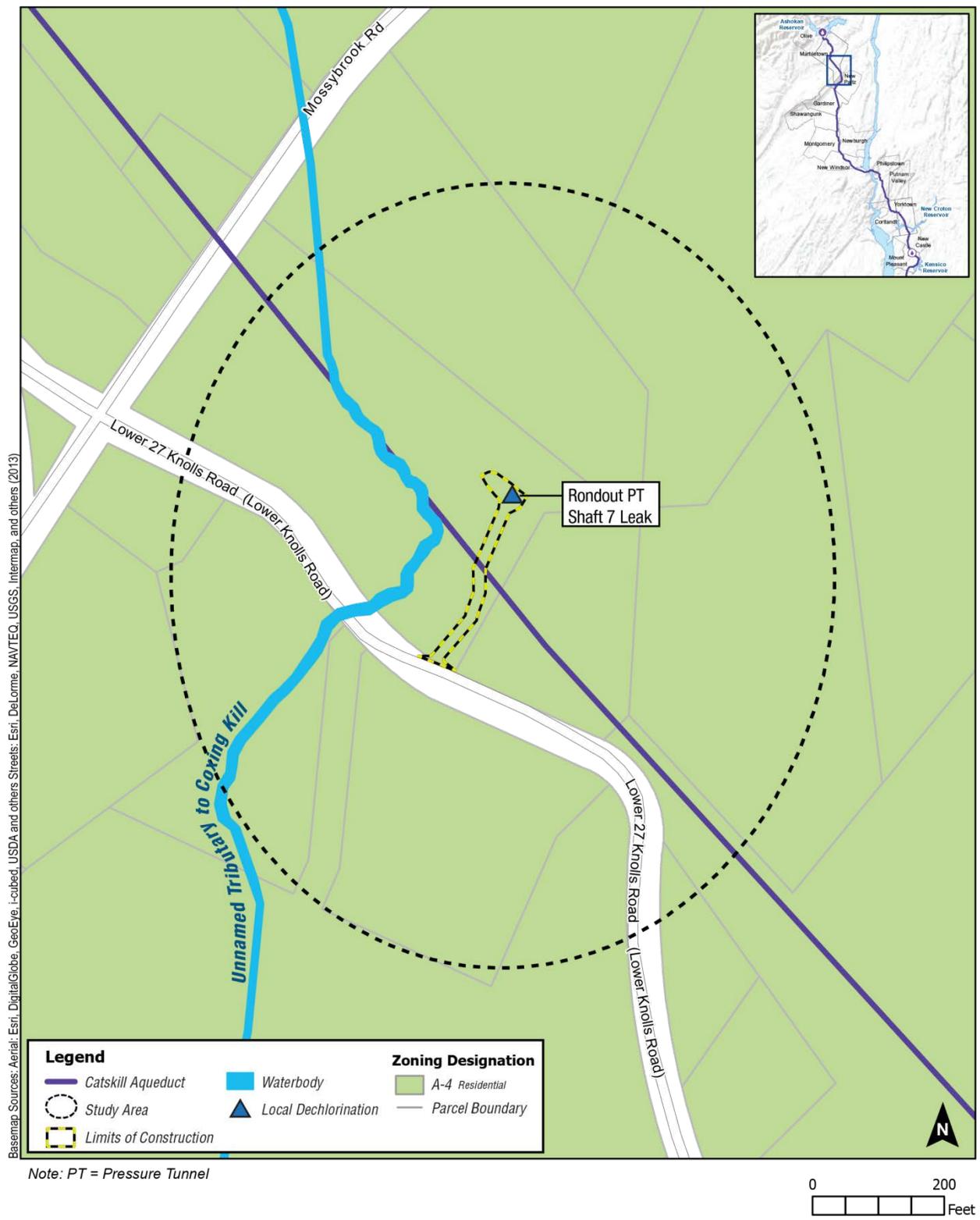


Figure 9.5-49: Zoning – Mossybrook Road Study Area



Therefore, the repair and rehabilitation would not result in significant adverse impacts to land use or zoning within the Mossybrook Road Study Area.

9.5.7.5 Socioeconomic Conditions

The study area consists primarily of residential land use, with parcels of vacant land and public services land uses. Land cover within the study area is entirely wooded (see **Figure 9.5-48**), with a small wetland in the western portion of the study area.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP's understanding that no major developments or programs are planned within the Mossybrook Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that land use, population, housing, and economic activity within the Mossybrook Road Study Area would be similar to baseline conditions.

As described in Section 9.5.7.4, "Land Use and Zoning," the repair and rehabilitation would require the acquisition of an approximately 0.3-acre easement within a 5.5-acre parcel (Tax ID 70.3-6-41.110). The easement acquisition would not alter the obligation for payment of property taxes on the parcel. The landowner would continue to pay taxes on the full-assessed value of the property, and there should be no significant impact to the tax base. There is a single-family residence on the parent parcel, but the residential portion of the parcel would not be disturbed by the repair and rehabilitation. Lower Knolls Road, a public road, would be used to reach a traveled way through a forested area of the parent parcel in order to access the easement. No residences would be directly impacted, no residents would be required to vacate their dwelling at any time, and no significant disruption to the local community is expected as a result of the acquisition or implementation of the project. Therefore, tax burdens would not shift because of this proposed acquisition. Thus, it is not anticipated that displacement of businesses or residences would occur as a result of this acquisition.

Construction would occur within existing DEP-owned property and access would occur on a small portion of private property. Following construction, all equipment would be removed and the staging area would be restored to baseline conditions. For the 0.3-acre easement, the private landowner is expected to be able to continue their existing uses after the repair and rehabilitation. As a result, the repair and rehabilitation would not directly displace businesses (or employees) or residences.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to socioeconomic conditions within the Mossybrook Road Study Area.

9.5.7.6 Natural Resources

The natural resources study area is the area surrounding the limits of construction and downstream resources potentially affected by the Shaft 7 Leak, as shown on **Figure 9.5-50**.

Based on preliminary field visits conducted on January 23 and April 28, 2015, and a field visit conducted on June 14, 2016, the area surrounding the Shaft 7 Leak is best characterized as a successional northern hardwoods. At the base of a rock ledge, the leak forms as a series of seeps, which flow into a forested/emergent wetland.

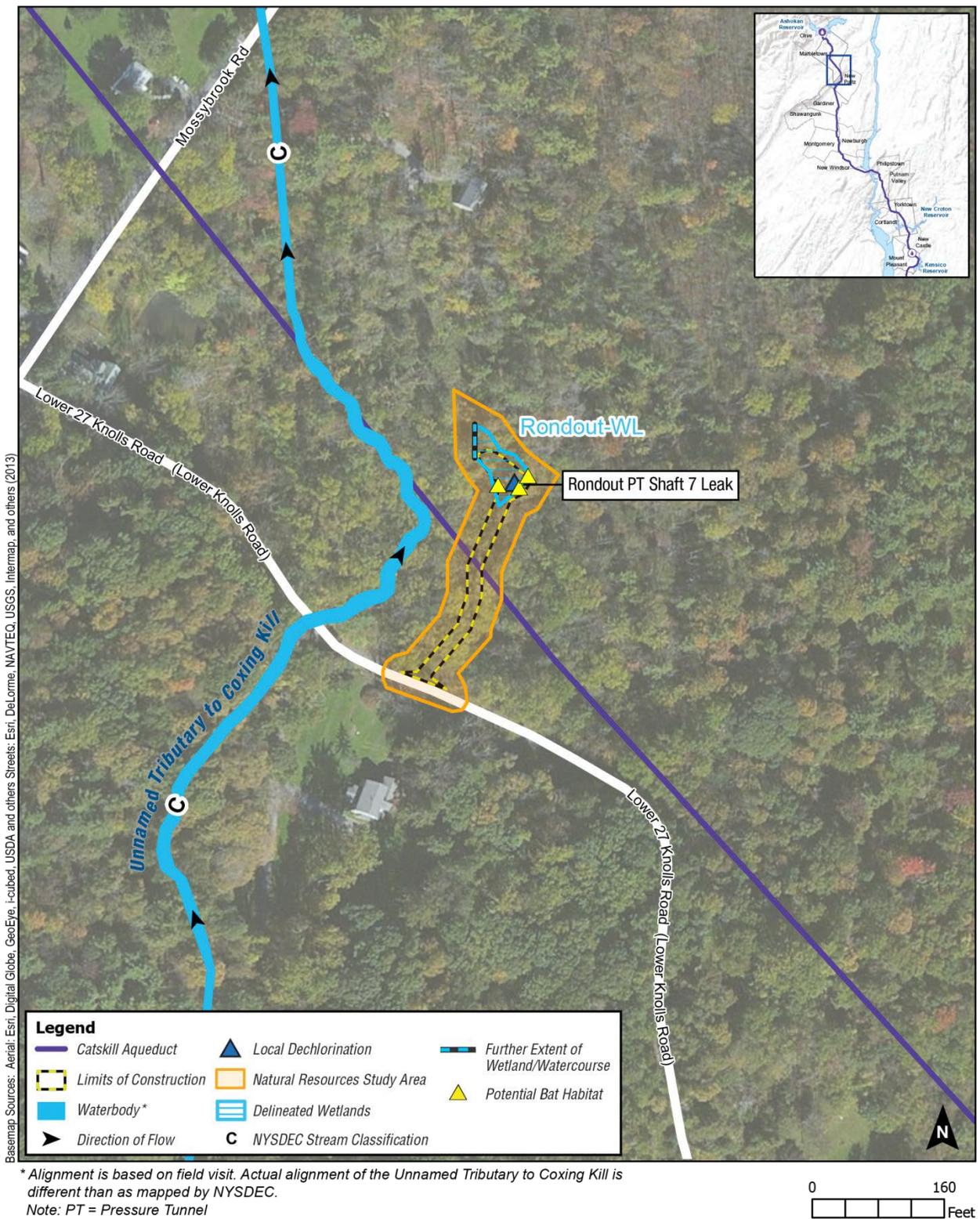


Figure 9.5-50: Natural Resources – Mossybrook Road Study Area



These habitats have the potential to support protected water resources, terrestrial resources, and wildlife species. Therefore, an analysis of the potential effects to natural resources that could result from the repair and rehabilitation is presented below. The potential for the repair and rehabilitation to result in changes to natural resources as a result of the proposed temporary chlorination at the Ashokan Screen Chamber is further analyzed in Section 9.19, “Project-wide Impact Analysis.”

Water Resources

The natural resources study area is within the lower Hudson River drainage basin, more specifically within the Coxing Kill-Rondout Creek subwatershed (HUC 020200070604) of the Rondout watershed (HUC 02020007).

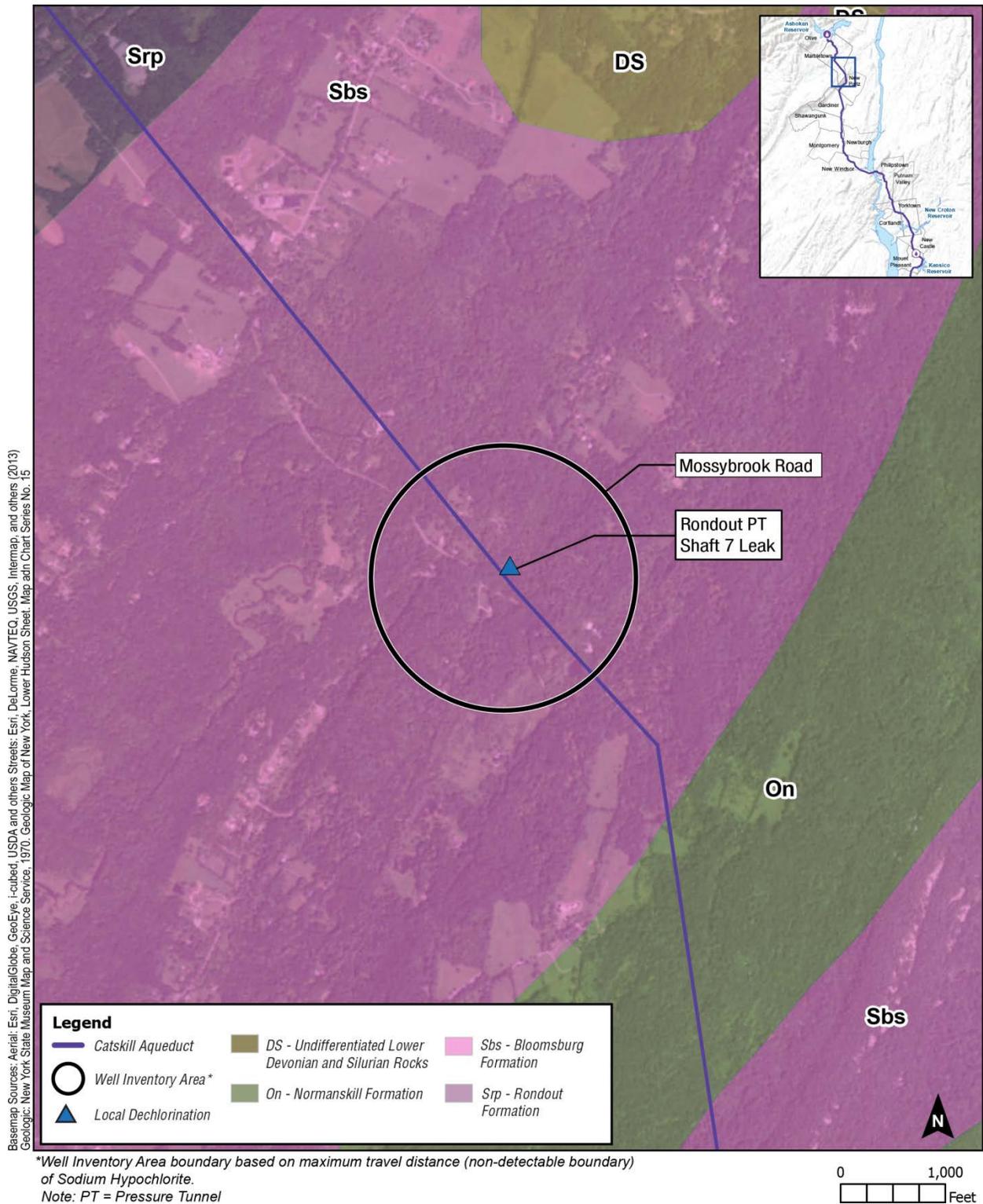
For this study area, groundwater was also assessed because leak repair is not feasible and water from the Shaft 7 Leak in the Rondout Pressure Tunnel could migrate through bedrock fractures and faults to interact with the native groundwater in the bedrock aquifer.

Water from the Shaft 7 Leak is formed by artificial water resources, and may not be jurisdictional under Sections 401 and 404 of the Clean Water Act. Installation of a passive dechlorination system would result in temporary disturbance. There is no defined leak flowpath. Diffuse flows are present as seeps from the base of a rock ledge that contribute to a wetland. The leak has been observed to diminish or cease to flow during occasional Catskill Aqueduct shutdowns. The wetland within the natural resources study area may be subject to federal jurisdiction given its size and possible hydrologic connection with an unnamed tributary to Coxing Kill that is northeast of the natural resources study area. There is no surface water within the natural resources study area. Furthermore, there are no water resources that would be subject to State Protection of Waters or Freshwater Wetlands regulations. Additionally, because the Town of Marbletown regulates NYSDEC wetlands, the activities associated with the repair and rehabilitation are not subject to local requirements (Marbletown Town Code Chapter 200: Zoning).

Groundwater

An unconsolidated aquifer and a bedrock aquifer underlie the Mossybrook Road Study Area. The unconsolidated aquifer is generally composed of groundwater held within permeable sand, gravel, and silt deposits, while the bedrock aquifer is generally composed of groundwater contained within fractures or pore-space of the bedrock. The unconsolidated aquifer is approximately 22 to 54 feet thick, with a water table elevation estimated to be near the surface, according to the Marbletown Aquifer Protection Study (Mid-Hudson 2005).

The bedrock aquifer is the deeper of the two aquifers in the natural resources study area. The bedrock formations include the High Falls Shale, the Shawangunk Sandstone/Conglomerate (historically referred to as “grit”), and the Hudson River Shale/Slate (Berkey 1911). The New York State Bedrock Geologic Map (see **Figure 9.5-51**) shows major formations but does not show the smaller secondary bedrock units. For example, the map shows the Rondout Formation but does not show divisions between its secondary geologic units. Visual observations made



Basemap Sources: Aerial: Esri, DigitalGlobe, GeoEye, i-cubed, USDA and others Streets: Esri, DeLorme, NAVTEQ, USGS, Intermap, and others (2013)
 Geological: New York State Museum Map and Science Service, 1970, Geologic Map of New York, Lower Hudson Sheet, Map adn Chart Series No. 15

Figure 9.5-51: Bedrock Geology - Mossybrook Road Study Area



during the construction of the Catskill Aqueduct provides a more detailed description of the bedrock geology, particularly those units that are only found at the depth of the aqueduct (i.e., Hudson River Shale/Slate) within the natural resources study area (see **Figure 9.5-52**) (Berkey 1911).

The amount of water leaking from the aqueduct into the surrounding bedrock is related to the HGL in the aqueduct. As the HGL increases, the amount of water leaking into the bedrock could also be increasing. The opposite would be true when the HGL decreases. This is demonstrated by the reduction in leak flow that has been measured when flow in the aqueduct is shut down and the HGL decreases over time.

Groundwater in the Mossybrook Road Study Area is used as a drinking water supply for local residents using water supply wells. Therefore, groundwater use is also further described in Section 9.5.7.8, “Water and Sewer Infrastructure.”

Wetlands

Based upon the field visits, a forested wetland receiving flows from the Shaft 7 Leak was identified in the northwestern portion of the natural resources study area and was delineated on June 14, 2016. The water resource name and area are shown in **Table 9.5-24**.

Table 9.5-24: Water Resources and Classifications within the Mossybrook Road Natural Resources Study Area

Water Resource	Area (Square Feet)	Length (Feet)	Cowardin Classification
Rondout-WL	3,140	NA	Palustrine Forested/Emergent, Persistent Vegetation, Saturated (PFO/EM1B)
Note: NA = Not Applicable.			

Wetland Rondout-WL

Wetland Rondout-WL is located where the Leak 7 expresses in the northwestern portion of the natural resources study area (see **Figure 9.5-50**). Based on U.S. Department of Agriculture (USDA) hydric soil data, topography, and the field visit, the on-site wetland extends outside of the natural resources study area to the northwest and southwest and is associated with the unnamed tributary to Coxing Kill, a NYSDEC Class C waterbody. Dominant vegetation within the wetland consists of field horsetail, skunk cabbage, sensitive fern, and bay forget-me-not (*Myosotis laxa*). The wetland continues outside of the natural resources study area and features a sparse tree canopy with a dense growth of common reed. The wetland would be best described as a “Palustrine Forested/Emergent, Persistent Vegetation, Saturated” system based on the Cowardin System (Cowardin et al. 1979) (see **Table 9.5-24**).

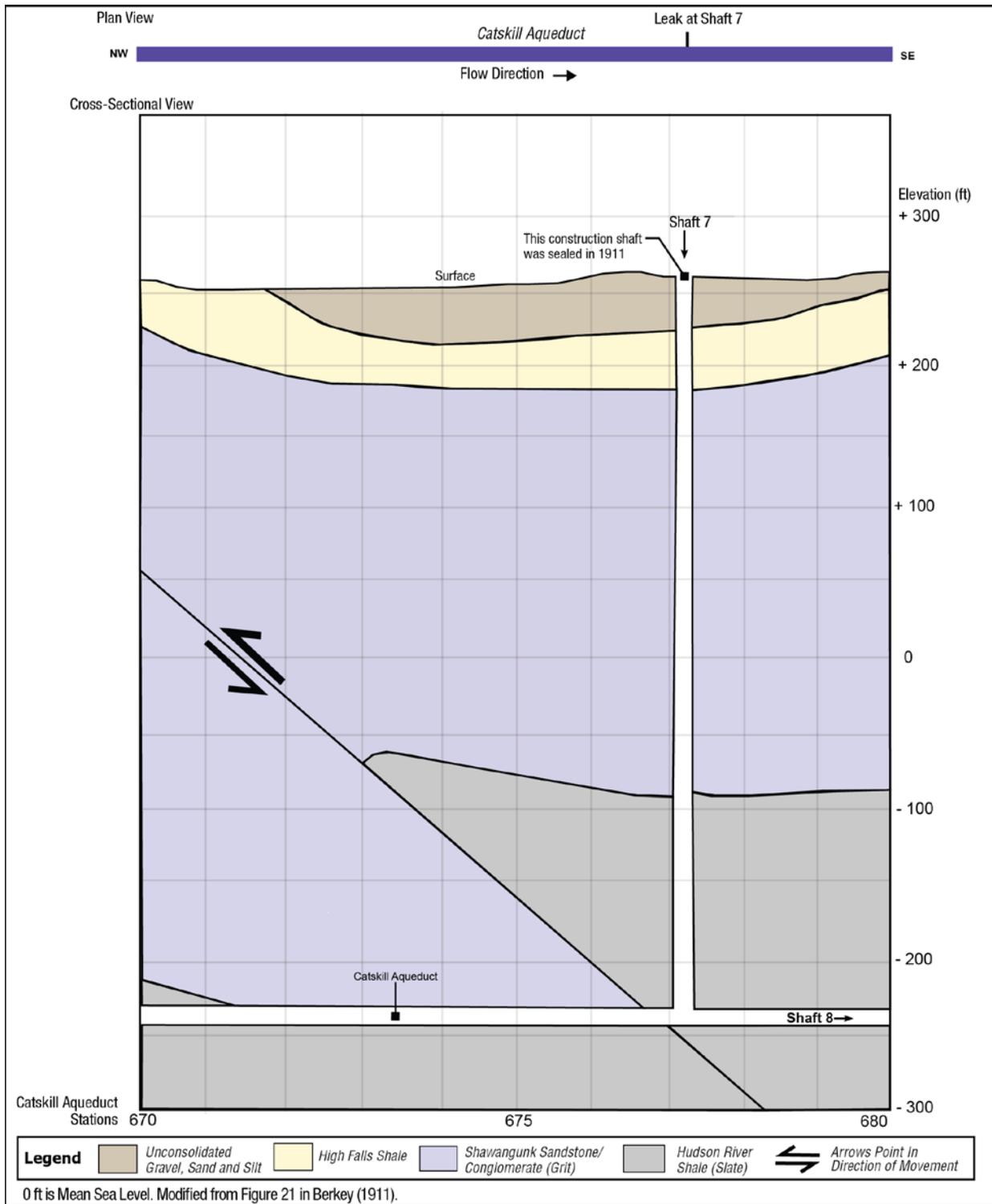


Figure 9.5-52: Generalized Geologic Cross-Section - Mossybrook Road Study Area



The upper 20 inches of soil is composed of clay loam, silty clay, and clay with a low chroma matrix and redoxomorphic features, which is indicative of wetland soils. Hydric soil indicators include the presence of stratified layers. Primary indicators of wetland hydrology include surface water, a high water table, saturation, oxidized rhizospheres on living roots (i.e., evidence of plant growth in soil with low or no oxygen), and a thin muck surface.

Wetland hydrology is anticipated to be primarily provided by contributions of surface runoff, groundwater flow from the surrounding forested area, and bankfull flows from the unnamed tributary to Coxing Kill. The Shaft 7 Leak also contributes to the wetland, but given the low leak flow (less than 10 gpm), is not anticipated to be a significant source of hydrology. There is no defined leak flowpath channel flowing through the wetland.

Future Without the Repair and Rehabilitation

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP's understanding that no projects or developments are anticipated within the natural resources study area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that the future conditions of water resources within the Mossybrook Road Study Area would be the same as baseline conditions.

Analysis of Potential Effect

This section analyzes the potential for temporary and permanent disturbance to water resources associated with the repair and rehabilitation and long-term operation of the Catskill Aqueduct in the Mossybrook Road Study Area.

Construction

Work activities related to the repair and rehabilitation have the potential to temporarily reduce vegetated areas and permanently alter groundwater and wetlands in the natural resources study area.

Groundwater

Localized construction dewatering may be necessary during construction to install the dechlorination system. This would result in a temporary depression of the water table near areas where shallow water would interfere with the dechlorination system installation. A temporary sump pit with bypass piping to a dewatering bag would be used to collect and divert water around the trenched location of the dechlorination system to keep the work area dry. It would also prevent sediment from entering downstream locations, specifically wetland Rondout-WL. Construction dewatering would be conducted in accordance with the SPDES General Permit for Stormwater Discharges from Construction Activities and other applicable regulatory requirements. Due to the short-term duration of construction within this study area (totaling 8 weeks over 2 months), there would be no measurable effect on shallow groundwater resources. Following construction, temporary chlorination of the Catskill Aqueduct would occur from 2019 through 2023, and the passive dechlorination system would be operated. The system would treat leak flows, and discharges would meet applicable regulatory requirements.

Groundwater quantity, level, and flow would be unchanged during temporary chlorination since this leak in the Rondout Pressure Tunnel would not be repaired. However, groundwater quality could change as chlorinated leak water mixes with, and travels within the groundwater in the bedrock aquifer. Changes in groundwater quality would occur along the leak water preferential pathways which may result from pre-existing geologic fault or fracture system, previous construction borings or Shaft 7 itself.

Wetlands

Repair and rehabilitation activities related to staging and access improvements and installation of the passive dechlorination system-would result in temporary discharges to wetlands.

Prior to commencement of the repair and rehabilitation, temporary sediment and erosion control measures, such as silt fencing, would be installed, maintained through construction, and checked and reinstalled as necessary to adequately protect adjacent water resources. Internal leak repair is not proposed for this study area because the Shaft 7 Leak is located in a pressure tunnel, where accessibility is limited.

To conduct the work, access improvements may be needed along an existing access path and a staging area adjacent to the wetland may be cleared. The Shaft 7 Leak is located directly adjacent to Wetland Rondout-WL. Heavy equipment would not be required during construction. Work would primarily be conducted on foot, resulting in minimal soil compaction within the surrounding wetland. The staging area would be restored following construction. However, access improvements would remain following installation of the passive dechlorination system.

Anticipated disturbance to water resources was quantified based on the limits of construction and proposed work activities (see **Table 9.5-25**). Activities associated with staging and access improvements and passive dechlorination system installation would result in approximately 1,880 square feet of temporary disturbance to Rondout-WL. Up to 90 square feet of permanent disturbance to water resources may occur as part of access improvements, though much of this disturbance may be avoided. Following construction, temporarily disturbed areas would be restored to natural conditions and planted with native vegetation.

Table 9.5-25: Estimated Disturbance to Water Resources within the Mossybrook Road Natural Resources Study Area

Water Resource	Baseline conditions (Square Feet)	Temporary Effects (Square Feet)	Permanent Effects (Square Feet)
Rondout-WL	3,140	1,880 <i>Access and staging improvements, and passive dechlorination system installation</i>	90 <i>Access improvements</i>

Temporary Chlorination

Temporary chlorination of the Catskill Aqueduct would occur from 2019 through 2023, and the passive dechlorination system would be operated so that all discharges meet regulatory requirements. Groundwater quantity, level, and flow would be unchanged during temporary

chlorination since this leak in the Rondout Pressure Tunnel of the Catskill Aqueduct would not be repaired. However, groundwater quality could change as chlorinated leak water mixes with, and travels within the groundwater in the bedrock aquifer. The potential impacts associated with water quality changes to the existing water infrastructure (water supply wells) and public health (drinking water) are analyzed and assessed in Section 9.5.7.8, “Water and Sewer Infrastructure,” and Section 9.5.7.12, “Public Health,” respectively.

Operation

When temporary chlorination is no longer required, operation of the Catskill Aqueduct would be consistent with baseline conditions. Operation of the temporary dechlorination systems would not be necessary. Groundwater resources within the Mossybrook Road Study Area would return to baseline conditions as any sodium hypochlorite, chlorine dioxide, and/or chlorine residuals would degrade relatively quickly as these react with native groundwater and migrate through the aquifer.

Water Resources Conclusions

Repair and rehabilitation work activities would include temporary disturbance to water resources. Construction staging and installation of the temporary dechlorination system would result in approximately 1,880 square feet of temporary disturbance to wetlands (Rondout-WL).

Temporary chlorination of the Catskill Aqueduct would occur from 2019 through 2023, and the passive dechlorination system would be operated so that all discharges meet regulatory requirements. Groundwater quantity, level, and flow would be unchanged, but groundwater quality would be affected as chlorinated leak water mixes with and travels within groundwater in the bedrock aquifer. The potential impacts associated with water quality changes to the existing water infrastructure (water supply wells) and public health (drinking water) are analyzed and assessed in Section 9.5.7.8, “Water and Sewer Infrastructure,” and Section 9.5.7.12, “Public Health,” respectively.

Once temporary chlorination ceases, operation of the Catskill Aqueduct would return to baseline conditions, the passive dechlorination system would be removed, and the study area would be restored to natural conditions, with the exception of the access road. Groundwater quality in the natural resources study area would quickly return to a pre-chlorination baseline, as any sodium hypochlorite, chlorine dioxide, and/or chlorine residual would degrade quickly as it reacts with native groundwater and soils. Therefore, the features characterizing the groundwater resources in the natural resources study area (i.e., groundwater levels and quantity, extent and connection between the aquifers, groundwater quality, and use of the groundwater resources for drinking water purposes) would be consistent with baseline conditions.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to water resources within the Mossybrook Road Study Area.

Terrestrial Resources

Within the natural resources study area, the community includes a forested/emergent wetland surrounded by successional northern hardwoods. This a broadly defined community that commonly occurs on abandoned agricultural fields and pastures (Edinger et al. 2014).

The dominant tree is eastern red-cedar (*Juniperus virginiana*). Smaller numbers of early successional hardwoods are present, including aspen (*Populus* spp.), elm (*Ulmus* spp.), ash (*Fraxinus* spp.), and black walnut (*Juglans nigra*). White pine (*Pinus strobus*) and basswood (*Tilia americana*) are also present near the leak. The sparse shrub layer consists of multiflora rose (*Rosa multiflora*), northern spicebush (*Lindera benzoin*) and tatarian honeysuckle (*Lonicera tatarica*). The groundcover consists of Japanese stiltgrass (*Microstegium vimineum*), garlic mustard (*Alliaria petiolata*), and dame's rocket (*Hesperis matronalis*). Ebony spleenwort (*Asplenium platyneuron*) and Christmas fern (*Polystichum acrostichoides*) were identified on the ledges and slopes near the leak.

Consultation with NYNHP identified one ecological community of significance: a hemlock-northern hardwood forest. Based on the ecological communities identified during field visits, there are no communities of significance present within the natural resources study area. During construction, tree removal is proposed. While the Town of Marbletown does not regulate the removal of trees associated with the repair and rehabilitation, terrestrial resources within the study area warrant analysis.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP's understanding that no new projects or developments that would affect terrestrial resources are anticipated within the Mossybrook Road Study Area within the timeframe of the impact analysis. Natural processes, such as changes in habitat due to natural vegetative succession, are anticipated to continue. Therefore, in the future without the repair and rehabilitation, it is assumed that terrestrial resources within the natural resources study area would be the same as baseline conditions.

Construction would include minor tree clearing and shrub removal for the purpose of improving site access and staging areas. It is estimated that within the limits of construction, approximately 1 tree would need to be removed. Tree removal would not change the character of the area or affect surrounding trees, and would be conducted from November 1 through March 31 to avoid impacts to Indiana bats (*Myotis sodalis*) and northern long-eared bats (*Myotis septentrionalis*).

Following construction, all equipment would be removed from the natural resources study area, and staging areas would be restored to natural conditions. Vegetated areas temporarily cleared during construction are anticipated to grow back with similar communities as baseline conditions. During temporary chlorination, chlorinated leak water would be treated at the Shaft 7 Leak. See Section 9.19. "Project-wide Impact Analysis" for an analysis of the potential impact at locations where chlorinated water from the aqueduct enters the surrounding environment.

Following the repair and rehabilitation, operation of the aqueduct would be consistent with baseline conditions, and the passive dechlorination system would be removed. Temporarily disturbed areas within the natural resources study area would be restored to natural conditions,

and natural reforestation and vegetative succession of aqueduct areas not routinely maintained would continue to occur over time.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to terrestrial resources within the Mossybrook Road Study Area.

Federal/State Threatened and Endangered Species and State Species of Special Concern

This section includes an analysis of potential impacts to federal/State Threatened and Endangered Species and State Species of Special Concern identified in Section 9.3.9, “Natural Resources,” as having the potential to be affected by activities within the natural resource study area. To identify those species that could be affected, species that could occur up to 0.25 mile from the work site were determined in consultation with USFWS, USACE, NYNHP, and NYSDEC, as well as county and local offices, as applicable.

As discussed in Section 9.3.9, “Natural Resources,” 14 species were identified to have the potential to be affected by the repair and rehabilitation within the natural resources study area. Therefore, conditions in the future without the repair and rehabilitation, an analysis of the potential for impacts to these 14 species, and a summary of conclusions on the potential effects resulting from the repair and rehabilitation are provided below.

In the future without the repair and rehabilitation, it is assumed that federal/State Threatened and Endangered Species and State Species of Special Concern within the study area would largely be the same as baseline conditions, other than possible changes in habitat due to natural vegetative succession and general anthropogenic influences.

An analysis of the potential for disturbance to federal/State Threatened and Endangered Species and State Species of Special Concern from the repair and rehabilitation within the natural resources study area is shown in **Table 9.5-26**. The analysis included an evaluation of the repair and rehabilitation work activities within the study area and field visits, as applicable.

Table 9.5-26: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern, and Habitats within the Mossybrook Road Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Amphibians and Reptiles					
Blue-spotted Salamander	<i>Ambystoma laterale</i>	Unlisted	Special Concern	Activities associated with the staging and access improvements, and passive dechlorination system would result in temporary disturbance to wetlands. However, perimeter silt fencing would limit disturbance to adjacent habitat. All discharges would meet applicable regulatory requirements, so there would be no disturbance to wetlands downstream of the passive dechlorination system. The work site would be restored to natural conditions following temporary chlorination, and the access improvements that remain would not impact habitat. Therefore, there are no effects anticipated and no further analysis for blue-spotted salamanders is warranted for this study area.	No
Bog Turtle	<i>Clemmys</i> [= <i>Glyptemys</i>] <i>muhlenbergii</i>	Threatened	Endangered	No suitable bog turtle habitat was observed. Perimeter silt fencing would limit disturbance to adjacent habitat and help prevent individuals from entering the study area. All discharges would meet applicable regulatory requirements, so there would be no disturbance to wetlands downstream of the passive dechlorination system. The work site would be restored to natural conditions following temporary chlorination and the access improvements that remain would not impact habitat. Therefore, there are no effects anticipated and no further analysis for bog turtles is warranted for this study area.	No
Eastern Box Turtle	<i>Terrapene carolina</i>	Unlisted	Special Concern	Potential habitat exists within the forested wetland and successional northern hardwoods. Any eastern box turtles that might otherwise use the area are expected to instead utilize similar, adjacent habitats during construction, as they are a highly mobile species. Furthermore, perimeter silt fencing would limit disturbance to adjacent habitat and prevent individual turtles from entering the work site. Finally, upon construction completion and temporary chlorination, the site would be restored to natural conditions and would not affect breeding, nesting, or foraging habitat. Therefore, there are no effects anticipated and no further analysis for eastern box turtles is warranted for this study area.	No

Table 9.5-26: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern, and Habitats within the Mossybrook Road Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Eastern Hognose Snake	<i>Heterodon platyrhinos</i>	Unlisted	Special Concern	Potential habitat exists within the successional northern hardwoods. If any potential habitat exists at the site, a variety of habitats would be available for the species' use in the vicinity. Perimeter silt fencing would also limit disturbance to adjacent habitat. Upon construction completion and temporary chlorination, the site would be restored to natural conditions and would not affect breeding, nesting, or foraging habitat. Therefore, there are no effects anticipated and no further analysis for eastern hognose snakes is warranted for this study area.	No
Jefferson Salamander	<i>Ambystoma jeffersonianum</i>	Unlisted	Special Concern	Activities associated with the staging and access improvements, and passive dechlorination system would result in temporary disturbance to wetlands. However, perimeter silt fencing would limit disturbance to adjacent habitat. All discharges would meet applicable regulatory requirements, so there would be no disturbance to wetlands downstream of the passive dechlorination system. The work site would be restored to natural conditions following temporary chlorination, and the access improvements that remain would not impact habitat. Therefore, there are no effects anticipated and no further analysis for Jefferson salamanders is warranted for this study area.	No
Jefferson Salamander Complex	<i>Ambystoma jeffersonianum x laterale</i>	Unlisted	Special Concern	Activities associated with the staging and access improvements, and passive dechlorination system would result in temporary disturbance to wetlands. However, perimeter silt fencing would limit disturbance to adjacent habitat. All discharges would meet applicable regulatory requirements, so there would be no disturbance to wetlands downstream of the passive dechlorination system. The work site would be restored to natural conditions following temporary chlorination, and the access improvements that remain would not impact habitat. Therefore, there are no effects anticipated and no further analysis for the Jefferson salamander complex is warranted for this study area.	No

Table 9.5-26: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern, and Habitats within the Mossybrook Road Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Marbled Salamander	<i>Ambystoma opacum</i>	Unlisted	Special Concern	Activities associated with the staging and access improvements, and passive dechlorination system would result in temporary disturbance to wetlands. However, perimeter silt fencing would limit disturbance to adjacent habitat. All discharges would meet applicable regulatory requirements, so there would be no disturbance to wetlands downstream of the passive dechlorination system. The work site would be restored to natural conditions following temporary chlorination, and the access improvements that remain would not impact habitat. Therefore, there are no effects anticipated and no further analysis for marbled salamanders is warranted for this study area.	No
Northern Cricket Frog	<i>Acris c. crepitans</i>	Unlisted	Endangered	Activities associated with staging and access improvements, and passive dechlorination system would result in temporary disturbance to wetlands. However, perimeter silt fencing would limit disturbance to adjacent habitat. All discharges would meet applicable regulatory requirements, so there would be no disturbance to wetlands downstream of the passive dechlorination system. The work site would be restored to natural conditions following temporary chlorination, and the access improvements that remain would not impact habitat. Therefore, there are no effects anticipated and no further analysis for northern cricket frogs is warranted for this study area.	No
Spotted Turtle	<i>Clemmys guttata</i>	Unlisted	Special Concern	Activities associated with the staging and access improvements, and passive dechlorination system would result in temporary disturbance to wetlands. However, perimeter silt fencing would limit disturbance to adjacent habitat and help prevent individuals from entering the study area. All discharges would meet applicable regulatory requirements, so there would be no disturbance to wetlands downstream of the passive dechlorination system. The work site would be restored to natural conditions following temporary chlorination, and the access improvements that remain would not impact habitat. Therefore, there are no effects anticipated and no further analysis for spotted turtles is warranted for this study area.	No
Timber Rattlesnake	<i>Crotalus horridus</i>	Unlisted	Threatened	According to records received from the NYNHP, there is a timber rattlesnake hibernaculum located 1.5 miles from the study area and therefore, timber rattlesnakes have the potential to migrate through or forage within the study area. Therefore, further analysis is warranted for this study area.	Yes. See further analysis below.

Table 9.5-26: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern, and Habitats within the Mossybrook Road Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Wood Turtle	<i>Glyptemys insculpta</i>	Unlisted	Special Concern	Potential habitat exists within the successional northern hardwoods. If any potential habitat exists at the site, a variety of habitats would be available for the species' use in the vicinity. Perimeter silt fencing would also help prevent individuals from entering the study area. Upon construction completion and temporary chlorination, the site would be restored to natural conditions and would not affect breeding, nesting, or foraging habitat. Therefore, there are no effects anticipated and no further analysis for wood turtles is warranted for this study area.	No
Birds					
Red-shouldered Hawk	<i>Buteo lineatus</i>	MBTA	Special Concern	No individuals were incidentally observed during the field visits on January 23, 2015 and April 28, 2015. During the June 14, 2016 site assessment, a Red-shouldered Hawk was observed flying over the site. Potential foraging, breeding, and nesting habitat could exist within the vicinity of the forested wetland in the study area. However, there was no evidence of a hawk nest or fledglings on the site. Temporary noise could discourage hawks from nesting in the immediate vicinity of the work site during construction. Although some individuals seem to be unaffected by human activity, most are secretive and avoid inhabited areas. Because the land surrounding the study area is remote and relatively uninhabited, there is abundant suitable habitat in the surrounding areas. During temporary chlorination, operation of the passive dechlorination system is unlikely to deter hawks from breeding or foraging in the study area. Therefore, there are no effects anticipated and no further analysis for Red-shouldered Hawks is warranted for this study area.	No
Mammals					
Indiana Bat	<i>Myotis sodalis</i>	Endangered	Endangered	A summer habitat survey was conducted on June 14, 2016. No bats were incidentally observed during these field visits. Potential bat roosting habitat includes three snags in the vicinity of Shaft 7 Leak. Therefore, further analysis is warranted for this study area.	Yes. See further analysis below.
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	Threatened	Threatened Unlisted	A summer habitat survey was conducted on June 14, 2016. NYNHP identified occurrences within 5 miles of the study area. No bats were incidentally observed during these field visits. Potential bat roosting habitat includes three snags in the vicinity of Shaft 7 Leak. Therefore, further analysis is warranted for this study area.	Yes. See further analysis below.
Note: MBTA: Migratory Bird Treaty Act					

Timber Rattlesnake (Crotalus horridus)

In the future with the repair and rehabilitation, work activities would predominantly occur on previously disturbed areas along the Catskill Aqueduct. According to records received from the NYNHP, there is a timber rattlesnake (*Crotalus horridus*) hibernaculum located 1.5 miles from the study area and therefore, timber rattlesnakes have the potential to migrate through or forage within the study area. Prior to commencing work, timber rattlesnakes, if noted to occur within the work site would be removed by a DEP Wildlife Specialist to areas with suitable habitat, and perimeter soil and erosion control measures would be erected to help prevent additional individuals from entering the work site. Vehicles entering and exiting the work site would take precaution to avoid timber rattlesnakes that could be basking on or traveling across on-site roads.

In summary, given the range of protective measures that would be in place for the duration of construction, as well as the schedule and temporary duration of the proposed activities, no effects are anticipated to timber rattlesnakes and their habitat. Therefore, the repair and rehabilitation may affect, but is unlikely to adversely affect, timber rattlesnakes in this study area.

Indiana Bat (Myotis sodalis)

A summer habitat survey was conducted in the study area on June 14, 2016. Three dead trees with dbhs of 7, 12, and 20 inches and having exfoliating bark were identified as having bat roosting potential (see **Figure 9.5-50**). In the future with the repair and rehabilitation, activities would be localized and confined to the immediate vicinity of Shaft 7. Repair and rehabilitation activities to construct the access road and passive dechlorination system would occur with minimal clearing of brush and trees where there could be potential roosting trees. Repair and rehabilitation activities would not result in significant loss or modification of roosting or foraging habitat for Indiana bats. It is estimated that one tree may be removed. Minor effects to wetlands would be possible, but foraging habitat would continue to be available in the canopy within the study area and in adjacent forested and wetland areas. There may be temporary noise that discourages Indiana bats from roosting in the immediate vicinity of the work site. However, there is abundant suitable habitat in the surrounding areas in which Indiana bats could roost. Any tree removal that is required would be limited to select trees along the access road, and would be conducted from November 1 through March 31 to avoid impacts to Indiana bats. Therefore, the repair and rehabilitation may affect, but is unlikely to adversely affect Indiana bats in this study area.

Northern Long-eared Bat (Myotis septentrionalis)

A summer habitat survey was conducted in the study area on June 14, 2016. Northern long-eared bats have been documented to roost in man-made structures. However, there are no structures within the study area that could be used by roosting bats. They are more commonly known to roost in trees (see the potential roosting habitat results for Indiana bats, above). Disturbance to these trees is anticipated to be avoided.

In the future with the repair and rehabilitation, activities would be localized and confined to the immediate vicinity of Shaft 7. Repair and rehabilitation activities to construct the access road and passive dechlorination system would occur with minimal clearing of brush and trees where there

could be potential roosting trees. Repair and rehabilitation activities would not result in significant loss or modification of roosting or foraging habitat for northern long-eared bats. It is estimated that one tree may be removed. Minor effects to wetlands would be possible, but foraging habitat would continue to be available in the canopy within the study area and in adjacent forested and wetland areas. There may be temporary noise that discourages northern long-eared bats from roosting in the immediate vicinity of the work site. However, there is abundant suitable habitat in the surrounding areas that northern long-eared bats could use for roosting and foraging. Tree removal would be limited to select trees along the access road, and would be conducted from November 1 through March 31 to avoid impacts to northern long-eared bats. Therefore, the repair and rehabilitation may affect, but is unlikely to adversely affect northern long-eared bats in this study area.

Federal/State Threatened and Endangered Species and State Species of Special Concern Conclusions

Based on the impact analysis, no take is anticipated. There would be no anticipated effects to blue-spotted salamanders (*Ambystoma laterale*), bog turtles (*Clemmys [=Glyptemys] muhlenbergii*), eastern box turtles (*Terrapene carolina*), eastern hognose snakes (*Heterodon platyrhinos*), Jefferson salamanders (*Ambystoma jeffersonianum*), Jefferson salamander complex (*Ambystoma jeffersonianum x laterale*), marbled salamanders (*Ambystoma opacum*), northern cricket frogs (*Acris c. crepitans*), spotted turtles (*Clemmys guttata*), wood turtles (*Glyptemys insculpta*), or Red-shouldered Hawks (*Buteo lineatus*) associated with the repair and rehabilitation. Repair and rehabilitation may affect, but is not likely to adversely affect, timber rattlesnakes, Indiana bats, and northern long-eared bats.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to federal/State Threatened and Endangered Species or State Species of Special Concern within the Mossybrook Road Study Area.

9.5.7.7 Hazardous Materials

To evaluate the potential presence of hazardous materials within the Mossybrook Road Study Area, a Phase I ESA was conducted in general conformance with the scope and limitations of ASTM Practice E 1527-13 and CEQR requirements to identify RECs. The Phase I ESA included site reconnaissance, research on current/historical use, and review of federal and State regulatory listings for both the site and neighboring properties within the appropriate search distance defined in the ASTM standard.

Based on the Phase I ESA investigations at the work site within this study area, there was no indication of an environmental impact that would constitute a REC as defined by the ASTM standard that would affect activities in the study area. Additionally, there is no history of contamination at or in the vicinity of Mossybrook Drive Study Area where repair and rehabilitation work activities would be located. Furthermore, the proposed excavation area for the passive dechlorination system at the leak site would occur on a previously disturbed section of the Catskill Aqueduct. Given the findings of previous subsurface investigation along similar portions of the aqueduct corridor, no subsurface ground contamination is anticipated.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP's understanding that no developments or structures that would introduce hazardous materials to the environment are anticipated within the Mossybrook Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that the presence of hazardous materials within the Mossybrook Road Study Area would be the same as baseline conditions.

In the future with the repair and rehabilitation, work activities would potentially require storage and use of a variety of petroleum and other chemical products, such as diesel fuel for back-up power, lubricating oil for construction vehicles, and miscellaneous cleaning and maintenance chemicals. The use and storage of these products would be in accordance with applicable regulatory requirements and guidelines, including those relating to federal Spill Prevention, Control, and Countermeasures requirements; and State petroleum bulk storage, chemical bulk storage, and spill reporting requirements. Furthermore, the proposed excavation area for the passive dechlorination system at the leak would occur on a previously disturbed section of the Catskill Aqueduct. During temporary chlorination, activated carbon filters, which are inert and are used for treating drinking water, would be used as part of the passive dechlorination system to treat chlorinated leak water. Following the repair and rehabilitation, the passive dechlorination system would be removed, the site would be restored to baseline conditions, and operation of the Catskill Aqueduct would be consistent with baseline conditions.

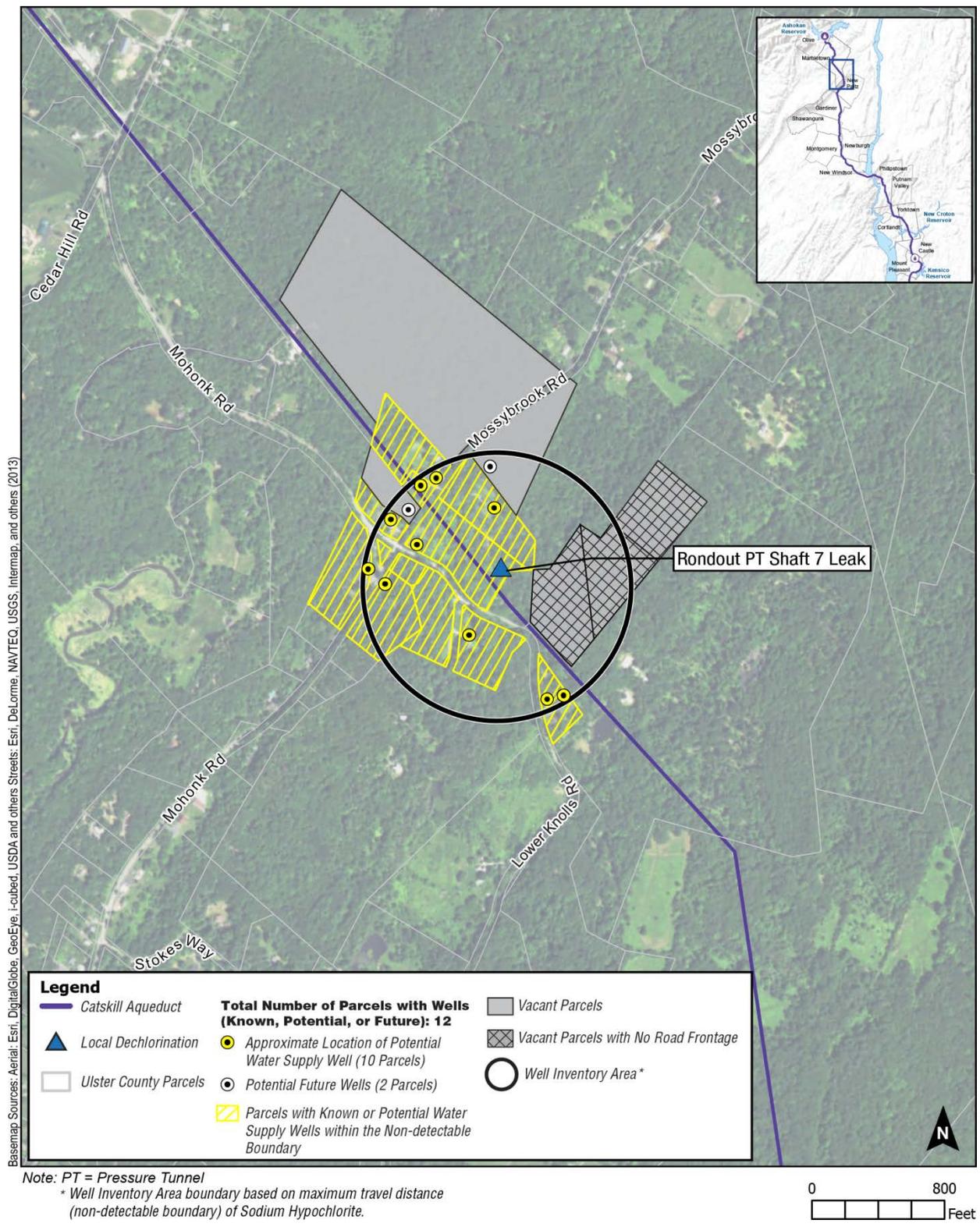
Therefore, the repair and rehabilitation would not result in significant adverse impacts from the presence or disturbance of hazardous materials within the Mossybrook Road Study Area.

9.5.7.8 Water and Sewer Infrastructure

The repair and rehabilitation has the potential to affect private water supply systems within the Mossybrook Road Study Area. Discharges generated from the repair and rehabilitation are discussed in Section 9.19, "Project-wide Impact Analysis."

Residents in the study area rely on private water supply wells, as there are no municipal water supply systems in the study. A typical home in Ulster County uses an individual supply well in either the unconsolidated or bedrock aquifer. Although less common, it is not unusual to find shallower sources of drinking water in older homes in rural areas, such as shallow dug wells, shallow well points, or springs.

An inventory of private supply wells was completed to estimate the number of wells that may be affected by the leak. The well inventory was completed in the area defined by the maximum distance that sodium hypochlorite, chlorine dioxide, and/or chlorine residuals may be found in the groundwater during temporary chlorination of the aqueduct (the methodology for estimating the distance is described further in Section 9.3.11.2, "Impact Analysis Methodology"). Twelve parcels were identified in the area that contain known, potential or future wells based on a review of GIS aerial imagery and town tax billing information. Ten parcels currently contain or may contain private drinking water supply wells (see **Figure 9.5-53**). An additional two (2) parcels were identified to have the potential for future wells if the parcels were developed.



Basemap Sources: Aerial, Esri, DigitalGlobe, GeoEye, i-cubed, USDA and others Streets: Esri, DeLorme, NAVTEQ, USGS, Intermap, and others (2013)

Figure 9.5-53: Area Well Inventory - Mossybrook Road Study Area



Most wells on these parcels are presumed to be in the bedrock aquifer as the bedrock aquifer is capable of yielding adequate quantities of groundwater and the unconsolidated aquifer is thin and lower yielding than the bedrock aquifer (Mid-Hudson 2005).

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP's understanding that no new projects or developments are anticipated within the natural resources study area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that the future conditions of the water supply infrastructure would be the same as baseline conditions.

In the future with the repair and rehabilitation, work activities would occur while the aqueduct is in service. Installation of the passive dechlorination system would not affect existing water or sewer systems. Internal leak repair is not proposed for this study area because the Shaft 7 Leak is located in a pressure tunnel, where accessibility is limited. Repairs would be challenging due to the depth of the aqueduct and the need to contain a highly pressurized leak at this location.

During temporary chlorination, changes to groundwater quality could occur as chlorinated water from the aqueduct leak would enter the bedrock aquifer. This could have a temporary effect on groundwater quality in private water supply wells. Private water supply wells would require treatment to lower the concentration of sodium hypochlorite, chlorine dioxide, and/or chlorine residuals to non-detectable levels. Further discussion of the effect of chlorinated water on private drinking water supply wells is found in Section 9.5.7.12, "Public Health."

Following temporary chlorination, groundwater quality in the Mossybrook Road Study Area would quickly return to a pre-chlorination baseline condition, since any levels of sodium hypochlorite, chlorine dioxide, and/or chlorine residuals would degrade quickly as these react with native groundwater and soils. Operation of the Catskill Aqueduct within the study area would be consistent with baseline conditions.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to water and sewer infrastructure within the Mossybrook Road Study Area.

9.5.7.9 Transportation

The study area for the transportation analysis consists of the major convergent roadways that would potentially be used by the employee and construction vehicles associated with repair and rehabilitation work activities en route to and from the Mossybrook Road Study Area.

Access to the repair and rehabilitation limits of construction for the work site within the Mossybrook Road Study Area would be via Mossybrook Road to Lower Knolls Road (see **Figure 9.5-45**). Mossybrook Road and Lower Knolls Road are two-way local roadways. To the extent available, construction vehicles would travel on truck-permitted roadways directly to and from the Mossybrook Road Study Area. There is no public transportation and little to no pedestrian activity in the immediate vicinity of the study area. Under current operations, DEP employees access the site periodically. However, there are no DEP employees who work at or visit the study area on a daily basis, and the small number of DEP employee vehicles has little to no effect on traffic conditions within the study area.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP's understanding that no changes in land use or an increase in traffic due to outside developments are anticipated within the Mossybrook Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that traffic, public transportation, and pedestrian activities within the study area would be similar to baseline conditions.

Repair and rehabilitation work activities within the Mossybrook Road Study Area were evaluated to determine which would have the potential to generate the most vehicle trips and therefore be the basis of this transportation analysis. Of these activities, local staging and access improvements would generate the most vehicle trips. Local staging and access improvements would occur in summer ~~2019~~2018 between 7 AM and 5 PM, Monday through Friday, for approximately 1 week.

In the future with the repair and rehabilitation, construction vehicles would access the site via Mossybrook Road. The estimated number of peak-day one-way vehicle trips associated with the passive dechlorination system installation is 7 vehicle trips, or approximately 14 peak-day vehicle round trips that would travel to and from the study area. The majority of the peak daily vehicle round trips, approximately 8 vehicle round trips or 8 PCEs, would be workers traveling directly to and from the staging area, with an additional 2 daily shuttle trips between the study area and the staging area. The remaining approximately 4 peak-day vehicle round trips (7 PCEs) would be trucks or other construction vehicles.

During a peak day, the estimated number of peak-hour vehicle trip ends associated with passive dechlorination system installation is approximately 7 peak-hour vehicle trip ends (9 PCEs). This includes approximately 4 vehicle trip ends (4 PCEs) from workers traveling directly to and from the staging area, approximately 1 peak-hour shuttle trip between the study area and the staging area, and approximately 2 vehicle trip ends (4 PCEs) from trucks or other construction vehicles. For the purpose of this analysis, the peak-hour project-generated vehicles are anticipated to coincide with typical construction hours for employee vehicles entering the site. Assuming one, 10-hour shift, this would be from 6 AM to 7 AM, and would be unlikely to coincide with the peak hour for existing traffic. Following construction, operation of the passive dechlorination system would generate occasional vehicle trips as DEP employees periodically monitor and maintain the system through 2023; however, fewer than the *CEQR Technical Manual* screening threshold of 50 peak-hour PCEs would be generated during this period.

In total, the repair and rehabilitation would result in approximately 9 peak-hour PCEs within the Mossybrook Road Study Area, which is below the *CEQR Technical Manual* screening threshold of 50 peak-hour PCEs as described in Section 9.3.13, "Transportation." The work activities at the Mossybrook Road Study Area would be short-term (totaling 2 weeks over 1 month; see **Table 9.5-23**) and would not generate public parking or transportation demands or pedestrian activity within the Mossybrook Road Study Area. Following completion of the repair and rehabilitation, traffic patterns would return to baseline conditions.

Therefore, although there would be a minor temporary increase in traffic, the repair and rehabilitation would not result in significant adverse impacts to transportation within the Mossybrook Road Study Area.

9.5.7.10 Noise

As described in Section 9.3.15, “Noise,” mobile noise associated with the repair and rehabilitation within the Mossybrook Road Study Area does not warrant analysis. This section includes an analysis of potential impacts from stationary noise associated with the repair and rehabilitation to sensitive receptors within the study area.

The study area for the noise analysis is the area within 1,500 feet of the repair and rehabilitation work site as shown on **Figure 9.5-54**.

The Mossybrook Road Noise Study Area includes residential parcels within 1,500 feet of the repair and rehabilitation activities that are considered noise-sensitive receptors for this analysis. The temporary work activities were evaluated to disclose potential noise levels at the nearest residence. While the Town of Marbletown does not have a noise code applicable to the Mossybrook Road Study Area, there are noise-sensitive receptors within the study area that warrant an analysis.

Existing ambient noise levels within the Mossybrook Road Study Area are influenced by vehicular traffic traveling on Mossybrook Road, Lower Knolls Road, and other local roadways. The existing noise levels within the study area are comparable to the levels in a very quiet suburban and rural residential environment, based on the distance from major transportation corridors, the population density of the area, and the presence of other noise-producing elements. Typical noise levels (measured as L_{eq}) for very quiet suburban and rural communities are 40 dBA during the daytime and 34 dBA during the nighttime.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP’s understanding that no major projects that would result in a change in land use, or new noise-generating sources that would contribute to an increase in ambient noise levels are anticipated within the Mossybrook Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that ambient noise levels within the Mossybrook Road Study Area would be similar to baseline conditions.

In the future with the repair and rehabilitation, stationary noise-producing work activities within the Mossybrook Road Study Area would occur at one site. The stationary noise-generating equipment that would be used within the Mossybrook Road Study Area was evaluated to determine which work activity would have the potential to emit the most noise and, therefore, be the basis of this stationary noise analysis. Of the activities, the stationary noise-generating equipment associated with the installation of the passive dechlorination system would emit the most noise. Passive dechlorination system installation would occur in summer ~~2019~~2018 between the hours of 7 AM and 5 PM, Monday through Friday, for approximately 1 week prior to the second 10-week shutdown.

The noise analysis focused on the three loudest stationary noise-generating equipment types necessary for the installation of the passive dechlorination system. Associated equipment reference noise levels are shown in **Table 9.5-27**. The types of noise-generating equipment analyzed were conservatively based on peak construction operating conditions.

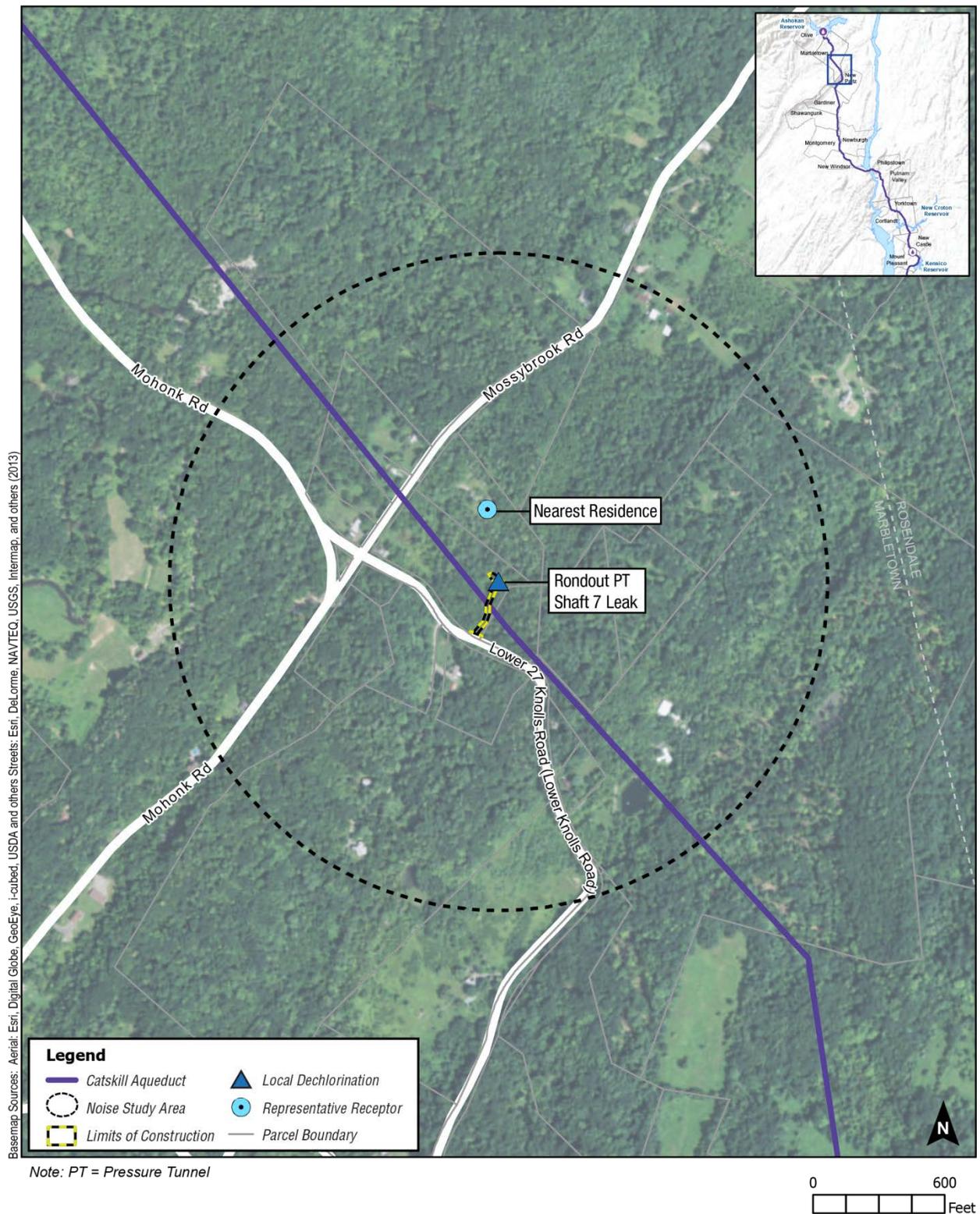


Figure 9.5-54: Noise - Mossybrook Road Study Area



Table 9.5-27: Stationary Source Construction Equipment Modeled at the Mossybrook Road Study Area - Noise Analysis and Reference Noise Levels (L_{eq})

Equipment Type	Reference Noise Level (L_{eq}) at 50 feet (dBA) ¹
Excavator	81
Generator	82
Backhoe	76
Note: ¹ City Environmental Quality Review (CEQR) Technical Manual, Chapter 22.	

Passive dechlorination system installation within the Mossybrook Road Study Area during the repair and rehabilitation could produce a noise level (L_{eq}) of approximately 69 dBA at the nearest residence, approximately 335 feet away from the passive dechlorination system installation.

Following completion of the repair and rehabilitation activities, the construction equipment and vehicles would be removed from the Mossybrook Road Study Area. The repair and rehabilitation activities would be temporary, with the peak work activities occurring during passive dechlorination system installation in summer ~~2019~~2018 for a limited period (1 week, see **Table 9.5-23**).

Therefore, although there would be a temporary increase in noise, noise from the repair and rehabilitation would not result in significant adverse impacts to sensitive receptors within the Mossybrook Road Study Area.

9.5.7.11 Neighborhood Character

The character of the Mossybrook Road Study Area is largely defined by a mix of residential, public services, and vacant land uses and its physical setting within a rural location (see **Figure 9.5-48**). The study area is bounded by Mossybrook Road to the north and traversed by Lower Knolls Road, which roughly parallels the aqueduct. An unnamed tributary to Coxing Kill, itself a tributary to Rondout Creek, flows from south to north across the western portion of the study area. The work site is located in a residentially zoned area on private property.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP’s understanding that no changes in land use and no new projects or structures are anticipated within the Mossybrook Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that neighborhood character within the study area would be similar to baseline conditions.

As described in Section 9.3.16, “Neighborhood Character,” there would be no potential for the repair and rehabilitation to affect shadows and urban design. In addition, based on the screening assessment for open space and recreation, historic and cultural resources, and visual resources, an impact analysis for the Mossybrook Road Study Area was not warranted, as discussed in the following sections: Section 9.3.6, “Open Space and Recreation,” Section 9.3.7, “Historic and Cultural Resources,” and Section 9.3.8, and “Visual Resources.” As described in Section 9.5.7.4,

“Land Use and Zoning,” and Section 9.5.7.5, “Socioeconomic Conditions,” the work activities would not affect land use and zoning and socioeconomic conditions in the Mossybrook Road Study Area. Furthermore, the public policy impact analysis provided in Section 9.5.2, “Town of Marbletown Impact Analysis,” concluded the work activities were consistent with applicable plans.

As described in Sections 9.5.7.9, “Transportation,” and 9.5.7.10, “Noise,” the work activities in the Mossybrook Road Study Area would be short-term (intermittently over 1 month) and would result in a temporary increase in traffic and noise. Following completion of the repair and rehabilitation, the construction equipment and vehicles would be removed from the study area and traffic patterns would return to baseline conditions. These temporary increases in traffic and noise levels would not result in a density of activity or service conditions that would affect the overall character of the study area.

The repair and rehabilitation would not generate significant adverse effects in: land use, zoning, and public policy; socioeconomic conditions; open space and recreation; shadows; historic and cultural resources; urban design and visual resources; transportation; or noise.

Therefore, there would be no significant adverse impacts related to neighborhood character from the repair and rehabilitation within the Mossybrook Road Study Area.

9.5.7.12 Public Health

As described in Section 9.5.7.6, “Natural Resources,” and Section 9.5.7.8, “Water and Sewer Infrastructure,” the repair and rehabilitation would not result in significant adverse impacts to water levels and quantity.

Groundwater results obtained during a shutdown of the Catskill Aqueduct indicated that the water at the leak site contains measureable levels of sulfate, chloride, alkalinity, conductivity, turbidity, total organic carbon, iron, aluminum, calcium, manganese, and hardness. The baseline groundwater chemistry in the Mossybrook Road Study Area is typical of groundwater found elsewhere in Ulster County as described in the USGS Water Supply Paper 1985, Ground-Water Resources of Orange and Ulster Counties, New York. Despite the baseline groundwater chemistry results, a change in flows at the Shaft 7 site was observed during a shutdown of the Catskill Aqueduct in 2015, indicating it is likely influenced by a leak in the Rondout Pressure Tunnel.

Repair and rehabilitation work activities could result in a temporary increase in levels of sodium hypochlorite, chlorine dioxide, and/or chlorine residuals in the local groundwater during the temporary chlorination period.

Sodium hypochlorite and chlorine dioxide (the two oxidants that would be used for chlorination of aqueduct water) are widely used disinfectants in municipal water supply systems. These compounds will be used at doses that are below the NYSDOH maximum residual disinfectant levels of 0.8 mg/L of chlorine dioxide and 4.0 mg/L of chlorine as sodium hypochlorite. However, private residential wells are currently not disinfected by either oxidant. Sodium hypochlorite, chlorine dioxide, and potential chlorine residuals are regulated in drinking water.

Therefore, the distance that sodium hypochlorite or chlorine dioxide could travel from a leak was analyzed to assess potential effects on private drinking water supply wells. As described in Section 9.3.17, “Public Health,” an analytical solution was used to determine the distance that chlorinated water would travel in a bedrock fracture, similar to the fault or boring that may be transmitting leak water to the Shaft 7 Leak.

In addition to the presence of sodium hypochlorite, chlorine dioxide, and/or chlorine residuals, private wells may also be affected by DBPs present in leak water that has been chlorinated. The primary DBPs formed as a result of sodium hypochlorite addition are THMs and HAAs while those associated with the addition of chlorine dioxide are chlorite and chlorate. Use of chlorine dioxide may also result in the presence of chloride in leak water. Concentrations of these DBPs would vary depending on the oxidant, its dose, and water quality conditions but would remain below any applicable regulatory levels. Some, like HAAs, would be anticipated to biodegrade as water moves through the soil before reaching the private wells. In addition, the presence of these compounds in the water does not present a taste or odor concern. Further analysis of DBPs and the measures aimed at monitoring and minimizing any potential changes to characteristics of Catskill Aqueduct water as a result of temporary chlorination are presented in Section 9.19, “Project-wide Impact Analysis.”

The maximum doses of sodium hypochlorite or chlorine dioxide that would be introduced at the chlorination facility at the Ashokan Screen Chamber are 1.25 mg/L and 0.8 mg/L, respectively. However, it should be noted that the maximum doses of these chemicals would be used for a short time period after the initiation of chlorination in order to reduce existing levels of biofilm, and lower doses between 0.25 and 0.50 mg/L would subsequently be used to limit the biofilm reoccurrence. Use of sodium hypochlorite is anticipated during the winter, and use of chlorine dioxide is anticipated during the summer to reduce the formation of DBPs. Using the seasonal-dependent decay rates computed for the nearby High Falls Community Tap (selected due to its proximity to the leak site) and the projected maximum doses at the point of introduction, residual levels of sodium hypochlorite or chlorine dioxide in the aqueduct at the leaks would be approximately 0.79 mg/L and 0.54 mg/L, respectively, based upon the maximum doses of these two chemicals that would be used. The minimum concentration of chlorine that can be measured by conventional analytical techniques is 0.01 mg/l. Any remaining concentrations below that value are undetectable in drinking water.

Results of the analytical solution indicate that at a leak rate of 100 gpm, a sodium hypochlorite concentration of 0.01 mg/l could travel a maximum of approximately 800 feet. A chlorine dioxide concentration of 0.01 mg/L at the same leak rate could travel a maximum of approximately 650 feet (see **Figure 9.5-55**). If the actual leak rate is less, the distances at which either oxidant travels will be less. For example, a leak of 10 gpm would result in detectable levels sodium hypochlorite or chlorine dioxide at maximum distances of approximately 250 feet and 200 feet, respectively, from the aqueduct (see Section 9.3.17, “Public Health” for a discussion of the leak flow at depth). These distances were based upon the maximum doses of sodium hypochlorite (1.25 mg/L) and chlorine dioxide (0.8 mg/L). As noted previously, these maximum doses would be short term. Much lower doses would be used to limit the reoccurrence of biofilm and, therefore, would be anticipated to travel lesser distances from the aqueduct leaks.

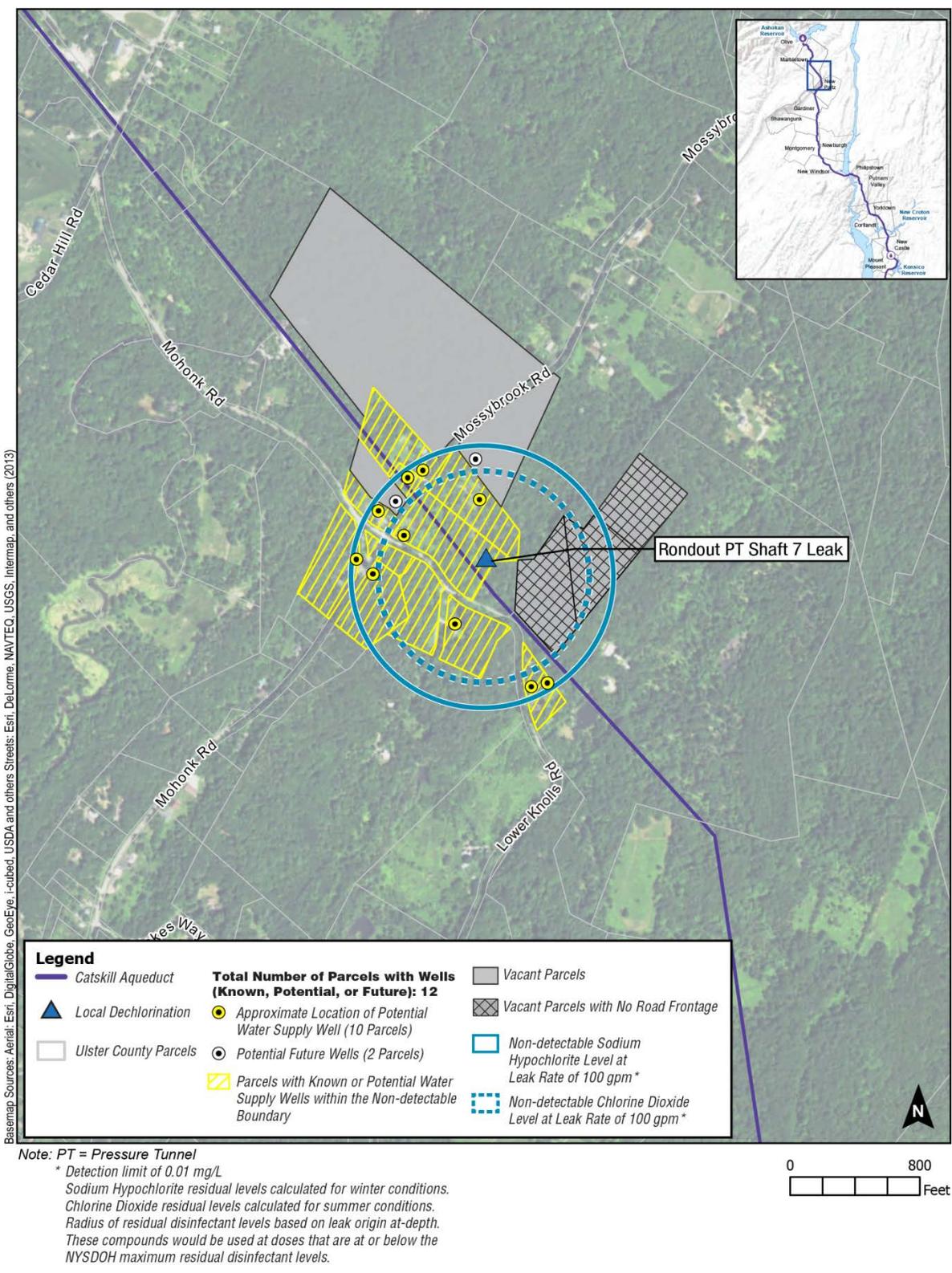


Figure 9.5-55: Potential Travel Distance of Chlorinated Water from Aqueduct Leak at Depth – Mossybrook Road Study Area



These distances would be the furthest likely extent of chlorinated groundwater flow. Although sodium hypochlorite, chlorine dioxide, and/or chlorine residuals may be reliably measured at very low levels if present at this distance, no health effects would occur at these concentrations since they are well below acceptable limits for drinking water. In addition, these estimates are likely conservative. Since the geology of the Mossybrook Road Study Area likely contains a complex series of interconnected fractures, the groundwater would be anticipated move slower than indicated by the analytical solution, allowing more time for any sodium hypochlorite, chlorine dioxide, and/or chlorine residuals to break down. Likewise, these distances were also calculated based upon the maximum doses of sodium hypochlorite and chlorine dioxide that would be used.

During temporary chlorination, sodium hypochlorite and chlorine dioxide (as well as chlorine residuals) could be measured in groundwater up to approximately 800 feet and 650 feet outward from the leak location, depending on the leak flow. Based on these estimates, several private drinking water supply wells could exhibit elevated levels of sodium hypochlorite, chlorine dioxide and/or chlorine residuals. As shown on **Figure 9.5-55**, there is the potential for detectable levels of sodium hypochlorite, chlorine dioxide and/or chlorine residuals to migrate to up to 12 parcels with known, potential or future potential private drinking water supply wells within the Mossybrook Road Study Area. Ten of these parcels currently have structures with potential wells. Two of these parcels are vacant parcels that may be developed in the future and could require a private drinking water supply wells.

Once the chlorinated leak water reaches the bedrock aquifer, it would react chemically with the native groundwater. Water chemistry analysis conducted in 2015 for the Shaft 7 Leak indicated measurable quantities of manganese, iron, and sulfate at this leak. These naturally occurring compounds would likely accelerate the breakdown of any sodium hypochlorite, chlorine dioxide, and/or chlorine residuals and slow the transport of residuals in the groundwater. The rate at which that breakdown would occur and how it affects the migration would depend on many factors, including the concentration of sodium hypochlorite, chlorine dioxide, and/or chlorine residuals in the leak water.

Because the quality of groundwater in the study area could change as a result of the chlorination of aqueduct water and potentially affect drinking water supply wells, DEP commits to implementing a Well Action Plan. DEP would coordinate with property owners to implement the Action Plan elements, as applicable and necessary. See Section 9.19, "Commitments," for details on the Well Action Plan for the Mossybrook Road Study Area. The Action Plan would include obtaining well characteristics, monitoring and providing treatment or alternate water supply, if needed. DEP would also coordinate with current and/or future landowners of vacant parcels that could contain, or be developed to contain, private drinking water supply wells that could be developed before or during the temporary chlorination of the aqueduct.

Following the repair and rehabilitation, the passive dechlorination system at the leak and any point-of-use treatment systems for drinking water supply wells would be removed. The aqueduct would no longer contain chlorinated water that could leak into the bedrock aquifer groundwater in the Mossybrook Road Study Area, and operation of the Catskill Aqueduct would be consistent with baseline conditions. Groundwater would return to baseline conditions, as any sodium

hypochlorite, chlorine dioxide and/or chlorine residuals would degrade relatively quickly as these react with native groundwater and migrate through the aquifer.

Based on the analyses above, the repair and rehabilitation would not result in significant adverse impacts to groundwater.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to public health within the Mossybrook Road Study Area.

9.5.8 LOWER KNOLLS ROAD STUDY AREA IMPACT ANALYSIS

Within the Lower Knolls Road Study Area, the aqueduct transitions from the Rondout Pressure Tunnel to the Bonticou Grade Tunnel. This transition occurs via a deep vertical shaft at the Rondout Pressure Tunnel Uptake Chamber (Rondout Uptake Chamber), which is equipped with a boathole to the south (see **Figure 9.5-56**).

Work activities within the Lower Knolls Road Study Area would include: staging and access improvements; biofilm removal and condition assessment; and air vent installation.

9.5.8.1 Study Area Location and Description

The Lower Knolls Road Study Area is located along the upper Catskill Aqueduct in the Town of Marbletown. The Catskill Aqueduct traverses the study area in a general northwest to southeast direction. Lower 27 Knolls Road (Lower Knolls Road) intersects the western portion of the study area. The proposed work site within the study area is located in the area surrounding the Rondout Uptake Chamber. Access would be provided by an existing access road that connects to Lower Knolls Road. The study area boundary is located approximately 400 feet beyond the outermost areas of disturbance related to the work site and associated access route. **Figure 9.5-56** shows an aerial photograph of the study area, including the path of the aqueduct and the limits of construction. **Figure 9.5-57** shows photographs of the study area.

There is one site listed on the National Register of Historic Places, the Lake Mohonk Mountain House Complex (NR Number 90NR02849), located within the southwest portion of the Lower Knolls Road Study Area. There are no other local, State, or federally designated landmarks, historic districts, or known archeological resources within the study area.

9.5.8.2 Proposed Activities within the Lower Knolls Road Study Area

To support activities within the Lower Knolls Road Study Area, the Ashokan Screen Chamber (within the Ashokan Screen Chamber Study Area in the Town of Olive) would serve as a primary staging area from which workers would be transported to the site daily. Several secondary staging areas would provide additional parking, and equipment and materials would be staged on site. Erosion and sediment control measures such as silt fencing and hay bales would be installed at the perimeter of the work site as needed. A site plan showing a layout of the limits of construction for the work site, which would occupy a total of approximately 1.1 acres, is shown on **Figure 9.5-58**. The schedule for work within the study area is shown in **Table 9.5-28**. The duration of active construction within the Lower Knolls Road Study Area is estimated to total 16 weeks over 1.5 years.

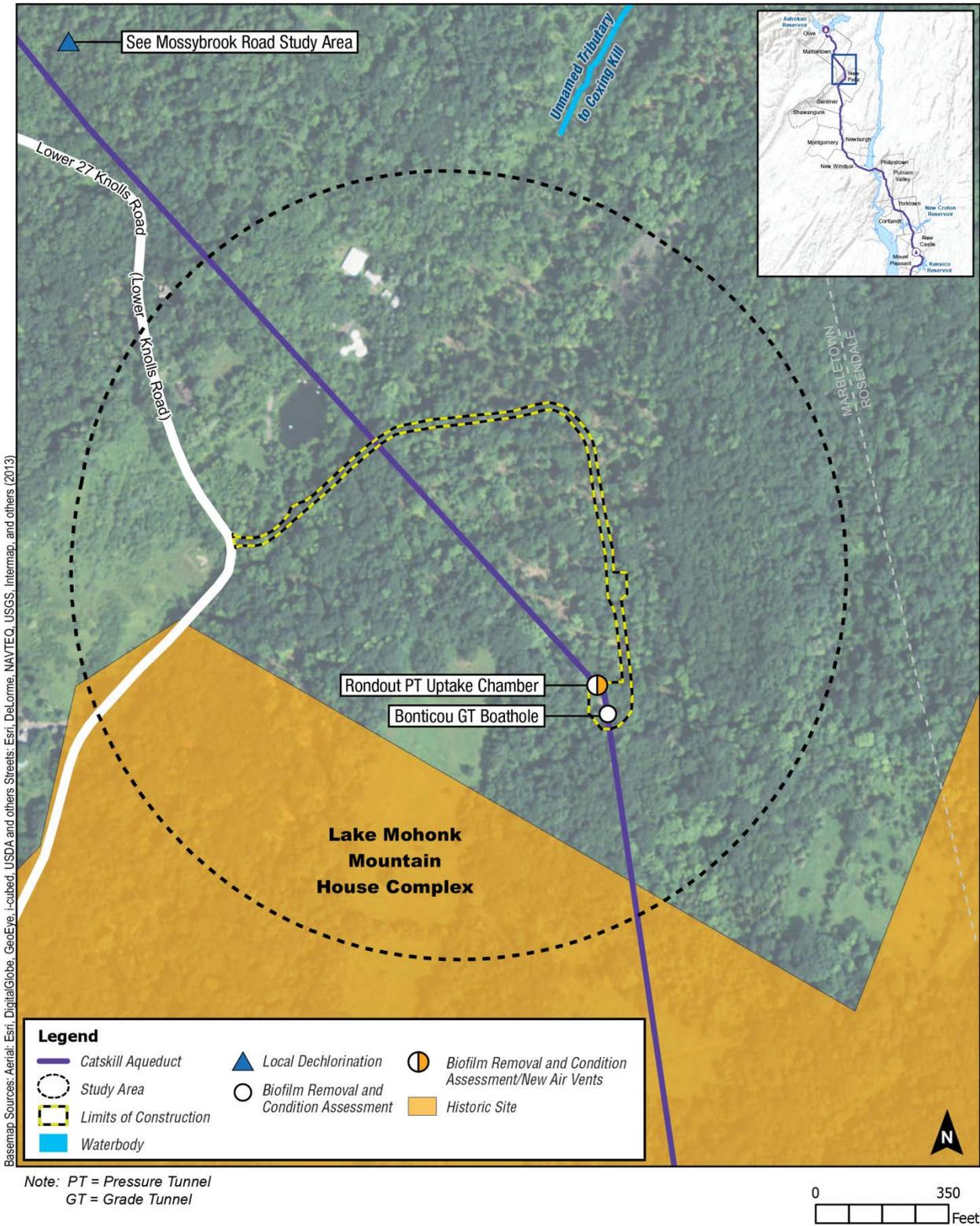


Figure 9.5-56: Study Area – Lower Knolls Road





Photograph 1: Rondout Uptake Chamber ground opening.



Photograph 2: Rondout Uptake Chamber looking southeast.

Figure 9.5-57: Photographs – Lower Knolls Road Study Area



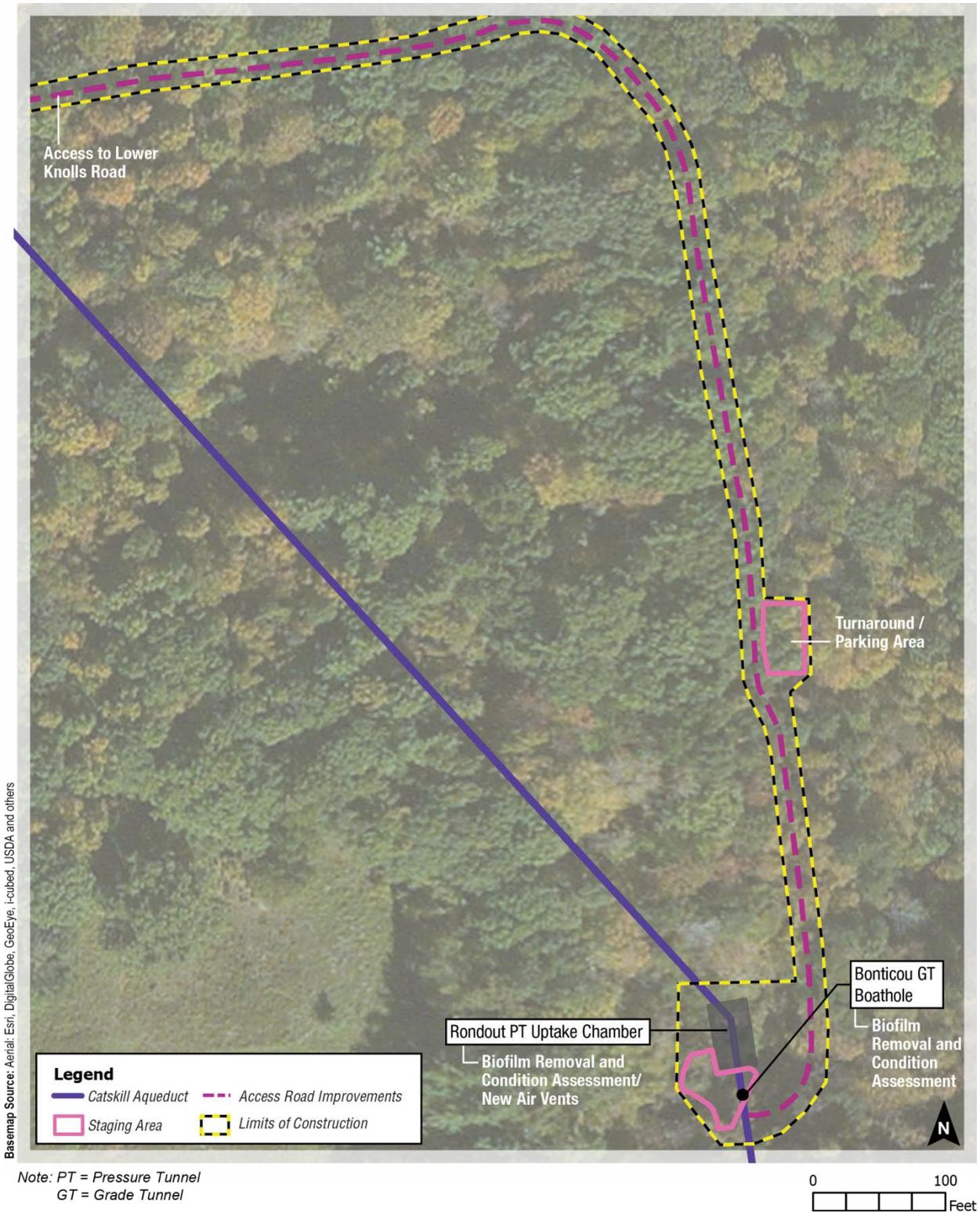


Figure 9.5-58: Site Plan – Lower Knolls Study Area



Table 9.5-28: Schedule of Work Activities within the Lower Knolls Road Study Area

Work Activity	Dates	Duration	Work Hours	Crew Size ¹
Staging and Access Improvements ²	Summer 2019 2018	4 weeks	Monday to Friday, 7 AM to 5 PM	8
Air Vent Installation	Fall 2019 2018 (Second 10-week shutdown)	3 weeks	7 days a week, 7 AM to 7 PM	8
Biofilm Removal and Condition Assessment	Fall 2020 2019 (Third 10-week shutdown)	9 weeks	7 days a week, 7 AM to 7 PM	21

Notes:
¹ Crew size refers to the number of people anticipated at the work site(s).
² Tree removal would be conducted from November 1 through March 31 to avoid impacts to Indiana bats (*Myotis sodalis*) and northern long-eared bats (*Myotis septentrionalis*).

Work in the study area would begin with staging and access improvements in summer ~~2019~~2018. Improvements from Lower Knolls Road to the Rondout Uptake Chamber would entail grading and the removal of up to 13 trees, grading for a truck turnaround, underbrush clearing, and gravel placement for leveling and erosion control.

Following the access improvements, air vent installation would occur. Three air vent structures would be delivered to the site and mounted on a concrete slab, which would replace an existing removable concrete slab on top of the Rondout Uptake Chamber. Minor excavation of approximately 18 inches of soil may be required to access the existing opening.

Biofilm removal and condition assessment would occur during the third 10-week shutdown in fall ~~2020~~2019, with the existing boathole at the Rondout Uptake Chamber providing access into the aqueduct. It would also serve as a collection point for biofilm, which would be transported for disposal at a registered, permitted, or otherwise authorized facility. Although the aqueduct would be unwatered during this shutdown, any residual water would be diverted through an internal bypass pipe around the work segments within the aqueduct for discharge to the aqueduct downstream. Any residual water that does not meet water quality standards, and any wash water generated from biofilm removal would then be transported to a temporary treatment system, where it would be treated to meet water quality standards for discharge back into the aqueduct or to a nearby waterbody (see Section 9.2, “Project Description”). Upon completion of biofilm removal and condition assessment, all equipment and materials would be removed, and any areas requiring temporary disturbance would be restored to baseline conditions.

Impact categories analyzed for the Lower Knolls Road Study Area are presented in Sections 9.5.8.3, “Land Use and Zoning,” through 9.5.8.11, “Neighborhood Character,” and include land use and zoning; socioeconomic conditions; historic and cultural resources; visual resources; natural resources, consisting of terrestrial resources and federal/State Threatened and Endangered Species and State Species of Special Concern; hazardous materials; transportation; stationary noise; and neighborhood character. Additionally, the study area’s compatibility with applicable public policies was analyzed on a town-wide basis in Section 9.5.2, “Town of

Marbletown Impact Analysis.” As described in Section 9.3, “Screening Assessment and Impact Analysis Methodology,” an impact analysis related to community facilities and services; open space and recreation; the remaining natural resources subcategories including water resources, geology and soils, aquatic and benthic resources, wildlife, federal/State Candidate Species, and unlisted rare and vulnerable species; water and sewer infrastructure; energy; air quality; and mobile noise within the study area is not warranted. Finally, impacts related to project-wide natural resources, water and sewer infrastructure, and public health were analyzed within Section 9.19, “Project-wide Impact Analysis.”

9.5.8.3 Land Use and Zoning

The study area is primarily undeveloped land dominated by forest, consisting of residential, commercial, and vacant land uses. Access to the work site would require crossing two privately owned parcels with permission from the owners. **Figure 9.5-59** shows a map of the land uses in the study area and its surroundings.

The study area is within the residential (A-4) zoning district as designated by the Town of Marbletown Zoning Code (see **Figure 9.5-60**). The residential (A-4) zoning district provides for 4-acre residential zoning. The Catskill Aqueduct is a permitted use as a water supply utility within residential (A-4) zoning district.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP’s understanding that no major projects or programs are planned that would change land use or zoning within the Lower Knolls Road Study Area within the timeframe of the repair and rehabilitation impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that land use and zoning within the Lower Knolls Road Study Area would be similar to baseline conditions.

The proposed repair and rehabilitation includes the acquisition of an easement on approximately 0.25 acre of land within portions of a 72.4-acre parcel in the Town of Marbletown, identified on the Ulster County Tax Map as Tax ID 70.3-6-46. The land use within the proposed easement area is residential and zoned A-4 by the Town of Marbletown Zoning Code. DEP has an existing easement of unspecified width over the majority of the existing road. This easement acquisition seeks to formalize the width of the City’s easement at 50 feet, and to extend the easement over another branch of the road approximately 225 feet in length. The portion of the property affected by the easement would not include any existing buildings. The easement would preclude the landowner from any activity that would interfere with or be inconsistent with the rights conveyed to the City, but would not impose any other restrictions on the landowner’s use of the existing road. Acquisition of the easement would be consistent with existing land uses, conform to existing zoning regulations, and would not result in residential or business displacement.

Following construction, all equipment would be removed from the Lower Knolls Road Study Area and staging areas would be restored to baseline conditions. Operation of the Catskill Aqueduct would be consistent with baseline conditions and would conform with adjacent land uses and zoning. In addition, the proposed acquisition of the 0.25-acre easement and the access requirements are not anticipated to result in a significant adverse land use impact to the owner.

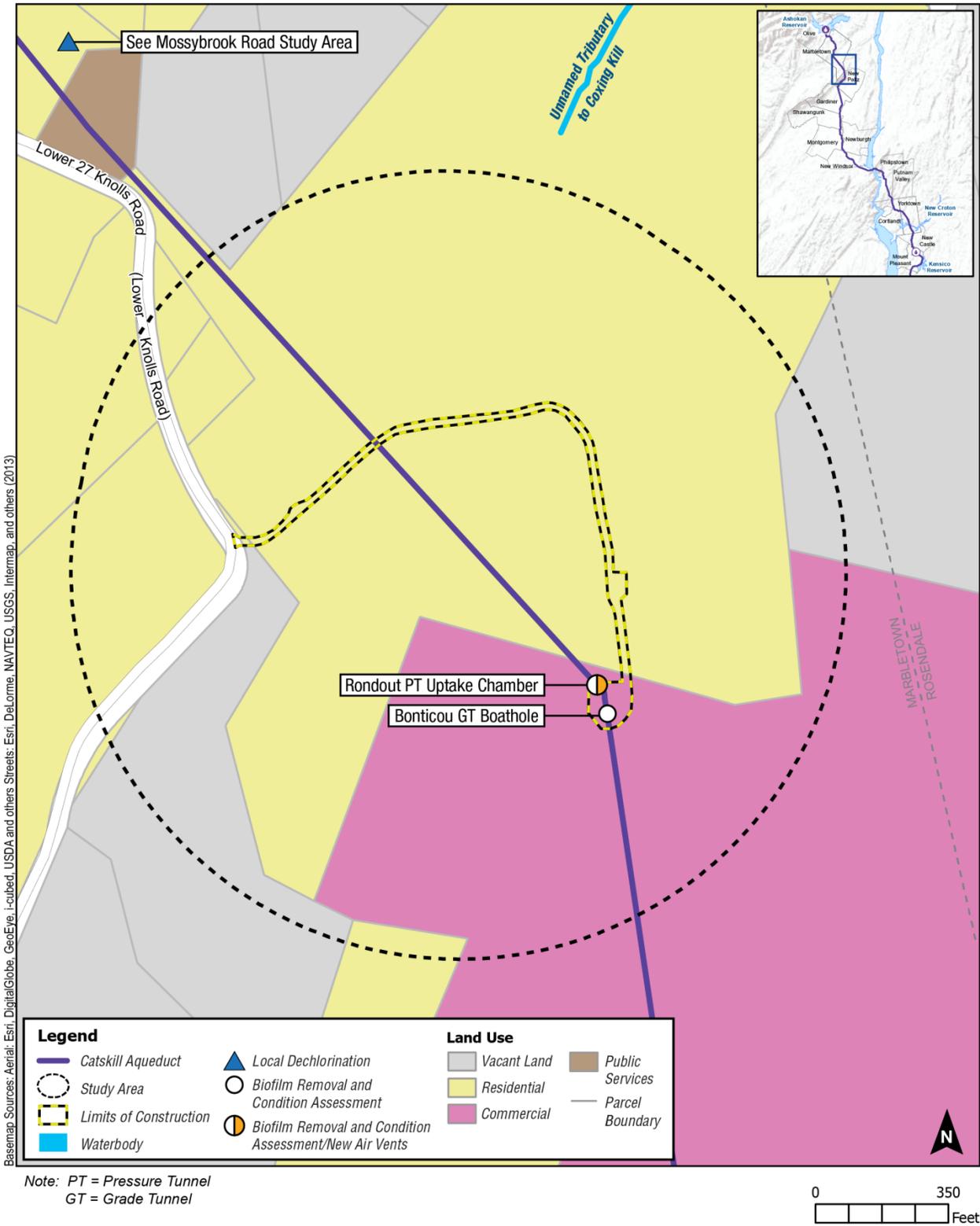


Figure 9.5-59: Land Use – Lower Knolls Road Study Area



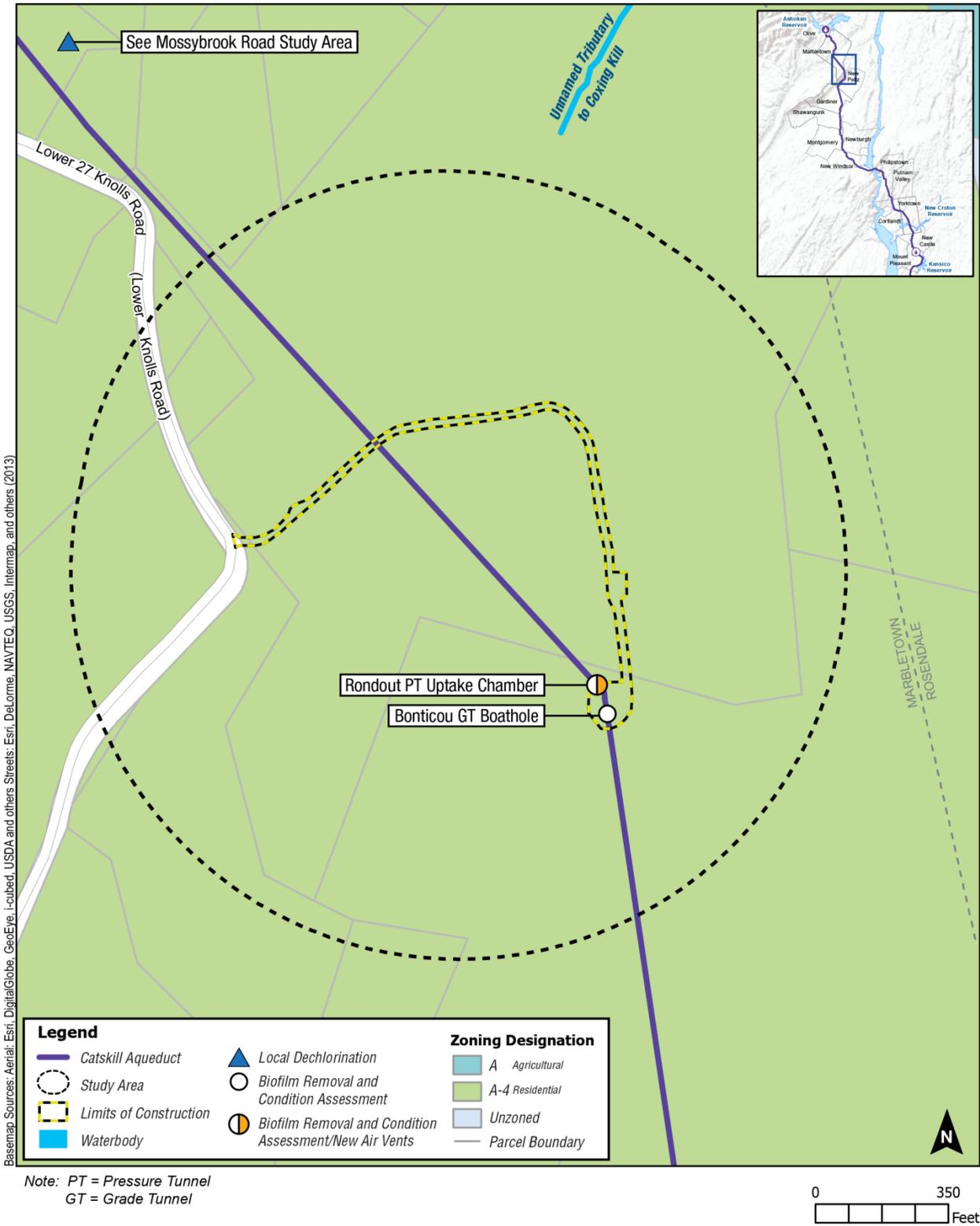


Figure 9.5-60: Zoning – Lower Knolls Road Study Area



As such, the property affected by the easement is expected to be able to continue its existing use after the repair and rehabilitation. The permanent easement would not result in any housing or business displacement and overall, there would be no change to land use and zoning. Furthermore, by not affecting land use, the permanent easements would be in compliance with the Town of Marbletown code related to open space preservation.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to land use or zoning within the Lower Knolls Road Study Area.

9.5.8.4 Socioeconomic Conditions

The study area is primarily undeveloped land dominated by forest, consisting of residential, commercial, and vacant land uses (see **Figure 9.5-59**). Access to the work site would require crossing two privately owned parcels with permission from the owners.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP's understanding that no major projects or programs are planned within the Lower Knolls Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that land use, population, housing, and economic activity within the Lower Knolls Road Study Area would be similar to baseline conditions.

As described in Section 9.5.8.3, "Land Use and Zoning," the repair and rehabilitation would require the acquisition of an approximately 0.25-acre easement within a 72.4-acre parcel (Tax ID 70.3-6-46). The easement acquisition would not alter the obligation for payment of property taxes on the parcel. The landowner would continue to pay taxes on the full-assessed value of the property, and there should be no significant impact to the tax base. Therefore, tax burdens would not shift because of this proposed acquisition. Thus, it is not anticipated that displacement of businesses or residences would occur as a result of the acquisition.

Construction would occur within existing DEP-owned property and access would occur on a small portion with private property. Following construction, all equipment would be removed and the staging areas would be restored to baseline conditions. For the 0.25-acre easement, the private landowner is expected to be able to continue their existing uses after repair and rehabilitation. As a result, the repair and rehabilitation would not directly displace businesses (or employees) or residential homes.

Therefore, repair and rehabilitation would not result in significant adverse impacts to socioeconomic conditions within the Lower Knolls Road Study Area.

9.5.8.5 Historic and Cultural Resources

As shown on **Figure 9.5-61**, there is one site listed on the National Register of Historic Places, the Lake Mohonk Mountain House Complex (NR Number 90NR02849), within the southwest portion of the Lower Knolls Road Study Area. The Lake Mohonk Mountain House Complex totals approximately 7,500 acres and includes the Lake Mohonk Mountain House, which is also a National Historic Landmark. The Lower Knolls Road Study Area contains within it 15 acres of

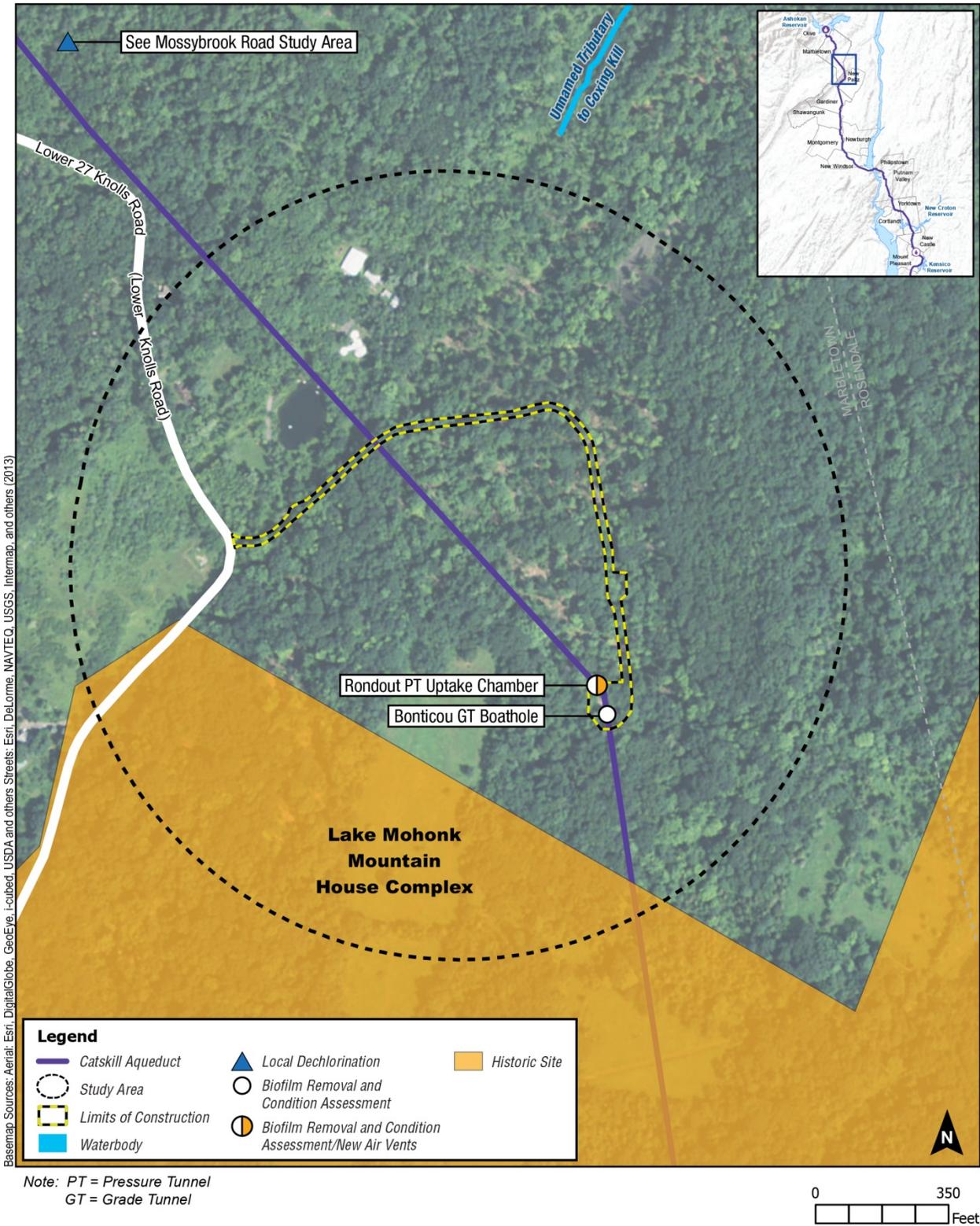


Figure 9.5-61: Historic and Cultural Resources – Lower Knolls Road Study Area



the Lake Mohonk Mountain House Complex. However, the historic Lake Mohonk Mountain House Resort is approximately three miles from the Rondout Pressure Tunnel Uptake Chamber. Neither the Rondout Uptake Chamber, nor the access road and staging areas associated with the installation of three air vents, are located within the Lake Mohonk Mountain House Complex.

Areas of previous disturbance associated with construction of the Catskill Aqueduct were identified and compared to the potential for ground disturbance within the Lower Knolls Road Study Area to determine if the repair and rehabilitation could affect archeological resources.

In the future without the repair and rehabilitation, it is assumed that historic and cultural resources within the Lower Knolls Road Study Area would be the same as baseline conditions.

The Lower Knolls Road Study Area is not located in an area with the potential to contain archeological resources. All work activities would be located within the areas of previous soil disturbance. Work activities would not affect the Lake Mohonk Mountain House Complex. SHPO concurred and concluded in letters dated April 17, 2015 and July 6, 2015 that there were no concerns regarding potential impacts to historic or archeological resources associated with the repair and rehabilitation work activities within the study area, and no additional archeological investigations are necessary. Work activities would occur on previously disturbed soils.

Following completion of the repair and rehabilitation work activities, construction equipment and vehicles would be removed from the study area, and temporary staging areas would be restored to baseline conditions. The new air vents at the Rondout Uptake Chamber are permanent structures that would remain following construction. The repair and rehabilitation within the Lower Knolls Road Study Area would not result in new permanent structures or additions to existing structures within the Lake Mohonk Mountain House Complex because the new air vents would be located outside this area. Following the repair and rehabilitation within the Lower Knolls Road Study Area, operation of the Catskill Aqueduct would be consistent with baseline conditions and would not affect historic and cultural resources.

In addition, based on this analysis, the repair and rehabilitation within the Lower Knolls Road Study Area would be compliant with the Town of Marbletown Code, Chapter 128, Heritage and Preservation, discussed in Section 9.3.3.3, "Town Codes."

Therefore, although there is one site within the Lower Knolls Road Study Area listed under the National or State Register of Historic Places, the repair and rehabilitation would not result in significant adverse impacts related to historic and cultural resources within the Lower Knolls Road Study Area.

9.5.8.6 Visual Resources

The study area for the visual resources analysis is the area within the Lower Knolls Road Study Area. It also includes view corridors that extend beyond the study area based on the locations that are publicly accessible.

One visual resource, consisting of the Lake Mohonk Mountain House Complex that is listed on the National Register of Historic Places, was identified within the Lower Knolls Road Study Area, as shown on **Figure 9.5-61**. As noted, approximately 15 acres of the approximately

7,500 acre Lake Mohonk Mountain House Complex are located within the southwestern portion of the Lower Knolls Road Study Area. The Rondout Uptake Chamber is not located within the Lake Mohonk Mountain House Complex. The Rondout Uptake Chamber and temporary staging area are located within a densely vegetated area, with no views of the Rondout Uptake Chamber from the Lake Mohonk Mountain House Complex.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP's understanding that no new projects or structures that would alter views from visual or aesthetic resources are anticipated within the Lower Knolls Road Study Area within the timeframe of the impact analysis. Natural processes, such as changes in habitat due to natural vegetative succession, are anticipated to continue. Therefore, in the future without the repair and rehabilitation, it is assumed that visual resources within the Lower Knolls Road Study Area would be the same as baseline conditions.

During construction, the repair and rehabilitation work activities would be short-term (intermittently over 1.5 years, see **Table 9.5-28**) and would not affect the Lake Mohonk Mountain House Complex. SHPO concurred in letters dated April 17, 2015 and July 6, 2015. While some tree removal is required for the construction staging area, this would not greatly detract from the aesthetics of the area because the staging area would be screened from view by the surrounding forested land.

Following completion of the repair and rehabilitation work activities, the construction equipment and vehicles would be removed and the staging areas would be restored to baseline conditions. The new air vents at the Rondout Uptake Chamber are permanent structures that would remain following construction. Following the repair and rehabilitation within the Lower Knolls Road Study Area, operation of the Catskill Aqueduct would be consistent with baseline conditions and would not result in changes to the future visual and aesthetic resource conditions of the views to the Lake Mohonk Mountain House Complex.

In addition, based on this analysis, the repair and rehabilitation within the Lower Knolls Road Study Area would be compliant with the Town of Marbletown Code, Chapter 128, Heritage and Preservation, discussed in Section 9.3.3.3, "Town Codes."

Therefore, the repair and rehabilitation would not result in significant adverse impacts to visual resources within the Lower Knolls Road Study Area.

9.5.8.7 Natural Resources

The study area for the natural resources analysis is the immediate area surrounding the limits of construction associated with the new air vents at the Rondout Uptake Chamber (see **Figure 9.5-62**).

Based on field visits on November 13, 2013, January 23, 2015, and July 31, 2015, the habitat within the natural resources study area is best characterized as a hemlock-northern hardwood forest. Within the natural resources study area, there are no wetlands or surface waterbodies. There is a pond outside of the natural resources study area, to the north of the limits of construction, which the USFWS NWI identifies as a wetland. Recent tree clearing is evident on portions of the study area and most of the larger ash (*Fraxinus* spp.) trees are dead due to

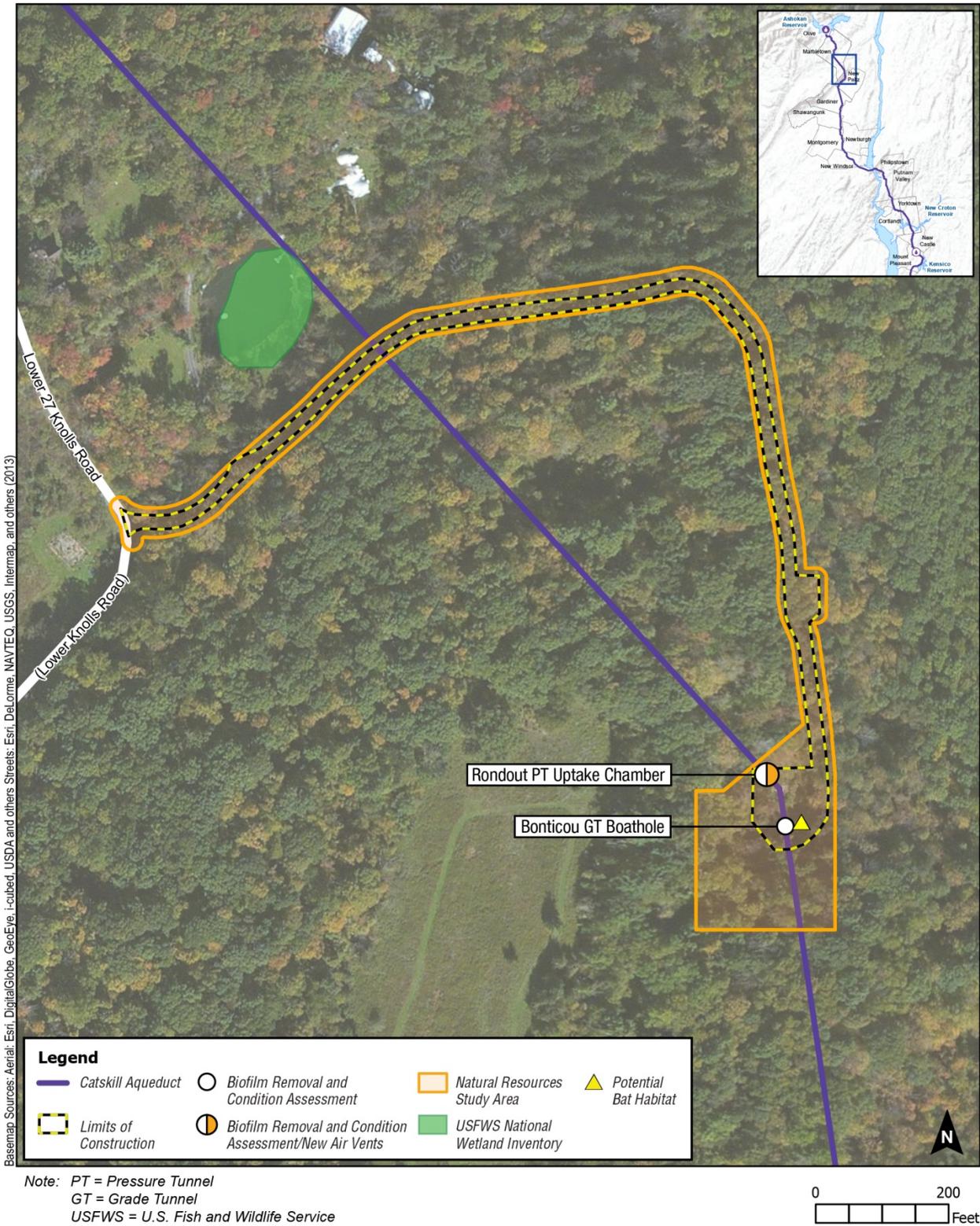


Figure 9.5-62: Natural Resources - Lower Knolls Road Study Area



invasive Emerald Ash Borers. These habitats have the potential to support protected terrestrial resources and wildlife species. Therefore, an analysis of the potential effects to natural resources that could result from repair and rehabilitation activities is presented below.

Terrestrial Resources

Consultation with NYNHP identified one ecological community of significance within the study area, a hemlock-northern hardwood forest. This ecological community of significance is present in the natural resources study area. Dominant tree species within the natural resources study area consist of white ash (*Fraxinus americana*), red maple (*Acer rubrum*), sweet birch (*Betula lenta*), sugar maple (*Acer saccharum*), eastern hemlock (*Tsuga canadensis*) and black oak (*Quercus velutina*). The understory is sparse. The dominant shrub species are Japanese barberry (*Berberis thunbergii*) and wineberry (*Rubus phoenicolasius*). Herbaceous vegetation consists of garlic mustard (*Alliaria petiolata*), pokeweed (*Phytolacca americana*), and mullein (*Verbascum thapsus*). While the Town of Marbletown does not regulate the removal of trees associated with the repair and rehabilitation, terrestrial resources within this study area warrant an analysis.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP's understanding that no new projects or developments that would affect terrestrial resources are anticipated within the Lower Knolls Road Study Area within the timeframe of the impact analysis. Natural processes, such as changes in habitat due to natural vegetative succession, are anticipated to continue. Therefore, in the future without the repair and rehabilitation, it is assumed that terrestrial resources within the study area would be the same as baseline conditions.

Work activities would include minor tree clearing and shrub removal for the purpose of improving site access to and staging areas at the Rondout Pressure Tunnel Uptake Chamber. Along the access road, an estimated 13 trees consisting of five species with a range of average dbh of between 8 and 17 inches may be removed to selectively widen the access road within the study area. The most common species of trees to be removed include 5 red maple, 3 sweet birch, and 3 sugar maple. These trees are located along the current access road that heads east from Lower Knolls Road, crosses over the aqueduct, and turns south toward the uptake chamber. Tree removal would occur in discrete locations along the densely forested areas of the access road, and would not dramatically change the character of the natural resources study area or affect surrounding trees. Only those trees that lay in the footprint of the construction limits would be removed. All other trees would be protected or preserved. All tree removal would be conducted from November 1 through March 31 to avoid impacts to Indiana bats (*Myotis sodalis*) and northern long-eared bats (*Myotis septentrionalis*). Following construction, the staging areas would be restored to natural conditions.

The repair and rehabilitation at the Lower Knolls Road site would be minor. Approximately 2,500 square feet at the vent location would be disturbed during work activities. In addition to tree removal, some downed trees at the site would be removed to allow access to the uptake chamber and new air vents site. Tree removal would not cause new habitat fragmentation. Rather, it would provide DEP reliable access to their existing infrastructure for routine operation and maintenance in the future. The known primary threats to hemlock-northern hardwood forest are woolly adelgids (*Adelges tsugae*) (affecting eastern hemlock) and emerald ash borer (*Agrilus planipennis*) (affecting white and green ash [*Fraxinus pennsylvanica*]). Both insect pests

have caused damage and declines to their host tree species in the vicinity and can be expected to continue to alter the forest composition. However, none of these threats would be exacerbated by the repair and rehabilitation within the Lower Knolls Road Study Area.

Following the completion of the repair and rehabilitation, the staging area at the uptake chamber would be restored to natural conditions. The access road improvements would be permanent. There would be no disturbance to the significant ecological community of hemlock-northern hardwood forest.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to terrestrial resources within the Lower Knolls Road Study Area.

Federal/State Threatened and Endangered and State Species of Special Concern

This section includes an analysis of potential impacts to federal/State Threatened and Endangered Species and State Species of Special Concern identified in Section 9.3.9, “Natural Resources,” as having the potential to be affected by activities within the natural resources study area. To identify those species that could be affected, species that could occur up to 0.25 mile from the work site were determined in consultation with USFWS, USACE, NYNHP, and NYSDEC, as well as county and local offices, as applicable.

As discussed in Section 9.3.9, “Natural Resources,” six species were identified as to have the potential to be affected by the repair and rehabilitation within the natural resources study area. Therefore, conditions in the future without the repair and rehabilitation, an analysis of the potential for impacts to these six species, and a summary of conclusions on the potential effects resulting from the repair and rehabilitation are provided below.

In the future without the repair and rehabilitation, it is assumed that federal/State Threatened and Endangered Species, and State Species of Special Concern within the study area would largely be the same as baseline conditions, other than possible changes in habitat due to natural vegetative succession and general anthropogenic influences.

An analysis of the potential for disturbance to federal/State Threatened and Endangered Species and State Species of Special Concern from the repair and rehabilitation within the natural resources study area is shown in **Table 9.5-29**. The analysis included an evaluation of the repair and rehabilitation work activities within the study area and observed during field visits, as applicable.

Table 9.5-29: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern and Habitats within the Lower Knolls Road Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Amphibians and Reptiles					
Eastern Box Turtle	<i>Terrapene carolina</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visits on November 13, 2013, January 23, 2015, and July 31, 2015. Potential habitat exists within the mesic forest, floodplain forest, wetlands, and old field areas. Work activities would be largely confined to previously disturbed areas. If any isolated areas of potential habitat exist at the work site, as a highly mobile species, any eastern box turtles that might otherwise use these areas are expected to instead utilize similar, adjacent habitats during construction. Furthermore, perimeter silt fencing would limit disturbance to adjacent habitat and prevent individual turtles from entering the work site during construction. Finally, upon construction completion, the staging areas would be restored to natural conditions. Therefore, there are no effects anticipated and no further analysis for eastern box turtles is warranted for this study area.	No
Eastern Hognose Snake	<i>Heterodon platyrhinos</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visit on November 13, 2013, January 23, 2015, and July 31, 2015. Potential habitat exists within the woodlands and old field areas. Work activities would be largely confined to previously disturbed areas. If any isolated areas of potential habitat exist at the work site, eastern hognose snakes that might otherwise use these areas are expected to instead utilize similar, adjacent habitats during construction. Furthermore, perimeter silt fencing would limit disturbance to adjacent habitat and prevent individual snakes from entering the work site during construction. Therefore, there are no effects anticipated and no further analysis for eastern hognose snakes is warranted for this study area.	No
Timber Rattlesnake	<i>Crotalus horridus</i>	Unlisted	Threatened	No individuals were incidentally observed during the field visit on November 13, 2013, January 23, 2015, and July 31, 2015. Potential habitat exists within the mesic forest and old field areas. According to records received from NYNHP, there is a timber rattlesnake hibernaculum located 1.5 miles from the study area and therefore, timber rattlesnakes have the potential to migrate through or forage within the study area. Therefore, further analysis is warranted for this study area.	Yes. See further analysis below.

Table 9.5-29: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern and Habitats within the Lower Knolls Road Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Wood Turtle	<i>Glyptemys insculpta</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visit on November 13, 2013, January 23, 2015, and July 31, 2015. Potential habitat exists within the woodland areas. Work activities would be largely confined to previously disturbed areas, and wood turtles are expected to utilize similar, adjacent habitats during construction. Furthermore, perimeter silt fencing would limit disturbance to adjacent habitat and prevent individual turtles from entering the work site during construction. Finally, upon construction completion, the staging areas would be restored to natural conditions. Therefore, there are no effects anticipated and no further analysis for wood turtles is warranted for this study area.	No
Mammals					
Indiana Bat	<i>Myotis sodalis</i>	Endangered	Endangered	No individuals were incidentally observed during the field visits on November 13, 2013, January 23, 2015, and. Potential bat roosting habitat includes a shagbark hickory within the study area. Additionally, a naturally occurring stream and perennial pond are located within the study area and could provide foraging habitat. Therefore, further analysis is warranted for this study area.	Yes. See further analysis below.
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	Threatened	Unlisted	No individuals were incidentally observed during the field visits on November 13, 2013, January 23, 2015, and. Potential bat roosting habitat includes a shagbark hickory. Therefore, further analysis is warranted for this study area.	Yes. See further analysis below.

Timber Rattlesnake (Crotalus horridus)

In the future with the repair and rehabilitation, work activities would predominantly occur on previously disturbed areas along the Catskill Aqueduct. According to records received from the NYNHP, there is a timber rattlesnake (*Crotalus horridus*) hibernaculum located approximately 1.5 miles from the study area and therefore, timber rattlesnakes have the potential to migrate through or forage within the study area. This is unlikely, however, due to the presence of roads and other development in the area. Prior to commencing work, timber rattlesnakes, if noted to occur within the work site, would be removed by a DEP Wildlife Specialist to areas with suitable habitat. Perimeter soil and erosion control measures would be erected to help prevent additional individuals from entering the work site. Vehicles entering and exiting the work site would take precaution to avoid timber rattlesnakes that could be basking on or traveling across on-site roads. Furthermore, the site would be restored to natural conditions upon completion and the air vents that remain are not anticipated to affect timber rattlesnake habitat.

In summary, given the range of protective measures that would be in place for the duration of construction, as well as the limited footprint of disturbance to potential habitat, no significant effects to timber rattlesnakes are anticipated. Therefore, the repair and rehabilitation may affect, but is unlikely to adversely affect, timber rattlesnakes in this study area.

Indiana Bat (Myotis sodalis)

A summer habitat survey was conducted in the study area on July 31, 2016. Potential bat roosting habitat includes a dead white ash with a dbh of 17 inches and exfoliating bark within the study area.

In the future with the repair and rehabilitation, activities would predominantly occur on previously disturbed areas along the Catskill Aqueduct and would be localized and confined to the immediate vicinity of the Rondout Uptake. Repair and rehabilitation work activities on the work site would occur with minimal clearing of brush and small trees. One potential roosting tree may be removed. Repair and rehabilitation work activities would not result in significant loss or modification of forested habitat for roosting Indiana bats.

There are no water resources in the study area, and foraging habitat would continue to be available in the canopy within the study area and in adjacent forested areas. There may be temporary noise that discourages Indiana bats from roosting in the immediate vicinity of the work sites. However, there is abundant suitable habitat in the surrounding areas in which Indiana bats could roost. All tree removal would be conducted from November 1 through March 31 to avoid impacts to Indiana bats. Therefore, the repair and rehabilitation may affect, but is unlikely to adversely affect, Indiana bats in this study area.

Northern Long-eared Bat (Myotis septentrionalis)

A summer habitat survey was conducted in the study area on July 31, 2016. Northern long-eared bats have been documented to roost in man-made structures. However, there are no structures within the study area that could be used by roosting bats. They are more commonly known to roost in trees (see the potential roosting habitat results for Indiana bats, above).

The Rondout Uptake Chamber is a three-sided concrete superstructure housing the shaft and valve equipment; however, this lacks a roof and does not provide roosting locations. If any bat guano is observed in or near the superstructure during work activities, USFWS would be contacted and DEP would await further guidance.

In the future with the repair and rehabilitation, activities would predominantly occur on previously disturbed areas along the Catskill Aqueduct and would be localized and confined to the immediate vicinity of the Rondout Uptake Chamber. Repair and rehabilitation work activities would not result in significant loss or modification of forested habitat for roosting northern long-eared bats. Repair and rehabilitation work activities on the work site would occur with minimal clearing of brush and small trees, and one potential roosting tree may be removed. All tree removal would be conducted from November 1 through March 31 to avoid impacts to northern long-eared bats.

There are no water resources in the study area and foraging habitat would continue to be available in the canopy within the study area and in adjacent forested areas. There may be temporary noise that discourages northern long-eared bats from roosting in the immediate vicinity of the work sites. However, there is abundant suitable habitat within the surrounding areas where northern long-eared bats could roost. Therefore, the repair and rehabilitation may affect, but is unlikely to adversely affect northern long-eared bats in this study area.

Federal/State Threatened and Endangered Species and State Species of Special Concern Conclusions

Based on the impact analysis, no take is anticipated. There would be no effects to eastern box turtles (*Terrapene carolina*), eastern hognose snakes (*Heterodon platyrhinos*), or wood turtles (*Glyptemys insculpta*) associated with the repair and rehabilitation. Repair and rehabilitation may affect, but is not likely to adversely affect, timber rattlesnakes, Indiana bats, and northern long-eared bats.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to federal/State Threatened and Endangered Species or State Species of Special Concern within the Lower Knolls Road Study Area.

9.5.8.8 Hazardous Materials

To evaluate the potential presence of hazardous materials within the Lower Knolls Road Study Area, a Phase I ESA was conducted in general conformance with the scope and limitations of ASTM Practice E 1527-13 and CEQR requirements to identify RECs. The Phase I ESA included site reconnaissance, research on current/historical use, and review of federal and State regulatory listings for both the site and neighboring properties within the appropriate search distance defined in the ASTM standard. The findings from the Phase I ESA investigation and results from DEP's legacy files for the work sites, including a geotechnical investigation, were collectively reviewed to assess the potential presence of and potential for disturbance to hazardous materials in the study area.

Based on the Phase I ESA investigation within this study area, there was no indication of an environmental impact that would constitute a REC as defined by the ASTM standard that would affect activities in the study area. Additionally, there is no history of contamination at or in the vicinity of the Lower Knolls Road Study Area.

Geotechnical environmental investigations and sampling were undertaken for contaminants of concern including volatile and semivolatile organics, PCBs, and total petroleum hydrocarbons along the aqueduct within the study area. Chromium and arsenic were noted in the soil sampling results. Total chromium was reported in the samples collected at Rondout Pressure Tunnel Uptake Chamber. Chromium concentrations, however, were consistent over a widespread sampling area and are more likely associated with background concentrations. Along the Catskill Aqueduct, there are widespread occurrences of chromium, which are attributed to the existing geological formations. Arsenic, although naturally occurring in soils, is likely to be the result of background concentrations. In addition, although gasoline range organics were not detected in the samples, total petroleum hydrocarbons were detected at low concentrations that would not warrant remedial actions.

Based on the results of the environmental investigations completed within the Lower Knolls Road Study Area, no other hazardous materials are known to exist. The soil results support the reuse of excavated materials as backfill and do not suggest the need for special management, handling, or health and safety measures at this time.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP's understanding that no developments or structures that would introduce hazardous materials to the environment are anticipated within the Lower Knolls Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that the presence of hazardous materials within the Lower Knolls Road Study Area would be the same as baseline conditions.

In the future with the repair and rehabilitation, work activities would require the potential storage and use of a variety of petroleum and other chemical products, such as diesel fuel for back-up power, lubricating oil for construction vehicles, and miscellaneous cleaning and maintenance chemicals during construction. The use and storage of these would be in accordance with applicable regulatory requirements and guidelines, including those relating to federal Spill Prevention, Control, and Countermeasures requirements; and State petroleum bulk storage, chemical bulk storage, and spill reporting requirements. Following construction, all equipment, as well as chemical storage, would be removed from the Lower Knolls Study Area. The staging areas would be restored, and operation of the Catskill Aqueduct would be consistent with baseline conditions.

Therefore, the repair and rehabilitation would not result in significant adverse impacts from the presence or disturbance of hazardous materials within the Lower Knolls Road Study Area.

9.5.8.9 Transportation

The study area for the transportation analysis consists of the major convergent roadways that would potentially be used by the employee and construction vehicles associated with repair and rehabilitation work activities en route to and from the Lower Knolls Road Study Area.

Access to the repair and rehabilitation limits of construction for the work sites within the Lower Knolls Road Study Area would be from Lower 27 Knolls Road (Lower Knolls Road) to an access road crossing through private property (see **Figure 9.5-56**). Lower Knolls Road is a two-way local roadway. To the extent available, construction vehicles would travel on truck-permitted roadways directly to and from the Lower Knolls Road Study Area. There is no public transportation and little to no pedestrian activity in the immediate vicinity of the study area. Under current operations, DEP employees periodically access the site. However, there are no DEP employees who work at or visit the study area on a daily basis, and the small number of DEP employee vehicles has little to no effect on traffic conditions within the study area.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP's understanding that no changes in land use or an increase in traffic due to outside developments are anticipated within the Lower Knolls Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that traffic, public transportation, and pedestrian activities within the study area would be similar to baseline conditions.

Repair and rehabilitation work activities within the Lower Knolls Road Study Area were evaluated to determine which would have the potential to generate the most vehicle trips and, therefore, be the basis of this transportation analysis. Of these activities, staging and access improvements would generate the most vehicle trips. Staging and access improvements would occur in summer ~~2019~~2018 between the hours of 7 AM and 5 PM, Monday through Friday, for approximately 4 weeks.

In the future with the repair and rehabilitation, construction vehicles would travel along Lower Knolls Road to the access road crossing through private property. The estimated number of peak-day one-way vehicle trips associated with local staging and access improvements is 27 vehicles, or approximately 54 peak-day vehicle round trips that would travel to and from the study area. Approximately 16 vehicle round trips, or 16 PCEs, would be workers traveling directly to and from the staging area, with an additional 4 daily shuttle trips between the study area and the staging area. The remaining approximately 34 peak-day vehicle round trips (73 PCEs) would be trucks or other construction vehicles.

During a peak day, the estimated number of peak-hour vehicle trip ends associated with local staging and access improvements is approximately 27 peak-hour vehicle trip ends (48 PCEs). This includes approximately 8 vehicle trip ends (8 PCEs) from workers traveling directly to and from the staging area, approximately 2 peak-hour shuttle trips between the study area and the staging area, and approximately 17 vehicle trip ends (38 PCEs) from trucks or other construction vehicles. For the purpose of this analysis, the peak-hour project-generated vehicles are anticipated to coincide with typical construction hours for employee vehicles entering the site.

Assuming one 10-hour shift, this would be from 6 AM to 7 AM, and would be unlikely to coincide with the peak hour for existing traffic.

The repair and rehabilitation would result in approximately 48 peak-hour PCEs along Lower Knolls Road, which is below the *CEQR Technical Manual* screening threshold of 50 peak-hour PCEs as described in Section 9.3.13, “Transportation.” The work activities at the Lower Knolls Road Study Area would be short-term (totaling 16 weeks over 1.5 years; see **Table 9.5-28**) and would not generate public parking or transportation demands, or pedestrian activity within the Lower Knolls Road Study Area. Following completion of the repair and rehabilitation, traffic patterns would return to baseline conditions.

Therefore, although there would be a minor temporary increase in traffic, the repair and rehabilitation would not result in significant adverse impacts to transportation within the Lower Knolls Road Study Area.

9.5.8.10 Noise

As described in Section 9.3.15, “Noise,” mobile noise associated with the repair and rehabilitation within the Lower Knolls Road Study Area does not warrant analysis. This section includes an analysis of potential impacts from stationary noise associated with the repair and rehabilitation to sensitive receptors within the study area.

The study area for the stationary noise analysis is the area within 1,500 feet of the repair and rehabilitation activities as shown on **Figure 9.5-63**.

The Lower Knolls Road Noise Study Area includes residential parcels within 1,500 feet of the repair and rehabilitation work site that are considered noise-sensitive receptors for this analysis. The temporary work activities were evaluated to disclose potential noise levels at the nearest residence. While the Town of Marbletown does not have a noise code applicable to the Lower Knolls Road Study Area, there are noise-sensitive receptors within the study area that warrant an analysis. The noise study area also includes land in the Town of Rosendale. However, there are no noise-sensitive receptors within the Lower Knolls Road Study Area in the Town of Rosendale.

Existing ambient noise levels within the Lower Knolls Road Study Area are influenced by vehicular traffic traveling on Mossybrook Road, Lower Knolls Road, and other local roadways.

The existing noise levels within the study area are comparable to the levels in a very quiet suburban and rural residential environment, based on the distance from major transportation corridors, the population density of the area, and the presence of other noise-producing elements. Typical noise levels (measured as L_{eq}) for very quiet suburban and rural communities are 40 dBA during the daytime and 34 dBA during the nighttime.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP’s understanding that no major projects that would result in a change in land use, or new noise-generating sources that would contribute to an increase in ambient noise levels, are anticipated within the Lower Knolls Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that ambient noise levels within the Lower Knolls Road Study Area would be similar to baseline conditions.

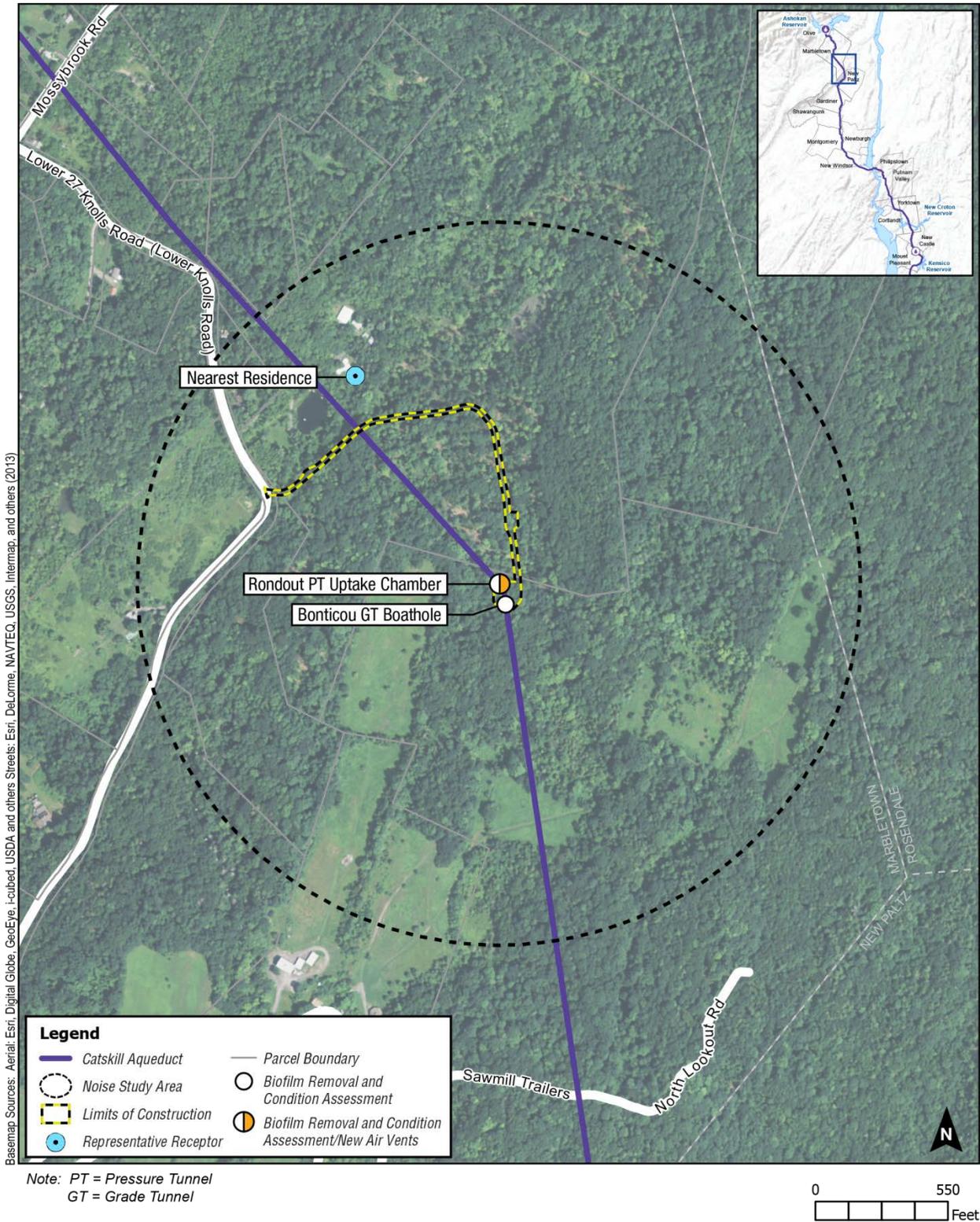


Figure 9.5-63: Noise - Lower Knolls Road Study Area



In the future with the repair and rehabilitation, stationary noise-producing work activities within the Lower Knolls Road Study Area would occur at one work site. The stationary noise-generating equipment that would be used within the Lower Knolls Road Study Area was evaluated to determine which work activity would have the potential to emit the most noise and, therefore, be the basis of this stationary noise analysis. Of the activities, the stationary noise-generating equipment associated with the installation of the air vents would emit the most noise. Air vent installation would occur in fall ~~2019~~2018 between the hours of 7 AM and 7 PM, 7 days a week for approximately 3 weeks during the second 10-week shutdown (see **Table 9.5-28**).

The noise analysis focused on the three loudest stationary noise-generating equipment types necessary for the air vent installation. Associated equipment reference noise levels are shown in **Table 9.5-30**. The types of noise-generating equipment analyzed were conservatively based on peak construction operating conditions.

Table 9.5-30: Stationary Source Construction Equipment Modeled at the Lower Knolls Road Study Area - Noise Analysis and Reference Noise Levels (L_{eq})

Equipment Type	Reference Noise Level (L_{eq}) at 50 feet (dBA)
Crane	77
Concrete Mixer Truck	81
Generator	82
Note: ¹ <i>City Environmental Quality Review (CEQR) Technical Manual, Chapter 22.</i>	

Air vent installation within the Lower Knolls Road Study Area during the repair and rehabilitation would emit a noise level (L_{eq}) of approximately 59 dBA at the nearest residence, located approximately 1,050 feet away from the vent installation.

Following completion of the repair and rehabilitation work activities, the construction equipment and vehicles would be removed from the Lower Knolls Road Study Area. The repair and rehabilitation work activities would be temporary with the peak work activities occurring during air vent installation in fall ~~2019~~2018 for a limited period (up to 3 weeks, see **Table 9.5-28**).

Therefore, although there would be a temporary increase in noise, noise from the repair and rehabilitation would not result in significant adverse impacts to sensitive receptors within the Lower Knolls Road Study Area.

9.5.8.11 Neighborhood Character

The character of the Lower Knolls Road Study Area is primarily undeveloped land dominated by forest, consisting of residential, commercial, and vacant land uses and its physical setting within a rural location (see **Figure 9.5-59**). The Catskill Aqueduct traverses the study area in a general northwest to southeast direction. Lower Knolls Road intersects the western portion of the study area. The proposed work site is located in the area surrounding the Rondout Uptake Chamber. Access would be provided by an access road that connects to Lower Knolls Road.

DEP has consulted with the Town of Marbletown and Ulster County, and it is DEP's understanding that no changes in land use and no new projects or structures are anticipated within the Lower Knolls Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that neighborhood character within the study area would be similar to baseline conditions.

As described in Section 9.3.16, "Neighborhood Character," there would be no potential for the repair and rehabilitation to affect shadows and urban design. In addition, based on the screening assessment for open space and recreation, an impact analysis for the Lower Knolls Road Study Area was not warranted, as discussed in Section 9.3.6, "Open Space and Recreation." As described in Section 9.5.8.3, "Land Use and Zoning," Section 9.5.8.4, "Socioeconomic Conditions," Section 9.5.8.5, "Historic and Cultural Resources," and Section 9.5.8.6, "Visual Resources," the work activities would not affect land use and zoning, socioeconomic conditions, historic and cultural resources, and visual resources in the Lower Knolls Road Study Area. Furthermore, the public policy impact analysis provided in Section 9.5.2, "Town of Marbletown Impact Analysis," concluded that the work activities were consistent with applicable plans.

As described in Sections 9.5.8.9, "Transportation," and 9.5.8.10, "Noise," the work activities in the Lower Knolls Road Study Area would be short-term (intermittently over 1.5 years) and would result in a temporary increase in traffic and noise. Following completion of the repair and rehabilitation, the construction equipment and vehicles would be removed from the study area and traffic patterns would return to baseline conditions. These temporary increases in traffic and noise levels would not result in a density of activity or service conditions that would affect the overall character of the study area.

The repair and rehabilitation would not generate significant adverse effects in: land use, zoning, and public policy; socioeconomic conditions; open space and recreation; shadows; historic and cultural resources; urban design and visual resources; transportation; or noise.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to neighborhood within the Lower Knolls Road Study Area.

9.6 TOWN OF NEW PALTZ

9.6.1 TOWN OF NEW PALTZ PROJECT DESCRIPTION

The Town of New Paltz is located in Ulster County, New York, on the western side of the Hudson River. It is bounded by the Towns of Marletown to the northwest, Rosendale to the north, Esopus to the northeast, Lloyd to the east to southeast, Gardiner to the south and southwest, and Rochester to the west. The Town of New Paltz encompasses approximately 34 square miles. General boundaries of locations where activities associated with the repair and rehabilitation of the Catskill Aqueduct would occur within the Town of New Paltz are shown on **Figure 9.6-1**.

The Catskill Aqueduct stretches for approximately 5 miles in a south to southwest direction through the Town of New Paltz. Notable sites along the aqueduct within the Town of New Paltz that are associated with repair and rehabilitation work activities include the Poor Farm Arch Bridge and Wallkill Pressure Tunnel Downtake Chamber. Proposed repair and rehabilitation work activities within the town would occur within two study areas as shown in **Table 9.6-1**.

Table 9.6-1: Schedule of Work Activities within the Town of New Paltz

Work Activity	Study Area	
	Mountain Rest Road	New Paltz-Minnewaska Road
Staging and Access Improvements	-	✓
Internal Leak Repair	-	✓
Bridge Repair	-	✓
Boathole Preparation	-	✓
Boathole Installation	-	✓
Air Vent Installation	-	✓
Biofilm Removal and Condition Assessment	✓	✓
Large-scale Wash Water Treatment	-	✓
Dechlorination Installation	✓	-
Sluice Gate Removal	✓	-
Dechlorination System Operation	✓	-
Notes: - = Work activity not proposed. ✓ = Work activity proposed.		

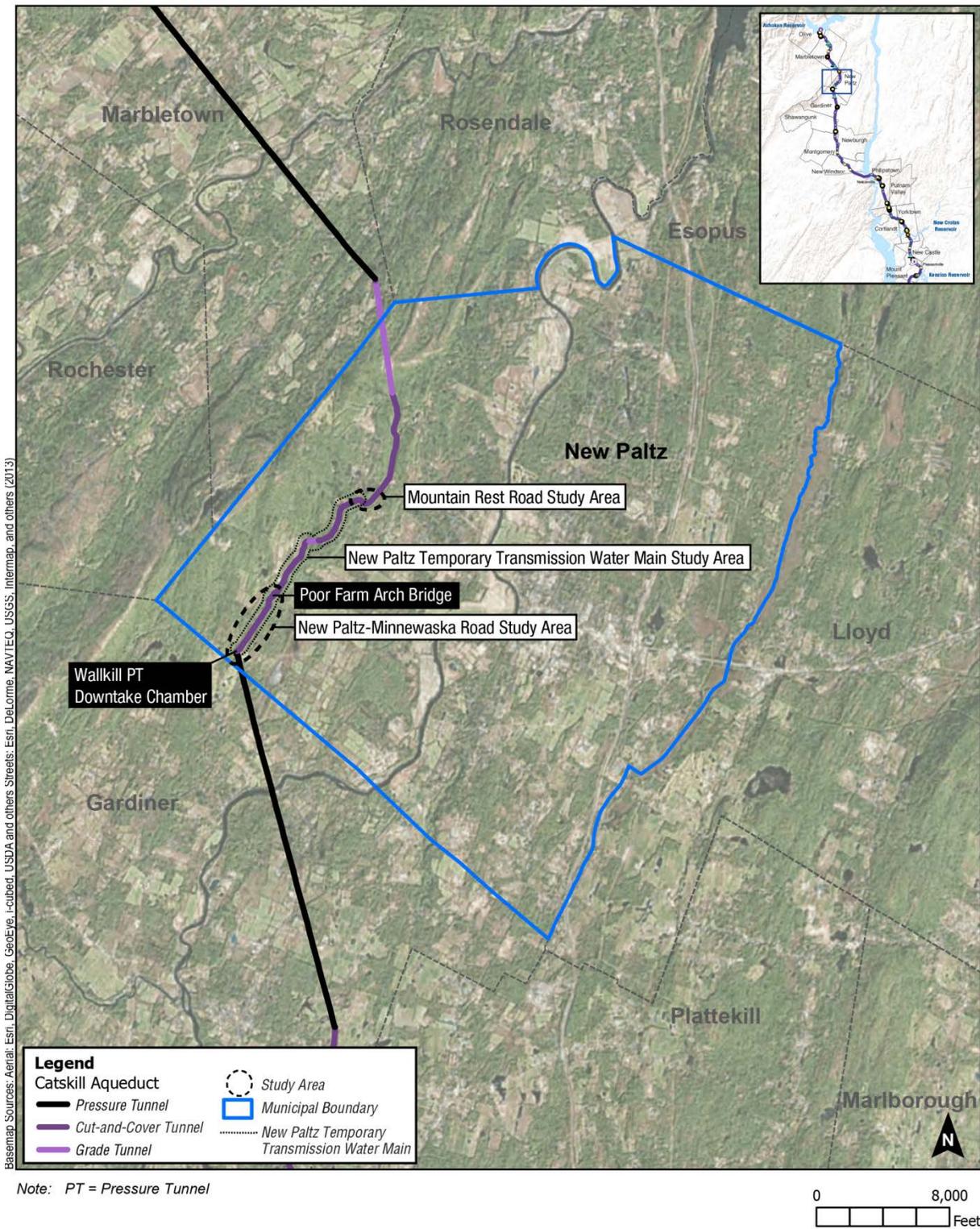


Figure 9.6-1: Town of New Paltz Study Areas



The Mountain Rest Road and New Paltz-Minnewaska Road study areas in the Town of New Paltz encompass the majority of work that would occur as part of the repair and rehabilitation in this municipality. Additional work activities in the town do not warrant further assessment. Work sites located outside the study areas include activities that would primarily be conducted within the aqueduct interior (see Section 9.3, “Screening Assessment and Impact Analysis Methodology”). In the Town of New Paltz, they include biofilm removal and condition assessment at access manholes not located in these study areas and permanently sealing two culvert drain sluice gates. See Section 9.2, “Project Description,” for an overall project description of the repair and rehabilitation. Section 9.6.2, “Town of New Paltz Impact Analysis,” below provides a discussion of local regulations in the Town of New Paltz jurisdictional limits. The following sections provide a description of the study areas, proposed activities, and impact analysis for the two study areas:

- Section 9.6.3 – Mountain Rest Road Study Area Impact Analysis
- Section 9.6.4 – New Paltz-Minnewaska Road Study Area Impact Analysis

Subsequent to the publication of the DEIS, DEP identified an additional element of UWSR. This new project element would involve the development of a temporary transmission water main (temporary pipeline) to supply water to the Village and Town of New Paltz. While this element is in the Town of New Paltz, see Section 9.18, “New Paltz Temporary Transmission Water Main” for the discussion of this element.

9.6.2 TOWN OF NEW PALTZ IMPACT ANALYSIS

9.6.2.1 Public Policy

Because local public policies would not vary for study areas in the same town, public policies were evaluated on a town-wide basis. As described in Section 9.3.3, “Land Use, Zoning, and Public Policy,” the repair and rehabilitation’s consistency with the applicable policies of the Ulster County Open Space Plan (Ulster County 2007) in the Mountain Rest Road and New Paltz-Minnewaska Road study areas are analyzed below.

Ulster County Open Space Plan (2007)

The Ulster County Open Space Plan establishes a framework for the management and protection of open space resources identified by Ulster County. These include water resources, working landscapes, landforms and natural features, ecological communities, cultural and historic resources, and recreational resources. To provide guidance on these open space resources, Ulster County has established the 10 “Principles of the Open Space Plan” that seek to safeguard the open space values of Ulster County. Based upon review of these principles, the potential effects of the repair and rehabilitation within the Mountain Rest Road and New Paltz-Minnewaska Road study areas are evaluated for compatibility with the two applicable principles below:

- (1) *Preserve and protect open space, unique natural areas and heritage areas and sites, wetlands, water and woodland resources, scenic views, areas of natural beauty and the rural character of Ulster County.*

Historic and cultural resources and water and terrestrial resources within the Mountain Rest Road Study Area are discussed in Section 9.3.7, “Historic and Cultural Resources,” and Section 9.3.9, “Natural Resources.” Open space and recreation and visual resources were identified within the Mountain Rest Road and New Paltz-Minnewaska Road study areas. Additionally, terrestrial resources and historic and cultural resources were identified within the New Paltz-Minnewaska Road Study Area. The potential for impacts within the Mountain Rest Road and New Paltz-Minnewaska study areas are analyzed in detail in the respective “Open Space and Recreation,” “Visual Resources,” and “Natural Resources” sections. In addition, the potential for impacts within the New Paltz-Minnewaska Road Study Area are analyzed in the “Historic and Cultural Resources” section.

Under this principle, the Open Space Plan recommends protecting valuable landforms and natural features in order to benefit residents and preserve the rural character of Ulster County. This principle was analyzed for the repair and rehabilitation as work in the study areas would potentially impact existing open space, historic resources, visual resources, and natural resources, directly or indirectly, depending on the study area.

Within the Mountain Rest Road Study Area, the Village of New Paltz currently has the ability to access water from the Catskill Aqueduct for its potable water needs. During the repair and rehabilitation, a temporary dechlorination system would be installed within the existing New Paltz Pump Station building. Dechlorinated aqueduct water would be temporarily conveyed through the Village’s existing water supply infrastructure and would be discharged to the New Paltz Reservoir, outside the study area, in accordance with applicable regulatory requirements established as part of required discharge permits. Natural areas would be unaffected because no new development or ground disturbance would be required for the repair and rehabilitation in the study area. A small portion of Mohonk Preserve property is located in the far western portion of the study area, on the western side of Mountain Rest Road, see Section 9.6.3.3, “Open Space and Recreation.” No work activities related to the Mountain Rest Road Study Area would take place within Mohonk Preserve, nor would they disrupt views looking east from the preserve. Following completion of the repair and rehabilitation, temporarily disturbed areas in the Mountain Rest Road Study Area would be restored to baseline conditions.

In the New Paltz-Minnewaska Study Area, work activities would occur at two locations, Poor Farm Arch Bridge and Wallkill Pressure Tunnel Downtake Chamber. A leak in the Catskill Aqueduct at Poor Farm Arch Bridge flows to the Kleine Kill in the study area and would be repaired. This would restore the Kleine Kill to pre-leak conditions. Additionally, repairs to the Poor Farm Arch Bridge may require temporary in-stream access, during which temporary erosion and sediment control measures would be used to minimize disturbance to the Kleine Kill. Poor Farm Arch Bridge is also located near the Glory Hill Trail and other informal trails associated with the Mohonk Preserve and Lake Mohonk Mountain House Complex. Tree removal near Poor Farm Arch Bridge would be minor and located adjacent to an unforested area along the aqueduct berm. It would therefore, not detract from the aesthetics of the area. Other informal trails may exist closer and have views to the Wallkill Downtake Chamber and Poor Farm Arch Bridge; although, repair and rehabilitation work activities would not impact access to those informal trails.

There is one site listed on the National Register of Historic Places, the Lake Mohonk Mountain House Complex, which comprises a majority of the New Paltz-Minnewaska Road Study Area in the north and southwest portion of the study area, see Section 9.6.4.7, “Historic and Cultural Resources.” The Lake Mohonk Mountain House is a National Historic Landmark located within the complex, located approximately 2 miles northwest, outside of the New Paltz-Minnewaska Road Study Area. The repair and rehabilitation within the New Paltz-Minnewaska Road Study Area would not result in new permanent structures or additions to existing structures within the Lake Mohonk Mountain House Complex because the new boathole and air vent would be located outside this area. Following completion of the repair and rehabilitation, temporarily disturbed areas in the New Paltz-Minnewaska Road Study Area would be restored to baseline conditions.

As discussed above, the repair and rehabilitation would occur at existing DEP facilities and work activities would be minimal in nature. As such, the repair and rehabilitation within the Mountain Rest Road and New Paltz-Minnewaska Road study areas would not affect open space resources, unique natural areas and heritage areas and sites, wetlands, water and woodland resources, scenic views, areas of natural beauty, or the rural character of Ulster County and would be consistent with this principle.

- (2) *Protect and enhance the county’s most valuable open space landforms and natural features with coordinated planning and safeguard policies.*

Open space and visual resources were identified within the Mountain Rest Road and New Paltz-Minnewaska Road study areas. The potential for impacts to open space and visual resources associated with the repair and rehabilitation within the Mountain Rest Road and New Paltz-Minnewaska Road study areas are analyzed in detail in the respective “Open Space and Recreation” and “Visual Resources” sections.

Under this principle, the Open Space Plan recommends preserving the visual or ecological values of significant landforms and natural features in order to protect against inappropriate development. This principle was analyzed for repair and rehabilitation as work in the study areas would potentially impact existing open space, visual resources, and natural resources, directly or indirectly, depending on the study area.

Based on the work activities described above, the repair and rehabilitation within the Mountain Rest Road and New Paltz-Minnewaska Road study areas would not permanently affect landforms and natural features such as valleys, ridgelines, slopes, coastal areas, or scenic areas. Repair and rehabilitation work activities within the Mountain Rest Road and New Paltz-Minnewaska Road study areas would take place at existing DEP facilities on disturbed lands. Repair and rehabilitation work activities, equipment, and vehicles within the Mountain Rest Road Study Area would not disrupt views looking east from the Mohonk Preserve due to a dense stands of trees along the aqueduct. The Glory Hill Trail within the New Paltz-Minnewaska Road Study Area would remain open and active during the repair and rehabilitation. Repair and rehabilitation work activities would not reduce the usage of the trail. Other informal trails may exist closer and have views to the Wallkill Downtake Chamber and Poor Farm Arch Bridge in the New Paltz-Minnewaska Road Study Area; although, repair and rehabilitation work activities would not impact access to those informal trails.

As such, the repair and rehabilitation within the Mountain Rest Road and New Paltz-Minnewaska Road study areas would not affect open space landforms and natural features within Ulster County and would be consistent with this principle.

Repair and rehabilitation would therefore be consistent with the Ulster County Open Space Plan and would not result in significant adverse impacts to public policy within the Mountain Rest Road and New Paltz-Minnewaska Road study areas.

9.6.3 MOUNTAIN REST ROAD STUDY AREA IMPACT ANALYSIS

Within the Mountain Rest Road Study Area, the aqueduct consists of the Wallkill North Cut-and-Cover Tunnel. Two access manholes, one of which includes a culvert drain, and the second which is connected to the Village of New Paltz water supply system at the New Paltz Connection Chamber, are located within the study area (see **Figure 9.6-2**). The New Paltz Connection Chamber connects to the New Paltz Pump Station south of the Catskill Aqueduct within the study area.

Work activities within the Mountain Rest Road Study Area would include: biofilm removal and condition assessment; the installation and operation of a local dechlorination system for the New Paltz water supply system; and sluice gate removal.

9.6.3.1 Study Area Location and Description

The Mountain Rest Road Study Area is located along the upper Catskill Aqueduct in the Town of New Paltz. The Catskill Aqueduct traverses the study area in a general east to west direction. Mountain Rest Road traverses the western portion of the study area, paralleling an unnamed tributary to Kleine Kill that flows to the south. Proposed work sites within the study area include the New Paltz Connection Chamber and New Paltz Pump Station in the eastern portion of the study area and the culvert drain access manhole in the western portion of the study area. Access to both work sites would be provided from Mountain Rest Road – to the east via an access road that parallels the aqueduct and to the west by driving over the cut-and-cover tunnel. The study area boundary is located approximately 400 feet beyond the outermost areas of disturbance related to the work sites. **Figure 9.6-2** shows an aerial photograph of the study area, including the path of the aqueduct, the limits of construction, and the proposed access routes. **Figure 9.6-3** shows photographs of the New Paltz Pump Station within study area.

The study area consists of public services, residential, open space and recreation, and vacant land uses. The aqueduct and limits of construction for both work sites are located in a public services corridor which is owned and maintained by DEP. **Figure 9.6-4** shows a map of the land uses in the study area and its surroundings.

The study area is entirely located within an agricultural (A-3) zoning district, as designated by the Town of New Paltz Zoning Code (see **Figure 9.6-5**). The Catskill Aqueduct is a permitted use as a public utility within the agricultural (A-3) zoning district.

There are no federal, State, or local designated landmarks, historic districts, or known archeological resources within the study area.

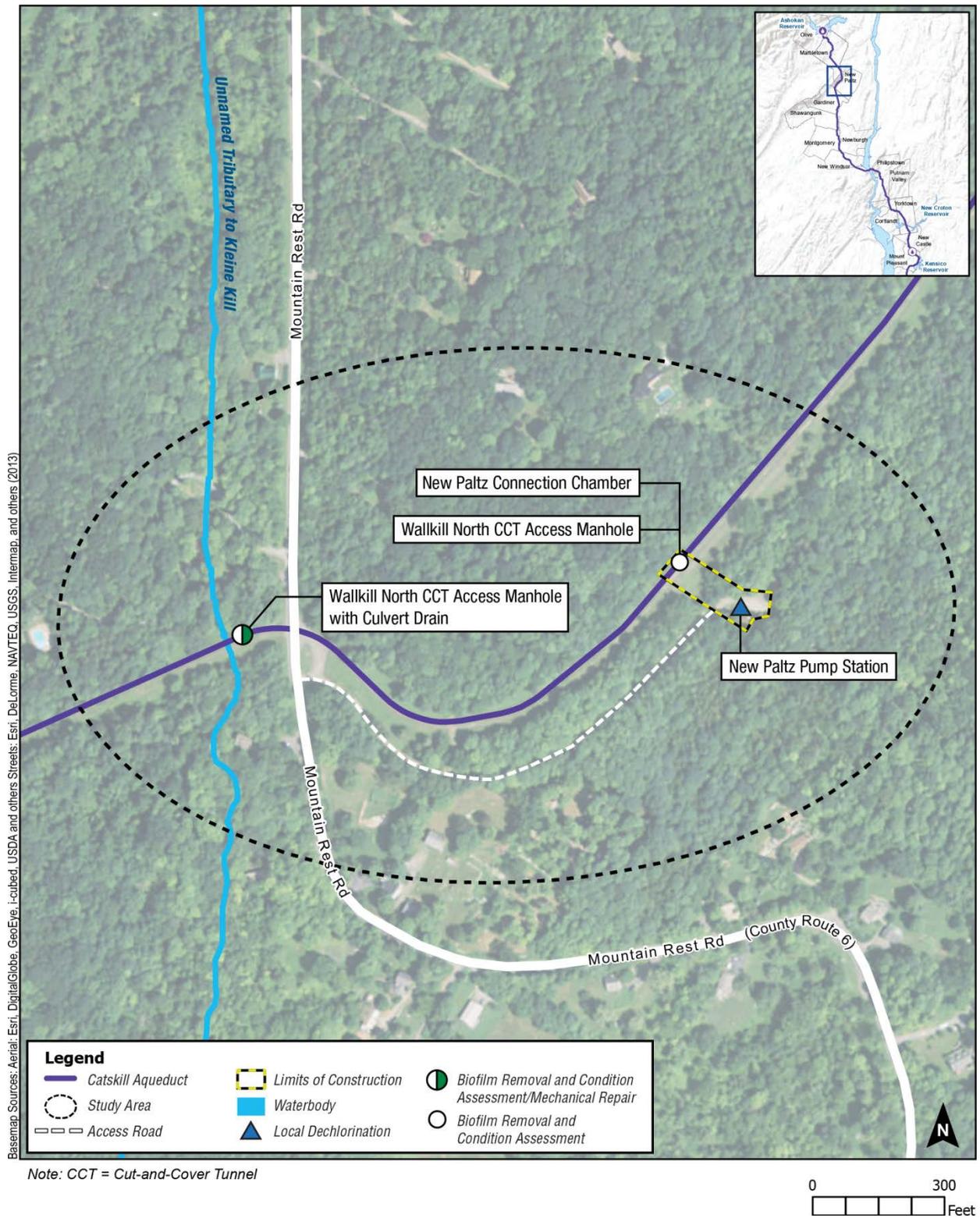


Figure 9.6-2: Study Area – Mountain Rest Road





Photograph 1: View of the southern facade of structure housing the New Paltz Pump Station. Photograph taken facing northwest.



Photograph 2: View of the eastern facade of the structure housing the New Paltz Pump Station. Photograph taken facing west.

Figure 9.6-3: Photographs – Mountain Rest Road Study Area



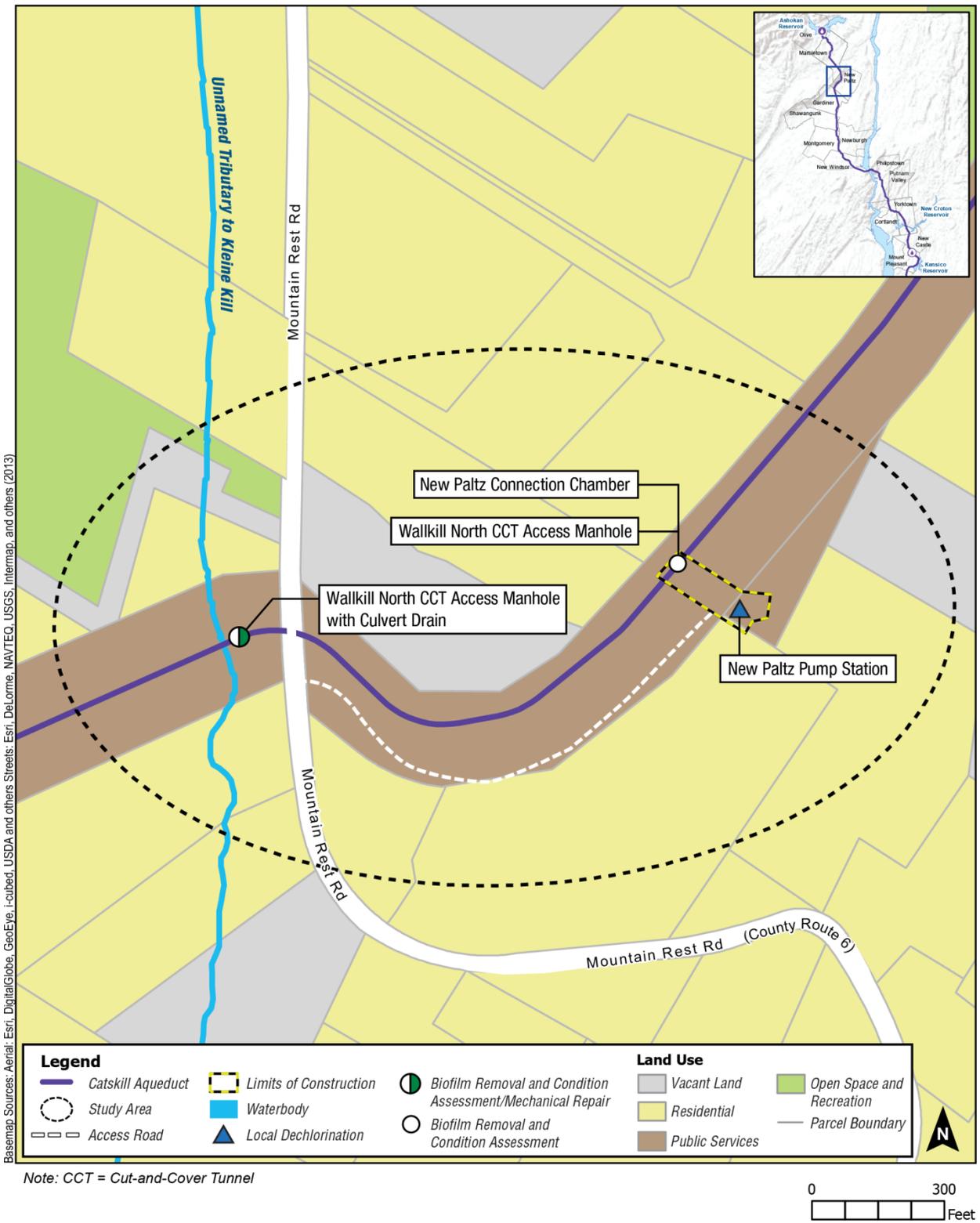


Figure 9.6-4: Land Use – Mountain Rest Road Study Area



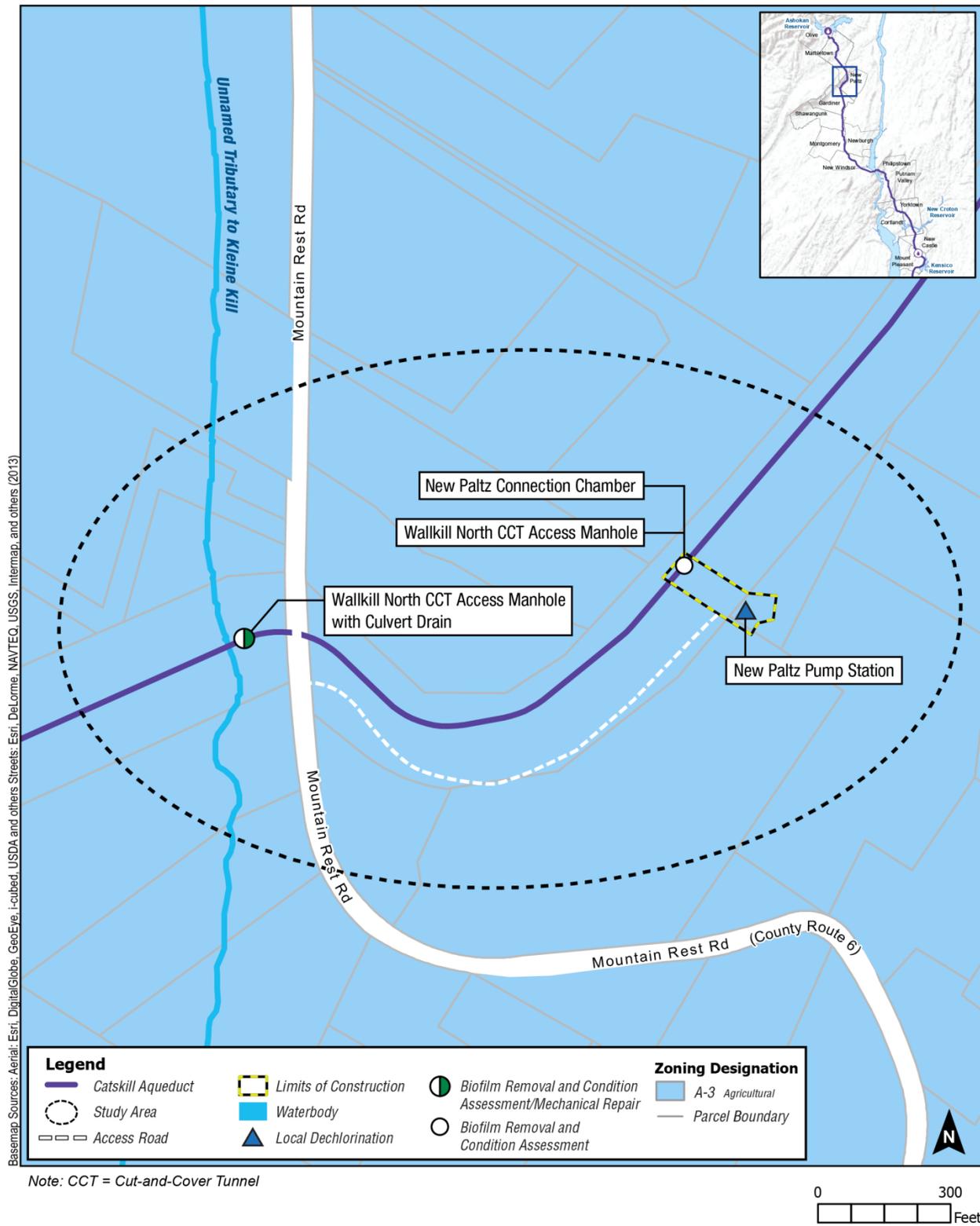


Figure 9.6-5: Zoning – Mountain Rest Road Study Area



9.6.3.2 Proposed Activities within the Mountain Rest Road Study Area

To support activities within the Mountain Rest Road Study Area, the Ashokan Screen Chamber would serve as a primary staging area from which workers would be transported to the site daily. Several secondary staging areas would provide additional parking, and equipment and materials would be staged on site. No staging or access improvements would be necessary other than underbrush clearing and gravel placement for leveling and erosion control. Erosion and sediment control measures such as silt fencing and hay bales would be installed at the perimeter of the work sites as needed. A site plan showing a layout of the limits of construction at the New Paltz Connection Chamber and New Paltz Pump Station, which would occupy a total of 0.5 acre, is shown on **Figure 9.6-6**. The schedule for work within the study area is shown in **Table 9.6-2**. The duration of active construction within the Mountain Rest Road Study Area is estimated to total 12 weeks over 1.5 years.

Table 9.6-2: Schedule of Work Activities within the Mountain Rest Road Study Area

Work Activity	Dates	Duration	Work Hours	Crew Size ¹
Dechlorination Installation	Summer 2019 2018	6 weeks	Monday to Friday, 7 AM to 5 PM	6
Sluice Gate Removal	Fall 2019 2018 (Second 10-week shutdown)	3 weeks	7 days a week, 7 AM to 7 PM	12
Biofilm Removal and Condition Assessment	Fall 2020 2019 (Third 10-week shutdown)	3 weeks	7 days a week, 7 AM to 7 PM	21
Dechlorination System Operation	2019 – 2023	4+ years	7 days a week, 24 hours per day	2
Note: ¹ Crew size refers to the number of people anticipated at the work site(s).				

Work in the study area would begin with installation of the dechlorination system in summer ~~2019~~2018. The New Paltz Pump Station would be retrofitted to house an active liquid sodium bisulfite chemical injection system including metering pumps, small storage drums, and secondary containment. Within the existing pump station building, drums of sodium bisulfite would be provided, equivalent to an approximately 10-day supply based on an average flow of 0.6 mgd. A new water line extending from a potable water source to the dechlorination system would also be installed for an eyewash station.

Removal of the sluice gate within the culvert drain access manhole would occur during the second 10-week shutdown in fall ~~2019~~2018. The sluice gate would be replaced with a blind flange to seal the opening that it currently covers.

Biofilm removal and condition assessment would occur during the third 10-week shutdown in fall ~~2020~~2019, with the two access manholes providing access into the aqueduct. These locations would also serve as collection points for biofilm, which would be transported for disposal at a registered, permitted, or otherwise authorized facility. Although the aqueduct would be unwatered during this shutdown, any residual water would be diverted through an internal bypass

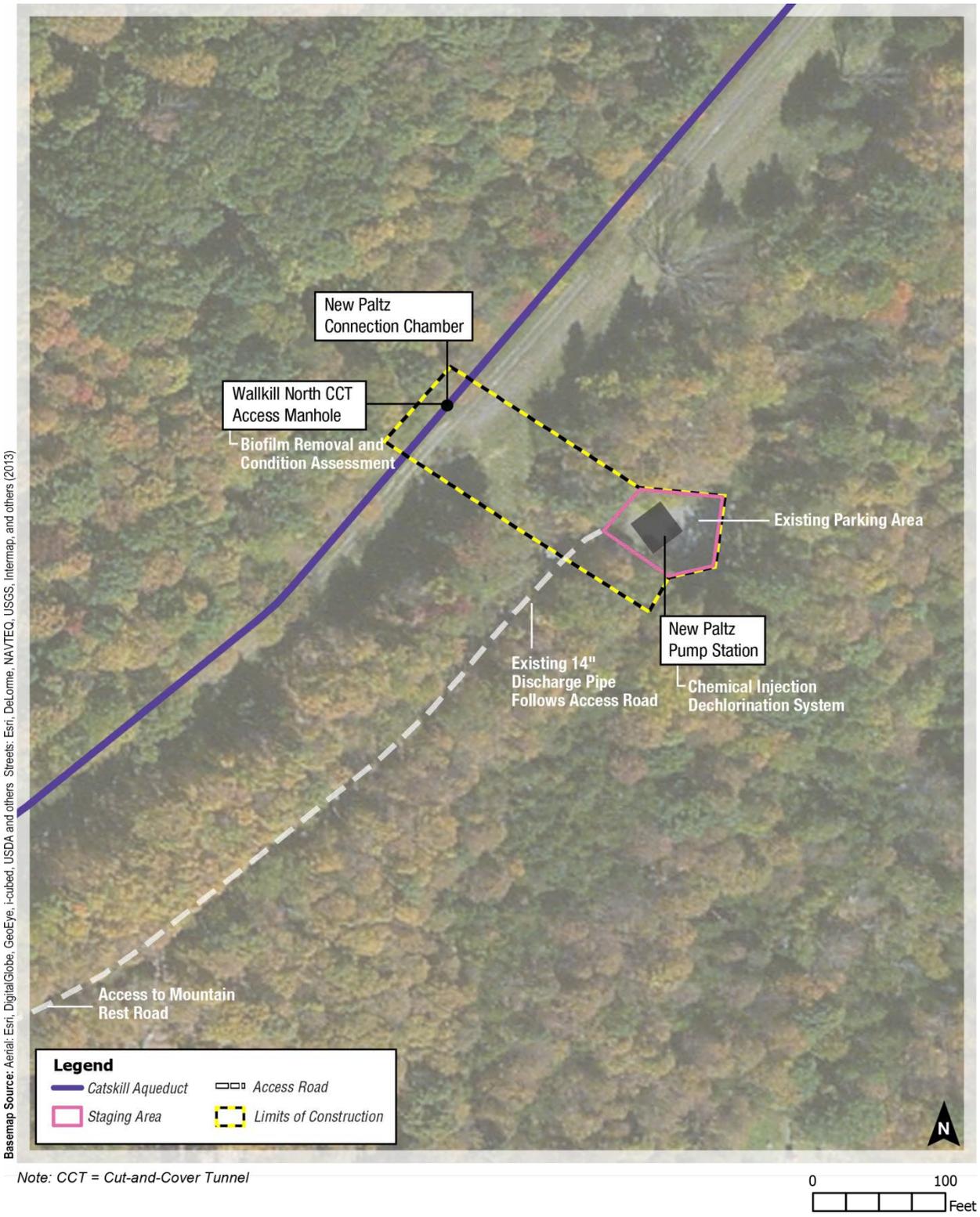


Figure 9.6-6: Site Plan – Mountain Rest Road Study Area



pipe around the work segments within the aqueduct for discharge to the aqueduct downstream. Any residual water that does not meet water quality standards, and any wash water generated from biofilm removal, would then be transported to a temporary treatment system, where it would be treated to meet water quality standards for discharge back into the aqueduct or to a nearby waterbody (see Section 9.2, “Project Description”). Upon completion of biofilm removal and condition assessment, all equipment and materials would be removed.

Lastly, described in Section 9.2 “Project Description,” the local dechlorination systems would be in operation when chlorination of the aqueduct begins in ~~2020~~2019. When activated, the local dechlorination system would be inspected and maintained on a regular basis, including one to three deliveries of sodium bisulfite per month, depending on the system’s use, and monitoring of residual chlorine concentrations, as required. When chlorination is no longer required in 2023, the local dechlorination system would no longer be operated.

Impact categories analyzed for the Mountain Rest Road Study Area are presented in Sections 9.6.3.3, “Open Space and Recreation,” through 9.6.3.9, “Neighborhood Character,” and include open space and recreation; visual resources; natural resources including federal/State Threatened and Endangered Species and State Species of Special Concern; hazardous materials; transportation; stationary noise; and neighborhood character. Additionally, the study area’s compatibility with applicable public policies was analyzed on a town-wide basis in Section 9.6.2, “Town of New Paltz Impact Analysis.” As described in Section 9.3, “Screening Assessment and Impact Analysis Methodology,” an impact analysis related to land use and zoning; socioeconomic conditions; community facilities and services; historic and cultural resources; the remaining natural resources subcategories, including geology and soils, water resources, aquatic and benthic resources, terrestrial resources, wildlife, federal/State Candidate Species, and unlisted rare and vulnerable species; energy; air quality; and mobile noise within the study area is not warranted. Finally, impacts related to project-wide natural resources, water and sewer infrastructure, and public health were analyzed within Section 9.19, “Project-wide Impact Analysis.”

9.6.3.3 Open Space and Recreation

As shown on **Figure 9.6-7**, one open space and recreation resource exists within the Mountain Rest Road Study Area. Approximately 1 acre of the Mohonk Preserve is located within the northwestern portion of the Mountain Rest Road Study Area. In total, the Mohonk Preserve is approximately 8,000 acres and is a non-profit nature preserve used for outdoor recreation such as hiking, picnicking, snowshoeing, and biking. No mapped trails, trailheads, or preserve entrances are present in the Mountain Rest Road Study Area.

DEP has consulted with the Town of New Paltz and Ulster County, and it is DEP’s understanding that no plans to expand or create new open space or recreational resources are anticipated within the Mountain Rest Road Study Area within the timeframe of the impact analysis. Natural processes, such as changes in habitat due to natural vegetative succession, are anticipated to continue. Use of the identified open space is anticipated to continue. Therefore, in the future without the repair and rehabilitation, it is assumed that open space and recreation within the Mountain Rest Road Study Area would be the same as baseline conditions.

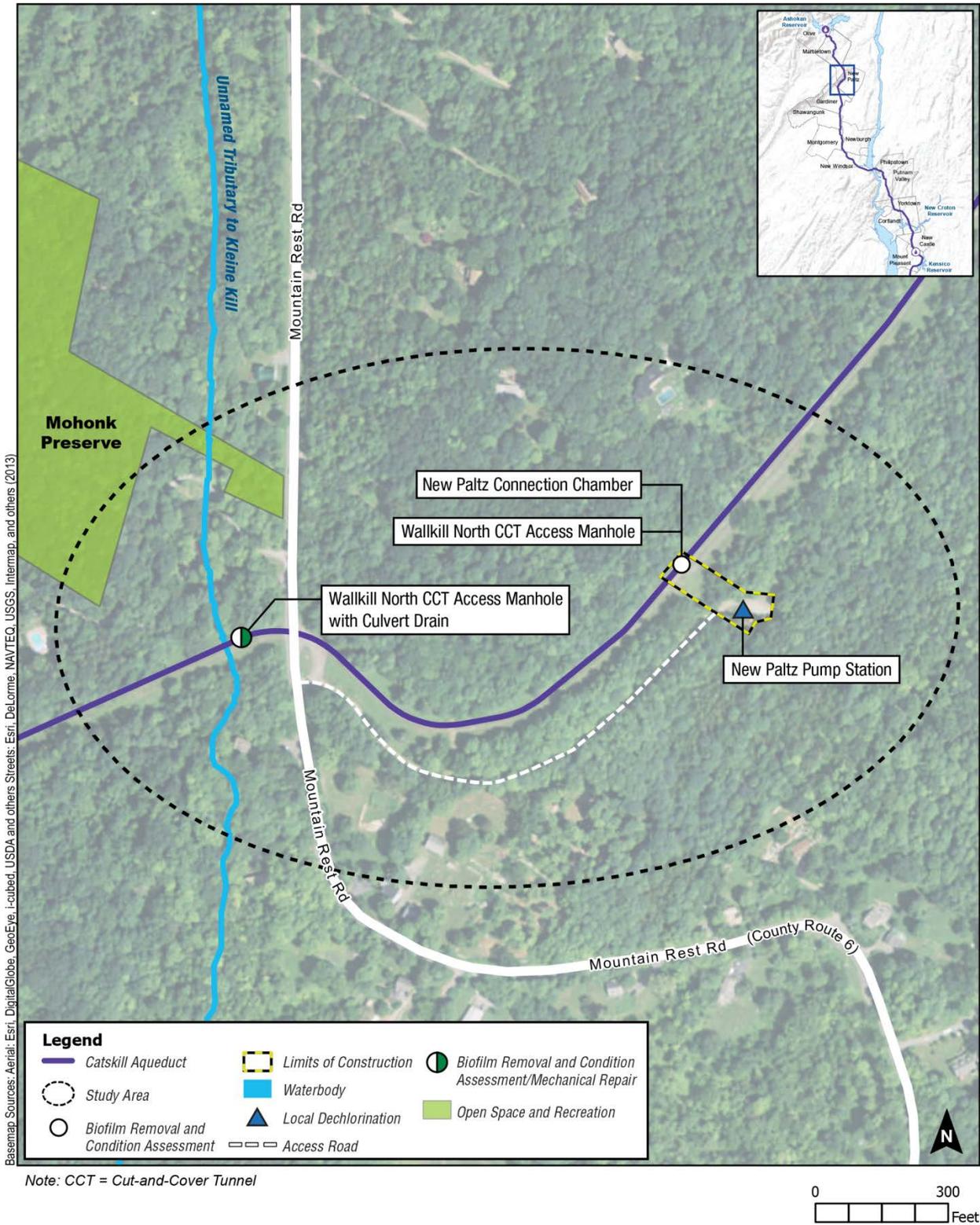


Figure 9.6-7: Open Space and Visual Resources – Mountain Rest Road Study Area



The limits of construction would be located outside the boundaries of Mohonk Preserve. During construction, the repair and rehabilitation work activities within the Mountain Rest Road Study Area would be short-term (intermittently over 1.5 years, see **Table 9.6-2**). Work activities related to the local dechlorination system would occur east of the preserve. The limits of construction would be east of Mountain Rest Road and behind dense stands of trees. Retrofitting would take place within the pump station building. Vehicle access for construction would be provided from an existing driveway off Mountain Rest Road which heads east, away from Mohonk Preserve. Repair and rehabilitation work activities, equipment, and vehicles within the Mountain Rest Road Study Area would not disrupt views looking east from the preserve. Following completion of the repair and rehabilitation work activities, the construction equipment and vehicles would be removed from the Mountain Rest Road Study Area.

As discussed in the Section 9.6.3.8, “Noise,” the repair and rehabilitation work activities would temporarily increase noise levels within the Mountain Rest Road Study Area that may affect recreational activities within the Mohonk Preserve. The Mohonk Preserve within the study area does not contain noise-sensitive receptors, as there are no maintained formal trails. However, upon completion of the repair and rehabilitation, the recreational uses within the preserve would be unaffected. The local dechlorination system would be housed within the building at the New Paltz Pump Station and would be not visible. Similar to the routine maintenance access during baseline conditions, occasional use of the access road would occur from 2019 through 2023 during the temporary chlorination period. This would consist of one truck visiting the site every few weeks to perform routine maintenance or sampling only when the system is operating and the Village of New Paltz is drawing water from the Catskill Aqueduct. Following the repair and rehabilitation, operation of the aqueduct would be consistent with baseline conditions and the local dechlorination system would no longer be operated.

As such, the repair and rehabilitation would not encroach upon, cause a loss of open space, affect the use or physical character of, or disrupt views from the Mohonk Preserve.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to open space and recreation within the Mountain Rest Road Study Area.

9.6.3.4 Visual Resources

The study area for the visual resources analysis is the area within the Mountain Rest Road Study Area. It also includes view corridors that extend beyond the study area based on the locations that are publicly accessible.

Visual resources, consisting of one locally significant resource, the Mohonk Preserve, were identified within the Mountain Rest Road Study Area, as shown on **Figure 9.6-7**. The Mohonk Preserve is approximately 8,000 acres and is a non-profit nature preserve. Approximately 1 acre of the preserve is located within the western portion of the Mountain Rest Road Study Area.

DEP has consulted with the Town of New Paltz and Ulster County, and it is DEP’s understanding that no new projects or structures that would alter views from visual or aesthetic resources are anticipated within the Mountain Rest Road Study Area within the timeframe of the

impact analysis. Natural processes, such as changes in habitat due to natural vegetative succession, are anticipated to continue. Therefore, in the future without the repair and rehabilitation, it is assumed that visual resources within the Mountain Rest Road Study Area would be the same as baseline conditions.

During construction, the repair and rehabilitation work activities within the Mountain Rest Road Study Area would be minimal and short-term (intermittently over 1.5 years). The limits of construction would be east of Mountain Rest Road and behind dense stands of trees, with retrofitting taking place within the pump station building in an area that is not visible from Mohonk Preserve. Vehicle access for construction would be provided from an existing driveway off Mountain Rest Road which heads east, away from Mohonk Preserve. Repair and rehabilitation work activities, equipment, and vehicles within the Mountain Rest Road Study Area would not disrupt views looking east from the preserve. Following completion of the repair and rehabilitation work activities, the construction equipment and vehicles would be removed from the Mountain Rest Road Study Area.

Occasional use of the access road would occur from 2019 through 2023 during the temporary chlorination period. It would consist of one truck visiting the site every few weeks to perform routine maintenance or sampling only when the system is operating and the Village of New Paltz is drawing water from the Catskill Aqueduct. Following the repair and rehabilitation, operation of the aqueduct would be consistent with baseline conditions and the local dechlorination system would no longer be operated.

As such, the repair and rehabilitation would result in minor encroachment upon visual resources, but would not affect the use or physical character of, or disrupt views from Mohonk Preserve.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to visual resources within the Mountain Rest Road Study Area.

9.6.3.5 Natural Resources

The study area for natural resources analysis is the immediate area surrounding the limits of construction, including the New Paltz Connection Chamber and New Paltz Pump Station that would house the local dechlorination system, as shown on **Figure 9.6-8**. Resources potentially occurring within the natural resources study area were identified through a desktop evaluation of NYSDEC water classification data, NYSDEC freshwater wetlands maps, USFWS National Wetlands Inventory maps, national hydrography data, published soil survey maps, and USGS topographic maps. Based on a desktop assessment, the natural resources study area includes a portion of the Catskill Aqueduct with a mowed pathway surrounded by deciduous forest. These habitats have the potential to support protected wildlife species. Therefore, an analysis of the potential effects to these species that could result from the repair and rehabilitation activities is presented below.

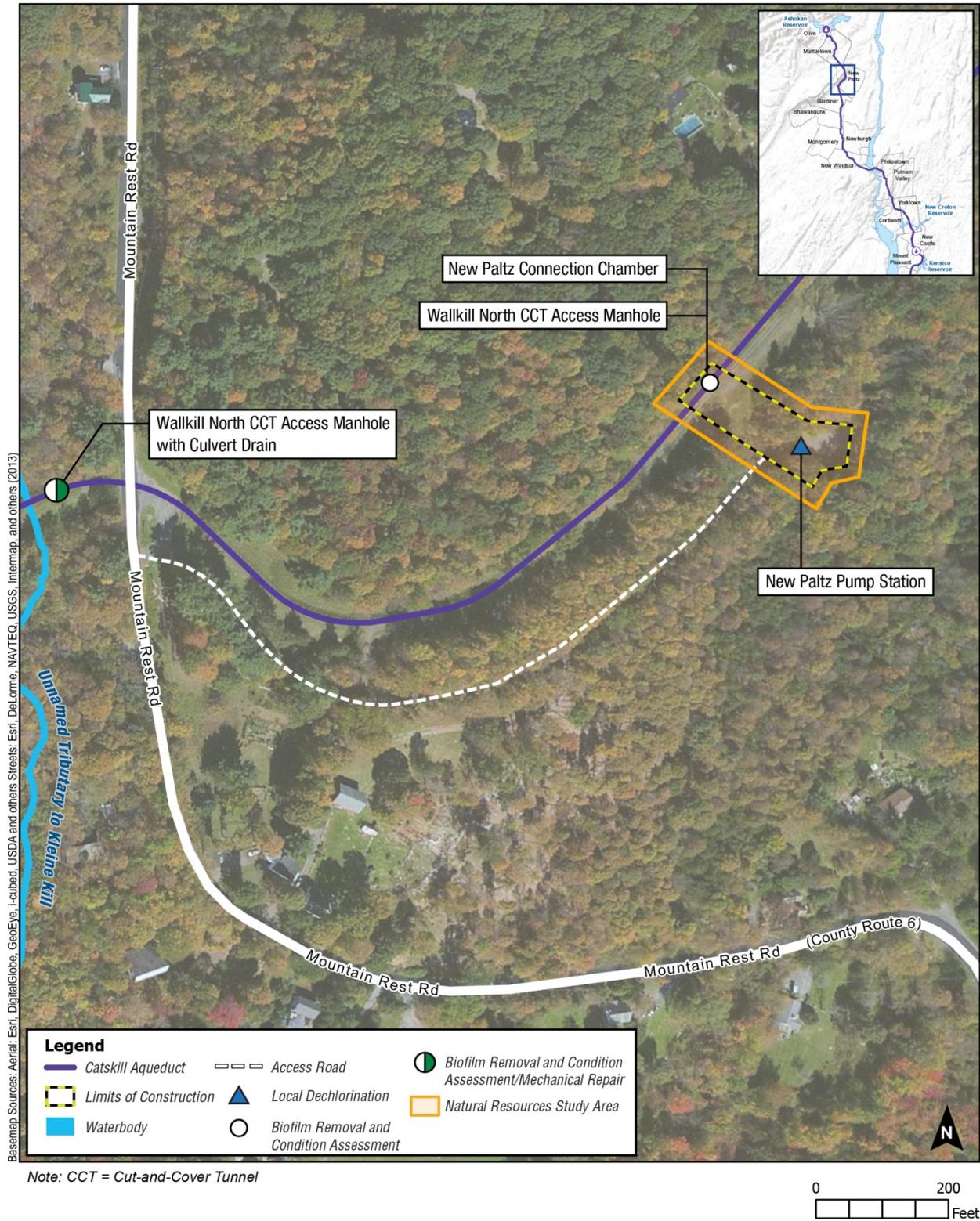


Figure 9.6-8: Natural Resources – Mountain Rest Road Study Area



Federal/State Threatened and Endangered Species and State Species of Special Concern

This section includes an analysis of potential impacts to federal/State Threatened and Endangered Species and State Species of Special Concern identified in Section 9.3.9, “Natural Resources,” as having the potential to be affected by activities within the natural resources study area. Species that could be affected within the study area and could occur up to 0.25 mile from the work sites were determined in consultation with USFWS, USACE, NYNHP, and NYSDEC as well as county and local offices, as applicable.

As discussed in Section 9.3.9, “Natural Resources,” five species were identified to have the potential to be affected by the repair and rehabilitation within the natural resources study area. Therefore, conditions in the future without the repair and rehabilitation, an analysis of the potential for impacts to these five species, and a summary of conclusions on the potential effects resulting from the repair and rehabilitation are provided below.

In the future without the repair and rehabilitation, it is assumed that federal/State Threatened and Endangered Species and State Species of Special Concern within the study area would largely be the same as baseline conditions, other than possible changes in habitat due to natural vegetative succession and general anthropogenic influences.

An analysis of the potential for disturbance to federal/State Threatened and Endangered Species and State Species of Special Concern from the repair and rehabilitation within the natural resources study area is shown in **Table 9.6-3**. The analysis included an evaluation of the repair and rehabilitation work activities within the study area and field visits, as applicable.

Table 9.6-3: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern, and Habitats within the Mountain Rest Road Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Amphibians and Reptiles					
Eastern Box Turtle	<i>Terrapene carolina</i>	Unlisted	Special Concern	Work activities would be confined to previously disturbed areas. If any isolated areas of potential habitat exist at the site, as a highly mobile species, any eastern box turtles that might otherwise use these areas are expected to instead utilize similar, adjacent habitats during construction. Furthermore, perimeter silt fencing would limit disturbance to adjacent habitat and prevent individual turtles from entering the work sites. Finally, the site would be restored to natural conditions following temporary chlorination. Therefore, there are no effects anticipated and no further analysis for eastern box turtles is warranted for this study area.	No
Eastern Hognose Snake	<i>Heterodon platyrhinos</i>	Unlisted	Special Concern	Permanent disturbance would be limited to areas previously disturbed. Should any potential habitat exist at the site, a variety of habitats would be available for the species use in the vicinity during construction. The site would be restored to natural conditions following temporary chlorination. Therefore, there are no effects anticipated and no further analysis for eastern hognose snakes is warranted for this study area.	No
Timber Rattlesnake	<i>Crotalus horridus</i>	Unlisted	Threatened	Permanent disturbance would be limited to previously disturbed areas. Should any potential habitat exist at the site, a variety of habitats would be available for the species use in the vicinity during construction. The site would be restored to natural conditions following temporary chlorination. Therefore, no further analysis for timber rattlesnakes is warranted for this study area.	No
Wood Turtle	<i>Glyptemys insculpta</i>	Unlisted	Special Concern	Permanent disturbance is limited to previously disturbed areas. Should any potential habitat exist at the site, a variety of habitats would be available for the species use in the vicinity during construction. Furthermore, perimeter silt fencing would limit disturbance to adjacent habitat and prevent individual turtles from entering the work sites. Finally, the site would be restored to natural conditions following temporary chlorination. Therefore, there are no effects anticipated and no further analysis for wood turtles is warranted for this study area.	No

Table 9.6-3: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern, and Habitats within the Mountain Rest Road Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Mammals					
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	Threatened	Threatened Unlisted	NYNHP did not identify occurrences within 2.5 miles of the study area. The pump station building could provide potential roosting habitat. A chemical injection system would be installed and operated during temporary chlorination, but would not permanently alter the structure. Should any bats or their guano be observed within these structures during work activities, USFWS and NYSDEC would be contacted immediately to determine the best course of action. Noise from work activities is possible, but unlikely to adversely affect foraging bats. Therefore, there are no effects anticipated and no further analysis for northern long-eared bats is warranted for this study area.	No

Federal/State Threatened and Endangered Species and State Species of Special Concern Conclusions

Based on the impact analysis, no take is anticipated. There would be no effects to eastern box turtles (*Terrapene carolina*), eastern hognose snakes (*Heterodon platyrhinos*), timber rattlesnakes (*Crotalus horridus*), wood turtles (*Glyptemys insculpta*), or northern long-eared bats (*Myotis septentrionalis*) associated with the repair and rehabilitation.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to federal/State Threatened and Endangered Species or State Species of Special Concern within the Mountain Rest Road Study Area.

9.6.3.6 Hazardous Materials

To evaluate the potential presence of hazardous materials within the Mountain Rest Road Study Area, a Phase I Environmental Site Assessment (ESA) was conducted in general conformance with the scope and limitations of American Society for Testing and Materials (ASTM) Practice E 1527-13 and City Environmental Quality Review (CEQR) requirements to identify Recognized Environmental Conditions (RECs). The Phase I ESA included site reconnaissance, research on current/historical use, and review of federal and State regulatory listings for both the site and neighboring properties within the appropriate search distance defined in the ASTM standard.

Based on the Phase I ESA investigations at sites within this study area, there was no indication of an environmental impact that would constitute a REC as defined by the ASTM standard that would affect activities in the study area. Additionally, there is no history of contamination at or in the vicinity of Mountain Rest Road Study where repair and rehabilitation work activities would occur. Furthermore, the proposed excavation area for the new water line extending from a potable water source to the local dechlorination system would be located on a previously disturbed section of the Catskill Aqueduct. Given the findings of previous subsurface investigation along similar portions of the aqueduct corridor, no subsurface ground contamination is anticipated.

DEP has consulted with the Town of New Paltz and Ulster County, and it is DEP's understanding that no developments or structures that would introduce hazardous materials to the environment are anticipated within the Mountain Rest Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that the presence of hazardous materials within the Mountain Rest Road Study Area would be the same as baseline conditions.

In the future with the repair and rehabilitation, work activities would require storage and use of a variety of petroleum and other chemical products, such as diesel fuel for back-up power, lubricating oil for construction vehicles, sodium bisulfite small storage drums that would be provided with a secondary containment, and miscellaneous cleaning and maintenance chemicals. The use and storage of these products would be in accordance with applicable regulatory requirements and guidelines including those relating to: federal Spill Prevention, Control, and Countermeasures requirements; and State petroleum bulk storage, chemical bulk storage, and

spill reporting requirements. Furthermore, the proposed minor excavation associated with the local dechlorination system installation would be located on a previously disturbed section of the Catskill Aqueduct.

When operational, the local dechlorination system would treat the chlorinated Catskill Aqueduct water by injecting liquefied sodium bisulfite into the pressurized pipe segment. Residual chlorine in the water would be monitored, as required, so adjustments to the dose of the chemical could be made. Sodium bisulfite is commonly used for the removal of chlorine residual in water. DEP would handle all materials in accordance with applicable federal, State, and local regulations and guidelines. Following and the repair and rehabilitation, operation of the Catskill Aqueduct would be consistent with baseline conditions.

Therefore, the repair and rehabilitation would not result in significant adverse impacts from the presence or disturbance of hazardous materials within the Mountain Rest Road Study Area.

9.6.3.7 Transportation

The study area for the transportation analysis consists of the major convergent roadways that would potentially be used by the employee and construction vehicles associated with repair and rehabilitation work activities en route to and from the Mountain Rest Road Study Area.

Access to the repair and rehabilitation limits of construction for the work sites within the Mountain Rest Road Study Area would be via Mountain Rest Road (County Route 6) which also connects to the existing access road (see **Figure 9.6-2**). Mountain Rest Road is a two-lane, two-way rural minor collector roadway. To the extent available, construction vehicles would travel on truck-permitted roadways directly to and from the Mountain Rest Road Study Area. There is no public transportation and little to no pedestrian activity in the immediate vicinity of the study area. Under current operations, DEP employees periodically access the site. However, there are no DEP employees who work at or visit the study area on a daily basis, and the small number of DEP employee vehicles has little to no effect on traffic conditions within the study area.

DEP has consulted with the Town of New Paltz and Ulster County, and it is DEP's understanding that no changes in land use or an increase in traffic due to outside developments are anticipated within the Mountain Rest Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that traffic, public transportation, and pedestrian activities within the study area would be similar to baseline conditions.

Repair and rehabilitation work activities within the Mountain Rest Road Study Area were evaluated to determine which would have the potential to generate the most vehicle trips and therefore be the basis of this transportation analysis. Of these activities, biofilm removal and condition assessment would generate the most vehicle trips. Biofilm removal and condition assessment would occur in fall ~~2020~~2019 between the hours of 7 AM and 7 PM, 7 days a week for approximately 3 weeks during the third 10-week shutdown period.

In the future with the repair and rehabilitation, construction vehicles would access the site via Mountain Rest Road. The estimated number of peak-day one-way vehicle trips associated with

the biofilm removal and condition assessment is 33 vehicle trips, or approximately 66 peak-day vehicle round trips that would travel to and from the study area. The majority of the peak daily vehicle round trips, approximately 42 vehicle round trips or 42 Passenger Car Equivalents (PCEs), would be workers traveling directly to and from the staging area. There could be an additional 8 daily shuttle trips between the study area and the staging area. The remaining approximately 16 peak-day vehicle round trips (21 PCEs) would be trucks or other construction vehicles.

During a peak day, the estimated number of peak-hour vehicle trip ends associated with biofilm removal and condition assessment is approximately 33 peak-hour vehicle trip ends (36 PCEs). This includes approximately 21 vehicle trip ends (21 PCEs) from workers traveling directly to and from the staging area, approximately 4 peak-hour shuttle trips between the study area and the staging area, and approximately 8 vehicle trip ends (11 PCEs) from trucks or other construction vehicles. For the purpose of this analysis, the peak-hour project-generated vehicles are anticipated to coincide with typical construction hours for employee vehicles entering the site. Assuming one 12-hour shift, this would be from 6 AM to 7 AM, and would be unlikely to coincide with the peak hour for existing traffic.

The repair and rehabilitation would result in approximately 36 peak-hour PCEs along Mountain Rest Road, which is below the *CEQR Technical Manual* screening threshold of 50 peak-hour PCEs as described in Section 9.3.13, "Transportation." The work activities at the Mountain Rest Road Study Area would be short-term (totaling 12 weeks over 1.5 years; see **Table 9.6-2**) and would not generate public parking or transportation demands or pedestrian activity within the Mountain Rest Road Study Area. Following completion of the repair and rehabilitation, traffic patterns would return to baseline conditions.

Therefore, although there would be a minor temporary increase in traffic, the repair and rehabilitation would not result in significant adverse impacts to transportation within the Mountain Rest Road Study Area.

9.6.3.8 Noise

As described in Section 9.3.15, "Noise," mobile noise associated with the repair and rehabilitation within the Mountain Rest Road Study Area does not warrant analysis. This section includes an analysis of potential impacts from stationary noise associated with the repair and rehabilitation to sensitive receptors within the Mountain Rest Road Study Area.

The study area for the stationary noise analysis is the area within 1,500 feet of the repair and rehabilitation work activities as shown on **Figure 9.6-9**.

The Mountain Rest Road Noise Study Area includes residential parcels within 1,500 feet of the repair and rehabilitation work sites that are considered noise-sensitive receptors for this analysis. The temporary work activities were evaluated to determine compliance with the local noise code. The repair and rehabilitation within the Mountain Rest Road Study Area is subject to the Town of New Paltz Noise Control Law. The Town of New Paltz Noise Control Law (§100-3.B) prohibits construction work between the hours of 8 PM and 7 AM, specifically the operation of pile drivers, steam shovels, pneumatic hammers, derricks, hoists, or other equipment that creates loud or unusual noise.

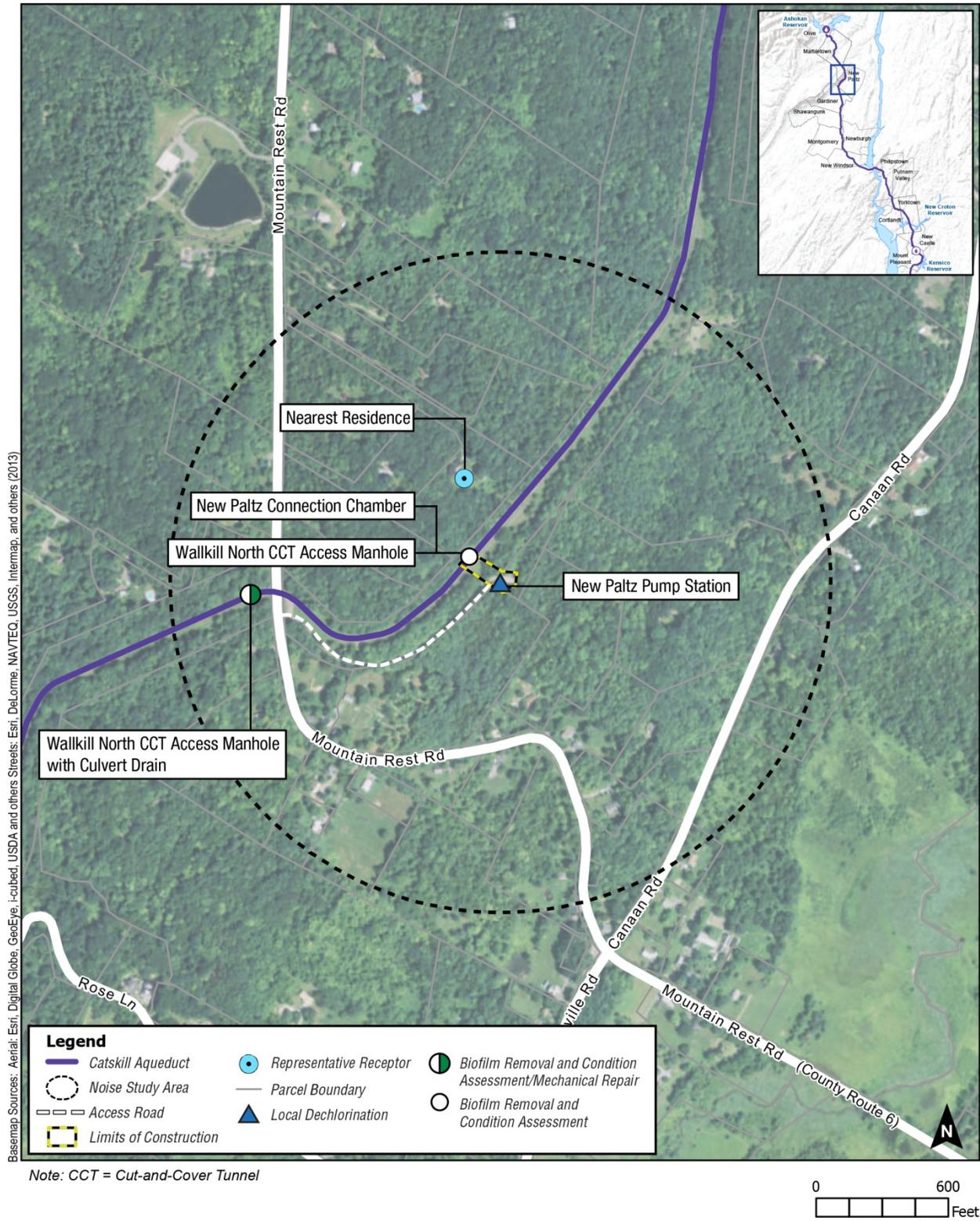


Figure 9.6-9: Noise – Mountain Rest Road Study Area



Existing ambient noise levels within the Mountain Rest Road Study Area are influenced by vehicular traffic traveling on Mountain Rest Road and other local roadways. The existing noise levels within the study area are comparable to a very quiet suburban and rural residential environment based on the distance from major transportation corridors, the population density of the area, and the presence of other noise-producing elements. Typical noise levels (measured as L_{eq}) for very quiet suburban and rural communities are 40 dBA during the daytime and 34 dBA during the nighttime.

DEP has consulted with the Town of New Paltz and Ulster County, and it is DEP’s understanding that no major projects that would result in a change in land use, or new noise-generating sources that would contribute to an increase in ambient noise levels are anticipated within the Mountain Rest Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that ambient noise levels within the Mountain Rest Road Study Area would be similar to baseline conditions.

In the future with the repair and rehabilitation, stationary noise-producing work activities would occur at one site. The stationary noise-generating equipment associated with installation of the local dechlorination system would operate indoors. Therefore, noise outside of the building would be limited. Dechlorination system installation would occur in summer ~~2019~~2018 between the hours of 7 AM and 5 PM, Monday through Friday for approximately 6 weeks prior to the second 10-week shutdown. **Table 9.6-4** lists the three loudest stationary noise-generating equipment types associated with the dechlorination system installation that would operate indoors.

Table 9.6-4: Stationary Source Construction Equipment Modeled at the Mountain Rest Road Study Area - Noise Analysis and Reference Noise Levels (L_{eq})

Equipment Type	Reference Noise Level (L_{eq}) at 50 feet (dBA)
Pneumatic Tools	82
Generator	82
Backhoe	76
Note: ¹ <i>City Environmental Quality Review (CEQR) Technical Manual, Chapter 22.</i>	

Following completion of the repair and rehabilitation activities, the construction equipment and vehicles would be removed from the Mountain Rest Road Study Area. The repair and rehabilitation work activities would be temporary with peak work activities occurring during dechlorination system installation in summer ~~2019~~2018 for a limited period (e.g., 6 weeks).

Therefore, although there would be a temporary increase in noise, noise from the repair and rehabilitation would not result in significant adverse impacts to sensitive receptors within the Mountain Rest Road Study Area.

9.6.3.9 Neighborhood Character

The character of the Mountain Rest Road Study Area is largely defined by a mix of residential, public services, open space and recreation, and vacant land uses and its physical setting within a rural location (see **Figure 9.6-4**). The Catskill Aqueduct traverses the study area in a general east to west direction. Mountain Rest Road traverses the western portion of the study area, paralleling an unnamed tributary to Kleine Kill flowing to the south.

DEP has consulted with the Town of New Paltz and Ulster County, and it is DEP's understanding that no changes in land use and no new projects or structures are anticipated within the Mountain Rest Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that neighborhood character within the study area would be similar to baseline conditions.

The limits of construction for the work sites and associated access routes are located in a public services corridor with tree cover, which is owned and maintained by DEP. As described in Section 9.3.16, "Neighborhood Character," there would be no potential for the repair and rehabilitation to affect shadows and urban design. In addition, based on the screening assessment for land use and zoning; socioeconomic conditions; and historic and cultural resources, an impact analysis for the Mountain Rest Road Study Area is not warranted, as discussed in the following sections: Section 9.3.3, "Land Use, Zoning, and Public Policy," Section 9.3.4, "Socioeconomic Conditions," and Section 9.3.7, "Historic and Cultural Resources," respectively. As described in Section 9.6.3.3, "Open Space and Recreation," and Section 9.6.3.4, "Visual Resources," the work activities would not affect open space and recreation and visual resources in the Mountain Rest Road Study Area. Furthermore, the public policy impact analysis provided in Section 9.6.2, "Town of New Paltz Impact Analysis," concluded the work activities were consistent with applicable plans.

As described in Sections 9.6.3.7, "Transportation," and 9.6.3.8, "Noise," the work activities in the Mountain Rest Road Study Area would be short-term (intermittently over 1.5 years) and would result in a temporary increase in traffic and noise. Following completion of the repair and rehabilitation, the construction equipment and vehicles would be removed from the study area and traffic patterns would return to baseline conditions. These temporary increases in traffic and noise levels would not result in a density of activity or service conditions that would affect the overall character of the study area.

The repair and rehabilitation would not generate significant adverse effects in land use, zoning, and public policy; socioeconomic conditions; open space and recreation; shadows; historic and cultural resources; urban design and visual resources; transportation; or noise.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to neighborhood character within the Mountain Rest Road Study Area.

9.6.4 NEW PALTZ-MINNEWASKA ROAD STUDY AREA IMPACT ANALYSIS

Within the New Paltz-Minnewaska Road Study Area, the aqueduct consists of the Wallkill North Cut-and-Cover Tunnel, transitioning to the Wallkill Pressure Tunnel via a deep vertical shaft at the Wallkill Pressure Tunnel Downtake Chamber (Wallkill Downtake Chamber), which is

equipped with a boathole at its north end. Also located in this study area is the Poor Farm Arch Bridge, which supports the cut-and-cover tunnel as it passes over Kleine Kill. A leak emanating from the bridge structure and entering Kleine Kill (the Poor Farm Arch Leak) has been identified at this location. An access manhole along the cut-and-cover tunnel is located just south of the Poor Farm Arch Bridge (see **Figure 9.6-10**).

Work activities within the New Paltz-Minnewaska Road Study Area would include: staging and access improvements; internal leak repair; bridge repair; boathole preparation and installation; air vent installation; biofilm removal and condition assessment; and large-scale wash water treatment.

9.6.4.1 Study Area Location and Description

The New Paltz-Minnewaska Road Study Area is located along the upper Catskill Aqueduct in the Town of New Paltz, with a small part of its southern end extending into the Town of Gardiner, Ulster County. The Catskill Aqueduct traverses the study area in a northeast to southwest direction. Kleine Kill, a tributary to Wallkill River, traverses the northern portion of the study area. The study area is bounded to the south by New Paltz-Minnewaska Road (also known as State Route 299 and County Route 8), a heavily traveled two-lane arterial, and to the northeast by Lenape Lane, a local roadway.

Proposed work sites within the study area include one at the Poor Farm Arch Bridge, one at the access manhole just south of the Poor Farm Arch Bridge, and one at the Wallkill Downtake Chamber. Access to the Wallkill Downtake Chamber would occur via New Paltz-Minnewaska Road to an existing gravel access road. Access to the two work sites at the north end of the study area would be provided by this same route and then by driving north on top of the cut-and-cover tunnel. The study area boundary is located approximately 400 feet beyond the outermost areas of disturbance related to the work sites. **Figure 9.6-10** shows an aerial photograph of the study area, including the path of the aqueduct, limits of construction for each work site, and the proposed access route. **Figure 9.6-11** and **Figure 9.6-12** show photographs of the study area.

A small portion of the Lake Mohonk Mountain House Complex, listed on the National Register of Historic Places, is located in the study area. There are no other federal, State, or local designated historic districts, landmarks, or known archeological resources within the study area.

9.6.4.2 Description of Existing Poor Farm Arch Bridge and Leak

The Poor Farm Arch Bridge is a concrete bridge structure with stone masonry facing crossing the Kleine Kill. Approximately 40 feet of the Wallkill North Cut-and-Cover Tunnel is enclosed by the bridge. During a November 2014 inspection, areas of deteriorated concrete, corroded support structures, and surface defects were documented at various locations within the concrete arch. Access to the underside of the arch is via difficult terrain and steep slopes from the top of the bridge.

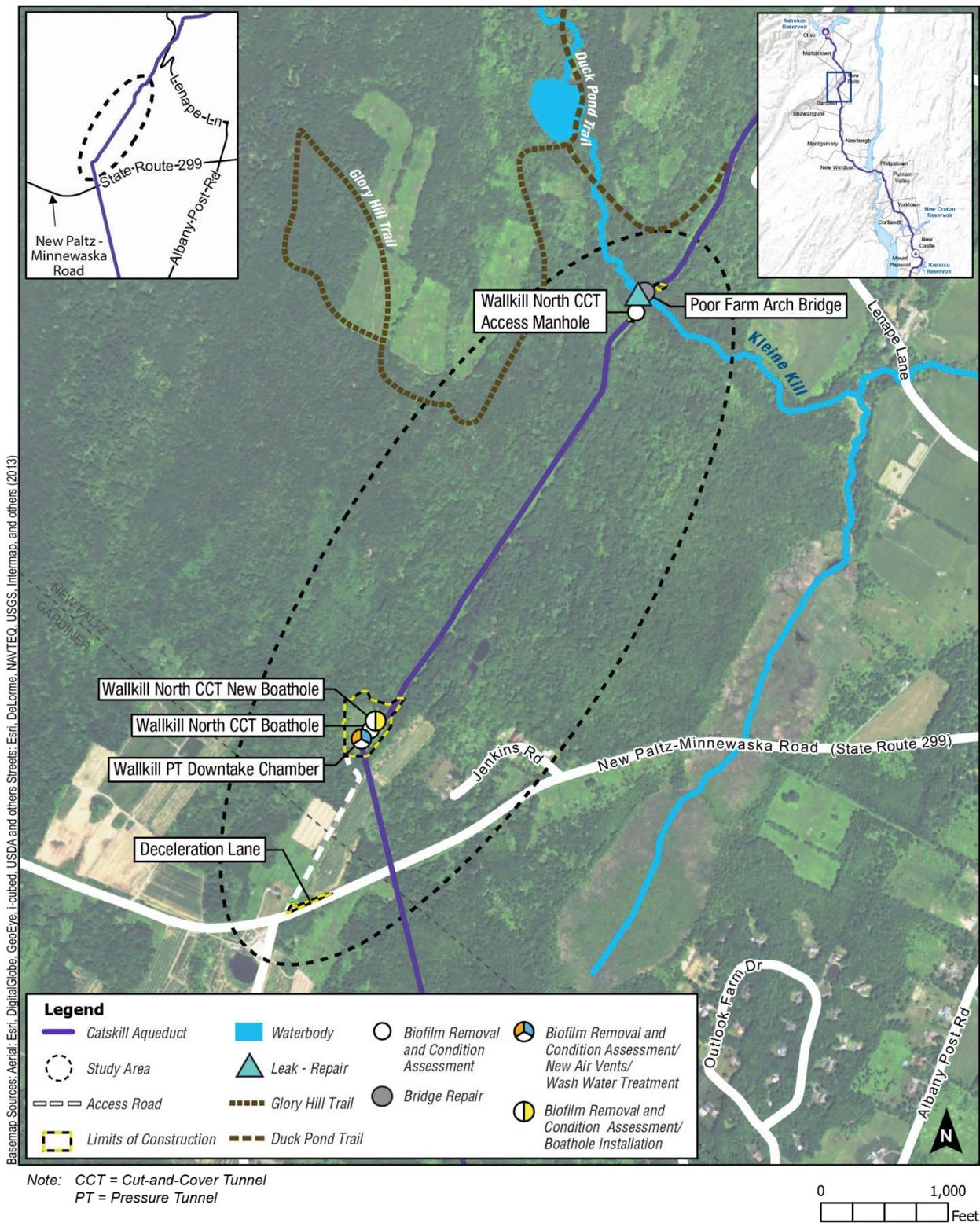


Figure 9.6-10: Study Area – New Paltz-Minnewaska Road





Photograph 1: Wallkill Downtake Chamber looking northeast.



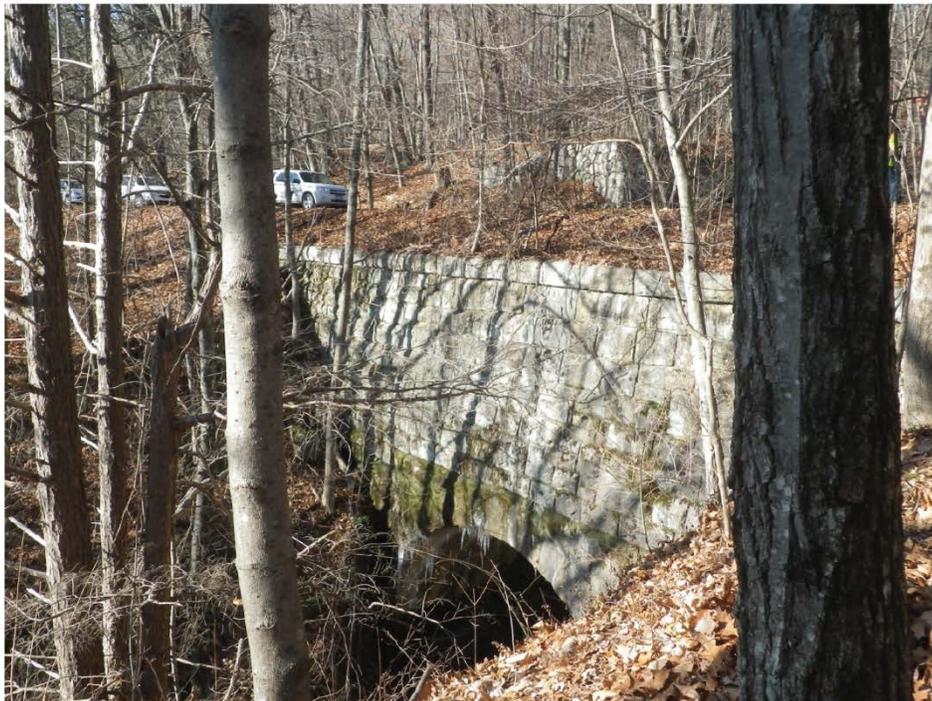
Photograph 2: Looking west (mainly) from Wallkill Downtake Chamber.

Figure 9.6-11: Photographs – New Paltz-Minnewaska Road Study Area





Photograph 3: View of existing boathole from the ground surface.



Photograph 4: Poor Farm Arch Bridge, facing southwest.

Figure 9.6-12: Photographs – New Paltz-Minnewaska Road Study Area



The Poor Farm Arch Leak results from cracks at construction joints along the interior of the tunnel and root infiltration north of the bridge. The leak discharges approximately 0.7 gpm (or approximately 1,000 gpd) to Kleine Kill. Because the leak expresses from the concrete bridge abutment directly to the stream below, there is no associated overland flowpath.

9.6.4.3 Proposed Activities within the New Paltz-Minnewaska Road Study Area

To support activities within the New Paltz-Minnewaska Road Study Area, the Ashokan Screen Chamber, in the Town of Olive (see Section 9.4.3, “Ashokan Screen Chamber Study Area Impact Analysis”), would serve as a primary staging area from which workers would be transported to the site daily. Several secondary staging areas, including one at the Wallkill Downtake Chamber, would provide additional parking. Equipment and materials would be staged on site. Erosion and sediment control measures such as silt fencing and hay bales would be installed at the perimeter of the work sites as needed. Site plans showing layouts of the limits of construction for the work sites, which would occupy a total of 4.0 acres, are shown on **Figure 9.6-13**, **Figure 9.6-14**, and **Figure 9.6-15**. The schedule for work within the study area is shown in **Table 9.6-5**. The duration of active construction within the New Paltz-Minnewaska Road Study Area is estimated to total 39 weeks over 2.5 years, with some overlapping work activities.

Work in the study area would begin with internal repair of the Poor Farm Arch Leak during the first 10-week shutdown in fall ~~2018~~2017. Although the aqueduct would be unwatered during this shutdown, any upstream residual water in the aqueduct would be conveyed downstream using a pipe to bypass the work area. To conduct the leak repair, grout would be applied over an approximately 100-foot length of tunnel following a small amount of localized biofilm removal and inspection of the tunnel wall for additional cracks.

Staging and access improvements would take place in spring or summer ~~2019~~2018. Improvements would entail construction of a new deceleration lane along the westbound side of New Paltz-Minnewaska Road to facilitate access to the Wallkill Downtake Chamber. The deceleration line would be up to 12 feet wide with an 8 foot shoulder and approximately 180 feet long. Grading and leveling of the access road would be required, in addition to grading at the northwest corner of the Wallkill Downtake Chamber work site. Work zone traffic controls including flaggers would be used along New Paltz-Minnewaska Road during construction if construction of the deceleration lane is not feasible.

The removal of up to 10 trees, and underbrush clearing and gravel placement for leveling and erosion control would also occur. The staging area to the north of the Poor Farm Arch Bridge is currently used for routine maintenance. It would be expanded to approximately 600 square feet to serve as a truck turnaround and to support work at the bridge.

Table 9.6-5: Schedule of Work Activities within the New Paltz-Minnewaska Road Study Area

Work Activity	Dates	Duration	Work Hours ¹	Crew Size ²
Internal Leak Repair	Fall 2018 2017 (First 10-week shutdown)	5 weeks	7 days a week, 24 hours per day	10
Staging and Access Improvements ³	Spring or Summer 2019 2018	10 weeks	Monday to Friday, 7 AM to 5 PM	8
Bridge Repair	Summer 2019 2018	6 weeks	Monday to Friday, 7AM to 5PM	13
Boathole Preparation	Summer 2019 2018	3 weeks	Monday to Friday, 8AM to sunset	10
Boathole Installation	Fall 2019 2018 (Second 10-week shutdown)	2 weeks	7 days a week, 7AM to 7PM	8
Air Vent Installation	Fall 2019 2018 (Second 10-week shutdown)	3 weeks	7 days a week, 7AM to 7PM	8
Biofilm Removal and Condition Assessment ⁴	Fall 2020 2019 (Third 10-week shutdown)	2 weeks	7 days a week, 7AM to 7PM	21
Large-scale Wash Water Treatment ⁴	Fall 2020 2019 (Third 10-week shutdown)	10 weeks	7 days a week, 24 hours per day	7

Notes:

¹ Work hours while the aqueduct is in service would be adjusted to meet local regulations where possible, per the Town of Gardiner Noise Control Law §220-40.C.

² Crew size refers to the number of people anticipated at the work site(s).

³ Tree removal would be conducted from November 1 through March 31 to avoid impacts to Indiana bats (*Myotis sodalis*) and northern long-eared bats (*Myotis septentrionalis*).

⁴ Overlapping activities are estimated to total 2 weeks and are not included in the duration of active construction.

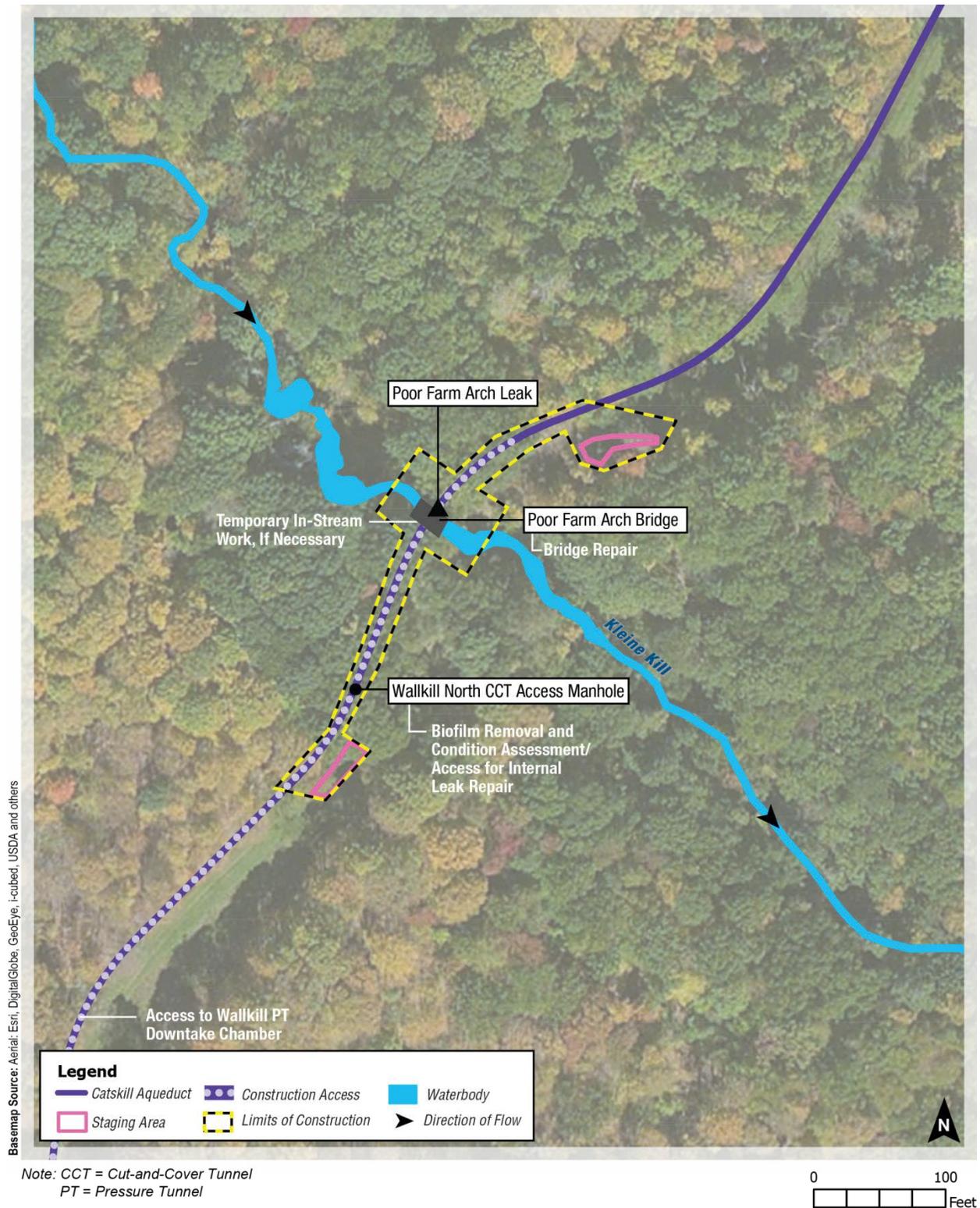


Figure 9.6-13: Site Plan for Poor Farm Arch Bridge – New Paltz-Minnewaska Road Study Area



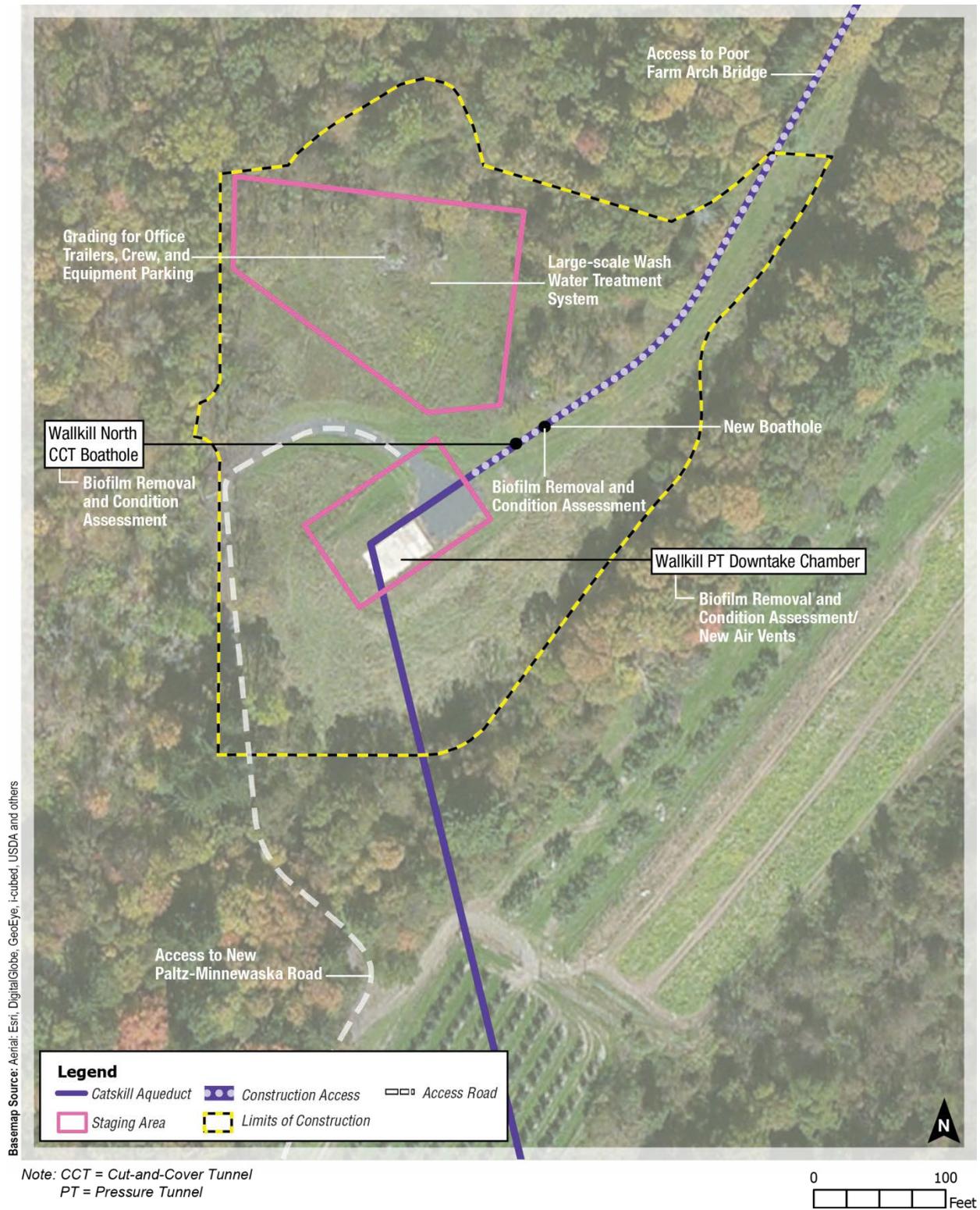


Figure 9.6-14: Site Plan for Walkkill PT Downtake Chamber – New Paltz-Minnewaska Road Study Area



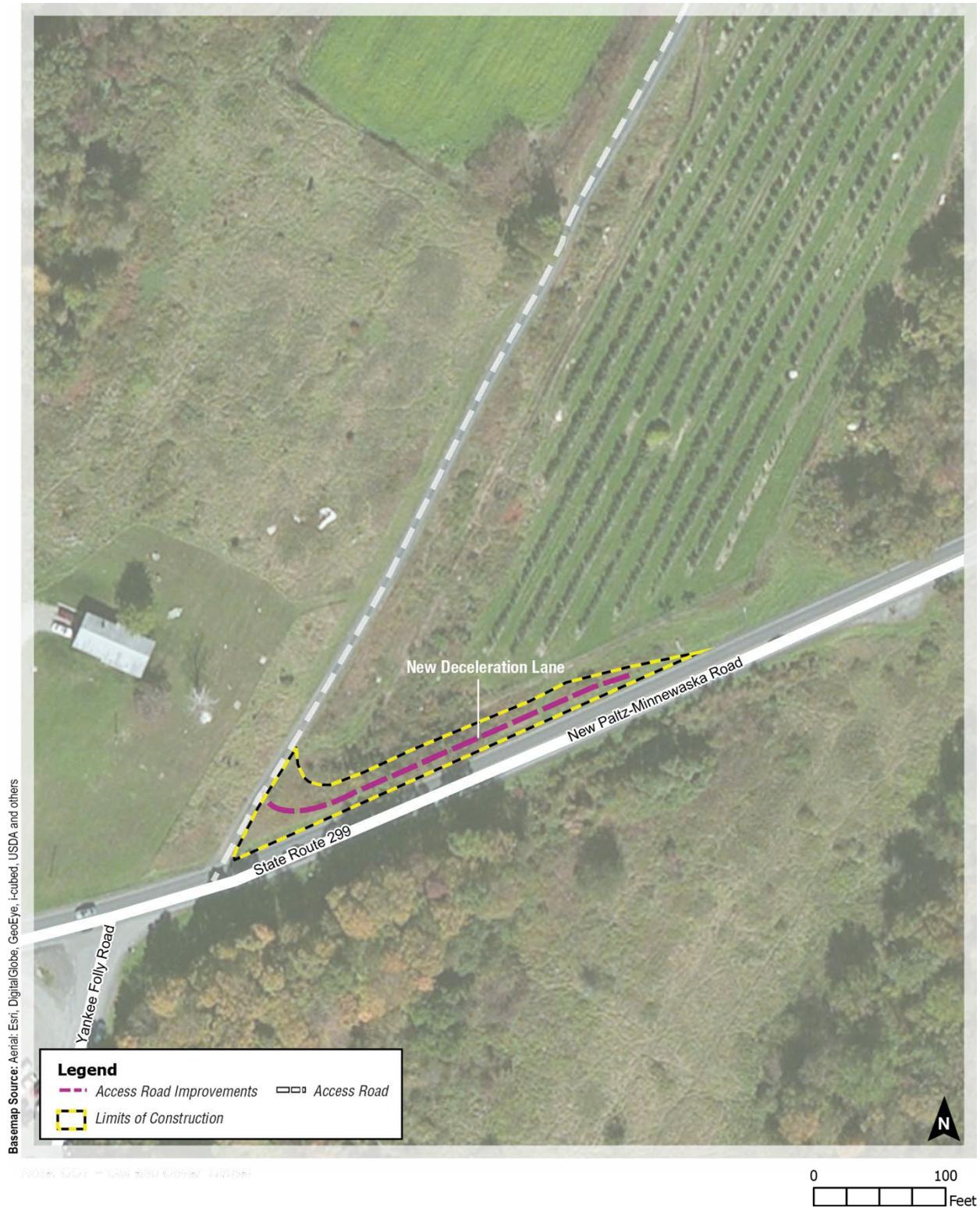


Figure 9.6-15: Site Plan for Deceleration Lane – New Paltz-Minnewaska Road Study Area



Following these improvements, exterior repairs would be made to the bridge structure. Work would entail inspection of the bridge structure and repairs to corroded support structures, deteriorated concrete, and other surface defects as described further in Section 9.6.4.2, “Description of Existing Poor Farm Arch Bridge and Leak.” All repairs would be in-kind and would not alter the external appearance of the bridge. Because the exterior of the bridge is not easily accessible, bridge repairs would require installation of temporary scaffolding and rigging spanning the Kleine Kill, or the use of specially-equipped trucks to allow access to elevated portions of the bridge structure (e.g., snooper trucks). A turbidity curtain would be installed to prevent sediment from moving downstream. Temporary in-stream disturbance would cover a total area of approximately 620 square feet. There would be no permanent in-stream disturbance.

In addition to the bridge repair work, preparation of the new boathole upstream of the Wallkill Downtake Chamber would also take place in summer ~~2019~~2018. The work would consist of the excavation of approximately 45 cubic yards of soil and construction of a cast-in-place concrete collar. Boathole installation, which requires unwatering of the aqueduct to tie into the crown of the cut-and-cover tunnel, would take place during the second 10-week shutdown in fall ~~2019~~2018.

Air vent installation would also occur during the second 10-week shutdown. Three air vent structures would be delivered to the site and mounted on a concrete slab, which would replace an existing removable concrete slab on top of the Wallkill Downtake Chamber. Minor excavation of approximately 18 inches of soil may be required to access the existing opening.

Lastly, biofilm removal and condition assessment would occur during the third 10-week shutdown in fall ~~2020~~2019. Access into the aqueduct would be provided by the new boathole, the access manhole, and the existing boathole at the Wallkill Downtake Chamber. These locations would also serve as collection points for biofilm, which would be transported for disposal at a registered, permitted, or otherwise authorized facility. Although the aqueduct would be unwatered during this shutdown, any residual water would be diverted through an internal bypass pipe around the work segments within the aqueduct for discharge to the aqueduct downstream. Any residual water that does not meet water quality standards, and any wash water generated from biofilm removal would be delivered to a wash water treatment system that would be established at the site. The wash water would be treated to meet water quality standards for discharge back into the aqueduct (see Section 9.2, “Project Description”). The treatment system would require 24-hour operation to process the anticipated volume of wash water. To reduce truck trips during the weekend, biofilm removed from the aqueduct in this study area would be stockpiled over the weekend at the Wallkill Downtake Chamber and removed from the site Monday through Friday. Upon completion of biofilm removal and condition assessment, all equipment and materials would be removed, and any areas requiring temporary disturbance would be restored to baseline conditions.

Impact categories analyzed for the New Paltz-Minnewaska Road Study Area are presented below in Sections 9.6.4.4, “Land Use and Zoning,” through 9.6.4.13, “Neighborhood Character,” and include land use and zoning; socioeconomic conditions; open space and recreation; historic and cultural resources; visual resources; natural resources including water resources, terrestrial resources, and federal/State Threatened and Endangered Species and State Species of Special

Concern; hazardous materials; transportation; stationary noise; and neighborhood character. Additionally, the study area's compatibility with applicable public policies was analyzed on a town-wide basis in Section 9.6.2, "Town of New Paltz Impact Analysis." As described in Section 9.3, "Screening Assessment and Impact Analysis Methodology," an impact analysis related to community facilities and services; the remaining natural resources subcategories, including geology and soils, aquatic and benthic resources, wildlife, federal/State Candidate Species and unlisted rare and vulnerable species; energy; air quality; and mobile noise; within the study area is not warranted. Finally, impacts related to project-wide natural resources, water and sewer infrastructure, and public health were analyzed within Section 9.19, "Project-wide Impact Analysis."

9.6.4.4 Land Use and Zoning

The study area is predominately open space and recreation, vacant, and public services (Catskill Aqueduct) land uses, in addition to portions of agricultural, residential, and commercial land uses (see **Figure 9.6-16**). The Wallkill Downtake Chamber is located within a public services corridor which is owned and maintained by DEP. The work sites near Poor Farm Arch Bridge are partially located on open space property owned by Ulster County. Access to these work sites would require crossing a parcel with permission from the owners.

The study area contains four zoning districts, including agricultural (A-3) as designated by the Town of New Paltz Zoning Code, rural agriculture (RA) zoning district as designated by the Town of Gardiner Zoning Code, and Shawangunk Ridge Protection zoning districts (SP-1 and SP-3) (see **Figure 9.6-17**). The Catskill Aqueduct is a permitted use as a public utility within the rural agricultural (RA) and agricultural zoning (A-3) districts.

DEP has consulted with the Towns of New Paltz and Gardiner and Ulster County, and it is DEP's understanding that no major projects or programs are planned that would change land use or zoning in the New Paltz-Minnewaska Road Study Area within the timeframe of the repair and rehabilitation impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that land use and zoning within the New Paltz-Minnewaska Road Study Area would be similar to baseline conditions.

The repair and rehabilitation would require the acquisition of 0.7 acre of undeveloped land owned by Ulster County. The subject parcel is identified on the Ulster County Tax Map as Tax ID 86.1-1-41. The City would use the acquired land for pedestrian access by workers to a portion of the Catskill Aqueduct located on adjacent lands. The condition of the parcel is not anticipated to change as a result of the proposed acquisition. The parcel is currently vacant and zoned agricultural (A-3). Under the agricultural (A-3) zoning designation, parcels may be used for residential dwellings, agriculture, or a home occupation as of right; lots are to be a minimum of 3 acres in size unless in a cluster development. Additionally, the subject parcel has no road frontage, so it would not be eligible for further subdivision as zoned. The proposed acquisition would be consistent with adjacent land uses, conforms to the existing zoning regulations, and would not result in residential or business displacement.

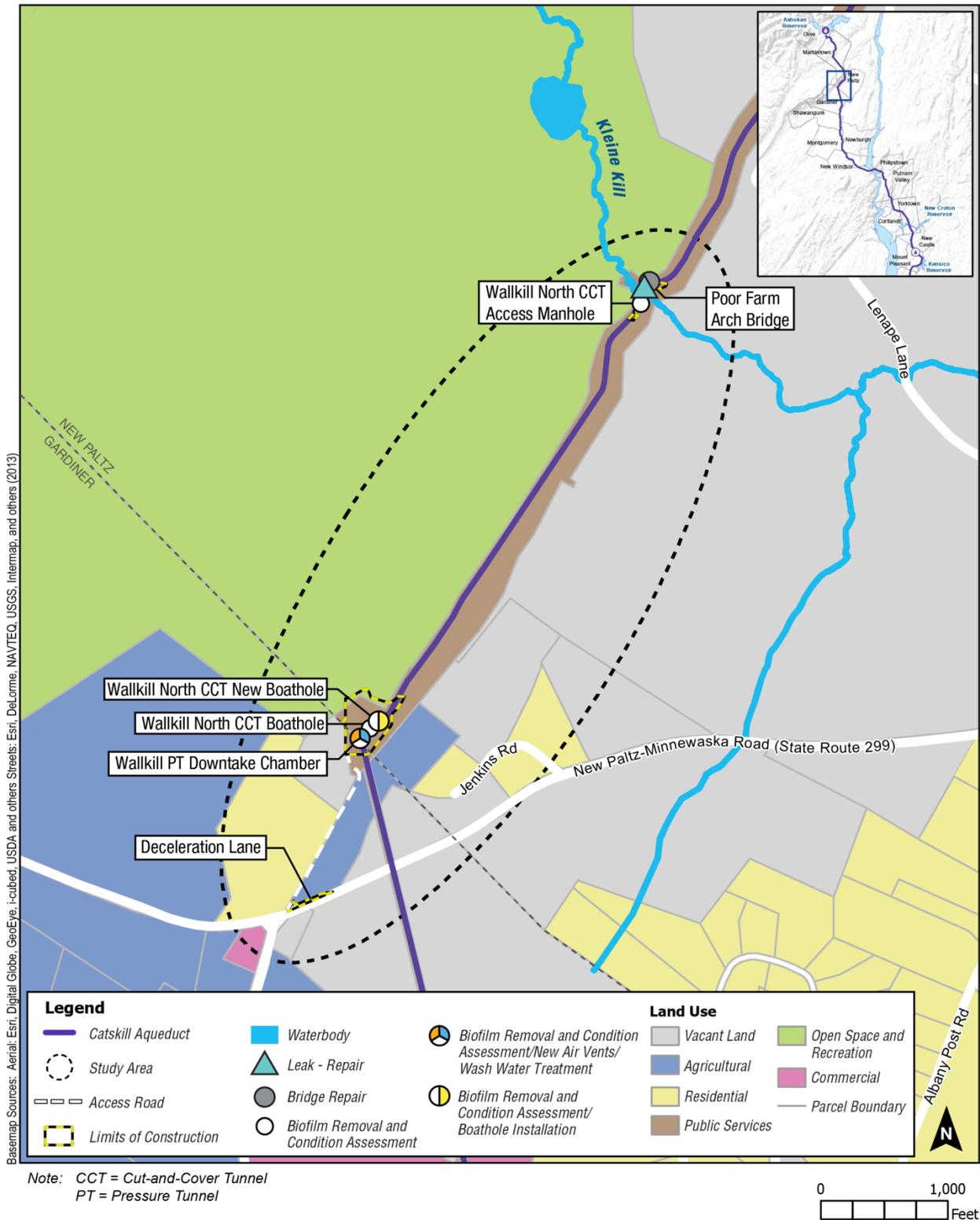


Figure 9.6-16: Land Use – New Paltz-Minnewaska Road Study Area



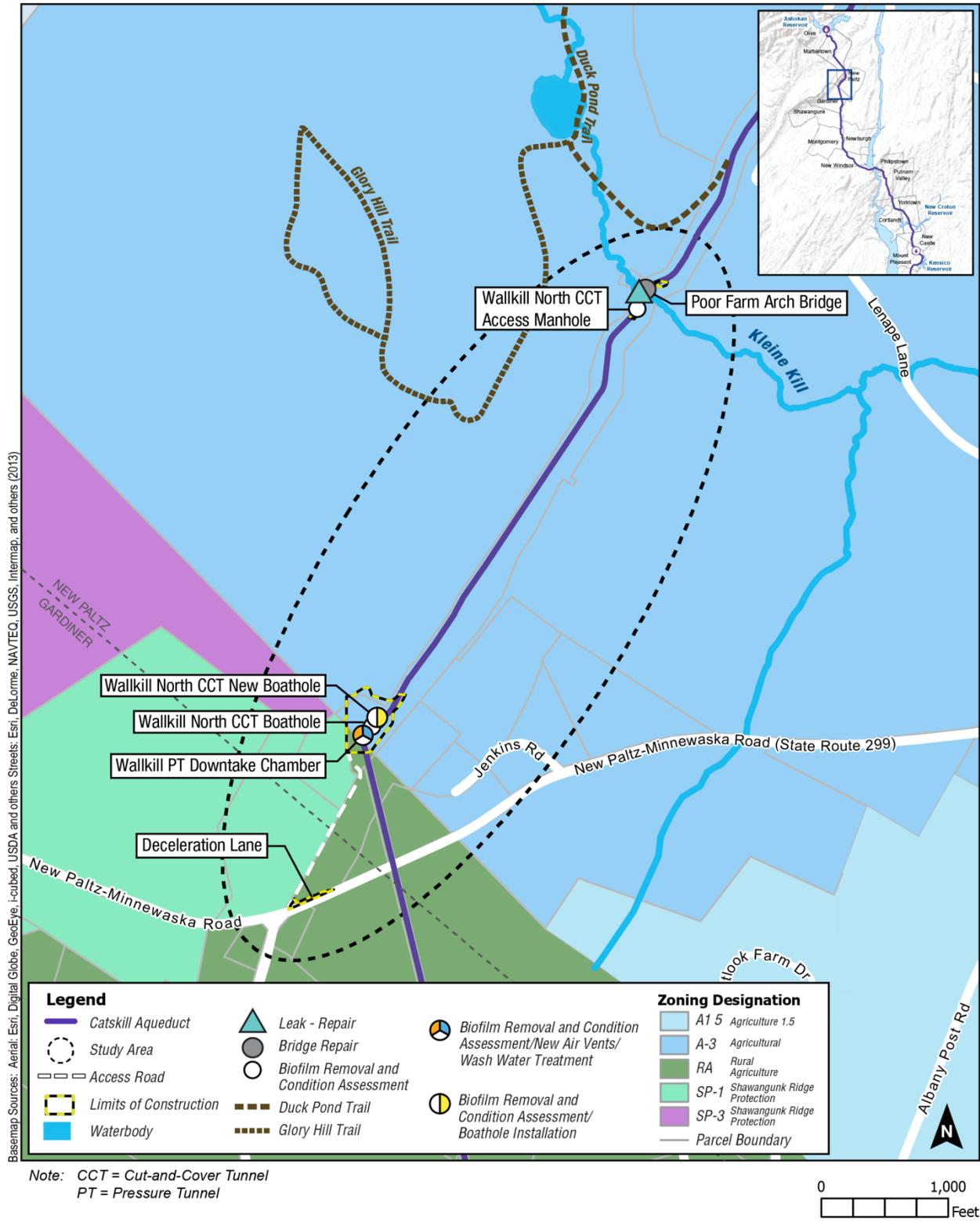


Figure 9.6-17: Zoning – New Paltz-Minnewaska Road Study Area



Following construction, all equipment would be removed from the New Paltz-Minnewaska Road Study Area and staging areas would be restored to baseline conditions. Operation of the Catskill Aqueduct would be consistent with baseline conditions and would conform with adjacent land uses and zoning.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to land use or zoning within the New Paltz-Minnewaska Road Study Area.

9.6.4.5 Socioeconomic Conditions

The study area is predominately open space and recreation, vacant, and public services (Catskill Aqueduct) land uses, in addition to portions of agricultural, residential, and commercial land uses (see **Figure 9.6-16**). It is primarily forested, with low-density residential areas and agricultural fields in the south. The Walkkill Downtake Chamber is accessed by crossing a private property. Poor Farm Arch Bridge is accessed by driving on top of the Catskill Aqueduct from the Walkkill Downtake Chamber or by crossing a vacant parcel owned by Ulster County.

DEP has consulted with the Towns of New Paltz and Gardiner and Ulster County, and it is DEP's understanding that no major developments or programs are planned within the New Paltz-Minnewaska Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that land use, population, housing, and economic activity within the New Paltz-Minnewaska Road Study Area would be similar to baseline conditions.

As described in Section 9.6.4.4, "Land Use and Zoning," the repair and rehabilitation would require the acquisition of 0.7 acre of vacant land owned by Ulster County. Ulster County does not currently pay taxes on the parcel. Subsequent to the transfer of the parcel, DEP would pay property taxes on the parcel.

Construction and access would partially occur within this vacant land proposed for acquisition. Following construction, all equipment would be removed and staging areas would be restored to baseline conditions. The land acquired by DEP would be converted to public utility use, which would not create any significant impacts to the existing landowner. The proposed acquisition would not preclude future development of the remaining portion of the parcel. As a result, the repair and rehabilitation would not directly displace businesses (or employees) or residences.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to socioeconomic conditions within the New Paltz-Minnewaska Road Study Area.

9.6.4.6 Open Space and Recreation

As shown on **Figure 9.6-18**, two open space and recreation resources exist within the New Paltz-Minnewaska Road Study Area: the Mohonk Preserve and the Glory Hill Trail. Approximately 86 acres of the Mohonk Preserve are located within the western portion of the New Paltz-Minnewaska Road Study Area.

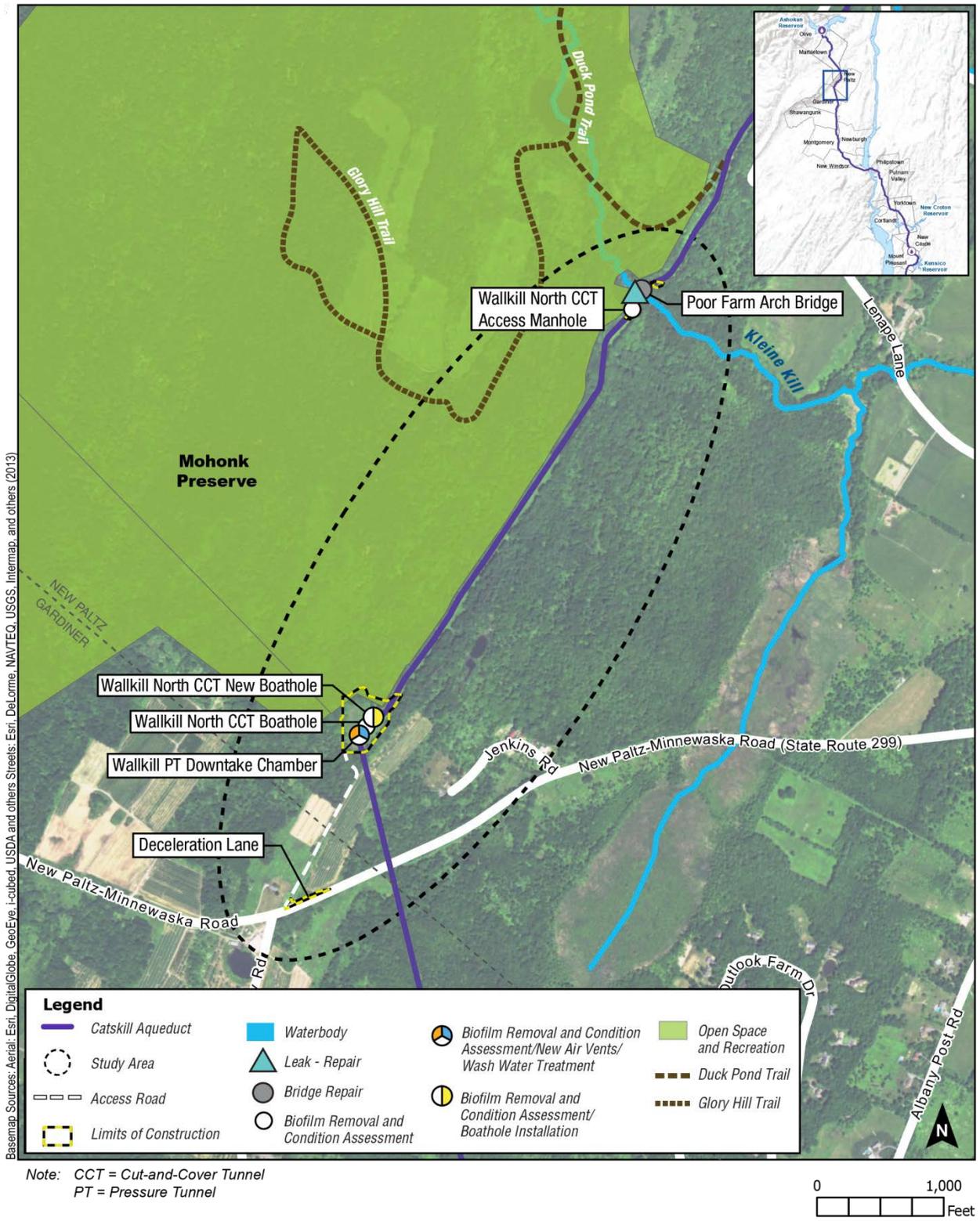


Figure 9.6-18: Open Space and Visual Resources – New Paltz-Minnewaska Road Study Area



In total, the Mohonk Preserve is approximately 8,000 acres and is a non-profit nature preserve used for outdoor recreation such as hiking, picnicking, snowshoeing, and biking. The entrance to the Visitor Center Trailhead of the Mohonk Preserve is located at 3197 State Route 55, Gardiner, New York. As shown on **Figure 9.6-18**, a segment of a Lake Mohonk Mountain House Complex mapped hiking trail, the Glory Hill Trail, is located within the study area, west of the Poor Farm Arch Bridge, and outside the limits of construction for the work sites. Other informal trails may exist in the study area. However, those trails are not mapped and formally maintained. The Glory Hill Trail may have limited views of the Poor Farm Arch Bridge through the densely forested area along the trail. Duck Pond Trail, located within the Mohonk Preserve and outside the study area, provides access to the Glory Hill Trail.

DEP has consulted with the Towns of New Paltz and Gardiner and Ulster County, and it is DEP's understanding that no plans to expand or create new open spaces or recreational resources are anticipated within the New Paltz-Minnewaska Road Study Area within the timeframe of the impact analysis. Natural processes, such as changes in habitat due to natural vegetative succession, are anticipated to continue. Use of the identified open spaces is anticipated to continue. Therefore, in the future without the repair and rehabilitation, it is assumed that open space and recreation within the New Paltz-Minnewaska Road Study Area would be the same as baseline conditions.

Repair and rehabilitation work activities in the area of the Wallkill Downtake Chamber would be farther from the Glory Hill Trail and would be screened from view from the trail by the surrounding forested land. Other informal trails may exist closer and have views to the Wallkill Downtake Chamber and Poor Farm Arch Bridge; although, repair and rehabilitation work activities would not impact access to those informal trails.

During construction, the repair and rehabilitation work activities within the New Paltz-Minnewaska Road Study Area would be short-term (totaling 39 weeks over 2.5 years, see **Table 9.6-5**). There are two proposed staging areas for repair and rehabilitation work activities related to the Poor Farm Arch Bridge (leak and bridge repairs). The northernmost staging area is located approximately 800 feet from the Glory Hill Trail and approximately 450 feet from the historic Duck Pond Trail, located outside of the study area. An informal trail crosses the aqueduct immediately north of Poor Farm Arch Bridge.

Work activities for Poor Farm Arch Bridge are outside the Mohonk Preserve and would not disrupt use of the preserve. However, they may temporarily affect views from informal trails due to minor tree clearing and shrub removal adjacent to the cut-and-cover berm. Construction vehicles would proceed with caution while driving in the vicinity of the hiking trails, and would yield to trail users. Work activities located at the Wallkill Downtake Chamber would be approximately 2,500 feet from the Glory Hill Trail and are not visible from nearby vantage points along the trail. The proposed wash water treatment system would be located within the proposed construction staging area at the Wallkill Downtake Chamber for a 10-week period.

As discussed in Section 9.6.4.12, "Noise," there may be temporary increases in noise levels due to the work activities within the New Paltz-Minnewaska Road Study Area that may discourage hiking or other recreational uses of the trails within Mohonk Preserve and Lake Mohonk Mountain House Complex. Following construction, all equipment would be removed from the

New Paltz-Minnewaska Road Study Area and staging areas would be restored to baseline conditions. The new air vent and boathole at the Wallkill Downtake Chamber are permanent structures that would remain. Operation of the Catskill Aqueduct would be consistent with baseline conditions and would not disrupt recreational use of adjacent open spaces. As such, the repair and rehabilitation would not encroach upon, cause a loss of open space, impact the use or physical character of, or disrupt views from the Mohonk Preserve or Glory Hill Trail.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to open space and recreation within the New Paltz-Minnewaska Road Study Area.

9.6.4.7 Historic and Cultural Resources

As shown on **Figure 9.6-19**, there is one site listed on the National Register of Historic Places, the Lake Mohonk Mountain House Complex (NR Number 90NR02849). It comprises a majority of the New Paltz-Minnewaska Road Study Area in the north and southwest portion of the study area. The Lake Mohonk Mountain House is a National Historic Landmark located within the complex, located approximately 2 miles northwest of the New Paltz-Minnewaska Road Study Area outside of the study area. A review of the SHPO ArcGIS database indicates that approximately 148 acres of the Lake Mohonk Mountain House Complex are located within the New Paltz-Minnewaska Road Study Area. In addition, per SHPO, there are no additional State-designated historic districts, no State landmarks, and no known structures eligible for listing on the National/State Register of Historic Places within the study area.

In the future without the repair and rehabilitation, it is assumed that historic and cultural resources within the New Paltz-Minnewaska Road Study Area would be the same as baseline conditions.

Areas of previous disturbance associated with construction of the Catskill Aqueduct were identified, and compared to the potential for ground disturbance within the New Paltz-Minnewaska Road Study Area to determine if the repair and rehabilitation could affect archeological resources. The area of the Wallkill Cut-and-Cover Tunnel and its associated earthen berm was previously disturbed during the initial construction of the Catskill Aqueduct in the early 1900s. In addition, the Wallkill Downtake Chamber forms the juncture between the Wallkill North Cut-and-Cover Tunnel and the Wallkill Pressure Tunnel. To construct the Wallkill Downtake Chamber, significant excavation was required for the 500-foot vertical shaft to serve both as a junction between the two tunnels and as a point of surface entry. All work activities would be located within these areas of previous soil disturbance.

The Poor Farm Arch Bridge and the associated staging areas are located within the Lake Mohonk Mountain House Complex. Work would include grading, clearing of trees and shrubs, and temporary gravel and stone placement. The remaining work activities within the New Paltz-Minnewaska Road Study Area would occur on the periphery of the Lake Mohonk Mountain House Complex and only on soils previously disturbed. SHPO concurred and concluded in a letter dated July 6, 2015, that there were no concerns regarding potential impacts

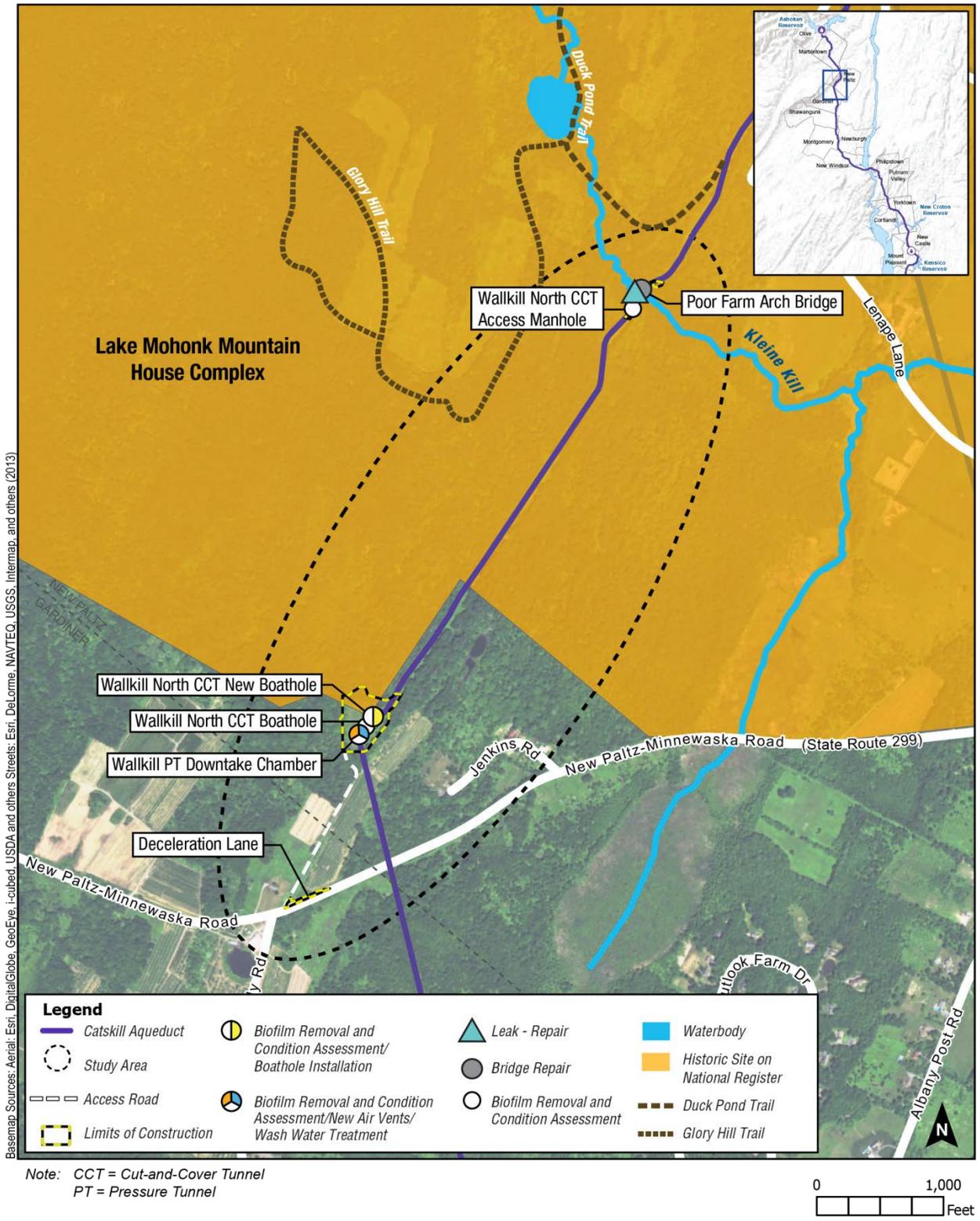


Figure 9.6-19: Historic and Cultural Resources – New Paltz-Minnewaska Road Study Area



to historic or archeological resources associated with the repair and rehabilitation work activities within the study area and no additional archeological investigations are necessary. Work activities would occur on soils previously disturbed.

Following completion of the repair and rehabilitation work activities, construction equipment and vehicles would be removed from the study area, and temporary staging areas would be restored to baseline conditions. The new air vent and boathole at the Wallkill Downtake Chamber are permanent structures that would remain. The repair and rehabilitation within the New Paltz-Minnewaska Road Study Area would not result in new permanent structures or additions to existing structures within the Lake Mohonk Mountain House Complex because the new boathole and air vent would be located outside this area. Following the repair and rehabilitation, operation of the Catskill Aqueduct within the study area would be consistent with baseline conditions and would not affect historic and cultural resources.

Therefore, although there is one site within the New Paltz-Minnewaska Road Study Area listed on the National Register of Historic Places, the repair and rehabilitation would not result in significant adverse impacts to historic and cultural resources within the New Paltz-Minnewaska Road Study Area.

9.6.4.8 Visual Resources

The study area for the visual resources analysis is the area within the New Paltz-Minnewaska Road Study Area. It also includes view corridors that extend beyond the study area, based on locations that are publicly accessible.

As shown on **Figure 9.6-18** and **Figure 9.6-19**, visual resources, consisting of one site listed on the National Register of Historic Places, the Lake Mohonk Mountain House Complex, and two locally significant resources, the Mohonk Preserve and Glory Hill Trail, were identified within the New Paltz-Minnewaska Road Study Area. Other informal trails may exist in the study area. However, those trails are not mapped and formally maintained.

As noted, the Lake Mohonk Mountain House Complex, totaling approximately 7,500 acres, is listed on the National Register of Historic Places. Approximately 148 acres of the complex is located within the north and southwest portion of the New Paltz-Minnewaska Road Study Area. The Lake Mohonk Mountain House, which is part of the complex and is a National Historic Landmark, is not located within the New Paltz-Minnewaska Road Study Area. There are no views of either the Wallkill Downtake Chamber or the Poor Farm Arch Bridge from the Lake Mohonk Mountain House.

A portion of the historic Lake Mohonk Mountain House Complex located north and west of the Catskill Aqueduct is also designated as the Mohonk Preserve, a locally significant resource within the New Paltz-Minnewaska Road Study Area. The Mohonk Preserve is approximately 8,000 acres and is a non-profit nature preserve. Approximately 86 acres of the Mohonk Preserve are located within the western portion of the New Paltz-Minnewaska Road Study Area. A segment of a Lake Mohonk Mountain House Complex hiking trail, Glory Hill Trail, is located approximately 800 feet west of the Poor Farm Arch Bridge and has limited views of the Poor Farm Arch Bridge through the densely forested area.

DEP has consulted with the Towns of New Paltz and Gardiner and Ulster County, and it is DEP's understanding that no new projects or structures that would alter views from visual or aesthetic resources are anticipated within the New Paltz-Minnewaska Road Study Area within the timeframe of the impact analysis. Natural processes, such as changes in habitat due to natural vegetative succession, are anticipated to continue. Therefore, in the future without the repair and rehabilitation, it is assumed that visual resources within the New Paltz-Minnewaska Road Study Area would be the same as baseline conditions.

SHPO concurred and concluded in letters dated April 17, 2015 and July 6, 2015 that there were no concerns regarding potential impacts to historic resources associated with the repair and rehabilitation work activities.

Repair and rehabilitation work activities in the area of the Wallkill Downtake Chamber would be farther from the Glory Hill Trail (approximately 2,500 feet) and would be screened from view from the trail by the surrounding forested land. During construction, work activities would be short-term (totaling 39 weeks over 2.5 years; see **Table 9.6-5**) and would not impact the Lake Mohonk Mountain House since it is located approximately 2 miles northwest of the New Paltz-Minnewaska Road Study Area. The Poor Farm Arch Bridge and the proposed associated staging areas are located within the Lake Mohonk Mountain House Complex. The northernmost staging area is located approximately 800 feet from the Glory Hill Trail and approximately 450 feet from a hiking trail, the historic Duck Pond Trail, located outside the study area. While some tree removal is required for the construction staging area to function as a truck turnaround, this would not greatly detract from the aesthetics of the area because the staging area would be adjacent to the cut-and-cover berm that is currently unforested. Other construction staging areas within the study area would be screened from view from the Glory Hill Trail by the surrounding forested land. Work activities at the Wallkill Downtake Chamber would occur approximately 2,500 feet from the Glory Hill Trail, would not occur within the Lake Mohonk Mountain House Complex, and would not be visible from nearby vantage points along the trail.

Following construction, all equipment would be removed from the New Paltz-Minnewaska Road Study Area and staging areas would be restored to baseline conditions. The new air vent and boathole at the Wallkill Downtake Chamber are permanent structures that would remain following construction. Following the repair and rehabilitation within the New Paltz-Minnewaska Road Study Area, operation of the Catskill Aqueduct would be consistent with baseline conditions. It would not result in changes to the future visual and aesthetic resource conditions of the views to the Lake Mohonk Mountain House Complex, the Mohonk Preserve, or Glory Hill Trail.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to visual resources within the New Paltz-Minnewaska Road Study Area.

9.6.4.9 Natural Resources

The study areas for the natural resources analysis are the immediate areas surrounding the limits of construction at Poor Farm Arch Bridge, the Wallkill Downtake Chamber, and access road improvements (see **Figure 9.6-20** and **Figure 9.6-21**). These study areas also include

downstream resources potentially influenced by the Poor Farm Arch Leak, and are collectively referred to as the natural resources study area.

Based on field visits conducted on November 21, 2014 and August 3, 2015, ecological communities in the vicinity of the Poor Farm Arch Bridge include hemlock-northern hardwood forest within the ravine, and chestnut oak forest surrounding the ravine. A portion of Kleine Kill crosses the natural resources study area near the Poor Farm Arch Bridge. The Wallkill Downtake Chamber is surrounded by successional old field forest. Based on a desktop assessment, the area for access road improvements to the Wallkill Downtake Chamber is best characterized as brushy cleared land.

These habitats have the potential to support protected water resources, terrestrial resources, and wildlife species. Therefore, an analysis of the potential effects to natural resources that could result from the repair and rehabilitation activities is presented below.

Water Resources

The natural resources study area is within the Lower Hudson River drainage basin, more specifically within the Rondout watershed (hydrologic unit code [HUC] 02020007) and the Kleine Kill-Wallkill River subwatershed (HUC 020200070406).

The Kleine Kill is subject to federal jurisdiction under Sections 401 and 404 of the Clean Water Act for proposed work activities. As a Class AA stream, the Kleine Kill is also subject to State Protection of Waters regulations with a regulated 50-foot buffer to protect the streambed and banks. Municipal wetlands permitting for in-stream work would not be required as the nature of the project-ordinary maintenance and repair of the aqueduct-qualifies as an exempt activity under New Paltz Town Code Chapter 139-10B: Activities Allowed Without Permits.

Surface Water

Surface water in the natural resources study area was assessed on August 3, 2015 and includes the Kleine Kill as shown on **Figure 9.6-20**. Because the aqueduct leak in this study area expresses from the concrete bridge abutment directly to the Kleine Kill, there is no overland flowpath for the Poor Farm Arch Leak. This leak would diminish or cease to flow during occasional Catskill Aqueduct shutdowns. As shown on **Figure 9.6-21**, there is no mapped surface water within the vicinity of the Wallkill Downtake Chamber.

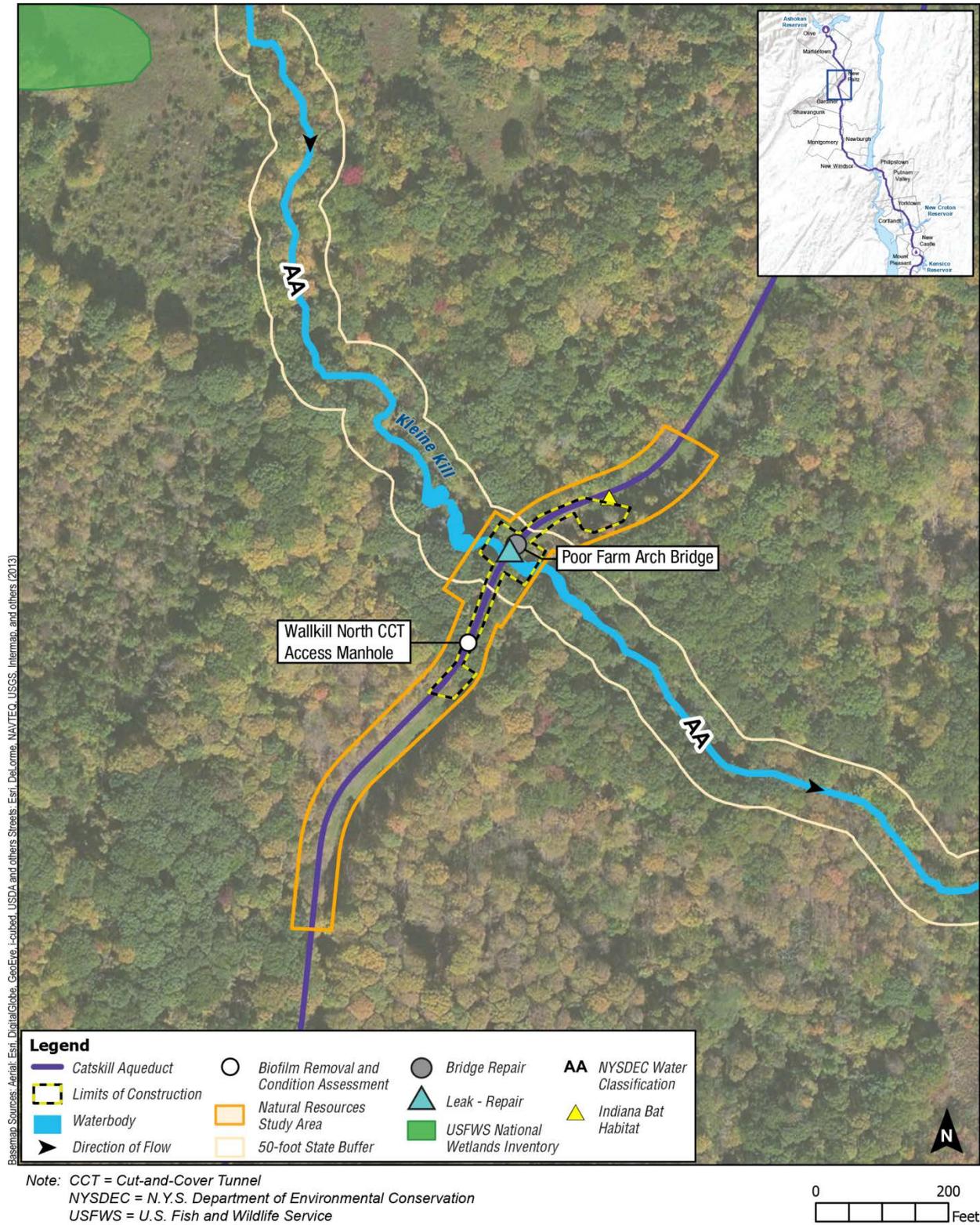


Figure 9.6-20: Natural Resources for Poor Farm Arch Bridge – New Paltz-Minnewaska Road Study Area



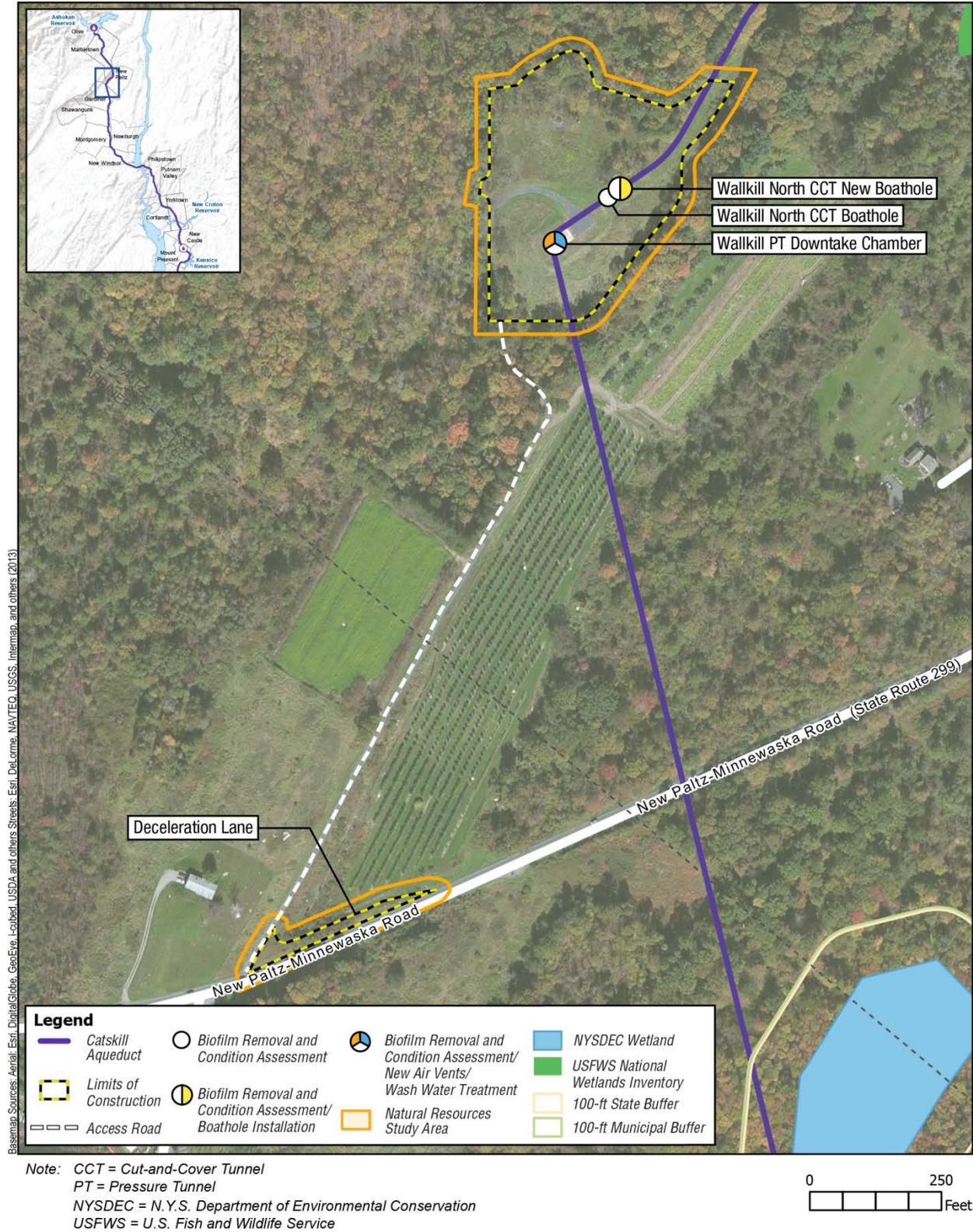


Figure 9.6-21: Natural Resources for Walkkill PT Downtake Chamber – New Paltz-Minnewaska Road Study Area



Kleine Kill

The Kleine Kill is a mountain stream sourced from the hills east of Lake Mohonk. The Kleine Kill enters the natural resources study area from the northwest and flows southeast through a deep, wooded gorge. As the Kleine Kill travels under Poor Farm Arch Bridge and the aqueduct, it receives flows from Poor Farm Arch Leak that seep from cracks in the southern bridge abutment. The combined flows from the Kleine Kill and the Poor Farm Arch Leak cross eastward beneath the bridge, and continue southeast exiting the natural resources study area. Flows were observed in the Kleine Kill during the August 3, 2015 survey, which occurred following an extended period of dry weather, indicating the Kleine Kill may be perennial.

The Kleine Kill is dominated by rocky substrate and ranges in width from approximately 3 to 7 feet within the natural resources study area. The limits of the stream are based on an aerial survey of the aqueduct corridor. The streambanks are confined by the steep slopes of the gorge through which the Kleine Kill flows. As listed on **Table 9.6-6**, the watercourse is classified as a “Riverine, Upper Perennial, Rock Bottom” based on the Cowardin System (Cowardin et al. 1979).

Table 9.6-6: Water Resources and Classifications within the New Paltz-Minnewaska Road Natural Resources Study Area

Water Resource	Area (Square Feet)	Length (Feet)	Cowardin Classification
Kleine Kill	800	140	Riverine, Upper Perennial, Rock Bottom (R3RB)

Future Without the Repair and Rehabilitation

DEP has consulted with the Towns of New Paltz and Gardiner and Ulster County, and it is DEP’s understanding that no projects or developments are anticipated within the natural resources study area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that the Poor Farm Arch Leak would continue, and that the future conditions of the water resources within the New Paltz-Minnewaska Road Study Area would be the same as baseline conditions.

Analysis of Potential Effects

This section analyzes the potential for temporary and permanent disturbance to water resources associated with the repair and rehabilitation and long-term operation of the Catskill Aqueduct in the New Paltz-Minnewaska Road Study Area.

Construction

Work activities related to the repair and rehabilitation have the potential to alter surface water flows.

Prior to commencing the repair and rehabilitation, temporary sediment and erosion control measures, such as silt fencing, would be installed around each construction staging area and

work site. Temporary staging north and south of the Poor Farm Arch Bridge would occur on top of the aqueduct. Repair of the Poor Farm Arch Leak would occur within the interior of the aqueduct, and would avoid direct disturbance to the Kleine Kill. The exterior structure of the Poor Farm Arch Bridge that requires repair are not easily accessible and may require temporary scaffolding and rigging spanning the Kleine Kill. A turbidity curtain would be installed to prevent sediment from moving downstream. These temporary measures would be designed in accordance with the State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity and other applicable regulatory requirements to ensure that the river and its streambanks are protected, aquatic life movement is uninhibited, and sediment and other pollutants are prevented from entering the waterway.

Internal leak repairs would be conducted when the aqueduct is unwatered. A non-toxic, quick-curing grout suitable for use in drinking water conduits would be used for the Poor Farm Arch Leak repair. It would expand with contact to water to fill cracks and voids within the tunnel wall and along the exterior tunnel surface. If the grout comes in contact with subsurface flows along the exterior of the tunnel wall, it would cure in place and not migrate beyond the repair site. These repair techniques would use a minimal amount of water to prepare the tunnel wall prior to application. Any wastewater generated during leak repair or residual water in the tunnel would be managed using barriers to prevent wastewater from migrating downstream and would be treated, as necessary. Therefore, there would be minimal risk to contamination of downstream water resources from chemical compounds seeping through the cracks.

To conduct exterior repairs of the bridge, DEP would seek to avoid in-stream disturbance by using snooper trucks or an equivalent vehicle that would allow access beneath elevated portions of the bridge structure. If it is not feasible to use this equipment, then scaffolding would be placed in a manner that would minimize disruption of the stream banks and would not inhibit aquatic life movement.

Anticipated temporary disturbance to water resources and regulated buffers were quantified based on the limits of construction and proposed work activities (see **Table 9.6-7**).

The scaffolding would be in place for the shortest duration practical and would be removed at the completion of work activities. These activities would occur during summer months when flows would naturally be low. Scaffolding would result in approximately 620 square feet of temporary disturbance within the Kleine Kill and 5,290 square feet of temporary disturbance within the 50-foot State Protection of Waters buffer (see **Table 9.6-7**). Following construction, temporarily disturbed areas would be restored to natural conditions and planted with native vegetation.

Table 9.6-7: Estimated Disturbance to Water Resources within the New Paltz-Minnewaska Road Natural Resources Study Area

Water Resource ¹	Baseline Conditions (Square Feet)	Temporary Effects (Square Feet)	Permanent Effects (Square Feet)
Kleine Kill	800	620 <i>Scaffolding</i>	0
50-foot State Protection of Waters Buffer	11,760	5,290 <i>Scaffolding</i>	0
Note: ¹ Municipal buffer is not applicable because the work activities are not subject to Town review.			

Operation

Leak repair would eliminate leak flow to the Kleine Kill and would restore the stream to its natural, pre-leak condition. Anticipated changes resulting from the repair and rehabilitation were analyzed by calculating the contribution of Poor Farm Arch Leak to the Kleine Kill during low flows, as discussed below under “Leak Contributions during Low Flow.”

As discussed, the elimination of the Poor Farm Arch Leak flow would represent a negligible decrease of the Kleine Kills’ flow from its artificially elevated level and does not warrant further analysis.

Leak Contributions during Low Flow

To assess the contribution of the Poor Farm Arch Leak to the Kleine Kill, desktop calculations of critical low flow (7Q10 and 7Q2 flow) were completed. The 7Q10 and 7Q2 flows are commonly used measures of low flow and represent the lowest 7 day average flow with return periods of 10 years and 2 years, respectively. In the analysis, the 7Q10 and 7Q2 flows were adapted to understand conditions during critical low flow periods where further flow reductions from leak repair would result in the greatest potential impact to local hydrology. Average flow was also calculated to compare with typical baseline conditions.

The low flow estimation method involved drainage area normalization where flows for the Kleine Kill were estimated by multiplying flows at a nearby USGS gauge for a similar drainage area by the ratio of the Kleine Kill’s drainage area to the USGS gauge drainage area.^{1,2}

The analysis indicated that the Kleine Kill has a drainage area of approximately 401 acres where Poor Farm Arch Leak enters the stream. This drainage area was calculated using the USGS

¹ http://water.epa.gov/scitech/datait/tools/warsss/pla_box15.cfm (see steps 11 and 15). The historic record of flows at a nearby gauged stream was normalized (e.g., divided by the drainage area) to calculate flows independent of drainage area. This information was then multiplied by the respective receiving stream’s drainage area at the point where the leak enters the waterbody, thus creating a flow distribution for the ungauged receiving stream.

² http://acwc.sdp.sirsi.net/client/en_US/search/asset/1000461.

StreamStats Program.³ Flow estimates were calculated for the Kleine Kill and compared to the measured leak flow as shown in **Table 9.6-8**.

Table 9.6-8: Estimated Leak Contributions for New Paltz-Minnewaska Road Study Area

Flow Scenario	Poor Farm Arch Leak		
	Kleine Kill Stream Flow (gpm) ¹	Maximum Leak Flow (gpm) ²	Leak Flow to Kleine Kill Flow (%)
Average	987.4	0.680	0.1
7Q2	89.8	0.680	0.8 ²
7Q10	41.3	0.680	1.6 ²
Notes:			
¹ Based on USGS gauge 01363382 at Bush Kill, below Maltby Hollow Brook at West Ashokan, New York and data for 2001 to 2014.			
² Leak flow is based on maximum flow measured on September 29, 2014.			

Based on the results, leak flow would be a minor contributor to the Kleine Kill’s natural flow. The estimated average daily flow for the Kleine Kill at the confluence with the Poor Farm Arch Leak was calculated as approximately 987 gpm. The Poor Farm Arch Leak flow is estimated to be 0.680 gpm. During average flow conditions, the flow of the Poor Farm Arch Leak is approximately 0.1 percent of the baseflow (i.e., the portion of stream flow that is not runoff) of the Kleine Kill.⁴ During low flow conditions, the leak flow would continue to be a minor contributor to the 7Q2 and 7Q10 flows of Kleine Kill River, contributing less than 1 percent of the approximated flows necessary to maintain aquatic habitat and water quality. Therefore, elimination of flow from the Poor Arch Farm Leak would restore Kleine Kill to its pre-leak conditions and natural function, but would have no apparent effect on its downstream resources.

Water Resources Conclusions

Water resources in the natural resources study area include the Kleine Kill, which flows under Poor Farm Arch Bridge, where it receives flows from Poor Farm Arch Leak that seep from cracks in the southern bridge abutment. The Poor Farm Arch Leak is artificial flow sourced from the Catskill Aqueduct. Following leak repair, flows of the Poor Farm Arch Leak would cease to contribute to the Kleine Kill, restoring the Kleine Kill to its pre-leak conditions and natural function. The reduction of flow from the leak repair would be negligible compared to existing flow in the Kleine Kill.

No permanently measurable effects of leak repair are anticipated to its downstream resources.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to water resources within the New Paltz-Minnewaska Road Study Area.

³ USGS, 2014. http://water.usgs.gov/osw/streamstats/new_york.html

⁴ This estimate assumes that Poor Farm Arch Leak is not part of the natural flow of the Kleine Kill.

Terrestrial Resources

The study area in the vicinity of the Poor Farm Arch Bridge consists of a hemlock-northern hardwood forest within the ravine and chestnut oak forest surrounding the ravine. Tree species within the hemlock-northern hardwood forest include eastern hemlock (*Tsuga canadensis*), black cherry (*Prunus serotina*), red oak (*Quercus rubra*), black oak (*Q. velutina*), sugar maple (*Acer saccharum*), red maple (*A. rubrum*), and bigtooth aspen (*Populus grandidentata*). The understory is dominated by New York fern (*Thelypteris noveboracensis*). Trees within the chestnut oak forest include scarlet oak (*Quercus coccinea*), chestnut oak (*Q. prinus*), black oak, red oak, red maple, sugar maple, and black cherry. American beech (*Fagus grandifolia*) saplings and New York fern were observed in the understory. These areas of hemlock-northern hardwood forest and chestnut oak forest observed during field visits are not mapped as a significant natural community by the NYNHP.

In the vicinity of the Wallkill Downtake Chamber, the natural resources study area consists primarily of a successional old field, and habitat along New Paltz-Minnewaska Road consists of brushy cleared land. Trees at the forest edge, which is nearly 200 feet from the Wallkill Downtake Chamber, include eastern red-cedar (*Juniperus virginiana*), black walnut (*Juglans nigra*), white ash (*Fraxinus americana*), white pine (*Pinus strobus*), and black cherry. Shrubs include northern spicebush (*Lindera benzoin*) and tatarian honeysuckle (*Lonicera tatarica*), and herbs observed include Timothy-grass (*Phleum pratense*), dandelion (*Taraxacum* spp.), strawberry (*Fragaria x ananassa*), Russian knapweed (*Rhaponticum repens*), wild bergamot (*Monarda fistulosa*), and garlic mustard (*Alliaria petiolata*). While the Town of New Paltz regulates removal of trees at least 7 inches dbh (New Paltz Town Code Chapter 130: Tree Conservation), trees located within 10 feet of any existing building or structure permitted on a property are exempt from these regulations. While tree removal within the Town of New Paltz would be exempt, terrestrial resources within the study area warrant an analysis.

DEP has consulted with the Towns of New Paltz and Gardiner and Ulster County, and it is DEP's understanding that no new projects or developments that would affect terrestrial resources are anticipated within the New Paltz-Minnewaska Road Study Area within the timeframe of the impact analysis. Natural processes, such as changes in habitat due to natural vegetative succession, are anticipated to continue. Therefore, in the future without the repair and rehabilitation, it is assumed that terrestrial resources within the study area would be the same as baseline conditions.

In the future with the repair and rehabilitation, work activities would include minor tree clearing, shrub removal, and gravel placement for leveling and erosion control for the purpose of improving site access and staging areas. Grading and leveling of the access road and grading at the northwest corner of the Wallkill Downtake Chamber work site would be required. At Poor Farm Arch Bridge, 10 trees consisting of 7 species with a range of average diameter at breast height (dbh) of between 11 and 21 inches may be removed to establish staging areas north and south of the bridge. Eastern red-cedar was the most common species, and a total of four cedars may be removed. These trees are generally located adjacent to the existing Catskill Aqueduct. Tree removal would occur in discrete locations along the densely forested areas east and west of the aqueduct, and would not dramatically change the character of the area or affect surrounding trees. All tree removal would be conducted from November 1 through March 31 to avoid impacts to Indiana bats (*Myotis sodalis*) and northern long-eared bats (*Myotis septentrionalis*).

No tree removal would occur at the Wallkill Downtake Chamber. Minor brush removal would occur along New Paltz-Minnewaska Road to improve visibility south of the access road. This would be temporary. No grubbing or other ground disturbance is proposed in this location. The new air vent and boathole at the Wallkill Downtake Chamber are permanent structures that would remain following construction, but would not alter habitats since they would be installed in existing cleared areas.

Following construction, all equipment would be removed from the study area, and staging areas would be restored to natural conditions. Vegetated areas temporarily cleared during construction are anticipated to grow back with similar communities. Following the repair and rehabilitation operation of the Catskill Aqueduct, within the natural resources study area, would be consistent with baseline conditions. Natural reforestation and vegetative succession of aqueduct areas not routinely maintained would continue to occur over time.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to terrestrial resources within the New Paltz-Minnewaska Road Study Area.

Federal/State Threatened and Endangered and State Species of Special Concern

This section includes an analysis of potential impacts to federal/State Threatened and Endangered Species and State Species of Special Concern identified in Section 9.3.9, “Natural Resources,” as having the potential to be affected by activities within the natural resources study area. Species that could be affected and could occur up to 0.25 mile from the work sites were determined in consultation with USFWS, USACE, NYNHP, and NYSDEC, as well as county and local offices, as applicable.

As discussed in Section 9.3.9, “Natural Resources,” eight species were identified to have the potential to be affected by the repair and rehabilitation within the natural resources study areas. Therefore, conditions in the future without the repair and rehabilitation, an analysis of the potential for impacts to these eight species, and a summary of conclusions on the potential effects resulting from the repair and rehabilitation are provided below.

In the future without the repair and rehabilitation, it is assumed that federal/State Threatened and Endangered Species and State Species of Special Concern within the study area would largely be the same as baseline conditions, other than other than possible changes in habitat due to natural vegetative succession and general anthropogenic influences.

An analysis of the potential for disturbance to federal/State Threatened and Endangered Species and State Species of Special Concern from the repair and rehabilitation within the natural resources study area is shown in **Table 9.6-9**. The analysis included an evaluation of the repair and rehabilitation work activities within the study area and observations during field visits, as applicable.

Table 9.6-9: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern and Habitats within the New Paltz-Minnewaska Road Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Amphibians and Reptiles					
Eastern Box Turtle	<i>Terrapene carolina</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visits on November 21, 2014 and August 3, 2015. Potential habitat exists within the adjacent hemlock-northern hardwood and chestnut oak forests, as well as within the successional old field. Work activities would be largely confined to previously disturbed areas. If any isolated areas of potential habitat exist at the sites, as a highly mobile species, any eastern box turtles that might otherwise use these areas are expected to instead utilize similar, adjacent habitats during construction. Furthermore, perimeter silt fencing would limit disturbance to adjacent habitats and prevent individuals from entering work sites during construction. Finally, upon construction completion, the staging areas would be restored to natural conditions and the new air vent and boathole that remain would not affect breeding, nesting, or foraging habitat. Therefore, there are no effects anticipated and no further analysis for eastern box turtles is warranted for this study area.	No
Timber Rattlesnake	<i>Crotalus horridus</i>	Unlisted	Threatened	No individuals were incidentally observed during the field visits on November 21, 2014 and August 3, 2015. The old field and open land at the duntake would provide potential foraging and basking habitat. According to NYNHP, no records of timber rattlesnakes were identified within 1.5 miles of the study area. Temporary effects to basking habitat is possible. However, upon completion of the repair and rehabilitation, the staging areas would be restored to natural conditions and is not anticipated to affect basking habitat. Therefore, there are no effects anticipated and no further analysis for timber rattlesnakes is warranted for this study area.	No
Wood Turtle	<i>Glyptemys insculpta</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visits on November 21, 2014 and August 3, 2015. Potential habitat exists within the adjacent hardwood forest and successional old field areas. However, work activities would be largely confined to previously disturbed areas. Should any potential habitat exist at the sites, a variety of habitats would be available for the species' use in the vicinity during construction. Finally, upon construction completion, the staging areas would be restored to natural conditions. Therefore, there are no effects anticipated and no further analysis for wood turtles is warranted for this study area.	No

Table 9.6-9: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern and Habitats within the New Paltz-Minnewaska Road Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Birds					
Cerulean Warbler	<i>Setophaga cerulea</i>	MBTA	Special Concern	No individuals were incidentally observed during the field visits on November 21, 2014 and August 3, 2015. Preferred habitat for Cerulean Warblers is high in the canopy of mature forests. No disturbance would occur in habitat utilized by this species. Should any potential habitat exist at the sites, a variety of habitats would be available for the species' use in the vicinity during construction. Therefore, there are no effects anticipated and no further analysis for Cerulean Warblers is warranted for this study area.	No
Sharp-shinned Hawk	<i>Accipiter striatus</i>	MBTA	Special Concern	No individuals were incidentally observed during the field visits on November 21, 2014 and August 3, 2015. Potential habitat exists within the adjacent hardwood forest and forest edge. However, work activities would be largely confined to previously disturbed areas. Should any potential habitat exist at the sites, a variety of habitats would be available for the species' use in the vicinity during construction. Finally, upon construction completion, the staging areas would be restored to natural conditions. Therefore, there are no effects anticipated and no further analysis for Sharp-shinned Hawks is warranted for this study area.	No
Mammals					
Indiana Bat	<i>Myotis sodalis</i>	Endangered	Endangered	Potential bat roosting habitat was observed surrounding the Poor Farm Arch Bridge during the field visit on August 3, 2015. Removal of one tree suitable for roosting could occur. Temporary work activities within the Kleine Kill along with noise from work activities may discourage this bat species from roosting in the immediate vicinity of the work sites and foraging near the stream. Therefore, further analysis is warranted for this study area.	Yes. See further analysis below.
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	Threatened	<u>Threatened</u> Unlisted	Potential bat roosting habitat was observed surrounding the Poor Farm Arch Bridge during the field visit on August 3, 2015. Removal of one tree suitable for roosting could occur. Temporary work activities within the Kleine Kill along with noise from work activities may discourage this bat species from roosting in the immediate vicinity of the work sites and foraging near the stream. Therefore, further analysis is warranted for this study area.	Yes. See further analysis below.
Plants					
Scarlet Indian-paintbrush	<i>Castilleja coccinea</i>	Unlisted	Endangered	No suitable habitat or evidence of specimens was found in study area during presence/absence surveys. Therefore, there are no effects anticipated and no further analysis for Scarlet Indian-paintbrush is warranted for this study area.	No
Note: MBTA: Migratory Bird Treaty Act					

Indiana Bat (*Myotis sodalis*)

Work activities that could potentially affect Indiana bats or their habitat would predominantly occur on previously disturbed areas along the Catskill Aqueduct, and would be localized to the vicinity of the Poor Farm Arch Bridge (see **Figure 9.6-20**).

Potential bat roosting habitat was observed surrounding the Poor Farm Arch Bridge during the field visit on August 3, 2015. One bigtooth aspen, with a dbh of approximately 21 inches, was identified as a potential roost tree in the vicinity of the northern staging area near the Poor Farm Arch Bridge. The tree was observed to be in poor condition with a large crack in the trunk and damage from woodpeckers. As identified in Section 9.6.4.9, “Terrestrial Resources,” this tree may need to be removed during construction. In addition to roosting habitat, the Kleine Kill stream corridor may provide some foraging habitat for bats.

Temporary work activities within the Kleine Kill and noise from repair and rehabilitation work activities may discourage this bat species from roosting in the immediate vicinity of the work sites and foraging near the stream. However, there is abundant suitable habitat in the surrounding areas that Indiana bats could use for roosting and foraging. Removal of any trees would be conducted from November 1 through March 31 to avoid impacts to Indiana bats.

Construction lighting would be used, as needed, during the 10-week shutdowns that would occur between October and March. Therefore, it would be unlikely for bats to use the area and no disturbance from nighttime lighting is anticipated.

Given the protective measures that would be in place for the duration of construction, no significant effects are anticipated to Indiana bats and their habitat. Therefore, the repair and rehabilitation may affect, but is unlikely to adversely affect Indiana bats in this study area.

Northern Long-eared Bat (*Myotis septentrionalis*)

Work activities that could potentially affect northern long-eared bats or their habitat would predominantly occur on previously disturbed areas along the Catskill Aqueduct. Poor Farm Arch Bridge is a man-made structure located at the northern extent of the natural resources study area that could be used by as a roosting site by northern long-eared bats. Northern long-eared bats are more commonly known to roost in trees (see the potential roosting habitat results for Indiana bats, above).

Foraging habitat would continue to be available in adjacent forested areas and near streams and open water. Poor Farm Arch Bridge is shaded and unlikely to be used for roosting. However, DEP would inspect the bridge prior to working to verify whether there are any roosting bats. Should any bats or their guano be observed during work activities, USFWS would be contacted and DEP would await further guidance. Temporary work activities within the Kleine Kill along with noise from work activities may discourage this bat species from roosting in the immediate vicinity of the work sites and foraging near the stream. However, there is abundant suitable habitat in the surrounding areas that northern long-eared bats could use for roosting and foraging.

Removal of all trees would be conducted from November 1 through March 31 to avoid impacts to northern long-eared bats. Construction lighting would be used as needed during the 10-week shutdowns, and because these would occur during between October March, it would be unlikely for bats to use the area and, therefore, no disturbance from nighttime lighting is anticipated.

Given the measures that would be in place for the duration of construction, no significant effects are anticipated to northern long-eared bats and their habitat. Therefore, the repair and rehabilitation may affect, but is unlikely to adversely affect northern long-eared bats in this study area.

Federal/State Threatened and Endangered Species and State Species of Special Concern Conclusions

Based on the impact analysis, no take is anticipated. There would be no effects to eastern box turtles (*Terrapene carolina*), timber rattlesnakes (*Crotalus horridus*), wood turtles (*Glyptemys insculpta*), Cerulean Warblers (*Setophaga cerulea*), Sharp-shinned Hawks (*Accipiter striatus*), or Scarlet Indian-paintbrush (*Castilleja coccinea*) associated with the repair and rehabilitation. Repair and rehabilitation may affect, but is not likely to adversely affect, Indiana bats or northern long-eared bats.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to federal/State Threatened and Endangered Species or State Species of Special Concern within the New Paltz-Minnewaska Road Study Area.

9.6.4.10 Hazardous Materials

To evaluate the potential presence of hazardous materials within the New Paltz-Minnewaska Road Study Area, a Phase I ESA was conducted in general conformance with the scope and limitations of ASTM Practice E 1527-13 and CEQR requirements to identify RECs. The Phase I ESA included site reconnaissance, research on current/historical use, and review of federal and State regulatory listings for both the site itself and for its neighboring properties within the appropriate search distance defined in the ASTM standard. The findings from the Phase I ESA investigation and results from DEP's legacy files for the work sites, including a geotechnical investigation and environmental health and safety sampling, were collectively reviewed to assess the potential presence of and potential for disturbance to hazardous materials in the study area.

Based on the Phase I ESA investigations, there was no indication of an environmental impact that would constitute a REC as defined by the ASTM standard that would affect activities in the study area.

Geotechnical environmental investigations and sampling were undertaken for contaminants of concern including volatile and semivolatile organics, polychlorinated biphenyls (PCBs), and total petroleum hydrocarbons along the aqueduct within the study area. Several parameters were noted in the soil sampling results including total chromium, lead, mercury, nickel, and zinc. Total chromium was reported in the three samples collected at the Wallkill Downtake Chamber Chromium concentrations, however, were consistent over a widespread sampling area and are more likely associated with background concentrations. Along the Catskill Aqueduct, there are widespread occurrences of chromium, which are attributed to the existing geological formations.

The legacy data also revealed that lead-containing paint is present on the exterior door of the Wallkill Downtake Chamber. Materials sampled did not identify asbestos or PCB-containing paint or mercury-containing paint. In addition, gasoline range organic compounds and total petroleum hydrocarbons were also detected, but at low concentrations that are not considered to be indicative of contamination that warrants remedial actions.

Based on the results of the environmental investigations completed within the New Paltz-Minnewaska Road Study Area, no other hazardous materials are known to exist. The soil results support the reuse of excavated materials associated with the boathole and air vent installation as backfill, and do not suggest the need for special management, handling, or health and safety measures at this time.

DEP has consulted with the Towns of New Paltz and Gardiner and Ulster County, and it is DEP's understanding that no developments or structures that would introduce hazardous materials to the environment are anticipated within the New Paltz-Minnewaska Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that the presence of hazardous materials within the New Paltz-Minnewaska Road Study Area would be the same as baseline conditions.

In the future with the repair and rehabilitation, work activities would require the potential storage and use of a variety of petroleum and other chemical products. These could include diesel fuel for back-up power, lubricating oil for construction vehicles, and miscellaneous cleaning and maintenance chemicals during construction. The use and storage of all of these would be in accordance with applicable regulatory requirements and guidelines including those relating to: federal Spill Prevention, Control, and Countermeasures requirements; and State petroleum bulk storage, chemical bulk storage, and spill reporting requirements. Furthermore, excavation associated with the work activities for the installation of a new boathole and air vents would occur on previously disturbed soils.

Leak repairs would consist of grouting the leaking and cracked areas with carbon fiber material, which are inert, quick-curing and suitable for use in drinking water supply systems. The Poor Farm Arch Leak would be repaired prior to the introduction of chlorine into the aqueduct, and therefore a passive dechlorination system is not proposed for this study area. DEP would handle all materials in accordance with applicable federal, State, and local regulations and guidelines. Following construction of the repair and rehabilitation, all equipment as well as chemical storage would be removed from the New Paltz-Minnewaska Road Study Area. Staging areas would be restored and operation of the Catskill Aqueduct would be consistent with baseline conditions.

Therefore, the repair and rehabilitation would not result in significant adverse impacts from the presence or disturbance of hazardous materials within the New Paltz-Minnewaska Road Study Area.

9.6.4.11 Transportation

The study area for the transportation analysis consists of the major convergent roadways that would potentially be used by the employee and construction vehicles associated with repair and rehabilitation work activities en route to and from the New Paltz-Minnewaska Road Study Area, as shown on **Figure 9.6-10**. Access to the repair and rehabilitation limits of construction for the

work sites within the study area would be via New Paltz-Minnewaska Road (State Route 299) which leads to the existing gravel access road that partially traverses private property.

The New Paltz-Minnewaska Road is a two-lane rural principal arterial type road. There is no public transportation and little to no pedestrian activity in the immediate vicinity of the study area. Under current operations, DEP employees periodically access the site. However, there are no DEP employees who work at or visit the study area on a daily basis, and the small number of DEP employee vehicles has little to no effect on traffic conditions within the study area.

DEP has consulted with the Towns of New Paltz and Gardiner and Ulster County, and it is DEP's understanding that no changes in land use or an increase in traffic due to outside developments are anticipated within the New Paltz-Minnewaska Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that traffic, public transportation, and pedestrian activities within the study area would be similar to baseline conditions.

In the future with the repair and rehabilitation, due to the steep and angled entrance from New Paltz-Minnewaska Road to the access road and observed high speeds of through vehicles traveling on this road, a deceleration lane would be constructed. This deceleration lane would provide access to the repair and rehabilitation work sites within the study area and allow vehicles to execute the right turn from New Paltz-Minnewaska Road to the access road.

Repair and rehabilitation work activities within the New Paltz-Minnewaska Road Study Area were evaluated to determine which would have the potential to generate the most vehicle trips and therefore be the basis of this transportation analysis. Of these activities, wash water treatment would generate the most vehicle trips. Wash water treatment would occur in fall ~~2020~~2019, for 24-hours per day, 7 days a week for approximately 10 weeks during the third 10-week shutdown period. To reduce truck trips during weekends, biofilm removed from the aqueduct in this study area would be stockpiled over the weekend and removed from the site Monday through Friday. This would not change the number of trips assumed for a peak day or peak hour.

The estimated number of peak-day one-way vehicle trips associated with large-scale wash water treatment is 71 vehicles, or approximately 142 peak-day vehicle round trips that would travel to and from the New Paltz-Minnewaska Road Study Area. Approximately 42 vehicle round trips or 42 PCEs, are workers either traveling to and from the study area or traveling directly to and from the staging area (depending on parking capacity), with potentially 8 daily shuttle trips between the study area and the staging area. The remaining approximately 92 peak-day vehicle round trips (103 PCEs) would be trucks or other construction vehicles.

During a peak day, the estimated number of peak-hour vehicle trip ends associated with large-scale wash water treatment is approximately 50 peak-hour vehicle trip ends (57 PCEs). This includes approximately 14 vehicle trip ends (14 PCEs) from workers traveling directly to and from the staging area. It also includes approximately 4 peak-hour shuttle trips between the study area and the staging area, and approximately 32 vehicle trip ends (39 PCEs) from trucks or other construction vehicles. For the purpose of this analysis, the peak-hour project-generated vehicles are anticipated to coincide with typical construction hours for employee vehicles

entering the site. Assuming three 8-hour shifts, this would be during the 6 AM to 7 AM, 2 PM to 3 PM, and 10 PM to 11 PM hours, and would be unlikely to coincide with the peak hour for existing traffic. Additionally, the overnight shift may have fewer workers and result in lower peak-hour vehicle trip ends than other shifts.

The repair and rehabilitation would result in approximately 57 peak-hour PCEs within the New Paltz-Minnewaska Road Study Area, which is above the *CEQR Technical Manual* screening threshold of 50 peak-hour PCEs as described in Section 9.3.13, “Transportation.” The work activities at the New Paltz-Minnewaska Road Study Area would be short-term (totaling 39 weeks over 2.5 years; see **Table 9.6-5**) and would not generate public parking or transportation demands or pedestrian activity within the New Paltz-Minnewaska Road Study Area. Following completion of the repair and rehabilitation, traffic patterns would return to baseline conditions.

Therefore, although there would be a minor temporary increase in traffic, the repair and rehabilitation would not result in significant adverse impacts to transportation within the New Paltz-Minnewaska Road Study Area.

9.6.4.12 Noise

As described in Section 9.3.15, “Noise,” mobile noise associated with the repair and rehabilitation within the New Paltz-Minnewaska Road Study Area does not warrant analysis. This section includes an analysis of potential impacts from stationary noise associated with the repair and rehabilitation to sensitive receptors within the study area.

The study area for the noise analysis is the area within 1,500 feet of the repair and rehabilitation work activities as shown on **Figure 9.6-22**, which encompasses areas within the Towns of New Paltz and Gardiner. The study area is split into two polygons, which together are considered the noise study area. One worst-case receptor was analyzed for each type of receptor.

The New Paltz-Minnewaska Road Noise Study Area includes residential parcels located in the southern portion of the study area. It also includes the Mohonk Preserve and a recreational trail located in the northern portion of the study area within 1,500 feet of the repair and rehabilitation work sites. These are considered noise-sensitive receptors for this analysis. The temporary work activities were evaluated to determine compliance with the local noise codes.

The repair and rehabilitation within the New Paltz-Minnewaska Road Study Area is subject to the Towns of New Paltz and Gardiner Noise Control Laws. The Town of New Paltz Noise Control Law (§100-3.B) prohibits construction work between the hours of 8 PM and 7 AM, specifically the operation of pile drivers, steam shovels, pneumatic hammers, derricks, hoists, or other equipment that creates loud or unusual noise. The Town of Gardiner Noise Control Law (§220-40.C) limits daytime and nighttime noise levels at the property line of the lot from which noise is emitted. However, construction and maintenance activities between 8 AM and sunset are exempt. Noise between the hours of 7 AM and 8 PM cannot exceed 70 dBA, and noise between the hours of 8 PM and 7 AM cannot exceed 60 dBA.

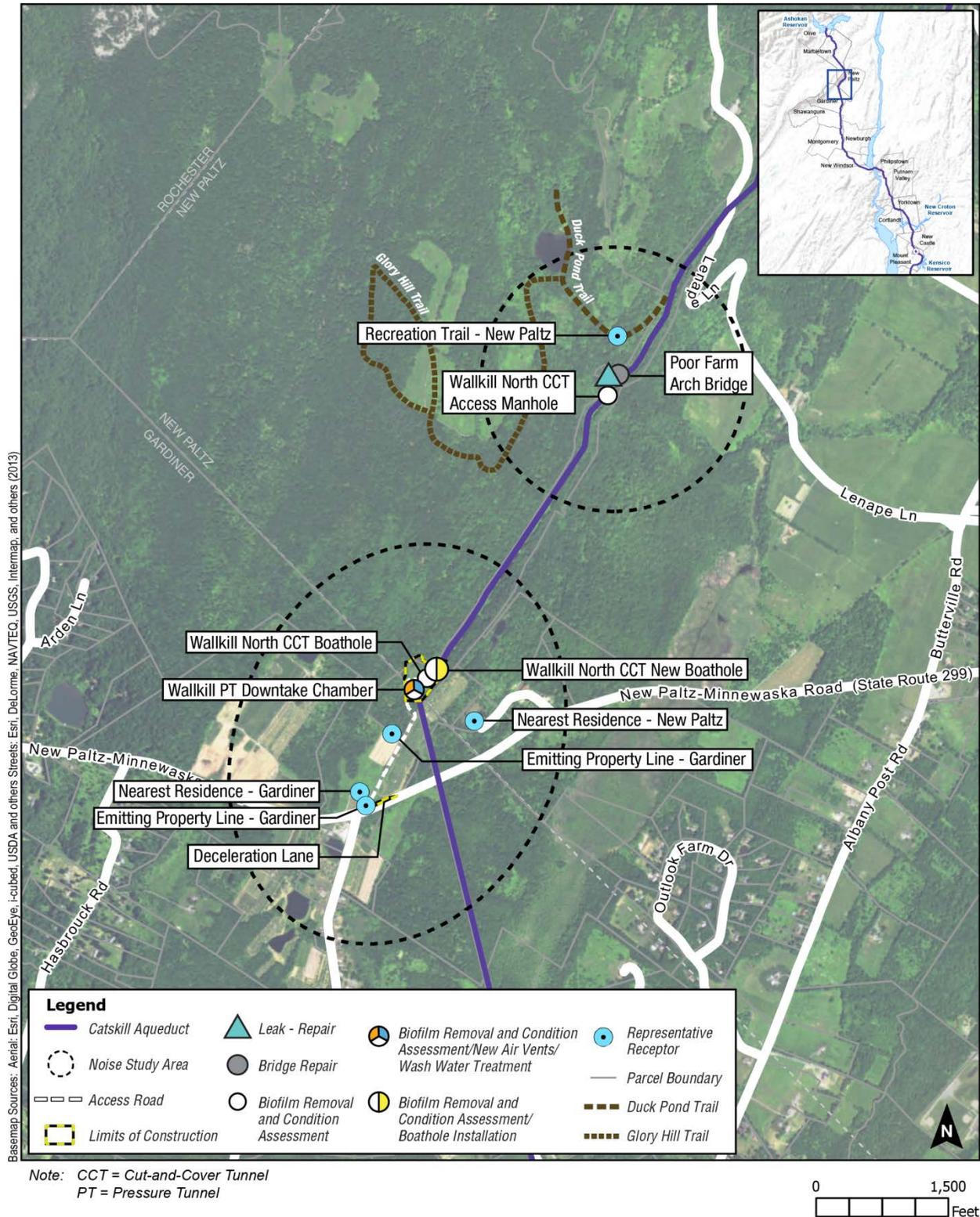


Figure 9.6-22: Noise – New Paltz-Minnewaska Road Study Area



Existing ambient noise levels within the New Paltz-Minnewaska Road Study Area are influenced by vehicular traffic traveling on New Paltz-Minnewaska Road and other local roadways. The existing noise levels within the study area are comparable to a very quiet suburban and rural residential environment based on the distance to major transportation corridors, the population density of the area, and the presence of other noise-producing elements. Typical noise levels (measured as L_{eq}) for very quiet suburban and rural communities are 40 dBA during the daytime and 34 dBA during the nighttime.

DEP has consulted with the Towns of New Paltz and Gardiner and Ulster County, and it is DEP's understanding that no major projects that would result in a change in land use, or new noise-generating sources that would contribute to an increase in ambient noise levels are anticipated within the New Paltz-Minnewaska Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that ambient noise levels within the New Paltz-Minnewaska Road Study Area would be similar to baseline conditions.

In the future with the repair and rehabilitation, stationary noise-producing activities would occur at two sites. The stationary noise-generating equipment that would be used within the New Paltz-Minnewaska Road Study Area was evaluated to determine which work activity would have the potential to emit the most noise and, therefore, be the basis of this stationary noise analysis.

The northern and southern work sites are about 4,000 feet apart and include unique receptors. Therefore both areas were included in the stationary noise analysis. Of the activities, the stationary noise-generating equipment associated with the leak repair would emit the most noise in the northern portion of the study area (at the Poor Farm Arch Bridge) and the stationary noise-generating equipment associated with the new air vents and boathole installation would emit the most noise in the southern portion of the study area (at the Wallkill Downtake Chamber). Leak repair would occur in fall ~~2018~~2017 for up to 24 hours per day, 7 days a week for approximately 5 weeks during the first 10-week shutdown. Air vent installation and boathole installation would occur in fall ~~2019~~2018 between 7 AM and 7 PM, 7 days a week for approximately 3 weeks and 2 weeks, respectively, during the second 10-week shutdown (see **Table 9.6-5**). Repair and rehabilitation noise-producing activities at the Wallkill Downtake Chamber also could include 24-hour construction operations during large-scale wash water treatment.

Therefore, the noise analysis focused on the three loudest stationary noise-generating equipment types necessary for the leak repair (24-hour work at the Poor Farm Arch Bridge), air vent installation (daytime work at the Wallkill Downtake Chamber), boathole installation (daytime work at the Wallkill Downtake Chamber), and large-scale wash water treatment (24-hour work at the Wallkill Downtake Chamber). Associated equipment reference noise levels are shown in **Table 9.6-10**. The types of noise-generating equipment analyzed were conservatively based on peak construction operating conditions.

The results of the stationary construction noise analysis are shown in **Table 9.6-11**. Although there would be an increase in stationary noise levels during 24-hour construction periods during the temporary shutdowns, work would primarily occur in the fall and winter months when residents typically have windows closed. Noise levels inside would be further reduced to interior

noise levels (L_{eq}) of approximately 36 dBA at the nearest residence in the Town of New Paltz and 31 dBA at the nearest residence in the Town of Gardiner.

Repair and rehabilitation work activities have the potential to occur outside of the allowable construction hours defined by the Town of New Paltz. The repair and rehabilitation construction noise levels are also expected to exceed the Town of New Paltz noise limits. DEP would work with the Town of New Paltz, as appropriate.

Table 9.6-10: Stationary Source Construction Equipment Modeled at the New Paltz-Minnewaska Road Study Area - Noise Analysis and Reference Noise Levels (L_{eq})

Equipment Type	Reference Noise Level (L_{eq}) at 50 feet (dBA) ¹
Leak Repair (Poor Farm Arch Bridge – 24 hours per day, 7 days a week)	
Ventilation Fan	85
Generator	82
Backhoe	76
Air Vent Installation and Boathole Installation (Wallkill Downtake Chamber – 7 AM to 7 PM, 7 days a week)	
Crane	77
Generator	82
Concrete Mixer Truck	81
Large-Scale Wash Water Treatment (Wallkill Downtake Chamber – 24 hours per day, 7 days a week)	
Backhoe	76
Crane	77
Generator	82
Note: ¹ City Environmental Quality Review (CEQR) Technical Manual, Chapter 22.	

Table 9.6-11: Stationary Noise Analysis Results (L_{eq}) at the Nearest Noise-Sensitive Receptors within the New Paltz-Minnewaska Road Study Area

Nearest Noise-Sensitive Receptor	Distance from Site (Feet)	Predicted Stationary Noise Level (L_{eq}) at Noise-Sensitive Receptor (dBA)	Town of New Paltz Noise Limit	Town of Gardiner Noise Limit	Potential for Exceedance (Yes or No)
Leak Repair (Poor Farm Arch Bridge – 24 hours per day, 7 days a week)					
Recreational Trail (Mohonk Preserve)	498	67	NA	NA ¹	Yes ²
Air Vent Installation and Boathole Installation (Walkkill Downtake Chamber – 7 AM to 7 PM, 7 days a week)					
Nearest Residence – New Paltz	720	62	NA	NA	No
Nearest Residence – Gardiner	1,347	57	NA	NA	NA
Emitting Property Line – Gardiner	592	64	NA	70 ³	No
Large-Scale Wash Water Treatment (Walkkill Downtake Chamber – 24 hours per day, 7 days a week)					
Nearest Residence - New Paltz	754	60	NA	NA	Yes ²
Nearest Residence - Gardiner	1,347	55	NA	NA	NA
Emitting Property Line - Gardiner	592	63	NA	70 ³ /60 ⁴	Yes
Notes:					
NA = Not Applicable					
¹ The Town of Gardiner is located outside of the 1,500-foot noise study buffer.					
² The Town of New Paltz prohibits the use of noise-producing construction equipment between the hours of 8 PM and 7 AM.					
³ Noise limit is applicable between the hours of 7 AM and 8 PM.					
⁴ Noise limit is applicable between the hours of 8 PM and 7 AM.					

Following completion of the repair and rehabilitation, the construction equipment and vehicles would be removed from the New Paltz-Minnewaska Road Study Area. The repair and rehabilitation work activities would be temporary in nature, with the peak work activities occurring during leak repair in fall ~~2018~~2017, air vent installation in fall ~~2019~~2018, and boathole installation in fall ~~2019~~2018 for limited periods (i.e., up to 10 weeks, per activity).

Therefore, although there would be a temporary increase in noise, noise from the repair and rehabilitation would not result in significant adverse impacts to sensitive receptors within the New Paltz-Minnewaska Road Study Area.

9.6.4.13 Neighborhood Character

The character of the New Paltz-Minnewaska Road Study Area is largely defined by a mix of public services, agricultural, open space and recreation, and vacant land uses and its physical setting within a rural location (see **Figure 9.6-16**). The Catskill Aqueduct traverses the study area in a northeast to southwest direction. Kleine Kill, a tributary to the Wallkill River, traverses the northern portion of the study area. The study area is bounded to the south by New Paltz-Minnewaska Road (also known as State Route 299 and County Route 8), a heavily traveled two-lane arterial, and to the northeast by Lenape Lane, a local roadway. The Wallkill Downtake Chamber is located within a public services corridor which is owned and maintained by DEP; the other two work sites are located on private property. Access to the Wallkill Downtake Chamber would occur via New Paltz-Minnewaska Road to an existing gravel access road. Access to the limits of construction for the two work sites at the north end of the study area would be provided by this same route and then driving north on top of the cut-and-cover tunnel.

DEP has consulted with the Towns of New Paltz and Gardiner and Ulster County, and it is DEP's understanding that no changes in land use and no new projects or structures are anticipated within the New Paltz-Minnewaska Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that neighborhood character within the study area would be similar to baseline conditions.

As described in Section 9.3.16, "Neighborhood Character," there would be no potential for the repair and rehabilitation to affect shadows and urban design. As described in Section 9.6.4.4 "Land Use and Zoning," Section 9.6.4.5, "Socioeconomic Conditions," Section 9.6.4.6, "Open Space and Recreation," Section 9.6.4.7, "Historic and Cultural Resources," and Section 9.6.4.8, "Visual Resources," the work activities would not affect land use and zoning, socioeconomic conditions, open space and recreation, historic and cultural resources, and visual resources in the New Paltz-Minnewaska Road Study Area. Furthermore, the public policy impact analysis provided in Section 9.6.2, "Town of New Paltz Impact Analysis," concluded the work activities were consistent with applicable plans.

As described in Sections 9.6.4.11, "Transportation," and 9.6.4.12, "Noise," during construction, the work activities in the New Paltz-Minnewaska Road Study Area would be short-term (totaling 39 weeks over 2.5 years) and would result in a temporary increase in traffic and noise. Following completion of the repair and rehabilitation, the construction equipment and vehicles would be removed from the study area and traffic patterns would return to baseline conditions. These

temporary increases in traffic and noise levels would not result in a density of activity or service conditions that would affect the overall character of the study area.

The repair and rehabilitation would not generate significant adverse effects in land use, zoning, and public policy; socioeconomic conditions; open space and recreation; shadows; historic and cultural resources; urban design and visual resources; transportation; or noise.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to neighborhood character within the New Paltz-Minnewaska Road Study Area.

9.7 TOWN OF GARDINER

9.7.1 TOWN OF GARDINER PROJECT DESCRIPTION

The Town of Gardiner is located in Ulster County, New York on the western side of the Hudson River. It is bounded by the Towns of New Paltz to the north and northeast, Lloyd to the east, Plattekill to the southeast, Shawangunk to the south and southwest, Wawarsing to the west and Rochester to the northwest. The Town of Gardiner is approximately 45 square miles. General boundaries of locations where activities associated with the repair and rehabilitation would occur within the Town of Gardiner are shown on **Figure 9.7-1**.

The Catskill Aqueduct stretches for approximately 7 miles in a southerly direction through the Town of Gardiner. Notable sites along the aqueduct within the Town of Gardiner that are associated with repair and rehabilitation work activities include the Wallkill Pressure Tunnel Drainage Chamber, Wallkill Pressure Tunnel Uptake Chamber, and the Catskill/Delaware Interconnection at Shaft 4 (Shaft 4 Interconnection). The repair and rehabilitation work activities within the Town of Gardiner would occur within three study areas as shown in **Table 9.7-1**.

Table 9.7-1: Schedule of Work Activities within the Town of Gardiner

Work Activity	Study Area		
	Forest Glen Road	Le Fevre Lane	Armato Lane
Primary Staging Area Management	-	-	✓
Internal Leak Repair	✓	-	-
Air Vent Installation	-	✓	-
Biofilm Removal and Condition Assessment	-	✓	✓
Small-scale Wash Water Treatment	-	-	✓
Dechlorination Installation (if necessary)	✓	-	-
Dechlorination Demobilization/ Site Restoration (if necessary)	✓	-	-

Notes:
 - = Work activity not proposed.
 ✓ = Work activity proposed.

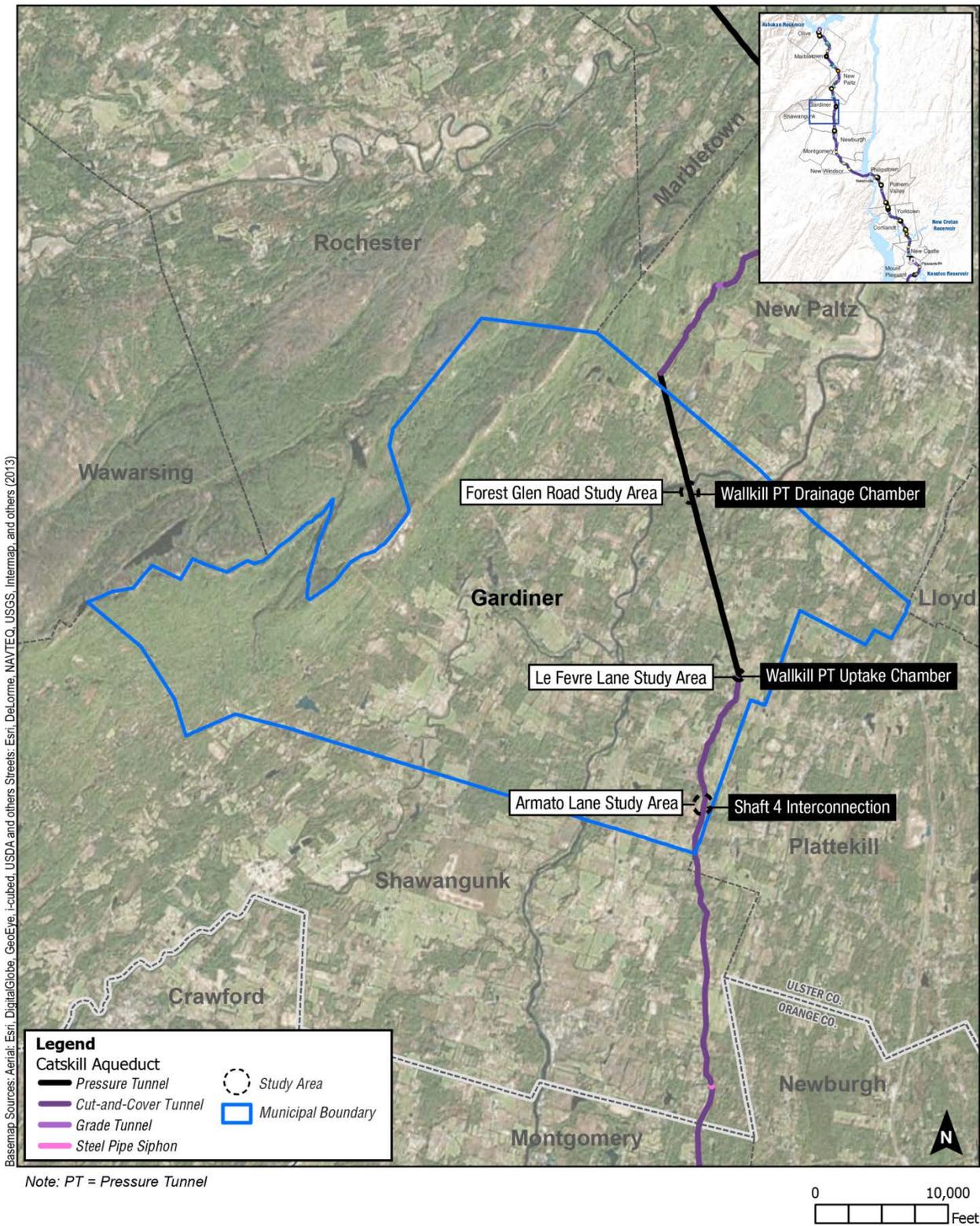


Figure 9.7-1: Town of Gardiner Study Areas



These three study areas in the Town of Gardiner encompass the majority of work that would occur as part of the repair and rehabilitation in this municipality. Additional work activities in the town do not warrant further assessment. Work sites located outside the study area include activities that would primarily be conducted within the aqueduct interior (see Section 9.3, “Screening Assessment and Impact Analysis Methodology”). In the Town of Gardiner, they include biofilm removal and condition assessment at access manholes not located in these study areas and permanently sealing one culvert drain sluice gate. See Section 9.2, “Project Description,” for an overall project description of the repair and rehabilitation. Section 9.7.2, “Town of Gardiner Impact Analysis,” provides a discussion of local regulations in the Town of Gardiner jurisdictional limits. The following sections provide a description of the study area, proposed activities, and impact analysis for the three study areas:

- Section 9.7.3 – Forest Glen Road Study Area Impact Analysis
- Section 9.7.4 – Le Fevre Lane Study Area Impact Analysis
- Section 9.7.5 – Armato Lane Study Area Impact Analysis

9.7.2 TOWN OF GARDINER IMPACT ANALYSIS

9.7.2.1 Public Policy

Because local public policies would not vary for study areas within the same town, public policies are evaluated on a town-wide basis. While the Town of Gardiner is located in Ulster County, and is therefore, subject to the Ulster County Open Space Plan (Ulster County 2007), no policies contained within the Plan are applicable to the Le Fevre Lane and Armato Lane study areas. As discussed in Section 9.3.3.3, “Town Codes,” the repair and rehabilitation’s consistency with the applicable policies and regulations within the Town of Gardiner was reviewed. As described in Section 9.3.3, “Land Use, Zoning, and Public Policy,” the repair and rehabilitation’s consistency with the applicable policies of the Ulster County Open Space Plan within the Forest Glen Road Study Area are analyzed as follows.

Ulster County Open Space Plan (2007)

The Ulster County Open Space Plan established a framework for the management and protection of open space resources identified by Ulster County. These include water resources, working landscapes, landforms and natural features, ecological communities, cultural and historic resources, and recreational resources. To provide guidance on these open space resources, Ulster County established the 10 “Principles of the Open Space Plan” that seek to safeguard the open space values of Ulster County. Of those 10 principles, two principles are applicable to the repair and rehabilitation. The potential effects of the repair and rehabilitation within study areas in the Town of Gardiner are evaluated for compatibility with the following two applicable principles:

- (1) *Preserve and protect open space, unique natural areas and heritage areas and sites, wetlands, water and woodland resources, scenic views, areas of natural beauty and the rural character of Ulster County.*

Open space and recreational resources and water resources were identified within the Forest Glen Road Study Area. Visual resources were identified within the Forest Glen Road, Le Fevre

Lane, and Armato Lane study areas. The potential for impacts to these resources is analyzed in detail in Section 9.7.3.4, “Open Space and Recreation,” and Section 9.7.3.6, “Natural Resources” for the Forest Glen Road Study Area, and the respective “Visual Resources” sections for the Le Fevre Lane and the Armato Lane study areas. As discussed in Section 9.3.7, “Historic and Cultural Resources,” and Section 9.3.9, “Natural Resources,” there would be no effect of the repair and rehabilitation on historic and cultural resources or terrestrial resources within study areas in the Town of Gardiner, and there were no water resources within Le Fevre Lane and Armato Lane study areas.

Under this principle, the Open Space Plan recommends protecting valuable landforms and natural features in order to benefit residents and preserve the rural character of Ulster County. This principle was analyzed for repair and rehabilitation as work in the study areas would potentially impact existing open space, visual resources and natural resources, directly or indirectly, depending on the study area.

As discussed in these sections, the repair and rehabilitation would occur at the existing DEP facilities, and the work activities would primarily consist of maintenance and repairs. Within the Forest Glen Road Study Area, Leak 6 in the Catskill Aqueduct flows to the Wallkill River in the study area and would be repaired, which would restore the Wallkill River to pre-leak conditions. No tree removal would take place in the Forest Glen Road Study Area. Work activities at the Forest Glen Road Study Area would not be visible from nearby vantage points along the Wallkill River.

Additionally, the Shawangunk Mountains Scenic Byway passes through both the Le Fevre Lane and Armato Lane study areas. The repair and rehabilitation would not result in significant adverse impacts to visual resources within these study areas, as views in these sections are limited due to the vegetation along both sides of the byway. The byway’s Corridor Management Plan (Shawangunk Mountains Scenic Byway 2005) identifies locations with views of the Shawangunk Mountains, and there are no view locations identified within either the Le Fevre Lane or Armato Lane study areas.

Following completion of the repair and rehabilitation, the Forest Glen Road, Le Fevre Lane, and Armato Lane study areas would be restored to baseline conditions. As such, the repair and rehabilitation within the Forest Glen Road, Le Fevre Lane, and Armato Lane study areas would not affect open space resources, unique natural areas and heritage areas and sites, wetlands, water and woodland resources, scenic views, areas of natural beauty, or the rural character of Ulster County and would be consistent with this principle.

- (2) *Protect and enhance the county’s most valuable open space landforms and natural features with coordinated planning and safeguard policies.*

Open space, recreational, and visual resources were identified within the Forest Glen Road Study Area, and the potential for impacts associated with the repair and rehabilitation is analyzed in detail in Section 9.7.3.4, “Open Space and Recreation” and Section 9.7.3.5, “Visual Resources” respectively.

Under this principle, the Open Space Plan recommends preserving the visual or ecological values of significant landforms and natural features in order to protect against inappropriate development. This principle was analyzed for repair and rehabilitation as work in the study areas

would potentially impact existing open space and visual resources, directly or indirectly, depending on the study area.

The repair and rehabilitation within the Forest Glen Road Study Area would occur at an existing DEP facility and would not permanently affect landforms and natural features such as valleys, ridgelines, slopes, coastal areas, or scenic areas. The Wallkill River within the Forest Glen Road Study Area would remain accessible during the repair and rehabilitation, and work activities would not reduce recreational use of the river. The portion of the Wallkill River located in the Forest Glen Road Study Area is not visible from the limits of construction, and is located behind dense stands of trees and upgradient from the river.

Following the completion of activities, operation of the Catskill Aqueduct would be consistent with baseline conditions. As such, the repair and rehabilitation within the Forest Glen Road, Le Fevre Lane, and Armato Lane study areas would not affect open space landforms and natural features within Ulster County and would be consistent with the principle.

Repair and rehabilitation would therefore be consistent with the Ulster County Open Space Plan and would not result in significant adverse impacts to public policy within the Forest Glen Road, Le Fevre Lane, and Armato Lane study areas.

9.7.3 FOREST GLEN ROAD STUDY AREA IMPACT ANALYSIS

Within the Forest Glen Road Study Area, the aqueduct consists of the Wallkill Pressure Tunnel. One leak (referred to as Leak 6) has been identified in this study area at the Wallkill Pressure Tunnel Drainage Chamber (Wallkill Drainage Chamber; see **Figure 9.7-2**).

Work activities within the Forest Glen Road Study Area would include: internal leak repair; and, if necessary, the installation and operation of a passive dechlorination system, which would also require site restoration following completion of aqueduct chlorination.

9.7.3.1 Study Area Location and Description

The Forest Glen Road Study Area is located along the upper Catskill Aqueduct in the Town of Gardiner. The Catskill Aqueduct traverses the study area in a general north to south direction. Just north of the study area, the Wallkill River flows from west to east. An unnamed tributary to the Wallkill River originates near the Wallkill Drainage Chamber before bending to the west at the study area's midpoint and continuing northwest to a riparian wetland along the Wallkill River. Forest Glen Road is located to the south of the study area, and River Park Drive is located to the east. The proposed work site within the study area is located at Leak 6 at the Wallkill Drainage Chamber. Leak 6 exits the Wallkill Drainage Chamber by flowing through a subsurface blow-off conduit that conveys leak water underground approximately 60 feet before daylighting at a concrete headwall. Access to the work site would be provided by an access road that connects to Forest Glen Road. The study area boundary is located approximately 500 feet beyond the outermost limits of disturbance related to this work site. **Figure 9.7-2** shows an aerial photograph of the study area, including the path of the aqueduct, the limits of construction for the work site, and the proposed access route. **Figure 9.7-3** shows photographs of the study area.

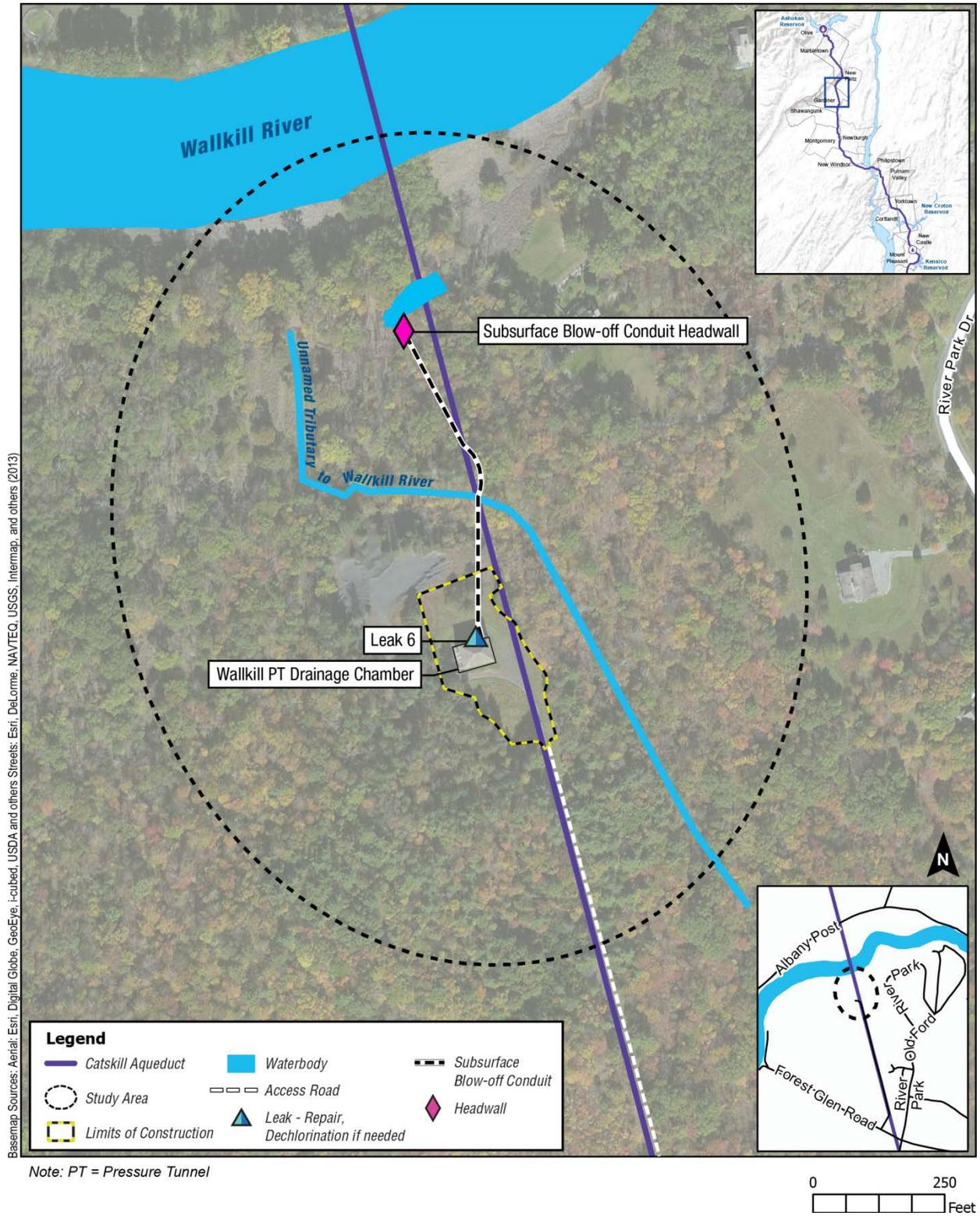


Figure 9.7-2: Study Area – Forest Glen Road





Photograph 1: Ponding from Leak 6 near headwall to subsurface blow-off conduit.



Photograph 2: View of cleared lawn area surrounding Forest Glen Road Study Area.

Figure 9.7-3: Photographs – Forest Glen Road Study Area



The study area includes public services, residential, and vacant land uses. The study area is heavily wooded with some cleared and grassy areas around the Wallkill Drainage Chamber, a wetland area in the northern portion of the study area, and some sparsely spaced residential properties. The limits of construction for the work site and associated access route are located in a public services corridor with grassy cover, which is owned and maintained by DEP and separated from adjacent land by a forested zone. **Figure 9.7-4** shows a map of the land uses within the study area and its surroundings.

Zoning within the Forest Glen Road Study Area is entirely residential agricultural (RA) as designated by the Town of Gardiner Zoning Code (see **Figure 9.7-5**). The Catskill Aqueduct is a permitted use as a public utility facility within the residential agricultural (RA) zoning district.

There are no federal, State, or local designated landmarks, historic districts, or known archeological resources within the study area.

9.7.3.2 Description of Leak 6

Leak 6 is located approximately 330 feet below grade underneath the Wallkill Drainage Chamber. The leak is created by an inoperable valve that diverts a small portion of aqueduct water through a vertical shaft, which ascends to the floor of the Wallkill Drainage Chamber's weir chamber approximately 8 to 10 feet below grade. The pressurized aqueduct water rises through this shaft and into the weir chamber before flowing over the weir and into a blow-off conduit. The conduit conveys the water underground from approximately 60 feet below the chamber to a concrete headwall where the leak daylights, approximately 700 feet to the north. At that point, the leak water discharges into a depressed area separated from the Wallkill River by a berm, which results in ponding in the depressed area from overtopping by the river and the continuous inflow of leak water. The flow of Leak 6 is approximately 8 gpm (or approximately 11,500 gpd). Since the leak flows through the conduit directly into the ponded area, there are no leak flowpaths or surface expressions in the surrounding environment. **Figure 9.7-3** shows photographs of the study area, including the accumulated water from Leak 6 near the Wallkill Drainage Chamber as it flows towards the river (Photograph 1).

9.7.3.3 Proposed Activities within the Forest Glen Road Study Area

To support activities within the Forest Glen Road Study Area, the Shaft 4 Interconnection (within the Armato Lane Study Area) would serve as a primary staging area from which workers would be transported to the site daily. Several secondary staging areas, including one at the Wallkill Drainage Chamber, would provide additional parking. Equipment and materials would be staged on site. No staging area or access improvements would be necessary other than underbrush clearing and gravel placement for leveling and erosion control. Erosion and sediment control measures such as silt fencing and hay bales would be installed at the perimeter of the work site as needed. A site plan showing a layout of the limits of construction for the work site, which would occupy a total of 1.1 acres, is shown on **Figure 9.7-6**. The schedule for work within the study area is shown in **Table 9.7-2**. The duration of active construction within the Forest Glen Study Area is estimated to total 8 weeks over 10 months, in addition to 2 weeks to demobilize and restore the site following temporary chlorination.

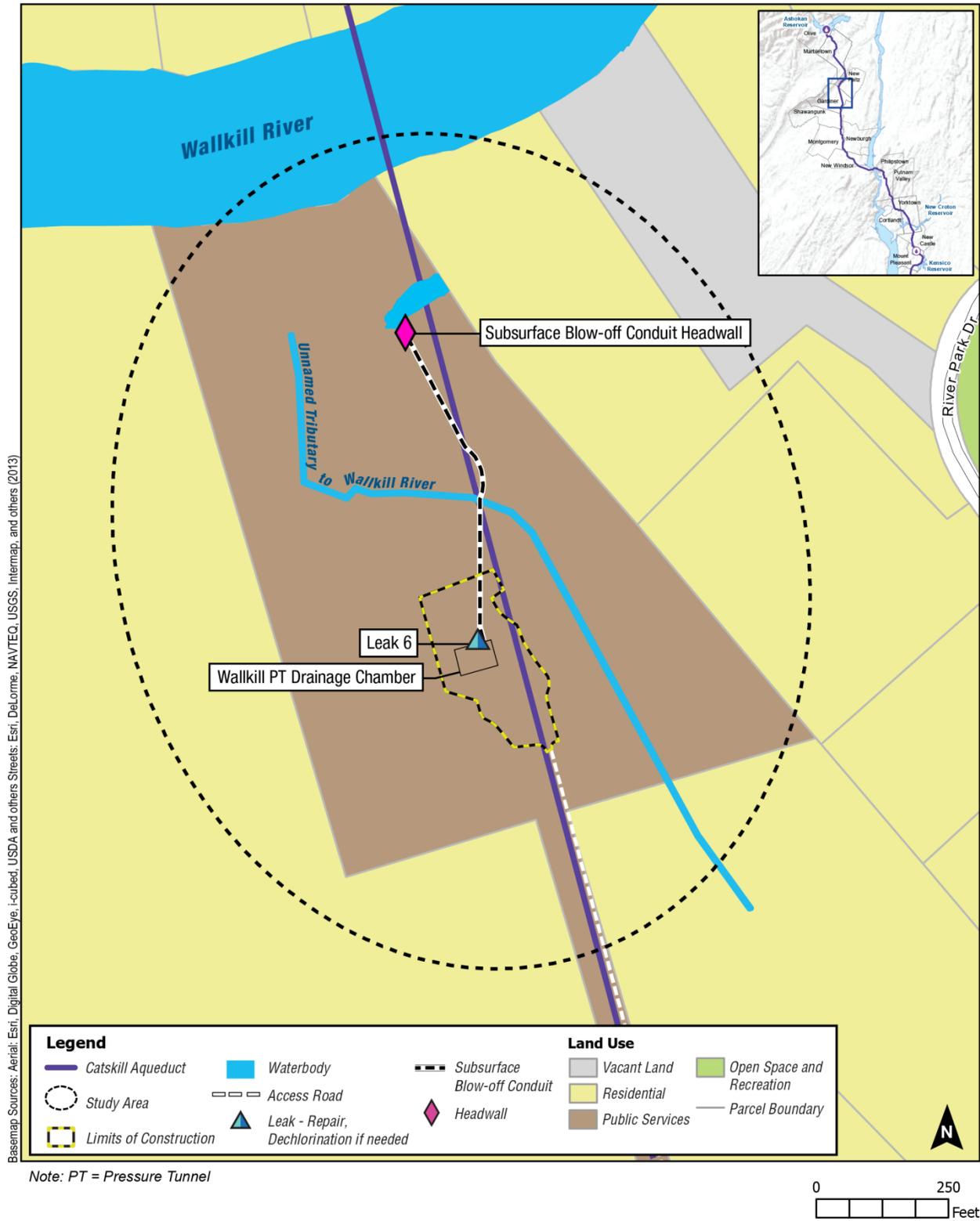


Figure 9.7-4: Land Use – Forest Glen Road Study Area



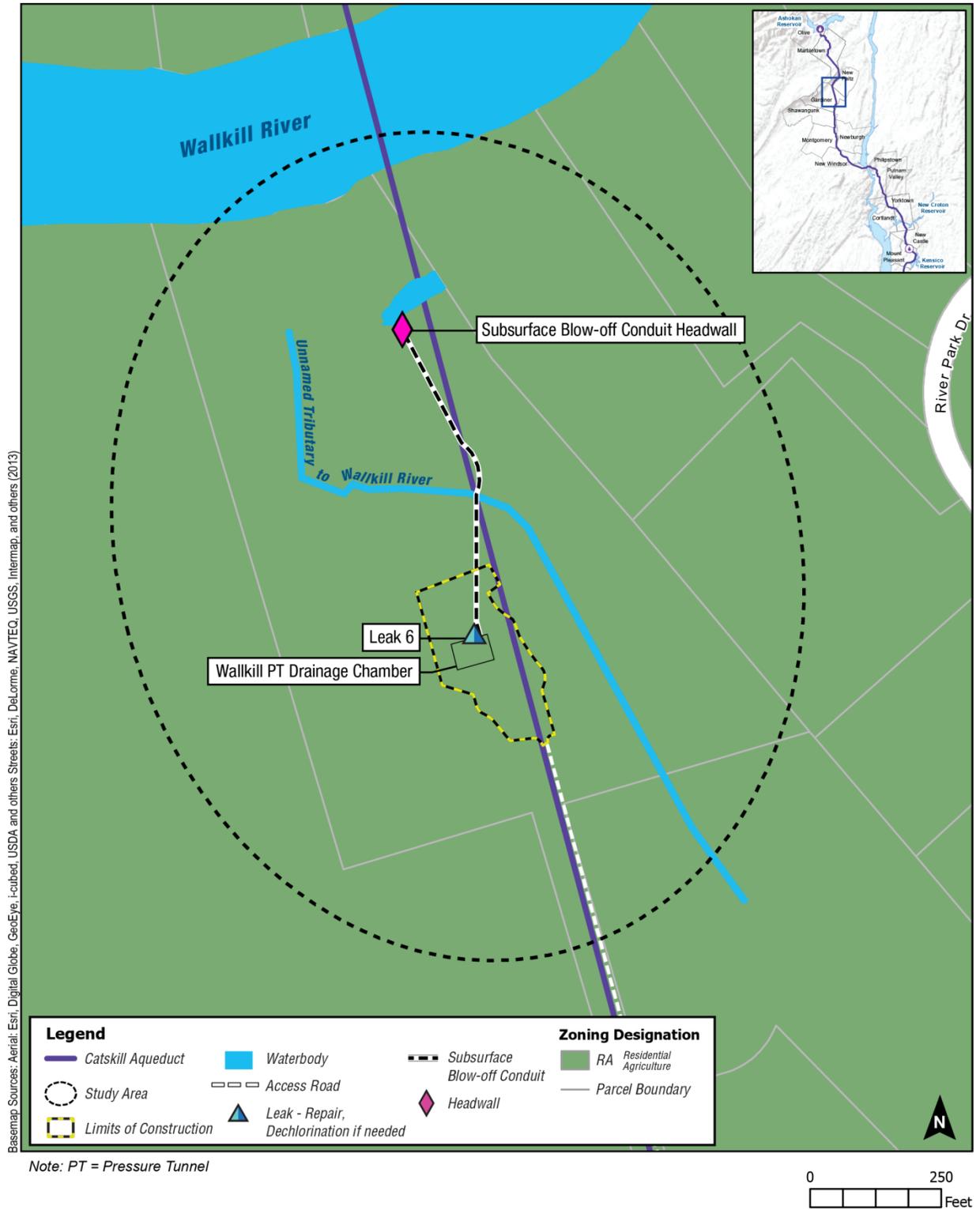


Figure 9.7-5: Zoning – Forest Glen Road Study Area



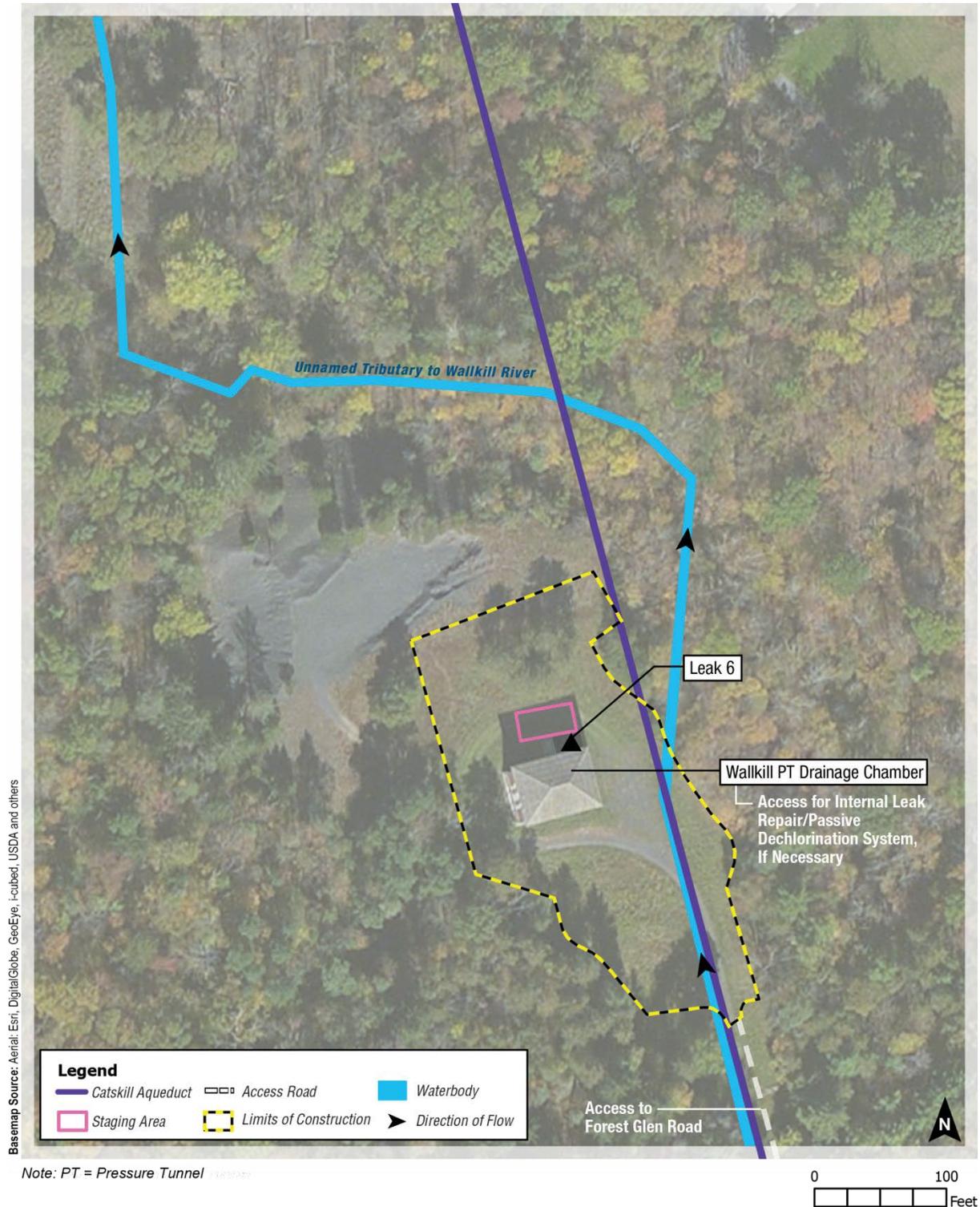


Figure 9.7-6: Site Plan – Forest Glen Road Study Area



Table 9.7-2: Schedule of Work Activities within the Forest Glen Road Study Area

Work Activity	Dates	Duration	Work Hours ¹	Crew Size ²
Internal Leak Repair	Fall 2018 2017 (First 10-week shutdown)	4 weeks	7 days a week, 24 hours per day	10
Dechlorination Installation (if necessary)	Summer 2019 2018	4 weeks	Monday to Friday, 8 AM to sunset	8
Dechlorination Demobilization/ Site Restoration ³ (if necessary)	2023	2 weeks	Monday to Friday, 7 AM to 5 PM	8
Notes:				
¹ Work hours while the aqueduct is in service would be adjusted to meet local regulations where possible, in accordance with the Town of Gardiner Noise Control Law §220-40.C.				
² Crew size refers to the number of people anticipated at the work site(s).				
³ Dechlorination demobilization and site restoration is not included in estimated duration of active construction.				

Work in the study area would begin with internal leak repair during the first 10-week shutdown in fall ~~2018~~2017. Since the aqueduct is pressurized at this location, the vertical shaft below the Wallkill Drainage Chamber would be filled with water even during the shutdown, requiring a certified diver to perform the repairs. The diver would enter the shaft, remove the existing leaking 16-inch flap valve, and install a pipe plug, which would be reinforced with placement of an additional security flange.

Once installed, the plug is expected to permanently repair Leak 6. However, if leak repair is unsuccessful, a temporary, passive dechlorination system would be installed in summer ~~2019~~2018. An activated carbon trench with a footprint of approximately 13 square feet would be installed upstream of the weir in the weir chamber. This would require temporary diversion of the leak water around the work area. The dechlorination system would be sized to treat the leak flow that would occur when the aqueduct is operated at its maximum capacity, and anticipated flow during temporary chlorination. Upon completion of installation, all construction equipment and materials would be removed.

As stated in Section 9.2, “Project Description,” local dechlorination systems would be in operation when chlorination of the aqueduct begins in ~~2020~~2019. While in operation, the systems would be inspected and maintained on a regular basis, including the monitoring of residual chlorine concentrations, as required. When chlorination is no longer required in 2023, the passive dechlorination system would be removed, and any areas temporarily disturbed would be restored to baseline conditions.

Impact categories analyzed for the Forest Glen Road Study Area are presented in Section 9.7.3.4, “Open Space and Recreation” through Section 9.7.3.10, “Neighborhood Character,” and include: open space and recreation; visual resources; natural resources, including water resources, and federal/State Threatened and Endangered Species, and State Species of Special Concern; hazardous materials; transportation; stationary noise; and neighborhood character associated with the repair and rehabilitation within the study area. Additionally, the study area’s compatibility

with applicable public policies was analyzed on a town-wide basis in Section 9.7.2, “Town of Gardiner Impact Analysis.” As described in Section 9.3, “Screening Assessment and Impact Analysis Methodology,” an impact analysis related to land use and zoning; socioeconomic conditions; community facilities and services; historic and cultural resources; other natural resources subcategories including geology and soils, aquatic and benthic resources, wildlife, terrestrial resources, federal/State Candidate Species, and unlisted rare and vulnerable species; energy; air quality; and mobile noise within the study area is not warranted. Finally, impacts related to project-wide natural resources, water and sewer infrastructure, and public health were analyzed within Section 9.19, “Project-wide Impact Analysis.”

9.7.3.4 Open Space and Recreation

As shown on **Figure 9.7-2**, one open space and recreation resource exists within the Forest Glen Road Study Area: the Wallkill River. Approximately 500 feet of the Wallkill River is located within the Forest Glen Road Study Area. The Wallkill River provides recreational fishing for walleye (*Sander vitreus*) from the first Saturday in May through March 15, and for smallmouth bass (*Micropterus dolomieu*) and largemouth bass (*Micropterus salmoides*) from the third Saturday in June through November 30. The Wallkill River is not a NYSDEC trout stocking waterbody. There are no NYSDEC parking areas, Public Fishing Rights locations, or boat launches located in the Forest Glen Road Study Area.¹ The Wallkill River also provides recreational boating (e.g., canoeing and kayaking). No access to the Wallkill River is provided from the Forest Glen Road Study Area.

DEP has consulted with the Town of Gardiner and Ulster County, and it is DEP’s understanding that no plans to expand or create new open spaces or recreational resources are anticipated within the Forest Glen Road Study Area within the timeframe of the impact analysis. Natural processes, such as changes in habitat due to natural vegetative succession, are anticipated to continue. Use of the identified open space is anticipated to continue. Therefore, in the future without the repair and rehabilitation, it is assumed that open space and recreation within the Forest Glen Road Study Area would be the same as baseline conditions.

During construction, the repair and rehabilitation work activities within the Forest Glen Road Study Area would be short-term (intermittently over 10 months; see **Table 9.7-2**). Site preparation activities at the construction staging area near the Wallkill Drainage Chamber building would not include clearing of trees near the Wallkill River. Construction of the passive dechlorination system for Leak 6 would occur at the existing site, and staging would be provided on a small footprint of upland area adjacent to the structure. No disturbance near the Wallkill River would occur. Therefore, repair and rehabilitation work activities would not disrupt any recreational uses of the Wallkill River.

As discussed in Section 9.7.3.9, “Noise,” there could be temporary increases in noise levels within the Forest Glen Road Study Area that would occur in a location far removed from the

¹ Permanent easements for the purpose of public fishing rights are purchased by NYSDEC from willing landowners giving anglers the right to fish and walk along these banks.

Wallkill River. However, upon completion of the repair and rehabilitation work activities, the recreational use of the Wallkill River would be unaffected.

All construction equipment would be removed from the Forest Glen Road Study Area and the staging area would be restored to baseline conditions. Temporary chlorination of the Catskill Aqueduct would occur from 2019 through 2023, and the passive dechlorination system, if necessary, would be operated. During this time, no disturbance outside the drainage chamber building would occur. Occasional maintenance would be needed, similar to baseline operating conditions. Once the Catskill Aqueduct returns to typical operations in 2023, the passive dechlorination system would be removed and the site would be restored to baseline conditions.

Following the repair and rehabilitation within the Forest Glen Road Study Area, operation of the Catskill Aqueduct would be consistent with baseline conditions, and would not disrupt recreation activities or use of adjacent open spaces. As such, the repair and rehabilitation would not encroach upon, cause a loss of open space, affect the use or physical character of, or disrupt views from the Wallkill River.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to open space and recreation within the Forest Glen Road Study Area.

9.7.3.5 Visual Resources

The study area for the visual resources analysis is the area within the Forest Glen Road Study Area. It also includes view corridors that extend beyond the study area based on the locations that are publicly accessible.

Visual resources, consisting of one locally significant resource, the Wallkill River, were identified within the Forest Glen Road Study Area, as shown on **Figure 9.7-2**. Approximately 500 feet of the Wallkill River is within the Forest Glen Road Study Area. Due to the existing forested areas along the river and adjacent to the Wallkill Drainage Chamber, there are no views of the drainage chamber from the Wallkill River.

DEP has consulted with the Town of Gardiner and Ulster County, and it is DEP's understanding that no new projects or structures that would alter views or aesthetic resources are anticipated within the Forest Glen Road Study Area within the timeframe of the impact analysis. Natural processes such as changes in habitat due to natural vegetative succession are anticipated to continue. Therefore, in the future without the repair and rehabilitation, it is assumed that visual resources within the Forest Glen Road Study Area would be the same as baseline conditions.

During construction, the repair and rehabilitation work activities within the Forest Glen Road Study Area would be short-term (intermittently over 10 months; see **Table 9.7-2**). Site preparation activities at the construction staging area near the Wallkill Pressure Tunnel Drainage Chamber would not include clearing of trees near Wallkill River. Construction of the passive temporary dechlorination system for Leak 6, if needed, would occur at the existing drainage chamber building and the staging would be sited on a small footprint on an upland area adjacent to the structure, and would not be visible from the Wallkill River. No disturbances near the Wallkill River would take place.

Therefore, repair and rehabilitation work activities would not disrupt any views from the Wallkill River. All construction equipment would be removed from the Forest Glen Road Study Area and the staging area would be restored to baseline conditions. Temporary chlorination of the Catskill Aqueduct would occur from 2019 through 2023, and the passive dechlorination system, if necessary, would be operated. During this time, no disturbance outside the drainage chamber building would occur. Occasional maintenance would be needed, similar to baseline operating conditions.

Once the Catskill Aqueduct returns to typical operations in 2023, the passive dechlorination system would be removed and the site would be restored to baseline conditions. Following the repair and rehabilitation within the Forest Glen Road Study Area, operation of the aqueduct would be consistent with baseline conditions. It would not result in changes to the future visual and aesthetic resource conditions of the views to the Wallkill River.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to visual resources within the Forest Glen Road Study Area.

9.7.3.6 Natural Resources

The study area for the natural resources analysis is the area surrounding the limits of construction, including Leak 6 and the Wallkill Drainage Chamber (see **Figure 9.7-7**). The boundary is also inclusive of downstream resources potentially influenced by the leak.

Based on a field visits conducted on June 17, 2013 and June 19, 2015, the study area is dominated by hardwood forest communities, including a maple-basswood rich mesic forest and floodplain forest bordering the Wallkill River. The study area also contains a forested wetland with small areas of shallow emergent marsh at the headwall of the blow-off conduit where the leak daylights. There is also a small area of old field community dominated by grasses and herbaceous weeds. The potential for the repair and rehabilitation to result in changes to natural resources as a result of the proposed temporary chlorination at the Ashokan Screen Chamber is further analyzed in Section 9.19, "Project-wide Impact Analysis."

Water Resources

The natural resources study area is within the Lower Hudson River drainage basin, more specifically within the Rondout watershed (hydrologic unit code [HUC] 02020007) and the Kleine Kill-Wallkill River subwatershed (HUC 020200070406).

All wetlands and surface waters in the natural resources study area are subject to jurisdiction under Sections 401 and 404 of the Clean Water Act for proposed work activities. As a Class B waterbody, the Wallkill River, which is adjacent to the natural resources study area, is subject to State Protection of Waters regulations with a regulated 50-foot buffer to protect the streambed and banks.

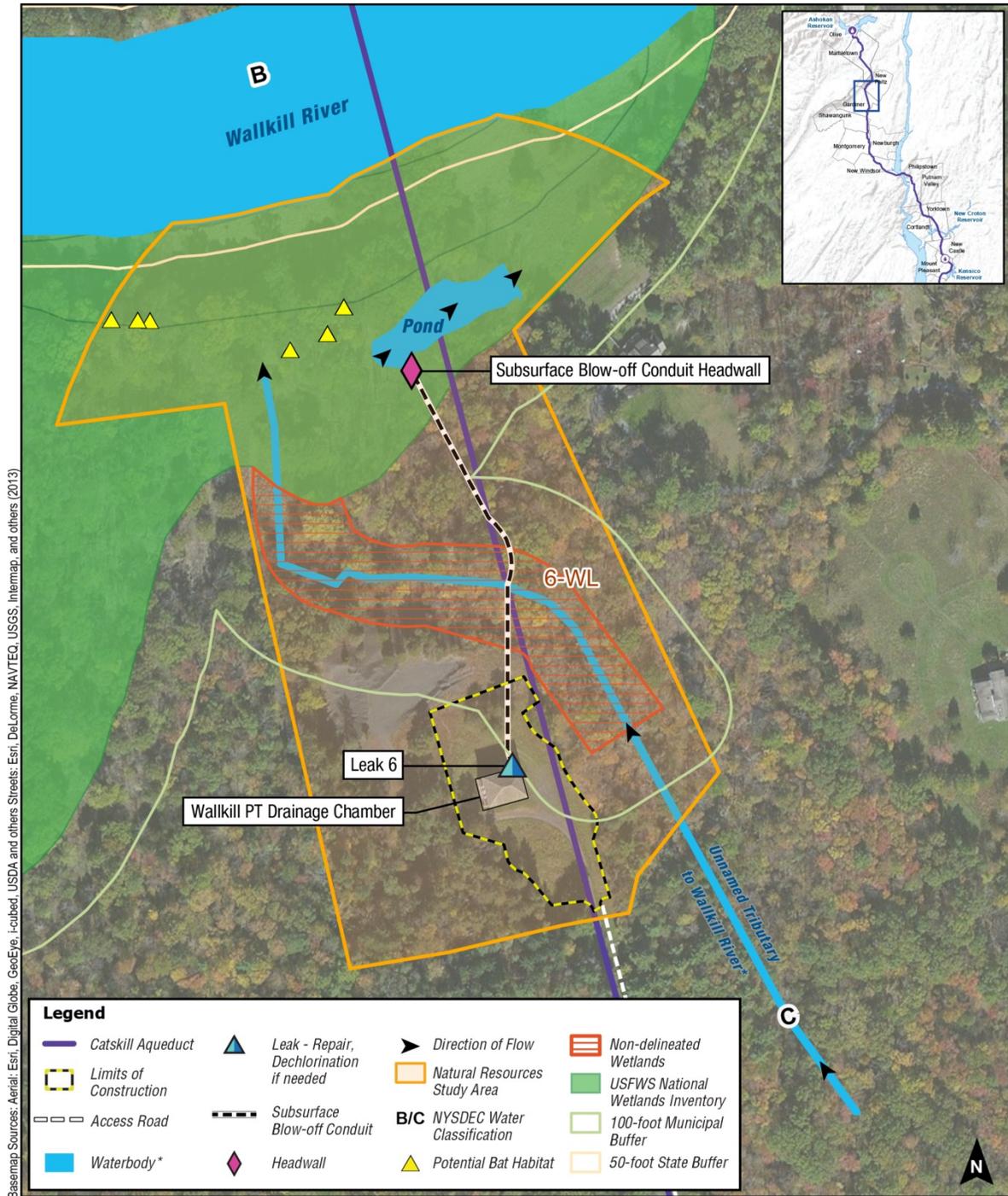


Figure 9.7-7: Natural Resources – Forest Glen Road Study Area



In addition, the Town of Gardiner regulates activities within wetlands following NYSDEC and USACE regulations, and a 100-foot buffer for riparian wetlands along watercourses with NYSDEC classifications of C(T) or greater, like the Wallkill River (Gardiner Town Code Chapter 220-35: Wetland and Watercourse Protection). Based on its NYSDEC classification, the Wallkill River would also have a 100-foot municipal buffer. Therefore, activities occurring within wetlands or within the buffer to the Wallkill River could be subject to Town review and approval. Work activities at the unnamed tributary to Wallkill River are not regulated by the Town of Gardiner because it is a NYSDEC Class C waterbody.

Surface Water

Surface water delineations in the natural resources study area occurred on June 17, 2013 and June 19, 2015. The water resource name, length, area, and classifications are shown in **Table 9.7-3**. The Wallkill River is mapped immediately north of the natural resources study area and flows west to east (see **Figure 9.7-7**). Based upon a review of NYSDEC data, an unnamed tributary to the Wallkill River is mapped in the northern portion of the natural resources study area. There is no flowpath for Leak 6 because the leak flow is contained within the existing subsurface blow-off conduit. However, Leak 6 diminishes or ceases to flow to the Wallkill River during occasional Catskill Aqueduct shutdowns.

Table 9.7-3: Water Resources and Classifications within the Forest Glen Road Natural Resources Study Area

Water Resource	Area (Square Feet)	Length (Feet)	Cowardin Classification
6-WL (includes NWI wetland)	321,030	NA	Palustrine, Forested, Broad-Leaved Deciduous (PFO1)
Pond (within NWI wetland)	13,430	NA	Lacustrine, Limnetic, Unconsolidated Bottom, Mud (L1UB3)
Unnamed Tributary to Wallkill River	3,070	770	Riverine, Upper Perennial, Unconsolidated Bottom, Seasonally Flooded (R3UBC)
Note: NA = Not Applicable			

Unnamed Tributary to Wallkill River

As identified above, an unnamed tributary to the Wallkill River originates southeast of the drainage chamber building and flows northwest before the tributary enters a riparian wetland along the Wallkill River in the natural resources study area. This unnamed tributary is not associated with Leak 6. However, it flows into the same NWI wetland complex as Leak 6.

The watercourse has a steep gradient in its upper reaches, and is aggrading (laterally migrating or becoming braided) when it enters the forested wetland bordering the Wallkill River. This watercourse is classified as a “Riverine, Upper Perennial, Unconsolidated Bottom, Seasonally Flooded” system based on the Cowardin System. Log and branch deposits (i.e., woody debris) were piled against the upstream side of tree trunks throughout the forested wetland and indicate that the area is submerged during flooding events.

Wetlands

There is a mapped NWI palustrine forested wetland along the Wallkill River (see **Figure 9.7-7** and **Table 9.7-3**) in the northern portion of the study area. The presence or absence of wetlands was determined during the field visits and through a desktop assessment of NYSDEC water classification data, historic USGS topographic maps, national hydrography data, NRCS soil survey, and local topography.

Wetland 6-WL

The results of the field visits to the study area indicate that wetlands are present northeast of the Wallkill Drainage Chamber and continue northward to the Wallkill River (shown as non-delineated Wetland 6-WL and NWI; see **Figure 9.7-7**). Dominant species present within the wetland consist of silver maple (*Acer saccharinum*), black willow (*Salix nigra*), shagbark hickory (*Carya ovata*), green ash (*Fraxinus pennsylvanica*), broadleaf cattail (*Typha latifolia*), skunk cabbage (*Symplocarpus foetidus*), sensitive fern (*Onoclea sensibilis*), spotted touch-me-not (*Impatiens capensis*), greater bladder sedge (*Carex intumescens*), and lizard's tail (*Saururus cernuus*), which are obligate or facultative wetland species commonly found in wetlands.

Leak 6 is a valve leak that diverts a small portion of aqueduct water over a weir into the Wallkill Drainage Chamber blow-off conduit. Flow exiting the blow-off conduit enters a shaded ponded area that is approximately 18 inches deep, 250 feet long, and 75 feet wide and is hydrologically connected to the Wallkill River. This ponded area is associated with the NWI wetland that continues along the southern bank of the Wallkill River. The pond is the result of an 18-inch plastic culvert on the northeastern terminus of the pond that restricts flow from the blow-off conduit headwall to the Wallkill River. The bottom of the culvert at the pond outlet is higher than the bed of the pond, enabling the pond to hold water and the area to remain inundated.

There is a high degree of interconnectivity between the pond and adjacent wetlands/waterways. The area surrounding the pond is wetland and the area down-gradient of the pond is bounded by the river to the north. Wetland hydrology is provided by surface connections to the unnamed tributary to Wallkill River, contributions from the drainage area, and hydrology from the Wallkill River during bankfull events.

Small fish, including largemouth bass, redbfin pickerel (*Esox americanus americanus*), and minnows (family Cyprinidae), were observed in the shallow ponded area below the blow-off conduit headwall.

Future Without the Repair and Rehabilitation

DEP has consulted with the Town of Gardiner and Ulster County, and it is DEP's understanding that no projects or developments are anticipated to occur within the natural resources study area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that the future conditions of water resources within the Forest Glen Road Study Area would remain the same as baseline conditions.

Analysis of Potential Effect

This section analyzes the potential for temporary and permanent disturbance to water resources associated with construction, temporary chlorination, and long-term operation of the Catskill Aqueduct in the Forest Glen Road Study Area.

Construction

Work activities related to the repair and rehabilitation have the potential to alter flows to surface water. Prior to commencing the repair and rehabilitation, temporary sediment and erosion control measures, such as silt fences, would be installed, particularly adjacent to 6-WL and the unnamed tributary to the Wallkill River. Pumping would be conducted only when necessary. These temporary measures would be designed in accordance with the State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity and other applicable regulatory requirements to ensure sediment and other pollutants are prevented from entering the waterway. The Forest Glen Road Study Area contains an existing DEP facility with an existing access road that does not encroach upon nearby water resources. No access improvements to this road are needed.

If leak repair is not successful a temporary dechlorination system would be installed at the leak in already disturbed area. While the dechlorination system is installed, the leak flow would be temporarily diverted using gravity bypass piping overland to the pond at the headwall of the blow-off conduit.

Anticipated temporary disturbance to water resources and regulated buffers were quantified based on the limits of construction and proposed work activities (see **Table 9.7-4**). Construction activities and staging would occur on the existing cleared area near the Wallkill Drainage Chamber, which is adjacent to the unnamed tributary and 6-WL. Approximately 13,610 square feet associated with the municipal buffer would be temporarily affected. There would be no permanent disturbance to water resources, wetlands, or State or municipal buffers during construction. Following construction, temporarily disturbed areas would be restored to natural conditions and planted with native vegetation.

Table 9.7-4: Estimated Disturbance to Water Resources within the Forest Glen Road Natural Resources Study Area

Water Resource	Baseline Conditions (Square Feet)	Temporary Effects (Square Feet)	Permanent Effects (Square Feet)
6-WL	321,030	0	0
Pond	13,430	0	0
Unnamed tributary of Wallkill River	3,070	0	0
State Protection of Waters Buffer	3,730	0	0
Water Resource Municipal Buffer	154,830	13,610 <i>Construction staging area and temporary dechlorination system installation (if needed)</i>	0

Temporary Chlorination

Following construction, temporary chlorination of the Catskill Aqueduct would occur from 2019 through 2023, and the temporary passive dechlorination system would be operated. The system would treat all discharges to meet applicable regulatory requirements. Once the Catskill Aqueduct returns to typical operations in 2023, the passive dechlorination system would be removed, and the site restored to natural conditions.

Operation

The proposed leak repair would eliminate leak flow to the Wallkill River, restoring the river to its natural, pre-leak condition. Additionally, leak repair would be similar to the flow changes that the Wallkill River currently experiences during occasional Catskill Aqueduct shutdowns when the leak ceases to flow, albeit a permanent change. Because leak repair would permanently alter flows, the anticipated changes resulting from the repair and rehabilitation were analyzed by calculating the contribution of Leak 6 to the Wallkill River during low flows, as discussed below (see “Leak Contributions during Low Flow”).

Leak repair would eliminate continuous flows from the blow-off conduit to the pond, but is not anticipated to affect 6-WL. The hydrologic influence of the Wallkill River along its floodplain near the blow-off conduit headwall was depicted in the aqueduct’s record of construction, and is anticipated to be the primary hydrologic input to the wetlands within the natural resources study area. Secondary contributions from surface connections to the unnamed tributary to the Wallkill River and its drainage area also provide hydrology.

While Leak 6 contributes to the ponded area, it has low flows and the ponded area would continue to receive inflows from these other sources of hydrology following leak repair. Except during prolonged dry periods, the ponded area is anticipated to remain inundated due to the 18-inch elevation of the culvert.

Leak Contributions during Low Flow

To assess the contribution of Leak 6 to the Wallkill River, desktop calculations of critical low flow (7Q10 and 7Q2 flow) were completed. The 7Q10 and 7Q2 flows are commonly used measures of low flow and represent the lowest 7-day average flow with return periods of 10 years and 2 years, respectively. In the analysis, the 7Q10 and 7Q2 flows were adapted to understand conditions during critical low flow periods where further flow reductions from leak repair would result in the greatest potential impact to local hydrology. Average flow was also calculated to compare with typical baseline conditions.

The USGS gauge located in the immediate vicinity of Leak 6 has a drainage area of 695 square miles, and no adjustments to the drainage area were necessary to account for the point where flows from Leak 6 enter the Wallkill River.

The leak flow would be a minor contributor to the Wallkill River’s natural flow (see **Table 9.7-5**). The estimated average daily flow for the Wallkill River at the confluence with Leak 6 was computed as approximately 560,000 gpm.

Table 9.7-5: Estimated Leak Contributions for Forest Glen Road Study Area

Flow Scenario	Walkkill River Flow (gpm) ¹	Leak Flow (gpm) ²	Leak Flow to Walkkill Flow (%)
Average	562,834	8.3	0.001
7Q2	32,361	8.3	0.026
7Q10	12,926	8.3	0.064
Notes:			
¹ Based on USGS gauge 01371500 at Walkkill River at Gardiner and data for 1983 to 2013.			
² Leak flow is based on maximum flow estimated based on weir measurements at the Walkkill Drainage Chamber during typical Catskill Aqueduct operation.			

Leak 6 flow is estimated to be approximately 8.3 gpm. During average flow conditions, the flow of the leak is approximately 0.001 percent of the baseflow of the Walkkill River.² During low flow conditions, the leak flow would continue to be a minor contributor to the 7Q2 and 7Q10 flows of Walkkill River, contributing less than one percent of the approximated flows necessary to maintain aquatic habitat and water quality. Therefore, elimination of flow from Leak 6 would restore the Walkkill River to its pre-leak conditions and natural function, but would have no measureable effect on its downstream resources.

Water Resources Conclusions

All access and staging activities for leak repair and local dechlorination would occur in existing disturbed areas at the Walkkill Drainage Chamber. They may result in minor, temporary disturbance to the municipally-regulated buffer of the unnamed tributary to Walkkill River. Once the Catskill Aqueduct returns to typical operations in 2023, the passive dechlorination system would cease to operate and the site would be restored to natural conditions. If the leak is successfully repaired, contributions of Leak 6 to the ponded area at the blow-off headwall would cease. This would restore the Walkkill River to its pre-leak conditions and natural function. This would have no effect on its downstream resources, and the ponded area would continue to receive inflows from naturally occurring sources.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to water resources within the Forest Glen Road Study Area.

Federal/State Threatened and Endangered Species and State Species of Special Concern

This section includes an analysis of potential impacts to federal/State Threatened and Endangered Species and State Species of Special Concern identified in Section 9.3.9, “Natural Resources,” as having the potential to be affected by activities within the Forest Glen Road Study Area. To identify those species that could be affected within the natural resources study area, species that could occur up to 0.25 mile from the work site were determined in consultation

² This estimate assumes that leak flow is not part of the natural flow of Walkkill River.

with USFWS, USACE, NYNHP, and NYSDEC, as well as county and local offices, as applicable.

As discussed in Section 9.3.9, “Natural Resources,” 15 species were identified to have the potential to be affected by the repair and rehabilitation within the natural resources study areas. Therefore, conditions in the future without the repair and rehabilitation, an analysis of the potential for impacts to these 15 species, and a summary of conclusions on the potential effects resulting from the repair and rehabilitation are provided below.

In the future without the repair and rehabilitation, it is assumed that federal/State Threatened and Endangered Species and State Species of Special Concern within the study area would largely be the same as baseline conditions, other than possible changes in habitat due to natural vegetative succession and general anthropogenic influences.

An analysis of the potential for disturbance to federal/State Threatened and Endangered Species and State Species of Special Concern from the repair and rehabilitation within the natural resources study area is shown in **Table 9.7-6**. The analysis included an evaluation of the repair and rehabilitation work activities within the study area and field visits, as applicable.

Table 9.7-6: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern and Habitats within the Forest Glen Road Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Amphibians and Reptiles					
Bog Turtle	<i>Clemmys</i> [= <i>Glyptemys</i>] <i>muhlenbergii</i>	Threatened	Endangered	Wetlands, including unmapped wetlands, that could provide potential habitat for bog turtles were identified through a desktop assessment and a June 17, 2013 field visit. A Phase I habitat assessment was conducted on June 19, 2015. Therefore, further analysis is warranted for this study area.	Yes. See further analysis below.
Eastern Box Turtle	<i>Terrapene carolina</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visits on June 17, 2013 and June 19, 2015. Potential habitat exists within the hardwood forest communities and old field. Work activities would be largely confined to previously disturbed areas. If any isolated areas of potential habitat exist at the sites, as a highly mobile species, any eastern box turtles that might otherwise use these areas are expected to instead utilize similar, adjacent habitats during construction. Furthermore, perimeter silt fencing would limit disturbance to adjacent habitat and prevent individual turtles from entering the work site. Therefore, there are no effects anticipated and no further analysis for eastern box turtles is warranted for this study area.	No
Jefferson Salamander	<i>Ambystoma jeffersonianum</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visits on June 17, 2013 and June 19, 2015. Potential habitat exists in the ponded area and wetlands in the study area. Anticipated changes in hydrology from leak repair would be minimal and not likely to adversely affect potential habitat such as soils and vegetation. Finally, following leak repair, no project-related disturbance to wetlands or hydrology of the wetland complex along the Wallkill River is anticipated. Therefore, there are no effects anticipated and no further analysis for Jefferson salamanders is warranted for this study area.	No
Jefferson Salamander Complex	<i>Ambystoma jeffersonianum</i> x <i>laterale</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visits on June 17, 2013 and June 19, 2015. Potential habitat exists in the ponded area and wetlands in the study area. Anticipated changes in hydrology from leak repair would be minimal and not likely to adversely affect potential habitat such as soils and vegetation. Finally, following leak repair, no project-related disturbance to wetlands or hydrology of the wetland complex along the Wallkill River is anticipated. Therefore, there are no effects anticipated and no further analysis for Jefferson salamander complex is warranted for this study area.	No

Table 9.7-6: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern and Habitats within the Forest Glen Road Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Spotted Turtle	<i>Clemmys guttata</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visits on June 17, 2013 and June 19, 2015. Potential habitat exists within the emergent marsh and old field. There would be minimal anticipated changes in hydrology and no significant changes to soils and vegetation to affect potential habitat. Furthermore, perimeter silt fencing would limit disturbance to adjacent habitat and help prevent individuals from entering the work site during construction. Finally, following leak repair, no project-related disturbance to wetlands or hydrology of the wetland complex along the Wallkill River is anticipated. Therefore, there are no effects anticipated and no further analysis for spotted turtles is warranted for this study area.	No
Timber Rattlesnake	<i>Crotalus horridus</i>	Unlisted	Threatened	No individuals were incidentally observed during the field visits on June 17, 2013 and June 19, 2015. According to NYNHP, no records of timber rattlesnakes were identified within 1.5 miles of the study area. Potential habitat exists within the successional old field areas. Temporary effects to basking habitat are possible; however, upon completion of the repair and rehabilitation, the staging areas would be restored to natural conditions and internal leak repair is not anticipated to affect basking habitat. Therefore, there are no effects anticipated and no further analysis for timber rattlesnakes is warranted for this study area.	No
Wood Turtle	<i>Glyptemys insculpta</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visits on June 17, 2013 and June 19, 2015. Potential habitat exists within the Wallkill River, unnamed tributary, and adjacent wetlands and uplands. However, perimeter silt fencing would limit disturbance to adjacent habitat and help prevent individuals from entering the work site during construction. There would be minimal anticipated changes in hydrology and no significant changes to soils and vegetation to affect potential habitat. Therefore, there are no effects anticipated and no further analysis for wood turtles is warranted for this study area.	No

Table 9.7-6: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern and Habitats within the Forest Glen Road Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Birds					
American Bittern	<i>Botaurus lentiginosus</i>	MBTA	Special Concern	No individuals were incidentally observed during the field visits on June 17, 2013 and June 19, 2015. Potential habitat exists within the small shallow emergent marsh adjacent the Walkill River. Temporary noise could discourage bitterns from nesting in the immediate vicinity of the worksite. However, there is abundant suitable habitat in the surrounding areas. Following leak repair, no project-related disturbance to wetlands or hydrology of the wetland complex along the Walkill River is anticipated. Therefore, there are no effects anticipated and no further analysis for American Bitterns is warranted for this study area.	No
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	MBTA	Special Concern	No individuals were incidentally observed during the field visits on June 17, 2013 and June 19, 2015. Potential nesting and foraging habitat exists within the floodplain forest and open field. The temporary noise could discourage woodpeckers from nesting in the immediate vicinity of the work site. No tree removal is proposed, so there would be no potential loss of nest sites. There is abundant suitable habitat in the surrounding areas. Therefore, there are no effects anticipated and no further analysis for Red-headed Woodpeckers is warranted for this study area.	No
Red-shouldered Hawk	<i>Buteo lineatus</i>	MBTA	Special Concern	No individuals were incidentally observed during the field visits on June 17, 2013 and June 19, 2015. Potential nesting and foraging habitat exists within the marshes and floodplain forests in the study area. Temporary noise could discourage hawks from nesting in the immediate vicinity of the work site. No tree removal is proposed, so there would be no potential loss of nest sites. There is abundant suitable habitat in the surrounding areas. Therefore, there are no effects anticipated and no further analysis for Red-shouldered Hawks is warranted for this study area.	No

Table 9.7-6: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern and Habitats within the Forest Glen Road Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Sharp-shinned Hawk	<i>Accipiter striatus</i>	MBTA	Special Concern	No individuals were incidentally observed during the field visits on June 17, 2013 and June 19, 2015. Potential nesting and foraging habitat and potential stopover habitat (resting and foraging) exists within and along the edge of the hardwood forest communities in the study area. The temporary noise could discourage hawks from nesting in the immediate vicinity of the work site. No tree removal is proposed, so there would be no potential loss of nest sites. There is abundant suitable habitat in the surrounding areas. Therefore, there are no effects anticipated and no further analysis for Sharp-shinned Hawks is warranted for this study area.	No
Whip-poor-will	<i>Antrostomus vociferus</i>	MBTA	Special Concern	No individuals were incidentally observed during the field visits on June 17, 2013 and June 19, 2015. Potential nesting and foraging habitat exists within the hardwood forest communities in the study area; however, work activities would be largely confined to previously disturbed areas. No tree removal is proposed and construction would take place primarily during daytime hours, thereby avoiding direct disturbance to potential roosting, nesting, and foraging habitat. Should any potential habitat exist at the sites, a variety of habitats would be available for the species' use in the vicinity during construction. If there are active ground nests when construction commences, these would be located in forested areas beyond the construction limits such that the trees and local topography would naturally attenuate construction noises and no direct disturbance or mortality is anticipated. Moreover, individuals in these areas are acclimated to human activity and ambient noise. Finally, upon construction completion, the staging areas would be restored to natural conditions. Therefore, there are no effects anticipated and no further analysis for Whip-poor-wills is warranted for this study area.	No

Table 9.7-6: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern and Habitats within the Forest Glen Road Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Mammals					
Indiana Bat	<i>Myotis sodalis</i>	Endangered	Endangered	No individuals were incidentally observed during the field visits on June 17, 2013 and June 19, 2015. Potential roosting habitat was identified for 6 trees in the study area near Walkkill River. No tree removal is proposed. There may be temporary noise that discourages bats from roosting in the immediate vicinity of the work site; however, this work would not occur over an extended period of time and there is abundant suitable habitat in the surrounding areas within which bats could roost. Repair activities would not adversely affect wetlands or hydrology along the Walkkill River and bat foraging would be unchanged within the study area. Therefore, there are no effects anticipated and no further analysis for Indiana bats is warranted for this study area.	No
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	Threatened	<u>Threatened</u> Unlisted	No individuals were incidentally observed during the field visits on June 17, 2013 and June 19, 2015. Potential roosting habitat was identified for 6 trees in the study area near Walkkill River. No tree removal is proposed. There may be temporary noise that discourages bats from roosting in the immediate vicinity of the work site; however, this work would not occur over an extended period of time and there is abundant suitable habitat in the surrounding areas within which bats could roost. Repair activities would not adversely affect wetlands or hydrology along the Walkkill River and bat foraging would be unchanged within the study area. Therefore, there are no effects anticipated and no further analysis for northern long-eared bats is warranted for this study area.	No
Plants					
Scarlet Indian-paintbrush	<i>Castilleja coccinea</i>	Unlisted	Endangered	NYNHP identified an historic record of Scarlet Indian-paintbrush near the work site. Rare plant surveys conducted during the growing season on June 17, 2013 and June 19, 2015, did not identify potential habitat or any specimens within the study area. Therefore, there are no effects anticipated and no further analysis for Scarlet Indian-paintbrush is warranted for this study area.	No
Note: MBTA: Migratory Bird Treaty Act					

Bog Turtle (*Clemmys [=Glyptemys] muhlenbergii*)

An emergent wetland associated with the pond in Wetland 6-WL/NWI wetland was identified during the June 2013 study area visit, but is completely shaded by adjacent trees. A Phase I Bog Turtle Habitat Survey was conducted on June 19, 2015 within the natural resources study area to assess the potential for disturbance resulting from leak repair. The area was deemed to not contain potential bog turtle (*Clemmys [=Glyptemys] muhlenbergii*) habitat based on the lack of mucky soils, lack of springs or seeps, and lack of an open herbaceous layer. The herbaceous layer was dominated by cattails and Japanese stiltgrass (*Microstegium vimineum*). The surveyed area was within the Wallkill River floodplain and lacked evidence of groundwater influence.

Repair and rehabilitation work activities and operation of the temporary dechlorination system would be localized and confined to the immediate vicinity of the leak, where limited habitat availability occurs. No potential bog turtle habitat was identified in the Phase I assessment, so there would be no disturbance following leak repair, or if needed, during operation of the temporary dechlorination system. Therefore, the repair and rehabilitation may affect, but is unlikely to adversely affect bog turtles within the Forest Glen Road Study Area.

Federal/State Threatened and Endangered Species and State Species of Special Concern Conclusions

Based on the impact analysis, no take is anticipated. There would be no effects to eastern box turtles (*Terrapene carolina*), Jefferson salamanders (*Ambystoma jeffersonianum*), Jefferson salamander complex (*Ambystoma jeffersonianum x laterale*), spotted turtles (*Clemmys guttata*), timber rattlesnakes (*Crotalus horridus*), wood turtles (*Glyptemys insculpta*), American Bitterns (*Botaurus lentiginosus*), Red-headed Woodpeckers (*Melanerpes erythrocephalus*), Red-shouldered Hawks (*Buteo lineatus*), Sharp-shinned Hawks (*Accipiter striatus*), Whip-poor-wills (*Antrostomus vociferus*), Indiana bats (*Myotis sodalis*), northern long-eared bats (*Myotis septentrionalis*), or Scarlet Indian-paintbrush (*Castilleja coccinea*) associated with the repair and rehabilitation. Repair and rehabilitation may affect, but is not likely to adversely affect, bog turtles.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to federal/State Threatened and Endangered Species or State Species of Special Concern within the Forest Glen Road Study Area.

9.7.3.7 Hazardous Materials

To evaluate the potential presence of hazardous materials within the Forest Glen Road Study Area, a Phase I Environmental Site Assessment (ESA) was performed in general conformance with the scope and limitations of American Society for Testing and Materials (ASTM) Practice E 1527-13 and City Environmental Quality Review (CEQR) requirements to identify Recognized Environmental Conditions (RECs). The Phase I ESA included site reconnaissance, research on current/historical use, and a review of federal and State regulatory listings for both the site itself and for its neighboring properties within the appropriate search distance defined in the ASTM standard. The findings from the Phase I ESA investigation and results from DEP's legacy files for the work site, including a geotechnical investigation and environmental health and safety

sampling, were collectively reviewed to assess the potential presence of and potential for disturbance to hazardous materials in the study area.

Geotechnical environmental investigations and sampling were undertaken for contaminants of concern including asbestos, lead, volatile and semivolatile organics, polychlorinated biphenyls (PCBs), and total petroleum hydrocarbons along the aqueduct within the study area. Chromium was noted in the soil sampling results. Total chromium was reported in the sample collected at the Wallkill Drainage Chamber. Chromium concentrations, however, were consistent over a widespread sampling area and are more likely associated with background concentrations. Along the Catskill Aqueduct, there are widespread occurrences of chromium, which are attributed to the existing geological formations. The legacy data also revealed that lead-containing paint was found on the exterior door. Materials sampled did not identify asbestos-containing materials or PCB-containing paint or mercury-containing paint. In addition, gasoline range organics were not detected in the sample. Diesel range organic compounds were detected, but at low concentrations that are not considered to be indicative of contamination that warrants remedial actions.

Based on the results of the environmental investigations completed within the Forest Glen Road Study Area, no other hazardous materials are known to exist. The soil results support the reuse of excavated materials as backfill and do not suggest the need for special management, handling or health and safety measures at this time.

DEP has consulted with the Town of Gardiner and Ulster County, and it is DEP's understanding that no developments or structures that would introduce hazardous materials to the environment are anticipated within the Forest Glen Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that the presence of hazardous materials within the Forest Glen Road Study Area would be the same as baseline conditions.

In the future with the repair and rehabilitation, work activities would potentially require the storage and use of a variety of petroleum and other chemical products, such as diesel fuel for back-up power, lubricating oil for construction vehicles, and miscellaneous cleaning and maintenance chemicals. DEP would handle all materials in accordance with applicable federal, State, and local regulations and guidelines. The use and storage of all of these would be in accordance with applicable regulatory requirements and guidelines including those relating to: federal Spill Prevention, Control, and Countermeasures requirements; and State petroleum bulk storage, chemical bulk storage, and spill reporting requirements.

Repairs to the valve leak would be undertaken during construction, and if leak repair is ultimately not feasible, a temporary passive dechlorination system would be installed prior to chlorination activities. Equipment, vehicles, and chemicals stored on site would be removed and the staging area would be restored to baseline conditions.

During temporary chlorination, the carbon filter dechlorination system would be operated. The activated carbon filter is inert and used for treating drinking water, and treated water from the dechlorination system would meet applicable regulatory limits. Following the repair and rehabilitation of the Catskill Aqueduct, the local dechlorination system and all equipment would

be removed from the Forest Glen Study Area. The staging areas would be restored and operation of the Catskill Aqueduct would be consistent with baseline conditions.

Therefore, the repair and rehabilitation would not result in significant adverse impacts from the presence or disturbance of hazardous materials within the Forest Glen Road Study Area.

9.7.3.8 Transportation

The study area for the transportation analysis consists of the major convergent roadways that would potentially be used by the employee and construction vehicles associated with repair and rehabilitation work activities en route to and from the Forest Glen Road Study Area.

Access to the repair and rehabilitation limits of construction for the work site within the Forest Glen Road Study Area would be via State Route 208 and Forest Glen Road to an access road on DEP property (see **Figure 9.7-2**). Forest Glen Road is a two-way local roadway. State Route 208 is a two-lane, two-way rural minor arterial roadway. To the extent available, construction vehicles would travel on truck-permitted roadways directly to and from the Forest Glen Road Study Area. There is no public transportation and little to no pedestrian activity in the immediate vicinity of the study area. Under current operations, DEP employees periodically access the site. However, there are no DEP employees who work at or visit the study area on a daily basis, and the small number of DEP employee vehicles has little to no effect on traffic conditions within the study area.

DEP has consulted with the Town of Gardiner and Ulster County, and it is DEP's understanding that no changes in land use or an increase in traffic due to outside developments are anticipated within the Forest Glen Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that traffic, public transportation, and pedestrian activities within the study area would be similar to baseline conditions.

Repair and rehabilitation work activities within the Forest Glen Road Study Area were evaluated to determine which would have the potential to generate the most vehicle trips and therefore be the basis of this transportation analysis. The internal repair of Leak 6 would generate the most vehicle trips. Internal leak repair would occur in fall ~~2018~~2017 for up to 24 hours per day, 7 days a week for approximately 4 weeks during the first 10-week shutdown.

In the future with the repair and rehabilitation, construction vehicles would travel along Forest Glen Road to the access road on DEP property. The estimated number of peak-day one-way vehicle trips associated with the study area is 32 vehicles, or approximately 64 peak-day vehicle round trips that would travel to and from the Forest Glen Road Study Area. The majority of the peak daily vehicle round trips, approximately 40 vehicle round trips or 40 Passenger Car Equivalents (PCEs), would be workers either traveling to and from the study area, or traveling directly to and from the staging area (depending on parking capacity). There would potentially be 8 daily shuttle trips between the study area and the staging area. The remaining 16 peak-day vehicle round trips (21 PCEs) would be trucks or other construction vehicles.

During a peak day, the estimated number of peak-hour vehicle trip ends is approximately 32 peak-hour vehicle trip ends (35 PCEs). This includes approximately 20 vehicle trip ends

(20 PCEs) from workers traveling directly to and from the staging area, approximately 4 peak-hour shuttle trips between the study area and the staging area, and approximately 8 vehicle trip ends (11 PCEs) from trucks or other construction vehicles. For the purpose of this analysis, the peak-hour project-generated vehicles are anticipated to coincide with typical construction hours for employee vehicles entering the site. Assuming two 12-hour shifts, this would be during the 6 AM to 7 AM and 6 PM to 7 PM hours, and would be unlikely to coincide with the peak hour for existing traffic. Following construction, operation of the dechlorination systems would generate occasional vehicle trips as DEP employees periodically monitor and maintain the systems through 2023; however, fewer than the *CEQR Technical Manual* screening threshold of 50 peak-hour PCEs would be generated during this period.

In total, the repair and rehabilitation would result in approximately 35 peak-hour PCEs along Forest Glen Road, which is below the *CEQR Technical Manual* screening threshold of 50 peak-hour PCEs as described in Section 9.3.13, “Transportation.” The work activities within the Forest Glen Road Study Area would be short-term (totaling 8 weeks over 10 months; see **Table 9.7-2**) and would not generate public parking or transportation demands or pedestrian activity within the Forest Glen Road Study Area. Following completion of the repair and rehabilitation, traffic patterns would return to baseline conditions.

Therefore, although there would be a minor temporary increase in traffic, the repair and rehabilitation would not result in significant adverse impacts to transportation within the Forest Glen Road Study Area.

9.7.3.9 Noise

As described in Section 9.3.15, “Noise,” mobile noise associated with the repair and rehabilitation within the Forest Glen Road Study Area does not warrant analysis. This section includes an analysis of potential impacts from stationary noise associated with the repair and rehabilitation to sensitive receptors within the study area.

The potential for impacts from stationary noise associated with the repair and rehabilitation within the Forest Glen Road Study Area is discussed below. The study area for the stationary noise analysis is the area within 1,500 feet of the repair and rehabilitation work site as shown in **Figure 9.7-8**.

The Forest Glen Road Study Area includes residential parcels within 1,500 feet of the repair and rehabilitation work site that are considered noise-sensitive receptors for this analysis. The temporary work activities were evaluated to determine compliance with the local noise code. The repair and rehabilitation is subject to the Town of Gardiner Noise Control Law (§220-40.C) which limits daytime and nighttime noise levels at the property line of the lot from which noise is emitted. However, construction and maintenance activities between 8 AM and sunset are exempt. The noises of safety signals, warning devices, emergency pressure-relief valves or other emergency warning signals are also exempt. Noise between the hours of 7 AM and 8 PM cannot exceed 70 dBA, and noise between the hours of 8 PM and 7 AM cannot exceed 60 dBA at the property line.

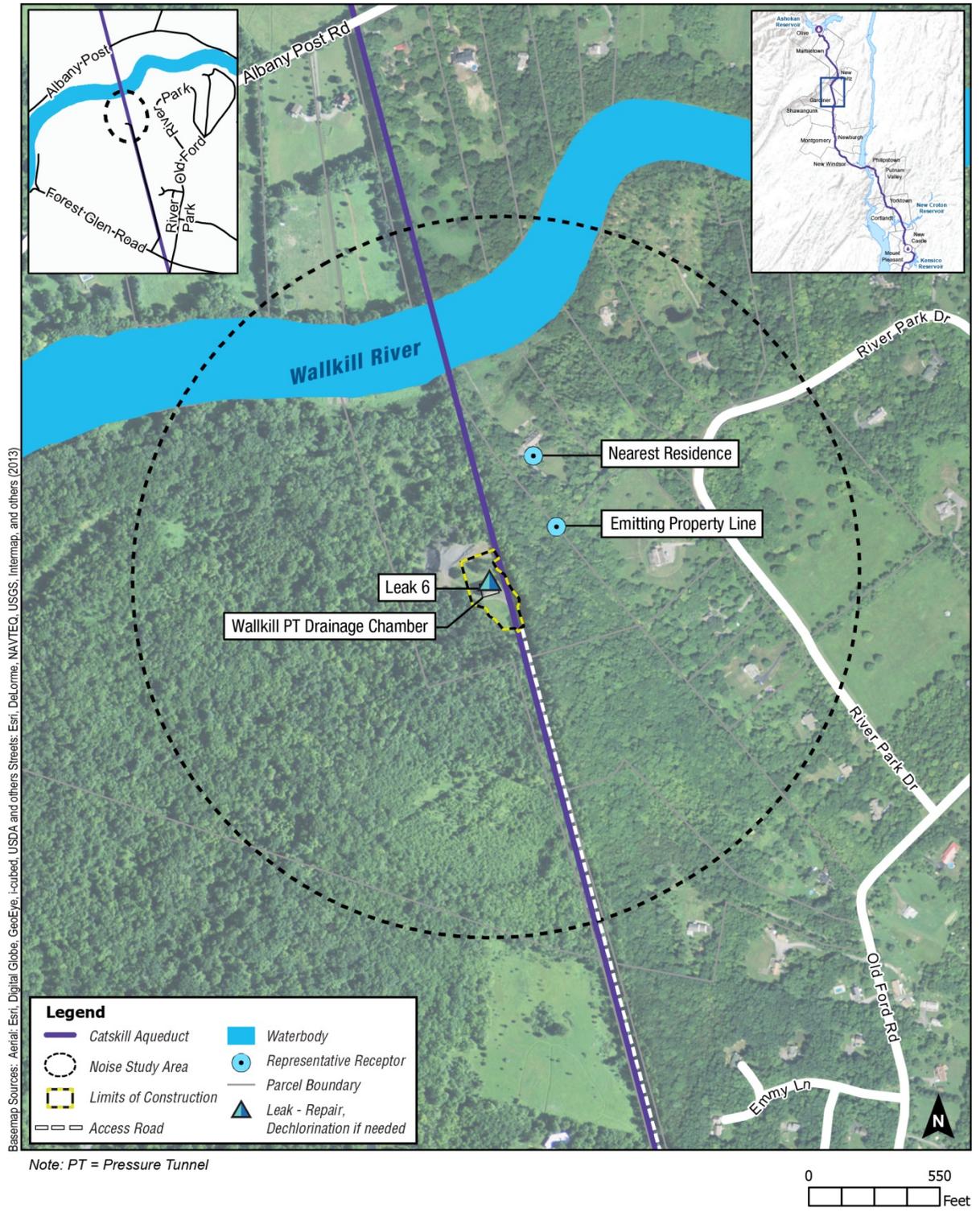


Figure 9.7-8: Noise – Forest Glen Road Study Area



Existing ambient noise levels within the Forest Glen Road Study Area are influenced by vehicular traffic traveling on River Park Drive, Old Ford Road, Forest Glen Road, and other local roadways. The existing noise levels within the study area are comparable to a very quiet suburban and rural residential environment based on the distance from major transportation corridors and the population density of the area. Typical noise levels (measured as L_{eq}) for very quiet suburban and rural communities are 40 dBA during the daytime and 34 dBA during the nighttime.

DEP has consulted with the Town of Gardiner and Ulster County, and it is DEP's understanding that no major projects that would result in a change in land use or new noise-generating sources that would contribute to an increase in ambient noise levels are anticipated within the Forest Glen Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that ambient noise levels within the Forest Glen Road Study Area would be similar to baseline conditions.

In the future with the repair and rehabilitation, stationary noise-producing work activities within the Forest Glen Road Study Area would occur at two sites. The stationary noise-generating equipment that would be used within the Forest Glen Road Study Area was evaluated to determine which work activity would have the potential to emit the most noise and, therefore, be the basis of this stationary noise analysis. Of the activities, the stationary noise-generating equipment associated with installation of the dechlorination system would emit the most noise. If necessary, dechlorination installation would occur in summer ~~2019~~2018 between the hours of 8 AM and sunset, Monday through Friday for approximately 4 weeks. Work conducted while the aqueduct is in service will be adjusted to comply with allowable work hours per town noise codes. Repair and rehabilitation noise-producing activities also could include 24-hour construction during leak repair, and nighttime work would be subject to the Town of Gardiner noise limits (see **Table 9.7-2**).

The noise analysis focused on the three loudest stationary noise-generating equipment types necessary for the dechlorination installation and leak repair. Associated equipment reference noise levels are shown in **Table 9.7-7**. The types of noise-generating equipment analyzed were conservatively based on peak construction operating conditions.

The results of the stationary construction noise analysis are shown on **Table 9.7-8**. The Town of Gardiner regulates noise at the property line from which the noise is emitted. However, the nearest noise-sensitive receptor is a residence approximately 550 feet away from the work activities. Dechlorination installation and leak repair within the Forest Glen Road Study Area during the repair and rehabilitation would emit a noise level (L_{eq}) of approximately 64 dBA and 63 dBA, respectively, at the nearest residence. At night, noise levels from leak repair could exceed the Town of Gardiner noise limits. Other noise-producing equipment would also be utilized within the study area for a limited period during work activities. However, this equipment would not be expected to be louder than those associated with dechlorination installation and leak repair. Since the repair and rehabilitation within the Forest Glen Road Study Area would emit noise levels greater than allowed by the Town of Gardiner noise code, DEP would work with the Town of Gardiner, as appropriate.

Table 9.7-7: Stationary Source Construction Equipment Modeled for Repair and Rehabilitation within the Forest Glen Road Study Area – Noise Analysis and Reference Noise Levels (L_{eq})

Equipment Type	Reference Noise Level (L_{eq}) at 50 feet (dBA) ¹
Dechlorination Installation (8 AM to sunset, Monday through Friday)	
Generator	82
Excavator	81
Backhoe	76
Leak Repair (24 hours per day, 7 days a week)	
Generator	82
Crane	77
Pump	74
Note: ¹ City Environmental Quality Review (CEQR) Technical Manual, Chapter 22.	

Table 9.7-8: Stationary Construction Noise Analysis Results (L_{eq}) at the Nearest Noise-Sensitive Receptors for Repair and Rehabilitation within the Forest Glen Road Study Area

Location	Distance from Site (Feet)	Predicted Stationary Noise Level (L_{eq}) at Noise-Sensitive Receptor (dBA)	Town of Gardiner Noise Limit (dBA)	Potential for Exceedance (Yes or No)
Dechlorination Installation (8 AM to sunset, Monday through Friday)				
Emitting Property Line	361	68	$70^1/60^2$	No ³
Nearest Residence	554	64	NA	NA
Leak Repair (24 hours per day, 7 days a week)				
Emitting Property Line	361	67	$70^1/60^2$	Yes
Nearest Residence	554	63	NA	NA
Notes: NA = Not Applicable ¹ Daytime noise limit is applicable between the hours of 7 AM and 8 PM. ² Nighttime noise limit is applicable between the hours of 8 PM and 7 AM. ³ Construction and maintenance activities between 8 AM and sunset are exempt.				

Although leak repair would result in an increase in stationary noise levels during 24-hour construction periods during the shutdown of the Catskill Aqueduct, work would primarily occur in the fall and winter months when residents typically have windows closed. Noise levels inside would be further reduced to an interior noise level (L_{eq}) of approximately 39 dBA at the nearest residence. Following completion of the repair and rehabilitation work activities, the construction equipment and vehicles would be removed from the Forest Glen Road Study Area. The repair and rehabilitation would be temporary in nature with peak work activities occurring during leak repair in fall ~~2018~~2017 and dechlorination installation in summer ~~2019~~2018 for a limited period (e.g., up to 4 weeks).

Therefore, although there would be a temporary increase in noise, noise from the repair and rehabilitation would not result in significant adverse impacts to sensitive receptors within the Forest Glen Road Study Area.

9.7.3.10 Neighborhood Character

The character of the Forest Glen Road Study Area is largely defined by a mix of public services, residential, and vacant land uses and its physical setting within a rural location (see **Figure 9.7-4**). The Catskill Aqueduct traverses the study area in a general north to south direction. Just north of the study area, the Wallkill River flows from west to east. An unnamed tributary to the Wallkill River originates in the study area and bends to the west at the study area's midpoint. Forest Glen Road is located to the south of the study area, and River Park Drive is located to the east. Both the work site and associated access route are located in a public services corridor with grassy cover. They are owned and maintained by DEP and separated from adjacent land by a forested zone. Access to the work site would be provided by an access road that connects to Forest Glen Road.

DEP has consulted with the Town of Gardiner and Ulster County, and it is DEP's understanding that no changes in land use and no new projects or structures are anticipated within the Forest Glen Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that neighborhood character within the study area would be similar to baseline conditions.

As described in Section 9.3.16, "Neighborhood Character," there would be no potential for the repair and rehabilitation to affect shadows and urban design. In addition, based on the screening assessment for land use and zoning; socioeconomic conditions; and historic and cultural resources, an impact analysis for the Forest Glen Road Study Area was not warranted, as discussed in the following sections: Section 9.3.3, "Land Use, Zoning, and Public Policy," Section 9.3.4, "Socioeconomic Conditions," and Section 9.3.7, "Historic and Cultural Resources," respectively. As described in Section 9.7.3.4, "Open Space and Recreation," and Section 9.7.3.5, "Visual Resources," the work activities would not affect open space and recreation and visual resources in the Forest Glen Road Study Area. Furthermore, the public policy impact analysis provided in Section 9.7.2, "Town of Gardiner Impact Analysis," concluded the work activities were consistent with applicable plans.

As described in Sections 9.7.3.8, "Transportation," and 9.7.3.9, "Noise," during construction, the work activities in the Forest Glen Road Study Area would be short-term (intermittently over

10 months) and would result in a temporary increase in traffic and noise. Following completion of the repair and rehabilitation, the construction equipment and vehicles would be removed from the study area and traffic patterns would return to baseline conditions. These temporary increases in traffic and noise levels would not result in a density of activity or service conditions that would affect the overall character of the study area.

The repair and rehabilitation would not generate significant adverse effects in land use, zoning, and public policy; socioeconomic conditions; open space and recreation; shadows; historic and cultural resources; urban design and visual resources; transportation; or noise.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to neighborhood character within the Forest Glen Road Study Area.

9.7.4 LE FEVRE LANE STUDY AREA IMPACT ANALYSIS

Within the Le Fevre Lane Study Area, the aqueduct transitions from the Wallkill Pressure Tunnel to the Wallkill South Cut-and-Cover Tunnel via a deep vertical shaft at the Wallkill Pressure Tunnel Uptake Chamber (Wallkill Uptake Chamber), which is equipped with a boathole at its south end (see **Figure 9.7-9**).

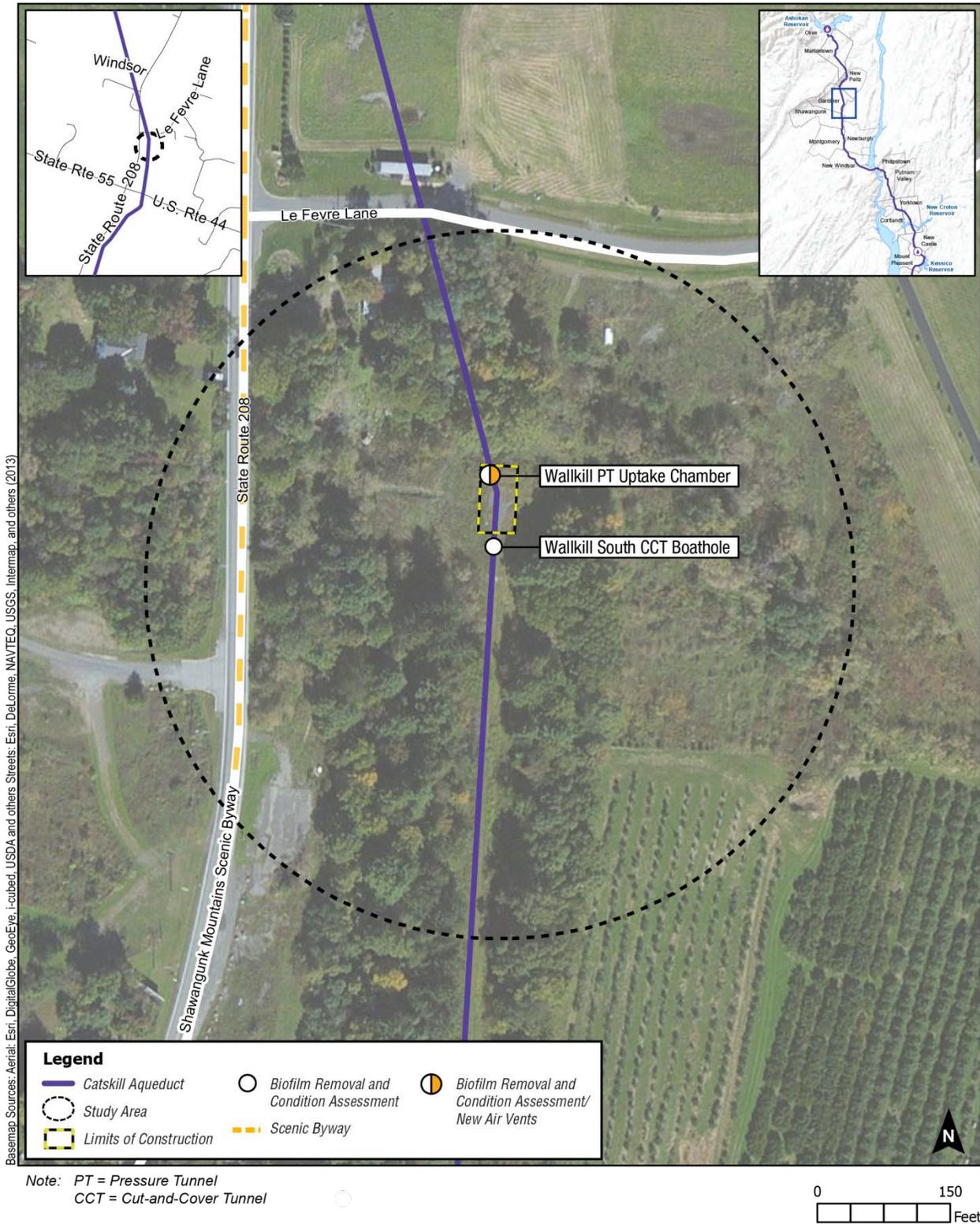
Work activities within the Le Fevre Lane Study Area would include: air vent installation, and biofilm removal and condition assessment.

9.7.4.1 Study Area Location and Description

The Le Fevre Lane Study Area is located along the upper Catskill Aqueduct in the Town of Gardiner. The Catskill Aqueduct traverses the study area in a general north to south direction. The study area is bounded to the north by Le Fevre Lane, with Main Street (U.S. Route 44/State Route 55) located just to the south. State Route 208 traverses the study area in a north to south direction in its western portion. The proposed work site within the study area is located at the Wallkill Uptake Chamber. Access would be provided by driving on top of the cut-and-cover tunnel from an entrance off either Le Fevre Lane or Main Street. The study area boundary is located approximately 400 feet beyond the outermost areas of disturbance related to the work site.

Figure 9.7-9 shows an aerial photograph of the study area, including the path of the aqueduct and the limits of construction for the work site. **Figure 9.7-10** shows photographs of the Wallkill Uptake Chamber in the study area.

The study area includes residential, public services, and vacant land uses. The limits of construction for the work site and associated access route are located in a public services corridor with grassy cover, which is owned and maintained by DEP and separated from adjacent land by a forested zone. Access to the limits of construction for the work site would require crossing a small portion of private property with permission from the owner. **Figure 9.7-11** shows a map of the land uses within the study area and its surroundings.



Basemap Sources: Aerial: Esri, DigitalGlobe, GeoEye, i-cubed, USDA and others Streets: Esri, DeLorme, NAVTEQ, USGS, Intermap, and others (2013)

Figure 9.7-9: Study Area – Le Fevre Lane





Photograph 1: View from Wallkill Uptake Chamber looking north.



Photograph 2: View from Wallkill Uptake Chamber facing east.

Figure 9.7-10: Photographs – Le Fevre Lane Study Area



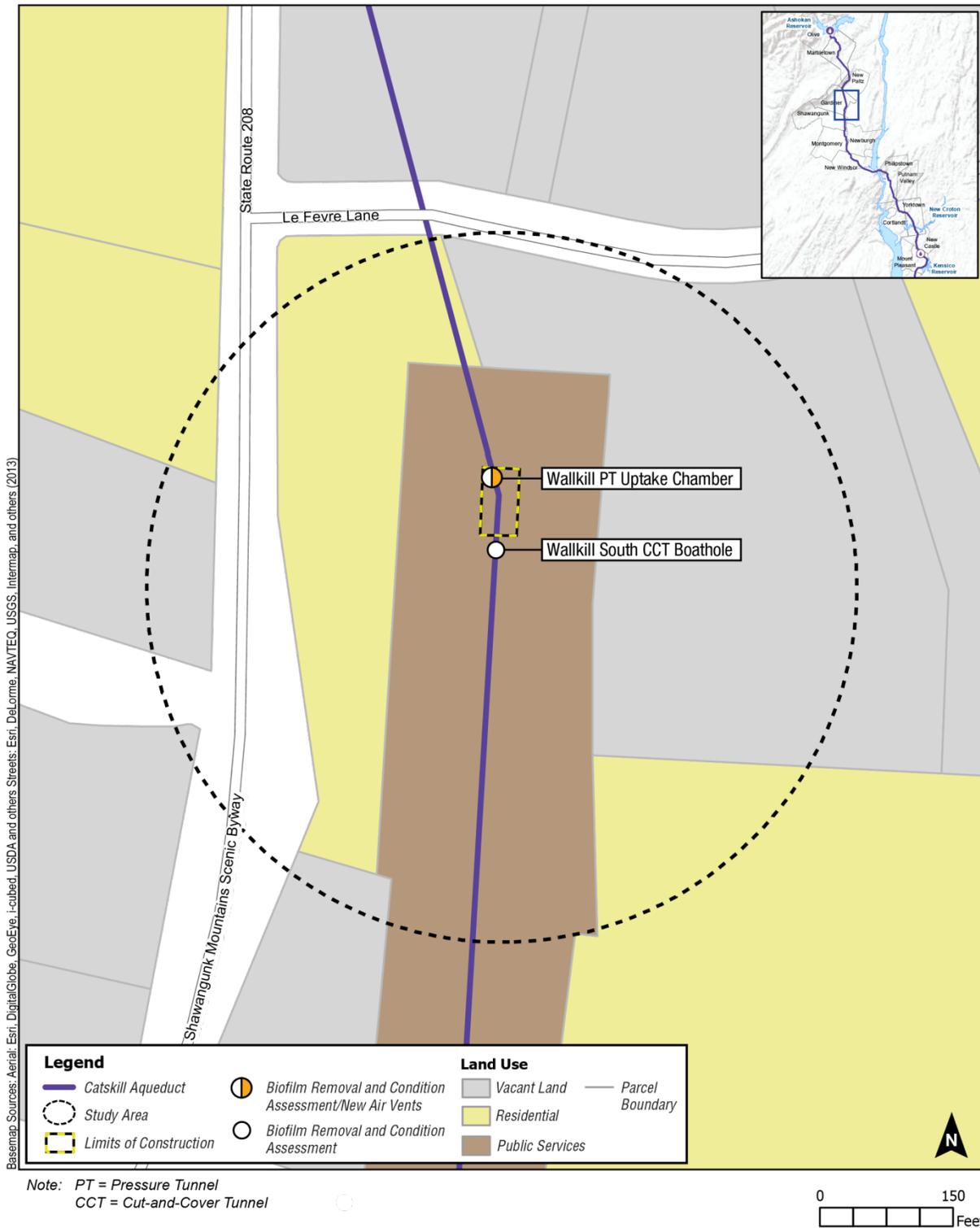


Figure 9.7-11: Land Use – Le Fevre Lane Study Area



Zoning within the study area is primarily residential agricultural (RA) with a small portion of the southwest corner designated as highway commercial (HC), as designated by the Town of Gardiner Zoning Code (see **Figure 9.7-12**). The Catskill Aqueduct is located within the residential agricultural (RA) zoning district. This zoning district allows for residential, agricultural, forestry, recreation, and land conservation uses, encouraging development activities that preserve large tracts of contiguous open space and agricultural land. The Catskill Aqueduct is a permitted use as a public utility facility within the residential agricultural (RA) zoning district.

State Route 208 has been designated by NYSDOT as the Shawangunk Mountains Scenic Byway. There are no other federal, State, or local designated landmarks, historic districts, or known archeological resources within the study area.

9.7.4.2 Proposed Activities within the Le Fevre Lane Study Area

To support activities within the Le Fevre Lane Study Area, the Shaft 4 Interconnection (within the Armato Lane Study Area) would serve as a primary staging area from which workers would be transported to the site daily. Several secondary staging areas, including one at the Wallkill Uptake Chamber, would provide additional parking. Equipment and materials would be staged on site. No staging area or access improvements would be necessary other than underbrush clearing and gravel placement for leveling and erosion control. Erosion and sediment control measures such as silt fencing and hay bales would be installed at the perimeter of the work sites as needed. A site plan showing a layout of the limits of construction for the work site, which would occupy a total of 3,100 square feet, is shown on **Figure 9.7-13**. The schedule for work within the study area is shown in **Table 9.7-9**. The total duration of active construction within the Le Fevre Study Area is estimated to total 13 weeks over 1.5 years.

Table 9.7-9: Schedule of Work Activities within the Le Fevre Lane Study Area

Work Activity	Dates	Duration	Work Hours	Crew Size ¹
Air Vent Installation	Fall 2019 2018 (Second 10-week shutdown)	3 weeks	7 days a week, 7 AM to 7 PM	8
Biofilm Removal and Condition Assessment	Fall 2020 2019 (Third 10-week shutdown)	10 weeks	7 days a week, 7 AM to 7 PM	21
Note: ¹ Crew size refers to the number of people anticipated at the work site(s).				

Work in the study area would begin with air vent installation during the second 10-week shutdown in fall ~~2019~~2018. Three air vent structures would be delivered to the site and mounted on a concrete slab, which would replace an existing removable concrete slab on top of the Wallkill Uptake Chamber. Minor excavation of approximately 18 inches of soil may be required to access the existing opening.

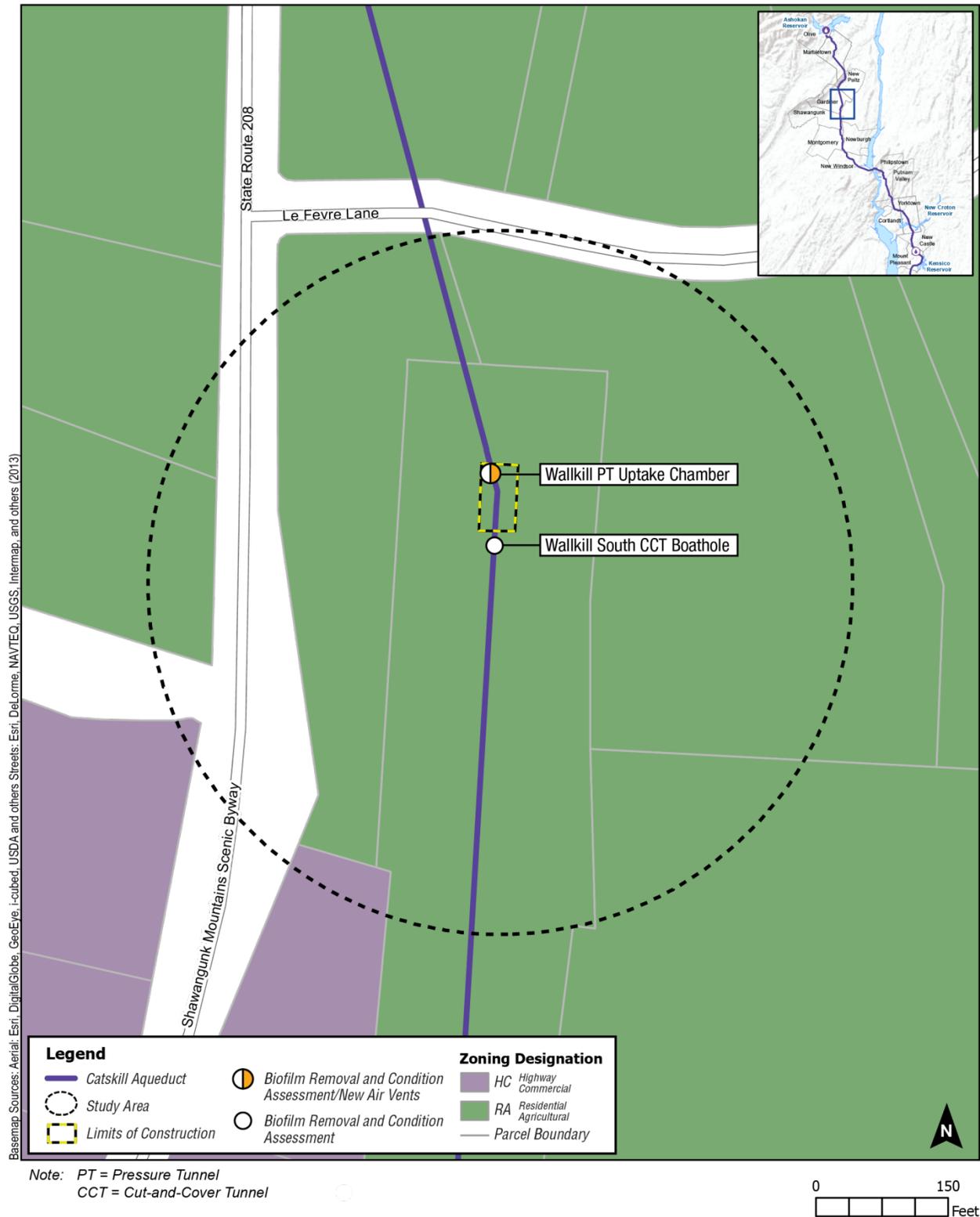


Figure 9.7-12: Zoning – Le Fevre Lane Study Area



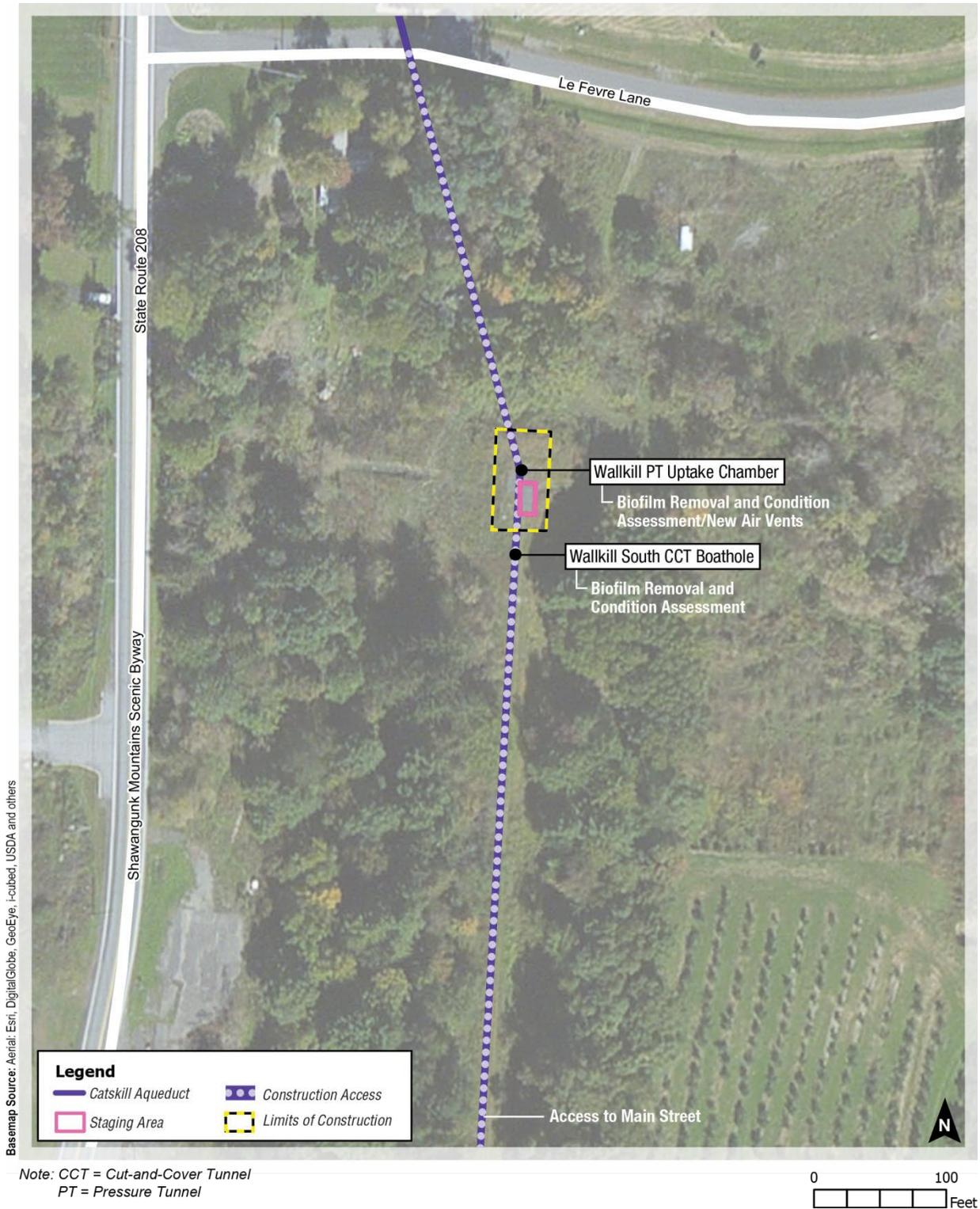


Figure 9.7-13: Site Plan – Le Fevre Lane Study Area

Biofilm removal and condition assessment would occur during the third 10-week shutdown in fall ~~2020~~2019. The existing boathole at the Wallkill Uptake Chamber would be used for access into the aqueduct. It would also serve as a collection point for biofilm, which would be transported for disposal at a registered, permitted, or otherwise authorized facility. Although the aqueduct would be unwatered during this shutdown, any residual water would be diverted through an internal bypass pipe around the work segments for discharge to the aqueduct downstream. Any residual water that does not meet water quality standards, and any wash water generated from biofilm removal, would then be transported to a temporary treatment system, where it would be treated to meet water quality standards for discharge back into the aqueduct or to a nearby waterbody (see Section 9.2, “Project Description”). Upon completion of biofilm removal and condition assessment, all equipment and materials would be removed, and any areas requiring temporary disturbance would be restored to baseline conditions.

Impact categories analyzed for the Le Fevre Lane Study Area are presented in Sections 9.7.4.3, “Visual Resources,” through Section 9.7.4.8, “Neighborhood Character,” and include visual resources; natural resources, consisting of federal/State Threatened and Endangered Species and State Species of Special Concern; hazardous materials; transportation; stationary noise; and neighborhood character. Additionally, the study area’s compatibility with applicable public policies was analyzed on a town-wide basis in Section 9.7.2, “Town of Gardiner Impact Analysis.” As described in Section 9.3, “Screening Assessment and Impact Analysis Methodology,” an impact analysis related to land use and zoning; socioeconomic conditions; community facilities and services; open space and recreation; historic and cultural resources; other natural resources subcategories, including water resources, geology and soils, aquatic and benthic resources, wildlife, terrestrial resources, federal/State Candidate Species, and unlisted rare and vulnerable species; water and sewer infrastructure; energy; air quality; and mobile noise within the study area is not warranted. Finally, impacts related to project-wide natural resources, water and sewer infrastructure, and public health were analyzed within Section 9.19, “Project-wide Impact Analysis.”

9.7.4.3 Visual Resources

The study area for the visual resources analysis is the area within the Le Fevre Lane Study Area. It also includes view corridors that extend beyond the study area based on the locations that are publicly accessible.

As shown on **Figure 9.7-9**, one visual resource, the Shawangunk Mountains Scenic Byway, was identified within the Le Fevre Lane Study Area. The 88-mile Shawangunk Mountains Scenic Byway, under the purview of NYSDOT, was designated a visual resource based on the scenic, natural, historic, and recreational resources in the region, particularly the views of the Shawangunk Mountains. Approximately 540 feet of the byway is located within the Le Fevre Lane Study Area. State Route 208, the eastern-most roadway of the Shawangunk Mountains Scenic Byway, passes through the western portion of the Le Fevre Lane Study Area. Views from this part of State Route 208 are limited due to the vegetation along the both sides of the roadway. Views to the Shawangunk Mountains occur looking west from State Route 208, with the Le Fevre Lane Study Area to the east, or behind the viewer. The byway’s Corridor Management Plan (Shawangunk Mountains Scenic Byway 2005) identifies locations with views of the

Shawangunk Mountains. The Le Fevre Lane Study Area is not located in one of these view locations.

DEP has consulted with the Town of Gardiner and Ulster County, and it is DEP's understanding that no new projects or structures that would alter views from visual or aesthetic resources are anticipated within the Le Fevre Lane Study Area within the timeframe of the impact analysis. Natural processes, such as changes in habitat due to natural vegetative succession, are anticipated to continue. Therefore, in the future without the repair and rehabilitation, it is assumed that visual resources within the Le Fevre Lane Study Area would be the same as baseline conditions.

During construction, the repair and rehabilitation work activities would be short-term (intermittently over 1.5 years; see **Table 9.7-9**). As stated above, the Le Fevre Lane Study Area is not in a location with direct views of the Shawangunk Mountains; therefore, work activities associated with the installation of the new air vent at the Wallkill Uptake Chamber would not result in any significant adverse impacts to visual resources.

All equipment and vehicles would be removed and the area would be restored to baseline conditions. The new air vent at the Wallkill Uptake Chamber would be a permanent structure that would remain following construction. Following the repair and rehabilitation within the Le Fevre Lane Study Area, operation of the Catskill Aqueduct would be consistent with baseline conditions and would not result in changes to the future visual and aesthetic resource conditions of the views to the Shawangunk Mountains from the scenic byway.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to visual resources within the Le Fevre Lane Study Area.

9.7.4.4 Natural Resources

The study area for the natural resources analysis is the immediate area surrounding the limits of construction, including the Wallkill Uptake Chamber (see **Figure 9.7-14**). The general ecology of the natural resources study area was analyzed based on a field visit conducted on November 13, 2013. The natural resources study area includes a portion of the Catskill Aqueduct similar to the mowed lawn with trees community. This area has the possibility to support protected species.

Federal/State Threatened and Endangered Species and State Species of Special Concern

This section includes an analysis of potential impacts to federal/State Threatened and Endangered Species and State Species of Special Concern identified in Section 9.3.9, "Natural Resources," as having the potential to be affected by activities within the natural resources study area. To identify those species that could be affected within the natural resources study area, species that could occur up to 0.25 mile from the work sites were determined in consultation with USFWS, USACE, NYNHP, and NYSDEC, as well as county and local offices, as applicable.

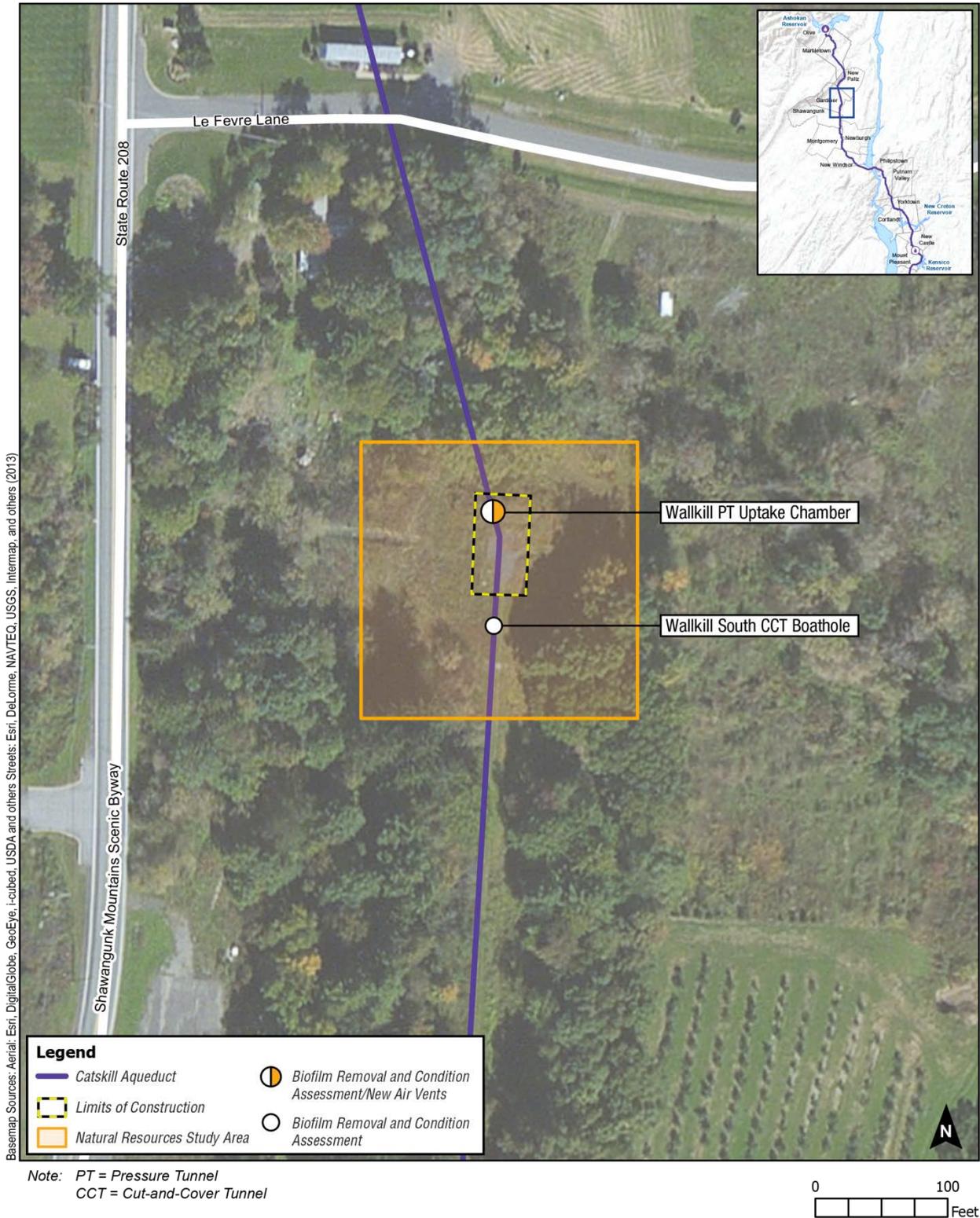


Figure 9.7-14: Natural Resources – Le Fevre Lane Study Area



As discussed in Section 9.3.9, “Natural Resources,” four species were identified to have the potential to be affected by the repair and rehabilitation within the natural resources study area. Therefore, conditions in the future without the repair and rehabilitation, an analysis of the potential for impacts to these four species, and a summary of conclusions on the potential effects resulting from the repair and rehabilitation are provided below.

In the future without the repair and rehabilitation, it is assumed that federal/State Threatened and Endangered Species and State Species of Special Concern within the study area would largely be the same as baseline conditions, other than population changes due to natural vegetative succession and general anthropogenic influences.

An analysis of the potential for disturbance to federal/State Threatened and Endangered Species and State Species of Special Concern from the repair and rehabilitation within the natural resources study area is shown in **Table 9.7-10**. The analysis included an evaluation of the repair and rehabilitation work activities within the study area and field visits, as applicable.

Table 9.7-10: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern and Habitats within the Le Fevre Lane Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Amphibians and Reptiles					
Eastern Box Turtle	<i>Terrapene carolina</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visit on November 13, 2013. Potential habitat exists within the deciduous forest and mowed areas in the study area. While construction activities would be largely confined to previously disturbed areas, if any isolated areas of potential habitat exist at the sites, as a highly mobile species, any eastern box turtles that might otherwise use these areas are expected to instead utilize similar, adjacent habitats during construction. Furthermore, perimeter silt fencing would limit disturbance to adjacent habitat and prevent individual turtles from entering the work sites during construction. Finally, upon construction completion, the staging areas would be restored to natural conditions and the air vents that remain would not affect breeding, nesting, or foraging habitat. Therefore, there are no effects anticipated and no further analysis for eastern box turtles is warranted for this study area.	No
Timber Rattlesnake	<i>Crotalus horridus</i>	Unlisted	Threatened	No individuals were incidentally observed during the field visit on November 13, 2013. According to NYNHP, no records of timber rattlesnakes were identified within 1.5 miles of the study area. Potential habitat exists within the deciduous forest and mowed areas in the study area. Temporary effects to basking habitat are possible; however, upon completion of the repair and rehabilitation, the staging areas would be restored to natural conditions and the new air vent that remains is not anticipated to affect basking habitat. Therefore, there are no effects anticipated and no further analysis for timber rattlesnakes is warranted for this study area.	No
Wood Turtle	<i>Glyptemys insculpta</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visit on November 13, 2013. Potential habitat exists within the deciduous forest and mowed areas in the study area; however, work activities would be largely confined to previously disturbed areas. Any wood turtles that might use these areas are expected to instead utilize similar, adjacent habitats during construction. Furthermore, perimeter silt fencing would limit disturbance to adjacent habitat and prevent individual turtles from entering the work sites during construction. Finally, upon construction completion, the staging areas would be restored to natural conditions and the air vents that remain would not affect breeding, nesting, or foraging habitat. Therefore, there are no effects anticipated and no further analysis for wood turtles is warranted for this study area.	No

Table 9.7-10: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern and Habitats within the Le Fevre Lane Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Birds					
Sharp-shinned Hawk	<i>Accipiter striatus</i>	MBTA	Special Concern	No individuals were incidentally observed during the field visit on November 13, 2013. Potential stopover habitat (resting and foraging) exists within and along the edge of the hardwood forest communities in the study area. Sharp-shinned Hawks breed in deep forests and would not be impacted by work activities. Work activities would be largely confined to previously disturbed areas and would not impact breeding hawks in the deep forest. As a highly mobile species, any hawks that might use the forest edges for foraging are expected to instead utilize similar, adjacent habitats during construction. Finally, upon construction completion, the staging areas would be restored to natural conditions and the air vents that remain would not affect habitat. Therefore, there are no effects anticipated and no further analysis for Sharp-shinned Hawks is warranted for this study area.	No
<p>Note: MBTA: Migratory Bird Treaty Act</p>					

Federal/State Threatened and Endangered Species and State Species of Special Concern Conclusions

Based on the impact analysis, no take is anticipated. There would be no effects to eastern box turtles (*Terrapene carolina*), timber rattlesnakes (*Crotalus horridus*), wood turtles (*Glyptemys insculpta*), or Sharp-shinned Hawks (*Accipiter striatus*), associated with the repair and rehabilitation.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to federal/State Threatened and Endangered Species or State Species of Special Concern within the Le Fevre Lane Study Area.

9.7.4.5 Hazardous Materials

To evaluate the potential presence of hazardous materials within the Le Fevre Lane Study Area, a Phase I ESA was performed in general conformance with the scope and limitations of ASTM Practice E 1527-13 and CEQR requirements to identify RECs. The Phase I ESA included site reconnaissance, research on current/historical use, and review of federal and State regulatory listings for both the site and neighboring properties within the appropriate search distance defined in the ASTM standard.

Based on the Phase I ESA investigation within this study area, there was no indication of an environmental impact that would constitute a REC as defined by the ASTM standard that would affect activities in the study area. In addition, the legacy data indicates that materials sampled did not identify asbestos-containing materials, lead-containing paint, PCB-containing paint, or mercury-containing paint within this study area.

DEP has consulted with the Town of Gardiner and Ulster County, and it is DEP's understanding that no developments or structures that would introduce hazardous materials to the environment are anticipated within the Le Fevre Lane Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that the presence of hazardous materials within the Le Fevre Lane Study Area would be the same as baseline conditions.

In the future with the repair and rehabilitation, work activities may require on-site storage and the use of a variety of petroleum and other chemical products, such as diesel fuel for back-up power, lubricating oil for construction vehicles, and miscellaneous cleaning and maintenance chemicals during construction. The use and storage of all of these would be in accordance with applicable regulatory requirements and guidelines including those relating to: federal Spill Prevention, Control, and Countermeasures requirements; and State petroleum bulk storage, chemical bulk storage, and spill reporting requirements. Furthermore, excavation associated with the work activities for the installation of the new air vents would occur on previously disturbed soils. Following the repair and rehabilitation of the Catskill Aqueduct, all equipment would be removed from the Le Fevre Study Area. The staging area would be restored and operation of the Catskill Aqueduct would be consistent with baseline conditions.

Therefore, the repair and rehabilitation would not result in significant adverse impacts from the presence or disturbance of hazardous materials within the Le Fevre Lane Study Area.

9.7.4.6 Transportation

The study area for the transportation analysis consists of the major convergent roadways that would potentially be used by the employee and construction vehicles associated with the repair and rehabilitation work activities en route to and from the Le Fevre Lane Study Area.

Access to the repair and rehabilitation work sites within the Le Fevre Lane Study Area would be by driving on top of the cut-and-cover tunnel that connects to either Le Fevre Lane (which connects to State Route 208) or Main Street (U.S. Route 44/State Route 55, see **Figure 9.7-9**). Le Fevre Lane is a two-way local roadway. Main Street is a two-lane, two-way major collector roadway. To the extent available, construction vehicles would travel on truck-permitted roadways directly to and from the Le Fevre Lane Study Area. There is no public transportation and little to no pedestrian activity in the immediate vicinity of the study area. Under current operations, DEP employees periodically access the site. However, there are no DEP employees who work at or visit the study area on a daily basis, and the small number of DEP employee vehicles has little to no effect on traffic conditions within the study area.

DEP has consulted with the Town of Gardiner and Ulster County, and it is DEP's understanding that no changes in land use or an increase in traffic due to outside developments are anticipated within the Le Fevre Lane Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that traffic, public transportation, and pedestrian activities within the study area would be similar to baseline conditions.

Repair and rehabilitation work activities within the Le Fevre Lane Study Area were evaluated to determine which would have the potential to generate the most vehicle trips and therefore be the basis of this transportation analysis. Of these activities, biofilm removal and condition assessment would generate the most vehicle trips. Biofilm removal and condition assessment would occur in fall ~~2020~~2019 between the hours of 7 AM and 7 PM, 7 days a week for approximately 10 weeks during the third 10-week shutdown.

In the future with the repair and rehabilitation, construction vehicles would travel along an access route on top of the cut-and-cover tunnel that connects to either Le Fevre Lane or Main Street. The estimated number of peak-day one-way vehicle trips associated with the biofilm removal and condition assessment is 33 vehicle trips, or approximately 66 peak-day vehicle round trips that would travel to and from the study area. The majority of the peak daily vehicle round trips, approximately 42 vehicle round trips or 42 PCEs, would be workers either traveling to and from the study area, or traveling directly to and from the staging area (depending on parking capacity), with potentially 8 daily shuttle trips between the study area and the staging area. The remaining approximately 16 peak-day vehicle round trips (21 PCEs) would be trucks or other construction vehicles.

During a peak day, the estimated number of peak-hour vehicle trip ends associated with biofilm removal and condition assessment is approximately 33 peak-hour vehicle trip ends (36 PCEs). This includes approximately 21 vehicle trip ends (21 PCEs) from workers traveling directly to

and from the staging area, approximately 4 peak-hour shuttle trips between the study area and the staging area, and approximately 8 vehicle trip ends (11 PCEs) from trucks or other construction vehicles. For the purpose of this analysis, the peak-hour project-generated vehicles are anticipated to coincide with typical construction hours for employee vehicles entering the site. Assuming one 12-hour shift, this would be from 6 AM to 7 AM, and would be unlikely to coincide with the peak hour for existing traffic.

The repair and rehabilitation would result in approximately 36 peak-hour PCEs along Le Fevre Lane or Main Street, which is below the *CEQR Technical Manual* screening threshold of 50 peak-hour PCEs as described in Section 9.3.13, “Transportation.” The work activities at the Le Fevre Lane Study Area would be short-term (totaling 13 weeks over 1.5 years; see **Table 9.7-9**) and would not generate public parking or transportation demands or pedestrian activity within the Le Fevre Lane Study Area. Following completion of the repair and rehabilitation, traffic patterns would return to baseline conditions.

Therefore, although there would be a minor temporary increase in traffic, the repair and rehabilitation would not result in significant adverse impacts to transportation within the Le Fevre Lane Study Area.

9.7.4.7 Noise

As described in Section 9.3.15, “Noise,” mobile noise associated with the repair and rehabilitation within the Le Fevre Lane Study Area does not warrant analysis. This section includes an analysis of potential impacts from stationary noise associated with the repair and rehabilitation to sensitive receptors within the study area.

The potential for impacts from stationary noise associated with the repair and rehabilitation within the Le Fevre Lane Study Area is discussed below. The study area for the stationary noise analysis is the area within 1,500 feet of the repair and rehabilitation work sites as shown on **Figure 9.7-15**.

The Le Fevre Lane Study Area includes residential parcels within 1,500 feet of the repair and rehabilitation work sites that are considered noise-sensitive receptors for this analysis. The temporary work activities were evaluated to determine compliance with the local noise code. The repair and rehabilitation within the Le Fevre Lane Study Area is subject to the Town of Gardiner Noise Control Law (§220-40.C) which limits daytime and nighttime noise levels at the emitting property line. However, construction and maintenance activities between 8 AM and sunset are exempt. The noises of safety signals, warning devices, emergency pressure-relief valves or other emergency warning signals are also exempt. Noise between the hours of 7 AM and 8 PM cannot exceed 70 dBA, and noise between the hours of 8 PM and 7 AM cannot exceed 60 dBA at the emitting property line.

Existing ambient noise levels within the Le Fevre Lane Study Area are influenced by vehicular traffic traveling on State Route 208, Le Fevre Lane and other local roadways. The existing noise levels within the study area are comparable to a very quiet suburban and rural residential environment based on the distance from major transportation corridors and the population density of the area. Typical noise levels (measured as L_{eq}) for very quiet suburban and rural communities are 40 dBA during the daytime and 34 dBA during the nighttime.

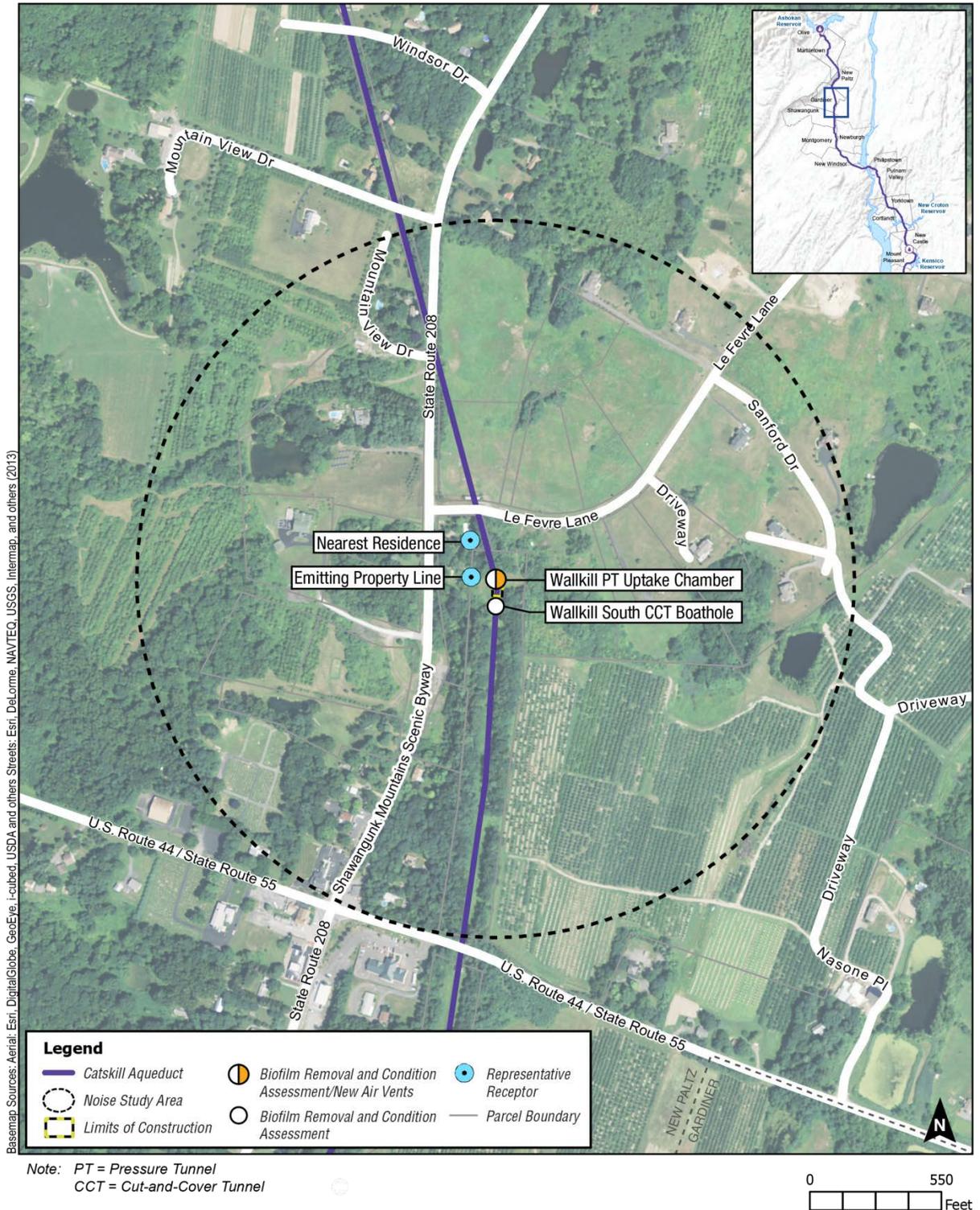


Figure 9.7-15: Noise – Le Fevre Lane Study Area



DEP has consulted with the Town of Gardiner and Ulster County, and it is DEP’s understanding that no major projects that would result in a change in land use, or new noise-generating sources that would contribute to an increase in ambient noise levels, are anticipated within the Le Fevre Lane Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that ambient noise levels within the Le Fevre Lane Study Area would be similar to baseline conditions.

In the future with the repair and rehabilitation, stationary noise-producing work activities within the Le Fevre Lane Study Area would occur on one site. The stationary noise-generating equipment associated with installation of the air vents was the basis of this stationary noise analysis. Air vent installation would occur in fall ~~2019~~2018 between the hours of 7 AM and 7 PM, 7 days a week for approximately 3 weeks during the second 10-week shutdown (see **Table 9.7-9**).

The noise analysis focused on the three loudest stationary noise-generating equipment types necessary for the air vent installation. Associated equipment reference noise levels are shown in **Table 9.7-11**. The types of noise-generating equipment analyzed were conservatively based on peak construction operating conditions.

Table 9.7-11: Stationary Source Construction Equipment Modeled at the Le Fevre Lane Study Area – Noise Analysis and Reference Noise Levels (L_{eq})

Equipment Type	Reference Noise Level (L_{eq}) at 50 Feet (dBA) ¹
Crane	77
Generator	82
Concrete Mixer Truck	81
Note: ¹ City Environmental Quality Review (CEQR) Technical Manual, Chapter 22.	

Results of the stationary construction noise analysis are shown on **Table 9.7-12**. The Town of Gardiner regulates noise at the property line from which the noise is emitted. However, the nearest noise-sensitive receptor is a residence approximately 100 feet away from the emitting property line. Air vent installation within the Le Fevre Lane Study Area during the repair and rehabilitation would emit a noise level (L_{eq}) of approximately 74 dBA at the nearest residence. Since the repair and rehabilitation within the Le Fevre Lane Study Area would emit noise levels greater than allowed by the Town of Gardiner noise codes, DEP would work with the Town of Gardiner as appropriate.

Following completion of the repair and rehabilitation work activities, the construction equipment and vehicles would be removed from the Le Fevre Lane Study Area. The repair and rehabilitation work activities would be temporary in nature with peak work activities occurring during air vent installation in fall ~~2019~~2018 for a limited time period (3 weeks).

Therefore, although there would be a temporary increase in noise, noise from the repair and rehabilitation would not result in significant adverse impacts to sensitive receptors within the Le Fevre Lane Study Area.

Table 9.7-12: Stationary Noise Analysis Results (L_{eq}) at the Nearest Noise-Sensitive Receptors within the Le Fevre Lane Study Area

Nearest Noise-Sensitive Receptor	Distance from Site (Feet)	Predicted Stationary Noise Level (L_{eq}) at Noise-Sensitive Receptor (dBA)	Town of Gardiner Noise Limit, dBA	Potential for Exceedance (Yes or No)
Emitting Property Line	103	79	70 ^{1,2}	Yes
Nearest Residence	193	74	NA	NA
Notes: NA = Not Applicable ¹ Daytime noise limit is applicable between the hours of 7 AM and 8 PM. ² The Town of Gardiner has a separate nighttime noise limit that applies between the hours of 8 PM and 7 AM. Activity is not anticipated during these hours.				

9.7.4.8 Neighborhood Character

The character of the Le Fevre Lane Study Area is largely defined by a mix of residential, public services, and vacant land uses and its physical setting within a rural location (see **Figure 9.7-11**). The Catskill Aqueduct traverses the study area in a general north to south direction. The study area is bounded to the north by Le Fevre Lane, with Main Street (U.S. Route 44/State Route 55) located just to the south. State Route 208 traverses the study area in a north to south direction in its western portion. The work sites and associated access routes are located in a public services corridor owned and maintained by DEP and separated from adjacent land by a forested area. Access to the work site also requires crossing a small portion of private property with permission from the owner. Access would be provided by driving on top of the cut-and-cover tunnel from an entrance off either Le Fevre Lane or Main Street.

DEP has consulted with the Town of Gardiner and Ulster County, and it is DEP’s understanding that no changes in land use and no new projects or structures are anticipated within the Le Fevre Lane Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that neighborhood character within the study area would be similar to baseline conditions.

As described in Section 9.3.16, “Neighborhood Character,” there would be no potential for the repair and rehabilitation to affect shadows and urban design. In addition, based on the screening assessments for land use and zoning; socioeconomic conditions; open space and recreation and historic and cultural resources, an impact analysis for the Le Fevre Lane Study Area was not warranted, as discussed in the following sections: Section 9.3.3, “Land Use, Zoning, and Public Policy,” Section 9.3.4, “Socioeconomic Conditions,” Section 9.3.6, “Open Space and Recreation,” and Section 9.3.7, “Historic and Cultural Resources,” respectively. As described in Section 9.7.4.3, “Visual Resources,” the work activities would not affect visual resources in the Le Fevre Lane Study Area. Furthermore, the public policy impact analysis provided in Section 9.7.2, “Town of Gardiner Impact Analysis,” concluded the work activities were consistent with applicable plans.

As described in Sections 9.7.4.6, “Transportation,” and 9.7.4.7, “Noise,” during construction, the work activities in the Le Fevre Lane Study Area would be short-term (intermittently over 1.5 years) and would result in a temporary increase in traffic and noise. Following completion of the repair and rehabilitation, the construction equipment and vehicles would be removed from the study area and traffic patterns would return to baseline conditions. These temporary increases in traffic and noise levels would not result in a density of activity or service conditions that would affect the overall character of the study area.

The repair and rehabilitation would not generate significant adverse effects in land use, zoning, and public policy; socioeconomic conditions; open space and recreation; shadows; historic and cultural resources; urban design and visual resources; transportation; or noise.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to neighborhood character within the Le Fevre Lane Study Area.

9.7.5 ARMATO LANE STUDY AREA IMPACT ANALYSIS

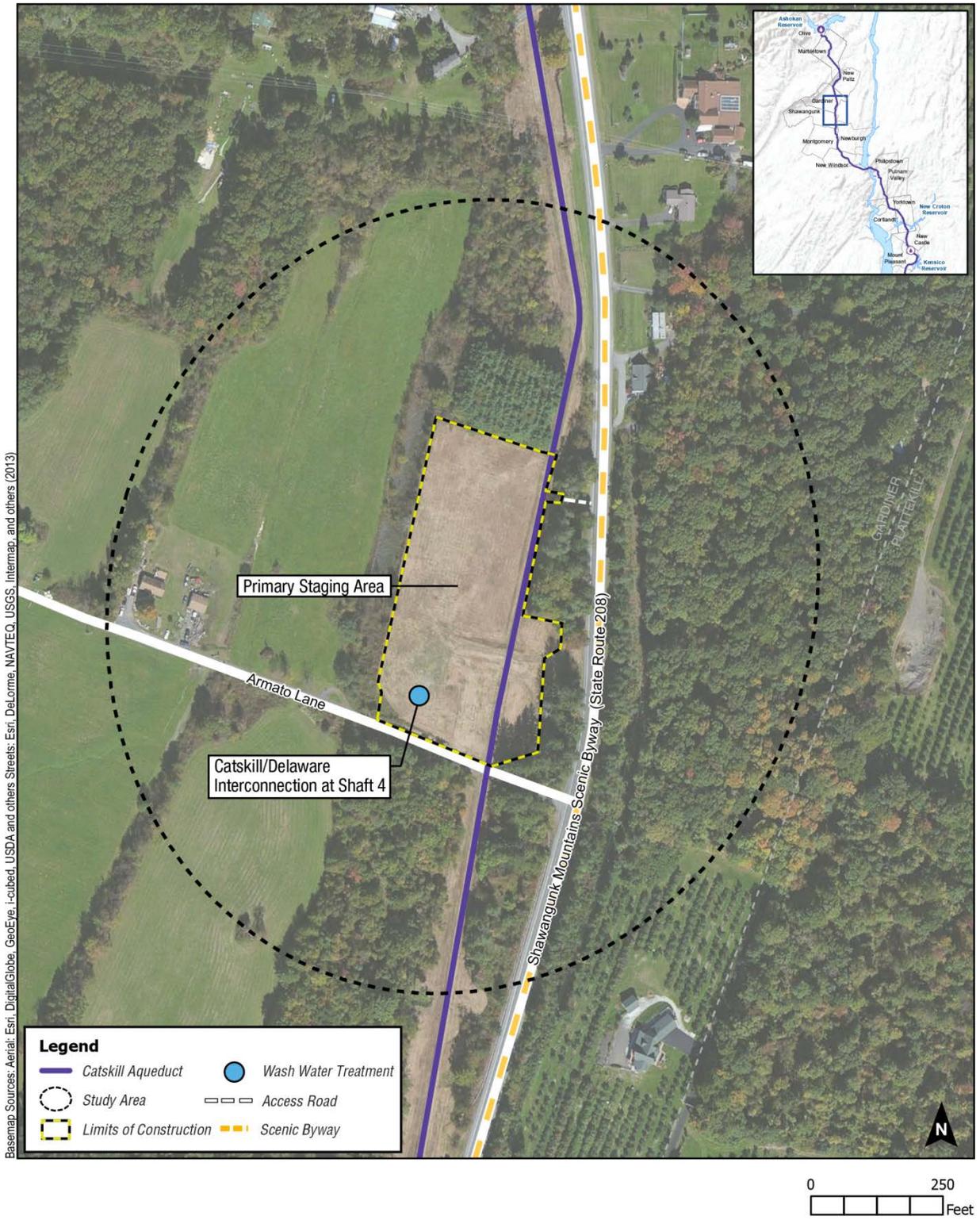
Within the Armato Lane Study Area, the aqueduct consists of the Wallkill South Cut-and-Cover Tunnel. The Shaft 4 Interconnection, an approximately 4,500 square foot, partially buried facility that will allow water from the Delaware System to be diverted to the Catskill Aqueduct, is currently under construction in this study area (see **Figure 9.7-16**).

Work activities within the Armato Lane Study Area would include: establishment and use of a primary staging area; biofilm removal and condition assessment; and small-scale wash water treatment.

9.7.5.1 Study Area Location and Description

The Armato Lane Study Area is located along the upper Catskill Aqueduct in the Town of Gardiner. The Catskill Aqueduct traverses the study area in a general north to south direction. State Route 208 traverses the study area paralleling the aqueduct to its east, and Armato Lane crosses the southern portion of the study area from the west. The proposed work site within the study area is located in the area to the northwest of the intersection of State Route 208 and Armato Lane. Access to the work site would be provided by an entrance off State Route 208. The study area boundary is located approximately 400 feet beyond the outermost area of disturbance related to the work site. **Figure 9.7-16** shows an aerial photograph of the study area, including the path of the aqueduct, the limits of construction for the work site, and the proposed access route. **Figure 9.7-17** shows photographs of the study area.

The study area includes agricultural, residential, vacant, and public services land uses. A forested area is located in its eastern portion, and a large grassy area is located in its western portion. The limits of construction for the work site and associated access route are located in a public services corridor. They are owned and maintained by DEP and separated from adjacent land by a forested zone. **Figure 9.7-18** shows a map of the land uses within the study area and its surroundings.



Basemap Sources: Aerial: Esri, DigitalGlobe, GeoEye, i-cubed, USDA and others Streets: Esri, DeLorme, NAVTEQ, USGS, Intermap, and others (2013)

Figure 9.7-16: Study Area – Armato Lane





Photograph 1: North view of staging area.



Photograph 2: North-Northwest view of existing staging area.

Figure 9.7-17: Photographs – Armato Lane Study Area



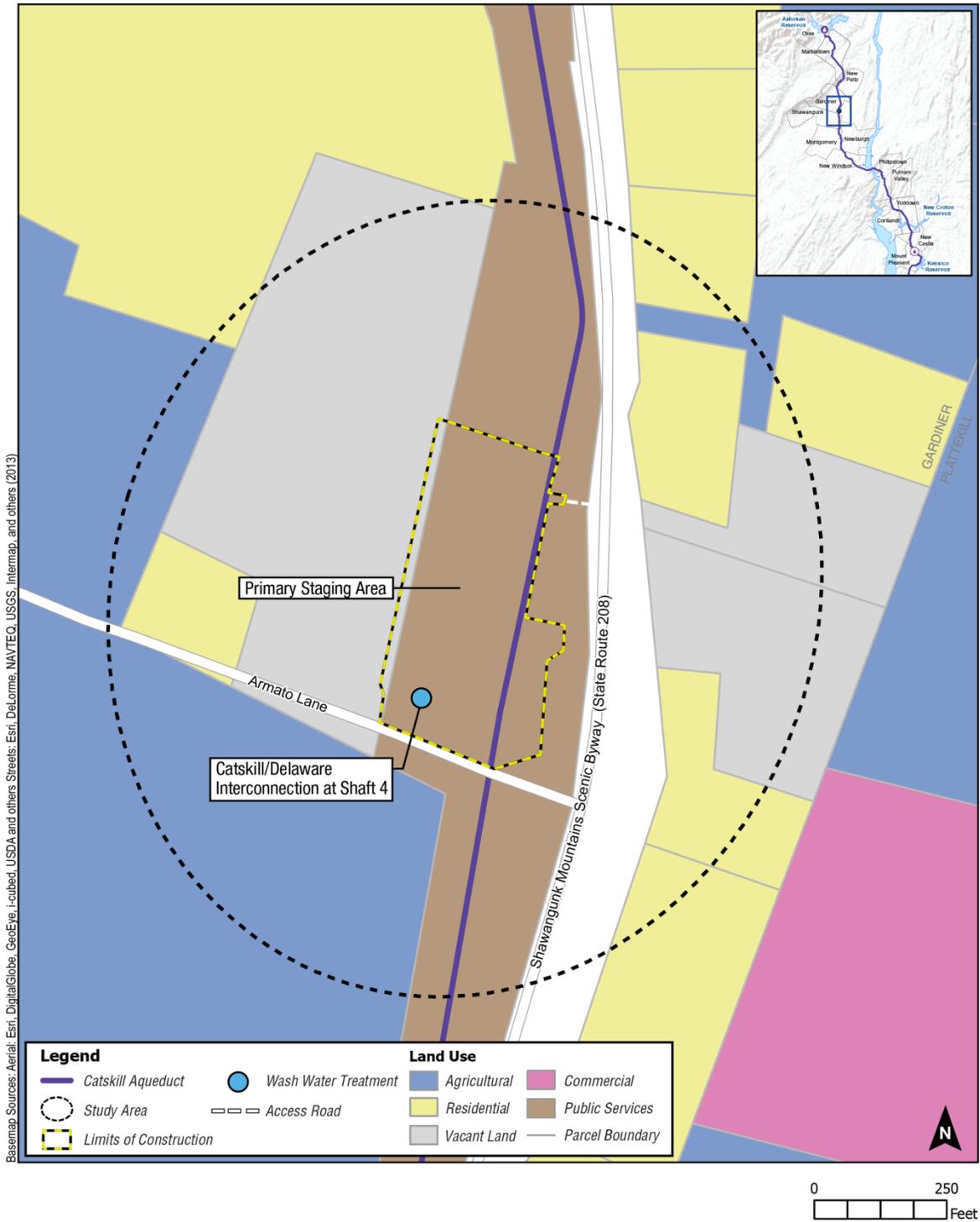


Figure 9.7-18: Land Use – Armato Lane Study Area



Zoning within the study area is entirely rural agricultural (RA), as designated by the Town of Gardiner Zoning Code (see **Figure 9.7-19**). The rural agricultural (RA) zoning classification allows for residential, agricultural, forestry, recreation, and land conservation uses, and encourages development activities that preserve large tracts of contiguous open space and agricultural land. The Catskill Aqueduct is a permitted use as public utility facility within the rural agricultural (RA) zoning district. State Route 208 has been designated by NYSDOT as the Shawangunk Mountains Scenic Byway. There are no other federal, State, or local designated landmarks, historic districts, or known archeological resources within the study area.

9.7.5.2 Proposed Activities within the Armato Lane Study Area

The area to the northwest of the intersection of State Route 208 and Armato Lane is currently being used for construction of the Shaft 4 Interconnection. For the repair and rehabilitation, it would be used as a primary staging area for contractor trailers and parking to support construction activities along the 20 miles of aqueduct directly west of the Hudson River. The primary staging area would be established in ~~2018~~2017 and would be available for the duration of repair and rehabilitation. No staging or access improvements would be necessary other than gravel placement for leveling and erosion control. Erosion and sediment control measures such as silt fencing and hay bales would be installed at the perimeter of the work site as needed. A site plan showing a layout of the limits of construction for the, which would occupy a total of 3.7 acres, is shown on **Figure 9.7-20**. The schedule for work within the study area is shown in **Table 9.7-13**. The duration of active construction within the Armato Lane Study Area is estimated to total 92 weeks over 2.5 years, with some overlapping activities.

Table 9.7-13: Schedule of Work Activities within the Armato Lane Study Area

Work Activity	Dates	Duration	Work Hours	Crew Size ¹
Primary Staging Area Management	2018 2017 – 2020	Less than 2 continuous years	7 days a week, 24 hours per day (shutdowns) Monday to Friday, 7 AM to 5 PM (all other times)	12
Biofilm Removal and Condition Assessment/ Small-scale Wash Water Treatment	Fall 2020 2019 (Third 10-week shutdown)	4 weeks	7 days a week, 7 AM to 7 PM	21
Note: ¹ Crew size refers to the number of people anticipated at the work site(s).				

Biofilm removal and condition assessment would occur during the third 10-week shutdown in fall ~~2020~~2019, with access into the aqueduct provided by the Shaft 4 Interconnection site. It would also serve as a collection point for biofilm, which would be transported for disposal at a registered, permitted, or otherwise authorized facility. Although the aqueduct would be unwatered during this shutdown, any residual water would be diverted through an internal bypass pipe around the work segments within the aqueduct for discharge to the aqueduct downstream.

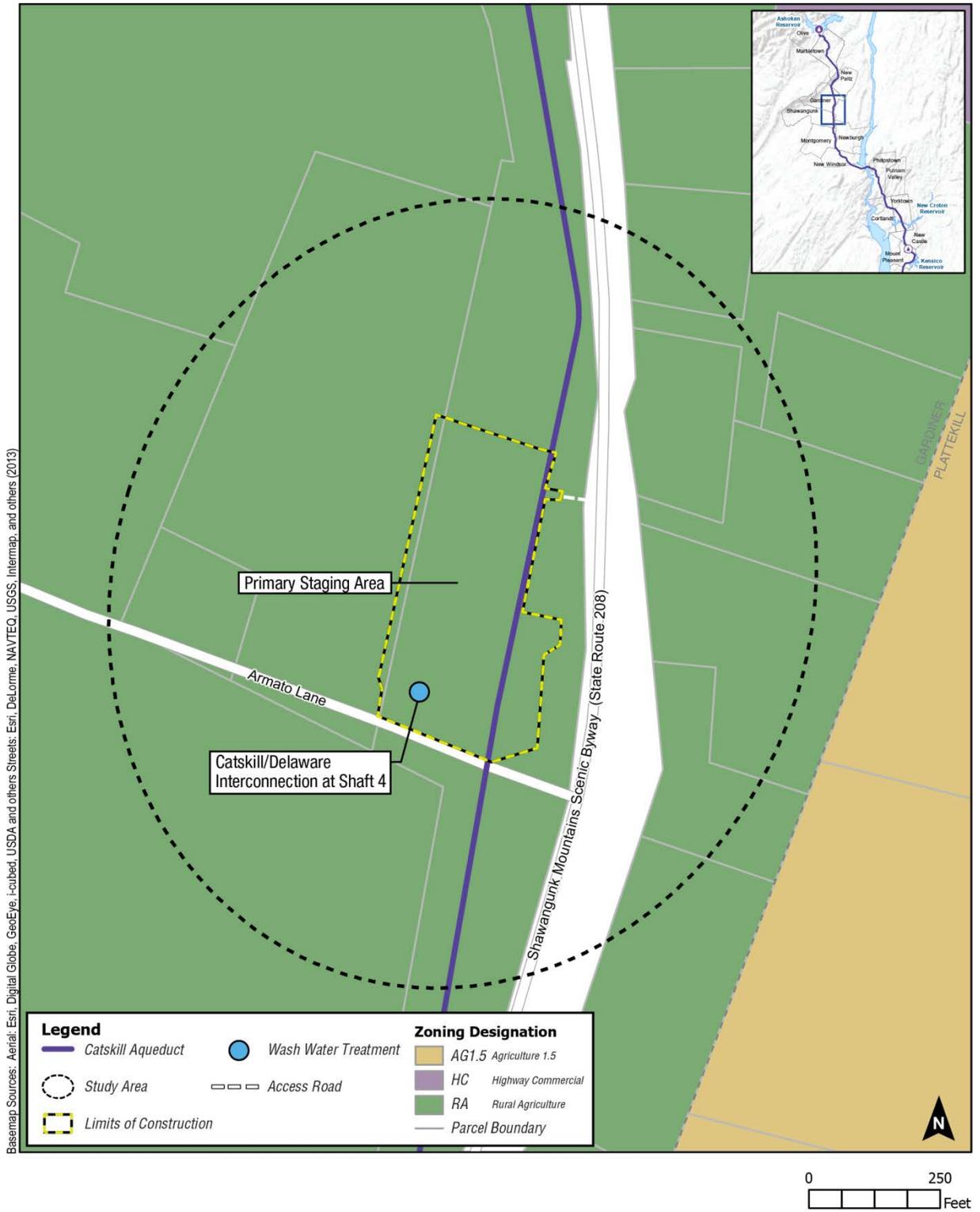


Figure 9.7-19: Zoning – Armato Lane Study Area





Figure 9.7-20: Site Plan – Armato Lane Study Area



Any residual water that does not meet water quality standards, and any wash water generated from biofilm removal, would then be transported to a temporary treatment system, where it would be treated to meet water quality standards for discharge back into the aqueduct or to a nearby waterbody (see Section 9.2, “Project Description”). Potential treatment locations include the Shaft 4 Interconnection, at which a small-scale treatment system could be established.

Upon completion of repair and rehabilitation in 2020, all trailers, equipment, and materials associated with the primary staging area would be removed, and any areas requiring temporary disturbance would be restored to baseline conditions.

Impact categories analyzed for the Armato Lane Study Area are presented in Section 9.7.5.3, “Visual Resources,” through Section 9.7.5.8, “Neighborhood Character,” and include visual resources; natural resources including federal/State Threatened and Endangered Species and State Species of Special Concern; hazardous materials; transportation; stationary noise; and neighborhood character.

Additionally, the study area’s compatibility with applicable public policies was analyzed on a town-wide basis in Section 9.7.2, “Town of Gardiner Impact Analysis” As detailed in Section 9.3, “Screening Assessment and Impact Analysis Methodology,” an impact analysis related to land use and zoning; socioeconomic conditions; community facilities and services; open space and recreation; historic and cultural resources; other natural resources subcategories including water resources, geology and soils, aquatic and benthic resources, terrestrial resources, wildlife, federal/State Candidate Species, and unlisted rare and vulnerable species; energy; air quality; and mobile noise within the study area is not warranted. Finally, impacts related to project-wide natural resources, water and sewer infrastructure, and public health were analyzed within Section 9.19, “Project-wide Impact Analysis.”

9.7.5.3 Visual Resources

The study area for the visual resources analysis is the area within the Armato Lane Study Area. It also includes view corridors that extend beyond the study area based on the locations that are publicly accessible.

As shown on **Figure 9.7-16**, one visual resource the Shawangunk Mountains Scenic Byway, was identified within the Armato Lane Study Area. The 88-mile Shawangunk Mountains Scenic Byway, under the purview of NYSDOT, was designated a visual resource based on the scenic, natural, historic and recreational resources in the region, particularly the views of the Shawangunk Mountains. Approximately 1,400 feet of the byway is located within the Armato Lane Study Area. State Route 208, the eastern-most roadway of the Shawangunk Mountains Scenic Byway, passes through the eastern portion of the Armato Lane Study Area. The byway’s Corridor Management Plan (Shawangunk Mountains Scenic Byway 2005) identifies locations with views of the Shawangunk Mountains. The Armato Lane Study Area is not located directly in one of the identified locations with significant views, or viewsheds; views from this part of State Route 208 are limited due to the vegetation along the both sides of the roadway.

The Armato Lane Study Area is currently under construction for the interconnection of the Delaware and Catskill Aqueducts at Shaft 4, with additional landscaping to buffer views from State Route 208.

DEP has consulted with the Town of Gardiner and Ulster County, and it is DEP's understanding that no new projects or structures that would alter views from visual or aesthetic resources are anticipated within the Armato Lane Study Area within the timeframe of the impact analysis. Natural processes, such as changes in habitat due to natural vegetative succession, are anticipated to continue. Therefore, in the future without the repair and rehabilitation, it is assumed that visual resources within the Armato Lane Study Area would be the same as baseline conditions.

During construction, the repair and rehabilitation work activities would not affect the scenic byway. As stated above, the Armato Lane Study Area is not located directly within a location with views of the Shawangunk Mountains. Therefore, work activities associated with the staging areas would not result in any significant adverse impacts to visual resources.

Upon the completion of the repair and rehabilitation, all equipment and vehicles would be removed and the work site would be restored to baseline conditions. The repair and rehabilitation within the Armato Lane Study Area would not result in changes to the future visual and aesthetic resource conditions of the views to the Shawangunk Mountains from the scenic byway.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to visual resources within the Armato Lane Study Area.

9.7.5.4 Natural Resources

The study area for the natural resources analysis is identical to the Armato Lane Study Area (see **Figure 9.7-16**). A natural resources-specific study area was not developed for this study area as delineations and species-specific surveys were not warranted.

The habitat in the study area has been previously documented to contain successional old field and a narrow band of mixed woodlands resembling an Appalachian oak-pine forest. The site has been used as a construction staging area for other DEP projects.

Federal/State Threatened and Endangered Species and State Species of Special Concern

This section includes an analysis of potential impacts to federal/State Threatened and Endangered Species and State Species of Special Concern, identified in Section 9.3.9, "Natural Resources," as having the potential to be affected by activities within the Armato Lane Study Area. To identify those species that could be affected within the natural resources study area, species that could occur up to 0.25 mile from the work sites were determined in consultation with USFWS, USACE, NYNHP, and NYSDEC, as well as county and local offices, as applicable.

As discussed in Section 9.3.9, "Natural Resources," three species were identified to have the potential to be affected by the repair and rehabilitation within the study area. Therefore, conditions in the future without the repair and rehabilitation, an analysis of the potential for

impacts to these three species, and a summary of conclusions on the potential effects resulting from the repair and rehabilitation are provided below.

In the future without the repair and rehabilitation, it is assumed that federal/State Threatened and Endangered Species and State Species of Special Concern within the study area would largely be the same as baseline conditions, other than possible changes in habitat due to natural vegetative succession and general anthropogenic influences.

An analysis of the potential for disturbance to federal/State Threatened and Endangered Species and State Species of Special Concern from the repair and rehabilitation within the Armato Lane Study Area is shown in **Table 9.7-14**. The analysis included an evaluation of the repair and rehabilitation work activities within the study area.

Table 9.7-14: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern and Habitats within the Armato Lane Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Amphibians and Reptiles					
Eastern Box Turtle	<i>Terrapene carolina</i>	Unlisted	Special Concern	The habitat in the study area has been previously documented to contain successional old field and a narrow band of mixed woodlands resembling an Appalachian oak-pine forest. Construction could result in potential effects to eastern box turtles and their nests. Eastern box turtles are mobile species that use a variety of habitats and would be expected to utilize similar adjacent habitats during construction. Perimeter silt fencing would also help prevent individuals from entering work sites during construction. Since the eastern box turtle population is stable within the Hudson River Valley region, any effects to potential habitat or to some individuals would not result in significant adverse impacts to regional populations. Therefore, there are no effects anticipated and no further analysis for eastern box turtles is warranted for this study area.	No
Timber Rattlesnake	<i>Crotalus horridus</i>	Unlisted	Threatened	The habitat in the study area has been previously documented to contain successional old field and a narrow band of mixed woodlands resembling an Appalachian oak-pine forest. Temporary effects to basking habitat is possible; however, upon completion of the repair and rehabilitation, the staging areas would be restored to natural conditions and is not anticipated that basking habitat would be affected. Therefore, there are no effects anticipated and no further analysis for timber rattlesnakes is warranted for this study area.	No
Wood Turtle	<i>Glyptemys insculpta</i>	Unlisted	Special Concern	The habitat in the study area has been previously documented to contain successional old field and a narrow band of mixed woodlands resembling an Appalachian oak-pine forest. Potential nesting habitat is present in the study area. Construction could affect individuals or their nests. However, perimeter silt fencing would help prevent individuals from entering work sites during construction. Since populations are stable within the Hudson River Valley region, any effects to potential habitat or to some individuals would not result in significant adverse impacts to regional populations. Therefore, there are no effects anticipated and no further analysis for wood turtles is warranted for this study area.	No

Federal/State Threatened and Endangered Species and State Species of Special Concern Conclusions

Based on the impact analysis, no take is anticipated. There would be no effects to eastern box turtles (*Terrapene carolina*), timber rattlesnakes (*Crotalus horridus*), or wood turtles (*Glyptemys insculpta*) associated with the repair and rehabilitation.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to federal/State Threatened and Endangered Species and State Species of Special Concern within the Armato Lane Study Area.

9.7.5.5 Hazardous Materials

To evaluate the potential presence of hazardous materials within the Armato Lane Study Area, a Phase I ESA was performed in general conformance with the scope and limitations of ASTM Practice E 1527-13 and CEQR requirements to identify RECs. The Phase I ESA included site reconnaissance, research on current/historical use, and a review of federal and State regulatory listings for both the site and neighboring properties within the appropriate search distance defined in the ASTM standard.

Based on the Phase I ESA investigation within this study area, there was no indication of an environmental impact that would constitute an REC as defined by the ASTM standard that would affect activities in the study area. Additionally, there is no history of contamination at or in the vicinity of the Armato Lane Study Area, where a primary staging area would be located. The staging area would be located on previously disturbed land, with no new grading or excavation anticipated.

DEP has consulted with the Town of Gardiner and Ulster County, and it is DEP's understanding that no developments or structures that would introduce hazardous materials to the environment are anticipated within the Armato Lane Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that the presence of hazardous materials within the Armato Lane Study Area would be the same as baseline conditions.

In the future with the repair and rehabilitation, work activities and the primary staging area would require storage and the use of a variety of petroleum and other chemical products, such as diesel fuel for back-up power, lubricating oil for construction vehicles, and miscellaneous cleaning and maintenance chemicals during construction. The use and storage of all of these would be in accordance with applicable regulatory requirements and guidelines including those relating to: federal Spill Prevention, Control, and Countermeasures requirements; and State petroleum bulk storage, chemical bulk storage, and spill reporting requirements. No excavation would occur at the Armato Lane Study Area during repair and rehabilitation. Following the repair and rehabilitation of the Catskill Aqueduct, all equipment would be removed from the Armato Lane Study Area. The staging area would be restored and operation of the Catskill Aqueduct would be consistent with baseline conditions.

Therefore, the repair and rehabilitation would not result in significant adverse impacts from the presence or disturbance of hazardous materials within the Armato Lane Study Area.

9.7.5.6 Transportation

The study area for the transportation analysis consists of the major convergent roadways that would potentially be used by the employee and construction vehicles associated with repair and rehabilitation work activities en route to and from the Armato Lane Study Area.

As shown on **Figure 9.7-16**, access to the repair and rehabilitation work sites within the Armato Lane Study Area would be via State Route 208. State Route 208 is a two-lane, two-way rural minor arterial roadway. To the extent available, construction vehicles would travel on truck-permitted roadways directly to and from the Armato Lane Study Area. There is no public transportation and little to no pedestrian activity in the immediate vicinity of the study area. There is construction activity (unrelated to the repair and rehabilitation) occurring at this study area that is scheduled to continue through summer 2016. Excluding this construction activity, DEP employees periodically access the site. However, there are no DEP employees who work at or visit the study area on a daily basis, and the small number of DEP employee vehicles has little to no effect on traffic conditions within the study area.

DEP has consulted with the Town of Gardiner and Ulster County, and it is DEP's understanding that no changes in land use or an increase in traffic due to outside developments are anticipated within the Armato Lane Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that traffic, public transportation, and pedestrian activities within the study area would be similar to baseline conditions.

In the future with the repair and rehabilitation, the Armato Lane Study Area would serve as a primary staging area to support work activities at the Forest Glen Road, Le Fevre Lane, Armato Lane, Strawridge Road, Winchell Drive, Mount Airy Road, and Passaro Drive study areas. The primary staging area would be used for contractor's office trailers and equipment storage. However, it would only be accessed for short periods (i.e., several weeks coinciding with spring/summer construction and the 10-week shutdowns) for parking, deliveries, and other activities. If the destination work site is a primary or secondary staging area, and if sufficient parking capacity exists at the destination work site, then the construction workers would proceed directly to the work site to park their personal vehicles. Otherwise, if the destination work site is not at a staging area with sufficient parking capacity, all construction workers for these study areas would drive to the primary staging area or to a secondary staging area, and would then be shuttled from the staging area to the study area work sites. Shuttle capacity is based on an average occupancy of six construction workers per shuttle vehicle.

Use of this primary staging area would span the duration of construction (~~2018~~2017 to 2020), with peak staging area activity during concentrated activities occurring during the three 10-week shutdowns when work could take place up to 24 hours per day, 7 days a week. The primary staging area would be used for contractor's office trailers and equipment storage. However, it would only be accessed for short periods (i.e., several weeks coinciding with the 10-week shutdowns) for parking, deliveries, and other activities.

Repair and rehabilitation work activities within the Armato Lane Study Area were evaluated to determine which activities would have the potential to generate the most vehicle trips and therefore be the basis of this transportation analysis. Of these activities, use of the primary staging area within the study area during the third 10-week shutdown in fall ~~2020~~2019 would generate the most vehicle trips. Therefore, peak-day and peak-hour calculations were conducted for vehicles that would travel to and from the primary staging area during this peak period. During this time, there would be shuttle trips between the primary staging area and study areas, as well as between the secondary staging areas and study areas. There would be two shuttles operating each peak hour between the primary staging area and the Winchell Drive and Mount Airy Road study areas (eight shuttles daily, in total).

The estimated number of peak-day one-way vehicle trips associated with the Armato Lane Study Area is 118 vehicles, or approximately 236 peak-day vehicle round trips (267 PCEs) that would travel to and from the Armato Lane Study Area. Approximately 90 vehicle round trips, or 90 PCEs, would be workers traveling to and from the Armato Lane Study Area. The remaining 146 peak-day vehicle round trips (177 PCEs) would be trucks or other construction vehicles.

During a peak day, the estimated number of peak-hour vehicle trip ends associated with the Armato Lane Study Area is approximately 116 peak-hour vehicle trip ends (132 PCEs). This includes approximately 57 vehicle trip ends (57 PCEs) from workers and approximately 59 vehicle trip ends (75 PCEs) for trucks or other construction vehicles. For the purpose of this analysis, the peak-hour project-generated vehicles are anticipated to coincide with typical construction hours for employee vehicles entering the site. Assuming two 12-hour shifts, this would be during the 6 AM to 7 AM and 6 PM to 7 PM hours, and would be unlikely to coincide with the peak hour for non-project-related traffic.

The repair and rehabilitation work activities would result in approximately 132 peak-hour PCEs along State Route 208, which is above the *CEQR Technical Manual* screening threshold of 50 peak-hour PCEs as described in Section 9.3.13, "Transportation." While use of this study area as a primary staging area would span the duration of construction (~~2018~~2017 through 2020), concentrated activities would occur during the three 10-week shutdowns (see **Table 9.7-13**). Construction would not generate public parking, transportation demands, or pedestrian activity within the Armato Lane Study Area. Following completion of the primary staging area activities, traffic patterns would return to baseline conditions.

Therefore, although there would be a minor temporary increase in traffic, the repair and rehabilitation would not result in significant adverse impacts to transportation within the Armato Lane Study Area.

9.7.5.7 Noise

As described in Section 9.3.15, "Noise," mobile noise associated with the repair and rehabilitation within the Armato Lane Study Area does not warrant analysis. This section includes an analysis of potential impacts to from stationary noise associated with the repair and rehabilitation to sensitive receptors within the study area.

The potential for impacts from stationary noise associated with the repair and rehabilitation within the Armato Lane Study Area is discussed below. The study area for the stationary noise analysis is the area within 1,500 feet of the repair and rehabilitation work sites as shown on **Figure 9.7-21**. The Armato Lane Study Area includes residential parcels within 1,500 feet of the repair and rehabilitation work sites that are considered noise-sensitive receptors for this analysis. The temporary work activities were evaluated to determine compliance with the local noise codes.

The repair and rehabilitation is subject to the Town of Gardiner Noise Control Law (§220-40.C) which limits daytime and nighttime noise levels at the property line of the lot from which noise is emitted. However, construction and maintenance activities between 8 AM and sunset are exempt. The noises of safety signals, warning devices, emergency pressure-relief valves or other emergency warning signals are also exempt. Noise between the hours of 7 AM and 8 PM cannot exceed 70 dBA and noise between the hours of 8 PM and 7 AM cannot exceed 60 dBA at the property line. The noise study area also includes land in the adjacent Town of Plattekill. The Town of Plattekill Noise Control Law (§73-4) limits daytime and nighttime noise levels at the property line of the receiving land use; however, sounds that originate from construction sites are exempt. Additionally, there are no noise-sensitive receptors within the Armato Lane Study Area in the Town of Plattekill.

Existing ambient noise levels within the Armato Lane Study Area are influenced by vehicular traffic traveling on State Route 208 and local roadways. The existing noise levels within the study area are comparable to a quiet suburban residential environment based on the distance from major transportation corridors, the population density of the area, and the presence of other noise-producing elements (e.g., commercial uses). Typical noise levels (measured as L_{eq}) for quiet suburban communities are 45 dBA and 39 dBA during the daytime and nighttime, respectively. As of July 2016, construction of the interconnection of the Delaware and Catskill aqueducts at Shaft 4 had been occurring within the Armato Lane Study Area for more than 2 years. This construction project included limited 24-hour work periods, 7 days a week, as well as work during normal business hours. This has contributed to elevated existing ambient noise levels.

DEP has consulted with the Towns of Gardiner and Plattekill and Ulster County, and it is DEP's understanding that no major projects that would result in a change in land use, or new noise-generating sources that would contribute to an increase in ambient noise levels, are anticipated within the Armato Lane Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that ambient noise levels within the Armato Lane Study Area would be similar to baseline conditions.

In the future with the repair and rehabilitation, stationary noise-producing work activities within the Armato Lane Study Area would occur at one site. As this location is coincident with staging areas associated with prior DEP projects, no modifications would be required. The stationary noise-generating equipment that would be used within the Armato Lane Study Area was evaluated to determine which work activity would have the potential to emit the most noise and, therefore, be the basis of this stationary noise analysis. Of the activities, the stationary noise-generating equipment associated with the primary staging area would emit the most noise.

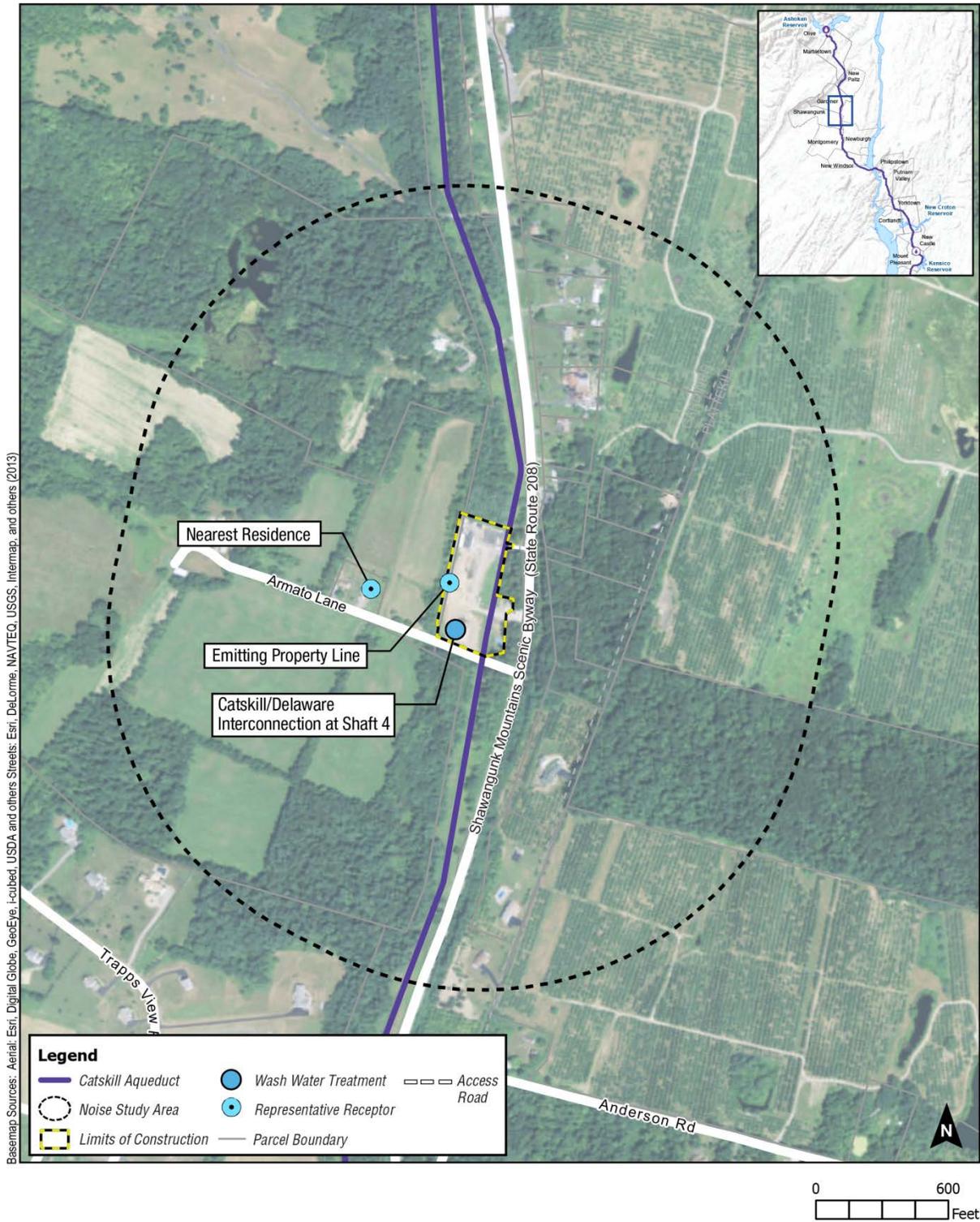


Figure 9.7-21: Noise – Armato Lane Study Area



Use of the primary staging area within the study area would span the duration of construction (2018~~2017~~ to 2020), with concentrated activities occurring during the three 10-week shutdowns where work could take place for 24 hours per day, 7 days a week (see **Table 9.7-13**).

The noise analysis focused on the two loudest stationary noise-generating equipment types necessary for the use as a primary staging area because this work activity would only require two types of equipment. Associated equipment reference noise levels are shown in **Table 9.7-15**. The types of noise-generating equipment analyzed were conservatively based on peak construction operating conditions.

Table 9.7-15: Stationary Source Construction Equipment Modeled at the Armato Lane Study Area – Noise Analysis and Reference Noise Levels (L_{eq})

Equipment Type	Reference Noise Level (L_{eq}) at 50 feet (dBA)
Generator	82
Light Plant	58
Note: ¹ City Environmental Quality Review (CEQR) Technical Manual, Chapter 22.	

The results of the stationary construction noise analysis are shown on **Table 9.7-16**. The Town of Gardiner regulates noise at the property line from which the noise is emitted. However, the nearest noise-sensitive receptor is a residence approximately 450 feet away from the work activities. Use of the primary staging area within the Armato Lane Study Area during the repair and rehabilitation would emit a noise level (L_{eq}) of approximately 63 dBA at the nearest residence. Although there would be an increase in stationary noise levels during 24-hour construction periods during the shutdown of the Catskill Aqueduct, work would primarily occur in the fall and winter months when residents typically have windows closed. Noise levels inside would be further reduced to an interior noise level (L_{eq}) of 39 dBA at the nearest residence. Since the repair and rehabilitation within the Armato Lane Study Area would emit noise levels greater than allowed by the Town of Gardiner noise codes, DEP would work with the Town of Gardiner, as appropriate.

Table 9.7-16: Stationary Noise Analysis Results (L_{eq}) at the Nearest Noise-Sensitive Receptors within the Armato Lane Study Area

Location	Distance from Site (Feet)	Predicted Stationary Noise Level (L_{eq}) at Noise-Sensitive Receptor (dBA)	Town of Gardiner Noise Limit (dBA)	Potential for Exceedance (Yes or No)
Emitting Property Line	105	76	70 ¹ /60 ²	Yes
Nearest Residence	459	63	NA	NA
Notes: NA = Not Applicable ¹ Daytime noise limit is applicable between the hours of 7 AM and 8 PM. ² Nighttime noise limit is applicable between the hours of 8 PM and 7 AM.				

Following completion of the work activities, the construction equipment and vehicles associated with the repair and rehabilitation would be removed from the Armato Lane Study Area. However, construction activities associated with other DEP projects may continue beyond this period.

Therefore, although there would be a temporary increase in noise, noise from the repair and rehabilitation would not result in significant adverse impacts to sensitive receptors within the Armato Lane Study Area.

9.7.5.8 Neighborhood Character

The character of the Armato Lane Study Area is largely defined by a mix of agricultural, residential, vacant, and public services land uses and its physical setting within a rural location. The Catskill Aqueduct traverses the study area in a general north to south direction. State Route 208 traverses the study area paralleling the aqueduct to its east, and Armato Lane crosses the southern portion of the study area from the west. The work site and associated access route are located in a public services corridor, owned and maintained by DEP and separated from adjacent land by a forested zone.

DEP has consulted with the Town of Gardiner and Ulster County, and it is DEP's understanding that no changes in land use and no new projects or structures are anticipated within the Armato Lane Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that neighborhood character within the study area would be similar to baseline conditions.

As described in Section 9.3.16, "Neighborhood Character," there would be no potential for the repair and rehabilitation to affect shadows and urban design. In addition, based on the screening assessment for land use and zoning; socioeconomic conditions; open space and recreation; and historic and cultural resources, an impact analysis for the Armato Lane Study Area was not warranted, as discussed in the following sections: Section 9.3.3, "Land Use, Zoning, and Public Policy," Section 9.3.4, "Socioeconomic Conditions," Section 9.3.6, "Open Space and Recreation," and Section 9.3.7, "Historic and Cultural Resources," respectively. As described in Section 9.7.5.3, "Visual Resources," the work activities would not affect visual resources in the Armato Lane Study Area. Furthermore, the public policy impact analysis provided in Section 9.7.2, "Town of Gardiner Impact Analysis," concluded the work activities were consistent with applicable plans.

As described in Sections 9.7.5.6, "Transportation," and 9.7.5.7, "Noise," during construction, the work activities in the Armato Lane Study Area would be short-term. While use of this study area as a primary staging area would span the duration of construction (~~2018~~2017 through 2020), concentrated activities would occur during the three 10-week shutdowns, resulting in a temporary increase in traffic and noise.

Following completion of the repair and rehabilitation, the construction equipment and vehicles would be removed from the study area and traffic patterns would return to baseline conditions. These temporary increases in traffic and noise levels would not result in a density of activity or service conditions that would affect the overall character of the study area.

The repair and rehabilitation would not generate significant adverse effects in land use, zoning, and public policy; socioeconomic conditions; open space and recreation; shadows; historic and cultural resources; urban design and visual resources; transportation; or noise.

Therefore, the repair and rehabilitation would not result in significant adverse impacts related to neighborhood character within the Armato Lane Study Area.

9.8 TOWN OF SHAWANGUNK

9.8.1 TOWN OF SHAWANGUNK PROJECT DESCRIPTION

The Town of Shawangunk is located in Ulster County, New York, on the western side of the Hudson River. It is bounded by the Towns of Gardiner to the northeast, Wawarsing to the northwest, and Plattekill to the east in Ulster County; the Town of Mamakating to the west in Sullivan County, New York; and the Towns of Crawford to the south, Montgomery to the southeast, and Newburgh to the east in Orange County, New York. The Town of Shawangunk encompasses approximately 56.5 square miles.

The Catskill Aqueduct stretches for approximately 3.7 miles in a southerly direction through the Town of Shawangunk, and the Strawridge Road Study Area, where activities associated with the repair and rehabilitation would occur within the Town of Shawangunk, are shown on **Figure 9.8-1**. Notable sites along the aqueduct within the Town of Shawangunk that are associated with repair and rehabilitation work activities include the St. Elmo Siphon Downtake Boathole and the St. Elmo Siphon Uptake Boathole. The repair and rehabilitation work activities in the Town of Shawangunk are as shown in **Table 9.8-1**.

Table 9.8-1: Schedule of Work Activities within the Town of Shawangunk

Work Activity	Strawridge Road Study Area
Staging and Access Improvements	✓
Boathole Preparation	✓
Boathole Installation	✓
Sluice Gate Removal	✓
Air Vent Installation	✓
Biofilm Removal and Condition Assessment/ Small-scale Wash Water Treatment	✓
Note: ✓ = Work activity proposed.	

The Strawridge Road Study Area in the Town of Shawangunk encompasses the majority of work that would occur as part of the repair and rehabilitation in this municipality. Additional work activities in the town do not warrant further assessment. Work sites located outside the study area include activities that would primarily be conducted within the aqueduct interior (see Section 9.3, “Screening Assessment and Impact Analysis Methodology”). In the Town of Shawangunk, they include biofilm removal and condition assessment at access manholes not located in these study areas and permanently sealing one culvert drain sluice gate. See Section 9.2, “Project Description,” for an overall project description of the repair and rehabilitation. Section 9.8.2, “Town of Shawangunk Impact Analysis,” provides a discussion of local regulations in the Town of Shawangunk jurisdictional limits. Section 9.8.3, “Strawridge Road Study Area Impact Analysis,” provides a description of the study area, proposed activities, and impact analysis for the Strawridge Road Study Area.

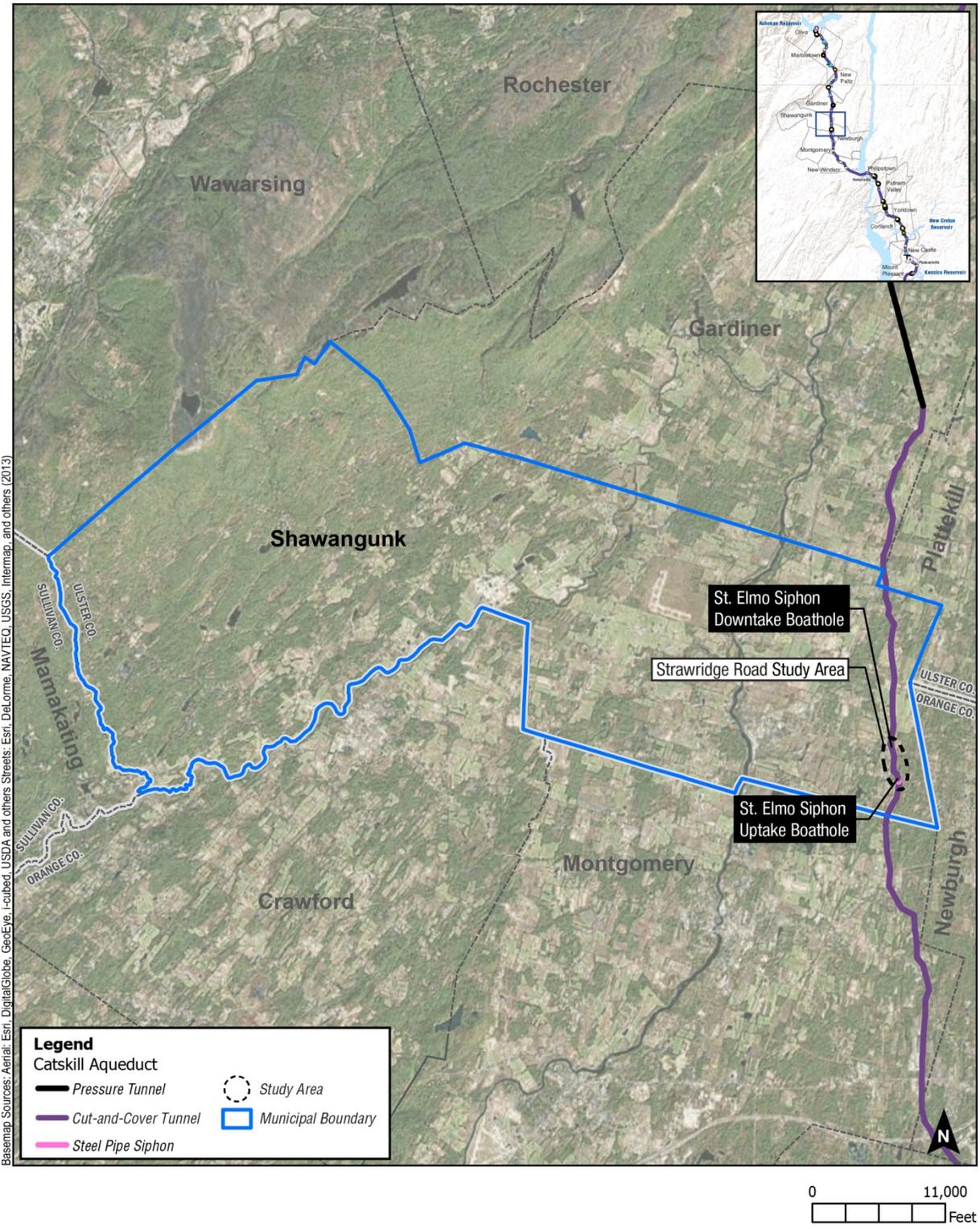


Figure 9.8-1: Town of Shawangunk Study Area



9.8.2 TOWN OF SHAWANGUNK IMPACT ANALYSIS

9.8.2.1 Public Policy

Because local public policies would not vary for study areas within the same town, public policies are evaluated on a town-wide basis. As discussed in Section 9.3.3.3, “Town Codes,” the repair and rehabilitation’s consistency with the applicable policies of the Ulster County Open Space Plan (Ulster County 2007) within the Strawridge Road Study Area is analyzed as follows.

Ulster County Open Space Plan (2007)

The Ulster County Open Space Plan establishes a framework for the management and protection of open space resources identified by Ulster County, including protected open space, water resources, working landscapes, landforms and natural features, ecological communities, cultural and historic resources, and recreational resources. To provide guidance on these open space resources, Ulster County has established the 10 “Principles of the Open Space Plan” that seek to safeguard the open space values of Ulster County. Of those 10 principles, the potential effects of the repair and rehabilitation within the Strawridge Road Study Area is evaluated for compatibility with the following applicable principle:

Preserve and protect open space, unique natural areas and heritage areas and sites, wetlands, water and woodland resources, scenic views, areas of natural beauty and the rural character of Ulster County.

No protected open space, working landscapes, cultural and historic resources, or recreational resources are located within the Strawridge Road Study Area. Water and terrestrial resources were identified within the Strawridge Road Study Area and are discussed in Section 9.8.3.3, “Natural Resources.” The repair and rehabilitation would not result in significant adverse impacts to water resources within the Strawridge Road Study Area. The repair and rehabilitation work activities in the Town of Shawangunk are shown in **Table 9.8-1**. No wetlands were identified within the natural resources study area; however, the construction staging area may encroach on these and the 50-foot State and municipal protection buffer. Temporary sediment and erosion control measures would be implemented to avoid impacts to the unnamed tributary to Borden Creek located within the study area. Additionally, the repair and rehabilitation would not result in significant adverse impacts to federal/State Threatened and Endangered Species and State Species of Special Concern within the Strawridge Road Study Area.

Under this principle, the Open Space Plan recommends the preservation and protection of critical open space resources and systems in order to provide for the benefit of Ulster County Residents and partners of the Open Space Plan. This principle was analyzed for repair and rehabilitation as work in the Strawridge Road Study Area would potentially impact natural resources, directly or indirectly.

The repair and rehabilitation would occur at existing DEP facilities within the Strawridge Road Study Area. The work activities would be minimal in nature. As such, the repair and rehabilitation within the Strawridge Road Study Area would not affect open space resources, unique natural areas and heritage areas and sites, wetlands, water and woodland resources, scenic

views, areas of natural beauty, or the rural character of Ulster County. Therefore, the repair and rehabilitation would be consistent with this principle.

Repair and rehabilitation would be consistent with the Ulster County Open Space Plan.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to public policy within the Strawridge Road Study Area.

9.8.3 STRAWRIDGE ROAD STUDY AREA IMPACT ANALYSIS

Within the Strawridge Road Study Area, the aqueduct consists of two segments of the St. Elmo Cut-and-Cover Tunnel, between which lies the St. Elmo Siphon. The northern segment of the St. Elmo Cut-and-Cover Tunnel transitions to the St. Elmo Siphon at the St. Elmo Siphon Downtake Boathole (St. Elmo Downtake Boathole), and back to the southern segment of the St. Elmo Cut-and-Cover Tunnel at the St. Elmo Siphon Uptake Boathole (St. Elmo Uptake Boathole). An access manhole with a culvert drain is located along the northern segment of the St. Elmo Cut-and-Cover Tunnel (see **Figure 9.8-2**).

Work activities within the Strawridge Road Study Area would include staging and access improvements; boathole preparation and installation; sluice gate removal; air vent installation; biofilm removal and condition assessment; and small-scale wash water treatment.

9.8.3.1 Study Area Location and Description

The Strawridge Road Study Area is located along the upper Catskill Aqueduct in the Town of Shawangunk. The Catskill Aqueduct traverses the study area in a general north to south direction. Strawridge Road and State Route 300 intersect the study area from east to west, and an unnamed tributary to Borden Creek passes through its northwestern portion. Proposed work sites within the study area include: a staging area north of State Route 300; an area along the south shoulder of Strawridge Road extending to the St. Elmo Downtake Boathole; and the St. Elmo Uptake Boathole. Access to the first two work sites would be provided directly off State Route 300 and Strawridge Road, respectively, while access to the southern-most work site would be provided by driving over the cut-and-cover tunnel from Saint Michaels Lane to the south of the study area. The study area boundary is located approximately 400 feet beyond the outermost areas of disturbance related to the work sites. **Figure 9.8-2** shows an aerial photograph of the study area, including the path of the aqueduct, the limits of construction for each work site, and the proposed access routes. **Figure 9.8-3** shows photographs of the St. Elmo Siphon Uptake Boathole in the study area.

The study area includes residential, agricultural, vacant, and public services land uses. There is also one commercial parcel. It is surrounded by wooded and grassy residential properties. The limits of construction for the work sites and associated access routes are located entirely in a public services corridor and a small area of vacant land with grassy cover, which is owned and maintained by DEP. **Figure 9.8-4** shows a map of the land uses within the study area and its surroundings.

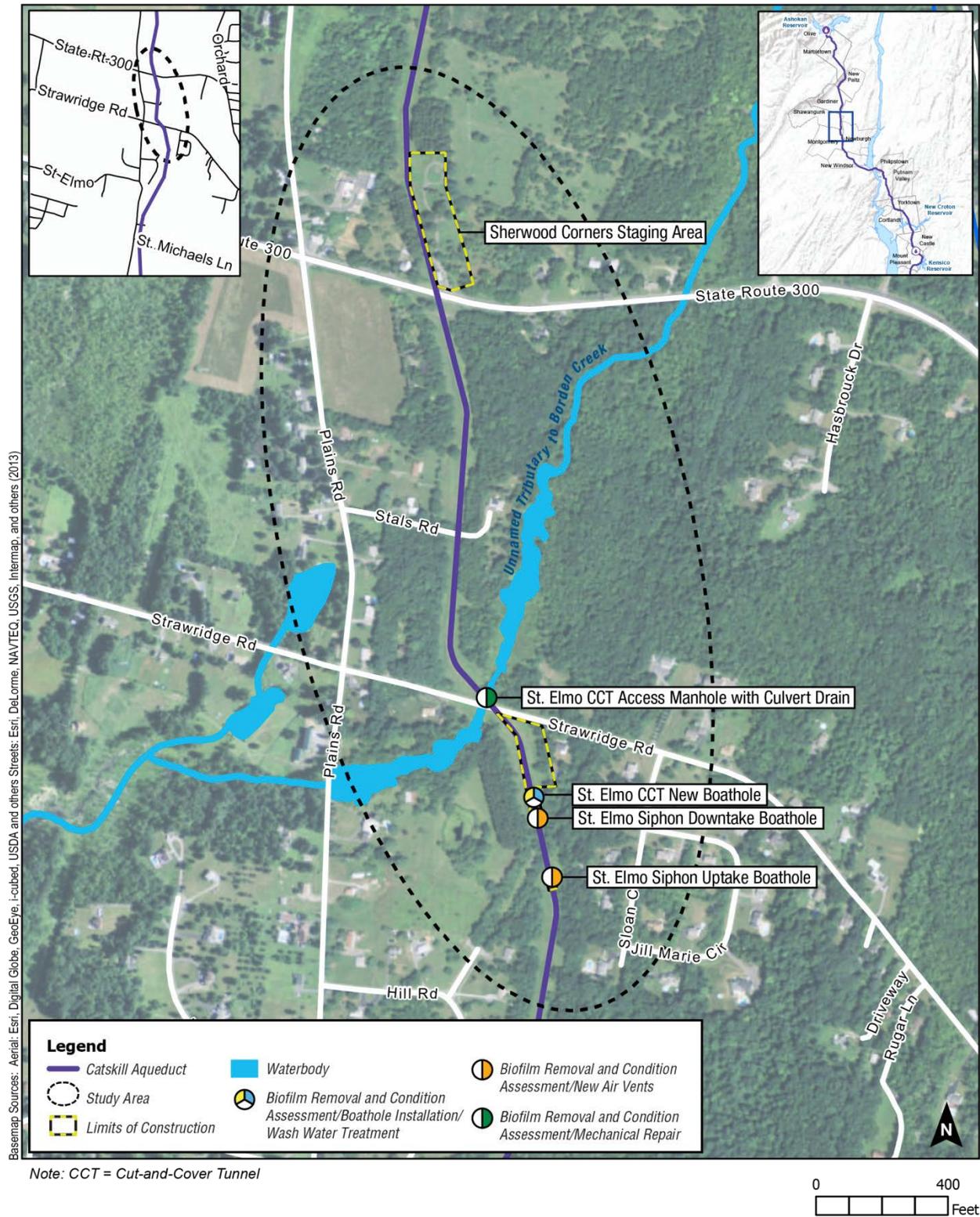


Figure 9.8-2: Study Area – Strawridge Road Study Area





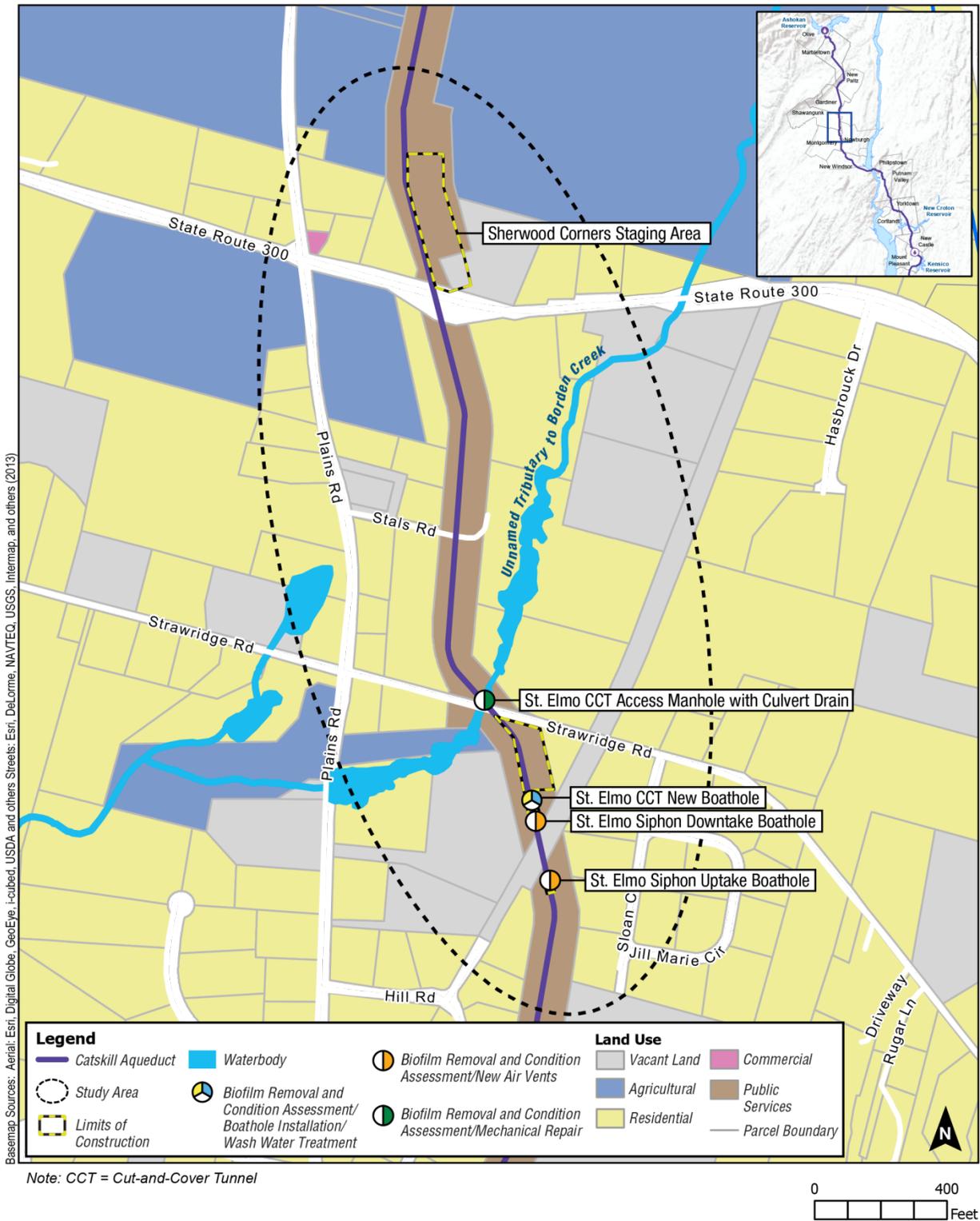
Photograph 1: St. Elmo Siphon Uptake Boathole (looking south).



Photograph 2: St. Elmo Siphon Uptake Boathole (looking northeast).

Figure 9.8-3: Photographs – Strawridge Road Study Area





Basemap Sources: Aerial: Esri, Digital Globe, GeoEye, i-cubed, USDA and others Streets: Esri, DeLorme, NAVTEQ, USGS, Intermap, and others (2013)

Figure 9.8-4: Land Use – Strawridge Road Study Area



Zoning within the study area is entirely residential-agricultural (R-Ag 2), which provides for moderate-density residential development, as designated by the Town of Shawangunk Zoning Code (see **Figure 9.8-5**). The Catskill Aqueduct is a permitted use as a public water supply within the residential-agricultural (R-Ag 2) zoning district.

There are no federal, State, or local designated landmarks, historic districts, or known archeological resources within the study area.

9.8.3.2 Proposed Activities within the Strawridge Road Study Area

To support activities within the Strawridge Road Study Area, the Shaft 4 Interconnection (within the Armato Lane Study Area in the Town of Gardiner) would serve as a primary staging area from which workers would be transported to the site daily. Several secondary staging areas, including one along State Route 300 (referred to as Sherwood Corners) and one along the shoulder of Strawridge Road, would provide additional parking. Equipment and materials would be staged on site. Erosion and sediment control measures such as silt fencing and hay bales would be installed at the perimeter of the work sites as needed. A site plan showing a layout of the limits of construction for the work sites, which would occupy a total of 3.5 acres, is shown on **Figure 9.8-6**. The schedule for work within the study area is shown in **Table 9.8-2**. The duration of active construction within the Strawridge Road Study Area is estimated to total 18 weeks over 1.5 years.

Table 9.8-2: Schedule of Work Activities within the Strawridge Road Study Area

Work Activity	Dates	Duration	Work Hours ¹	Crew Size ²
Staging and Access Improvements ³	Summer 2019 2018	2 weeks	Monday to Friday, 8 AM to 6 PM	8
Boathole Preparation	Summer 2019 2018	3 weeks	Monday to Friday, 8 AM to 6 PM	10
Boathole Installation	Fall 2019 2018 (Second 10-week shutdown)	2 weeks	7 days a week, 7 AM to 7 PM	8
Sluice Gate Removal	Fall 2019 2018 (Second 10-week shutdown)	3 weeks	7 days a week, 7 AM to 7 PM	12
Air Vent Installation	Fall 2019 2018 (Second 10-week shutdown)	3 weeks	7 days a week, 7 AM to 7 PM	8
Biofilm Removal and Condition Assessment/ Small-scale Wash Water Treatment	Fall 2020 2019 (Third 10-week shutdown)	5 weeks	7 days a week, 7 AM to 7 PM	21

Notes:

¹ Work hours while the aqueduct is in service would be adjusted to meet local regulations where possible, in accordance with the Town of Shawangunk Noise Control Law §177-44(D)(1).

² Crew size refers to the number of people anticipated at the work site(s).

³ Tree removal would be conducted from November 1 through March 31 to avoid impacts to Indiana bats (*Myotis sodalis*) and northern long-eared bats (*Myotis septentrionalis*).

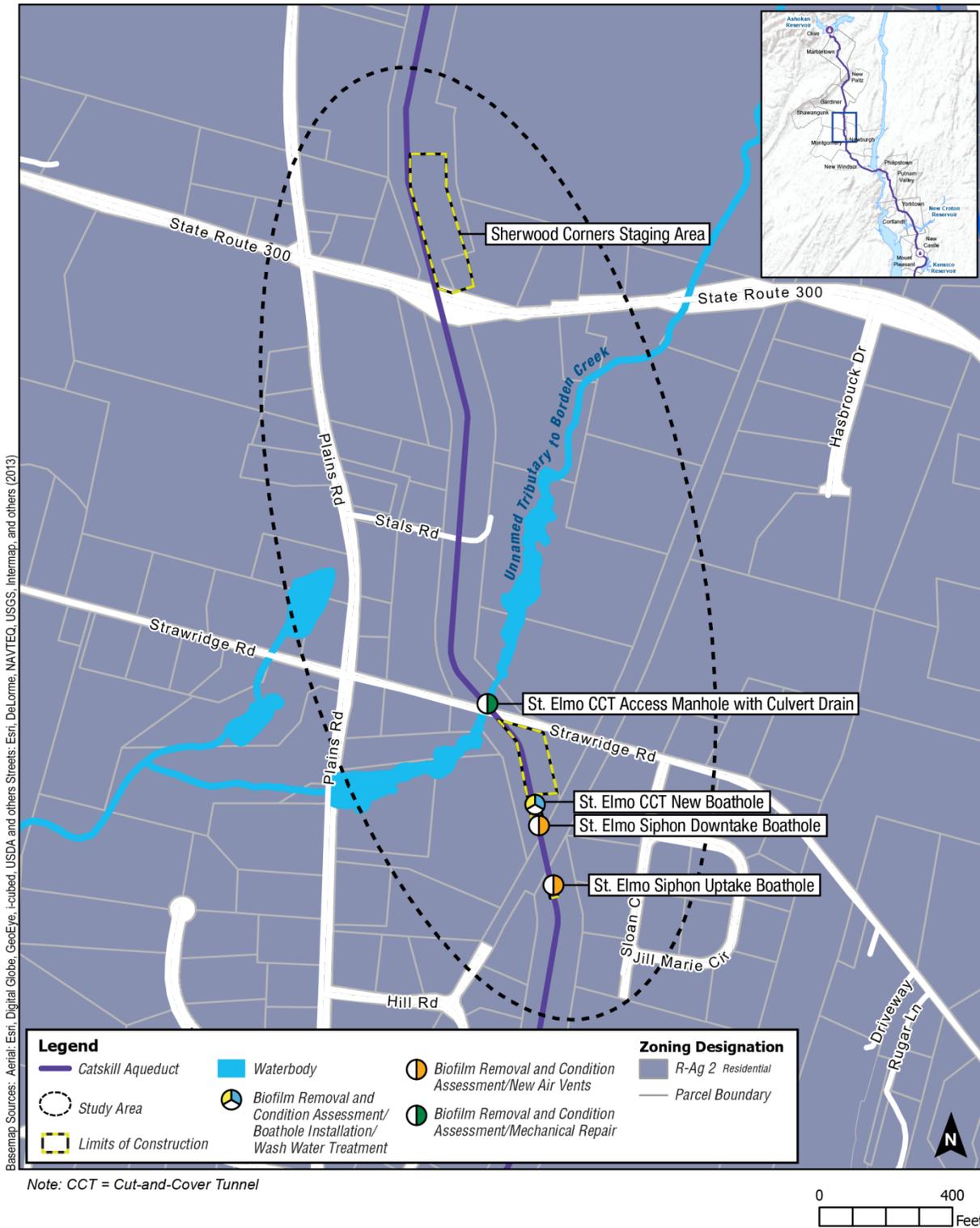


Figure 9.8-5: Zoning – Strawridge Road Study Area



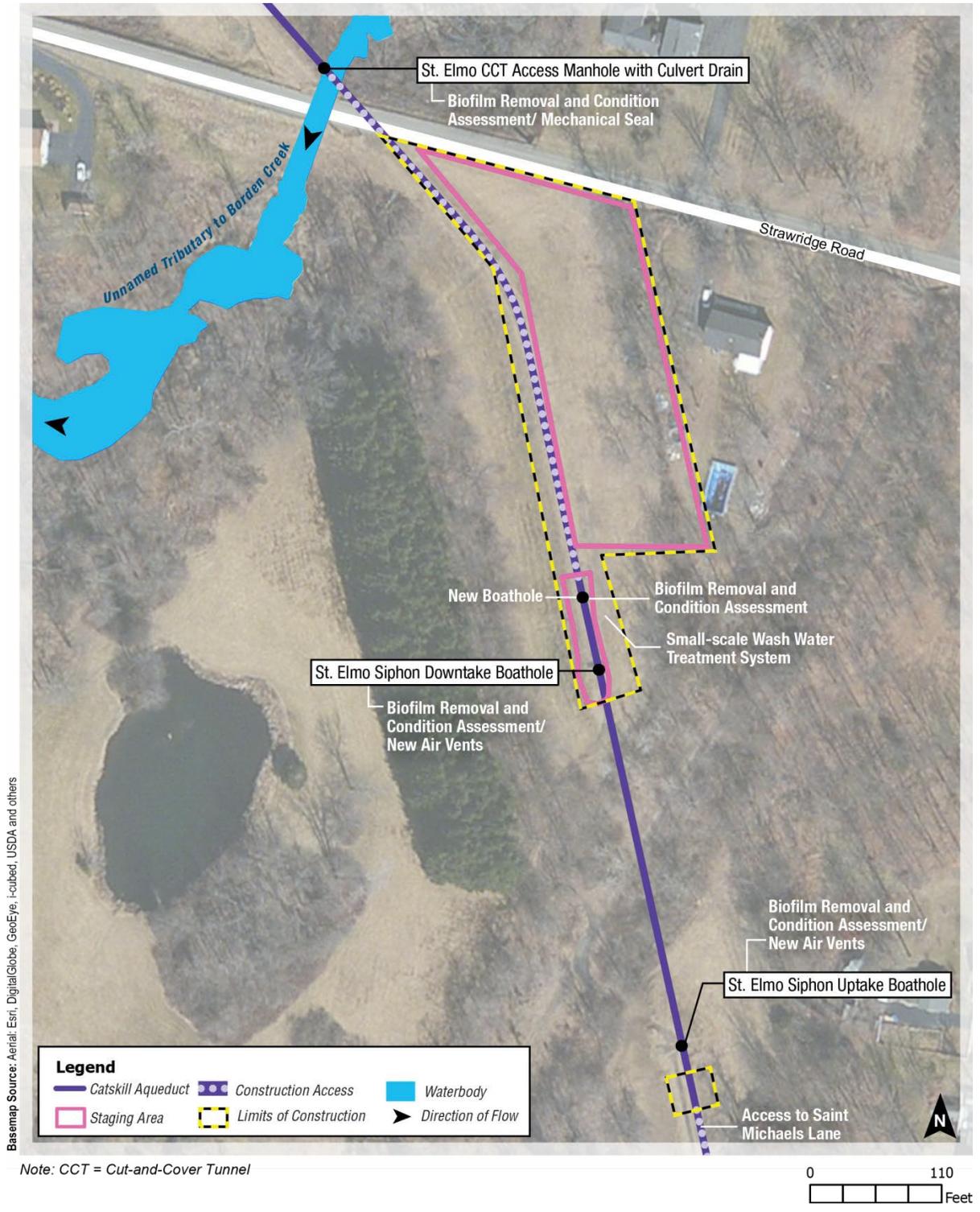


Figure 9.8-6: Site Plan – Strawridge Road Study Area



Work within the study area would begin in summer ~~2019~~2018 with staging and access improvements. Improvements would involve roadside grading to accommodate truck unloading and material transfer. It would also include underbrush clearing, gravel placement for leveling and erosion control, and the removal of approximately seven trees north of State Route 300.

Preparation of the new boathole upstream of the St. Elmo Downtake Boathole would also take place in summer ~~2019~~2018. The work would consist of the excavation of approximately 45 cubic yards of soil and construction of a cast-in-place concrete collar. Boathole installation, which requires unwatering of the aqueduct to tie into the crown of the cut-and-cover tunnel, would take place during the second 10-week shutdown in fall ~~2019~~2018.

Removal of the sluice gate within the culvert drain access manhole would occur during the second 10-week shutdown in fall ~~2019~~2018. The sluice gate would be replaced with a blind flange to seal the opening that it covers. Air vent installation at the St. Elmo Downtake Boathole and the St. Elmo Uptake Boathole would also occur at this time. For each location, two air vent structures would be mounted on a concrete slab, which, together with an access hatch, would replace the existing cover of the boathole. Minor excavation of approximately 18 inches of soil may be required to access the existing covers.

Biofilm removal and condition assessment would occur during the third 10-week shutdown in fall ~~2020~~2019. Access into the aqueduct would be provided by the new boathole, the culvert drain access manhole, the St. Elmo Downtake Boathole, and the St. Elmo Uptake Boathole. These locations would also serve as collection points for biofilm, which would be transported for disposal at a registered, permitted, or otherwise authorized facility. Although the aqueduct would be unwatered during this shutdown, any residual water would be diverted through an internal bypass pipe around the work segments within the aqueduct for discharge to the aqueduct downstream. Any residual water that does not meet water quality standards, and any wash water generated from biofilm removal, would then be transported to a temporary treatment system, where it would be treated to meet water quality standards for discharge back into the aqueduct or to a nearby waterbody (see Section 9.2, “Project Description”). Potential treatment locations include the new boathole, at which a small-scale treatment system could be established. Upon completion of biofilm removal and condition assessment, all equipment and materials would be removed and any areas requiring temporary disturbance would be restored to baseline conditions. Improvements at Sherwood Corners would remain in place following construction so this area can continue to be utilized by DEP for future operations and maintenance activities.

Impact categories analyzed for the Strawridge Road Study Area are presented in Section 9.8.3.3, “Natural Resources,” through Section 9.8.3.7, “Neighborhood Character,” and include: natural resources, including water resources, terrestrial resources, federal/State Threatened and Endangered Species, and State Species of Special Concern; hazardous materials; transportation; stationary noise; and neighborhood character. Additionally, the study area’s compatibility with applicable public policies was analyzed on a town-wide basis in Section 9.8.2, “Town of Shawangunk Impact Analysis.” As described in Section 9.3, “Screening Assessment and Impact Analysis Methodology,” an impact analysis related to land use and zoning; socioeconomic conditions; community facilities and services; open space and recreation; historic and cultural resources; visual resources; the remaining natural resources subcategories, including geology and soils, aquatic and benthic resources, wildlife, and federal/State Candidate Species, and unlisted

rare and vulnerable species; energy; air quality; and mobile noise within the study area are not warranted. Finally, impacts related to project-wide natural resources, water and sewer infrastructure, and public health were analyzed within Section 9.19, “Project-wide Impact Analysis.”

9.8.3.3 Natural Resources

As shown on **Figure 9.8-7**, the study area for the natural resources analysis is the immediate area surrounding the limits of construction, including the St. Elmo Downtake Boathole and the St. Elmo Uptake Boathole. A second section of the study area located at Sherwood Corners corresponds to the limits of construction and includes the area required for staging (see **Figure 9.8-2**). These areas are collectively referred to as the natural resources study area.

The general ecology of the natural resources study area was assessed based on field visits conducted on November 13, 2013, and July 7, 2015. The natural resources study area is a mowed lawn and transitions to a rich mesophytic forest in the low-lying area between the two boatholes adjacent to the Catskill Aqueduct. Northwest of the St. Elmo Downtake Boathole immediately outside the natural resources study area is a perennial stream (unnamed tributary to Borden Creek). Based on a desktop assessment, Sherwood Corners is characterized as mowed lawn with trees. These habitats have the potential to support protected water resources and wildlife species, and an analysis of the potential effects to natural resources that could result from the repair and rehabilitation activities is presented below.

Water Resources

The natural resources study area is within the lower Hudson River drainage basin, more specifically within the Rondout watershed (hydrologic unit code [HUC] 02020007) and the Muddy Kill-Walkill River subwatershed (HUC 020200070405). The unnamed tributary to Borden Creek is mapped immediately northwest of the natural resources study area and flows northeast to southwest (see **Figure 9.8-7**). National Wetlands Inventory wetlands were mapped in the study area; however, no wetlands were documented during a wetland delineation of the natural resources study area, as described in detail below. Additionally, there are no mapped water resources within the natural resources study area near Sherwood Corners.

Potential disturbance to water resources may occur as a result of temporary construction staging and would be subject to federal, State, and municipal regulations. Water resources located in the natural resources study area are jurisdictional under Sections 401 and 404 of the Clean Water Act.

As a Class AA waterbody, the unnamed tributary to Borden Creek is subject to State Protection of Waters regulations with a regulated 50-foot buffer to protect the streambed and banks. Water resources in the study area are not regulated by the Town of Shawangunk because there are no mapped wetlands designated or eligible for designation by the NYSDEC or activities near Shawangunk Kill (Shawangunk Town Code Chapter 177: Zoning). However, the natural resources study area extends within the 50-foot State Protection of Waters buffer, so work activities may require State approval.

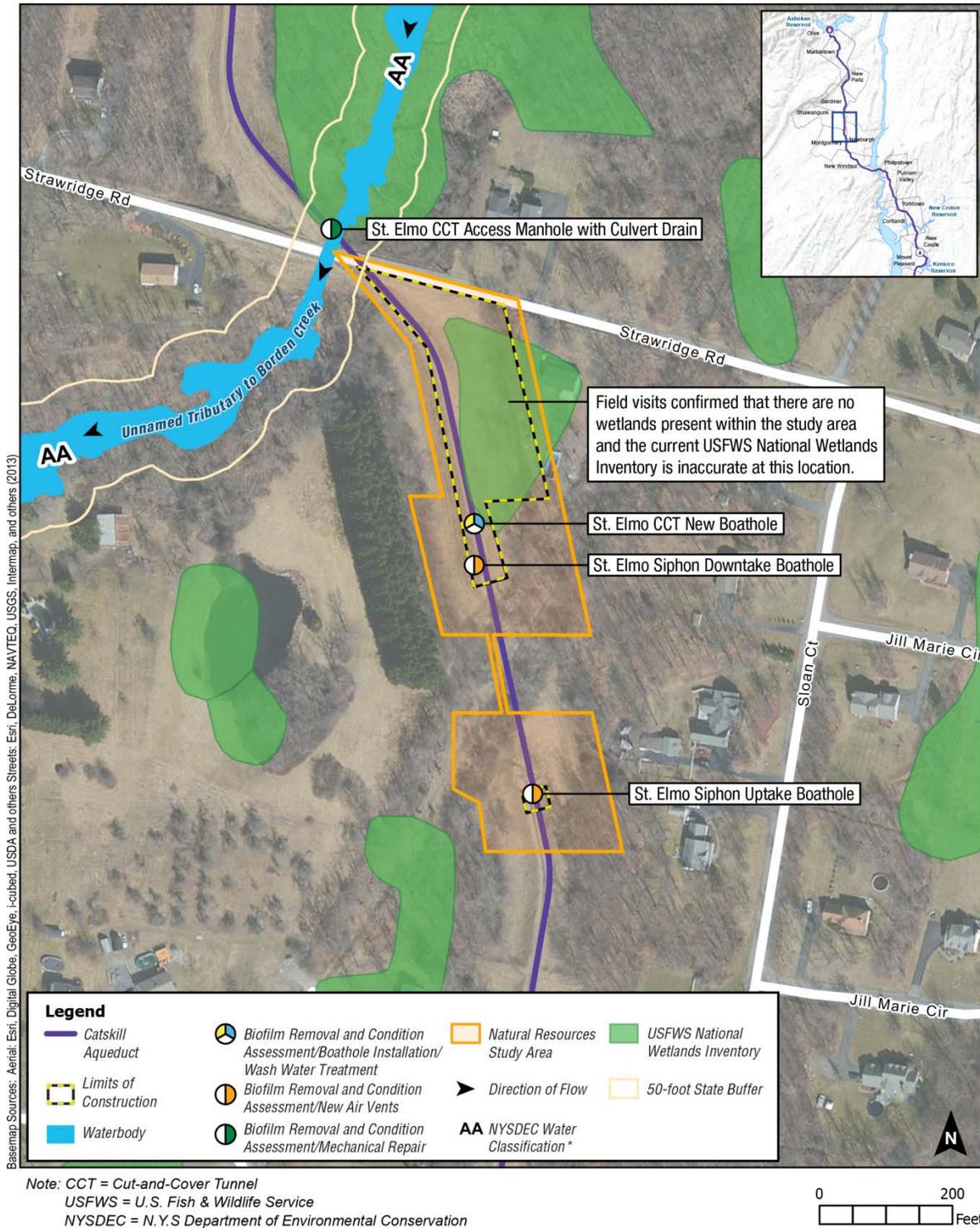


Figure 9.8-7: Natural Resources – Strawridge Road Study Area



Surface Water

Surface water in and near the natural resources study area was assessed on November 13, 2013, and delineated through a desktop assessment of NYSDEC water classification data, historic USGS topographic maps, national hydrography data, and local topography.

Unnamed Tributary to Borden Creek

The unnamed tributary to Borden Creek is mapped west of the northwest corner of the natural resources study area. It flows northeast to southwest under Strawridge Road. The stream does not occur in the natural resources study area, but the 50-foot State Protection of Waters buffer overlaps with the natural resources study area. The watercourse has a low gradient, mud bottom with patches of dense aquatic vegetation.

The unnamed tributary is classified as a “Riverine, Upper Perennial, Unconsolidated Bottom, Permanently Flooded (R3UBH)” system based on the Cowardin System (Cowardin et al. 1979).

Wetlands

During the July 7, 2015, field visit, a wetland delineation in an area to the east of the St. Elmo Cut-and-Cover Downtake Boathole was conducted and no indicators of wetland hydrology, hydrophytic vegetation, or hydric soils were observed (see **Figure 9.8-7**). The site was disturbed and soils appeared to be fill. Therefore, there are no wetlands in the study area.

Future Without the Repair and Rehabilitation

DEP has consulted with the Town of Shawangunk and Ulster County and it is DEP’s understanding that no projects or developments are anticipated to occur within the natural resources study area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that the future conditions of water resources within the Strawridge Road Study Area would be the same as baseline conditions.

Analysis of Potential Effect

This section analyzes the potential for temporary and permanent disturbance to water resources associated with repair and operation and long-term operation of the Catskill Aqueduct of the repair and rehabilitation in the Strawridge Road Study Area.

Construction

Work activities associated with installation of two air vents and a boathole would be localized and confined to the vicinity of the St. Elmo Uptake Boathole and St. Elmo Downtake Boathole on top of the cut-and-cover tunnel and designated staging areas. Clearing of some underbrush would be necessary for the staging area within the limits of construction south of Strawridge Road. However, all activities would occur in upland areas.

Prior to commencing the repair and rehabilitation, temporary sediment and erosion control measures, such as silt fences, would be installed to avoid indirect effects on the unnamed

tributary to Borden Creek. These temporary measures would be designed in accordance with the State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity and other applicable regulatory requirements to ensure that the tributary and its streambanks are protected, and sediment and other pollutants are prevented from entering the waterway. No in-water work is proposed.

Anticipated temporary disturbance to water resources and regulated buffers was quantified based on the limits of construction and proposed work activities (see **Table 9.8-3**). Construction staging and activities would result in approximately 60 square feet of temporary disturbance associated with the 50-foot State Protection of Waters buffer. Following construction, temporarily disturbed areas would be restored to natural conditions and planted with native vegetation. No effects to water resources are anticipated within the Strawridge Road Study Area.

Table 9.8-3: Estimated Disturbance to Water Resources within the Strawridge Road Natural Resources Study Area

Water Resource	Baseline Conditions (Square Feet)	Temporary Effects (Square Feet)	Permanent Effects (Square Feet)
50-foot State Protection of Waters Buffer	750	60 <i>Construction staging area</i>	0

Operation

Following the repair and rehabilitation, operation of the Catskill Aqueduct within the study area would be consistent with baseline conditions. Water resources would persist and be unaffected by maintenance activities. Native vegetation planted in temporarily disturbed areas within the 50-foot State Protection of Waters Buffer would become established and surrounding vegetation would colonize the area, thereby providing a protected stream buffer consistent with baseline conditions.

Water Resources Conclusions

No wetlands were identified within the natural resources study area. However, the construction staging area may encroach on the 50-foot State Protection of Waters buffer of the unnamed tributary to Borden Creek. Temporary sediment and erosion control measures would be implemented to avoid impacts to the unnamed tributary to Borden Creek, and temporarily disturbed areas would be restored to natural conditions following construction.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to water resources within the Strawridge Road Study Area.

Terrestrial Resources

Terrestrial resources within the natural resources study area consist of mowed lawn and transitions to a rich mesophytic forest at the boatholes and mowed lawn with trees at Sherwood Corners. Tree species observed during the surveys include red maple (*Acer rubrum*), white spruce (*Picea glauca*), red oak (*Quercus rubra*), bigtooth aspen (*Populus grandidentata*), black cherry (*Prunus serotina*), eastern red-cedar (*Juniperus virginiana*), pin oak (*Quercus palustris*),

flowering dogwood (*Cornus florida*), staghorn sumac (*Rhus typhina*), mulberry (*Morus* spp.), blue spruce (*Picea pungens*), and sugar maple (*Acer saccharum*). Shrubs include tatarian honeysuckle (*Lonicera tatarica*), nannyberry (*Viburnum lentago*), arrow-wood (*Viburnum recognitum*), raspberry (*Rubus idaeus*), privet (*Ligustrum* spp.), multiflora rose (*Rosa multiflora*), and common winterberry (*Ilex verticillata*). Herbs and vines include Timothy-grass (*Phleum pratense*), tall crabgrass (*Digitaria sanguinalis*), bladder campion (*Silene vulgaris*), butter and eggs (*Linaria vulgaris*), Russian knapweed (*Rhaponticum repens*), dandelion (*Taraxacum* spp.), yarrow (*Achillea millefolium*), milkweed (*Asclepias syriaca*), fox grape (*Vitis labrusca*), and poison ivy (*Toxicodendron radicans*).

During construction, minor tree removal at Sherwood Corners may be needed. The Town of Shawangunk regulates tree removal (Shawangunk Town Code Chapter 177: Zoning). Exemptions include clearing less than 20,000 square feet. While the town may not regulate the removal of trees associated with the repair and rehabilitation, terrestrial resources within the study area warrant an analysis.

DEP has consulted with the Town of Shawangunk and Ulster County and it is DEP's understanding that no new projects or developments that would affect terrestrial resources are anticipated within the Strawridge Road Study Area within the timeframe of the impact analysis. Natural processes, such as changes in habitat due to natural vegetative succession, are anticipated to continue. Therefore, in the future without the repair and rehabilitation, it is assumed that terrestrial resources within the study area would be the similar to baseline conditions.

Work activities associated with the repair and rehabilitation may require minor tree clearing and shrub removal for the purpose of improving site access and staging areas, particularly north of State Route 300, in the natural resources study area referred to as Sherwood Corners. Within the natural resources study area, removal of approximately seven trees may be needed to facilitate staging. The trees proposed for removal are located on DEP property in the vicinity of the cleared work area along the Catskill Aqueduct. Tree removal would not dramatically change the character of the area or affect surrounding trees. Any tree removal needed would be conducted from November 1 through March 31 to avoid impacts to potential roosting trees for Indiana bats (*Myotis sodalis*) and northern long-eared bats (*Myotis septentrionalis*). Due to the limited number of trees that may need to be removed, this activity appears to be exempt from Town of Shawangunk tree removal regulations. However, if applicable, tree removal on DEP property would be conducted in accordance with town requirements.

Following construction, all equipment would be removed from the Strawridge Road Study Area and temporarily disturbed areas would be restored to natural conditions. Improvements at Sherwood Corners would remain in place following construction so this area can continue to be utilized by DEP for operation and maintenance. Operation of the Catskill Aqueduct would be consistent with baseline conditions and natural reforestation and vegetative succession of aqueduct areas not routinely maintained would continue to occur over time.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to terrestrial resources within the Strawridge Road Study Area.

Federal/State Threatened and Endangered Species and State Species of Special Concern

This section includes an analysis of potential impacts to federal/State Threatened, Endangered, and Candidate Species, and State Species of Special Concern identified in Section 9.3.9, “Natural Resources,” as having the potential to be affected by activities within the Strawridge Road Study Area. To identify those species that could be affected within the study area and could occur up to 0.25 mile from the work sites were determined in consultation with USFWS, USACE, NYNHP, and NYSDEC, as well as county and local offices, as applicable.

As discussed in Section 9.3.9, “Natural Resources,” nine species were identified to have the potential to be affected by the repair and rehabilitation within the natural resources study area. Therefore, conditions in the future without the repair and rehabilitation, an analysis of the potential for impacts to these nine species, and a summary of conclusions on the potential effects resulting from the repair and rehabilitation are provided below.

In the future without the repair and rehabilitation, it is assumed that federal/State Threatened and Endangered Species and State Species of Special Concern within the study area would largely be the same as baseline conditions, other than possible changes in habitat due to natural vegetative succession and general anthropogenic influences.

An analysis of the potential for disturbance to federal/State Threatened and Endangered Species and State Species of Special Concern during the repair and rehabilitation within the Strawridge Road Study Area is shown in **Table 9.8-4**. The analysis included an evaluation of the repair and rehabilitation work activities within the study area and field visits, as applicable.

Table 9.8-4: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern and Habitats within the Strawridge Road Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Amphibians and Reptiles					
Bog Turtle	<i>Clemmys</i> [= <i>Glyptemys</i>] <i>muhlenbergii</i>	Threatened	Endangered	No wetlands were identified during the 2015 field visit. All work activities associated with installation of two air vents and a boathole would be confined to the vicinity of the boatholes and staging areas and would occur in upland areas. Furthermore, perimeter silt fencing would limit disturbance to adjacent habitat and prevent individual turtles from entering the work sites during construction. Finally, upon construction completion, temporarily disturbed areas would be restored to natural conditions and the new boathole and air vents that remain would not affect bog turtle habitat. Therefore, there are no effects anticipated and no further analysis for bog turtles is warranted for this study area.	No
Eastern Box Turtle	<i>Terrapene carolina</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visits on November 13, 2013, and July 7, 2015. Potential habitat exists within the mowed lawn and mesophytic forest. While work activities including staging and access improvements; boathole preparation and installation; sluice gate removal; and air vent installation would be largely confined to previously disturbed areas, if any isolated areas of potential habitat exist at the sites, as a highly mobile species, any eastern box turtles that might otherwise use these areas are expected to instead use similar, adjacent habitats during construction. Furthermore, perimeter silt fencing would limit disturbance to adjacent habitat and prevent individual turtles from entering the work sites during construction. Finally, upon construction completion, temporarily disturbed areas would be restored to natural conditions and the new boathole and air vents that remain would not affect breeding, nesting, or foraging habitat. Therefore, there are no effects anticipated and no further analysis for eastern box turtles is warranted for this study area.	No
Jefferson Salamander	<i>Ambystoma jeffersonianum</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visits on November 13, 2013, and July 7, 2015. No wetlands were identified during the 2015 field visit. All work activities associated with installation of two air vents and a boathole would be confined to the vicinity of the boatholes and staging areas and would occur in upland areas. Therefore, there are no effects anticipated and no further analysis for Jefferson salamanders is warranted for this study area.	No
Jefferson Salamander Complex	<i>Ambystoma jeffersonianum</i> x <i>laterale</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visits on November 13, 2013, and July 7, 2015. No wetlands were identified during the 2015 field visit. All work activities associated with installation of two air vents and a boathole would be confined to the vicinity of the boatholes and staging areas and would occur in upland areas. Therefore, there are no effects anticipated and no further analysis for Jefferson salamander complex is warranted for this study area.	No

Table 9.8-4: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern and Habitats within the Strawridge Road Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Marbled Salamander	<i>Ambystoma opacum</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visits on November 13, 2013, and July 7, 2015. No wetlands were identified during the 2015 field visit. All work activities associated with installation of two air vents and a boathole would be confined to the vicinity of the boatholes and staging areas and would occur in upland areas. Therefore, there are no effects anticipated and no further analysis for marbled salamanders is warranted for this study area.	No
Spotted Turtle	<i>Clemmys guttata</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visits on November 13, 2013, and July 7, 2015. No wetlands were identified during the 2015 field visit. All work activities associated with installation of two air vents and a boathole would be confined to the vicinity of the boatholes and staging areas and would occur in upland areas. Furthermore, perimeter silt fencing would limit disturbance to adjacent habitat and prevent individual turtles from entering the work sites during construction. Finally, upon construction completion, temporarily disturbed areas would be restored to natural conditions and the new boathole and air vents that remain would not affect breeding, nesting, or foraging habitat. Therefore, there are no effects anticipated and no further analysis for spotted turtles is warranted for this study area.	No
Birds					
Cooper's Hawk	<i>Accipiter cooperii</i>	MBTA	Special Concern	No individuals were incidentally observed during the field visits on November 13, 2013, and July 7, 2015. Potential nesting habitat exists within the patches of deciduous forests. The mesophytic forest could also provide stop over habitat (resting and foraging) for migrating Cooper's Hawks and during the winter. Because Cooper's Hawks are considered relatively tolerant of human disturbance and fragmentation, potential effects would be minimal. No tree removal is proposed. Finally, upon construction completion, temporarily disturbed areas would be restored to natural conditions and the new boathole and air vents that remain would not affect breeding, nesting, or foraging habitat. Therefore, there are no effects anticipated and no further analysis for Cooper's Hawks is warranted for this study area.	No

Table 9.8-4: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern and Habitats within the Strawridge Road Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Mammals					
Indiana Bat	<i>Myotis sodalis</i>	Endangered	Endangered	Any removal of trees would be conducted from November 1 through March 31 to avoid impacts to potential roosting bats. Therefore, there are no effects anticipated and no further analysis for Indiana bats is warranted for this study area.	No
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	Threatened	<u>Threatened</u> None	Any removal of trees would be conducted from November 1 through March 31 to avoid impacts to potential roosting bats. Therefore, there are no effects anticipated and no further analysis for northern long-eared bats is warranted for this study area.	No
Note: MBTA: Migratory Bird Treaty Act					

Federal/State Threatened and Endangered Species and State Species of Special Concern Conclusions

Based on the impact analysis, no take is anticipated. There would be no effects to bog turtles (*Clemmys [=Glyptemys] muhlenbergii*), eastern box turtles (*Terrapene carolina*), Jefferson salamanders (*Ambystoma jeffersonianum*), Jefferson salamander complex (*Ambystoma jeffersonianum x laterale*), marbled salamanders (*Ambystoma opacum*), spotted turtles (*Clemmys guttata*), Cooper's Hawks (*Accipiter cooperii*), Indiana bats, or northern long-eared bats associated with the repair and rehabilitation.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to federal/State Threatened and Endangered Species or State Species of Special Concern within the Strawridge Road Study Area.

9.8.3.4 Hazardous Materials

To evaluate the potential presence of hazardous materials within the Strawridge Road Study Area, a Phase I Environmental Site Assessment (ESA) was conducted in general conformance with the scope and limitations of American Society for Testing and Materials (ASTM) Practice E 1527-13 and City Environmental Quality Review (CEQR) requirements to identify recognized environmental conditions (RECs). The Phase I ESA included site reconnaissance, research on current and historical use, and review of federal and State regulatory listings for both the site and neighboring properties within the appropriate search distance defined in the ASTM standard. The findings from the Phase I ESA investigation and results from DEP's legacy files for the work sites, including a geotechnical investigation, were collectively reviewed to assess the potential presence of and potential for disturbance to hazardous materials in the study area.

Based on the Phase I ESA investigation within this study area, there was no indication of an existing environmental impact that would constitute a REC as defined by the ASTM standard that would affect activities in the study area.

Geotechnical environmental investigation and sampling were undertaken for contaminants of concern including volatile and semivolatile organics, polychlorinated biphenyls (PCBs), and total petroleum hydrocarbons along the aqueduct within the study area. Chromium was noted in the soil sampling results. Total chromium was reported in the samples collected at the St. Elmo Downtake Chamber and St. Elmo Uptake Chamber. Chromium concentrations, however, were consistent over a widespread sampling area and are more likely associated with background concentrations. Along the Catskill Aqueduct, there are widespread occurrences of chromium, which are attributed to the existing geological formations. In addition, gasoline range organics were not detected in the samples. Total petroleum hydrocarbons were detected, but at low concentrations that are not considered to be indicative of contamination that warrants remedial actions.

Based on the results of the environmental investigations completed within the Strawridge Road Study Area, no other hazardous materials are known to exist. The soil results support the reuse of excavated materials as backfill and do not suggest the need for special management, handling, or health and safety measures at this time.

DEP has consulted with the Town of Shawangunk and Ulster County, and it is DEP's understanding that no developments or structures that would introduce hazardous materials to the environment are anticipated within the Strawridge Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that the presence of hazardous materials within the Strawridge Road Study Area would be the same as baseline conditions.

In the future with the repair and rehabilitation, work activities would require the potential storage and use of a variety of petroleum and other chemical products, such as diesel fuel for back-up power, lubricating oil for construction vehicles, and miscellaneous cleaning and maintenance chemicals during construction. The use and storage of all of these would be in accordance with applicable regulatory requirements and guidelines including those relating to: federal Spill Prevention, Control, and Countermeasures requirements; and State petroleum bulk storage, chemical bulk storage and spill reporting requirements. Furthermore, excavation associated with the work activities for the installation of a new boathole and air vents would occur on previously disturbed soils. Following construction, all equipment would be removed from the Strawridge Road Study Area. Staging areas would be restored, and operation of the repaired and rehabilitated Catskill Aqueduct would be consistent with baseline conditions.

Therefore, the repair and rehabilitation would not result in significant adverse impacts from the presence or disturbance of hazardous materials within the Strawridge Road Study Area.

9.8.3.5 Transportation

The study area for the transportation analysis consists of the major convergent roadways that would potentially be used by the employee and construction vehicles associated with repair and rehabilitation work activities en route to and from the Strawridge Road Study Area.

Access to the repair and rehabilitation limits of construction for the work sites within the Strawridge Road Study Area would occur from three routes. Access would be via State Route 300 north to a staging area, via Strawridge Road south to the St. Elmo Cut-and-Cover Tunnel, and via Plains Road (signed as County Route 21 within Ulster County and County Route 85 within Orange County) and Saint Michaels Lane north to the St. Elmo Cut-and-Cover Tunnel (see **Figure 9.8-2**). State Route 300 is a two-lane urban major collector road. Strawridge Road and Saint Michaels Lane are one-lane local roadways. Plains Road is a two-way, two-lane local roadway.

To the extent available, construction vehicles would travel on truck-permitted roadways directly to and from the Strawridge Road Study Area. There is no public transportation and little to no pedestrian activity in the vicinity of the study area. Under current operations, DEP employees periodically access the site. However, there are no DEP employees who work at or visit the study area on a daily basis. The small number of DEP employee vehicles has little to no effect on traffic conditions within the study area.

DEP has consulted with the Town of Shawangunk and Ulster County and it is DEP's understanding that no changes in land use or an increase in traffic due to outside developments are anticipated within the Strawridge Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that traffic,

public transportation, and pedestrian activities within the study area would be similar to baseline conditions.

Repair and rehabilitation work activities within the Strawridge Road Study Area were evaluated to determine which would have the potential to generate the most vehicle trips and therefore be the basis of this transportation analysis. Of these activities, biofilm removal and condition assessment would generate the most vehicle trips. Biofilm removal and condition assessment would occur in fall ~~2020~~2019 from 7 AM to 7 PM, 7 days a week for approximately 5 weeks during the third 10-week shutdown period.

In the future with the repair and rehabilitation, construction vehicles associated with biofilm removal and condition assessment would travel within the Strawridge Road Study Area. The estimated number of peak-day one-way vehicle trips associated with biofilm removal and condition assessment is 33 vehicles, or approximately 66 peak-day vehicle round trips that would travel to and from the Strawridge Road Study Area. The majority of the peak daily vehicle round trips, approximately 42 vehicle round trips or 42 Passenger Car Equivalents (PCEs), would be workers either traveling to and from the site area or traveling directly to and from the staging area (depending on parking capacity), with potentially eight daily shuttle trips between the study area and the staging area. The remaining 16 peak-day vehicle round trips (21 PCEs) would be trucks or other construction vehicles.

During a peak day, the estimated number of peak-hour vehicle trip ends associated with biofilm removal and condition assessment is approximately 33 peak-hour vehicle trip ends (36 PCEs). Approximately 21 vehicle trip ends (21 PCEs) would be workers either traveling to and from the site area or traveling directly to and from the staging area (depending on parking capacity). There would be approximately 4 daily shuttle trips between the study area and the staging area. Approximately 8 vehicle trip ends (11 PCEs) would be trucks or other construction vehicles. For the purpose of this analysis, the peak-hour project-generated vehicles are anticipated to coincide with typical construction hours for employee vehicles entering the site. Assuming one 12-hour shift, this would be from 6 AM to 7 AM, and would be unlikely to coincide with the peak hour for existing traffic.

The repair and rehabilitation would result in approximately 36 peak-hour PCEs within the Strawridge Road Study Area, which is below the *CEQR Technical Manual* screening threshold of 50 peak-hour PCEs as described in Section 9.3.13, “Transportation.” The work activities within the Strawridge Road Study Area would be short-term (totaling 18 weeks over 1.5 years; see **Table 9.8-1**) and would not generate public parking, transportation demands, or pedestrian activity within the Strawridge Road Study Area. Following completion of the repair and rehabilitation, traffic patterns would return to baseline conditions.

Therefore, although there would be a minor temporary increase in traffic, the repair and rehabilitation would not result in significant adverse impacts to transportation within the Strawridge Road Study Area.

9.8.3.6 Noise

As described in Section 9.3.15, “Noise,” mobile noise associated with the repair and rehabilitation within the Strawridge Road Study Area does not warrant analysis. Additionally,

the secondary staging areas would be used as overflow parking. Therefore, a noise impact analysis related to secondary staging areas is not warranted.

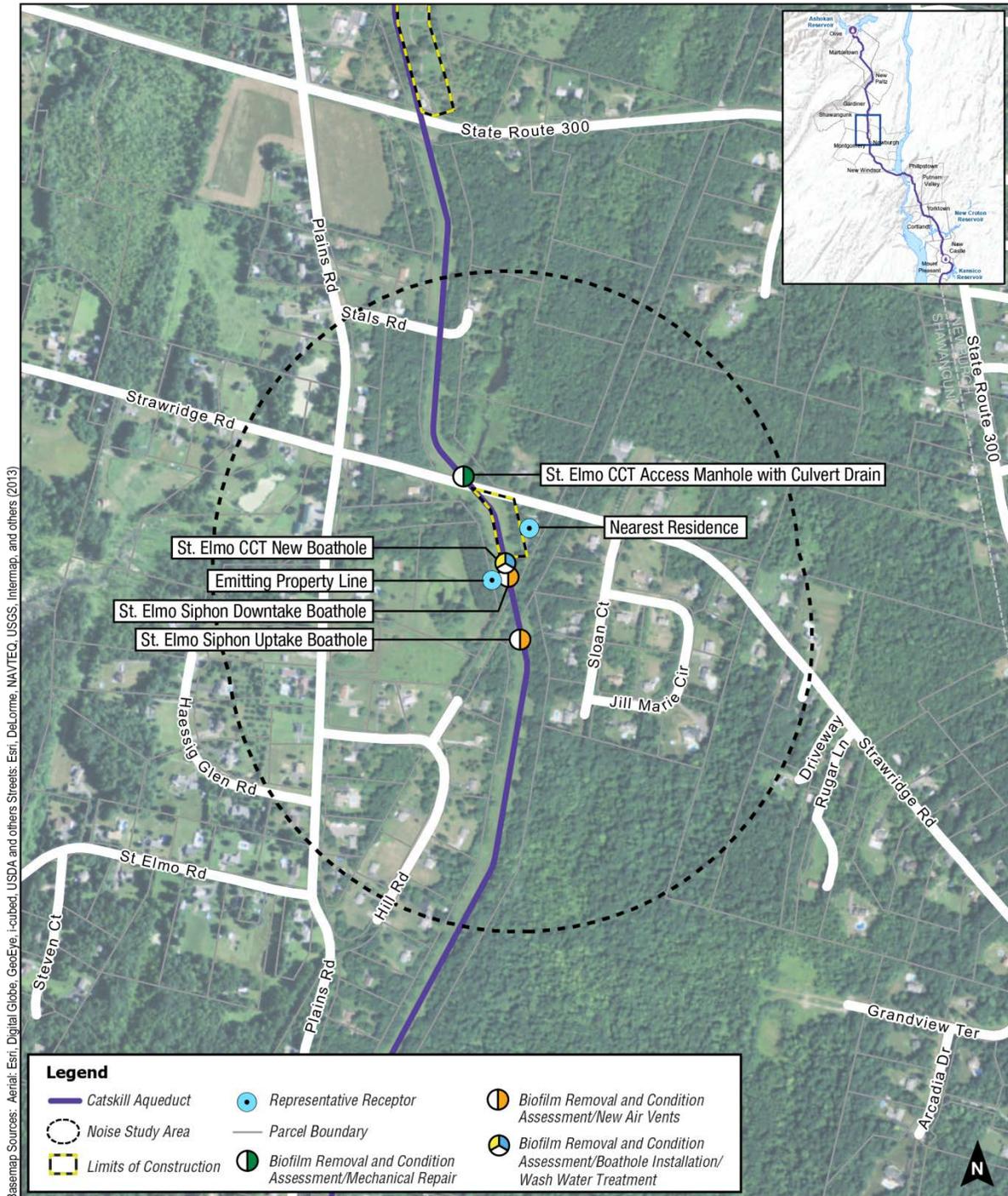
The study area for the stationary noise analysis is the area within 1,500 feet of the repair and rehabilitation work activities, as shown on **Figure 9.8-8**.

The Strawridge Road Noise Study Area includes residential parcels within 1,500 feet of the repair and rehabilitation work sites that are considered noise-sensitive receptors for this analysis. The temporary work activities were evaluated to determine compliance with the local noise code. The repair and rehabilitation is subject to the Town of Shawangunk performance standards in Section 177-44(D)(1), which state noise levels at the emitting property line shall not exceed 60 dBA between 7 AM and 8 PM and 50 dBA between 8 PM and 7 AM. However, temporary construction noise between the hours of 8 AM and 6 PM is exempt.

Existing ambient noise levels within the Strawridge Road Study Area are influenced by vehicular traffic traveling on Strawridge Road and other local roadways. The existing noise levels within the study area are comparable to a quiet suburban residential environment based on the distance from major transportation corridors, the population density of the area, and the presence of other noise-producing elements. Typical noise levels (measured as L_{eq}) for quiet suburban communities are 45 dBA during the daytime and 39 dBA during the nighttime.

DEP has consulted with the Town of Shawangunk and Ulster County and it is DEP's understanding that no major projects that would result in a change in land use, or new noise-generating sources that would contribute to an increase in ambient noise levels, are anticipated within the Strawridge Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that ambient noise levels within the Strawridge Road Study Area would be similar to baseline conditions.

In the future with the repair and rehabilitation, stationary noise-producing work activities within the Strawridge Road Study Area would occur on three sites. The stationary noise-generating equipment that would be used within the Strawridge Road Study Area was evaluated to determine which of these activities would have the potential to emit the most noise and, therefore, be the basis of this stationary noise analysis. Of these activities, the stationary noise-generating equipment associated with the air vent installation and boathole installation would emit the most noise. Air vent installation would produce the most noise at the emitting property line and boathole installation would produce the most noise at the nearest residence. Both air vent installation and boathole installation would occur in fall ~~2019~~2018 between the hours of 7 AM and 7 PM, 7 days a week for approximately 3 weeks and 2 weeks, respectively, during the second 10-week shutdown.



Basemap Sources: Aerial: Esri, Digital Globe, GeoEye, i-cubed, USDA and others Streets: Esri, DeLorme, NAVTEQ, USGS, Intermap, and others (2013)

Note: CCT = Cut-and-Cover Tunnel

Figure 9.8-8: Noise – Strawridge Road Study Area



The noise analysis focused on the three loudest stationary noise-generating equipment types necessary for the air vent installation at the St. Elmo Uptake Boathole and boathole installation, respectively. Associated equipment reference noise levels are shown in **Table 9.8-5**. The types of noise-generating equipment analyzed were conservatively based on peak construction operating conditions.

Table 9.8-5: Stationary Source Construction Equipment Modeled at the Strawridge Road Study Area – Noise Analysis and Reference Noise Levels (L_{eq})

Equipment Type	Reference Noise Level (L_{eq}) at 50 feet (dBA) ¹
Air Vent Installation	
Crane	77
Concrete Mixer Truck	81
Generator	82
Boathole Installation	
Generator	82
Concrete Mixer Truck	81
Crane	77
Note: ¹ City Environmental Quality Review (CEQR) Technical Manual, Chapter 22.	

Table 9.8-6 shows the results of the stationary construction noise analysis. The Town of Shawangunk regulates noise at the emitting property line from the work activities. However, the nearest noise-sensitive receptor is a residence approximately 220 feet away from the work activities. At the nearest residence, peak noise levels (L_{eq}) would be attributable to boathole installation and could reach 72 dBA during daytime hours. Other noise-producing equipment would be used within the study area for a limited period during work activities; however, this equipment would not be expected to be louder than those associated with air vent installation and boathole installation.

Table 9.8-6: Stationary Noise Analysis Results (L_{eq}) at the Nearest Noise-Sensitive Receptors within the Strawridge Road Study Area

Nearest Noise-Sensitive Receptor	Distance from Site (Feet)	Predicted Stationary Noise Level (L_{eq}) at Noise-Sensitive Receptor (dBA)	Town of Shawangunk Noise Limit (dBA)	Potential for Code Exceedance (Yes or No)
Air Vent Installation				
Emitting Property Line	72	82	60 ¹	Yes
Boathole Installation				
Nearest Residence	220	72	NA	NA
Notes: NA = Not Applicable ¹ Daytime noise limit is applicable between the hours of 7 AM and 8 PM.				

Although there would be an increase in stationary noise levels, work would primarily occur in the fall and winter months when residents typically have windows closed and noise levels inside would be further reduced to an interior noise level (L_{eq}) of 48 dBA at the nearest residence. Because the repair and rehabilitation within the Strawridge Road Study Area would emit noise levels greater than allowed by the Town of Shawangunk noise codes, DEP would work with the Town of Shawangunk, as appropriate.

Following completion of the repair and rehabilitation work activities, the construction equipment and vehicles would be removed from the Strawridge Road Study Area. The repair and rehabilitation would be temporary in nature with peak daytime work activities occurring during air vent installation and boathole installation in fall ~~2019~~2018 for a limited period (e.g., 3 weeks).

Therefore, although there would be a temporary increase in noise, noise from the repair and rehabilitation would not result in significant adverse impacts to sensitive receptors within the Strawridge Road Study Area.

9.8.3.7 Neighborhood Character

The character of the Strawridge Road Study Area is largely defined by a mix of residential, agricultural, vacant, and public services land uses and its physical setting within a rural location (see **Figure 9.8-4**). The Catskill Aqueduct traverses the study area in a general north to south direction. Strawridge Road and State Route 300 intersect the study area from east to west, and an unnamed tributary to the Borden Creek passes through its central portion. The limits of construction for the work sites and associated access routes are largely located in a public services corridor with grassy cover, owned and maintained by DEP.

DEP has consulted with the Town of Shawangunk and Ulster County and it is DEP's understanding that no changes in land use and no new projects or structures are anticipated within the Strawridge Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that neighborhood character within the study area would be similar to baseline conditions.

As described in Section 9.3.16, "Neighborhood Character," there would be no potential for the repair and rehabilitation to affect shadows and urban design. In addition, based on the screening assessment for land use, zoning, and public policy; socioeconomic conditions; open space and recreation; historic and cultural resources; and visual resources, an impact analysis for the Strawridge Road Study Area was not warranted, as discussed in the following sections: Section 9.3.3, "Land Use, Zoning, and Public Policy," Section 9.3.4, "Socioeconomic Conditions," Section 9.3.6, "Open Space and Recreation," Section 9.3.7, "Historic and Cultural Resources," and Section 9.3.8, "Visual Resources," respectively.

As described in 9.8.3.5, "Transportation," and Section 9.8.3.6, "Noise," the work and staging area activities in the Strawridge Road Study Area would be short-term (intermittently over 1.5 years) and would result in a temporary increase in traffic and noise. Following completion of the repair and rehabilitation, the construction equipment and vehicles would be removed from the study area and traffic patterns would return to baseline conditions. These temporary increases

in traffic and noise levels would not result in a density of activity or service conditions that would affect the overall character of the study area.

The repair and rehabilitation would not generate significant adverse effects in land use, zoning, and public policy; socioeconomic conditions; open space and recreation; shadows; historic and cultural resources; urban design and visual resources; transportation; or noise.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to neighborhood character within the Strawridge Road Study Area.

9.9 TOWN OF MONTGOMERY

9.9.1 TOWN OF MONTGOMERY PROJECT DESCRIPTION

The Town of Montgomery is located in Orange County, New York, on the western side of the Hudson River. It is bounded by the Town of Shawangunk to the north in Ulster County, New York; and the Towns of Newburgh to the east, New Windsor to the southeast, Hamptonburgh to the south, Wallkill to the southwest, and Crawford to the west in Orange County. The Town of Montgomery encompasses approximately 51 square miles.

The Catskill Aqueduct stretches for approximately 4.8 miles in a southerly direction through the Town of Montgomery, and the Winchell Drive Study Area, where activities associated with the repair and rehabilitation would occur, are shown on **Figure 9.9-1**. The repair and rehabilitation work activities within the Town of Montgomery are shown in **Table 9.9-1**.

Table 9.9-1: Schedule of Work Activities within the Town of Montgomery

Work Activity	Winchell Drive Study Area
Boathole Preparation	✓
Boathole Installation	✓
Biofilm Removal and Condition Assessment/ Small-scale Wash Water Treatment	✓
Note: ✓ = Work activity proposed.	

The Winchell Drive Study Area in the Town of Montgomery encompasses the majority of work that would occur as part of the repair and rehabilitation in this municipality. Additional work activities in the town do not warrant further assessment. Work sites located outside the study area include activities that would primarily be conducted within the aqueduct interior (see Section 9.3, “Screening Assessment and Impact Analysis Methodology”). In the Town of Montgomery, they include biofilm removal and condition assessment at access manholes not located in these study areas and permanently sealing two culvert drain sluice gates. See Section 9.2, “Project Description,” for an overall project description of the repair and rehabilitation. Section 9.9.3, “Winchell Drive Study Area Impact Analysis,” provides a description of the study area, proposed activities, and impact analysis for the Winchell Drive Study Area.

9.9.2 TOWN OF MONTGOMERY IMPACT ANALYSIS

9.9.2.1 Public Policy

Because local public policies would not vary for study areas in the same town, public policies were evaluated on a town-wide basis. While the Town of Montgomery is located in Orange County, and therefore subject to the Orange County Supplemental Open Space Plan (Orange County 2003), no policies contained within that Plan are applicable to the Winchell Drive Study Area.

As discussed in Section 9.3.3.4, “Town Codes,” the repair and rehabilitation’s consistency with the applicable policies and regulations in the Town of Montgomery was reviewed.

Therefore, the repair and rehabilitation work activities within the Winchell Drive Study Area in the Town of Montgomery would not result in potential significant adverse impacts to public policy.

9.9.3 WINCHELL DRIVE STUDY AREA IMPACT ANALYSIS

Within the Winchell Drive Study Area, the aqueduct consists of the Orange Cut-and-Cover Tunnel. An access manhole is located along this segment in the upper portion of the study area (see **Figure 9.9-2**). Work activities within the Winchell Drive Study Area would include boathole preparation and installation; biofilm removal and condition assessment; and small-scale wash water treatment system.

9.9.3.1 Study Area Location and Description

The Winchell Drive Study Area is located along the upper Catskill Aqueduct in the Towns of Montgomery and Newburgh. The Catskill Aqueduct traverses the study area in a general north to south direction. International Boulevard (State Route 747), a two-lane arterial, roughly parallels the path of the aqueduct in the western portion of the study area. South Drury Lane, which enters the study area from the north, is located along the border between the Towns of Montgomery and Newburgh. The proposed work site within the study area is surrounding the access manhole. Access would be provided from South Drury Lane or by driving over the cut-and-cover tunnel from Winchell Drive to the south. The study area boundary is located approximately 400 feet beyond the outermost areas of disturbance related to the work site. **Figure 9.9-2** shows an aerial photograph of the study area, including the path of the aqueduct, the limits of construction for each work site, and the proposed access route.

The study area consists of residential, commercial, vacant, and public services land uses. It is predominantly wooded, with vegetation ranging from grasses to scattered shrubs. The limits of construction for the work sites and associated access route are located in a public services corridor with grassy cover, which is owned and maintained by DEP. **Figure 9.9-3** shows a map of the land uses within the study area and its surroundings.

Zoning in the study area is a combination of residential (R1), interchange business (IB), designed commercial (B-1), and industrial park major access (I-2) zoning districts (see **Figure 9.9-4**). The eastern portion of the study area is primarily located in a residential (R-1) zoning district, as designated by the Town of Newburgh’s Zoning Code. The aqueduct and the limits of construction for the work sites are located within an interchange business (IB) zoning district, as designated by the Town of Montgomery Zoning Code. The Catskill Aqueduct is a permitted use as a public utility structure within the interchange business (IB) zoning district.

There are no federal, State, or local designated landmarks, historic districts, or known archeological resources within the study area.

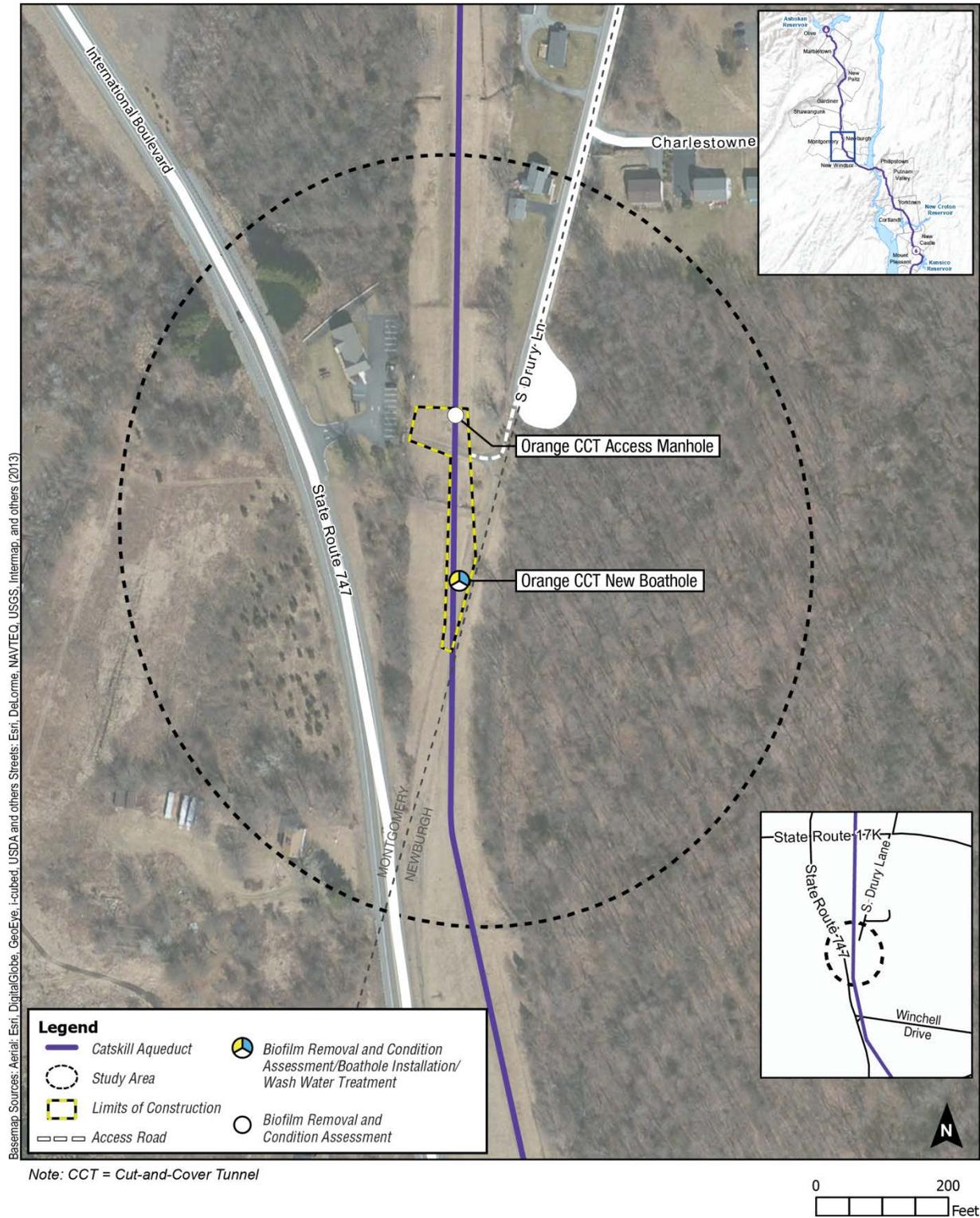


Figure 9.9-2: Study Area – Winchell Drive



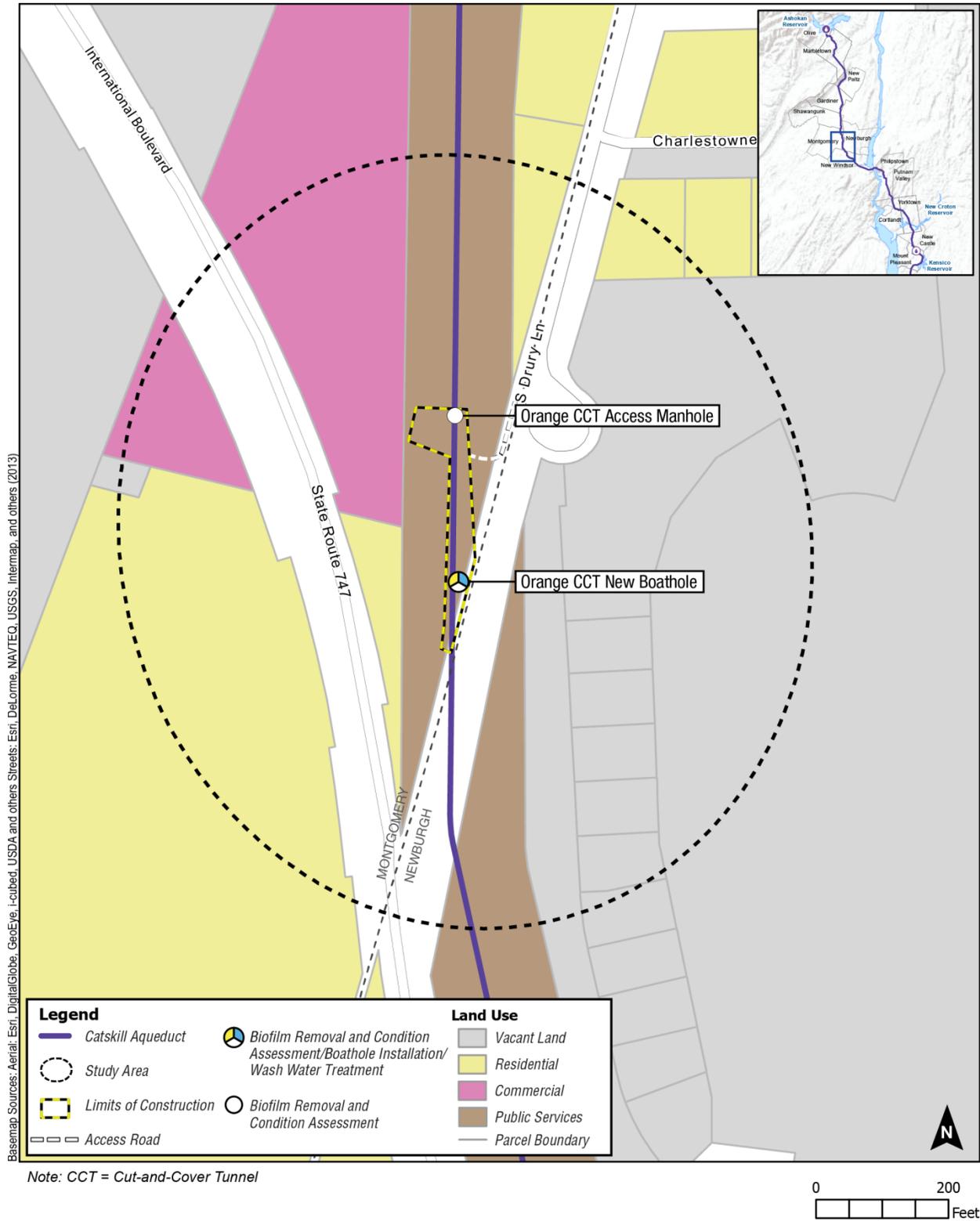


Figure 9.9-3: Land Use – Winchell Drive Study Area



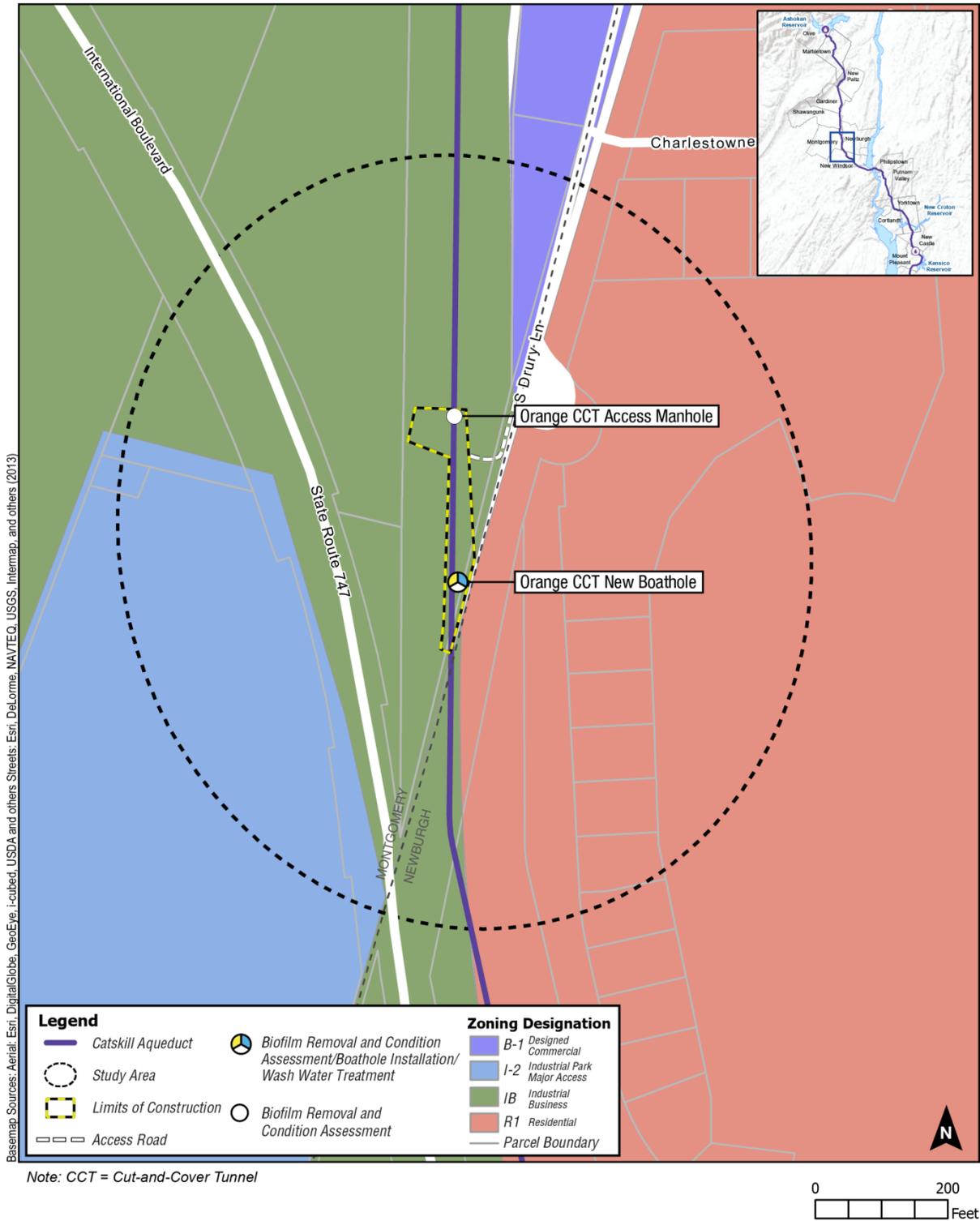


Figure 9.9-4: Zoning – Winchell Drive Study Area



9.9.3.2 Proposed Activities within the Winchell Drive Study Area

To support activities within the Winchell Drive Study Area, the Shaft 4 Interconnection (within the Armato Lane Study Area in the Town of Gardiner) would serve as a primary staging area from which workers would be transported to the site daily. Several secondary staging areas would provide additional parking, and equipment and materials would be staged on site. No staging or access improvements would be necessary other than underbrush clearing and gravel placement for leveling and erosion control. Erosion and sediment control measures such as silt fencing and hay bales would be installed at the perimeter of the work site as needed. A site plan showing a layout of the limits of construction for the work sites, which would occupy a total of approximately 15,600 square feet, is shown on **Figure 9.9-5**. The schedule for work within the study area is shown in **Table 9.9-2**. The total duration of active construction within the Winchell Drive Study Area is estimated to total 9 weeks over 1.5 years.

Table 9.9-2: Schedule of Work Activities within the Winchell Drive Study Area

Work Activity	Dates	Duration	Work Hours	Crew Size ¹
Boathole Preparation	Summer 2019 2018	3 weeks	Monday to Friday, 7 AM to 5 PM	10
Boathole Installation	Fall 2019 2018 (Second 10-week shutdown)	2 weeks	7 days a week, 7 AM to 7 PM	8
Biofilm Removal and Condition Assessment/ Small-scale Wash Water Treatment	Fall 2020 2019 (Third 10-week shutdown)	4 weeks	7 days a week, 7 AM to 7 PM	21
Note: ¹ Crew size refers to the number of people anticipated at the work site(s).				

Work in the study area would begin with new boathole preparation in summer ~~2019~~2018. The work would consist of the excavation of approximately 45 cubic yards of soil and construction of a cast-in-place concrete collar. Boathole installation, which requires unwatering of the aqueduct to tie into the crown of the cut-and-cover tunnel, would take place during the second 10-week shutdown in fall ~~2019~~2018.

Biofilm removal and condition assessment would occur during the third 10-week shutdown in fall ~~2020~~2019, with access into the aqueduct provided by the new boathole and the existing access manhole. These locations would also serve as collection points for biofilm, which would be transported for disposal at a registered, permitted, or otherwise authorized facility. Although the aqueduct would be unwatered during this shutdown, any residual water would be diverted through an internal bypass pipe around the work segments within the aqueduct for discharge to the aqueduct downstream. Any residual water that does not meet water quality standards, and any wash water generated from biofilm removal, would then be transported to a temporary treatment facility, where it would be treated to meet water quality standards for discharge back into the aqueduct or to a nearby waterbody (see Section 9.2, “Project Description”). Potential treatment locations include the new boathole, at which a small-scale wash water treatment system could be established. Upon completion of biofilm removal and condition assessment, all equipment and

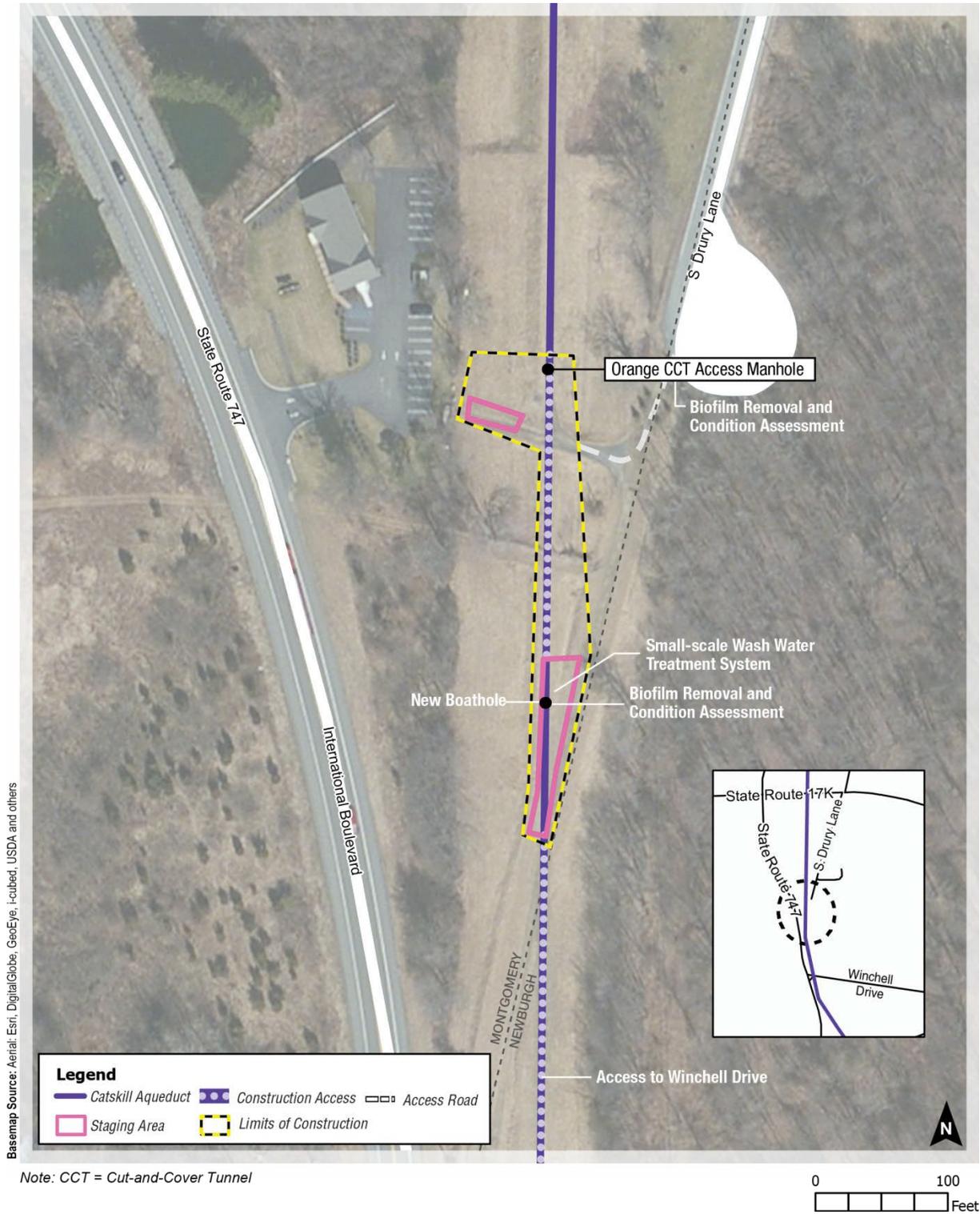


Figure 9.9-5: Site Plan – Winchell Drive Study Area



materials would be removed, and any areas requiring temporary disturbance would be restored to baseline conditions.

Impact categories analyzed for the Winchell Drive Study Area are presented in Section 9.9.3.3, “Natural Resources,” through Section 9.9.3.7, “Neighborhood Character” and include natural resources including federal/State Threatened and Endangered Species and State Species of Special Concern; hazardous materials; transportation; stationary noise; and neighborhood character. Additionally, the study area’s compatibility with applicable public policies was analyzed on a town-wide basis in Section 9.9.2, “Town of Montgomery Impact Analysis.” As described in Section 9.3, “Screening Assessment and Impact Analysis Methodology,” impact analyses related to land use and zoning; socioeconomic conditions; community facilities and services; open space and recreation; historic and cultural resources; visual resources; the remaining natural resources subcategories, including geology and soils, water resources, aquatic and benthic resources, terrestrial resources, wildlife, federal/State Candidate Species, and unlisted rare and vulnerable species; energy; air quality; and mobile noise within the study area are not warranted. Finally, impacts related to project-wide natural resources, water and sewer infrastructure, and public health were analyzed within Section 9.19, “Project-wide Impact Analysis.”

9.9.3.3 Natural Resources

The study area for the natural resources analysis is the area surrounding the limits of construction; including the Orange Cut-and-Cover Access Manhole and the proposed boathole (see **Figure 9.9-6**). A desktop assessment of natural resources was prepared. Resources potentially occurring within the study area were identified through a desktop evaluation of NYSDEC water classification data, NYSDEC freshwater wetlands maps, USFWS National Wetlands Inventory wetland maps, national hydrography data, published soil survey maps, and USGS topographic maps.

Based on the desktop assessment, the habitat in the study area appears to be mowed lawn on the aqueduct berm, and is surrounded by an ecological community consisting of deciduous trees potentially similar to a rich mesophytic forest.

Therefore, analysis of the potential effects to natural resources that could result from the repair and rehabilitation activities is presented below.

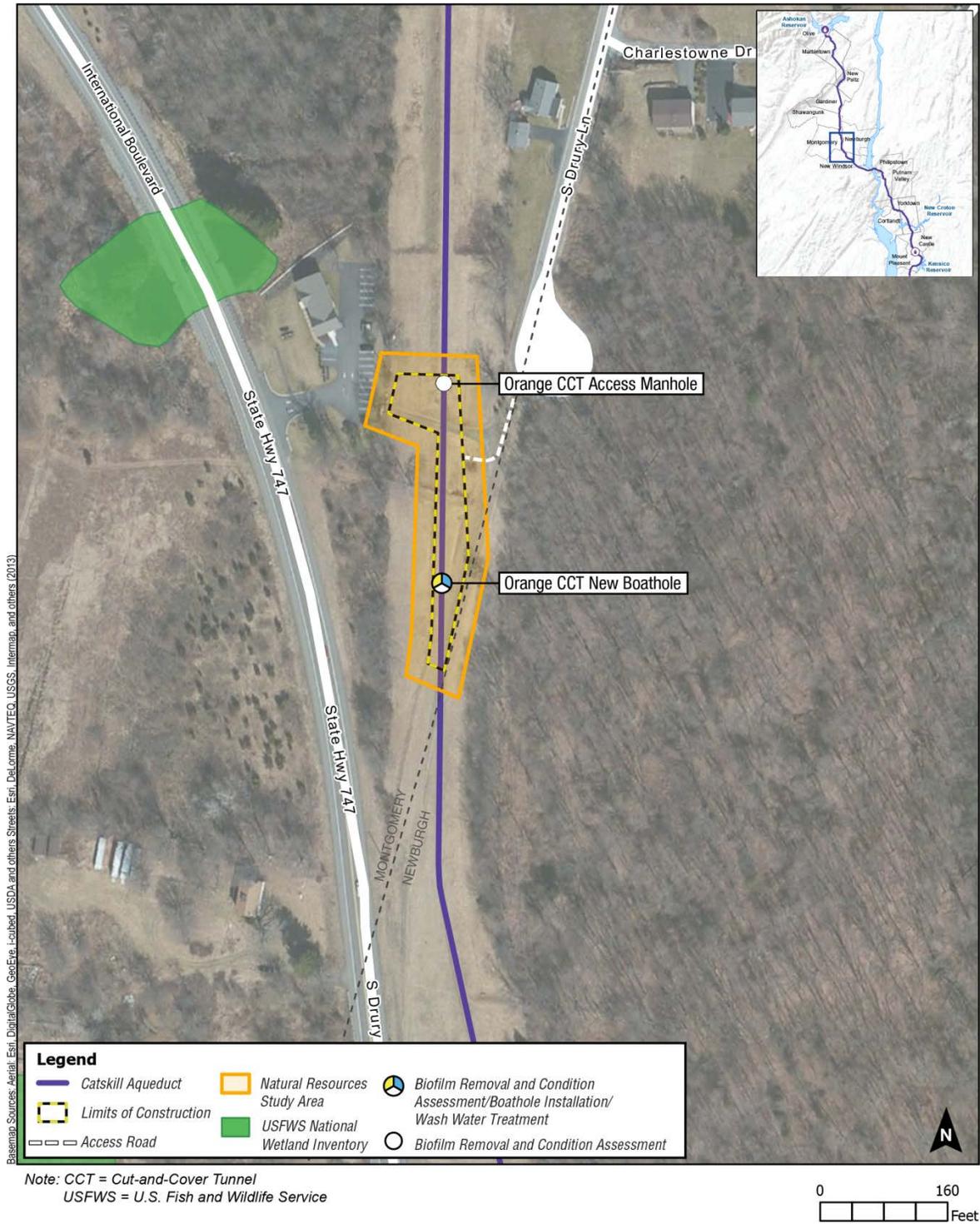


Figure 9.9-6: Natural Resources – Winchell Drive Study Area



Federal/State Threatened and Endangered Species and State Species of Special Concern

This section includes an analysis of potential impacts to federal/State Threatened and Endangered Species and State Species of Special Concern identified in Section 9.3.9, “Natural Resources,” as having the potential to be affected by activities within the Winchell Drive Study Area. Species that could be affected within the study area and could occur up to 0.25 mile from the work sites were determined in consultation with USFWS, USACE, NYNHP, and NYSDEC, as well as county and local offices, as applicable.

As discussed in Section 9.3.9, “Natural Resources,” two species were identified to have the potential to be affected by the repair and rehabilitation within the natural resources study area. Therefore, conditions in the future without the repair and rehabilitation, an analysis of the potential for impacts to these two species, and a summary of conclusions on the potential effects resulting from the repair and rehabilitation are provided below.

In the future without the repair and rehabilitation, it is assumed that federal/State Threatened and Endangered Species and State Species of Special Concern within the study area would largely be the same as baseline conditions, other than possible changes in habitat due to natural vegetative succession and general anthropogenic influences.

An analysis of the potential for disturbance to federal/State Threatened and Endangered Species and State Species of Special Concern during the repair and rehabilitation within the Winchell Drive Study Area is shown in **Table 9.9-3**. The analysis included an evaluation of the repair and rehabilitation work activities within the study area and field visits, as applicable.

***Federal/State Threatened and Endangered Species and State Species of Special Concern
Conclusions***

Based on the impact analysis, no take is anticipated. There would be no effects to eastern box turtles (*Terrapene carolina*) or small whorled pogonias (*Isotria medeoloides*) associated with the repair and rehabilitation.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to federal/State Threatened and Endangered Species or State Species of Special Concern within the Winchell Drive Study Area.

Table 9.9-3: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern and Habitats within the Winchell Drive Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Amphibians and Reptiles					
Eastern Box Turtle	<i>Terrapene carolina</i>	Unlisted	Special Concern	Based on the desktop assessment, the habitat in the study area appears to be mowed lawn surrounded by deciduous trees similar to a rich mesophytic forest. Potential habitat may exist with these habitats. The repair and rehabilitation would include a permanent new boathole, but this is a minor change to the existing cut-and-cover tunnel. Vegetated areas temporarily cleared during construction would be restored to natural conditions. Therefore, there are no effects anticipated and no further analysis for eastern box turtles is warranted for this study area.	No
Plants					
Small Whorled Pogonia	<i>Isotria medeoloides</i>	Threatened	Threatened	All work activities would be localized and confined to the vicinity of the Orange Cut-and-Cover Tunnel and would not be expected to result in direct effects to potential habitat. Should any work be required outside the limits of the berm, the potential for habitat would be assessed prior to disturbance. Therefore, there are no effects anticipated and no further analysis for small whorled pogonias is warranted for this study area.	No

9.9.3.4 Hazardous Materials

To evaluate the potential presence of hazardous materials within the Winchell Drive Study Area, a Phase I Environmental Site Assessment (ESA) was conducted in general conformance with the scope and limitations of American Society for Testing and Materials (ASTM) Practice E 1527-13 and City Environmental Quality Review (CEQR) requirements to identify recognized environmental conditions (RECs). The Phase I ESA included site reconnaissance, research on current and historical use, and review of federal and State regulatory listings for both the site and neighboring properties within the appropriate search distance defined in the ASTM standard.

Based on the Phase I ESA investigations at sites within this study area, there was no indication of an environmental impact that would constitute a REC as defined by the ASTM standard that would affect activities in the study area. Additionally, there is no history of contamination at or in the vicinity of the Winchell Drive Study Area where repair and rehabilitation work activities would be located. Furthermore, the proposed excavation area for the new boathole installation would occur on a previously disturbed area along the Orange Cut-and-Cover Tunnel segment. Given the findings of previous subsurface investigations along similar portions of the aqueduct corridor, no subsurface ground contamination is anticipated.

DEP has consulted with the Towns of Montgomery and Newburgh and Orange County, and it is DEP's understanding that no developments or structures that would introduce hazardous materials to the environment are anticipated within the Winchell Drive Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that the presence of hazardous materials within the Winchell Drive Study Area would be the same as baseline conditions.

In the future with the repair and rehabilitation, work activities would require the potential storage and use of a variety of petroleum and other chemical products, such as diesel fuel for back-up power, lubricating oil for construction vehicles, and miscellaneous cleaning and maintenance chemicals during construction. The use and storage of all of these would be in accordance with applicable regulatory requirements and guidelines including those relating to: federal Spill Prevention, Control, and Countermeasures requirements; and State petroleum bulk storage, chemical bulk storage and spill reporting requirements. Furthermore, excavation associated with the installation of a new boathole would occur on previously disturbed soils. Following repair and rehabilitation, all equipment would be removed from the Winchell Drive Study Area. The staging areas would be restored, and operation of the Catskill Aqueduct would be consistent with baseline conditions.

Therefore, the repair and rehabilitation would not result in significant adverse impacts from the presence or disturbance of hazardous materials within the Winchell Drive Study Area.

9.9.3.5 Transportation

The study area for the transportation analysis consists of the major convergent roadways that would potentially be used by the employee and construction vehicles associated with repair and rehabilitation work activities en route to and from the Winchell Drive Study Area.

Access to the repair and rehabilitation limits of construction for the work sites within the Winchell Drive Study Area would be via International Boulevard (State Route 747) and Winchell Drive directly to the cut-and-cover tunnel (see **Figure 9.9-2**). State Route 747 is a two-lane, two-way major collector roadway. Winchell Drive is a one lane, two-way local roadway.

To the extent available, construction vehicles would travel on truck-permitted roadways directly to and from the Winchell Drive Study Area. There is no public transportation and little to no pedestrian activity in the vicinity of the study area. Under current operations, DEP employees periodically access the site; however, there are no DEP employees who work at or visit the study area on a daily basis. The small number of DEP employee vehicles has little to no effect on traffic conditions within the study area.

DEP has consulted with the Towns of Montgomery and Newburgh and Orange County and it is DEP's understanding that no changes in land use or an increase in traffic due to outside developments are anticipated within the Winchell Drive Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that traffic, public transportation, and pedestrian activities within the study area would be similar to baseline conditions.

Repair and rehabilitation work activities within the Winchell Drive Study Area were evaluated to determine which would have the potential to generate the most vehicle trips and therefore be the basis of this transportation analysis. Of these activities, biofilm removal and condition assessment would generate the most vehicle trips. Biofilm removal and condition assessment would occur in fall ~~2020~~2019 between the hours of 7 AM and 7 PM, 7 days a week for approximately 4 weeks during the third 10-week shutdown.

In the future with the repair and rehabilitation, construction vehicles would travel along Winchell Drive directly to the cut-and-cover tunnel. The estimated number of peak-day one-way vehicle trips associated with biofilm removal and condition assessment is 33 vehicles, or approximately 66 peak-day vehicle round trips that would travel to and from the study area. The majority of the peak daily vehicle round trips, approximately 42 vehicle round trips or 42 Passenger Car Equivalents (PCEs), would be workers traveling directly to and from the staging area, with an additional 8 daily shuttle trips between the study area and the staging area. The remaining approximately 16 peak-day vehicle round trips (21 PCEs) would be trucks or other construction vehicles.

During a peak day, the estimated number of peak-hour vehicle trip ends associated with the biofilm removal and condition assessment is approximately 33 peak-hour vehicle trip ends (36 PCEs). Approximately 21 vehicle trip ends (21 PCEs) would be workers traveling directly to and from the staging area. There would be approximately 4 peak-hour shuttle trips between the study area and the staging area. Approximately 8 vehicle trip ends (11 PCEs) would be trucks or other construction vehicles. For the purpose of this analysis, the peak-hour project-generated vehicles are anticipated to coincide with typical construction hours for employee vehicles entering the site. Assuming one 12-hour shift, this would be from 6 AM to 7 AM, and would be unlikely to coincide with the peak hour for existing traffic.

The repair and rehabilitation would result in approximately 36 peak-hour PCEs along Winchell Drive, which is below the *CEQR Technical Manual* screening threshold of 50 peak-hour PCEs as described in Section 9.3.13, “Transportation.” The work activities at the Winchell Drive Study Area would be short-term (up to 9 weeks over 1.5 years; see **Table 9.9-2**) and would not generate public parking or transportation demands or pedestrian activity within the Winchell Drive Study Area. Following completion of the repair and rehabilitation, traffic patterns would return to baseline conditions.

Therefore, although there would be a minor temporary increase in traffic, the repair and rehabilitation would not result in significant adverse impacts to transportation within the Winchell Drive Study Area.

9.9.3.6 Noise

As described in the Section 9.3.15, “Noise,” mobile noise associated with the repair and rehabilitation within the Winchell Drive Study Area does not warrant analysis. This section includes an analysis of potential impacts from stationary noise associated with the repair and rehabilitation to sensitive receptors within the study area.

The study area for the noise analysis is the area within 1,500 feet of the repair and rehabilitation activities, as shown on **Figure 9.9-7**, which encompasses areas within the Towns of Montgomery and Newburgh.

The Winchell Drive Noise Study Area includes residential parcels within 1,500 feet of the repair and rehabilitation work sites that are considered noise-sensitive receptors for this analysis. The temporary work activities were evaluated to determine compliance with the local noise codes. The repair and rehabilitation is subject to the Town of Montgomery and Newburgh Zoning Codes. The Town of Montgomery Zoning Code (§235-9.1) prohibits the emission of noise beyond the limits of a lot so as to be dangerous or prejudicial to the public health, safety, or general welfare. However, the Town of Montgomery does not have quantitative noise limits applicable to the Winchell Drive Study Area. Construction work is also subject to the performance standards in Section §125-5 of the Town of Newburgh code, which states the maximum sound pressure levels at the emitting property line shall not exceed 65 dBA between 8 AM and 10 PM and 56 dBA between 10 PM and 8 AM in residential districts. The emitting property line used in the analysis was the property line nearest to the work activities. However, work activities between 7 AM and 7 PM are exempt.

Existing ambient noise levels within the Winchell Drive Study Area are influenced by vehicular traffic traveling on International Boulevard (State Route 747), South Drury Lane, Winchell Drive, and other local roadways. The existing noise levels within the study area are comparable to a quiet suburban residential environment based on the distance from major transportation corridors, the population density of the area, and the presence of other noise-producing elements. Typical noise levels (measured as L_{eq}) for quiet suburban communities are 45 dBA during the daytime and 39 dBA during the nighttime.

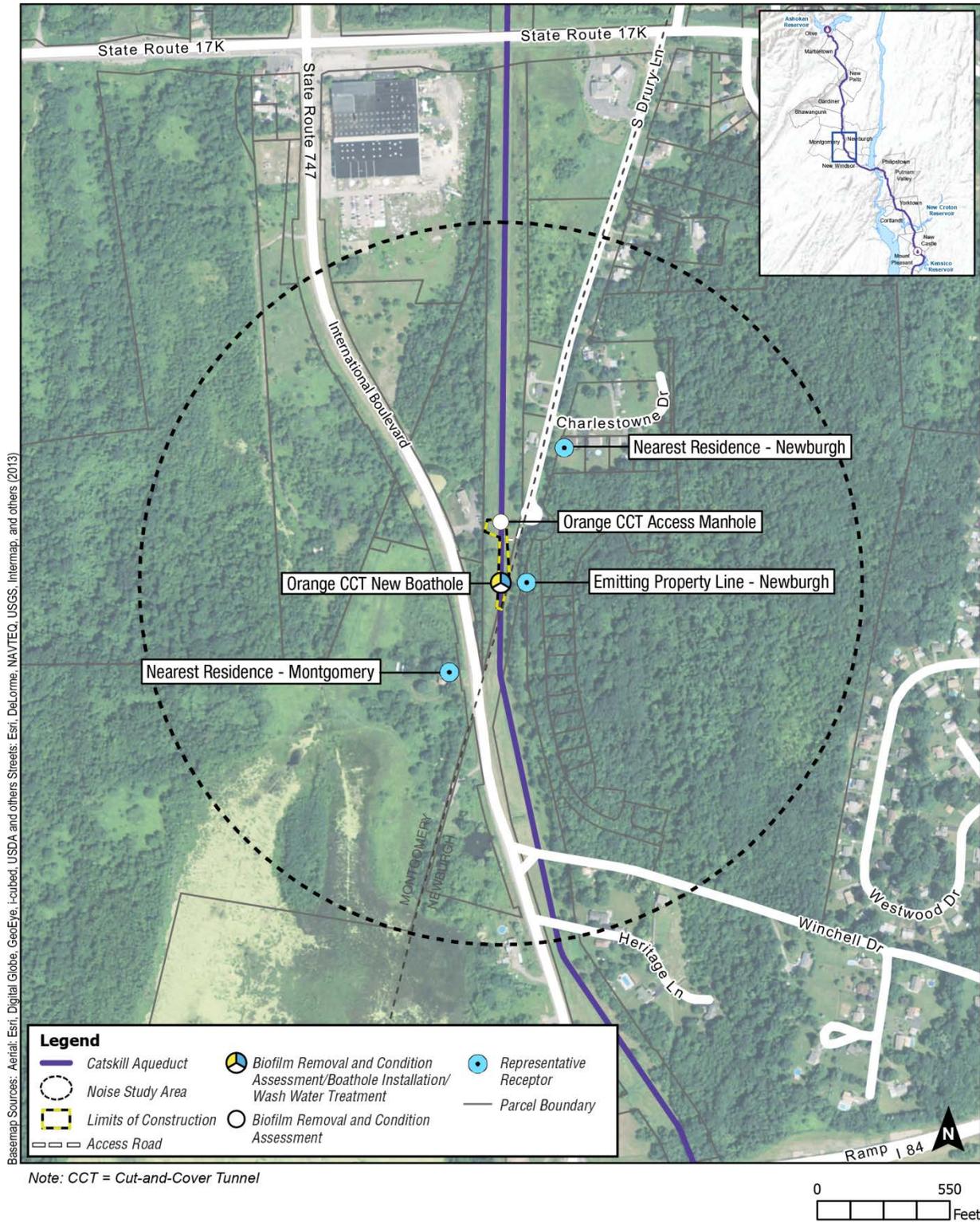


Figure 9.9-7: Noise – Winchell Drive Study Area



DEP has consulted with the Towns of Montgomery and Newburgh and Orange County and it is DEP’s understanding that no major projects that would result in a change in land use, or new noise-generating sources that would contribute to an increase in ambient noise levels, are anticipated within the Winchell Drive Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that ambient noise levels within the Winchell Drive Study Area would be similar to baseline conditions.

In the future with the repair and rehabilitation, stationary noise-producing work activities within the Winchell Drive Study Area would occur on one site. The stationary noise-generating equipment associated with the installation of the boathole was the basis of this stationary noise analysis. Boathole installation would occur in fall ~~2019~~2018 between the hours of 7 AM and 7 PM, 7 days a week for approximately 2 weeks during the second 10-week shutdown.

The noise analysis focused on the three loudest stationary noise-generating equipment types necessary for the boathole installation. Associated equipment reference noise levels are shown in **Table 9.9-4**. The Town of Newburgh code defines allowable noise levels at the emitting property line using the maximum sound level (L_{max}). The Town of Montgomery does not specify a metric, so the equivalent average sound level (L_{eq}) was used. The types of noise-generating equipment analyzed were conservatively based on peak construction operating conditions.

Table 9.9-4: Stationary Source Construction Equipment Modeled at the Winchell Drive Study Area – Noise Analysis and Reference Noise Levels (L_{eq} and L_{max})

Equipment Type	Reference Noise Level (L_{eq}) at 50 feet (dBA)	Reference Noise Level (L_{max}) at 50 feet (dBA) ¹
Crane	77	85
Generator	82	82
Concrete Mixer	81	85

Note:
¹ City Environmental Quality Review (CEQR) Technical Manual, Chapter 22.

The results of the stationary construction noise analysis are shown in **Table 9.9-5**. The Town of Montgomery does not have quantitative noise limits applicable to the Winchell Drive Study Area. The nearest noise-sensitive receptor in the Town of Montgomery is a residence approximately 430 feet away from the work activities. The Town of Newburgh limits the maximum sound pressure level, L_{max} , at the emitting property line of the work activities and defines daytime and nighttime noise limits based on the zoning district. However, work activities between 7 AM and 7 PM, such as boathole installation, are exempt from the L_{max} limits. The nearest noise-sensitive receptor in the Town of Newburgh is a residence approximately 620 feet away from the work activities. At the nearest residence, maximum noise levels (L_{max}) would be attributable to the boathole installation and could reach approximately 67 dBA during daytime hours.

Table 9.9-5: Stationary Noise Analysis Results (L_{eq} and L_{max}) at the Nearest Noise-Sensitive Receptors within the Winchell Drive Study Area

Nearest Noise-Sensitive Receptor	Distance from Site (Feet)	Predicted Stationary Noise Level at Noise-Sensitive Receptor (dBA)	Town of Newburgh Noise Limit (dBA)	Town of Montgomery Noise Limit (dBA)	Potential for Code Exceedance (Yes or No)
Nearest Residence - Montgomery	426	67 ¹	NA	NA	NA
Emitting Property Line - Newburgh	108	82 ²	65 ³ /56 ⁴	NA	No ⁵
Nearest Residence - Newburgh	623	67 ²	NA	NA	NA
Notes: NA = Not Applicable ¹ Metric for noise level is the hourly equivalent average noise level (L_{eq}). ² Metric for noise level is the maximum sound level (L_{max}), as required in the Town of Newburgh ordinance. ³ Daytime noise limit is applicable between the hours of 8 AM and 10 PM. ⁴ Nighttime noise limit is applicable between the hours of 10 PM and 8 AM. ⁵ Work activities between 7 AM and 7 PM are exempt.					

Following completion of the repair and rehabilitation work activities, the construction equipment and vehicles would be removed from the Winchell Drive Study Area. The repair and rehabilitation work activities would be temporary in nature, with peak work activities that would occur during boathole installation in fall ~~2019~~2018 for a limited period (e.g., 2 weeks). These activities would comply with the local noise codes.

Therefore, although there would be a temporary increase in noise, noise from the repair and rehabilitation would not result in significant adverse impacts to sensitive receptors within the Winchell Drive Study Area.

9.9.3.7 Neighborhood Character

The character of the Winchell Drive Study Area is largely defined by a mix of residential, commercial, vacant, and public services land uses and its physical setting within a rural location (see **Figure 9.9-3**). The Catskill Aqueduct traverses the study area in a general north to south direction. International Boulevard (State Route 747), a two-lane arterial, roughly parallels the path of the aqueduct in the western portion of the study area. South Drury Lane, which enters the study area from the north, is located along the border between the Towns of Montgomery and Newburgh. The limits of construction for the work sites and associated access route are located in a public services corridor with grassy cover, owned and maintained by DEP.

DEP has consulted with the Towns of Montgomery and Newburgh and Orange County and it is DEP's understanding that no changes in land use and no new projects or structures are

anticipated within the Winchell Drive Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that neighborhood character within the study area would be similar to baseline conditions.

As described in Section 9.3.16, “Neighborhood Character,” there would be no potential for the repair and rehabilitation to shadows and urban design. In addition, based on the screening assessment for land use and zoning; socioeconomic conditions; open space and recreation; historic and cultural resources; and visual resources, an impact analysis for the Winchell Drive Study Area was not warranted, as discussed in the following sections: Section 9.3.3, “Land Use, Zoning, and Public Policy,” Section 9.3.4, “Socioeconomic Conditions,” Section 9.3.6, “Open Space and Recreation,” Section 9.3.7, “Historic and Cultural Resources,” and Section 9.3.8, “Visual Resources,” respectively. Furthermore, the public policy impact analysis provided in Section 9.9.2, “Town of Montgomery Impact Analysis,” concluded the work activities were consistent with applicable plans.

As described in Sections 9.9.3.5, “Transportation,” and Section 9.9.3.6, “Noise,” during construction, the work activities in the Winchell Drive Study Area would be short-term (intermittently over 1.5 years) and would result in a temporary increase in traffic and noise. Following completion of the repair and rehabilitation, the construction equipment and vehicles would be removed from the study area and traffic patterns would return to baseline conditions. These temporary increases in traffic and noise levels would not result in a density of activity or service conditions that would affect the overall character of the study area.

The repair and rehabilitation would not generate significant adverse effects in land use, zoning, and public policy; socioeconomic conditions; open space and recreation; shadows; historic and cultural resources; urban design and visual resources; transportation; or noise.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to neighborhood character within the Winchell Drive Study Area.

9.10 TOWN OF NEW WINDSOR

9.10.1 TOWN OF NEW WINDSOR PROJECT DESCRIPTION

The Town of New Windsor is located in Orange County, New York, on the western side of the Hudson River. It is bounded by the Town of Newburgh to the north, City of Newburgh to the northeast, Hudson River to the east, Town of Cornwall to the southeast, Town of Blooming Grove to the southwest, Town of Hamptonburgh to the west, and Town of Montgomery to the northwest. The Town of New Windsor encompasses approximately 37 square miles. General boundaries of locations where work activities associated with repair and rehabilitation of the Catskill Aqueduct would occur within the Town of New Windsor are shown on **Figure 9.10-1**.

The Catskill Aqueduct stretches for approximately 5.6 miles in a northwest to southeast direction through the Town of New Windsor. Notable sites along the aqueduct within the Town of New Windsor include the Washington Square Steel Pipe Siphon North Chamber, Washington Square Steel Pipe Siphon South Chamber, and the Moodna Pressure Tunnel Downtake Chamber. The repair and rehabilitation work activities within the Town of New Windsor would occur within two study areas, as shown in **Table 9.10-1**.

Table 9.10-1: Schedule of Work Activities within the Town of New Windsor

Work Activity	Study Area	
	Mount Airy Road	Passaro Drive
Staging and Access Improvements	✓	✓
Streambank Restoration and Protection	✓	-
Blow-off Chamber Reconstruction	✓	-
Boathole Preparation	✓	✓
Boathole Installation	✓	✓
Biofilm Removal and Condition Assessment	✓	✓
Large-scale Wash Water Treatment	-	✓
Small-scale Wash Water Treatment	✓	-
Dechlorination System Operation (if necessary)	✓	-
Notes: - = Work activity not proposed. ✓ = Work activity proposed.		

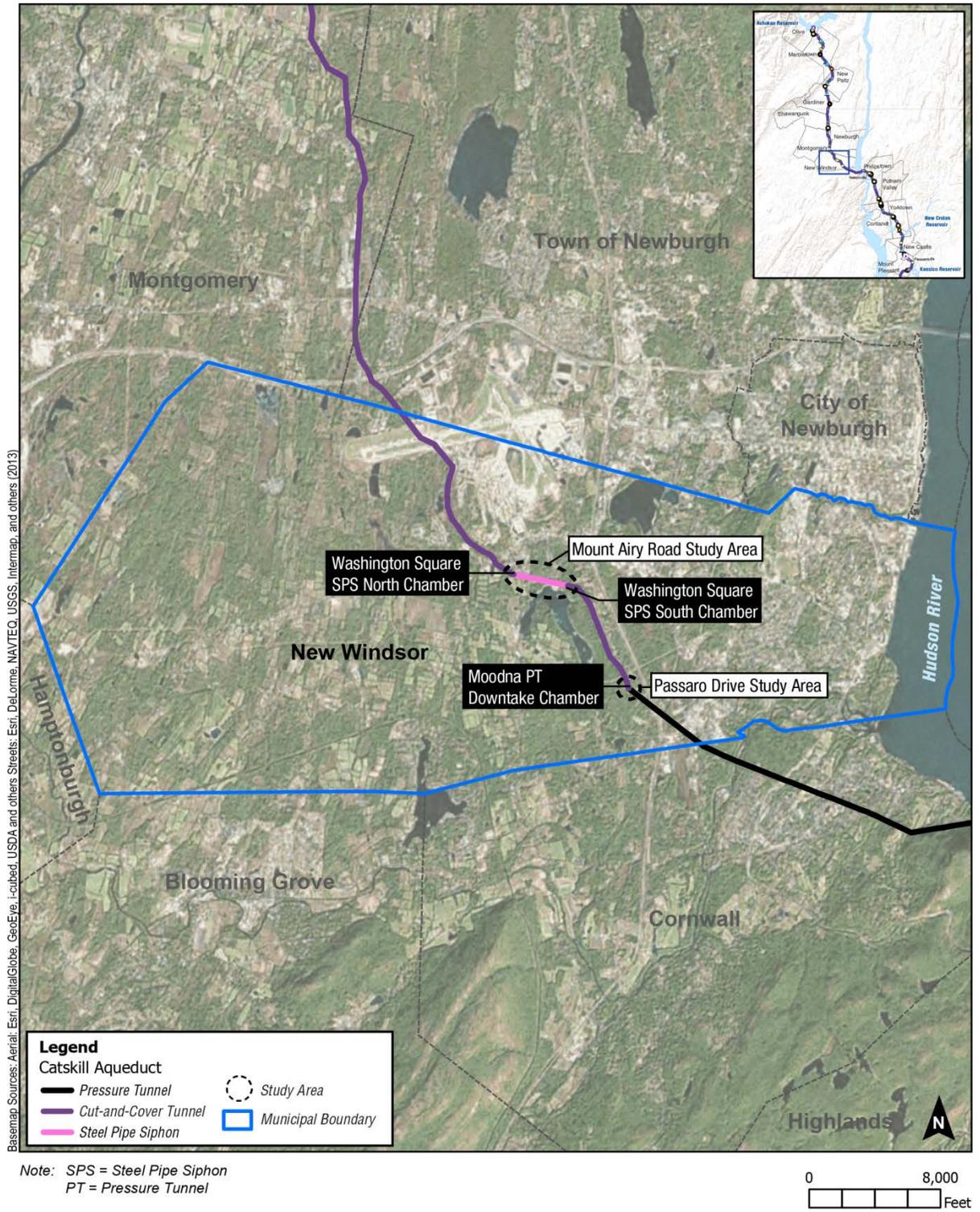


Figure 9.10-1: Town of New Windsor Study Areas



These two study areas in the Town of New Windsor encompass the majority of work that would occur as part of the repair and rehabilitation in this municipality. Additional work activities in the town do not warrant further assessment. Work sites located outside the study areas include activities that would primarily be conducted within the aqueduct interior (see Section 9.3, “Screening Assessment and Impact Analysis Methodology”). In the Town of New Windsor, they include biofilm removal and condition assessment at access manholes not located in these study areas and permanent sealing of three culvert drain sluice gates. See Section 9.2, “Project Description,” for an overall project description of the repair and rehabilitation. Section 9.10.2, “Town of New Windsor Impact Analysis,” provides a discussion of local regulations in the Town of New Windsor’s jurisdictional limits. The following sections provide a description of the study area, proposed activities, and impact analysis for the two study areas:

- Section 9.10.3 – Mount Airy Road Study Area Impact Analysis
- Section 9.10.4 – Passaro Drive Study Area Impact Analysis

9.10.2 TOWN OF NEW WINDSOR IMPACT ANALYSIS

9.10.2.1 Public Policy

Because local public policies would not vary for study areas in the same town, public policies were evaluated on a town-wide basis. While the Town of New Windsor is located in Orange County, and is therefore subject to the Orange County Open Space Plan, no policies within that Plan are applicable to the Passaro Drive Study Area. As discussed in Section 9.3.3.3, “Town Codes,” the repair and rehabilitation’s consistency with the applicable policies and regulations within the Town of New Windsor Study Area was analyzed. As described in Section 9.3.3, “Land Use, Zoning, and Public Policy,” the repair and rehabilitation’s consistency with the applicable policies of the Orange County Supplemental Open Space Plan (Orange County 2003) in the Mount Airy Road Study Area was analyzed as follows.

Orange County Supplemental Open Space Plan (2003)

The Orange County Supplemental Open Space Plan was adopted in 2003 to support goals within the Orange County Comprehensive Plan. It was designed to define the uniqueness and environmental characteristics of Orange County as they relate to quality of life, defining future open space needs, and protecting key open spaces. Based upon a review of these principles, the potential effects of the repair and rehabilitation within the Mount Airy Road Study Area were evaluated for compatibility with the two applicable principles below:

- (1) *Water Resources*
 - *Permanent Protection of County Reservoir Lands*

Water resources within the Mount Airy Road Study Area are discussed in detail within Section 9.10.3.5, “Natural Resources.” As discussed in that section, the repair and rehabilitation would occur at existing DEP facilities within the Mount Airy Road Study Area. Within this Study Area, anticipated activities would include staging and access improvements, blow-off

chamber reconstruction, boathole preparation and installation, biofilm removal and condition assessment, small-scale wash water treatment and local dechlorination.

Under this principle, the Open Space Plan recommends permanent protection of reservoir lands in order to support open space, park, and water supply uses only. This principle was analyzed for repair and rehabilitation as work in this study area would potentially impact existing reservoir lands directly or indirectly.

As part of the work, unwatering of the aqueduct would be required and this would result in raw water discharges to Silver Stream, which flows north to Lake Washington, outside the current study area, which is one of two primary reservoirs that provides the City of Newburgh with drinking water. The second of these two reservoirs is Brown's Pond, which is located in the southern portion of the study area. Additionally, diversion of Silver Stream around in-stream work would be required in order to complete certain work elements. Finally, the discharge of treated biofilm wash waters with a discharge to surface water may also be required.

The proposed action would not impact current or future permanent protection of reservoir lands. Likewise, the proposed action would not be expected to affect water resources and more specifically these reservoirs for several reasons. While discharges of raw aqueduct water could take place at any time during construction or future maintenance, this would consist of uncontaminated raw water from the aqueduct that the City of Newburgh currently has the ability to access for its potable water needs. Any unwatering that would occur during temporary chlorination would only occur after chlorination is temporarily stopped and sufficient time has elapsed to remove any residual chlorine. Sediment and erosion control measures would also be put in place for all construction activities. Discharge of treated biofilm wash water or dechlorinated aqueduct water that would be temporarily discharged to Silver Stream would be conducted in accordance with applicable regulatory requirements established as part of required discharge permits. As a result, work activities are not anticipated to result in significant increases in turbidity, scouring, or other adverse impacts to Silver Stream or the City of Newburgh's reservoirs. As such, the repair and rehabilitation within the Mount Airy Road Study Area would not affect reservoir lands of Orange County and would be consistent with this principle.

(2) *Biological Diversity*

- *Protect and Enhance Priority Aquatic Systems*

Biological resources, particularly those associated with aquatic systems, were identified within the Mount Airy Road Study Area. The potential for impacts to biological diversity associated with the repair and rehabilitation is evaluated in Section 9.3.9, "Natural Resources," and water resources within the Mount Airy Road Study Area are discussed in detail in Section 9.10.3.5, "Natural Resources."

Under this principle, the Open Space Plan recommends protecting priority aquatic systems in order to preserve their unique features and enhance ecosystem health. This principle was analyzed for repair and rehabilitation as work in this study area would potentially impact existing aquatic systems directly or indirectly.

The repair and rehabilitation within the Mount Airy Road Study Area would not permanently affect biologically diverse areas within the study area. The limits of construction occur in previously disturbed areas, and would not occur in the vicinity of a priority waterbody, as identified in the Open Space Plan. Based on the work activities described above, the repair and rehabilitation would include minor disturbance to aquatic systems and would be conducted in accordance with federal, State, and municipal regulations.

At the Mount Airy Road Study Area, five trees may be removed to establish better access to the proposed staging area. However, these trees are not located near water resources. Following construction, staging areas would be restored and operation of the Catskill Aqueduct would be consistent with baseline conditions. Likewise, the measures discussed above related to the protection of reservoir lands and the quality of these resources would also serve to limit potential adverse impacts to aquatic systems within the study area and would be consistent with this principle.

Repair and rehabilitation would be consistent with the Orange County Supplemental Open Space Plan and would not result in significant adverse impacts to public policy within the Mount Airy Road and Passaro Drive study areas.

9.10.3 MOUNT AIRY ROAD STUDY AREA IMPACT ANALYSIS

Within this study area, the aqueduct transitions from the Orange Cut-and-Cover Tunnel to the Washington Square Steel Pipe Siphon at the Washington Square Steel Pipe Siphon North Chamber (North Siphon Chamber). The study area also includes four sets of access manholes along the steel pipe siphon, the Washington Square Steel Pipe Siphon Blow-off Chambers (Blow-off Chambers), and the Newburgh Connection Chamber. At the eastern end of the study area, the aqueduct transitions from the Washington Square Steel Pipe Siphon to the Orange Cut-and-Cover Tunnel at the Washington Square Steel Pipe Siphon South Chamber (South Siphon Chamber) (see **Figure 9.10-2**).

Work activities within the Mount Airy Drive Study Area would include: staging and access improvements; blow-off chamber reconstruction and associated streambank restoration and protection; boathole preparation and installation; biofilm removal and condition assessment; small-scale wash water treatment; and, if necessary, installation and operation of a local dechlorination system for the City of Newburgh water supply system.

9.10.3.1 Study Area Location and Description

The Mount Airy Road Study Area is located along the upper Catskill Aqueduct in the Town of New Windsor. The Catskill Aqueduct traverses the study area in a general west to east direction. Brown's Pond Reservoir extends into the southeastern portion of the study area, discharging to Silver Stream, which flows to the north. Mount Airy Road crosses the western portion of the study area and intersects Moores Hill Road, which bisects the study area in a general southwest to northeast direction. Proposed work sites within the study area include one at the North Siphon Chamber, one at the Blow-off Chambers, and one at the South Siphon Chamber. The North Siphon Chamber would be accessed via a new access road from Mount Airy Road and by driving on top of the steel pipe siphon. The Blow-off Chambers would be accessed by an access road from Moores Hill Road.

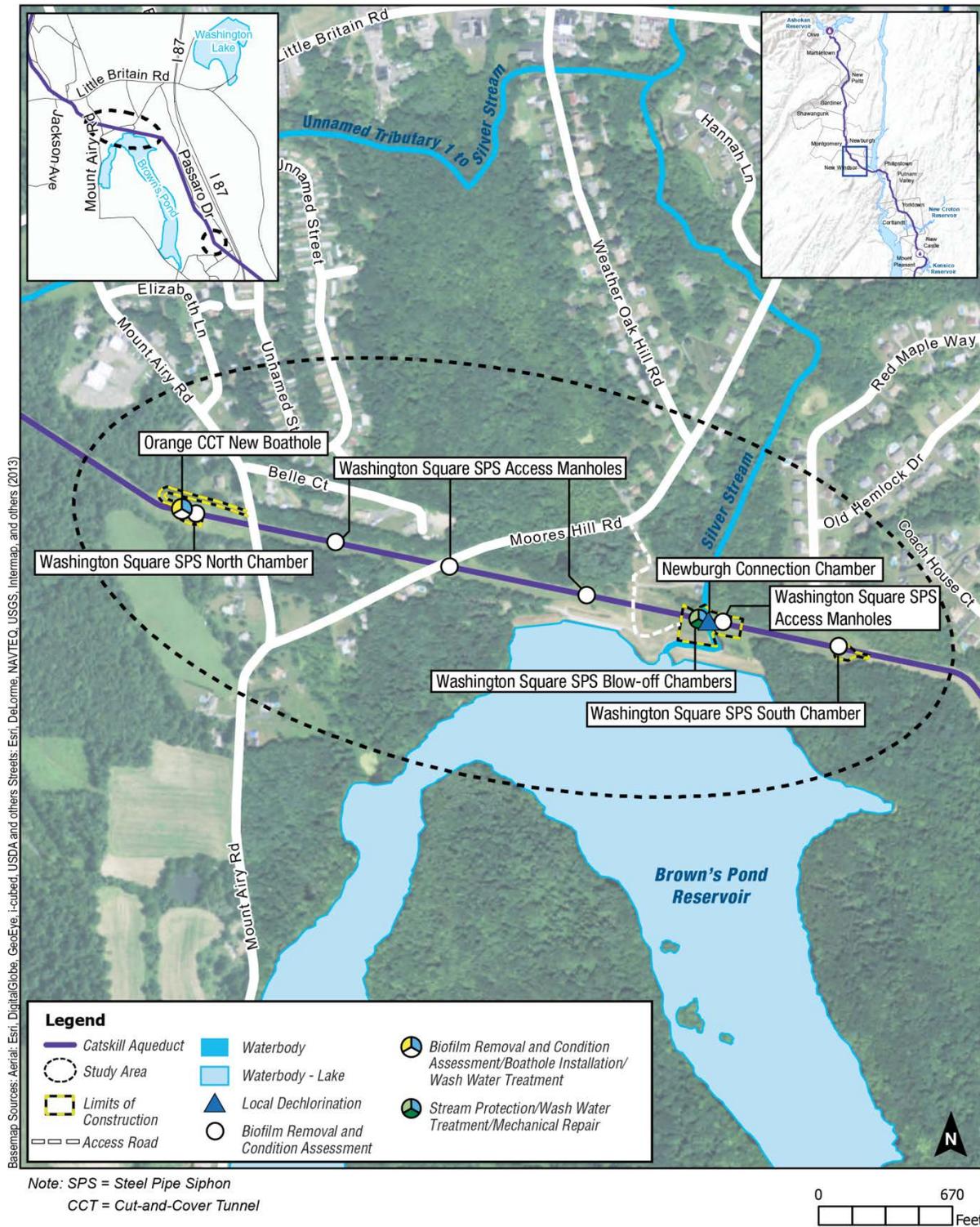


Figure 9.10-2: Study Area – Mount Airy Road



The South Siphon Chamber would be accessed by driving over the cut-and-cover tunnel from an access road connecting to Passaro Drive. The study area boundary is located approximately 400 feet beyond the outermost areas of disturbance related to the work sites. **Figure 9.10-2** shows an aerial photograph of the study area, including the path of the aqueduct, the limits of construction for the work sites, and the proposed access routes. **Figure 9.10-3** shows two photographs of the western Washington Square Blow-off Chamber in the study area.

The study area consists of agricultural, residential, commercial, vacant, and public services land uses. The limits of construction for the work sites and associated access routes are located in a public services corridor with grassy cover, which is owned and maintained by DEP and abutted on the north and south sides by forested areas. **Figure 9.10-4** shows a map of the land uses in the study area and its surroundings.

Zoning in the Mount Airy Road Study Area includes rural residential (R-1), open-space residential (R-2), and suburban residential (R-3) zoning districts, as designated by the Town of New Windsor Zoning Code (see **Figure 9.10-5**). The Catskill Aqueduct and limits of construction of the work sites are located within rural residential (R-1) and open-space residential (R-2) zoning districts, which provide for low- and medium-density single-family residences. The Catskill Aqueduct is a permitted use as a water transmission system (essential service) within the rural residential (R-1) and open-space residential (R-2) zoning districts.

There are no federal, State, or local designated landmarks, historic districts, or known archeological resources within the study area.

9.10.3.2 Proposed Activities within the Mount Airy Road Study Area

To support activities within the Mount Airy Road Study Area, the Catskill/Delaware Interconnection at Shaft 4 (Shaft 4 Interconnection) (within the Armato Lane Study Area in the Town of Gardiner) would serve as a primary staging area from which workers would be transported to the site daily. Several secondary staging areas, including one at the North Siphon Chamber, would provide additional parking. Equipment and materials would be staged on site. Erosion and sediment control measures such as silt fencing and hay bales would be installed at the perimeter of the work sites as needed. Site plans showing layouts of the limits of construction for the work sites, which would occupy a total of ~~1.4~~1.7 acres, are shown on **Figure 9.10-6**, **Figure 9.10-7**, and **Figure 9.10-8**. The schedule for work within the study area is shown in **Table 9.10-2**. The duration of active construction within the Mount Airy Study Area is estimated to total 26 weeks over 1.5 years.

Work in the study area would begin with staging and access improvements in summer ~~2019~~2018. Improvements would entail the removal of shrubs and up to five trees in the area surrounding the North Siphon Chamber, in addition to underbrush clearing and gravel placement for leveling and erosion control.



Photograph 1: Washington Square, Steel Pipe Siphon west blow-off chamber exterior, valve vault, manway, and vent; looking southwest.



Photograph 2: Washington Square, Steel Pipe Siphon west blow-off chamber discharge pipe to Silver Stream; looking west.

Figure 9.10-3: Photographs – Mount Airy Road Study Area



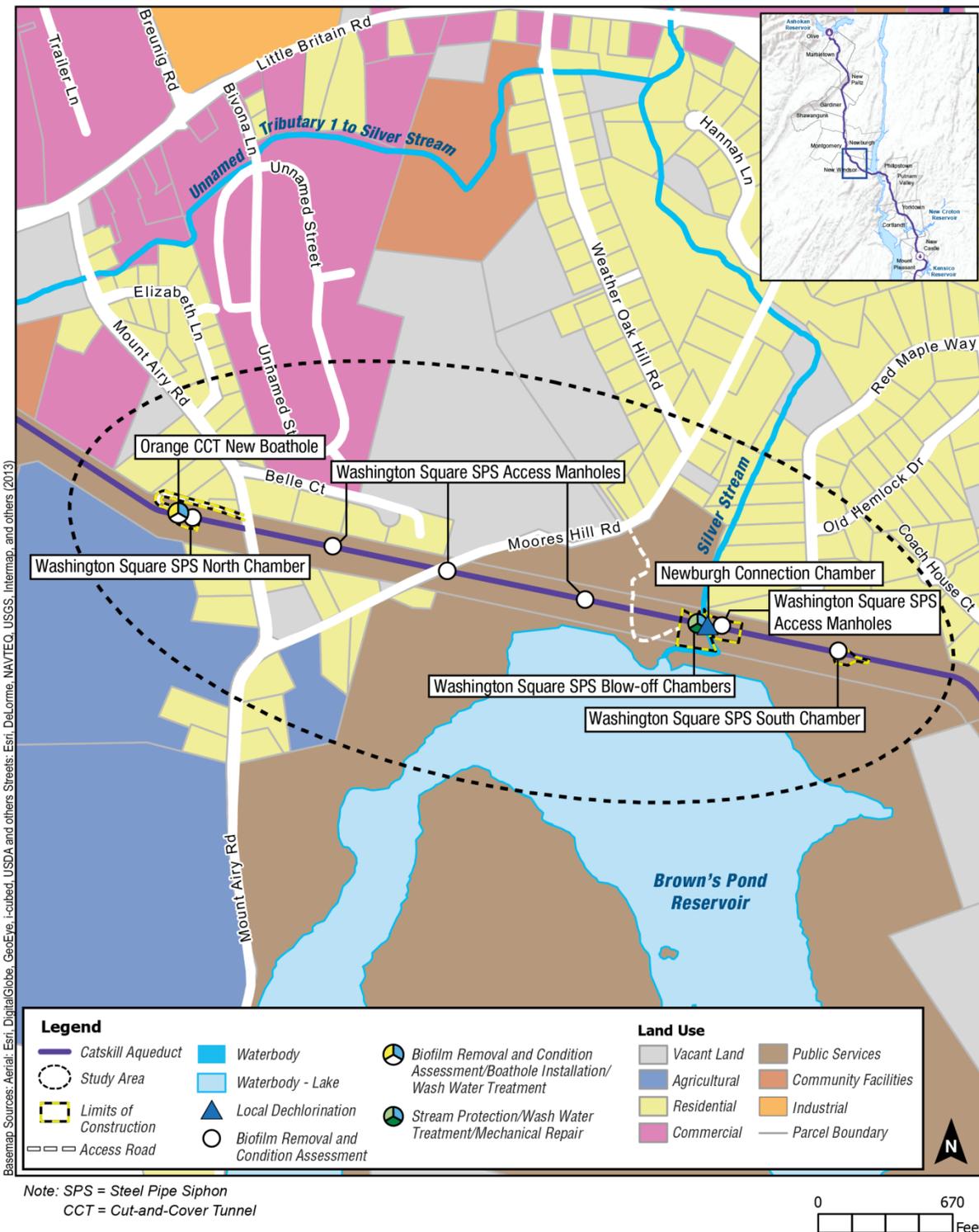


Figure 9.10-4: Land Use – Mount Airy Road Study Area



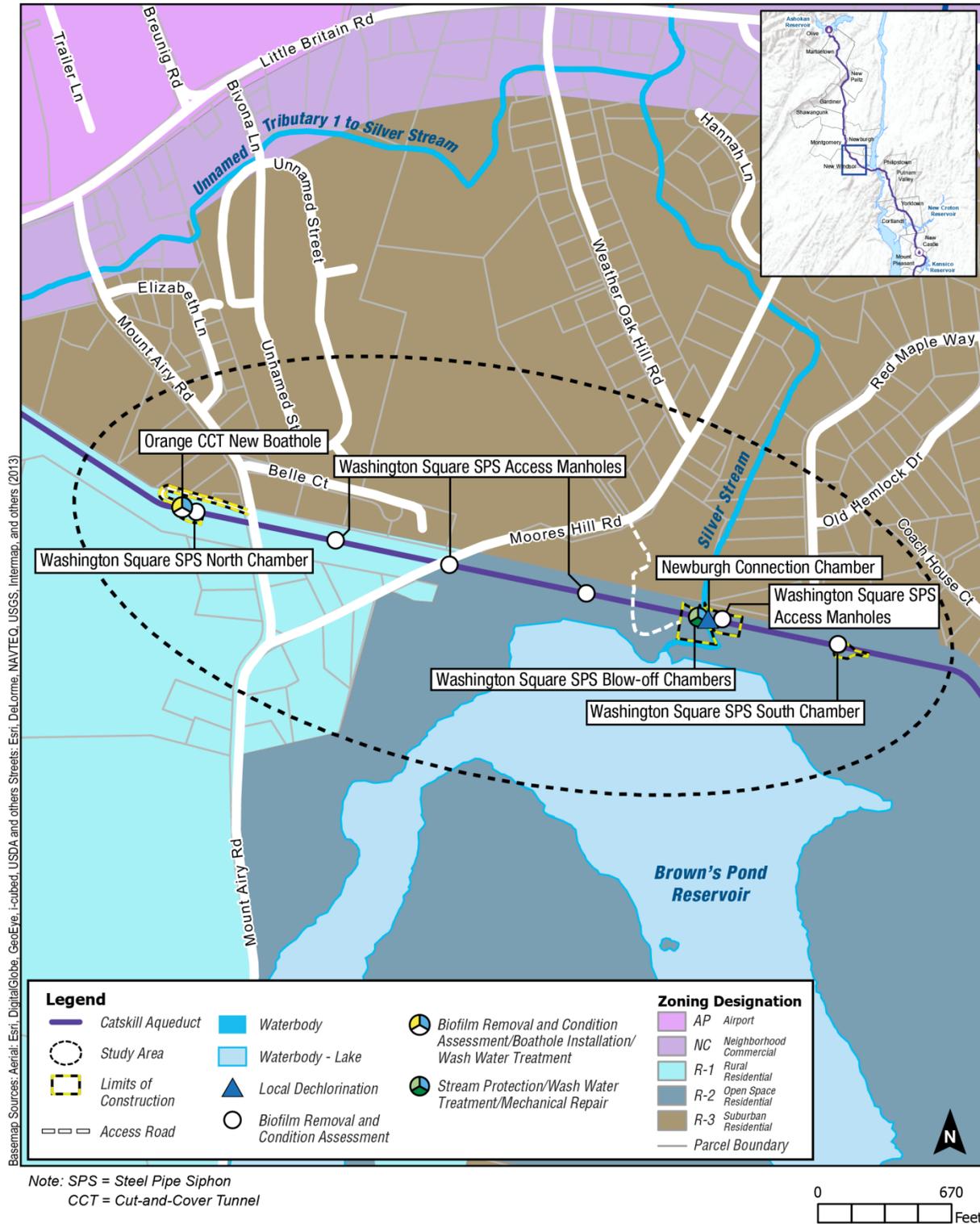


Figure 9.10-5: Zoning – Mount Airy Road Study Area



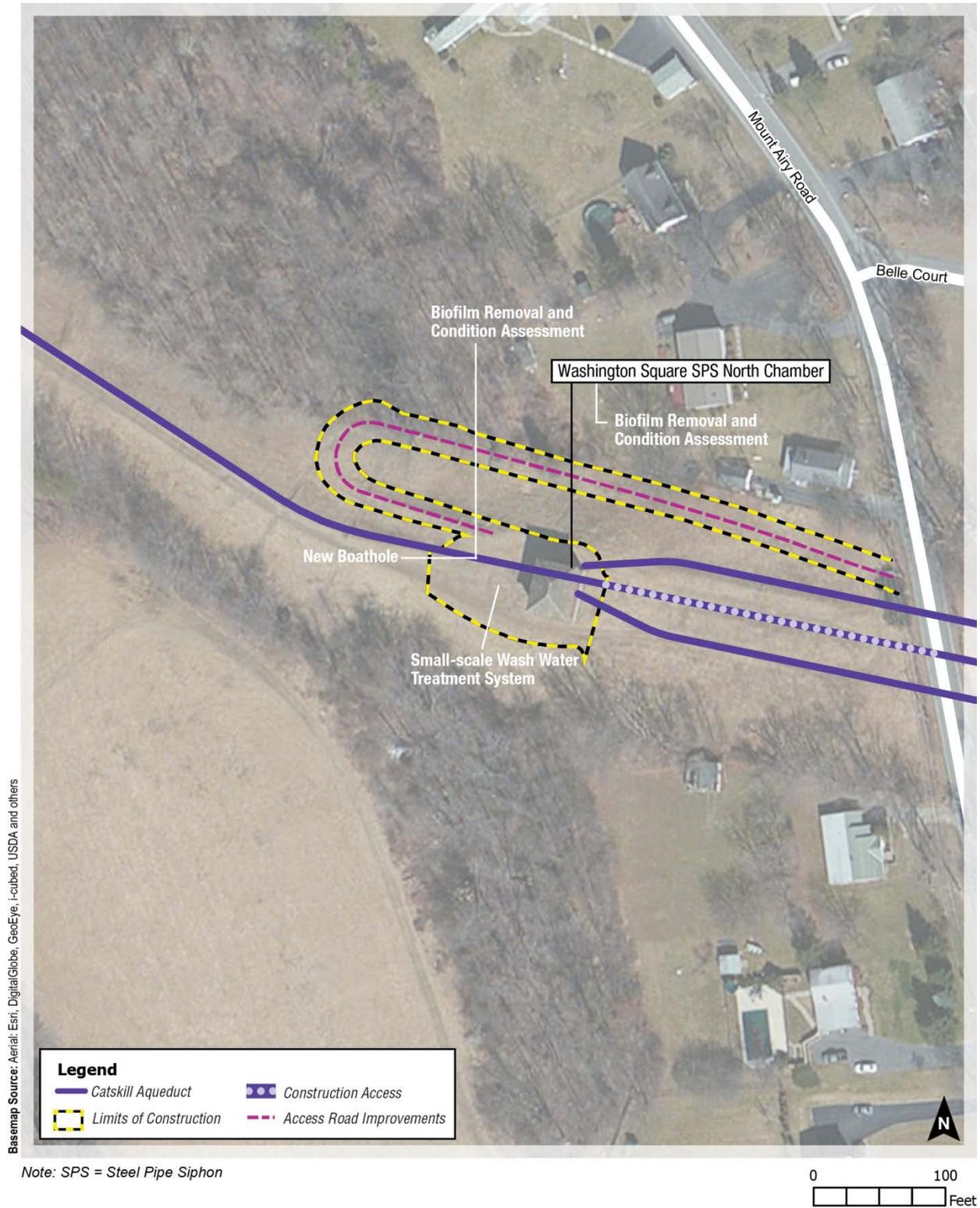


Figure 9.10-6: Site Plan for Washington Square SPS North Chamber – Mount Airy Road Study Area



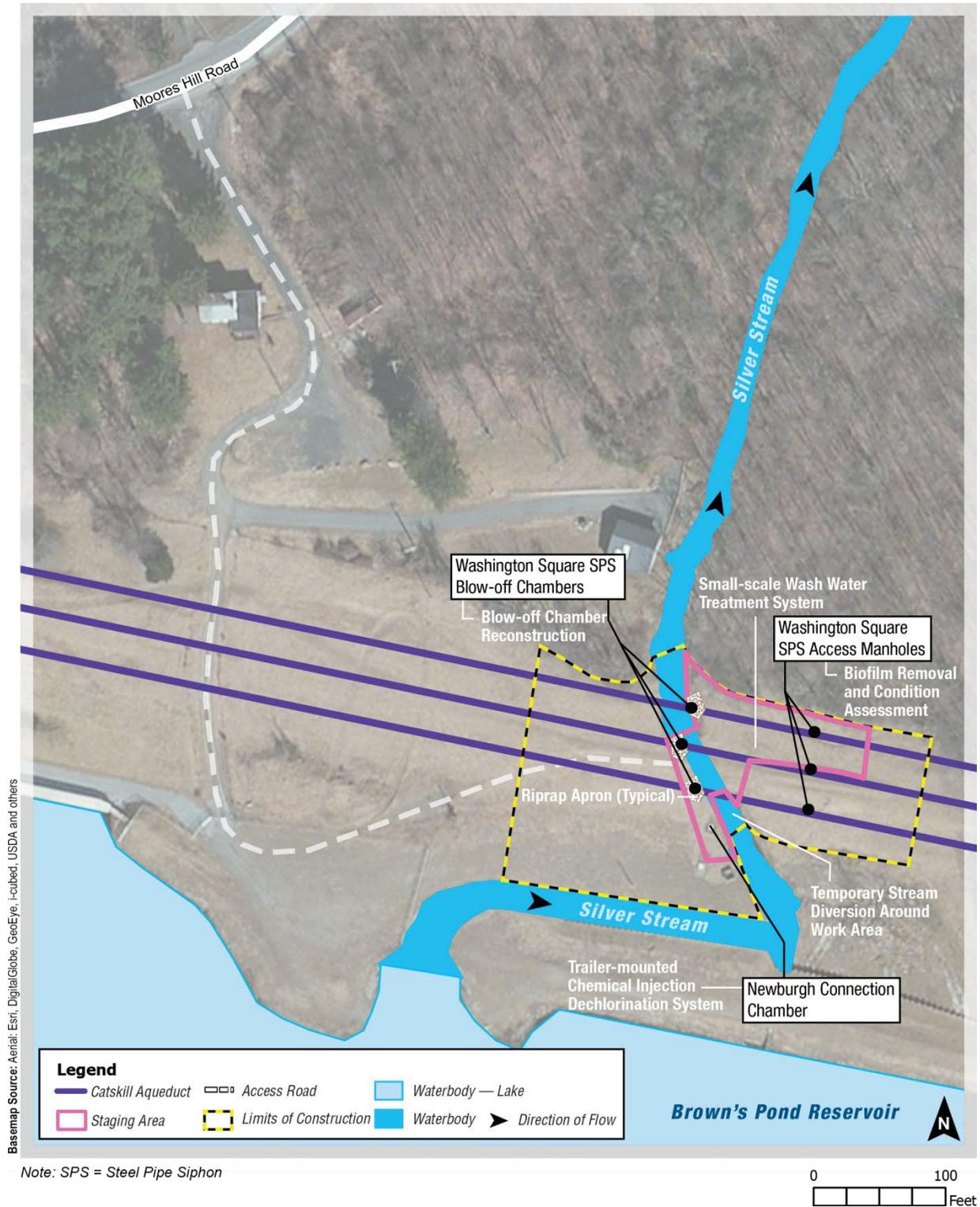


Figure 9.10-7: Site Plan for Washington Square SPS Blow-off Chambers and Newburgh Connection Chamber – Mount Airy Road Study Area



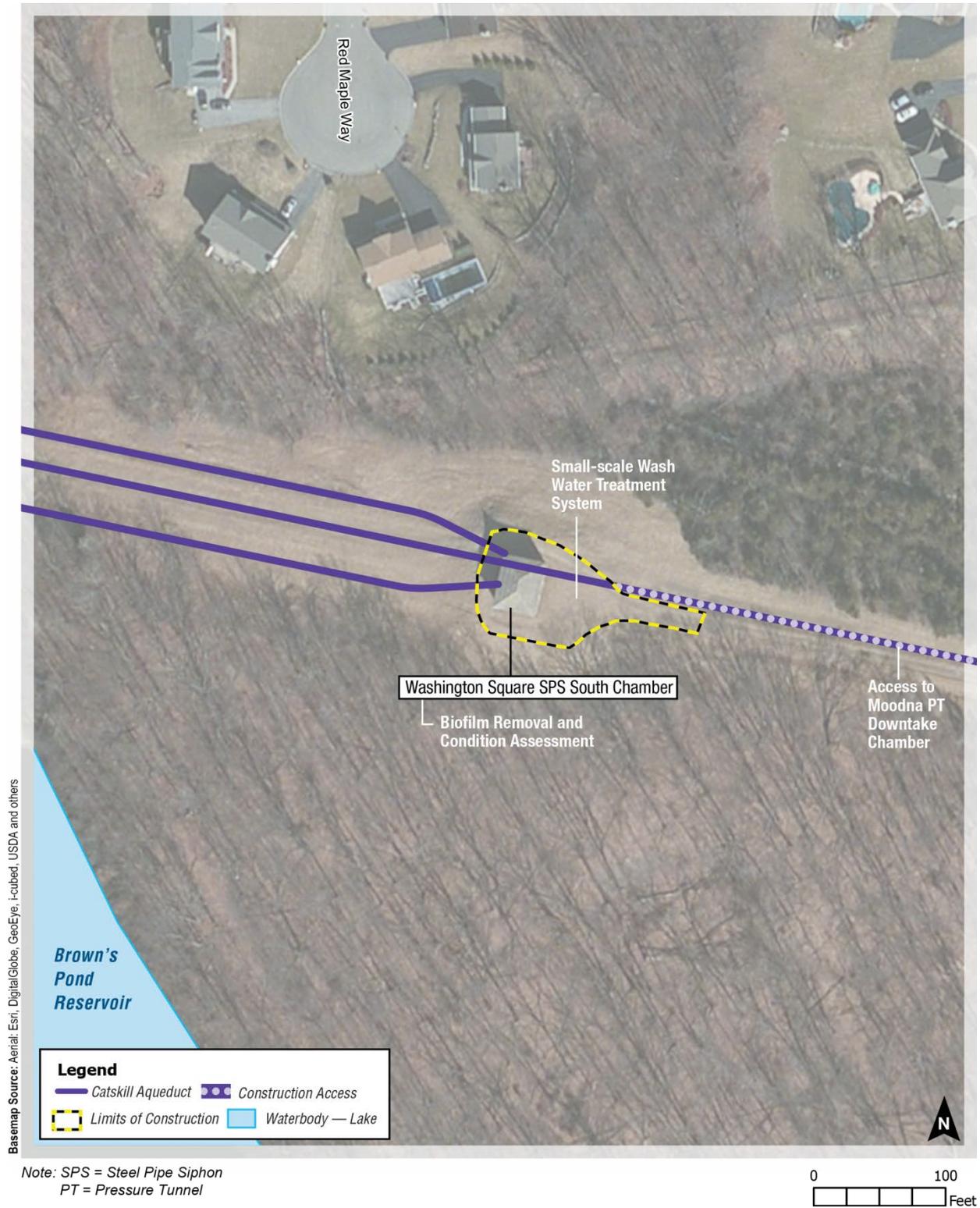


Figure 9.10-8: Site Plan for Washington Square SPS South Chamber – Mount Airy Road Study Area



Table 9.10-2: Schedule of Work Activities within the Mount Airy Road Study Area

Work Activity	Dates	Duration	Work Hours	Crew Size ¹
Staging and Access Improvements ²	Summer 2019 2018	2 weeks	Monday to Friday, 7 AM to 5 PM	8
Streambank Restoration and Protection	Summer 2019 2018	3 weeks	Monday to Friday, 7 AM to 5 PM	10
Blow-off Chamber Reconstruction	Summer 2019 2018	9 weeks	Monday to Friday, 7 AM to 5 PM	12
Boathole Preparation	Summer 2019 2018	3 weeks	Monday to Friday, 7 AM to 5 PM	10
Boathole Installation	Fall 2019 2018 (Second 10-week shutdown)	2 weeks	7 days a week, 7 AM to 7 PM	8
Biofilm Removal and Condition Assessment/ Small-scale Wash Water Treatment	Fall 2020 2019 (Third 10-week shutdown)	7 weeks	7 days a week, 7 AM to 7 PM	21
Dechlorination System Operation (if necessary)	2019 – 2023	4+ years	7 days a week, 24 hours per day	2
Notes:				
¹ Crew size refers to the number of people anticipated at the work site(s).				
² Tree removal would be conducted from November 1 through March 31 to avoid impacts to Indiana bats (<i>Myotis sodalis</i>) and northern long-eared bats (<i>Myotis septentrionalis</i>).				

Following the staging and access improvements, restoration and protection of the portion of Silver Stream adjacent to the Blow-off Chambers would also take place in summer ~~2019~~2018. The work would include installation of permanent riprap aprons to repair bank erosion and minimize future bank erosion at this location. To ensure a dry working environment, a temporary stream diversion would be installed, and a pump would be operated to divert the stream around the work area. A turbidity curtain would be installed to prevent sediment from moving downstream. Blow-off chamber reconstruction, including replacement of the blow-off valves, discharge pipes, and chamber covers; repair of the concrete walls; and removal of the access ladders, would also take place in summer ~~2019~~2018 (small portions of the work that require shutdowns would be performed in spring and fall of that year). In total, the work would require the excavation of 90 cubic yards of soil and 220 cubic yards of soil for fill, resulting in a net fill of 130 cubic yards of soil. Temporary in-stream disturbance would cover a total area of approximately 1,650 square feet, and there would be approximately 590 square feet of permanent in-stream disturbance. Temporary wetland disturbance would cover a total area of approximately 190 square feet, and there would be no permanent wetland disturbance.

Afterwards, the blow-off valves would be used to unwater the aqueduct for future shutdowns during the repair and rehabilitation and future maintenance.

Preparation of the new boathole upstream of the North Siphon Chamber would also take place in summer ~~2019~~2018. The work would consist of the excavation of approximately 45 cubic yards of soil and construction of a cast-in-place concrete collar. Boathole installation, which requires unwatering of the aqueduct to tie-in to the crown of the cut-and-cover tunnel, would take place during the second 10-week shutdown in fall ~~2019~~2018.

Biofilm removal and condition assessment would occur during the third 10-week shutdown in fall ~~2020~~2019. Access into the aqueduct would be provided by the new boathole, the four sets of access manholes, the North Siphon Chamber, and the South Siphon Chamber. These locations would also serve as collection points for biofilm, which would be transported for disposal at a registered, permitted, or otherwise authorized facility. Although the aqueduct would be unwatered during this shutdown, any residual water would be diverted through an internal bypass pipe around the work segments within the aqueduct for discharge to the aqueduct downstream. Any residual water that does not meet water quality standards, and any wash water generated from biofilm removal, would then be transported to a temporary treatment system, where it would be treated to meet water quality standards for discharge back into the aqueduct or to a nearby waterbody (see Section 9.2, “Project Description”). Potential treatment locations within the study area include the North Siphon Chamber, the South Siphon Chamber, and the Blow-off Chambers, at which small-scale wash water treatment systems could be established. Upon completion of biofilm removal and condition assessment, all equipment and materials would be removed, and any areas requiring temporary disturbance would be restored to baseline conditions.

As described in Section 9.2, “Project Description,” the local dechlorination systems would be in operation when chlorination of the aqueduct begins in ~~2020~~2019. The City of Newburgh currently has the ability to access water from the Catskill Aqueduct for its potable water needs at the Newburgh Connection Chamber. A trailer-mounted chemical injection unit equipped with two 330-gallon sodium bisulfite totes would be operated at the Newburgh Connection Chamber when in use, and stored off-site when not in use. While in operation, this local dechlorination system would be inspected and maintained on a regular basis, including the monitoring of chlorine residuals, as required. When chlorination of the aqueduct is no longer required in 2023, the local dechlorination system would no longer be operated.

Impact categories analyzed for the Mount Airy Road Study Area are presented in Section 9.10.3.3, “Open Space and Recreation,” through Section 9.10.3.9, “Neighborhood Character,” and include: open space and recreation; visual resources; natural resources including water resources, terrestrial resources, and federal/State Threatened and Endangered Species and State Species of Special Concern; hazardous materials; transportation; stationary noise; and neighborhood character. Additionally, the study area’s compatibility with applicable public policies was analyzed on a town-wide basis in Section 9.10.2, “Town of New Windsor Impact Analysis.” As described in Section 9.3, “Screening Assessment and Impact Analysis Methodology,” impact analyses related to land use and zoning; socioeconomic conditions; community facilities and services; historic and cultural resources; the remaining natural resources subcategories, including geology and soils, aquatic and benthic resources, wildlife, federal/State Candidate Species, and unlisted rare and vulnerable species; energy; air quality; and mobile noise within the study area are not warranted. Finally, impacts related to project-wide

natural resources, water and sewer infrastructure, and public health were analyzed within Section 9.19, “Project-wide Impact Analysis.”

9.10.3.3 Open Space and Recreation

As shown on **Figure 9.10-2**, one open space resource exists within the Mount Airy Road Study Area: Brown’s Pond Reservoir (Brown’s Pond). Approximately 28 acres of Brown’s Pond is located within the southeastern portion of the Mount Airy Road Study Area. In total, Brown’s Pond is approximately 192 acres and part of the City of Newburgh’s reserve water supply. Outdoor recreation such as fishing and boating are permitted on Brown’s Pond. Fishing is permitted from the shoreline during NYSDEC permitted fishing seasons, May through September. Only boats supplied by the City of Newburgh are permitted for use at Brown’s Pond.

DEP has consulted with the Town of New Windsor and Orange County, and it is DEP’s understanding that no plans to expand or create new open space or recreational resources are anticipated within the Mount Airy Road Study Area within the timeframe of the impact analysis. Natural processes, such as changes in habitat due to natural vegetative succession, are anticipated to continue. Use of the identified open spaces is anticipated to continue. Therefore, in the future without the repair and rehabilitation, it is assumed that open space and recreation within the Mount Airy Road Study Area would be the same as baseline conditions.

During construction, the repair and rehabilitation work activities related to the North Siphon Chamber (i.e., boathole installation, biofilm removal and condition assessment, and small-scale wash water treatment) would be located northwest of the reservoir (see **Figure 9.10-6**). The construction staging area near the Blow-off Chambers would be directly north of Brown’s Pond. This staging area along the dam would not include tree removal. Work activities during construction would not impact the use of Brown’s Pond. The access road leading to the Blow-off Chambers is located on a residential road used regularly by vehicles for access to homes in the area (see **Figure 9.10-7**). The local dechlorination system would be operated on site near the Blow-off Chambers (i.e., Newburgh Connection Chamber), and given its small footprint, would not affect access to, use of, or views of Brown’s Pond. When chlorination of the aqueduct is no longer required in 2023, the system would no longer be operated. Finally, the South Siphon Chamber would be used for biofilm removal and condition assessment, and is northeast of Brown’s Pond and accessible by driving on top of the Catskill Aqueduct (see **Figure 9.10-8**). Therefore, repair and rehabilitation work activities would not disrupt any recreational uses associated with traveling to Brown’s Pond.

As discussed in the impact analysis in Section 9.10.3.8, “Noise,” below for the Mount Airy Road Study Area, there could be temporary increases in noise levels within the Mount Airy Road Study Area that could be heard by anglers and boaters at Brown’s Pond. However, once the repair and rehabilitation work activities are complete, the recreational uses within Brown’s Pond would be unaffected.

Following construction, all equipment would be removed from the Mount Airy Road Study Area and staging areas would be restored to baseline conditions. The new boathole at the North Siphon Chamber would be a permanent structure that would remain following construction. Following the repair and rehabilitation within the Mount Airy Road Study Area, operation of the

Catskill Aqueduct would be consistent with baseline conditions and would not disrupt recreation use of adjacent open spaces. As such, the repair and rehabilitation would not encroach upon, cause a loss of open space, impact the use or physical character of, or disrupt views from the open space and recreation of Brown's Pond.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to open space and recreation within the Mount Airy Road Study Area.

9.10.3.4 Visual Resources

The study area for the visual resources analysis is the area within the Mount Airy Road Study Area, and also includes view corridors that extend beyond the study area based on the locations that are publicly accessible.

As shown on **Figure 9.10-2**, one visual resource exists within the Mount Airy Road Study Area: Brown's Pond Reservoir. Approximately 28 acres of Brown's Pond Reservoir is located within the southeastern portion of the Mount Airy Road Study Area.

DEP has consulted with the Town of New Windsor and Orange County, and it is DEP's understanding that no new projects or structures that would alter views from visual or aesthetic resources are anticipated within the Mount Airy Road Study Area within the timeframe of the impact analysis. Natural processes, such as changes in habitat due to natural vegetative succession, are anticipated to continue. Therefore, in the future without the repair and rehabilitation, it is assumed that visual resources within the Mount Airy Road Study Area would be the same as baseline conditions.

During construction, the repair and rehabilitation work activities within the Mount Airy Road Study Area would be short-term (intermittently over 1.5 years; see **Table 9.10-2**). Work activities related to the North Siphon Chamber (i.e., boathole installation, biofilm removal and condition assessment, small-scale wash water treatment) would be located northwest of Brown's Pond Reservoir and would not be visible from the reservoir. Blow-off chamber reconstruction and local dechlorination would be adjacent to Silver Stream and visible from only the northern portions of Brown's Pond Reservoir. Work activities may be visible at the existing Blow-off Chambers, although would not impact use of Brown's Pond Reservoir. No tree removal would occur at the Blow-off Chambers adjacent to the reservoir (see **Figure 9.10-7**). Site preparation at the North Siphon Chamber would include minor clearing of trees and shrubs. Tree removal would not change the character of the area or affect surrounding trees (see **Figure 9.10-6**). Brown's Pond Reservoir is not visible from the South Siphon Chamber (see **Figure 9.10-8**). Therefore, repair and rehabilitation work activities would not disrupt any view from Brown's Pond Reservoir.

Following construction, all equipment and vehicles would be removed and the area would be restored to baseline conditions. The new boathole at the North Siphon Chamber would be a permanent structure that would remain following construction, although it would not drastically alter baseline views. Following the repair and rehabilitation within the Mount Airy Road Study Area, operation of the Catskill Aqueduct would be consistent with baseline conditions and the local dechlorination system would no longer be operated. It would not result in changes to the future visual and aesthetic resource conditions of the views from Brown's Pond.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to visual resources within the Mount Airy Road Study Area.

9.10.3.5 Natural Resources

The study area for the natural resource analysis is the immediate area surrounding the limits of construction at the North Siphon Chamber (see **Figure 9.10-9**), the Blow-off Chambers including the work along Silver Stream (see **Figure 9.10-10**), and the South Siphon Chamber. See **Figure 9.10-8** for more detail on the South Siphon Chamber. These areas are collectively referred to as the natural resources study area.

Based on field visits conducted on November 13 and 14, 2013, and August 3, 2015, habitat at the North Siphon Chamber includes successional old field, bordered by forest. Habitat near the Blow-off Chambers and South Siphon Chamber is best characterized as mowed lawn with trees that are bordered to the north by forest. Based on a desktop assessment, the South Siphon Chamber is best characterized as mowed lawn with trees. A portion of Silver Stream crosses the natural resources study area near the Blow-off Chambers. Potential wetlands in the floodplain of Brown's Pond Reservoir and Silver Stream were also observed during the field visit.

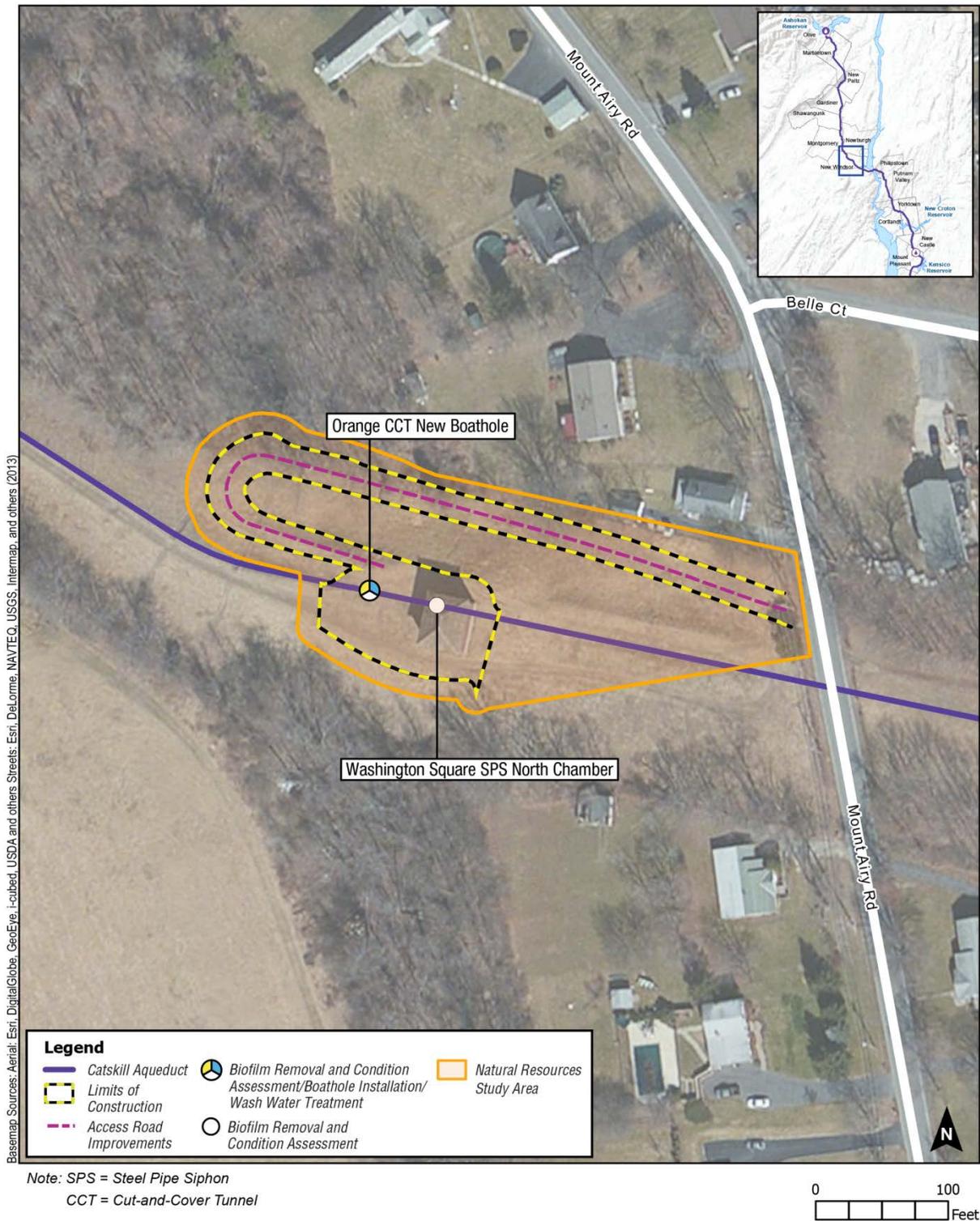
These habitats have the potential to support protected water resources, terrestrial resources, and wildlife species, and an analysis of the potential effects to natural resources that could result from the repair and rehabilitation work activities is presented below.

Water Resources

No water resources were identified at the North or South Siphon Chambers. The analysis below focuses on the natural resources study area at the Blow-off Chambers (see **Figure 9.10-10**).

The natural resources study area is within the Lower Hudson River drainage basin, more specifically within the Hudson-Wappingers watershed (hydrologic unit code [HUC] 02020008) and the Moodna Creek subwatershed (HUC 0202000804).

Repair and rehabilitation work activities would occur within and adjacent to water resources and are subject to federal, State, and municipal regulations. Silver Stream and wetlands in the natural resources study area would be subject to U.S. Army Corps of Engineers jurisdiction under Sections 401 and 404 of the Clean Water Act. As a Class A waterbody, Silver Stream is subject to State Protection of Waters regulations with a regulated 50-foot buffer to protect the streambed and banks. In addition, disturbance to wetlands, or natural or artificial watercourses is also regulated by the Town of New Windsor (New Windsor Town Code Chapter 249: Stormwater Management). A minimum 100-foot buffer is required along the shoreline of Brown's Pond Reservoir south of the natural resources study area. All other waters have a minimum 50-foot undisturbed buffer. Therefore, repair and rehabilitation work activities occurring within water resources within the natural resources study area may be subject to Town review and approval.



Basemap Sources: Aerial: Esri, DigitalGlobe, GeoEye, I-cubed, USDA and others Streets: Esri, DeLorme, NAVTEC, USGS, Intermap, and others (2013)

Figure 9.10-9: Natural Resources for Washington Square SPS North Chamber – Mount Airy Road Study Area



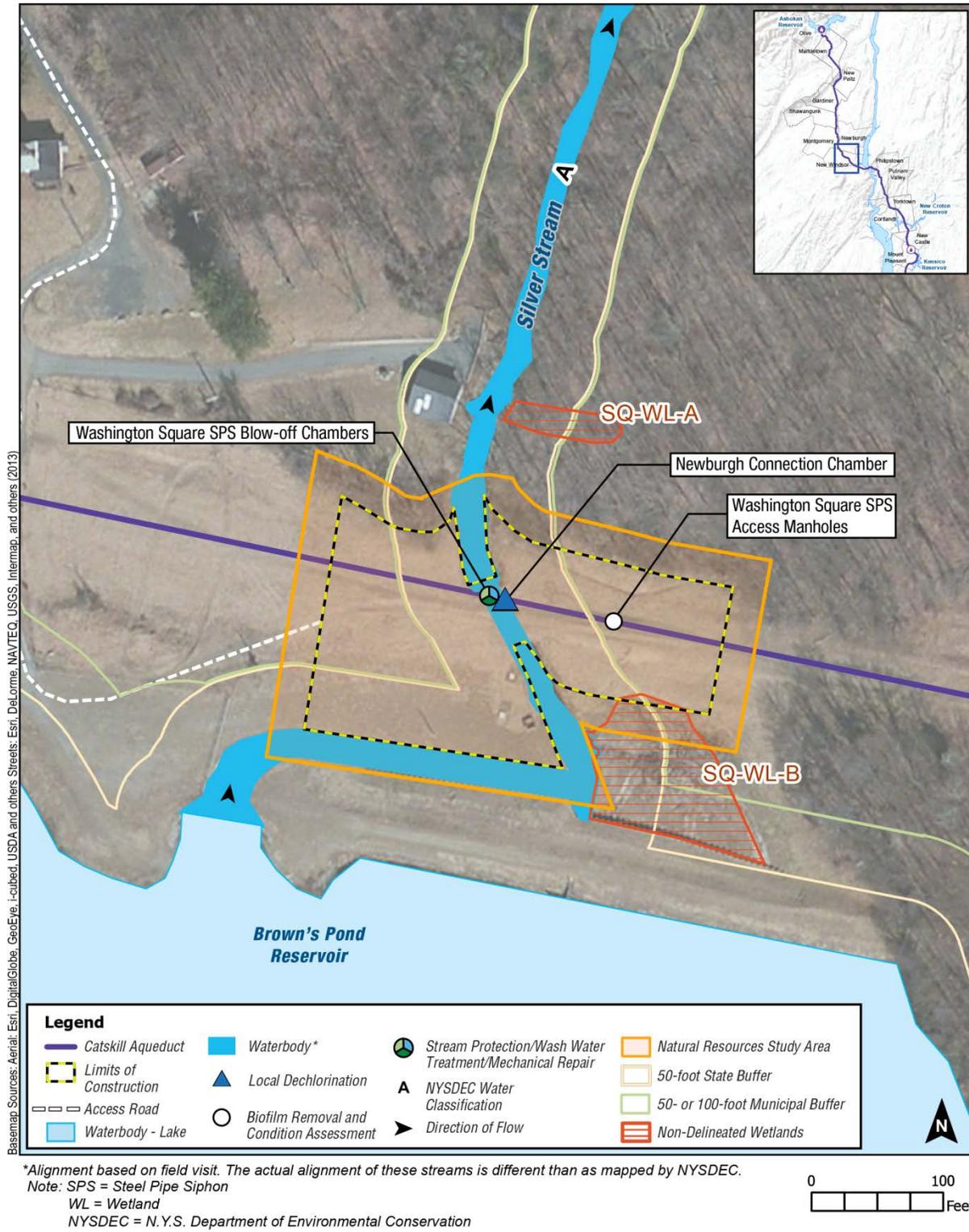


Figure 9.10-10: Natural Resources for Washington Square SPS Blow-off Chambers and Newburgh Connection Chamber – Mount Airy Road Study Area



Surface Water

Surface water in the natural resources study area was assessed on November 13 and 14, 2013, and August 3, 2015. The water resource name, length, area, and classification is shown in **Table 9.10-3**.

Table 9.10-3: Water Resources and Classifications within the Mount Airy Road Natural Resources Study Area

Water Resource	Area (Square Feet)	Length (Feet)	Cowardin Classification
Silver Stream	8,460	530	Riverine, Lower Perennial, Managed (R2Gm)
SQ-WL-B	2,070	NA	Palustrine Emergent Wetland (PEM)
Note: NA = Not Applicable			

Silver Stream

Silver Stream originates at Brown’s Pond Reservoir. The watercourse has a concrete-lined channel from the spillway of Brown’s Pond Reservoir through a culvert under an unnamed road (see **Figure 9.10-10**). In this reach of stream, the watercourse is approximately 10 feet wide and approximately 0.5 to 2 feet deep. Silver Stream is classified as a “Riverine, Lower Perennial, Managed” system based on the Cowardin System (Cowardin et al. 1979; see **Table 9.10-3**).

Wetlands

The Mount Airy Road Study Area does not contain National Wetlands Inventory or NYSDEC wetlands within its natural resource study area. However, during field investigations, wetlands were observed within the natural resource study area. One potential wetland, identified as SQ-WL-B, is located south of the Blow-off Chambers, east of and adjacent to Silver Stream. Another potential wetland was identified north of the Blow-off Chambers, east of and adjacent to Silver Stream. The wetlands were observed on November 14, 2013, and identified as palustrine emergent wetlands surrounded by a deciduous upland forest. Vegetation observed included sedges, rushes, broad leaf cattail, and common reed. Silver Stream likely contributes to the wetland hydrology.

Future Without the Repair and Rehabilitation

DEP has consulted with the Town of New Windsor and Orange County, and it is DEP’s understanding that no project or developments are anticipated to occur within the natural resources study area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that the future conditions of water resources within the Mount Airy Road Study Area would be the same as baseline conditions.

Analysis of Potential Effects

This section analyzes the potential for temporary and permanent disturbance to water resources associated with the repair and rehabilitation and long-term operation of the Catskill Aqueduct in the Mount Airy Road Study Area.

Construction

Work activities related to the repair and rehabilitation would temporarily disturb surface water and vegetated riparian areas, and have the potential to temporarily alter flows in Silver Stream.

Prior to commencing the repair and rehabilitation, temporary sediment and erosion control measures, such as silt fencing, would be installed. Within the limit of construction, localized construction dewatering (i.e., installing a barrier and pump to keep the work area dry) may be necessary to facilitate excavation for blow-off chambers and discharge pipe replacement. Blow-off chamber reconstruction would also require in-stream access and temporary stream protection. A temporary stream diversion and a downstream turbidity curtain would be installed. To protect the stream, its banks, aquatic life movement, and prevent sediment and other pollutants from entering the waterway, temporary measures would be designed in accordance with the State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity and other applicable regulatory requirements.

Blow-off chamber reconstruction and adjacent streambank restoration and protection would require regrading of the southern streambank and installation of permanent riprap aprons approximately 20 to 30 feet long. The re-contoured streambank would not increase the extent of impervious surface and would not alter runoff to the stream. The riprap aprons would be placed to repair historical bank erosion and minimize future bank erosion in the natural resources study area. The riprap would also protect the stream while the blow-offs are operated and prevent or limit scour and turbidity.

Anticipated temporary and permanent disturbances to water resources and regulated buffers were quantified based on the limits of construction and proposed work activities within the natural resources study area (see **Table 9.10-4**). Construction staging would occur on top of the aqueduct and the temporary stream diversion would extend into the stream, resulting in approximately 190 square feet of temporary disturbance to wetland habitat and approximately 1,650 square feet of temporary disturbance within Silver Stream. Approximately 33,500 square feet associated with the State and municipal buffers in the study area would be temporarily affected. The upgrades and maintenance at blow-off chambers would protect against future bank erosion. This would require approximately 590 square feet of permanent disturbance to Silver Stream, and approximately 6,180 square feet within each of the State Protection of Waters and municipal water resource buffers (see **Table 9.10-4**). Following construction, temporarily disturbed areas would be restored to natural conditions and planted with native vegetation. Permanent disturbance is further analyzed in Section 9.19, "Project-wide Impact Analysis."

Table 9.10-4: Estimated Disturbance to Water Resources within the Mount Airy Road Natural Resources Study Area

Water Resources	Baseline Conditions (Square Feet)	Temporary Effects (Square Feet)	Permanent Effects (Square Feet)
Silver Stream	8,460	1,650 <i>Construction staging</i>	590 <i>Riprap aprons</i>
SQ-WL-B	2,070	190 <i>Construction staging</i>	0
50-foot State Protection of Waters	31,010	16,740 <i>Construction staging</i>	6,180 <i>Riprap aprons and regrading following blow-off chamber reconstruction</i>
50-foot Municipal Water Resource Buffer	31,010	16,740 <i>Construction staging</i>	6,180 <i>Riprap aprons, regrading following blow-off chamber reconstruction</i>

The blow-off chambers have been identified as potential discharge points for treated wash water. Any wash water generated from the siphons would be treated to meet applicable discharge limits, water quality standards, and/or other requirements for reuse in the removal operation, or for discharge back to the Catskill Aqueduct or to Silver Stream. No biofilm would be discharged to surface water. Treated wash water would be discharged at low flows that would not result in scour or other physical changes to the stream. In the event alum is added as part of the treatment process, flocculated particles would primarily settle prior to treated wash water being discharged to the stream. Given the low flows and short-term, temporary nature of the discharges (approximately 7 weeks), discharges to Silver Stream are not anticipated to cause turbidity or scouring, inundate the receiving stream, or affect stream substrate.

This study area has also been identified as a location for discharging raw aqueduct water while unwatering the aqueduct. Reconstructing the blow-offs would require the siphons to be unwatered. This initial unwatering of the siphons would occur with temporary measures in place to protect the stream from erosion. Unwatering events to surface water would also occur at any time after stream protection measures are in place during and following construction, and are described in “Operation” below.

Temporary Chlorination

Temporary chlorination of the Catskill Aqueduct would occur from 2019 through 2023. When the City of Newburgh draws water from the aqueduct during this time, the local dechlorination system would be operated to treat chlorinated water before it enters Silver Stream. Monitoring would be conducted as necessary, and all discharges would meet regulatory requirements. Once the Catskill Aqueduct returns to typical operations in 2023, the local dechlorination system would no longer be operated.

Operation

Once blow-off chamber repairs and streambank restoration and protection are complete, the function of the Blow-off Chambers would be restored. Discharge of raw water to unwater the siphon pipes to Silver Stream could occur in the future during DEP’s typical operations. The

aqueduct could be unwatered via the Blow-off Chambers to conduct maintenance or inspection. This is expected to occur infrequently.

During an unwatering event, new blow-off valves and chambers would be operated to moderate discharge flows. This would result in lower discharges from each chamber of approximately 5,400 gpm at initial valve opening to a maximum flow of approximately 18,900 gpm. It would take approximately 9 hours to unwater the Washington Square Steel Pipe Siphon, as each siphon pipe would be unwatered separately.

Bankfull flow is the flow that just fills the channel to the top of its banks (i.e., stream capacity) and at the point in which water begins to flow onto the floodplain. If the discharge associated with an unwatering event is greater than the bankfull flow, indirect downstream effects, such as an increase in erosion and scouring over the baseline, could be reasonably expected to occur. Bankfull flow could not be predicted for Silver Stream because of the upstream flow control structure, and as such, it could not be determined whether unwatering would result in a bankfull event. Operational controls would be used during unwatering to avoid a potential bankfull event. Flows would be moderated by throttling the valves. They would be monitored by an on-site crew to prevent the receiving stream from becoming inundated by discharges of raw water. In the event that inundation begins to occur during unwatering, the on-site crew would have the ability to cease unwatering at any time to allow streamflows to subside to baseline flows. Moreover, blow-off discharges would be restricted from occurring within 24 hours of predicted rain events, during rain events, and for a period of 48 hours after rain events or after streamflow returns to normal. Therefore, the proposed raw water discharges would be short-term and temporary (up to 9 hours total), are not anticipated to cause scouring, and would not alter stream capacity of Silver Stream.

Because the baseline condition includes the City of Newburgh's use of the Catskill Aqueduct as a water supply, the discharge of raw aqueduct water into Silver Stream during an unwatering event would not represent a significant change from the baseline condition. Although a typical unwatering event during the typical operation of the aqueduct may have higher flows, the discharges would be shorter in duration than discharges related to the City of Newburgh's use of the aqueduct as a drinking water supply.

Water Resources Conclusions

Water resources adjacent to the Blow-off Chambers include Silver Stream and its associated wetlands. While the majority of work activities would result in temporary disturbance, minor permanent disturbance would occur as part of blow-off chamber reconstruction and associated streambank restoration and protection. Discharges would be limited to raw aqueduct unwatering events. These would be infrequent and would be limited to several hours in duration, and biofilm wash waters that would be discharged over the course of 7 weeks in ~~2020~~2019 during the third 10-week shutdown. Permanent fill would be minimal and would be beneficial in that it would repair historic bank erosion and minimize future scouring.

Restoring the historic function of the blow-offs to discharge raw aqueduct water would be a change in baseline conditions. However, based on the above assessment, there would be minimal indirect effects to water resources.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to water resources within the Mount Airy Road Study Area.

Terrestrial Resources

The natural resources study area in the vicinity of the North Siphon Chamber is characterized as successional old field surrounded by a rich mesophytic forest (see **Figure 9.10-9**). Tree species include black walnut (*Juglans nigra*), red maple (*Acer rubrum*), red oak (*Quercus rubra*), black cherry (*Prunus serotina*), bigtooth aspen (*Populus grandidentata*), slippery elm (*Ulmus rubra*), pin oak (*Quercus palustris*), and sassafras (*Sassafras albidum*). Shrubs include multiflora rose (*Rosa multiflora*) and tatarian honeysuckle (*Lonicera tatarica*). Timothy-grass (*Phleum pratense*), catnip (*Nepeta* spp.), strawberry (*Fragaria x ananassa*), yarrow (*Achillea millefolium*), spiny sowthistle (*Sonchus asper*), red clover (*Trifolium pratense*), Russian knapweed (*Rhaponticum repens*), leafy spurge (*Euphorbia esula*), fox grape (*Vitis labrusca*), and poison ivy (*Toxicodendron radicans*) are present in the herbaceous and vine layers.

The natural resources study area in the vicinity of the Blow-off Chambers is characterized as mowed field with trees (see **Figure 9.10-10**). Species include eastern red-cedar (*Juniperus virginiana*), white ash (*Fraxinus americana*), red oak, white oak (*Quercus alba*), tree-of-heaven (*Ailanthus altissima*), and buckthorn (*Rhamnus* spp.). Tatarian honeysuckle, butter and eggs (*Linaria vulgaris*), Oriental bittersweet (*Elastrus orbiculatus*), and fox grape are present in the shrub, herbaceous, and vine layers. Based on the desktop assessment, the South Siphon Chamber is best characterized as mowed lawn with trees, assumed to be comprised of similar species as the other sections of the natural resources study area. While the Town of New Windsor does not regulate tree removal associated with the repair and rehabilitation, terrestrial resources in the study area warrant further analysis.

DEP has consulted with the Town of New Windsor and Orange County, and it is DEP's understanding that no new projects or developments that would affect terrestrial resources are anticipated within the Mount Airy Road Study Area within the timeframe of the impact analysis. Natural processes, such as changes in habitat due to natural vegetative succession, are anticipated to continued. Therefore, in the future without the repair and rehabilitation, it is assumed that terrestrial resources within the natural resources study area would be similar to baseline conditions.

In the future with the repair and rehabilitation, work activities would include minor tree clearing and shrub removal at the North Siphon Chamber for the purpose of improving site access and creating staging areas. It is anticipated that five trees would need to be removed as a part of the work activities in the natural resources study area. These trees include ~~one black walnut, three~~ four eastern red-cedars, and one white ash, with an average dbh of approximately 12 inches and may be removed to establish better access to proposed staging area. All tree removal would be conducted from November 1 through March 31 to avoid impacts to Indiana bats (*Myotis sodalis*) and northern long-eared bats (*Myotis septentrionalis*). These trees are located adjacent to Mount Airy Road. Tree removal would not change the character of the area or affect surrounding trees.

Following construction, staging areas would be restored to natural conditions. Vegetated areas temporarily cleared during construction are anticipated to grow back with similar communities.

Operation of the repaired and rehabilitated Catskill Aqueduct would be consistent with baseline conditions. Natural reforestation and vegetative succession of aqueduct areas not routinely maintained would continue to occur over time.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to terrestrial resources within the Mount Airy Road Study Area.

Federal/State Threatened and Endangered Species and State Species of Special Concern

This section includes an analysis of potential impacts to federal/State Threatened and Endangered Species and State Species of Special Concern identified in Section 9.3.9, “Natural Resources,” as having the potential to be affected by work activities within the natural resources study area. Species that could be affected within the natural resources study area and species that could occur up to 0.25 mile from the work sites were determined in consultation with USFWS, USACE, NYNHP, and NYSDEC, as well as county and local offices, as applicable.

As discussed in Section 9.3.9, “Natural Resources,” seven species were identified to have the potential to be affected by the repair and rehabilitation within the natural resources study areas. Therefore, conditions in the future without the repair and rehabilitation, an analysis of the potential for impacts to these seven species, and a summary of conclusions on the potential effects resulting from the repair and rehabilitation are provided below.

In the future without the repair and rehabilitation, it is assumed that federal/State Threatened and Endangered Species and State Species of Special Concern within the study area would largely be the same as baseline conditions, other than possible changes in habitat due to natural vegetative succession and general anthropogenic influences.

An analysis of the potential for disturbance to federal/State Threatened and Endangered Species and State Species of Special Concern from the repair and rehabilitation within the natural resources study area is shown in **Table 9.10-5**. The analysis included an evaluation of the repair and rehabilitation work activities within the study area and observations from field visits, as applicable.

Table 9.10-5: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern and Habitat within the Mount Airy Road Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Disturbance	Warrants Further Analysis
Amphibians and Reptiles					
Bog Turtle	<i>Clemmys</i> [= <i>Glyptemys</i>] <i>muhlenbergii</i>	Threatened	Endangered	No individuals were incidentally observed during the field visits on November 13 and 14, 2013, and August 3, 2015. During field investigations, wetlands were observed within the natural resource study area near the Blow-off Chambers. The wetlands were observed on November 14, 2013, and identified as palustrine emergent wetlands surrounded by a deciduous forest. Perimeter silt fencing would limit disturbance to adjacent habitat and prevent individual turtles from entering the work sites. Upon construction completion, the site would be restored to natural conditions and the new streambank restoration measures that remain would not affect habitat. Therefore, there are no effects anticipated and no further analysis for bog turtles is warranted for this study area.	No
Eastern Box Turtle	<i>Terrapene carolina</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visits on November 13 and 14, 2013, and August 3, 2015. While work activities would be largely confined to previously disturbed areas, if any isolated areas of potential habitat exist at the sites, as a mobile species, any eastern box turtles that might otherwise use these areas are expected to instead utilize similar, adjacent habitats during construction. Furthermore, perimeter silt fencing would limit disturbance to adjacent habitat and prevent individual turtles from entering the work sites during construction. Finally, upon construction completion, the staging areas would be restored to natural conditions and the new boathole that remains would not affect breeding, nesting, or foraging habitat. Therefore, there are no effects anticipated and no further analysis for eastern box turtles is warranted for this study area.	No
Timber Rattlesnake	<i>Crotalus horridus</i>	Unlisted	Threatened	No individuals were incidentally observed during the field visits on November 13 and 14, 2013, and August 3, 2015. According to NYNHP, no records of timber rattlesnakes were identified within 1.5 miles of the study area. Potential habitat exists within the successional old field areas surrounded by forest. Temporary effects to basking habitat are possible; however, upon completion of the repair and rehabilitation, the staging areas would be restored to natural conditions and the new boathole that remains is not anticipated to affect basking habitat. Therefore, there are no effects anticipated and no further analysis for timber rattlesnakes is warranted for this study area.	No
Wood Turtle	<i>Glyptemys insculpta</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visits on November 13-14, 2013, and August 3, 2015. Work activities include in-water, riparian, and wetland buffer disturbance that have the potential to temporarily disturb wood turtle habitat. Therefore, further analysis for wood turtles is warranted for this study area.	Yes. See further analysis below.

Table 9.10-5: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern and Habitat within the Mount Airy Road Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Disturbance	Warrants Further Analysis
Mammals					
Indiana Bat	<i>Myotis sodalis</i>	Endangered	Endangered	Based on tree surveys conducted on August 3, 2015, no trees with potential bat roosting habitat would be removed. All tree removal would be conducted from November 1 through March 31. The on-site stream and nearby reservoir could be suitable foraging habitat; however, work activities would result in minor, permanent fill within Silver Stream. Given that this would be limited to a small portion of the streambank, it would not adversely impact bat foraging within the study area. Therefore, there are no effects anticipated and no further analysis for Indiana bats is warranted for this study area.	No
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	Threatened	Threatened Unlisted	During the field visits, there was no access to the chamber building interiors to investigate signs of roosting bats at the facility. Should any bats or their guano be observed using these structures for roosting during work activities, USFWS and NYSDEC would be contacted immediately to determine the best course of action. Based on tree surveys conducted on August 3, 2015, no trees with potential bat roosting habitat would be removed. All tree removal would be conducted from November 1 through March 31. On-site stream and nearby reservoir could be suitable foraging habitat; however, work activities would result in minor, permanent fill within Silver Stream. Given that this would be limited to a small portion of the streambank, it would not adversely impact bat foraging within the study area. Therefore, there are no effects anticipated and no further analysis for northern long-eared bats is warranted for this study area.	No
Plants					
Small Whorled Pogonia	<i>Isotria medeoloides</i>	Threatened	Threatened	There were no NYNHP records of in the vicinity of the study area. No suitable habitat or specimens were found within the study area based on the survey conducted on August 3, 2015, which generally corresponds to the peak growing season when individuals would be most apparent. Therefore, there are no effects anticipated and no further analysis for small whorled pogonias is warranted for this study area.	No

Wood Turtle (*Glyptemys insculpta*)

In the future with the repair and rehabilitation, work activities that could potentially affect wood turtles (*Glyptemys insculpta*) or their habitat would be limited to a short reach of stream and the adjacent riparian habitat at the Blow-off Chambers. The study area is disturbed, but may be used by transient turtles moving between suitable adjacent habitats. A number of protective measures would be in place that would further limit the potential for effects. Specifically, perimeter silt fencing, temporary stream diversion, and in-stream turbidity curtains would be erected, as required, for erosion and sediment control prior to commencing work. This would help minimize impacts to potential habitat and prevent individual wood turtles from entering the work sites adjacent to the stream during construction. The excavation and regrading necessary to replace blow-off chambers and discharge pipes would not increase the extent of impervious surface and would not alter runoff to the stream. In addition, unwatering and treated wash water discharge flows would be moderated to ensure that the streambanks are not overtopped as a result of the repair and rehabilitation. Finally, a local dechlorination system would treat chlorinated aqueduct water prior to discharging to Silver Stream. All discharges would be treated to meet water quality standards of Silver Stream. Therefore, no degradation of aquatic habitat is anticipated as a result of the repair and rehabilitation.

In addition to protective measures, the proposed schedule and duration for the in-stream work associated with streambank restoration is anticipated to minimize disturbance to wood turtles and their habitat. Specifically, this work would not occur when wood turtles are hibernating within the stream, but primarily during the summer and fall when the species travel through the creek. As a mobile species, they are anticipated to utilize adjacent habitat while these work activities take place. Furthermore, both treated wash water and raw water discharges would occur during the fall when wood turtles retreat to rivers and large streams for hibernation. This stream reach may be susceptible to freezing during winter, so it may not provide suitable habitat for hibernation. Moreover, the proposed streambank restoration (including installation of riprap aprons) is scheduled to be completed prior to aqueduct unwatering and treated wash water discharge to prevent scour and streambank erosion.

Once completed, the streambank restoration measures would dissipate flows during future unwatering events to protect downstream shorelines and riparian habitat. While in-stream and streambank habitat would be permanently altered, the upgrades and maintenance would be limited to a small portion of the stream as a whole and there would therefore be minimal effects to potential wood turtle habitat along Silver Stream.

While no wood turtle individuals were identified during the field visits, and the perimeter fencing is anticipated to prevent wood turtles from entering the work areas, any wood turtles encountered within the limits of construction would be moved by a DEP Wildlife Specialist to adjacent suitable habitat. Upon construction completion, the staging areas would be restored to natural conditions and planted with native vegetation. The new boathole and streambank restoration measures that remain would not affect breeding, nesting, or foraging habitat. In summary, given the range of protective measures that would be in place for the duration of construction, the schedule and temporary duration of the proposed work activities, and permanent stream protection that would benefit wood turtle habitat during future aqueduct

unwatering, no effects are anticipated to wood turtles and their habitat. Therefore, the repair and rehabilitation may affect, but is unlikely to adversely affect, wood turtles in this study area.

Federal/State Threatened and Endangered Species and State Species of Special Concern Conclusions

Based on the impact analysis, no take is anticipated. There would be no effects to bog turtles (*Clemmys [=Glyptemys] muhlenbergii*), eastern box turtles (*Terrapene carolina*), timber rattlesnakes (*Crotalus horridus*), Indiana bats, northern long-eared bats, or small whorled pogonias (*Isotria medeoloides*) associated with the repair and rehabilitation. The repair and rehabilitation may affect, but is not likely to adversely affect, wood turtles.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to federal/State Threatened and Endangered Species or State Species of Special Concern within the Mount Airy Road Study Area.

9.10.3.6 Hazardous Materials

To evaluate the potential presence of hazardous materials within the Mount Airy Road Study Area, a Phase I Environmental Site Assessment (ESA) was conducted in general conformance with the scope and limitations of American Society for Testing and Materials (ASTM) Practice E 1527-13 and City Environmental Quality Review (CEQR) requirements to identify Recognized Environmental Conditions (RECs). The Phase I ESA included site reconnaissance, research on current/historical use, and review of federal and State regulatory listings for both the site itself and for its neighboring properties within appropriate search distance defined in the ASTM standard. The findings from the Phase I ESA investigation and results from DEP's legacy files for the work sites, including a geotechnical investigation and environmental health and safety sampling, were collectively reviewed to assess the potential presence of and potential for disturbance to hazardous materials in the study area.

Based on the Phase I ESA investigations, there was no indication of an environmental impact that would constitute a REC as defined by the ASTM standard that would affect work activities in the study area. Additionally, there is no history of contamination at, or in the vicinity of, the Mount Airy Road Study Area where a new boathole would be constructed, and where temporary gravel placement would occur for the construction staging area and access road.

A Phase I ESA or hazardous materials assessment would be conducted prior to disturbance or work activities as part of the project at the proposed blow-off chamber reconstruction, access road, and construction staging area in accordance with ASTM Practice E 1527-13, CEQR requirements, and other governmental regulations and guidelines.

The Blow-off Chambers are located on a previously disturbed area along the Washington Square Steel Pipe Siphon (see **Figure 9.10-7**). Given the findings of previous subsurface investigation along similar portions of the aqueduct corridor, no subsurface ground contamination is anticipated.

Geotechnical environmental investigations and sampling were undertaken for contaminants of concern including asbestos, lead, volatile and semivolatile organics, polychlorinated biphenyls (PCBs), and total petroleum hydrocarbons along the aqueduct within the study area. Chromium was noted in the soil sampling results. Total chromium was reported in the sample collected at the North Siphon Chamber (see **Figure 9.10-6**). Chromium concentrations, however, were consistent over a widespread sampling area and are more likely associated with background concentrations. Along the Catskill Aqueduct, there are widespread occurrences of chromium, which are attributed to the existing geological formations. The legacy data also revealed that lead-containing materials are present on the middle broome gate and metal exterior door of the North Siphon Chamber building (see **Figure 9.10-6**). Materials sampled did not identify asbestos-containing materials, PCB-containing paint, or mercury-containing paint. In addition, gasoline range organics were not detected in the samples. Total petroleum hydrocarbons were detected, but at low concentrations that are not considered to be indicative of contamination that warrants remedial actions.

Based on the results of the environmental investigations completed within the Mount Airy Road Study Area, no other hazardous materials are known to exist. The soil results support the reuse of excavated materials associated with the boathole installation and blow-off chamber reconstruction as backfill and do not suggest the need for special management, handling, or health and safety measures at this time.

DEP has consulted with the Town of New Windsor and Orange County, and it is DEP's understanding that no developments or structures that would introduce hazardous materials to the environment are anticipated within the Mount Airy Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that the presence of hazardous materials within the Mount Airy Road Study Area would be the same as baseline conditions.

In the future with the repair and rehabilitation, work activities would require the potential storage and use of a variety of petroleum and other chemical products, such as diesel fuel for backup power, lubricating oil for construction vehicles, and miscellaneous cleaning and maintenance chemicals during construction. DEP would handle all materials in accordance with applicable federal, State, and local regulations and guidelines. The use and storage of all of these would be in accordance with applicable regulatory requirements and guidelines including those relating to federal Spill Prevention, Control, and Countermeasures requirements; and State petroleum bulk storage, chemical bulk storage, and spill reporting requirements. Furthermore, excavation associated with the work activities for the installation of a new boathole and blow-off chamber reconstruction would occur on previously disturbed soils. Following construction, all equipment would be removed from the Mount Airy Road Study Area. The staging areas would be restored to baseline conditions, and operation of the repaired and rehabilitated Catskill Aqueduct would be consistent with baseline conditions.

Therefore, the repair and rehabilitation would not result in significant adverse impacts from the presence or disturbance of hazardous materials within the Mount Airy Road Study Area.

9.10.3.7 Transportation

The study area for the transportation analysis consists of the major convergent roadways that would potentially be used by the employee and construction vehicles associated with repair and rehabilitation work activities en route to and from the Mount Airy Road Study Area.

Access to the repair and rehabilitation limits of construction for the work sites within the Mount Airy Road Study Area would be via Mount Airy Road and Moores Hill Road to an existing access road (see **Figure 9.10-2**). The South Siphon Chamber would be accessed by driving over the cut-and-cover tunnel to Passaro Drive via the Moodna Pressure Tunnel Downtake Chamber (see **Figure 9.10-2**). Mount Airy Road is a two-lane, two-way major collector roadway. Moores Hill Road is a two-lane, two-way local roadway. To the extent available, construction vehicles would travel on truck-permitted roadways directly to and from the Mount Airy Road Study Area.

There is no public transportation and little to no pedestrian activity in the immediate vicinity of the study area. Under current operations, DEP employees periodically access the site. However, there are no DEP employees who work at or visit the study area on a daily basis, and the small number of DEP employee vehicles has little to no effect on traffic conditions within the study area.

DEP has consulted with the Town of New Windsor and Orange County, and it is DEP's understanding that no changes in land use or an increase in traffic due to outside developments is anticipated within the Mount Airy Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that traffic, public transportation, and pedestrian use within the study area would be similar to baseline conditions.

Repair and rehabilitation work activities within the Mount Airy Road Study Area were evaluated to determine which would have the potential to generate the most vehicle trips and therefore be the basis of this transportation analysis. Of these work activities, blow-off chamber reconstruction would generate the most vehicle trips. Blow-off Chamber reconstruction would occur in summer ~~2019~~²⁰¹⁸ between the hours of 7 AM and 5 PM, Monday through Friday, for approximately 9 weeks, with work that requires shutdowns being performed in spring or fall of that year (see **Figure 9.10-7**).

In the future with the repair and rehabilitation, construction vehicles would travel along Moores Hill Road to the DEP access road. The estimated number of peak-day one-way vehicle trips associated with blow-off chamber reconstruction is 85 vehicles, or approximately 170 peak-day vehicle round trips that would travel to and from the study area. Approximately 24 vehicle round trips (24 Passenger Car Equivalents [PCEs]) would be workers either traveling to and from the study area or traveling directly to and from the staging area (depending on parking capacity), with potentially 4 daily shuttle trips between the study area and the staging area. The remaining approximately 142 peak-day vehicle round trips (343 PCEs) would be trucks or other construction vehicles.

During a peak day, the estimated number of peak-hour vehicle trip ends associated with blow-off chamber reconstruction is approximately 37 peak-hour vehicle trip ends (66 PCEs). This would include approximately 12 vehicle trip ends (12 PCEs) from workers traveling directly to and from the staging area. It would also include approximately 2 daily shuttle trips between the study area and the staging area, and approximately 23 vehicle trip ends (52 PCEs) from trucks or other

construction vehicles. For the purpose of this analysis, the peak-hour project-generated vehicles are anticipated to coincide with typical construction hours for employee vehicles entering the site. Assuming one 12-hour shift, this would be from 6 AM to 7 AM, and would be unlikely to coincide with the peak hour for existing traffic.

The repair and rehabilitation would result in approximately 66 peak-hour PCEs along Mount Airy Road and Moores Hill Road, which is above the *CEQR Technical Manual* screening threshold of 50 peak-hour PCEs as described in Section 9.3.13, “Transportation.” The work activities at the Mount Airy Road Study Area would be short-term (totaling 26 weeks over 1.5 years; see **Table 9.10-2**) and would not generate public parking, transportation demands, or pedestrian use within the Mount Airy Road Study Area. Following completion of the repair and rehabilitation, traffic patterns would return to baseline conditions.

Therefore, although there would be a minor temporary increase in traffic, the repair and rehabilitation would not result in significant adverse impacts to transportation within the Mount Airy Road Study Area.

9.10.3.8 Noise

As described in Section 9.3.15, “Noise,” mobile noise associated with the repair and rehabilitation within the Mount Airy Road Study Area does not warrant analysis. This section includes an analysis of potential impacts from stationary noise associated with the repair and rehabilitation to sensitive receptors within the study area.

The study area for the stationary noise analysis is the area within 1,500 feet of the repair and rehabilitation activities as shown on **Figure 9.10-11**.

The Mount Airy Road Noise Study Area includes residential parcels within 1,500 feet of the repair and rehabilitation work sites that are considered noise-sensitive receptors for this analysis. The study area is subject to the Town of New Windsor Noise Control Laws. The Town of New Windsor Noise Control code (§300-71) exempts construction noise between the hours of 7 AM to 7 PM on weekdays and between the hours of 8 AM to 6 PM on Saturdays. However, work that would occur outside the hours specified, except for noise emanating from the operation of motor vehicles on public highways and private roads, is restricted to a maximum sound pressure level of 65 decibels between 8 AM to 9 PM and 56 decibels between 9 PM to 8 AM in the residential zoning districts, and 80 decibels between 8 AM to 10 PM and 70 decibels between 10 PM and 8 AM in non-residential districts. Compliance is evaluated at the nearest emitting property line to the sound source. No construction sounds are permitted on Sundays and legal holidays.

Existing ambient noise levels within the Mount Airy Road Study Area are influenced by vehicular traffic traveling on Mount Airy Road and other local roadways. The existing noise levels within the study area are comparable to a quiet suburban residential environment based on the distance from major transportation corridors, the population density of the area, and the presence of other noise-producing elements. Typical noise levels (measured as L_{eq}) for quiet suburban communities are 45 dBA during the daytime and 39 dBA during the nighttime.

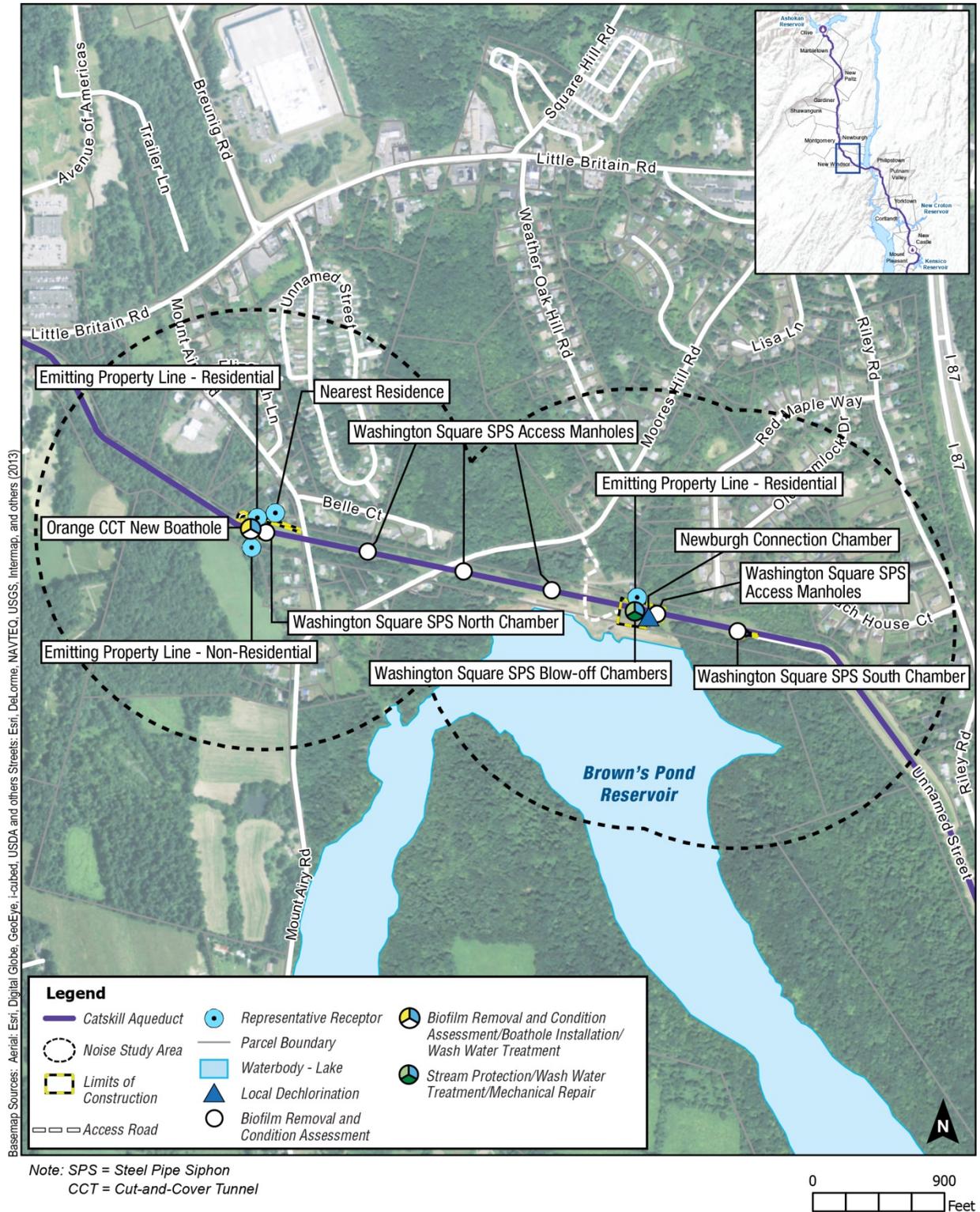


Figure 9.10-11: Noise – Mount Airy Road Study Area



DEP has consulted with the Town of New Windsor and Orange County, and it is DEP’s understanding that no major projects that would result in a change in land use, or new noise-generating sources that would contribute to an increase in ambient noise levels, are anticipated within the Mount Airy Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that ambient noise levels within the Mount Airy Road Study Area would be similar to baseline conditions.

In the future with the repair and rehabilitation, stationary noise-producing work activities within the Mount Airy Road Study Area would occur on three sites. The stationary noise-generating equipment that would be used within the Mount Airy Road Study Area was evaluated to determine which work activity would have the potential to emit the most noise and, therefore, be the basis of this stationary noise analysis. Of the activities, the stationary noise-generating equipment associated with the boathole installation and blow-off chamber reconstruction are expected to emit the most noise at noise-sensitive receptors. Boathole installation would occur in fall ~~2019~~2018 between the hours of 7 AM and 7 PM, 7 days a week for approximately 2 weeks during the second 10-week shutdown. Blow-off Chamber reconstruction would occur in summer ~~2019~~2018 between the hours of 7 AM and 5 PM, Monday through Friday, for approximately 9 weeks prior to the second 10-week shutdown (see **Table 9.10-2**).

The noise analysis focused on the three loudest stationary noise-generating equipment types necessary for the boathole installation and blow-off chamber reconstruction. Associated equipment reference noise levels are shown in **Table 9.10-6**. The types of noise-generating equipment analyzed were conservatively based on peak construction operating conditions.

Table 9.10-6: Stationary Source Construction Equipment Modeled at the Mount Airy Road Study Area – Noise Analysis and Reference Noise Levels (L_{max})

Equipment Type	Reference Noise Level (L _{max}) at 50 feet (dBA) ¹
Boathole Installation (7 AM to 7 PM, 7 days a week)	
Crane	85
Concrete Mixer Truck	85
Generator	82
Blow-off Chamber Reconstruction (7 AM to 5 PM, Monday through Friday)	
Dozer	85
Excavator	85
Crane	85
Note:	
¹ City Environmental Quality Review (CEQR) Technical Manual, Chapter 22.	

Table 9.10-7 shows the results of the stationary construction noise analysis. The Town of New Windsor L_{max} limits apply at the emitting property line of the work activities and define daytime and nighttime noise limits based on the land use district. The Mount Airy Road limits of construction are bordered by both residential and non-residential land uses. However, the nearest

noise-sensitive receptor is a residence approximately 180 feet away from the work activities. Boathole installation within the Mount Airy Road Study Area during the repair and rehabilitation would emit a noise level (L_{max}) of approximately 85 dBA at the property line of the work area and 78 dBA at the nearest residence. Other noise-producing equipment would also be utilized within the study area for a limited period during work activities. However, this equipment would not be expected to be louder than those associated with boathole installation and blow-off chamber reconstruction. Due to the work schedule, blow-off chamber reconstruction would be exempt from the Town of New Windsor L_{max} limits. However, boathole installation would occur during hours that are outside of the exemption. Since the repair and rehabilitation within the Mount Airy Road Study Area would emit noise levels greater than allowed by the Town of New Windsor noise codes and would occur outside of allowed construction hours, DEP would work with the Town of New Windsor as appropriate.

Table 9.10-7: Stationary Noise Analysis Results (L_{max}) at the Nearest Noise-Sensitive Receptors within the Mount Airy Road Study Area

Nearest Noise-Sensitive Receptor	Distance from Site (Feet)	Predicted Stationary Noise Level (L_{max}) at Noise-Sensitive Receptor (dBA)	Town of New Windsor Noise Limit (dBA)	Potential for Exceedance (Yes or No)
Boathole Installation (7 AM to 7 PM, 7 days a week)				
Emitting Property Line - Non-residential	129	81	80 ¹ /70 ²	Yes
Emitting Property Line - Residential	78	85	65 ³ /56 ⁴	Yes
Nearest Residence	176	78	NA	NA
Blow-off Chamber Reconstruction (7 AM to 5 PM, Monday through Friday)				
Emitting Property Line - Residential	75	86	65 ³ /56 ⁴	No ⁵
Notes:				
NA = Not Applicable				
¹ Noise limit is applicable between the hours of 8 AM and 10 PM in non-residential districts.				
² Noise limit is applicable between the hours of 10 PM and 8 AM in non-residential districts.				
³ Noise limit is applicable between the hours of 8 AM and 9 PM in residential districts.				
⁴ Noise limit is applicable between the hours of 9 PM and 8 AM in residential districts.				
⁵ Construction noise between the hours of 7 AM to 7 PM on weekdays is exempt.				

Following completion of the repair and rehabilitation work activities, the construction equipment and vehicles would be removed from the Mount Airy Road Study Area. The repair and rehabilitation work activities would be temporary in nature with peak work activities occurring during boathole installation in fall 2019~~2018~~ and blow-off chamber reconstruction in summer 2019~~2018~~ for limited periods (for example, up to 9 weeks). Therefore, although there would be a temporary increase in noise, noise from the repair and rehabilitation would not result in significant adverse impacts to sensitive receptors within the Mount Airy Road Study Area.

9.10.3.9 Neighborhood Character

The character of the Mount Airy Road Study Area is largely defined by a mix of agricultural, residential, commercial, vacant, and public services land uses and its physical setting within a rural location (see **Figure 9.10-4**). The Catskill Aqueduct traverses the study area in a general west to east direction. Brown's Pond Reservoir extends into the southeastern portion of the study area, discharging to Silver Stream, which flows to the north. Mount Airy Road crosses the western portion of the study area and intersects Moores Hill Road, which bisects the study area in a general southwest to northeast direction. The limits of construction for the work site and associated access route are located in a public services corridor with grassy cover, which is owned and maintained by DEP and abutted on the north and south sides by forested areas.

DEP has consulted with the Town of New Windsor and Orange County, and it is DEP's understanding that no changes in land use and no new projects or structures are anticipated within the Mount Airy Road Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that neighborhood character within the study area would be similar to baseline conditions.

As described in Section 9.3.16, "Neighborhood Character," there would be no potential for the repair and rehabilitation to affect shadows and urban design. In addition, based on the screening assessment for land use and zoning; socioeconomic conditions; and historic and cultural resources, an impact analysis for the Mount Airy Road Study Area was not warranted, as discussed in the following sections: Section 9.3.3, "Land Use, Zoning, and Public Policy," Section 9.3.4, "Socioeconomic Conditions," and Section 9.3.7, "Historic and Cultural Resources," respectively. As described in Section 9.10.3.3, "Open Space and Recreation," and Section 9.10.3.4, "Visual Resources," the work activities would have no significant adverse impact to open space and recreation and visual resources in the Mount Airy Road Study Area. Furthermore, the public policy impact analysis provided in 9.10.2, "Town of New Windsor Impact Analysis," concluded the work activities were consistent with applicable plans.

As described in Sections 9.10.3.7, "Transportation," and 9.10.3.8, "Noise," during construction, the work activities in the Mount Airy Road Study Area would be short-term (intermittently over 1.5 years) and would result in a temporary increase in traffic and noise. Following completion of the repair and rehabilitation, the construction equipment and vehicles would be removed from the study area and traffic patterns would return to baseline conditions. These temporary increases in traffic and noise levels would not result in a density of activity or service conditions that would affect the overall character of the study area.

The repair and rehabilitation would not generate significant adverse effects on land use, zoning, and public policy; socioeconomic conditions; open space and recreation; shadows; historic and cultural resources; urban design and visual resources; transportation; or noise.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to neighborhood character within the Mount Airy Road Study Area.

9.10.4 PASSARO DRIVE STUDY AREA IMPACT ANALYSIS

Within the Passaro Drive Study Area, the aqueduct transitions from the Orange Cut-and-Cover Tunnel to the Moodna Pressure Tunnel. This transition occurs via a deep vertical shaft at the Moodna Pressure Tunnel Downtake Chamber (Moodna Downtake Chamber), which is equipped with a boathole on the northern side (see **Figure 9.10-12**).

Work activities within the Passaro Drive Study Area would include: staging and access improvements; boathole preparation and installation; biofilm removal and condition assessment; and large-scale wash water treatment.

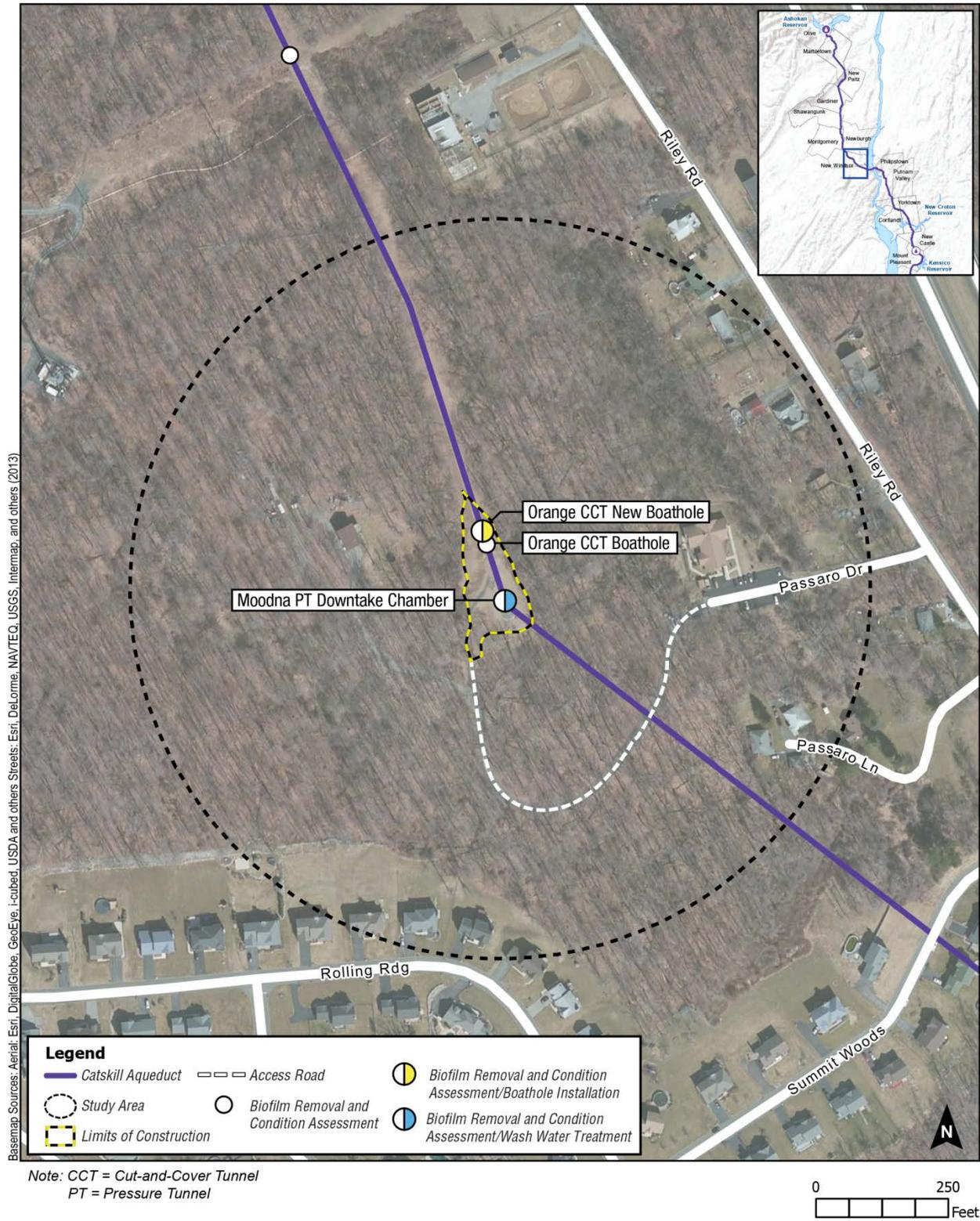
9.10.4.1 Study Area Location and Description

The Passaro Drive Study Area is located along the upper Catskill Aqueduct in the Town of New Windsor. The Catskill Aqueduct traverses the study area in a general northwest to southeast direction. The study area is roughly bounded by Riley Road to the northeast and Rolling Ridge, a subdivision road, to the south. A portion of Passaro Drive, a private road off Riley Road, intersects the study area from the east. The proposed work site is located at the Moodna Downtake Chamber. Access would be provided by an access road that connects to Passaro Drive. The study area boundary is located approximately 400 feet beyond the outermost areas of disturbance related to the work site. **Figure 9.10-12** shows an aerial photograph of the study area, including the path of the aqueduct, the limits of construction for the work site, and the proposed access route. **Figure 9.10-13** shows photographs of the study area.

The study area consists of residential, commercial, community facilities, and public services land uses, in addition to some vacant land parcels. Land cover is largely forested, with some residential development. The limits of construction for the work site is located in a public services corridor with grassy cover, which is owned and maintained by DEP. Passaro Drive and a portion of the access road are located on private property, on a shared driveway with a community facility. This site is accessed with permission from the owner. **Figure 9.10-14** shows a map of the land uses in the study area and its surroundings.

Zoning in the Passaro Drive Study Area includes open space residential (R-2) and suburban residential (R-3) zoning districts, as designated by the Town of New Windsor Zoning Code (see **Figure 9.10-15**). The Catskill Aqueduct is located within the open residential (R-2) zoning district, which provides for low- and medium-density single-family residences, and a small portion of the suburban residential (R-3) zoning district, which provides for one- and two-family residences. The Catskill Aqueduct is a permitted use as a water transmission system (essential service) within the open space residential (R-2) and suburban residential (R-3) zoning districts.

There are no federal, State, or local designated landmarks, historic districts, or known archeological resources within the study area.



Basemap Sources: Aerial: Esri, DigitalGlobe, GeoEye, i-cubed, USDA and others Streets: Esri, DeLorme, NAVTEQ, USGS, Intermap, and others (2013)

Figure 9.10-12: Study Area – Passaro Drive





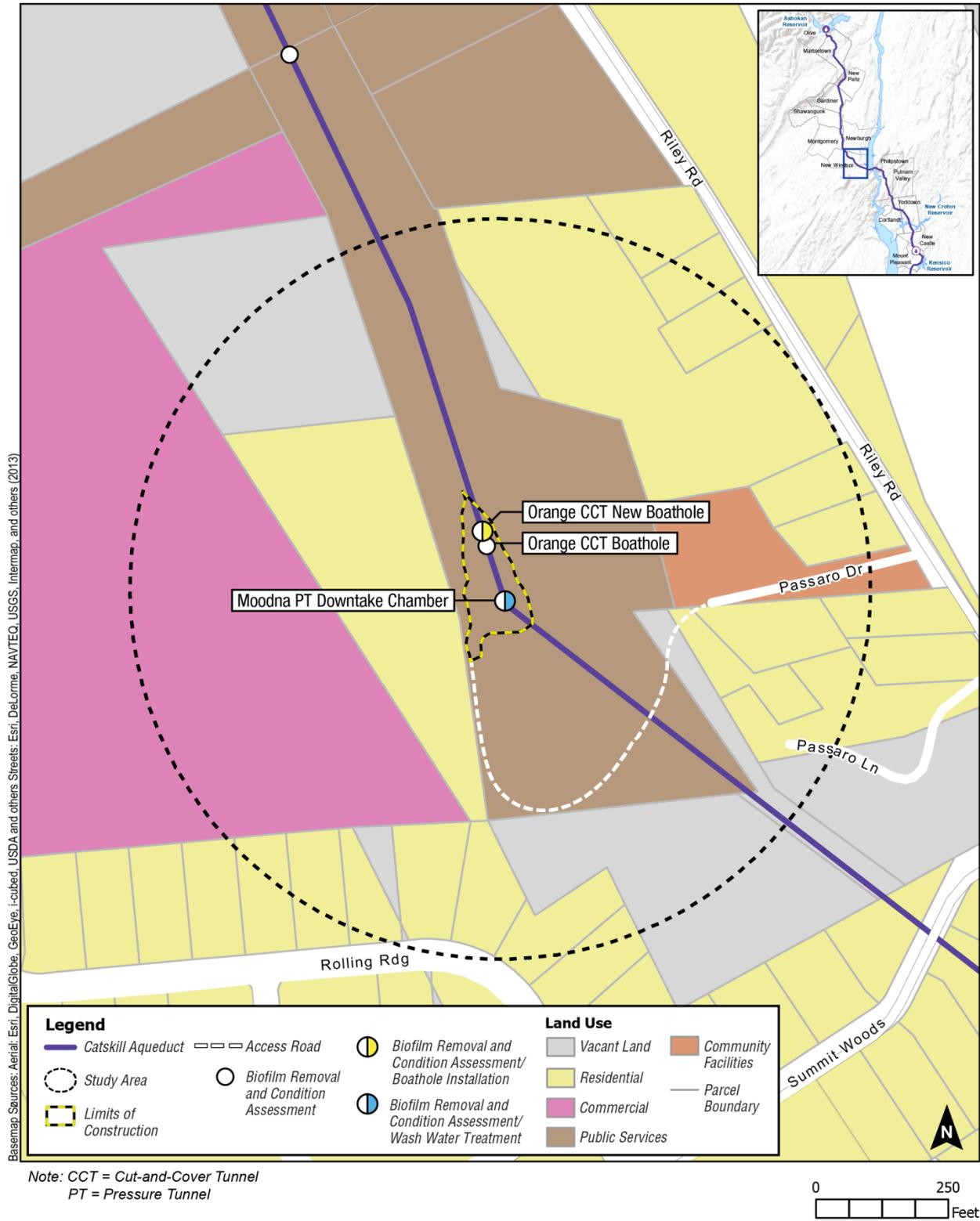
Photograph 1: View from Moodna Downtake Chamber, facing north.



Photograph 2: Looking south from aqueduct corridor to access road.

Figure 9.10-13: Photographs – Passaro Drive Study Area





Basemap Sources: Aerial: Esri, DigitalGlobe, GeoEye, i-cubed, USDA and others Streets: Esri, DeLorme, NAVTEQ, USGS, Intermap, and others (2013)

Figure 9.10-14: Land Use – Passaro Drive Study Area



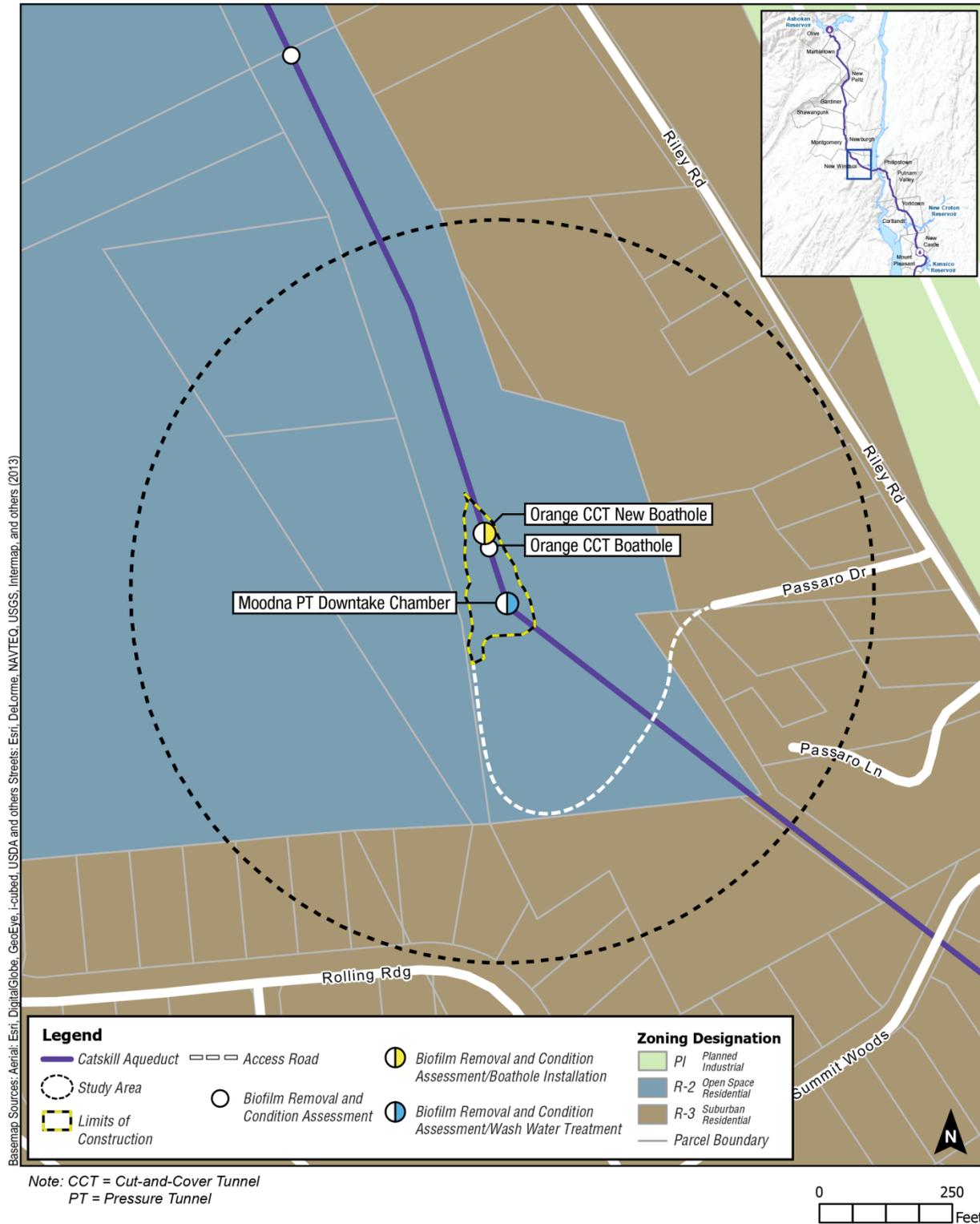


Figure 9.10-15: Zoning - Passaro Drive Study Area



9.10.4.2 Proposed Activities within the Passaro Drive Study Area

To support activities within the Passaro Drive Study Area, the Shaft 4 Interconnection (within the Armato Lane Study Area in the Town of Gardiner) would serve as a primary staging area from which workers would be transported to the site daily. Several secondary staging areas, including one at the Moodna Downtake Chamber, would provide additional parking. Equipment and materials would be staged on site. Erosion and sediment control measures such as silt fencing and hay bales would be installed at the perimeter of the work site as needed. A site plan showing a layout of the limits of construction for the work site, which would occupy a total of 0.6 acre, is shown on **Figure 9.10-16**. The schedule for work within the study area is shown in **Table 9.10-8**. The duration of active construction within the Passaro Drive Study Area is estimated to total 17 weeks over 1.5 years, with some overlapping activities.

Table 9.10-8: Schedule of Work Activities within the Passaro Drive Study Area

Work Activity	Dates	Duration	Work Hours	Crew Size ¹
Staging and Access Improvements ²	Summer 2019 2018	2 weeks	Monday to Friday, 7 AM to 5 PM	8
Boathole Preparation	Summer 2019 2018	3 weeks	Monday to Friday, 7 AM to 5 PM	10
Boathole Installation	Fall 2019 2018 (Second 10-week shutdown)	2 weeks	7 days a week, 7 AM to 7 PM	8
Biofilm Removal and Condition Assessment ³	Fall 2020 2019 (Third 10-week shutdown)	2 weeks	7 days a week, 7 AM to 7 PM	21
Large-scale Wash Water Treatment ³	Fall 2020 2019 (Third 10-week shutdown)	10 weeks	7 days a week, 24 hours per day	7
Notes:				
¹ Crew size refers to the number of people anticipated at the work site(s).				
² Tree removal would be conducted from November 1 through March 31 to avoid impacts to Indiana bats (<i>Myotis sodalis</i>) and northern long-eared bats (<i>Myotis septentrionalis</i>).				
³ Overlapping activities are estimated to total 2 weeks and are not included in the duration of active construction.				

Work in the study area would begin in summer ~~2019~~2018 with staging and access improvements. Improvements would involve grading and the removal of up to nine trees to establish a staging area, in addition to underbrush clearing and gravel placement for leveling and erosion control. Improvements at the Moodna Downtake Chamber would remain in place following construction so this area can continue to be utilized by DEP for future operations and maintenance activities.

Preparation of the new boathole would also take place in summer ~~2019~~2018. The work would consist of the excavation of approximately 45 cubic yards of soil and construction of a cast-in-place concrete collar. Boathole installation, which requires unwatering of the aqueduct to tie-in to the crown of the cut-and-cover tunnel, would take place during the second 10-week shutdown in fall ~~2019~~2018.

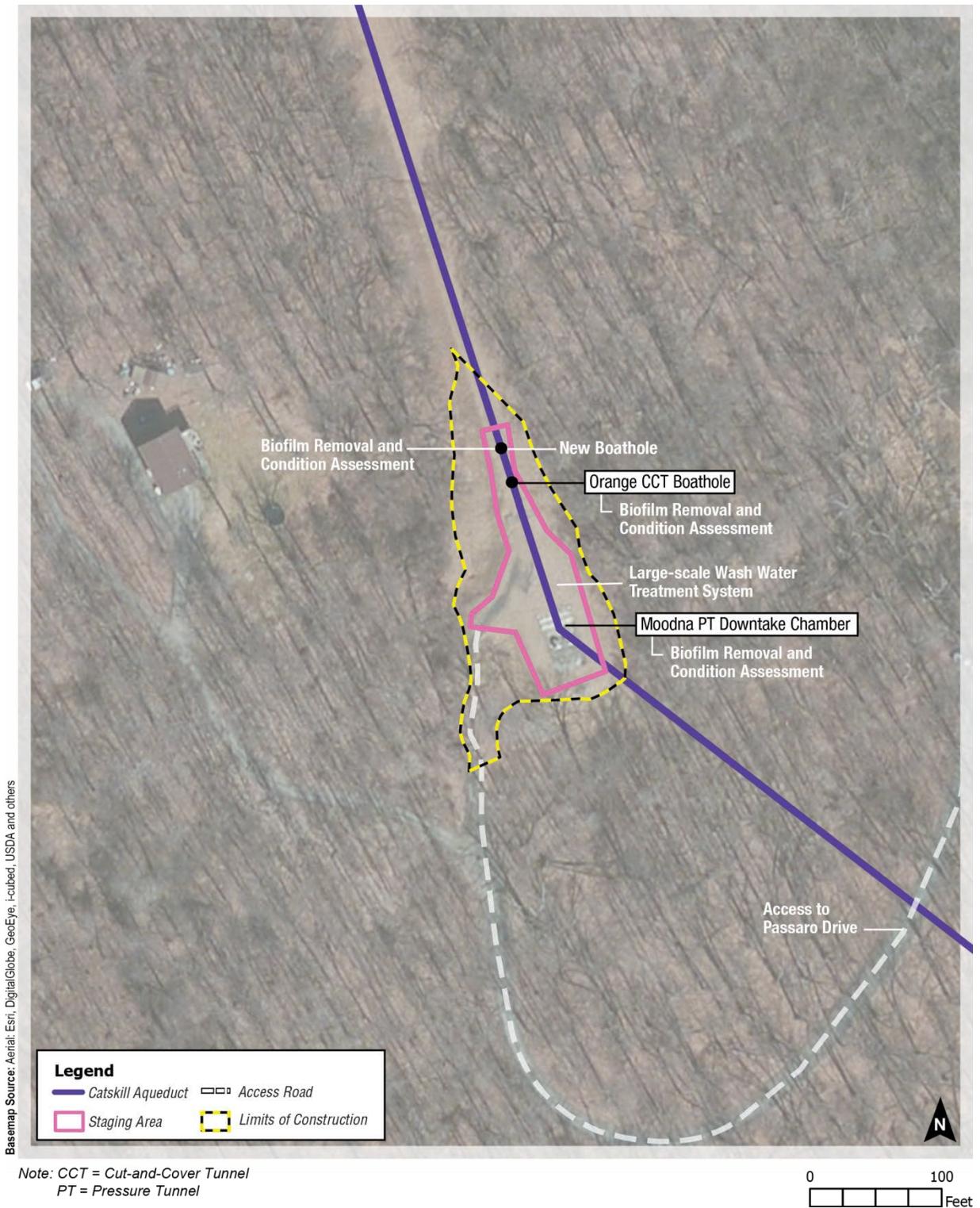


Figure 9.10-16: Site Plan - Passaro Drive Study Area



Lastly, biofilm removal and condition assessment would occur during the third 10-week shutdown in fall ~~2020~~2019. Access into the aqueduct would be provided by the new boathole and the existing boathole at the Moodna Downtake Chamber. These locations would also serve as collection points for biofilm, which would be transported for disposal at a registered, permitted, or otherwise authorized facility. Although the aqueduct would be unwatered during this shutdown, any residual water would be diverted through an internal bypass pipe around the work segments within the aqueduct for discharge to the aqueduct downstream. Any residual water that does not meet water quality standards, and any wash water generated from biofilm removal, would then be transported to a large-scale wash water treatment system. The system would be established at the new boathole, where wash water would be treated to meet water quality standards for discharge back into the aqueduct or to a nearby waterbody (see Section 9.2, “Project Description”). The treatment facility would require 24-hour operation to process the anticipated volume of wash water. Upon completion of biofilm removal and condition assessment, all equipment and materials would be removed, and any areas requiring temporary disturbance would be restored to baseline conditions.

Impact categories analyzed for the Passaro Drive Study Area are presented in Section 9.10.4.3, “Community Facilities and Services,” through Section 9.10.4.8, “Neighborhood Character,” and include: community facilities and services; natural resources, including terrestrial resources and federal/State Threatened and Endangered Species and State Species of Special Concern; hazardous materials; transportation; stationary noise; and neighborhood character. Additionally, the study area’s compatibility with applicable public policies was analyzed on a town-wide basis in Section 9.10.2, “Town of New Windsor Impact Analysis.” As described in Section 9.3, “Screening Assessment and Impact Analysis Methodology,” an impact analysis related to land use and zoning; socioeconomic conditions; open space and recreation; historic and cultural resources; visual resources; the remaining natural resources subcategories, including geology and soils, water resources, aquatic and benthic resources, wildlife, federal/State Candidate Species, and unlisted rare and vulnerable species; energy; air quality; and mobile noise within the study area is not warranted. Finally, impacts related to project-wide natural resources, water and sewer infrastructure, and public health were analyzed within Section 9.19, “Project-wide Impact Analysis.”

9.10.4.3 Community Facilities and Services

As shown on **Figure 9.10-14**, one community facility is located along a private road, Passaro Drive, along Riley Road. This facility is the Hudson Valley Developmental Disabilities Service Offices, which is a school for special needs individuals operated by New York State Office for People with Developmental Disabilities. DEP shares use of Passaro Drive for access to the Moodna Downtake Chamber through an existing agreement.

DEP has consulted with the Town of New Windsor and Orange County, and it is DEP’s understanding that no new community facilities and services are planned or under development within the Passaro Drive Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that community facilities and services within the Passaro Drive Study Area would be the same as baseline conditions.

In the future with the repair and rehabilitation, work activities would not require a reallocation of public safety or police services to the Hudson Valley Developmental Disabilities Service Offices, equipment and trucks would use Passaro Drive to access the Moodna Downtake Chamber. There would be 24-hour site access for 10 weeks during large-scale wash water treatment, and other periods when the site would be accessed during weekdays and weekends. Due to the short-term nature of the work (intermittently over 1.5 years), temporary construction access is not anticipated to impact the use of or access to the community facility within the study area. Therefore, work activities associated with the new boathole and biofilm removal and condition assessment and small-scale wash water treatment would not result in any significant adverse impacts to community facilities and services.

Following construction, all equipment and vehicles would be removed and temporarily disturbed areas would be restored to baseline conditions. The boathole at the Moodna Downtake Chamber would be a permanent structure that would remain following construction, but would not affect access to the facility. Following the repair and rehabilitation, operation of the Catskill Aqueduct would be consistent with baseline conditions.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to community facilities and services within the Passaro Drive Study Area.

9.10.4.4 Natural Resources

A natural resources study area was established for the natural resources analysis and includes the immediate area surrounding the limits of construction at the Moodna Pressure Tunnel Downtake Chamber (see **Figure 9.10-17**).

Based on a field visit conducted on November 14, 2013, habitat in the vicinity of the Moodna Downtake includes a successional old field surrounded by an oak-tuliptree forest (Edinger et al. 2014). The site also has steep grassy slopes on the south, east, and west sides of the Moodna Downtake. These habitats have the potential to support terrestrial resources and protected wildlife species, and an analysis of the potential effects to natural resources that could result from the repair and rehabilitation work activities is presented below.

Terrestrial Resources

The natural resources study area in the vicinity of the Moodna Downtake Chamber includes a successional old field surrounded by an oak-tuliptree forest (see **Figure 9.10-17**). Tree species include sugar maple (*Acer saccharum*), tree-of-heaven (*Ailanthus altissima*), tuliptree (*Liriodendron tulipifera*), pin oak (*Quercus palustris*), Norway maple (*Acer platanoides*), American elm (*Ulmus americana*), black locust (*Robinia pseudoacacia*), bigtooth aspen (*Populus grandidentata*), sassafras (*Sassafras albidum*), and flowering dogwood (*Cornus florida*). Shrub species include multiflora rose (*Rosa multiflora*), wineberry (*Rubus phoenicolasius*), tatarian honeysuckle (*Lonicera tatarica*), and Japanese barberry (*Berberis thunbergii*). Herbs and vines include garlic mustard (*Alliaria petiolata*), Timothy-grass (*Phleum pratense*), tall crabgrass (*Digitaria sanguinalis*), wild bergamot (*Monarda fistuosa*), New York fern (*Parathelypteris noveboracensis*), fox grape (*Vitis labrusca*), and poison ivy (*Toxicodendron radicans*). There are large oaks (18 to 24 inches) on the westerly side of the

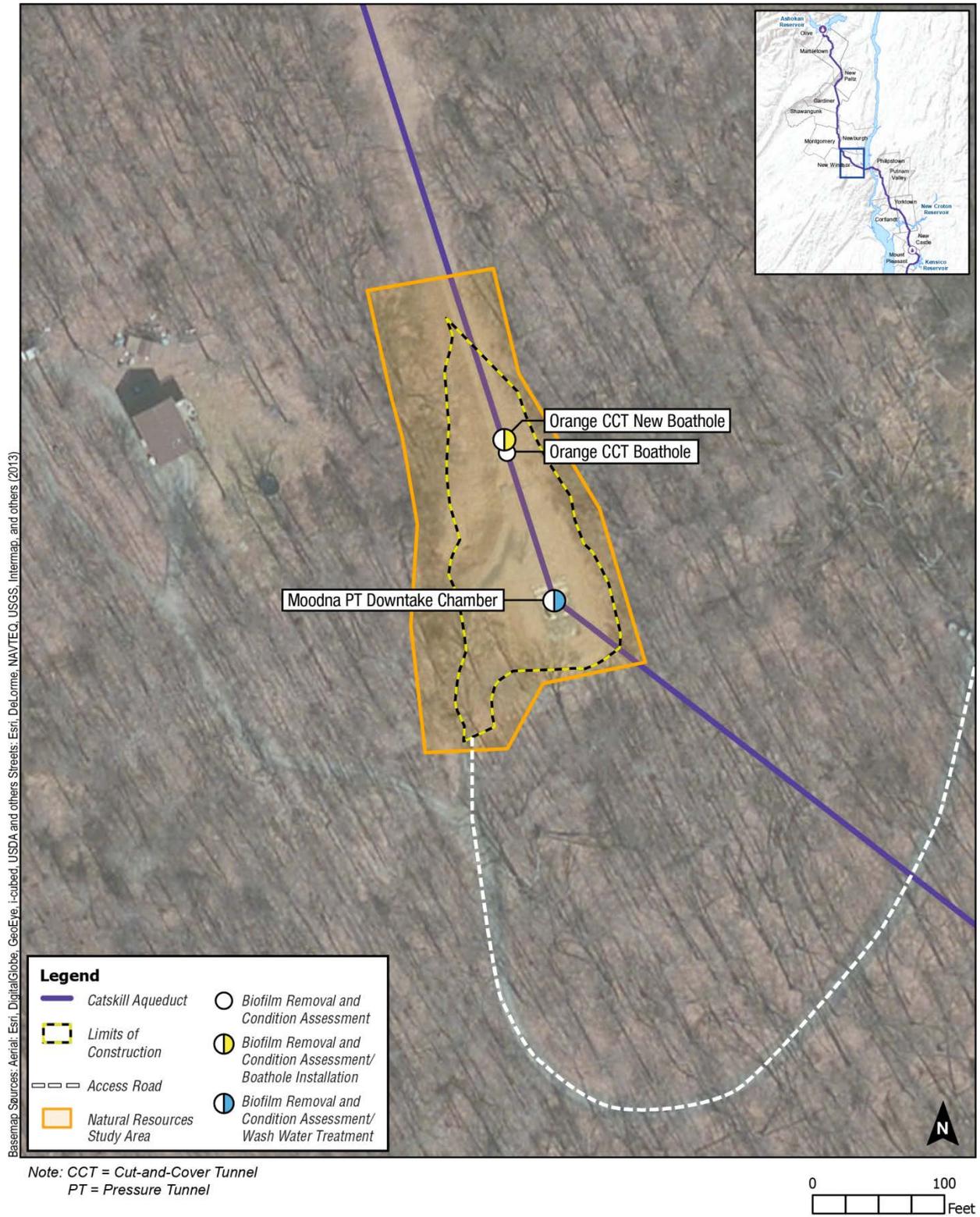


Figure 9.10-17: Natural Resources – Passaro Drive Study Area



aqueduct clearing. While the Town of New Windsor does not regulate the removal of trees associated with the repair and rehabilitation, terrestrial resources in the natural resources study area warrant further analysis.

DEP has consulted with the Town of New Windsor and Orange County, and it is DEP's understanding that no new projects or programs that would affect terrestrial resources are anticipated within the Passaro Drive Study Area within the timeframe of the impact analysis. Natural processes, such as changes in habitat due to natural vegetative succession, are anticipated to continue. Therefore, in the future without the repair and rehabilitation, it is assumed that terrestrial resources within the study area would be the same as baseline conditions.

Work activities would include minor tree clearing and shrub removal for the purpose of improving site access and staging areas. A tree survey was conducted on August 8, 2015. Nine trees consisting of six species with a range of average diameter at breast height of between 5 and 23 inches may be removed to establish staging areas. The most common species of trees that may be removed include three sassafras and two American elm. These trees are located west of the Catskill Aqueduct. All tree removal would be conducted from November 1 through March 31 to avoid impacts to Indiana bats (*Myotis sodalis*) and northern long-eared bats (*Myotis septentrionalis*). Tree removal would occur in discrete locations along the densely forested areas west of the aqueduct, and would not change the character of the area or affect surrounding trees.

Following construction, all equipment would be removed from the study area, and temporarily disturbed areas would be restored to natural conditions. Vegetated areas temporarily cleared during construction are anticipated to grow back with similar communities. Following the repair and rehabilitation within the Passaro Drive Study Area, operation of the Catskill Aqueduct would be consistent with baseline conditions and natural reforestation, and vegetative succession of aqueduct areas not routinely maintained would continue to occur over time.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to terrestrial resources within the Passaro Drive Study Area.

Federal/State Threatened and Endangered Species and State Species of Special Concern

This section includes an analysis of potential impacts to federal/State Threatened and Endangered Species and State Species of Special Concern identified in Section 9.3.9, "Natural Resources," as having the potential to be affected by work activities within the natural resources study area. Species that could be affected within the natural resources study area and could occur up to 0.25 mile from the work site were determined in consultation with USFWS, USACE, NYNHP, and NYSDEC, as well as county and local offices, as applicable.

As discussed in Section 9.3.9, "Natural Resources," six species were identified to have the potential to be affected by the repair and rehabilitation within the natural resources study areas. Therefore, conditions in the future without the repair and rehabilitation, an analysis of the potential for impacts to these six species and a summary of conclusions on the potential effects resulting from the repair and rehabilitation are provided below.

In the future without the repair and rehabilitation, it is assumed that federal/State Threatened and Endangered Species and State Species of Special Concern within the study area would largely be

the same as baseline conditions, other than possible changes in habitat due to natural vegetative succession and general anthropogenic influences.

An analysis of the potential for disturbance to federal/State Threatened and Endangered Species and State Species of Special Concern from the repair and rehabilitation within the natural resources study area is shown in **Table 9.10-9**. The analysis included an evaluation of the repair and rehabilitation work activities within the study area and field visits, as applicable.

Table 9.10-9: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern and Habitats within the Passaro Drive Natural Resources Study Area

Common Name	Scientific Name	Federal Listing	State Listing	Analysis of Potential Disturbance	Warrants Further Analysis
Amphibians and Reptiles					
Eastern Box Turtle	<i>Terrapene carolina</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visit on November 14, 2013. Potential habitat exists within the adjacent oak-tuliptree forest, and within the successional old field areas. While work activities would be largely confined to previously disturbed areas, if any isolated areas of potential habitat exist at the sites, any eastern box turtles that might otherwise use these areas are expected to instead utilize similar, adjacent habitats during construction, as they are a mobile species. Furthermore, perimeter silt fencing would limit disturbance to adjacent habitat and prevent individual turtles from entering the work sites during construction. Finally, upon construction completion, temporarily disturbed areas would be restored to natural conditions. Therefore, there are no effects anticipated and no further analysis for eastern box turtles is warranted for this study area.	No
Timber Rattlesnake	<i>Crotalus horridus</i>	Unlisted	Threatened	No individuals were incidentally observed during the field visit on November 14, 2013. According to NYNHP, no records of timber rattlesnakes were identified within 1.5 miles of the study area. Potential habitat exists within the successional old field areas surrounded by forest. Temporary effects to basking habitat are possible; however, upon completion of the repair and rehabilitation, temporarily disturbed areas would be restored to natural conditions. Therefore, there are no effects anticipated and no further analysis for timber rattlesnakes is warranted for this study area.	No
Wood Turtle	<i>Glyptemys insculpta</i>	Unlisted	Special Concern	No individuals were incidentally observed during the field visit on November 14, 2013. Potential habitat exists within the adjacent forest and within the successional old field areas. While work activities would be largely confined to previously disturbed areas, if any isolated areas of potential habitat exist at the sites, individuals that might otherwise use these areas are expected to instead utilize similar, adjacent habitats during construction. Furthermore, perimeter silt fencing would limit disturbance to adjacent habitat and prevent individual turtles from entering the work sites during construction. Finally, upon construction completion, temporarily disturbed areas would be restored to natural conditions. Therefore, there are no effects anticipated and no further analysis for wood turtles is warranted for this study area.	No

Table 9.10-9: Analysis of Potential Disturbance to Federal/State Threatened and Endangered Species and State Species of Special Concern and Habitats within the Passaro Drive Natural Resources Study Area

Mammals					
Indiana Bat	<i>Myotis sodalis</i>	Endangered	Endangered	Based on the tree surveys conducted on August 8, 2015, no trees tagged for removal were identified to contain potential bat roosting habitat. Minimal potential foraging habitat exists within the study area. All tree removal would be conducted from November 1 through March 31. Therefore, there are no effects anticipated and no further analysis for Indiana bats is warranted for this study area.	No
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	Threatened	<u>Threatened</u> None	Based on the tree survey conducted on August 8, 2015, no trees tagged for removal were identified to contain potential bat roosting habitat. Minimal potential foraging habitat exists within the study area. All tree removal would be conducted from November 1 through March 31. Therefore, there are no effects anticipated and no further analysis for northern long-eared bats is warranted for this study area.	No
Plants					
Small Whorled Pogonia	<i>Isotria medeoloides</i>	Threatened	Threatened	There were no NYNHP records of in the vicinity of the study area. No suitable habitat or specimens were found within the study area based on the survey conducted on August 8, 2015, which generally corresponds to the peak growing season when individuals would be most apparent. Therefore, there are no effects anticipated and no further analysis for small whorled pogonias is warranted for this study area.	No

Federal/State Threatened and Endangered Species and State Species of Special Concern Conclusions

Based on the impact analysis, no take is anticipated. There would be no effects to eastern box turtles (*Terrapene carolina*), timber rattlesnakes (*Crotalus horridus*), wood turtles (*Glyptemys insculpta*), Indiana bats, northern long-eared bats, or small whorled pogonias (*Isotria medeoloides*) associated with the repair and rehabilitation.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to federal/State Threatened and Endangered Species or State Species of Special Concern within the Passaro Drive Study Area.

9.10.4.5 Hazardous Materials

To evaluate the potential presence of hazardous materials within the Passaro Drive Study Area, a Phase I ESA was conducted in general conformance with the scope and limitations of ASTM Practice E 1527-13 and CEQR requirements to identify RECs. The Phase I ESA included site reconnaissance, research on current/historical use, and review of federal and State regulatory listings for both the site and neighboring properties within the appropriate search distance defined in the ASTM standard. The findings from the Phase I ESA investigation and results from DEP's legacy files for the work sites, including a geotechnical investigation and environmental health and safety sampling, were collectively reviewed to assess the potential presence of and potential for disturbance to hazardous materials in the study area.

Geotechnical environmental investigations and sampling were undertaken for contaminants of concern including asbestos, lead, volatile and semivolatile organics, PCBs, and total petroleum hydrocarbons along the aqueduct within the study area. Several parameters were noted in the soil sampling results including chromium, arsenic, and mercury. Total chromium was reported in the two samples collected at the Moodna Downtake Chamber. Chromium concentrations, however, were consistent over a widespread sampling area and are more likely associated with background concentrations. Along the Catskill Aqueduct, there are widespread occurrences of chromium, which are attributed to the existing geological formations. Likewise, arsenic and mercury were detected in one sample, but is also naturally occurring in soils and is therefore also likely to be the result of background concentrations. The legacy data indicate that materials sampled did not identify any asbestos-containing materials, lead, PCB, or mercury paints within this the study area. In addition, gasoline range organics were not detected in the samples. Total petroleum hydrocarbons were detected, but at low concentrations that are not considered to be indicative of contamination that warrants remedial actions.

Based on the results of the environmental investigations completed within the Passaro Drive Study Area, no other hazardous materials are known to exist. The soil results support the reuse of excavated materials associated with the boathole installation as backfill and do not suggest the need for special management, handling, or health and safety measures at this time.

DEP has consulted with the Town of New Windsor and Orange County, and it is DEP's understanding that no developments or structures that would introduce hazardous materials to the environment are anticipated within the Passaro Drive Study Area within the timeframe of the

impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that the presence of hazardous materials within the Passaro Drive Study Area would be the same as baseline conditions.

In the future with the repair and rehabilitation, work activities would require the potential storage and use of a variety of petroleum and other chemical products, such as diesel fuel for backup power, lubricating oil for construction vehicles, and miscellaneous cleaning and maintenance chemicals during construction. The use and storage of all of these would be in accordance with applicable regulatory requirements and guidelines including those relating to federal Spill Prevention, Control, and Countermeasures requirements; and State petroleum bulk storage, chemical bulk storage, and spill reporting requirements. Furthermore, excavation associated with the work activities for the installation of a new boathole would occur on previously disturbed soils. Following construction, all equipment would be removed from the Passaro Drive Study Area. The staging areas would be restored to baseline conditions, and operation of the repaired and rehabilitated Catskill Aqueduct would be consistent with baseline conditions.

Therefore, the repair and rehabilitation would not result in significant adverse impacts from the presence or disturbance of hazardous materials within the Passaro Drive Study Area.

9.10.4.6 Transportation

The study area for the transportation analysis consists of the major convergent roadways that would potentially be used by the employee and construction vehicles associated with repair and rehabilitation work activities en route to and from the Passaro Drive Study Area.

Access to the repair and rehabilitation limits of construction for the work sites within the Passaro Drive Study Area would be via an access road that connects to Passaro Drive (see **Figure 9.10-12**). Passaro Drive is one-lane, two-way local private roadway. To the extent available, construction vehicles would travel on truck-permitted roadways directly to and from the Passaro Drive Study Area. There is no public transportation and little to no pedestrian activity in the immediate vicinity of the study area, although there is a community facility located along Passaro Drive that shares driveway access with the study area. Under current operations, DEP employees periodically access the site. However, there are no DEP employees who work at or visit the study area on a daily basis, and the small number of DEP employee vehicles has little to no effect on traffic conditions within the study area.

DEP has consulted with the Town of New Windsor and Orange County, and it is DEP's understanding that no changes in land use or an increase in traffic due to outside developments are anticipated within the Passaro Drive Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that traffic, public transportation, and pedestrian use within the study area would be similar to baseline conditions.

Repair and rehabilitation work activities within the Passaro Drive Study Area were evaluated to determine which would have the potential to generate the most vehicle trips and therefore be the basis of this transportation analysis. Of these activities, large-scale wash water treatment would generate the most vehicle trips. Large-scale wash water treatment would occur in fall ~~2020~~2019

for 24 hours per day, 7 days a week, for approximately 10 weeks during the third 10-week shutdown.

In the future with the repair and rehabilitation, construction vehicles would travel along Passaro Drive to the DEP access road. The estimated number of peak-day one-way vehicle trips associated with large-scale wash water treatment is 71 vehicles, or approximately 142 peak-day vehicle round trips that would travel to and from the study area. Approximately 42 vehicle round trips, or 42 PCEs, would be workers either traveling to and from the study area or traveling directly to and from the staging area (depending on parking capacity), with potentially 8 daily shuttle trips between the study area and the staging area. The remaining approximately 92 peak-day vehicle round trips (103 PCEs) would be trucks or other construction vehicles. On an average day, the estimated number of vehicle round trips is 72, with approximately 28 vehicle trip ends occurring during the peak hour.

During a peak day, the estimated number of peak-hour vehicle trip ends associated with large-scale wash water treatment is approximately 50 peak-hour vehicle trip ends (57 PCEs). This includes approximately 14 vehicle trip ends (14 PCEs) from workers traveling directly to and from the staging area, approximately 4 daily shuttle trips between the study area and the staging area, and approximately 32 vehicle trip ends (39 PCEs) from trucks or other construction vehicles. For the purpose of this analysis, the peak-hour project-generated vehicles are anticipated to coincide with typical construction hours for employee vehicles entering the site. Assuming three 8-hour shifts, this would be during the 6 AM to 7 AM, 2 PM to 3 PM, and 10 PM to 11 PM hours, and would be unlikely to coincide with the peak hour for existing traffic. Additionally, the overnight shift may have fewer workers and result in lower peak-hour vehicle trip ends than other shifts.

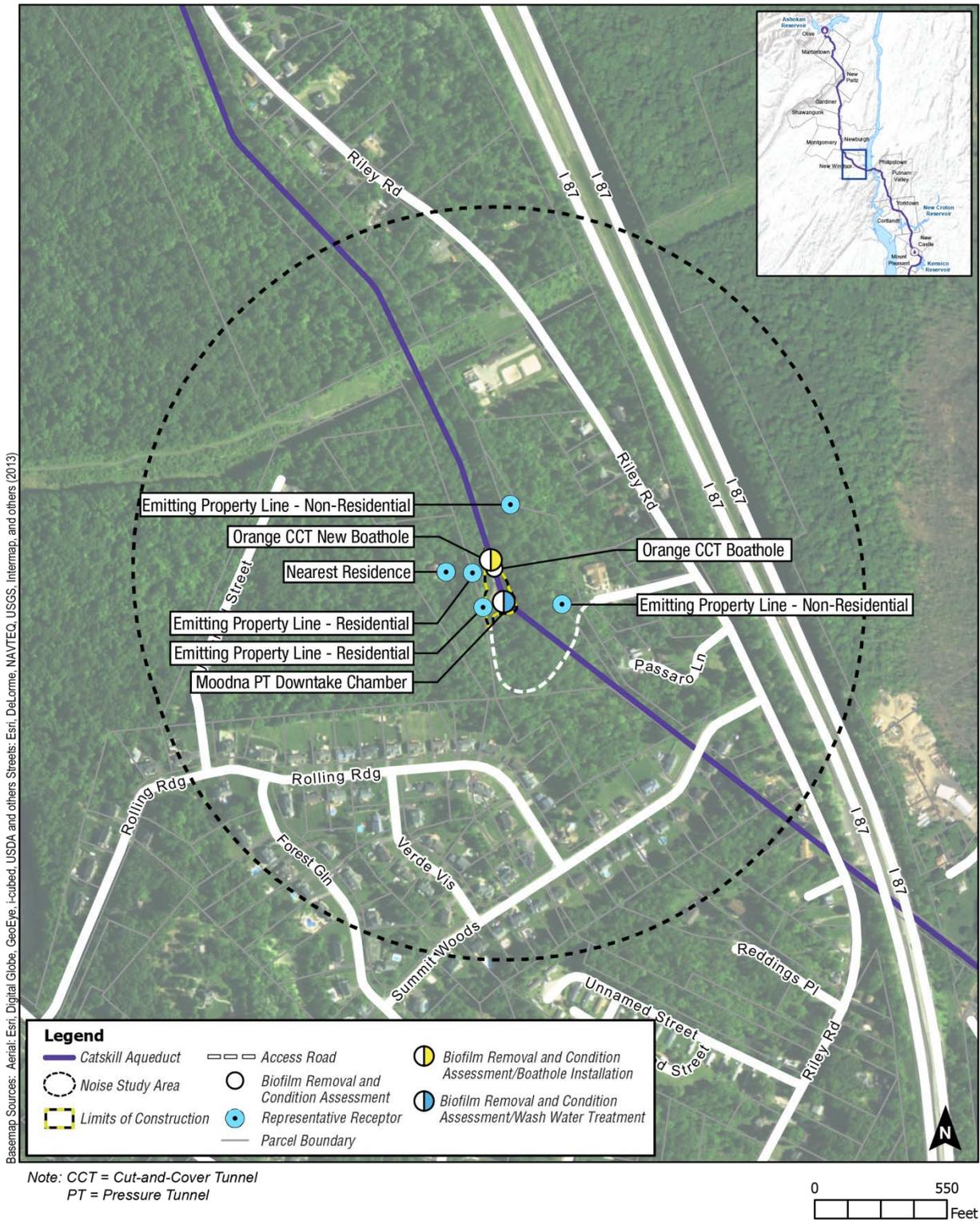
The repair and rehabilitation would result in approximately 57 peak-hour PCEs along Passaro Drive, which is above the *CEQR Technical Manual* screening threshold of 50 peak-hour PCEs as described in Section 9.3.13, “Transportation.” The work activities at the Passaro Drive Study Area would be short-term (totaling 17 weeks over 1.5 years; see **Table 9.10-8**) and would not generate public parking or transportation demands or pedestrian activity within the Passaro Drive Study Area. Following completion of the repair and rehabilitation, traffic patterns would return to baseline conditions.

Therefore, although there would be a minor temporary increase in traffic, the repair and rehabilitation would not result in significant adverse impacts to transportation within the Passaro Drive Study Area.

9.10.4.7 Noise

As described in the Section 9.3.15, “Noise,” mobile noise associated with the repair and rehabilitation within the Passaro Drive Study Area does not warrant analysis. This section includes an analysis of potential impacts from stationary noise associated with the repair and rehabilitation to sensitive receptors within the study area.

The study area for the stationary noise analysis is the area within 1,500 feet of the repair and rehabilitation work activities as shown on **Figure 9.10-18**.



Basemap Sources: Aerial: Esri, Digital Globe, GeoEye, I-cubed, USDA and others Streets: Esri, DeLorme, NAVTEQ, USGS, Intermap, and others (2013)

Figure 9.10-18: Noise – Passaro Drive Study Area



The Passaro Drive Noise Study Area includes residential parcels and a community facility within 1,500 feet of the repair and rehabilitation work sites that are considered noise-sensitive receptors for this analysis.

The temporary work activities were evaluated to determine compliance with the local noise code. The repair and rehabilitation is subject to the Town of New Windsor Noise Control Laws. The Town of New Windsor Noise Control code (§300-71) exempts construction noise between the hours of 7 AM to 7 PM on weekdays and between the hours of 8 AM to 6 PM on Saturdays

However, work that would occur outside the hours specified, except for noise emanating from the operation of motor vehicles on public highways and private roads, is restricted to a maximum sound pressure level of 65 decibels between 8 AM to 9 PM, 56 decibels between 9 PM to 8 AM in residential zoning districts, and 80 decibels between 8 AM to 10 PM and 70 decibels between 10 PM and 8 AM in non-residential districts. Compliance is evaluated at the nearest emitting property line to the sound source. No construction sounds are permitted on Sundays and legal holidays.

Existing ambient noise levels within the Passaro Drive Road Study Area are influenced by vehicular traffic traveling on I-87, Riley Road, Passaro Drive, and nearby local roads. The existing noise levels within the study area are comparable to the levels within a normal suburban environment, based on the distance from major transportation corridors, the population density of the area, and the presence of other noise-producing elements. Typical noise levels (measured as L_{eq}) for normal suburban communities are 50 dBA during the daytime and 44 dBA during the nighttime.

DEP has consulted with the Town of New Windsor and Orange County, and it is DEP's understanding that no major projects that would result in a change in land use, or new noise-generating sources that would contribute to an increase in ambient noise levels, are anticipated within the Passaro Drive Study Area within the timeframe of the impact analysis.

Therefore, in the future without the repair and rehabilitation, it is assumed that ambient noise levels within the Passaro Drive Study Area would be similar to baseline conditions.

In the future with the repair and rehabilitation, stationary noise-producing work activities within the Passaro Drive Study Area would occur at one work site. The stationary noise-generating equipment that would be used within the Passaro Drive Study Area was evaluated to determine which work activity would have the potential to emit the most noise and, therefore, be the basis of this stationary noise analysis. In addition, two peak construction phases were evaluated in the Passaro Drive Study Area for comparison with the Town of New Windsor daytime and nighttime noise limits. The stationary noise-generating equipment associated with the installation of the boathole was the basis of the daytime stationary noise analysis. Boathole installation would occur in fall ~~2019~~2018 between the hours of 7 AM and 7 PM, 7 days a week, for approximately 2 weeks during the second 10-week shutdown (see **Table 9.10-8**). The stationary noise-generating equipment associated with large-scale wash water treatment was the basis of the nighttime stationary noise analysis. Large-scale wash water treatment would occur in fall ~~2020~~2019 for up to 24 hours per day, 7 days a week, for approximately 10 weeks during the third 10-week shutdown period (see **Table 9.10-8**).

The noise analysis focused on the three loudest stationary noise-generating equipment types necessary for the boathole installation and large-scale wash water treatment. Associated equipment reference noise levels are shown in **Table 9.10-10**. The types of noise-generating equipment analyzed were conservatively based on peak construction operating conditions.

Table 9.10-10: Stationary Source Construction Equipment Modeled at the Passaro Drive Study Area – Noise Analysis and Reference Noise Levels (L_{max})

Equipment Type	Reference Noise Level (L_{max}) at 50 feet (dBA) ¹
Boathole Installation (7 AM to 7 PM, 7 days a week)	
Crane	85
Concrete Mixer Truck	85
Generator	82
Large-Scale Wash Water Treatment (24 hours per day, 7 days a week)	
Crane	85
Generator	82
Backhoe	80
Note:	
¹ City Environmental Quality Review (CEQR) Technical Manual, Chapter 22.	

Table 9.10-11 shows the results of the stationary construction noise analysis. The Town of New Windsor L_{max} limits apply at the emitting property line of the work site and define daytime and nighttime noise limits based on the land use district. The Passaro Drive work area is bordered by both residential and non-residential land uses. Therefore, noise levels at the nearest property line for residential and non-residential districts were calculated. However, the nearest noise-sensitive receptor is a residence approximately 200 to 270 feet away from the work activities. Boathole installation and large-scale wash water treatment within the Passaro Drive Study Area during the repair and rehabilitation would emit noise levels (L_{max}) of approximately 77 dBA and 73 dBA at the nearest residence during daytime and nighttime hours, respectively. Other noise-producing equipment would be utilized within the study area for a limited period during work activities. However, this equipment would not be expected to be louder than equipment associated with boathole installation and large-scale wash water treatment. Since the repair and rehabilitation within the Passaro Drive Study Area would emit noise levels greater than allowed by the Town of New Windsor noise codes and would occur outside of allowed construction hours, DEP would work with the Town of New Windsor, as appropriate.

Although there would be an increase in stationary noise levels during 24-hour construction periods associated with the aqueduct shutdowns, work would primarily occur in the fall and winter months when residents typically have windows closed. Noise levels inside would be further reduced to an interior noise level (L_{max}) of approximately 53 dBA and 49 dBA at the nearest residence during daytime and nighttime hours, respectively. Following completion of the repair and rehabilitation work activities, the construction equipment and vehicles would be

Table 9.10-11: Stationary Noise Analysis Results (L_{max}) at the Nearest Noise-Sensitive Receptors within the Passaro Drive Study Area

Location	Distance from Site (Feet)	Predicted Stationary Noise Level (L_{max}) at Noise-Sensitive Receptor (dBA)	Town of New Windsor Noise Limit (dBA)	Potential for Exceedance (Yes or No)
Boathole Installation (7 AM to 7 PM, 7 days a week)				
Emitting Property Line - Non-Residential	271	74	80 ¹ /70 ²	Yes ³
Emitting Property Line - Residential	91	84	65 ⁴ /56 ⁵	Yes ³
Nearest Residence	198	77	NA	NA
Large-Scale Wash Water Treatment (24 hour per day, 7 days a week)				
Emitting Property Line - Non-residential	243	74	80 ¹ /70 ²	Yes ³
Emitting Property Line - Residential	92	82	65 ⁴ /56 ⁵	Yes ³
Nearest Residence	266	73	NA	NA
Notes:				
NA = Not Applicable				
¹ Noise limit is applicable between the hours of 8 AM and 10 PM in non-residential districts.				
² Noise limit is applicable between the hours of 10 PM and 8 AM in non-residential districts.				
³ Repair and rehabilitation work activities have the potential to occur outside of the allowable construction hours defined by the Town of New Windsor.				
⁴ Noise limit is applicable between the hours of 8 AM and 9 PM in residential districts.				
⁵ Noise limit is applicable between the hours of 9 PM and 8 AM in residential districts.				

removed from the Passaro Drive Study Area. The repair and rehabilitation work activities would be temporary, with peak work activities occurring during boathole installation in fall ~~2019~~2018 and large-scale wash water treatment in fall ~~2020~~2019 for limited periods (for example, up to 10 weeks per activity).

Therefore, although there would be a temporary increase in noise, noise from the repair and rehabilitation would not result in significant adverse impacts to sensitive receptors within the Passaro Drive Study Area.

9.10.4.8 Neighborhood Character

The character of the Passaro Drive Study Area is largely defined by a mix of residential, commercial, community facilities, and public services land uses and its physical setting within a rural/suburban location (see **Figure 9.10-14**). The Catskill Aqueduct traverses the study area in a general northwest to southeast direction. The study area is roughly bounded by Riley Road to the northeast and Rolling Ridge, a subdivision road, to the south. The limits of construction for the work site is located in a public services corridor with grassy cover, which is owned and maintained by DEP. Access would be provided by an access road that connects to Passaro Drive.

DEP has consulted with the Town of New Windsor and Orange County, and it is DEP's understanding that no changes in land use and no new projects or structures are anticipated within the Passaro Drive Study Area within the timeframe of the impact analysis. Therefore, in the future without the repair and rehabilitation, it is assumed that neighborhood character within the study area would be similar to baseline conditions.

As described in Section 9.3.16, "Neighborhood Character," there would be no potential for the repair and rehabilitation to affect shadows and urban design. In addition, based on the screening assessment for land use and zoning; socioeconomic conditions; open space and recreation; historic and cultural resources; and visual resources, an impact analysis for the Passaro Drive Study Area was not warranted, as discussed in the following sections: Section 9.3.3, "Land Use, Zoning, and Public Policy," Section 9.3.4, "Socioeconomic Conditions," Section 9.3.6, "Open Space and Recreation," Section 9.3.7, "Historic and Cultural Resources," and Section 9.3.8, "Visual Resources," respectively. Furthermore, the public policy impact analysis provided in 9.10.2, "Town of New Windsor Impact Analysis," concluded the work activities were consistent with applicable plans.

As described in Sections 9.10.4.6, "Transportation," and 9.10.4.7, "Noise," during construction, the work activities in the Passaro Drive Study Area would be short-term (intermittently over 1.5 years) and would result in a temporary increase in traffic and noise. Following completion of the repair and rehabilitation, the construction equipment and vehicles would be removed from the study area and traffic patterns would return to baseline conditions. These temporary increases in traffic and noise levels would not result in a density of activity or service conditions that would affect the overall character of the study area.

The repair and rehabilitation would not generate significant adverse effects in land use, zoning, and public policy; socioeconomic conditions; open space and recreation; shadows; historic and cultural resources; urban design and visual resources; transportation; or noise.

Therefore, the repair and rehabilitation would not result in significant adverse impacts to neighborhood character within the Passaro Drive Study Area.