BEFORE THE FEDERAL ENERGY REGULATORY COMMISSION
APPLICATION FOR LICENSE FOR MAJOR PROJECT – EXISTING DAM

Cannonsville Hydroelectric Project

FERC Project No. 13287

VOLUME 6

Appendix E-4: Impact of Hydropower Development Construction Related Activities on Wildlife and Botanical Resources, including Wetlands, Riparian, and Littoral Habitat, and Rare, Threatened and Endangered Species

City of New York

NYC Environmental Protection

February 2012

City of New York
West of Hudson Hydroelectric Project

Project No. 13287

Impact of Construction-Related Activities on Wildlife and Botanical Resources, including Wetlands, Riparian, and Littoral Habitat, and Rare, Threatened, and Endangered Species

Cannonsville, Pepacton, and Neversink Developments

February 2012

EXECUTIVE SUMMARY

The City of New York ("City"), acting through the New York City Department of Environmental Protection ("DEP") has filed with the Federal Energy Regulatory Commission a Notice of Intent to develop hydroelectric generation at the West of Hudson Hydroelectric Project. As part of the licensing process for the Project, the DEP conducted a study to evaluate the impact of proposed construction-related activities on wetlands, wildlife, and botanical resources at the Cannonsville, Pepacton, and Neversink Reservoirs.

The geographic scope of this study included the proposed construction areas at each development and a buffer area of up to 100 feet surrounding the construction areas. A field assessment was conducted in June 2010 and April 2011 to document existing habitat conditions in the proposed construction areas and to evaluate how construction-related activities could impact wetlands, wildlife, and botanical resources, including rare, threatened, and endangered ("RTE") species. A team of two field biologists visited the proposed construction areas to document the existing habitat conditions including vegetative cover type, RTE species and habitat, invasive plant species, and wetlands.

At the Cannonsville development, impacts to upland botanical resources during construction-related activities will be limited to (a) temporary disturbances to existing mowed fields which will serve as the construction staging areas and spoils disposal location; and (b) selective trimming and removal of trees during construction of the substation and related electrical interconnection facilities. Clearing related to the proposed substation and interconnection facilities will result in minor fragmentation of the upland forest; however, this area is isolated from surrounding continuous forest blocks due to the river channels and dam. Therefore, the fragmentation is not expected to cause impacts to wildlife passage routes. No impacts to upland botanical resources within the buffer locations are expected.

The emergent wetland proposed for excavation in the tailrace area at the Cannonsville development is approximately 1.05 acres. Impacts to this wetland will result in a change of wetland type from a shallow emergent to deep riverine type. Additionally, two small emergent wetlands were found in the buffer zones adjacent to the staging areas at the Cannonsville development, ranging in size from 0.1 to 0.6 acres; these two wetlands will be demarcated and avoided during the use of the adjacent staging areas and therefore, no adverse impacts to these areas are anticipated as a result of the construction activities.

Three vernal pools ranging in size from 600 to 7,500 square feet were found at the Cannonsville development during the April 2011 field survey. The larger pool was found to contain amphibian egg masses and may potentially serve as habitat for the longtail and Jefferson's salamander. These vernal pools, however, were located within the buffer zones surrounding the construction areas at the Cannonsville development. These vernal pools will be demarcated and avoided during construction and therefore, no adverse impacts are anticipated.

Potential temporary impacts to riparian and littoral areas of the river channel below the release works may occur during construction at the Cannonsville development. Such potential temporary impacts include lowered stream velocities and reduced depths in areas below the release works. Because this area will remain wetted during construction from backwater provided from the spillway channel, impacts to the riparian and littoral areas, as well as the plant and animal species that use such areas as habitat, are not expected to be significant.

To maintain downstream river flows during construction, a temporary siphon is proposed to convey water over the existing spillway and into the spillway channel at the Cannonsville development. The spillway channel is excavated in bedrock and is typically dry except when the dam is spilling; therefore, this channel does not support vegetation and aquatic life. The temporary siphon will extend into the littoral

zone of Cannonsville Reservoir and any short term impacts to this area, such as avoidance of or entrainment through the temporary siphon intake by aquatic organisms, are unavoidable due to the need to maintain flows downstream. Overall, it is expected that construction-related activities at the Cannonsville development will not result in any material impacts to environmental resources.

The construction-related work at the Pepacton development will be limited in scope and occur within and immediately adjacent to the existing release works building. The proposed construction areas consist of mowed turf and paved roads. Impacts to upland botanical resources will be limited to disturbances to existing mowed fields which will serve as the construction staging area and location of new electrical equipment. To maintain downstream river flows during construction, a temporary siphon is proposed to convey water over the existing spillway and into the spillway channel at the Pepacton development. The spillway channel is excavated in bedrock and is typically dry except when the dam is spilling; therefore, this channel does not support vegetation and aquatic life. The temporary siphon will extend into the littoral zone of Pepacton Reservoir, however any short term impacts to this area, such as avoidance of or entrainment through the temporary siphon intake by aquatic organisms, are unavoidable due to the need to maintain flows downstream. It is anticipated that construction-related activities at the Pepacton development will not result in any material impacts to environmental resources.

Similar to the Pepacton development, the construction-related work at the Neversink development will be limited in scope and occur within and adjacent to the existing release works building. The proposed construction areas at the Neversink development consist of mowed turf and paved roads, as well as forest plantation, and successional field where an existing underground conduit will be utilized for the electrical connection. Based on the site visits, the areas proposed for construction at the Neversink development are currently disturbed and it is expected that construction-related activities at the Neversink development will not result in any material impacts to botanical and wildlife resources.

To maintain downstream river flows during construction, a temporary siphon is proposed to convey water over the existing spillway and into the spillway channel at the Neversink development. The spillway channel is excavated in bedrock, is typically dry except when the dam is spilling, and, thus, does not support vegetation and aquatic life. The temporary siphon will extend into the littoral zone of Neversink Reservoir; however, as with the other two developments, any short term impacts to the littoral zone related to this temporary siphon, such as avoidance of or entrainment through the temporary siphon intake by aquatic organisms, are unavoidable due to the need to maintain flows downstream. It is anticipated that construction-related activities at the Neversink development will not result in any material impacts to environmental resources.

Bald eagles were observed at each of the three developments during the field surveys. Based on the field observations, there does not appear to be any nesting or roosting habitat (*e.g.*, tall trees) in the proposed construction areas or buffer zones. In terms of bald eagle foraging activities, at the Cannonsville development, the tailrace excavation area is localized to a relatively small area (~1 acre), and there are other undisturbed areas that would afford ample alternative foraging opportunities, such as Cannonsville Reservoir, the channel downstream of the spillway, and other downstream locations. At Pepacton and Neversink, the construction activities will be limited to inside and adjacent to the existing intake buildings. Such activities are not expected to affect bald eagle foraging opportunities at the three proposed developments.

Nevertheless, prior to construction, DEP will identify any bald eagle nests in the vicinity of the construction-related activities at each development. DEP will then establish, and incorporate into the final construction plans, any necessary additional buffer zones and restrictions around nests, foraging areas, and roosting areas, as appropriate, and in consultation with the U.S. Fish and Wildlife Service ("USFWS") and the New York State Department of Environmental Conservation ("NYSDEC"). At the

Cannonsville development, DEP has incorporated raptor protection measures in the design of the new overhead supply and transmission lines to greatly reduce the collision and electrocution risk for raptors, including bald eagles.

The need for and appropriateness of potential mitigation measures to protect environmental resources are discussed for each proposed development including avoidance of sensitive areas, wetlands permitting, sediment and erosion control practices, invasive species transport prevention, and bald eagle protection practices. Additional details on protection and mitigation measures will be developed prior to construction in consultation with appropriate resource agencies (*i.e.*, USFWS, NYSDEC and U.S. Army Corps of Engineers, as applicable) and other interested parties. With any necessary and appropriate protection and mitigation measures, construction-related activities at the three proposed developments are not expected to result in any material impacts to environmental resources.

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LIST OF ABBREVIATIONS

City	City of New York
DEP	New York City Department of Environmental Protection
FERC	Federal Energy Regulatory Commission
kV	kilovolt
NWI	National Wetland Inventory
NYSDEC	New York State Department of Environmental Conservation
NYSEG	New York State Electric & Gas Corporation
Project	West of Hudson Hydroelectric Project, FERC Project No. 13287
RTE	rare, threatened and endangered
sq. ft.	square feet
SWPPP	Stormwater Pollution Prevention Plan
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service

1.0 INTRODUCTION

The City of New York ("City"), acting through the New York City Department of Environmental Protection ("DEP") has filed with the Federal Energy Regulatory Commission ("FERC") a Notice of Intent to develop hydroelectric generation at four sites that together comprise the West of Hudson Hydroelectric Project ("Project"), FERC Project No. 13287. The four sites are owned by the City and operated by the DEP, as part of the City's water supply system. The City seeks to develop hydroelectric facilities at those sites while simultaneously maintaining its primary water supply function and adhering to the statutory and regulatory requirements governing its water supply operations, conservation releases, directed releases, water quality standards, and other related activities.

In accordance with the Preliminary Permit issued to the City by the FERC, the DEP is evaluating the technical and economic merit and feasibility for each proposed hydroelectric development. Based on the feasibility analysis completed to date, the City has suspended the completion of environmental studies at the Schoharie development while it continues to evaluate the economic feasibility of any hydroelectric facility at that site. The City will proceed with appropriate studies in the event such an alternative is identified. Accordingly, this study is limited to the following three proposed developments:

Development	Dam	River
Cannonsville	Cannonsville Dam	West Branch Delaware River
Pepacton	Downsville Dam	East Branch Delaware River
Neversink	Neversink Dam	Neversink River

During the study plan development process, DEP proposed to conduct a study to evaluate the impact of construction-related activities at the Cannonsville, Pepacton, and Neversink Reservoirs on: (a) wildlife and botanical resources; (b) wetlands, riparian and littoral habitat; and (c) rare, threatened and endangered ("RTE") species. The U.S. Fish and Wildlife Service ("USFWS") and New York State Department of Environmental Conservation ("NYSDEC") concurred with this approach.

The geographic scope of the study includes the proposed construction areas and a buffer of up to 100 feet around each construction area. The field work for this study was completed in June 2010 and April 2011.

The goals of this study are to document the existing botanical and wildlife resources, including wetlands, riparian and littoral habitat conditions and RTE species at the three developments and to determine the potential impacts of construction-related activities thereon. Preliminary appropriate protection and mitigation measures to account for any identified potential impacts are also discussed herein. A related, separate report has been prepared which describes the proposed sediment and erosion control measures at each development; therefore, sediment and erosion control-related issues are not addressed in this report.

2.0 SUMMARY OF PROPOSED CONSTRUCTION ACTIVITIES

This section summarizes the expected construction-related activities at the three developments. The activities are subject to change as the City's proposal and licensing process advances. However, the areas to be disturbed are not likely to materially change.

Prior to performing the field investigations, base maps were prepared showing the proposed construction areas at each development. Buffer zones of up to 100 feet were established around temporary or permanent impact areas and included in the field assessment. The base maps are shown as Figure 2-1 through Figure 2-3.

Cannonsville Development

The Cannonsville development includes the construction of a separate powerhouse adjacent to the existing low-level outlet works. The turbine discharges would flow through steel draft tubes into concrete chambers beneath the powerhouse floor. Water from these chambers will be discharged into the common tailrace channel and into the West Branch of the Delaware River.

Figure 2-1 presents an overview of the proposed Cannonsville development, showing the location of the powerhouse, tailrace, the spoils area where excavated material from the powerhouse and tailrace construction will be disposed, and the temporary staging areas for equipment and material storage during construction. Located adjacent to Staging Area 3 will be a temporary sedimentation pond. Standing water in the channel and tailrace work area will be pumped into the pond to facilitate sediment deposition while allowing water to filter.

Additional work involves relocating the sewer pump station and leach field, installing a temporary cofferdam in the river, installing a temporary siphon over the spillway to maintain conservation flows during the tie-in to the existing conduit, constructing a generator lead from the powerhouse to an indoor switchgear, and installing the interconnection facilities from the substation to New York State Electric & Gas Corporation's ("NYSEG") transmission system. The route for the generator lead is proposed to run underground from the powerhouse indoor switchgear to the first pole, then overhead on new poles (replacing the existing poles) to the existing service building where a new substation will be constructed. There are existing poles in this area which will be replaced with 40-foot poles, of which approximately 10 feet will be below ground. The right-of-way width will be 30 feet.

From the new substation, approximately 460 feet of new overhead electric line will be constructed and tied into the existing 46 kV transmission lines. The new transmission line structures will be approximately 45 feet above ground. The right-of-way width will be 100 feet.

Access to Cannonsville Dam is controlled by a DEP gate from State Route 10. All roads located inside the gate are non-public and are owned by the City. All equipment ingress and egress will occur through the DEP gate. From the DEP gate, the road is paved and extends across the access bridge located downstream of the release works building. After traversing the access bridge, there are three road branches as follows: a) a paved road extends northerly to the top of the dam, b) a paved road extends easterly to the release works building, and c) an existing dirt road runs westerly to the proposed spoils location. Staging Areas 1 and 2 as well as the spoils disposal area will be accessed from the existing dirt road. Along the existing dirt road, some minimal clearing, grubbing, and grading may be required to permit construction vehicle access to Staging Areas 1 and 2 and the spoils location.

Pepacton Development

The Pepacton development consists of installing a turbine in one of the two pipe and valve assemblies in the existing release water chamber. Figure 2-2 is the site plan showing the release water chamber, the proposed location of the associated electrical equipment (which will occupy an area approximately 9 feet wide by 12 feet long and include a small building), construction staging area, and interconnection with the NYSEG distribution system. Access to the electrical equipment will be from the existing City-owned roadway leading to the release water building and spillway crest. The interconnection lines connecting the facility to NYSEG's distribution system will be approximately 80 feet long and will be buried, if practical.

Access to the Downsville Dam is controlled by a DEP gate from State Route 30. The road located inside the gate is non-public and owned by the City. All equipment ingress and egress will occur through the DEP gate. From the DEP gate, the road is paved and extends along the top of the dam ending at the release water chamber.

Neversink Development

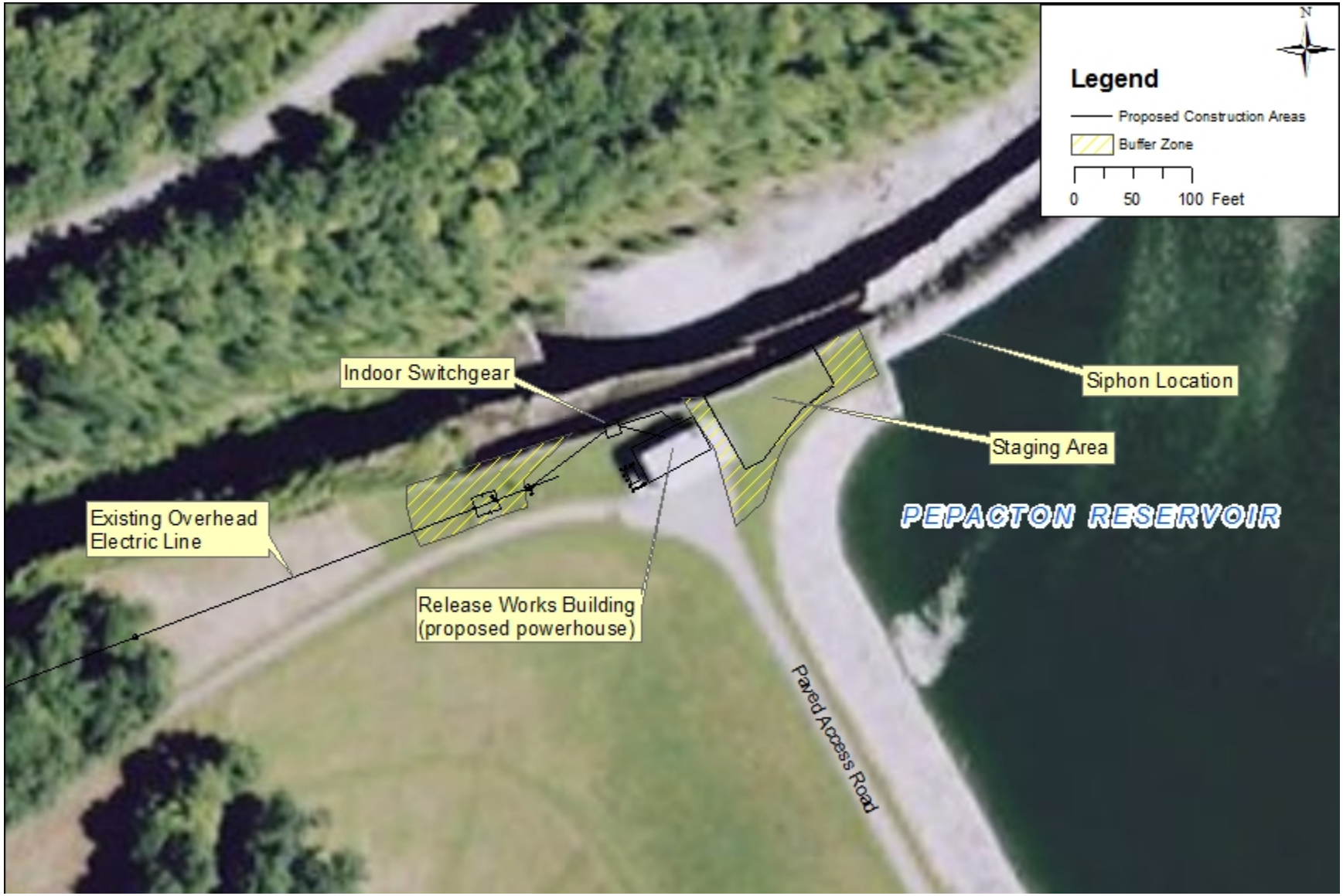
The Neversink development consists of installing a turbine in one of the two pipe and valve assemblies in the valve chamber of the existing intake structure. Figure 2-3 presents an overview of the proposed construction area showing the staging area, the location of the associated electrical equipment (which will occupy an area approximately 8 feet wide by 20 feet long and include a small building), and the interconnection with the NYSEG distribution system. Access to the electrical equipment will be from the existing parking area adjacent to the intake chamber. A staging area will be established south of the intake chamber, in an area which consists of a mowed lawn. Separate from the Project, the DEP is installing three three-inch conduits in an underground duct bank from State Route 55 to the intake chamber. One of those conduits will be used for the interconnection of the facility with NYSEG's distribution system.

Access to the Neversink Dam is controlled by a DEP gate from State Route 55 (Plate 57). The road located inside the gate is non-public and owned by the City. All equipment ingress and egress will occur through the DEP gate. From the DEP gate, the road is paved and extends directly to the intake structure.

Figure 2-1: Cannonsville Development Study Area: Proposed Construction Areas and Associated Buffer Zones.

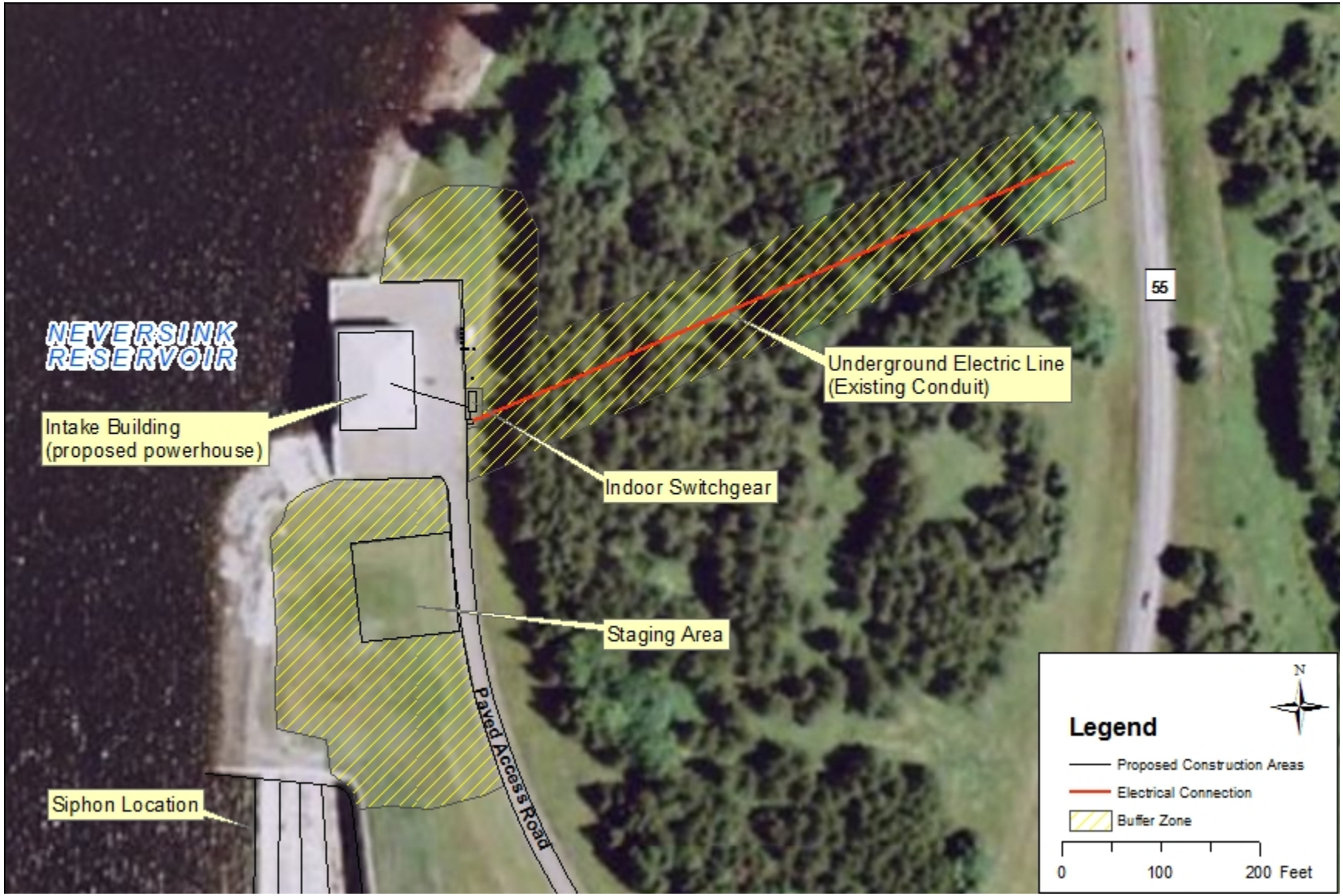
Notes: Imagery source: ESRI world imagery. All other data layers created by Gomez and Sullivan Engineers, P.C.

Figure 2-2: Pepacton Development Study Area: Proposed Construction Areas and Associated Buffer Zones.



Notes: Imagery source: ESRI world imagery. All other data layers created by Gomez and Sullivan Engineers, P.C.

Figure 2-3: Neversink Development Study Area: Proposed Construction Areas and Associated Buffer Zones.



Notes: Imagery source: ESRI world imagery. All other data layers created by Gomez and Sullivan Engineers, P.C.

3.0 STUDY METHODS

The methods employed for the study included compiling existing information, developing maps of areas to be surveyed, conducting field surveys, and developing conclusions related to the potential impacts of construction activities on environmental resources. Recommended mitigation measures based on any potential identified impacts are also discussed in this report. It is important to note that the erosion and sediment control measures proposed for protecting environmental resources from construction-related activities associated with the Project are presented in a separate report (DEP, 2011).

3.1 Review Existing Data

The proposed construction and buffer zone areas, along with ingress and egress routes used for the construction activities, were loaded into GIS computers with aerial imagery for use in the field surveys. The buffer zones of up to 100 feet were established around temporary or permanent impact areas and included in the field assessment. Ingress and egress routes used for the construction activities are shown on each base map as paved or dirt roads.

Existing information relative to wildlife and botanical resources, including RTE species, wetland, riparian and littoral habitats was presented in the Pre-Application Document and will be supplemented based on the results of this study for the purposes of any license application(s) related to the Project.

Wetlands and Deepwater Habitats

Geographic Information System data showing National Wetland Inventory ("NWI") and NYSDEC wetlands for each development were reviewed prior to the field survey. The NWI wetland and deepwater habitat types were confirmed during the field assessment. Additional wetland areas found within or adjacent to the proposed construction areas were delineated according to the NYSDEC Freshwater Wetlands Delineation Manual (1995) and the U.S. Army Corps of Engineers ("USACE") Wetlands Delineation Manual (1987). The technical guideline for wetlands requires that a positive wetland indicator be present for each parameter (vegetation, soils, and hydrology), except in limited instances identified in the USACE manual. Wetlands are classified in this report using the Classification of Wetlands and Deepwater Habitats of the United States (Cowardin *et al.*, 1979). The Cowardin classification system was developed as a basis for identifying, classifying, and mapping wetlands, other special aquatic sites, and deepwater aquatic habitats.

RTE Species

During the study plan development process, existing data relative to RTE species was gathered. The New York Natural Heritage Program was consulted to verify and update RTE information for the proposed Project area. The RTE species having the potential of being found at the three developments based on their respective geographic range and habitat preferences are described below.

Northern wild monkshood (federally-listed Threatened plant species)

The Northern wild monkshood is noted for its very distinctive, blue hood-shaped flowers which bloom between June and September. The plant is typically found on shaded to partially shaded cliffs, algific talus slopes, or on cool, streamside sites. These areas have cool soil conditions, cold air drainage, or cold groundwater flowage. On algific talus slopes, these conditions are caused by the outflow of cool air and water from ice contained in underground fissures. These fissures are connected to sinkholes and are a conduit for the air flows.

Bicknell's thrush (state-listed Special Concern bird species).

The Bicknell's thrush is an elusive neotropical migrant that breeds in the high elevation forests of northeastern North America and winters in the Caribbean. It is a habitat specialist restricted to montane forests of balsam fir. In New York, the Bicknell's thrush breeds at high elevations in the Adirondack and Catskill Mountains, which represent the southern-most boundary of its breeding range. Because of its preference for stands of dense fir trees on ridgelines, the Bicknell's thrush is often associated with recently disturbed areas characterized by standing dead conifers and dense regrowth of balsam fir.

Timber rattlesnake (state-listed Threatened reptile species)

Populations of the timber rattlesnake were once found on Long Island and in most mountainous and hilly areas of New York State, except in the higher elevations of the Adirondacks, Catskills, and Tug Hill region. They are now found in isolated populations in southeastern New York, the Southern Tier, and in the peripheral eastern Adirondacks. Timber rattlesnakes are generally found in deciduous forests in rugged terrain in these areas. In the summer, pregnant females seem to prefer open, rocky ledges where temperatures are higher, while the males and non-pregnant females seem to prefer cooler, thicker woods where the forest canopy is more closed.

Jefferson salamander (state-listed Special Concern amphibian species)

The geographic range of the Jefferson salamander includes southern New York, northern New Jersey, and most of Pennsylvania to Ohio and southern Indiana. Jefferson salamanders have a strong affinity for upland forests and prefer to reside most of the year in well drained deciduous or mixed forest, within 250 to 1600 meters of a small vernal pool or pond, commonly surrounded by alder, red maple, buttonbush, and dogwood. They hide beneath leaf litter, loose soil, and stones, or in rotting logs, rodent burrows, or subterranean burrows which they excavate. Vernal pools, or temporary ponds, are necessary for reproduction and need to be full of dead and decaying leaves for cover and overhanging bushes or grass for egg deposition.

Jefferson salamanders hibernate underground in the winter months, usually near breeding sites. In March and April (sometimes as early as February), they begin to migrate to breeding ponds which is thought to be triggered by the first early warm spring rains or other conditions of high humidity and above-freezing temperatures. Adult Jefferson salamanders are rarely seen outside of the breeding season, but are presumed to eat earthworms and other invertebrates underground. The ideal time of year to locate the Jefferson salamander is during the breeding months of March and April.

Longtail salamander (state-listed Special Concern amphibian species)

The range of the longtail salamander extends from southern New York and northern New Jersey southwest through southern Illinois, southeastern Missouri, as well as western Tennessee. Longtail salamanders can be found near streams or around caves, where they seek shelter under rocks, rotting logs, or in shale banks. Adults are found in moist or wet terrestrial situations, usually along the borders of streams, seeps, or wetlands. Breeding presumably occurs in late autumn and early winter. Eggs are laid in the winter, but are rarely found, probably because they are attached to rocks in dark, subsurface streams or seepages. The aquatic larvae hatch in 4-12 weeks and probably complete metamorphosis in the same year, although some may remain as larvae until the following spring or summer.

Bald eagle (state-listed Threatened bird species)

Historically, bald eagles nested in forests along the shorelines of oceans, lakes or rivers throughout most of North America, often moving south in winter to areas where water remained open. Wintering grounds are from southern Canada south, along major river systems, in intermountain regions, and in the Great Plains. In the northern United States, bald eagles will typically begin courting and nest building in the winter. The typical breeding season for the bald eagles in the vicinity of the Project begins with nest

construction in January and ends with the last chick fledged in early summer. The locations of existing nesting areas of bald eagles in the vicinity of the Project were identified from DEP records prior to conducting any field work. As shown in Table 3.2-1, DEP located 12 bald eagle nests in the vicinity of the Project in 2009.

Table 3.2-1: Bald Eagle Nest Locations in the Project Vicinity (2009).

Nest ID	Reservoir	County	Town	Distance To Dam (Miles)
NY 13	Cannonsville	Delaware	Deposit	1.5
NY 34	Cannonsville	Delaware	Tompkins	5.8
NY 88	Cannonsville	Delaware	Deposit	1
NY 89	Cannonsville	Delaware	Tompkins	8.7
NY 89	Cannonsville	Delaware	Tompkins	9
NY 93	Cannonsville	Delaware	Tompkins	1
NY 12	Pepacton	Delaware	Colchester	1.15
NY 36	Pepacton	Delaware	Middletown	13.5
NY 72	Pepacton	Delaware	Andes	11.6
NY 75	Pepacton	Delaware	Tompkins	6.15
NY 90	Pepacton	Delaware	Colchester	3.7
NY 15	Neversink	Sullivan	Neversink	3.7

3.2 Field Surveys

Field work was conducted from June 28-30, 2010, and April 25-26, 2011 at the three proposed developments. The field surveys consisted of observing the areas that will be temporarily or permanently disturbed as part of the Project, as well as the surrounding buffer zones. A team of two field biologists traversed the areas designated on the site maps (Figures 2-1 through 2-3) to document the botanical resources and wildlife resources.

Botanical and wildlife resources are described in this report as ecological community types in accordance with the classification system contained in the NYSDEC publication *Ecological Communities of New York State* (Edinger *et al.,* 2002). An ecological community is a variable assemblage of interacting plant and animal populations that share a common environment. Definitions of the systems and subsystems used in Edinger *et al.,* 2002 are adapted from the U.S. Fish and Wildlife Service wetland classification (Cowardin *et al.*, 1979), and U.S. Department of Agriculture ecological land use categories. Systems include riverine (rivers and streams), lacustrine (lakes and ponds), palustrine (wetlands), and terrestrial (uplands). This classification also includes a comprehensive treatment of cultural communities (human modified) along with the natural types. Notes were added to the classification of community types at the study area for each respective proposed development to provide additional, relevant details and/or describe unique occurrences.

Habitat and cover type documentation was conducted using a pentop field computer with pre-loaded aerial images and ArcGIS software. As mentioned, wetland areas found within or adjacent to the proposed construction areas were delineated according to the NYSDEC and USACE methods. Wetland boundaries were recorded using a Trimble ProXH handheld Global Positioning System unit, which generally provides sub-meter accuracy.

During the field surveys all observed animals, or signs of their presence, were documented within the proposed construction areas and buffer zones associated with each development. Photographs of each

vegetative cover type in the respective construction areas and buffer zones were collected and included as Appendix A. Note that the photographs include parcel numbers such as C-1 (Cannonsville-1), C-2, P-1 (Pepacton-1), N-1 (Neversink-1), etc.

While collecting information on the botanical and wildlife resources in the Project area, special attention was given to the habitat conditions preferred by the RTE species. Specifically, the field surveys were performed to check for the presence of RTE species and associated habitat (described above) that could be impacted by construction activities, including:

- Northern wild monkshood and associated habitat;
- recording any visual/auditory evidence for the presence of Bicknell's thrush and identifying any balsam fir stands;
- bald eagle including nesting, roosting, and feeding areas;
- timber rattlesnake presence and associated habitat;
- the presence of Jefferson's and longtail salamanders and associated habitat.

The 2011 field survey was conducted in April specifically for the purposes of identifying and documenting any vernal pool habitat in the study area that could potentially be utilized by Jefferson's and longtail salamanders.

The data collected during the field surveys were evaluated to determine if the proposed construction activities could result in (a) potential direct impacts to plant or animal species or their habitats, (b) potential fragmentation of continuous habitats used by any such species, (c) potential impacts to passage corridors used by any species, and (d) potential spread of invasive plant species.

4.0 RESULTS

The results of the field survey are presented below for each proposed development. Botanical resources are described as vegetative cover types with additional details provided with regard to wetland, riparian, and littoral habitats and invasive plant species found. Wildlife resources are generally described based on the cover types found and observations of wildlife (including RTE) species in the study area. Photographs collected during the survey are presented in Appendix A. A list of plant species observed at the three proposed developments is contained in Appendix B, and a list of animal species observed at the three proposed developments is contained in Appendix C.

4.1 Cannonsville Development

Field surveys at the Cannonsville development were conducted on June 29-30, 2010, and April 26, 2011. Weather during the June 2010 survey was hot and humid, Cannonsville Reservoir was not spilling and the downstream release was 423 cfs. The night prior to the April 2011 field survey brought heavy thunderstorms to the region; on the date of survey, Cannonsville Reservoir was spilling 958 cfs (Plate 47) and the downstream release was approximately 1,500 cfs (Plate 38).

Botanical Resources

Vegetative cover types in the areas proposed for disturbance (*i.e.*, construction-related activities) and the buffer zones consist of open fields, mixed forest and, in the area of the tailrace excavation, emergent and riverine wetlands and deepwater habitats. Table 4.1-1 provides a description of construction and buffer areas at Cannonsville development and Figure 4.1-1 presents this information on a map. Table 4.1-2 lists the ecological community types observed during the field assessment at the proposed Cannonsville development. Note that wetland, riparian and littoral resources are described in more detail below.

Impacts to upland botanical resources will be limited to temporary disturbances to existing mowed fields which will serve as the construction staging areas. No impacts to upland botanical resources within the buffer locations are expected. The locations of the generator lead, substation, and interconnection facilities are not expected to cause or lead to any adverse environmental impacts. However, selective trimming and removal of adjacent trees will occur, as necessary. Clearing this corridor will result in minor fragmentation of the upland forest, but this area is isolated from surrounding continuous forest blocks due to the river channels and dam. Therefore, the fragmentation is not expected to cause impacts to wildlife passage routes.

Invasive Plant Species

The invasive plants species found at the Cannonsville development are listed below and the locations are shown on Figure 4.1-2:

- Reed canarygrass
- Black locust
- Common mullein
- Multiflora rose
- Japanese knotweed
- Common mugwort
- Japanese barberry
- Honeysuckle
- Hairy willow herb
- Autumn olive

Deepwater, Wetlands, Riparian and Littoral Habitats

The NWI mapped deepwater habitats at the Cannonsville development include the Cannonsville Reservoir and the West Branch Delaware River. The Cannonsville Reservoir is classified as *lacustrine, limnetic, unconsolidated bottom, permanently flooded and impounded* (L1UBHh). Downstream of Cannonsville Reservoir, the north channel immediately below the spillway of the West Branch Delaware River is classified as *riverine, upper perennial, unconsolidated bottom, permanently flooded* (R3RBH). Starting approximately 600 meters below the spillway, the north channel is classified as *riverine, lower perennial, unconsolidated bottom, permanently flooded* (R2UBH). The south channel (below the release works) of the West Branch Delaware River is *riverine, lower perennial, unconsolidated bottom, permanently flooded* (R2UBH). There are no NYSDEC regulated wetlands present in or adjacent to the proposed construction areas.

During the field study, three wetlands were identified and delineated: two were found in buffer zone adjacent to construction staging areas and one wetland complex was located in the area proposed for tailrace excavation, as shown on Figure 4.1-1. A small wetland (parcel no. C-4a) of less than 0.1 acre is located in the buffer areanorth of Staging Area 1 in a depressional, spring-fed location. Although surrounded by upland forest, this wetland is classified as *palustrine, persistent emergent, saturated wetland* (PEM1B) due to the emergent vegetation and saturated soil conditions found there. Dominant wetland plants found included jewelweed, sensitive fern, marsh bedstraw, horsetail and foxtail sedge.

The floodplain (parcel no. C-10) in the buffer area adjacent to Staging Area 2 is classified as *palustrine, persistent emergent, seasonally flooded wetland* (PEM1E). This wetland is 0.6 acres and is classified as a palustrine system due to the presence of persistent emergent plants, primarily reed canarygrass, and is a seasonally flooded riparian system. Other dominant plants found in this location included jewelweed, sensitive fern, and spotted joe pye weed.

The area proposed for tailrace excavation consists of two wetland types. The open water channel (C-18) is classified as *riverine, lower perennial, unconsolidated bottom, permanently flooded,* as described above, because there were no submerged aquatic vegetation species found in this area and the bottom substrate was a mix of gravel and cobble overlain by silt. Adjacent to the channel, in the area proposed for excavation, is a wetland of approximately 1.05 acres classified as *palustrine, persistent emergent, seasonally flooded* (PEM1E). This wetland is classified as a palustrine system due to the presence of persistent emergent plants, such as reed canarygrass and yellow rocket, and is a seasonally flooded riparian area. Additional wetland plants found in this location include jewelweed and shrub willows.

To maintain downstream river flows during construction, a temporary siphon is proposed to convey water over the existing spillway and into the spillway channel. The spillway channel is excavated in bedrock and is typically dry except when the dam is spilling; therefore, this channel does not support vegetation and aquatic life. The temporary siphon will extent into the littoral zone of Cannonsville Reservoir, however any short term impacts to this area, such as avoidance of or entrainment through the temporary siphon intake by aquatic organisms, are unavoidable due to the need to maintain flows downstream.

The riparian and littoral areas of the tailrace channel were observed during the April site visit (Figure 4.1-4). Starting at the release works and looking downstream, the river right riparian area downstream to the bridge (C-13) is a riprapped shore with moderately sloped 10 feet high banks dominated by shrub cover. Downstream of the bridge, the riparian area remains moderately sloped and high, but is naturally vegetated and contains an expansive sidebar containing herbaceous vegetation (dominated by reed canarygrass). The river right shoreline vegetation consists of a mix of plantation trees (Norway spruce), white pine, black locus, sycamore, multiflora rose and invasive Japanese knotweed. Staying on river right from a point approximately 2,500 feet from the release works downstream to the confluence with the spillway channel, the bank slope flattens out and the riparian vegetation transitions to herbaceous cover. The river left riparian area consists of moderately steep riprapped bank with shrubby vegetation from the

release works to a point just downstream of the bridge. Beyond this point, the bank becomes extremely steep and forested. The spillway channel riparian zone of both riversides consists of riprap banks.

The tailrace channel is a long deep run containing extensive sidebars on river right, and one riffle area approximately 1,000 feet downstream of the release works. The littoral area was composed of very fine silt and clay lacking any submerged vegetation. The sidebars were submerged during the April visit due to relatively high flows occurring at this time.

The current release works will be closed for a period when the construction phase involves integrating the turbines with the discharge through the dam. This will result in a change to the water depths and velocities of the tailrace channel. The immediate tailrace area will be dewatered for excavation. Downstream areas will remain wetted due to the backwater received from the spillway channel. Based on hydraulic modeling of the tailrace channel, assuming a flow of 200 cfs, when water is provided to the spillway channel via the temporary siphon during construction and the tailrace channel flow is shut-off, the water depths in the tailrace channel will be slightly lower (one foot or less) for approximately 1,600 feet downstream of the release works (see Figure 4.1-4). Downstream of this point, water depths will be at or above levels related to the same flow provided through the release works. Normal velocities in tailrace channel vary according to the flow releases, and water velocity is expected to be zero during the time the release works are closed. Because this area will remain wetted during construction, impacts to the riparian and littoral areas, as well as the plant and animal species that use these areas as habitat, are not anticipated.

Wildlife Species and Habitat Observations

Wildlife observations in the proposed construction areas and buffer zones included: American crow, red-winged blackbird, pileated woodpecker, Eastern cottontail, white-tailed deer, common merganser, Northern flicker, Canada goose, American robin, and black-capped chickadee. Hermit thrush was also recognized as being present based on sound/auditory observation.

Three vernal pools were identified during the April 2011 field work. Vernal Pool 1 is located in a mixed upland forest with little ground cover (parcel C-27) adjacent to a mowed area near the paved road (Figure 4.1-1). This small depression was approximately 200 sq. ft. and part of a man- made drainage ditch and contained cinder blocks and old road signs at the outlet (Plate 31). No signs of biological life were observed in Vernal Pool 1.

Vernal Pool 2 was located within the buffer zone adjacent to the proposed overhead electric line (C-28a). This pool was approximately 600 sq. ft. and supported wildlife, as a Northern red-backed salamander was observed. Because Vernal Pool 2 is located outside of any of the proposed construction areas, no material impacts to Vernal Pool 2 are anticipated to occur as a result of construction-related activities.

Vernal Pool 3 is approximately 7,500 sq. ft. and a small portion thereof is located with the outer limits of the buffer zone associated with proposed Staging Area 1 (parcel C-5). This vernal pool is fed by seasonal groundwater seepage which is captured in a long, ditch-like depression adjacent to the mowed field, and it extends well beyond the study area (see Figure 4.1-1). Approximately 20 amphibian egg masses were found in this pool (Plate 33).

Based on the site visits, many of the areas proposed for construction at the Cannonsville development are currently disturbed (mowed). The upland forest areas in the buffer zones around the construction areas provide very good wildlife habitat as do the vernal pools found at the site. However, the vernal pools found in the buffer zones at the Project will be avoided and left undisturbed during construction activities. The boundaries of each will remain demarcated and instructions will be provided to the construction personnel to avoid these areas. Given that the areas will not be disturbed during construction, their

relative character is not expected to be materially impacted by construction-related activities at the Cannonsville development.

RTE Species and Habitat Observations

Adult and juvenile bald eagles were observed flying in the vicinity of the Cannonsville Dam during the field assessment on June 29-30, 2010. No nesting, roosting or feeding activities were observed near the proposed construction areas and/or buffer zones. Bald eagles were also observed during the April 26, 2011 field work. Juvenile and adult bald eagles were observed perched downstream of the tailrace channel, two adult eagles were perched above the spillway, and a few others were observed soaring around the reservoir. However no nesting or feeding activities were observed near the proposed construction areas and/or buffer zones.

Vernal Pool 3 described above could potentially serve as suitable habitat for the Jefferson's and longtail salamanders. As mentioned, this vernal pool, as well as the other two vernal pools, were found in the buffer zone at the Project and will be demarcated and avoided during construction activities. Therefore, no impacts to this habitat are anticipated.

No other RTE species or habitats were observed in the proposed construction areas and/or buffer zones at the Cannonsville development.

Table 4.1-1: Description of Proposed Construction and Buffer Areas at Cannonsville Development.

Parcel No.	Description	Notes
C-1	Spoils disposal area	Mowed field
C-1a	Spoils disposal area buffer zone	Primarily mowed turf, with a few scattered trees; Stone-lined drainage ditch present
C-2	Spoils disposal area buffer zone	Mixed upland forest with areas of brush understory; Contains existing unpaved access road
C-3	Spoils disposal area buffer zone	Primarily mowed turf, with areas of shrub and scattered ornamental trees
C-4	Staging Area 1 buffer zone	Deciduous forest
C-4a	Staging Area 1 buffer zone	Groundwater-fed wetland
C-5	Staging Area 1	Open field containing a few coniferous trees
C-5a	Staging Area 1 buffer zone	Open field, adjacent to and inclusive of a portion of Vernal Pool 3
C-6	Staging Area 1 buffer zone	Mature Norway spruce plantation; very little understory
C-7	Staging Area 1 buffer zone	Riverbank. Vegetated riparian zone, primarily herbaceous plants
C-8	Staging Area 2	Mowed field, bordered by drainage swales on east and west
C-9	Staging Area 2 buffer zone	Mature Norway spruce plantation; very little understory
C-10	Staging Area 2 buffer zone	Floodplain wetland; dominant plant species is reed canarygrass
C-11	Staging Area 2 buffer zone	Shrubby upland, bordered by drainage swale
C-12	Staging Area 2 buffer zone	Riverbank. Mix of tree, shrub and herbaceous riparian plants. Contains drainage swale
C-13	Shoreline buffer zone	Shrubby shoreline dominated by black locust seedlings (invasive species)
C-14	Tailrace excavation area	Emergent wetland, dominated by reed canarygrass
C-15	Access road and release works	Paved area
C-16	Buffer zone between access road and riverbank	Mowed turf
C-17	Septic tank & underground electric line	Mowed turf
C-18	Open channel of Delaware River	Free-flowing, shallow, no submerged vegetation
C-19	Buffer zone adjacent to penstock/powerhouse	Mixed mature forest, extremely steep

Table 4.1-1 (Cont.): Description of Proposed Construction and Buffer Areas at Cannonsville Development.

Parcel No.	Description	Notes
C-23	Staging Area 3	Mowed turf
C-24	Overhead electric line buffer zone	Thin strip of mixed upland forest with a small seep along edge toward a man-made drainage ditch
C-25	Existing overhead electric line and buffer zone	Mowed turf with drainage ditch
C-26	Overhead electric line buffer zone	Mixed upland forest with minimal ground cover
C-27	Overhead electric line buffer zone	Mixed upland forest containing Vernal Pool 1
C-28	Proposed Overhead electric line from substation to NYSEG poles	Mixed upland forest
C-28a	Buffer zone around overhead electric line	Mixed upland forest
C-29	Proposed substation location and buffer zone	Mowed turf
C-30	Existing transmission line ROW	Mixed upland shrub

Table 4.1-2: Ecological Communities at the Cannonsville Study Area.

Parcel	System	Subsystem	Ecological Community
C-1	Terrestrial	Terrestrial Cultural	Mowed lawn
C-1a	Terrestrial	Terrestrial Cultural	Mowed lawn
C-2	Terrestrial	Forested Upland	Rich mesophytic forest
C-3	Terrestrial	Forested Upland	Rich mesophytic forest
C-4	Terrestrial	Forested Upland	Rich mesophytic forest
C-4a	Palustrine *	Forested Mineral Soil Wetlands	Persistent emergent, saturated wetland
C-5/5a	Terrestrial	Terrestrial Cultural	Mowed lawn
C-6	Terrestrial	Terrestrial Cultural	Spruce/fir plantation
C-7	Terrestrial	Open Upland	Herbaceous riparian riverbank**
C-8	Terrestrial	Terrestrial Cultural	Mowed lawn
C-9	Terrestrial	Terrestrial Cultural	Spruce/fir plantation
C-10	Palustrine *	Open Mineral Soil Wetlands	Persistent emergent, seasonally flooded wetland
C-11	Terrestrial	Open Upland	Successional shrubland
C-12	Terrestrial	Open Upland	Shrub/tree riparian riverbank**
C-13	Terrestrial	Terrestrial Cultural	Riprap artificial shore**
C-14	Palustrine*	Open Mineral Soil Wetlands	Persistent emergent, seasonally flooded wetland
C-15	Terrestrial	Terrestrial Cultural	Paved road/path
C-16	Terrestrial	Terrestrial Cultural	Riprap artificial shore**
C-17	Terrestrial	Terrestrial Cultural	Mowed lawn
C-18	Riverine*	Natural Stream	Lower perennial, unconsolidated bottom, permanently flooded
C-19	Terrestrial	Forested Upland	Hemlock-northern hardwood forest
C-23	Terrestrial	Terrestrial Cultural	Mowed lawn
C-24	Terrestrial	Forested Upland	Hemlock-northern hardwood forest
C-25	Terrestrial	Terrestrial Cultural	Mowed lawn
C-26	Terrestrial	Forested Upland	Hemlock-northern hardwood forest
C-27	Terrestrial	Forested Upland	Hemlock-northern hardwood forest
C-28/28a	Terrestrial	Forested Upland	Hemlock-northern hardwood forest
C-29	Terrestrial	Terrestrial Cultural	Mowed lawn
C-30	Terrestrial	Terrestrial Cultural	Brushy cleared land

Notes: * Indicates wetland community type classified using Cowardin *et al.*, 1979. ** Indicates riparian community type not found in Edinger *et al.*, 2002.

4.2 Pepacton Development

Field surveys at the Pepacton development were conducted on June 28, 2010 and April 25, 2011. Weather during the June 2010 survey was hot and humid and Pepacton Reservoir was not spilling. Weather during the April 2011 was warm with occasional rain and fog and Pepacton Reservoir was spilling at a rate of 1,064 cfs.

Botanical Resources

Vegetative cover types in the areas proposed for disturbance and the buffer zones at the Pepacton development consist exclusively of mowed turf and paved roads. A description of these cover types and the associated ecological communities (Edinger *et al*., 2002) at the Pepacton development are listed in Table 4.2-1 and shown in Figure 4.2-1. Impacts to upland botanical resources will be limited to disturbances to existing mowed fields which will serve as the construction staging area and switchgear location.

Table 4.2-1: Cover Types and Ecological Communities at the Pepacton Study Area.

Parcel Number	Description	System	Subsystem	Community
P-1	Staging Area	Terrestrial	Terrestrial Cultural	Mowed lawn
P-2	Switchgear and interconnection facilities	Terrestrial	Terrestrial Cultural	Mowed lawn

Invasive Plant Species

No invasive plants species were found at the Pepacton development study area.

Deepwater, Wetlands, Riparian and Littoral Habitats

The NWI mapped deepwater habitats at the Pepacton development include the Pepacton Reservoir and the East Branch Delaware River. The Pepacton Reservoir is classified as *lacustrine, limnetic, unconsolidated bottom, permanently flooded and impounded* (L1UBHh). Downstream of the reservoir, the river channel is classified as *riverine, lower perennial, unconsolidated bottom, permanently flooded* (R2UBH). There were no other wetlands found in the proposed construction areas or buffer zones at the Pepacton development.

To maintain downstream river flows during construction, a temporary siphon is proposed to convey water over the existing spillway and into the spillway channel. The spillway channel is excavated in bedrock and is typically dry except when the dam is spilling; therefore, this channel does not support vegetation and aquatic life (Plates 51 and 54). The temporary siphon will extend into the littoral zone of Pepacton Reservoir, however any short term impacts to this area, such as avoidance of or entrainment through the temporary siphon intake by aquatic organisms, are unavoidable due to the need to maintain flows downstream. No other impacts to wetland, riparian or littoral habitats are anticipated during construction.

Wildlife Species and Habitat Observations

Cliff swallows nest in the corners of the window openings on the existing intake building release water chamber. These birds were not disturbed by presence of personnel during the field surveys and , it is not anticipated that construction activities at the Project would cause any long-term impacts. Other incidental wildlife observations included: white-tailed deer, common mergansers, European starlings, American robin, great blue heron, wild turkey, ring-billed gull, American crow, and double-crested cormorants.

Based on the site visits, all of the areas proposed for construction at the Pepacton development are currently disturbed with limited wildlife habitat.

RTE Species and Habitat Observations

Bald eagles were observed flying in the vicinity of the Downsville Dam during the field assessment. An adult eagle and a juvenile were spotted together flying over the dam. However, no nesting, roosting or feeding activities were observed near the proposed construction areas and/or buffer zones.

No other RTE species or associated habitats were observed in the proposed construction areas and/or buffer zones at the Pepacton development.

4.3 Neversink Development

Field surveys at the Neversink development were conducted on June 28, 2010 and April 25, 2011. Weather during the June 2010 survey was hot and humid and Neversink Reservoir was not spilling. Weather during the April 2011 survey was warm with occasional rain and fog and Neversink Reservoir was not spilling.

Botanical Resources

Vegetative cover types in the areas proposed for disturbance and the buffer zones at the Neversink development consist of mowed turf, paved roads, and a forest plantation. A description of these cover types and the associated ecological communities (Edinger *et al*., 2002) are listed in Table 4.3-1 and shown in Figure 4.3-1. Potential construction-related impacts at this development are expected to be minimal. With the exception of the proposed underground electrical interconnection through the forest plantation and field, the construction work will involve the use only of a mowed area as a staging location. The majority of the construction work will occur within or adjacent to the existing intake structure.

Table 4.3-1: Cover Types and Ecological Communities at the Neversink Study Area.

Parcel Number	Description	System	Subsystem	Community
N-1	Staging Area	Terrestrial	Terrestrial Cultural	Mowed lawn
N-2	Access road and parking lot	Terrestrial	Terrestrial Cultural	Paved road/path
N-3	Buffer zone around powerhouse construction area	Terrestrial	Terrestrial Cultural	Mowed lawn
N-4	Electrical interconnection corridor	Terrestrial	Terrestrial Cultural	Pine plantation
N-5	Electrical interconnection corridor	Terrestrial	Open Uplands	Successional old field
N-6	Existing overhead electrical line	Terrestrial	Terrestrial Cultural	Mowed roadside/pathway

During the April 25, 2011 site survey it was observed that some of the forest plantation trees were cleared to install an underground electric line connection between the intake building and the existing electrical pole on Route 55 as part of a separate, unrelated upgrade project (Plates 69-73) at Neversink. The clearing-activities associated with this unrelated project at Neversink, ultimately, reduce the potential for impacts associated with the Neversink development because the proposed underground electric line associated with the development will utilize this same corridor, and, thus, not require additional clearing of forest plantation trees within such corridor.

Invasive Species

The only invasive plant species found at the Neversink development was multiflora rose, as shown on Figure 4.3-2.

Deepwater, Wetlands, Riparian and Littoral Habitats

The NWI mapped deepwater habitats at the Neversink development include the Neversink Reservoir and the Neversink River. Based upon field observations, the Neversink Reservoir is classified as *lacustrine, limnetic, unconsolidated bottom, permanently flooded* (L1UBHh). The Neversink spillway and stilling basin below are classified as *riverine, lower perennial, unconsolidated bottom, permanently flooded, excavated* (R2UBHx). There were no other wetlands found in the proposed construction areas or buffer zones at the Neversink development.

To maintain downstream river flows during construction, a temporary siphon is proposed to convey water over the existing spillway and into the spillway channel. The spillway channel is excavated in bedrock and is typically dry except when the dam is spilling; therefore, this channel does not support vegetation and aquatic life (see Plates 56 and 65). The temporary siphon will extend into the littoral zone of Neversink Reservoir, however, as with the other two sites any short term impacts related to this area, such as avoidance of or entrainment through the temporary siphon intake by aquatic organisms, are unavoidable due to the need to maintain flows downstream. No other impacts to wetland, riparian or littoral habitats are anticipated during construction.

Wildlife Species and Habitat Observations

As at Pepacton, cliff swallows nest in the corners of the windows of the intake structure. These birds were not disturbed by presence of personnel during field studies and, it is not anticipated that construction activities related to the Neversink development would cause any long-term impacts. Other wildlife observations included: American crow, Canada goose, and white-tailed deer (scat). Based on the site visits, most of the areas proposed for construction at the Neversink development are currently disturbed. As noted above, the corridor for the proposed underground electrical line has already been cleared as part of a separate, unrelated project at Neversink to install underground electrical connections from an existing NYSEG pole on Route 55 to the existing release works structure. Accordingly, construction of the proposed underground line associated with the proposed Neversink development will not require additional clearing of trees from this corridor.

RTE Species and Habitat Observations

Bald eagles were observed soaring over the Neversink Reservoir during both field assessments. However, no nesting, roosting, or feeding activities were observed near the proposed construction areas and/or buffer zones.

No other RTE species or associated habitats were observed in the proposed construction areas and/or buffer zones at the Neversink development.

Figure 4.1-1: Vegetative Cover Types, Wetlands and Vernal Pools at the Proposed Cannonsville Development.

Notes: Imagery source: ESRI world imagery. All other data layers created by Gomez and Sullivan Engineers, P.C.

Figure 4.1-2: Invasive Plant Species Found at the Proposed Cannonsville Development.

Notes: Imagery source: ESRI world imagery. All other data layers created by Gomez and Sullivan Engineers, P.C.

Figure 4.1-3: Riverine Shoreline Characteristics of the Proposed Cannonsville Development.

Notes: Imagery source: ESRI world imagery. All other data layers created by Gomez and Sullivan Engineers, P.C.

Figure 4.1-4: Hydraulic Model of Tailrace Channel at Cannonsville.

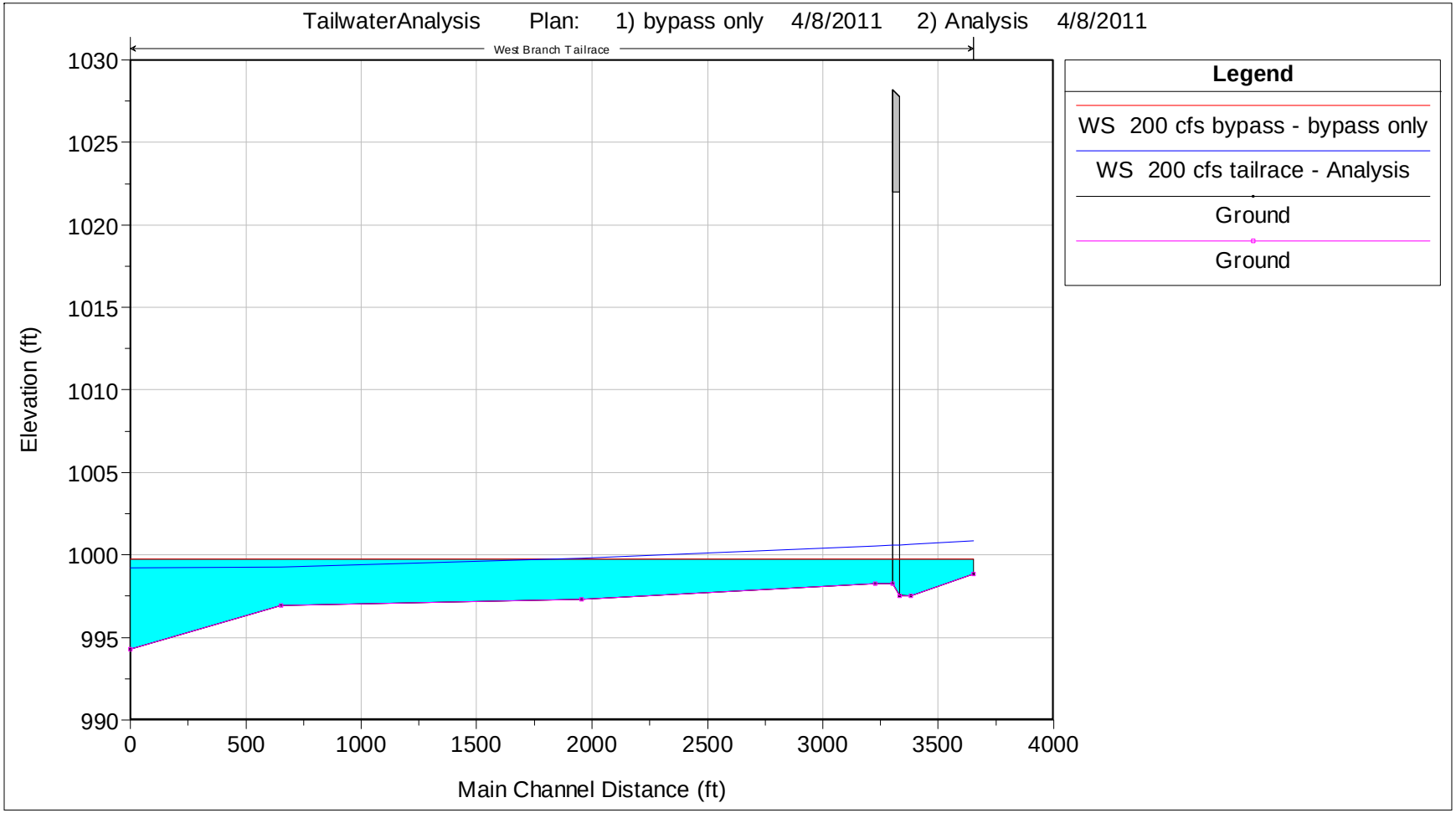
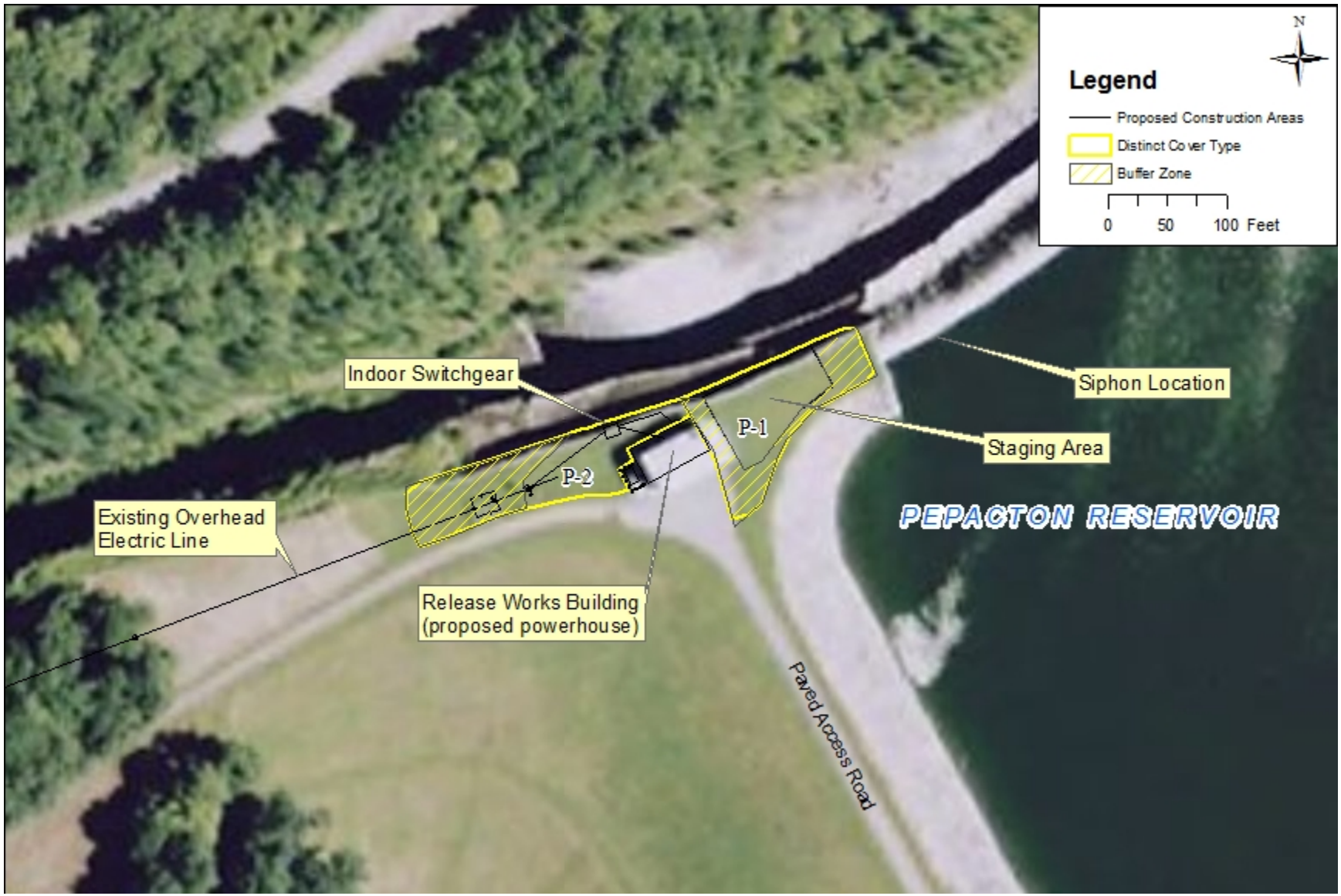
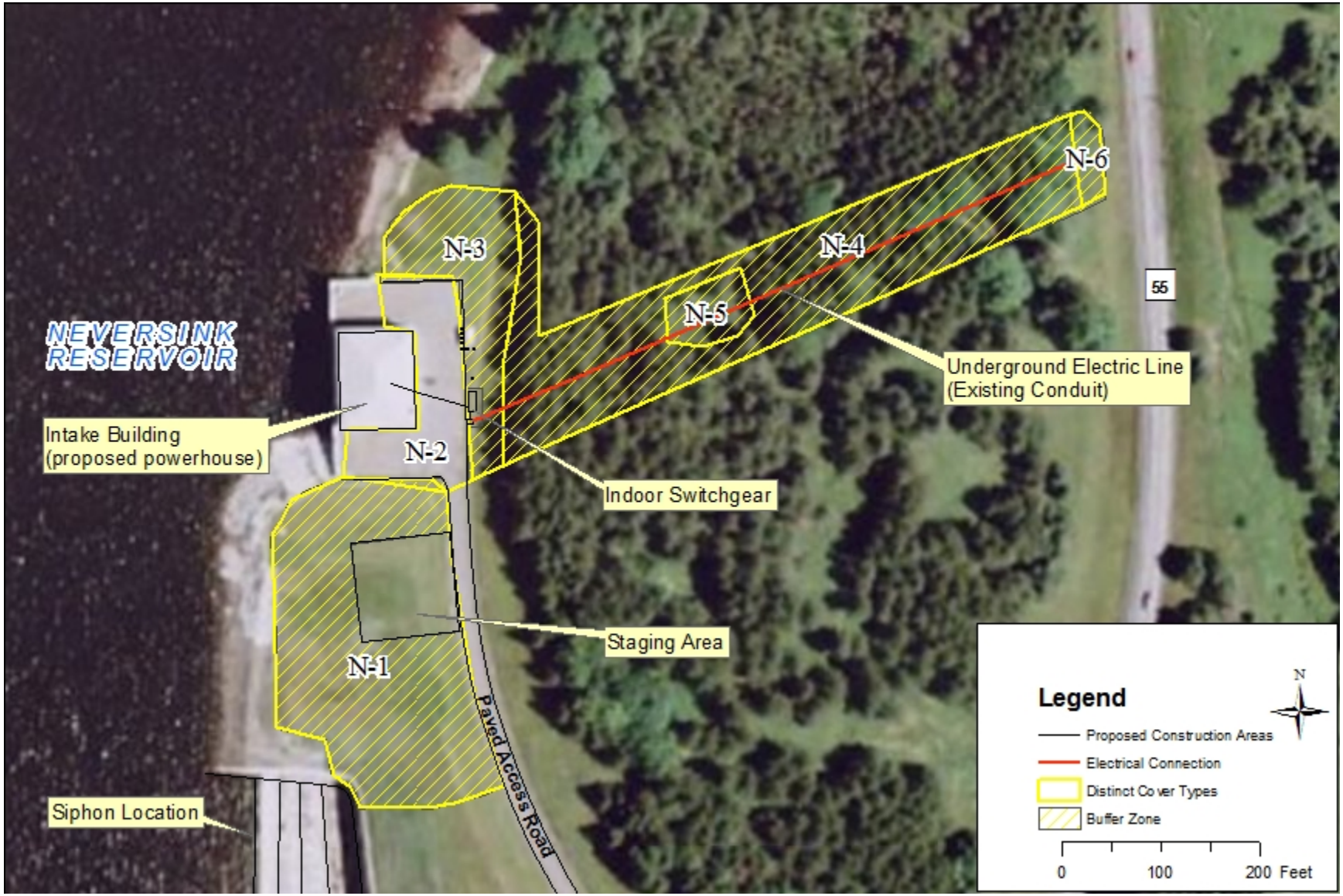


Figure 4.2-1: Vegetative Cover Types at the Proposed Pepacton Development.



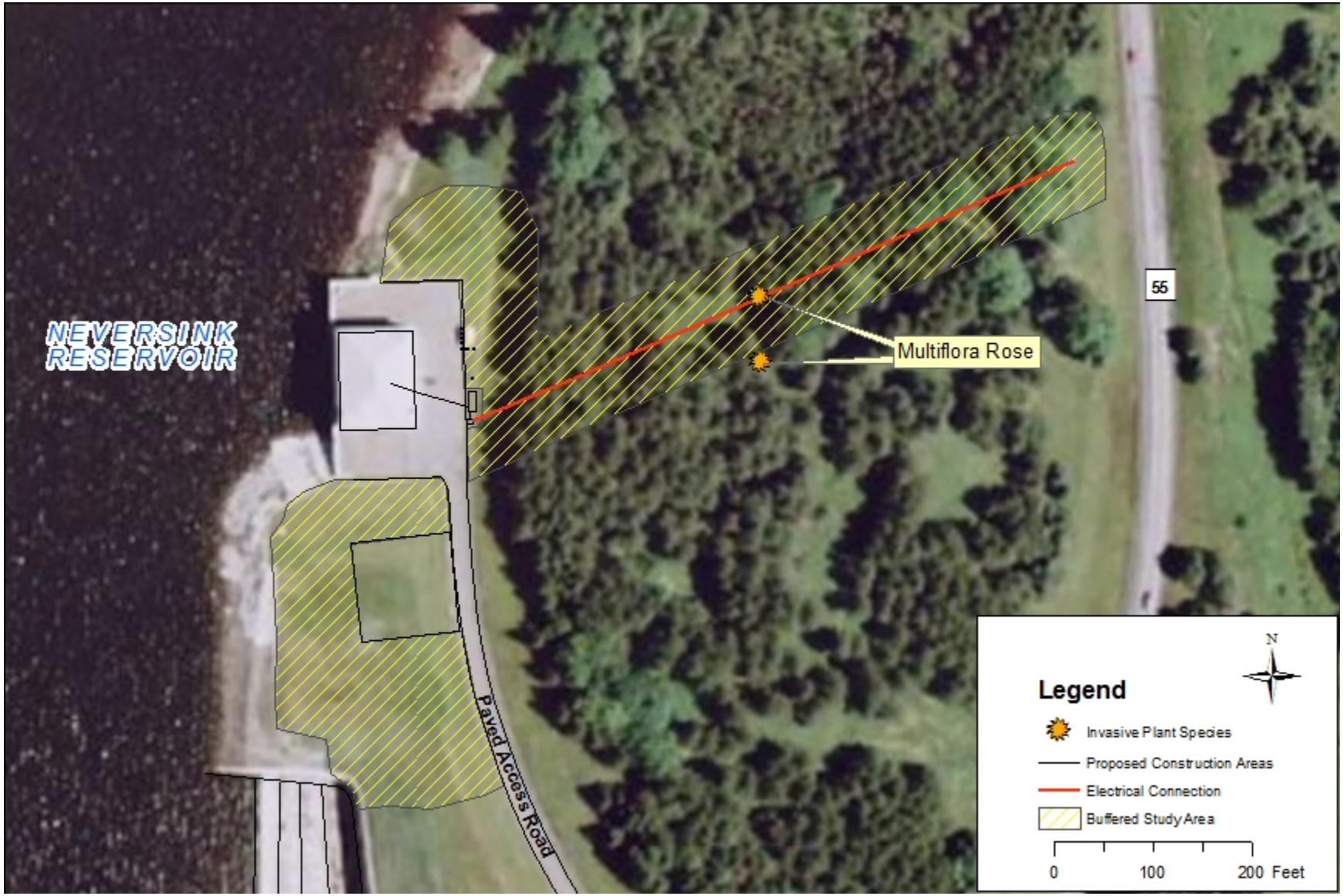
Notes: Imagery source: ESRI world imagery. All other data layers created by Gomez and Sullivan Engineers, P.C.

Figure 4.3-1: Vegetative Cover Types at the Proposed Neversink Development.



Notes: Imagery source: ESRI world imagery. All other data layers created by Gomez and Sullivan Engineers, P.C.

Figure 4.3-2: Invasive Plant Species Found at the Proposed Neversink Development.



Notes: Imagery source: ESRI world imagery. All other data layers created by Gomez and Sullivan Engineers, P.C.

5.0 SITE-SPECIFIC MITIGATION MEASURES

Based on the potential impacts of construction-related activities on wetlands, wildlife, botanical resources, and RTE species previously described in Section 4, this section provides potential mitigation measures to protect these resources from such impacts. These measures will be developed further prior to construction, in consultation with NYSDEC, USFWS, and other interested parties.

5.1 Protection and Avoidance of Sensitive Resources

Three wetlands and three vernal pools were identified in the study area at the proposed Cannonsville development. Only one of these wetlands (C-14/C-18 complex) is located in an area proposed for construction. The other two wetlands as well as the three vernal pools were found to be at least partly located in the buffer zone areas adjacent to the construction areas, as follows:

Resource	Location
Emergent Wetland C-4a	Buffer zone adjacent to Staging Area 1
Floodplain Wetland C-10	Buffer zone adjacent to Staging Area 2
Vernal Pool 1	Buffer zone adjacent to existing electric line
Vernal Pool 2	Buffer zone adjacent to new transmission lines
Vernal Pool 3	Buffer zone adjacent to Staging Area 1

The wetlands and vernal pools found in the buffer zones at the Project will be avoided and left undisturbed during construction activities. The boundaries of each will remain demarcated and instructions will be provided to the construction personnel to avoid these areas.

5.2 Wetlands Permitting

Impacts to certain wetlands at the Cannonsville development due to construction activities are unavoidable. Just over one acre of emergent wetland (parcel C-14) will be impacted by the construction of the powerhouse and tailrace at the Cannonsville development. Impacts will include excavation and removal of the vegetation and substrate to allow for a deeper tailrace area to accommodate the proposed turbine draft tube. The existing riverine deepwater habitat (parcel C-18) will also be excavated to allow for a deeper tailrace channel. There will be no net loss of wetlands due to this construction. However, the currently existing emergent wetland will be transformed into deepwater habitat.

The emergent wetland is currently of poor value due to the incursion of the invasive plant species reed canarygrass. Unlike native wetland vegetation, dense stands of reed canarygrass have little value for wildlife. Few species eat the grass, and the stems grow too densely to provide adequate cover for small mammals and waterfowl. Accordingly, no mitigation measures are proposed at this time. However, prior to construction, DEP will obtain all necessary permits from the USACE and the NYSDEC. Consultation with the applicable resource agencies will occur during the process of obtaining any permits required for the Project.

The DEP intends to complete a joint application for permit(s) for submittal to NYSDEC and USACE for wetlands and waterways disturbances prior to construction of the proposed developments. Applicable rules, regulations and permit requirements may include:

- Section 10 of the Rivers and Harbors Act of 1899 which prohibits the obstruction or alteration of navigable waters of the United States without a permit from the USACE. Activities related to Project construction that require a Section 10 permit include dredging and excavation.

- Section 404 of the Clean Water Act which prohibits the discharge of dredged or fill material into waters of the United States without a permit from the USACE. Activities related to Project construction that may require a Section 404 permit include the in-channel work proposed at the Cannonsville development.

In addition, New York State's freshwater wetlands are protected under Article 24 of the New York State Environmental Conservation Law, commonly known as the Freshwater Wetlands Act (the Act or Article 24). Wetlands protected under Article 24 are known as New York State "regulated" wetlands. The regulated area includes the wetlands themselves as well as a protective buffer or "adjacent area" extending 100 feet landward of the wetland boundary. Title 3 of the Act mandates that all freshwater wetlands with an area 12.4 acres[1] or greater be depicted on a set of maps promulgated by DEC. There are no New York State regulated wetlands in the study area at the Project.

5.3 Sediment and Erosion Control Plan

A sediment and erosion control plan has been developed as specified in the study plan (Issue No. 3: Impact of Construction-Related Activities on Erosion). During construction, sediment and erosion control measures and stormwater management practices will be employed to minimize erosion and sedimentation in wetland, littoral and riparian areas at the project. The conceptual planning for erosion control presented in the Erosion Control Report (DEP 2011) are based on the proposed location of structures (powerhouse, transmission lines, substation) and the proposed locations for staging areas, spoils, sedimentation basin, and access routes. It is expected once final design plans are developed, detailed erosion and sediment control plans and stormwater pollution prevention plans ("SWPPP") will be prepared. In addition to providing for erosion and sediment control, the measures identified in the plan will serve to alert construction personnel of "avoidance areas" related to sensitive areas such as vernal pools and wetlands.

5.4 Invasive Species Control

The invasive plant species found at the Cannonsville and Neversink developments are shown in Figures 4.1-2 and 4.3-2, respectively. There were no invasive plants found at the Pepacton development. The invasive plants found at the Cannonsville and Neversink developments are largely naturalized and established in the region. There were no new invasive plants discovered at the Project which are on the regional "Early Detection" or "Approaching Region" lists (Invasive Plant Council of New York State, 2007). Nevertheless, measures will be taken to avoid the spread of the existing invasive species during construction.

At the Cannonsville development, fill from the excavated tailrace channel will be transported and deposited in the spoils disposal area. In order to prevent invasive species from being spread within the property, excavated material will be covered with clean, weed-free top soil, mulch, and seeded. Newly

[1] Wetlands less than 12.4 acres in size may also be mapped if they have unusual local importance or are located within the Adirondack Park.

seeded areas will be watered as needed to establish grass. If the season prohibits the establishment of grass, a temporary cover, such as straw, will be used to prevent vegetative growth until the weather permits. Additional management practices will be implemented to prevent invasive plant species from being transported off-site, including cleaning vehicles, boots and tools prior to moving them off-site.

At the Neversink development, the invasive species multiflora rose is limited to areas along the existing underground conduit. No additional disturbances to this area are anticipated during construction and therefore, no measures to avoid the spread of the existing invasive species during construction are proposed at Neversink.

5.5 Bald Eagle Protection Measures

The proposed developments are home to breeding populations of bald eagles. The bald eagle is protected under the Bald and Golden Eagle Protection Act (16 U.S.C. §§ 668-668d) and the Migratory Bird Treaty Act (16 U.S.C. §§ 703-712), and continues to be listed as a threatened species in New York State under the NYS Endangered Species Act (6 NYCRR Part 182 §11-0535).

The DEP monitors bald eagle activity at the proposed developments and will continue to do so during construction. Based on the field observations, there does not appear to be any nesting or roosting habitat (*e.g.*, tall trees) in the proposed construction areas or buffer zones. However, bald eagle habitat use may change from year to year. As shown previously in Table 3.2-1, bald eagle nests identified in 2009 were located at least one mile or more from the respective dam locations at each development. Therefore, maps of the nesting locations were not prepared. However, prior to construction, DEP will identify any bald eagle nests in the vicinity of the proposed construction activities at each respective development. DEP will provide this information to the USFWS and NYSDEC, maps will be developed, and conceptual buffer zones around nests will be established, as appropriate.

Further, to prevent disturbances to nests, foraging areas, and roosting areas, restrictions, as described below, may be incorporated into the construction plan associated with the Project, as appropriate, consistent with the suggested measures in the USFWS Bald Eagle Management Guidelines (USFWS, 2007). These measures may include:

- Avoid clear cutting or removal of overstory trees within 330 feet of eagle nests at any time.

- If nests are found within 330-660 feet of the proposed construction areas, construction sequencing may be altered to occur outside of the nesting season (typically January – July), in consultation with the USFWS and NYSDEC, depending on whether the construction activity will be visible from the nest.

- Currently it is not anticipated that blasting will be required for the tailrace excavation at the Cannonsville development. If site conditions require shallow blasting, DEP will consult with the USFWS and NYSDEC, as necessary, regarding any required blasting plans.

- Additionally, DEP envisions working with USFWS and NYSDEC to implement protective measures for bald eagles, and other raptors, that may choose to perch on the new overhead electric lines and poles at the Cannonsville development. Several options exist, but the purpose is to create an exclusion zone at each pole so that an outstretched wing cannot make contact with a high-voltage line. Extensions affixed to the pole above the power lines would allow for safe perching opportunities.

Construction activities are not likely to adversely affect foraging activities of bald eagle at the three proposed developments. At the Cannonsville development, the excavation area is localized to a relatively small area (~1 acre), and there are other undisturbed areas that would afford ample alternative foraging opportunities, such as Cannonsville Reservoir, the channel downstream of the spillway, and other downstream locations. At Pepacton and Neversink, the construction activities will be limited to inside and adjacent to the existing intake buildings; such activities are not expected to affect bald eagle foraging opportunities. New information regarding bald eagle nest locations at the time of construction may warrant additional protection measures as indicated above.

At the Cannonsville development, DEP has incorporated raptor protection measures in the design of the new overhead supply and transmission lines to greatly reduce the collision and electrocution risk for raptors, including bald eagles. The design measures include tangent construction and overhead grounded static wires on the transmission lines, and cross arms installed on the new supply line poles, as recommend by Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006 (APLIC 2006).

6.0 REFERENCES

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APPENDIX A – PHOTOGRAPHS

Cannonsville Development: Photographs Taken June 29 - 30, 2010

Plate 1: View of the proposed spoils disposal area at Cannonsville development (C-1).

Plate 2: Drainage swale on the edge of the proposed spoils disposal area at Cannonsville development.

Plate 3: Mixed upland forest cover type (C-2) adjacent to the proposed spoils disposal area at Cannonsville development.

Plate 4: Mixed field/shrub cover type (C-3) adjacent to the proposed spoils disposal area at Cannonsville development.

Plate 5: Spillway at Cannonsville Reservoir.

Plate 6: Spillway at Cannonsville Reservoir.

Plate 7: Proposed Staging Area 1 at Cannonsville development. Open field cover type (C-5) with forest plantation on left (C-6).

Plate 8: Riverbank adjacent to proposed Staging Area 1 (C-7) at Cannonsville development.

Plate 9: Floodplain wetland (C-10) dominated by reed canarygrass at Cannonsville development.

Plate 10: Proposed Staging Area 2 (C-8) at Cannonsville development. Mowed field.

Plate 11: Drainage swale located west of proposed Staging Area 2 at Cannonsville development.

Plate 12: Emergent wetland (C-4a) adjacent to proposed Staging Area 1 at Cannonsville development.

Plate 13: Proposed Staging Area 3 at Cannonsville development.

Plate 14: Upstream view of existing release works and adjacent emergent wetland (C-14) at Cannonsville development.

Plate 15: Emergent wetland (C-14) adjacent to existing release works (looking east) at Cannonsville development.

Plate 16: Downstream view of West Branch Delaware River and adjacent emergent wetland (C-14) from existing release works at Cannonsville development.

Plate 17: View of the cross-channel weir downstream of existing release works at Cannonsville development.

Plate 18: Mixed forest buffer area (C-19) south of existing release works at Cannonsville development.

Plate 19: Proposed location of new powerhouse (C-16) at Cannonsville development.

Plate 20: Existing transmission line corridor at Cannonsville development.

Plate 21: Emergent wetland (C-14) located within the proposed tailrace excavation area at Cannonsville development.

Plate 22: Upstream view of emergent wetland (C-14) and West Branch Delaware River channel (C-18) in the proposed tailrace excavation area at Cannonsville development.

Plate 23: Downstream view of West Branch Delaware River channel (C-18) in the proposed tailrace excavation area at Cannonsville development.

Plate 24: Downstream view of West Branch Delaware River channel downstream of bridge at Cannonsville development.

Cannonsville Development: Photographs Taken April 26, 2011

Plate 25: Uphill view of mixed upland forest (C-24) at Cannonsville development.

Plate 26: Uphill view of mowed turf (C-25) with drainage ditch adjacent to C-24 at Cannonsville development.

Plate 27: Mixed upland forest (C-26) at Cannonsville development.

Plate 28: Mixed upland forest (C-27) (see photo left) at Cannonsville development. Mowed grass along road (C-25).

Plate 29: Mixed upland forest (C-28) in area of proposed overhead transmission line at Cannonsville development.

Plate 30: Mixed upland forest (C-28) looking back at proposed substation location at Cannonsville development.

Plate 31: Vernal Pool 1 at Cannonsville development: small man-made depression made with road signs and cinder blocks found in mixed upland forest (C-27).

Plate 32: Vernal Pool 2 at Cannonsville development; adjacent to mowed access road in mixed upland forest (C-28).

Plate 33: Vernal Pool 3 containing egg masses.

Plate 34: West-facing view of mowed area (C-29) near proposed substation location at Cannonsville development.

Plate 35: Proposed substation location mowed area (C-29) at Cannonsville development.

Plate 36: West-facing view of access road parallel with West Branch Delaware River channel at Cannonsville development.

Plate 37: Spillway channel when dam is spilling (958 cfs) at Cannonsville development.

Plate 38: Downstream Release (approximately 1,500 cfs) at Cannonsville development.

Plate 39: River right upstream view of channel and riverbank adjacent to proposed Staging Area 1 (C-7) at Cannonsville development.

Plate 40: River right downstream view of channel and riparian area adjacent to proposed Staging Area 1 (C-7) at Cannonsville development; moderately sloped 10 feet high banks.

Plate 41: Downstream view of river left at Cannonsville development; steep forested area.

Plate 42: Downstream view where river right bank slope flattens out at Cannonsville development.

Plate 43: Downstream river right Japanese knotweed stalks from last summer's growth at Cannonsville development.

Plate 44: River right upstream view at peninsula point of West Branch of Delaware River and rocky shoreline at Cannonsville development.

Plate 45: River right downstream view of convergence of West Branch of the Delaware River with spillway channel at Cannonsville development.

Plate 46: Upstream view of spillway channel from peninsula at Cannonsville development.

Plate 47: Spillway overflow at Cannonsville Reservoir.

Plate 48: Downstream view of spillway channel at Cannonsville development.

Pepacton Development: Photographs Taken June 28, 2010

Plate 49: Proposed Staging Area at Pepacton development (P-1).

Plate 50: Existing overhead electric lines at Pepacton development.

Plate 51: Spillway at Pepacton Reservoir.

Pepacton Development: Photographs Taken April 25, 2011

Plate 52: Spillway overflow at Pepacton Reservoir - view from paved access road.

Plate 53: Pepacton Reservoir spillway overflow.

Plate 54: Spillway channel at Pepacton development.

Plate 55: Spillway channel ledge with current release works building (this structure will house the proposed powerhouse) in background at Pepacton development.

Neversink Development: Photographs Taken June 28, 2010.

Plate 56: Neversink Reservoir Spillway viewed from Rt. 55.

Plate 57: Gated access road at Neversink Reservoir (19.3 feet wide).

Plate 58: Proposed Staging Area at Neversink development (N-1).

Plate 59: Weather station adjacent to the proposed Staging Area (N-1) at Neversink development.

Plate 60: Weather station, propane tank, and intake building at Neversink development (cover types N-2 and N-3).

Plate 61: Looking east into forest plantation (N-4) at Neversink development.

Plate 62: Forest plantation (N-4) at Neversink development, proposed route of underground transmission line.

Plate 63: Successional field cover type area (N-5) near proposed route of underground transmission line at Neversink development.

Plate 64: Road shoulder (N-6) containing existing electrical pole at Route 55 at Neversink development.

Neversink Development: Photographs Taken April 25, 2011.

Plate 65: Spillway at Neversink Reservoir.

Plate 66: Current intake building (this existing structure will house the proposed powerhouse) at Neversink development.

Plate 67: South view of proposed Staging Area buffer zone at Neversink development (N-1).

Plate 68: South view of paved access road drainage ditch at Neversink development.

Plate 69: East view of proposed underground electrical line at Neversink development. Note that the clearing depicted in this photograph pertains to a separate, unrelated project at Neversink to install an underground electrical connection to the existing intake structure at the site.

Plate 70: Westward view of cleared forest plantation (N-4) for proposed underground electrical line at Neversink development. Note that the clearing depicted in this photograph pertains to a separate, unrelated project at Neversink to install an underground electrical connection to the existing intake structure at the site.

Plate 71: Eastward view of cut plantation pines along corridor for the proposed underground electric line at Neversink development. Note that the clearing depicted in this photograph pertains to a separate, unrelated project at Neversink to install an underground electrical connection to the existing intake structure at the site.

Plate 72: East view of existing electrical pole on Route 55 and corridor for the proposed underground electric line at Neversink development. Note that the clearing depicted in this photograph pertains to a separate, unrelated project at Neversink to install an underground electrical connection to the existing intake structure at the site.

Plate 73: Westward view of existing electrical pole on Route 55 and corridor for the proposed underground electric line at Neversink development. Note that the clearing depicted in this photograph pertains to a separate, unrelated project at Neversink to install an underground electrical connection to the existing intake structure at the site.

APPENDIX B – LIST OF PLANT SPECIES OBSERVED

Scientific Name	Common Name	Neversink						Pepacton		Canonnsville																											
		N-1	N-2	N-3	N-4	N-5	N-6	P-1	P-2	C-1	C-1a	C-2	C-3	C-4	C-4a	C-5/5a	C-6	C-7	C-8	C-9	C-10	C-11	C-12	C-13	C-14	C-15	C-16	C-17	C-18	C-19	C-23	C-24	C-25	C-26	C-27	C-28/28a	C-29	Invasive
Fagus grandifolia	American beech																															X		X				
Ulmus americana	American elm													X				X						X														
Carpinus caroliniana	American hornbeam																					X	X													X		
Platanus occidentalis	American sycamore																				X		X															
Malus domestica	Apple				X																			X														
Elaeagnus umbellata	Autumn olive									X			X																										Yes
Populus balsamifera	Balsam poplar				X																																	
Lotus corniculatus	Birdsfoot trefoil				X					X	X					X		X						X														
Rumex obtusifolius	Bitterdock																						X	X						X								
Betula lenta	Black birch																																	X	X	X		
Prunus serotina	Black cherry				X					X	X	X		X									X	X								X		X	X	X		
Sambucus canadensis	Black elderberry																							X														
Robinia psuedoacacia	Black locust																					X		X														Yes
Picea pungens	Blue spruce				X																																	
Verbena hastata	Blue vervain										X													X														
Acer negundo	Boxelder																	X					X	X														
Typha latifolia	Broadleaf cattail																							X														
Trifolium spp.	Clover	X		X	X	X			X	X	X					X			X												X							
Asclepias syriaca	Common milkweed				X	X				X	X		X		X	X		X			X	X	X	X														
Artemisia vulgaris	Common mugwort												X									X																Yes
Verbascum thapsus	Common mullein																	X																				Yes
Hypericum perforatum	Common St. Johnswort																							X														Yes
Achillea millefolium	Common yarrow									X	X					X		X						X														
Vicia cracca	Cow vetch									X	X							X																				
Lysimachia nummularia	Creeping jenny																					X																Yes
Dianthus armeria	Deptford pink											X																										
Tsuga canadensis	Eastern hemlock				X																									X		X		X	X	X		
Toxicodendron radicans	Eastern poison ivy																					X	X	X														
Pinus strobus	Eastern white pine				X								X	X																				X				
Convolvulus arvensis	Field bindweed																					X		X														
Penstemon digitalis	Foxglove beardtongue											X																										
Carex alopecoidea	Foxtail sedge														X																							
Solidago spp.	Goldenrods				X	X				X	X	X		X		X		X				X	X							X								
Not identified	Grasses (mowed)	X		X			X	X	X	X	X					X			X									X			X		X				X	
Betula populifolia	Gray birch										X																							X	X	X		
Cornus racemosa	Gray dogwood											X											X	X														
Fraxinus pennsylvanica	Green ash				X									X								X	X	X										X		X		
Epilobium hirsutum	Hairy willowherb														X							X		X														Yes
Crataegus spp.	Hawthorn											X	X	X	X			X														X				X		
Galeopsis tetrahit	Hemp nettle											X				X		X				X																
Vaccinium corymbosum	Highbush blueberry					X																																
Lonicera spp.	Honeysuckle												X					X					X															Yes
Equisetum spp.	Horsetail														X																							
Castilleja mutis	Indian paintbrush				X																																	
Apocynum cannabinum	Indianhemp																	X																				

Scientific Name	Common Name	Neversink						Pepacton		Canonnsville																														
		N-1	N-2	N-3	N-4	N-5	N-6	P-1	P-2	C-1	C-1a	C-2	C-3	C-4	C-4a	C-5/5a	C-6	C-7	C-8	C-9	C-10	C-11	C-12	C-13	C-14	C-15	C-16	C-17	C-18	C-19	C-23	C-24	C-25	C-26	C-27	C-28/28a	C-29	Invasive
Berberis thunbergii	Japanese barberry											X																										Yes
Fallopia japonica	Japanese knotweed																	X						X														Yes
Impatiens capensis	Jewelweed														X						X	X		X	X					X								
Galium palustre	Marsh bedstraw														X																							
Podophyllum peltatum	Mayapple																					X																
Spiraea latifolia	Meadowsweet				X							X			X	X		X					X	X	X													
Acer spicatum	Mountain maple																													X								
Rosa multiflora	Multiflora rose				X						X	X	X									X	X	X				X				X			X			
Quercus rubra	Northern red oak													X																		X						
Picea abies	Norway spruce				X							X				X	X			X																		
Leucanthemum vulgare	Oxeye daisy																	X				X		X														
Anaphalis margaritacea	Pearly everlasting																							X														
Solanum xanti	Purple nightshade																							X	X													
Rubus odoratus	Purple-flowering raspberry																							X						X								
Populus tremuloides	Quaking aspen											X												X														
Rubus spp.	Raspberry/blackberry					X						X	X					X					X	X						X					X	X		
Acer rubrum	Red maple				X							X	X									X		X								X			X	X		
Phalaris arundinacea	Reed canarygrass															X					X				X												Yes
Vitis riparia	Riverbank grape												X									X																
Pinus sylvestris	Scotch pine				X	X																																
Onoclea sensibilis	Sensitive fern														X			X			X		X							X								
Amelanchier spp.	Serviceberry													X																								
Acer saccharinum	Silver maple																																	X				
Mentha spicata	Spearmint											X																										
Acer saccharum	Sugar maple												X	X								X	X									X		X				
Lysimachia terrestris	Swamp candles														X			X																				
Comptonia peregrina	Sweet fern																							X														
Phleum pratense	Timothy									X	X					X																						
Parthenocissus quinquefolia	Virginia creeper				X					X	X	X						X				X	X	X														
Fragaria virginiana	Virginia strawberry									X	X																											
Lysimachia quadrifolia	Whorled yellow loosestrife											X																										
Salix spp.	Willow																						X		X													
Barbarea vulgaris	Yellowrocket																								X													
Betula alleghaniensis	Yellow birch																					X	X	X						X		X						
Oxalis stricta	Yellow woodsorrel														X																							

Notes: Invasive according to New York State Early Detection Invasive Plants by Region, Assessment of Naturalized Invasive Plants, REGION: CRISP, October, 2007. Mowed grasses not identified to species.

APPENDIX C – LIST OF ANIMAL SPECIES OBSERVED

Scientific Name	Common Name	Neversink	Pepacton	Cannonsville
Birds				
Corvus brachyrhynchos	American crow	X	X	X
Turdus migratorius	American robin		X	X
Haliaeetus leucocephalus	Bald eagle	X	X	X
Parus atricapillus	Black-capped chickadee			X
Branta canadensis	Canada goose	X		X
Petrochelidon pyrrhonota	Cliff swallow	X	X	
Mergus merganser	Common merganser		X	X
Phalacrocorax auritus	Double-crested cormorant		X	
Sturnus vulgaris	European starling		X	
Ardea herodias	Great blue heron		X	
Catharus guttatus	Hermit thrush			X
Colaptes auratus	Northern flicker			X
Dryocopus pileatus	Pileated woodpecker			X
Agelaius phoeniceus	Red-winged blackbird			X
Larus delawarensis	Ring-billed gull		X	
Meleagris gallopavo	Wild turkey		X	
Mammals				
Sylvilagus floridanus	Eastern cottontail			X
Odocoileus virginianus	White-tailed deer	X	X	X
Amphibians				
Plethodon cinereus	Northern red-backed salamander			X