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

Cannonsville Hydroelectric Project

FERC Project No. 13287

VOLUME 4

Appendix E-2: Impact of Construction-Related Activities on Erosion

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 Erosion

Cannonsville, Pepacton, and Neversink Developments

February 2012

(revised for Final License Application)

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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 DEP 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 DEP 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 DEP will proceed with appropriate studies for that development 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, the DEP proposed to conduct a study to evaluate the impact of construction-related activities on erosion at the Cannonsville, Pepacton, and Neversink Developments. The goal of this study is to conceptually describe the proposed sediment and erosion control measures at each development. The narrative is supplemented with conceptual level drawings showing the proposed location of the erosion control measures.

The conceptual planning for erosion control discussed in this report is based on the proposed location of structures (powerhouse, transmission lines, switchgear and 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 prevent plans ("SWPPP") will be prepared.

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2.0 SUMMARY OF PROPOSED CONSTRUCTION ACTIVITIES

This section summarizes construction related activities, which are subject to change as the DEP's proposal and licensing process advances. No work on or around the reservoir or lands surrounding the reservoirs (except as noted below) is expected to occur. The Projects should not cause or lead to any erosion in such areas.

2.1 Cannonsville Development

The Cannonsville development includes the construction of a separate powerhouse adjacent to the existing low-level outlet works. The existing penstock would be extended into the powerhouse, with the turbine discharges flowing through steel draft tubes into concrete chambers beneath the powerhouse floor. Water from these chambers will be discharged into a widened common tailrace channel and into the West Branch of the Delaware River. The powerhouse will be longer and slightly taller than the existing low-level outlet works. The approximate powerhouse dimensions are 168 feet long, 54 feet high and 52 feet high. The outside walls of the powerhouse will be constructed in a manner that creates the same granite look as the existing release works building.

Figure 2.1-1 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. 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 NYSEG's transmission system. The route for the generator lead is not yet finalized, but it is likely to run underground from the powerhouse indoor switchgear to a pole, then overhead approximately 1200 feet to the substation (approximately 43 feet wide by 115 feet long). 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 interconnection facilities between the new substation and the transmission line, approximately 460 feet, will consist of new overhead poles approximately 45 feet above ground. Access to the new structure and appurtenances will be from existing roadways at the site.

2.2 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 2.2-2 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 roadway leading to the release water chamber 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.

2.3 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 2.3-1 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. 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.

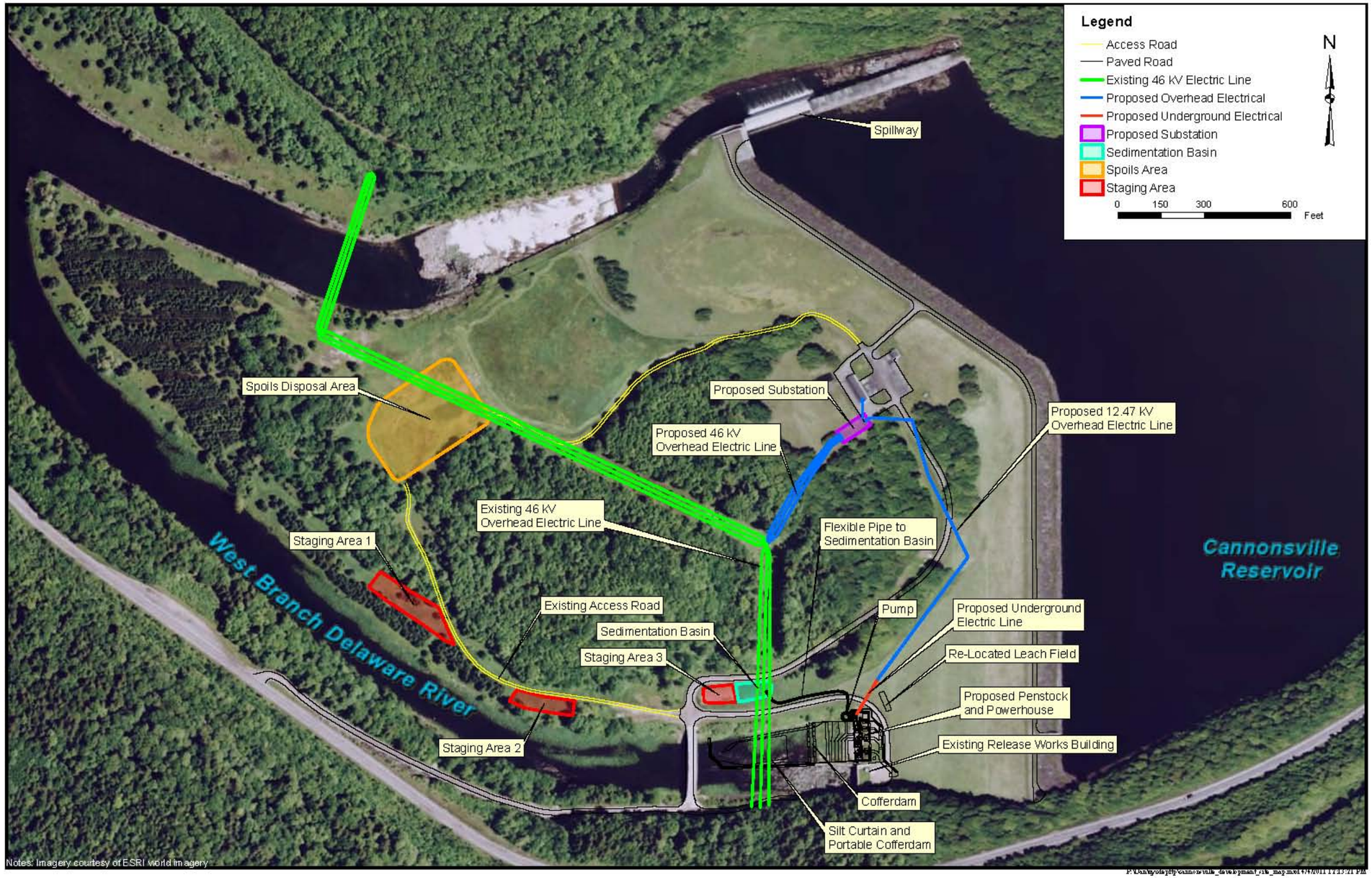


Figure 2.1-1: Cannonsville Development Study Area. Notes: Imagery source: ESRI world imagery. All other data layers created by Gomez and Sullivan Engineers. P.C.

Figure 2.2-1: Pepacton Development Study Area. Notes: Imagery source: ESRI world imagery. All other data layers created by Gomez and Sullivan Engineers. P.C.

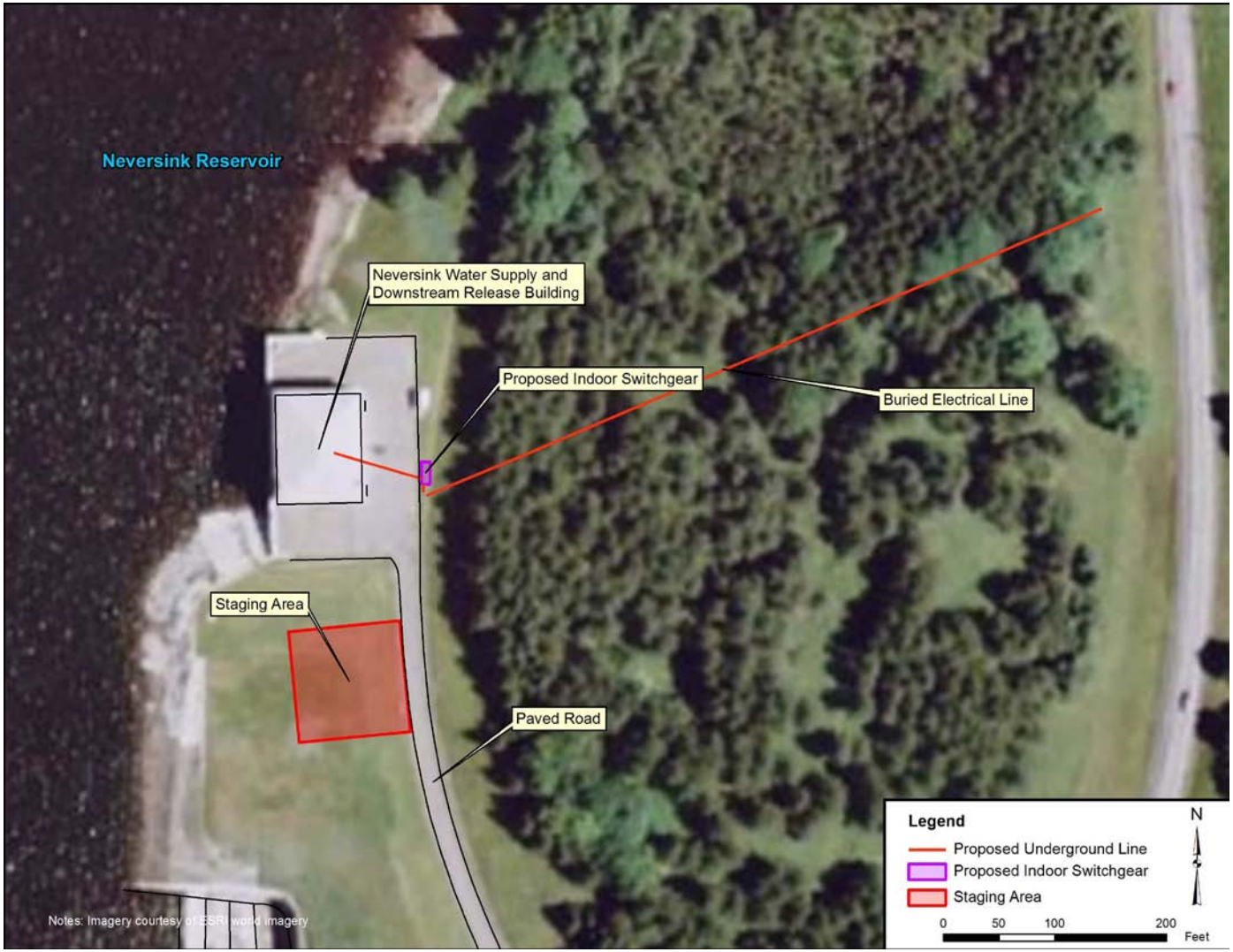


Figure 2.3-1: Neversink Study Development Area. Notes: Imagery source: ESRI world imagery. All other data layers created by Gomez and Sullivan Engineers. P.C.

3.0 EROSION CONTROL MEASURES

The conceptual measures described herein will be submitted with the license application and refined as the proposal progresses. Detailed sediment and erosion control measures and stormwater management practices will be developed and incorporated into the final design plans for each development.

During construction, sediment and erosion control measures and stormwater management practices will be employed to minimize erosion and prevent sedimentation in surface waters. All erosion and sediment control measures will be designed and implemented in accordance with the *New York State Standards and Specifications for Erosion and Sediment Control* (NYSDEC, 2005). A NYSDEC State Pollution Discharge Elimination System ("SPDES") General Permit for Stormwater Discharges will be required for each Project that results in an area of soil disturbance of one or more acres. As part of this permit, a stormwater pollution prevention plan ("SWPPP") will be required for the Cannonsville development because the area of disturbance is greater than one acre. In addition to the SPDES permit, the Project will be required to comply with DEP's stringent erosion control rules and regulations.

Prior to any ground disturbing activities, all applicable soil erosion and sediment controls (silt fencing, temporary berms, turbidity curtains, portable dams, hay bales, sedimentation basins, etc.) will be installed and maintained. Upon the completion of construction, all disturbed areas will be restored. As appropriate, the areas will be repaved, covered with gravel, or covered with top soil, mulch, and seed. Newly seeded areas will be watered as needed to establish grass. If the season prevents repaving or the establishment of grass, a temporary cover, such as straw, will be used to control erosion.

3.1 Cannonsville Development

Figures 3.1-1 and 3.1-2 were developed to show the locations of proposed sediment and erosion control measures.

The proposed measures to control erosion are conceptually described.

Access Road

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 this 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. Silt fencing will be placed on both sides of the dirt road to prevent eroded soils from migrating into the West Branch of the Delaware River.

Staging Areas

Staging Area 1*:* Silt fencing will be installed around the staging area to protect the emergent wetland to the north and to control potentially eroded soils from migrating into the West Branch of the Delaware River.

Staging Area 2*:* Silt fencing will be installed around Staging Area 2 to control potentially eroded soils from migrating into the West Branch of the Delaware River.

Staging Area 3*:* Staging Area 3 includes a portion of existing paved road as well as a gravel platform. Silt fencing will be installed around the staging area to control potentially eroded soils from migrating into drainage ditches that eventually lead to the river.

Excavation

Sedimentation Pond: 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 allow sediment deposition while allowing water to filter. A silt fence will be placed around the proposed pond perimeter. To create the pond, dredging will be required; this material will be placed temporarily in the spoils disposal area. After the sediment pond is no longer needed and is fully dewatered, the excavated material will be placed in the pond to re-establish the existing grade. The surface area will be topsoiled, mulched, seeded and watered as necessary to establish grass. The silt fence placed around the area will be maintained until permanent grass is established.

Tailrace and Channel: A cofferdam approximately 4-feet high, 12-feet wide, with 2:1 side slopes will be placed downstream of the proposed powerhouse. The existing concrete tailrace wall will adjoin the cofferdam, sectioning off the work area. The majority of channel excavation will occur in this work area.

Below the cofferdam, a pre-fabricated cofferdam will run downstream parallel with the river, and then turn northerly, to surround the tailrace excavation work area. This pre-fabricated cofferdam will be similar to a Portadam. Outside the entire length of the pre-fabricated cofferdam will be a turbidity curtain to prevent any sediment from escaping the work area. The turbidity curtain is necessary when the pre-fabricated cofferdam is installed and removed such that any eroded soils are not conveyed to the West Branch of the Delaware River. During construction, access will be maintained to the existing release chamber.

Within the tailrace and channel excavation areas, a pump will be used to maintain a dry work area. Water pumped from the work area will be placed in a sedimentation basin as described earlier. Water will be allowed to percolate through soils to filter any suspended sediments.

Proposed Spoils Disposal Location

Fill from the excavated powerhouse, tailrace channel and sedimentation pond will be transported and deposited in this spoils disposal area as shown in Figure 2.1-1. It is estimated that the excavated fill will be approximately 23,000 cubic yards ("CY"), average 6.5 feet deep and cover approximately 2.3 acres. Potential impacts to this location are minimal as this site is a mowed field. However, silt fencing will be installed around the perimeter of the spoils to contain excavated materials and prevent them from migrating into the West Branch of the Delaware River.

After all excavated material is placed at the spoils location area, it will be topsoiled, mulched, seeded, and watered as needed to establish grass. If the season prevents the establishment of a temporary cover, the spoils area will be mulched with straw.

Substation and Interconnection Facilities

The generator lead will run from the powerhouse to the substation. New poles will be installed to run the overhead wiring. It is estimated that there will be 40-foot poles for 12.47 kV and 50-foot poles for 46 kV

lines; the exact location of the poles has not been determined. Because of the steep slope in this area, it is important to establish grass on newly exposed areas to prevent erosion. Silt fencing will be placed around all work areas to contain excavated materials and prevent them from migrating into the West Branch of the Delaware River, and maintained until grass is well-established. The substation will be located near the existing service building in an existing grassed area. Silt fencing will be placed around the work area.

Relocated Leach Field

The existing leach field must be relocated due to the location of the powerhouse. Silt fencing will be placed around the relocated leach field until such time that grass becomes established.

3.2 Pepacton Development

Figure 3.2-1 shows the locations of proposed sediment and erosion control measures. The proposed measures to control erosion are conceptually described.

Access Roads

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. Because the only ground disturbing activity for the Pepacton development will be for the indoor switchgear building, underground electric lines, and the staging area, silt fencing along the paved access road is not needed.

Staging Area

A staging area will be established east of the existing release water chamber, which consists of a mowed lawn. Silt fencing will be installed around the staging area to contain excavated materials and prevent them from entering the reservoir or spillway channel.

Indoor Switchgear Building

An indoor switchgear building and underground electric lines will be constructed just north of the existing release water chamber, in an area which consists of a mowed lawn. Silt fencing will be installed around the disturbed areas to contain excavated materials and prevent them from entering the reservoir or spillway channel.

Interconnection Facilities

Underground electric lines will be constructed between the new indoor switchgear building and the existing distribution line, in an area which consists of a mowed lawn. Silt fencing will be installed around the disturbed areas to contain excavated materials and prevent them from entering the reservoir or spillway channel.

All disturbed areas will be topsoiled, mulched, seeded and watered to establish grass. Once grass is established, the silt fencing will be removed.

3.3 Neversink Development

Figure 3.3-1 shows the locations of proposed sediment and erosion control measures. The proposed measures to control erosion are conceptually described.

Access Roads

Access to the Neversink Dam is controlled by a DEP gate from State Route 55. 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. Because the only ground disturbing activity for the Neversink Development will be located in and around the parking area adjacent to the intake structure, and in the staging area, silt fencing along the paved access road is not needed.

Staging Area

A staging area will be established south of the intake chamber, in an area which consists of a mowed lawn. Silt fencing will be installed around the staging area to prevent eroded soils from migrating into the reservoir.

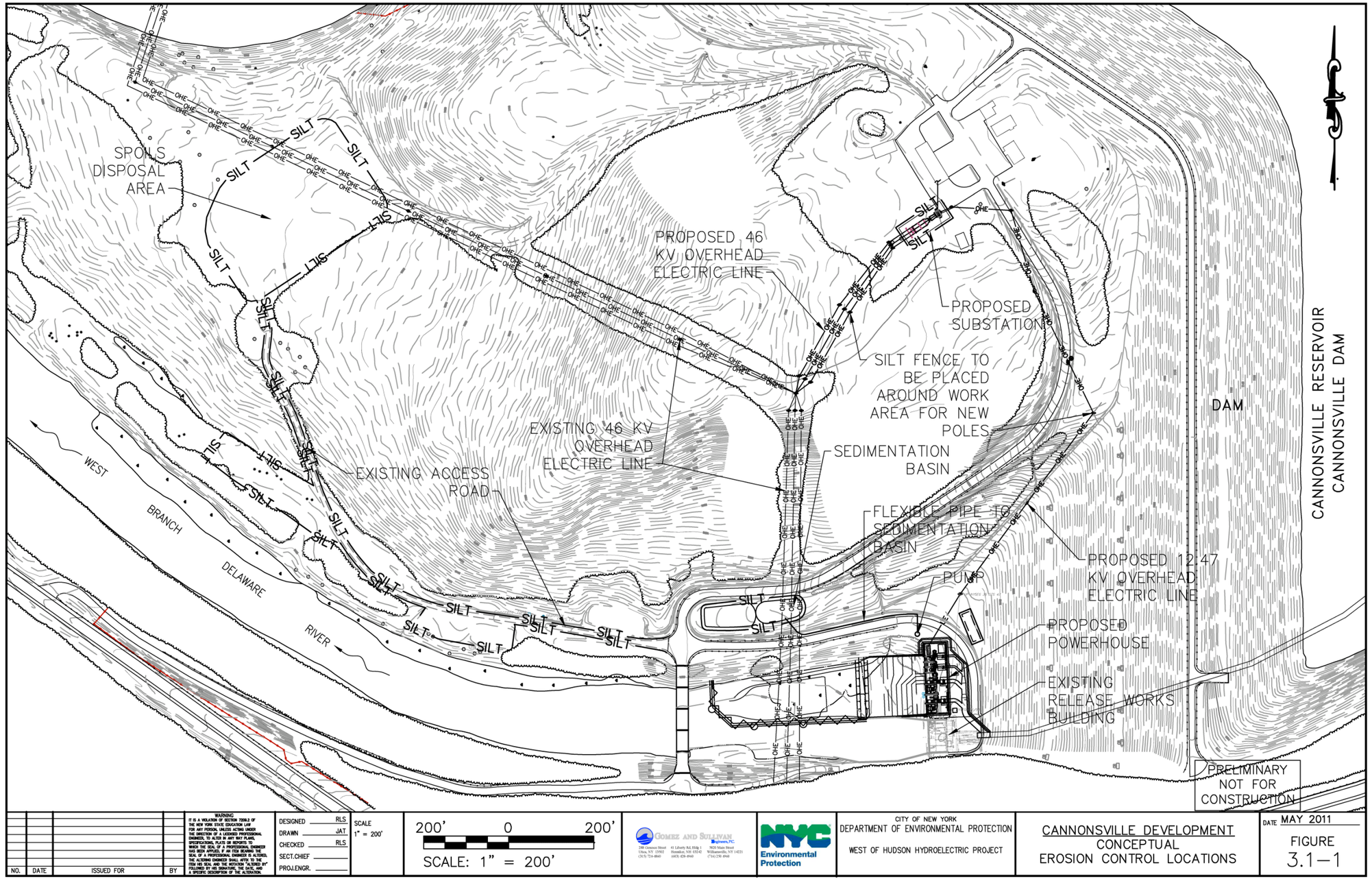
Indoor Switchgear Building

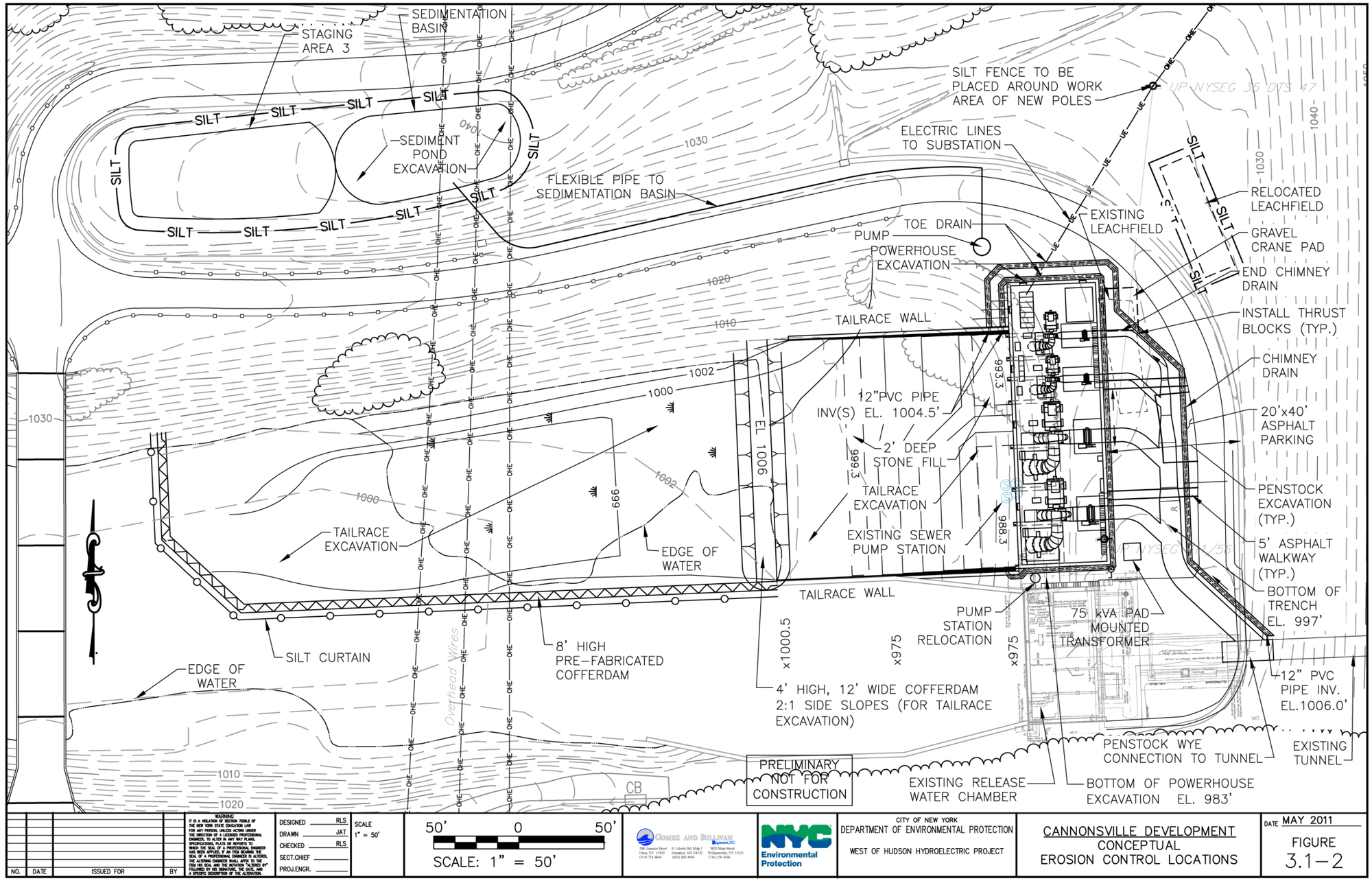
An indoor switchgear building and underground electric lines will be constructed east of the intake structure in an area consisting of a mowed lawn immediately adjacent to the parking lot. Silt fencing will be installed around the switchgear to contain excavated materials and prevent them from migrating into the reservoir.

Interconnection Facilities

The wires connecting the switchgear to the NYSEG distribution system will be placed in existing underground conduits running from the location of the switchgear building to an existing pole located on State Route 55. Because no ground will be disturbed except in the switchgear building, no erosion protection measures are proposed for this aspect of the construction.

All disturbed areas will be topsoiled, mulched, seeded and watered to establish grass. Once grass is established the silt fencing will be removed.


SPOILS DISPOSAL AREA
SILT
PROPOSED 46 KV OVERHEAD ELECTRIC LINE
PROPOSED SUBSTATION
SILT FENCE TO BE PLACED AROUND WORK AREA FOR NEW POLES
EXISTING 46 KV OVERHEAD ELECTRIC LINE
SEDIMENTATION BASIN
EXISTING ACCESS ROAD
FLEXIBLE PIPE TO SEDIMENTATION BASIN
PUMP
PROPOSED 12.47 KV OVERHEAD ELECTRIC LINE
PROPOSED POWERHOUSE
EXISTING RELEASE WORKS BUILDING
DAM
CANNONSVILLE RESERVOIR
CANNONSVILLE DAM
WEST BRANCH DELAWARE RIVER
OHE
PRELIMINARY NOT FOR CONSTRUCTION
NO. DATE ISSUED FOR BY
WARNING
IT IS A VIOLATION OF SECTION 7209.2 OF THE NEW YORK STATE EDUCATION LAW FOR ANY PERSON, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER IN ANY WAY PLANS, SPECIFICATIONS, PLATS OR REPORTS TO WHICH THE SEAL OF A PROFESSIONAL ENGINEER HAS BEEN AFFIXED. IF AN ENGINEER ALTERS THE SEAL OF A PROFESSIONAL ENGINEER IS ALTERED, THE ALTERING ENGINEER SHALL AFFIX TO THE ITEM HIS SEAL AND THE NOTATION "ALTERED BY" FOLLOWED BY HIS SIGNATURE, THE DATE, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.
DESIGNED RLS
DRAWN JAT
CHECKED RLS
SECT.CHIEF
PROJ.ENGR.
SCALE 1" = 200'
200' 0 200'
SCALE: 1" = 200'
GOMEZ AND SULLIVAN Engineers, PC
NYC Environmental Protection
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
WEST OF HUDSON HYDROELECTRIC PROJECT
CANNONSVILLE DEVELOPMENT
CONCEPTUAL
EROSION CONTROL LOCATIONS
DATE MAY 2011
FIGURE
3.1–1



SEDIMENTATION BASIN
STAGING AREA 3
SILT
SEDIMENT POND EXCAVATION
FLEXIBLE PIPE TO SEDIMENTATION BASIN
SILT FENCE TO BE PLACED AROUND WORK AREA OF NEW POLES
UP NYSEG 35 DTS 47
ELECTRIC LINES TO SUBSTATION
EXISTING LEACHFIELD
RELOCATED LEACHFIELD
GRAVEL CRANE PAD
END CHIMNEY DRAIN
INSTALL THRUST BLOCKS (TYP.)
CHIMNEY DRAIN
20'x40' ASPHALT PARKING
PENSTOCK EXCAVATION (TYP.)
5' ASPHALT WALKWAY (TYP.)
BOTTOM OF TRENCH EL. 997'
12" PVC PIPE INV. EL.1006.0'
EXISTING TUNNEL
PENSTOCK WYE CONNECTION TO TUNNEL
BOTTOM OF POWERHOUSE EXCAVATION EL. 983'
EXISTING RELEASE WATER CHAMBER
PRELIMINARY NOT FOR CONSTRUCTION
TOE DRAIN
PUMP
POWERHOUSE EXCAVATION
TAILRACE WALL
12"PVC PIPE INV(S) EL. 1004.5'
2' DEEP STONE FILL
TAILRACE EXCAVATION
EXISTING SEWER PUMP STATION
EL 1006
993.3
999.3
988.3
999
1000
1002
1010
1020
1030
1040
TAILRACE EXCAVATION
EDGE OF WATER
TAILRACE WALL
PUMP STATION RELOCATION
75 kVA PAD MOUNTED TRANSFORMER
x1000.5
x975
x975
SILT CURTAIN
8' HIGH PRE-FABRICATED COFFERDAM
4' HIGH, 12' WIDE COFFERDAM 2:1 SIDE SLOPES (FOR TAILRACE EXCAVATION)
EDGE OF WATER
Overhead Wires
CB
NO.
DATE
ISSUED FOR
BY
DESIGNED RLS
DRAWN JAT
CHECKED RLS
SECT.CHIEF
PROJ.ENGR.
SCALE 1" = 50'
50' 0 50'
SCALE: 1" = 50'
GOMEZ AND SULLIVAN
NYC Environmental Protection
CITY OF NEW YORK
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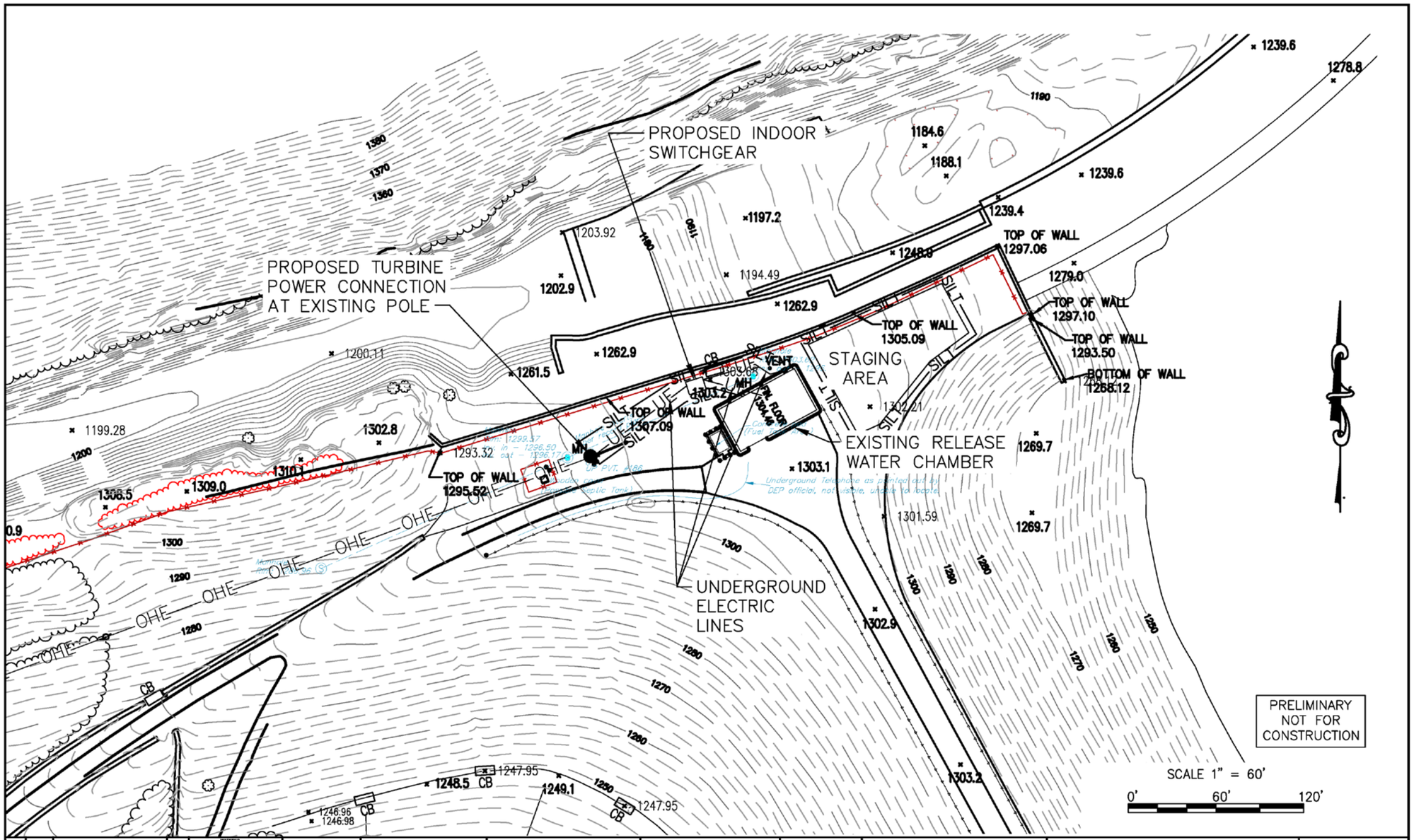
WEST OF HUDSON HYDROELECTRIC PROJECT
CANNONSVILLE DEVELOPMENT
CONCEPTUAL
EROSION CONTROL LOCATIONS
DATE MAY 2011
FIGURE 3.1-2


PROPOSED INDOOR SWITCHGEAR
PROPOSED TURBINE POWER CONNECTION AT EXISTING POLE
STAGING AREA
EXISTING RELEASE WATER CHAMBER
UNDERGROUND ELECTRIC LINES
TOP OF WALL 1297.06
TOP OF WALL 1297.10
TOP OF WALL 1293.50
BOTTOM OF WALL 1268.12
TOP OF WALL 1305.09
TOP OF WALL 1307.09
TOP OF WALL 1295.52
PRELIMINARY NOT FOR CONSTRUCTION
SCALE 1" = 60'
0' 60' 120'
DESIGNED RLS
DRAWN JAT
CHECKED RLS
SECT.CHIEF
PROJ.ENGR.
SCALE 1" = 60'
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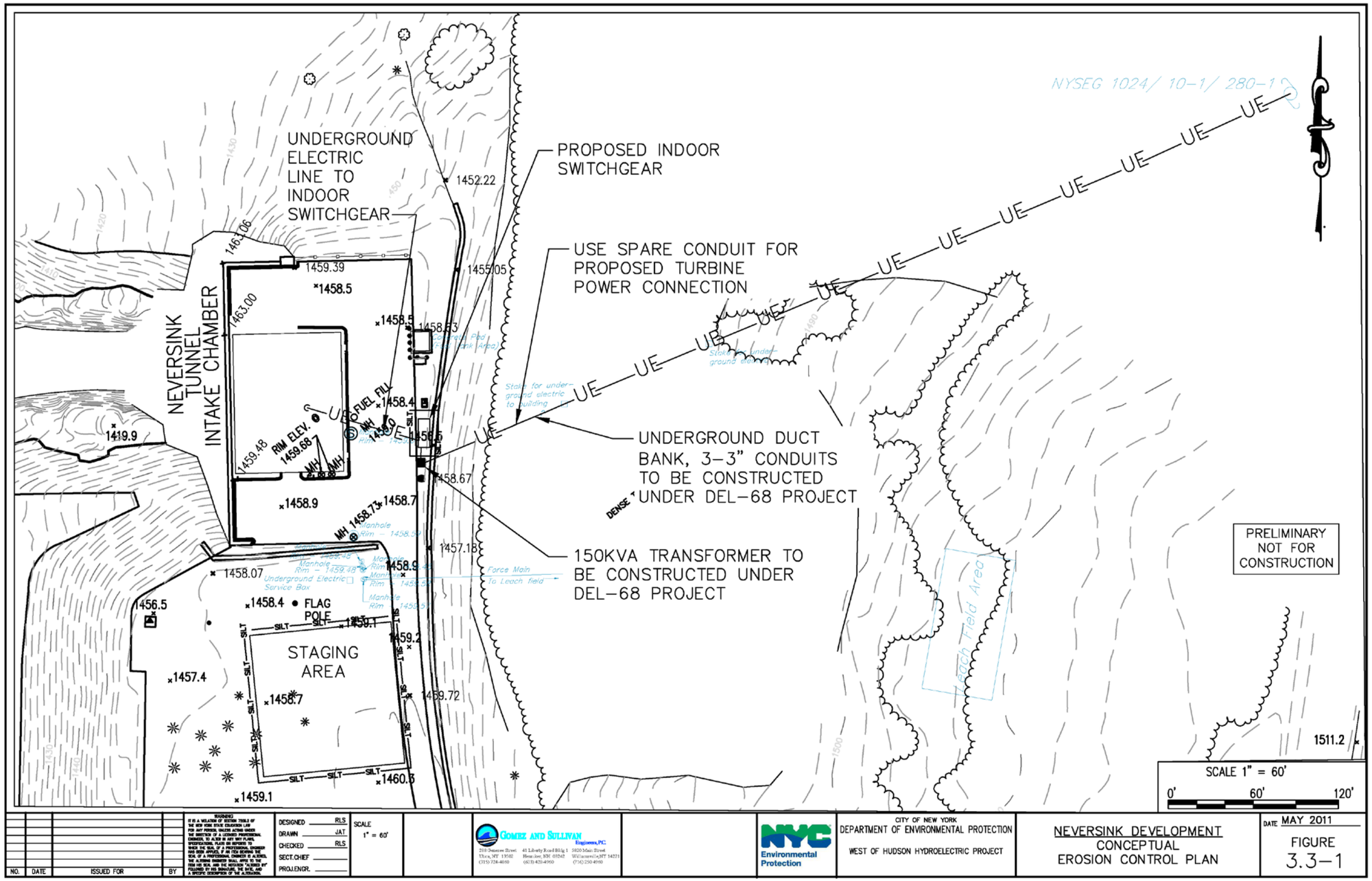
WEST OF HUDSON HYDROELECTRIC PROJECT
PEPACTON DEVELOPMENT
CONCEPTUAL
EROSION CONTROL PLAN
DATE MAY 2011
FIGURE 3.2-1
NO. DATE ISSUED FOR BY



NYSEG 1024/ 10-1/ 280-1
UNDERGROUND ELECTRIC LINE TO INDOOR SWITCHGEAR
PROPOSED INDOOR SWITCHGEAR
USE SPARE CONDUIT FOR PROPOSED TURBINE POWER CONNECTION
UNDERGROUND DUCT BANK, 3-3" CONDUITS TO BE CONSTRUCTED UNDER DEL-68 PROJECT
150KVA TRANSFORMER TO BE CONSTRUCTED UNDER DEL-68 PROJECT
NEVERSINK TUNNEL INTAKE CHAMBER
STAGING AREA
FLAG POLE
Leach Field Area
PRELIMINARY NOT FOR CONSTRUCTION
SCALE 1" = 60'
0' 60' 120'
DESIGNED RLS
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NEVERSINK DEVELOPMENT
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FIGURE 3.3-1