December 5, 2018
PS&S Project No. 04759-003

VIA EMAIL

Ms. Allison Ray
Burns and McDonnell Engineering, Inc.
108 Leigus Road Building A, Suite 1100
Wallingford, CT 06492

Re: Western Nassau Transmission Project
Dewatering Evaluation

Paulus, Sokolowski, and Sartor Engineering, PC (PS&S) is pleased to present Burns and McDonnell Engineering, Inc. (BMcD) with this memo which provides a summary of the field findings regarding depth to groundwater and identifies areas along the Project Route where dewatering procedures may need to be implemented to maintain dry work spaces during construction of the Western Nassau Transmission Project (WNTP, or “the Project”). The memo also contains an evaluation of potential dewatering solutions recommended at each Project Route area where dewatering is likely.

1.0 INTRODUCTION

The Project is the construction of a new 138 kilovolt (kV) underground electric transmission line (Facility) between the East Garden City Substation (located in Uniondale) and the Valley Stream Substation (located in Lynbrook), both in the Town of Hempstead. The new Facility would be located wholly within the Town of Hempstead and would traverse the Villages of Garden City, Malverne, and Lynbrook. The proposed geographic alignment of the Facility is referred to as the Project Route and would be constructed primarily within municipal public roadways rights-of-way (“ROW”) for a total distance of approximately seven-and-a-half miles.

In general, the excavation of the duct bank trenches will be at a minimum of six-feet deep and at least three feet width to provide adequate area for the placement of the cable conduits. Greater trench depth and/or alternative duct bank configurations may be required to avoid existing subsurface obstructions. Excavation for splice vault installation will be larger than the duct back trenches to an average depth of 12 feet with over excavations of two feet on each side for workspace. A trenchless jack-and-bore is currently proposed for the LIRR crossing within Franklin Ave. The jack-and-bore installation will consist of excavating and shoring two shafts, a sending shaft and receiving shaft, one on either side of the crossing. A sending shaft is typically larger, approximately 15 feet by 30 feet, to accommodate additional installation equipment and working space needed in the shaft. A receiving shaft is typically approximately 10 feet by 15 feet. Both shafts are excavated to approximately 15 feet.

PS&S has conducted a review of the 60 percent Plan and Profile (P&P) Drawings prepared by BMcD to identify the proposed depths of the duct banks, splice vaults, and jack-and-bore shafts along the Project Route. This memo compares depth to groundwater data obtained via a subsurface investigation conducted in the summer 2018 (as described in Section 2.0) to the terminal depth of the proposed underground facilities depicted in the Plan and Profile drawings to identify areas where dewatering may be necessary.
2.0 GROUNDWATER DATA COLLECTION

Between August 6, 2018 and November 1, 2018, Aquifer Drilling (ADT), a subsidiary of Cascade Drilling L.P., advanced soil borings along the length of the Project Route as part of a subsurface investigation that was implemented to evaluate soil characteristics and to obtain depth to groundwater readings. A total of 64 soil borings were advanced to various depths, with a minimum depth of 15 feet. The subsurface investigation included the installation of groundwater monitoring wells at three “trenchless” boring locations and multiple boring locations where groundwater was encountered within 15 feet of the ground surface.

Once a groundwater monitoring well was installed, well development was conducted at each well to flush out accumulated sediments and debris before proper groundwater levels could be measured and sampling could occur. Prior to well development each well was recorded for depth-to-bottom and depth-to-water measurements, which were utilized to estimate total well volume. Each well was then developed via 3-foot-long hand bailers to manually collect water from the well. Once the well showed acceptable recharge and water showed a noticeable improvement to turbidity, well development was deemed to be completed. At least three times the calculated volume of the well was purged from each well before terminating well development. Upon completing well development, final depth-to-bottom and depth-to-water measurements were recorded.

For all other soil borings (including those advanced for geotechnical, “trenchless”, or environmental evaluation purposes) where wells were not installed, depth to groundwater was estimated based on the observed moisture content and soil conditions within the collected macrocore or split spoon samples. All geotechnical and environmental soil borings were advanced to a maximum depth of ~22 feet below ground surface (BGS). Thus, no groundwater was encountered in several of the soil borings. Table 1 below contains a summary of the soil borings where groundwater was observed.

<table>
<thead>
<tr>
<th>Soil Boring/Well ID</th>
<th>Depth to Groundwater Observed in Soil Boring (feet BGS)</th>
<th>Depth to Groundwater Measured in Monitoring Well (feet BGS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOR-19</td>
<td>10.5</td>
<td>10.54</td>
</tr>
<tr>
<td>BOR-20</td>
<td>8.5</td>
<td>6.5</td>
</tr>
<tr>
<td>BOR-21</td>
<td>6.25</td>
<td>6.56</td>
</tr>
<tr>
<td>BOR-24</td>
<td>19</td>
<td>N/A</td>
</tr>
<tr>
<td>BOR-25</td>
<td>19</td>
<td>N/A</td>
</tr>
<tr>
<td>BOR-26</td>
<td>19</td>
<td>N/A</td>
</tr>
<tr>
<td>BOR-27</td>
<td>20</td>
<td>N/A</td>
</tr>
<tr>
<td>BOR-28</td>
<td>14</td>
<td>13.32</td>
</tr>
<tr>
<td>BOR-29</td>
<td>14.5</td>
<td>12.59</td>
</tr>
<tr>
<td>BOR-62</td>
<td>30</td>
<td>30.8</td>
</tr>
<tr>
<td>BOR-63</td>
<td>30</td>
<td>N/A</td>
</tr>
<tr>
<td>BOR-64</td>
<td>30</td>
<td>N/A</td>
</tr>
<tr>
<td>BOR-68</td>
<td>16</td>
<td>N/A</td>
</tr>
<tr>
<td>BOR-69</td>
<td>14</td>
<td>N/A</td>
</tr>
<tr>
<td>BOR-71</td>
<td>15</td>
<td>N/A</td>
</tr>
<tr>
<td>BOR-72</td>
<td>15</td>
<td>N/A</td>
</tr>
<tr>
<td>BOR-73</td>
<td>16</td>
<td>N/A</td>
</tr>
<tr>
<td>BOR-74</td>
<td>14</td>
<td>17.78</td>
</tr>
<tr>
<td>BOR-74A</td>
<td>30</td>
<td>N/A</td>
</tr>
<tr>
<td>BOR-75</td>
<td>14</td>
<td>N/A</td>
</tr>
<tr>
<td>BOR-75A</td>
<td>20</td>
<td>N/A</td>
</tr>
<tr>
<td>BOR-76</td>
<td>14</td>
<td>N/A</td>
</tr>
<tr>
<td>BOR-77</td>
<td>14</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Table 1

<table>
<thead>
<tr>
<th>Soil Boring/ Well ID</th>
<th>Depth to Groundwater Observed in Soil Boring (feet BGS)</th>
<th>Depth to Groundwater Measured in Monitoring Well (feet BGS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOR-78</td>
<td>14</td>
<td>N/A</td>
</tr>
<tr>
<td>BOR-79</td>
<td>14</td>
<td>N/A</td>
</tr>
<tr>
<td>BOR-80</td>
<td>8</td>
<td>5.24</td>
</tr>
<tr>
<td>BOR-81</td>
<td>11.5</td>
<td>5.29</td>
</tr>
<tr>
<td>BOR-82</td>
<td>14</td>
<td>N/A</td>
</tr>
<tr>
<td>BOR-83</td>
<td>6</td>
<td>N/A</td>
</tr>
</tbody>
</table>

More detail on the methodology and findings of the subsurface investigation can be found in the “Subsurface Investigation Report”, dated November 8, 2018 and prepared by PS&S.

3.0 FIELD OBSERVATIONS AND RESULTS

The findings of the subsurface investigation indicate five (5) specific Project Route intervals where groundwater can be expected to be encountered during excavation activities associated with the construction of the Facility, as summarized in Table 2 below.

Table 2

<table>
<thead>
<tr>
<th>Section Description</th>
<th>South Extent (Station Reference)</th>
<th>North Extent (Station Reference)</th>
<th>Approximate Linear Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Johnson Lane and Nassau Boulevard Western Adjacent to Halls Pond Park</td>
<td>148+00; 129+00</td>
<td>156+00; 133+00</td>
<td>1200</td>
</tr>
<tr>
<td>Eastern Adjacent to Halls Pond Park on Hempstead Avenue</td>
<td>127+00</td>
<td>156+00</td>
<td>2900</td>
</tr>
<tr>
<td>Southern State Parkway Crossing</td>
<td>104+00</td>
<td>107+00</td>
<td>300</td>
</tr>
<tr>
<td>Village of Malverne</td>
<td>85+00</td>
<td>90+00</td>
<td>400</td>
</tr>
<tr>
<td>Valley Stream in the Vicinity of Stevenson Street</td>
<td>24+00</td>
<td>32+00</td>
<td>800</td>
</tr>
<tr>
<td>Totals</td>
<td></td>
<td></td>
<td>5,600 (1.06 miles)</td>
</tr>
</tbody>
</table>

The geographic extent of those areas and the groundwater data obtained within each area is described in the paragraphs below. An overview map of these potential dewatering intervals is included as Figure 1. Profile views of these intervals comparing the estimated water table depth with the depth of the proposed underground facilities as depicted in the 60 percent Plan and Profile drawings are included as Figures 2A-2F.

3.1 Johnson Lane and Nassau Boulevard Western Adjacent to Halls Pond Park

The proposed Project Route as presented in the P&P drawings will bypass the portion of Hempstead Avenue between Johnson Lane and Euclid Avenue and will instead follow the western side of Halls Pond Park within Nassau Boulevard. The path will extend from Nassau Boulevard and its intersection with Hempstead Avenue north to Johnson Lane, before cutting east along Johnson Lane back to Hempstead Avenue (Stations 130+00 and 156+00). Observed groundwater levels at BOR-82 (Station 138+55) were approximately 14 feet BGS, and at approximately 6 feet BGS at BOR-83 (Station 151+77). Please refer to figures 2A and 2B.
The proposed construction work along Nassau Boulevard and Johnson Lane will consist of duct bank trench excavation and the installation of two splice vaults. Duct bank excavation is anticipated to extend as deep as 12 feet below ground surface at the intersection of Nassau Boulevard and Hempstead Avenue and as deep as 14 feet below ground surface along Johnson Lane. Splice vault excavations are anticipated to extend to between 13 and 14 feet below ground surface along this stretch of the Project Route.

Conditions along the Proposed Route indicate that groundwater will very likely be encountered for excavation work along the entirety of Johnson Lane, extending slightly onto Hempstead Avenue from stations 150+00 to 156+19. Groundwater levels observed at BOR-82 (Station 138+55) did not indicate interface with the proposed depths of the duct bank trench as presented in the P&P drawings. However, no data was collected for points on Nassau Blvd. south of BOR-82 between Station 129+00 and Station 138+55. Dewatering should be anticipated between these stations, Groundwater and subsequent dewatering should not extend to BOR-69 at Station 157+00, where groundwater was observed around 14 feet BGS but excavation will not extend past 13 feet BGS.

3.2 Eastern Adjacent to Halls Pond Park on Hempstead Avenue
The eastern adjacent area to Halls Pond Park on Hempstead Avenue includes borings BOR-19, BOR-20, BOR-21, BOR-68, BOR-80, and BOR-81. This area can generally be described as the segment of Hempstead Avenue between Johnson Lane to the north, and Euclid Avenue to the south (see Figure 2C).

The wells installed in this area all indicate the presence of groundwater above 11 feet BGS and as high as 5.24 feet BGS. The geotechnical boring BOR-68 indicated groundwater around 16 feet BGS.

Conditions along the southern portion of this segment indicate that groundwater should be encountered during excavation, specifically between Station 129+45 and BOR-19 which sits approximately 225 feet north of Eagle Avenue. Proposed duct bank installation between 129+45 and 130+55 dips to around 12 feet BGS (19 feet elevation), while groundwater is detected around 10 to 11 feet BGS (20 to 21 feet elevation). Additionally, to the east of Halls Pond Park, groundwater is observed at 14 feet BGS (19.5 feet elevation) in BOR-79 and 6.56 feet BGS nearby at BOR-21. Proposed duct bank installation in this area should range from 7.5 to 13.5 feet BGS. Please note that detailed engineering for this segment has not been developed and no station reference numbers have been assigned as of the writing of this memo. However, dewatering should be expected north of BOR-21 if trench and splice vault depths are to remain generally consistent with the existing profiles created.

3.3 Southern State Parkway Crossing
Groundwater may be encountered during excavation work at the Cornwell Avenue Southern State Parkway underpass (see Figure 2D). The ground surface and proposed duct bank excavation both dip as they pass underneath Southern State Parkway, between approximate Stations 103+93 to 107+01. Groundwater was observed at BOR-71, at Station 107+10, at approximately 15 feet BGS (elevation 22.75) while excavation depths proposed between the stations extend down to 10 to 15.5 feet BGS. It is likely then, that groundwater will be encountered during excavation activities in this area.

3.4 Village of Malverne
Groundwater may be encountered during excavation work in a small section of the Project Route in the Village of Malverne, within Hempstead Avenue between Malverne Avenue and Dogwood Avenue between approximate Stations 85+00 and 90+00 (see Figure 2E). Groundwater was encountered at BOR-72 at approximately 15 feet BGS. Proposed duct bank excavation limits between Stations 85+00 and 90+00 extend to between 14 and 15 feet BGS. It is likely that groundwater will be encountered during excavation activities in this area.

3.5 Valley Stream in the Vicinity of Stevenson Street
Groundwater may be encountered over the course of excavation work around the intersection of Stephenson Street and Whitehall Street, around Station 31+00 (see Figure 2F). Duct bank excavation at this location extends down to depths of 12 to 13 feet BGS (approximately 11.5 feet elevation) to avoid
existing utilities in Whitehall Street. Based on depth to groundwater readings collected from BOR-76, BOR-77, and BOR-78 groundwater is estimated to be encountered at depths of approximately 12 to 13 feet BGS (approximately 12 feet elevation) in this area. It is likely then, that groundwater will be encountered during excavation activities in this area.

4.0 DEWATERING PERMITTING AND BEST MANAGEMENT PRACTICES

4.1 General Permit for Stormwater Discharges from Construction Activity

Pursuant to Section 402 of the Clean Water Act, stormwater discharges from certain construction activities are unlawful unless they are authorized by a National Pollutant Discharge Elimination System (NPDES) permit or a federally approved state permit program. New York’s State Pollutant Discharge Elimination System (SPDES) General Permit (GP) for Stormwater Discharges from Construction Activity (GP-0-15-002) is issued pursuant to Article 17, Titles 7, 8 and Article 70 of the Environmental Conservation Law (ECL) and is a federally approved state permit program regulating stormwater discharges. Discharges defined in the GP-0-15-002 are inclusive of dewatering.

The Project will seek coverage under GP-0-15-002. To obtain coverage under the GP, the Applicant must prepare a Stormwater Pollution Prevention Plan that complies with the requirements of the GP. The Project Route transects multiple Municipal Separate Storm Sewer System (MS4) jurisdictions and as such, the SWPPP must be submitted to the respective MS4 authorities for their review and acceptance. Once the MS4 acceptance form is completed and signed by the MS4 authority, it must be submitted along with an Notice of Intent (NOI) to the NYSDEC. The NOI can be submitted electronically (eNOI) via NYSDEC’s website or via hard copy submission. Authorization of coverage under the general permit begins five (5) business days after NYSDEC receipt of a complete eNOI. Authorization of coverage for paper-based NOIs is 10 business days after receipt. Coverage will begin only if the SWPPP complies with all NYSDEC technical standards contained in the New York Standards and Specifications for Erosion and Sediment Control ("Blue Book").

It should be noted that the general permit does not authorize violations of water quality standards even if the Project is otherwise complying with the general permit. As a result, dewater discharges that result in excessive turbidity in receiving water bodies or other problems can result in a notice of violation from NYSDEC even if the Project is complying with the general permit and with the Project SWPPP.

4.2 LI Well Permit

Pursuant to the requirements set forth in 6 NYCRR Part 602.1, a Long Island Well Permit is required for proposed construction activities involving the installation/operation of a well (including dewatering activities) that discharges more than 45 gallons per minute (or 64,800 gallons per day).

There exists the potential for dewatering rates to exceed the 64,800 gallons per day threshold at some locations and as such, PS&S recommends also requesting Long Island Well Permit.

Given that the Project is regulated by Article VII of the Public Service Law, the Long Island Well Permit would be executed by the Department of Public Service Chief of the Environmental Certification and Compliance Section of the Office of Utility Rates and Services and would be made concurrent with New York Public Service Commission (NYPSC) approval of the EM&CP for the Project.

4.3 Best Management Practices

Dewatering operations must be managed by appropriate control measures to assure discharges do not result in a violation of water quality standards (including groundwater standards). Dewatering system designs must be consistent with the standards and specifications contained in the Blue Book. Dewatering procedures must also be implemented in compliance with PSEG Long Island Standard Operation Procedure (SOP) EG-706 “Excavation Dewatering” (see Attachment A).
Water being discharged from excavations must be free of odor, a visible sheen, or discoloration and must not be discharged from a suspected contaminated source without treatment. If odor, sheen, discoloration, or a suspected contamination source is observed during dewatering operations, the discharge should be directed to a mobile settling tank (frac tank) for laboratory analysis, treatment, and off-site disposal, if warranted.

If the observed assessment of the excavation and dewatering exhibits no evidence of odor, sheen, discoloration, or suspected contamination, appropriate control measures must still be implemented while discharging. An effective sump should be designed and installed in the excavation that is consistent with the standards and specifications contained in the Blue Book and the sump must prevent the discharging of sediment laden waters to receiving areas. Please see Figure 3.3 from the Blue Book which is included in Attachment B.

Discharges to adjacent upland areas are appropriate in some locations but discharge locations must be located down-gradient of the excavation area and the discharges must infiltrate the soil without flooding the area, causing soil erosion, or causing impacts to abutting property owners. Discharge should be pumped through a geotextile filter bag to trap and retain sediment prior to discharging. The geotextile material must have the attributes specified in Section 5 of the Blue Book (see Attachment B).

In cases where groundwater discharge cannot be made to soil given the lack of vegetated receiving areas or without flooding the area or impacting abutting properties, groundwater can be discharged to storm drain inlets. Release of sediment or sediment laden waters into storm drain inlets is prohibited by the MS4 authorities and water treatment facilities to protect water quality and to preserve the operational integrity of their systems.

Storm drain inlets must be protected from migrating sediment during construction activities. Drainage area for storm drain inlets should not exceed one acre. Storm drain inlet protection can take multiple forms. For locations in which a storm drain system is in place, but final elevation grading has not been completed, fabric drop inlet protection should be utilized. Where surfaces surrounding the storm drain inlet are already paved, sand bags, compost filter socks, geo-tubes filled with ballast, and commercially manufactured surface barriers can be utilized. Practices shall be weighted, braced, tied, or otherwise anchored to prevent movement or shifting of location on paved surfaces. Please see Figures 5.31 through 5.33 from the Blue Book which are included in Attachment B.

Commercially manufactured mechanical storm drain inserts can also be utilized. All mechanical inserts should be installed and anchored in accordance with the manufacturer’s recommendations and design details. The fabric portion of the insert must equal or exceed the performance standard for the silt fence fabric. The mechanical inserts must be installed to preserve a minimum of 50 percent of the open, unobstructed design flow area of the storm drain inlet opening so as to maintain capacity for storm events.

If no suitable upland areas or storm inlets are identified as receiving areas, frac tanks can be utilized for off-site disposal of dewater.

5.0 DEWATERING RECOMMENDATIONS

The findings of the subsurface investigation as described in Section 3.0 indicate that groundwater can be expected to be encountered in excavations within five Project Route areas. Potential dewatering solutions at each respective location are detailed in the sections below.

5.1 Johnson Lane and Nassau Boulevard Western Adjacent to Halls Pond Park
Johnson Lane abuts private residences and a Nassau County owned stream channel (Mill River/Pines Stream) and a culvert which conveys the stream under Johnson Lane. Dewatering in this area would best be directed to two storm inlets located just east of the culvert.
Johnson Lane is a Town of Hempstead jurisdictional road, so these inlets are presumably under the Town of Hempstead MS4 jurisdiction. The ultimate discharge point for these inlets are unknown at this time.

Any dewatering into Nassau Boulevard storm inlets would fall under the jurisdiction of the Nassau County MS4 authority.

The results of the subsurface investigation conducted do not indicate that groundwater encountered in this section of the Project Route is likely to be contaminated.

5.2 Eastern Adjacent to Halls Pond Park on Hempstead Avenue

Groundwater samples collected from BOR-20 and BOR-21, located on the southeast side of Halls Pond Park, found several compounds in excess of NYSDEC Effluent Limitations, Class GA. Semi-volatile organic compounds (SVOCs) including Benzo(a)anthracene, Benzo(b)fluoranthene, and Chrysene exceeded their effluent limits in BOR-20 and BOR-21, and Benzo(a)pyrene exceeded its effluent limits in BOR-21. The metal compounds Iron and Sodium also exceeded their effluent limits in both BOR-20 and BOR-21. Finally, the pesticide Dieldrin exceeds its effluent limit in BOR-21.

Given these results, laboratory analysis of dewater should be conducted in this area prior to upland or storm inlet discharge. Pre-treatment or pumping to frac tank for off-site disposal may be warranted in this area.

If laboratory analysis indicates that groundwater in the excavation does not contain contaminants above applicable discharge standards, dewater within Hempstead Avenue eastern adjacent to Halls Pond Park could presumably be discharged to the vegetated shoulders or Halls Pond Park immediately west of Hempstead Avenue, assuming final design of this section proposes the duct bank alignment to be located on the west side of the road.

Any dewatering into storm inlets within Hempstead Avenue would fall under the jurisdiction of the Nassau County MS4 authority.

5.3 Southern State Parkway Crossing

Although there are some NYSDOT-owned vegetated shoulders to both the north and south of the Southern State Parkway underpass on Cornwell Ave., the slope of the shoulders and general space constraints would likely make upland dewatering challenging in this area.

Dewatering into storm inlets located along Cornwell Avenue or Dogwood Avenue (north of the Southern State Parkway) would fall under the jurisdiction of the Nassau County MS4 authority. Dogwood Avenue south of the Southern State Parkway is the jurisdiction of the Village of Malverne MS4 authority.

The results of the subsurface investigation conducted do not indicate that groundwater encountered in this section of the Project Route is likely to be contaminated.

5.4 Village of Malverne

Dewatering in the vicinity of the Village of Malverne excavation (Stations 86+00 to 86+50) is flanked by private residences and businesses, so dewatering would have to be directed to the storm inlets located within Hempstead Avenue.

Any dewatering into storm inlets within Dogwood Avenue would fall under the jurisdiction of the Village of Malverne MS4 authority. Storm inlets within Hempstead Avenue in this area would be under the jurisdiction of Nassau County.

The results of the subsurface investigation conducted do not indicate that groundwater encountered in this section of the Project Route is likely to be contaminated. Arsenic contamination was detected in BOR-24, at Station 75+00, over 1,000 feet away and is expected to be a localized issue around BOR-24 that would not impact groundwater in this area.
5.5 Valley Stream in the Vicinity of Stevenson Street
Dewatering in the vicinity of the Stevenson Street Intersection with Whitehall Street is flanked by private properties, so dewatering would have to be directed to the storm inlets located within Whitehall Street. Two storm inlets flank each side of the Stevenson Street intersection and a third storm drain is situated at the west side of the intersection. Any dewatering into Whitehall Street storm inlets would fall under the jurisdiction of the Nassau County MS4 authority.

The results of the subsurface investigation conducted do not indicate that groundwater encountered in this section of the Project Route is likely to be contaminated.
FIGURES
FIGURE 1
Potential Dewatering Locations
Figure No. 1

Project No. 04759.0003

Scale: 1" = 1200'

Drawn By: DO
Chk'd By: SS

Date: 11/30/2018

POTENTIAL DEWATERING LOCATIONS
Western Nassau Transmission Project

Sources:
2. Esri World Street Map, 2018

Legend
- Route Stationing
- Potential Dewatering
- Location
- Proposed Underground Transmission Line
- Hempstead Ave. Alternative
- Existing Substation

Legend

Sources:
2. Esri World Street Map, 2018

Path: \psands.aec\ProjectData\Projects\04759\0003\DWGs\Y-GIS\Maps\Dewatering\Fig01_Potential_Dewatering_Locations_20181129_01.mxd
FIGURE 2
Plan and Profile Sections of Potential Dewatering Areas
Notes:
Groundwater table is inferred from depth to groundwater levels in observed saturation levels in soil borings.
Groundwater table is inferred from depth to groundwater measurements obtained from monitoring wells and observed saturation levels in soil borings.
Notes:
Groundwater table is inferred from depth to groundwater measurements obtained from monitoring wells and observed saturation levels in soil borings.
SOUTHERN STATE GROUNDWATER LOCATIONS

Notes:
Groundwater table is inferred from depth to groundwater measurements obtained from monitoring wells and observed saturation levels in soil borings.
Notes:
Groundwater table is inferred from depth to groundwater measurements obtained from monitoring wells and observed saturation levels in soil borings.
Notes:
Groundwater table is inferred from depth to groundwater measurements obtained from monitoring wells and observed saturation levels in soil borings.
ATTACHMENT A
PSEG Long Island SOP
EG-706 Excavation Dewatering
Excavation Dewatering
### REVISION HISTORY

Controlled electronic copies of all revisions will be retained with the PSEG Long Island Operations Manual

<table>
<thead>
<tr>
<th>Version</th>
<th>Description of Change</th>
<th>PSEG LI Approver and Title</th>
<th>LIPA Approver and Title</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>Complete Revision</td>
<td>Wei Chiang, Manager,</td>
<td>---</td>
<td>8/29/2014</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Environmental Compliance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rev. 1</td>
<td>General Update; PSEG</td>
<td>Wei Chiang, Manager,</td>
<td>---</td>
<td>2/23/2017</td>
</tr>
<tr>
<td></td>
<td>Long Island Format</td>
<td>Environmental Compliance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rev. 1.1</td>
<td>Minor Edits</td>
<td>Wei Chiang, Manager,</td>
<td>---</td>
<td>3/10/2017</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Environmental Compliance</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Approved by Wei Chiang
Date 3/10/2017

Approved by _____________________________
Date _____________________________
# TABLE OF CONTENTS

1. OPERATIONS MANUAL DOCUMENT HIERARCHY ................................................................. 4
2. PURPOSE ............................................................................................................................... 4
3. APPLICABILITY .................................................................................................................... 4
4. RESPONSIBILITIES .............................................................................................................. 4
5. PROCEDURE ....................................................................................................................... 5
6. DOCUMENTATION ............................................................................................................. 9
7. REFERENCES ...................................................................................................................... 9
8. TERMS AND DEFINITIONS ............................................................................................... 9
9. ATTACHMENTS ............................................................................................................... 9
1. OPERATIONS MANUAL DOCUMENT HIERARCHY

The PSEG Long Island Operations Manual is composed of 5 levels of documents:

- **Core Functions.** Core Functions define the functional areas of the Operations Manual that are critical to the operation of the Utility. They list and briefly describe the major processes contained in their portion of the Operations Manual.

- **Processes / Sub-Processes.** Processes and Sub-Processes define the way we work within or across functions. They describe a series of steps performed in bringing about an end result. Processes document “what” must be completed to ensure the end result is achieved.

- **Procedures.** Procedures describe a way of performing or affecting a process step, or a series of process steps taken to accomplish an end. Procedures document “how” tasks are completed to ensure the step in a Process or an end result is achieved.

- **Technical Manuals.** Technical Manuals document specific instructions and required parts for the installation, operation, and maintenance of a piece of equipment, machine, process, or system.

- **Job Hazard Analyses (JHA).** Job Hazard Analyses (JHAs) document the identified risks or hazards of a specific job in the workplace, and the measures to eliminate or control those hazards. The JHA document is used in the workplace or at the job site to guide workers in safe job performance.

2. PURPOSE

The purpose of this procedure is to document the steps to dewater excavations, while reducing the potential discharge of sediment to surface waters or sewer systems.

3. APPLICABILITY

This guidance document applies to the handling of water from all excavations dug by PSEG Long Island or its contractors during routine/operational maintenance and construction of underground utilities. It does not apply to large construction projects for which individual permits or approvals for dewatering have been obtained. For this type of work, refer to the procedures and best management practices described in EP No. 3 and its associated EGs.
4. RESPONSIBILITIES

4.1 Vice President, T&D Operations
The Vice President, T&D Operations provides governance over this procedure.

4.2 Director, T&D Services
The Director, T&D Services provides oversight of this procedure.

4.3 Manager, Environmental Compliance
The Manager, Environmental Compliance provides support to the actions underlined in this procedure.

4.4 Analysts, Field Coordinators, and Environmental Specialists
The Analysts, Field Coordinators, and Environmental Specialists are responsible for overseeing this procedure to assure regulatory compliance and sustaining PSEG Long Island policies. Operations personnel are responsible for execution of the actions outlined in this guidance.

5. PROCEDURE

Release of sediment or dirt into catch basins, sewers, or surface water and wetlands is prohibited in order to protect the environment as prescribed by federal, state and local regulatory agencies throughout our operating regions. Release of sediment with water into sewer works is also prohibited by local public works departments and water treatment facilities so as to preserve the operational integrity of their systems.

Water found in all excavations must be assessed for obvious signs of contamination (e.g., discoloration, odor, floating oil liquids from broken gas mains or sewer pipes, etc.) prior to discharge. If obvious signs of contamination are present, water cannot be pumped onto the ground or into catch basins, sewer systems, retention ponds, or surface water bodies. If obvious signs of contamination are encountered in any excavation, contact your Environmental Compliance for further instructions. Water exhibiting signs of contamination will typically need to be managed by a contractor for proper off-site disposal.

If the assessment shows NO evidence of contamination, best management practices (BMPs) still need to be followed in order to avoid pumping sediment-laden water from the excavation. One or more of the procedures described below must be utilized when pumping water from excavations. The BMP(s) selected must be monitored for effectiveness in
avoiding the discharge of sediment and, if they are ineffective, additional or different BMPs must be used:

- The first choice is to pump water with no obvious signs of contamination to upland and unpaved area where it can infiltrate without creating runoff. Although situations where this practice can be followed will be uncommon, it should be the first alternative evaluated;

- Avoid pumping sediment-laden water from the excavation by constructing an effective sump at the base of the excavation where the pump would be placed. An effective sump would be gravel-lined and result in infiltration so as to eliminate the need to discharge sediment laded water from the excavation;

- Use filter fabric over storm drains and sewer inlets prior to discharging any water to them (see Figure 1);

- Protect all surface waters and wetlands from sediment by using straw bales and a silt fence between the excavation and the body of water or wetland (see Figure 2);

- Use a filter bag/sock or pump box at the discharge end of the dewatering pump hose to capture sediment (see Figure 3); or

- For large projects, construct a dewatering pit using straw bales and filter fabric to filter the water prior to discharge (see Figure 4).

- For excessive water handling, consider renting a mobile settling tank (frac tank).

![Figure 1 – Filter Fabric Over Storm Drains and Sewer Inlets](image-url)
Figure 2 – Examples of Straw Bale/Slit Fence Barrier and Straw Bale Dike
Figure 3 – Example of Filter Stock or Filter Bag Use

Figure 4 – Example of Dewatering Pit Design
6. DOCUMENTATION

N/A

7. REFERENCES

1) EP No. 7, "Water and Waste Water Management"

8. TERMS AND DEFINITIONS

1) BMP – Best Management Practice
2) EG – Environmental Guidance
3) EP – Environmental Procedure

9. ATTACHMENTS

None

NOTE:
If you have any questions regarding how to obtain materials used in the above water management practices, contact Environmental Compliance.
ATTACHMENT B

Blue Book Standards and Specifications
**Definition & Scope**

A temporary pit which is constructed using pipe and stone for pumping excessive water from excavations to a suitable discharge area.

**Conditions Where Practice Applies**

Sump pits are constructed when water collects during the excavation phase of construction. This practice is particularly useful in urban areas during excavation for building foundations. It may also be necessary during construction activities that encounter high ground water tables in floodplain locations.

**Design Criteria**

The number of sump pits and their locations shall be determined by the contractor/engineer. A design is not required, but construction should conform to the general criteria outlined on Figure 3.3 on page 3.8.

A perforated vertical standpipe is placed in the center of the pit and surrounded with a stone screening material to collect filtered water. Water is then pumped from the center of the pipe to a suitable discharge area.
CONSTRUCTION SPECIFICATIONS

1. PIT DIMENSIONS ARE VARIABLE.

2. THE STANDPIPE SHOULD BE CONSTRUCTED BY PERFORATING A 12'-24' DIAMETER CORRUGATED OR PVC PIPE.

3. A BASE OF NYS DOT #2 OR EQUIVALENT AGGREGATE SHOULD BE PLACED IN THE PIT TO A DEPTH OF 12". AFTER INSTALLING THE STANDPIPE, THE PIT SURROUNDING THE STANDPIPE SHOULD BE BACKFILLED WITH NYS DOT #2 OR EQUIVALENT AGGREGATE.

4. THE STANDPIPE SHOULD EXTEND 12'-18' ABOVE THE LIP OF THE PIT.

5. IF DISCHARGE WILL BE PUMPED DIRECTLY TO A STORM DRAINAGE SYSTEM, THE STANDPIPE SHOULD BE WRAPPED WITH FILTERCLOTH BEFORE INSTALLATION. IT IS RECOMMENDED THAT 1/4"-1/2" HARDWARE CLOTH MAY BE PLACED AROUND THE STANDPIPE, PRIOR TO ATTACHING THE FILTERCLOTH.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

DEWATERING SUMP PIT
STANDARD AND SPECIFICATIONS FOR
GEOTEXTILE FILTER BAG

Definition & Scope

A temporary portable device through which sediment laden water is pumped to trap and retain sediment prior to its discharge to drainageways or off-site.

Condition Where Practice Applies

On sites where space is limited such as urban construction or linear projects (e.g. roads and utility work) where rights-of-way are limited and larger de-silting practices are impractical.

Design Criteria

1. Location - The portable filter bag should be located to minimize interference with construction activities and pedestrian traffic. It should also be placed in a location that is vegetated, relatively level, and provides for ease of access by heavy equipment, cleanout, disposal of trapped sediment, and proper release of filtered water.

   The filter bag shall also be placed at least 50 feet from all wetlands, streams or other surface waters.

2. Size - Geotextile filter bag shall be sized in accordance with the manufacturers recommendations based on the pump discharge rate.

   Materials and Installation

   1. The geotextile material will have the following attributes:

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Grab Tensile Strength</td>
<td>200 lbs.</td>
</tr>
<tr>
<td>Minimum Grab Tensile Elongation</td>
<td>50 %</td>
</tr>
<tr>
<td>Minimum Trapezoid Tear Strength</td>
<td>80 lbs.</td>
</tr>
<tr>
<td>Mullen Burst Strength</td>
<td>380 psi</td>
</tr>
<tr>
<td>Minimum Puncture Strength</td>
<td>130 lbs</td>
</tr>
<tr>
<td>Apparent Opening Size</td>
<td>40 - 80 US sieve</td>
</tr>
<tr>
<td>Minimum UV Resistance</td>
<td>70%</td>
</tr>
<tr>
<td>Minimum Flow Thru Rate</td>
<td>70 gpm/sq ft</td>
</tr>
</tbody>
</table>

2. The bag shall be sewn with a double needle machine using high strength thread, double stitched “Joe” type capable of minimum roll strength of 100 lbs/inch (ASTM D4884).

3. The geotextile filter bag shall have an opening large enough to accommodate a 4 inch diameter discharge hose with an attached strap to tie off the bag to the hose to prevent back flow.

4. The geotextile shall be placed on a gravel bed 2 inches thick, a straw mat 4 inches thick, or a vegetated filter strip to allow water to flow out of the bag in all directions.

Maintenance

1. The geotextile filter bag is considered full when remaining bag flow area has been reduced by 75%. At this point, it should be replaced with a new bag.

2. Disposal may be accomplished by removing the bag to an appropriate designated upland area, cut open, remove the geotextile for disposal, and spread sediment contents and seeded and mulched according to the vegetative plan.
**Definition & Scope**

A temporary barrier with low permeability, installed around inlets in the form of a fence, berm or excavation around an opening, detaining water and thereby reducing the sediment content of sediment laden water by settling thus preventing heavily sediment laden water from entering a storm drain system.

**Conditions Where Practice Applies**

This practice shall be used where the drainage area to an inlet is disturbed, it is not possible to temporarily divert the storm drain outfall into a trapping device, and watertight blocking of inlets is not advisable. It is not to be used in place of sediment trapping devices. This practice shall be used with an upstream buffer strip if placed at a storm drain inlet on a paved surface. It may be used in conjunction with storm drain diversion to help prevent siltation of pipes installed with low slope angle.

**Types of Storm Drain Inlet Practices**

There are five (5) specific types of storm drain inlet protection practices that vary according to their function, location, drainage area, and availability of materials:

1. Excavated Drop Inlet Protection
2. Fabric Drop Inlet Protection
3. Stone & Block Drop Inlet Protection
4. Paved Surface Inlet Protection
5. Manufactured Insert Inlet Protection

**Design Criteria**

Drainage Area – The drainage area for storm drain inlets shall not exceed one acre. Erosion control/temporary stabilization measures must be implemented on the disturbed drainage area tributary to the inlet. The crest elevations of these practices shall provide storage and minimize bypass flow.

**Type I – Excavated Drop Inlet Protection**

This practice is generally used during initial overlot grading after the storm drain trunk line is installed.

Limit the drainage area to the inlet device to 1 acre. Excavated side slopes shall be no steeper than 2:1. The minimum depth shall be 1 foot and the maximum depth 2 feet as measured from the crest of the inlet structure. Shape the excavated basin to fit conditions with the longest dimension oriented toward the longest inflow area to provide maximum trap efficiency. The capacity of the excavated basin should be established to contain 900 cubic feet per acre of disturbed area. Weep holes, protected by fabric and stone, should be provided for draining the temporary pool.

Inspect and clean the excavated basin after every storm. Sediment should be removed when 50 percent of the storage volume is achieved. This material should be incorporated into the site in a stabilized manner.

**Type II – Fabric Drop Inlet Protection**

This practice is generally used during final elevation grading phases after the storm drain system is completed.

Limit the drainage area to 1 acre per inlet device. Land area slope immediately surrounding this device should not exceed 1 percent. The maximum height of the fabric above the inlet crest shall not exceed 1.5 feet unless reinforced.

The top of the barrier should be maintained to allow overflow to drop into the drop inlet and not bypass the inlet to
unprotected lower areas. Support stakes for fabric shall be a minimum of 3 feet long, spaced a maximum of 3 feet apart. They should be driven close to the inlet so any overflow drops into the inlet and not on the unprotected soil. Improved performance and sediment storage volume can be obtained by excavating the area.

Inspect the fabric barrier after each rain event and make repairs as needed. Remove sediment from the pool area as necessary with care not to undercut or damage the filter fabric. Upon stabilization of the drainage area, remove all materials and unstable sediment and dispose of properly. Bring the adjacent area of the drop inlet to grade, smooth and compact and stabilize in the appropriate manner to the site.

**Type III – Stone and Block Drop Inlet Protection**

This practice is generally used during the initial and intermediate overlot grading of a construction site.

Limit the drainage area to 1 acre at the drop inlet. The stone barrier should have a minimum height of 1 foot and a maximum height of 2 feet. Do not use mortar. The height should be limited to prevent excess ponding and bypass flow.

Recess the first course of blocks at least 2 inches below the crest opening of the storm drain for lateral support. Subsequent courses can be supported laterally if needed by placing a 2x4 inch wood stud through the block openings perpendicular to the course. The bottom row should have a few blocks oriented so flow can drain through the block to dewater the basin area.

The stone should be placed just below the top of the blocks on slopes of 2:1 or flatter. Place hardware cloth of wire mesh with ½ inch openings over all block openings to hold stone in place.

As an optional design, the concrete blocks may be omitted and the entire structure constructed of stone, ringing the outlet (“doughnut”). The stone should be kept at a 3:1 slope toward the inlet to keep it from being washed into the inlet. A level area 1 foot wide and four inches below the crest will further prevent wash. Stone on the slope toward the inlet should be at least 3 inches in size for stability and 1 inch or smaller away from the inlet to control flow rate. The elevation of the top of the stone crest must be maintained 6 inches lower than the ground elevation down slope from the inlet to ensure that all storm flows pass over the stone into the storm drain and not past the structure. Temporary diking should be used as necessary to prevent bypass flow.

The barrier should be inspected after each rain event and repairs made where needed. Remove sediment as necessary to provide for accurate storage volume for subsequent rains. Upon stabilization of contributing drainage area, remove all materials and any unstable soil and dispose of properly.

Bring the disturbed area to proper grade, smooth, compact and stabilize in a manner appropriate to the site.

**Type IV – Paved Surface Inlet Protection**

This practice is generally used after pavement construction has been done while final grading and soil stabilization is occurring. These practices should be used with upstream buffer strips in linear construction applications, and with temporary surface stabilization for overlot areas, to reduce the sediment load at the practice. This practice includes sand bags, compost filter socks, geo-tubes filled with ballast, and manufactured surface barriers. Pea gravel can also be used in conjunction with these practices to improve performance. When the inlet is not at a low point, and is offset from the pavement or gutter line, protection should be selected and installed so that flows are not diverted around the inlet.
The drainage area should be limited to 1 acre at the drain inlet. All practices will be placed at the inlet perimeter or beyond to maximize the flow capacity of the inlet. Practices shall be weighted, braced, tied, or otherwise anchored to prevent movement or shifting of location on paved surfaces. Traffic safety shall be integrated with the use of this practice. All practices should be marked with traffic safety cones as appropriate. Structure height shall not cause flooding or by-pass flow that would cause additional erosion.

The structure should be inspected after every storm event. Any sediment should be removed and disposed of on the site. Any broken or damaged components should be replaced. Check all materials for proper anchorage and secure as necessary.

**Type V - Manufactured Insert Inlet Protection**

The drainage area shall be limited to 1 acre at the drain inlet. All inserts will be installed and anchored in accordance with the manufacturers recommendations and design details. The fabric portion of the structure will equal or exceed the performance standard for the silt fence fabric. The inserts will be installed to preserve a minimum of 50 percent of the open, unobstructed design flow area of the storm drain inlet opening to maintain capacity for storm events.
Figure 5.31
Excavated Drop Inlet Protection

CONSTRUCTION SPECIFICATIONS

1. CLEAR THE AREA OF ALL DEBRIS THAT WILL HINDER EXCAVATION.
2. GRADE APPROACH TO THE INLET UNIFORMLY AROUND THE BASIN.
3. WEEP HOLES SHALL BE PROTECTED BY GRAVEL.
4. UPON STABILIZATION OF CONTRIBUTING DRAINAGE AREA, SEAL WEEP HOLES, FILL EXCAVATION WITH STABLE SOIL TO FINAL GRADE, COMPACT IT PROPERLY AND STABILIZE WITH PERMANENT SEEDING.

MAXIMUM DRAINAGE AREA 1 ACRE

ADAPTED FROM DETAILS PROVIDED BY USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

EXCAVATED DROP INLET PROTECTION
Figure 5.32  
Fabric Drop Inlet Protection

1. Fabric shall have an EOS of 40-85. Burlap may be used for short term applications.
2. Cut fabric from a continuous roll to eliminate joints. If joints are needed they will be overlapped to the next stake.
3. Stake materials will be standard 2” x 4” wood or equivalent metal with a minimum length of 3 feet.
4. Space stakes evenly around inlet 3 feet apart and drive a minimum 18 inches deep. Spans greater than 3 feet may be bridged with the use of wire mesh behind the filter fabric for support.
5. Fabric shall be embedded 1 foot minimum below ground and backfilled. It shall be securely fastened to the stakes and frame.
6. A 2” x 4” wood frame shall be completed around the crest of the fabric for over flow stability. Maximum drainage area 1 acre.

Adapted from details provided by: USDA - NRCS, New York State Department of Transportation, New York State Department of Environmental Conservation, New York State Soil & Water Conservation Committee.
**Figure 5.33**

**Stone & Block Drop Inlet Protection**

**CONSTRUCTION SPECIFICATIONS**

1. Lay one block on each side of the structure on its side for dewatering. Foundation shall be 2 inches minimum below rest of inlet and blocks shall be placed against inlet for support.

2. Hardware cloth or 1/2" wire mesh shall be placed over block openings to support stone.

3. Use clean stone or gravel 1/2-3/4 inch in diameter placed 2 inches below top of the block on a 21 slope or flatter.

4. For stone structures only, a 1 foot thick layer of the filter stone will be placed against the 3 inch stone as shown on the drawings.

Maximum drainage area 1 acre

Adapted from details provided by: USDA - NRCS, New York State Department of Transportation, New York State Department of Environmental Conservation, New York State Soil & Water Conservation Committee

---

**STONE & BLOCK DROP INLET PROTECTION**