PSE&G

Stormwater Management Report

Sharp Road Switch
Block 15, Lot 2
225 Sharp Road
Township of Evesham, Burlington County, NJ

Prepared By

BLACK & VEATCH

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Revision 0
4-23-2025

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STATE OF NEW JERSEY
NO. 53074
LICENSED PROFESSIONAL ENGINEER

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Site Location

The existing property is located in the Township of Evesham, Burlington County, New Jersey and is owned by Public Service Electric & Gas (PSE&G). The property's total area is approximately 58.4 acres, located between N Elmwood Rd to the west, Church Rd to the north, Sharp Rd to the east, and Evesboro - Medford Rd to the south. There is an existing PSE&G substation (Cox's Corner Switching Station) on the west side of the property. The existing substation and access road comprise approximately 7 acres. The new Sharp Road Switch project is planned for the east side of the property. Areas around the property include residential neighborhoods, townhomes/apartments, and trees/ponds/green space. See Attachment C for the site survey.

Project Description

The overall scope of the project is to enhance the reliability of the PSE&G electrical grid by installing new electrical equipment and circuits. The proposed project consists of the construction of a new substation (Sharp Road Switch) to the east of the already existing Cox's Corner Switching Station. Sharp Road Switch will include the installation of the following items:

- 230/69kV transformer with associated oil containment
- 54' x 28' control house enclosure
- Electrical equipment of appropriate voltage class
- Overhead and underground line termination structures
- Spread footer or slab-on-grade type foundations for all equipment
- Retaining walls
- Grading, site development, and fence for the new substation pad area

The proposed soil disturbances will be made throughout the eastern half of the property within non-wetland area. The proposed area to be disturbed is approximately 3.43 acres and is shown in the attached soil erosion and sediment control plans (see Attachment B). There are also additional short term temporary disturbance areas for underground and overhead utility work.

The project also includes the installation of new equipment and steel structures on existing foundations, and a perimeter security upgrade at the existing Cox's Corner Switching station. The new perimeter security upgrades will consist of a combination of a new security fence and walls in strategic locations to improve the station physical security. These additions are within the existing substation extents and have minimal cover condition impacts, so they are not included in the scope of the stormwater system design covered in this report.

Pre-Construction Stormwater Management Conditions

The property currently consists of the Cox's Corner Switching Station and its connecting access drive to Sharp Rd. The remainder of the site, on which the proposed Sharp Road Switch station is to be developed, is primarily pervious open space and wooded area. A stream runs north-south between the existing Cox's Corner Switching Station and the proposed Sharp Road Switch station. The specific areas of each surface type can be seen in Table 1. According to the Natural Resources

Conservation Service (NRCS) web soil survey, the site is primarily covered with Holmdel loamy sand, 0-5% slopes. The NRCS hydrologic soil group for the site is defined as 'C' based on the soil survey and site geotechnical investigation.

The existing site drainage patterns and drainage sub-basins can be seen in Attachment E. Runoff from the Sharp Road Switch project area flows directly or indirectly to the stream running along the western side of the project site. Two culverts are provided under the existing access drive to connect the stream and connect wetland areas on both sides of the access drive.

Table 1 below summarizes the pre-construction conditions including areas, cover type, and NRCS TR-55 curve numbers used to compute the volume, timing, and velocity of stormwater runoff produced.

Table 1 – Pre-Construction Site Cover Conditions

Pre-Construction Site Cover Conditions					
Common Label	Cover Type	Area		% of Distrubuted Area	NRCS Curve Number (Group C soils)
		Sq. Ft.	Acres		
Building and Foundations	Impervious (Roof/Foundation)	0	0	0%	98
*Oil Containment	Controlled Hydraulic Surface	0	0	0%	86.2
Open Area	Woods-Grass Combination (Good Condition)	151,234	3.47	100%	72
Substation Surfacing (4" Crushed Stone)	Custom Gravel	0	0	0%	86.2
Substation Driveway Surfacing (Macadam/Asphalt)	Impervious (Paved roads)	0	0	0%	98
Total Area=		151,234	3.47	Composite Curve Number=	72
Total Impervious Area=		0	0		
*Oil containment area is assumed to behave hydraulically as substation surfacing.					
Since station access drives are evaluated with a curve number of 98, access drive area is included in total impervious area. Trench is located under the building and foundation area.					

Post-Construction Stormwater Management Conditions

The project will require earthwork activities and soil disturbances to prepare the property for substation development. The site will be cleared of trees within the project area and the topsoil will be stripped within the limits of the proposed construction areas. After topsoil stripping, grading will occur to raise, level, and improve drainage on the site. After grading, the site will be stabilized with a 2" layer of ¾" clean, crushed stone. After site stabilization, new foundations and below grade infrastructure will be installed. Following this installation, the foundations will be backfilled, and the site re-stabilized to final condition. Final site stabilization includes a 4" layer of ¾" clean, crushed stone surfacing applied across most of the site to promote runoff infiltration

as well as provide the grounding insulation necessary in substations for personnel safety. A further buildout of electrical substation equipment may be installed within the proposed fence in a future project. The site development and stormwater management design of this project is accounting for the expected equipment that may be installed in a future project.

As described in the pre-construction conditions, the prevailing drainage from the site is generally towards the stream on the west side of the project area. This will be maintained in the site development of this project for the post-construction conditions. In the proposed site development work, the majority of the runoff generated by the redeveloped site will be captured onsite via the installation of new catch basins and infiltration basins. This basin system will facilitate runoff infiltration, connect individual basins using a series of pipes, and control outfall through an outlet control structure and pipe located near the stream. The system allows for the two infiltration basins to each collect and infiltrate runoff at various areas of the project site, but also distribute runoff among the other infiltration basin through the connecting pipe. For supporting documents, please reference Attachments A, B, and E.

The pre-construction versus post-construction runoff quantity calculations for the site demonstrate that peak runoff rates outleting from the site will be reduced. An empirical observation of the pre and post development inputs indicated that a reduction in site runoff overall is occurring. The design intention is to capture more runoff, to infiltrate runoff into the soil using designated basins, and to address the uncontrolled runoff currently occurring in some areas of the property. All excess runoff from the project site and vicinity, whether controlled onsite or not, is ultimately draining into the nearby stream.

The proposed construction activities at the Sharp Road Switch station will *increase* impervious area by 0.76 acres. This includes any additional impervious area from a further buildout of electrical substation equipment that may be installed within the proposed fence in a future project. The New Jersey Administrative Code (N.J.A.C.) 7:8-1.2 defines an impervious surface as a surface that has been covered with a layer of material so that it is highly resistant to infiltration by water. The proposed work will add 0.08 acres of oil containment, which will retain water temporarily until after a storm-event. The site composite curve number will *increase* by 11.4 from 72.0 (pre-construction) to 83.4 (post-construction). The stormwater system capacity is designed for all increased runoff due to cover condition changes across the entire project site, and the grading design of the project site “captures” as much of the runoff as feasible into the infiltration basins.

Table 2 below summarizes the post-construction conditions including areas, cover type, and NRCS TR-55 curve numbers used to compute the volume, timing, and velocity of stormwater runoff produced. Oil containment areas will contain and hold water temporarily during and after any rain events and will discharge to adjacent grade via sump pumps. These areas are assumed to behave hydraulically as substation surfacing.

Table 2 – Post-Construction Site Cover Conditions

Post-Construction Site Cover Conditions					
Common Label	Cover Type	Area		% of Distrubuted Area	NRCS Curve Number (Group C soils)
		Sq. Ft.	Acres		
Building and Foundations	Impervious (Roof/Foundation)	7822	0.18	5%	98
*Oil Containment	Controlled Hydraulic Surface	3342	0.08	2%	86.2
Open Area	Pasture/Grassland/Range (Good Condition)	66647	1.53	44%	74
Substation Surfacing (4" Crushed Stone)	Custom Gravel	48345	1.11	32%	86.2
Substation Driveway Surfacing (Macadam/Asphalt)	Impervious (Paved roads)	25079	0.58	17%	98
Total Area=		151,234	3.47	Composite Curve	83.4
Total Impervious Area=		32,901	0.76		
*Oil containment area is assumed to behave hydraulically as substation surfacing.					
Since station access drives are evaluated with a curve number of 98, access drive area is included in total impervious area. Trench is located under the building and foundation area.					

Stormwater Management Details

Per New Jersey Administrative Code (N.J.A.C.) 7:8, requirements for a “major development” are defined as:

1. Disturbance of one (1) or more acres of land since February 2, 2004;
2. The creation of one-quarter (0.25) or more acres of “regulated impervious surface” since February 2, 2004;
3. The creation of one-quarter (0.25) or more acres of “regulated motor vehicle surface” since March 2, 2021; or
4. A combination of 2 and 3 above that totals an area of one-quarter acre of more. The same surface shall not be counted twice when determining if the combination area equals one-quarter acre or more.

The limits of disturbance for this project encompass approximately 3.47 acres. Therefore, this project qualifies as a “major development” since the area of disturbance is greater than the limits set by N.J.A.C. 7:8. A small scale infiltration system has been designed to meet the stormwater requirements set by N.J.A.C. 7:8 for a "major development” as described in the below sections; see Attachment B for stormwater system drawings.

In addition to the designed stormwater system, the proposed project also utilizes nonstructural stormwater management strategies recognized in the New Jersey Stormwater Best Management Practices Manual (BMP Manual) such as:

1. Employing disconnected impervious surface areas (spread footings) where possible to break up runoff flows (N.J.A.C. 7:8-2.4(g)2)
2. Using 4" of loose, clean aggregate yard surfacing to promote infiltration and improve runoff quality (N.J.A.C 7:8-2.4(g)4)
3. Landscaping where possible to encourage water retention (N.J.A.C 7:8-2.4(g)7)
4. Including oil containment areas for the transformers (N.J.A.C 7:8-2.4(g)9.iii)

The use of an oil containment area provides the dual benefit of containing stormwater runoff temporarily during and after the storm event is over and filtering potential contaminants out of the water when it drains. Collectively, these non-structural BMP's minimize the impact the proposed improvements will have on stormwater runoff and groundwater recharge.

Stormwater Runoff Quantity Impacts

This project qualifies as a major development, which triggers the Stormwater Management requirements under N.J.A.C. 7:8. A detailed stormwater analysis of the pre and post construction conditions was performed to assess the runoff quantity impacts of the project. The small-scale infiltration basin BMPs are used to limit the post-construction peak discharges to 50, 75, and 80 percent of the pre-construction peak discharges in response to the 2, 10, and 100-year design events, respectively, for both current and future conditions. See Attachment A for analysis calculations. The existing and proposed discharge rates for the 2, 10, and 100-year storm events can be seen below:

Table 3 – Peak Discharge Rates

Pre-Construction		
Storm Event	Current Discharge (cfs)	Future Discharge (cfs)
2 Year	1.92	2.91
10 Year	5.01	6.69
100 Year	12.33	17.37
Post-Construction		
2 Year	0.72	1.35
10 Year	3.55	5.02
100 Year	9.66	12.60

It should be noted that the area of impervious cover will be *increased* by 0.76 acres. To accommodate this change in cover, the project has proposed a system of connected infiltration basins metered by an individual outfall orifice. While each area of the site is identified as a different "sub-basin" within the attachments, the site will act as a single management system with multiple runoff collection points due to the catch basins, connecting pipes (including

between infiltration basins) and the single outfall. As seen above in the pre and post construction discharge rates, the proposed improvements are in accordance with the stormwater runoff quantity requirements of N.J.A.C 7:8-5.6(b)1.

Stormwater Runoff Quality Impacts

As stated by N.J.A.C. 7:8-5.5 (a), evaluation of stormwater quality impacts is required if an additional one-quarter acre, or more, of motor vehicle surface is being proposed. The proposed improvements will have a net *increase* of 0.58 acres of motor vehicle surface, so the requirements will apply. Per N.J.A.C 7:8-5-5 (b), "Stormwater management measures shall be designed to reduce the post-construction load of total suspended solids (TSS) in stormwater runoff generated from the water quality design storm." Specifically, "Eighty percent TSS removal of the anticipated load, expressed as an annual average shall be achieved for the stormwater runoff from the net *increase* of motor vehicle surface."

An infiltration basin designed in accordance with the New Jersey Stormwater BMP Manual will result in the minimum 80% of total suspended solid (TSS) removal. Thus, this project is satisfactorily addressing the water quality requirements in N.J.A.C. 7:8-5.5 by using infiltration basins to manage stormwater runoff.

In addition to the proposed infiltration basin BMP, new oil containment areas will be constructed. These BMPs provide dual benefits of containing stormwater runoff temporarily during and after a storm event and filtering potential contaminants bout of the water when it drains. Therefore, the proposed BMPs will minimize the impact the proposed improvements will have on stormwater runoff quality.

Groundwater Recharge Impacts

As required by N.J.A.C. 7:8-5.4(b) the groundwater recharge capacity of the site must be conserved by meeting one of the following conditions:

i. That 100 percent of the average annual pre-construction groundwater recharge volume is maintained post-construction; or
ii. That the difference between the pre-construction and post construction two-year storm runoff volume is infiltrated.

As stated by N.J.A.C. 7:8-5.4(b).2, groundwater recharge requirements do not apply to projects within the "urban redevelopment area." According to the Policy Map of the State Development and Redevelopment Plan shown in Attachment F, the Sharp Road Switch station is part of the Fringe Planning Area. Therefore, this site is not exempt from groundwater recharge impact considerations.

As shown in the below table, the proposed infiltration basins will maintain more than 100% percent of the average annual pre-construction groundwater recharge volume post-construction. Thus, this project is satisfactorily addressing the groundwater recharge

requirements in N.J.A.C 7:8-5.4(b)i. See Attachment A for the full calculations and the completed "New Jersey Groundwater Recharge Spreadsheet."

Table 4 – Groundwater Recharge Summary

Description	Pre-Construction	Post-Construction	% of Pre-Construction Recharge Volume
Annual Recharge Due to Surface Conditions (ft^3)	139,039	81,600	
Annual BMP Recharge Volume Provided by West and East Basins (ft^3)	-	122,616	
Total (ft^3)	139,039	204,216	147%

Green Infrastructure

N.J.A.C. 7:8-5.3 includes a Green Infrastructure section highlighting appropriate BMPs to address Groundwater Recharge, Stormwater Quality, and Stormwater Quantity.

As outlined in the respective sections above, series of small-scale infiltration basins have been designed to manage stormwater for the proposed project improvements. Per N.J.A.C. 7:8-5.3(b), small scale infiltration basins are limited to a maximum contributory drainage area of 2.5 acres. As shown on Attachment E, the maximum contributory drainage area for one basin is 2.08 acres, so the proposed small scale infiltration basins meet the drainage area requirements of N.J.A.C. 7:8.

The below table summarizes the evaluation and selection of available green infrastructure BMPs for the project.

Table 5 – BMP System Applicability

BMP	**Component Description**	**Project Applicability**
Cistern	Quantity storage with a reuse requirement from a tank-like structure	N/A. The proposed project has insufficient reuse capabilities for this system
Dry Well	Groundwater recharge component with below grade chamber	Not selected. The proposed infiltration basin BMP addresses the groundwater recharge requirements.
Grass Swale	TSS Removal	Not selected. The proposed infiltration basin BMP addresses the quality requirements for station drives.

BMP	Component Description	Project Applicability
Green Roof	Quantity storage component by way of impounding water on top of structures	N/A. Limited building roof area for the proposed project, as well as significant concerns storing waters on critical electrical infrastructure such as the proposed control house.
Manufactured Treatment Device	TSS Removal on station outfalls lines	Not selected. The proposed infiltration basin BMP addresses the quality requirements for station drives.
Pervious Paving System	Large void stone bed beneath a choker course aggregate promoting TSS removal and quantity storage. Due to site characteristics, underdrains would be required.	Not selected. The proposed infiltration basin BMP addresses the quantity requirements and quality requirements for station drives.
Vegetative Filter Strip	TSS Removal across surface flows	Not selected. The proposed infiltration basin BMP addresses the quality requirements for station drives.
Bioretention System	Vegetated areas with permeable soil beds to support TSS removal and quantity storage.	Not selected. The proposed infiltration basin BMP addresses the quantity requirements and quality requirements for station drives.
Infiltration Basin	At grade, open basin that would collect storm flows to provide TSS removal and/or quantity storage with infiltration characteristics	Applicable and utilized. The system addresses the stormwater runoff quantity, stormwater runoff quality, and groundwater recharge requirements.
Sand Filter	Extended sand bed designed to infiltrate into subgrade while providing TSS removal and quantity storage	Not selected. The proposed infiltration basin BMP addresses the quantity requirements and quality requirements for station drives.
Standard Constructed Wetland	At grade, impounded water area that would direct storm flows thru marsh vegetation to provide TSS removal and quantity storage	Not selected. The proposed infiltration basin BMP addresses the quantity requirements and quality requirements for station drives.

BMP	Component Description	Project Applicability
Wet Pond	Permanent water pool level and quantity storage with a reuse requirement	Not selected. The proposed infiltration basin BMP addresses the quantity requirements and quality requirements for station drives.

Conclusion

The N.J.A.C. Title 7, Chapter 8 details the requirements for the stormwater management rules applicable to this project. These requirements are set to reduce the impacts of stormwater runoff. As discussed herein, the work at the proposed Sharp Road Switch station meets the requirements of Evesham Township and N.J.A.C. 7:8 for green infrastructure, stormwater runoff quality, stormwater runoff quality, and groundwater recharge.

References

1. Township of Evesham, NJ Code Chapter 139, Stormwater Management

2. New Jersey Administrative Code, Title 7, Chapter 8 (N.J.A.C. 7:8)

3. New Jersey Administrative Code, Title 7, Chapter 13 (N.J.A.C. 7:13)

4. New Jersey State Planning Website (nj.gov/state/planning)

5. Water Resources Engineering, Larry W. Mays, Wiley, 2011

6. USDA Technical Release 55, Urban Hydrology for Small Watersheds, 1986.

7. Stormwater Collection Systems Design Handbook, Larry W. Mays, 2001

8. Subsurface Investigation, Proposed Sharp Road Substation – Marlton, Burlington County, New Jersey, GZA GeoEnviromental Inc, June 11, 2024

9. New Jersey Stormwater Best Management Practices Manual, July 2023

Attachment A – Stormwater Calculations

BLACK & VEATCH

CALCULATION RECORD

Confidential and Proprietary Business Information of Black & Veatch

Client Name PSE&G Page 1 of 57

Project Name Sharp Rd Substation Project No. 415962

Calculation Title Stormwater Analysis

Calculation No./File No.

Verification Method: ☒ Check and Review ☐ Alternate Calculations

Objective: The objective of this calculation is to determine the Pre and Post development storm water management system design and analysis for the Sharp Ed substation for the design storm event of 2,10 and 100year-24 hours.

Unverified Assumptions Requiring Subsequent Verification			
No.	**Assumption**	**Verified By***	**Date**
N/A	N/A	N/A	N/A

Refer to Page _____ of this calculation for additional assumptions.

This Section Used for Software-Generated Calculations
BV Standard Application Program Name/Version HEC HMS 4.11, HY-8.0.0.1

Review and Approval						
Rev	**Prepared By***	**Date**	**Verified By***	**Date**	**Approved By***	**Date**
0	Rutvee Sojitra	08-19-24	Greg Johnson			
1	Rutvee Sojitra	12-11-24	Greg Johnson			
2	Rutvee Sojitra	4-23-25	Greg Johnson			

*Signature required.

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1.0 REFERENCES:

1) TR55, Urban Hydrology for Small Watersheds, U.S. Department of Agriculture, Soil Conservation Service, June 1986.

2) HEC-HMS, Hydrologic Modeling System, U.S. Army Corps of Engineers, Version 4.11, Build: 75790 Date: 14July2023 DSS: 7-IQ JAVA: 17.0.7

3) Updated Report Subsurface Investigation, Proposed Sharp Road Substation Marlton, Burlington County, New Jersey, PSE&G, GZA GeoEnvironmental,Inc., June 11 2024.

4) PSE&G, Sharp Road Switch, Grading and Site Development Plan, BV Dwg 798446-A-0P,

5) PSE&G, Cox's Corner substation, Boundary and Topograpghic survey, PSEG Services Corporation, Surveys and Mapping, 7/5/2023.

6) PSE&G, Sharp Road Switch, Key Plan, BV Dwg 798864-A-0P 08/01/2024.

7) Sharp Road Switch Aerial Image, Google Earth Pro, Historical Imagery from 1985.

8) HY-8 v.7.60, Culvert Analysis Software Package, Federal Highway Administration, Build Date Jul 30, 2019.

9) United States Dept. of Agriculture, Natural Resources Conservation Service, Web Soil Survey, Website: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

10) U.S.Geologic Survey, Mount Holly Quadrangle, Burlington Co., NJ, 7.5 Minute Series, 2023.

11) New Jersey Administrative Code, N.J.A.C. 7:8 Stormwater Management, Date Last Amended July 17, 2023.

12) Fluid Mechanics, 8th Edition, Streeter and Wylie, McGraw-Hill, 1985.

13) Introduction to Hydrology, 3rd Edition, Viessman, Jr., Lewis, & Knapp, HarperCollins, 1989.

14) New Jersey Stormwater Best Management Practices Manual, Last Updated July 2023.

2.0 DESIGN BASIS:

The proposed project includes the construction of a new substation, along with associated equipment and access roads. The property is located at 225 Sharp Road, in the Township of Evesham, Burlington County, New Jersey. The property area is approximately 58.4 acres.

The project will be designed to meet the requirements of the New Jersey Administrative Code, N.J.A.C. 7:8 Stormwater Management. The 2, 10, and 100-Year recurrence interval events shall be used as the design precipitation events. Design methodologies will be based on the New Jersey Best Management Practices Manual.

The existing property will be evaluated based on its area and infiltration characteristics. The proposed final property conditions consider the substation's buildings and equipment, along with roads and plant surfacing. In the proposed final condition, BMPs are provided to meet any stormwater quality and quantity requirements applicable to the project.

The HEC-HMS Hydrologic Modeling System software package is used to model the response of the system to the design precipitation events as specified by N.J.A.C. 7:8. Modeling is performed for the project in its existing, and proposed conditions. (Reference 2)

3.0 DEFINITION OF UNITS AND CONSTANTS:

cfs	cubic feet per second
ac-ft	acre-feet
sq mi	square miles
sq ft	square feet
hr	hour
in	inches
ft	feet
ft/sec	feet per second
cu-ft	cubic feet

4.0 ANALYSIS:

Required HEC-HMS design input parameters include watershed area, infiltration characteristics, and time lag. Also, stage-area and stage-discharge relationships are required for the proposed finished site BMPs. Design precipitation events and the precipitation distribution are also used in the HEC-HMS models.

Stormwater Management System:

Pre-Development:

The existing site consists of some wood- grassed combination areas, which are modeled as in good condition.

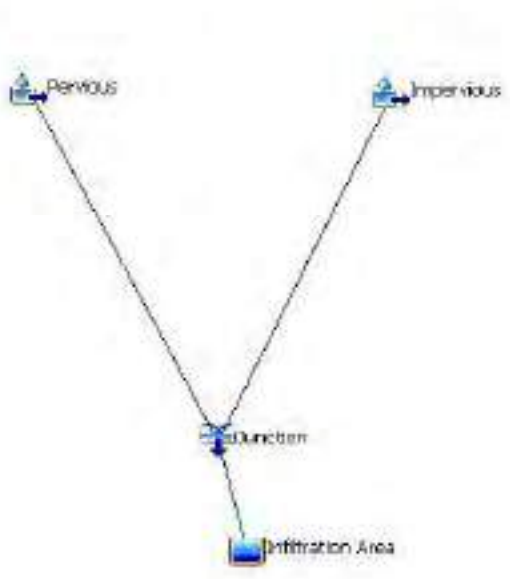
Post-Development:

The proposed stormwater management system is shown in the below sketch. For all subbasins, pervious and impervious surfaces are modeled separately. Runoff from each area is routed to a BMP. Two (2) infiltration basins comprised of storage at different elevations are proposed to meet the regulatory requirements.

Approximately 82.5% of the property drains to a set of infiltration basin at the west end of the property, while 11.66% will have minimum cover change and therefore will iniltrate into the ground. Remaining 6% is routed off site in the south as it couldn't be diverted to the infiltration basin due to elevation contrains.

Discharge hydrographs from the small-scale infiltration BMPs are combined in the model at "Junction-Post" to determine peak property discharge.

The Post development basin were modelled as impervious and pervious separtely draining into the infiltration basin as shown in the figure below:



Watershed Area:

From References 4 and 5, the watershed area of the project is **151,234 square feet**. This is equal to **3.47 acres**, or **0.00542 square miles.** The watershed area in the proposed condition is slightly less than the area for the existing condition due to containment areas which do not contribute to runoff.
Areas for each subbasin are developed in detail in the Infiltration Characteristics section of the calculation.

Design Precipitation Events:

From References 11, design precipitation events for this project include the 2, 10, and 100-Year, 24-Hour Events. Precipitation frequency data at the site for these events were obtained from Reference 14.

Event	Precip. (in.)
2-Year, 24-Hour	**3.36**
10-Year, 24-Hour	**5.18**
100-Year, 24-Hour	**8.81**

Table 5-1: County-Specific, New Jersey 24-Hour Rainfall Frequency Data

NEW JERSEY 24 HOUR RAINFALL FREQUENCY DATA

Rainfall amounts in Inches

County	1 year	2 year	5 year	10 year	25 year	50 year	100 year
Atlantic	2.72	3.31	4.30	5.16	6.46	7.61	8.90
Bergen	2.75	3.34	4.27	5.07	6.28	7.32	8.47
Burlington	2.77	3.36	4.34	5.18	6.45	7.56	8.81
Camden	2.73	3.31	4.25	5.06	6.28	7.34	8.52
Cape May	2.67	3.25	4.22	5.07	6.34	7.47	8.73
Cumberland	2.69	3.27	4.25	5.09	6.37	7.49	8.76
Essex	2.85	3.44	4.40	5.22	6.44	7.49	8.66
Gloucester	2.71	3.29	4.24	5.05	6.29	7.36	8.55
Hudson	2.79	3.31	4.23	5.02	6.19	7.20	8.31
Hunterdon	2.80	3.38	4.26	5.00	6.09	7.02	8.03
Mercer	2.74	3.31	4.23	5.01	6.19	7.20	8.33
Middlesex	2.76	3.35	4.30	5.12	6.36	7.43	8.63
Monmouth	2.79	3.38	4.38	5.23	6.53	7.66	8.94
Morris	2.94	3.54	4.47	5.24	6.37	7.30	8.35
Ocean	2.81	3.42	4.46	5.33	6.68	7.87	9.20
Passaic	2.87	3.47	4.42	5.23	6.43	7.47	8.62
Salem	2.69	3.26	4.20	5.00	6.22	7.28	8.45
Somerset	2.76	3.34	4.25	5.01	6.15	7.13	8.21
Sussex	2.68	3.22	4.02	4.70	5.72	6.60	7.68
Union	2.80	3.39	4.35	5.17	6.42	7.49	8.69
Warren	2.78	3.34	4.18	4.89	5.93	6.83	7.82

Notes: The average point rainfall amounts listed above were developed from data contained in NOAA Atlas 14 Volume 2.

Point rainfall estimates for specific locations may be obtained from the Precipitation Frequency Data Server located at http://www.nws.noaa.gov/ohd/hdsc/

For most hydrologic design procedures, the rainfall amounts listed above may be rounded to the nearest tenth of an inch.

Design Precipitation Events:

From NJAC 7:8 Stormwater Management (Reference 11), apply factors from Tables 5-5 and 5-6 to the design precipitation events presented on Page A6, to determine the Current and Future design precipitation values for this Burlington County site.

Table 5-5: Current Precipitation Adjustment Factors

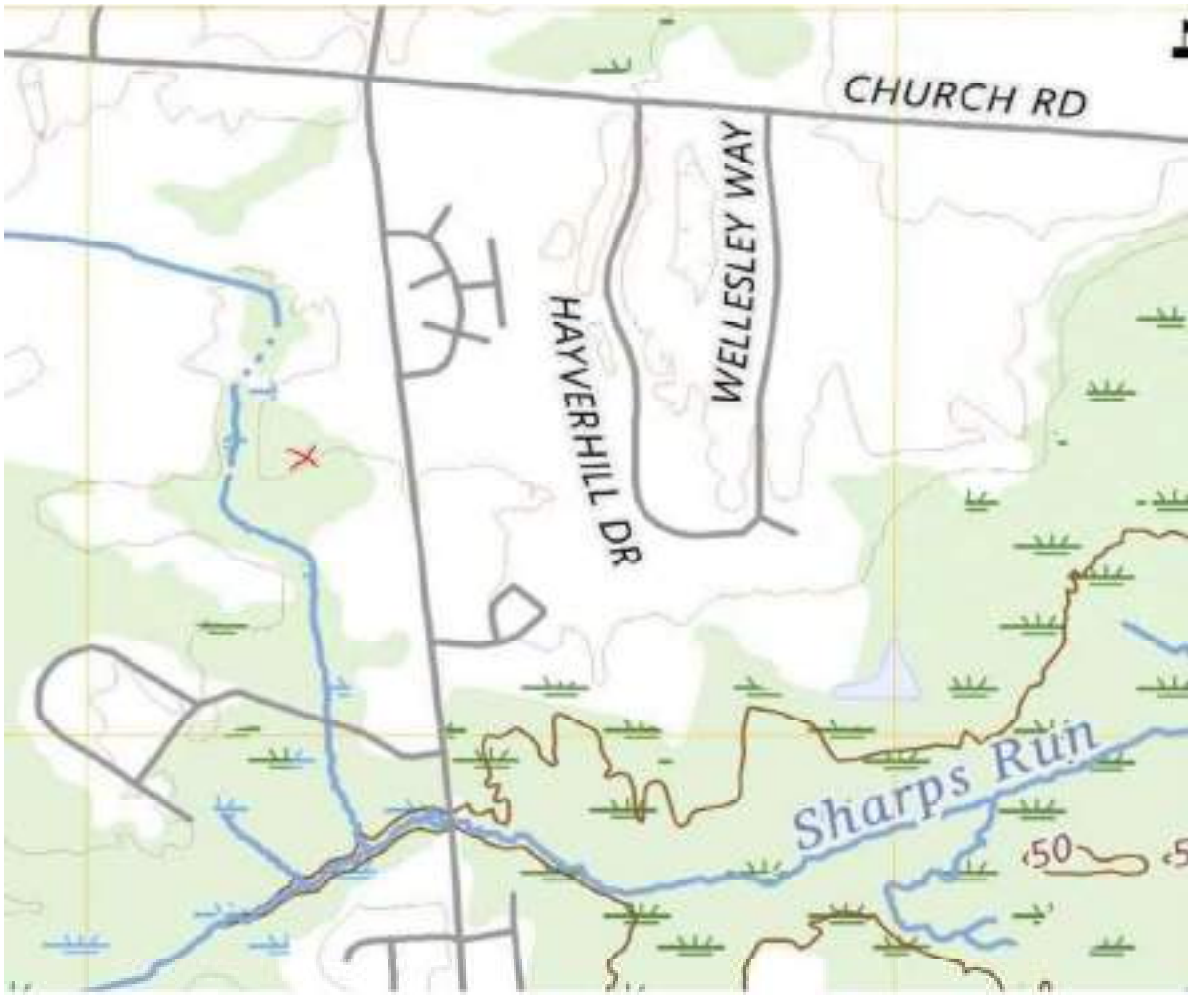
County	Current Precipitation Adjustment Factors		
	2-year Design Storm	10-year Design Storm	100-year Design Storm
Atlantic	1.01	1.02	1.03
Bergen	1.01	1.03	1.06
Burlington	0.99	1.01	1.04

Table 5-6: Future Precipitation Change Factors

County	Future Precipitation Change Factors		
	2-year Design Storm	10-year Design Storm	100-year Design Storm
Atlantic	1.22	1.24	1.39
Bergen	1.20	1.23	1.37
Burlington	1.17	1.18	1.32

Event	NOAA Precip. (in)	Current Precip. (in)	Future Precip. (in)
2-Year, 24-Hour	**3.36**	**3.33**	**3.93**
10-Year, 24-Hour	**5.18**	**5.23**	**6.11**
100-Year, 24-Hour	**8.81**	**9.16**	**11.63**

Owner:	**Public Service Electric and Gas Company**	**Page:**	**A6.2**
Plant:	**Sharp Road Substation**		
Address:	**225 Sharp Road, Marlton, NJ 08053**		
Project No.:	**415962**	**File No.**	
Title:	**Stormwater Analysis**		


CHURCH RD
WELLESLEY WAY
HAYVERHILL DR
Sharps Run
50

Time-of-Concentration - Existing Site: (from References 1 and 15)

The time-of-concentration for stormwater runoff to travel across the site from the hydrologically most remote portion of the watershed is determined based on the topography from References 4 and 5. The time-of-concentration is made up of travel time due to sheet flow, shallow concentrated flow, and channel flow Sheet flow travel time is a function of precipitation, so Current and Future values will be determined.

Substation:

Sheet Flow (Current):

Surface Description:	grass	
Manning's Roughness:	0.24	(Ref. 1)
Flow Length:	74	feet
2-Yr 24-Hr Precip.:	3.33	inches
Land Slope:	0.028	ft/ft
Travel Time:	**0.159**	**hours** (from Ref. 1 equation)

Sheet Flow (Future):

Surface Description:	grass	
Manning's Roughness:	0.24	(Ref. 1)
Flow Length:	74	feet
2-Yr 24-Hr Precip.:	3.93	inches
Land Slope:	0.028	ft/ft
Travel Time:	**0.147**	**hours** (from Ref. 1 equation)

Shallow Concentrated Flow:

Surface Description:	grass	
Flow Length:	284	feet
Watercourse Slope:	0.011	ft/ft
Average Velocity:	1.6	ft/sec (Ref. 14)
Travel Time:	**0.049**	**hours** (length/(3600*Velocity))

Current Precipitation Tc:

Time-of-Conc.:	**0.209**	**hr**
Time Lag = 0.6*Tc =	**0.125**	**hr**
Time Lag = 0.6*Tc =	**7.5**	**min**

Future Precipitation Tc:

Time-of-Conc.:	**0.196**	**hr**
Time Lag = 0.6*Tc =	**0.118**	**hr**
Time Lag = 0.6*Tc =	**7.1**	**min**

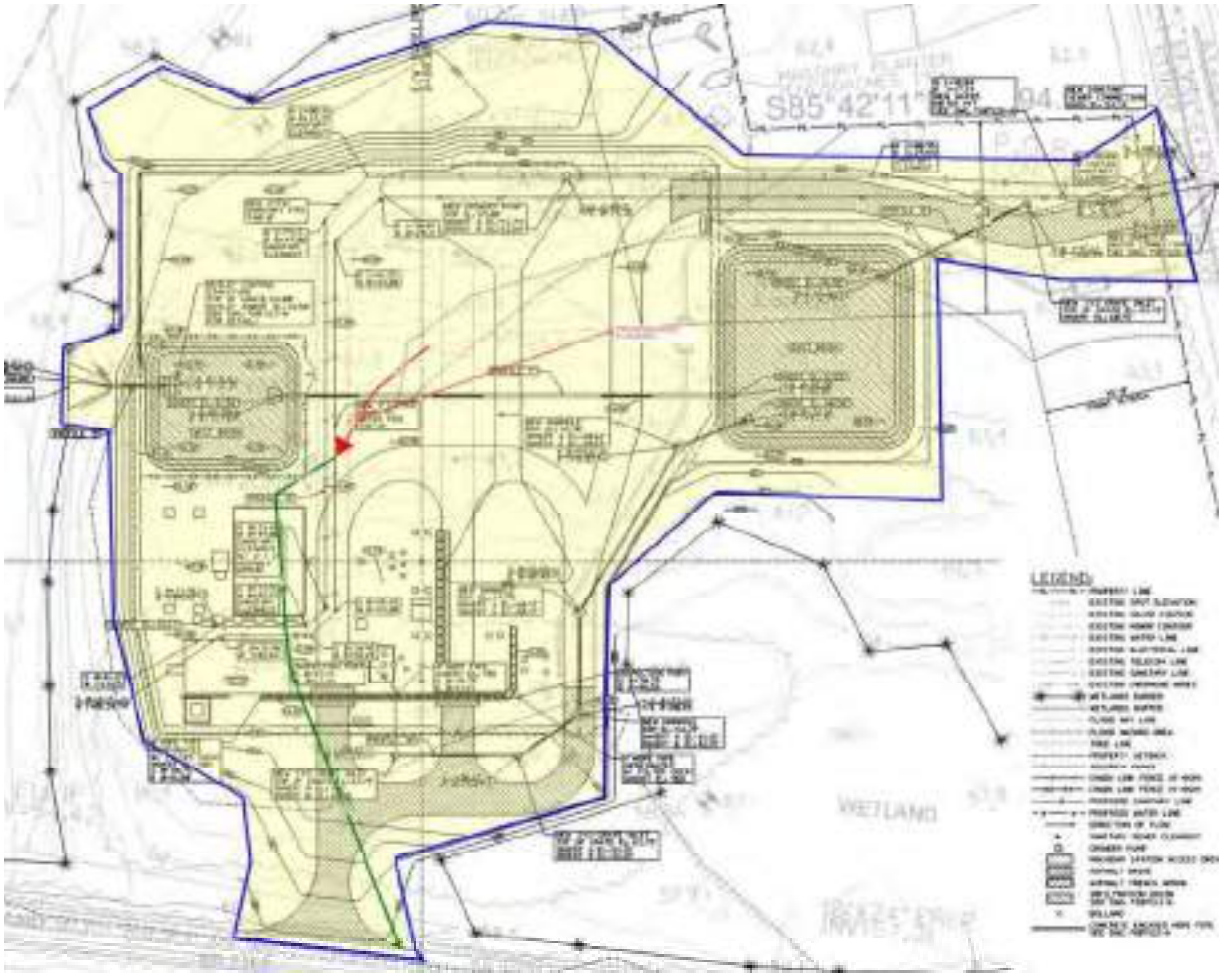
Flow Path: (From Ref. 4)

See Page A7.5

Owner:	**Public Service Electric and Gas Company**		**Page: A7.5**
Plant:	**Sharp Road Substation**		
Address:	**225 Sharp Road, Marlton, NJ 08053**		
Project No.:	**415962**	**File No.**	
Title:	**Stormwater Analysis**		

Time-of-Concentration - Existing Site:

Pre-Development Flow Path



Time-of-Concentration - Proposed Site:

Substation:

Sheet Flow (Current):

Surface Description:	grass	
Manning's Roughness:	0.011	(Ref. 1)
Flow Length:	60	feet
2-Yr 24-Hr Precip.:	3.33	inches
Land Slope:	0.007	ft/ft
Travel Time:	**0.020**	**hours** (from Ref. 1 equation)

Sheet Flow (Future):

Surface Description:	grass	
Manning's Roughness:	0.011	(Ref. 1)
Flow Length:	60	feet
2-Yr 24-Hr Precip.:	3.93	inches
Land Slope:	0.013	ft/ft
Travel Time:	**0.014**	**hours** (from Ref. 1 equation)

Shallow Concentrated Flow:

Surface Description:	grass	
Flow Length:	85	feet
Watercourse Slope:	0.013	ft/ft
Average Velocity:	2.1	ft/sec (Ref. 14)
Travel Time:	**0.011**	**hours** (length/(3600*Velocity))

Current Precipitation Tc:

Time-of-Conc.:	**0.031**	**hr**
Time Lag = 0.6*Tc =	**0.019**	**hr**
Time Lag = 0.6*Tc =	**1.1**	**min**

Future Precipitation Tc:

Time-of-Conc.:	**0.026**	**hr**
Time Lag = 0.6*Tc =	**0.015**	**hr**
Time Lag = 0.6*Tc =	**1**	**min**

Flow Path: (From Ref. 4)

See Page A8.5

Owner:	**Public Service Electric and Gas Company**		**Page:** **A8.5**
Plant:	**Sharp Road Substation**		
Address:	**225 Sharp Road, Marlton, NJ 08053**		
Project No.:	**415962**	**File No.**	
Title:	**Stormwater Analysis**		

Time-of-Concentration - Proposed Site:

Post-Development Flow Path

Hydrologic Soil Group:

From the Web Soil Survey (Reference 9), the site is predominately Adelphia fine sandy loam and Homdel loamy sand, with a **Hydrologic Soil Group Rating of C**.

Summary by Map Unit — Burlington County, New Jersey (NJ005)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
AdrA	Adelphia fine sandy loam, 0 to 2 percent slopes	C	1.1	20.1%
HoaB	Holmdel loamy sand, 0 to 5 percent slopes	C	4.1	75.2%
ShsA	Shrewsbury fine sandy loam, 0 to 2 percent slopes	B/D	0.3	4.7%
Totals for Area of Interest			**5.5**	**100.0%**

Owner:	**Public Service Electric and Gas Company**	**Page:**	**A10**
Plant:	**Sharp Road Substation**		
Address:	**225 Sharp Road, Marlton, NJ 08053**		
Project No.:	**415962**	**File No.**	
Title:	**Stormwater Analysis**		

Infiltration Characteristics:

Infiltration characteristics are modeled based on the SCS Curve Number method (References 1 and 15)
From Reference 9, the soils at the site are assigned a Hydrologic Soil Group rating of C.
Area and surfacing values for the existing and proposed site are tabulated below from References 4 and
Runoff from impervious surfaces is calculated separately from pervious surfaces.

Pre-Development

Surface	Area (sf)	Area (ac)	Area (sq mi)	CN
Woods-Grass - Good Cond	151234	3.47	0.00542	72

Post-Development

Yard Stone Curve Number Determination:

Determine Curve Number for loose rock fill with a porosity of 0.4. (Ref. 15)
S = maximum retention = (0.4)(4 inch layer) = 1.6 inches.
S = (1000/CN - 10) (Ref. 1)
thus,
CN = 1000/(S+10) = 1000/(1.6+10) = **86.2**

Surface - Substation	Area (sf)	CN	CN*Area
Foundations/Buildings	7852	**98**	769535.2
Yard Stone	48345	**86.2**	4167339
Substation Driveway	25079	**98**	2457742
Grass - Good Cond.	66647	**74**	4931878
Containment	3342	**86.2**	288080
Total Contributing Area =	**151265**	**3.472576**	**12614575**

Composite Curve Number =	**83.4**	(CN*Area/Total Area)
Pervious Composite CN =	**79.3**	
Impervious Composite CN =	**98.0**	

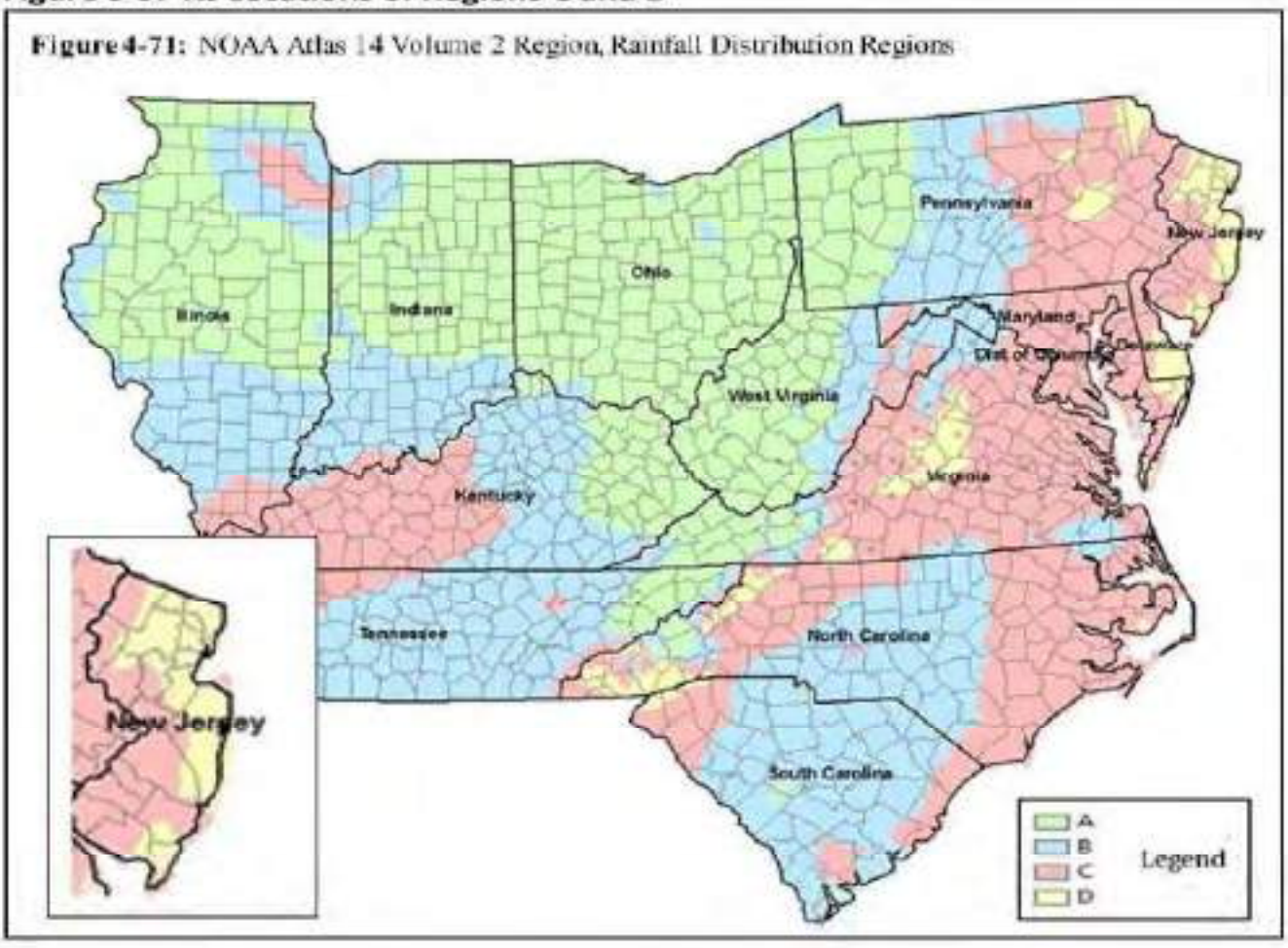
Surface	Area (sf)	Area (ac)	Area (sq mi)
Substation - Impervious	36273	0.83	**0.00130**
Substation - Pervious	114992	2.64	**0.00412**
Area Total	151265	3.47	**0.00543**

Precipitation Distribution:

The site, in Burlington County, is located in western New Jersey, as shown in the Quadrangle Location figure (Reference 10). From Reference 14, use the NOAA Type C distribution for this site, based on Figure 5-9: NJ Locations of Regions C and D.

QUADRANGLE LOCATION

Figure 5-9: NJ Locations of Regions C and D



Precipitation Distribution:

From Reference 14, the NOAA Type C distribution in provided in Table 5-2.

Table 5-2: NRCS NOAA_C and NOAA_D Rainfall Distribution by Rainfall Depth (fractional)

Time (hours)	NOAA_C (inch per inch of precipitat	NOAA_D (inch per inch of precipitati	Time (hours)	NOAA_C (inch per inch of precipitati	NOAA_D (inch per inch of precipitat	Time (hours)	NOAA_C (inch per inch of precipitati	NOAA_D (inch per inch of precipitat	Time (hours)	NOAA_C (inch per inch of precipitat	NOAA_D (inch per inch of precipitati
0.1	0.00128	0.0011	6.1	0.0809	0.08717	12.1	0.59331	0.58346	18.1	0.92236	0.91638
0.2	0.00231	0.0022	6.2	0.08259	0.08901	12.2	0.63382	0.61972	18.2	0.92396	0.91812
0.3	0.00335	0.00332	6.3	0.08432	0.0909	12.3	0.663	0.64585	18.3	0.92555	0.91985
0.4	0.00441	0.00445	6.4	0.08609	0.09283	12.4	0.68428	0.6649	18.4	0.92713	0.92157
0.5	0.00547	0.00559	6.5	0.0879	0.0948	12.5	0.7045	0.683	18.5	0.9287	0.92327
0.6	0.00654	0.00674	6.6	0.08975	0.09682	12.6	0.71755	0.69644	18.6	0.93026	0.92497
0.7	0.00763	0.0079	6.7	0.09164	0.09888	12.7	0.72978	0.70887	18.7	0.93181	0.92665
0.8	0.00872	0.00907	6.8	0.09356	0.10099	12.8	0.74093	0.72028	18.8	0.93335	0.92833
0.9	0.00982	0.01025	6.9	0.09553	0.10314	12.9	0.75101	0.73067	18.9	0.93488	0.92999
1	0.01093	0.01145	7	0.09754	0.10534	13	0.76001	0.74005	19	0.9364	0.93164
1.1	0.01206	0.01265	7.1	0.09959	0.10758	13.1	0.76794	0.7484	19.1	0.93791	0.93328
1.2	0.01319	0.01387	7.2	0.10168	0.10987	13.2	0.77529	0.75618	19.2	0.93941	0.93491
1.3	0.01433	0.0151	7.3	0.1038	0.1122	13.3	0.78207	0.76338	19.3	0.9409	0.93653
1.4	0.01548	0.01634	7.4	0.10597	0.11458	13.4	0.78827	0.77	19.4	0.94238	0.93813
1.5	0.01665	0.01759	7.5	0.10818	0.117	13.5	0.7939	0.77604	19.5	0.94385	0.93973
1.6	0.01782	0.01885	7.6	0.11042	0.11946	13.6	0.79896	0.7815	19.6	0.94531	0.94131
1.7	0.019	0.02012	7.7	0.11271	0.12197	13.7	0.80386	0.7868	19.7	0.94676	0.94289
1.8	0.02019	0.0214	7.8	0.11503	0.12453	13.8	0.80861	0.79195	19.8	0.94821	0.94445
1.9	0.0214	0.0227	7.9	0.1174	0.12712	13.9	0.81322	0.79693	19.9	0.94964	0.946
2	0.02261	0.024	8	0.11981	0.12977	14	0.81767	0.80176	20	0.95106	0.94754
2.1	0.02383	0.02532	8.1	0.12225	0.13246	14.1	0.82197	0.80643	20.1	0.95247	0.94907
2.2	0.02506	0.02665	8.2	0.12474	0.13519	14.2	0.82613	0.81094	20.2	0.95387	0.95059
2.3	0.02631	0.02799	8.3	0.12726	0.13796	14.3	0.83013	0.8153	20.3	0.95526	0.95209
2.4	0.02756	0.02934	8.4	0.12982	0.14079	14.4	0.83398	0.81949	20.4	0.95664	0.95359
2.5	0.02882	0.0307	8.5	0.13243	0.14365	14.5	0.83769	0.82353	20.5	0.95801	0.95507
2.6	0.03009	0.03207	8.6	0.13507	0.14656	14.6	0.84124	0.82741	20.6	0.95938	0.95655
2.7	0.03137	0.03346	8.7	0.13776	0.14952	14.7	0.84464	0.83113	20.7	0.96073	0.95801
2.8	0.03267	0.03485	8.8	0.14048	0.15252	14.8	0.8479	0.8347	20.8	0.96207	0.95946
2.9	0.03397	0.03626	8.9	0.14324	0.15556	14.9	0.851	0.8381	20.9	0.9634	0.9609
3	0.03528	0.03767	9	0.14605	0.15865	15	0.85395	0.84135	21	0.96472	0.96233
3.1	0.0366	0.0391	9.1	0.149	0.1619	15.1	0.85676	0.84444	21.1	0.96603	0.96374
3.2	0.03793	0.04054	9.2	0.1521	0.1653	15.2	0.85952	0.84746	21.2	0.96733	0.96515
3.3	0.03927	0.04199	9.3	0.15536	0.16887	15.3	0.86224	0.85048	21.3	0.96863	0.96654
3.4	0.04062	0.04345	9.4	0.15876	0.17259	15.4	0.86493	0.85344	21.4	0.96991	0.96793
3.5	0.04199	0.04493	9.5	0.16231	0.17647	15.5	0.86757	0.85635	21.5	0.97118	0.9693
3.6	0.04336	0.04641	9.6	0.16602	0.18051	15.6	0.87018	0.85921	21.6	0.97244	0.97066
3.7	0.04474	0.04791	9.7	0.16987	0.1847	15.7	0.87274	0.86204	21.7	0.97369	0.97201
3.8	0.04613	0.04941	9.8	0.17387	0.18906	15.8	0.87526	0.86481	21.8	0.97494	0.97335
3.9	0.04753	0.05093	9.9	0.17803	0.19357	15.9	0.87775	0.86754	21.9	0.97617	0.97468
4	0.04894	0.05246	10	0.18233	0.19824	16	0.88019	0.87023	22	0.97739	0.976
4.1	0.05036	0.054	10.1	0.18678	0.20307	16.1	0.8826	0.87288	22.1	0.9786	0.9773
4.2	0.05179	0.05555	10.2	0.19139	0.20805	16.2	0.88497	0.87547	22.2	0.97981	0.9786
4.3	0.05324	0.05711	10.3	0.19614	0.2132	16.3	0.88729	0.87803	22.3	0.981	0.97988
4.4	0.05469	0.05869	10.4	0.20104	0.2185	16.4	0.88958	0.88054	22.4	0.98218	0.98115
4.5	0.05615	0.06027	10.5	0.2061	0.22396	16.5	0.89182	0.883	22.5	0.98335	0.98241
4.6	0.05762	0.06187	10.6	0.21173	0.23	16.6	0.89403	0.88542	22.6	0.98452	0.98366
4.7	0.0591	0.06347	10.7	0.21793	0.23662	16.7	0.8962	0.8878	22.7	0.98567	0.9849
4.8	0.06059	0.06509	10.8	0.22471	0.24382	16.8	0.89832	0.89013	22.8	0.98681	0.98613
4.9	0.06209	0.06672	10.9	0.23206	0.2516	16.9	0.90041	0.89242	22.9	0.98794	0.98735
5	0.0636	0.06836	11	0.23999	0.25995	17	0.90246	0.89466	23	0.98907	0.98855
5.1	0.06512	0.07001	11.1	0.24899	0.26933	17.1	0.90447	0.89686	23.1	0.99018	0.98975
5.2	0.06665	0.07167	11.2	0.25907	0.27972	17.2	0.90644	0.89901	23.2	0.99128	0.99093
5.3	0.06819	0.07335	11.3	0.27022	0.29113	17.3	0.90836	0.90112	23.3	0.99237	0.9921
5.4	0.06974	0.07503	11.4	0.28245	0.30356	17.4	0.91025	0.90318	23.4	0.99346	0.99326
5.5	0.0713	0.07673	11.5	0.2955	0.317	17.5	0.9121	0.9052	23.5	0.99453	0.99441
5.6	0.07287	0.07843	11.6	0.31572	0.3351	17.6	0.91391	0.90717	23.6	0.99559	0.99555
5.7	0.07445	0.08015	11.7	0.337	0.35415	17.7	0.91568	0.9091	23.7	0.99665	0.99668
5.8	0.07604	0.08188	11.8	0.36618	0.38028	17.8	0.91741	0.91099	23.8	0.99769	0.99779
5.9	0.07764	0.08362	11.9	0.40663	0.41654	17.9	0.9191	0.91283	23.9	0.99872	0.9989
6	0.07925	0.08537	12	0.4766	0.47909	18	0.92075	0.91463	24	1	1

Owner: Public Service Electric and Gas Company
Plant: Sharp Road Substation
Address: 225 Sharp Road, Marlton, NJ 08053
Project No.: 415962 **File No.**
Title: Stormwater Analysis

Proposed Site Stage - Storage Relationship:

Stormwater runoff at the substation is routed to infiltration basins. A set of 2 basins is provided at the 1 East and 1 West end of the property. The bottom elevation of each basin is set to be at least 2 feet above the groundwater elevation, based on data from Reference 3. The toal stage-storage is provided in the tables below.

Total Infiltration Basin				
Elevation	Area	Area	Cum. Vol.	Cum. Vol.
(ft)	(sq ft)	(acres)	(cu ft)	(ac-ft)
60.5	6464.36	0.148	0	0
61	10322.23	0.237	4196.6475	0.0963418
61.5	10827.12	0.249	9483.985	0.2177223
61.8	11559.19	0.265	12841.932	0.2948102
62	11906.59	0.273	15311.058	0.3514935
63	13711.41	0.315	28120.058	0.6455477
63.5	14656.24	0.336	35211.97	0.8083556
64	15629.34	0.359	42790.433	0.9823332

East infiltration basin		
Elevation	Area	Area
(ft)	(sq ft)	(acres)
60.5	6464.36	0.15
61	7274.42	0.17
61.5	7779.31	0.18
61.8	8089.02	0.19
62	8298.33	0.19
63	9378.78	0.22
63.5	9940.22	0.23
64	10515.79	0.24

West infiltration basin		
Elevation	Area	Area
(ft)	(sq ft)	(acres)
61.5	3047.81	0.07
61.8	3470.17	0.08
62	3608.26	0.08
63	4332.63	0.10
63.5	4716.02	0.11
64	5113.55	0.12

Proposed Site Stage - Discharge Relationships:

For the proposed property, the small-scale infiltration basin BMPs are equipped with discharge structures and discharge pipes. At each location, the stage-discharge relationships of the structure and the pipe are compared to determine which controls at each elevation.

The HY-8 Culvert Analysis Package (Federal Highway Admin., Reference 8) is used to determine the stage-discharge relationship of the discharge pipelines. The input parameters and output table for each of the HDPE discharge pipes is provided on the following two pages. Most of the discharge is routed to the existing storm sewer system, as provided in Reference 5.

The stage-discharge relationships are provided on Pages A13 and A15.

Infiltration:

The infiltration rate for the east and west infiltration BMPs is based on the minimum subsoil design .

Permeability Rate (0.5 inches/hour) from the New Jersey Stormwater Best Management Practices Manual (Reference 14).

Infiltration = 0.5 in/hr
Infiltration = 0.04 ft/hr
Infiltration = 1.157E-05 ft/sec

All Infiltration Basins					
Elevation	Area	Area	Cum. Vol.	Cum. Vol.	Infiltration Q
	(sq ft)	(acres)	(cu ft)	(ac-ft)	(cfs)
60.5	6464.36	0.15	0	0	0.070
61	10322.23	0.24	4196.6475	0.0963418	0.119
61.5	10827.12	0.25	9483.985	0.2177223	0.125
61.8	11559.19	0.27	12841.932	0.2948102	0.134
62	11906.59	0.27	15311.058	0.3514935	0.138
63	13711.41	0.31	28120.058	0.6455477	0.159
63.5	14656.24	0.34	35211.97	0.8083556	0.170
64	15629.34	0.36	42790.433	0.9823332	0.181

Owner: Public Service Electric and Gas Company
Plant: Sharp Road Substation
Address: 225 Sharp Road, Marlton, NJ 08053
Project No.: 415962 **File No.**
Title: Stormwater Analysis

Stage - Discharge Relationship - Orifice Discharge:

The east and west infiltration vault BMPs are equipped with orifices to regulate the discharge.

Discharge through an orifice is estimated using the orifice equation, as provided in Reference 12:

$Q = C_d A_o (2gH)^{1/2}$ and rectangular weir equation: $Q = C_d * L * H^{3/2}$

where:

Q = the estimated discharge (cfs)
Cd = the discharge coefficient = the velocity coefficient x the contraction coefficient
Cd = (0.98)(0.63) = 0.617
Ao = the area of the orifice opening (sq ft)
H = the head on the orifice as measured from the center of the orifice to the free surface (ft)
L = is the length of the weir crest, and
H = is the head (height of water) above the crest.

West Basin Orifices:

Five orifices are used in the west infiltration basin discharge structure. Orifice No. 1 is 8 in diameter @62.3ft, orifice no. 2 is 8.5in diameter @ 62.5', orifice no. 3 is 12 in diameter @ 61.8', orifice no. 4 is 7 in diameter @ 63.0', and Rectagular weir 10' @ 63.50'.

Basin Stage	Orifice No. 1: 8" @ 62.3'		Orifice No. 2: 8.5" @ 62.5'		Orifice No. 3: 12" @ 61.8'		Orifice No. 4: 7" @ 63.0'		Rectangular weir 10' @63.50		Infiltration	Q Total
	H (ft)	Q (cfs)	H (ft)	Q (cfs)	H (ft)	Q (cfs)	H (ft)	Q (cfs)	H (ft)	Q (cfs)	(cfs)	(cfs)
60.50											0.07	0.070
61.00											0.12	0.119
61.50											0.13	0.125
61.80											0.13	0.134
62.00											0.14	0.138
62.50					0.20	1.74					0.15	1.887
63.00	0.37	1.03	0.15	0.74	0.70	3.25					0.16	5.185
63.50	0.87	1.58	0.65	1.57	1.20	4.26	0.21	0.61			0.17	8.187
63.65	1.02	1.71	0.80	1.74	1.35	4.52	0.36	0.79	0.15	0.35	0.17	9.294
63.75	1.12	1.79	0.90	1.85	1.45	4.68	0.46	0.90	0.25	0.76	0.18	10.160
64.00	1.37	1.98	1.15	2.09	1.70	5.07	0.71	1.11	0.50	2.16	0.18	12.598

Infiltration Basin Discharge:

Comparing the discharge pipe relationship on Page A16 to the orifice relationship, above, the orifice relationship controls the discharge from the infiltration basins at all elevations above the Orifice No. 3 invert.

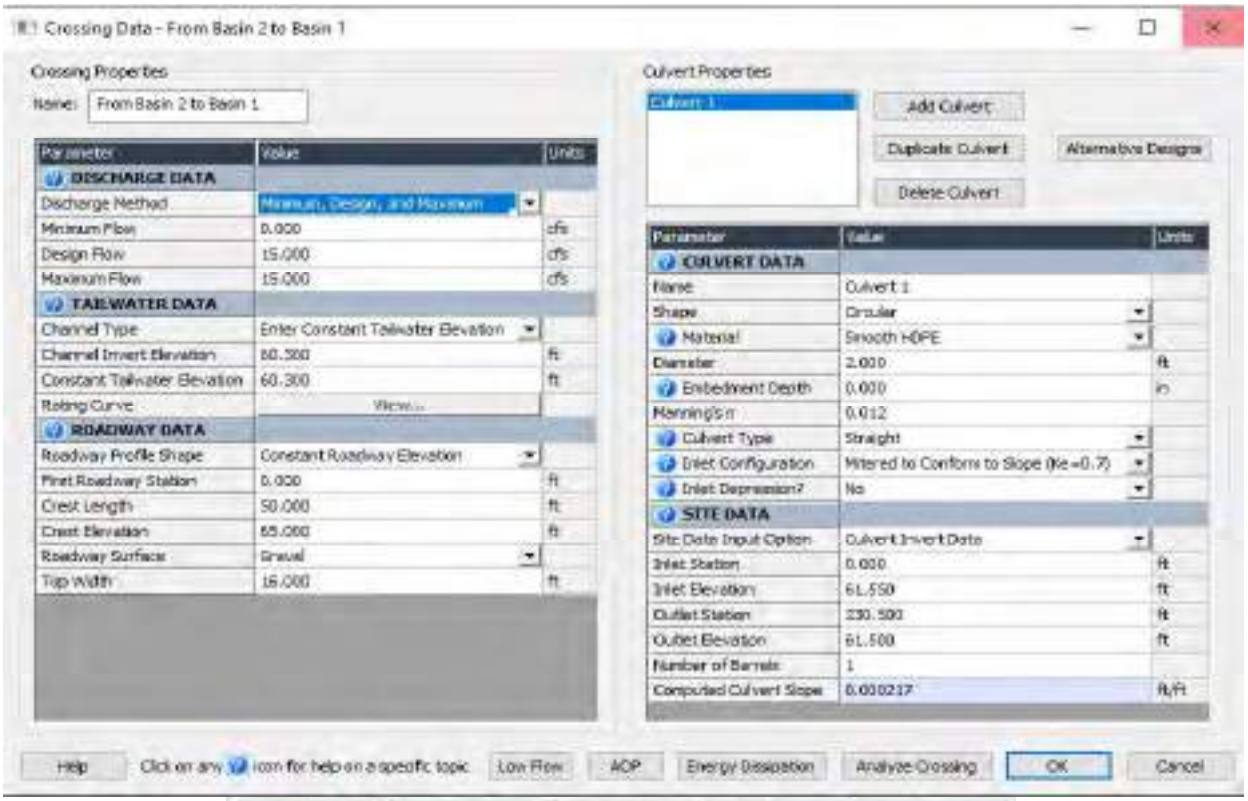
Proposed Site Stage - Discharge Relationship: (Continued)

South Infiltration Basin Discharge:

Th discharge pipe connecting Basin 3 to Basin 2 is sized based on the peak flow cfs from basin 3 only for 100Yr 24hr storm event.

East Infiltration Basin Discharge:

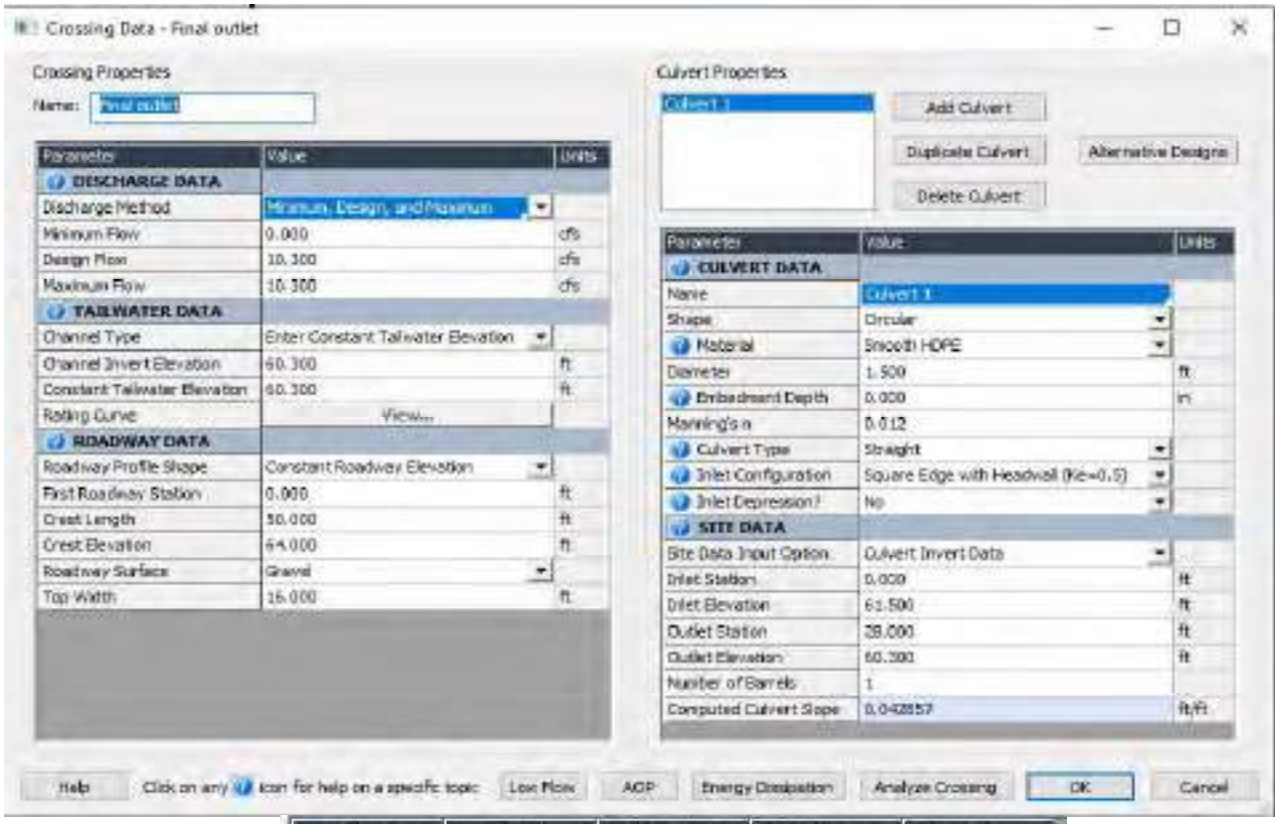
The east infiltration basin is connected to the west infiltration basin in such a way that it acts like one basin. The pipe connecting these two basins is sized for the 100Yr 24hr peak flow generated from Basin 2 & 3.



Headwater Elevation (ft)	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
61.55	0.00	0.00	0.00	1
62.31	1.50	1.50	0.00	1
62.62	3.00	3.00	0.00	1
62.87	4.50	4.50	0.00	1
63.09	6.00	6.00	0.00	1
63.30	7.50	7.50	0.00	1
63.51	9.00	9.00	0.00	1
63.73	10.50	10.50	0.00	1
63.99	12.00	12.00	0.00	1
64.29	13.50	13.50	0.00	1
64.62	15.00	15.00	0.00	1
65.00	16.59	16.59	0.00	Overtopping

West Infiltration Basin Discharge:

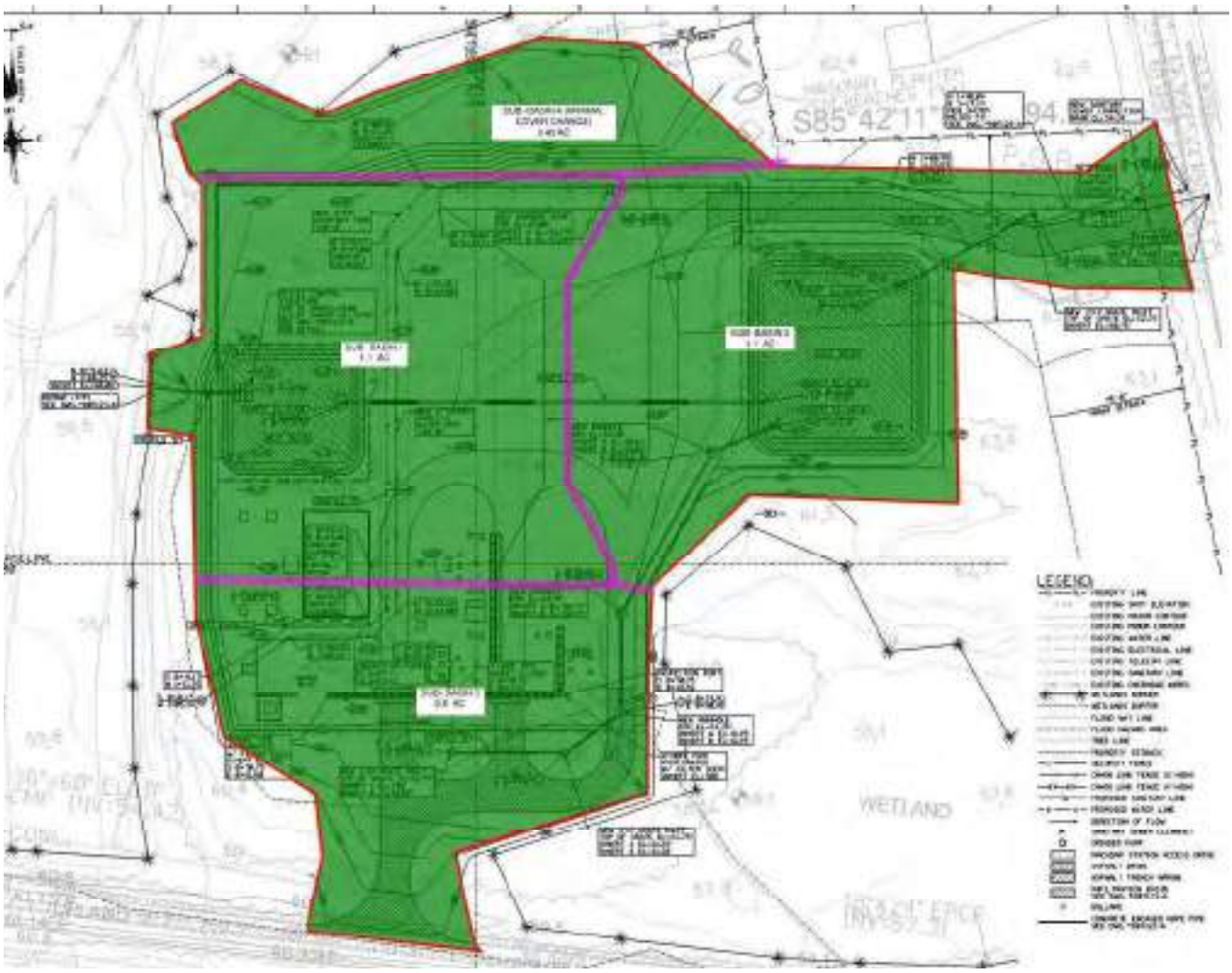
Discharge pipe analysis for a 18-inch HDPE discharge pipeline approximately 28 feet in length, with an upstream invert elevation of 61.50 feet, a downsteam invert of 60.30 feet, and a constant tailwater elevation of 60.30 feet, assuming full flow in the existing ditch in the west. Input data and the rating table are provided below.



Headwater Elevation (ft)	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
61.50	0.00	0.00	0.00	1
62.00	1.03	1.03	0.00	1
62.22	2.06	2.06	0.00	1
62.44	3.09	3.09	0.00	1
62.62	4.12	4.12	0.00	1
62.79	5.15	5.15	0.00	1
62.96	6.18	6.18	0.00	1
63.14	7.21	7.21	0.00	1
63.34	8.24	8.24	0.00	1
63.56	9.27	9.27	0.00	1
63.81	10.30	10.30	0.00	1
64.00	11.00	11.00	0.00	Overtopping

Owner:	**Public Service Electric and Gas Company**	**Page:**	**A17**
Plant:	**Sharp Road Substation**		
Address:	**225 Sharp Road, Marlton, NJ 08053**		
Project No.:	**415962** **File No.**		
Title:	**Stormwater Analysis**		

The over all site drains into 4 different basin as shown below. The runnoff from basin 4 does not reach to the outlet control structure but is accounted for the water quality and storage.



HYDROLOGIC MODEL RESULTS:

The HEC-HMS Hydrologic Modeling System (Ref. 2) was used to model the performance of the site in response to the 2, 10, and 100-Year, 24-Hour Current and Projected Future design precipitation events.

For all design cases the post-development peak discharge is less than or equal to the maximum allowable proposed value, which is 50, 75, and 80 percent of the pre-development maximum value for the 2, 10, and 100-Year events, as provided in the table below. The maximum water surface elevation (wsel) in the infiltration basins in response to each design event is also provided in the table below (units for wsel are ft msl).

Delmarva unit hydrograph results:

EVENT	PRE (cfs)	MAX POST (cfs)	POST (cfs)	POST WSEL (ft)
2YR Current	1.92	0.96	0.72	62.17
10YR Current	5.01	3.76	3.55	62.75
100YR Current	12.33	9.86	9.66	63.69
2YR Future	2.91	1.46	1.35	62.35
10YR Future	6.69	5.02	5.02	62.98
100YR Future	17.37	13.90	12.60	64.00

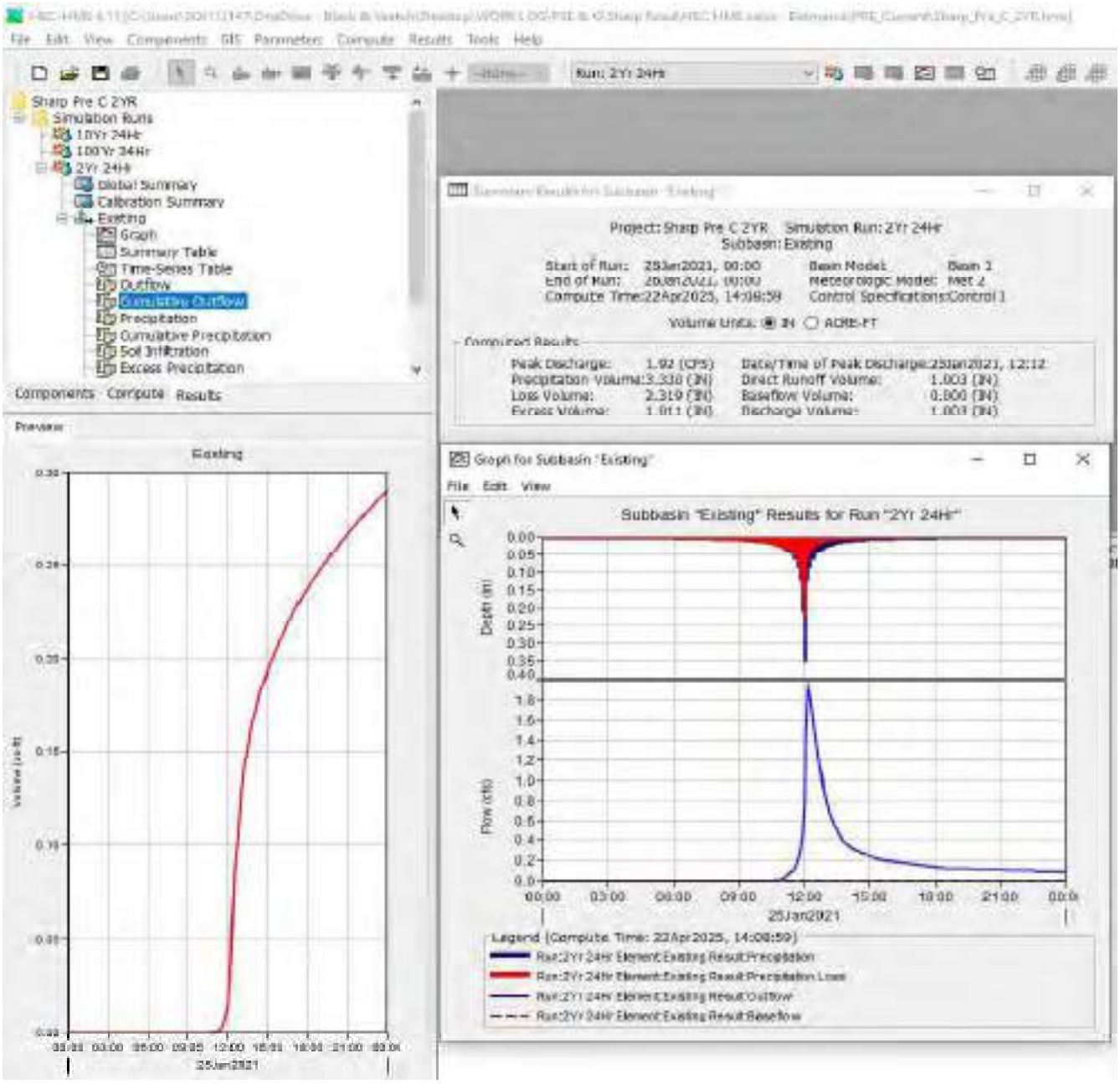
Basin	2-Year Current (cfs)	10-Year Current (cfs)	100-Year Current (cfs)	2-Year Future (cfs)	10-Year Future (cfs)	100-Year Future (cfs)
Total Site - Pre	1.92	5.01	12.33	2.91	6.69	17.37
Total Site - Post	0.72	3.55	9.66	1.35	5.02	12.60

HEC-HMS time series data for Subbasin, for both Current and Projected Future events, is presented on Pages A22 - A24 (Current) and Pages A25 - A28 (Future). This data demonstrates that for all design events the post-development discharge never exceeds the pre at any hydrograph time increment.

HEC-HMS results for the site in its existing and proposed conditions, for all events, are provided on Pages A22-A28.

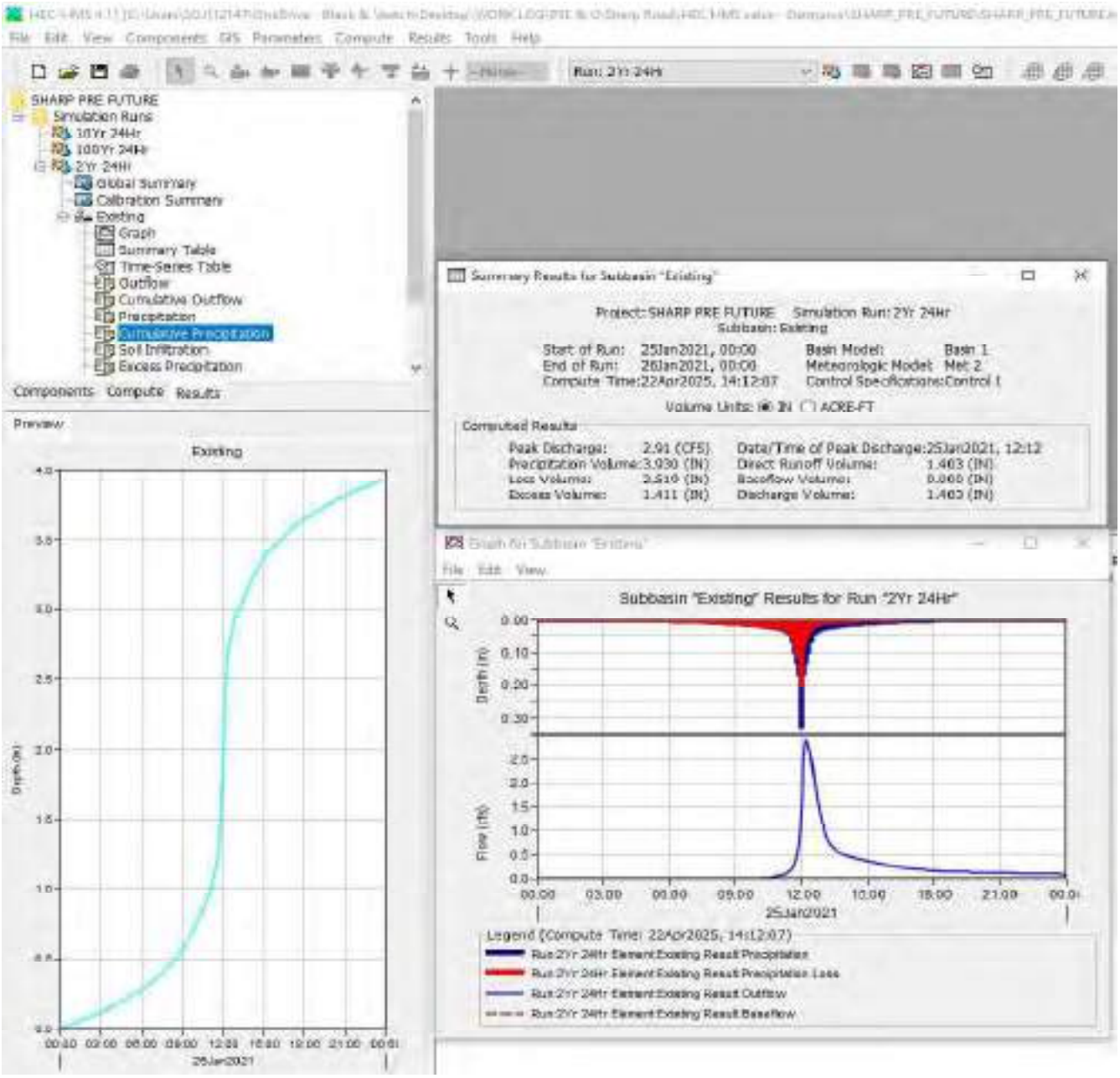
HYDROLOGIC MODEL RESULTS USING DELMARVA UNIT HYDROGRAPH METHOD :

HEC-HMS computed results for the property in its existing condition in response to the current 2-year event.



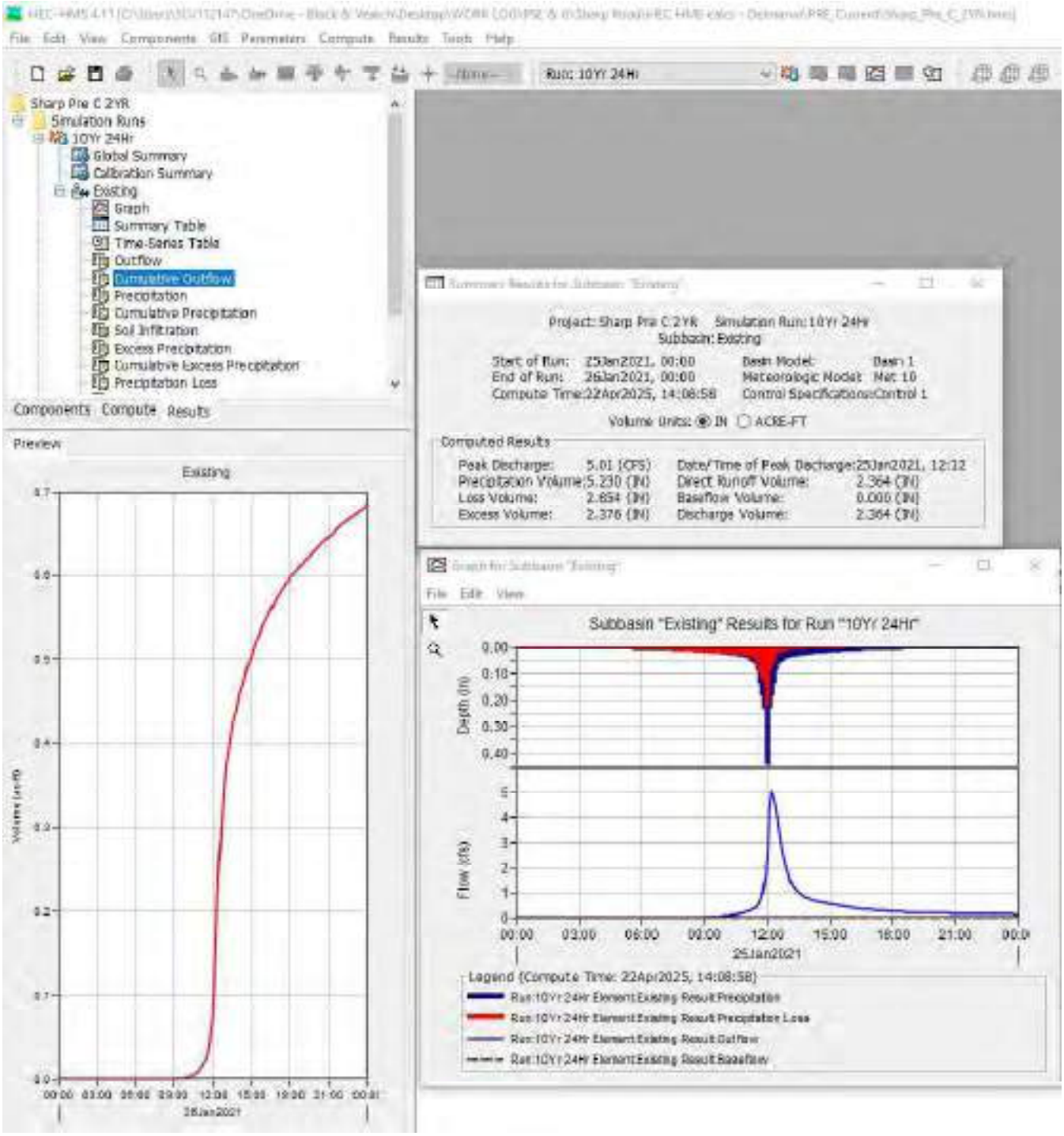
HYDROLOGIC MODEL RESULTS USING DELMARVA UNIT HYDROGRAPH METHOD :

HEC-HMS computed results for the property in its existing condition in response to the future 2-year event.



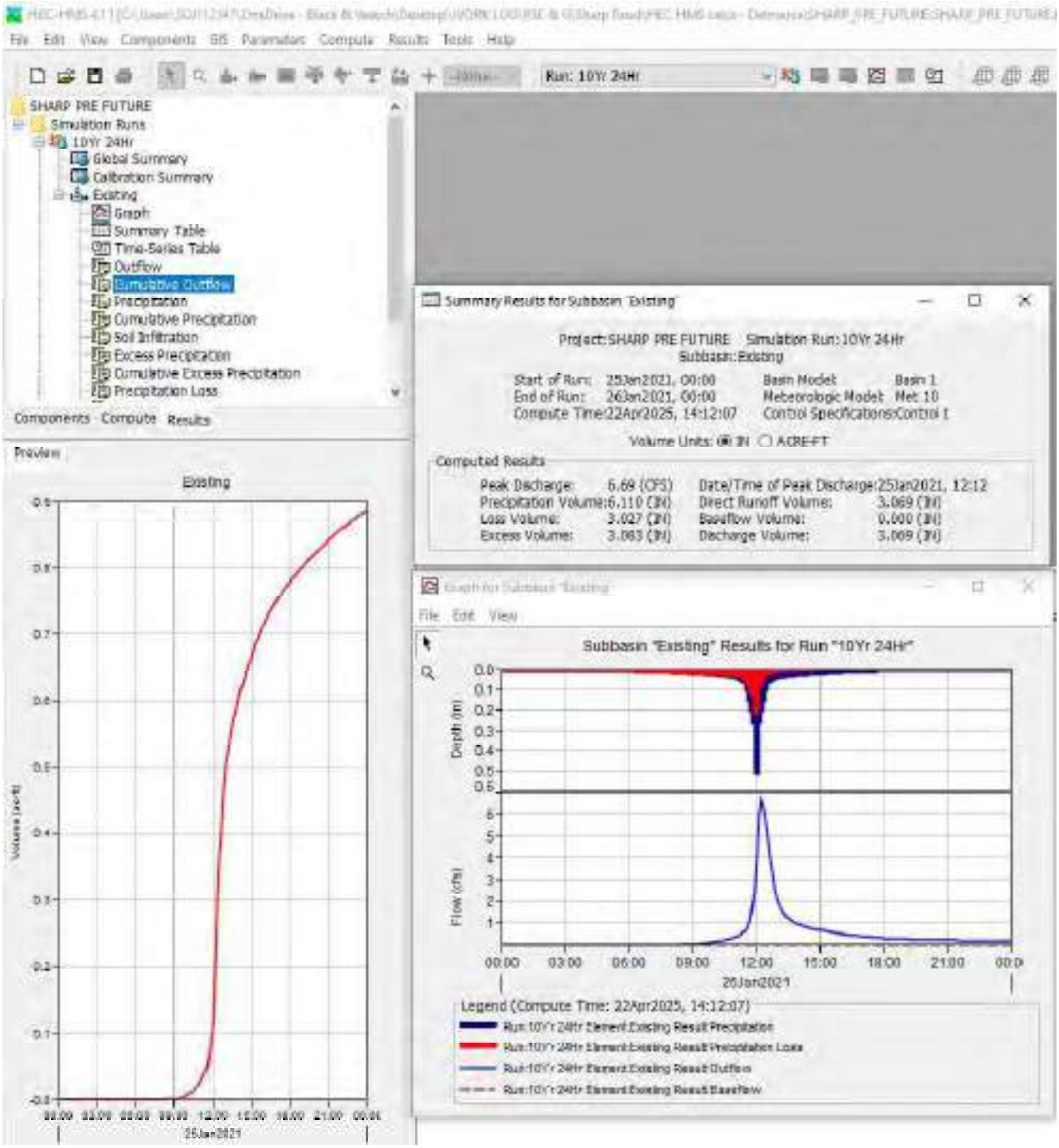
HYDROLOGIC MODEL RESULTS USING DELMARVA UNIT HYDROGRAPH METHOD :

HEC-HMS computed results for the property in its existing condition in response to the current 10-year event.



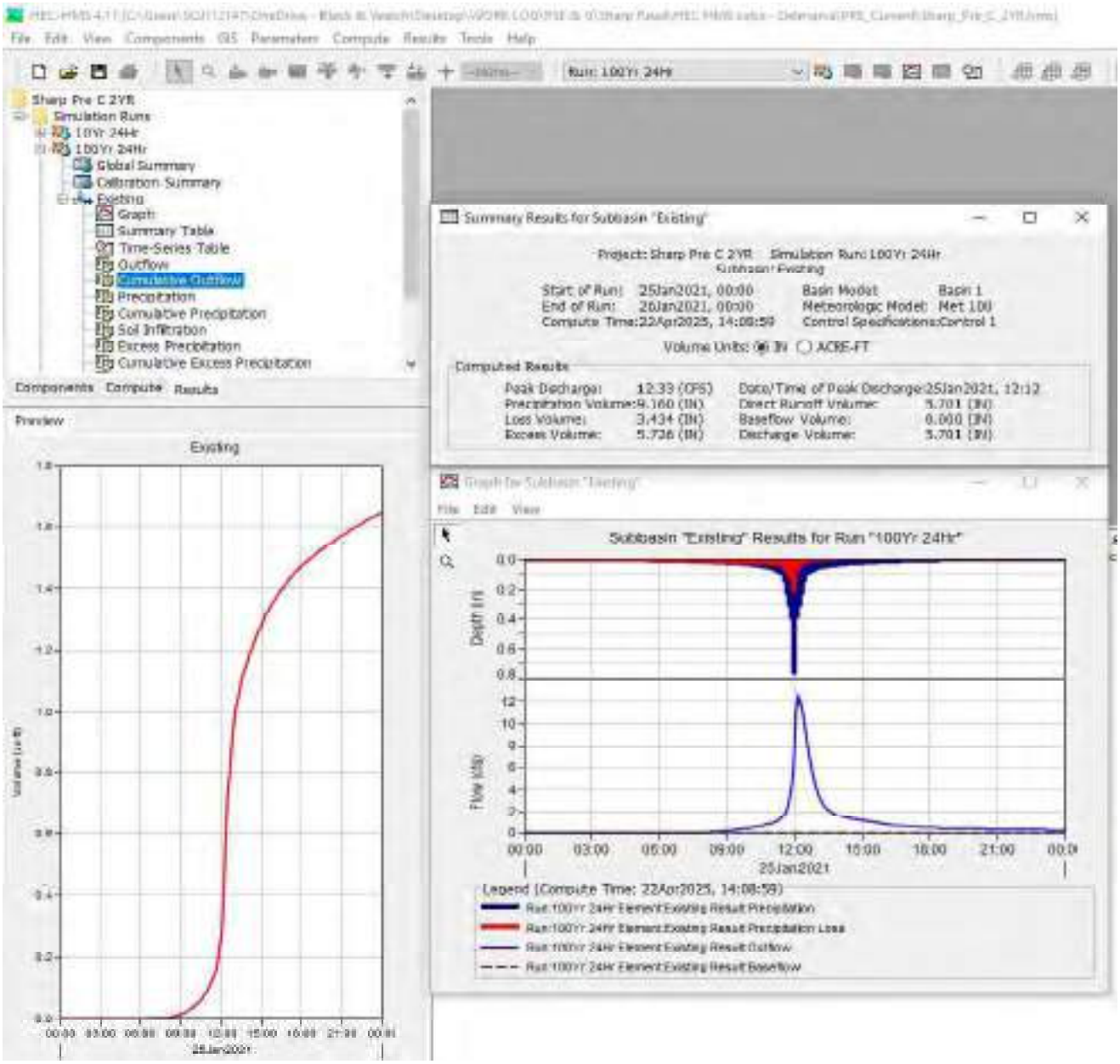
HYDROLOGIC MODEL RESULTS USING DELMARVA UNIT HYDROGRAPH METHOD :

HEC-HMS computed results for the property in its existing condition in response to the future 10-year event.



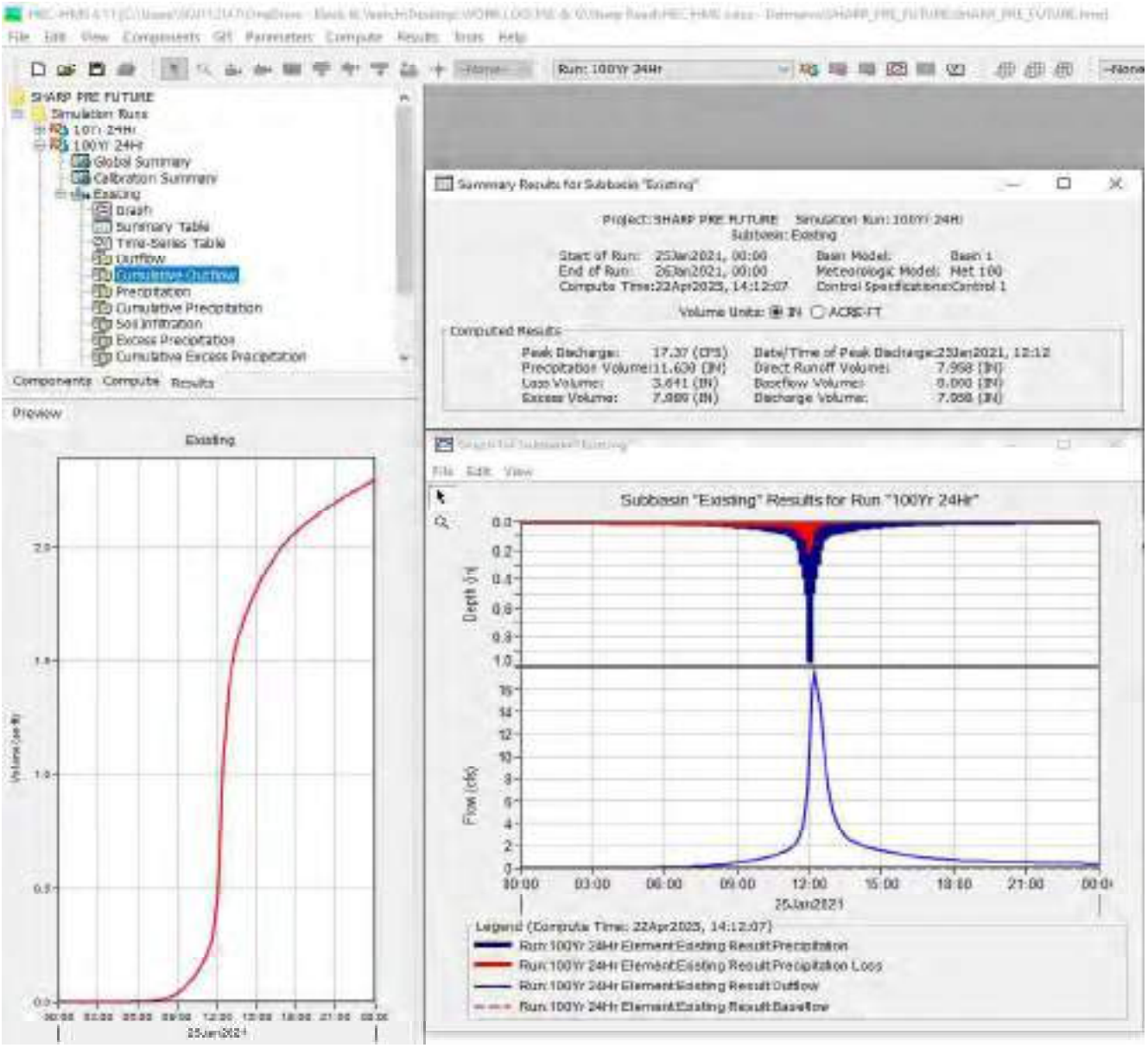
HYDROLOGIC MODEL RESULTS USING DELMARVA UNIT HYDROGRAPH METHOD :

HEC-HMS computed results for the property in its existing condition in response to the current 100-year event.



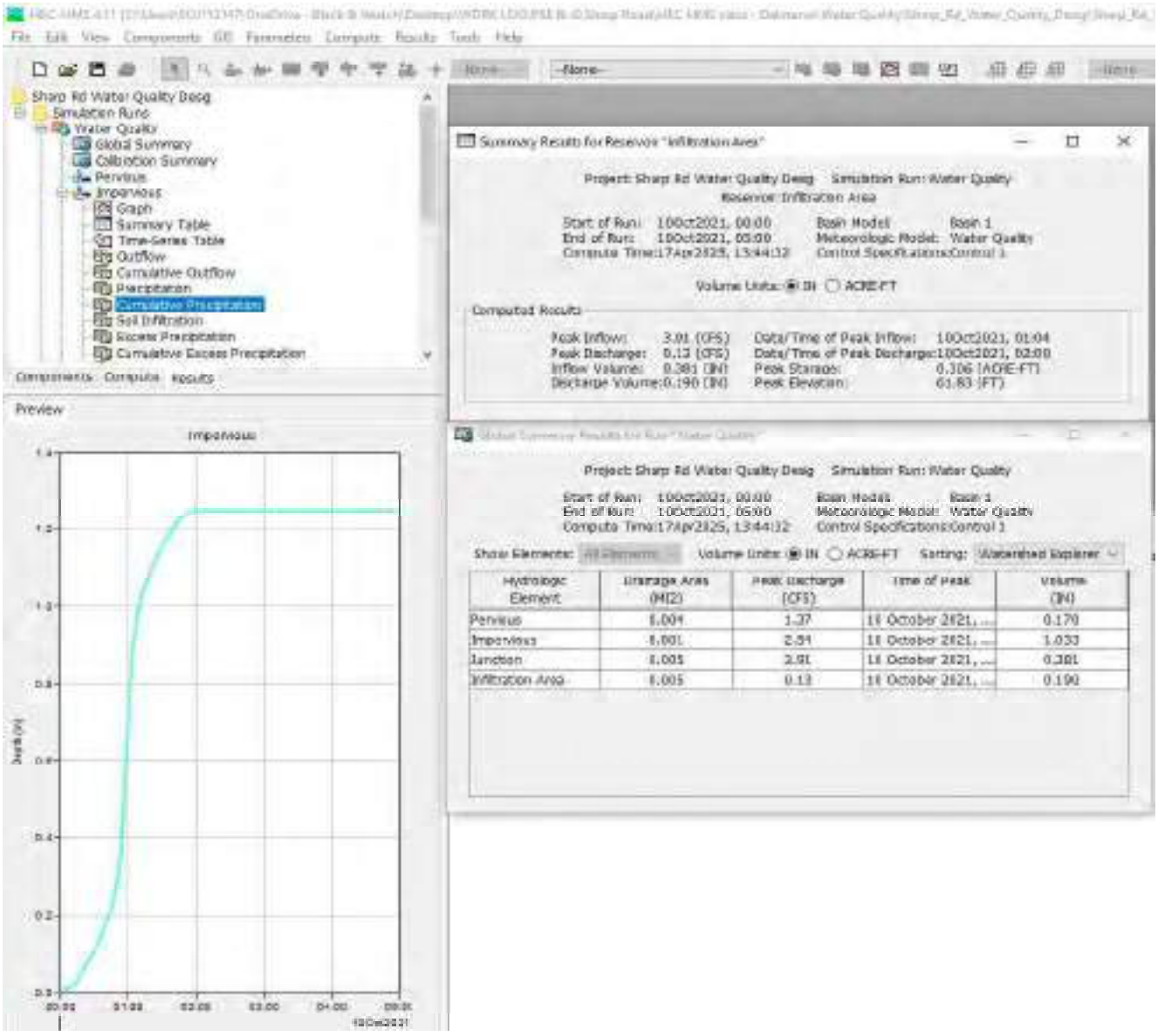
HYDROLOGIC MODEL RESULTS USING DELMARVA UNIT HYDROGRAPH METHOD :

HEC-HMS computed results for the property in its existing condition in response to the future 100-year event.



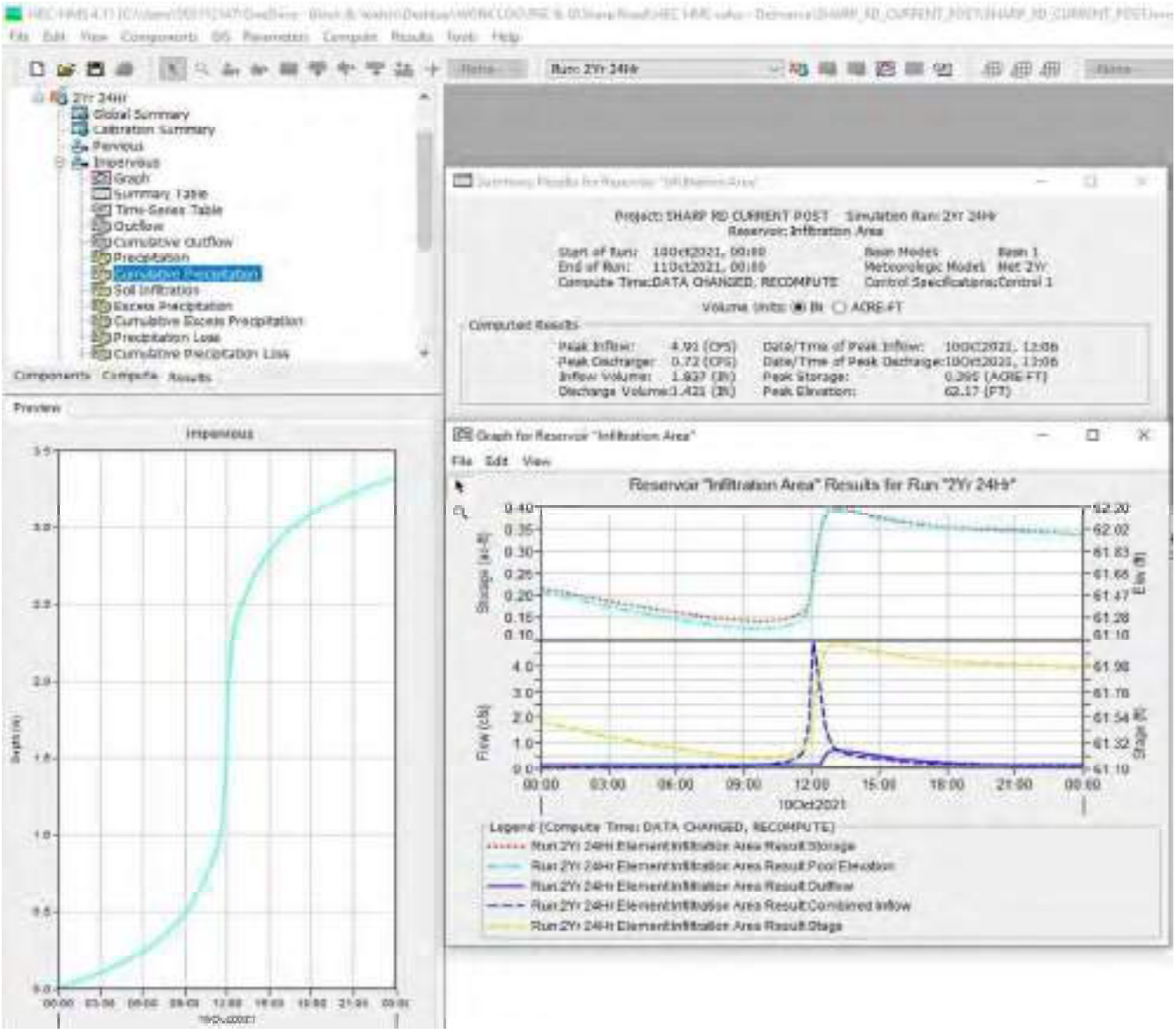
HYDROLOGIC MODEL RESULTS USING DELMARVA UNIT HYDROGRAPH METHOD :

HEC-HMS computed results for the property in its proposed condition in response to the Water Quality Design Storm (1.25 inches distributed over 2 hours).



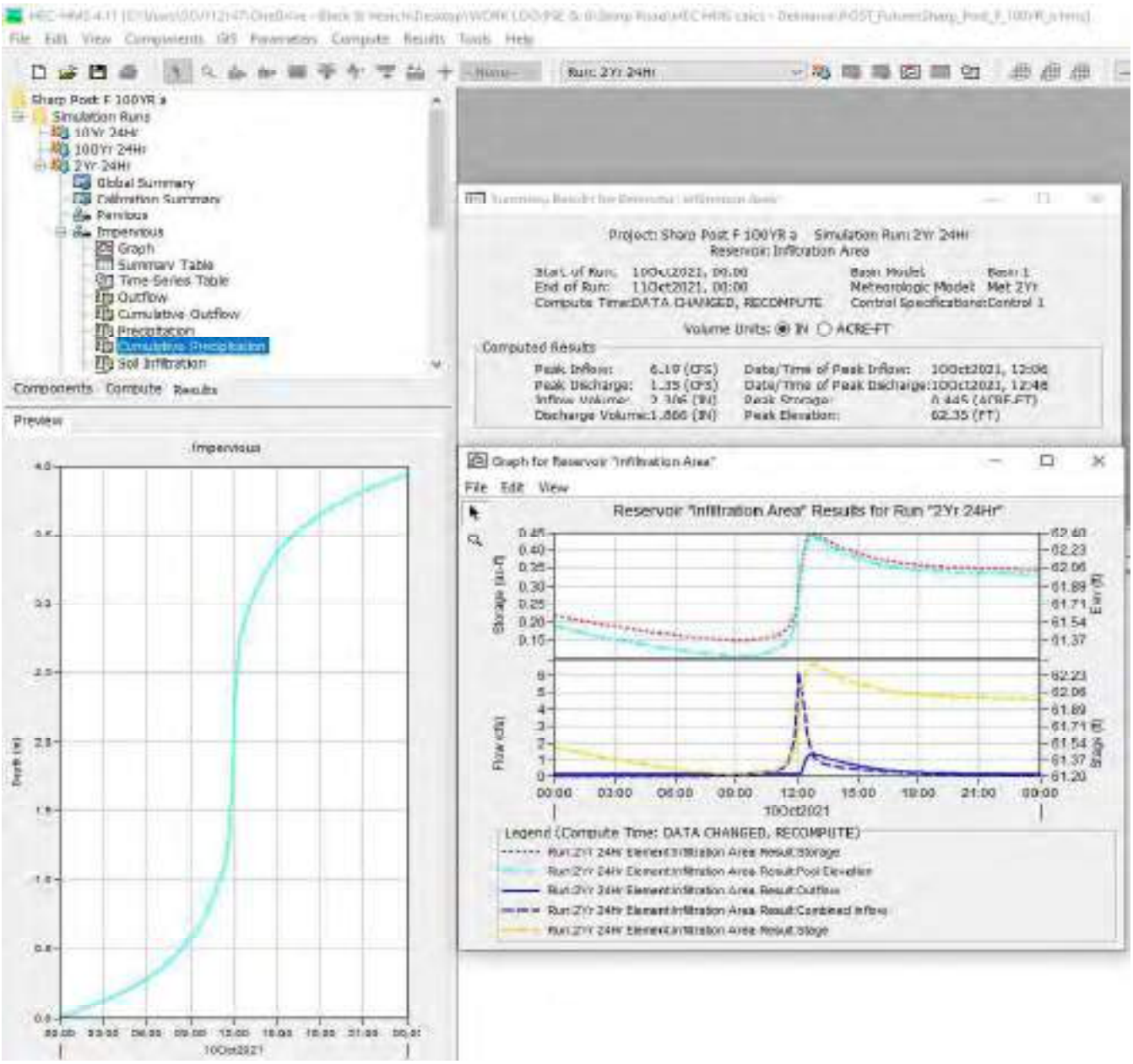
HYDROLOGIC MODEL RESULTS USING DELMARVA UNIT HYDROGRAPH METHOD :

HEC-HMS computed results for the property in its proposed condition in response to the current 2-year event, including Summary Results for all the Infiltration Basins combined.



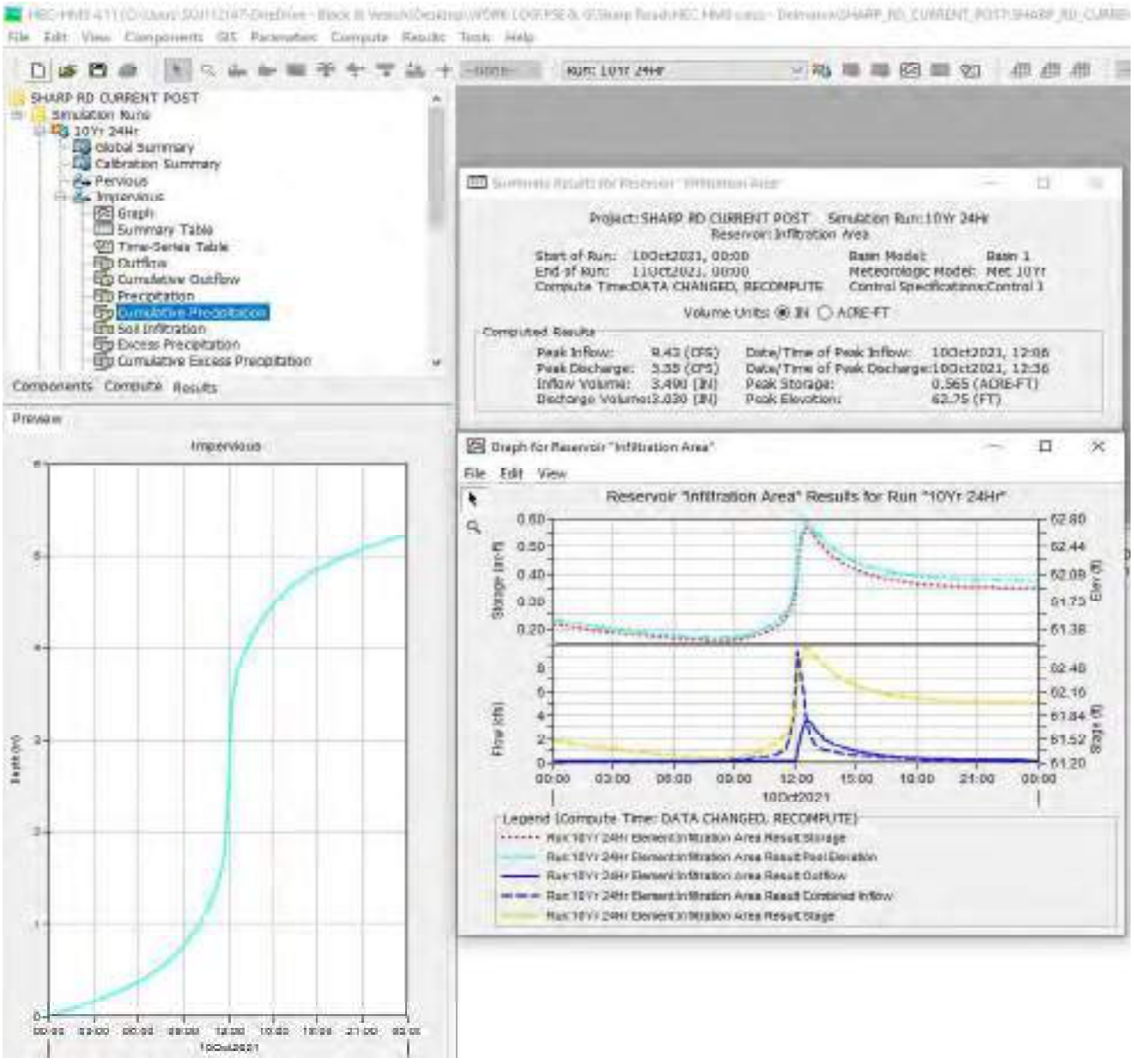
HYDROLOGIC MODEL RESULTS USING DELMARVA UNIT HYDROGRAPH METHOD :

HEC-HMS computed results for the property in its proposed condition in response to the future 2-year event, including Summary Results for all the Infiltration Basins combined.



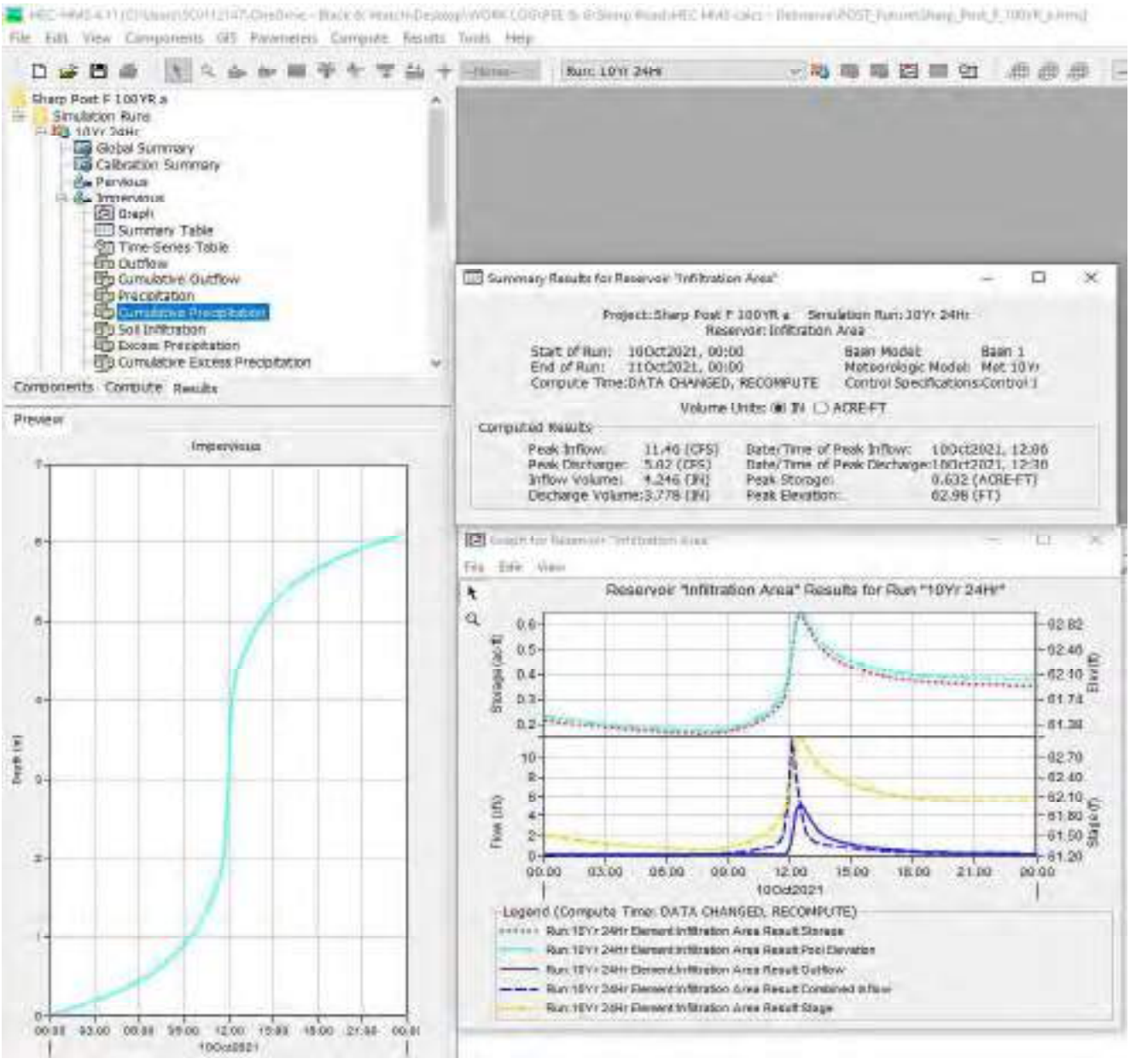
HYDROLOGIC MODEL RESULTS USING DELMARVA UNIT HYDROGRAPH METHOD :

HEC-HMS computed results for the property in its proposed condition in response to the current 10-year event, including Summary Results for all the Infiltration Basins combined.



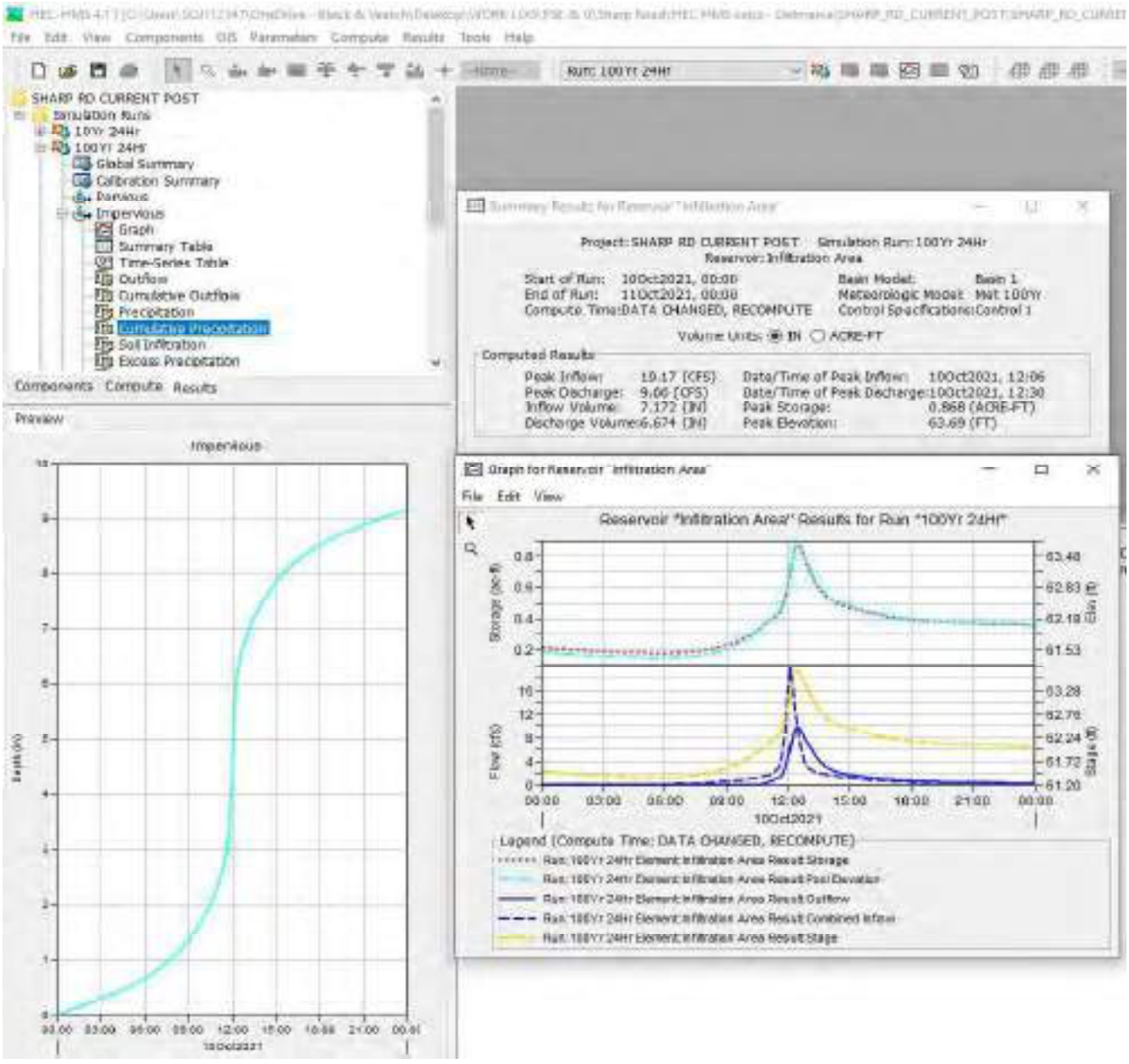
HYDROLOGIC MODEL RESULTS USING DELMARVA UNIT HYDROGRAPH METHOD :

HEC-HMS computed results for the property in its proposed condition in response to the future 10-year event, including Summary Results for all the Infiltration Basins combined.



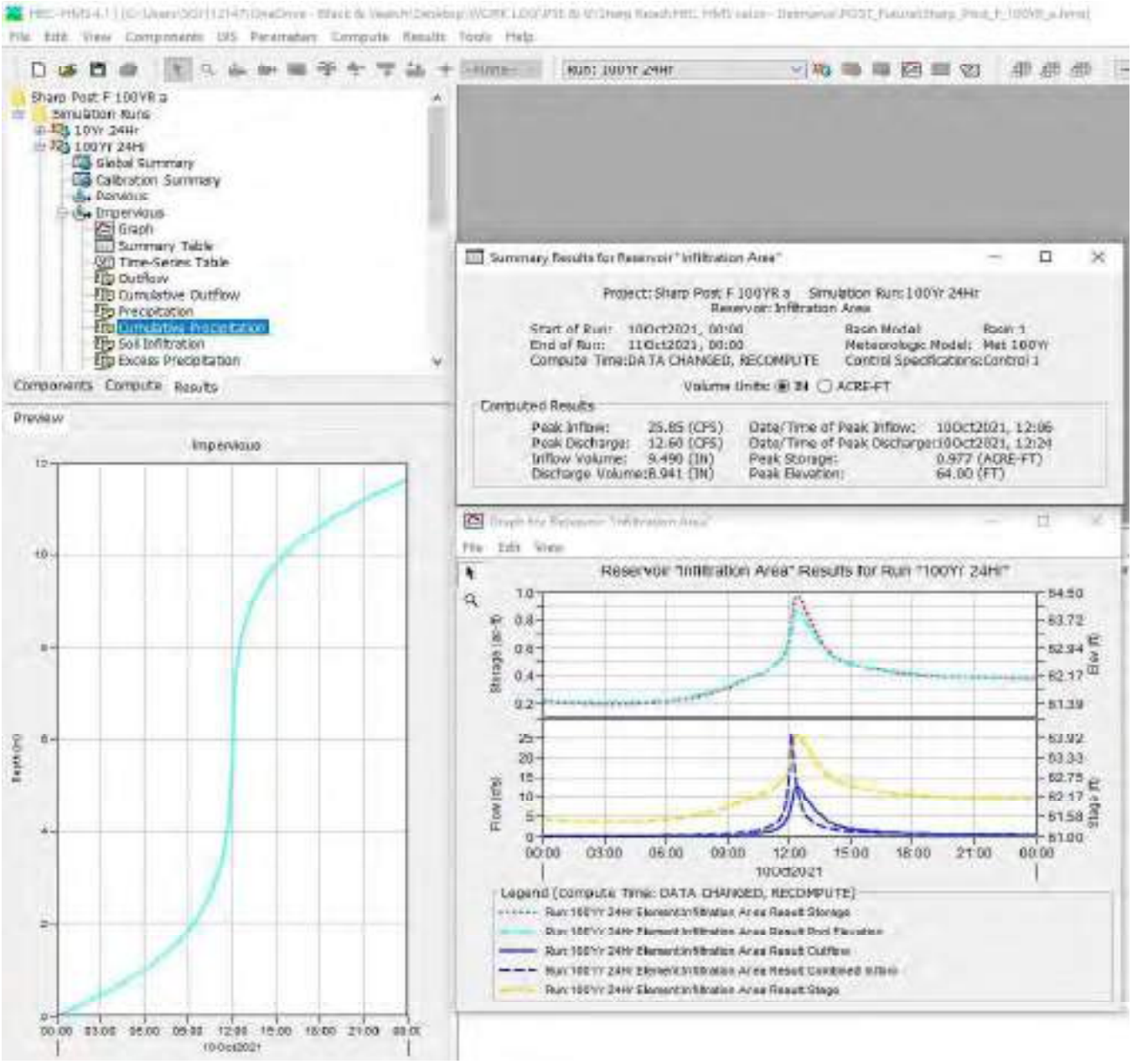
HYDROLOGIC MODEL RESULTS USING DELMARVA UNIT HYDROGRAPH METHOD :

HEC-HMS computed results for the property in its proposed condition in response to the current 100-year event, including Summary Results for all the Infiltration Basins combined.



HYDROLOGIC MODEL RESULTS USING DELMARVA UNIT HYDROGRAPH METHOD :

HEC-HMS computed results for the property in its proposed condition in response to the future 100-year event, including Summary Results for all the Infiltration Basins combined.



5.0 CONCLUSION:

The property has been designed to meet the requirements of the New Jersey Administrative Code, N.J.A.C. 7:8, Stormwater Management, and the City of Evesham Municipal Stormwater Management Ordinance, No. 5426. The 2, 10, and 100-Year recurrence interval events were used as the design precipitation events. Design methodologies were based on the New Jersey Best Management Practices Manual.

Two(2) Small-Scale Infiltration Basin BMPs were used to meet the water quality and water quality requirements.West infiltration basin is the main basin with an outlet structure. Alternative BMPs were not used because of the physical and safety requirements of the substation.

The HEC-HMS Hydrologic Modeling System software package was used to model the response of the system to the design precipitation events as specified by N.J.A.C. 7:8. Modeling was performed for the property in its existing and proposed conditions.

For the property in its existing condition, the peak stormwater discharge in response to the 2, 10, and 100-Year precipitation events was 2.91 cfs, 6.69 cfs, and 17.37 cfs, respectively.

For the entire contributing watershed in its proposed final condition, stormwater runoff hydrographs from the south, east and west infiltration basin BMPs were combined. The peak combined stormwater discharge in response to the 2, 10, and 100-Year precipitation events was 1.35 cfs, 5.02 cfs, and 12.60 cfs, respectively. These values are 46.40, 75, and 72.53 percent of the pre-development values, which meets the regulatory limit of 50, 75, and 80 percent, for these events.

In response to the Water Quality Design Storm, the peak water surface elevations in the infiltration basins was 61.3 ft. Orifice inverts were set at or above these elevations to prevent discharge to the existing storm sewer in response to the WQDS.

The Small-Scale Infiltration Basin BMP states that the Maximum Design Storm Drain Time is limited to 72 hours after a rain event. The HEC-HMS output for the post-development 100-Year event shows that all standing water is discharged quickly after the design event. The maximum depth of water below the lower orifice invert, which is in the west infiltration basin, will discharge in approximately 45 hours at the Minimum Subsoil Design Permeability Rate of 0.5 inches/hr, which meets the drain time limit.

The ground water recharge calculations are shown to meet the groundwater recharge requirements of the NJDEP Stormwater Management Rules at N.J.A.C. 7:8. The post development comditions with provide more than required ground water recharge through the infiltration basins.

6.0 GROUND WATER RECHARGE CALCS:

The ground water recharge calculations are shown to meet the groundwater recharge requirements of the NJDEP Stormwater Management Rules at N.J.A.C. 7:8. The post development conditions will provide more than 100% ground water recharge through the proposed infiltration basins.
See the attached for the ground water recharge calcs:

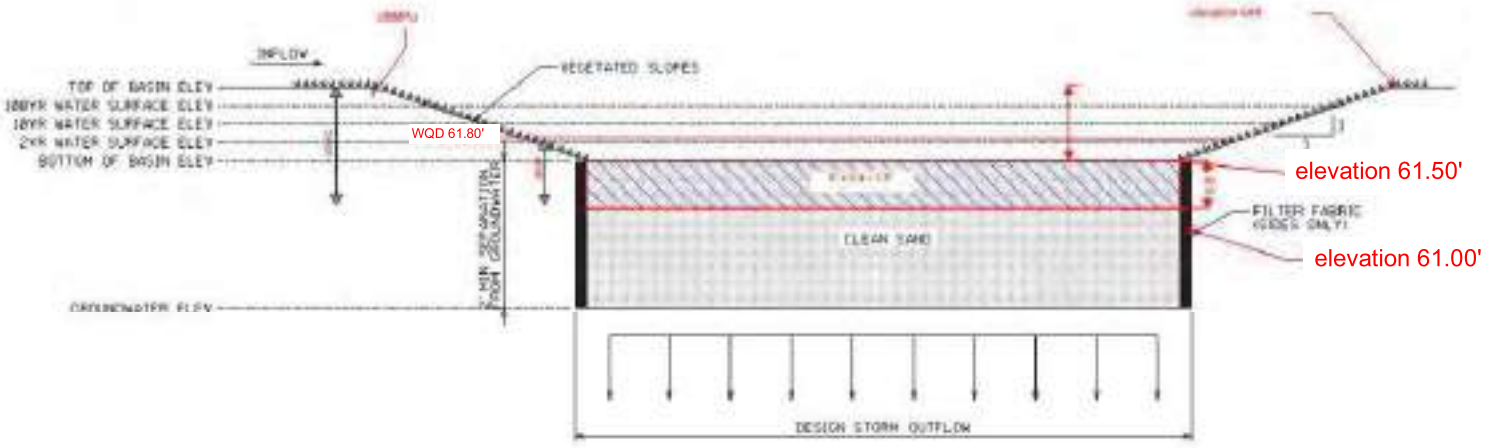
Basin 1- West Infiltration Basin

Lowest stage area: 2930.28 sf

dBMP: WQD 3.6"+ 1.8"= 5.4"
30% void ratio assumes for well graded soil 0.5' in ground

dBMPu: = 1.2"
is the depth between 100yr peak elevation 63.9ft and TOP 64 ft

dEXC: = dBMPu 1.2"+ 30"= 31.2"
Total depth of the infiltration basin



TYPICAL INFILTRATION BASIN DETAIL
NOT TO SCALE

INFILTRATION BASIN SCHEDULE

BASIN	TOP OF BASIN ELEV	100 YR WATER SURFACE ELEV	10 YR WATER SURFACE ELEV	2 YR WATER SURFACE ELEV	BOTTOM OF BASIC ELEV	ESTIMATED GROUNDWATER ELEV
WEST BASIN	64.0	63.90	63.00	62.3	61.5	61.00
EAST BASIN	64.0	63.90	63.00	62.3	60.5	60.00

New Jersey Groundwater Recharge Spreadsheet Version 4.0 November 2003

Annual Groundwater Recharge Analysis (based on GSR-32)

Select Township ↓	Average Annual P (in)	Climatic Factor
BURLINGTON CO., EVESHAM TWP	45.0	1.42

Project Name:	Sharp Rd
Description:	
Analysis Date:	08/13/24

Pre-Developed Conditions

Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)
1	3.43	Woods-grass combination	Holmdel	11.2	139,039
2					
3					
4					
5					
6					
7	0				
8	0				
9	0				
10	0				
11	0				
12	0				
13	0				
14	0				
15	0				
Total =	3.4			Total Annual Recharge (in)	Total Annual Recharge (cu-ft)
				11.2	139,039

Post-Developed Conditions

Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)
1	0.765	Impervious areas	Holmdel	0.0	-
2	1.1	Gravel, dirt	Holmdel	5.5	21,950
3	1.5	adow, Pasture, Grassland or ra	Holmdel	11.0	59,650
4					
5	0				
6	0				
7	0				
8	0				
9	0				
10	0				
11	0				
12	0				
13	0				
14	0				
15	0				
Total =	3.4	Warning: make total area equal to Pre-Developed Condition		Total Annual Recharge (in)	Total Annual Recharge (cu.ft)
				6.6	81,600

Annual Recharge Requirements Calculation ↓

% of Pre-Developed Annual Recharge to Preserve =	100%	Total Impervious Area (sq.ft)
		33,323
Post-Development Annual Recharge Deficit=	*57,439*	(cubic feet)

Recharge Efficiency Parameters Calculations (area averages)

RWC=	#N/A	(in)	DRWC=	#N/A	(in)
ERWC =	#N/A	(in)	EDRWC=	#N/A	(in)

Procedure to fill the Pre-Development and Post-Development Conditions Tables

For each land segment, first enter the area, then select TR-55 Land Cover, then select Soil. Start from the top of the table and proceed downward. Don't leave blank rows (with A=0) in between your segment entries. Rows with A=0 will not be displayed or used in calculations. For impervious areas outside of standard lots select "Impervious Areas" as the Land Cover. Soil type for impervious areas are only required if an infiltration facility will be built within these areas.

Project Name	Description	Analysis Date	BMP or LID Type
Sharp Rd	0	07/09/24	

Recharge BMP Input Parameters

Parameter	Symbol	Value	Unit
BMP Area	ABMP	2930.3	sq.ft
BMP Effective Depth, this is the design variable	dBMP	5.4	in
Upper level of the BMP surface (negative if above ground)	dBMPu	1.2	in
Depth of lower surface of BMP, must be>=dBMPu	dEXC	31.2	in
Post-development Land Segment Location of BMP , Input Zero if Location is distributed or undetermined	SegBMP	3	unitless

Root Zone Water capacity Calculated Parameters

Parameter	Symbol	Value	Unit
Empty Portion of RWC under Post-D Natural Recharge	ERWC	1.66	in
ERWC Modified to consider dEXC	EDRWC	0.99	in
Empty Portion of RWC under Infilt. BMP	RERWC	0.78	in

Recharge Design Parameters

Parameter	Symbol	Value	Unit
Inches of Runoff to capture	Qdesign	0.49	in
Inches of Rainfall to capture	Pdesign	0.61	in
Recharge Provided Avg. over Imp. Area		17.4	in
Runoff Captured Avg. over imp. Area		22.7	in

BMP Calculated Size Parameters

ABMP/Aimp	Aratio	0.09	unitless
BMP Volume	VBMP	1,319	cu.ft

Parameters from Annual Recharge Worksheet

Post-D Deficit Recharge (or desired recharge volume)	Vdef	57,439	cu.ft
Post-D Impervious Area (or target Impervious Area)	Aimp	33,323	sq.ft
Root Zone Water Capacity	RWC	5.73	in
RWC Modified to consider dEXC	DRWC	3.41	in
Climatic Factor	C-factor	1.42	no units
Average Annual P	Pavg	45.0	in
Recharge Requirement over Imp. Area	dr	20.7	in

System Performance Calculated Parameters

Annual BMP Recharge Volume		48,207	cu.ft
Avg BMP Recharge Efficiency		76.6%	Represents % Infiltration Recharged
%Rainfall became Runoff		77.8%	%
%Runoff Infiltrated		64.8%	%
%Runoff Recharged		49.6%	%
%Rainfall Recharged		38.6%	%

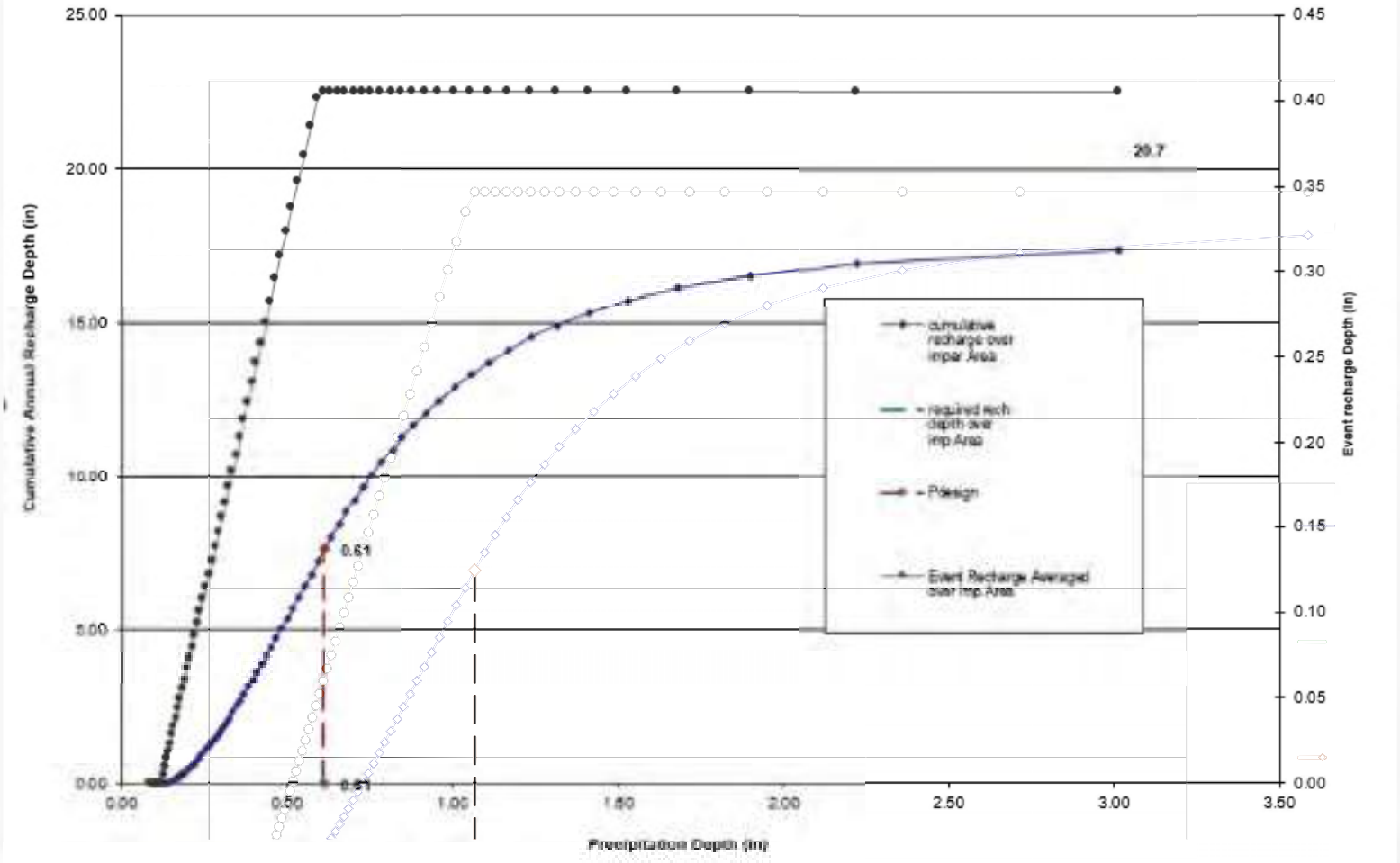
CALCULATION CHECK MESSAGES

Volume Balance--> Solve Problem to satisfy Annual Recharge
dBMP Check---> OK
dEXC Check---> OK
BMP Location---> OK

OTHER NOTES

Pdesign is accurate only after BMP dimensions are updated to make rech volume= deficit volume. The portion of BMP infiltration prior to filling and the area occupied by BMP are ignored in these calculations. Results are sensetive to dBMP, make sure dBMP selected is small enough for BMP to empty in less than 3 days. For land Segment Location of BMP if you select "impervious areas" RWC will be minimal but not zero as determined by the soil type and a shallow root zone for this Land Cover allowing consideration of lateral flow and other losses.

How to solve for different recharge volumes: By default the spreadsheet assigns the values of total deficit recharge volume "Vdef" and total proposed impervious area "Aimp" from the "Annual Recharge" sheet to "Vdef" and "Aimp" on this page. This allows solution for a single BMP to handle the entire recharge requirement assuming the runoff from entire impervious area is available to the BMP.
To solve for a smaller BMP or a LID-IMP to recharge only part of the recharge requirement, set Vdef to your target value and Aimp to impervious area directly connected to your infiltration facility and then solve for ABMP or dBMP. To go back to the default configuration clik the "Default Vdef & Aimp" button.


25.00
20.00
15.00
10.00
5.00
0.00
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
Cumulative Annual Recharge Depth (in)
Event recharge Depth (in)
Precipitation Depth (in)
20.7
0.61
0.61
cumulative recharge over impar Area
required rech depth over imp Area
P design
Event Recharge Averaged over Imp Area

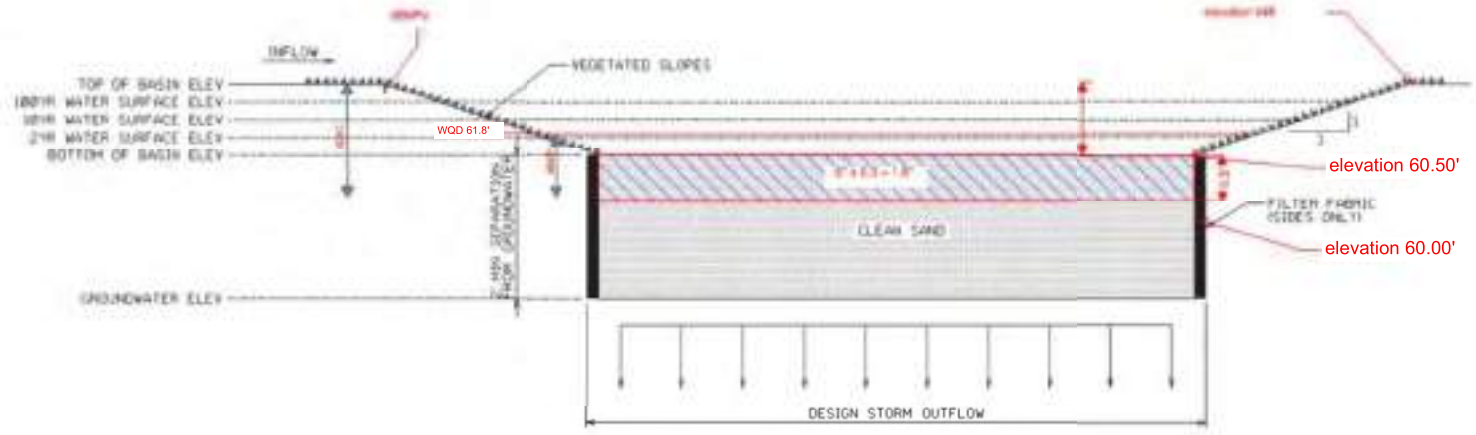
Basin 2-East Infiltration Basin

Lowest stage area: 6288.49

dBMP: WQD 15.6"+ 1.8"= 17.4"
30% void ratio assumes for well graded soil 0.5' in ground

dBMPu: = 1.2"
is the depth between 100yr peak elevation 63.9ft and TOP 64 ft

dEXC: = dBMPu 1.2"+42"= 43.2"
Total depth of the infiltration basin



TYPICAL INFILTRATION BASIN DETAIL
NOT TO SCALE

INFILTRATION BASIN SCHEDULE

BASIN	TOP OF BASIN ELEV	100 YR WATER SURFACE ELEV	10 YR WATER SURFACE ELEV	2 YR WATER SURFACE ELEV	BOTTOM OF BASIC ELEV	ESTIMATED GROUNDWATER ELEV
WEST BASIN	64.0	63.90	63.00	62.3	61.5	61.00
EAST BASIN	64.0	63.90	63.00	62.3	60.5	60.00

New Jersey Groundwater Recharge Spreadsheet Version 2.0 November 2003

Annual Groundwater Recharge Analysis (based on GSR-32)

Select Township ↓	Average Annual P (in)	Climatic Factor
BURLINGTON CO., EVESHAM TWP	45.0	1.42

Project Name:	Sharp Rd
Description:	
Analysis Date:	08/13/24

Pre-Developed Conditions

Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)
1	3.43	Woods-grass combination	Holmdel	11.2	139,039
2					
3					
4					
5					
6					
7	0				
8	0				
9	0				
10	0				
11	0				
12	0				
13	0				
14	0				
15	0				
Total =	3.4			Total Annual Recharge (in)	Total Annual Recharge (cu-ft)
				11.2	139,039

Post-Developed Conditions

Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)
1	0.765	Impervious areas	Holmdel	0.0	-
2	1.1	Gravel, dirt	Holmdel	5.5	21,950
3	1.5	adow, Pasture, Grassland or ra	Holmdel	11.0	59,650
4					
5	0				
6	0				
7	0				
8	0				
9	0				
10	0				
11	0				
12	0				
13	0				
14	0				
15	0				
Total =	3.4	Warning: make total area equal to Pre-Developed Condition		Total Annual Recharge (in)	Total Annual Recharge (cu.ft)
				6.6	81,600

Annual Recharge Requirements Calculation ↓

% of Pre-Developed Annual Recharge to Preserve =	100%	Total Impervious Area (sq.ft)
		33,323
Post-Development Annual Recharge Deficit=	*57,439*	(cubic feet)

Recharge Efficiency Parameters Calculations (area averages)

RWC=	#N/A	(in)	DRWC=	#N/A	(in)
ERWC =	#N/A	(in)	EDRWC=	#N/A	(in)

Procedure to fill the Pre-Development and Post-Development Conditions Tables

For each land segment, first enter the area, then select TR-55 Land Cover, then select Soil. Start from the top of the table and proceed downward. Don't leave blank rows (with A=0) in between your segment entries. Rows with A=0 will not be displayed or used in calculations. For impervious areas outside of standard lots select "Impervious Areas" as the Land Cover. Soil type for impervious areas are only required if an infiltration facility will be built within these areas.

Project Name	Description	Analysis Date	BMP or LID Type
Sharp Rd	0	07/09/24	

Recharge BMP Input Parameters

Parameter	Symbol	Value	Unit
BMP Area	ABMP	6288.5	sq.ft
BMP Effective Depth, this is the design variable	dBMP	17.4	in
Upper level of the BMP surface (negative if above ground)	dBMPu	1.2	in
Depth of lower surface of BMP, must be>=dBMPu	dEXC	43.2	in
Post-development Land Segment Location of BMP , Input Zero if Location is distributed or undetermined	SegBMP	3	unitless

Root Zone Water capacity Calculated Parameters

Parameter	Symbol	Value	Unit
Empty Portion of RWC under Post-D Natural Recharge	ERWC	1.66	in
ERWC Modified to consider dEXC	EDRWC	0.74	in
Empty Portion of RWC under Infilt. BMP	RERWC	0.60	in

Recharge Design Parameters

Parameter	Symbol	Value	Unit
Inches of Runoff to capture	Qdesign	2.78	in
Inches of Rainfall to capture	Pdesign	3.01	in
Recharge Provided Avg. over Imp. Area		26.8	in
Runoff Captured Avg. over imp. Area		35.0	in

BMP Calculated Size Parameters

ABMP/Aimp	Aratio	0.19	unitless
BMP Volume	VBMP	9,118	cu.ft

Parameters from Annual Recharge Worksheet

Post-D Deficit Recharge (or desired recharge volume)	Vdef	57,439	cu.ft
Post-D Impervious Area (or target Impervious Area)	Aimp	33,323	sq.ft
Root Zone Water Capacity	RWC	5.73	in
RWC Modified to consider dEXC	DRWC	2.55	in
Climatic Factor	C-factor	1.42	no units
Average Annual P	Pavg	45.0	in
Recharge Requirement over Imp. Area	dr	20.7	in

System Performance Calculated Parameters

Annual BMP Recharge Volume		74,409	cu.ft
Avg BMP Recharge Efficiency		76.6%	Represents % Infiltration Recharged
%Rainfall became Runoff		77.8%	%
%Runoff Infiltrated		100.0%	%
%Runoff Recharged		76.6%	%
%Rainfall Recharged		59.5%	%

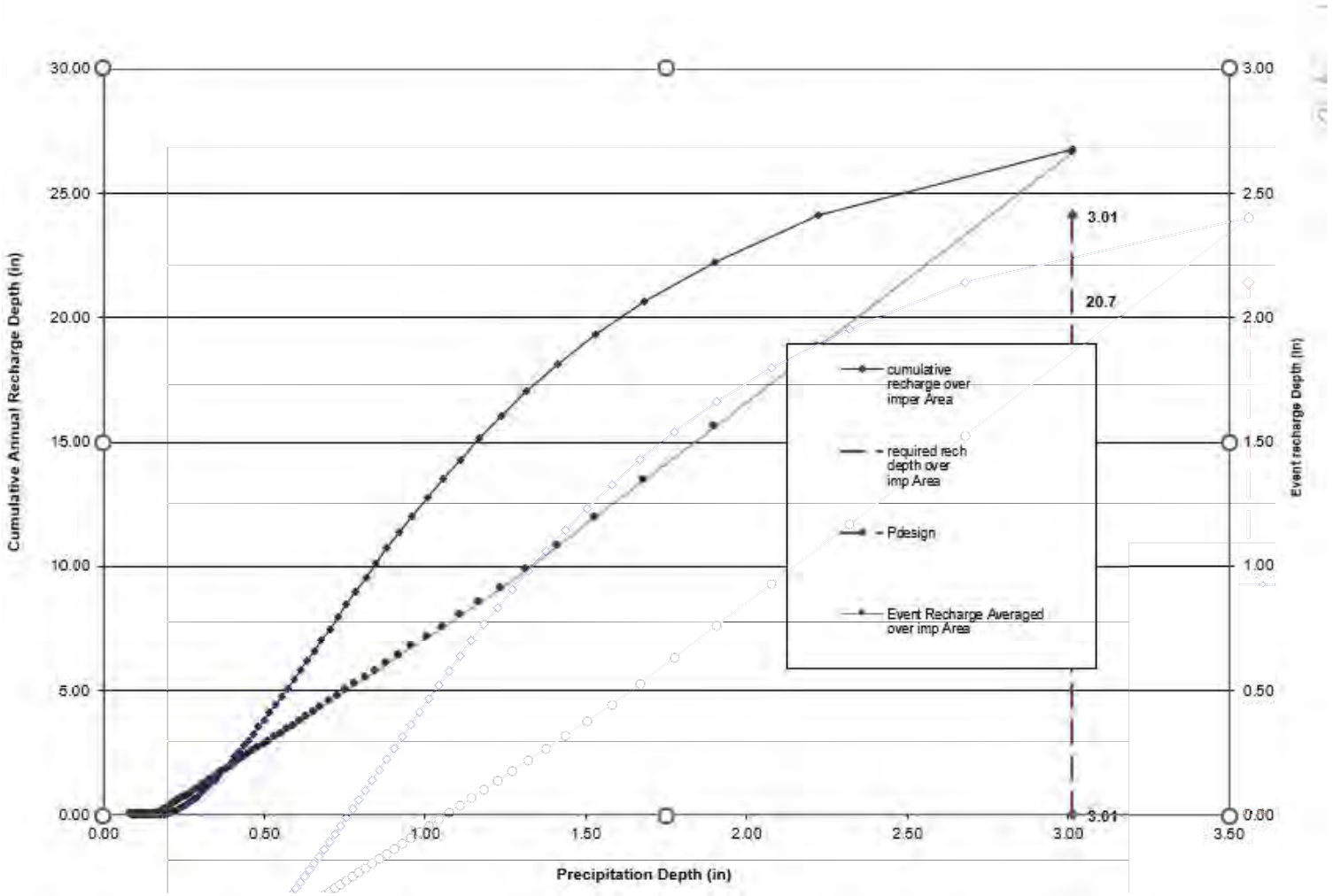
CALCULATION CHECK MESSAGES

Volume Balance--> Solve Problem to satisfy Annual Recharge
dBMP Check---> OK
dEXC Check---> OK
BMP Location---> OK

OTHER NOTES

Pdesign is accurate only after BMP dimensions are updated to make rech volume= deficit volume. The portion of BMP infiltration prior to filling and the area occupied by BMP are ignored in these calculations. Results are sensetive to dBMP, make sure dBMP selected is small enough for BMP to empty in less than 3 days. For land Segment Location of BMP if you select "impervious areas" RWC will be minimal but not zero as determined by the soil type and a shallow root zone for this Land Cover allowing consideration of lateral flow and other losses.

How to solve for different recharge volumes: By default the spreadsheet assigns the values of total deficit recharge volume "Vdef" and total proposed impervious area "Aimp" from the "Annual Recharge" sheet to "Vdef" and "Aimp" on this page. This allows solution for a single BMP to handle the entire recharge requirement assuming the runoff from entire impervious area is available to the BMP.
To solve for a smaller BMP or a LID-IMP to recharge only part of the recharge requirement, set Vdef to your target value and Aimp to impervious area directly connected to your infiltration facility and then solve for ABMP or dBMP. To go back to the default configuration clik the "Default Vdef & Aimp" button.


Cumulative Annual Recharge Depth (in)
Event recharge Depth (in)
Precipitation Depth (in)
30.00
25.00
20.00
15.00
10.00
5.00
0.00
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
3.01
20.7
3.01
cumulative recharge over imper Area
required rech depth over imp Area
Pdesign
Event Recharge Averaged over imp Area

7.0 Groundwater Mounding Assessment:

EAST BASIN:

From the New Jersey Stormwater BMP Manual (Reference 14), Chapter 9.8, hydraulic impacts on the groundwater table must be assessed when using a small-scale infiltration basin BMP, using the methodology from Ch 13: Groundwater Table Hydraulic Impact Assessments for Infiltration BMPs.

Chapter 13 of the NJ Stormwater BMP Manual, provides guidance for a Groundwater Mounding Assessment, along with the *Hantush Spreadsheet* , to be used for the assessment.

Input parameters for the spreadsheet are developed below based on Ch. 13 recommendations.
Soils parameters are obtained from Reference 3, Updated Report Subsurface Investigation, Proposed Sharp Road Substation.
Boring SB-1 and Test Pit TP-1, from Reference 3, is located near the BMP location.

Recharge Rate =	1.6	in/hr	
Runoff Depth =	0.59	in	(from HEC-HMS Output for WQDS)
Runoff Area =	74751.5	sq ft	(half of total tributary area)
Volume of Runoff =	3675	cu ft	
Infiltration Area =	6595.47	sq ft	(east and half south DA)
Duration of Infiltration =	4.2	hr	(from Ch 13 equation, Ref. 15)
Specific Yield =	0.15		(default value, Ch 13, Ref. 15)
Horiz Hyd Conductivity =	1.6	in/hr	(5*Recharge Rate for Coastal Plain)
BMP x value =	39.7	ft	(1/2 length for total square basin)
BMP y value =	39.7	ft	(1/2 width for total square basin)
Initial Thick Satur Zone =	50	ft	(from Boring B-2 at the BMP site.)

Groundwater Mounding Assessment - Results:

Output from the *Hantush Spreadsheet* is provided on the following two pages. The dimensions of the BMP x value and y value are switched to model the mounding performance in each direction. For both cases, the thickness of groundwater mounding at the BMP site is **1.280 feet**. Given that the groundwater elevation at Boring B-2 is 9.5 feet msl, the top of groundwater mounding elevation is 10.78 feet msl, as compared to the bottom of the small-scale infiltration basin BMP at elevation 14.75 feet msl. Thus, the mounding thickness of 1.280 feet does not negatively impact the performance of the BMP.

Groundwater Mounding Assessment:

WEST BASIN:

From the New Jersey Stormwater BMP Manual (Reference 14), Chapter 9.8, hydraulic impacts on the groundwater table must be assessed when using a small-scale infiltration basin BMP, using the methodology from Ch 13: Groundwater Table Hydraulic Impact Assessments for Infiltration BMPs.

Chapter 13 of the NJ Stormwater BMP Manual, provides guidance for a Groundwater Mounding Assessment, along with the *Hantush Spreadsheet* , to be used for the assessment.

Input parameters for the spreadsheet are developed below based on Ch. 13 recommendations. Soils parameters are obtained from Reference 3, Updated Report Subsurface Investigation, Proposed Sharp Road Substation
Boring SB-1 and Test Pit TP-1, from Reference 3, is located near the BMP location.

Recharge Rate =	1.6	in/hr	
Runoff Depth =	0.59	in	(from HEC-HMS Output for WQDS)
Runoff Area =	74751.5	sq ft	(half of total tributary area)
Volume of Runoff =	3675	cu ft	
Infiltration Area =	3236.97	sq ft	(west+half south DA)
Duration of Infiltration =	8.5	hr	(from Ch 13 equation, Ref. 15)
Specific Yield =	0.15		(default value, Ch 13, Ref. 15)
Horiz Hyd Conductivity =	1.6	in/hr	(5*Recharge Rate for Coastal Plain)
BMP x value =	39.5	ft	(1/2 length for total square basin)
BMP y value =	39.5	ft	(1/2 width for total square basin)
Initial Thick Satur Zone =	50	ft	(from Boring B-2 at the BMP site.)

Groundwater Mounding Assessment - Results:

Output from the *Hantush Spreadsheet* is provided on the following two pages. The dimensions of the BMP x value and y value are switched to model the mounding performance in each direction. For both cases, the thickness of groundwater mounding at the BMP site is **1.280 feet**. Given that the groundwater elevation at Boring B-2 is 9.5 feet msl, the top of groundwater mounding elevation is 10.78 feet msl, as compared to the bottom of the small-scale infiltration basin BMP at elevation 14.75 feet msl. Thus, the mounding thickness of 1.280 feet does not negatively impact the performance of the BMP.

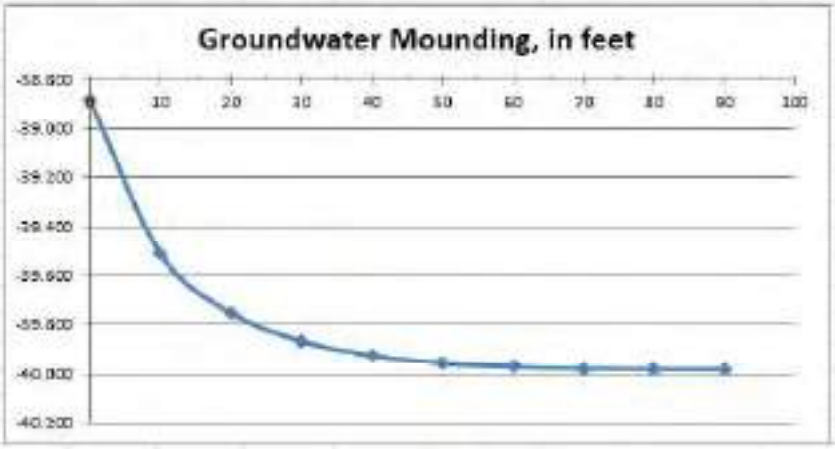
Stormwater Runoff Quantity Events:

Results from the Hantush Spreadsheet for East Infiltration Basin

Input Values		
1.60	R	Recharge rate (permeability rate) (in/hr)
0.150	Sy	Specific yield, Sy (dimensionless) default value is 0.15; max value is 0.2 provided that a lab test data is submitted
1.60	Kh	Horizontal hydraulic conductivity (in/hr) Kh = SxRecharge Rate (R) in the coastal plain; Kh=R outside the coastal plain
39.700	x	1/2 length of basin (x direction, in feet)
30.700	y	1/2 width of basin (y direction, in feet)
0.20	t	Duration of infiltration period (hours)
50.00	hi(0)	Initial thickness of saturated zone (feet)
11.115	h(max)	Maximum thickness of saturated zone (beneath center of basin at end of infiltration period)
-38.885	Δh(max)	Maximum groundwater mounding (beneath center of basin at end of infiltration period)

Ground-water Mounding, in feet	Distance from center of basin in x direction, in feet
-38.885	0
-39.513	10
-39.753	20
-39.868	30
-39.928	40
-39.959	50
-39.974	60
-39.980	70
-39.983	80
-39.984	90

Re-Calculate Now



Disclaimer

made available to the general public as a convenience for those wishing to replicate values documented in the USGS Scientific Investigations Report 2010-5102 "Groundwater mounding beneath hypothetical stormwater infiltration basins" or to calculate values based on user-specified site conditions. Any changes made to the spreadsheet (other than values identified as user-specified) after transmission from the USGS could have unintended, undesirable consequences. These consequences could include, but may not be limited to: erroneous output, numerical instabilities, and violations of underlying assumptions that are inherent in results presented in the accompanying USGS published report. The USGS assumes no responsibility for the consequences of any changes made to the spreadsheet. If changes are made to the spreadsheet, the user is responsible for documenting the changes and justifying the results and conclusions.

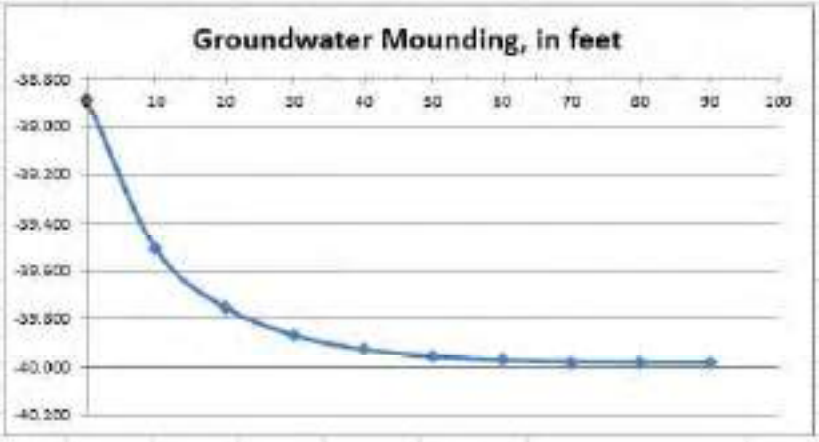
Stormwater Runoff Quantity Events:

Results from the Hantush Spreadsheetfor West Infiltration Basin

Input Values		
1.60	R	Recharge rate (permeability rate) (in/hr)
0.150	Sy	Specific yield, Sy (dimensionless) default value is 0.15; max value is 0.2 provided that a lab test data is submitted
1.60	Kh	Horizontal hydraulic conductivity (in/hr) Kh = SxRecharge Rate (R) in the coastal plain; Kh=R outside the coastal plain
39.500	x	1/2 length of basin (x direction, in feet)
39.500	y	1/2 width of basin (y direction, in feet)
8.50	t	Duration of infiltration period (hours)
50.00	hi(0)	Initial thickness of saturated zone (feet)
11.115	h(max)	Maximum thickness of saturated zone (beneath center of basin at end of infiltration period)
-38.885	Δh(max)	Maximum groundwater mounding (beneath center of basin at end of infiltration period)

Ground-water Mounding, in feet	Distance from center of basin in x direction, in feet
-38.885	0
-39.513	10
-39.752	20
-39.868	30
-39.928	40
-39.959	50
-39.976	60
-39.986	70
-39.992	80
-39.994	90

Re-Calculate Now



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8.0 Conduit Outlet Protection:

RIP-RAP for 12in pipe:

Design the erosion protection for the section immediately downstream of the outlet of the stormwater discharge pipe, based on New Jersey soil erosion standards. (Reference 14)

Apron Dimensions:

For: $TW \geq \frac{1}{2} D_o$ $\quad La = 3\left(\frac{q}{Do^{0.5}}\right)$ $\quad Wa = 3Wo + 0.4La$

Where:	Do =	1 ft (maximum inside culvert height)
	Wo =	1 ft (maximum inside culvert width)
	Q =	2 cfs (maximum culvert discharge)
	q =	2 cfs per foot (unit discharge = Q/Wo)
	La =	**6** ft (apron length)
	Wa =	**5** ft (apron width at downstream end of protection)
	Wco =	**3** ft (apron width at culvert outlet - at least 3 times culvert width)

Riprap:

For Horizontal Apron: $d_{50} = \frac{0.02}{Tw} q^{1.33}$ $\quad$ where $q = \frac{Q}{Wo}$

Tw =	0.2	ft (for areas where Tw cannot be computed, use Tw=0.2Do)
d_{50} =	**0.25**	ft (median stone diameter in feet)

Riprap Gradation:

The riprap shall be composed of a well-graded mixture such that 50% of the mixture by weight shall be larger than the d_{50} size as determined from the design procedure. A well-graded mixture as used herein is defined as a mixture composed primarily of the larger stone sizes, but with a sufficient mixture of other sizes to fill the progressively-smaller voids between the stones. The diameter of the largest stone size in such a mixture shall be 1.5 times the d_{50} size. The d_{75} should be 1.25 times the d_{50} and the d_{15} should be 0.5 times the d_{50} size.

Thickness of Riprap Lining:

Construction techniques, discharge, size of channel, sizes and gradation of riprap, etc., should be taken into consideration when determining the thickness of riprap lining. The thickness of riprap lining shall meet at least one of the following two criteria:

1. A thickness of at least three times the d_{50} size if a filter layer is not used.
2. A thickness of at least two times the d_{50} size if a filter layer is used.

For ease of construction and sourcing, **use a riprap thickness of three times the d_{50} size.**

RIP-RAP for 18in pipe:

Design the erosion protection for the section immediately downstream of the outlet of the stormwater discharge pipe, based on New Jersey soil erosion standards. (Reference 14)

Apron Dimensions:

For: $TW < \frac{1}{2} D_o$ $\quad La = 1.8\left(\frac{q}{Do^{0.5}}\right) + 7Do \quad Wa = 3Wo + La$

Where:	Do =	1.5	ft (maximum inside culvert height)
	Wo =	1.5	ft (maximum inside culvert width)
	Q =	10.3	cfs (maximum culvert discharge)
	q =	6.9	cfs per foot (unit discharge = Q/Wo)
	La =	**21**	ft (apron length)
	Wa =	**25**	ft (apron width at downstream end of protection)
	Wco =	**5**	ft (apron width at culvert outlet - at least 3 times culvert width)

Riprap:

For Horizontal Apron: $d_{50} = \frac{0.02}{Tw} q^{1.33}$ where $q = \frac{Q}{Wo}$

Tw =	0.3	ft (for areas where Tw cannot be computed, use Tw=0.2Do)
d_{50} =	**0.86**	ft (median stone diameter in feet)

Riprap Gradation:

The riprap shall be composed of a well-graded mixture such that 50% of the mixture by weight shall be larger than the d_{50} size as determined from the design procedure. A well-graded mixture as used herein is defined as a mixture composed primarily of the larger stone sizes, but with a sufficient mixture of other sizes to fill the progressively-smaller voids between the stones. The diameter of the largest stone size in such a mixture shall be 1.5 times the d_{50} size. The d_{75} should be 1.25 times the d_{50} and the d_{15} should be 0.5 times the d_{50} size.

Thickness of Riprap Lining:

Construction techniques, discharge, size of channel, sizes and graduation of riprap, etc., should be taken into consideration when determining the thickness of riprap lining. The thickness of riprap lining shall meet at least one of the following two criteria:

1. A thickness of at least three times the d_{50} size if a filter layer is not used.

2. A thickness of at least two times the d_{50} size if a filter layer is used.

For ease of construction and sourcing, **use a riprap thickness of three times the d_{50} size.**

RIP-RAP for 24 in pipe:

Design the erosion protection for the section immediately downstream of the outlet of the stormwater discharge pipe, based on New Jersey soil erosion standards. (Reference 14)

Apron Dimensions:

For: TW $\geq$ ½ D_o $$La = 3\left(\frac{q}{Do^{0.5}}\right) \qquad Wa = 3Wo + 0.4La$$

Where:

Do =	2	ft (maximum inside culvert height)
Wo =	2	ft (maximum inside culvert width)
Q =	6	cfs (maximum culvert discharge)
q =	3	cfs per foot (unit discharge = Q/Wo)
La =	**6**	ft (apron length)
Wa =	**9**	ft (apron width at downstream end of protection)
Wco =	**5**	ft (apron width at culvert outlet - at least 3 times culvert width)

Riprap:

For Horizontal Apron: $$d_{50} = \frac{0.02}{Tw} q^{1.33} \qquad \text{where } q = \frac{Q}{Wo}$$

Tw =	0.4	ft (for areas where Tw cannot be computed, use Tw=0.2Do)
d_{50} =	**0.22**	ft (median stone diameter in feet)

Riprap Gradation:

The riprap shall be composed of a well-graded mixture such that 50% of the mixture by weight shall be larger than the d_{50} size as determined from the design procedure. A well-graded mixture as used herein is defined as a mixture composed primarily of the larger stone sizes, but with a sufficient mixture of other sizes to fill the progressively-smaller voids between the stones. The diameter of the largest stone size in such a mixture shall be 1.5 times the d_{50} size. The d_{75} should be 1.25 times the d_{50} and the d_{15} should be 0.5 times the d_{50} size.

Thickness of Riprap Lining:

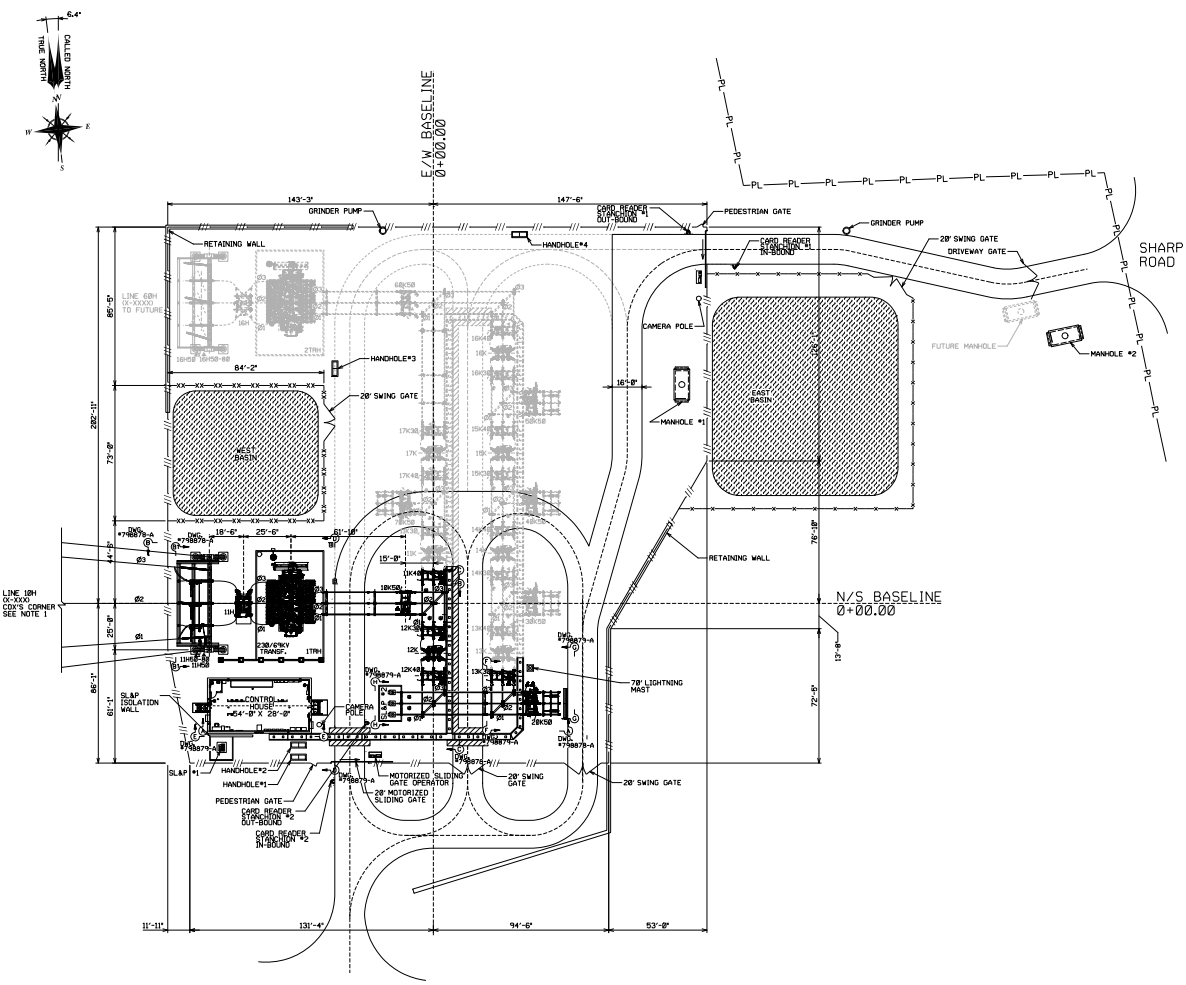
Construction techniques, discharge, size of channel, sizes and graduation of riprap, etc., should be taken into consideration when determining the thickness of riprap lining. The thickness of riprap lining shall meet at least one of the following two criteria:

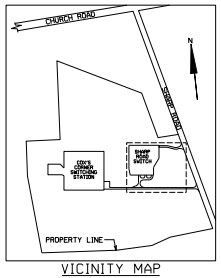
1. A thickness of at least three times the d_{50} size if a filter layer is not used.

2. A thickness of at least two times the d_{50} size if a filter layer is used.

For ease of construction and sourcing, **use a riprap thickness of three times the d_{50} size.**

Attachment B – Grading, Utility, and Soil Erosion and Sediment Control Drawings





VICINITY MAP

CONSTRUCTION NOTES:

1. SLAP #1 IS TO TERMINATE AT SWITCHGEAR POSITION FOR FEEDER #8825.

LEGEND:

- FUTURE EQUIPMENT
- ▲ - INDICATES LOCATION OF GROUND SWITCH MECHANISM
- ▲ - INDICATES LOCATION OF DISCONNECT SWITCH OPERATING MECHANISM
- 78'-0" LIGHTNING MAST
- TRENCH APRON
- ISOLATION WALL
- 8' ANTI-CUT/CLIMB FENCE
- CHAINLINK FENCE (8' HIGH)
- CHAINLINK FENCE (4' HIGH)
- RETAINING WALL
- CABLE TRENCH
- BOLLARD

NOTES:

1. INCOMING LINE TRANSPOSED TO MATCH CURRENT STATION'S PHASING

REFERENCE DRAWINGS:

1. CONTROL HOUSE	DWG. #798875-A
2. BUS PLAN SHEET 1	DWG. #798876-A
3. BUS PLAN SHEET 2	DWG. #798877-A
4. BUS SECTIONS SHEET 1	DWG. #798878-A
5. BUS SECTIONS SHEET 2	DWG. #798879-A
6. ONE LINE CONTROL	DWG. #798914-A
7. CONDUIT PLAN	DWG. #798881-A
8. GROUNDING PLAN	DWG. #798884-A
9. MANHOLE AND DUCT BANK PLAN	DWG. #798887-A
10. LIGHTNING PROTECTION PLAN	DWG. #798890-A
11. LIGHTING PLAN	DWG. #798891-A
12. NORTH GATE CONDUIT PLAN & DETAILS	DWG. #798894-A
13. SOUTH GATE CONDUIT PLAN & DETAILS	DWG. #798912-A

APPLICATION CASE #TBD

NO	DATE	DESCRIPTION	DWN	CKD	EXD	APD
	/ /					

REVISION

SITE LOCATION
225 SHARP RD.
BLOCK 15, LOT 2

SCALE: 1"=20'-0"

SHARP ROAD SWITCH
230/69KV SWITCHYARD
KEY PLAN

ARRANGEMENT — ELECTRICAL

PSEG
PUBLIC SERVICE ELECTRIC AND GAS COMPANY
ELECTRIC DELIVERY COMPANY-ASSET RELIABILITY, NEWARK N.J.

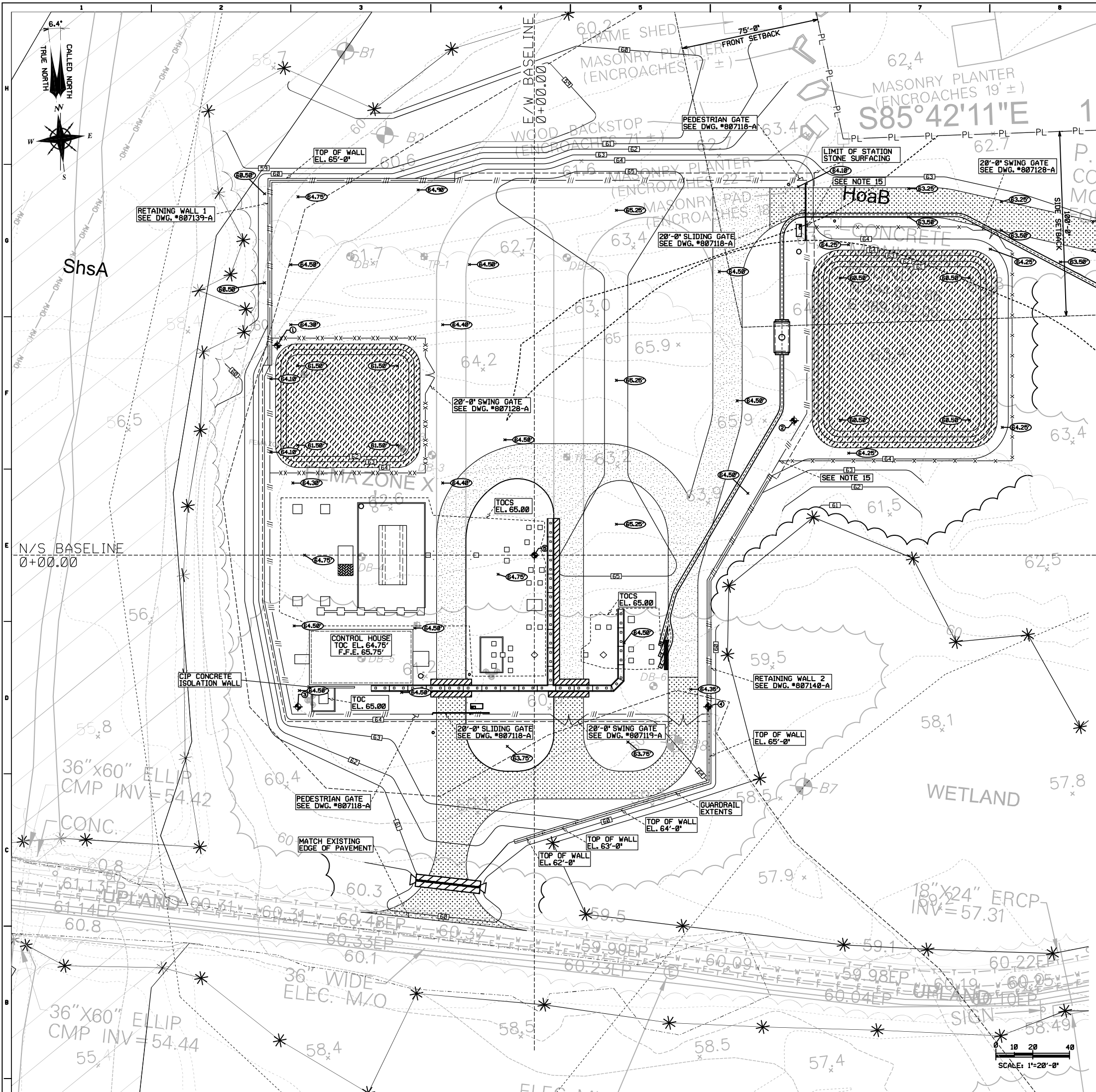
DRAWN J. HERNANDEZ CHECKED F. ARRUDA SCALE 1"=20'-0"
DATE 04/23/2008 EXAMINED M.J. STACHOW
VBS APPROVED P. MATTACHIONE

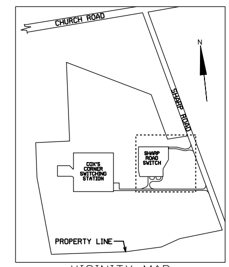
798874 A -0P

BLACK & VEATCH

DWN	SCF
DES	EH
CHK	FSA
APD	TJS

BLACK & VEATCH
THE LIGHT OF ENGINEERING
CORPORATION (NEW JERSEY)





VICINITY MAP

GENERAL NOTES:

1. PRIOR TO ANY LAND DISTURBANCE, THE LIMITS OF DISTURBANCE, LIMITS OF GRADING AND LOCATION OF EROSION AND CONTROL DEVICES SHALL BE FIELD STAKED.
2. ALL SITE WORK SHALL BE IN ACCORDANCE WITH THE PSE&G GENERAL SPECIFICATION '16-CIVIL 04' PAVING FOR SWITCHING AND SUBSTATIONS," AND '21-CIVIL 05' "EXCAVATION AND TRENCHING FOR SWITCHING AND SUBSTATIONS.
3. SOIL INVESTIGATION BY GZA GEOENVIRONMENTAL, INC. REPORT TITLED "PROPOSED SHARP ROAD SUBSTATION", DATED JUNE 11, 2024, GZA PROJECT NO. 26.0093004.00
4. ALL FILL SHALL BE CERTIFIED CLEAN, SOIL BASED AGGREGATE MEETING AN I-5 GRADATION UNLESS ALTERNATE METHODS ARE APPROVED BY ENGINEER. DATA SHEETS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.
5. ALL FENCING WORK SHALL BE IN ACCORDANCE WITH THE PSE&G GENERAL SPECIFICATION '21 CIVIL 20' "GALVANIZED STEEL CHAIN LINK PROPERTY FENCE AND MISCELLANEOUS SITE PROTECTIVE BARRIERS".
6. ALL FRESHLY GRADED AREAS SHALL RECEIVE ROCK SURFACING TO BE 2" OF 3/4" CLEAN CRUSHED TEMPORARY STABILIZING STONE.
7. SITE SECURITY IS THE RESPONSIBILITY OF THE CONTRACTOR.
8. ALL GRADING ACTIVITIES AND SUBSEQUENT SOIL STABILIZATION METHODS SHALL PROGRESS IN THE MANNER SPECIFIED IN THE CONSTRUCTION SEQUENCE.
9. CONTRACTOR SHALL ESTABLISH SURVEYING CONTROL FOR GRADING AND CONSTRUCTION.
10. ALL TREES, STUMPS, RUBBISH, ROOTMAT AND ORGANIC MATTER SHALL BE REMOVED FROM WITHIN THE GRADING LIMITS.
11. NO FILL OR CUT SHALL BE MADE WHICH CREATES AN EXPOSED SURFACE STEEPER IN SLOPE THAN ONE AND A HALF (1.5) HORIZONTAL TO ONE (1) VERTICAL.
12. NO FILL SHALL BE PLACED ON FROZEN GROUND.
13. ALL FILL MATERIAL SHALL BE PLACED IN MAXIMUM 6" HORIZONTAL LIFTS AND BE UNIFORMILY COMPACTED TO A MINIMUM OF 95% MAXIMUM DRY DENSITY IN ACCORDANCE WITH ASTM D-1557. EACH LIFT SHALL BE COMPACTED TO PLUS OR MINUS TWO PERCENT (+/- 2%) OF THE OPTIMUM MOISTURE CONTENT OF THE MAXIMUM DENSITY AS DETERMINED IN THE LABORATORY BY THE STANDARD PROCTOR TEST (AASHTO T-99 OR ASTM D-698). IN-PLACE (FIELD) DENSITY SHALL BE DETERMINED IN ACCORDANCE WITH AASHTO T-191/ASTM D-1556 (SAND-CONE METHODS), OR AASHTO T-238/ASTM D-2922 (SHALLOW NUCLEAR METHODS).
14. ALL DISTURBED AREAS NOT COVERED WITH ROCK SURFACING SHALL BE COVERED WITH EROSION MATTING OR STABILIZED IN ACCORDANCE WITH THE SEEDING SCHEDULE NOTED ON DWG. #798448-A OR IN ACCORDANCE WITH LANDSCAPE PLAN.
15. GAPS BETWEEN CHAIN LINK FENCE AND ANTI-CUT/CLIMB FENCE SHALL BE A MAXIMUM OF 3".

LEGEND:

- PROPERTY LINE
- EXISTING SPOT ELEVATION
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING WATER LINE
- EXISTING TELECOM LINE
- EXISTING ELECTRICAL LINE
- EXISTING OVERHEAD WIRES
- EXISTING TREE LINE
- PROPOSED TREE LINE
- WETLANDS BORDER
- WETLANDS BUFFER
- FLOOD HAZARD AREA
- FLOOD WAY
- SURVEY REFERENCE POINTS
- DIRECTION OF OVERLAND FLOW
- LIMITS OF STATION STONE SURFACING
- PROPERTY SETBACK
- PROPOSED CONTOURS
- PROPOSED SPOT ELEVATIONS
- 8' HIGH ANTI-CUT/CLIMB FENCE (SEE DWG. #807119)
- CHAIN LINK FENCE (8' HIGH - SEE DWG. #807128)
- CHAIN LINK FENCE (4' HIGH - SEE DWG. #807128)
- SOIL SURVEY TYPES
- MACADAM STATION ACCESS DRIVE
- ASPHALT DRIVE
- CONCRETE TRENCH APRON
- INFILTRATION BASIN (DETAIL ON DWG. #807123-A)
- BOLLARD

SURVEY REFERENCE POINTS

○	STATION COORDINATES	STATE PLANE COORDINATES
1	N 1+13.52	NORTHING: 394,556.44
	W 1+39.27	EASTING: 388,725.14
2	N 0+72.86	NORTHING: 394,485.27
	E 1+40.50	EASTING: 388,998.74
3	S 0+82.06	NORTHING: 394,360.81
	W 1+28.05	EASTING: 388,714.79
4	S 0+82.06	NORTHING: 394,336.40
	E 0+94.01	EASTING: 388,935.51
5	N 0+00.00	NORTHING: 394,428.29
	W 0+00.00	EASTING: 388,851.08

NOTE: HORIZONTAL DATUM = NAD-83 (2011)
VERTICAL DATUM = NAVD-88
UNITS = U.S. SURVEY FEET

REFERENCE DRAWINGS:

1. KEY PLAN — DWG. #798874-A
2. SOIL EROSION AND SEDIMENT CONTROL PLAN — DWG. #798447-A
3. SOIL EROSION AND SEDIMENT CONTROL NOTES AND DETAILS — DWG. #798448-A
4. 8' HIGH ANTI-CUT/CLIMB FENCE DETAILS SH. 1 — DWG. #807118-A
5. 8' HIGH ANTI-CUT/CLIMB FENCE DETAILS SH. 2 — DWG. #807119-A
6. GRADING DETAILS — DWG. #807120-A
7. GENERAL FENCE DETAILS — DWG. #807128-A
8. SIGHT TRIANGLE PLAN — DWG. #807129-A

SITE LOCATION
225 SHARP RD BLOCK 15, LOT 2

SURVEY INFORMATION
SURVEY PREPARED BY:
PSE&G SURVEYS & MAPPING 80 PARK PLAZA T20, NEWARK, NJ 07102-4194
DATE OF SURVEY: SEPTEMBER 23, 2024
SURVEY PREPARED FOR: PSE&G

THE PRESENCE OF UNDERGROUND HAZARDS MAY ONLY BE SHOWN ON OTHER DISCIPLINE DRAWINGS. THE CONTRACTOR IS RESPONSIBLE TO CHECK OTHER DISCIPLINE DRAWINGS FOR UNDERGROUND HAZARDS. CONTRACTOR SHALL FOLLOW PSE&G EXCAVATION PROCEDURE AND EXERCISE EXTREME CAUTION DURING ALL BELOW GRADE WORK.

SOIL NOTES:

1. SOIL TYPES ON SITE: ADMA - ADELPHIA FINE SANDY LOAM, 0-2% SLOPES; HOAB - HOLMDEL LOAMY SAND, 0-5% SLOPES; SHSA SHREWSBURY FINE SANDY LOAM, 0-2% SLOPES
2. SOILS INFORMATION BASED ON USDA SOILS MAP OF BURLINGTON COUNTY, NEW JERSEY.

SITE FLOOD NOTES:

1. PROPOSED SITE FALLS PARTIALLY WITHIN 100 YEAR FLOODPLAIN LINE AND NJ FHA DESIGN FLOOD LINE.
2. FLOOD INFORMATION BASED ON "FIRM, FLOOD INSURANCE RATE MAP, BURLINGTON COUNTY, NEW JERSEY (ALL JURISDICTIONS), PANEL NUMBER 261 OF 651, MAP NUMBER 34005C0261F". EFFECTIVE DATE 12/21/2017.

BLACK & VEATCH

DWN	MB
DES	MLS
CHK	NGG
APD	NGG

BLACK & VEATCH
11401 LAMAR AVE.
OVERLAND PARK, KS 66211
(CORPORATE HEADQUARTERS)

APPLICATION CASE
#TBD

NO	DATE	DESCRIPTION	DWN	CKD	EXD	APD
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	/					
	/					
	/					
	/					
	/					

REVISION

SHARP ROAD SWITCH

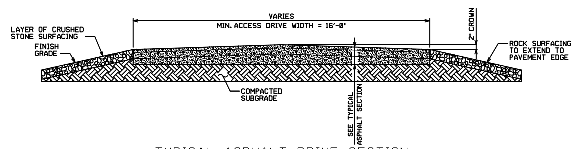
230/69KV SWITCHYARD
GRADING AND SITE DEVELOPMENT PLAN

YARD — CIVIL

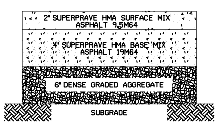
PSEG
PUBLIC SERVICE ELECTRIC AND GAS COMPANY
ELECTRIC DELIVERY COMPANY-ASSET RELIABILITY, NEWARK N.J.

DRAWN M. SCHUMACHER CHECKED N. GASPAR SCALE 1"=20'-0"
DATE 04/23/2025 EXAMINED E. SUDMAN
WBS C.92301.1.B.2.1.2.3 APPROVED H. SHAH

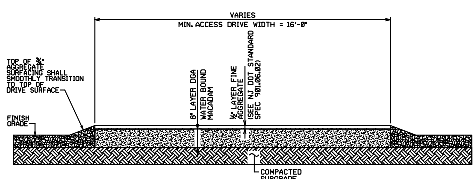
798446 A -0P



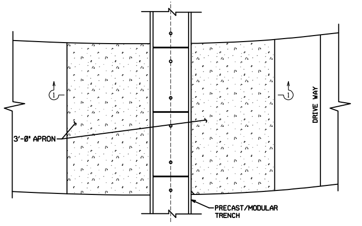
TYPICAL ASPHALT DRIVE SECTION
NOT TO SCALE



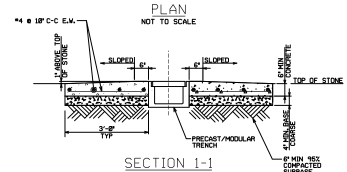
TYPICAL ASPHALT SECTION
NOT TO SCALE



TYPICAL STATION ACCESS DRIVE SECTION



PLAN
NOT TO SCALE

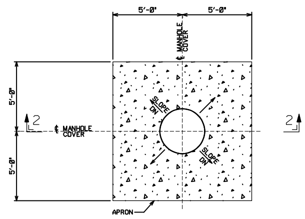


SECTION 1-1

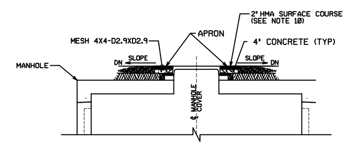
NOTES:

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI-318) AND PSE&G GENERAL SPECIFICATION '16 - CIVIL 04' "PAVING FOR SWITCHING AND SUBSTATION".
2. CONTRACTOR SHALL PROTECT PRECAST/MODULAR TRENCH DURING CONSTRUCTION.

CABLE TRENCH DRIVEWAY APRON DETAIL
NOT TO SCALE



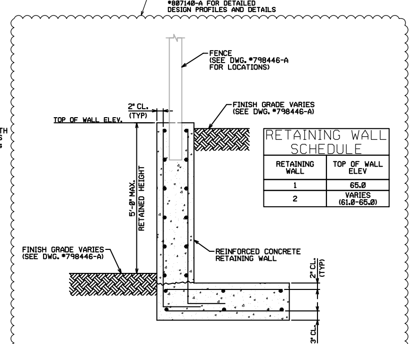
PLAN
NOT TO SCALE



SECTION 2-2

TYPICAL MANHOLE COVER APRON DETAIL
NOT TO SCALE

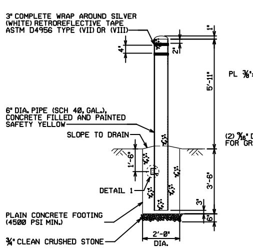
GENERIC DETAIL FOR PERMITTING
SEE DWG. #807139-A AND #807140-A FOR DETAILED DESIGN PROFILES AND DETAILS



RETAINING WALL SCHEDULE

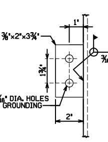
RETAINING WALL	TOP OF WALL ELEV
1	65.0
2	VARIES (61.0-65.0)

TYPICAL RETAINING WALL SECTION
NOT TO SCALE

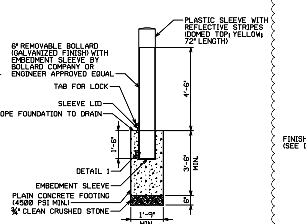


3" COMPLETE WRAP AROUND SILVER (WHITE) RETROREFLECTIVE TAPE ASTM D4956 TYPE (VII) OR (VIII)
6" DIA. PIPE (SCH 40, GAL), CONCRETE FILLED AND PAINTED SAFETY YELLOW
SLOPE TO DRAIN
DETAIL 1
PLAIN CONCRETE FOOTING (4500 PSI MIN.)
¾" CLEAN CRUSHED STONE
5'-11"
3'-6"
2'-0"
DIA.

TYPICAL BOLLARD DETAIL
NOT TO SCALE



DETAIL 1
GROUNDING PLATE
SCALE: 3" = 1'-0"



PLASTIC SLEEVE WITH REFLECTIVE STRIPES (DOMED TOP; YELLOW; 72" LENGTH)
6" REMOVABLE BOLLARD (GALVANIZED FINISH) WITH EMBEDMENT SLEEVE BY BOLLARD COMPANY OR ENGINEER APPROVED EQUAL
TAB FOR LOCK
SLEEVE LID
SLOPE FOUNDATION TO DRAIN
DETAIL 1
EMBEDMENT SLEEVE
PLAIN CONCRETE FOOTING (4500 PSI MIN.)
¾" CLEAN CRUSHED STONE
4'-6"
3'-6" MIN.
1'-9" MIN.

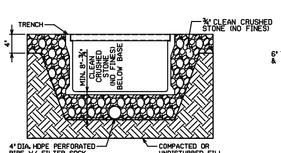
REMOVABLE BOLLARD DETAIL
NOT TO SCALE

CONCRETE NOTES:

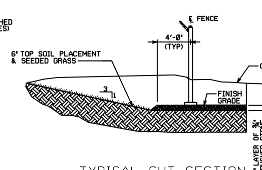
1. ALL CONCRETE CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI-318).
2. ALL CONCRETE TO HAVE 4,500 PSI COMPRESSIVE STRENGTH IN 28 DAYS.
3. COMPACTED SOIL TO HAVE A MIN. DENSITY EQUAL TO 95% OF THE MAX. DENSITY AS DETERMINED BY ASTM-1557.
4. ALL CONCRETE SURFACES SHALL BE TREATED WITH A CONCRETE CURING AND SEALING COMPOUND.
5. ALL CONCRETE CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE PSE&G GENERAL SPECIFICATIONS '19- CIVL 01' "REINFORCED CONCRETE WORK".
6. REINFORCING TO BE ASTM A615 GRADE 60.
7. ALL JOINTS AND EDGES SHALL BE TOOLED AND ROUNDED.
8. SUBBASE AND FORMWORK SHALL BE FIRM AND APPROVED BY THE CITY ENGINEER OR HIS/HER REPRESENTATIVE PRIOR TO POURING.
9. ALL CONSTRUCTION METHODS AND MATERIALS SHALL CONFORM TO 2019 N.J.D.O.T. STANDARD SPEC.
10. HMA SURFACE COURSE SHALL BE NJDOT SUPERPAVE HOT MIX ASPHALT 9.5M64 SURFACE COURSE UNLESS NOTED OTHERWISE.

REFERENCE DRAWINGS:

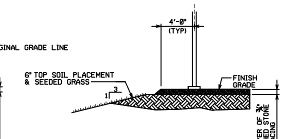
1. GRADING AND SITE DEVELOPMENT PLAN DWG. #798446-A



CABLE TRENCH UNDERDRAIN DETAIL
NOT TO SCALE



TYPICAL CUT SECTION
NOT TO SCALE



TYPICAL FILL SECTION
NOT TO SCALE

SITE LOCATION
225 SHARP RD BLOCK 15, LOT 2

THE PRESENCE OF UNDERGROUND HAZARDS MAY ONLY BE SHOWN ON OTHER DISCIPLINE DRAWINGS. THE CONTRACTOR IS RESPONSIBLE TO CHECK OTHER DISCIPLINE DRAWINGS FOR UNDERGROUND HAZARDS. CONTRACTOR SHALL FOLLOW PSE&G EXCAVATION PROCEDURE AND EXERCISE EXTREME CAUTION DURING ALL BELOW GRADE WORK.

APPLICATION CASE
#TBD

NO	DATE	DESCRIPTION	DWN	CKD	EXD	APD
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	/					

REVISION

SHARP ROAD SWITCH
230/69KV SWITCHYARD
GRADING DETAILS

YARD CIVIL

PSEG
PUBLIC SERVICE ELECTRIC AND GAS COMPANY
ELECTRIC DELIVERY COMPANY-ASSET RELIABILITY, NEWARK N.J.

DRAWN M. SCHUMACHER CHECKED N. GASPAR SCALE 1/2"=1'-0"
DATE 04/23/2025 EXAMINED E. SUDMAN
WBS C.92301.1.B.2.1.2.3 APPROVED H. SHAH

807120 A -0P

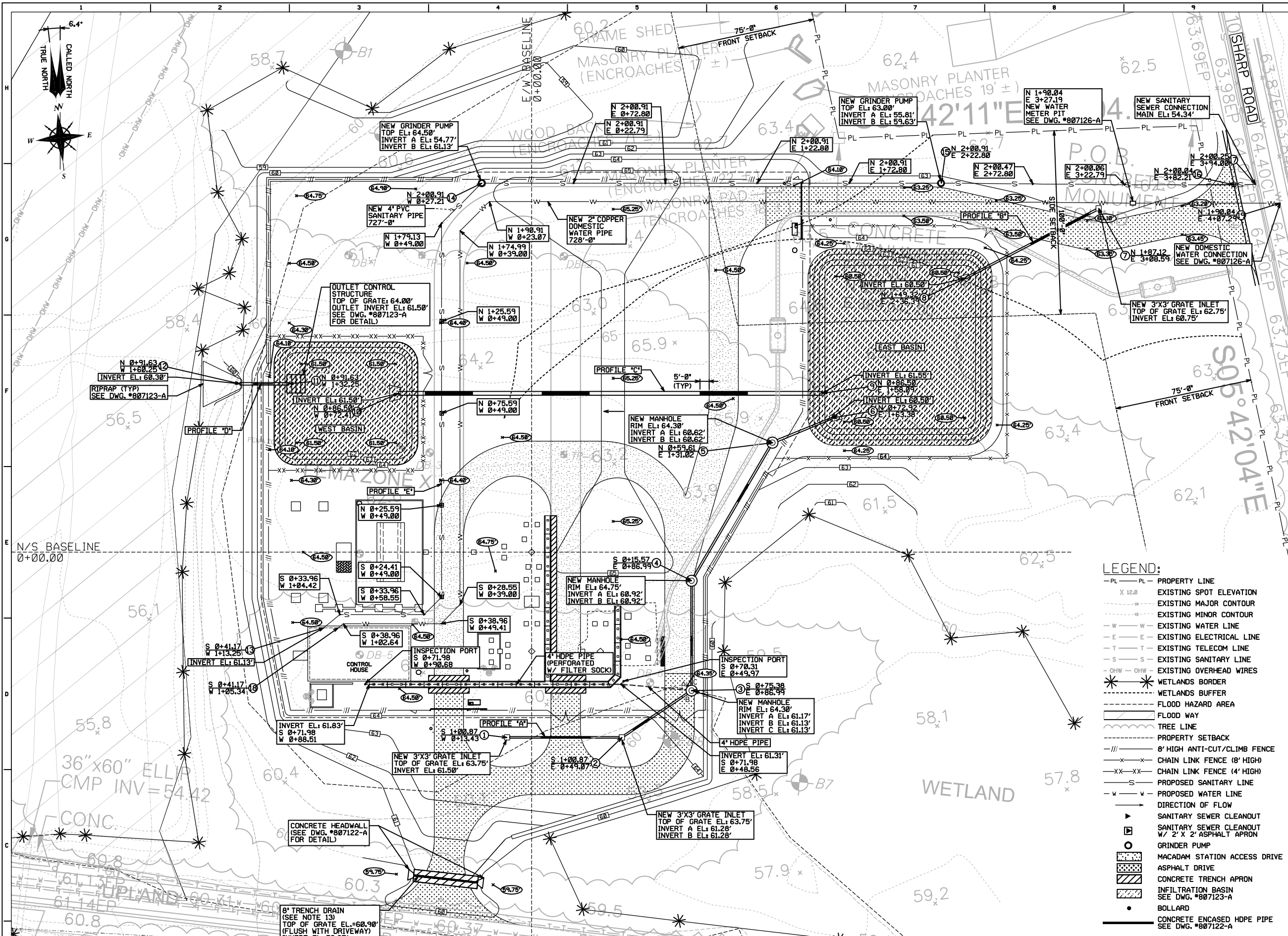
BLACK & VEATCH

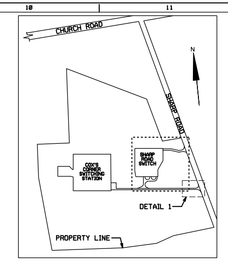
DWN	MB
DES	MLS
CHK	NGG
APD	NGG

BLACK & VEATCH
11401 LAMAR AVE.
OVERLAND PARK, KS 66211
(CORPORATE HEADQUARTERS)

I HEREBY CERTIFY THAT THIS DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF NEW JERSEY.

NICHOLAS G. GASPAR
N.J. PROFESSIONAL ENGINEER NO. GE53074
N.J. COA NO. 24GA27981200





VICINITY MAP

GENERAL NOTES:

1. GENERAL NOTES ARE APPLICABLE TO ALL UNDERGROUND UTILITY DRAWINGS.
2. THE LOCATIONS OF THE EXISTING FACILITIES AND UNDERGROUND UTILITIES SHOWN ON THIS SERIES OF DRAWINGS REPRESENT THE BEST KNOWLEDGE OF THE ENGINEER. BEFORE ANY WORK IS STARTED IN THE AREA OF EXISTING FACILITIES AND UNDERGROUND UTILITIES, THE CONTRACTOR SHALL CONFIRM THEIR LOCATIONS AND NOTIFY THE UTILITY COMPANY THAT WORK IS PLANNED IN THIS AREA.
3. ALL TIE-IN POINTS OF EXISTING UNDERGROUND UTILITIES SHALL BE FIELD VERIFIED AND ADJUSTED AS NECESSARY. CONTRACTOR SHALL FURNISH AND INSTALL ALL MATERIAL NECESSARY TO MAKE TIE-IN. EXISTING PIPING SHALL BE REMOVED OR ABANDONED IN PLACE AS NOTED ON THE DRAWINGS. EXISTING UNDERGROUND PIPING AND FACILITIES NOT NOTED ON THE DRAWINGS TO BE REMOVED OR ABANDONED SHALL BE CONFIRMED WITH THE COMPANY PRIOR TO BEING DISTURBED. MANHOLES ASSOCIATED WITH EXISTING PIPING TO BE REMOVED OR ABANDONED SHALL BE REMOVED UNLESS NEEDED FOR CONTINUED SERVICE OF OTHER ACTIVE PIPE. ALL WORK SHALL BE COORDINATED WITH THE PSE&G CONSTRUCTION MANAGER.
4. THE POTENTIAL FOR FLOATATION OF UNDERGROUND FACILITIES AND COMPONENTS (INCLUDING BUT NOT LIMITED TO, MANHOLES, BELOW GRADE TANKS, PIPING, DUCT BANK, CONDUITS ETC.) COULD EXIST DURING INSTALLATION DUE TO HIGH GROUND WATER CONDITIONS OR WHEN THE SITE IS INUNDATED WITH RAINFALL. THE CONSTRUCTION CONTRACTOR SHALL BE RESPONSIBLE FOR TAKING THE NECESSARY PRECAUTIONS AND ACTIONS TO ENSURE THAT NO FLOATATION OF ANY UNDERGROUND FACILITIES OCCUR DURING THEIR INSTALLATION.
5. WATER LINE AND SANITARY SEWER LINES UNDER PRESSURE SHALL BE INSTALLED A MINIMUM OF 4'-4" BELOW GRADE (12" BELOW FROST DEPTH). GRAVITY SANITARY SEWER LINES SHALL BE INSTALLED A MINIMUM OF 2'-0" BELOW GRADE. GAS LINE SHALL BE INSTALLED A MINIMUM OF 3'-0" BELOW GRADE.
6. ELECTRICAL LINES ARE NOT TO BE GROUNDED TO WATER PIPING.
7. THE MINIMUM CLEARANCE BETWEEN WATER AND SANITARY SEWER CROSSINGS SHALL BE 12". A PIPE SLEEVE 5'-0" EACH WAY OF CROSSING WILL ALSO BE ACCEPTABLE.
8. ALL INSTALLATIONS SHALL BE MARKED WITH APPROPRIATE UTILITY MARKING TAPE IN THE TOP SIX (6") INCH LAYER OF BACKFILL.
9. PIPE JOINTS SHALL NOT BE ENCASED WHEN POSSIBLE.
10. BEARING SURFACE SHOULD, WHERE POSSIBLE, BE PLACED AGAINST UNDISTURBED SOIL. WHERE IT IS NOT POSSIBLE, THE FILL BETWEEN THE BEARING SURFACE AND UNDISTURBED SOIL MUST BE COMPACTED TO AT LEAST 90 PERCENT STANDARD PROCTOR DENSITY.
11. SANITARY SEWER CLEANOUTS SHALL BE INSTALLED OUTSIDE THE CONTROL BUILDING AND AT THE PROPERTY LINE, PER THE NATIONAL STANDARD PLUMBING CODE.
12. CONTRACTOR SHALL SUBMIT PIPING MATERIALS FOR ENGINEER APRROVAL.
13. TRENCH DRAIN SHALL BE NEUTRAL MAXI 150 SYSTEM BY HYDROTEC, 12.20" HEIGHT WITH DUCTILE IRON GRATE OR APPROVED EQUAL. TRENCH DRAIN MUST BE INSTALLED PER MANUFACTURER SPECIFICATIONS. UTILIZE THE NUMBER OF CHANNEL SECTIONS REQUIRED FOR AN OVERALL LENGTH OF 35'. FIELD TO ADJUST AS NEEDED.

REFERENCE DRAWINGS:

1. GRADING AND SITE DEVELOPMENT PLAN — DWG. #798446-A
2. SOIL EROSION AND SEDIMENT CONTROL PLAN — DWG. #798447-A
3. SOIL EROSION AND SEDIMENT CONTROL NOTES AND DETAILS — DWG. #798448-A
4. KEY PLAN — DWG. #798874-A
5. SITE DETAILS — DWG. #807120-A
6. UTILITY PROFILES & DETAILS SHEET 1 OF 4 — DWG. #807122-A
7. UTILITY PROFILES & DETAILS SHEET 2 OF 4 — DWG. #807123-A
8. UTILITY PROFILES & DETAILS SHEET 3 OF 4 — DWG. #807125-A
9. UTILITY PROFILES & DETAILS SHEET 4 OF 4 — DWG. #807126-A
10. FOUNDATION PLAN — DWG. #807127-A

LEGEND:

- PL —— PL: PROPERTY LINE
- X 12.0: EXISTING SPOT ELEVATION
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- W —— W: EXISTING WATER LINE
- E —— E: EXISTING ELECTRICAL LINE
- T —— T: EXISTING TELECOM LINE
- S —— S: EXISTING SANITARY LINE
- OHW — OHW: EXISTING OVERHEAD WIRES
- WETLANDS BORDER
- WETLANDS BUFFER
- FLOOD HAZARD AREA
- FLOOD WAY
- TREE LINE
- PROPERTY SETBACK
- 8' HIGH ANTI-CUT/CLIMB FENCE
- CHAIN LINK FENCE (8' HIGH)
- CHAIN LINK FENCE (4' HIGH)
- PROPOSED SANITARY LINE
- PROPOSED WATER LINE
- DIRECTION OF FLOW
- SANITARY SEWER CLEANOUT
- SANITARY SEWER CLEANOUT W/ 2' X 2' ASPHALT APRON
- GRINDER PUMP
- MACADAM STATION ACCESS DRIVE
- ASPHALT DRIVE
- CONCRETE TRENCH APRON
- INFILTRATION BASIN SEE DWG. #807123-A
- BOLLARD
- CONCRETE ENCASED HDPE PIPE SEE DWG. #807122-A

PIPE SCHEDULE

PURPOSE	PIPE DESIGNATION PROFILE	FROM	TO	LENGTH	DIAMETER	MATERIAL	SLOPE	REF DWG. #
STORM	A	1	2	62'-6"	12"	HDPE	0.3%	807123-A
STORM	A	2	3	45'-8"	12"	HDPE	0.3%	807123-A
STORM	A	3	4	59'-10"	12"	HDPE	0.3%	807123-A
STORM	A	4	5	87'-1"	12"	HDPE	0.3%	807123-A
STORM	A	5	6 (EAST BASIN)	35'-0"	12"	HDPE	0.3%	807123-A
STORM	B	7	8 (EAST BASIN)	81'-6"	12"	HDPE	0.3%	807123-A
STORM	C	9 (EAST BASIN)	10 (WEST BASIN)	230'-6"	24"	HDPE	0.0%	807123-A
STORM	D	11 (WEST BASIN)	12 (OUTFALL)	28'-0"	18"	HDPE	4.3%	807125-A
SANITARY	E	13 (CTRL HOUSE)	14	305'-0"	4"	PVC	2.1%	807125-A
SANITARY	E	14	15	250'-0"	4"	PVC	2.1%	807125-A
SANITARY	E	15	16	160'-0"	4"	PVC	2.1%	807125-A
SANITARY	E	16	17 (SAN. CONN.)	12'-0"	4"	PVC	2.1%	807125-A
WATER	-	18 (CTRL HOUSE)	19 (WATER CONN.)	728'-0"	2"	COPPER	-	-

SCALE: 1"=20'-0" (0 10 20 40)

SITE LOCATION
225 SHARP RD BLOCK 15, LOT 2

SURVEY INFORMATION
SURVEY PREPARED BY:
PSE&G SURVEYS & MAPPING 80 PARK PLAZA T20, NEWARK, NJ 07102-4194
DATE OF SURVEY: SEPTEMBER 23, 2024
SURVEY PREPARED FOR: PSE&G

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APPLICATION CASE
#TBD

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	/					
	/					
	/					
	/					
	/					

REVISION

SHARP ROAD SWITCH

230/69KV SWITCHYARD
STORMWATER AND SITE UTILITIES PLAN

YARD — CIVIL

PSEG
PUBLIC SERVICE ELECTRIC AND GAS COMPANY
ELECTRIC DELIVERY COMPANY-ASSET RELIABILITY, NEWARK N.J.

DRAWN M. SCHUMACHER CHECKED N. GASPAR SCALE 1"=20'-0"
DATE 04/23/2025 EXAMINED E. SUDMAN
WBS C.92301.B.2.1.2.3 APPROVED H. SHAH

807121 A -0P

BLACK & VEATCH

DWN	MB
DES	MLS
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11401 LAMAR AVE.
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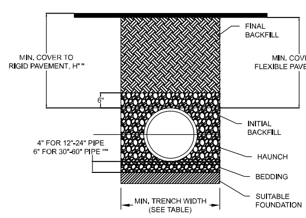
N.J. COA NO. 24GA27981200



NOTES:

1. ALL PIPE SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321, "STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY FLOW APPLICATIONS", LATEST ADDITION

2. MEASURES SHOULD BE TAKEN TO PREVENT MIGRATION OF NATIVE FINES INTO BACKFILL MATERIAL, WHEN REQUIRED.

3. FOUNDATION: WHERE THE TRENCH BOTTOM IS UNSTABLE, THE CONTRACTOR SHALL EXCAVATE TO A DEPTH REQUIRED BY THE ENGINEER AND REPLACE WITH SUITABLE MATERIAL AS SPECIFIED BY THE ENGINEER. AS AN ALTERNATIVE AND AT THE DISCRETION OF THE DESIGN ENGINEER, THE TRENCH BOTTOM MAY BE STABILIZED USING A GEOTEXTILE MATERIAL.

4. BEDDING: SUITABLE MATERIAL SHALL BE CLASS I, II OR III. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. UNLESS OTHERWISE NOTED BY THE ENGINEER, MINIMUM BEDDING THICKNESS SHALL BE 4" (100mm) FOR 4"-24" (100mm-600mm); 6" (150mm) FOR 30"-60" (750mm-900mm).

5. INITIAL BACKFILL: SUITABLE MATERIAL SHALL BE CLASS I, II OR III IN THE PIPE ZONE EXTENDING NOT LESS THAN 6" ABOVE CROWN OF PIPE. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. MATERIAL SHALL BE INSTALLED AS REQUIRED IN ASTM D2321, LATEST EDITION.

6. MINIMUM COVER: MINIMUM COVER, H, IN NON-TRAFFIC APPLICATIONS (GRASS OR LANDSCAPE AREAS) IS 12" FROM THE TOP OF PIPE TO GROUND SURFACE. ADDITIONAL COVER MAY BE REQUIRED TO PREVENT FLOATION. FOR TRAFFIC APPLICATIONS, MINIMUM COVER, H, IS 12" UP TO 48" DIAMETER PIPE AND 24" OF COVER FOR 54"-60" DIAMETER PIPE, MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TO TOP OF RIGID PAVEMENT.

RECOMMENDED MINIMUM TRENCH WIDTHS

PIPE DIAM.	MIN. TRENCH WIDTH
4"	21"
6"	23"
8"	26"
10"	28"
12"	30"
15"	34"
18"	39"
24"	48"
30"	56"
36"	64"
42"	72"
48"	80"
54"	88"
60"	96"

MINIMUM RECOMMENDED COVER BASED ON VECHICLE LOADING CONDITIONS

	SURFACE LIVE LOADING CONDITION	
PIPE DIAM.	H-25	HEAVY CONSTRUCTION (75T AXLE LOAD) *
12" - 48"	12"	48"
54" - 60"	24"	60"

* VEHICLES IN EXCESS OF 75T MAY REQUIRE ADDITIONAL COVER

MINIMUM RECOMMENDED COVER BASED ON RAILWAY LOADING CONDITIONS

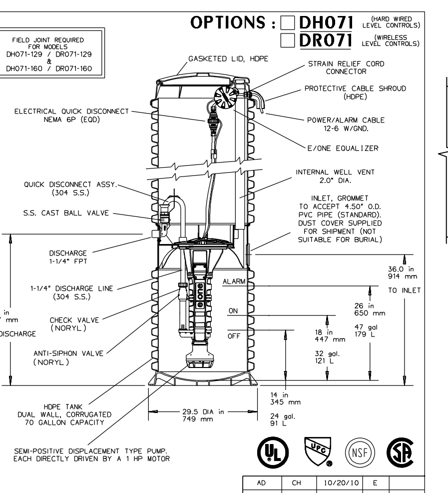
PIPE DIAM.	COOPER E-80**
UP TO 24"	24"
30"-36"	36"
42"-60"	48"

** COVER IS MEASURED FROM TOP OF PIPE TO BOTTOM OF RAILWAY TIE.
*** E-80 COVER REQUIREMENTS, ARE ONLY APPLICABLE TO ASTM F 2306 PIPE.

REV.	DESCRIPTION	BY	MM/DD/YY	CHK'D
2	ADDED E-80 INFORMATION	TJR	08/20/07	

NOTE: ALL DIMENSIONS ARE ± 1/2 FOOT.

DIA. DET/RET SYSTEM
TYPICAL TRENCH DETAIL
DRAWING NUMBER: STD-101
ADVANCED DRAINAGE SYSTEMS, INC. 4640 TRUEMAN BLVD HILLIARD, OHIO 43026
CKS 10/18/06 NTS 1 OF 1

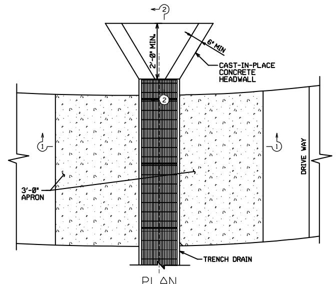


AD	CH	10/20/10	E	
DR BY	CHK'D	DATE	ISSUE	SCALE

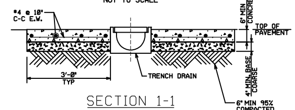
CONCRETE BALLAST MAY BE REQUIRED SEE INSTALLATION INSTRUCTION FOR DETAILS

NOTE: DIMENSIONS ARE FOR REF ONLY

e/one SEWER SYSTEMS
MODEL DH071 / DR071 DETAIL SHEET
NA0050P02



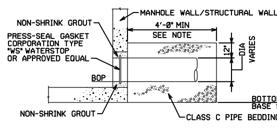
PLAN
NOT TO SCALE



SECTION 1-1

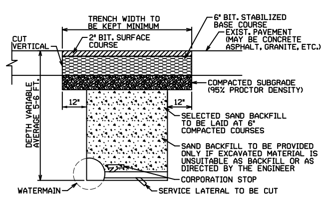
NOTES:
1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI-318) AND PSE&G GENERAL SPECIFICATION '16 - CIVIL 04' "PAVING FOR SWITCHING AND SUBSTATION".
2. CONTRACTOR SHALL PROTECT TRENCH DRAIN DURING CONSTRUCTION.

TRENCH DRAIN HEADWALL & APRON DETAIL
NOT TO SCALE

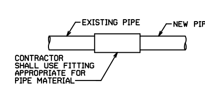


NOTE: CLASS C PIPE BEDDING TO LIMITS SHOWN OR EDGE OF MANHOLE EXCAVATION WHICHEVER IS GREATER

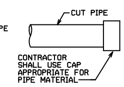
TYPICAL WALL PENETRATION DETAIL
NOT TO SCALE



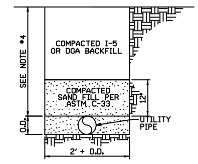
PAVEMENT RESTORATION DETAIL
NOT TO SCALE



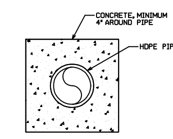
PIPE CONNECTION DETAIL



PIPE CAP DETAIL



TYPICAL TRENCH DETAILS FOR UTILITY PIPE
NOT TO SCALE



CONCRETE ENCASED HDPE PIPE DETAIL
NOT TO SCALE

GENERAL UTILITY NOTES:

1. GENERAL NOTES ARE APPLICABLE TO ALL UNDERGROUND UTILITY DRAWINGS.
2. ALL TIE-IN POINTS OF EXISTING UNDERGROUND UTILITIES SHALL BE FIELD VERIFIED AND ADJUSTED AS NECESSARY. CONTRACTOR SHALL FURNISH AND INSTALL ALL MATERIAL NECESSARY TO MAKE TIE-IN. EXISTING PIPING SHALL BE REMOVED OR ABANDONED IN PLACE AS NOTED ON THE DRAWINGS. EXISTING UNDERGROUND PIPING AND FACILITIES NOT NOTED ON THE DRAWINGS TO BE REMOVED OR ABANDONED SHALL BE CONFIRMED WITH THE COMPANY PRIOR TO BEING DISTURBED. MANHOLES ASSOCIATED WITH EXISTING PIPING TO BE REMOVED OR ABANDONED SHALL BE REMOVED UNLESS NEEDED FOR CONTINUED SERVICE OF OTHER ACTIVE PIPE. ALL WORK SHALL BE COORDINATED WITH CONSTRUCTION MANAGEMENT.
3. THE POTENTIAL FOR FLOATATION OF UNDERGROUND FACILITIES AND COMPONENTS (INCLUDING BUT NOT LIMITED TO, MANHOLES, BELOW GRADE TANKS, PIPING, DUCT BANK, CONDUITS ETC.) COULD EXIST DURING INSTALLATION DUE TO HIGH GROUND WATER CONDITIONS OR WHEN THE SITE IS INUNDATED WITH RAINFALL. THE CONSTRUCTION CONTRACTOR SHALL BE RESPONSIBLE FOR TAKING THE NECESSARY PRECAUTIONS AND ACTIONS TO ENSURE THAT NO FLOATATION OF ANY UNDERGROUND FACILITIES OCCUR DURING THEIR INSTALLATION.
4. WATER LINE AND SANITARY SEWER LINES UNDER PRESSURE SHALL BE INSTALLATED A MINIMUM OF 4'-4" BELOW GRADE (12" BELOW FROST DEPTH). GRAVITY SANITARY SEWER LINES SHALL BE INSTALLED A MINIMUM OF 2'-0" BELOW GRADE.
5. ELECTRICAL LINES ARE NOT TO BE GROUNDED TO WATER PIPING.
6. ALL INSTALLATIONS SHALL BE MARKED WITH APPROPRIATE UTILITY MARKING TAPE IN THE TOP SIX (6") INCH LAYER OF BACKFILL.
7. PIPE JOINTS SHALL NOT BE ENCASED WHEN POSSIBLE.
8. BEARING SURFACE SHOULD, WHERE POSSIBLE, BE PLACED AGAINST UNDISTURBED SOIL. WHERE IT IS NOT POSSIBLE, THE FILL BETWEEN THE BEARING SURFACE AND UNDISTURBED SOIL MUST BE COMPACTED TO AT LEAST 90 PERCENT STANDARD PROCTOR DENSITY.
9. ALL EXPOSED CONCRETE EDGES TO HAVE A ¾" CHAMFER TO A DEPTH OF 4" BELOW GRADES.
10. ALL ELEVATIONS ARE NAVD-88.
11. BUILDING SANITARY SERVICES A SINGLE RESTROOM AND PLUMBED EYEWASH IN THE CONTROL BUILDING REACHING A MAXIMUM DFU VALUE OF 8 PER THE 2015 NATIONAL STANDARD PLUMBING CODE.
12. 4" CLEANOUT TO BE INSTALLED 5'-0" OUTSIDE EXTERIOR OF CONTROL BUILDING PER PLAN DRAWING.
13. ALL WATER MAINS SHALL CLEAR SANITARY SEWERS BY A MINIMUM VERTICAL CLEARANCE OF 18".
14. SOLDER TYPE FITTINGS SHALL NOT BE USED UNDERGROUND.
15. ALL TAPPING VALVES AND SLEEVES SHALL BE INSTALLED UNDER WATER PRESSURE (WET TAP). VALVES SHALL BE MUELLER RESILIENT WEDGE GATE VALVE, OPENING IN A CLOCKWISE DIRECTION AND WILL HAVE A WATER WORKING PRESSURE OF 200 PSI. LOW PRESSURE TAPPING SLEEVES SHALL BE U.S. PIPE. HIGH PRESSURE TAPPING SLEEVES SHALL BE U.S. PIPE TYPE.
16. TRENCHING TO BE COMPLETED IN ACCORDANCE WITH PSE&G GENERAL SPECIFICATION '21-CIVIL 05 EXCAVATION AND TRENCHING FOR SWITCHING AND SUBSTATIONS'.
17. NON-METALLIC UTILITY LINES, SHALL BE INSTALLED WITH AN INSULATED COPPER TRACER WIRE OF AT LEAST 18 AWG AND ANY COLOR OTHER THAN YELLOW.

CONCRETE NOTES:

1. ALL CONCRETE TO HAVE 4,500 P.S.I. COMPRESSIVE STRENGTH IN 28 DAYS.
2. ALL CONCRETE CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE PSE&G GENERAL SPECIFICATION '19-CIVIL 01' "REINFORCED CONCRETE WORK", '13-CIVIL 06 "PRECAST CONCRETE UNDERGROUND STRUCTURES", AND THE BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI-318).
3. ALL CONDUITS, PIPES, PIPE SLEEVES, DUCTS, INSERTS, ANCHOR BOLTS & OTHER EMBEDDED ITEMS SHALL BE IN PLACE BEFORE POURING CONCRETE.
4. REINFORCING TO BE ASTM A615 GRADE 60.

UTILITY SPECIFICATION AND TESTING REQUIREMENTS:

1. CODES AND STANDARDS: WORK PERFORMED UNDER THESE SPECIFICATIONS SHALL BE DONE IN ACCORDANCE WITH THE FOLLOWING CODES AND STANDARDS.

WORK	IN ACCORDANCE WITH
OVERALL DESIGN	NJ IBC 2021, NFPA 24, 2015 NATIONAL STANDARD PLUMBING CODE, 2021 NFGC AWWA STANDARDS AS SPECIFICALLY NOTED WITHIN THIS PACKAGE.

2. THE FOLLOWING TESTING SHALL BE CONDUCTED IN ACCORDANCE WITH THE SPECIFIED SOURCE. THIS TESTING IS TO BE CONSIDERED PART OF THE DEFINED SCOPE OF WORK, AND ALL ASSOCIATED COSTS ARE THE RESPONSIBILITY OF THE SUBCONTRACTOR.

TESTS	IN ACCORDANCE WITH	CONDUCTED BY
ENTIRE SYSTEM	NJ IBC 2021, NFPA 24 AND 25. SEE NOTES FOR AWWA REQUIREMENTS.	SUBCONTRACTOR

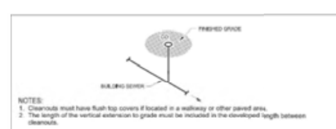
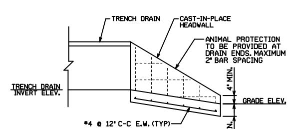


Figure 5.4.2
A SEWER CLEANOUT EXTENDED TO FINISHED GRADE

REFERENCE DRAWINGS:

1. STORMWATER & SITE UTILITIES PLAN — DWG. #807121-A
2. UTILITY PROFILES & DETAILS SHEET 2 OF 4 — DWG. #807123-A
3. UTILITY PROFILES & DETAILS SHEET 3 OF 4 — DWG. #807125-A
4. UTILITY PROFILES & DETAILS SHEET 4 OF 4 — DWG. #807126-A



SECTION 2-2

SITE LOCATION
225 SHARP RD BLOCK 15, LOT 2

THE PRESENCE OF UNDERGROUND HAZARDS MAY ONLY BE SHOWN ON OTHER DISCIPLINE DRAWINGS. THE CONTRACTOR IS RESPONSIBLE TO CHECK OTHER DISCIPLINE DRAWINGS FOR UNDERGROUND HAZARDS. CONTRACTOR SHALL FOLLOW PSE&G EXCAVATION PROCEDURE AND EXERCISE EXTREME CAUTION DURING ALL BELOW GRADE WORK.

APPLICATION CASE #TBD

NO	DATE	DESCRIPTION	DWN	CKD	EXD	APD
	/					
	/					
	/					
	/					
	/					
	/					

REVISION

SHARP ROAD SWITCH
230/69KV SWITCHYARD
UTILITY PROFILES & DETAILS
SHEET 1 OF 4
YARD — CIVIL

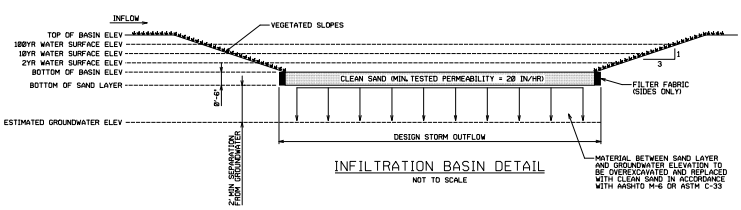
PSEG
PUBLIC SERVICE ELECTRIC AND GAS COMPANY
ELECTRIC DELIVERY COMPANY-ASSET RELIABILITY, NEWARK N.J.

DRAWN M. SCHUMACHER CHECKED N. GASPAR SCALE 1/2"=1'-0"
DATE 04/23/2025 EXAMINED E. SUDMAN
WBS C.92301.1.B.2.1.2.3 APPROVED H. SHAH

BLACK & VEATCH
DWN MB
DES MLS
CHK NGG
APD NGG

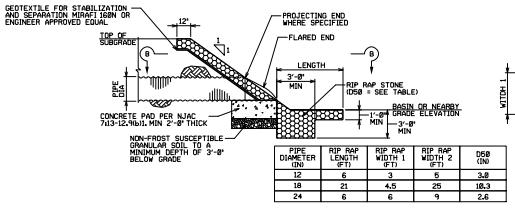
BLACK & VEATCH 11401 LAMAR AVE. OVERLAND PARK, KS 66211 (CORPORATE HEADQUARTERS)
I HEREBY CERTIFY THAT THIS DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF NEW JERSEY.
NICHOLAS G. GASPAR
N.J. PROFESSIONAL ENGINEER NO. GE53074
N.J. COA NO. 24GA27981200

807122 A -0P



INFILTRATION BASIN DETAIL

NOT TO SCALE



PIPE DIAMETER (IN)	RIP RAP LENGTH (FT)	RIP RAP WIDTH 1 (FT)	RIP RAP WIDTH 2 (FT)	D50 (IN)
12	6	3	5	3.8
18	21	4.5	25	18.3
24	6	6	9	2.6

TYPICAL CULVERT RIP RAP OUTLET END

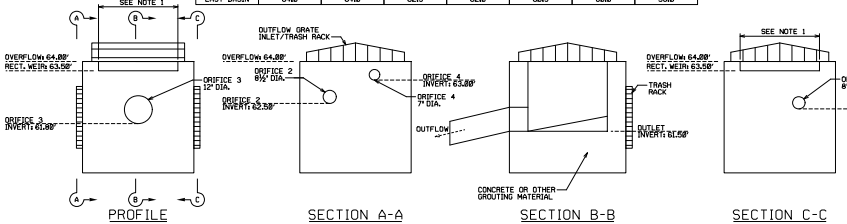
NOT TO SCALE

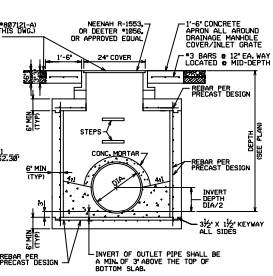
SECTION B-B

NOT TO SCALE

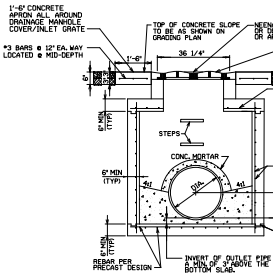
INFILTRATION BASIN SCHEDULE

BASIN	TOP OF BASIN ELEV	100 YR WATER SURFACE ELEV	10 YR WATER SURFACE ELEV	2 YR WATER SURFACE ELEV	BOTTOM OF BASIN ELEV	BOTTOM OF SAND LAYER	ESTIMATED GROUNDWATER ELEV
WEST BASIN	64.0	64.0	62.5	62.0	61.5	61.0	59.0
EAST BASIN	64.0	64.0	62.5	62.0	60.5	60.0	58.0





3X3 MANHOLE SECTION

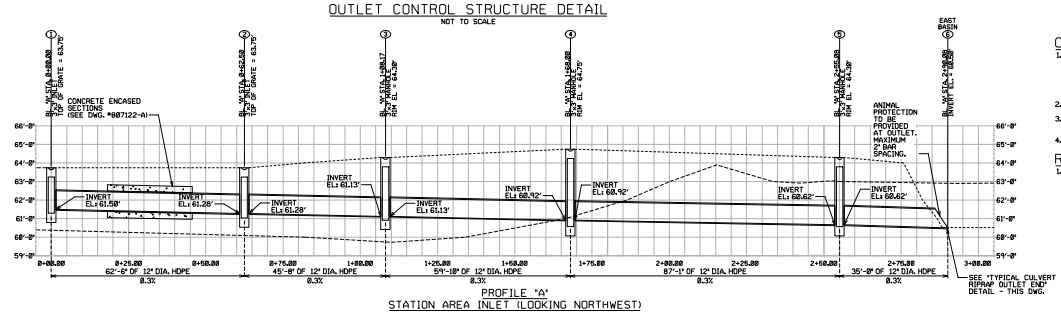


3X3 GRATE INLET SECTION

OUTLET CONTROL STRUCTURE DETAIL

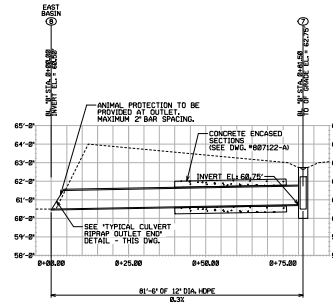
NOTES:
1. TOTAL COMBINED LENGTH OF RECTANGULAR WEIRS TO EQUAL 18'-0".

NOT TO SCALE



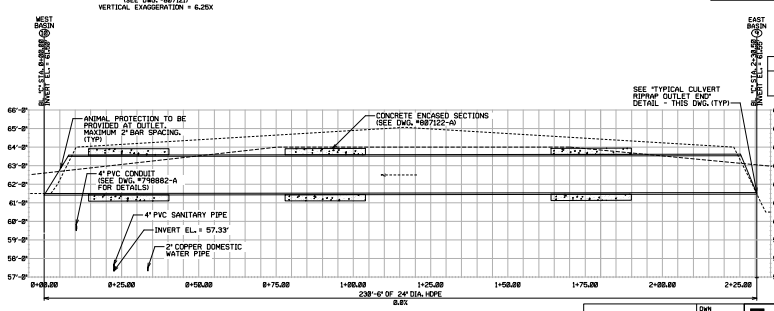
PROFILE "A"
STATION AREA INLET (LOOKING NORTHWEST)

(SEE DWG. #807121)
VERTICAL EXAGGERATION = 6.25X



PROFILE "B"
STATION AREA INLET (LOOKING NORTHWEST)

(SEE DWG. #807121)
VERTICAL EXAGGERATION = 6.25X



PROFILE "C"
BASIN CONNECTION (LOOKING NORTH)

(SEE DWG. #807121)
VERTICAL EXAGGERATION = 6.25X

CONCRETE NOTES:

1. ALL CONCRETE CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE PSE&G GENERAL SPECIFICATIONS 19-CIVIL 01 'REINFORCED CONCRETE WORK', 13-CIVIL 80 'PRECAST CONCRETE UNDERGROUND UTILITY DRAINAGE & MISCELLANEOUS STRUCTURES FOR SWITCHING AND SUBSTATIONS AND THE BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI-318).
2. ALL CONCRETE TO HAVE 4,500 P.S.I. COMPRESSIVE STRENGTH IN 28 DAYS.
3. ALL CONDUITS, PIPES, PIPE SLEEVES, DUCTS, INSERTS, ANCHOR BOLTS & OTHER EMBEDDED ITEMS SHALL BE IN PLACE BEFORE POURING CONCRETE.
4. REINFORCING TO BE ASTM A615 GRADE 60.

RIPRAP GRADATION:

1. THE RIPRAP SHALL BE COMPOSED OF A WELL-GRADED MIXTURE SUCH THAT 50% OF THE MIXTURE BY WEIGHT SHALL BE LARGER THAN THE d_{50} SIZE AS DETERMINED BY FROM THE DESIGN PROCEDURE. A WELL-GRADED MIXTURE AS USED HEREIN IS DEFINED AS A MIXTURE COMPOSED PRIMARILY OF THE LARGER STONE SIZES TO FILL THE PROGRESSIVELY-SMALLER VOIDS BETWEEN THE STONES, THE DIAMETER OF THE LARGEST STONE SIZE IN SUCH A MIXTURE SHALL BE 1.5 TIMES THE d_{50} SIZE. THE d_{50} SHOULD BE 1.25 TIMES THE d_{30} AND THE d_{50} SHOULD BE 0.5 TIMES THE d_{30} SIZE.

THE PRESENCE OF UNDERGROUND HAZARDS MAY ONLY BE SHOWN ON OTHER DISCIPLINE DRAWINGS. THE CONTRACTOR IS RESPONSIBLE TO CHECK OTHER DISCIPLINE DRAWINGS FOR UNDERGROUND HAZARDS. CONTRACTOR SHALL FOLLOW PSE&G EXCAVATION PROCEDURE AND EXERCISE EXTREME CAUTION DURING ALL BELOW GRADE WORK.

LEGEND:

------ PROPOSED GRADE
----- EXISTING GRADE

STORMWATER NOTES:

1. REGULAR MAINTENANCE SHALL BE PERFORMED ON SMALL-SCALE INFILTRATION BASIN SYSTEM PER NJAC 7:8-5.8 AND NJAC 7:14A.
2. SEDIMENT REMOVAL SHOULD TAKE PLACE WHEN ALL RUNOFF HAS DRAINED AND THE BASIN IS DRY.
3. DISPOSAL OF DEBRIS, TRASH, SEDIMENT AND OTHER WASTE MATERIAL MUST BE DONE AT SUITABLE DISPOSAL/ RECYCLING SITES AND IN COMPLIANCE WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL WASTE REGULATIONS.
4. ACCESS POINTS FOR MAINTENANCE ARE REQUIRED ON ALL ENCLOSED AREAS WITHIN SMALL-SCALE INFILTRATION BASIN.
5. STORMWATER BMPS MAY NOT BE USED FOR STOCKPILING OF PLOWED SNOW AND ICE, COMPOST, OR ANY OTHER MATERIAL.

GENERAL NOTES:

1. SEE DRAWING #807121-A FOR UTILITY NOTES.
2. ESTIMATED GROUNDWATER ELEVATION IS FROM THE SITE GEOTECHNICAL INVESTIGATION REPORT.
3. SOIL INVESTIGATION BY GZA GEOENVIRONMENTAL INC. REPORT TITLED "PROPOSED SHARP ROAD SUBSTATION, DATED JUNE 11, 2024, GZA PROJECT NO. 26.0013084.00.

REFERENCE DRAWINGS:

1. STORMWATER & SITE UTILITIES PLAN — DWG. #807121-A
2. UTILITY PROFILES & DETAILS SHEET 1 OF 4 — DWG. #807122-A
3. UTILITY PROFILES & DETAILS SHEET 2 OF 4 — DWG. #807125-A
4. UTILITY PROFILES & DETAILS SHEET 4 OF 4 — DWG. #807126-A

SITE LOCATION
225 SHARP RD
BLOCK 15, LOT 2

APPLICATION CASE #TBD

NO	DATE	DESCRIPTION	DWN	CKD	EXD	APD
		REVISION				

SHARP ROAD SWITCH
230/69KV SWITCHYARD
UTILITY PROFILES & DETAILS
SHEET 2 OF 4
YARD — CIVIL

PSE&G
PUBLIC SERVICE ELECTRIC AND GAS COMPANY
ELECTRIC DELIVERY COMPANY-ASSET RELIABILITY, NEWARK N.J.

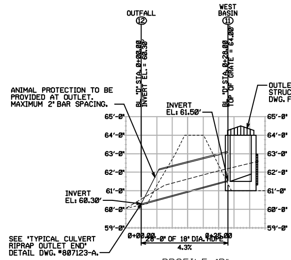
DRAWN: N.SCHUMACHER CHECKED: N.DARRAH SCALE: 1/2"=1'-0"
DATE: 09/23/2025 EXAMINED: E.BURMAN
VBS: S.SCHULZ APPROVED: S.???

807123 A -0P

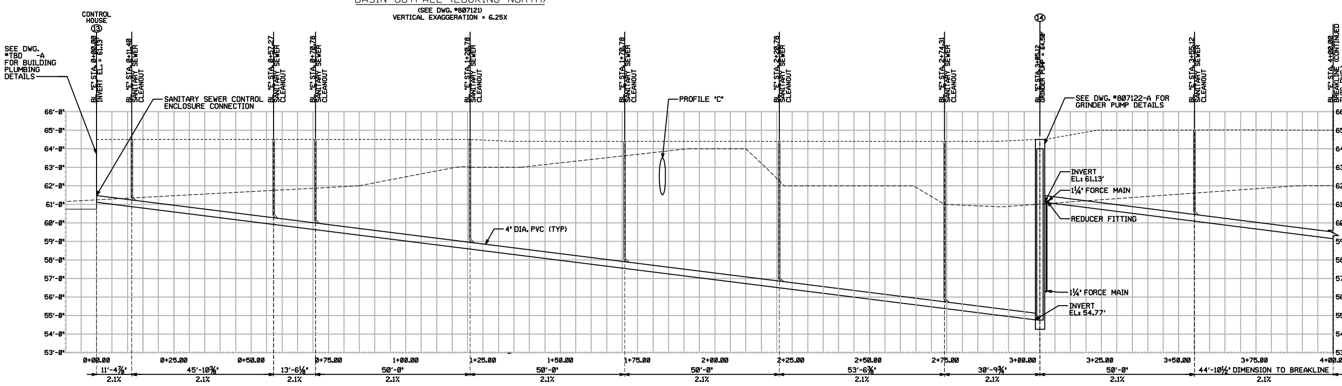
BLACK & VEATCH

DWN	MB
DES	MJS
CHK	NGG
APD	NGG

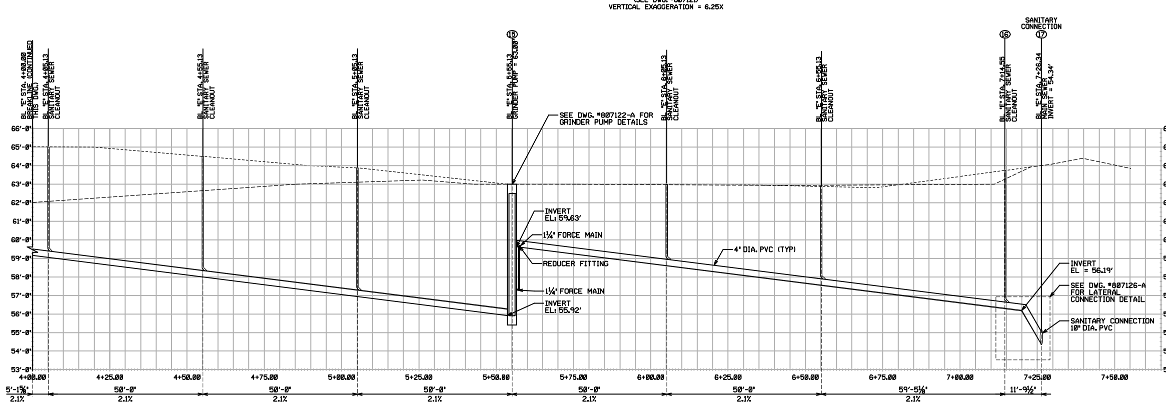
BLACK & VEATCH
1 WORLD TRADE CENTER, SUITE 2100, LONG BEACH, CA 90831
(562) 951-2000



PROFILE "D"
BASIN OUTFALL (LOOKING NORTH)
(SEE DWG. #807121)
VERTICAL EXAGGERATION = 6.25X


CONTROL HOUSE
SEE DWG. #TBD -A FOR BUILDING PLUMBING DETAILS
SANITARY SEWER CONTROL ENCLOSURE CONNECTION
PROFILE "C"
SEE DWG. #807122-A FOR GRINDER PUMP DETAILS
INVERT EL: 61.13'
1¼" FORCE MAIN
REDUCER FITTING
4" DIA. PVC (TYP)
1¼" FORCE MAIN
INVERT EL: 54.77'
44'-10½" DIMENSION TO BREAKLINE

PROFILE "E"
SANITARY SEWER (LOOKING NORTHWEST)
(SEE DWG. #807121)
VERTICAL EXAGGERATION = 6.25X



PROFILE "E"
SANITARY SEWER (LOOKING NORTHWEST)
(SEE DWG. #807121)
VERTICAL EXAGGERATION = 6.25X

LEGEND:
------- PROPOSED GRADE
----- EXISTING GRADE

REFERENCE DRAWINGS:
1. STORMWATER & SITE UTILITIES PLAN DWG. #807121-A
2. UTILITY PROFILES & DETAILS SHEET 1 OF 4 DWG. #807122-A
3. UTILITY PROFILES & DETAILS SHEET 2 OF 4 DWG. #807123-A
4. UTILITY PROFILES & DETAILS SHEET 4 OF 4 DWG. #807126-A

SITE LOCATION
225 SHARP RD BLOCK 15, LOT 2

THE PRESENCE OF UNDERGROUND HAZARDS MAY ONLY BE SHOWN ON OTHER DISCIPLINE DRAWINGS. THE CONTRACTOR IS RESPONSIBLE TO CHECK OTHER DISCIPLINE DRAWINGS FOR UNDERGROUND HAZARDS. CONTRACTOR SHALL FOLLOW PSE&G EXCAVATION PROCEDURE AND EXERCISE EXTREME CAUTION DURING ALL BELOW GRADE WORK.

BLACK & VEATCH

DWN	MB
DES	MLS
CHK	NGG
APD	NGG

BLACK & VEATCH
11401 LAMAR AVE.
OVERLAND PARK, KS 66211
(CORPORATE HEADQUARTERS)

I HEREBY CERTIFY THAT THIS DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF NEW JERSEY.

NICHOLAS G. GASPAR
N.J. PROFESSIONAL ENGINEER NO. GE53074
N.J. COA NO. 24GA27981200

APPLICATION CASE
#TBD

NO	DATE	DESCRIPTION	DWN	CKD	EXD	APD
	/					
	/					
	/					
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	/					
	/					

REVISION

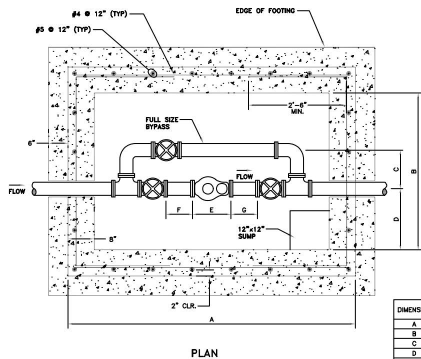
SHARP ROAD SWITCH
230/69KV SWITCHYARD
UTILITY PROFILES & DETAILS
SHEET 3 OF 4

YARD CIVIL

PSEG
PUBLIC SERVICE ELECTRIC AND GAS COMPANY
ELECTRIC DELIVERY COMPANY-ASSET RELIABILITY, NEWARK N. J.

DRAWN M. SCHUMACHER CHECKED N. GASPAR SCALE 1/2"=1'-0"
DATE 04/23/2025 EXAMINED E. SUDMAN
WBS C.92301.1.B.2.1.2.3 APPROVED H. SHAH

807125 A -0P



NOTES

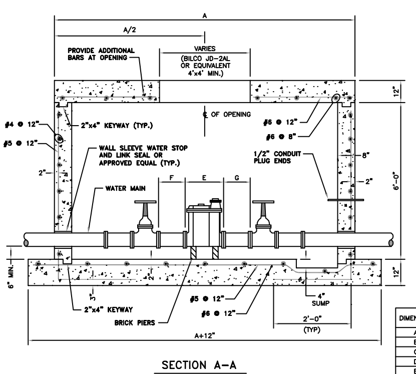
1. METER PITS SHALL ONLY BE USED WHEN APPROVED OR DIRECTED BY THE AUTHORITY.
2. THE DESIGN OF ALL METER PITS MUST BE APPROVED BY THE AUTHORITY.
3. THE MINIMUM CLEARANCE FROM SHUTOFF VALVES TO END OF PIT SHALL BE TWELVE INCHES (12").
4. THE MINIMUM SIDEWALL CLEARANCE OF PIPING SHALL BE TWENTY-FOUR INCHES (24").
5. THE METER PITS SHALL BE: WATERPROOF, FROST PROOF, CONSTRUCTED WITH A SUMP AND HAVE A SUMP PUMP INSTALLED.
6. METER PITS SHALL HAVE A HINGED, LOCKING ACCESS HATCH (MINIMUM SIZE IS 4' X 4'). THE HATCH SHALL BE CONSTRUCTED OF ALUMINIUM AND BE A BILCO JD-2AL OR AN APPROVED EQUAL.
7. A RETRACTABLE LADDER EXTENSION (BILCO LADDER-UP OR EQUAL) SHALL BE PROVIDED.
8. METERS SHALL BE OF THE RADIO READ TYPE. COORDINATE WITH AUTHORITY.

DIMENSION	PIPE SIZE 3"	4"	6"	8"	10"
A	9'-6"	11'-6"	13'-6"	17'-0"	18'-6"
B	6'-0"	6'-0"	6'-0"	8'-0"	8'-0"
C	1'-1¼"	1'-3½"	1'-5½"	1'-11"	2'-3½"
D	3'-0"	2'-8"	2'-6"	4'-0"	3'-8"
E	2'-½"	2'-5½"	3'-1"	4'-5½"	5'-8¾"
F	1'-6"	2'-0"	2'-6"	3'-6"	2'-6"
G	1'-0"	1'-6"	1'-6"	2'-0"	2'-6"

NO.	DATE	REVISIONS
1	5/14	UPDATED AND ADDED NOTES AND TABLE

EVESHAM MUNICIPAL UTILITIES AUTHORITY — METER PIT PLAN VIEW — DATE: 1995 — DWG BY: BAA — SHEET NO. 10W

M:\Projects\M140007\DETAILS\EMUADETS DATE: MAY 15, 2014 TIME: 7:20 AM


A
A/2
PROVIDE ADDITIONAL BARS AT OPENING
VARIES (BILCO JD-2AL OR EQUIVALENT 4'x4' MIN.)
℄ OF OPENING
#4 @ 12"
#5 @ 12"
2"x4" KEYWAY (TYP.)
WALL SLEEVE WATER STOP AND LINK SEAL OR APPROVED EQUAL (TYP.)
WATER MAIN
1/2" CONDUIT PLUG ENDS
2"x4" KEYWAY
BRICK PIERS
4" SUMP
2'-0" (TYP)
A+12"
SECTION A-A

NOTES

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4. THE MINIMUM SIDEWALL CLEARANCE OF PIPING SHALL BE TWENTY-FOUR INCHES (24").
5. THE METER PITS SHALL BE: WATERPROOF, FROST PROOF, CONSTRUCTED WITH A SUMP AND HAVE A SUMP PUMP INSTALLED.
6. METER PITS SHALL HAVE A HINGED, LOCKING ACCESS HATCH (MINIMUM SIZE IS 4' X 4'). THE HATCH SHALL BE CONSTRUCTED OF ALUMINIUM AND BE A BILCO JD-2AL OR AN APPROVED EQUAL.
7. A RETRACTABLE LADDER EXTENSION (BILCO LADDER-UP OR EQUAL) SHALL BE PROVIDED.
8. METERS SHALL BE OF THE RADIO READ TYPE. COORDINATE WITH AUTHORITY.

DIMENSION	PIPE SIZE 3"	4"	6"	8"	10"
A	9'-6"	11'-6"	13'-6"	17'-0"	18'-6"
B	6'-0"	6'-0"	6'-0"	8'-0"	8'-0"
C	1'-1¼"	1'-3½"	1'-5½"	1'-11"	2'-3½"
D	3'-0"	2'-8"	2'-6"	4'-0"	3'-8"
E	2'-½"	2'-5½"	3'-1"	4'-5½"	5'-8¾"
F	1'-6"	2'-0"	2'-6"	3'-6"	2'-6"
G	1'-0"	1'-6"	1'-6"	2'-0"	2'-6"

NO.	DATE	REVISIONS
1	5/14	UPDATED AND ADDED NOTES AND TABLE

EVESHAM MUNICIPAL UTILITIES AUTHORITY — METER PIT SECTION VIEW — DATE: 1995 — DWG BY: BAA — SHEET NO. 11W

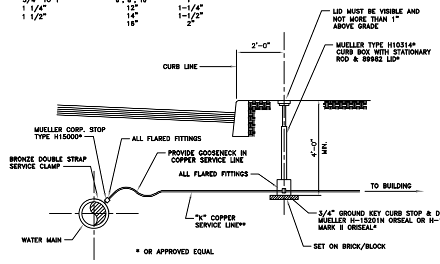
M:\Projects\M140007\DETAILS\EMUADETS DATE: MAY 15, 2014 TIME: 7:20 AM

SERVICE SIZES

"K" Copper Service	Dia.
0 to 100 ft.	3/4" TO 1"
101 to 200 ft.	1 1/4"
201 to 300 ft.	1 1/2"

MAXIMUM TAP SIZES

MAIN SIZE	LARGEST DIRECT TAP SIZE
6", 8", 10"	1"
12"	1-1/4"
14"	1-1/2"
16"	2"


CURB LINE
2'-0"
LID MUST BE VISIBLE AND NOT MORE THAN 1" ABOVE GRADE
MUELLER TYPE H10314* CURB BOX WITH STATIONARY ROD & 89982 LID*
MUELLER CORP. STOP TYPE H15000*
ALL FLARED FITTINGS
BRONZE DOUBLE STRAP SERVICE CLAMP
PROVIDE GOOSENECK IN COPPER SERVICE LINE
ALL FLARED FITTINGS
4'-0" MIN.
TO BUILDING
"K" COPPER SERVICE LINE**
3/4" GROUND KEY CURB STOP & DRAIN, MUELLER H-15201N ORSEAL OR H-15204N MARK II ORISEAL*
SET ON BRICK/BLOCK
WATER MAIN
* OR APPROVED EQUAL

NOTE:

1. CURB BOX SHALL NOT BE LOCATED IN DRIVEWAY, DRIVEWAY APRON OR SIDEWALK.
2. THE CONTRACTOR WILL BE REQUIRED TO USE A SERVICE SADDLE WHEN THE LARGEST TAP SIZE HAS BEEN EXCEEDED. THE SERVICE SADDLE SHALL BE A MUELLER DR2S SERIES WITH DOUBLE STAINLESS STEEL STRAPS OR APPROVED EQUAL.

NO.	DATE	REVISIONS
2	3/5/2014	UPDATED CURB STOP NOTE
1	11/20/07	ADDED MAXIMUM TAP SIZE TABLE AND NOTE

EVESHAM MUNICIPAL UTILITIES AUTHORITY — WATER SERVICE CONNECTION — DATE: 1995 — DWG BY: BAA — SHEET NO. 12W

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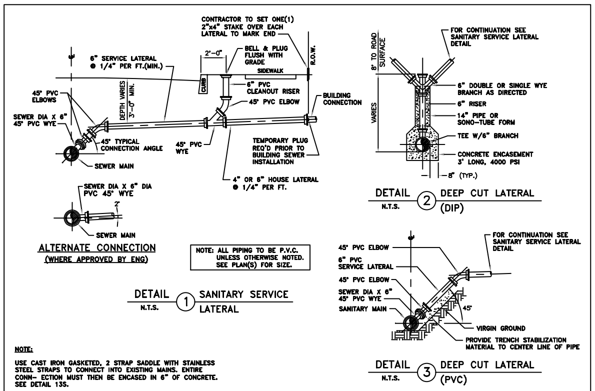
CONTRACTOR TO SET ONE(1) 2"x4" STAKE OVER EACH LATERAL TO MARK END
6" SERVICE LATERAL @ 1/4" PER FT.(MIN.)
BELL & PLUG FLUSH WITH GRADE
R.O.W.
SIDEWALK
6" PVC CLEANOUT RISER
45° PVC ELBOW
BUILDING CONNECTION
45° PVC ELBOWS
SEWER DIA X 6" 45° PVC WYE
45° TYPICAL CONNECTION ANGLE
45° PVC WYE
TEMPORARY PLUG REQ'D PRIOR TO BUILDING SEWER INSTALLATION
SEWER MAIN
4" OR 6" HOUSE LATERAL @ 1/4" PER FT.
SEWER DIA X 6" DIA PVC 45° WYE
SEWER MAIN
ALTERNATE CONNECTION
(WHERE APPROVED BY ENG)
NOTE: ALL PIPING TO BE P.V.C. UNLESS OTHERWISE NOTED. SEE PLAN(S) FOR SIZE.
DETAIL 1 SANITARY SERVICE LATERAL N.T.S.
FOR CONTINUATION SEE SANITARY SERVICE LATERAL DETAIL
6" DOUBLE OR SINGLE WYE BRANCH AS DIRECTED
6" RISER
14" PIPE OR SONO-TUBE FORM
TEE W/6" BRANCH
CONCRETE ENCASEMENT 3' LONG, 4000 PSI
8" (TYP.)
VARIES
DETAIL 2 DEEP CUT LATERAL (DIP) N.T.S.
45° PVC ELBOW
6" PVC SERVICE LATERAL
45° PVC ELBOW
SEWER DIA X 6" 45° PVC WYE
SANITARY MAIN
VIRGIN GROUND
PROVIDE TRENCH STABILIZATION MATERIAL TO CENTER LINE OF PIPE
DETAIL 3 DEEP CUT LATERAL (PVC) N.T.S.

NOTE:

USE CAST IRON GASKETED, 2 STRAP SADDLE WITH STAINLESS STEEL STRAPS TO CONNECT INTO EXISTING MAINS. ENTIRE CONN- ECTION MUST THEN BE ENCASED IN 6" OF CONCRETE. SEE DETAIL 13S.

NO.	DATE	REVISIONS

EVESHAM MUNICIPAL UTILITIES AUTHORITY — SANITARY SEWER SERVICE LATERAL — DATE: 1995 — DWG BY: BAA — SHEET NO. 8S

M:\Projects\M140007\DETAILS\EMUADETS DATE: AUG 31, 2012 TIME: 8:12 AM

REFERENCE DRAWINGS:

1. STORMWATER & SITE UTILITIES PLAN — DWG. *807121-A
2. UTILITY PROFILES & DETAILS SHEET 1 OF 4 — DWG. *807122-A
3. UTILITY PROFILES & DETAILS SHEET 2 OF 4 — DWG. *807123-A
4. UTILITY PROFILES & DETAILS SHEET 3 OF 4 — DWG. *807125-A

APPLICATION CASE #TBD

NO	DATE	DESCRIPTION	DWN	CKD	EXD	APD
	/					
	/					
	/					
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REVISION

SITE LOCATION
225 SHARP RD
BLOCK 15, LOT 2

THE PRESENCE OF UNDERGROUND HAZARDS MAY ONLY BE SHOWN ON OTHER DISCIPLINE DRAWINGS. THE CONTRACTOR IS RESPONSIBLE TO CHECK OTHER DISCIPLINE DRAWINGS FOR UNDERGROUND HAZARDS. CONTRACTOR SHALL FOLLOW PSE&G EXCAVATION PROCEDURE AND EXERCISE EXTREME CAUTION DURING ALL BELOW GRADE WORK.

BLACK & VEATCH — DWN MB — DES MLS — CHK NGG — APD NGG

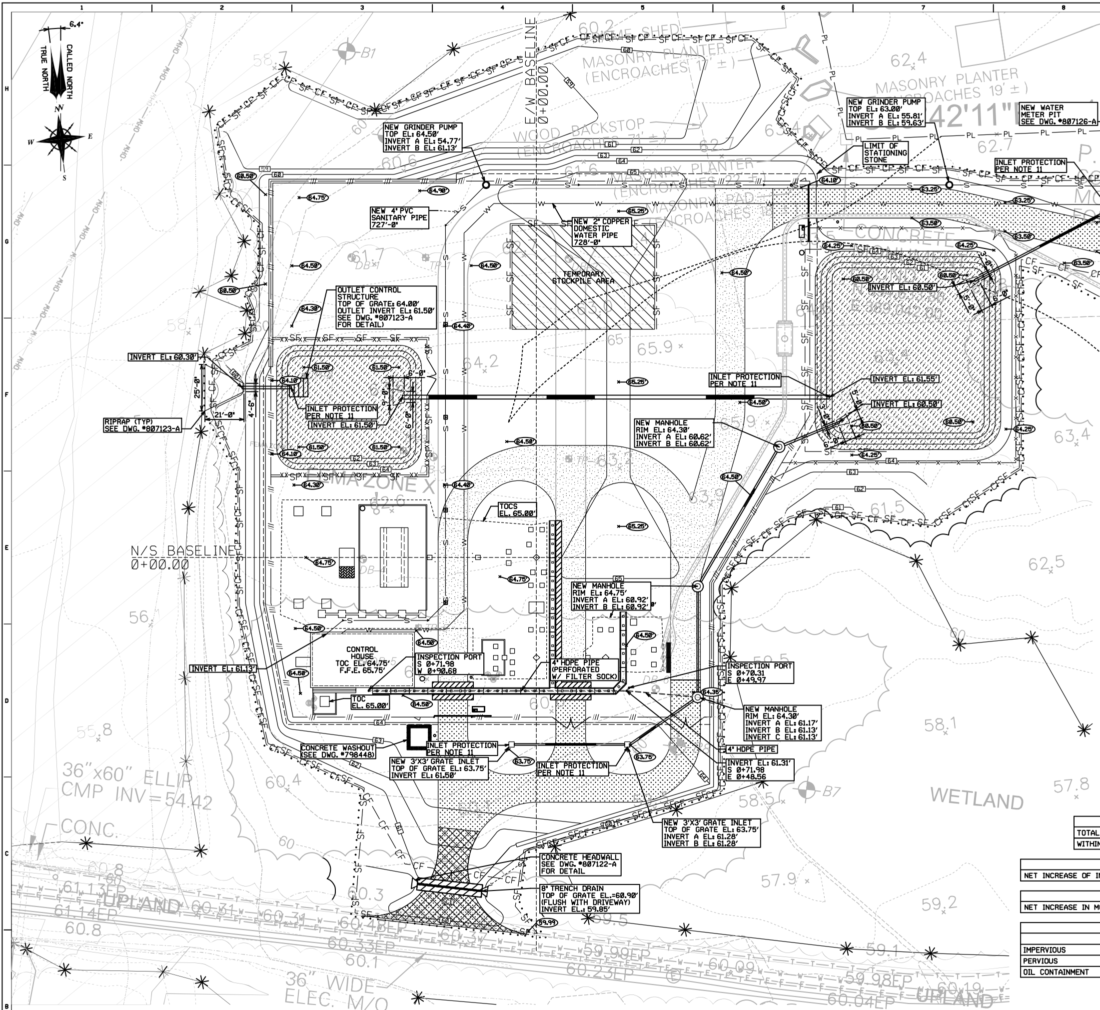
SHARP ROAD SWITCH
230/69KV SWITCHYARD
UTILITY PROFILES & DETAILS
SHEET 4 OF 4

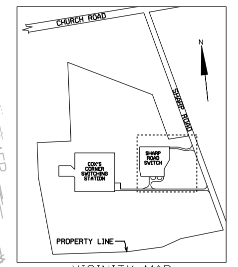
YARD — CIVIL

PSEG
PUBLIC SERVICE ELECTRIC AND GAS COMPANY
ELECTRIC DELIVERY COMPANY-ASSET RELIABILITY, NEWARK N.J.

DRAWN M. SCHUMACHER — CHECKED N. GASPAR — SCALE 1/2"=1'-0"
DATE 04/23/2025 — EXAMINED E. SUDMAN
WBS C.92301.1.B.2.1.2.3 — APPROVED H. SHAH

807126 A -0P





VICINITY MAP

SOIL COMPACTION REMEDIATION NOTE:

1. MITIGATION OF EXCESSIVE SOIL COMPACTION TO OCCUR WHERE PERMANENT VEGETATION IS TO BE ESTABLISHED. SUBSOIL COMPACTION REMEDIATION SUCH AS SCARIFICATION/TILLAGE (6" MIN. DEPTH) TO OCCUR PRIOR TO PLACEMENT OF TOPSOIL.

LEGEND:

- PROPERTY LINE
- EXISTING SPOT ELEVATION
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING WATER LINE
- EXISTING ELECTRICAL LINE
- EXISTING SANITARY LINE
- EXISTING TELECOM LINE
- EXISTING OVERHEAD WIRES
- TREE LINE
- SURVEY REFERENCE POINTS
- WETLANDS BORDER
- WETLANDS BUFFER
- LIMITS OF STATION STONE SURFACING
- PROPOSED CONTOURS
- PROPOSED SPOT ELEVATIONS
- 8' HIGH ANTI-CUT/CLIMB FENCE
- CHAIN LINK FENCE (8' HIGH)
- CHAIN LINK FENCE (4' HIGH)
- PROPOSED SANITARY LINE
- PROPOSED WATER LINE
- LIMITS OF DISTURBANCE
- SUPER SILT FENCE
- CONSTRUCTION FENCE
- MACADAM STATION ACCESS DRIVE
- ASPHALT DRIVE
- CONCRETE TRENCH APRON
- INFILTRATION BASIN (DETAIL ON DWG. #807123-A)
- SCE STABILIZED CONSTRUCTION ENTRANCE

LIMITS OF DISTURBANCE		
TOTAL:	153,425 SF	3.52 AC
WITHIN PROPERTY LIMITS:	151,350 SF	3.47 AC

	PROPOSED	DESIGN COND.
NET INCREASE OF IMPERVIOUS AREA =	0.50 AC	0.76 AC

	PROPOSED	DESIGN COND.
NET INCREASE IN MOTOR VEHICLE SURFACE =	0.41 AC	0.58 AC

COVER AREAS	EXISTING	PROPOSED	DESIGN COND.
IMPERVIOUS	0.00 AC	0.57 AC	0.76 AC
PERVIOUS	3.47 AC	2.86 AC	2.63 AC
OIL CONTAINMENT	0.00 AC	0.04 AC	0.08 AC

SOIL NOTES:

1. SOIL TYPES ON SITE: ADMA - ADELPHIA FINE SANDY LOAM, 0-2% SLOPES; HOAB - HOLMDEL LOAMY SAND, 0-5% SLOPES; SHSA SHREWSBURY FINE SANDY LOAM, 0-2% SLOPES
2. SOILS INFORMATION BASED ON USDA SOILS MAP OF BURLINGTON COUNTY, NEW JERSEY.

SITE FLOOD NOTES:

1. PROPOSED SITE FALLS PARTIALLY WITHIN 100 YEAR FLOODPLAIN LINE AND NJ FHA DESIGN FLOOD LINE (FEMA ZONE TBD)
2. FLOOD INFORMATION BASED ON "FIRM, FLOOD INSURANCE RATE MAP, BURLINGTON COUNTY, NEW JERSEY (ALL JURISDICTIONS), PANEL NUMBER 261 OF 651, MAP NUMBER 34005C0261F". EFFECTIVE DATE 12/21/2017.

GENERAL NOTES:

1. PRIOR TO ANY LAND DISTURBANCE, THE LIMITS OF DISTURBANCE, LIMITS OF GRADING AND LOCATION OF EROSION AND CONTROL DEVICES SHALL BE FIELD STAKED.
2. NO CHANGES SHALL BE MADE TO THE SOIL EROSION AND SEDIMENT CONTROL PLANS WITHOUT APPROVAL OF THE COMPANY CONSTRUCTION MANAGER AND THE NEW JERSEY LICENSED PROFESSIONAL ENGINEER CHARGED WITH SUPERVISION OF THE CONSTRUCTION OF THE SOIL EROSION AND SEDIMENT CONTROL MEASURES. THE CHANGES SHALL BE DOCUMENTED IN AN AS-BUILT PLAN, WHICH SHALL BE SIGNED AND SEALED BY THE SUPERVISING ENGINEER.
3. SOIL STOCKPILES MAY BE RELOCATED WITHIN THE LOD. SIZE AND LOCATION AT CONTRACTORS DISCRETION.
4. ALL SITE WORK SHALL BE IN ACCORDANCE WITH THE PSE&G GENERAL SPECIFICATION '16-CIVIL 04' PAVING FOR SWITCHING AND SUBSTATIONS," AND '21-CIVIL 05' "EXCAVATION AND TRENCHING FOR SWITCHING AND SUBSTATIONS.
5. SOIL INVESTIGATION BY GZA GEOENVIRONMENTAL, INC. REPORT TITLED "PROPOSED SHARP ROAD SUBSTATION", DATED JUNE 11, 2024, GZA PROJECT NO. 26.0093004.00
6. ALL FRESHLY GRADED AREAS SHALL RECEIVE ROCK SURFACING TO BE 2" OF 3/4" CLEAN CRUSHED TEMPORARY STABILIZING STONE.
7. ALL GRADING ACTIVITIES AND SUBSEQUENT SOIL STABILIZATION METHODS SHALL PROGRESS IN THE MANNER SPECIFIED IN THE CONSTRUCTION SEQUENCE.
8. CONTRACTOR SHALL ESTABLISH SURVEYING CONTROL FOR GRADING AND CONSTRUCTION.
9. ALL DISTURBED AREAS NOT COVERED WITH ROCK SURFACING SHALL BE COVERED WITH EROSION MATTING OR STABILIZED IN ACCORDANCE WITH THE SEEDING SCHEDULE NOTED ON DWG. #798448 OR IN ACCORDANCE WITH LANDSCAPE PLAN.
10. AT THE DISCRETION OF THE CONTRACTOR, CONCRETE WASHOUT MAY BE PLACED IN A MORE SUITABLE LOCATION OR RELOCATED DURING CONSTRUCTION AS NEEDED BASED ON THE CONSTRUCTION SEQUENCE AND CONSTRUCTION TRAFFIC.
11. INLET PROTECTION SHALL BE PLACED AFTER INLET INSTALLATION AND PRIOR TO INITIAL OPERATION OF STORMWATER SYSTEM. INLET PROTECTION SHALL NOT BE REMOVED UNTIL FINAL SITE STABILIZATION HAS TAKEN PLACE, AND VEGETAION (IF ANY) HAS BEEN ESTABLISHED. INLET PROTECTION SHALL NOT BE REMOVED UNTIL SITE IS SECURE AND CONSTRUCTION ACTIVITIES HAVE CONCLUDED.

REFERENCE DRAWINGS:

1. GRADING PLAN — DWG. #798446-A
2. SOIL EROSION AND SEDIMENT CONTROL NOTES AND DETAILS — DWG. #798448-A

APPROXIMATE SEQUENCE OF CONSTRUCTION	
ACTIVITY	ESTIMATED DURATION (CALENDAR DAYS)
INSTALL SOIL EROSION AND SEDIMENT CONTROL DEVICES	5
INSTALL STABILIZED CONSTRUCTION ENTRANCES	3
CLEAR EXISTING TREES AND VEGETATION	5
PERFORM INITIAL GRADING ACTIVITIES AND INSTALL TEMPORARY SITE STABILIZATION AND AGGREGATE SURFACING	20
INSTALL NEW STORWATER MANAGEMENT SYSTEM	15
INSTALL TEMPORARY CONSTRUCTION FENCING	3
INSTALL NEW STRUCTURES, EQUIPMENT AND FOUNDATIONS	200
INSTALL NEW SANITARY SEWER AND WATER LINES	10
INSTALL CONTROL BUILDING	15
INSTALL PERIMETER FENCE AND GATES	20
GRADE SITE TO FINAL CONTOURS WHERE APPLICABLE AND SPREAD CRUSHED STONE	10
SCARIFY/TILL, RESTORE TOPSOIL TO SPECIFICATION QUALITY (AS NEEDED), PERMANENTLY STABILIZE AND SEED SITE, INSTALL LANDSCAPING, AND REMOVE SOIL EROSION AND SEDIMENT CONTROL DEVICES	10
TOTAL:	316

SITE LOCATION
225 SHARP RD
BLOCK 15, LOT 2

SURVEY INFORMATION
SURVEY PREPARED BY:
PSE&G SURVEYS & MAPPING 80 PARK PLAZA T20, NEWARK, NJ 07102-4194
DATE OF SURVEY: JULY 5, 2023
SURVEY PREPARED FOR: PSE&G

THE PRESENCE OF UNDERGROUND HAZARDS MAY ONLY BE SHOWN ON OTHER DISCIPLINE DRAWINGS. THE CONTRACTOR IS RESPONSIBLE TO CHECK OTHER DISCIPLINE DRAWINGS FOR UNDERGROUND HAZARDS. CONTRACTOR SHALL FOLLOW PSE&G EXCAVATION PROCEDURE AND EXERCISE EXTREME CAUTION DURING ALL BELOW GRADE WORK.

0 10 20 40
SCALE: 1"=20'-0"

CALL BEFORE YOU DIG!
NEW JERSEY LAW REQUIRES 3 BUSINESS DAYS FOR A MARK OUT. BEGIN DIGGING WITHIN 10 BUSINESS DAYS. TICKET EXPIRES IN 45 BUSINESS DAYS.
NEW JERSEY ONE CALL
1-800-272-1000

BLACK & VEATCH

DWN	MB
DES	MLS
CHK	NGG
APD	NGG

BLACK & VEATCH
11401 LAMAR AVE.
OVERLAND PARK, KS 66211
(CORPORATE HEADQUARTERS)

I HEREBY CERTIFY THAT THIS DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF NEW JERSEY.

NICHOLAS G. GASPAR
N.J. PROFESSIONAL ENGINEER NO. GE53074
N.J. COA NO. 24GA27981200

APPLICATION CASE
#TBD

NO	DATE	DESCRIPTION	DWN	CKD	EXD	APD
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	/					
	/					

REVISION

SHARP ROAD SWITCH

230/69KV SWITCHYARD
SOIL EROSION AND SEDIMENT CONTROL PLAN

YARD — CIVIL

PSEG
PUBLIC SERVICE ELECTRIC AND GAS COMPANY
ELECTRIC DELIVERY COMPANY-ASSET RELIABILITY, NEWARK N.J.

DRAWN M. SCHUMACHER CHECKED N. GASPAR SCALE 1"=20'-0"
DATE 04/23/2025 EXAMINED E. SUDMAN
WBS C.92301.1.B.2.1.2.3 APPROVED H. SHAH

798447 A -0P

BURLINGTON COUNTY SOIL CONSERVATION DISTRICT
SOIL EROSION AND SEDIMENT CONTROL NOTES

1. ALL APPLICABLE EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE IN PLACE PRIOR TO ANY GRADING OPERATION AND/OR INSTALLATION OF PROPOSED STRUCTURES OR UTILITIES.
2. SOIL EROSION AND SEDIMENT CONTROL PRACTICES ON THE PLAN SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE STANDARDS FOR SOIL EROSION AND SEDIMENT CONTROL IN NEW JERSEY.
3. ALL APPLICABLE EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE LEFT IN PLACE UNTIL CONSTRUCTION IS COMPLETED AND/OR THE AREA IS STABILIZED.
4. ANY DISTURBED AREA THAT WILL BE LEFT EXPOSED FOR MORE THAN SIXTY (60) DAYS AND NOT SUBJECT TO CONSTRUCTION TRAFFIC SHALL IMMEDIATELY RECEIVE A TEMPORARY SEEDING AND FERTILIZATION IN ACCORDANCE WITH THE STANDARDS. IF THE SEASON PROHIBITS TEMPORARY SEEDING, THE DISTURBED AREAS WILL BE MULCHED WITH SALT HAY OR EQUIVALENT AND ANCHORED IN ACCORDANCE WITH THE STANDARDS.
5. ALL CRITICAL AREAS SUBJECT TO EROSION WILL RECEIVE A TEMPORARY SEEDING IN COMBINATION WITH STRAW MULCH IN ACCORDANCE WITH THE STANDARDS IMMEDIATELY FOLLOWING ROUGH GRADING.
6. THE SITE SHALL AT ALL TIMES BE GRADED AND MAINTAINED SUCH THAT ALL STORMWATER RUNOFF IS DIVERTED TO SOIL EROSION AND SEDIMENT CONTROL FACILITIES.
7. ALL SOIL EROSION AND SEDIMENT CONTROL STRUCTURES WILL BE INSPECTED AND MAINTAINED ON A REGULAR BASIS AND AFTER EVERY STORM EVENT.
8. SOIL STOCKPILES ARE NOT TO BE LOCATED WITHIN FIFTY (50) FEET OF A FLOODPLAIN, SLOPE, ROADWAY OR DRAINAGE FACILITY. THE BASE OF ALL STOCKPILES SHOULD BE PROTECTED BY A HAY BALE BARRIER OR SEDIMENT FENCE. PROPOSED LOCATIONS MUST BE DELINEATED ON THE PLANS.
9. A CRUSHED STONE TIRE CLEANING PAD WILL BE INSTALLED WHEREVER A CONSTRUCTION ACCESS EXISTS. THE RIP RAP PAD MUST BE 100 FEET IN LENGTH AND THE STONE MUST BE 1.5" - 4" IN SIZE, PLACED 12" THICK AND THE FULL WIDTH OF THE ENTRANCE. IT SHOULD BE UNDERLAIN WITH A SUITABLE SYNTHETIC FILTER FABRIC AND MAINTAINED. THE STRUCTURE MUST BE DELINEATED AND DETAILED ON THE PLANS.
10. IF A STONE CONSTRUCTION ACCESS IS TO BE USED AS AN EXIT ONTO A MAJOR HIGHWAY, A THIRTY (30) FOOT PAVED TRANSITION AREA SHALL BE INSTALLED.
11. ALL DRIVEWAYS MUST BE STABILIZED WITH 2½" CRUSHED STONE OR SUB BASE PRIOR TO INDIVIDUAL LOT CONSTRUCTION.
12. PAVED ROADWAYS MUST BE KEPT CLEAN AT ALL TIMES.
13. ALL CATCH BASIN INLETS WILL BE PROTECTED DURING CONSTRUCTION (FILTER DETAILS APPEAR ON PLAN).
14. ALL STORM DRAINAGE OUTLETS WILL BE STABILIZED BEFORE THE DISCHARGE POINTS BECOME OPERATIONAL.
15. ALL DEWATERING OPERATIONS MUST DISCHARGE DIRECTLY INTO A SEDIMENT FILTRATION DEVICE. THE SEDIMENT FILTER MUST BE PLACED SO AS NOT TO CAUSE EROSION OF THE DOWNSTREAM AREA. FIELD PLACEMENT AND USE OF THE STRUCTURE MUST BE APPROVED BY THE DISTRICT EROSION CONTROL INSPECTOR PRIOR TO COMMENCEMENT OF DEWATERING ACTIVITIES.
16. THE BURLINGTON COUNTY SOIL CONSERVATION DISTRICT SHALL BE NOTIFIED 72 HOURS PRIOR TO ANY LAND DISTURBANCE.
17. SOIL HAVING A PH OF 4.0 OR LESS OR CONTAINING IRON SULFIDE MUST BE COVERED WITH A MINIMUM OF 12 INCHES OF SOIL HAVING A PH OF 5.0 OR MORE BEFORE SEEDBED PREPARATION.
18. IT SHALL BE THE RESPONSIBILITY OF THE DEVELOPER TO PROVIDE CONFIRMATION OF LIME, FERTILIZER AND SEED APPLICATION RATES AT THE REQUEST OF THE BURLINGTON COUNTY SOIL CONSERVATION DISTRICT.
19. NJSA 4:24-39, ET SEQ. REQUIRES THAT NO CERTIFICATE OF OCCUPANCY BE ISSUED BEFORE ALL THE PROVISIONS OF THE CERTIFIED SOIL EROSION AND SEDIMENT CONTROL PLAN HAVE BEEN COMPLIED WITH FOR PERMANENT MEASURES. ALL SITE WORK FOR THE PROJECT MUST BE COMPLETED PRIOR TO THE DISTRICT ISSUING A REPORT OF COMPLIANCE AS A PREREQUISITE TO THE ISSUANCE OF A CERTIFICATE OF OCCUPANCY BY THE MUNICIPALITY.
20. NJSA 4:24-39, ET SEQ. REQUIRES THAT UPON PERMANENT SITE STABILIZATION AND COMPLETION OF CONSTRUCTION THE CONTRACTOR SHALL APPLY TO THE SOIL CONSERVATION DISTRICT FOR A FINAL COMPLIANCE INSPECTION TO CHECK THAT ALL THE PROVISIONS OF THE CERTIFIED SOIL EROSION AND SEDIMENT CONTROL PLAN HAVE BEEN COMPLIED WITH FOR PERMANENT MEASURES.
21. OFF-SITE SEDIMENT DISTURBANCE MAY REQUIRE ADDITIONAL CONTROL MEASURES TO BE DETERMINED BY THE DISTRICT EROSION CONTROL INSPECTOR.
22. A COPY OF THE CERTIFIED SOIL EROSION AND SEDIMENT CONTROL PLAN MUST BE MAINTAINED ON THE PROJECT SITE DURING CONSTRUCTION.
23. ANY CONVEYANCE OF THIS PROJECT PRIOR TO ITS COMPLETION WILL TRANSFER FULL RESPONSIBILITY FOR COMPLIANCE WITH THE CERTIFIED PLAN TO ALL SUBSEQUENT OWNERS.
24. IMMEDIATELY AFTER THE COMPLETION OF STRIPPING AND STOCKPILING TOPSOIL, THE STOCKPILE SHALL BE SEEDED WITH TEMPORARY VEGETATION. STABILIZE TOPSOIL STOCKPILES WITH STRAW MULCH FOR PROTECTION IF THE SEASON DOES NOT PERMIT THE ESTABLISHMENT OF TEMPORARY SEED.
25. ANY CHANGES TO THE SITE PLAN WILL REQUIRE THE SUBMISSION OF A REVISED SOIL EROSION AND SEDIMENT CONTROL PLAN TO THE BURLINGTON COUNTY SOIL CONSERVATION DISTRICT. THE REVISED PLAN MUST BE IN ACCORDANCE WITH THE CURRENT STANDARDS FOR SOIL EROSION AND SEDIMENT CONTROL IN NEW JERSEY.
26. MAXIMUM SIDE SLOPES OF ALL EXPOSED SURFACES SHALL NOT BE CONSTRUCTED STEEPER THAN 3:1.
27. THE DISTRICT EROSION CONTROL INSPECTOR MAY REQUIRE ADDITIONAL MEASURES TO BE INSTALLED.
28. IMMEDIATELY PRIOR TO TOPSOIL APPLICATION, THE SUBSOIL SHALL BE EVALUATED FOR COMPACTION IN ACCORDANCE WITH THE STANDARD FOR LAND GRADING. SEE DETAILS.
29. NJSA 4:24-39 ET SEQ. REQUIRES THAT NO CERTIFICATE OF OCCUPANCY BE ISSUED BEFORE THE COMPLETION OF A SOIL COMPACTION MITIGATION VERIFICATION FORM AND CONFIRMATION BY THE DISTRICT INSPECTOR THAT THE COMPACTION MITIGATION REQUIREMENTS IN THE STANDARD FOR LAND GRADING HAVE BEEN SUFFICIENTLY ADDRESSED.
30. THE RESPONSIBILITY FOR EROSION CONTROLS FOR INDIVIDUAL LOTS WILL TRANSFER TO SUBSEQUENT OWNERS OF THE LOT. THIS RESPONSIBILITY WILL BE DESCRIBED IN THE DEED, AND A SINGLE FAMILY HOME PLAN CONTAINING ALL NECESSARY EROSION CONTROLS WILL BE PROVIDED TO THE OWNER.
31. CONCRETE TRUCK WASHOUT AREAS WILL BE MAINTAINED ON A CONTINUAL BASIS AND AS NEEDED.
32. THE STORMWATER POLLUTION PREVENTION PLAN AND THE SPILL RESPONSE PLAN SHALL BE AVAILABLE ON SITE FOR REVIEW BY THE SCD INSPECTOR AND/OR THE NJDEP INSPECTOR.
33. THE SCD INSPECTOR OR NJDEP INSPECTOR MAY REQUIRE ADDITIONAL MEASURES FOR STORMWATER POLLUTION PREVENTION TO BE INSTALLED.
34. INSPECTIONS OF ALL STORMWATER POLLUTION PREVENTION PLAN MEASURES WILL BE CONDUCTED AND DOCUMENTED ON A REGULAR BASIS AND AFTER EVERY STORM EVENT.
35. WASTE COLLECTION CONTAINERS WILL NOT BE PERMITTED TO OVERFLOW.
36. ANY SPILLS OF HAZARDOUS OR SANITARY WASTES WILL BE CLEANED UP IMMEDIATELY, AND IN ACCORDANCE WITH THE SPILL RESPONSE PLAN. SPILL KITS MUST BE AVAILABLE ONSITE OR ADJACENT TO THE SITE.
37. ANY HAZARDOUS SUBSTANCE RELEASES IN EXCESS OF REPORTABLE QUANTITIES (RQ) ESTABLISHED UNDER 40 C.F.R. 110, 117 AND 302 THAT OCCUR WITHIN A 24-HOUR PERIOD MUST BE REPORTED THE NATIONAL RESPONSE CENTER (800 424-8802).

VEGETATIVE STANDARDS FOR SOIL STABILIZATION

SOIL PREPARATION	APPLICATION RATES	
	PERMANENT COVER *	TEMPORARY COVER
FERTILIZER (10-10-10 OR EQUIVALENT WITH 50% WATER INSOLUBLE NITROGEN UNLESS A SOIL TEST INDICATES OTHERWISE AND INCORPORATED INTO THE SURFACE 4 INCHES)	11 LB'S./ 1000 SQ.FT.	11 LB'S./ 1000 SQ.FT.
SLOW RELEASE NITROGEN (38 - 0 - 0 OR EQUIV.)	7 LB'S./ 1000 SQ.FT.	NOT REQUIRED
LIMESTONE (50% CALCIUM PLUS MAGNESIUM OXIDES)	180 LB'S/ 1000 SQ.FT.	135 LB'S./ 1000 SQ.FT.

* SEED OR SOD

GENERAL LOW MAINTENANCE MIXTURE SEEDING		
PERMANENT & TEMPORARY SEEDING ⚠		
MIXTURE	SEEDING RATES	
	LB'S./ACRE	LB'S./1000 SQ.FT.
FINE FESCUE (BLEND) HARD FESCUE CHEWING FESCUE STRONG CREEPING RED FESCUE	130	3.0
KENTUCKY BLUEGRASS	45	0.1
PERENNIAL RYEGRASS	20	0.5
plus WHITE CLOVER	5	0.1

⚠ IF SOD IS USED, IT WILL BE AN APPROVED BLUEGRASS / FESCUE MIXTURE

MULCH
(REQUIRED ON ALL SEEDING)

MULCH MATERIALS: UNROTTED SMALL - GRAIN STRAW, HAY OR SALT HAY.

ANCHORING METHOD: CRIMPER, LIQUID MULCH BINDERS, NETTING TIEDOWN.

APPLICATION RATES:
- POST - SEEDING: 70 - 90 LB'S./ 1000 SQ.FT.
- ⊠ MULCH ONLY: 90 - 115 LB'S./ 1000 SQ.FT.

⊠ WHERE SEASON / OTHER CONDITIONS UNSUITABLE FOR PLANTING OR WHERE STABILIZATION IS NEEDED FOR SHORT PERIOD UNTIL MORE SUITABLE PROTECTION CAN BE APPLIED.

TOPSOIL SPECIFICATIONS

1. ACCEPTABLE TOPSOIL SHALL BE RESERVED AND SUBSEQUENTLY APPLIED TO ALL DISTURBED AREAS.
2. ACCEPTABLE TOPSOIL SHALL CONTAIN LESS THAN 5% BY VOLUME OF CINDERS, STONES, SLAG, COARSE FRAGMENTS, GRAVEL, STICKS, ROOTS, TRASH OR OTHER MATERIALS LARGER THAN 1½" DIAMETER. TOP SOIL SHALL BE FREE OF PLANTS AND PLANT PARTS.
3. TEMPORARY TOPSOIL STOCKPILE SHALL BE LOCATED ON SITE AND WITHIN THE LIMITS OF DISTURBANCE. A LINE OF SILT FENCE SHALL BE PLACED ALONG THE DOWNSTREAM SIDE OF THE STOCKPILE.
4. AFTER GRADING AND COMPACTION OF SUBGRADE SURFACES TO THE SPECIFIED ELEVATIONS AND LIMITS, TOPSOIL AND SOIL AMENDMENTS SHALL BE APPLIED.
5. TOPSOIL DISTRIBUTION TO BE A UNIFORM APPLICATION TO AN AVERAGE DEPTH OF 5.0 INCHES, MINIMUM OF 4 INCHES, FIRMED IN PLACE IS REQUIRED. SOILS WITH A PH OF 4.0 OR LESS OR CONTAINING IRON SULFIDE SHALL BE COVERED WITH A MINIMUM DEPTH OF 12 INCHES OF SOIL HAVING A PH OF 5.0 OR MORE, IN ACCORDANCE WITH THE STANDARD FOR MANAGEMENT OF HIGH ACID PRODUCING SOIL (PG. 1-1).
6. TOPSOIL SHALL NOT BE PLACED WHILE THE TOPSOIL OR SUBGRADE IS FROZEN OR MUDDY.
7. IMPORTED TOPSOIL SHALL HAVE A MINIMUM ORGANIC MATTER CONTENT OF 2.75 PERCENT. ORGANIC MATTER CONTENT MAY BE RAISED BY ADDITIVES.

DUST CONTROL METHODS

MULCHES - SEE SOIL EROSION AND SEDIMENT CONTROL NOTE 4, THIS DWG.

VEGETATIVE COVER - SEE VEGETATIVE STANDARDS THIS SHEET.

SPRAY-ON ADHESIVES - ON MINERAL SOILS (NOT EFFECTIVE ON MUCK SOILS). KEEP TRAFFIC OFF THESE AREAS.

TILLAGE - TO ROUGHEN SURFACE AND BRING CLODS TO THE SURFACE. THIS IS A TEMPORARY EMERGENCY MEASURE WHICH SHOULD BE USED BEFORE SOIL BLOWING STARTS. BEGIN PLOWING ON WINDWARD SIDE OF SITE. CHISEL-TYPE PLOW SPACED ABOUT 12 INCHES APART, AND SPRING-TOOTHED HARROWS ARE EXAMPLES OF EQUIPMENT WHICH MAY PRODUCE THE DESIRED EFFECT.

SPRINKLING - SITE IS SPRINKLED UNTIL THE SURFACE IS WET.

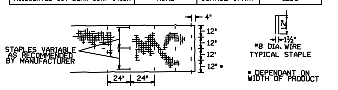
BARRIERS - SOLID BOARD FENCES, SNOW FENCES, BURLAP FENCES, CRATE WALLS, BALES OF HAY, AND SIMILAR MATERIAL CAN BE USED TO CONTROL AIR CURRENTS AND SOIL BLOWING.

CALCIUM CHLORIDE - SHALL BE IN THE FORM OF LOOSE, DRY GRANULES OR FLAKES FINE ENOUGH TO FEED THROUGH COMMONLY USED SPREADERS AT THE RATE THAT WILL KEEP SURFACE MOIST BUT NOT CAUSE POLLUTION OR PLANT DAMAGE. IF USED ON STEEPER SLOPES, THEN USE OTHER PRACTICES TO PREVENT WASHING INTO STREAMS, OR ACCUMULATION AROUND PLANTS.

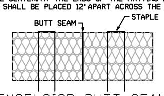
STONE - COVER SURFACE WITH CRUSHED STONE OR GRAVEL.

DUST CONTROL MATERIALS

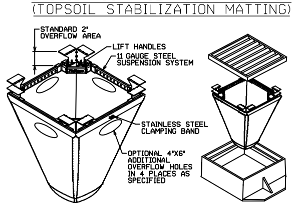
MATERIAL	WATER DILUTION	TYPE OF NOZZLE	APPLY GALLONS/ACRE
ANIONIC ASPHALT EMULSION	7:1	COARSE SPRAY	1200
LATEX EMULSION	12.5:1	FINE SPRAY	235
RESIN IN WATER	4:1	FINE SPRAY	300
POLYACRYLAMIDE (PAM) - SPRAY ON POLYACRYLAMIDE (PAM) - DRY SPREAD	APPLY ACCORDING TO MANUFACTURER'S INSTRUCTIONS. MAY ALSO BE USED AS AN ADDITIVE TO SEDIMENT BASINS TO FLOCCULATE AND PRECIPITATE SUSPENDED COLLOIDS.		
ACIDULATED SOY BEAN SOAP STICK	NONE	COARSE SPRAY	1200



SECURE MATTING AND BLANKETS WITH STAPLES SPACED 24" APART ALONG THE SIDES AND DOWN THE CENTER. AT THE ENDS OF THE MATTING AND AT 50 FOOT INTERVALS STAPLES SHALL BE PLACED 12" APART ACROSS THE WIDTH.



EXCELSIOR BUTT SEAM
EROSION CONTROL MULCH BLANKET
(TOPSOIL STABILIZATION MATTING)

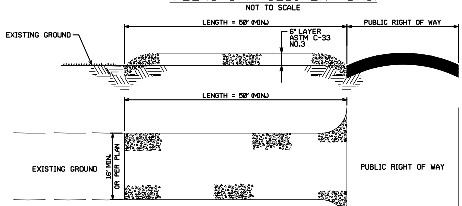


TYPICAL FLAT/RECTANGULAR/ROLLED CURB INLET FILTER (TYPES A, B, C, & D)

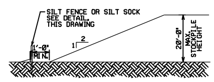
INSTALLATION:
1. REMOVE GRATE
2. DROP FLEXSTORM INLET FILTER ONTO LOAD BEARING LIP OF CASTING OR CONCRETE STRUCTURE
3. REPLACE GRATE

MATERIALS:
1. FRAMING - 11 GAUGE STEEL; CORROSION RESISTANT
2. SEDIMENT BAG - WOVEN GEOTEXTILE (TYPE FF OR APPROVED ALTERNATE); 2 CUBIC FT TYP VOLUME; STAINLESS STEEL LOCKING BAND SECURING BAG TO FRAME

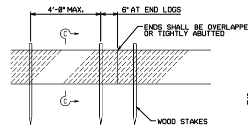
INLET PROTECTION DETAIL
(FLEXSTORM SEDIMENT BAG)
NOT TO SCALE



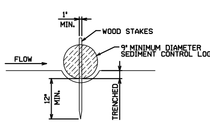
STABILIZED CONSTRUCTION ENTRANCE DETAIL
NOT TO SCALE
QTY = SEE PLAN
(SEE REF. DWG. #798447 FOR LOCATIONS)



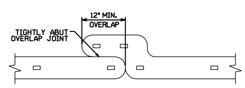
STOCKPILE DETAIL
NOT TO SCALE



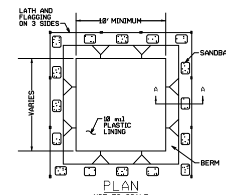
SILT SOCK DETAIL
NOT TO SCALE



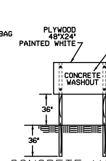
SECTION C-C
NOT TO SCALE



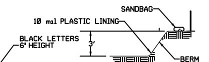
SILT SOCK JOINT DETAIL
NOT TO SCALE



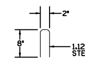
PLAN
NOT TO SCALE
TYPE "BELOW GRADE"



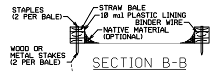
CONCRETE WASHOUT SIGN DETAIL
(OR EQUIVALENT)



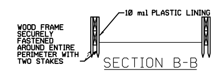
SECTION A-A
NOT TO SCALE



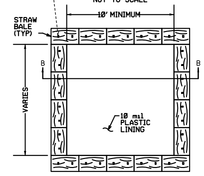
STAPLE DETAIL



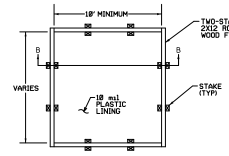
SECTION B-B



SECTION B-B
NOT TO SCALE

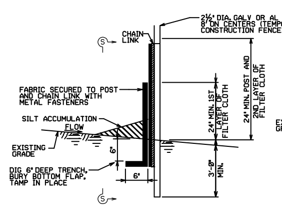


PLAN
NOT TO SCALE
TYPE "ABOVE GRADE"
WITH STRAW BALES

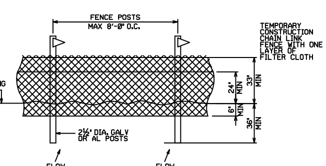


PLAN
NOT TO SCALE
TYPE "ABOVE GROUND"
WITH WOOD PLANKS

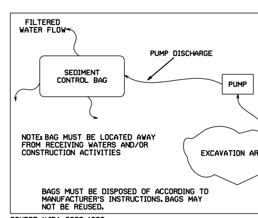
STANDARD CONCRETE WASHOUT
NOT TO SCALE



SUPER SILT FENCE DETAIL
NOT TO SCALE
(QTY = AS REQ'D. - SEE PLAN)



SECTION S-S
NOT TO SCALE



SOURCE: NJDA SSCC 1999
DEWATERING DETAIL

REFERENCE DRAWINGS:
1. SOIL EROSION AND SEDIMENT CONTROL PLAN — DWG. #798447-A

SITE LOCATION
225 SHARP RD BLOCK 15, LOT 2

THE PRESENCE OF UNDERGROUND HAZARDS MAY ONLY BE SHOWN ON OTHER DISCIPLINE DRAWINGS. THE CONTRACTOR IS RESPONSIBLE TO CHECK OTHER DISCIPLINE DRAWINGS FOR UNDERGROUND HAZARDS. CONTRACTOR SHALL FOLLOW PSE&G EXCAVATION PROCEDURE AND EXERCISE EXTREME CAUTION DURING ALL BELOW GRADE WORK.

APPLICATION CASE
#TBD

NO	DATE	DESCRIPTION	DWN	CKD	EXD	APD
	/					
	/					
	/					
	/					
	/					
	/					

REVISION

SHARP ROAD SWITCH
230/69KV SWITCHYARD
SOIL EROSION AND SEDIMENT CONTROL
NOTES AND DETAILS
YARD — CIVIL

PSEG
PUBLIC SERVICE ELECTRIC AND GAS COMPANY
ELECTRIC DELIVERY COMPANY-ASSET RELIABILITY, NEWARK N.J.

BLACK & VEATCH

DWN	MB
DES	MLS
CHK	NGG
APD	NGG

BLACK & VEATCH
11401 LAMAR AVE.
OVERLAND PARK, KS 66211
(CORPORATE HEADQUARTERS)

I HEREBY CERTIFY THAT THIS DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF NEW JERSEY.

NICHOLAS G. GASPAR
N.J. PROFESSIONAL ENGINEER NO. GE53074
N.J. COA NO. 24GA27981200

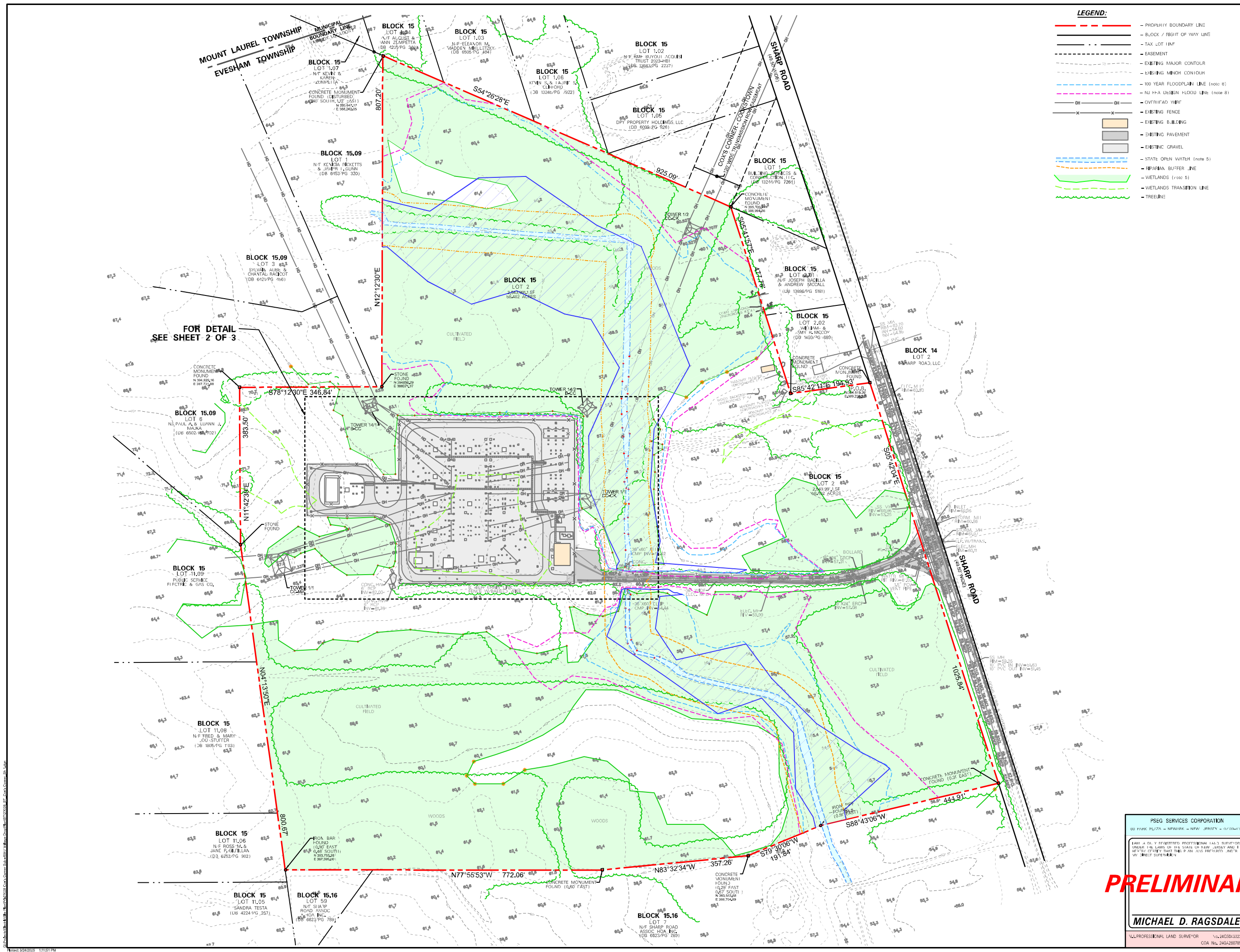
DRAWN M. SCHUMACHER CHECKED N. GASPAR SCALE 1/2"=1'-0"
DATE 04/23/2025 EXAMINED E. SUDMAN
WBS C.92301.1.B.2.1.2.3 APPROVED H. SHAH

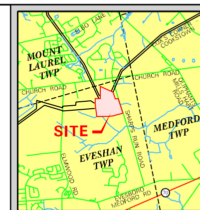
798448 A -0P

Attachment C – Site Location, Site Survey, and Flood Map

SHARP ROAD SWITCH

225 SHARP RD
TOWNSHIP OF EVESHAM
BLOCK 15, LOT 2
BURLINGTON COUNTY
NEW JERSEY





SITE LOCATION MAP

APPROXIMATE SCALE 1" = 3,000'

NADB3 (2011)

NOTES:

1. HORIZONTAL DATUM = NJSPCS NAD83/2011 EPOCH 2010.0 (MYCS2)
   VERTICAL DATUM = NAVD88/GEOID12B
   UNITS = U.S. SURVEY FEET
   ESTABLISHED UTILIZING KEYNET RTK GPS.
2. ALL DISTANCES SHOWN HEREON ARE HORIZONTAL GROUND DISTANCES, UNLESS OTHERWISE NOTED. GROUND DISTANCES MAY BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.99990926 CALCULATED AT THE FOLLOWING COORDINATE N:394,389.72', E:398,465.09', ELEV:62.50'
3. ALL COORDINATES SHOWN ARE GRID.
4. COORDINATES SHOWN ON THIS SURVEY ARE NAD83(2011) & NAVD88(GEOID12B) WITH A DRMS NETWORK ACCURACY OF ±0.03' HORIZONTAL & ±0.06' VERTICAL. LOCAL ACCURACY AT 2DRMS IS ±0.02' HORIZONTAL & ±0.02' VERTICAL.
5. WETLANDS AND STATE OPEN WATER DELINEATED BY ECOLSCIENCES, INC. ON 3/14/2023 AND FIELD LOCATED BY FRALINGER ENGINEERING PA, ON 4/21/2023.
6. THE LOCATION OF SUBSURFACE UTILITIES SHOWN ARE APPROXIMATE AND BASE ON VISIBLE ABOVE GROUND EVIDENCE AND AVAILABLE MAPPING FROM VARIOUS UTILITY PROVIDERS.
7. THIS PLAN WAS PREPARED FOR THE PURPOSE OF SHOWING THE POST-CONSTRUCTION CONDITIONS AT THE COX'S CORNER SUBSTATION IN CONNECTION WITH THE PSE&G 69KV VOLTAGE DROP PROJECT AND REFLECTS THE FIELD CONDITIONS AS OF 4/25/23. THE ORIGINAL SIGNED AND SEALED DOCUMENT IS THE DOCUMENT OF RECORD.
8. 100 FLOODPLAIN LINE AND THE NJ FHA DESIGN FLOOD LINE SHOWN PER HEC-RAS STUDY COMPLETED BY E2PM ON 7/30/2024.

REFERENCES:

1. TAX MAP OF THE EVESHAM, BURLINGTON COUNTY, N.J. SHEET 3.
2. PLAN OF SURVEY OF PREMISES – BLOCK 15 LOT 2, TOWNSHIP OF EVESHAM, COUNTY OF BURLINGTON, N.J. PREPARED BY JOHN G. TEUTTER ASSOCIATES, CAMDEN, N.J. DATED 5/22/1962, REVISED 2/28/1964.
3. LAND MAP, PSE&G CO., LANDS ACQUIRED FOR COX'S CORNER – COOKSTOWN, TRANSMISSION LINE RIGHT OF WAY, REAL ESTATE DEPARTMENT, NEWARK, N.J.
4. PLAN & PROFILE, COX'S CORNER – COOKSTOWN TRANSMISSION LINE, PREPARED BY PSE&G CO., ELECTRIC DEPARTMENT, DATED 10/6/1969, REVISED 2/22/88.
5. AS-BUILT SURVEY, COX'S CORNER SUBSTATION, BLOCK 15, LOT 2, PREPARED BY FRALINGER ENGINEERING PA, 629 SHILOH PIKE, BRIDGETON, NJ 08302, DATED 4/25/23 LAST REVISED 9/16/2024.
6. COX'S CORNER SUBSTATION DITCH CROSS SECTIONS, BLOCK 15, LOT 2, EVESHAM TOWNSHIP, BURLINGTON COUNTY, NEW JERSEY, PREPARED BY FRALINGER ENGINEERING PA, 629 SHILOH PIKE, BRIDGETON, NJ 08302, LAST REVISION DATED 8/14/23.
7. "FIRM, FLOOD INSURANCE RATE MAP, BURLINGTON COUNTY, NEW JERSEY (ALL JURISDICTIONS), PANEL NUMBER 261 of 641, MAP NUMBER 34005C0261F", EFFECTIVE DATE 12/21/2017

100 0 100 200 FEET

SCALE: 1" = 100'

NO	DATE	DESCRIPTION	DWN	CKD
1				

REVISION

PSEG Services Corporation
SURVEYS & MAPPING

CORPRATE HEADQUARTERS
80 Park Plaza T20
Newark, N.J. 07102-4194
Email: surveying@pseg.com

PSEG SERVICES CORPORATION
80 PARK PLAZA – NEWARK – NEW JERSEY – 07102-4194

I AM A DULY REGISTERED PROFESSIONAL LAND SURVEYOR UNDER THE LAWS OF THE STATE OF NEW JERSEY AND I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED UNDER MY DIRECT SUPERVISION

PRELIMINARY

MICHAEL D. RAGSDALE

N.J. PROFESSIONAL LAND SURVEYOR No. 24GS04332300
COA No. 24GA28078500

PSE&G
COX'S CORNER SUBSTATION

BLOCK 15, LOT 2
225 SHARP ROAD

TOWNSHIP OF EVESHAM BURLINGTON COUNTY, N.J.

BOUNDARY & TOPOGRAPHIC SURVEY

DRAWN MP / CML CHECKED AT SCALE AS SHOWN
DATE 3/24/2025 EXAMINED BSG AUTH PRJ-23028

1DWLRQDO)ORRG+D]DUG/D\HU)\,50HWWH

FEMA

/HJHQG

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Attachment D – Station Surfacing Stone Curve Number Calculations

Station Surfacing Stone Curve Number Calculation

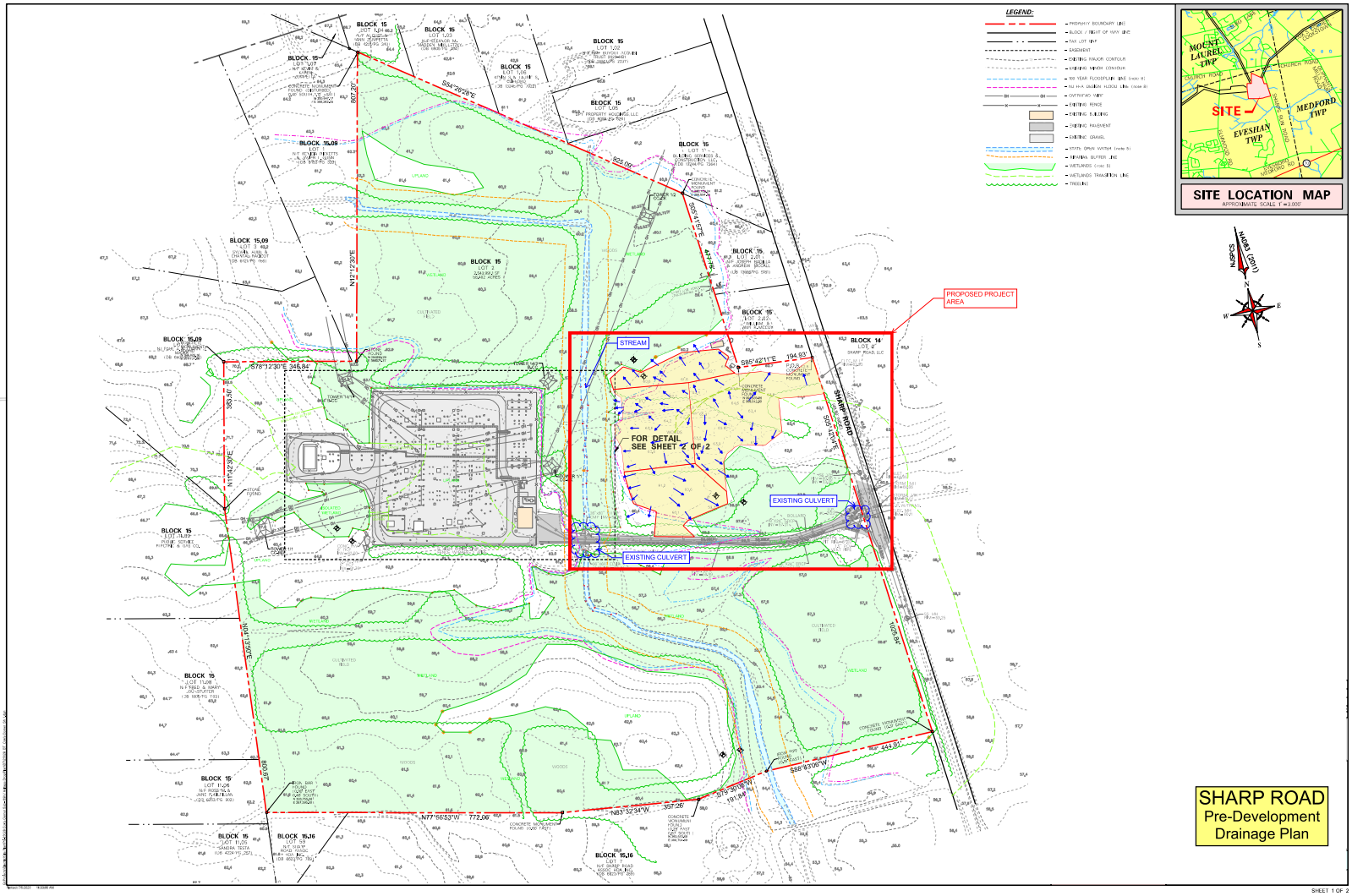
Porosity of crushed stone = 0.4

S = maximum retention = (0.4)(4 inch layer) = 1.6 inches

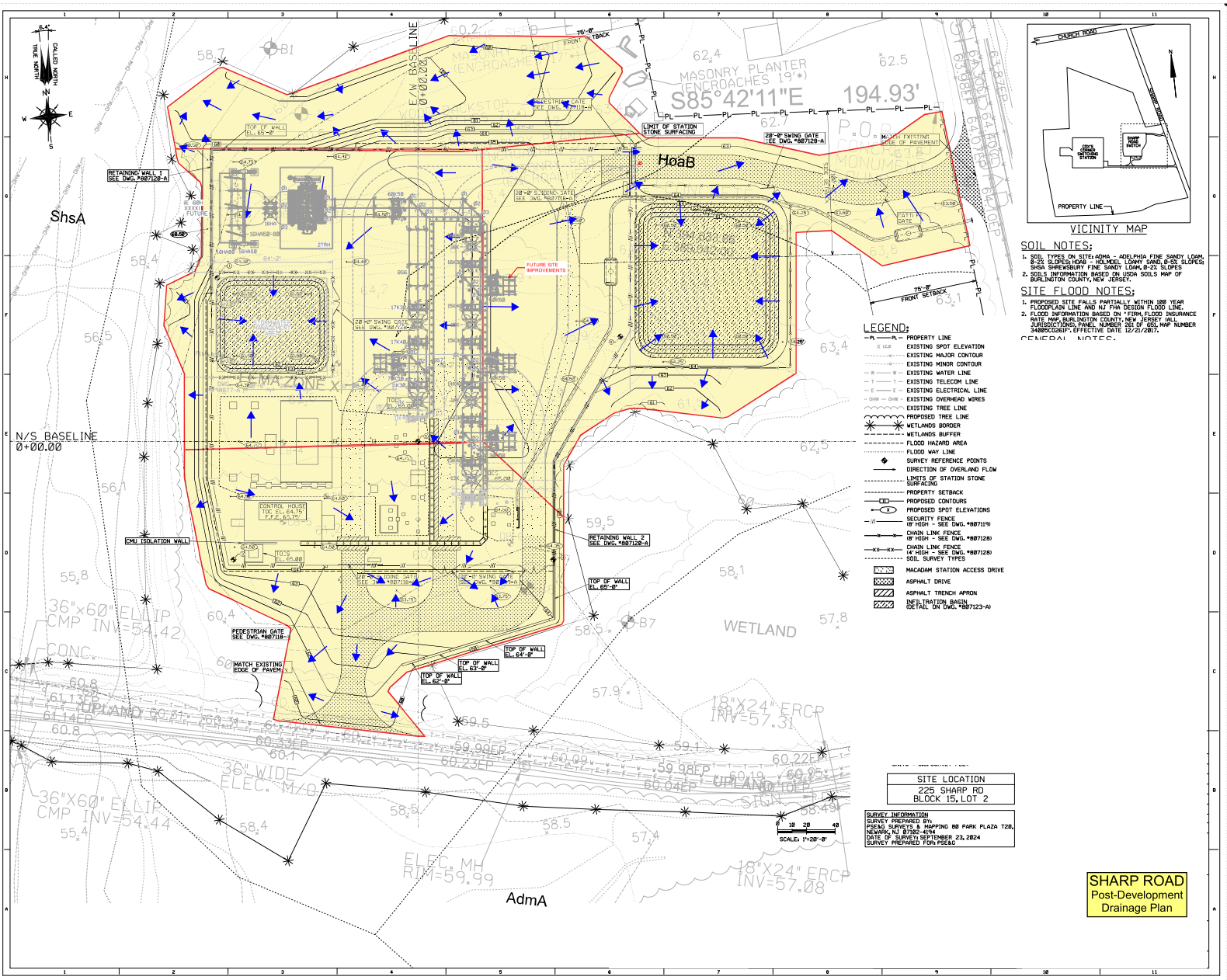
S = (1000/CN – 10) TR-55 eq. 2-4

CN = 1000/(S+10) = 1000/(1.6+10) = 86.2

Attachment E – Pre and Post Development Drainage Plan and Surface Conditions



SHARP ROAD
Pre-Development
Drainage Plan



VICINITY MAP

SOIL NOTES:

1. SOIL TYPES ON SITE: AdMA - ADELPHIA FINE SANDY LOAM, 0-2% SLOPES; HoAB - HOLMDEL LOAMY SAND, 0-5% SLOPES; ShSA SHREWSBURY FINE SANDY LOAM, 0-2% SLOPES
2. SOILS INFORMATION BASED ON USDA SOILS MAP OF BURLINGTON COUNTY, NEW JERSEY.

SITE FLOOD NOTES:

1. PROPOSED SITE FALLS PARTIALLY WITHIN 100 YEAR FLOODPLAIN LINE AND NJ FHA DESIGN FLOOD LINE.
2. FLOOD INFORMATION BASED ON "FIRM, FLOOD INSURANCE RATE MAP, BURLINGTON COUNTY, NEW JERSEY (ALL JURISDICTIONS), PANEL NUMBER 261 OF 695, MAP NUMBER 34005C0261F". EFFECTIVE DATE 12/21/2017.

GENERAL NOTES:

LEGEND:

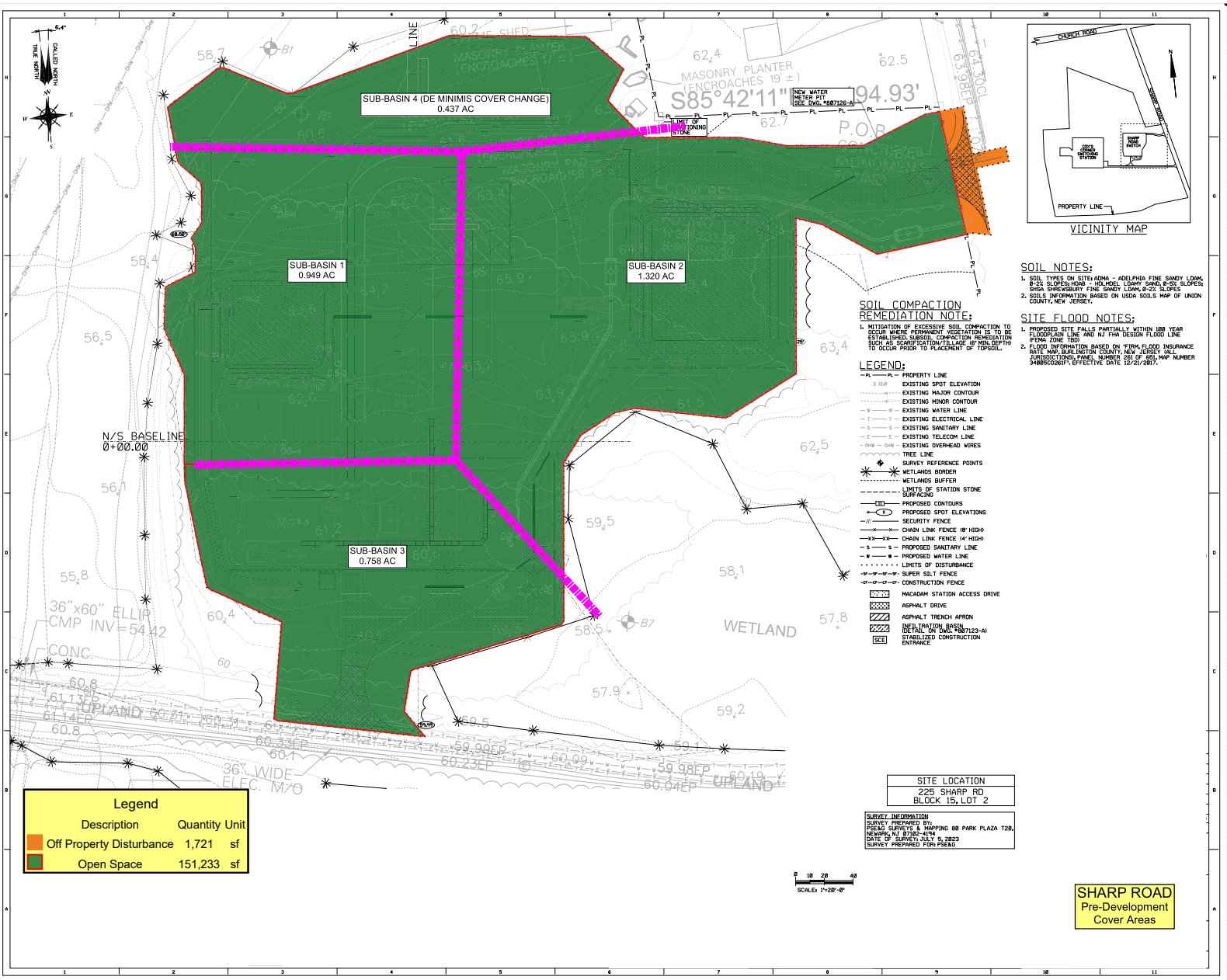
- PROPERTY LINE
- EXISTING SPOT ELEVATION
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING WATER LINE
- EXISTING TELECOM LINE
- EXISTING ELECTRICAL LINE
- EXISTING OVERHEAD WIRES
- EXISTING TREE LINE
- PROPOSED TREE LINE
- WETLANDS BORDER
- WETLANDS BUFFER
- FLOOD HAZARD AREA
- FLOOD WAY LINE
- SURVEY REFERENCE POINTS
- DIRECTION OF OVERLAND FLOW
- LIMITS OF STATION STONE SURFACING
- PROPERTY SETBACK
- PROPOSED CONTOURS
- PROPOSED SPOT ELEVATIONS
- SECURITY FENCE (8' HIGH - SEE DWG. #807119)
- CHAIN LINK FENCE (8' HIGH - SEE DWG. #807128)
- CHAIN LINK FENCE (4' HIGH - SEE DWG. #807128)
- SOIL SURVEY TYPES
- MACADAM STATION ACCESS DRIVE
- ASPHALT DRIVE
- ASPHALT TRENCH APRON
- INFILTRATION BASIN (DETAIL ON DWG. #807123-A)

SITE LOCATION
225 SHARP RD BLOCK 15, LOT 2

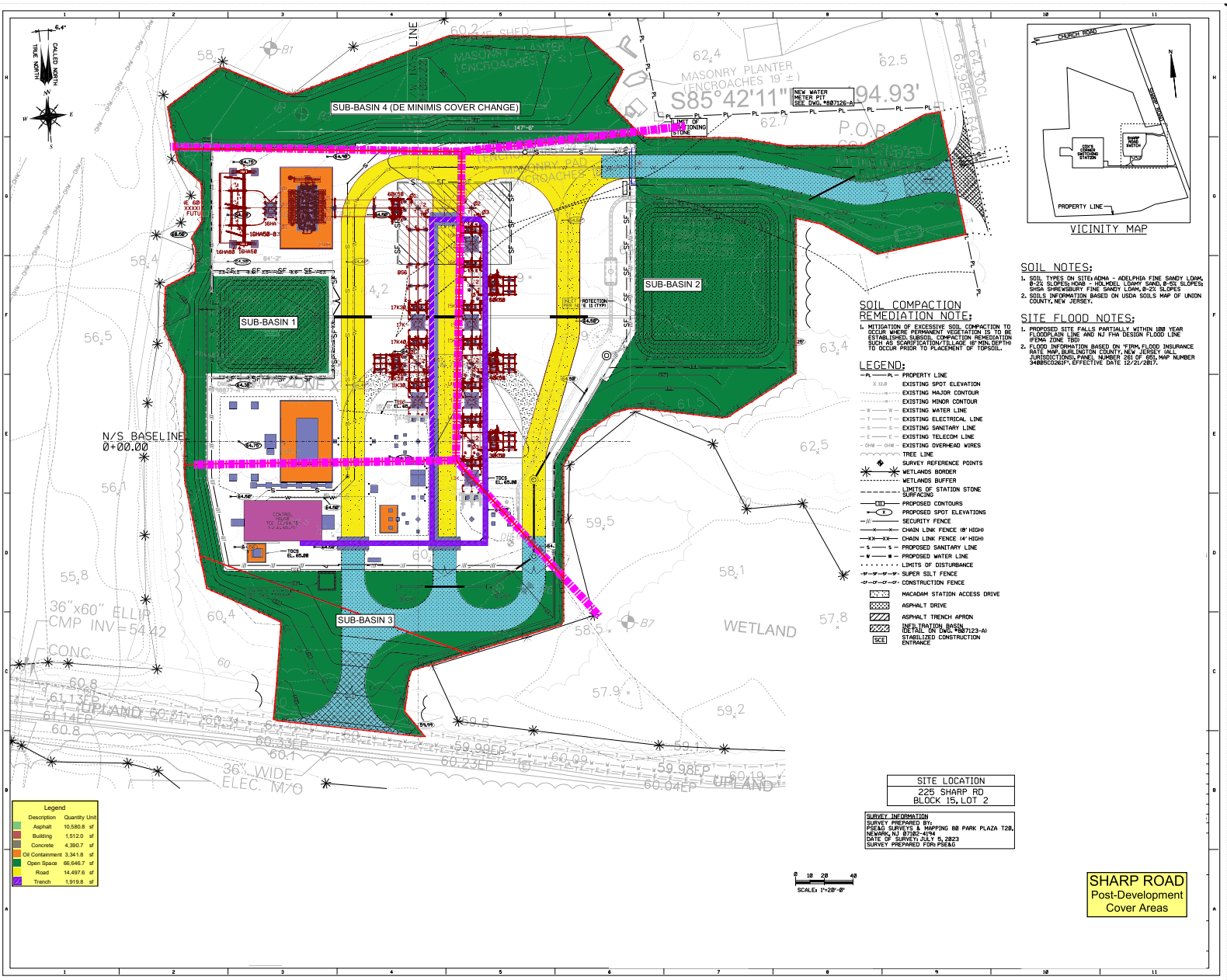
SURVEY INFORMATION
SURVEY PREPARED BY:
PSE&G SURVEYS & MAPPING 80 PARK PLAZA T28, NEWARK, NJ 07102-4194
DATE OF SURVEY: SEPTEMBER 23, 2024
SURVEY PREPARED FOR: PSE&G

SCALE: 1"=20'-0"

SHARP ROAD
Post-Development
Drainage Plan



Legend		
Description	Quantity	Unit
Off Property Disturbance	1,721	sf
Open Space	151,233	sf



VICINITY MAP

SOIL NOTES:

1. SOIL TYPES ON SITE: ADMA - ADELPHIA FINE SANDY LOAM, 0-2% SLOPES; HOAB - HOLMDEL LOAMY SAND, 0-5% SLOPES; SHSA SHREWSBURY FINE SANDY LOAM, 0-2% SLOPES
2. SOILS INFORMATION BASED ON USDA SOILS MAP OF UNION COUNTY, NEW JERSEY.

SITE FLOOD NOTES:

1. PROPOSED SITE FALLS PARTIALLY WITHIN 100 YEAR FLOODPLAIN LINE AND NJ FHA DESIGN FLOOD LINE (FEMA ZONE TBD)
2. FLOOD INFORMATION BASED ON "FIRM, FLOOD INSURANCE RATE MAP, BURLINGTON COUNTY, NEW JERSEY (ALL JURISDICTIONS), PANEL NUMBER 281 OF 653, MAP NUMBER 34005C0261F", EFFECTIVE DATE 12/21/2017.

SOIL COMPACTION REMEDIATION NOTE:

1. MITIGATION OF EXCESSIVE SOIL COMPACTION TO OCCUR WHERE PERMANENT VEGETATION IS TO BE ESTABLISHED. SUBSOIL COMPACTION REMEDIATION SUCH AS SCARIFICATION/TILLAGE (6" MIN. DEPTH) TO OCCUR PRIOR TO PLACEMENT OF TOPSOIL.

LEGEND:

- PROPERTY LINE
- EXISTING SPOT ELEVATION
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING WATER LINE
- EXISTING ELECTRICAL LINE
- EXISTING SANITARY LINE
- EXISTING TELECOM LINE
- EXISTING OVERHEAD WIRES
- TREE LINE
- SURVEY REFERENCE POINTS
- WETLANDS BORDER
- WETLANDS BUFFER
- LIMITS OF STATION STONE SURFACING
- PROPOSED CONTOURS
- PROPOSED SPOT ELEVATIONS
- SECURITY FENCE
- CHAIN LINK FENCE (8' HIGH)
- CHAIN LINK FENCE (4' HIGH)
- PROPOSED SANITARY LINE
- PROPOSED WATER LINE
- LIMITS OF DISTURBANCE
- SUPER SILT FENCE
- CONSTRUCTION FENCE
- MACADAM STATION ACCESS DRIVE
- ASPHALT DRIVE
- ASPHALT TRENCH APRON
- INFILTRATION BASIN (DETAIL ON DWG #887123-A)
- SCE STABILIZED CONSTRUCTION ENTRANCE

Legend		
Description	Quantity	Unit
Asphalt	10,580.8	sf
Building	1,512.0	sf
Concrete	4,390.7	sf
Oil Containment	3,341.8	sf
Open Space	66,646.7	sf
Road	14,497.6	sf
Trench	1,919.8	sf

SITE LOCATION
225 SHARP RD BLOCK 15, LOT 2

SURVEY INFORMATION
SURVEY PREPARED BY:
PSE&G SURVEYS & MAPPING 80 PARK PLAZA T2B,
NEWARK, NJ 07102-4194
DATE OF SURVEY: JULY 5, 2023
SURVEY PREPARED FOR: PSE&G

SCALE: 1"=20'-0"

SHARP ROAD
Post-Development Cover Areas

Attachment F – Policy Map of the State Development and Redevelopment Plan

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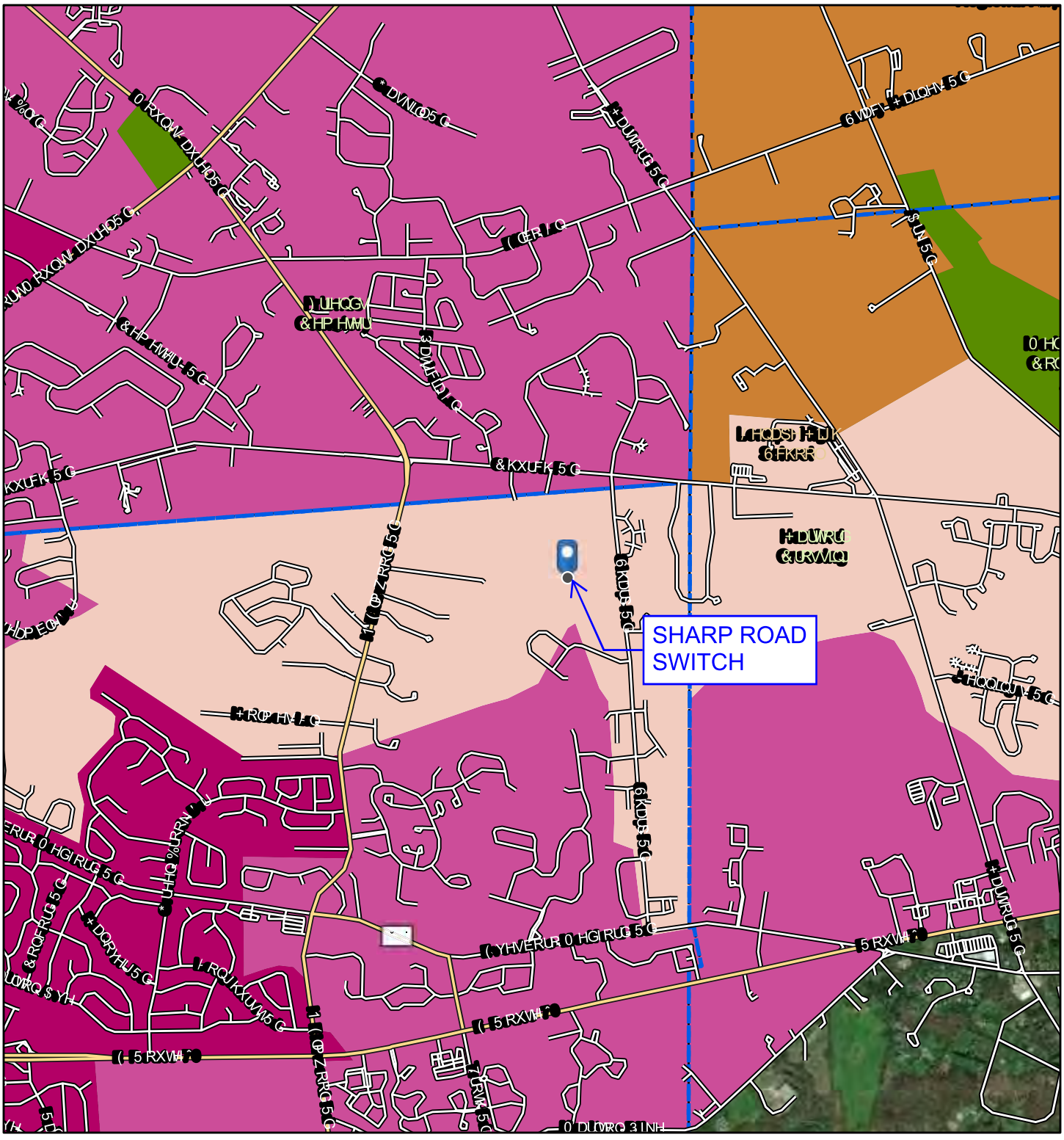

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)ULQJH 3ODQQLQJ $UHD

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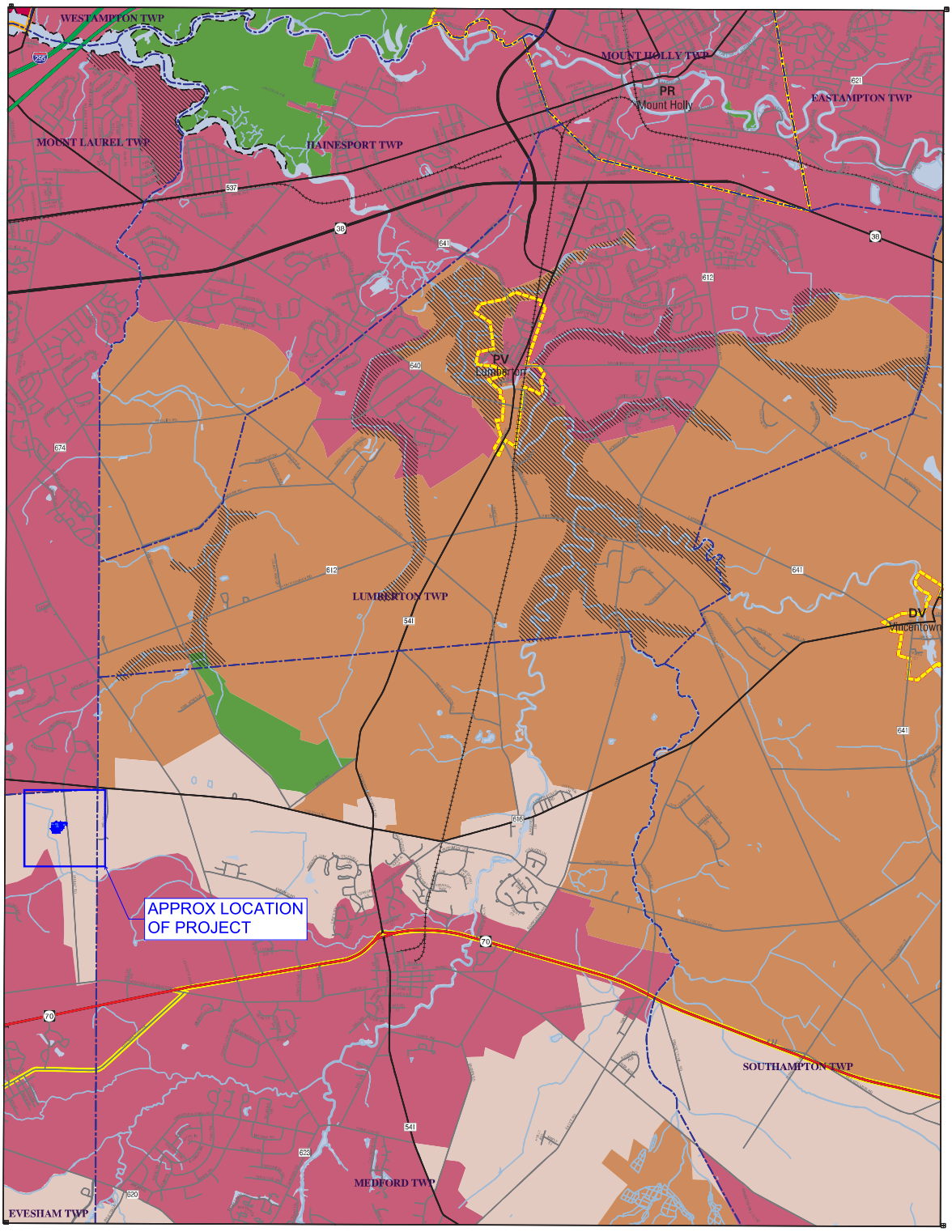
POLICY MAP
of the
New Jersey State Development and Redevelopment Plan

The State Plan is not itself a regulation but a statement of State policy that has been adopted by the State Planning Commission pursuant to statute to guide State, regional and local agencies in the exercise of their statutory authority.

NEW JERSEY
STATE PLANNING COMMISSION
February 2, 2009

Map prepared by the New Jersey Office of Smart Growth. Map was developed in part using digital data from the New Jersey Department of Environmental Protection, New Jersey Department of Transportation and the New Jersey Pinelands Commission. New Jersey State Plane Coordinate System. North American Datum 1983 (NAD83). ⊞ Denotes NAD27.



U C - Urban Center
D R - Designated Regional Center
P R - Proposed Regional Center
I R - Identified Regional Center
D T - Designated Town
P T - Proposed Town
I T - Identified Town
D V - Designated Village
P V - Proposed Village
I V - Identified Village
D H - Designated Hamlet
P H - Proposed Hamlet
I H - Identified Hamlet

- Urban Complex
- Metropolitan Planning Area
- Suburban Planning Area
- Fringe Planning Area
- Rural Planning Area
- Rural/Env.Sensitive Plannng Area
- Env. Sensitive Planning Area
- Env. Sens./Barrier Is. Planning Area
- Parks & Natural Areas
- Military Installations
- Hackensack Meadowlands
- Water
- Critical Environmental Site
- Historic & Cultural Site
- Node
- Core
- Endorsed Plan
- Center
- Municipal Boundary
- County Boundary
- CAFRA Boundary
- Interstate & Toll Roads
- US & State Roads
- Rail Lines & Commuter Stations
- Highlands Planning Area
- Highlands Preservation Area
- Protection
- Conservation
- Conservation Constrained
- Existing Community
- Existing Community Constrained
- Lake Community
- Wildlife Management
- State Designated Pinelands Area- (2007)
- Pinelands Regional Growth Area
- Pinelands Town
- Pinelands Village
- Pinelands Rural Development Area
- Pinelands Agricultural Production Area
- Pinelands Special Agricultural Area
- Pinelands Forest & Preservation Area
- Pinelands Military & Federal

I certify that this quadrangle of the State Plan Policy Map was adopted and approved by the New Jersey State Planning Commission on March 1, 2001.

Benjamin L. Spinelli, Secretary

SCALE 1:24000

1 MILE

1 KILOMETER

MOUNT HOLLY, NJ

Attachment G – Geotechnical Investigation

Known for excellence
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REPORT
SOILS AND FOUNDATION INVESTIGATION

Proposed Sharp Road Substation
Marlton, Burlington County, New Jersey
PSE&G

June 11, 2024
File No. 26.0093004.00

PREPARED FOR:
PSE&G
80 Park Plaza T-10
Newark, New Jersey 07101

GZA GeoEnvironmental, Inc.
27 Worlds Fair Dive | Somerset, NJ 08873
732-356-3400

GZA has 32 Offices Nationwide
www.gza.com

GZA
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GEOTECHNICAL
ENVIRONMENTAL
ECOLOGICAL
WATER
CONSTRUCTION MANAGEMENT

27 Worlds Fair Drive
Somerset, NJ
08873
T: 732-356-1400
www.gza.com

June 11, 2024
File No. 26.0093004.00

PSE&G
80 Park Plaza T-10
Newark, New Jersey 07101

Attention: Mr. Eric Sudman, P.E.
Staff Engineer

Report
Soils and Foundation Investigation
Proposed Sharp Road Substation
Marlton, Burlington County, New Jersey
PSE&G

Introduction

This report presents the results of a soils and foundation investigation performed by GZA GeoEnvironmental, Inc. (GZA) for the new Sharp Road Substation to be constructed in Marlton, Burlington County, New Jersey. The station would have an address of 251 Sharp Road and would be located adjacent to the existing Cox Corner Substation. The property is identified as Block 15, Lot 1 on local tax maps and is shown on the Site Location Map, Plate 1. Our work was performed in general accordance with our proposal dated September 7, 2023.

Project Understanding

Our project understanding is based on the following documents which were provided to us in PSE&G's recent request for proposal (RFP):

- General Specific No. 14 Civil 22 -June 2014
- Sharp Road – 69kV Voltage Drop – Boring Plan – July 24, 2023
- Sharp Road – 69kV Voltage Drop – Resistivity Testing Plan
- Marlton – 69kV Voltage Drop – Traverse Locations – July 18, 2023

Proposed Construction

Based on the information provided to us, we understand that the project would consist of the construction of a new 230/69kV station at Cox's Corner to feed an additional 69kV line from the Cox Corner Substation to Medford. The new station would reportedly include the following:

- A 230kV breaker at new 230/69kV transformer
- A 230kV overhead line termination structure including a new 230kV disconnect at new 230/69kV transformer
- A 230/69kV transformer
- A 69kV Breaker with associated disconnects
- Two 69kV disconnects for future installation of a 7 breaker ring expansion
- A new 69kV line and ground disconnect
- A 69kV line with minimum ratings of 800A during normal summer conditions and 1100A during summer emergency conditions
- A new 69kV transformer disconnect switch
- Reserve space for seven breaker 69kV ring bus and a 2nd 230/69kV transformer.
- A new Control House
- Two Station Light and Power (SL&P) transformers near the control house and AC distribution panels

The site would also be developed with interior driveways, fencing and gates, lighting, grounding, lightning protection, and potentially stormwater management BMP's.

Purpose and Scope of Work

The purpose of our services was to:

1) explore the subsurface soil and groundwater conditions at the requested exploration locations shown on the plan provided to us;

2) estimate the relevant geotechnical engineering properties of the encountered materials;

3) evaluate the site foundation requirements considering the anticipated construction and encountered subsurface conditions;

4) recommend appropriate types of foundations for support of the proposed improvements, and provide geotechnical-related foundation design and installation criteria, including an estimate of the Site Class as defined by Chapter 20 of ASCE-7 which is referenced in the International Building Code, New Jersey Edition (IBC-NJ), for seismic design purposes;

5) observe test pit excavations and perform field permeability/percolation tests and/or collect tube samples for laboratory permeability testing at the test pits;

6) obtain two soil samples from up to three test pits (total six samples) and submit them to Geotherm USA for thermal resistivity testing;

7) arrange for a field resistivity survey to be performed; and

8) discuss appropriate earthwork considerations consistent with the proposed construction and encountered subsurface conditions.

To accomplish these purposes, a subsurface exploration program consisting of 8 supervised test borings (SB-1 through SB-8) and 10 supervised stormwater test pits (TP-1 through TP-10) was performed. Prior to advancing the test borings, the areas were scanned with ground-penetrating radar (GPR). The test borings were advanced at the scanned locations using ATV mounted drilling equipment and extended to depths of approximately 52 feet below the ground surface (bgs), except for SB-1 which extended to 102 feet bgs. The test pit locations were also scanned using GPR and then excavated using a Komatsu PC45 track excavator provided by a subcontractor to PSE&G and extended to depths of approximately 7.5 to 10 feet bgs. The approximate locations of the explorations performed for this study are shown on the Plot Plan, Plate 2.

All field work was performed under the direct technical observation of representatives from GZA. Our representatives located the explorations in the field relative to existing surface features, maintained continuous logs of the explorations as the work proceeded, and supervised the soil sampling operations so as to develop the desired subsurface information. Numerous soil samples suitable for identification purposes

were extracted from the borings at closely spaced intervals in general accordance with the procedures of the Standard Penetration Test (ASTM D-1586). Upon completion, the borings were grouted.

In addition, our representative collected bulk and tube samples from the various strata encountered in the test pits. Field percolation tests were completed at approximately 4 feet bgs in TP-2, 7, and 9 to obtain information for stormwater design purposes. Groundwater seepage into the excavations was observed at or above 4 feet in the remaining test pits and therefore a single ring test was not performed at these locations. After the test pits and percolation tests were completed, they were backfilled using the excavated materials.

Detailed descriptions of the encountered subsurface conditions are presented on the Logs of Borings, Plates 3A through 3H and Logs of Test Pits Plates 4A through 4J. The soil samples obtained from the test borings were visually described in general accordance with the Unified Soil Classification System shown on Plate 5, while the soils encountered in stormwater test pits were described using the USDA Soil Classification Chart shown on Plate 6.

All soil samples were brought to our office for further examination in our soil mechanics laboratory. A geotechnical laboratory testing program consisting of mechanical grain-size analyses (ASTM D-6913-04), moisture content determinations (ASTM D-2216), and soil box resistivity tests (ASTM G-57) were performed on selected soil samples to assist in their classification and evaluation. The results of the mechanical grain-size tests are presented on Plates 7A through 7C, Gradation Curves while the results of the natural moisture content determinations are shown on the appropriate boring and test pit logs. Tube samples that were collected from several of the test pits were subjected to laboratory tube permeameter permeability tests for use by the project site engineer in the evaluation of the site stormwater design requirements. The permeability rates are presented on the individual test pit logs.

In addition, eight samples of the near surface soils were submitted to an NJDEP certified laboratory to perform chemical (corrosivity) testing for pH, sulfates, chloride ion, electric conductivity, redox potential, and sulfides. The results of the chemical tests and soil box resistivity tests are presented on Plate 8.

GZA also arranged for performance of a field resistivity survey as outlined in the RFP. The survey was performed by representatives of Quantum Geophysics, Inc. GZA also sent the six samples collected from the test pit excavations (two samples collected from TP-1, 4, and 10) for geothermal testing to an outside laboratory (Geotherm USA) for thermal resistivity testing. The field resistivity report and geothermal test results are provided in Appendix I to this report.

The results of our field explorations and laboratory testing programs have provided the basis for our engineering analyses and design recommendations. The following discussions of our findings and recommendations are subject to the Limitations attached as Appendix II to this report.

Site Conditions

Surface Features: The site is located west of Sharp Road between Nanticoke Court and Wenona Trail. The existing Cox Corner Substation is located directly west of the proposed station site and has a driveway extending off Sharp Road which will also coincide with the south entrance to the substation site. Except for the northern most portion of the site, the site is moderately to densely wooded. High-tension overhead wires extend along the west edge of the site entering into the Cox Corner Substation. Mapped wetlands are shown on the plans provided to us within the wooded area at the southeast corner of the proposed station.

Topographic information provided to us indicates the site crests to approximately Elevation (El.) +65 feet (NAVD88) near the center of the proposed station, then slopes downward to El. +60 feet to both the north and the south. All of the explorations were performed within the wooded area or cleared open lawn area.

Subsurface Conditions: The subsurface explorations encountered the following generalized strata presented in order of increasing depth:

1) Surface Materials: Approximately 1 to 19 inches of topsoil was encountered in the explorations at the ground surface.

2) Glauconitic Sands: The topsoil was underlain by glauconitic silty and clayey sands in all the explorations performed for this study. The glauconitic sands extended the full depth explored in the explorations except for SB-3 and SB-6. The glauconitic sands were typically medium dense but did encountered various loose or very dense layers within the stratum.

3) Sands and Silty Sands: Sands and silty sands were encountered below the glauconitic sands from approximately 60 feet to 100 feet bgs in SB-3 and from approximately 50 to 52 feet bgs (termination depth) in SB-6. These materials were observed to be medium to very dense.

4) Silty Clay: Sandy silty clays were encountered below the sands in SB-3 from approximately 100 feet bgs to 102 feet bgs (termination depth). This material was observed to be very stiff.

Groundwater was encountered in all explorations at depths ranging from approximately 2.5 feet to 7 feet bgs corresponding to approximate El. +54.5 feet to +60 feet. Temporary wells were installed in each of the boreholes (except SB-4 which was performed on the final day of drilling) and left in place overnight to obtain groundwater readings the following day. Water levels at boring SB-4 were estimated at the time of drilling. Actual groundwater levels will vary due to seasonal influences.

Findings and Recommendations

General: Based on the results of our study, it is our opinion that:

1) Following the site preparation procedures described in subsequent sections of this report, the proposed substation equipment and structures could be supported by conventional shallow foundations which derive their support from the undisturbed natural soils or controlled compacted fill installed atop the native bearing soils to reach the desired subgrade levels. Foundations may be designed for maximum net allowable bearing pressures of up to 3,000 pounds per square foot.

Following the recommended site preparation procedure, the undisturbed natural soils and properly placed and compacted controlled fill would also provide adequate support for the control building floor slab and other slabs.

The lightning masts, towers or H-frames, and any other structures subject to high lateral or uplift loads could be supported by either piles, drilled shaft foundations, or conventional spread foundations set at depths necessary to resist overturning forces.

2) Groundwater was encountered at depths of approximately 2.5 to 7 feet in the majority of the explorations. Therefore, some construction dewatering by pumping from sumps or ditches should be expected for shallow excavations. Additional formal dewatering consisting of well points and/or deep wells would likely be required for deeper excavations.

3) The excavated glauconitic silty and clayey sands above the groundwater levels would provide a fair source of materials for reuse as controlled compacted fill provided they are conditioned where necessary, to moisture contents needed to attain the required compaction and reused during drier/warmer times of the year.

The following sections of this report present further discussion of each of these items.

Site Preparation and Earthwork: The site should be cleared of trees and the topsoil should be stripped from below and at least 10 feet beyond the proposed construction areas. The topsoil will not be suitable for reuse as structural fill. The stripping should be expected to extend below the recorded topsoil levels due to varying thicknesses, disturbance/mixing of soils caused by unstable subgrades, heavy earth moving equipment, removal of stumps or concentrations of roots, etc. Grading information has not been provided to us; however, we anticipate that the new equipment would likely be established at or near existing grades

and that only minor cuts and fills would be required. Following stripping of the topsoil, the exposed subgrade soils in areas of the site to remain at grade or to be raised should be proofrolled and compacted to a firm and unyielding consistency with numerous passes of a smooth drum vibratory compactor with a minimum static weight of at least 12,000 pounds.

The majority of the areas are expected to consist of silty or clayey glauconitic sands which may initially be very moist, soft, or unstable during the proofrolling and potentially could require undercutting or drying and recompaction if present. Undercutting and/or subgrade stabilization work would be greater if the earthwork activities take place during or following wet or freezing weather, and to lesser depths during dry weather periods. If wet unstable subgrades are present, aeration could be attempted during favorable weather to dry and recompact subgrades to limit undercutting and expedite the work, otherwise undercutting and importing of dry granular fill will be required.

All subgrades which may be exposed to inclement weather should be sealed by compacting and grading to shed runoff and prevent ponding on a daily basis. After exposure, glauconitic soils and clayey subgrades would be very susceptible to disturbance and softening from construction equipment traffic, especially when wet or following thawing. Consequently, construction traffic should be kept off prepared subgrades during and following periods of wet or freezing weather, or overexcavation and replacement of the disturbed soils, or other stabilization treatments should be expected to be required to maintain stable subgrades.

Several samples of the glauconitic silty/clayey sands below the topsoil were subjected to moisture content testing and moisture contents ranged from about 8 to 38 percent, which suggests that most of the soils are currently above the estimated range of moisture content for compaction purposes and would need to be

dried to be reused. As mentioned previously, the extent of moisture conditioning would also vary with weather and the time of year the construction is performed.

If required to reach the proposed construction subgrade levels, controlled compacted fill should consist of dry, suitable portions of the excavated on-site granular soils or imported granular soils placed under the observation of the inspecting geotechnical engineer. Imported fill required to complete the site grading should consist of uncontaminated relatively well-graded sand and gravel soils containing less than 15 percent by weight of material passing a U.S. Standard No. 200 sieve and having a maximum particle size of 4 inches. Documentation of the environmental quality of the fill should include a written certification from the fill supplier stating that the fill is virgin material from a commercial or non-commercial source.

Any mass controlled compacted fill should be placed at appropriate moisture contents and in layers of no more than 12 inches in loose thickness and compacted using a large self-propelled vibratory roller. Moisture conditioning should be provided if needed. Backfill placed in confined areas such as foundation or utility trench excavations should be spread in layers on the order of 6 to 8 inches or less in loose thickness, as necessary, to achieve the required compaction. All structural controlled fill and backfill should be compacted to at least 95 percent of its maximum dry density as determined by the ASTM D-1557 test procedure. Compaction in non-structural areas could be reduced to a minimum of 90 percent of maximum dry density.

Construction excavations should be performed in accordance with applicable safety codes, including the latest OSHA Excavation Regulations. Based on the soils encountered in the test pits and borings, it is our opinion that the near surface natural sandy soils are typical of Type "C" soils as defined by the OSHA Excavation Regulations.

Groundwater was observed in most of the explorations at depths of 2.5 to 7 feet bgs and could be encountered during foundation and utility excavations. Soil mottling and variegated soil coloring often associated with glauconitic soils and wet soils which can be indicative of temporary saturated conditions were also observed in the test pits above the noted water seepage levels. It is anticipated that pumping from a series of sumps and trenches, and/or a series of closely spaced, localized well points, located in or adjacent to the excavations would be satisfactory for dewatering most shallow excavations below the seepage levels. The dewatering methods would have to consider the variability and glauconitic nature of the substrata. It should be noted that the permeability characteristics of glauconitic soils if disturbed or placed as fill can change substantially. The water should be pumped to an acceptable discharge point and consistent with any soil and erosion requirements, including potential acid soil considerations. The construction documents should require the contractor to provide all means and equipment necessary to maintain dry excavations at all times and to obtain any permits for the work. If groundwater seepage is encountered in foundation or other excavations, it may be desirable to install a thin layer of clean stone or lean concrete at the base of the excavations to facilitate dewatering and reduce disturbance of the exposed subgrade materials, as determined in conjunction with our representative at the time of construction.

Foundation Design Criteria: Following the site preparation procedures outlined in this report, the proposed improvements may be supported by conventional shallow foundations that derive their support from the undisturbed natural soils or properly placed controlled compacted fill or backfill placed atop the natural soils. Shallow foundations deriving their support from these materials may be designed to impose maximum allowable net bearing pressures of up to 3,000 pounds per square foot. We recommend that all foundation

subgrade soils be observed by a qualified geotechnical engineer from GZA to check for the presence of adequate bearing materials prior to concrete placement. Some loose sands or soft silty/clay soils could be encountered at foundation subgrade levels and will need to be recompacted or overexcavated and replaced with compacted clean stone or lean concrete under our observation.

Uplift loads may be resisted by the weight of the foundations, structure/equipment and soil within a zone defined by extending a line up and out from the edge of the foundations at an angle of 20 degrees from vertical. A total unit weight of 125 pounds per cubic foot could be used for the surficial glauconitic sandy site soils or imported granular fill provided they are compacted to at least 95 percent of its maximum dry density in accordance with the ASTM D-1557 modified Proctor test procedure. An ultimate coefficient of friction of 0.35 for sliding could be assumed between the concrete and the glauconitic sandy soils. This factor could be increased to 0.45 between concrete and import granular materials.

Foundations for the proposed improvements should be established at least 3 feet below the adjacent exterior grades, or deeper if required by the local building code to provide protection from frost penetration.

We estimate that anticipated lightly loaded spread foundations designed and installed in accordance with our recommendations would experience post-construction settlements on the order of ¾-inch, or less.

Seismic Considerations: Based on the subsurface conditions encountered in the explorations at the site and published geologic information, it is our opinion that the foundations for the proposed improvements can be designed using a Site Class “D” as determined by the IBC-NJ. Based on this, we recommend that seismic design spectral acceleration parameters of S_{DS} = 0.189g and S_{D1} = 0.075g be used for seismic design purposes.

Concrete Slab Design Criteria: Following the previously described site preparation procedures, the at-grade floor slab for a new control house or any other slabs required for support of the planned equipment could

be supported by the undisturbed and proofrolled natural soils or controlled compacted fill. We recommend that a minimum 6-inch-thick layer of porous fill consisting of clean 3/4-inch stone (or approved alternate) be placed beneath the slabs to provide a capillary break between the subgrade soils and the bottom of the concrete and to help provide a stable working base during construction. A subgrade modulus of 150 pounds per cubic inch (pci) would be appropriate for design of slabs.

We estimate that maximum post-construction settlements of lightly loaded floor slabs will be less than ½-inch.

Drilled Shaft Foundation Design Criteria: Support of heavily loaded foundations or above grade improvements subjected to high lateral loads and overturning moments such as monopoles or H-frames could be supported by drilled shaft foundations. The following table provides our estimates of the ultimate end bearing and skin friction capacities for an average soil profile encountered at the site; however, we recommend that the boring that is closest to the proposed drilled shaft be used for design purposes. These parameters are based on the design methodology outlined in FHWA Publication No. IF-99-025 entitled *Drilled Shafts: Construction Procedures and Design Methods, August 1999.*

Generalized Soil Type	Estimated Average Depth (ft)	Effective Unit Weight (pcf)	Angle of Internal Friction (degrees)	Calculated Ultimate Side Resistance (tsf)*	Ultimate End Bearing (tsf)
Silty Sands (Above GWT)	0 - 5	125	32	0.13	**
Glauconitic Sand Layer 1 (Below GWT)	5 - 25	57.6	32	0.5	9**
Glauconitic Sand Layer 2	25 - 50	62.6	34	0.8	15

**Calculated at midpoint of layer*
***Shafts less than 10 feet long would be considered conventional spread foundations in end bearing.*

We recommend that a minimum factor of safety of three be applied to the ultimate capacities presented unless load testing is performed. For uplift, a reduction of 0.7 should be applied to the ultimate side resistance unless load testing is performed. Settlement analyses should be performed, and the capacities limited to control settlement to the desired tolerance.

Drilled shafts should be constructed in accordance with the provisions set forth in the American Concrete Institute, "Design and Construction of Drilled Piers", ACI 336.3R-93 (ACI 336.3). Should drilled shafts be installed, groundwater dewatering may be required to complete installation. Shafts installed below the water table should be constructed by installing temporary casing to the proposed bottom to provide a stable shaft excavation. We anticipate that advancing the excavations into saturated materials will require maintaining the water level within the interior of the shaft at or near the ground surface at all times. In addition, slurry may also be required to maintain a stable excavation base.

Drilling should proceed continuously to the specified tip elevations. The bottoms of drilled shafts should be inspected, measured, and sounded in the presence of a representative from GZA to check that soil and other debris have been removed from the shafts prior to the placement of concrete. Temporary casing should be removed during concrete placement. Otherwise, both lateral and axial sidewall resistance may need to be reduced or neglected within the zone where the casing is left in-place, depending upon the method of casing installation and method of backfilling around the casing. If the casing is installed with a hammer, skin friction against the casing can be relied upon with a 40 percent reduction in compression and 60 percent reduction in tension. However, if the casing is pre-drilled, up to 50 percent reduction in compression should be applied, and the annular space between the casing and the soils should be backfilled with cementitious grout. It may be easier to incorporate grout into the drilling process to further encourage grout permeation along the length of the casing and not be limited to near the surface. If the casing is drilled in during construction, the

amount of available skin friction will be a function of the drilling techniques and the soils at that location. Per the guidelines in FHWA's manual, the most conservative method would be to ignore all skin friction within the cased zone. Should this not be desired, we would recommend that a test pier be installed and loaded if skin friction is required for design purposes prior to production drilling/installation. Concrete should be placed continuously and without cold joints from the bottom to the top of the shaft using methods approved by the structural engineer. Properly selected retarder additives are recommended for use in the approved mix design to allow greater time for casing removal, adjusting the reinforcing and anchor bolts, and forming the shaft top before setting begins. Upon completion of drilled shaft installations, disturbed soils around the tops of the shafts should be recompacted to a dense and stable condition.

Lateral Capacity: Drilled shafts are subject to lateral loads, and typically the design engineer would determine the lateral resistance of the shafts using the computer program L-Pile. Based on the borings and our laboratory testing, we recommend that the following average soil properties be utilized in analysis in accordance with our generalized soil stratum.

Generalized Soil Type	L-Pile Soil Type	Estimated Total Unit Weight [Effective Unit Weigh] (pcf)	Estimated Angle of Internal Friction	Soil Modulus "K" (pci)
Medium Dense Silty Sands or Imported Granular Controlled Compacted Fill	Sand	125 [62.6]	32	90
Glauconitic Sands Layer 1 (5-25 feet bgs)	Sand	120 [57.6]	32	60
Glauconitic Sands Layer 2 (25 – 50 feet bgs)	Sand	125 [62.6]	34	125
Deeper Sands/Silty Sands	Sand	130 [67.6]	36	125

Lateral Earth Pressures: Any below-grade walls, site retaining walls, or excavation support systems should be designed to resist lateral earth pressures imposed by the adjacent soils, as well as surcharge loads due to adjacent equipment, stockpiled soils, traffic, etc. The following estimated soil parameters could be used to design excavation support systems, below-grade walls or site retaining walls:

Soil Type	Total Unit Weight (pcf)	Angle of Internal Friction (degrees)	Active Earth Pressure Coefficient (Ka)	At-Rest Earth Pressure Coefficient (Ko)	Passive Earth Pressure Coefficient (Kp)
Native Medium Dense Clayey/Silty Sands or Import Granular Fill	125	32	0.307	0.469	3.26
Clean ¾'' Crushed Stone Backfill	105	38	0.238	0.384	4.20

We do not recommend that the silty and clayey soil be used as backfill for any new walls as they are relatively poorly draining and may impose higher lateral pressures. Excavated sands, silty sands or imported granular materials as previously specified would be better suited for this use. All new walls should be designed with drainage to prevent the buildup of hydrostatic loads behind the wall.

Stormwater Management Design: As part of our work, we were requested to perform percolation tests at the site. The logs of the test pits have been described in USDA format for stormwater design purposes. Field percolation tests were performed, as well as laboratory tube permeameter permeability tests, on tube samples obtained from these test pits. Field percolation tests were performed in test pits TP-2, TP-7, and TP-9 at approximately 4 feet below the existing ground surface. The other test pits encountered moderate groundwater seepage at or above this level. The percolation test failed to drain during the one-hour testing

period in TP-7, but was run to completion in TP-2 and TP-9 and resulted in permeability rates of 7.0 inches per hour and 1.9 inches per hour, respectively, based on the BMP conversion formula. The tube permeameter permeability tests indicate that relatively low rates were observed in the glauconitic soil layers at depth throughout the explorations, but more favorable rates were observed in the shallower upper sandy non-glauconitic zones of the subsoils. The test results are summarized on the appropriate test pit logs.

Chemical Testing: Three samples of the near surface soils were submitted to an NJDEP certified laboratory to determine pH, sulfates, chloride ion, electrical conductivity, redox potential and sulfides. Also, soil box resistivity tests were performed in our inhouse soil mechanics laboratory. The test results are summarized on Plate 8.

Based on American Concrete Institute ACI 318 guidelines, sulfate levels of less than 1,000 parts per million (ppm) indicate a negligible exposure for corrosion of concrete and ACI typically recommends the use of Type I cement. The sulfate test results ranged from 22 to 67 ppm. The USDA guidelines indicate a pH of less than 5.5 for sandy soils or 5.0 for fine-grained soils are considered to have a high risk of corrosion potential for concrete. The pH test result ranged from 5.19 to 6.19. Also, deeper gray clayey sand soils locally known as marl are present and exhibit low pH and are acidic when exposed at the surface. Therefore, based on the results of the pH tests, we would recommend that Type II cement be used.

In order to evaluate the risk of uncoated ductile iron (or steel) pipe to corrosion, the AWWA takes five parameters into consideration including electrical resistivity, pH, redox potential, sulfides, and moisture content. Each category is assigned a point value, and if the total points are 10 or higher, that indicates the soil is corrosive to ductile iron pipe and protection is needed. The samples tested had relatively low resistivity values resulting in a total of greater than 10 points and therefore, corrosion protection is recommended.

Please contact us if you have any questions regarding this report.

The following Plates and Appendices are attached and complete this report:

Plate 1 - Site Location Map
Plate 2 - Plot Plan
Plate 3A through 3H - Logs of Test Borings
Plate 4A through 4J - Logs of Test Pits
Plate 5 - Unified Soil Classification System
Plate 6 - USDA Soil Textural Triangle
Plates 7A through 7C - Gradation Curves
Plate 8 - Summary of Chemical Tests and Soil Box Tests
Appendix I – Geothermal Test Results and Field Resistivity Survey
Appendix II - Limitations

Respectfully submitted,

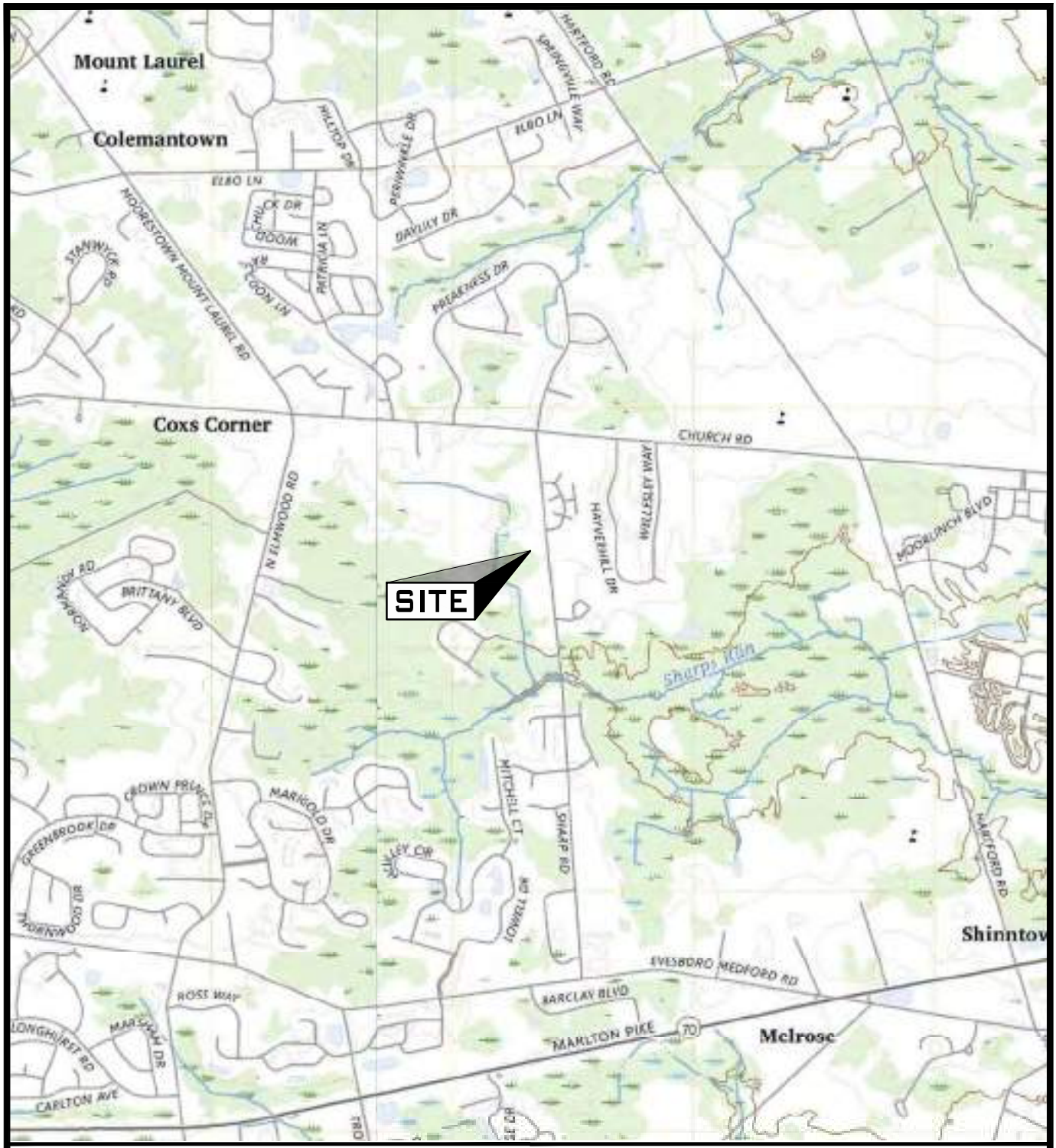
GZA GeoEnvironmental, Inc.

Christopher D. McLaughlin, P.E.
Senior Project Manager

Andrew Rizk, P.E.
Associate Principal

Robert E. Schwankert, P.E.
Consultant/Reviewer

CDM:AR/cdm
(1 copy submitted via email)



SOURCE: "Moorestown & Mount Holly Quadrangles, NJ, 7.5 Minute Series (Topographic)," USGS, 2023.

GZA	PROJ. MGR.: CDM DESIGNED BY: CDM DRAWN BY: VJD DATE: 4/24/24	SITE LOCATION MAP PROPOSED SHARP ROAD SUBSTATION EXPANSION MARLTON, NEW JERSEY PSE&G	JOB NO. 26.0093004.00 PLATE 1

GRAPHIC SCALE

30 0 15 30 60

1 inch = 30 ft.

KEY:

SB-1 NUMBER AND APPROXIMATE LOCATION OF BORINGS PERFORMED FOR THIS STUDY

TP-1 NUMBER AND APPROXIMATE LOCATION OF TEST PITS PERFORMED FOR THIS STUDY

NOTES:

1. This drawing is part of GZA GeoEnvironmental, Inc. Report No. 26.0093004.00 and should be read together with the report for complete evaluation.
2. General layout was obtained from a drawing prepared by PSE&G, entitled "Sharp Road Switch 230/69KV Substation Boring Plan" dated 7/24/23 (revised 3/27/24), scale 1/16"= 1'-0", and an aerial image provided by ©Microsoft Corp.©2023 MAXAR©CNES (2023) Distribution Airbus DS.

PLOT PLAN

PROPOSED SHARP ROAD SUBSTATION EXPANSION
MARLTON, NEW JERSEY
PSE&G

GZA GeoEnvironmental, Inc.
Engineers and Scientists
Known for excellence, Built on trust.
www.gza.com

JOB NO.	FILE NO.			
26.0093004.00	–			
DR. BY	CHK. BY	DATE	SCALE	PLATE
VJD	CDM	4/23/24	1"= 30'	2

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

PSE&G
Sharp Road Substation
Marlton, NJ

EXPLORATION NO.: SB-1
SHEET: 1 of 2
PROJECT NO: 26.0093004.00
REVIEWED BY: Chris McLaughlin

Logged By: Joe Malek
Drilling Co.: Craig Test Borings
Driller: Brian/Chris

Type of Rig: ATV
Rig Model: CME 55 LC
Drilling Method: Rotary Wash

Boring Location: See Plan
Ground Surface Elev. (ft.): +61
Date Start - Finish: 4/26/2024 - 4/26/2024
Final Boring Depth (ft.): 52

Hammer Type: Automatic
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.5/4

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
4/26/24	*	N.R.	-
4/29/24		5	24 hours

Depth (ft)	Sample No.	Sample Depth (ft.)	Sample Blows (per 6 in.)	Sample SPT Value	Symbol	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
	S1	0-2	2 2 2 2	4		4" Topsoil Light green glauconitic fine to medium sand, little silty clay (wet)(loose)			
	S2	2-4	3 4 6 8	10				18.1	
5	S3	4-6	6 12 12 4	24		- (medium dense)	5	16.9	
	S4	6-8	10 5 4 4	9		- (loose) - grading dark bluish green color (medium dense)			
	S5	8-10	6 7 8 10	15		- grading light green color			
10	S6	10-12	3 6 8 7	14		- grading dark green to black color	10		
	S7	12-14	10 14 14 12	28					
15	S8	15-17	4 7 8 8	15	SC		15		
20	S9	20-22	2 4 6 6	10			20	24.1	
25	S10	25-27	4 17 10 8	27			25		
30							30		

REMARKS

*Water level not recorded during drilling. Hole left open overnight and water read on following work day.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3A

1A - MTA BORING LOG USCS: 6/11/2024; 10:51:45 AM

TEST BORING LOG

GZA GeoEnvironmental, Inc. *Engineers and Scientists*	PSE&G Sharp Road Substation Marlton, NJ	EXPLORATION NO.: SB-1 SHEET: 2 of 2 PROJECT NO: 26.0093004.00 REVIEWED BY: Chris McLaughlin

Logged By: Joe Malek	**Type of Rig:** ATV	**Boring Location:** See Plan	**Final Boring Depth (ft.):** 52
Drilling Co.: Craig Test Borings	**Rig Model:** CME 55 LC	**Ground Surface Elev. (ft.):** +61	
Driller: Brian/Chris	**Drilling Method:** Rotary Wash	**Date Start - Finish:** 4/26/2024 - 4/26/2024	

Hammer Type: Automatic
Hammer Weight (lb.): 140 **Hammer Fall (in.):** 30
Auger or Casing O.D./I.D Dia (in.): 4.5/4

Groundwater Depth (ft.)			
Date	**Time**	**Water Depth**	**Stab. Time**
4/26/24	*	N.R.	-
4/29/24		5	24 hours

Depth (ft)	Sample No.	Sample Depth (ft.)	Sample Blows (per 6 in.)	Sample SPT Value	Symbol	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
	S11	30-32	13 17 26 29	43		Light green glauconitic fine to medium sand, little silty clay (wet)(loose)			
35	S12	35-37	3 5 10 13	15		- (medium dense)	35		
40	S13	40-42	6 11 13 19	24	SC	- grading with shell fragments	40		
45	S14	45-45.9	29 100/5"	100+		- (very dense)	45	25.4	
50	S15	50-52	13 26 28 30	54	SP	Green and gray fine to medium sand, trace silt (wet)(very dense)	50		
55						End of exploration at 52 feet. Groundwater encountered @ 5'			
60									

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3A

1A - MTA BORING LOG USCS: 6/11/2024; 10:51:45 AM

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

PSE&G
Sharp Road Substation
Marlton, NJ

EXPLORATION NO.: SB-2
SHEET: 1 of 2
PROJECT NO: 26.0093004.00
REVIEWED BY: Chris McLaughlin

Logged By: Joe Malek
Drilling Co.: Craig Test Borings
Driller: Brian/Chris

Type of Rig: ATV
Rig Model: CME 55 LC
Drilling Method: Rotary Wash

Boring Location: See Plan
Ground Surface Elev. (ft.): +63
Date Start - Finish: 4/26/2024 - 4/26/2024
Final Boring Depth (ft.): 52

Hammer Type: Automatic
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.5/4

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
4/26/24	*	N.R.	-
4/29/24		5.5	24 hours

Depth (ft)	Sample No.	Sample Depth (ft.)	Sample Blows (per 6 in.)	Sample SPT Value	Symbol	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
	S1	0-2	2 1 2 1	3		1" Topsoil			
						Light greenish brown slightly glauconitic fine to medium sand, little clayey silt (wet)(loose)		14.8	
	S2	2-4	2 1 1 3	2				23.6	
5	S3	4-6	6 6 6 5	12	SM/SC	- (medium dense)	5	19.9	
	S4	6-8	7 8 9 9	17					
	S5	8-10	8 5 6 5	11					
10							10		
	S6	10-12	2 2 3 4	5		Dark green to very dark brown glauconitic fine to medium sand, little silty clay (wet)(loose)		34.3	
	S7	12-14	2 3 6 6	9					
15							15		
	S8	15-17	3 4 5 5	9					
20					SC		20		
	S9	20-22	2 4 5 5	9		- grading some silty clay			
25							25		
	S10	25-27	4 5 8 8	13		- (medium dense)			
30							30		

REMARKS

*Water level not recorded during drilling. Hole left open overnight and water read on following work day.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3B

TEST BORING LOG

GZA GeoEnvironmental, Inc. *Engineers and Scientists*	PSE&G Sharp Road Substation Marlton, NJ	EXPLORATION NO.: SB-2 SHEET: 2 of 2 PROJECT NO: 26.0093004.00 REVIEWED BY: Chris McLaughlin

Logged By: Joe Malek	**Type of Rig:** ATV	**Boring Location:** See Plan **Final Boring Depth (ft.):** 52
Drilling Co.: Craig Test Borings	**Rig Model:** CME 55 LC	**Ground Surface Elev. (ft.):** +63
Driller: Brian/Chris	**Drilling Method:** Rotary Wash	**Date Start - Finish:** 4/26/2024 - 4/26/2024

Hammer Type: Automatic
Hammer Weight (lb.): 140 **Hammer Fall (in.):** 30
Auger or Casing O.D./I.D Dia (in.): 4.5/4

Groundwater Depth (ft.)			
Date	**Time**	**Water Depth**	**Stab. Time**
4/26/24	*	N.R.	-
4/29/24		5.5	24 hours

Depth (ft)	Sample No.	Sample Depth (ft.)	Sample Blows (per 6 in.)	Sample SPT Value	Symbol	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
	S11	30-32	15 24 30 27	54		Dark green to very dark brown glauconitic fine to coarse sand, little silty clay (wet)(very dense)			
35	S12	35-37	6 8 12 13	20		- (medium dense)	35		
40	S13	40-42	8 11 17 18	28	SC		40		
45	S14	45-46.4	14 31 100/5"	100+		- (very dense)	45		
50	S15	50-52	19 16 20 24	36		- (dense)	50		
						End of exploration at 52 feet. Groundwater encountered @ 5.5'			
55									
60									

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3B

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

PSE&G
Sharp Road Substation
Marlton, NJ

EXPLORATION NO.: SB-3
SHEET: 1 of 4
PROJECT NO: 26.0093004.00
REVIEWED BY: Chris McLaughlin

Logged By: Joe Malek
Drilling Co.: Craig Test Borings
Driller: Brian/Chris

Type of Rig: ATV
Rig Model: CME 55 LC
Drilling Method: Rotary Wash

Boring Location: See Plan
Ground Surface Elev. (ft.): +63
Date Start - Finish: 4/30/2024 - 4/30/2024
Final Boring Depth (ft.): 102

Hammer Type: Automatic
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.5/4

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
4/30/24	*	N.R.	-
5/1/24		7	24 hours

Depth (ft)	Sample No.	Sample Depth (ft.)	Sample Blows (per 6 in.)	Sample SPT Value	Symbol	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
0	S1	0-2	2 2 3 3	5	SM	4" Topsoil Light brown fine to medium sand, little silt (wet)(loose)	0	30.2	
	S2	2-4	3 4 4 6	8					
5	S3	4-6	6 5 10 4	15		- grading to some clayey silt (medium dense)	5		
	S4	6-8	13 12 15 12	27					
	S5	8-10	15 15 16 15	31		- (dense)			
10	S6	10-12	2 8 5 9	13		- (medium dense)	10		
	S7	12-14	9 5 5 5	10					
15	S8	15-17	3 5 8 9	13			15		
20	S9	20-22	3 5 8 8	13	SP/SC	Dark green to very dark brown glauconitic fine to medium sand, little silty clay (wet)(medium dense)	20		
25	S10	25-27	4 5 8 12	13		- grading to trace silty clay	25	28.6	
30							30		

REMARKS

*Water level not recorded during drilling. Hole left open overnight and water read on following work day.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3C

1A - MTA BORING LOG USCS: 6/11/2024; 10:51:50 AM

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

PSE&G
Sharp Road Substation
Marlton, NJ

EXPLORATION NO.: SB-3
SHEET: 2 of 4
PROJECT NO: 26.0093004.00
REVIEWED BY: Chris McLaughlin

Logged By: Joe Malek
Drilling Co.: Craig Test Borings
Driller: Brian/Chris

Type of Rig: ATV
Rig Model: CME 55 LC
Drilling Method: Rotary Wash

Boring Location: See Plan
Ground Surface Elev. (ft.): +63
Date Start - Finish: 4/30/2024 - 4/30/2024
Final Boring Depth (ft.): 102

Hammer Type: Automatic
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.5/4

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
4/30/24	*	N.R.	-
5/1/24		7	24 hours

Depth (ft)	Sample No.	Sample Depth (ft.)	Sample Blows (per 6 in.)	Sample SPT Value	Symbol	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
	S11	30-32	8 17 20 24	37		Dark green to very dark brown glauconitic fine to medium sand, little silty clay (wet)(dense)			
35	S12	35-37	24 38 43 48	81		- (very dense)	35		
40	S13	40-42	5 9 13 15	22		- grading to trace silty clay (medium dense)	40		
45	S14	45-47	15 27 34 54	61	SP/SC	- (very dense)	45		
50	S15	50-52	8 11 22 31	33		- grading with trace fine gravel (dense)	50	24.3	
55	S16	55-56.7	48 93 100/8"	100+		- (very dense)	55		
60							60		

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3C

TEST BORING LOG

GZA GeoEnvironmental, Inc. *Engineers and Scientists*	PSE&G Sharp Road Substation Marlton, NJ	EXPLORATION NO.: SB-3 SHEET: 3 of 4 PROJECT NO: 26.0093004.00 REVIEWED BY: Chris McLaughlin

Logged By: Joe Malek	**Type of Rig:** ATV	**Boring Location:** See Plan	**Final Boring Depth (ft.):** 102
Drilling Co.: Craig Test Borings	**Rig Model:** CME 55 LC	**Ground Surface Elev. (ft.):** +63	
Driller: Brian/Chris	**Drilling Method:** Rotary Wash	**Date Start - Finish:** 4/30/2024 - 4/30/2024	

Hammer Type: Automatic
Hammer Weight (lb.): 140 **Hammer Fall (in.):** 30
Auger or Casing O.D./I.D Dia (in.): 4.5/4

Groundwater Depth (ft.)			
Date	**Time**	**Water Depth**	**Stab. Time**
4/30/24	*	N.R.	-
5/1/24		7	24 hours

Depth (ft)	Sample No.	Sample Depth (ft.)	Sample Blows (per 6 in.)	Sample SPT Value	Symbol	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
	S17	60-62	14 19 6 4	25		Dark gray fine to medium sand, trace silt (wet)(medium dense)			
65	S18	65-67	28 45 46 45	91		- (very dense)	65		
70	S19	70-72	8 6 6 7	12		- (medium dense)	70		
75	S20	75-77	19 39 26 38	65	SP	- (very dense)	75		
80	S21	80-82	25 41 53 63	94			80		
85	S22	85-87	16 34 32 31	66			85		
90							90		

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3C

TEST BORING LOG

GZA GeoEnvironmental, Inc. *Engineers and Scientists*	PSE&G Sharp Road Substation Marlton, NJ	EXPLORATION NO.: SB-3 SHEET: 4 of 4 PROJECT NO: 26.0093004.00 REVIEWED BY: Chris McLaughlin

Logged By: Joe Malek	**Type of Rig:** ATV	**Boring Location:** See Plan **Final Boring Depth (ft.):** 102
Drilling Co.: Craig Test Borings	**Rig Model:** CME 55 LC	**Ground Surface Elev. (ft.):** +63
Driller: Brian/Chris	**Drilling Method:** Rotary Wash	**Date Start - Finish:** 4/30/2024 - 4/30/2024

Hammer Type: Automatic
Hammer Weight (lb.): 140 **Hammer Fall (in.):** 30
Auger or Casing O.D./I.D Dia (in.): 4.5/4

Groundwater Depth (ft.)			
Date	**Time**	**Water Depth**	**Stab. Time**
4/30/24	*	N.R.	-
5/1/24		7	24 hours

Depth (ft)	Sample No.	Sample Depth (ft.)	Sample Blows (per 6 in.)	Sample SPT Value	Symbol	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
	S23	90-92	20 28 34 32	62		Dark gray fine to medium sand, trace silt (wet)(medium dense)			
95	S24	95-97	9 28 32 36	60	SP		95		
100	S25	100-102	7 11 17 28	28	CL	Dark gray silty clay, and fine to medium sand (wet)(very stiff)	100		
						End of exploration at 102 feet. Groundwater encountered @ 7'			
105									
110									
115									
120									

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3C

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

PSE&G
Sharp Road Substation
Marlton, NJ

EXPLORATION NO.: SB-4
SHEET: 1 of 2
PROJECT NO: 26.0093004.00
REVIEWED BY: Chris McLaughlin

Logged By: Joe Malek
Drilling Co.: Craig Test Borings
Driller: Brian/Chris

Type of Rig: ATV
Rig Model: CME 55 LC
Drilling Method: Rotary Wash

Boring Location: See Plan
Ground Surface Elev. (ft.): +62
Date Start - Finish: 5/2/2024 - 5/2/2024
Final Boring Depth (ft.): 52

Hammer Type: Automatic
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.5/4

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
5/2/24		4	*

Depth (ft)	Sample No.	Sample Depth (ft.)	Sample Blows (per 6 in.)	Sample SPT Value	Symbol	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
						3" Topsoil			
	S1	0-2	2 2 3 3	5	SP/SM	Brown fine to medium sand, little silt (moist)(loose)		8.2	
	S2	2-4	2 3 5 6	8		- (wet)		19.6	
5	S3	4-6	8 8 8 8	16	SP/SC	Light green glauconitic fine to medium sand, trace silty clay (wet)(medium dense)	5	24.5	
	S4	6-8	8 11 10 6	21					
	S5	8-10	6 6 7 6	13					
10	S6	10-12	1 3 4 4	7		Dark green to dark brown glauconitic fine to medium sand, little silty clay (wet)(loose)	10	39.9	
	S7	12-14	6 6 10 8	16		- (medium dense)			
15	S8	15-17	3 4 3 5	7		- (loose)	15	27.8	
20	S9	20-22	2 3 5 6	8	SC		20	25.3	
25	S10	25-27	3 7 8 10	15		- (medium dense)	25		
30							30		

REMARKS

Water level established at time of drilling.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3D

1A - MTA BORING LOG USCS: 6/11/2024; 10:51:52 AM

TEST BORING LOG

GZA GeoEnvironmental, Inc. *Engineers and Scientists*	PSE&G Sharp Road Substation Marlton, NJ	EXPLORATION NO.: SB-4 SHEET: 2 of 2 PROJECT NO: 26.0093004.00 REVIEWED BY: Chris McLaughlin

Logged By: Joe Malek	**Type of Rig:** ATV	**Boring Location:** See Plan	**Final Boring Depth (ft.):** 52
Drilling Co.: Craig Test Borings	**Rig Model:** CME 55 LC	**Ground Surface Elev. (ft.):** +62	
Driller: Brian/Chris	**Drilling Method:** Rotary Wash	**Date Start - Finish:** 5/2/2024 - 5/2/2024	

Hammer Type: Automatic
Hammer Weight (lb.): 140 **Hammer Fall (in.):** 30
Auger or Casing O.D./I.D Dia (in.): 4.5/4

Groundwater Depth (ft.)			
Date	**Time**	**Water Depth**	**Stab. Time**
5/2/24		4	*

Depth (ft)	Sample No.	Sample Depth (ft.)	Sample Blows (per 6 in.)	Sample SPT Value	Symbol	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
	S11	30-32	6 10 13 16	23		Dark green to dark brown glauconitic fine to medium sand, little silty clay (wet)(medium dense)			
35	S12	35-37	13 18 15 16	33		- (dense)	35		
40	S13	40-42	5 12 16 23	28	SC	- (medium dense)	40		
45	S14	45-47	19 33 40 41	73		- grading with shells (very dense)	45		
50	S15	50-52	13 24 22 26	46		- (dense)	50		
						End of exploration at 52 feet. Groundwater encountered @ 4'			
55									
60									

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3D

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

PSE&G
Sharp Road Substation
Marlton, NJ

EXPLORATION NO.: SB-5
SHEET: 1 of 2
PROJECT NO: 26.0093004.00
REVIEWED BY: Chris McLaughlin

Logged By: Joe Malek
Drilling Co.: Craig Test Borings
Driller: Brian/Chris

Type of Rig: ATV
Rig Model: CME 55 LC
Drilling Method: Rotary Wash

Boring Location: See Plan
Ground Surface Elev. (ft.): +61.5
Date Start - Finish: 5/1/2024 - 5/1/2024
Final Boring Depth (ft.): 52

Hammer Type: Automatic
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.5/4

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
5/1/24	*	N.R.	-
5/2/24		4.5	24 hours

Depth (ft)	Sample No.	Sample Depth (ft.)	Sample Blows (per 6 in.)	Sample SPT Value	Symbol	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
						3" Topsoil			
	S1	0-2	1 3 3 2	6	SP/SM	Light brown fine to medium sand, trace silt (moist)(loose)			
	S2	2-4	2 2 3 4	5				28.1	
5	S3	4-6	6 7 9 11	16	SM	Light brown and green slightly glauconitic fine to medium sand, little clayey silt (wet)(medium dense)	5		
	S4	6-8	9 10 12 12	22					
	S5	8-10	7 4 5 7	9		- (loose)			
10							10		
	S6	10-12	2 4 6 7	10		Dark green to very dark brown glauconitic fine to medium sand, little silty clay (wet)(medium dense)		17.8	
	S7	12-14	8 7 8 8	15				27.6	
15							15		
	S8	15-17	3 6 7 8	13					
20							20		
	S9	20-22	3 3 4 6	7	SC	- (loose)		24.6	
25							25		
	S10	25-27	4 5 7 9	12		- (medium dense)			
30							30		

REMARKS

*Water level not recorded during drilling. Hole left open overnight and water read on following work day.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3E

1A - MTA BORING LOG USCS: 6/11/2024; 10:51:53 AM

TEST BORING LOG

GZA GeoEnvironmental, Inc. *Engineers and Scientists*	PSE&G Sharp Road Substation Marlton, NJ	EXPLORATION NO.: SB-5 SHEET: 2 of 2 PROJECT NO: 26.0093004.00 REVIEWED BY: Chris McLaughlin

Logged By: Joe Malek	**Type of Rig:** ATV	**Boring Location:** See Plan **Final Boring Depth (ft.):** 52
Drilling Co.: Craig Test Borings	**Rig Model:** CME 55 LC	**Ground Surface Elev. (ft.):** +61.5
Driller: Brian/Chris	**Drilling Method:** Rotary Wash	**Date Start - Finish:** 5/1/2024 - 5/1/2024

Hammer Type: Automatic
Hammer Weight (lb.): 140 **Hammer Fall (in.):** 30
Auger or Casing O.D./I.D Dia (in.): 4.5/4

Groundwater Depth (ft.)			
Date	**Time**	**Water Depth**	**Stab. Time**
5/1/24	*	N.R.	-
5/2/24		4.5	24 hours

Depth (ft)	Sample No.	Sample Depth (ft.)	Sample Blows (per 6 in.)	Sample SPT Value	Symbol	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
	S11	30-32	6 13 15 17	28		Dark green to very dark brown glauconitic fine to medium sand, little silty clay (wet)(medium dense)			
35	S12	35-37	17 34 47 28	81		- (very dense)	35		
40	S13	40-42	5 7 11 16	18	SC	- grading with shells (medium dense)	40		
45	S14	45-47	13 24 47 68	71		- (very dense)	45		
50	S15	50-52	12 23 18 24	41		- (dense)	50		
						End of exploration at 52 feet. Groundwater encountered @ 4.5'			
55									
60									

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3E

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

PSE&G
Sharp Road Substation
Marlton, NJ

EXPLORATION NO.: SB-6
SHEET: 1 of 2
PROJECT NO: 26.0093004.00
REVIEWED BY: Chris McLaughlin

Logged By: Joe Malek
Drilling Co.: Craig Test Borings
Driller: Brian/Chris

Type of Rig: ATV
Rig Model: CME 55 LC
Drilling Method: Rotary Wash

Boring Location: See Plan
Ground Surface Elev. (ft.): +60
Date Start - Finish: 5/1/2024 - 5/1/2024
Final Boring Depth (ft.): 52

Hammer Type: Automatic
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.5/4

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
5/1/24	*	N.R.	-
5/2/24		2.5	24 hours

Depth (ft)	Sample No.	Sample Depth (ft.)	Sample Blows (per 6 in.)	Sample SPT Value	Symbol	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
	S1	0-2	5 4 3 5	7		2" Topsoil			
					SP/SM	Brown fine to medium sand, little silt (wet)(loose)		14.4	
	S2	2-4	6 6 7 7	13		- (medium dense)		19.8	
5	S3	4-6	5 5 8 6	13		Light green and orange glauconitic fine to medium sand, little silty clay (wet)(medium dense)	5	29.5	
	S4	6-8	4 6 9 9	15					
	S5	8-10	9 12 15 13	27					
10							10		
	S6	10-12	6 10 13 13	23					
	S7	12-14	12 13 19 19	32					
15							15		
	S8	15-17	7 13 13 11	26	SC				
20							20		
	S9	20-22	5 4 4 5	8		- (loose) - grading dark green to very dark brown color			
25							25		
	S10	25-27	4 4 7 10	11		- (medium dense)			
30							30		

REMARKS

*Water level not recorded during drilling. Hole left open overnight and water read on following work day.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3F

1A - MTA BORING LOG USCS: 6/11/2024; 10:51:54 AM

TEST BORING LOG

GZA GeoEnvironmental, Inc. *Engineers and Scientists*	**PSE&G** **Sharp Road Substation** **Marlton, NJ**	**EXPLORATION NO.: SB-6** **SHEET: 2 of 2** **PROJECT NO: 26.0093004.00** **REVIEWED BY: Chris McLaughlin**

Logged By: Joe Malek	**Type of Rig:** ATV	**Boring Location:** See Plan **Final Boring Depth (ft.):** 52
Drilling Co.: Craig Test Borings	**Rig Model:** CME 55 LC	**Ground Surface Elev. (ft.):** +60
Driller: Brian/Chris	**Drilling Method:** Rotary Wash	**Date Start - Finish:** 5/1/2024 - 5/1/2024

Hammer Type: Automatic
Hammer Weight (lb.): 140 **Hammer Fall (in.):** 30
Auger or Casing O.D./I.D Dia (in.): 4.5/4

Groundwater Depth (ft.)			
Date	**Time**	**Water Depth**	**Stab. Time**
5/1/24	*	N.R.	-
5/2/24		2.5	24 hours

Depth (ft)	Sample No.	Sample Depth (ft.)	Sample Blows (per 6 in.)	Sample SPT Value	Symbol	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
	S11	30-32	10 19 19 17	38		Light green and orange glauconitic fine to medium sand, little silty clay (wet)(medium dense)		26.6	
35	S12	35-37	4 7 9 9	16		- (medium dense)	35		
40	S13	40-42	4 9 15 16	24	SC		40	21.5	
45	S14	45-47	13 22 33 39	55		- grading with shells (very dense)	45		
50	S15	50-52	11 21 42 56	63	SP	Gray fine to medium sand, trace silt (wet)(very dense)	50		
						End of exploration at 52 feet. Groundwater encountered @ 2.5'			
55									
60									

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3F

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

PSE&G
Sharp Road Substation
Marlton, NJ

EXPLORATION NO.: SB-7
SHEET: 1 of 2
PROJECT NO: 26.0093004.00
REVIEWED BY: Chris McLaughlin

Logged By: Joe Malek
Drilling Co.: Craig Test Borings
Driller: Brian/Chris

Type of Rig: ATV
Rig Model: CME 55 LC
Drilling Method: Rotary Wash

Boring Location: See Plan
Final Boring Depth (ft.): 52
Ground Surface Elev. (ft.): +63.5
Date Start - Finish: 4/29/2024 - 4/29/2024

Hammer Type: Automatic
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.5/4

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
4/29/24	*	N.R.	-
4/30/24		7	24 hours

Depth (ft)	Sample No.	Sample Depth (ft.)	Sample Blows (per 6 in.)	Sample SPT Value	Symbol	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
						4" Topsoil			
	S1	0-2	2 5 56 8	61	SP/SM	Light brown to light green fine to medium sand, little silt (very moist)(very dense)			
	S2	2-4	4 4 4 4	8		- (loose)		19.9	
5	S3	4-6	3 4 3 4	7		- (wet) - grading to trace silt	5	38.2	
	S4	6-8	5 8 7 8	15		- (medium dense)			
	S5	8-10	7 8 12 13	20	SC	Light green and brown glauconitic fine to medium sand, little silty clay (wet)(medium dense)			
10	S6	10-12	4 4 7 10	11			10	23.9	
	S7	12-14	7 12 14 33	26					
15	S8	15-17	5 8 10 14	18	SM	Light brown and green fine to coarse sand, little silt, little fine to coarse gravel (wet)(medium dense)	15		
20	S9	20-22	19 18 22 31	40		- (dense)	20		
25	S10	25-27	6 5 5 6	10	SC	Dark green to very dark brown glauconitic fine to medium sand, little silty clay (wet)(medium dense)	25		
30							30		

REMARKS

*Water level not recorded during drilling. Hole left open overnight and water read on following work day.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3G

1A - MTA BORING LOG USCS: 6/11/2024; 10:51:55 AM

TEST BORING LOG

GZA GeoEnvironmental, Inc. *Engineers and Scientists*	PSE&G Sharp Road Substation Marlton, NJ	EXPLORATION NO.: SB-7 SHEET: 2 of 2 PROJECT NO: 26.0093004.00 REVIEWED BY: Chris McLaughlin

Logged By: Joe Malek	**Type of Rig:** ATV	**Boring Location:** See Plan **Final Boring Depth (ft.):** 52
Drilling Co.: Craig Test Borings	**Rig Model:** CME 55 LC	**Ground Surface Elev. (ft.):** +63.5
Driller: Brian/Chris	**Drilling Method:** Rotary Wash	**Date Start - Finish:** 4/29/2024 - 4/29/2024

Hammer Type: Automatic
Hammer Weight (lb.): 140 **Hammer Fall (in.):** 30
Auger or Casing O.D./I.D Dia (in.): 4.5/4

Groundwater Depth (ft.)			
Date	**Time**	**Water Depth**	**Stab. Time**
4/29/24	*	N.R.	-
4/30/24		7	24 hours

Depth (ft)	Sample No.	Sample Depth (ft.)	Sample Blows (per 6 in.)	Sample SPT Value	Symbol	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
	S11	30-32	6 9 12 17	21		Dark green to very dark brown glauconitic fine to medium sand, little silty clay (wet)(medium dense)			
35	S12	35-37	12 13 17 22	30		- (dense)	35		
40	S13	40-42	9 13 21 26	34	SC	- grading with shells	40		
45	S14	45-46.3	29 76 100/3"	100+		- (very dense)	45		
50	S15	50-52	29 55 73 53	100+			50		
55						End of exploration at 52 feet. Groundwater encountered @ 7'			
60									

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3G

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

PSE&G
Sharp Road Substation
Marlton, NJ

EXPLORATION NO.: SB-8
SHEET: 1 of 2
PROJECT NO: 26.0093004.00
REVIEWED BY: Chris McLaughlin

Logged By: Joe Malek
Drilling Co.: Craig Test Borings
Driller: Brian/Chris

Type of Rig: ATV
Rig Model: CME 55 LC
Drilling Method: Rotary Wash

Boring Location: See Plan
Ground Surface Elev. (ft.): +64
Date Start - Finish: 4/29/2024 - 4/29/2024
Final Boring Depth (ft.): 51.9

Hammer Type: Automatic
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.5/4

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
4/29/24	*	N.R.	-
4/30/24		6	24 hours

Depth (ft)	Sample No.	Sample Depth (ft.)	Sample Blows (per 6 in.)	Sample SPT Value	Symbol	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
	S1	0-2	2 2 2 2	4	SP	4" Topsoil Light brown fine to medium sand, trace silt (medium)(loose)		8.2	
	S2	2-4	2 2 3 4	5				31.8	
5	S3	4-6	4 3 4 6	7		Green glauconitic fine to medium sand, little silty clay (wet)(loose)	5	19.6	
	S4	6-8	6 6 10 10	16		- (medium dense)			
	S5	8-10	8 10 13 12	23					
10	S6	10-12	7 5 4 5	9		- (loose)	10		
	S7	12-14	6 11 12 15	23		- (medium dense)			
15	S8	15-17	9 4 17 16	21	SC		15		
20	S9	20-22	9 16 13 14	29			20		
25	S10	25-27	4 5 6 8	11		- grading dark green to very dark brown fine color	25		
30							30		

REMARKS

*Water level not recorded during drilling. Hole left open overnight and water read on following work day.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3H

1A - MTA BORING LOG USCS: 6/11/2024; 10:51:56 AM

TEST BORING LOG

GZA GeoEnvironmental, Inc. *Engineers and Scientists*	PSE&G Sharp Road Substation Marlton, NJ	EXPLORATION NO.: SB-8 SHEET: 2 of 2 PROJECT NO: 26.0093004.00 REVIEWED BY: Chris McLaughlin

Logged By: Joe Malek	**Type of Rig:** ATV	**Boring Location:** See Plan **Final Boring Depth (ft.):** 51.9
Drilling Co.: Craig Test Borings	**Rig Model:** CME 55 LC	**Ground Surface Elev. (ft.):** +64
Driller: Brian/Chris	**Drilling Method:** Rotary Wash	**Date Start - Finish:** 4/29/2024 - 4/29/2024

Hammer Type: Automatic
Hammer Weight (lb.): 140 **Hammer Fall (in.):** 30
Auger or Casing O.D./I.D Dia (in.): 4.5/4

Groundwater Depth (ft.)			
Date	**Time**	**Water Depth**	**Stab. Time**
4/29/24	*	N.R.	-
4/30/24		6	24 hours

Depth (ft)	Sample No.	Sample Depth (ft.)	Sample Blows (per 6 in.)	Sample SPT Value	Symbol	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
	S11	30-32	10 18 20 40	38		Green glauconitic fine to medium sand, little silty clay (wet)(loose)			
35	S12	35-37	9 14 18 17	32			35		
40	S13	40-42	6 9 12 16	21	SC	- (medium dense)	40		
45	S14	45-47	12 16 39 57	55		- (very dense)	45		
50	S15	50-51.9	48 60 88 100/5"	100+			50		
55						End of exploration at 51.9 feet. Groundwater encountered @ 6'			
60									

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3H

1A - MTA BORING LOG USCS: 6/11/2024; 10:51:56 AM

TEST PIT LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

PSE&G
Sharp Road Substation
Marlton, NJ

EXPLORATION NO.: TP-1
SHEET: 1 of 1
PROJECT NO: 26.93004.00
REVIEWED BY: Chris McLaughlin

Logged By: Cody Lyons
Contractor: Furino & Sons
Operator: Frank/Ron

Test Pit Location: See Plan
Ground Surface Elev. (ft.): +62
Final Test Pit Depth (ft.): 8
Date Start - Finish: 4/20/2024 - 4/20/2024

Type of Excavator: Trackhoe
Excavator Model: Komatsu PC 45

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
04/20/24		2.5	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1			0-10	Topsoil - Dark grayish brown (10YR, 4/2) sandy loam, weak medium crumb, moist, friable, abrupt smooth boundary, many fine medium roots	1		
2	S1, T1	2	10-48	Light olive-brown (2.5YR, 5/4) glauconitic loamy sand, weak medium granular, wet, friable, clear smooth boundary, few fine roots	2	19.9	
3	Geo-1	3			3		
4					4		
5	S2, T2	5	48-96	Olive (5YR, 5/3) glauconitic sandy loam, weak medium crumb granular, wet, friable, common coarse distinct olive-yellow (2.5YR, 6/8) mottling throughout layer	5	19.8	
6					6		
7					7		
8	Geo-2	8			8		
9				End of exploration at 8 feet. Moderate groundwater seepage encountered @ 2.5'			
10				Tube Permeameter Test Results: 1.6 in/hr @ 2' <0.06 in/hr @ 5'			
11							
12							
13							
14							
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 4A

TEST PIT LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

PSE&G
Sharp Road Substation
Marlton, NJ

EXPLORATION NO.: TP-2
SHEET: 1 of 1
PROJECT NO: 26.93004.00
REVIEWED BY: Chris McLaughlin

Logged By: Cody Lyons
Contractor: Furino & Sons
Operator: Frank/Ron

Test Pit Location: See Plan
Ground Surface Elev. (ft.): +63
Final Test Pit Depth (ft.): 9
Date Start - Finish: 4/20/2024 - 4/20/2024

Type of Excavator: Trackhoe
Excavator Model: Komatsu PC 45

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
04/20/24		4	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1			0-5	Topsoil - Brown (10YR, 4/3) sandy loam, weak medium crumb, moist, friable, clear smooth boundary, many fine medium coarse roots	1		
2	S1, T1	2		Light yellowish brown (2.5YR, 6/4) loamy sand, weak medium granular, very moist, friable, gradual smooth boundary, common fine medium roots	2		
3			5-57		3		
4					4		
5	S2, T2	5		Olive (5YR, 5/3) glauconitic sandy loam, weak medium granular, wet, friable, many medium distinct olive-yellow (10YR, 6/8) mottling throughout layer	5	9.7	
6					6		
7			57-108		7		
8					8		
9					9		
10				End of exploration at 9 feet. Moderate groundwater seepage encountered @ 4'			
11				Tube Permeameter Test Results: 3.6 in/hr @ 2' <0.06 in/hr @ 5'			
12				Single Ring Test Results: 8:35 min/in = 7.0 in/hr @ 4'			
13							
14							
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 4B

TEST PIT LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

PSE&G
Sharp Road Substation
Marlton, NJ

EXPLORATION NO.: TP-3
SHEET: 1 of 1
PROJECT NO: 26.93004.00
REVIEWED BY: Chris McLaughlin

Logged By: Cody Lyons
Contractor: Furino & Sons
Operator: Frank/Ron

Test Pit Location: See Plan
Ground Surface Elev. (ft.): +63

Final Test Pit Depth (ft.): 9
Date Start - Finish: 4/22/2024 - 4/22/2024

Type of Excavator: Trackhoe
Excavator Model: Komatsu PC 45

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
04/22/24		3	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1			0-7	Topsoil - Brown (10YR, 4/3) sandy loam, weak medium crumb, moist, friable, clear smooth boundary, many fine medium roots	1		
2	S1, T1	2	7-30	Olive-yellow (2.5YR, 6/6) glauconitic loamy sand, weak medium granular, very moist, friable, gradual smooth boundary, few fine roots	2	12.9	
3				Olive (5YR, 5/3) glauconitic sandy loam, weak medium crumb, wet, friable	3		
4	S2, T2	4			4		
5					5		
6			30-108		6		
7					7		
8	S3, T3	8			8		
9					9		
10				End of exploration at 9 feet. Moderate groundwater seepage encountered @ 3' Tube Permeameter Test Results: 2.4 in/hr @ 2' 2.4 in/hr @ 4' <0.06 in/hr @ 8'			
11							
12							
13							
14							
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 4C

TEST PIT LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

PSE&G
Sharp Road Substation
Marlton, NJ

EXPLORATION NO.: TP-4
SHEET: 1 of 1
PROJECT NO: 26.93004.00
REVIEWED BY: Chris McLaughlin

Logged By: Cody Lyons
Contractor: Furino & Sons
Operator: Frank/Ron

Test Pit Location: See Plan
Ground Surface Elev. (ft.): +63

Final Test Pit Depth (ft.): 8.5
Date Start - Finish: 4/23/2024 - 4/23/2024

Type of Excavator: Trackhoe
Excavator Model: Komatsu PC 45

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
04/22/24		4	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1			0-11	Topsoil - Dark grayish brown (2.5YR, 4/2) sandy loam, weak medium crumb granular, moist, friable, abrupt smooth boundary, many fine medium roots	1		
2	S1, T1	2	11-66	Olive-yellow (2.5YR, 6/6) glauconitic loamy sand, weak medium granular, wet, friable, gradual smooth boundary, few fine roots	2		
3	Geo-1	3			3		
4					4		
5					5		
6	S2, T2	6	66-102	Olive (5YR, 4/3) glauconitic sandy loam, weak medium crumb granular, wet, friable, common fine distinct strong brown (7.5YR, 4/6) mottling throughout layer	6		
7					7		
8	Geo-2	8			8		
9				End of exploration at 8.5 feet. Moderate groundwater seepage encountered @ 4'			
10				Tube Permeameter Test Results: 1.1 in/hr @ 2'			
11							
12							
13							
14							
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 4D

TEST PIT LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

PSE&G
Sharp Road Substation
Marlton, NJ

EXPLORATION NO.: TP-5
SHEET: 1 of 1
PROJECT NO: 26.93004.00
REVIEWED BY: Chris McLaughlin

Logged By: Cody Lyons
Contractor: Furino & Sons
Operator: Frank/Ron

Test Pit Location: See Plan
Ground Surface Elev. (ft.): +61
Final Test Pit Depth (ft.): 9.5
Date Start - Finish: 4/23/2024 - 4/23/2024

Type of Excavator: Trackhoe
Excavator Model: Komatsu PC 45

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
04/23/24		3	
04/23/24		6.5	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1			0-9	Topsoil - Brown (10YR, 4/3) sandy loam, weak medium crumb, moist, friable, clear boundary, many fine medium roots	1		
2	S1, T1	2	9-54	Olive (5YR, 5/3) glauconitic loamy sand, weak medium granular, wet, friable, gradual smooth boundary, few fine roots, common medium distinct brownish yellow (10YR, 6/8) mottling encountered at 42 to 54 inches	2	24.7	
3	Geo-1	3			3		
4					4		
5			54-106	Olive (5YR, 5/4) glauconitic sandy loam, weak fine granular, wet, friable, abrupt smooth boundary, many medium distinct olive-yellow (2.5YR, 6/6), gray (5YR, 5/1) mottling throughout layer	5		
6	S2, T2	6			6	17.7	
7					7		
8	Geo-2	8			8		
9	S3, T3	9	106-114	Dark bluish gray (10B, 4/1) silty clay loam, moderate medium subangular blocky, wet, friable	9		
10				End of exploration at 9.5 feet. Rapid groundwater seepage encountered @ 3'			
11							
12							
13							
14							
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 4E

TEST PIT LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

PSE&G
Sharp Road Substation
Marlton, NJ

EXPLORATION NO.: TP-6
SHEET: 1 of 1
PROJECT NO: 26.93004.00
REVIEWED BY: Chris McLaughlin

Logged By: Cody Lyons
Contractor: Furino & Sons
Operator: Frank/Ron

Test Pit Location: See Plan
Ground Surface Elev. (ft.): +62.5
Final Test Pit Depth (ft.): 9.5
Date Start - Finish: 4/22/2024 - 4/22/2024

Type of Excavator: Trackhoe
Excavator Model: Komatsu PC 45

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
04/22/24		2.5	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1			0-15	Topsoil - Dark grayish brown (10YR, 4/2) sandy loam, weak medium crumb, moist, friable, abrupt smooth boundary, many fine medium roots	1		
2	S1, T1	2	15-53	Olive (5YR, 3/4) glauconitic loamy sand, weak medium granular, wet, friable, gradual smooth boundary, few fine roots, common medium distinct brownish yellow (10YR, 6/8) mottling encountered at 30 to 53 inches	2		
3	Geo-1	3			3		
4					4		
5	S2, T2	5	53-114	Olive (5YR, 5/3) glauconitic sandy loam, weak medium crumb, wet, friable, many medium distinct grayish green (5YR, 4/2), olive-yellow (2.5YR, 6/6) mottling throughout layer	5		
6					6		
7					7		
8	Geo-2	8			8		
9					9		
10				End of exploration at 9.5 feet. Moderate groundwater seepage encountered @ 2.5'			
11				Tube Permeameter Test Results: <0.06 in/hr @ 2'			
12							
13							
14							
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 4F

TEST PIT LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

PSE&G
Sharp Road Substation
Marlton, NJ

EXPLORATION NO.: TP-7
SHEET: 1 of 1
PROJECT NO: 26.93004.00
REVIEWED BY: Chris McLaughlin

Logged By: Cody Lyons
Contractor: Furino & Sons
Operator: Frank/Ron

Test Pit Location: See Plan
Ground Surface Elev. (ft.): +63.5
Final Test Pit Depth (ft.): 10
Date Start - Finish: 4/19/2024 - 4/19/2024

Type of Excavator: Trackhoe
Excavator Model: Komatsu PC 45

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
04/19/24		4	
04/19/24		8	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1			0-10	Topsoil - Very dark greenish brown (2.5 YR, 3/2) loamy sand, weak medium granular, moist, friable, abrupt smooth boundary, many fine medium roots	1		
2	S1, T1	2		Light olive-brown (2.5YR, 6/4) glauconitic loamy sand, weak medium granular, moist, friable, gradual smooth boundary, common fine medium roots, common medium faint olive-yellow (2.5YR, 6/6) mottling encountered at 39 to 57 inches	2	14.0	
3			10-57		3		
4					4		
5				Olive (5YR, 5/3) glauconitic sandy loam, moderate medium crumb, wet, friable, common coarse distinct olive-yellow (2.5YR, 6/6) mottling throughout layer	5		
6	S2, T2	6			6		
7					7		
8			57-120		8		
9					9		
10					10		
11				End of exploration at 10 feet. Slight groundwater seepage encountered @ 4' Moderate groundwater seepage encountered @ 8'			
12				Tube Permeameter Test Results: 1.5 in/hr @ 2'			
13				Single Ring Test Results: Failed to drain during one hour test period = <1 in/hr @ 4'			
14							
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 4G

3B - MTA TEST PIT USDA; 6/11/2024; 10:58:40 AM

TEST PIT LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

PSE&G
Sharp Road Substation
Marlton, NJ

EXPLORATION NO.: TP-8
SHEET: 1 of 1
PROJECT NO: 26.93004.00
REVIEWED BY: Chris McLaughlin

Logged By: Cody Lyons
Contractor: Furino & Sons
Operator: Frank/Ron

Test Pit Location: See Plan
Ground Surface Elev. (ft.): +63
Final Test Pit Depth (ft.): 7.5
Date Start - Finish: 4/19/2024 - 4/19/2024

Type of Excavator: Trackhoe
Excavator Model: Komatsu PC 45

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
04/19/24		3.5	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1	S1, T1	1	0-6	Topsoil - Brown (10YR, 4/3) loamy sand, weak medium crumb granular, moist, friable, abrupt smooth boundary, many fine medium roots	1		
			6-18	Olive-yellow (2.5YR, 6/6) glauconitic fine loamy sand, moderate medium crumb, very moist, firm, clear wavy boundary, common fine roots			
2					2		
3	S2, T2	3		Olive (5YR, 5/3) glauconitic loamy sand, weak medium granular, wet, friable, common medium faint olive-yellow (2.5YR, 6/6) mottling encountered throughout layer	3		
4					4		
5			18-90		5		
6					6		
7					7		
8				End of exploration at 7.5 feet. Moderate groundwater seepage encountered @ 3.5'			
9				Tube Permeameter Test Results: 1.1 in/hr @ 1'			
10				0.8 in/hr @ 3'			
11							
12							
13							
14							
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 4H

TEST PIT LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

PSE&G
Sharp Road Substation
Marlton, NJ

EXPLORATION NO.: TP-9
SHEET: 1 of 1
PROJECT NO: 26.93004.00
REVIEWED BY: Chris McLaughlin

Logged By: Cody Lyons
Contractor: Furino & Sons
Operator: Frank/Ron

Test Pit Location: See Plan
Ground Surface Elev. (ft.): +63
Final Test Pit Depth (ft.): 10
Date Start - Finish: 4/19/2024 - 4/19/2024

Type of Excavator: Trackhoe
Excavator Model: Komatsu PC 45

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
04/19/24		4.5	
04/19/24		6	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1			0-19	Topsoil - Dark grayish brown (10YR, 4/2) sandy loam, weak medium crumb, moist, friable, abrupt smooth boundary, many fine roots	1		
2	S1, T1	2	19-41	Light olive-brown (5YR, 6/4) glauconitic sandy loam, moderate medium crumb, very moist, friable, clear smooth boundary, common fine distinct brownish yellow (10YR, 6/8) mottling throughout layer	2		
3					3		
4	S2, T2	4	41-79	Olive (5YR, 4/3) glauconitic loamy sand, moderate coarse crumb, very moist to wet, friable, gradual smooth boundary, many medium distinct strong brown (7.5YR, 4/6) mottling throughout layer	4		
5					5		
6					6		
7	S3, T3	7	79-120	Olive (5YR, 4/3) glauconitic sandy loam, moderate medium granular, wet, firm, common medium faint strong brown (7.5YR, 4/6) mottling throughout layer	7		
8					8		
9					9		
10					10		
11				End of exploration at 10 feet. Slight groundwater seepage encountered @ 4.5' Moderate groundwater seepage encountered @ 6'			
12				Tube Permeameter Test Results: <0.06 in/hr @ 2' <0.06 in/hr @ 4'			
13							
14				Single Ring Test Results: 31:24 min/in = 1.9 in/hr @ 4'			
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 4I

TEST PIT LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

PSE&G
Sharp Road Substation
Marlton, NJ

EXPLORATION NO.: TP-10
SHEET: 1 of 1
PROJECT NO: 26.93004.00
REVIEWED BY: Chris McLaughlin

Logged By: Cody Lyons
Contractor: Furino & Sons
Operator: Frank/Ron

Test Pit Location: See Plan
Ground Surface Elev. (ft.): +60

Final Test Pit Depth (ft.): 8.5
Date Start - Finish: 4/23/2024 - 4/23/2024

Type of Excavator: Trackhoe
Excavator Model: Komatsu PC 45

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
04/23/24		3	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1			0-12	Topsoil - Brown (10YR, 4/3) sandy loam, weak medium crumb, moist, friable, abrupt smooth boundary, many fine medium roots	1		
2	S1, T1	2	12-61	Olive (5YR, 5/4) glauconitic loamy sand, weak medium granular, wet, friable, gradual smooth boundary, few fine roots, common medium distinct gray (5YR, 5/1) and strong brown (7.5YR, 4/6) mottling encountered at 19 to 61 inches	2		
3	Geo-1	3			3		
4					4		
5					5		
6	S2, T2	6	61-87	Olive (5YR, 5/4) glauconitic sandy loam, weak medium granular, wet, friable, clear smooth boundary, common fine distinct strong brown (7.5YR, 4/6) mottling throughout layer	6		
7					7		
8	T3, Geo-2	8	87-102	Dark olive-brown (2.5YR, 3/3) glauconitic and, 25% gravel, weak fine granular, wet, friable	8		
9				End of exploration at 8.5 feet. Rapid groundwater seepage encountered @ 3'			
10				Tube Permeameter Test Results: 0.3 in/hr @ 2' <0.06 in/hr @ 6'			
11							
12							
13							
14							
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 4J

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS More than 50% of material is LARGER than No. 200 Sieve	GRAVEL & GRAVELLY SOILS More than 50% of coarse fraction RETAINED on No. 4 Sieve	CLEAN GRAVELS (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines.
			GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
		GRAVELS WITH FINES (Appreciable amount of fines)	GM	Silty gravels, gravel-sand-silt mixtures.
			GC	Clayey gravels, gravel-sand-clay mixtures.
	SAND AND SANDY SOILS More than 50% of coarse fraction PASSING a No. 4 Sieve	CLEAN SAND (Little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines.
			SP	Poorly-graded sands, gravelly sands, little or no fines.
		SANDS WITH FINES (Appreciable amount of fines)	SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures.
FINE GRAINED SOILS More than 50% of material is SMALLER than No. 200 Sieve.	SILTS AND CLAYS Liquid limit LESS than 50		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
			OL	Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS Liquid limit GREATER than 50		MH	Inorganic silts, micaceous or diatomaceous fine sand or silty soils.
			CH	Inorganic clays of high plasticity, fat clays.
			OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS			PT	Peat, humus, swamp soils with high organic contents

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS.

GRADATION*		COMPACTNESS* sand and/or gravel		CONSISTENCY* clay and/or silt	
% Finer by Weight		Relative Density		Range of Shearing Strength in Pounds per Square Foot	
Trace	0% to 10%	Loose	0% to 40%	Very Soft	less than 250
Little	10% to 20%	Medium Dense	40% to 70%	Soft	250 to 500
Some	20% to 35%	Dense	70% to 90%	Medium	500 to 1000
And	35% to 50%	Very Dense	90% to 100%	Stiff	1000 to 2000
				Very Stiff	2000 to 4000
				Hard	Greater than 4000

**Values are from laboratory or field test data, where applicable. When no testing was performed, values are estimated.*

UNIFIED SOIL CLASSIFICATION SYSTEM

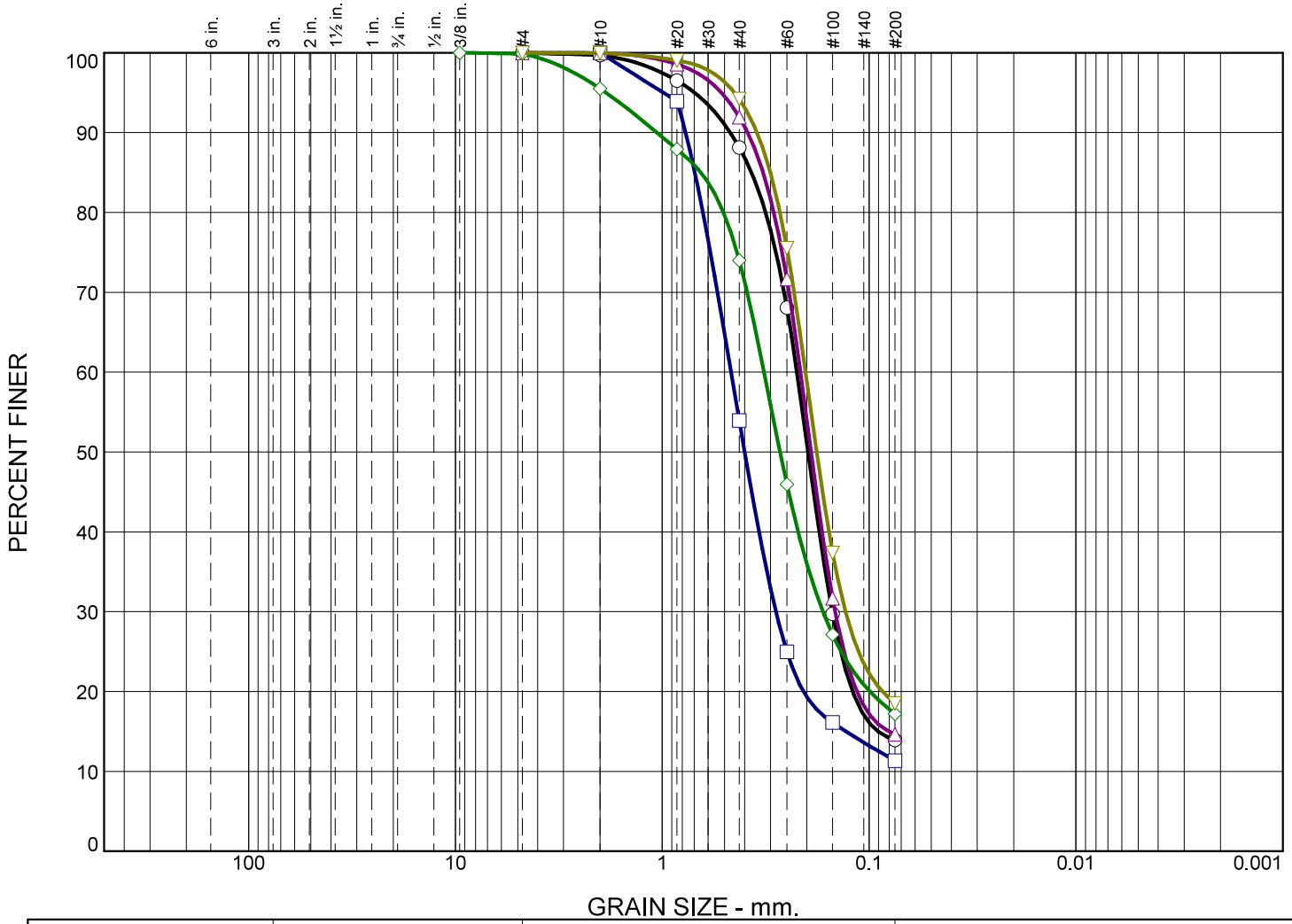
SOIL CLASSIFICATION CHART

PLATE 5

USDA SOIL CLASSIFICATION SYSTEM

PLATE 6

Gradation Curve(s)



	% Cobbles	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.3	11.6	74.2	13.9	
□	0.0	0.0	0.0	0.0	46.1	42.5	11.4	
△	0.0	0.0	0.0	0.0	8.1	77.3	14.6	
◇	0.0	0.0	0.1	4.4	21.5	56.8	17.2	
▽	0.0	0.0	0.0	0.0	5.8	75.7	18.5	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	SB-1	2	2-4	Fine to medium Sand, little Silty Clay (MC=18.1%)	SC
□	SB-1	9	20-22	Fine to medium Sand, little Silty Clay (MC=24.1%)	SP-SC
△	SB-2	1	0-2	Fine to medium Sand, little Clayey Silt (MC=14.8%)	SM
◇	SB-2	6	10-12	Fine to medium Sand Sand, little Silty Clay (MC=34.3%)	SC
▽	SB-3	1	0-2	Fine to medium Sand, little Silt (MC=30.2%)	SM

GZA GeoEnvironmental, Inc.

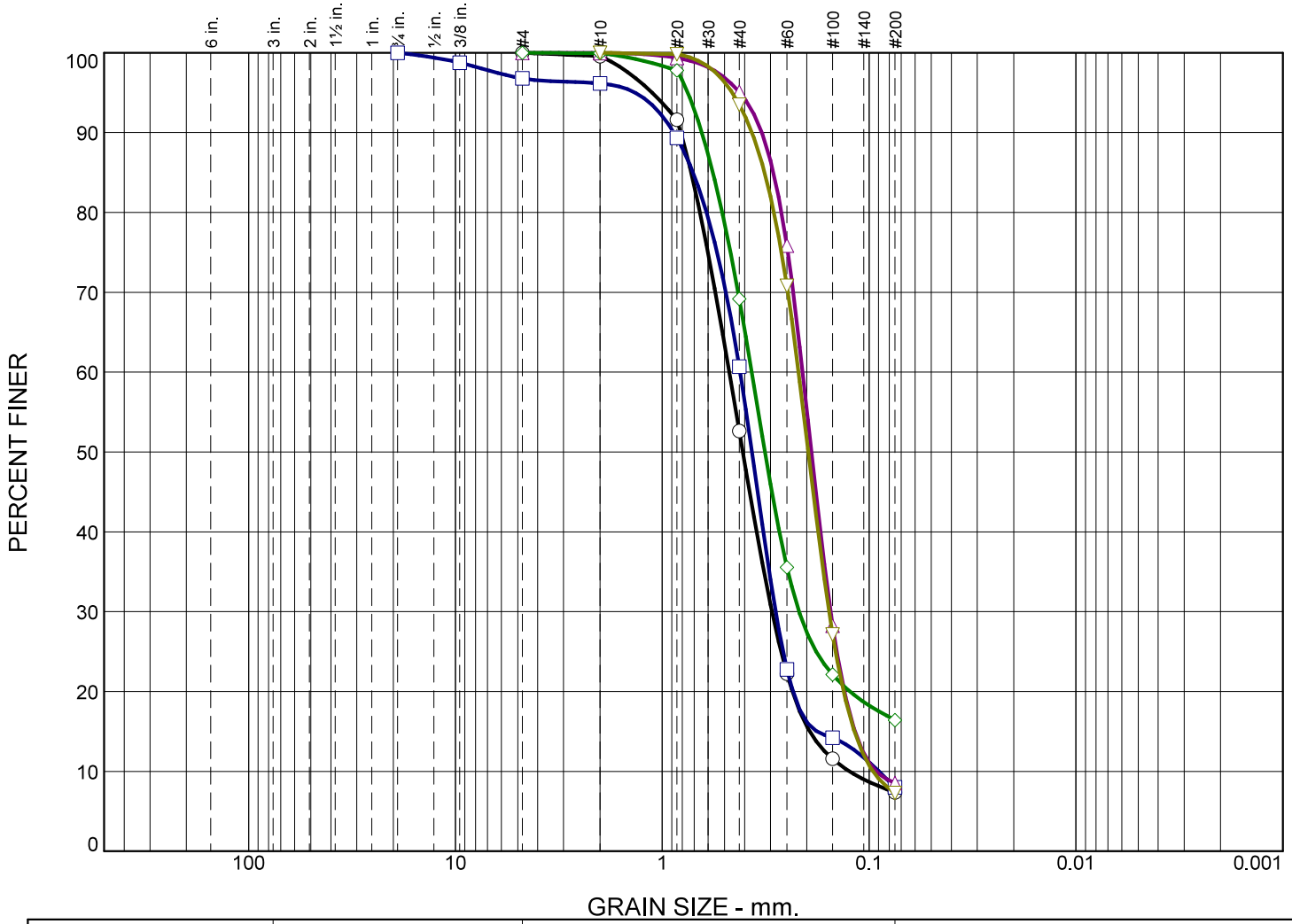
Somerset, NJ

Client: PSE&G

Project: Sharp Road Substation - Marlton, New Jersey

Project No.: 26.0093004.00 **Plate** 7A

Gradation Curve(s)



	% Cobbles	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.4	47.0	45.2	7.4	
□	0.0	0.0	3.2	0.6	35.5	52.7	8.0	
△	0.0	0.0	0.0	0.0	4.9	86.6	8.5	
◇	0.0	0.0	0.0	0.1	30.7	52.8	16.4	
▽	0.0	0.0	0.0	0.0	6.5	86.2	7.3	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	SB-3	10	25-27	Fine to medium Sand, trace Silty Clay (MC=28.6%)	SP-SC
□	SB-3	15	50-52	F-m Sand, trace Silty Clay, trace fine Gravel (MC=24.3%)	SP-SC
△	SB-4	3	4-6	Fine to medium Sand, trace Silty Clay (MC=24.5%)	SP-SM
◇	SB-4	6	10-12	Fine to medium Sand, little Silty Clay (MC=39.9%)	SC
▽	SB-5	2	2-4	Fine to medium Sand, trace Silt (MC=28.1%)	SP-SM

GZA GeoEnvironmental, Inc.

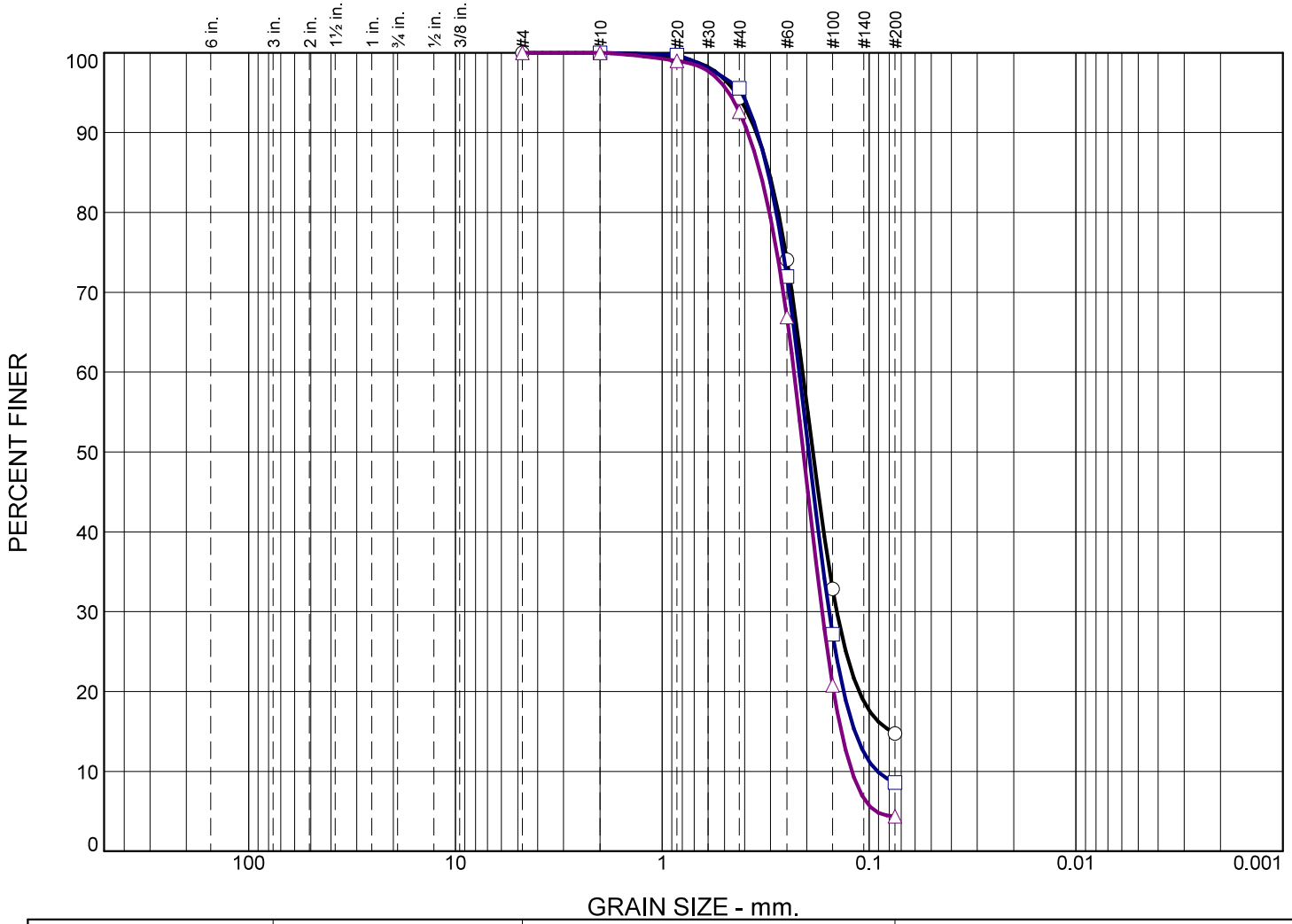
Somerset, NJ

Client: PSE&G

Project: Sharp Road Substation - Marlton, New Jersey

Project No.: 26.0093004.00 **Plate** 7B

Gradation Curve(s)



	% Cobbles	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	5.7	79.6	14.7	
□	0.0	0.0	0.0	0.0	4.5	86.9	8.6	
△	0.0	0.0	0.0	0.0	7.4	88.2	4.4	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	SB-6	3	4-6	Fine to medium Sand, little Silty Clay (MC=29.5%)	SC
□	SB-7	3	4-6	Fine to medium Sand, trace Silt (MC=38.2%)	SP-SM
△	SB-8	2	2-4	Fine to medium Sand, trace Silt (MC=31.8%)	SP

GZA GeoEnvironmental, Inc.

Somerset, NJ

Client: PSE&G

Project: Sharp Road Substation - Marlton, New Jersey

Project No.: 26.0093004.00 **Plate** 7C

Summary of Chemical Testing and Soil Box Resistivity Testing

Sharp Road Substation

Marlton, Burlington County, New Jersey

PSE&G

Summary of Soil Box Resistivity Tests			
Exploration Number	**Approximate Depth (ft.)**	**Generalized Soil Description**	**Resistivity (ohm-cm)**
B-1	4-6	Clayey Sand	47,800
B-1	20-22	Clayey Sand	9,000
B-1	45-47	Clayey Sand	1,860
B-3	0-2	Clayey Sand	86,400
B-3	25-27	Clayey Sand	1,620
B-3	50-52	Clayey Sand	5,000
B-6	2-4	Silty Sand	24,800
B-6	20-22	Clayey Sand	1,820
B-6	40-42	Clayey Sand	1,370

Exploration Number	Approximate Depth (ft.)	Generalized Soil Description	Chloride Ion (ppm)	pH	Sulfates (ppm)	Sulfides (ppm)	Redox Potential (mV)	Electrical Resistivity (ohm-cm)
B-1	4-6	Clayey Sand	11.0	5.72	35	ND	380	ND
B-3	2-4	Silty Sand	12.0	6.05	33	ND	340	ND
B-5	0-2	Sand	9.5	6.19	30	ND	330	ND
B-6	2-4	Silty Sand	11.0	5.84	39	ND	330	ND
TP-1	2	Loamy Sand	8.4	5.75	35	ND	340	ND
TP-4	6	Sandy Loam	8.2	5.62	67	ND	310	ND
TP-5	2	Loamy Sand	11.0	5.19	22	ND	330	ND
TP-10	6	Sandy Loam	12.0	5.27	78	ND	320	ND

**ND= Analyzed for but not detected*

Appendix I -
Geothermal Test Results and
Field Resistivity Survey

Geotherm

21239 FM529 Rd., Bldg F
Cypress, TX 77433
Office: 291-985-9344
info@geothermusa.com
http://www.geothermusa.com

May 15, 2024

GZA GeoEnvironmental, Inc.
117 Canal Road
South Bound Brook, NJ 08880
Attn: Chris McLaughlin, P.E.

Re: Thermal Analysis of Native Soil Samples
Sharp Road Substation – Marlton, NJ (Project No. 26.0093004.00)

The following is the report of thermal dryout characterization tests conducted on the six (6) tube samples of native soil from the referenced project sent to our laboratory.

Thermal Resistivity Tests: The tube samples were tested 'as received'. The tests were conducted in accordance with the **IEEE standard 442-2017**. The results are tabulated below and the thermal dryout curves are presented in **Figures 1 to 3.**

Sample ID, Description, Thermal Resistivity, Moisture Content and Density

Sample ID	Depth (ft)	Description (GZA)	Thermal Resistivity (°C-cm/W)		Moisture Content (%)	Dry Density (lb/ft^3)
			Wet	Dry		
TP-1	3	Loamy Sand	71	214	20	93
TP-1	8	Sandy Loam	73	228	23	92
TP-4	3	Loamy Sand	72	233	15	87
TP-4	8	Sandy Loam	68	206	21	96
TP-10	3	Loamy Sand	80	250	22	81
TP-10	8	Sandy Loam	77	219	25	91

Comments: The thermal characteristic depicted in the dryout curves apply for the soils at their respective test dry density.

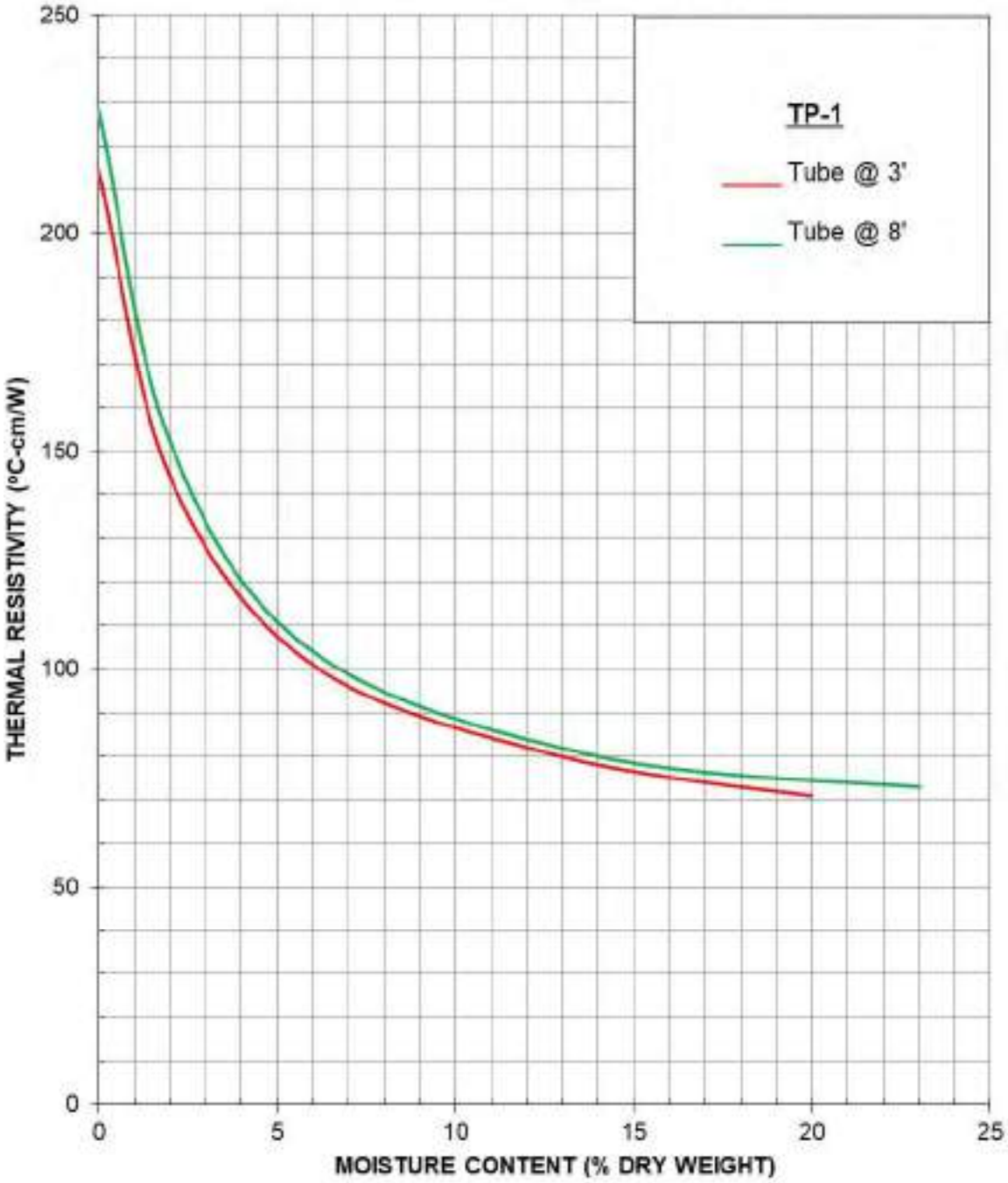
Please contact us if you have any questions or if we can be of further assistance.

Geotherm USA

Deepak Parmar

Geotherm

THERMAL DRYOUT CURVES



GZA GeoEnvironmental, Inc. (Project No. 26.0093004.00)

Sharp Road Substation – Marlton, NJ

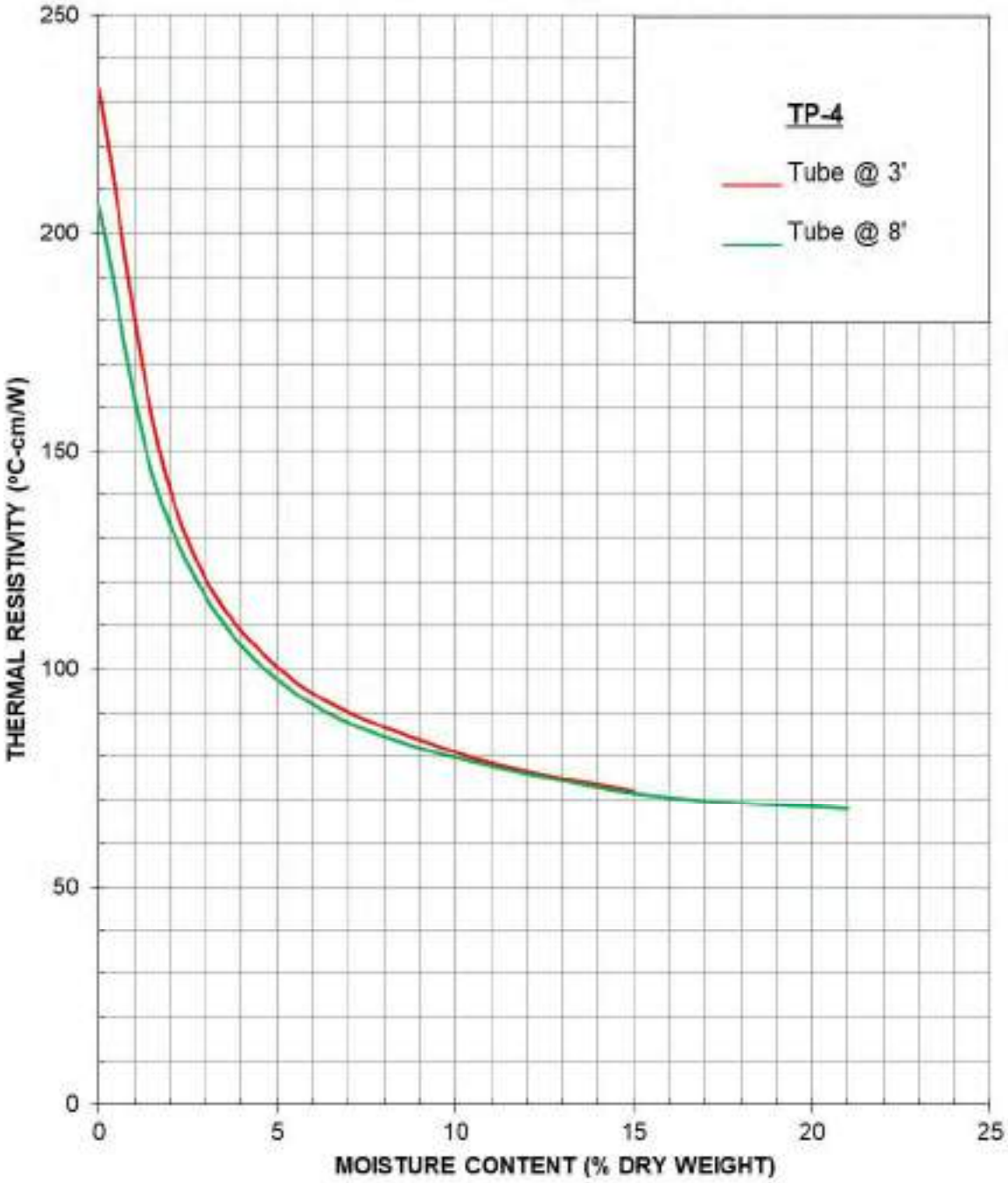
Thermal Analysis of Native Soil Samples

May 2024

Figure 1

Geotherm

THERMAL DRYOUT CURVES



GZA GeoEnvironmental, Inc. (Project No. 26.0093004.00)

Sharp Road Substation – Marlton, NJ

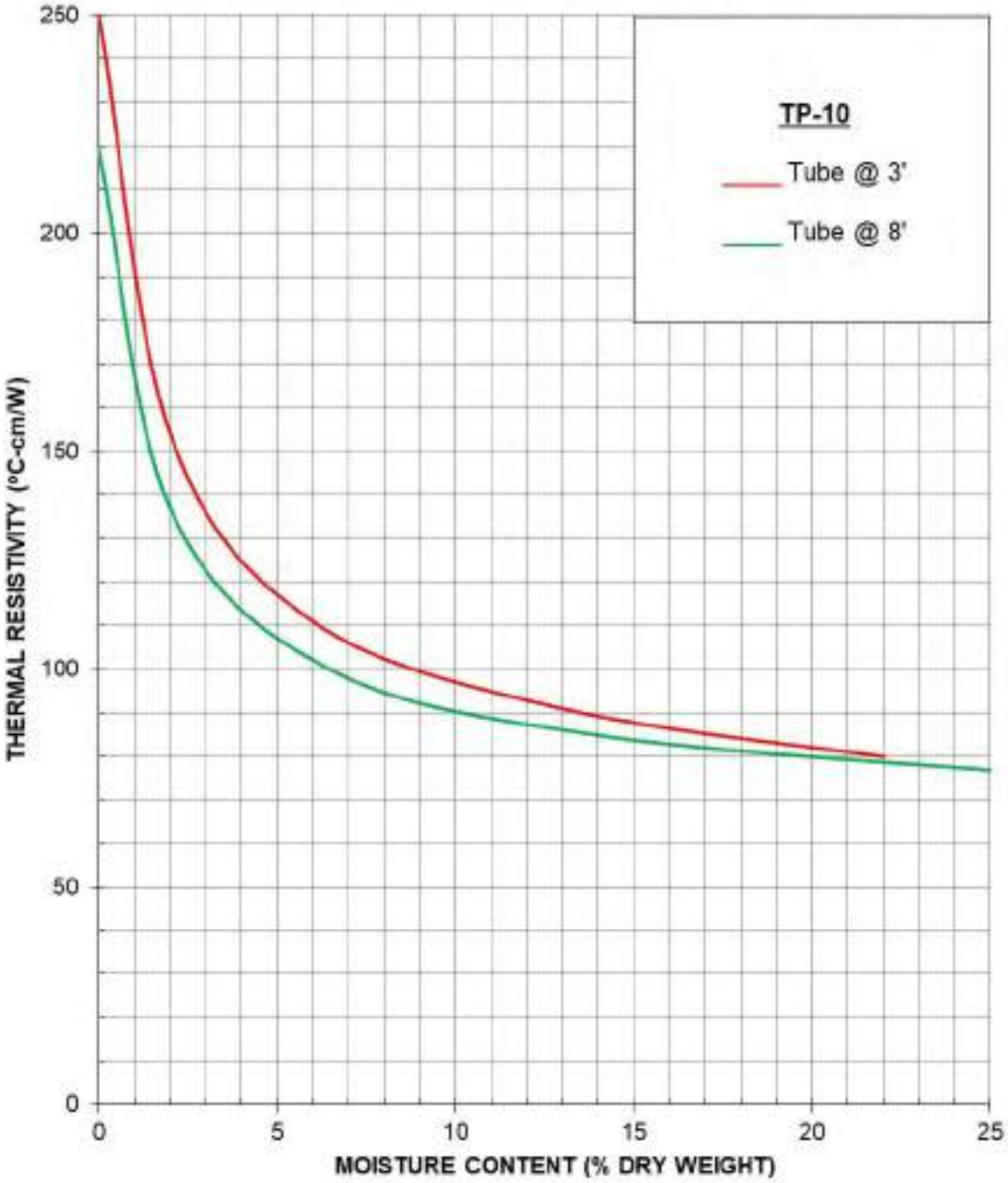
Thermal Analysis of Native Soil Samples

May 2024

Figure 2

Geotherm

THERMAL DRYOUT CURVES



GZA GeoEnvironmental, Inc. (Project No. 26.0093004.00)

Sharp Road Substation – Marlton, NJ

Thermal Analysis of Native Soil Samples

May 2024

Figure 3

Appendix II – Limitations

Attachment H – Operations & Maintenance Plan

Stormwater Operation & Maintenance Plan

Sharp Road Switch
Block 15, Lot 2
225 Sharp Road
Township of Evesham, Burlington County, NJ

Prepared By

11401 Lamar Ave.
Overland Park, KS 66211
913-458-2000

Revision 0
4-25-2025

Prepared by:_____
Max Schumacher, P.E.

Approved by: _____
Nicholas G. Gaspar, P.E.
N.J.P.E. License No. 53074
COA No. 24GA27981200

Table of Contents

1.0 Introduction

This Operations and Maintenance Plan has been prepared to address the requirements of the New Jersey Pollutant Discharge Elimination System (NJPDES) rules, N.J.A.C. 7:14A, Evesham Township Code Chapter 62-28, and the New Jersey Stormwater Best Management Practices (NJBMP) Manual. This Plan presents the Best Management Practices (BMPs) that have been designed for this project to ensure effective and reliable performance. The BMPs presented herein have been designed as an integral component of the project known as the Sharp Road Switch Station, which is located on Block 15, Lot 2 at 225 Sharp Road of Evesham Township, Burlington County, NJ. It will be the responsibility of the Public Service Electric and Gas Company (PSE&G) to provide maintenance of stormwater management facilities at the project site. Their contact information is as follows:

PUBLIC SERVICE ELECTRIC AND GAS COMPANY
Graham Mulholland, Distribution Supervisor – Maintenance, PSE&G Southern Division
300 Albany Road, Moorestown, NJ 08057
Telephone: (856) 778-6748

Responsible Party Acknowledgment

_____ Date:_____

The responsible party shall maintain a detailed log of the preventative and corrective maintenance for the stormwater management elements, including a record of all inspections and copies of all maintenance related work-orders (See Appendix A for Inspection and Maintenance Reports). The effectiveness of the maintenance plan shall be evaluated by the responsible party at least once a year and the plan shall be adjusted as needed. Written maintenance and repair records for all stormwater management elements shall be maintained for at least five years by the responsible party and shall be provided to the municipality and/or NJDEP upon request.

2.0 Maintenance

2.1 General Maintenance

- All structural components must be inspected, at least once annually, for cracking, subsidence, spalling, erosion, and deterioration.
- Components expected to receive and/or trap debris and sediment must be inspected for clogging at least four times annually.
- Sediment removal should take place when all stormwater runoff has drained from the basin and the basin is dry.
- Disposal of debris, trash, sediment, and other waste material must be done at suitable disposal/recycling sites and in compliance with all applicable local, state and federal waste regulations.
- Stormwater BMPs may not be used for stockpiling of plowed snow and ice, compost, or any other material.

2.2 Drainage Maintenance

- The basin must be inspected at least twice annually to determine if the permeability of the basin has decreased.
- If the actual drain time is longer than the design drain time, the components must be evaluated and appropriate measures taken to return the small-scale infiltration basin to the original tested as-built condition.
- If the small-scale infiltration basin fails to drain the WQDS within 72 hours, corrective action must be taken and the maintenance manual revised accordingly to prevent similar failures in the future. Note that annual tilling of the sand layer, using lightweight equipment, may assist in maintaining the infiltration capacity of a surface type system by breaking up clogged surfaces.

<u>Small-Scale Infiltration Basin Data:</u>
Design drainage time for the maximum design storm runoff volume: 24hrs

3.0 Maintenance Records and Reporting

All inspections (as required above), preventative and corrective maintenance, and required repairs shall be documented by the owner.

On an annual basis, a certified maintenance and inspection report and all required maintenance logs shall be submitted to the Municipal Engineering Department per Township of Evesham Code §62-28 J(i). These inspection, maintenance and repair records for all stormwater elements shall be maintained by the responsible party and also made available upon request by an any public entity with administrative, health, environmental, or safety authority over the site per §62-28 J(j).

The effectiveness of the maintenance plan shall be evaluated at least once per year and the plan shall be adjusted if necessary to ensure performance of the stormwater elements.

4.0 Equipment, Materials and General Maintenance Cost Estimate

The following items are associated with stormwater management facilities general maintenance requirements, i.e., routine inspections, regular maintenance and repairs, and estimated cost to perform each task.

1. INSPECTION
    a. Tools (clipboard, logs, camera, etc)
    b. Cost ($600/annual inspection)
        i. Four annual inspections $2400
        ii. Other annual inspections (assumes 2): $1200

2. MAINTENANCE / REPAIR
    a. Tools $200
        i. Shovel / Rake (sand tilling)
        ii. Trash containers (garbage & recyclables)
        iii. Wheel barrow
        iv. Proper Attire

    b. Anticipated Annual Cost
        i. Garbage/Recycle $500
        ii. Sediment Removal $1300

ANNUAL COST: ~$5600

APPENDIX A

INSPECTION AND MAINTENANCE REPORTS

Inspection Checklist / Maintenance Actions

Surface Infiltration – Extended Detention Basin

Checklist (circle one): Quarterly / Annual / Monthly / Special Event Inspection

Checklist No. _____ **Inspection Date:** _____

Date of most recent rain event: _____

Rain Condition (circle one):
Drizzle / Shower / Downpour / Other _____

Ground Condition (circle one):
Dry / Moist / Ponding / Submerged / Snow accumulation

The following inspection items and preventative/corrective maintenance actions listed below represent general requirements. The design engineer and/or responsible party shall adjust the items and actions to better meet the conditions of the site, the specific design targets, and the requirements of regulatory authorities.

	For Inspector			For Maintenance Crew
Component No. Component Name	Inspection Item and Inspection Item No.		Result	Preventative / Corrective Maintenance Actions
A1 Pretreatment (Forebay)	1	Scouring or erosion is present at inlet structure and/or riprap apron	Y__ N__	Check the flow diversion device before the inlet pipe and whether the bypass flow channel is clogged Work Order # _____
	2	Clogged pipes or excessive sediment in the forebay	Y__ N__	Remove sediment or debris
	3	Damaged outlet structure (e.g., cracking, subsidence, spalling, erosion, or deterioration)	Y__ N__	Repair or replace the outlet structure Work Order # _____
A2 Pretreatment (MTD, if installed)	1	MTD inspection	Y__ N__	(If a MTD is used for pretreatment, see manufacturer's maintenance manual)
A3 Pretreatment (Structural BMP)	1	BMP inspection	Y__ N__	(See BMP No. _____ Field Manual)

Note: *No pretreatment devices to be inspected at project site.*

	For Inspector			For Maintenance Crew
Component No. Component Name	Inspection Item and Inspection Item No.		Result	Preventative / Corrective Maintenance Actions
B Infiltration Bed	1	Standing water is present after the design drain time The observed drain time is approximately _____ hours	Y__ N__	Recheck to determine if there is standing water after 72 hours. If standing water is present longer than 5 days, report to mosquito commission. Remove any sediment buildup Replace the sand layer (if sand layer is installed; volume of replacement sand is specified in the Basin Configuration Targets in the Basic Design Information Section of this Manual) Work Order # _____
	2	Excessive sediment, silt, or trash accumulation on basin bed	Y__ N__	Clean pretreatment system Remove silt, sediment, and trash Work Order # _____
	3	Erosion or channelization is present	Y__ N__	Check whether the flow bypass or diversion device is clogged Re-grade the infiltration bed Work Order # _____
	4	Animal burrows/rodents are present	Y__ N__	Pest control Work Order # _____
	5	Uneven bed	Y__ N__	Use light equipment to resurface the bed Work Order # _____
	6	Evidence of sinkholes or subsidence	Y__ N__	Monitor for sinkhole development
Note:				

	For Inspector			For Maintenance Crew
Component No. Component Name	Inspection Item and Inspection Item No.		Result	Preventative / Corrective Maintenance Actions
C Vegetation	1	Large spot(s) showing bare soil	Y__ N__	Vegetative cover must be maintained at 85%. Revegetate if 50% or more vegetation has been lost Work Order # _____
	2	Overgrown vegetation	Y__ N__	Mow/trim the vegetation Work Order # _____
	3	Tree growth in the basin	Y__ N__	Clear, trim, or prune the trees according to the original Landscaping Plan Inspect to determine if the tree roots caused any structural damage Work Order # _____
Note:				

	For Inspector			For Maintenance Crew
Component No. Component Name	**Inspection Item and Inspection Item No.**		**Result**	**Preventative / Corrective Maintenance Actions**
D Basin Embankment and Side Slopes	1	Signs of erosion, soil slide or bulges, seeps and wet spots, loss of vegetation, or erosion on the basin slope	Y__ N__	Check for excessive overland runoff flow through the embankment. Check for any sink hole development Direct the overland runoff to the forebay or pretreatment area Restabilize the bank Work Order # _____
E Outlet	1	Trash or debris accumulation more than 20%	Y__ N__	Clean and remove Determine source of trash and address to reduce future maintenance costs or basin failure
	2	Trash rack is damaged or rusted greater than 50% Trash rack is loose or missing parts	Y__ N__	Repair or replace trash rack Work Order #_____
	3	Outlet components (e.g., orifice plates or weir plate) skewed, misaligned, or missing	Y__ N__	Repair or replace component Work Order #_____
	4	Discharge pipe apron is eroded or scoured	Y__ N__	Restabilize the discharge riprap apron Work Order #_____
	5	Standing water is present in the outlet structure longer than 72 hours	Y__ N__	Pump out the standing water Work Order # _____
Note:				

	For Inspector			For Maintenance Crew
Component No. Component Name	Inspection Item and Inspection Item No.		Result	Preventative / Corrective Maintenance Actions
F Emergency Spillway	1	Trees or excessive vegetation present	Y__ N__	Remove trees and roots, and restore berms if necessary Work Order #_____
	2	Damaged structure	Y__ N__	Repair Work Order #_____
G Miscellaneous	1	Fence: broken or eroded parts	Y__ N__	Repair or replace Work Order #_____
	2	Gate: missing gate or lock	Y__ N__	Repair or replace Work Order #_____
	3	Sign/plate: tiled, missing, or faded	Y__ N__	Repair or replace Work Order #_____
	4	Excessive or overgrown vegetation blocking access to the basin	Y__ N__	Clear, trim, or prune the vegetation to allow access for inspection and maintenance Work Order #_____
Note:				

Follow Up Items (Component No. / Inspection Item No.):

_____

Associated Work Orders: # _____, # _____, # _____, # _____, # _____

_____	_____	_____
Inspector Name	Signature	Date

Report issues to the local authority and mosquito commission as required by local ordinances and regulatory authorities.

File this checklist in the Maintenance Log after performing maintenance.

Preventative Maintenance Record

Corresponding Checklist No. _____
Component No._____, Inspection Item No._____

Work Logs

Activities	Components	Date Completed
Sediment/debris removal **Sediment removal should take place when the basin is thoroughly dry.**	~~A1/A2/A3 – Pretreatment~~	NA
	B – Infiltration Bed	
	D – Basin Embankment and Side Slopes	
	E – Outlet	
Vegetation removal	A1/A2/A3 – Pretreatment	
	B – Infiltration Bed	
	D – Basin Embankment and Side Slopes	
	E – Outlet	
	F – Emergency Spillway	

Vegetation is removed by _____ (type of equipment) with minimum disruption to the remaining vegetation.

All use of fertilizers, pesticides, mechanical treatments, and other means to ensure optimum vegetation health must not compromise the intended purpose of the stormwater management measure. The fertilizer applied is _____ (type), and _____ (quantity per usage) is applied _____ (frequency of use).

Debris, sediment, and trash are handled (onsite / by _____ (contractor name) to disposal site _____). (See Part I: Maintenance Plan – Disposal Plan Section)

If a sand layer is installed, replacement of the sand will occur according to the scheduled frequency (see Basin Configuration Targets above). The next scheduled replacement is _____ (date).

Crew member:_____/_____ **Date:** _____
(name/ signature)

Supervisor:_____/_____ **Date:** _____
(name/ signature)

File this Preventative Maintenance Record in the Maintenance Log after performing maintenance.

Corrective Maintenance Record

1. **Work Order #** _____ **Date Issued** _____

2. **Issue to be resolved:**

3. The issue was from **Corresponding Checklist No. _____, Component No. _____, Inspection Item No._____.**

4. **Required Actions**

Actions	Planned Date	Date Completed

5. **Responsible person(s):**
   _____

6. **Special requirements**
   - Time of the season or weather condition:_____
   - Tools/equipment:_____
   - Subcontractor (name or specific type):_____

Approved by _____/_____ **Date** _____
(name/signature)

Verification of completion by _____/_____ **Date** _____
(name/signature)

File this Corrective Maintenance Record in the Maintenance Log after performing maintenance.

Corrective Maintenance Record (Example)

7. Work Order # _____ Date Issued _____

8. Issue to be resolved:
(e.g., orifice plate is loose and bent)

9. The issue was from Corresponding Checklist No. _____, Component No. (e.g., E – Outlet), Inspection Item No.___ (e.g., 2, 3) _____.

10. Required Actions

Actions	Planned Date	Date Completed
New bolts to fix the orifice plate		
Repair/replace the trash rack		
Restabilize side slope (indicate location)		
Repair riprap apron with 100 cubic yards of aggregate		
Revegetate		
(List additional tasks, if applicable)		

11. Responsible person(s):
_____

12. Special requirements
- Time of the season or weather condition:_____
- Tools/equipment:_____
- Subcontractor (name or specific type):_____

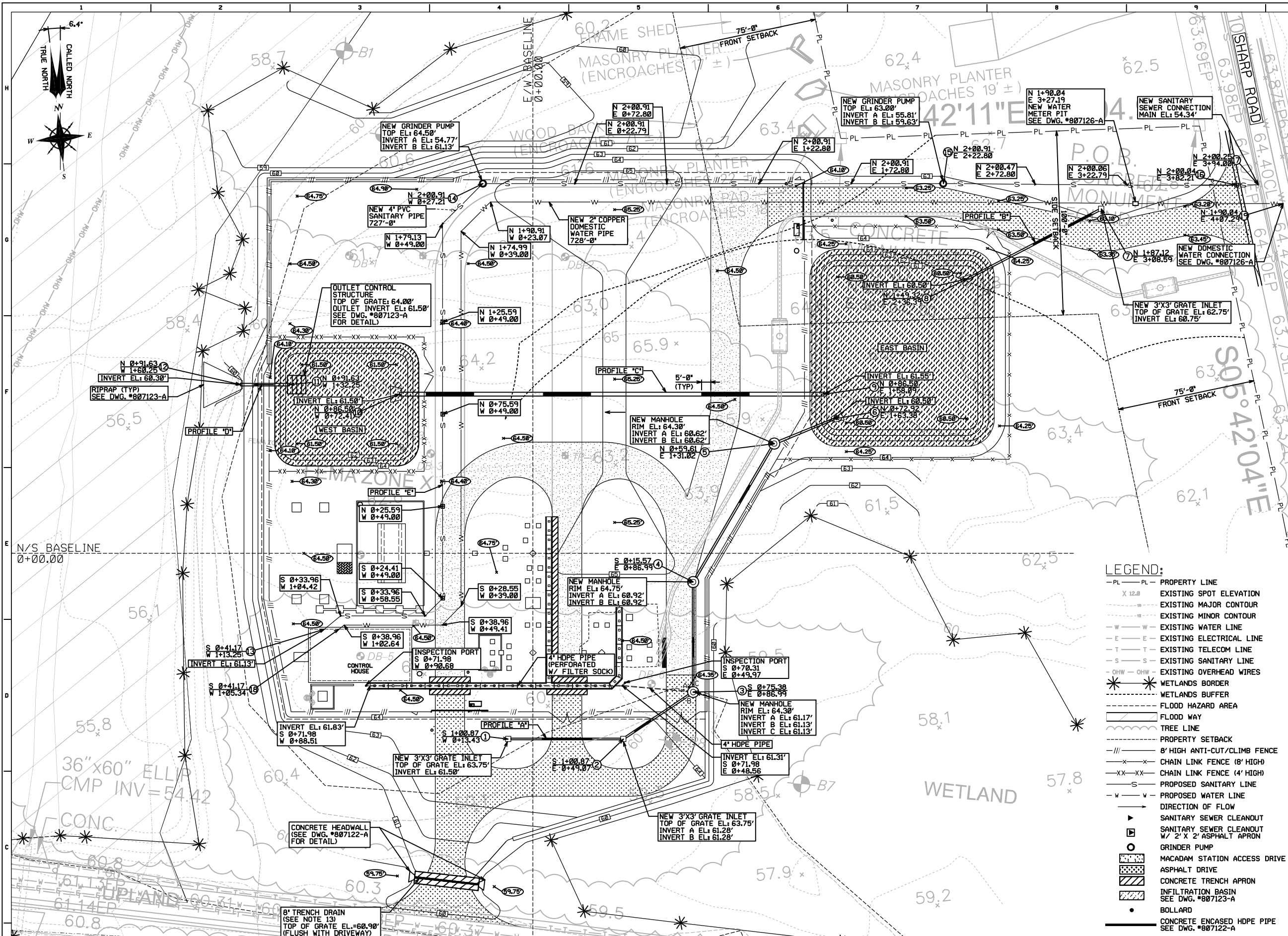
Approved by _____/_____ Date _____
(name/signature)

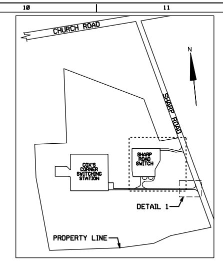
Verification of completion by _____/_____ Date _____
(name/signature)

File this Corrective Maintenance Record in the Maintenance Log after performing maintenance.

APPENDIX B

STORMWATER MANAGEMENT LOCATION PLAN





VICINITY MAP

GENERAL NOTES:

1. GENERAL NOTES ARE APPLICABLE TO ALL UNDERGROUND UTILITY DRAWINGS.
2. THE LOCATIONS OF THE EXISTING FACILITIES AND UNDERGROUND UTILITIES SHOWN ON THIS SERIES OF DRAWINGS REPRESENT THE BEST KNOWLEDGE OF THE ENGINEER. BEFORE ANY WORK IS STARTED IN THE AREA OF EXISTING FACILITIES AND UNDERGROUND UTILITIES, THE CONTRACTOR SHALL CONFIRM THEIR LOCATIONS AND NOTIFY THE UTILITY COMPANY THAT WORK IS PLANNED IN THIS AREA.
3. ALL TIE-IN POINTS OF EXISTING UNDERGROUND UTILITIES SHALL BE FIELD VERIFIED AND ADJUSTED AS NECESSARY. CONTRACTOR SHALL FURNISH AND INSTALL ALL MATERIAL NECESSARY TO MAKE TIE-IN. EXISTING PIPING SHALL BE REMOVED OR ABANDONED IN PLACE AS NOTED ON THE DRAWINGS. EXISTING UNDERGROUND PIPING AND FACILITIES NOT NOTED ON THE DRAWINGS TO BE REMOVED OR ABANDONED SHALL BE CONFIRMED WITH THE COMPANY PRIOR TO BEING DISTURBED. MANHOLES ASSOCIATED WITH EXISTING PIPING TO BE REMOVED OR ABANDONED SHALL BE REMOVED UNLESS NEEDED FOR CONTINUED SERVICE OF OTHER ACTIVE PIPE. ALL WORK SHALL BE COORDINATED WITH THE PSE&G CONSTRUCTION MANAGER.
4. THE POTENTIAL FOR FLOATATION OF UNDERGROUND FACILITIES AND COMPONENTS (INCLUDING BUT NOT LIMITED TO, MANHOLES, BELOW GRADE TANKS, PIPING, DUCT BANK, CONDUITS ETC.) COULD EXIST DURING INSTALLATION DUE TO HIGH GROUND WATER CONDITIONS OR WHEN THE SITE IS INUNDATED WITH RAINFALL. THE CONSTRUCTION CONTRACTOR SHALL BE RESPONSIBLE FOR TAKING THE NECESSARY PRECAUTIONS AND ACTIONS TO ENSURE THAT NO FLOATATION OF ANY UNDERGROUND FACILITIES OCCUR DURING THEIR INSTALLATION.
5. WATER LINE AND SANITARY SEWER LINES UNDER PRESSURE SHALL BE INSTALLED A MINIMUM OF 4'-4" BELOW GRADE (12" BELOW FROST DEPTH). GRAVITY SANITARY SEWER LINES SHALL BE INSTALLED A MINIMUM OF 2'-0" BELOW GRADE. GAS LINE SHALL BE INSTALLED A MINIMUM OF 3'-0" BELOW GRADE.
6. ELECTRICAL LINES ARE NOT TO BE GROUNDED TO WATER PIPING.
7. THE MINIMUM CLEARANCE BETWEEN WATER AND SANITARY SEWER CROSSINGS SHALL BE 12". A PIPE SLEEVE 5'-0" EACH WAY OF CROSSING WILL ALSO BE ACCEPTABLE.
8. ALL INSTALLATIONS SHALL BE MARKED WITH APPROPRIATE UTILITY MARKING TAPE IN THE TOP SIX (6") INCH LAYER OF BACKFILL.
9. PIPE JOINTS SHALL NOT BE ENCASED WHEN POSSIBLE.
10. BEARING SURFACE SHOULD, WHERE POSSIBLE, BE PLACED AGAINST UNDISTURBED SOIL. WHERE IT IS NOT POSSIBLE, THE FILL BETWEEN THE BEARING SURFACE AND UNDISTURBED SOIL MUST BE COMPACTED TO AT LEAST 90 PERCENT STANDARD PROCTOR DENSITY.
11. SANITARY SEWER CLEANOUTS SHALL BE INSTALLED OUTSIDE THE CONTROL BUILDING AND AT THE PROPERTY LINE, PER THE NATIONAL STANDARD PLUMBING CODE.
12. CONTRACTOR SHALL SUBMIT PIPING MATERIALS FOR ENGINEER APRROVAL.
13. TRENCH DRAIN SHALL BE NEUTRAL MAXI 150 SYSTEM BY HYDROTEC, 12.20" HEIGHT WITH DUCTILE IRON GRATE OR APPROVED EQUAL. TRENCH DRAIN MUST BE INSTALLED PER MANUFACTURER SPECIFICATIONS. UTILIZE THE NUMBER OF CHANNEL SECTIONS REQUIRED FOR AN OVERALL LENGTH OF 35'. FIELD TO ADJUST AS NEEDED.

REFERENCE DRAWINGS:

1. GRADING AND SITE DEVELOPMENT PLAN — DWG. #798446-A
2. SOIL EROSION AND SEDIMENT CONTROL PLAN — DWG. #798447-A
3. SOIL EROSION AND SEDIMENT CONTROL NOTES AND DETAILS — DWG. #798448-A
4. KEY PLAN — DWG. #798874-A
5. SITE DETAILS — DWG. #807120-A
6. UTILITY PROFILES & DETAILS SHEET 1 OF 4 — DWG. #807122-A
7. UTILITY PROFILES & DETAILS SHEET 2 OF 4 — DWG. #807123-A
8. UTILITY PROFILES & DETAILS SHEET 3 OF 4 — DWG. #807125-A
9. UTILITY PROFILES & DETAILS SHEET 4 OF 4 — DWG. #807126-A
10. FOUNDATION PLAN — DWG. #807127-A

LEGEND:

- PROPERTY LINE
- EXISTING SPOT ELEVATION
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING WATER LINE
- EXISTING ELECTRICAL LINE
- EXISTING TELECOM LINE
- EXISTING SANITARY LINE
- EXISTING OVERHEAD WIRES
- WETLANDS BORDER
- WETLANDS BUFFER
- FLOOD HAZARD AREA
- FLOOD WAY
- TREE LINE
- PROPERTY SETBACK
- 8' HIGH ANTI-CUT/CLIMB FENCE
- CHAIN LINK FENCE (8' HIGH)
- CHAIN LINK FENCE (4' HIGH)
- PROPOSED SANITARY LINE
- PROPOSED WATER LINE
- DIRECTION OF FLOW
- SANITARY SEWER CLEANOUT
- SANITARY SEWER CLEANOUT W/ 2' X 2' ASPHALT APRON
- GRINDER PUMP
- MACADAM STATION ACCESS DRIVE
- ASPHALT DRIVE
- CONCRETE TRENCH APRON
- INFILTRATION BASIN SEE DWG. #807123-A
- BOLLARD
- CONCRETE ENCASED HDPE PIPE SEE DWG. #807122-A

PIPE SCHEDULE

PURPOSE	PIPE DESIGNATION			LENGTH	DIAMETER	MATERIAL	SLOPE	REF DWG. #
	PROFILE	FROM	TO					
STORM	A	1	2	62'-6"	12"	HDPE	0.3%	807123-A
STORM	A	2	3	45'-8"	12"	HDPE	0.3%	807123-A
STORM	A	3	4	59'-10"	12"	HDPE	0.3%	807123-A
STORM	A	4	5	87'-1"	12"	HDPE	0.3%	807123-A
STORM	A	5	6 (EAST BASIN)	35'-0"	12"	HDPE	0.3%	807123-A
STORM	B	7	8 (EAST BASIN)	81'-6"	12"	HDPE	0.3%	807123-A
STORM	C	9 (EAST BASIN)	10 (WEST BASIN)	230'-6"	24"	HDPE	0.0%	807123-A
STORM	D	11 (WEST BASIN)	12 (OUTFALL)	28'-0"	18"	HDPE	4.3%	807125-A
SANITARY	E	13 (CTRL HOUSE)	14	305'-0"	4"	PVC	2.1%	807125-A
SANITARY	E	14	15	250'-0"	4"	PVC	2.1%	807125-A
SANITARY	E	15	16	160'-0"	4"	PVC	2.1%	807125-A
SANITARY	E	16	17 (SAN. CONN.)	12'-0"	4"	PVC	2.1%	807125-A
WATER	-	18 (CTRL HOUSE)	19 (WATER CONN.)	728'-0"	2"	COPPER	-	-

SITE LOCATION
225 SHARP RD BLOCK 15, LOT 2

SURVEY INFORMATION
SURVEY PREPARED BY:
PSE&G SURVEYS & MAPPING 80 PARK PLAZA T20, NEWARK, NJ 07102-4194
DATE OF SURVEY: SEPTEMBER 23, 2024
SURVEY PREPARED FOR: PSE&G

0 10 20 40
SCALE: 1"=20'-0"

THE PRESENCE OF UNDERGROUND HAZARDS MAY ONLY BE SHOWN ON OTHER DISCIPLINE DRAWINGS. THE CONTRACTOR IS RESPONSIBLE TO CHECK OTHER DISCIPLINE DRAWINGS FOR UNDERGROUND HAZARDS. CONTRACTOR SHALL FOLLOW PSE&G EXCAVATION PROCEDURE AND EXERCISE EXTREME CAUTION DURING ALL BELOW GRADE WORK.

BLACK & VEATCH

DWN	MB
DES	MLS
CHK	NGG
APD	NGG

BLACK & VEATCH
11401 LAMAR AVE.
OVERLAND PARK, KS 66211
(CORPORATE HEADQUARTERS)

I HEREBY CERTIFY THAT THIS DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF NEW JERSEY.

NICHOLAS G. GASPAR
N.J. PROFESSIONAL ENGINEER NO. GE53074
N.J. COA NO. 24GA27981200

APPLICATION CASE
#TBD

NO	DATE	DESCRIPTION	DWN	CKD	EXD	APD
	/					
	/					
	/					
	/					
	/					
	/					

REVISION

SHARP ROAD SWITCH

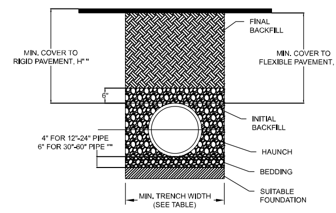
230/69KV SWITCHYARD
STORMWATER AND SITE UTILITIES PLAN

YARD — CIVIL

PSEG
PUBLIC SERVICE ELECTRIC AND GAS COMPANY
ELECTRIC DELIVERY COMPANY-ASSET RELIABILITY, NEWARK N.J.

DRAWN M. SCHUMACHER CHECKED N. GASPAR SCALE 1"=20'-0"
DATE 04/23/2025 EXAMINED E. SUDMAN
WBS C.92301.B.2.1.2.3 APPROVED H. SHAH

807121 A -0P



NOTES:

1. ALL PIPE SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321, "STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY FLOW APPLICATIONS", LATEST ADDITION

2. MEASURES SHOULD BE TAKEN TO PREVENT MIGRATION OF NATIVE FINES INTO BACKFILL MATERIAL, WHEN REQUIRED.

3. FOUNDATION: WHERE THE TRENCH BOTTOM IS UNSTABLE, THE CONTRACTOR SHALL EXCAVATE TO A DEPTH REQUIRED BY THE ENGINEER AND REPLACE WITH SUITABLE MATERIAL AS SPECIFIED BY THE ENGINEER. AS AN ALTERNATIVE AND AT THE DISCRETION OF THE DESIGN ENGINEER, THE TRENCH BOTTOM MAY BE STABILIZED USING A GEOTEXTILE MATERIAL.

4. BEDDING: SUITABLE MATERIAL SHALL BE CLASS I, II OR III. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. UNLESS OTHERWISE NOTED BY THE ENGINEER, MINIMUM BEDDING THICKNESS SHALL BE 4" (100mm) FOR 4"-24" (100mm-600mm); 6" (150mm) FOR 30"-60" (750mm-900mm).

5. INITIAL BACKFILL: SUITABLE MATERIAL SHALL BE CLASS I, II OR III IN THE PIPE ZONE EXTENDING NOT LESS THAN 6" ABOVE CROWN OF PIPE. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. MATERIAL SHALL BE INSTALLED AS REQUIRED IN ASTM D2321, LATEST EDITION.

6. MINIMUM COVER: MINIMUM COVER, H, IN NON-TRAFFIC APPLICATIONS (GRASS OR LANDSCAPE AREAS) IS 12" FROM THE TOP OF PIPE TO GROUND SURFACE. ADDITIONAL COVER MAY BE REQUIRED TO PREVENT FLOATION. FOR TRAFFIC APPLICATIONS, MINIMUM COVER, H, IS 12" UP TO 48" DIAMETER PIPE AND 24" OF COVER FOR 54"-60" DIAMETER PIPE, MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TO TOP OF RIGID PAVEMENT.

RECOMMENDED MINIMUM TRENCH WIDTHS

PIPE DIAM.	MIN. TRENCH WIDTH
4"	21"
6"	23"
8"	26"
10"	28"
12"	30"
15"	34"
18"	39"
24"	48"
30"	56"
36"	64"
42"	72"
48"	80"
54"	88"
60"	96"

MINIMUM RECOMMENDED COVER BASED ON VECHICLE LOADING CONDITIONS

	SURFACE LIVE LOADING CONDITION	
PIPE DIAM.	H-25	HEAVY CONSTRUCTION (75T AXLE LOAD) *
12" - 48"	12"	48"
54" - 60"	24"	60"

* VEHICLES IN EXCESS OF 75T MAY REQUIRE ADDITIONAL COVER

MINIMUM RECOMMENDED COVER BASED ON RAILWAY LOADING CONDITIONS

PIPE DIAM.	COOPER E-80**
UP TO 24"	24"
30"-36"	36"
42"-60"	48"

** COVER IS MEASURED FROM TOP OF PIPE TO BOTTOM OF RAILWAY TIE.
*** E-80 COVER REQUIREMENTS, ARE ONLY APPLICABLE TO ASTM F 2306 PIPE.

REV.	DESCRIPTION	BY	MM/DD/YY	CHK'D
2	ADDED E-80 INFORMATION	TJR	08/20/07	

NOTE: ALL DIMENSIONS ARE ± 1/2 FOOT.

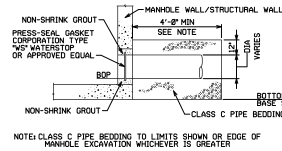
DIA. DET/RET SYSTEM

TYPICAL TRENCH DETAIL

DRAWING NUMBER: STD-101

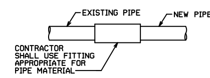
ADS — ADVANCED DRAINAGE SYSTEMS, INC. 4640 TRUEMAN BLVD HILLIARD, OHIO 43026

CKS 10/18/06 NTS 1 OF 1

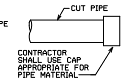


NOTE: CLASS C PIPE BEDDING TO LIMITS SHOWN OR EDGE OF MANHOLE EXCAVATION WHICHEVER IS GREATER

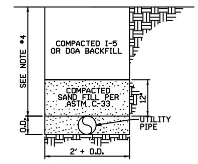
TYPICAL WALL PENETRATION DETAIL
NOT TO SCALE



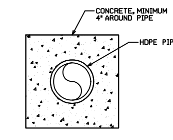
PIPE CONNECTION DETAIL



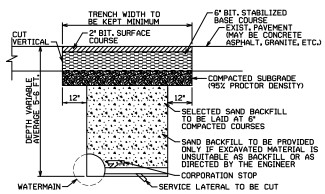
PIPE CAP DETAIL



TYPICAL TRENCH DETAILS FOR UTILITY PIPE
NOT TO SCALE



CONCRETE ENCASED HDPE PIPE DETAIL
NOT TO SCALE



PAVEMENT RESTORATION DETAIL
NOT TO SCALE

CONCRETE NOTES:

1. ALL CONCRETE TO HAVE 4,500 P.S.I. COMPRESSIVE STRENGTH IN 28 DAYS.
2. ALL CONCRETE CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE PSE&G GENERAL SPECIFICATION '19-CIVIL 01' "REINFORCED CONCRETE WORK", '13-CIVIL 06 "PRECAST CONCRETE UNDERGROUND STRUCTURES", AND THE BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI-318).
3. ALL CONDUITS, PIPES, PIPE SLEEVES, DUCTS, INSERTS, ANCHOR BOLTS & OTHER EMBEDDED ITEMS SHALL BE IN PLACE BEFORE POURING CONCRETE.
4. REINFORCING TO BE ASTM A615 GRADE 60.

UTILITY SPECIFICATION AND TESTING REQUIREMENTS:

1. CODES AND STANDARDS: WORK PERFORMED UNDER THESE SPECIFICATIONS SHALL BE DONE IN ACCORDANCE WITH THE FOLLOWING CODES AND STANDARDS.

WORK	IN ACCORDANCE WITH
OVERALL DESIGN	NJ IBC 2021, NFPA 24, 2015 NATIONAL STANDARD PLUMBING CODE, 2021 NFGC AWWA STANDARDS AS SPECIFICALLY NOTED WITHIN THIS PACKAGE.

2. THE FOLLOWING TESTING SHALL BE CONDUCTED IN ACCORDANCE WITH THE SPECIFIED SOURCE. THIS TESTING IS TO BE CONSIDERED PART OF THE DEFINED SCOPE OF WORK, AND ALL ASSOCIATED COSTS ARE THE RESPONSIBILITY OF THE SUBCONTRACTOR.

TESTS	IN ACCORDANCE WITH	CONDUCTED BY
ENTIRE SYSTEM	NJ IBC 2021, NFPA 24 AND 25. SEE NOTES FOR AWWA REQUIREMENTS.	SUBCONTRACTOR

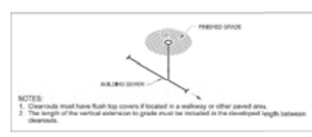


Figure 5.4.2
A SEWER CLEANOUT EXTENDED TO FINISHED GRADE

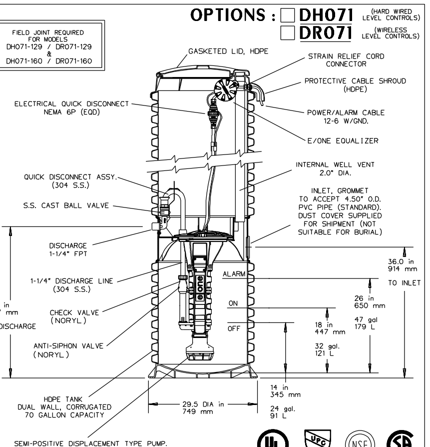
GENERAL UTILITY NOTES:

1. GENERAL NOTES ARE APPLICABLE TO ALL UNDERGROUND UTILITY DRAWINGS.
2. ALL TIE-IN POINTS OF EXISTING UNDERGROUND UTILITIES SHALL BE FIELD VERIFIED AND ADJUSTED AS NECESSARY. CONTRACTOR SHALL FURNISH AND INSTALL ALL MATERIAL NECESSARY TO MAKE TIE-IN. EXISTING PIPING SHALL BE REMOVED OR ABANDONED IN PLACE AS NOTED ON THE DRAWINGS. EXISTING UNDERGROUND PIPING AND FACILITIES NOT NOTED ON THE DRAWINGS TO BE REMOVED OR ABANDONED SHALL BE CONFIRMED WITH THE COMPANY PRIOR TO BEING DISTURBED. MANHOLES ASSOCIATED WITH EXISTING PIPING TO BE REMOVED OR ABANDONED SHALL BE REMOVED UNLESS NEEDED FOR CONTINUED SERVICE OF OTHER ACTIVE PIPE. ALL WORK SHALL BE COORDINATED WITH CONSTRUCTION MANAGEMENT.
3. THE POTENTIAL FOR FLOATATION OF UNDERGROUND FACILITIES AND COMPONENTS (INCLUDING BUT NOT LIMITED TO, MANHOLES, BELOW GRADE TANKS, PIPING, DUCT BANK, CONDUITS ETC.) COULD EXIST DURING INSTALLATION DUE TO HIGH GROUND WATER CONDITIONS OR WHEN THE SITE IS INUNDATED WITH RAINFALL. THE CONSTRUCTION CONTRACTOR SHALL BE RESPONSIBLE FOR TAKING THE NECESSARY PRECAUTIONS AND ACTIONS TO ENSURE THAT NO FLOATATION OF ANY UNDERGROUND FACILITIES OCCUR DURING THEIR INSTALLATION.
4. WATER LINE AND SANITARY SEWER LINES UNDER PRESSURE SHALL BE INSTALLATED A MINIMUM OF 4'-4" BELOW GRADE (12" BELOW FROST DEPTH). GRAVITY SANITARY SEWER LINES SHALL BE INSTALLED A MINIMUM OF 2'-0" BELOW GRADE.
5. ELECTRICAL LINES ARE NOT TO BE GROUNDED TO WATER PIPING.
6. ALL INSTALLATIONS SHALL BE MARKED WITH APPROPRIATE UTILITY MARKING TAPE IN THE TOP SIX (6") INCH LAYER OF BACKFILL.
7. PIPE JOINTS SHALL NOT BE ENCASED WHEN POSSIBLE.
8. BEARING SURFACE SHOULD, WHERE POSSIBLE, BE PLACED AGAINST UNDISTURBED SOIL. WHERE IT IS NOT POSSIBLE, THE FILL BETWEEN THE BEARING SURFACE AND UNDISTURBED SOIL MUST BE COMPACTED TO AT LEAST 90 PERCENT STANDARD PROCTOR DENSITY.
9. ALL EXPOSED CONCRETE EDGES TO HAVE A ¾" CHAMFER TO A DEPTH OF 4" BELOW GRADES.
10. ALL ELEVATIONS ARE NAVD-88.
11. BUILDING SANITARY SERVICES A SINGLE RESTROOM AND PLUMBED EYEWASH IN THE CONTROL BUILDING REACHING A MAXIMUM DFU VALUE OF 8 PER THE 2015 NATIONAL STANDARD PLUMBING CODE.
12. 4" CLEANOUT TO BE INSTALLED 5'-0" OUTSIDE EXTERIOR OF CONTROL BUILDING PER PLAN DRAWING.
13. ALL WATER MAINS SHALL CLEAR SANITARY SEWERS BY A MINIMUM VERTICAL CLEARANCE OF 18".
14. SOLDER TYPE FITTINGS SHALL NOT BE USED UNDERGROUND.
15. ALL TAPPING VALVES AND SLEEVES SHALL BE INSTALLED UNDER WATER PRESSURE (WET TAP). VALVES SHALL BE MUELLER RESILIENT WEDGE GATE VALVE, OPENING IN A CLOCKWISE DIRECTION AND WILL HAVE A WATER WORKING PRESSURE OF 200 PSI. LOW PRESSURE TAPPING SLEEVES SHALL BE U.S. PIPE. HIGH PRESSURE TAPPING SLEEVES SHALL BE U.S. PIPE TYPE.
16. TRENCHING TO BE COMPLETED IN ACCORDANCE WITH PSE&G GENERAL SPECIFICATION '21-CIVIL 05 EXCAVATION AND TRENCHING FOR SWITCHING AND SUBSTATIONS'.
17. NON-METALLIC UTILITY LINES, SHALL BE INSTALLED WITH AN INSULATED COPPER TRACER WIRE OF AT LEAST 18 AWG AND ANY COLOR OTHER THAN YELLOW.

REFERENCE DRAWINGS:

1. STORMWATER & SITE UTILITIES PLAN — DWG. #807121-A
2. UTILITY PROFILES & DETAILS SHEET 2 OF 4 — DWG. #807123-A
3. UTILITY PROFILES & DETAILS SHEET 3 OF 4 — DWG. #807125-A
4. UTILITY PROFILES & DETAILS SHEET 4 OF 4 — DWG. #807126-A

OPTIONS : ☐ DH071 (HARD WIRED LEVEL CONTROLS) ☐ DR071 (WIRELESS LEVEL CONTROLS)



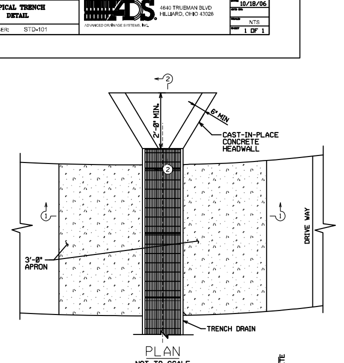
CONCRETE BALLAST MAY BE REQUIRED SEE INSTALLATION INSTRUCTION FOR DETAILS

NOTE: DIMENSIONS ARE FOR REF ONLY

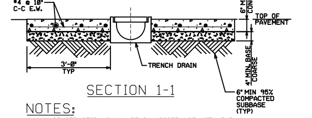
AD	CH	10/20/10	E	
DR BY	CHK'D	DATE	ISSUE	SCALE

e/one SEWER SYSTEMS
MODEL DH071 / DR071
DETAIL SHEET

NA0050P02



PLAN
NOT TO SCALE

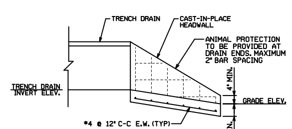


SECTION 1-1

NOTES:

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI-318) AND PSE&G GENERAL SPECIFICATION '16 - CIVIL 04' "PAVING FOR SWITCHING AND SUBSTATION".
2. CONTRACTOR SHALL PROTECT TRENCH DRAIN DURING CONSTRUCTION.

TRENCH DRAIN HEADWALL & APRON DETAIL
NOT TO SCALE



SECTION 2-2

SITE LOCATION
225 SHARP RD BLOCK 15, LOT 2

THE PRESENCE OF UNDERGROUND HAZARDS MAY ONLY BE SHOWN ON OTHER DISCIPLINE DRAWINGS. THE CONTRACTOR IS RESPONSIBLE TO CHECK OTHER DISCIPLINE DRAWINGS FOR UNDERGROUND HAZARDS. CONTRACTOR SHALL FOLLOW PSE&G EXCAVATION PROCEDURE AND EXERCISE EXTREME CAUTION DURING ALL BELOW GRADE WORK.

APPLICATION CASE #TBD

NO	DATE	DESCRIPTION	DWN	CKD	EXD	APD
	/					
	/					
	/					
	/					
	/					
	/					

REVISION

SHARP ROAD SWITCH
230/69KV SWITCHYARD
UTILITY PROFILES & DETAILS
SHEET 1 OF 4

YARD — CIVIL

PSEG
PUBLIC SERVICE ELECTRIC AND GAS COMPANY
ELECTRIC DELIVERY COMPANY-ASSET RELIABILITY, NEWARK N.J.

BLACK & VEATCH

DWN	MB
DES	MLS
CHK	NGG
APD	NGG

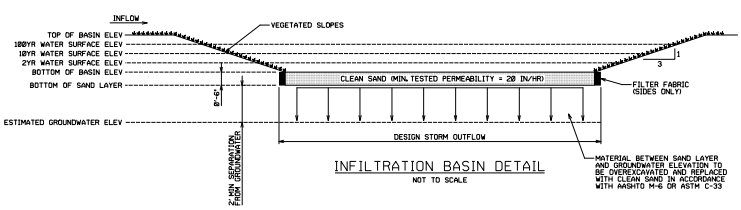
BLACK & VEATCH
11401 LAMAR AVE.
OVERLAND PARK, KS 66211
(CORPORATE HEADQUARTERS)

I HEREBY CERTIFY THAT THIS DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF NEW JERSEY.

NICHOLAS G. GASPAR
N.J. PROFESSIONAL ENGINEER NO. GE53074
N.J. COA NO. 24GA27981200

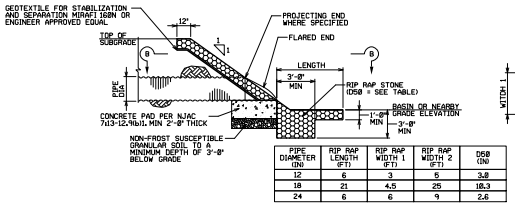
DRAWN M. SCHUMACHER CHECKED N. GASPAR SCALE 1/2"=1'-0"
DATE 04/23/2025 EXAMINED E. SUDMAN
WBS C.92301.1.B.2.1.2.3 APPROVED H. SHAH

807122 A -0P



INFILTRATION BASIN DETAIL

NOT TO SCALE



PIPE DIAMETER (IN)	RIP RAP LENGTH (FT)	RIP RAP WIDTH 1 (FT)	RIP RAP WIDTH 2 (FT)	D50 (IN)
12	6	3	5	3.8
18	21	4.5	25	18.3
24	6	6	9	2.6

TYPICAL CULVERT RIP RAP OUTLET END

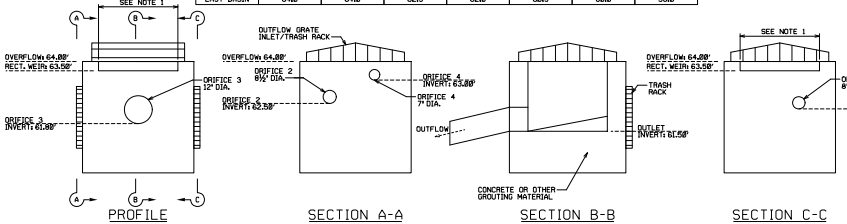
NOT TO SCALE

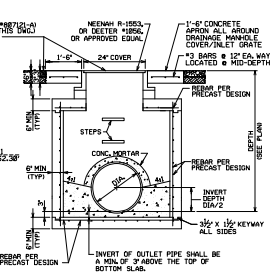
SECTION B-B

NOT TO SCALE

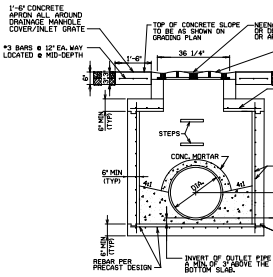
INFILTRATION BASIN SCHEDULE

BASIN	TOP OF BASIN ELEV	100 YR WATER SURFACE ELEV	10 YR WATER SURFACE ELEV	2 YR WATER SURFACE ELEV	BOTTOM OF BASIN ELEV	BOTTOM OF SAND LAYER	ESTIMATED GROUNDWATER ELEV
WEST BASIN	64.0	64.0	62.5	62.0	61.5	61.0	59.0
EAST BASIN	64.0	64.0	62.5	62.0	60.5	60.0	58.0





3X3 MANHOLE SECTION

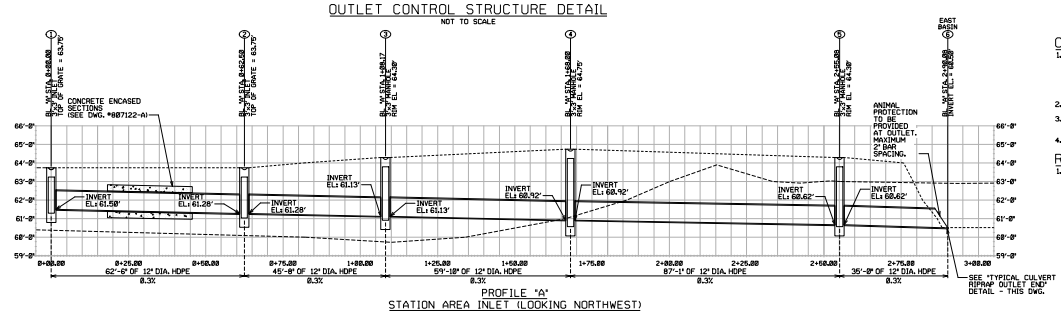


3X3 GRATE INLET SECTION

OUTLET CONTROL STRUCTURE DETAIL

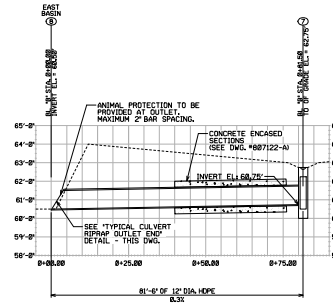
NOTES:
1. TOTAL COMBINED LENGTH OF RECTANGULAR WEIRS TO EQUAL 18'-0".

NOT TO SCALE



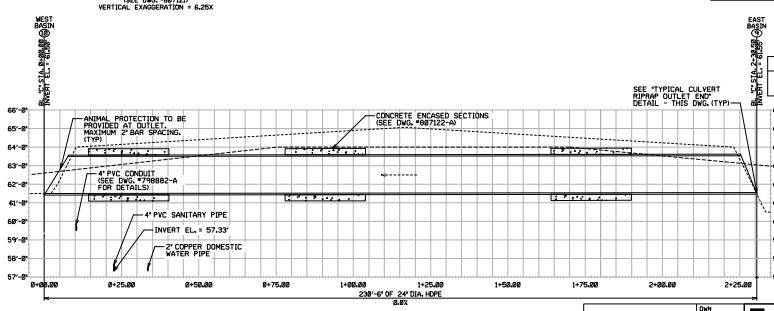
PROFILE "A"
STATION AREA INLET (LOOKING NORTHWEST)

(SEE DWG. #807121)
VERTICAL EXAGGERATION = 6.25X



PROFILE "B"
STATION AREA INLET (LOOKING NORTHWEST)

(SEE DWG. #807121)
VERTICAL EXAGGERATION = 6.25X



PROFILE "C"
BASIN CONNECTION (LOOKING NORTH)

(SEE DWG. #807121)
VERTICAL EXAGGERATION = 6.25X

CONCRETE NOTES:

1. ALL CONCRETE CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE PSE&G GENERAL SPECIFICATIONS 19-CIVIL 01 'REINFORCED CONCRETE WORK', 13-CIVIL 80 'PRECAST CONCRETE UNDERGROUND UTILITY DRAINAGE & MISCELLANEOUS STRUCTURES FOR SWITCHING AND SUBSTATIONS AND THE BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI-318).
2. ALL CONCRETE TO HAVE 4,500 P.S.I. COMPRESSIVE STRENGTH IN 28 DAYS.
3. ALL CONDUITS, PIPES, PIPE SLEEVES, DUCTS, INSERTS, ANCHOR BOLTS & OTHER EMBEDDED ITEMS SHALL BE IN PLACE BEFORE POURING CONCRETE.
4. REINFORCING TO BE ASTM A615 GRADE 60.

RIPRAP GRADATION:

1. THE RIPRAP SHALL BE COMPOSED OF A WELL-GRADED MIXTURE SUCH THAT 50% OF THE MIXTURE BY WEIGHT SHALL BE LARGER THAN THE d_{50} SIZE AS DETERMINED BY FROM THE DESIGN PROCEDURE. A WELL-GRADED MIXTURE AS USED HEREIN IS DEFINED AS A MIXTURE COMPOSED PRIMARILY OF THE LARGER STONE SIZES TO FILL THE PROGRESSIVELY-SMALLER VOIDS BETWEEN THE STONES, THE DIAMETER OF THE LARGEST STONE SIZE IN SUCH A MIXTURE SHALL BE 1.5 TIMES THE d_{50} SIZE. THE d_{50} SHOULD BE 1.25 TIMES THE d_{30} AND THE d_{50} SHOULD BE 0.5 TIMES THE d_{30} SIZE.

THE PRESENCE OF UNDERGROUND HAZARDS MAY ONLY BE SHOWN ON OTHER DISCIPLINE DRAWINGS. THE CONTRACTOR IS RESPONSIBLE TO CHECK OTHER DISCIPLINE DRAWINGS FOR UNDERGROUND HAZARDS. CONTRACTOR SHALL FOLLOW PSE&G EXCAVATION PROCEDURE AND EXERCISE EXTREME CAUTION DURING ALL BELOW GRADE WORK.

LEGEND:

------ PROPOSED GRADE
----- EXISTING GRADE

STORMWATER NOTES:

1. REGULAR MAINTENANCE SHALL BE PERFORMED ON SMALL-SCALE INFILTRATION BASIN SYSTEM PER NJAC 7:8-5.8 AND NJAC 7:14A.
2. SEDIMENT REMOVAL SHOULD TAKE PLACE WHEN ALL RUNOFF HAS DRAINED AND THE BASIN IS DRY.
3. DISPOSAL OF DEBRIS, TRASH, SEDIMENT AND OTHER WASTE MATERIAL MUST BE DONE AT SUITABLE DISPOSAL/ RECYCLING SITES AND IN COMPLIANCE WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL WASTE REGULATIONS.
4. ACCESS POINTS FOR MAINTENANCE ARE REQUIRED ON ALL ENCLOSED AREAS WITHIN SMALL-SCALE INFILTRATION BASIN.
5. STORMWATER BMPS MAY NOT BE USED FOR STOCKPILING OF PLOWED SNOW AND ICE, COMPOST, OR ANY OTHER MATERIAL.

GENERAL NOTES:

1. SEE DRAWING #807121-A FOR UTILITY NOTES.
2. ESTIMATED GROUNDWATER ELEVATION IS FROM THE SITE GEOTECHNICAL INVESTIGATION REPORT.
3. SOIL INVESTIGATION BY GZA GEOENVIRONMENTAL INC. REPORT TITLED "PROPOSED SHARP ROAD SUBSTATION, DATED JUNE 11, 2024, GZA PROJECT NO. 26.0013084.00.

REFERENCE DRAWINGS:

1. STORMWATER & SITE UTILITIES PLAN — DWG. #807121-A
2. UTILITY PROFILES & DETAILS SHEET 1 OF 4 — DWG. #807122-A
3. UTILITY PROFILES & DETAILS SHEET 2 OF 4 — DWG. #807125-A
4. UTILITY PROFILES & DETAILS SHEET 4 OF 4 — DWG. #807126-A

SITE LOCATION
225 SHARP RD
BLOCK 15, LOT 2

APPLICATION CASE #TBD

NO	DATE	DESCRIPTION	DWN	CKD	EXD	APD
		REVISION				

SHARP ROAD SWITCH
230/69KV SWITCHYARD
UTILITY PROFILES & DETAILS
SHEET 2 OF 4
YARD — CIVIL

PSE&G
PUBLIC SERVICE ELECTRIC AND GAS COMPANY
ELECTRIC DELIVERY COMPANY-ASSET RELIABILITY, NEWARK N.J.

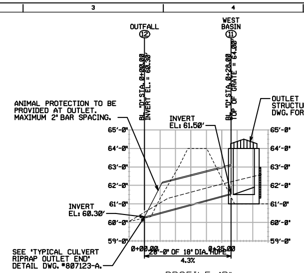
DRAWN: N.SCHUMACHER CHECKED: N.DARRAH SCALE: 1/2"=1'-0"
DATE: 09/23/2025 EXAMINED: E.BURMAN
VBS: S.SCHULZ APPROVED: S.???

807123 A -0P

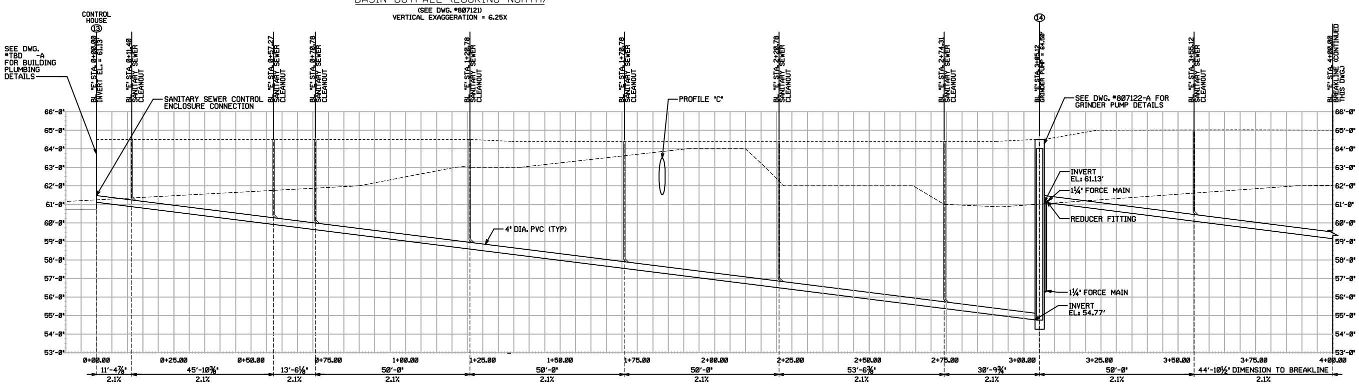
BLACK & VEATCH

DWN	MB
DES	MJS
CHK	NGG
APD	NGG

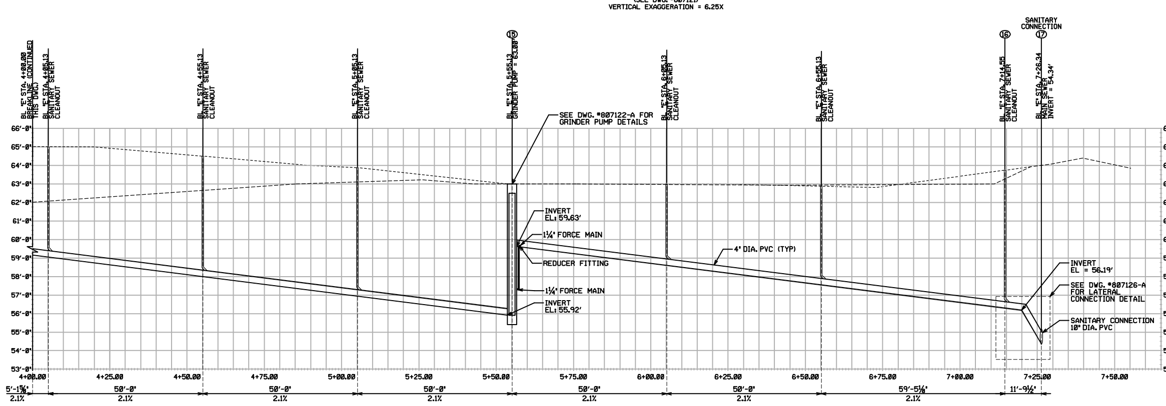
BLACK & VEATCH
1 WORLD TRADE CENTER, SUITE 2100, LONG BEACH, CA 90831
(562) 951-2000



PROFILE "D"
BASIN OUTFALL (LOOKING NORTH)
(SEE DWG. *807121)
VERTICAL EXAGGERATION = 6.25X


CONTROL HOUSE
SEE DWG. *TBD -A FOR BUILDING PLUMBING DETAILS
SANITARY SEWER CONTROL ENCLOSURE CONNECTION
PROFILE "C"
SEE DWG. *807122-A FOR GRINDER PUMP DETAILS
INVERT EL: 61.13'
1¼" FORCE MAIN
REDUCER FITTING
4" DIA. PVC (TYP)
1¼" FORCE MAIN
INVERT EL: 54.77'
44'-10½" DIMENSION TO BREAKLINE

PROFILE "E"
SANITARY SEWER (LOOKING NORTHWEST)
(SEE DWG. *807121)
VERTICAL EXAGGERATION = 6.25X


SEE DWG. *807122-A FOR GRINDER PUMP DETAILS
INVERT EL: 59.63'
1¼" FORCE MAIN
REDUCER FITTING
1¼" FORCE MAIN
INVERT EL: 55.92'
4" DIA. PVC (TYP)
SANITARY CONNECTION
BL "E" STA. 7+14.55 SANITARY SEWER CLEANOUT
BL "E" STA. 7+26.34 MAIN SEWER INVERT = 54.34'
INVERT EL = 56.19'
SEE DWG. *807126-A FOR LATERAL CONNECTION DETAIL
SANITARY CONNECTION 10" DIA. PVC

PROFILE "E"
SANITARY SEWER (LOOKING NORTHWEST)
(SEE DWG. *807121)
VERTICAL EXAGGERATION = 6.25X

LEGEND:

------- PROPOSED GRADE
----- EXISTING GRADE

REFERENCE DRAWINGS:

1. STORMWATER & SITE UTILITIES PLAN — DWG. *807121-A
2. UTILITY PROFILES & DETAILS SHEET 1 OF 4 — DWG. *807122-A
3. UTILITY PROFILES & DETAILS SHEET 2 OF 4 — DWG. *807123-A
4. UTILITY PROFILES & DETAILS SHEET 4 OF 4 — DWG. *807126-A

SITE LOCATION
225 SHARP RD BLOCK 15, LOT 2

THE PRESENCE OF UNDERGROUND HAZARDS MAY ONLY BE SHOWN ON OTHER DISCIPLINE DRAWINGS. THE CONTRACTOR IS RESPONSIBLE TO CHECK OTHER DISCIPLINE DRAWINGS FOR UNDERGROUND HAZARDS. CONTRACTOR SHALL FOLLOW PSE&G EXCAVATION PROCEDURE AND EXERCISE EXTREME CAUTION DURING ALL BELOW GRADE WORK.

BLACK & VEATCH

DWN	MB
DES	MLS
CHK	NGG
APD	NGG

BLACK & VEATCH
11401 LAMAR AVE.
OVERLAND PARK, KS 66211
(CORPORATE HEADQUARTERS)

I HEREBY CERTIFY THAT THIS DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF NEW JERSEY.

NICHOLAS G. GASPAR
N.J. PROFESSIONAL ENGINEER NO. GE53074
N.J. COA NO. 24GA27981200

APPLICATION CASE
#TBD

NO	DATE	DESCRIPTION	DWN	CKD	EXD	APD
	/					
	/					
	/					
	/					
	/					
	/					

REVISION

SHARP ROAD SWITCH

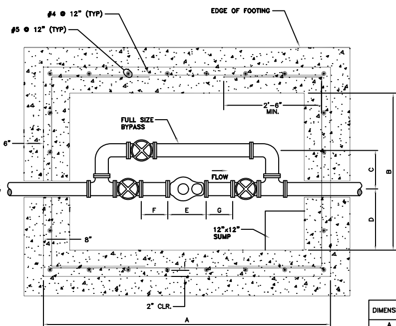
230/69KV SWITCHYARD
UTILITY PROFILES & DETAILS
SHEET 3 OF 4

YARD CIVIL

PSEG
PUBLIC SERVICE ELECTRIC AND GAS COMPANY
ELECTRIC DELIVERY COMPANY-ASSET RELIABILITY, NEWARK N.J.

DRAWN M. SCHUMACHER CHECKED N. GASPAR SCALE 1/2"=1'-0"
DATE 04/23/2025 EXAMINED E. SUDMAN
WBS C.92301.1.B.2.1.2.3 APPROVED H. SHAH

807125 A -0P



PLAN

NOTES

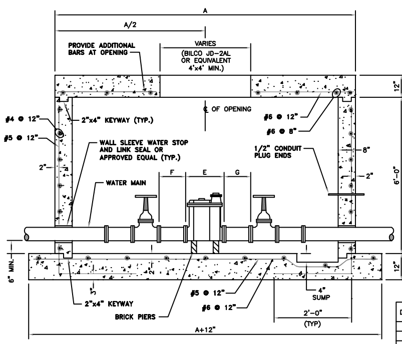
1. METER PITS SHALL ONLY BE USED WHEN APPROVED OR DIRECTED BY THE AUTHORITY.
2. THE DESIGN OF ALL METER PITS MUST BE APPROVED BY THE AUTHORITY.
3. THE MINIMUM CLEARANCE FROM SHUTOFF VALVES TO END OF PIT SHALL BE TWELVE INCHES (12").
4. THE MINIMUM SIDEWALL CLEARANCE OF PIPING SHALL BE TWENTY-FOUR INCHES (24").
5. THE METER PITS SHALL BE: WATERPROOF, FROST PROOF, CONSTRUCTED WITH A SUMP AND HAVE A SUMP PUMP INSTALLED.
6. METER PITS SHALL HAVE A HINGED, LOCKING ACCESS HATCH (MINIMUM SIZE IS 4' X 4'). THE HATCH SHALL BE CONSTRUCTED OF ALUMINIUM AND BE A BILCO JD-2AL OR AN APPROVED EQUAL.
7. A RETRACTABLE LADDER EXTENSION (BILCO LADDER-UP OR EQUAL) SHALL BE PROVIDED.
8. METERS SHALL BE OF THE RADIO READ TYPE. COORDINATE WITH AUTHORITY.

DIMENSION	PIPE SIZE				
	3"	4"	6"	8"	10"
A	9'-6"	11'-6"	13'-6"	17'-0"	18'-6"
B	6'-0"	6'-0"	6'-0"	8'-0"	8'-0"
C	1'-1¼"	1'-3½"	1'-5½"	1'-11"	2'-3½"
D	3'-0"	2'-8"	2'-6"	4'-0"	3'-8"
E	2'-½"	2'-5½"	3'-1"	4'-5½"	5'-8¾"
F	1'-6"	2'-0"	2'-6"	3'-6"	2'-6"
G	1'-0"	1'-6"	1'-6"	2'-0"	2'-6"

NO.	DATE	REVISIONS
1	5/14	UPDATED AND ADDED NOTES AND TABLE

EVESHAM MUNICIPAL UTILITIES AUTHORITY | METER PIT PLAN VIEW | DATE: 1995 | DWG BY: BAA | SHEET NO. 10W

M:\Projects\M140007\DETAILS\EMUADETS DATE: MAY 15, 2014 TIME: 7:20 AM


A
A/2
PROVIDE ADDITIONAL BARS AT OPENING
VARIES
(BILCO JD-2AL OR EQUIVALENT 4'x4' MIN.)
12"
℄ OF OPENING
#4 @ 12"
#5 @ 12"
2"x4" KEYWAY (TYP.)
#6 @ 12"
#6 @ 8"
WALL SLEEVE WATER STOP AND LINK SEAL OR APPROVED EQUAL (TYP.)
1/2" CONDUIT PLUG ENDS
8"
2"
F
E
G
WATER MAIN
2"
6'-0"
6" MIN.
12"
3"
2"x4" KEYWAY
BRICK PIERS
#5 @ 12"
#6 @ 12"
4" SUMP
2'-0" (TYP)
A+12"

SECTION A-A

NOTES

1. METER PITS SHALL ONLY BE USED WHEN APPROVED OR DIRECTED BY THE AUTHORITY.
2. THE DESIGN OF ALL METER PITS MUST BE APPROVED BY THE AUTHORITY.
3. THE MINIMUM CLEARANCE FROM SHUTOFF VALVES TO END OF PIT SHALL BE TWELVE INCHES (12").
4. THE MINIMUM SIDEWALL CLEARANCE OF PIPING SHALL BE TWENTY-FOUR INCHES (24").
5. THE METER PITS SHALL BE: WATERPROOF, FROST PROOF, CONSTRUCTED WITH A SUMP AND HAVE A SUMP PUMP INSTALLED.
6. METER PITS SHALL HAVE A HINGED, LOCKING ACCESS HATCH (MINIMUM SIZE IS 4' X 4'). THE HATCH SHALL BE CONSTRUCTED OF ALUMINIUM AND BE A BILCO JD-2AL OR AN APPROVED EQUAL.
7. A RETRACTABLE LADDER EXTENSION (BILCO LADDER-UP OR EQUAL) SHALL BE PROVIDED.
8. METERS SHALL BE OF THE RADIO READ TYPE. COORDINATE WITH AUTHORITY.

DIMENSION	PIPE SIZE				
	3"	4"	6"	8"	10"
A	9'-6"	11'-6"	13'-6"	17'-0"	18'-6"
B	6'-0"	6'-0"	6'-0"	8'-0"	8'-0"
C	1'-1¼"	1'-3½"	1'-5½"	1'-11"	2'-3½"
D	3'-0"	2'-8"	2'-6"	4'-0"	3'-8"
E	2'-½"	2'-5½"	3'-1"	4'-5½"	5'-8¾"
F	1'-6"	2'-0"	2'-6"	3'-6"	2'-6"
G	1'-0"	1'-6"	1'-6"	2'-0"	2'-6"

NO.	DATE	REVISIONS
1	5/14	UPDATED AND ADDED NOTES AND TABLE

EVESHAM MUNICIPAL UTILITIES AUTHORITY | METER PIT SECTION VIEW | DATE: 1995 | DWG BY: BAA | SHEET NO. 11W

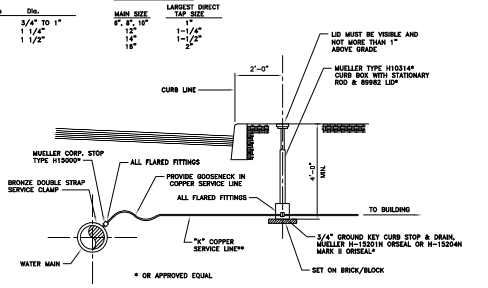
M:\Projects\M140007\DETAILS\EMUADETS DATE: MAY 15, 2014 TIME: 7:20 AM

SERVICE SIZES

"K" Copper Service	Dia.
0 to 100 ft.	3/4" TO 1"
101 to 200 ft.	1 1/4"
201 to 300 ft.	1 1/2"

MAXIMUM TAP SIZES

MAIN SIZE	LARGEST DIRECT TAP SIZE
6", 8", 10"	1"
12"	1-1/4"
14"	1-1/2"
16"	2"


LID MUST BE VISIBLE AND NOT MORE THAN 1" ABOVE GRADE
2'-0"
MUELLER TYPE H10314* CURB BOX WITH STATIONARY ROD & 89982 LID*
CURB LINE
MUELLER CORP. STOP TYPE H15000*
ALL FLARED FITTINGS
BRONZE DOUBLE STRAP SERVICE CLAMP
PROVIDE GOOSENECK IN COPPER SERVICE LINE
ALL FLARED FITTINGS
4'-0" MIN.
TO BUILDING
"K" COPPER SERVICE LINE**
WATER MAIN
3/4" GROUND KEY CURB STOP & DRAIN, MUELLER H-15201N ORSEAL OR H-15204N MARK II ORISEAL*
SET ON BRICK/BLOCK
* OR APPROVED EQUAL

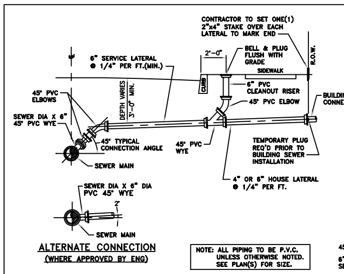
NOTE:

1. CURB BOX SHALL NOT BE LOCATED IN DRIVEWAY, DRIVEWAY APRON OR SIDEWALK.
2. THE CONTRACTOR WILL BE REQUIRED TO USE A SERVICE SADDLE WHEN THE LARGEST TAP SIZE HAS BEEN EXCEEDED. THE SERVICE SADDLE SHALL BE A MUELLER DR2S SERIES WITH DOUBLE STAINLESS STEEL STRAPS OR APPROVED EQUAL.

NO.	DATE	REVISIONS
2	3/5/2014	UPDATED CURB STOP NOTE
1	11/20/07	ADDED MAXIMUM TAP SIZE TABLE AND NOTE

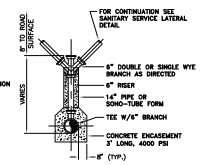
EVESHAM MUNICIPAL UTILITIES AUTHORITY | WATER SERVICE CONNECTION | DATE: 1995 | DWG BY: BAA | SHEET NO. 12W

M:\Projects\M140007\DETAILS\EMUADETS DATE: MAY 15, 2014 TIME: 7:20 AM

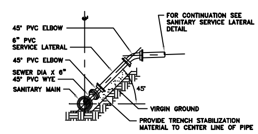

CONTRACTOR TO SET ONE(1) 2"x4" STAKE OVER EACH LATERAL TO MARK END
6" SERVICE LATERAL @ 1/4" PER FT.(MIN.)
2'-0"
BELL & PLUG FLUSH WITH GRADE
SIDEWALK
R.O.W.
CURB
45° PVC ELBOWS
DEPTH VARIES 3'-0" MIN.
6" PVC CLEANOUT RISER
45° PVC ELBOW
BUILDING CONNECTION
SEWER DIA X 6" 45° PVC WYE
45° TYPICAL CONNECTION ANGLE
45° PVC WYE
TEMPORARY PLUG REQ'D PRIOR TO BUILDING SEWER INSTALLATION
SEWER MAIN
4" OR 6" HOUSE LATERAL @ 1/4" PER FT.
SEWER DIA X 6" DIA PVC 45° WYE
2"
SEWER MAIN
ALTERNATE CONNECTION
(WHERE APPROVED BY ENG)

NOTE: ALL PIPING TO BE P.V.C. UNLESS OTHERWISE NOTED. SEE PLAN(S) FOR SIZE.

DETAIL (1) SANITARY SERVICE LATERAL
N.T.S.



DETAIL (2) DEEP CUT LATERAL (DIP)
N.T.S.



DETAIL (3) DEEP CUT LATERAL (PVC)
N.T.S.

NOTE:

USE CAST IRON GASKETED, 2 STRAP SADDLE WITH STAINLESS STEEL STRAPS TO CONNECT INTO EXISTING MAINS. ENTIRE CONN- ECTION MUST THEN BE ENCASED IN 6" OF CONCRETE. SEE DETAIL 13S.

NO.	DATE	REVISIONS

EVESHAM MUNICIPAL UTILITIES AUTHORITY | SANITARY SEWER SERVICE LATERAL | DATE: 1995 | DWG BY: BAA | SHEET NO. 8S

M:\Projects\M140007\DETAILS\EMUADETS DATE: AUG 31, 2012 TIME: 8:12 AM

REFERENCE DRAWINGS:

1. STORMWATER & SITE UTILITIES PLAN — DWG. #807121-A
2. UTILITY PROFILES & DETAILS SHEET 1 OF 4 — DWG. #807122-A
3. UTILITY PROFILES & DETAILS SHEET 2 OF 4 — DWG. #807123-A
4. UTILITY PROFILES & DETAILS SHEET 3 OF 4 — DWG. #807125-A

SITE LOCATION
225 SHARP RD
BLOCK 15, LOT 2

THE PRESENCE OF UNDERGROUND HAZARDS MAY ONLY BE SHOWN ON OTHER DISCIPLINE DRAWINGS. THE CONTRACTOR IS RESPONSIBLE TO CHECK OTHER DISCIPLINE DRAWINGS FOR UNDERGROUND HAZARDS. CONTRACTOR SHALL FOLLOW PSE&G EXCAVATION PROCEDURE AND EXERCISE EXTREME CAUTION DURING ALL BELOW GRADE WORK.

APPLICATION CASE
#TBD

NO	DATE	DESCRIPTION	DWN	CKD	EXD	APD
	/					
	/					
	/					
	/					
	/					
	/					

REVISION

SHARP ROAD SWITCH
230/69KV SWITCHYARD
UTILITY PROFILES & DETAILS
SHEET 4 OF 4

YARD — CIVIL

PSEG
PUBLIC SERVICE ELECTRIC AND GAS COMPANY
ELECTRIC DELIVERY COMPANY-ASSET RELIABILITY, NEWARK N.J.

DRAWN M. SCHUMACHER CHECKED N. GASPAR SCALE 1/2"=1'-0"
DATE 04/23/2025 EXAMINED E. SUDMAN
WBS C.92301.1.B.2.1.2.3 APPROVED H. SHAH

BLACK & VEATCH

DWN	MB
DES	MLS
CHK	NGG
APD	NGG

807126 A -0P