B&G ENGINEERING LLC

P: (732) 598.6616 | F: (609) 671.0715

STORMWATER MANAGEMENT REPORT

FOR

PARKING LOT EXPANSION AT

EISENHOWER ELEMENTARY SCHOOOL,
601 ERNSTON ROAD

BLOCK 447.06, LOT 2102

BOROUGH OF SAYREVILLE

MIDDLESEX COUNTY, NEW JERSEY

PREPARED BY:

B&G ENGINEERING LLC.
30 BERNARD DRIVE
EWING, NEW JERSEY 08628

April 30, 2025
Revised July 8, 2025

BESRICK G. PLUMMER, P.E.
NEW JERSEY PROFESSIONAL ENGINEER
LICENSE NO. 39534

B&G PROJECT NO. 2401A

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STORM SEWER DRAINAGE AREA MAP
PRE & POST DEVELOPMENT DRAINAGE AREA MAPS

INTRODUCTION

The scope of this report is to discuss the storm-water management measures proposed for the parking lot expansion at Eisenhower Elementary School in Sayreville, Middlesex County, New Jersey, (see Figure 1- Project Location Map). The facility's street address is 601 Ernston Road.

The proposed storm-water management system has been designed in accordance with the New Jersey Department of Environmental Protection and the Borough of Sayreville Stormwater Management Standards, per New Jersey Administrative Code Section 7:8-5.5. Storm-water routing calculations in this report are in accordance with USDA Soil Conservation Service Technical Release No. 55 (TR-55), "Urban Hydrology for Small Watersheds".

PROJECT DESCRIPTION

This project involves pavement, sidewalk and curb and drainage improvements at Eisenhower Elementary School located at 609 Ernston Road in the Borough of Sayreville. The improvements include the following tasks:

- Expanding the width of the Bus Drop off lane by 5 feet and widening entrance and exit driveways at Ernston Road intersection.
- Onsite reconfiguration of traffic flow with installation of concrete curb pavement markings and parking stalls reconfiguration
- Full depth reconstruction of a portion of the existing parking areas and driveways
- 2" mill & overlay of additional paved areas at the rear of the school
- Sidewalk & handicap ramps, realignment and installation as shown on the Construction Plans.
- Construction of a thirty-one (31) space parking lot including Five (5) handicap accessible parking spaces
- Converting three (3) existing "B" inlets into "E" inlets due to site layout changes
- Installation of an underground detention system to provide stormwater management for the new parking lot.
- Installation of storm sewers (inlets & pipes) as shown on the Construction Plans
- Installation of appropriate traffic signage and pavement markings
- Site Lighting to accommodate the new parking lot
- Lawn restoration and regrading at disturbed pervious areas

Pavement construction for parking lot and driveways will include a pavement cross section of 12- inches depth (6" of dense graded aggregate, 4" of hot- mix asphalt base course and 2" of hot-mix asphalt surface course.).

SITE DESCRIPTION

The site is identified as Lot 2102 in Block 447.06 based on the official tax map of the Borough of Sayreville, Middlesex County, New Jersey. Eisenhower Elementary School is located on

Ernston Road and vehicular access is via an existing paved driveway from Ernston Road. Pedestrian access to the site is via sidewalks from Ernston Road and the existing driveway.

The site is bordered to the south by Ernston Road and residential dwellings (townhouses) and to the north by wooded areas. East of the site is additional wooded areas the Garden State Parkway. To the west of the site there are several single-family residences. Figure 1, the Project Location Map is included in Appendix "A" of this report. The site's postal address is 601 Ernston Road, Parlin, NJ 08859.

Presently the site is occupied by Eisenhower Elementary School and associated infrastructure, including ancillary buildings, parking lots, wooded areas and open fields. On site utilities within the vicinity of the proposed work include sanitary sewers, water main, communications, electric and gas services. Open space includes lawn areas, shrubs and shade trees. Other onsite structures include light poles and traffic signage.

A review of the existing topography in the area of proposed improvements shows a site with varying slopes, which is reflective of existing paved areas and lawn areas. Onsite slopes across paved surfaces range from approximately 1% to 5% in parking lot areas and on access driveways. Existing lawn areas that will be disturbed have slopes ranging from 6% to 20% reflective of the fairly steep onsite slopes. Onsite storm sewer inlets collect some of the stormwater runoff from the proposed area of work. The site has an extensive network of storm sewers with inlets located strategically to collect stormwater runoff.

Based on the results of recent on-site soil testing, the soil in the area of the proposed thirty one (31) space parking lot, and underground detention system can be described as sand with traces of silt and gravel at depths of up to 12 feet.

SOIL CHARACTERISTICS

A review of the United States Department of Agriculture/Soil Conservation Service Soil Survey of Middlesex County New Jersey, indicates that the site in the area of proposed work is covered by the Psamments (PssA), soil series, occurring on 0 to 3% slopes, (see Figure 2 Soils Map). This series is described as occurring on elevations of 0 ft to 260 ft, with a map unit composition of 85% Psamments and similar soils, and, and 15% minor components.

The Psamments series has a typical profile of 0-6 inches of fine sand, 6 to 30 inches of sand, 30 to 72 inches of coarse sand. Depths to restrictive feature is usually more than 80 inches, with depth to water table occurring a minimum of 4ft below finished grade. This is a well drained soil and frequency of flooding and ponding water is negligible. This soil series characteristics is classified as Hydrologic Soil Group "A".

The soils Narrative from the Soil Survey is included in Appendix B, gives additional information on the nature and characteristics of the soil series. In addition, subsurface soil exploration was conducted on site in the area of the proposed parking lot and the enclosed report (Appendix "B") provide actual on-site soils information, regarding infiltration rates and depth toi seasonal high ground water.

PRE-DEVELOPMENT DRAINAGE CONDITIONS

The following sections detail the calculation methodologies and results of the storm-water management design.

The proposed stormwater management for this project focuses on maintaining or reducing pre-development flows under post development conditions. The existing parking lot and paved areas are drained by an existing storm sewer system with several inlets located throughout the site. Stormwater runoff is piped to an existing storm sewer system that runs along Ernston Road at the front of the site.

The area of the site slated for the parking lot expansion is currently a lawn area. Stormwater runoff from this location also gets collected by the existing on-site storm sewer system. Under pre-development conditions stormwater runoff from the areas of concern can be attributed to two (2) distinct drainage areas as shown on the Pre-Development Drainage Area Map in Appendix "F" of this report. Drainage Area # 1 sheet flows north & west from existing vegetated/lawn areas adjacent to Ernston Road, and runoff is collected by an existing on-site inlet located immediately west of the drainage area boundary. Due to the extremely sandy soil, we can also expect some stormwater infiltration into the underlying soils

Drainage Area # 2 flows north and east over a combination of mostly paved surfaces towards the rear of the site. Runoff from this drainage area is collected by various onsite inlets and existing storm sewers ranging from 15" diameter to 30" diameter in sizes. Stormwater runoff eventually connects to an existing municipal drainage system running along Ernston Road.

Predevelopment drainage calculations were done for the proposed disturbed area as shown on the predevelopment drainage area map Appendix "F" and as described herein. The pre-development routing calculations associated with the proposed underground detention systems are included in Appendix "C:" of this report.

Predevelopment stormwater runoff conditions for the Project were analyzed using the NRCS runoff method in HydroCAD software, with NOAA Type D storm distributions in accordance with NRCS New Jersey Bulletin No NJ210-12-1 . The following rainfall depths for Middlesex County were used:

TABLE 1- RAINFALL DEPTHS

Storm	Type III 24-hour Rainfall Depth, inches
2-year	3.35
10-year	5.12
100-year	8.63

Under existing conditions, the project area was delineated into two sub-catchments and entered into the model as follows:

TABLE 2- PREDEVELOPMENT DATA

Sub-catchment	Time of Concentration	Cover Type	CN	Area (sf)
Ex DA #1	6 minutes**	> 75% Grass Cover, Good, HSG* A	39	26,665
		Paved Parking, HSG A	98	2,889
Ex DA #2	6.0 minutes	> 75% Grass Cover, Good, HSG* A	39	10,604
		Paved Parking, HSG A	98	37,556
			Total Area (Acres)	77,714

*HSG = Hydrologic Soil Group **Minimum time of concentration

POST-DEVELOPMENT DRAINAGE CONDITIONS

The onsite surface cover within the limit of disturbance will change under post development conditions, due to the proposed 31 space parking lot construction. The change in surface cover is primarily concentrated in Post Development Drainage Area # 1 compared to Pre-Development Drainage Area # 1. For Post Development Drainage Area # 2 (Appendix "F" of this report), there will not be a significant change in surface cover compared to Pre-Development Drainage Area # 2.

Storm water management measures to mitigate post development runoff involved the design of one (1) underground detention systems, manufactured by Cultec Incorporated or approved equal. The proposed Detention basin # 1 will be installed beneath the proposed new parking lot and is designed to mitigate the increase in stormwater runoff that will be generated by the new parking lot. The Detention basin will ensure that post development runoff from the site is equal or less than predevelopment runoff for various frequency storms. Appendix "D" of this report includes stormwater routing calculations for post development flows.

Flow reductions and water quality measures will be attained through installation of an outlet structure with weir and orifice as required, sumps and isolation rows within the system.

The underground detention systems have been designed to meet the storm-water management requirements of the NJDEP, Freehold Soil Conservation District and the Borough of Sayreville.

Proposed conditions were also delineated into two sub-catchments, to collect stormwater runoff generated by the new 31 space parking lot. All stormwater from the new parking lot will be

detained by the proposed detention system. The proposed underground detention system has been designed to over detain the runoff from the detained sub-catchments, and to mitigate any increase in stormwater runoff due to the proposed improvements. Basin routing calculations are included in Appendix "D" of this report. The proposed sub-catchments were entered into the model as follows:

TABLE 3- POST DEVELOPMENT DATA

Sub-catchment	Time of Concentration	Cover Type	CN	Area (sf)
Prop DA #1	6 minutes**	> 75% Grass Cover, Good, HSG* A	39	12,450
		Paved Parking, HSG A	98	17,503
Prop DA #2	6.0 minutes	> 75% Grass Cover, Good, HSG* A	39	7,380
		Paved Parking, HSG A	98	39,780
			Total Area (Acres)	77,713

*HSG = Hydrologic Soil Group **Minimum time of concentration

PROPOSED STORMWATER MANAGEMENT DESIGN

The proposed storm-water management design consists of the construction of one (1) storm-water management below ground detention basin providing a total storage of 0.234 AF (10193 CF), including storage space from aggregates at base of structure using a 40% void ratio. Based on routing calculations and outlet structure configuration, the required peak storage volume is 0.106 af (4617 CF). Underground detention basin # 1 will be an ADS System Cultec R-300HD or approved equal. The details of this system are included on sheet SW-8 and SW-5 of the Site Plan set of drawings. The system is designed to control storm-water runoff generated by the proposed improvements.

FLOW REDUCTIONS COMPLIANCE

The proposed basins have been designed to reduce flows below existing for the 2-year storm, 10-year storm, and 100-year storm events. These flow reductions are summarized below:

TABLE 4- FLOW REDUCTIONS SUMMARY

	Existing (POA), cfs	Proposed (POA), cfs
2-year	2.71	2.77
10-year	4.88	4.71
100-year	9.99	8.61

The proposed underground detention systems have been designed with outlet control structures, summarized below.

Basin 1 Outlet Control Structure

- A 3-inch diameter orifice at elevation 69.00
- A 6-inch diameter orifice at elevation 69.30
- A 48-inch-wide by 6-inch-high weir set at elevation 70.0, approximately 1-ft above the 100-year water surface elevation.

This combination of flow controls allows the system to meet the required flow reductions in a simple, straightforward, and easily constructed manner while still providing 12 inches of freeboard within the proposed systems. Storm depths and volumes are shown in the table below.

TABLE 5 – PEAK ELEVATIONS & STORAGE VOLUMES

BASIN 1

Storm	Peak Elevation (ft)	Peak Storage Volume (AF)
2-year	68.61	0.005
10-year	69.05	0.026
100-year	69.66	0.081

COMPLIANCE WITH BOROUGH'S STORMWATER MANAGEMENT STANDARDS

Section 26-99.3 of the Borough's Ordinance Storm Drainage Facilities require that the proposed project achieve flood control, groundwater recharge, and pollutant reduction through the use of stormwater management measures.

Section 26-99.6.e Table 1 identifies Stormwater Best Management Practices (BMPs) that satisfy green infrastructure, groundwater recharge, stormwater runoff quality and quantity standards of

the New Jersey Stormwater BMP Manual. The proposed underground stormwater management system qualifies as a Small Scale Infiltration Basin (drainage area = 0.688 acres < 2.50 acre maximum), and therefore provides 80% TSS removal and is adequate to meet Stormwater Runoff Quantity and Groundwater Recharge.

Section 26-99.6.r(2)c – Stormwater Quantity requires 2-year (50%), 10-year (75%), and 100-year (80%) runoff reductions from the area that is attributable to the portion of the site on which the proposed development is to be constructed. In this case, these are EX-DA01 and Prop-DA-01. Please refer to the below table:

Storm	Existing (cfs)	Reduction	Target (cfs)	Proposed (cfs)
2-year	0.00	50%	0.00	0.00
10-year	0.16	75%	0.12	0.01
100-year	1.48	80%	1.184	0.704

The underground stormwater management system fully infiltrates the 2-year and 10-year storm events along with 84% of the 100-year storm event for the proposed developed area.

Storm	Existing (AF)	Proposed (AF)	Subsurface Recharge
2-year	0.002	0.062	0.062
10-year	0.022	0.136	0.136
100-year	0.103	0.308	0.260

The proposed stormwater management system fully meets the NJDEP Stormwater Management Regulations for quality, quantity, and groundwater recharge. The proposed underground stormwater management system functions as a Small-Scale Infiltration basin, providing 80%

TSS Removal. The proposed underground stormwater management system meets flow reduction requirements for the developed area for the 2-year, 10-year, and 100-year storm events. The proposed underground stormwater management system fully infiltrates the increase in stormwater runoff volume for the two-year storm event.

GROUNDWATER RECHARGE & WATER QUALITY REQUIREMENTS

The proposed improvements will result in a disturbance of approximately 1.72 acre over the entire site including existing parking lot construction, which is above the 1.0-acre NJDEP definition of a "major development". The NJDEP also states that any project with a net increase of 0.25 Acre is also a "major development" and is subjected to Groundwater recharge and water quality requirements. Ground cover calculations have indicated that the existing impervious cover in the area of proposed parking lot expansion is 1,152 SF= 0.03 AC. while the proposed impervious cover is 0.39 acre. The net increase in impervious coverage is 0.39-0.03 = 0.36 Acre. Although this project is classified as a "major development" per NJDEP standards, the Borough of Sayreville is located in the state of New Jersey Metropolitan Planning Area, PA 1. The regulations for PA1 sites provide a stormwater management exemption for sites that under existing conditions are not heavily wooded and are categorized as previously developed.

The proposed Detention Basin provides both flow reductions and Groundwater Recharge with the entire 2-year and 10-year storm events being infiltrated in the area of new parking lot construction. The School District is requesting a waiver from strict adherence to Water Quality compliance based on its location in NJ Planning Area 1 and the nature of the proposed improvements.

SOIL EROSION & SEDIMENT CONTROL

Soil Erosion and sediment control measures are proposed for this project based on Freehold Soil Conservation District Soil Erosion & sediment Control Standards. Silt fence and storm drain inlet protections are specified to be installed at designated locations as shown on sheet SW-5 of the Construction Plans. A stabilized construction access (min length 50 ft) is shown at the proposed access points for construction activities. The Freehold Soil Conservation District Standard General Notes are included on Sheet SW-5 and SW-6, along with construction details and notes.

OFFSITE STABILITY ANALYSIS

The proposed underground detention basin was analyzed in accordance with Standard 21-1 Offsite Stability. The basin was routed without accounting for infiltration or dead storage below an outlet. Standard 21-1 requires that for this condition proposed runoff leaving the site for the 2- and 10-year storm events are below existing rates.

	Existing (POA), cfs	Proposed (POA), cfs
2-year	2.81	2.80
10-year	5.12	4.86

Since the flows in this proposed condition are less than the existing flows and the site discharges to a municipal storm drain system, the discharge is stable.

ON SITE STORM SEWER COMPUTATIONS

Storm sewer capacity calculations were done using Manning's Equation for open channel flow. An "n" value of 0.013 was utilized for reinforced concrete pipe. A tabular layout of the storm sewer calculation is included in Appendix "E". These calculations only address proposed storm sewers that will be installed due to the planned improvements.

The calculations included herein show that the proposed on-site storm sewer system has the design capacity to convey both the 100yr storm (for detention) and the 25-year storm runoff for the proposed improvements. A summary of pipe computations is listed below:

25 yr storm sewer computations summary

Proposed 15" Pipe from Inlet # B-2 to Inlet # B-1

Q_{25} = **1.32 CFS**

Pipe Diameter = 15"

Pipe Slope = 1.00%

n= 0.013

From Manning's Equation: Pipe Capacity = **6.48 CFS**. Therefore the 15" pipe as designed has capacity to convey the 25 yr storm runoff from the disturbed area and from on-site undisturbed areas. This pipe also has excess capacity for additional runoff.

Proposed 15" Pipe from Inlet #B-2 to MH # 4

Cumulative Q_{25} = **2.79 CFS**

Pipe Diameter = 15"

Pipe Slope = 2.67%

n= 0.013

From Manning's Equation: Pipe Capacity = **10.58 CFS**. Therefore the 15" pipe as designed has capacity to convey the 25 yr storm runoff from disturbed and undisturbed areas. This pipe also has excess capacity for additional runoff.

Proposed 15" Pipe from MH # 4 to Basin # 1

Cumulative Q_{25} = **2.79 CFS**

Pipe Diameter = 15"

Pipe Slope = 0.50%

n= 0.013

From Manning's Equation: Pipe Capacity = **4.58 CFS**. Therefore the 15" pipe as designed has capacity to convey the 25 yr storm runoff from disturbed and undisturbed areas. This pipe also has excess capacity for additional runoff.

Proposed 15" Pipe from Inlet # B-3 to MH # 5

Q_{25} = **1.22 CFS**

Pipe Diameter = 15"

Pipe Slope = 1.00%

n= 0.013

From Manning's Equation: Pipe Capacity = **6.48 CFS**. Therefore the 15" pipe as designed has capacity to convey the 25 yr storm runoff from disturbed and undisturbed areas. This pipe also has excess capacity for additional runoff.

100 yr storm sewer computations summary

Proposed 15" Pipe from Inlet # B-2 to Inlet # B-1

Q_{100} = **1.55 CFS**

Pipe Diameter = 15"

Pipe Slope = 1.00%

n= 0.013

From Manning's Equation: Pipe Capacity = **6.48 CFS**. Therefore the 15" pipe as designed has capacity to convey the 100 yr storm runoff from the disturbed area and from on-site undisturbed areas. This pipe also has excess capacity for additional runoff.

Proposed 15" Pipe from Inlet #B-2 to MH # 4

Cumulative Q_{100} = **3.28 CFS**

Pipe Diameter = 15"

Pipe Slope = 2.67%

n= 0.013

From Manning's Equation: Pipe Capacity = **10.58 CFS**. Therefore the 15" pipe as designed has capacity to convey the 100-yr storm runoff from disturbed and undisturbed areas. This pipe also has excess capacity for additional runoff.

Proposed 15" Pipe from MH # 4 to Basin # 1

Cumulative Q_{100} = **3.28 CFS**

Pipe Diameter = 15"

Pipe Slope = 0.50%

n= 0.013

From Manning's Equation: Pipe Capacity = **4.58 CFS**. Therefore the 15" pipe as designed has capacity to convey the 100-yr storm runoff from disturbed and undisturbed areas. This pipe also has excess capacity for additional runoff.

Proposed 15" Pipe from Inlet # B-3 to MH # 5

Q_{25} = **1.43 CFS**

Pipe Diameter = 15"

Pipe Slope = 1.00%

n= 0.013

From Manning's Equation: Pipe Capacity = **6.48 CFS**. Therefore the 15" pipe as designed has capacity to convey the 100-yr storm runoff from disturbed and undisturbed areas. This pipe also has excess capacity for additional runoff.

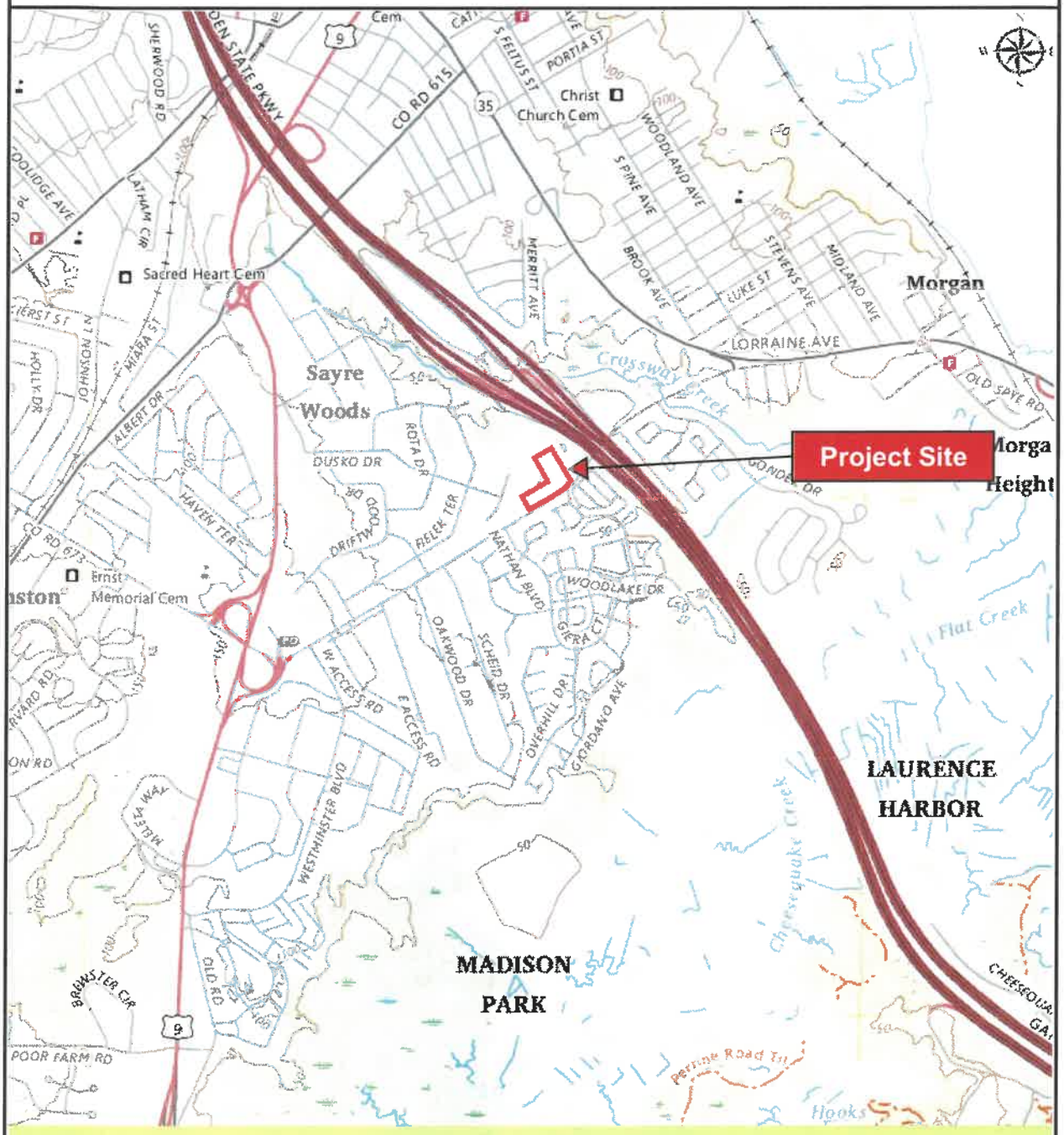
CONCLUSIONS

The proposed detention basin has been designed to address the flow reductions resulting from peak flows generated from the parking lot addition. The proposed onsite storm sewer system is designed to convey both the 25- yr. and 100-yr. frequency storms as discussed herein and as shown in the calculations included in appendix "E" of this report.

APPENDIX A

FIGURE 1 – PROJECT LOCATION MAP

Figure 1
Project Location Map



NJ State Plane Coordinates

552,547 ft. Easting (x), 592,531 ft. Northing (y)

Eisenhower Elementary School
Sayreville, NJ

Map Source: USGS South Amboy, NJ 7.5-minute Quadrangle (2023)

APPENDIX B

SOILS MAP, SOILS DESCRIPTION & SOIL INVESTIGATION REPORT

Figure 2
Soils Map

Soil Type
PssA - Pssaments, 0 to 3 percent slopes

Eisenhower Elementary School
Sayreville, NJ

Map Source: USDA Natural Resources Conservation Service, Web Soil Survey (2025)

Middlesex County, New Jersey

PssA—Psamments, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 1hv1m
Elevation: 0 to 260 feet
Mean annual precipitation: 28 to 59 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 161 to 231 days
Farmland classification: Not prime farmland

Map Unit Composition

Psamments, nearly level, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Psamments, Nearly Level

Setting

Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy lateral spread deposits

Typical profile

A - 0 to 6 inches: fine sand
C1 - 6 to 30 inches: sand
C2 - 30 to 72 inches: coarse sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: About 48 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Berryland, rarely flooded

Percent of map unit: 5 percent
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Mullica

Percent of map unit: 5 percent
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Atsion

Percent of map unit: 5 percent
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Middlesex County, New Jersey
Survey Area Data: Version 20, Sep 3, 2024

CONSULTANTS, INC.
4405 South Clinton Avenue
South Plainfield, NJ 07080

Tel: (800) 545-ATUL
(908) 754-8383
Fax: (908) 754-8633

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March 07, 2025

B & G Engineering LLC
30 Bernard Drive
Ewing, NJ 08628

Attn: Mr. Besrick Plummer
President

Re: **Subsurface Soil Investigation & Foundation Recommendation Report**
Proposed Expansion of Parking Lot at
Dwight D. Eisenhower Elementary School
601 Ernston Road
Parlin, NJ 08859
Borough of Sayreville, NJ
Block # 447.06, Lot # 2102

Dear Mr. Plummer,

Enclosed, please find three (3) copies of the Subsurface Soil Investigation & Foundation Recommendation Report for the three (3) Soil Borings and three (3) field percolation tests performed on February 21, 2025 at the project referenced above.

Soil samples collected during the soil boring program will be discarded thirty (30) days from the date of this report, if not requested in advance to do otherwise. We thank you very much for providing us with an opportunity to service you on this project.

Should you have any questions or require additional information, please do not hesitate to contact the undersigned at (908)754-8383.

Sincerely,
ANS Consultants, Inc.

Atulkumar N. Shah, PE, PP, F. ASCE
President
NJ PE License #24GE03443900
ANS/RM

Reported: B & G Engineering LLC – (3); File – (1)

File: AOT- 5349_01.SB

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CONSULTANTS, INC.
4405 South Clinton Avenue
South Plainfield, NJ 07080

Tel: (800) 545-ATUL
(908) 754-8383
Fax: (908) 754-8633

NJ EDA Approved Testing Laboratory • MBE/DBE Certified • NJ DEP Certified
www.ANSConsultants.net

March 07, 2025

B & G Engineering LLC
30 Bernard Drive
Ewing, NJ 08628

Attn: Mr. Besrick Plummer
President

Re: **Subsurface Soil Investigation & Foundation Recommendation Report**
Proposed Expansion of Parking Lot at
Dwight D. Eisenhower Elementary School
601 Ernston Road
Parlin, NJ 08859
Borough of Sayreville, NJ
Block # 447.06, Lot # 2102

Dear Mr. Plummer,

Enclosed, please find three (3) copies of the Subsurface Soil Investigation & Foundation Recommendation Report for the three (3) Soil Borings and three (3) field percolation tests performed on February 21, 2025 at the project referenced above. The soil boring and field percolation work was performed in accordance with our signed revised-1 proposal dated February 21, 2025.

Our **Scope of Services** included the following:

1. Drilling and full-time inspection of three (3) soil borings, down to maximum 12'-0" deep or to refusal whichever comes first, recording of groundwater level or depth to bedrock if encountered in the contracted depth.

2. To perform three (3) field percolation tests in each bore holes.

3. Performance of engineering evaluation to determine the stratification and physical properties of the subsurface materials and to develop and recommend appropriate type of foundation systems.

4. Preparation of a written report summarizing all findings and recommendations.

PROPOSED CONSTRUCTION:

The project site is located at 601 Ernston Road, Parlin, New Jersey in Middlesex County. At the present time, the subject site consists of Dwight D. Eisenhower Elementary School and its associated parking lot. We understand that expansion of the parking lot at Dwight D. Eisenhower Elementary School is proposed at the subject site. Our recommendations are based upon NJ IBC-2021 ASCE 7-22 and construction material loads for the Building Construction based upon American National Standards. Please see soil boring location plan in Appendix-A for the exact location and photographs in Appendix-C for the existing site conditions.

SITE CONDITIONS:

The subject site is located towards the north side of Ernston Road. The site was noted to be fairly leveled during soil boring activities. The subject site is noted to be primarily surrounded by residential properties. The subject property is located at approximately Latitude N 40° 27' 35.87", Longitude W 74° 17' 01.03" on the USGS Digital elevation Model. It is at an approximate elevation of 88' above mean sea level. See the site location plan in Appendix-A for more details.

FIELD INVESTIGATION:

SOIL BORING:

The soil boring locations were selected and marked by an ANS field representative based upon the location plan provided by the client and also based upon the equipment access. Surface utility mark-out was performed by New Jersey One-Call System. Underground utilities were also cleared by GPR solutions, a Private Utility Mark out Company on February 21, 2025. Once cleared, the soil boring work began on the same day.

A total of three (3) soil borings, B-1 to B-3 were drilled during the geo-technical investigation at the site on February 21, 2025. The soil boring locations are shown in the Soil Boring Location Plan which is included in Appendix-A. Soil boring work was performed under the direction and supervision of field Engineer Mr. Syed Abbas and Mr. Krunal Parmar. The borings were drilled using a 3" diameter hollow stem auger. Soil encountered was sampled continuously down to a depth of 12'-0" in all the borings B-1 to B-3 as contracted. Soil samples were extracted using a 2" diameter split spoon sampler as per the procedure specified in ASTM 1586-99.

Samples for the boring were obtained by the Standard Penetration Test (SPT) Method (ASTM D 1586), which consists of driving a 2-inch outside-diameter split-spoon sampler into the soil with a 140-pound weight falling freely from a distance of 30 inches. The samplers were driven in four successive 6-inch increments, with the number of blows per increment being recorded. The number of blows required to advance the sampler in the middle 12 inches is termed as the Standard Penetration Resistance (N-value) and is presented on the Field Test Boring Logs in Appendix-A.

During drilling operations, extracted soil samples were visually examined and classified by our Field Engineer. The soil sample description, Standard penetration test (SPT) blow counts and locations, strata changes, groundwater depth and other pertinent information were recorded on a detailed field log. Soil samples obtained from the split spoon sampler were visually classified according to the Unified Soil Classification System (USCS).

FIELD PERCOLATION TEST:

Three (3) field percolation tests were performed near soil boring B-1, B-2 and B-3. Please refer the soil boring & field percolation test location plan for the exact location of the field percolation test. Please refer to Appendix-A for field percolation tests report. The hole was drilled using a 3" diameter hollow stem auger and then the percolation test was performed. Details of each field percolation test are as follows:-

Percolation Test 1:

1. Depth of Test: 5'-1"
2. Water was filled to top of 2" diameter PVC pipe at 11:43 AM and left for 1 hour of saturation period.
3. 1 Hour saturation period ended at 12:43 PM.
4. Water was filled to top of PVC pipe again at 12:43 PM and drops in water level were recorded at 2 minute interval until as constant drop in water level was recorded.
5. Water was refilled to top of PVC pipe after each record.

S. No.	Time	Drop in Water Level every 2 min. interval	Remarks	Percolation Rate Per Hour
1.	12:43 PM	Water was filled to top of PVC pipe		
2.	12:45 PM	1½"		45"
3.	12:45 PM		Refilled	
4.	12:47 PM	1½"		45"
5.	12:47 PM		Refilled	
6.	12:49 PM	1½"		45"
7.	12:49 PM		Refilled	
8.	12:51 PM	1 3/8"		41.25"
9.	12:51 PM		Refilled	
10.	12:53 PM	1 3/8"		41.25"
11.	12:53 PM		Refilled	
12.	12:55 PM	1 5/16"		39.37"
13.	12:55 PM		Refilled	
14.	12:57 PM	1 5/16"		39.37"
15.	12:59 PM		Refilled	
16.	12:59 PM	1¼"		37.5"
17.	1:01 PM		Refilled	
18.	1:01 PM	1¼"		37.5"
19.	1:03 PM		Refilled	
20.	1:03 PM	1¼"		37.5"
21.	1:05 PM		Refilled	
22.	1:05 PM	1¼"		37.5"
23.	1:07 PM		Refilled	
24.	1:07 PM	1¼"		37.5"

$$\text{Average Percolation Rate Per Hour} = \frac{3 \times 45" + 2 \times 41.25" + 2 \times 39.37" + 5 \times 37.5"}{12}$$
$$= \frac{483.74"}{12} = 40.31 \text{ inch per hour}$$

Percolation Test 2:

1. Depth of Test: 5'-2"
2. Water was filled to top of 2" diameter PVC pipe at 1:28 PM and left for 1 hour of saturation period.
3. 1 Hour saturation period ended at 2:28 PM.
4. Water was filled to top of PVC pipe again at 2:28 PM and drops in water level were recorded at 1 minute interval until as constant drop in water level was recorded.
5. Water was refilled to top of PVC pipe after each record.

S. No.	Time	Drop in Water Level every 1 min. interval	Remarks	Percolation Rate Per Hour
1.	2:28 PM	Water was filled to top of PVC pipe		
2.	2:29 PM	15/16"		56.25"
3.	2:29 PM		Refilled	
4.	2:30 PM	15/16"		56.25"
5.	2:30 PM		Refilled	
6.	2:31 PM	15/16"		56.25"
7.	2:31 PM		Refilled	
8.	2:32 PM	7/8"		52.5"
9.	2:32 PM		Refilled	
10.	2:33 PM	7/8"		52.5"
11.	2:33 PM		Refilled	
12.	2:34 PM	7/8"		52.5"
13.	2:34 PM		Refilled	
14.	2:35 PM	13/16"		48.75"
15.	2:35 PM		Refilled	
16.	2:36 PM	13/16"		48.75"
17.	2:36 PM		Refilled	
18.	2:37 PM	12/16"		45"
19.	2:37 PM		Refilled	
20.	2:38 PM	12/16"		45"
21.	2:38 PM		Refilled	
22.	2:39 PM	12/16"		45"

23.	2:39 PM		Refilled	
24.	2:40 PM	12/16"		45"
25.	2:40 PM		Refilled	
26.	2:41 PM	12/16"		45"
27.	2:41 PM		Refilled	

$$\text{Average Percolation Rate Per Hour} = \frac{3 \times 56.25" + 3 \times 52.5" + 2 \times 48.75" + 5 \times 45"}{13}$$

$$= \frac{648.75"}{13} = 49.90 \text{ inch per hour.}$$

Percolation Test 3:

1. Depth of Test: 6'-7"
2. Water was filled to top of 2" diameter PVC pipe at 2:50 PM and left for 1 hour of saturation period.
3. 1 Hour saturation period ended at 3:50 PM.
4. Water was filled to top of PVC pipe again at 3:50 PM and drops in water level were recorded at 2 minute interval until as constant drop in water level was recorded.
5. Water was refilled to top of PVC pipe after each record.

S. No.	Time	Drop in Water Level every 2 min. interval	Remarks	Percolation Rate Per Hour
1.	3:50 PM	Water was filled to top of PVC pipe		
2.	3:52 PM	1 7/16"		43.12"
3.	3:52 PM		Refilled	
4.	3:54 PM	1 7/16"		43.12"
5.	3:54 PM		Refilled	
6.	3:56 PM	1 7/16"		43.12"
7.	3:56 PM		Refilled	
8.	3:58 PM	1 3/8"		41.25"
9.	3:58 PM		Refilled	
10.	4:00 PM	1 3/8"		41.25"
11.	4:00 PM		Refilled	
12.	4:02 PM	1 3/8"		41.25"
13.	4:02 PM		Refilled	
14.	4:04 PM	1 5/16"		39.37"
15.	4:04 PM		Refilled	

16.	4:06 PM	1 5/16"		39.37"
17.	4:06 PM		Refilled	
18.	4:08 PM	1¼"		37.5"
19.	4:08 PM		Refilled	
20.	4:10 PM	1 3/16"		35.62"
21.	4:10 PM		Refilled	
22.	4:12 PM	1 3/16"		35.62"
23.	4:12 PM		Refilled	
24.	4:14 PM	1 3/16"		35.62"
25.	4:14 PM		Refilled	
26.	4:16 PM	1 3/16"		35.62"
27.	4:16 PM			

$$\text{Average Percolation Rate Per Hour} = \frac{3 \times 43.12" + 3 \times 41.25" + 2 \times 39.37" + 1 \times 37.5" + 4 \times 35.62"}{13}$$

$$= \frac{511.83"}{13} = 39.37 \text{ inch per hour.}$$

LABORATORY TESTING:

A total of three (3) soil samples, one each from borings B-1 to B-3 were laboratory tested to determine in-place moisture content and to classify the soil as per Unified Soil Classification System, ASTM-D2487-93. The findings are summarized below. Laboratory test reports are enclosed in Appendix -B.

Soil Boring Number	Soil Sample No.	Depth collected	Moisture Content (%)	Fines thru #200 Sieve	USCS Symbol
B-1	S-1	4'- 6'	9.3	16.7	SM
B-2	S-2	6'- 8'	7.7	21.4	SM
B-3	S-3	8' - 10'	10.2	30.0	SM

SM: silty sands

SUBSURFACE CONDITIONS:

A detailed description of the soil encountered in the test boring is documented in the boring log which is presented in Appendix-A. The following gives a general description of the subsurface conditions encountered at the borings. While the borings may indicate that the subsurface conditions appear to be relatively uniform across the site, it should be recognized that the size of borings was small compared to the size of the site, and that the existence of anomalies cannot be precluded.

According to NJ Geoweb website, the geological formation is the Pensauken Formation and geologic age is Pliocene. The lithology consists of sand, clayey sand, pebble gravel, minor silt, clay, and cobble gravel; yellow, reddish yellow, white. Sand typically includes weathered feldspar. Locally iron-cemented. As much as 140 feet thick.

Based on the results of soil borings and our geo-technical laboratory testing, we estimate the general stratigraphy of the site to consist of the following major units, in an increasing order of depth.

Stratum-1: Fill material containing DGA: Gray f/c sand and gray crushed stone, trace silt was and grayish brown/dark gray, brown f/c sand, trace silt, trace f/c gravel, trace fragments of concrete was noted under this stratum in top 5 inches in B-1, in top 2 inches in B-2 and in top 5'-11" in B-3. The relative density of this material varied between very loose to loose condition.

Stratum-2: Yellowish orange/brown, reddish brown f/c sand, trace silt, trace f/m gravel and gray-yellow & light red sandy silt was noted under this stratum between 2 feet to 8 feet & between 10 feet to 12 feet in B-1, between 2 feet to 12 feet in B-2 and between 8 feet to 12 feet in B-3. The relative density of this material varied between loose to dense condition. The relative stiffness of this material was noted to be in stiff condition.

Stratum-3: Dark yellowish brown f/c sand and f/c gravel, trace silt was noted under this stratum between 8 feet to 10 feet in only boring B-1. The relative density of this material was noted to be in dense condition.

Stratum-4: Yellowish orange silty f/m sand, trace fine gravel was noted under this stratum between 6 feet to 8 feet in only boring B-3. The relative density of this material was noted to be in loose condition.

SUMMARY OF FINDINGS:

Boring Number	Depth in (feet)	Penetration Resistance N-Value	Soil Type	In-Place Soil Bearing Capacity(PSF)	Recommended Soil Bearing Capacity (PSF)
B-1	0 – 2	23	FILL	4600	3000
B-1	2 – 4	14	SP-SM	2800	3000
B-1	4 – 6	12	SP-SM	2400	2500
B-1	6 – 8	28	SP-SM	+5000	4000
B-1	8 – 10	32	SP/GP	+5000	4000
B-1	10 – 12	19	SP-SM	3800	4000

Boring Number	Depth in (feet)	Penetration Resistance N-Value	Soil Type	In-Place Soil Bearing Capacity(PSF)	Recommended Soil Bearing Capacity (PSF)
B-2	0 – 2	11	FILL	2200	2500
B-2	2 – 4	16	SP-SM	3200	3000
B-2	4 – 6	16	SP-SM	3200	3000
B-2	6 – 8	25	SP-SM	5000	4000
B-2	8 – 10	22	SP-SM	4400	4000
B-2	10 – 12	19	SP-SM	3800	4000

Boring Number	Depth in (feet)	Penetration Resistance N-Value	Soil Type	In-Place Soil Bearing Capacity(PSF)	Recommended Soil Bearing Capacity (PSF)
B-3	0 – 2	6	FILL	1200	1500
B-3	2 – 4	12	FILL	2400	1500
B-3	4 – 6	5	FILL	1000	1500
B-3	6 – 8	9	SM/GM	1800	2000
B-3	8 – 10	9	SP-SM	1800	2000
B-3	10 – 12	16	SP-SM	3200	3500

GROUNDWATER:

Groundwater was not encountered in any of the borings B-1 to B-3 below existing grade surface. It should be noted that groundwater level will fluctuate due to variations in rainfall or other factors not evident at the time of our investigation. Please note mottling was NOT noted down to 12' below grade.

CONCLUSIONS:

1. Groundwater was not encountered in any of the borings B-1 to B-3 below existing grade surface. Consequently, we anticipate that groundwater management during construction will be minimal.

2. Fill was noted in top 5 inches in B-1, in top 2 inches in B-2 and in top 5'-11" in B-3. Below fill, the on-site soil consists of f/c sand with trace silt & trace f/m gravel. Except fill on-site soil will be suitable as structural fill. Depending upon the time of the year when the actual construction takes place, drying of excavated sandy soil and aeration may be required to reduce the moisture content. In-situ moisture content of soil varied between 7.7 % to 10.2% which is generally considered moist.

3. The average percolation rate noted in all the three tests are as follows:

Perc. Test No.	Average Percolation Rate (inches per hour).
Perc. test no. - 1	40.31 inches per hr.
Perc. test no. - 2	49.90 inches per hr.
Perc. test no. - 3	39.37 inches per hr.

4. The following parameters should be used for seismic design of the building in accordance with **IBC-2021 ASCE 7-22**:

Description	Parameter	Recommended value
Mapped Spectral Acceleration for short periods:	Ss	0.26
Mapped Spectral Acceleration for 1-sec period:	S_1	0.049
Site Class:	D	Stiff Soil
5 percent damped Design spectral response acceleration at short periods:	S_{DS}	0.19
5 percent damped Design spectral response acceleration at 1-sec periods:	S_{D1}	0.069

5. Any fill used as backfill material within the building and pavement areas should consist of approved portions of the on-site granular soils, which have been maintained at moisture contents suitable for compaction or select fill should be imported. All fill should be placed in lift in the order of twelve (12) inches in loose thickness and be uniformly compacted to at least 95% of its maximum dry density as determined by the modified proctor density values derived based upon ASTM D-1557-98 test procedure.

In addition, we recommend that backfill soil placed in confined areas, such as foundation or utility excavations, should be spread in lifts in the order of six (6) to eight (8) inches in loose thickens and it should be compacted to the same degree using manually operated vibratory compaction equipment. We recommend that temporary construction slopes be established at one vertical to two horizontal, or flatter, or as required by the governing safety codes.

FOUNDATION DESIGN CRITERIA:

Fill was noted in top 5 inches in B-1, in top 2 inches in B-2 and in top 5'-11" in B-3. We recommend that the foundation for any building structure at the Dwight D. Eisenhower Elementary School shall be supported by conventional shallow foundation established on the medium dense soil noted between 4'-0" depth. Foundation should be designed to impose maximum allowable net bearing pressure of 2,000 pounds per square foot. A complete removal of fill is recommended from all three borings B-1 to B-3.

Any pockets of localized unsuitable soil encountered during foundation excavation should be completely removed. The over excavated area should be backfilled utilizing either controlled compacted fill or 3/4" size clean gravels. Any footing or slab placed in this area will require over excavation, removal of unsuitable material and backfilling with ¾ size stones or controlled compacted fill. Placing additional reinforcing steel to strength the footing over soft soil may be required.

We recommend that exterior foundations be established at least three feet below the adjacent exterior grade, or as required by local ordinance, to provide protection from frost penetration. The maximum post-construction settlements of foundations designed and constructed in accordance with our recommendations will be in the order of ¾" or less.

FLOOR SLAB DESIGN CRITERIA:

Removal of fill from top 5 inches in B-1, from top 2 inches in B-2 and from top 5'-11" in B-3 will be required. The floor slab or patio slab shall be supported directly on the compacted sub-grade of onsite material or controlled compacted structural fill. Compaction of the sand below the floor slab sub-grade to 95% of its optimum density will be required. We recommend performing compaction test at the rate of one test per 200-sq.ft area. Recommended Modulus of Sub-Grade reaction is 75 pci.

Any back fill required for the structural area to be off site or ¾" clean crushed stones may be utilized to minimize the influence of moisture on the first fill layer. All off-site fill should compose of relatively well graded sand and gravel containing less than 15% by weight passing U.S. Standard #200 sieve and having a maximum particle size of six inches.

Acceptable soil materials for backfill and fill should be free of clay, rock or gravel larger than six (6) inches in any dimension, debris, waste, frozen materials, vegetable and other

deleterious matter and it should comply with ASTM D-2487-91 soil classification groups GW, GP, SM, SW and SP.

All fill should be placed in lifts in the order of twelve (12) inches in loose thickness and it should be uniformly compacted to at least 95% of its maximum dry density as determined by the modified proctor density values derived based upon ASTM D-1557-93 test procedure. In addition, we recommend that backfill soils placed in confined areas, such as foundation or utility excavations, should be spread in lifts in the order of six to eight inches in loose thickness and be compacted to the same degree using manually.

RECOMMENDATIONS FOR THE EARTHWORK FOUNDATION CONSTRUCTION:

Clearing and Stripping: Clearing and stripping would include removing vegetation and any boulders or any loose or unsuitable soil at the distance of 5 feet beyond the limits of the proposed building excavation, structure and paved areas. Limits of stripping should conform to construction permit limitations.

Soil Erosion and Sediment Control: Clearing and stripping should be performed in accordance with the requirements of the soil erosion and sediment control plan and environment permits.

Excavation & side slope: An unbraced excavation slope of 2.0 horizontal to 1 vertical or flatter may be considered in the planning for construction. Sheeting and bracing, and or slope stabilization systems should be used wherever the unbraced slope pass beneath utilities or structures, the active roadway arrears and/or where it is found to be necessary or more cost effective to use sheeting in order to limit the size of the excavations and maintain traffic. Sheeting and bracing systems and excavation slopes may be designed using the soil properties presented in summary table provided earlier.

Proof rolling and compaction of Pavement and Fill Subgrades: Following stripping or excavation to plan elevations, all subgrades for placement of new foundation or parking lot pavement should be proof rolled using a vibratory roller with minimum 1 ton static weight in confined areas along side walls and 10 tons static weight in the footprint of the building and general roadway paved areas. Footing subgrades should be compacted with small area vibratory plate compactors. Proof rolling should be observed and evaluated by a qualified Geotechnical engineer or technician familiar with site conditions.

MINIMUM PAVEMENT DESIGN SECTIONS:

ACCESS ROAD AND TRUCK TRAFFIC AREAS:

Bituminous Concrete Surface Course (NJDOT I-5)	2 inches
Bituminous Concrete Base Course (NJDOT I-2)	4 inches
Quarry Process Sub-Base Course (NJ DOT DGA)	6 inches
TOTAL SECTION THICKNESS	**12 inches**

AUTOMOBILE PARKING AREAS:

Bituminous Concrete Surface Course (NJDOT I-5)	2 inches

Bituminous Concrete Base Course (NJDOT I-2)	3 inches
Quarry Process Sub-Base Course (NJ DOT DGA)	4 inches
TOTAL SECTION THICKNESS	**9 inches**

As previously discussed, it is recommended that the loose soil at the surface should be proof rolled and densified with a heavy vibratory compactor. With this recommended compaction, a CBR value of six (6) would be appropriate for use in the design of flexible pavements over site soils with imported granular fill, the CBR could be about eight (8).

RECOMMENDED SERVICES:

It is recommended that we should be retained to provide continuous observation and Soil engineering services during the excavation and foundation construction phases of the work. This is to observe compliance with the design concepts, specifications and recommendations, and to allow design charges in the event that subsurface conditions differ from those anticipated prior to start of construction.

LIMITATIONS:

The recommendations contained in this report are our best professional judgment as to be followed in the design and construction of the proposed project. There may be subsurface conditions not disclosed by the explorations adequately identify subsurface conditions for the purpose of this study. If during construction any differences are found between the report of the explorations and the actual subsurface conditions, they should be brought to our attention immediately so that the effect in our recommendations can be evaluated.

This report has been prepared in accordance with generally accepted Geo-technical Engineering practices for the exclusive use of our client, B & G Engineering, LLC and their designated representative(s). No other warranty, express or implied is made. Contractors' wishes to use the soil boring information may do at their own risk. Unless specifically indicated to the contrary in this report, this report does not address environmental considerations, which may affect the site development. The conclusions and recommendations of this report are not intended to supersede or overlook any N.J.D.E.P. Environmental conditions, which should be reflected in the site planning.

Should you have any questions or require additional information, please do not hesitate to contact the undersigned at (908)754-8383.

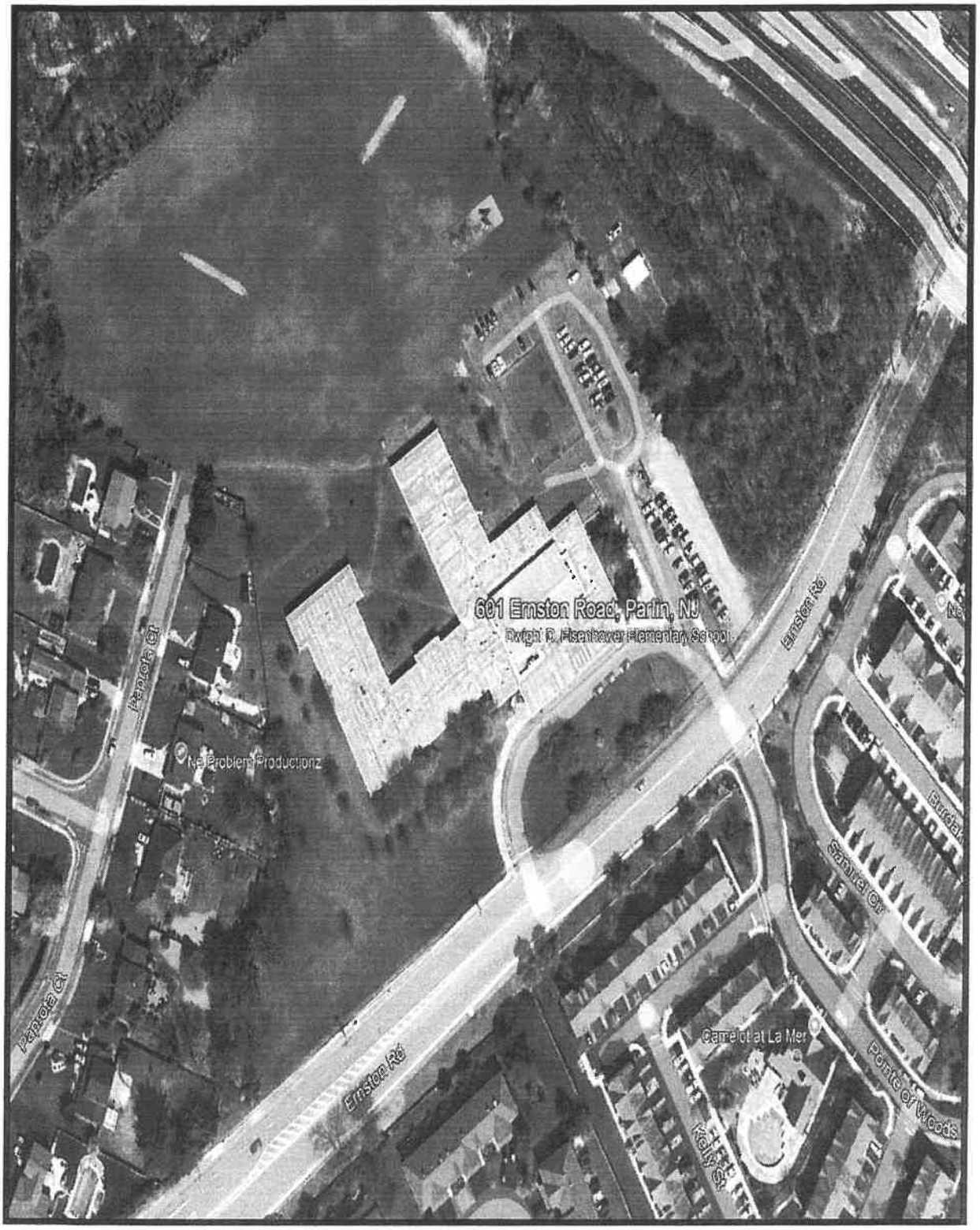
Sincerely,
ANS Consultants, Inc.

Atulkumar N. Shah, PE, PP, F. ASCE
President
NJ PE License #24GE03443900
ANS/RM

Reported: B & G Engineering LLC – (3); File – (1)

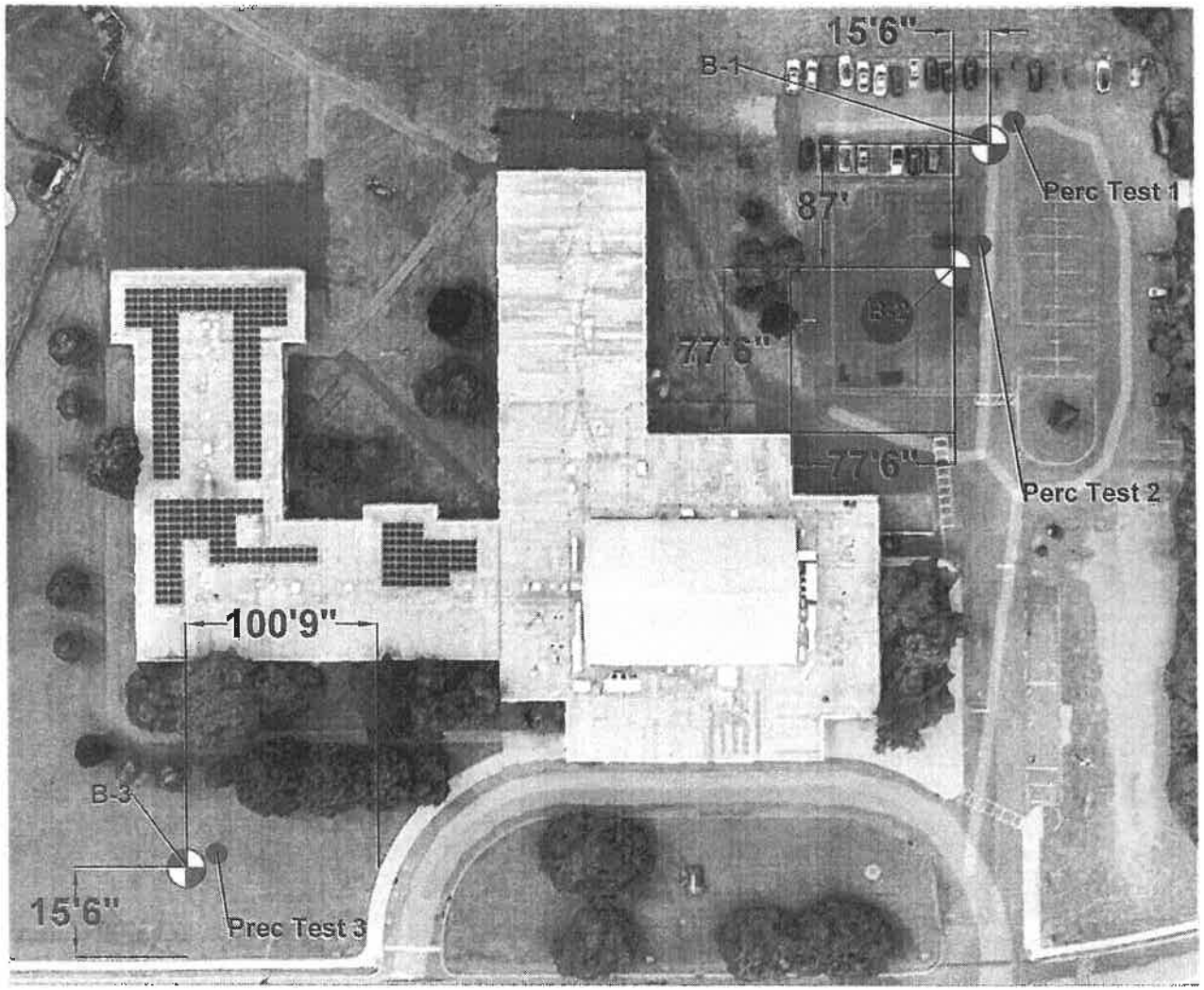
Appendix - A

GOOGLE MAP



Client: B & G Engineering LLC
Project: 601 Ernston Road
Parlin, NJ

ANS CONSULTANTS, INC.
4405 South Clinton Avenue
South Plainfield, NJ 07080



LEGEND:

- Soil Boring Location
- Perc Test Location

SOIL BORING AND FIELD PERCOLATION TEST LOCATION PLAN

SCALE: N.T.S

CLIENT: B & G Engineering LLC	
PROJECT: 601 Ernston Rd, Parlin, NJ	
ANS CONSULTANTS INC. 4405 SOUTH CLINTON AVE SO. PLAINFIELD, NJ, 07080 PHONE: (908)-754-8383 FAX: (908)-754-8633	
BY: Karan Shah	DATE: 03/05/2025
	Project No: AOT-5349

DRILL HOLE LOG
BORING NO.: B-1

PROJECT: Proposed Expansion of Parking Lot at Dwight D. Eisenhower Elementary School
PROJECT NO.: AOT-5349
CLIENT: B & G Engineerng LLC
DATE: 2-21-2025
LOCATION: 601 Ernston Road, Parlin, NJ
ELEVATION: N/A
DRILLER: JESUS, David & A. SHAH
LOGGED BY: Krunal Parmar
DRILL RIG: ACKER XLS
DEPTH TO WATER> INITIAL ▽ : AT COMPLETION ▽ :

ELEVATION/ DEPTH	WELL DETAIL	SOIL SYMBOLS, SAMPLERS AND TEST DATA	USCS	Description	NM	DD	STANDARD PENETRATION TEST DEPTH	N	CURVE
0		11-12-11-9	FILL	Asphalt-5". Fill material containing DGA: Gray f/c sand and gray crushed stone, trace silt, dry. @ 6": Yellowish orange f/m sand, trace silt, moist, medium dense.			0'-2'	23	
2		9-7-7-5	SP-SM	Yellowish orange f/m sand, trace silt, trace f/m gravel, moist, slightly compact.			2'-4'	14	
4		7-6-6-6	SP-SM	Yellowish orange f/c sand, trace silt, trace fine gravel, moist, slightly compact.			4'-6'	12	
6		8-11-17-23	SP-SM	Dark yellowish brown f/c sand, trace silt, trace f/m gravel, moist, medium dense.			6'-8'	28	
8		17-14-18-16	SP/GP	Dark yellowish brown f/c sand and f/c gravel, trace silt, moist, dense.			8'-10'	32	
10		15-9-10-11	SP-SM	Yellow and brown f/c sand, trace silt, trace f/m gravel, moist, medium dense.			10'-12'	19	
12				End of boring @ 12 feet.					
14									

CURVE: 10 30 50

This information pertains only to this boring and should not be interpreted as being indicitive of the site.

DRILL HOLE LOG
BORING NO.: B-2

PROJECT: Proposed Expansion of Parking Lot at Dwight D. Eisenhower Elementary School — PROJECT NO.: AOT-5349
CLIENT: B & G Engineerng LLC — DATE: 2-21-2025
LOCATION: 601 Ernston Road, Parlin, NJ — ELEVATION: N/A
DRILLER: JESUS, David & A. SHAH — LOGGED BY: Syed Abbas
DRILL RIG: ACKER XLS
DEPTH TO WATER> INITIAL ▽ : AT COMPLETION ▽ :

ELEVATION/ DEPTH	WELL DETAIL	SOIL SYMBOLS, SAMPLERS AND TEST DATA	USCS	Description	NM	DD	STANDARD PENETRATION TEST DEPTH	N	CURVE (10 30 50)
0		5-4-7-8	FILL	4" Thick asphalt. Fill material containing DGA: Gray f/c sand, trace silt, some f/c gray crushed stones, moist. @ 0-3": Gray-orange f/m sand, trace silt, trace fine gravel, wet, loose.			0'-2'	11	
2		8-8-8-8	SP-SM	@ 1'-0": Yellowish orange f/m sand, trace silt, trace fine gravel, slightly moist, slightly compact. Yellowish orange f/m sand, trace silt, trace fine gravel, slightly moist, slightly compact.			2'-4'	16	
4		7-8-8-13	SP-SM	Yellowish orange and brown f/c sand, trace silt, trace fine gravel, slightly moist.			4'-6'	16	
6		11-11-14-14	SP-SM	Yellowish brown f/c sand, trace silt, little f/m gravel, slightly moist, medium dense.			6'-8'	25	
8		13-11-11-10	SP-SM	Reddish brown f/m sand, trace silt, trace f/m gravel, slightly moist. @ 8'-6": Yellow and light red sandy silt, slightly moist, stiff.			8'-10'	22	
10		9-8-11-10	SP-SM	Gray-yellow and light red sandy silt, slightly moist, stiff.			10'-12'	19	
12				End of boring @ 12 feet.					
14									

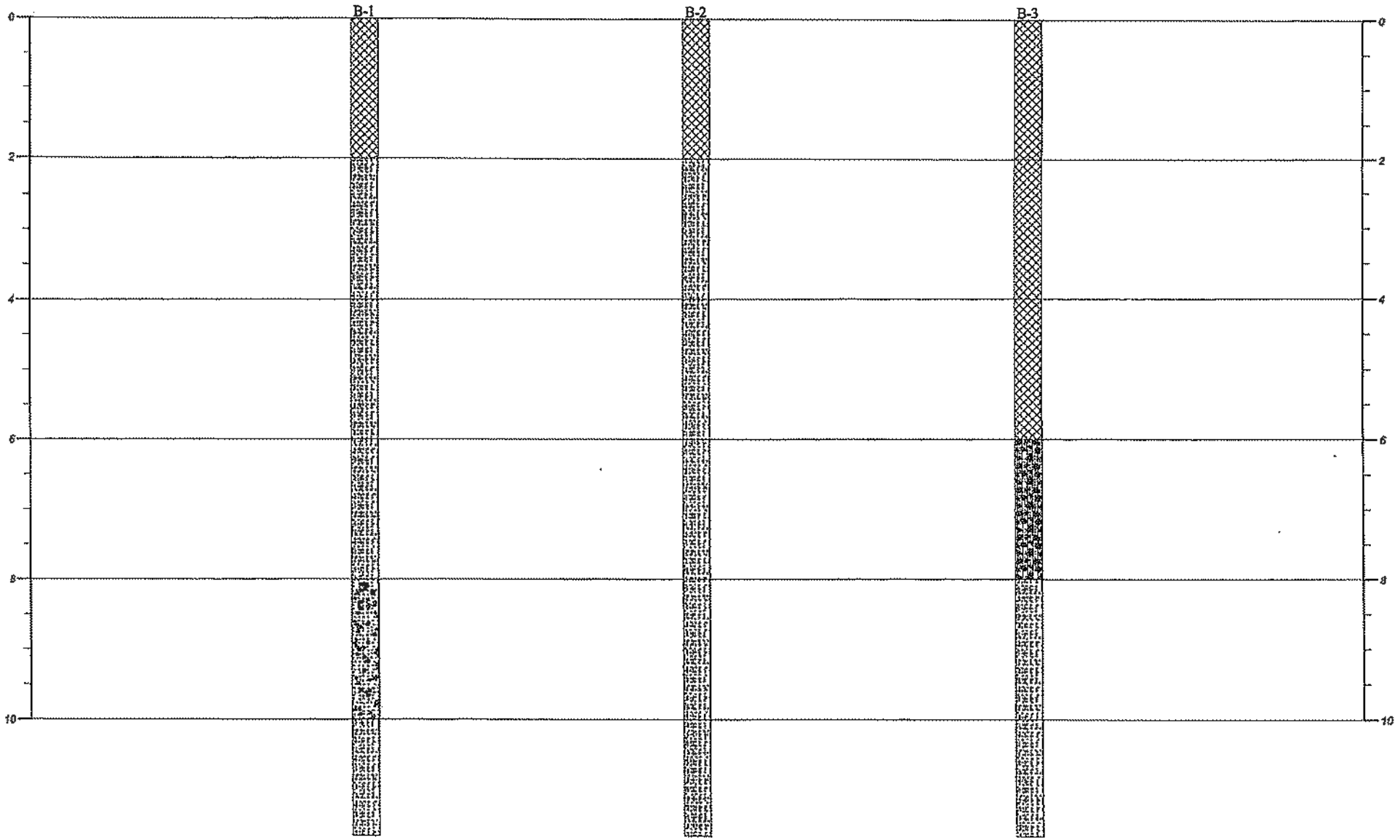
This information pertains only to this boring and should not be interpreted as being indicitive of the site.

DRILL HOLE LOG
BORING NO.: B-3

PROJECT: Proposed Expansion of Parking Lot at Dwight D. Eisenhower Elementary School — PROJECT NO.: AOT-5349
CLIENT: B & G Engineerng LLC — DATE: 2-21-2025
LOCATION: 601 Ernston Road, Parlin, NJ — ELEVATION: N/A
DRILLER: JESUS, David & A. SHAH — LOGGED BY: Syed Abbas
DRILL RIG: ACKER XLS
DEPTH TO WATER> INITIAL ▽ : AT COMPLETION ▽ :

ELEVATION/ DEPTH	WELL DETAIL	SOIL SYMBOLS, SAMPLERS AND TEST DATA	USCS	Description	NM	DD	STANDARD PENETRATION TEST DEPTH	N	CURVE (10 30 50)
0		2-2-4-4	FILL	5" Thick top soil. Fill material containing grayish brown f/m sand, trace silt, trace f/c gravel, moist, loose.			0'-2'	6	
2		3-4-8-6	FILL	Fill material containing grayish brown and dark gray f/c sand, trace silt, trace f/m gravel, some fragments of concrete, moist, slightly compact.			2'-4'	12	
4		3-2-3-3	FILL	Fill material containing gray and dark gray f/c sand, trace silt, some f/c gravel, trace fragments of concrete, moist, very loose.			4'-6'	5	
6		3-4-5-6	SM/GM	Yellowish orange silty f/m sand, trace fine gravel, moist, loose.			6'-8'	9	
8		5-4-5-4	SP-SM	Yellowish orange and brown f/c sand, trace silt, trace fine gravel, moist, loose.			8'-10'	9	
10		4-7-9-7	SP-SM	Yellowish brown f/c sand, trace silt, trace fine gravel, moist, slightly compact.			10'-12'	16	
12				End of boring @ 12 Feet.					
14									

This information pertains only to this boring and should not be interpreted as being indicitive of the site.



Plan View

Strata symbols

- Fill
- Poorly graded sand with silt
- Poorly graded sand and gravel
- Silty sand and gravel

ANS CONSULTANTS, INC.

GENERALIZED SOIL PROFILE

HORIZONTAL SCALE: VERTICAL SCALE: 1"=2'	DRAWN BY/APPROVED BY	DATE DRAWN
	PPP	3/7/2025

Proposed Expansion of Parking Lot at Dwight D. Eisenhower Elementary School

PROJECT NO. AOT-5349

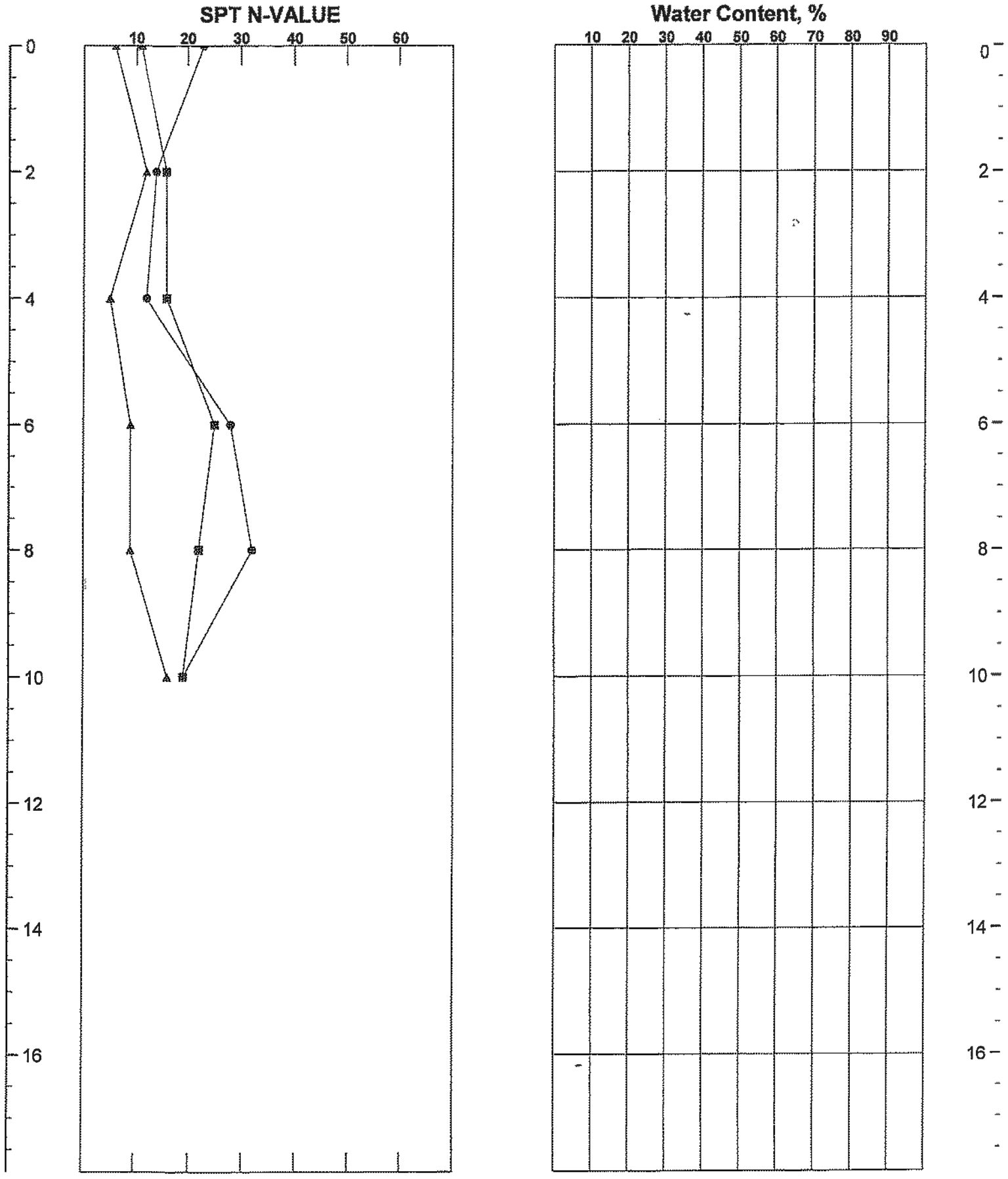
FIGURE NUMBER

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Fill
	Poorly graded sand with silt
	Poorly graded sand and gravel
	Silty sand and gravel

Notes:

1. Exploratory borings were drilled on 2-21-2025 using a 4-inch diameter continuous flight power auger.
2. No free water was encountered at the time of drilling or when re-checked the following day.
3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.



Key to Borings

- ● B-1
- ▲ B-3
- ■ B-2

ANS CONSULTANTS, INC.

Proposed Expansion of Parking Lot at Dwight D. Eisenhower Elementary School

Vertical Scale: 1 to 2	Figure:

Client: B & G Engineering LLC

Project: 601 Ernston Road, Parlin, NJ

Report of Field Percolation Test

Percolation Test 1:

1. Depth of Test: 5'-1"
2. Water was filled to top of 2" diameter PVC pipe at 11:43 AM and left for 1 hour of saturation period.
3. 1 Hour saturation period ended at 12:43 PM.
4. Water was filled to top of PVC pipe again at 12:43 PM and drops in water level were recorded at 2 minute interval until as constant drop in water level was recorded.
5. Water was refilled to top of PVC pipe after each record.

S. No.	Time	Drop in Water Level every 2 min. interval	Remarks	Percolation Rate Per Hour
1.	12:43 PM	Water was filled to top of PVC pipe		
2.	12:45 PM	1½"		45"
3.	12:45 PM		Refilled	
4.	12:47 PM	1½"		45"
5.	12:47 PM		Refilled	
6.	12:49 PM	1½"		45"
7.	12:49 PM		Refilled	
8.	12:51 PM	1 3/8"		41.25"
9.	12:51 PM		Refilled	
10.	12:53 PM	1 3/8"		41.25"
11.	12:53 PM		Refilled	
12.	12:55 PM	1 5/16"		39.37"
13.	12:55 PM		Refilled	
14.	12:57 PM	1 5/16"		39.37"
15.	12:59 PM		Refilled	
16.	12:59 PM	1¼"		37.5"
17.	1:01 PM		Refilled	
18.	1:01 PM	1¼"		37.5"
19.	1:03 PM		Refilled	
20.	1:03 PM	1¼"		37.5"
21.	1:05 PM		Refilled	
22.	1:05 PM	1¼"		37.5"

23.	1:07 PM		Refilled	
24.	1:07 PM	1¼"		37.5"

$$\text{Average Percolation Rate Per Hour} = \frac{3 \times 45" + 2 \times 41.25" + 2 \times 39.37" + 5 \times 37.5"}{12}$$

$$= \frac{483.74"}{12} = 40.31" \text{ per hour}$$

Percolation Test 2:

1. Depth of Test: 5'-2"
2. Water was filled to top of 2" diameter PVC pipe at 1:28 PM and left for 1 hour of saturation period.
3. 1 Hour saturation period ended at 2:28 PM.
4. Water was filled to top of PVC pipe again at 2:28 PM and drops in water level were recorded at 1 minute interval until as constant drop in water level was recorded.
5. Water was refilled to top of PVC pipe after each record.

S. No.	Time	Drop in Water Level every 1 min. interval	Remarks	Percolation Rate Per Hour
1.	2:28 PM	Water was filled to top of PVC pipe		
2.	2:29 PM	15/16"		56.25"
3.	2:29 PM		Refilled	
4.	2:30 PM	15/16"		56.25"
5.	2:30 PM		Refilled	
6.	2:31 PM	15/16"		56.25"
7.	2:31 PM		Refilled	
8.	2:32 PM	7/8"		52.5"
9.	2:32 PM		Refilled	
10.	2:33 PM	7/8"		52.5"
11.	2:33 PM		Refilled	
12.	2:34 PM	7/8"		52.5"
13.	2:34 PM		Refilled	
14.	2:35 PM	13/16"		48.75"
15.	2:35 PM		Refilled	
16.	2:36 PM	13/16"		48.75"
17.	2:36 PM		Refilled	

18.	2:37 PM	12/16"		45"
19.	2:37 PM		Refilled	
20.	2:38 PM	12/16"		45"
21.	2:38 PM		Refilled	
22.	2:39 PM	12/16"		45"
23.	2:39 PM		Refilled	
24.	2:40 PM	12/16"		45"
25.	2:40 PM		Refilled	
26.	2:41 PM	12/16"		45"
27.	2:41 PM		Refilled	

$$\text{Average Percolation Rate Per Hour} = \frac{3 \times 56.25" + 3 \times 52.5" + 2 \times 48.75" + 5 \times 45"}{13}$$

$$= \frac{168.75" + 157.5" + 97.5" + 225"}{13}$$

$$= \frac{648.75"}{13} = 49.90" \text{ per hour.}$$

Percolation Test 3:

1. Depth of Test: 6'7"
2. Water was filled to top of 2" diameter PVC pipe at 2:50 PM and left for 1 hour of saturation period.
3. 1 Hour saturation period ended at 3:50 PM.
4. Water was filled to top of PVC pipe again at 3:50 PM and drops in water level were recorded at 2 minute interval until as constant drop in water level was recorded.
5. Water was refilled to top of PVC pipe after each record.

S. No.	Time	Drop in Water Level every 2 min. interval	Remarks	Percolation Rate Per Hour
1.	3:50 PM	Water was filled to top of PVC pipe		
2.	3:52 PM	1 7/16"		43.12"
3.	3:52 PM		Refilled	
4.	3:54 PM	1 7/16"		43.12"
5.	3:54 PM		Refilled	
6.	3:56 PM	1 7/16"		43.12"
7.	3:56 PM		Refilled	

Client: B & G Engineering LLC

Project: 601 Ernston Road, Parlin, NJ

8.	3:58 PM	1 3/8"		41.25"
9.	3:58 PM		Refilled	
10.	4:00 PM	1 3/8"		41.25"
11.	4:00 PM		Refilled	
12.	4:02 PM	1 3/8"		41.25"
13.	4:02 PM		Refilled	
14.	4:04 PM	1 5/16"		39.37"
15.	4:04 PM		Refilled	
16.	4:06 PM	1 5/16"		39.37"
17.	4:06 PM		Refilled	
18.	4:08 PM	1¼"		37.5"
19.	4:08 PM		Refilled	
20.	4:10 PM	1 3/16"		35.62"
21.	4:10 PM		Refilled	
22.	4:12 PM	1 3/16"		35.62"
23.	4:12 PM		Refilled	
24.	4:14 PM	1 3/16"		35.62"
25.	4:14 PM		Refilled	
26.	4:16 PM	1 3/16"		35.62"
27.	4:16 PM			

$$\text{Average Percolation Rate Per Hour} = \frac{3 \times 43.12" + 3 \times 41.25" + 2 \times 39.37" + 1 \times 37.5" + 4 \times 35.62"}{13}$$

$$= \frac{129.36" + 123.75" + 78.74" + 37.5" + 142.48}{13}$$

$$= \frac{511.83"}{13} = 39.37" \text{ per hour.}$$

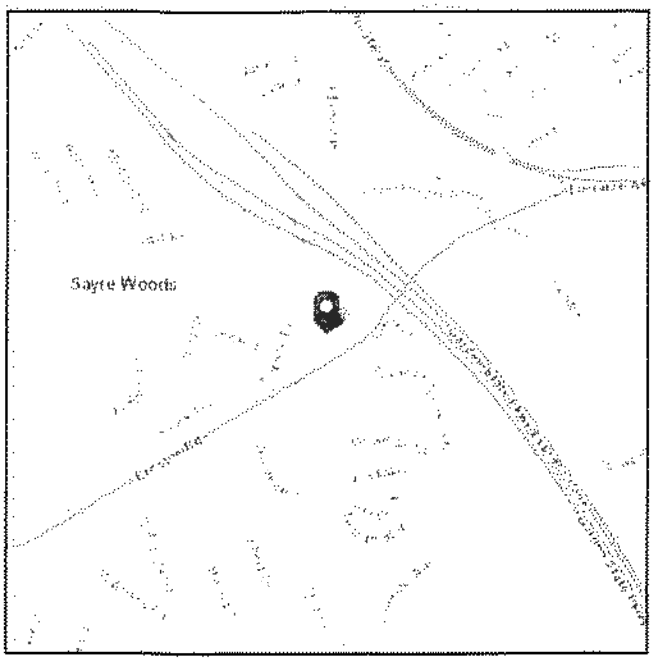
File: ANS.MS_.01

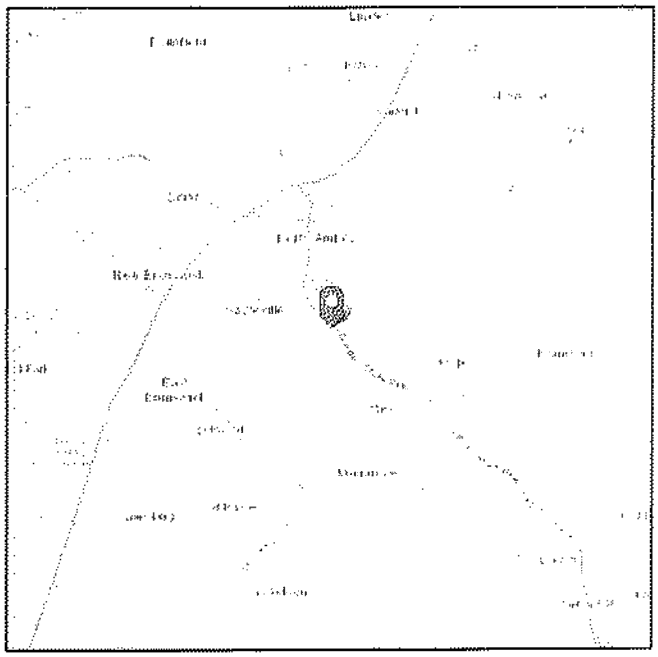
ASCE Hazards Report

Address:
601 Ernston Rd
Parlin, New Jersey
08859

Standard: ASCE/SEI 7-22
Risk Category: II
Soil Class: D - Stiff Soil

Latitude: 40.459988
Longitude: -74.283632
Elevation: 76.24670207572116 ft (NAVD 88)





ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

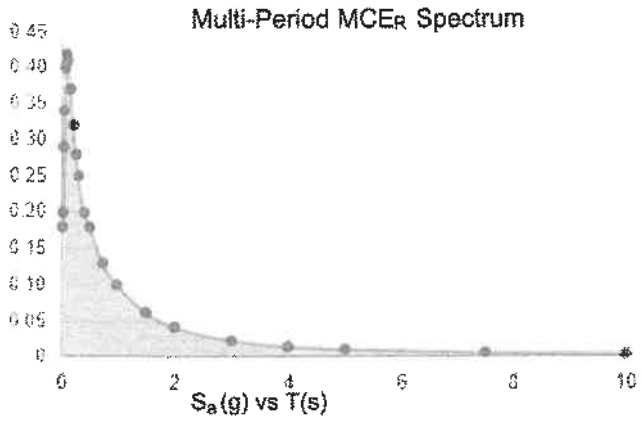
Seismic

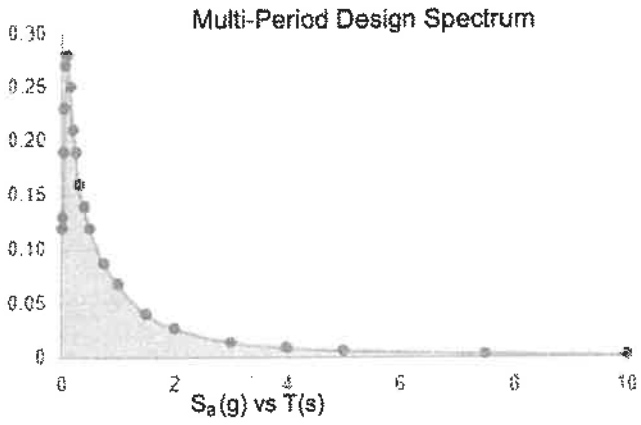
Site Soil Class: D - Stiff Soil

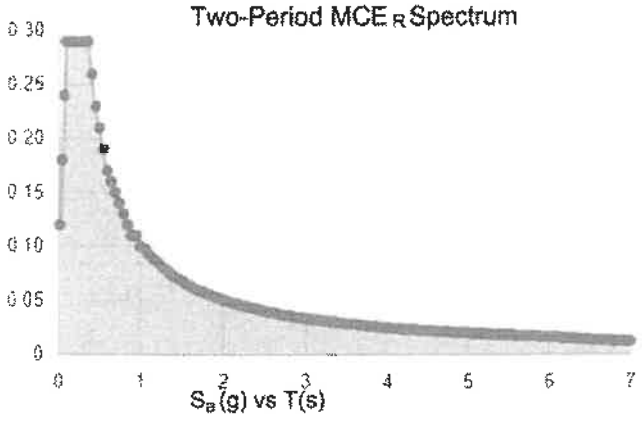
Results:

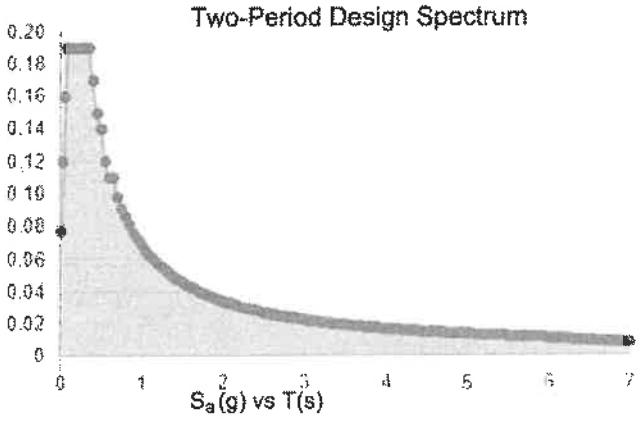
PGA_M :	0.16	T_L :	6
S_{MS} :	0.29	S_S :	0.26
S_{M1} :	0.1	S_1 :	0.049
S_{DS} :	0.19	V_{S30} :	260
S_{D1} :	0.069		

Seismic Design Category: B









MCER Vertical Response Spectrum

Vertical ground motion data has not yet been made available by USGS.

Design Vertical Response Spectrum

Vertical ground motion data has not yet been made available by USGS.

ASCE
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Data Accessed: Mon Mar 03 2025

Date Source:
USGS Seismic Design Maps based on ASCE/SEI 7-22 and ASCE/SEI 7-22 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-22 Ch. 21 are available from USGS.

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FIELD SOIL CLASSIFICATION SYSTEM

PARTICLE SIZE IDENTIFICATION

Boulders.....8 inch diameter or greater
Cobbles.....3 to 8 inch diameter
Gravel ..... Coarse -- 1 to 3 inch
Medium -- 1/2 to 1 inch
Fine -- 4.75 mm to 1/2 inch
Sand..... Coarse -- 2.0 mm to 4.75 mm
(dia. of pencil lead)
Medium -- 0.425 mm to 2.0 mm
(dia. of broom straw)
Fine -- 0.075 mm to 0.425 mm
(dia. of human hair)
Silt & Clay. . . Smaller than 0.075 mm

RELATIVE PORTIONS

Descriptive Term	Percent
Trace - tr	1 - 10
Some - sm	11 - 20
Adjective - ly	21 - 35
And - &	36 - 50

ABBREVIATIONS

Bn - Brown
Gy - Gray
Blk - Black
Rd - Red
Or - Orange
Bl - Blue
Lt - Light
Dk - Dark
Multi - Multi colored

Coarse grained - c
Medium grained - m
Fine grained- f

COHESIONLESS SOIL

(Gravel, Sand, Silt and Combinations)

DENSITY

Very Loose ..... 05 blows I ft or less
Loose .....06 to 10 blows / ft
Medium Dense .....11 to 30 blows / ft
Dense ..... 31 to 50 blows / ft
Very Dense .....51 blows / ft or more

COHESIVE SOIL

(Clay Silt and Combinations)

CONSISTENCY

Very Soft ..... . 01 blow / ft or less
Soft..... 02 to 4 blows / ft
Medium Stiff .....05 to 8 blows / ft
Stiff..... 09 to 15 blows / ft
Very Stiff ..... 16 to 30 blows / ft
Hard .....31 blows / ft or greater

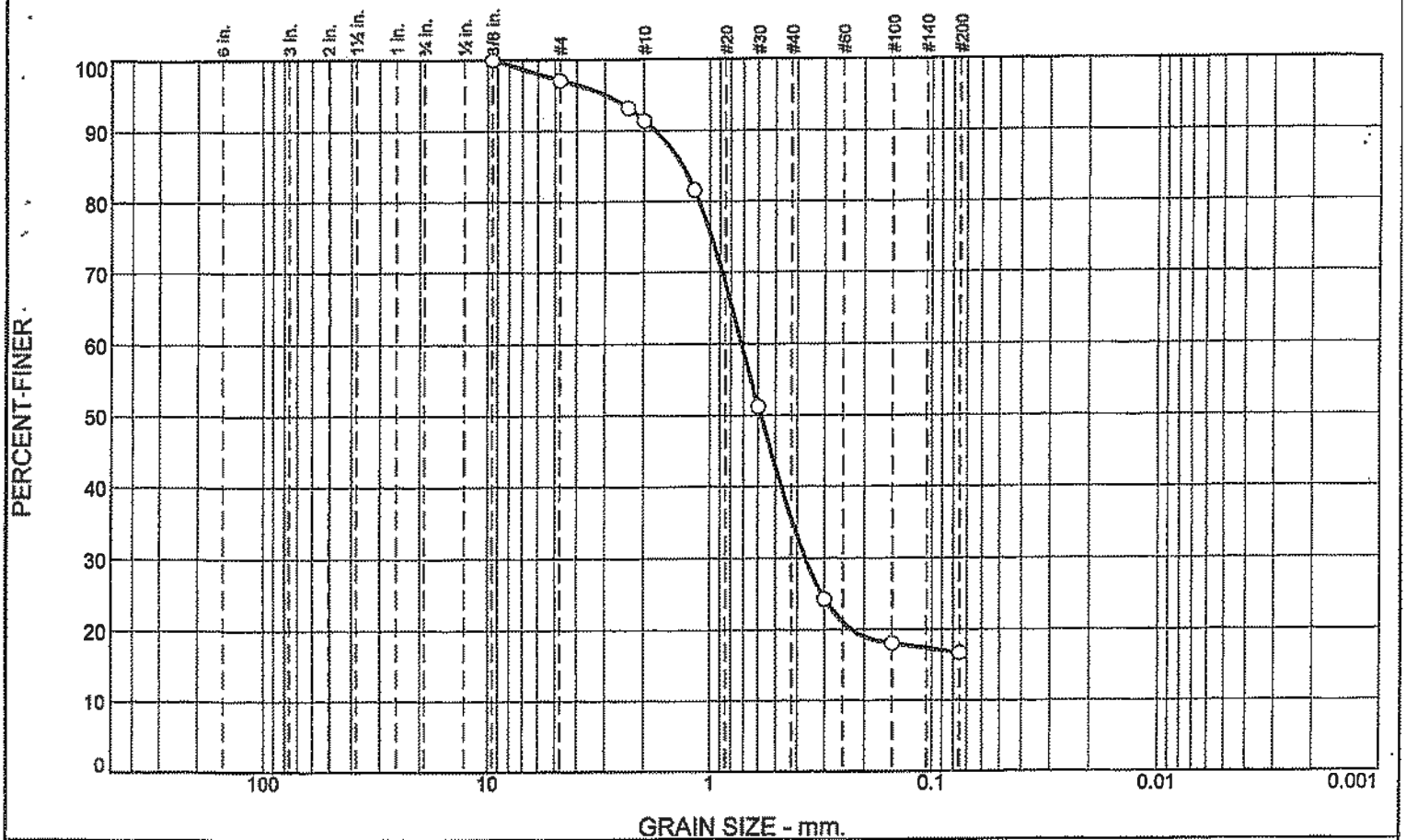
ROCK

R.Q.D.	Rock Quality
00 – 25.....	Very Poor
25 - 50%	Poor
50 - 75%	Fair
75 - 90%.....	Good
90 - 100%.....	Excellent

HSA - Hollow Stem Auger
SS- Split Spoon Sampler
WOR - Weight of Rods
WOH - Weight of Hammer
NR - No Recovery of Sample

Appendix-B

Particle Size Distribution Report As per ASTM D 6913



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.9	5.7	55.9	18.8	16.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8	100.0		
#4	97.1		
#8	93.1		
#10	91.4		
#16	81.6		
#30	51.2		
#50	24.3		
#100	18.1		
#200	16.7		

* (no specification provided)

Material Description

Orange brown in color. silty sand

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 1.7815 D_{85}= 1.3391 D_{60}= 0.7158
D_{50}= 0.5856 D_{30}= 0.3663 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-1-b

Remarks

Sample was collected on 02/21/24 and tested on 02/27/25. In-Situ %MC=9.3
F.M.=2.35

Location: B-1
Sample Number: S-1 **Depth:** 4'-6'

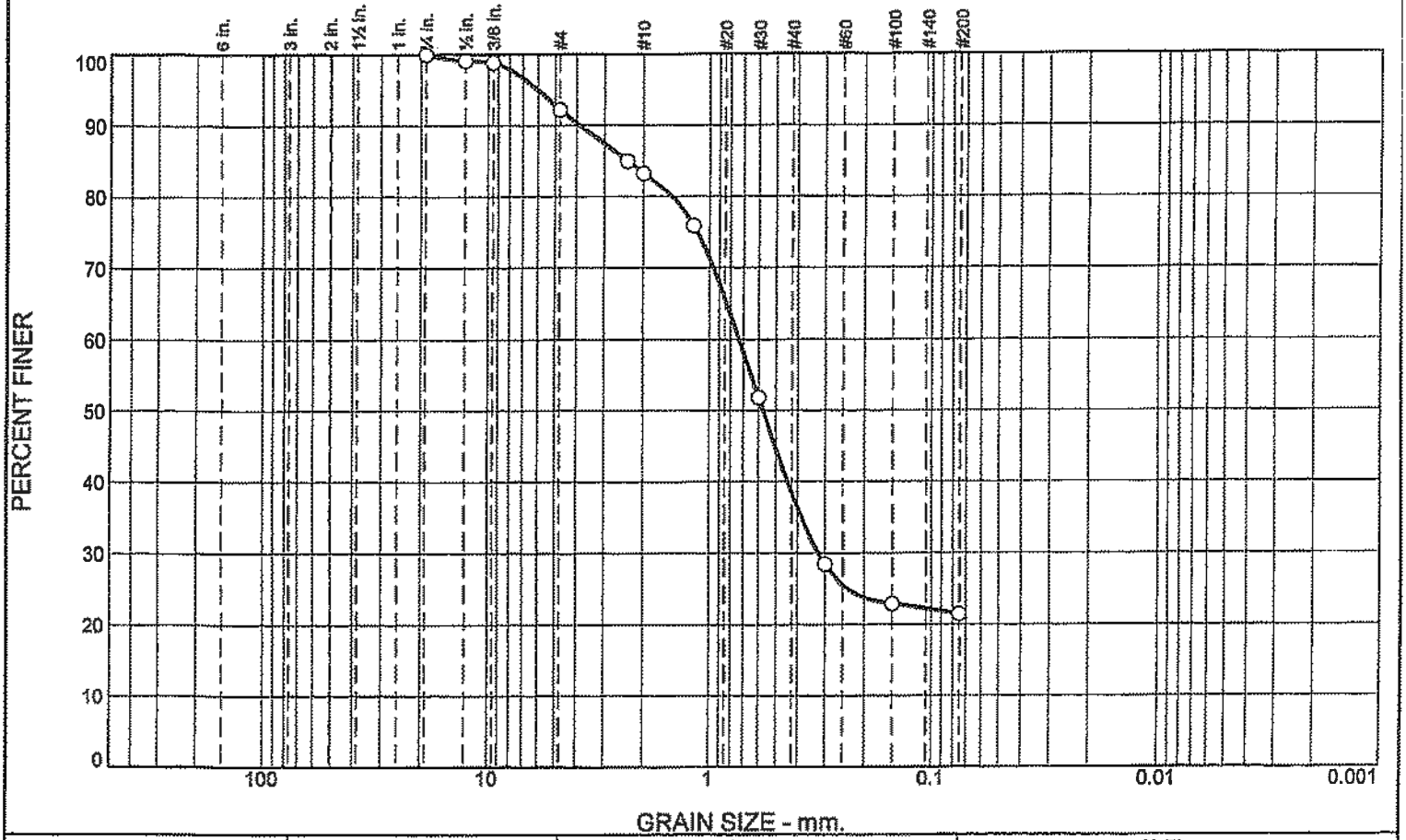
Date: 02/27/2025

ANS CONSULTANTS, INC.

South Plainfield, New Jersey

Client: B & G Engineering, LLC
Project: 601 Ernston Road, Parlin, NJ Borough of Sayreville, NJ Block # 447.06, Lot # 2102
Project No: AOT-5349 **Figure 1 F 1**

Particle Size Distribution Report As per ASTM D 6913



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	7.8	9.0	44.8	17.0	21.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
1/2	99.1		
3/8	98.8		
#4	92.2		
#8	85.0		
#10	83.2		
#16	75.9		
#30	51.8		
#50	28.4		
#100	22.9		
#200	21.4		

* (no specification provided)

Material Description

Orange brown in color. silty sand

Atterberg Limits

PL= NP LL= NV PI=

Coefficients

D_{90}= 3.8825 D_{85}= 2.3694 D_{60}= 0.7337
D_{50}= 0.5747 D_{30}= 0.3219 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-1-b

Remarks

Sample was collected on 02/21/25 and tested on 02/27/25. In-Situ %MC=7.7
F.M.=2.45

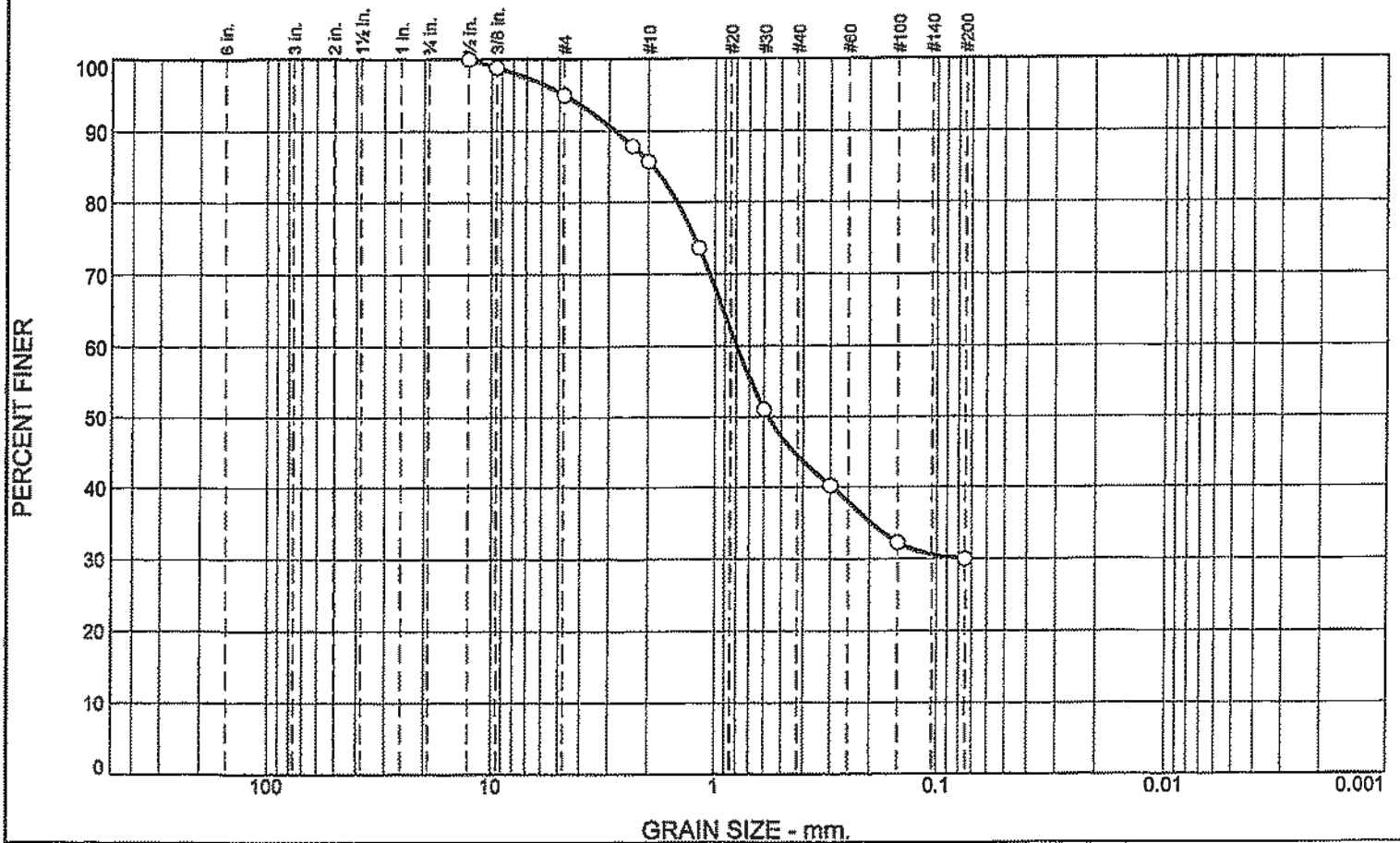
Location: B-2
Sample Number: S-2 **Depth:** 6'-8' **Date:**

ANS CONSULTANTS, INC.

South Plainfield, New Jersey

Client: B & G Engineering, LLC
Project: 601 Ernston Road, Parlin, NJ Borough of Sayreville, NJ Block # 447.06, Lot # 2102
Project No: AOT-5349 **Figure 2 F 1**

Particle Size Distribution Report As per ASTM D 6913



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	5.0	9.3	41.3	14.4	30.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2	100.0		
3/8	98.8		
#4	95.0		
#8	87.9		
#10	85.7		
#16	73.6		
#30	51.0		
#50	40.2		
#100	32.3		
#200	30.0		

* (no specification provided)

Material Description

Tan in color. silty sand

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 2.8262 D_{85}= 1.9094 D_{60}= 0.7982
D_{50}= 0.5757 D_{30}= 0.0769 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Sample was collected on 02/21/25 and tested on 02/27/25. In-Situ
%MC=10.2
F.M.=2.21

Location: B-3
Sample Number: S-3 **Depth:** 8'-10'

Date: 02/27/2025

ANS CONSULTANTS, INC.

South Plainfield, New Jersey

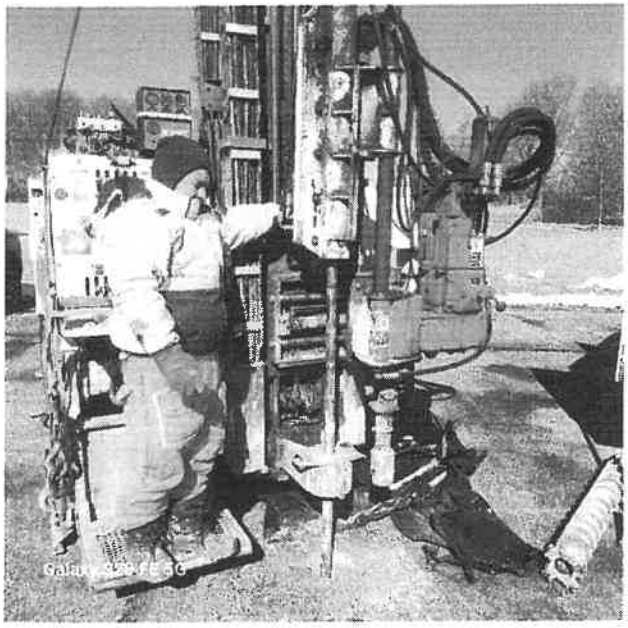
Client: B & G Engineering, LLC
Project: 601 Ernston Road, Parlin, NJ Borough of Sayreville, NJ Block # 447.06, Lot # 2102
Project No: AOT-5349 **Figure 3 F 1**

Appendix-C

CONSULTANTS, INC.
4405 South Clinton Avenue
South Plainfield, NJ 07080

Client: B & G Engineering LLC

Project: 601 Ernston Road, Parlin, NJ

	Sample procurement using split spoon samplers and augurs
	Sample recovery from split spoon samplers

CONSULTANTS, INC.
4405 South Clinton Avenue
South Plainfield, NJ 07080

Client: B & G Engineering LLC

Project: 601 Ernston Road, Parlin, NJ

Sample procurement using split spoon samplers and augurs

Sample recovery from split spoon samplers

ANS CONSULTANTS, INC.
4405 South Clinton Avenue
South Plainfield, NJ 07080

Client: B & G Engineering LLC

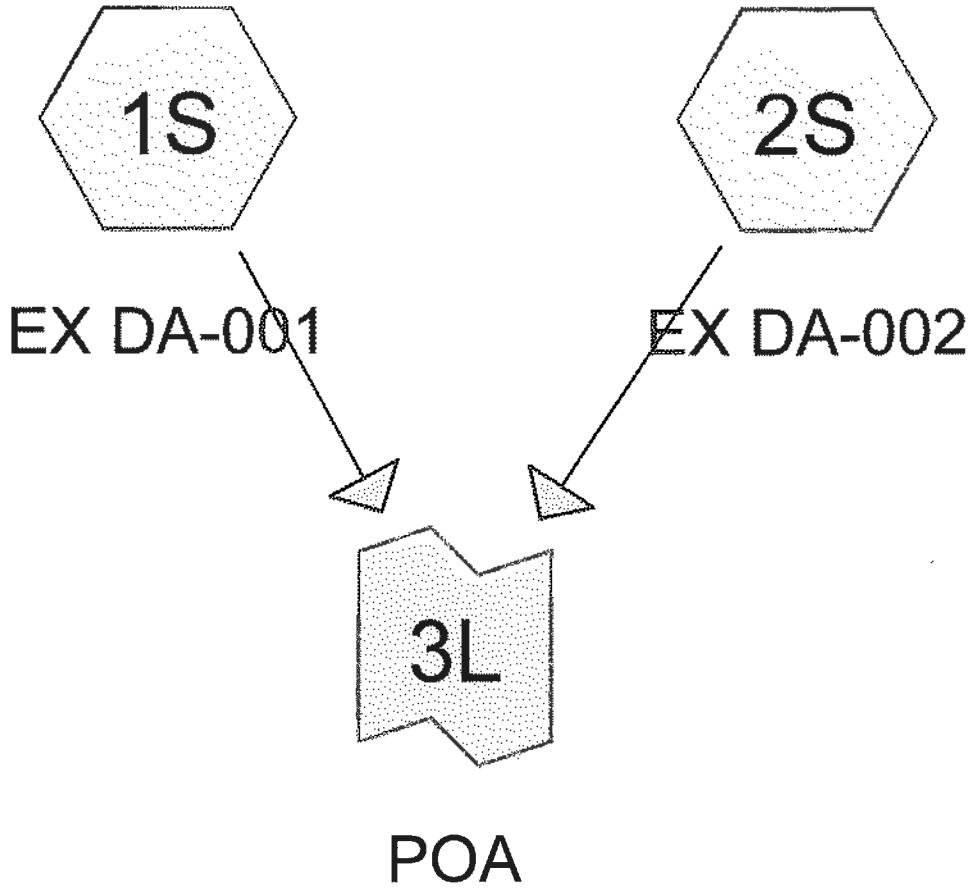
Project: 601 Ernston Road, Parlin, NJ

	Field Percolation Test

	Field Percolation Test

APPENDIX C

PRE DEVELOPMENT
RUNOFF CALCULATIONS



Subcat Reach Pond Link

Routing Diagram for Existing Conditions
Prepared by Dillis & Roy Civil Design Group, Printed 6/10/2025

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC	P2 (inches)
1	002-YEAR	NOAA 24-hr	D	Default	24.00	1	3.35	2	3.35
2	010-YEAR	NOAA 24-hr	D	Default	24.00	1	5.12	2	3.35
3	100-YEAR	NOAA 24-hr	D	Default	24.00	1	8.63	2	3.35

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.856	39	>75% Grass cover, Good, HSG A (1S, 2S)
0.928	98	Paved parking, HSG A (1S, 2S)
1.784	**70**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
1.784	HSG A	1S, 2S
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
1.784		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.856	0.000	0.000	0.000	0.000	0.856	>75% Grass cover, Good	1S, 2S
0.928	0.000	0.000	0.000	0.000	0.928	Paved parking	1S, 2S
1.784	**0.000**	**0.000**	**0.000**	**0.000**	**1.784**	**TOTAL AREA**	

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: EX DA-001 Runoff Area=29,554 sf 9.78% Impervious Runoff Depth>0.04"
Tc=6.0 min CN=45 Runoff=0.00 cfs 0.002 af

Subcatchment2S: EX DA-002 Runoff Area=48,160 sf 77.98% Impervious Runoff Depth>1.74"
Tc=0.0 min CN=85 Runoff=2.71 cfs 0.160 af

Link 3L: POA Inflow=2.71 cfs 0.162 af
Primary=2.71 cfs 0.162 af

Total Runoff Area = 1.784 ac Runoff Volume = 0.162 af Average Runoff Depth = 1.09"
47.96% Pervious = 0.856 ac 52.04% Impervious = 0.928 ac

Summary for Subcatchment 1S: EX DA-001

Runoff = 0.00 cfs @ 14.64 hrs, Volume= 0.002 af, Depth> 0.04"
Routed to Link 3L : POA

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 002-YEAR Rainfall=3.35", P2=3.35"

Area (sf)	CN	Description
26,665	39	>75% Grass cover, Good, HSG A
2,889	98	Paved parking, HSG A
29,554	45	Weighted Average
26,665		90.22% Pervious Area
2,889		9.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Summary for Subcatchment 2S: EX DA-002

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 2.71 cfs @ 12.05 hrs, Volume= 0.160 af, Depth> 1.74"
Routed to Link 3L : POA

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 002-YEAR Rainfall=3.35", P2=3.35"

Area (sf)	CN	Description
10,604	39	>75% Grass cover, Good, HSG A
37,556	98	Paved parking, HSG A
48,160	85	Weighted Average
10,604		22.02% Pervious Area
37,556		77.98% Impervious Area

Summary for Link 3L: POA

Inflow Area = 1.784 ac, 52.04% Impervious, Inflow Depth > 1.09" for 002-YEAR event
Inflow = 2.71 cfs @ 12.05 hrs, Volume= 0.162 af
Primary = 2.71 cfs @ 12.05 hrs, Volume= 0.162 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: EX DA-001 Runoff Area=29,554 sf 9.78% Impervious Runoff Depth>0.39"
Tc=6.0 min CN=45 Runoff=0.16 cfs 0.022 af

Subcatchment2S: EX DA-002 Runoff Area=48,160 sf 77.98% Impervious Runoff Depth>3.23"
Tc=0.0 min CN=85 Runoff=4.88 cfs 0.298 af

Link 3L: POA Inflow=4.88 cfs 0.320 af
Primary=4.88 cfs 0.320 af

Total Runoff Area = 1.784 ac Runoff Volume = 0.320 af Average Runoff Depth = 2.15"
47.96% Pervious = 0.856 ac 52.04% Impervious = 0.928 ac

Summary for Subcatchment 1S: EX DA-001

Runoff = 0.16 cfs @ 12.17 hrs, Volume= 0.022 af, Depth> 0.39"
Routed to Link 3L : POA

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 010-YEAR Rainfall=5.12", P2=3.35"

Area (sf)	CN	Description
26,665	39	>75% Grass cover, Good, HSG A
2,889	98	Paved parking, HSG A
29,554	45	Weighted Average
26,665		90.22% Pervious Area
2,889		9.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Summary for Subcatchment 2S: EX DA-002

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 4.88 cfs @ 12.05 hrs, Volume= 0.298 af, Depth> 3.23"
Routed to Link 3L : POA

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 010-YEAR Rainfall=5.12", P2=3.35"

Area (sf)	CN	Description
10,604	39	>75% Grass cover, Good, HSG A
37,556	98	Paved parking, HSG A
48,160	85	Weighted Average
10,604		22.02% Pervious Area
37,556		77.98% Impervious Area

Summary for Link 3L: POA

Inflow Area = 1.784 ac, 52.04% Impervious, Inflow Depth > 2.15" for 010-YEAR event
Inflow = 4.88 cfs @ 12.05 hrs, Volume= 0.320 af
Primary = 4.88 cfs @ 12.05 hrs, Volume= 0.320 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: EX DA-001 Runoff Area=29,554 sf 9.78% Impervious Runoff Depth>1.83"
Tc=6.0 min CN=45 Runoff=1.48 cfs 0.103 af

Subcatchment2S: EX DA-002 Runoff Area=48,160 sf 77.98% Impervious Runoff Depth>6.36"
Tc=0.0 min CN=85 Runoff=9.20 cfs 0.586 af

Link 3L: POA Inflow=9.99 cfs 0.689 af
Primary=9.99 cfs 0.689 af

Total Runoff Area = 1.784 ac Runoff Volume = 0.689 af Average Runoff Depth = 4.64"
47.96% Pervious = 0.856 ac 52.04% Impervious = 0.928 ac

Summary for Subcatchment 1S: EX DA-001

Runoff = 1.48 cfs @ 12.14 hrs, Volume= 0.103 af, Depth> 1.83"
Routed to Link 3L : POA

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100-YEAR Rainfall=8.63", P2=3.35"

Area (sf)	CN	Description
26,665	39	>75% Grass cover, Good, HSG A
2,889	98	Paved parking, HSG A
29,554	45	Weighted Average
26,665		90.22% Pervious Area
2,889		9.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Summary for Subcatchment 2S: EX DA-002

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 9.20 cfs @ 12.04 hrs, Volume= 0.586 af, Depth> 6.36"
Routed to Link 3L : POA

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100-YEAR Rainfall=8.63", P2=3.35"

Area (sf)	CN	Description
10,604	39	>75% Grass cover, Good, HSG A
37,556	98	Paved parking, HSG A
48,160	85	Weighted Average
10,604		22.02% Pervious Area
37,556		77.98% Impervious Area

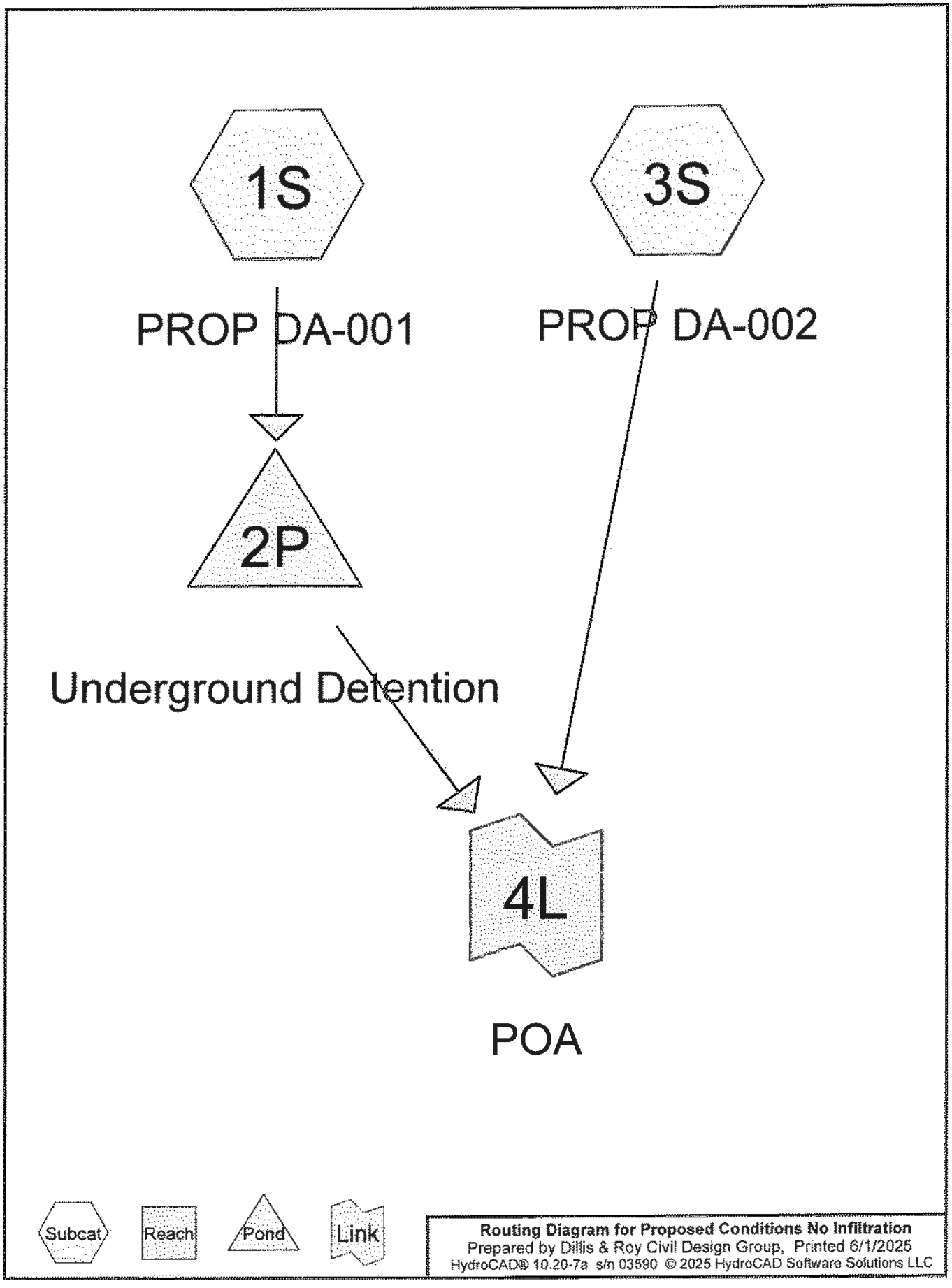
Summary for Link 3L: POA

Inflow Area = 1.784 ac, 52.04% Impervious, Inflow Depth > 4.64" for 100-YEAR event
Inflow = 9.99 cfs @ 12.05 hrs, Volume= 0.689 af
Primary = 9.99 cfs @ 12.05 hrs, Volume= 0.689 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

APPENDIX D

POST DEVELOPMENT RUNOFF & BASIN ROUTING CALCULATIONS



Routing Diagram for Proposed Conditions No Infiltration
Prepared by Dillis & Roy Civil Design Group, Printed 6/1/2025

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC	P2 (inches)
1	002-YEAR	NOAA 24-hr	D	Default	24.00	1	3.35	2	3.35
2	010-YEAR	NOAA 24-hr	D	Default	24.00	1	5.12	2	3.35

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.455	39	>75% Grass cover, Good, HSG A (1S, 3S)
1.315	98	Paved parking, HSG A (1S, 3S)
1.770	**83**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
1.770	HSG A	1S, 3S
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
1.770		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.455	0.000	0.000	0.000	0.000	0.455	>75% Grass cover, Good	1S, 3S
1.315	0.000	0.000	0.000	0.000	1.315	Paved parking	1S, 3S
1.770	**0.000**	**0.000**	**0.000**	**0.000**	**1.770**	**TOTAL AREA**	

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: PROP DA-001 Runoff Area=29,954 sf 58.44% Impervious Runoff Depth=1.08"
Tc=6.0 min CN=73 Runoff=0.85 cfs 0.062 af

Subcatchment3S: PROP DA-002 Runoff Area=47,160 sf 84.35% Impervious Runoff Depth=2.22"
Tc=6.0 min CN=89 Runoff=2.77 cfs 0.200 af

Pond 2P: Underground Detention Peak Elev=69.28' Storage=0.025 af Inflow=0.85 cfs 0.062 af
Outflow=0.09 cfs 0.062 af

Link 4L: POA Inflow=2.80 cfs 0.262 af
Primary=2.80 cfs 0.262 af

Total Runoff Area = 1.770 ac Runoff Volume = 0.262 af Average Runoff Depth = 1.78"
25.72% Pervious = 0.455 ac 74.28% Impervious = 1.315 ac

Summary for Subcatchment 1S: PROP DA-001

Runoff = 0.85 cfs @ 12.14 hrs, Volume= 0.062 af, Depth= 1.08"
Routed to Pond 2P : Underground Detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 002-YEAR Rainfall=3.35", P2=3.35"

Area (sf)	CN	Description
12,450	39	>75% Grass cover, Good, HSG A
17,504	98	Paved parking, HSG A
29,954	73	Weighted Average
12,450		41.56% Pervious Area
17,504		58.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Summary for Subcatchment 3S: PROP DA-002

Runoff = 2.77 cfs @ 12.13 hrs, Volume= 0.200 af, Depth= 2.22"
Routed to Link 4L : POA

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 002-YEAR Rainfall=3.35", P2=3.35"

Area (sf)	CN	Description
7,380	39	>75% Grass cover, Good, HSG A
39,780	98	Paved parking, HSG A
47,160	89	Weighted Average
7,380		15.65% Pervious Area
39,780		84.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Summary for Pond 2P: Underground Detention

Inflow Area = 0.688 ac, 58.44% Impervious, Inflow Depth = 1.08" for 002-YEAR event
Inflow = 0.85 cfs @ 12.14 hrs, Volume= 0.062 af
Outflow = 0.09 cfs @ 13.33 hrs, Volume= 0.062 af, Atten= 89%, Lag= 71.9 min
Primary = 0.09 cfs @ 13.33 hrs, Volume= 0.062 af
Routed to Link 4L : POA

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Peak Elev= 69.28' @ 13.33 hrs Surf.Area= 0.108 ac Storage= 0.025 af

Plug-Flow detention time= 273.0 min calculated for 0.062 af (99% of inflow)
Center-of-Mass det. time= 270.4 min (1,145.9 - 875.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	69.00'	0.073 af	**49.00'W x 95.68'L x 3.00'H Field A** 0.323 af Overall - 0.139 af Embedded = 0.184 af x 40.0% Voids
#2A	69.00'	0.139 af	**Cultec R-300HD** x 130 Inside #1 Effective Size= 45.6"W x 30.0"H => 6.53 sf x 7.08'L = 46.2 cf Overall Size= 51.0"W x 30.0"H x 7.54'L with 0.46' Overlap 130 Chambers in 10 Rows Cap Storage= 2.7 cf x 2 x 10 rows = 53.1 cf
		0.213 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	69.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	69.30'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	70.00'	**48.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.09 cfs @ 13.33 hrs HW=69.28' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.09 cfs @ 1.89 fps)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Link 4L: POA

Inflow Area = 1.770 ac, 74.28% Impervious, Inflow Depth = 1.77" for 002-YEAR event
Inflow = 2.80 cfs @ 12.13 hrs, Volume= 0.262 af
Primary = 2.80 cfs @ 12.13 hrs, Volume= 0.262 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: PROP DA-001 Runoff Area=29,954 sf 58.44% Impervious Runoff Depth=2.37"
Tc=6.0 min CN=73 Runoff=1.93 cfs 0.136 af

Subcatchment3S: PROP DA-002 Runoff Area=47,160 sf 84.35% Impervious Runoff Depth=3.89"
Tc=6.0 min CN=89 Runoff=4.71 cfs 0.351 af

Pond 2P: Underground Detention Peak Elev=69.58' Storage=0.052 af Inflow=1.93 cfs 0.136 af
Outflow=0.37 cfs 0.136 af

Link 4L: POA Inflow=4.86 cfs 0.486 af
Primary=4.86 cfs 0.486 af

Total Runoff Area = 1.770 ac Runoff Volume = 0.487 af Average Runoff Depth = 3.30"
25.72% Pervious = 0.455 ac 74.28% Impervious = 1.315 ac

Summary for Subcatchment 1S: PROP DA-001

Runoff = 1.93 cfs @ 12.13 hrs, Volume= 0.136 af, Depth= 2.37"
Routed to Pond 2P : Underground Detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 010-YEAR Rainfall=5.12", P2=3.35"

Area (sf)	CN	Description
12,450	39	>75% Grass cover, Good, HSG A
17,504	98	Paved parking, HSG A
29,954	73	Weighted Average
12,450		41.56% Pervious Area
17,504		58.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Summary for Subcatchment 3S: PROP DA-002

Runoff = 4.71 cfs @ 12.13 hrs, Volume= 0.351 af, Depth= 3.89"
Routed to Link 4L : POA

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 010-YEAR Rainfall=5.12", P2=3.35"

Area (sf)	CN	Description
7,380	39	>75% Grass cover, Good, HSG A
39,780	98	Paved parking, HSG A
47,160	89	Weighted Average
7,380		15.65% Pervious Area
39,780		84.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Summary for Pond 2P: Underground Detention

Inflow Area = 0.688 ac, 58.44% Impervious, Inflow Depth = 2.37" for 010-YEAR event
Inflow = 1.93 cfs @ 12.13 hrs, Volume= 0.136 af
Outflow = 0.37 cfs @ 12.59 hrs, Volume= 0.136 af, Atten= 81%, Lag= 27.7 min
Primary = 0.37 cfs @ 12.59 hrs, Volume= 0.136 af
Routed to Link 4L : POA

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Peak Elev= 69.58' @ 12.59 hrs Surf.Area= 0.108 ac Storage= 0.052 af

Plug-Flow detention time= 194.9 min calculated for 0.136 af (100% of inflow)
Center-of-Mass det. time= 193.7 min (1,043.3 - 849.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	69.00'	0.073 af	**49.00'W x 95.68'L x 3.00'H Field A** 0.323 af Overall - 0.139 af Embedded = 0.184 af x 40.0% Voids
#2A	69.00'	0.139 af	**Cultec R-300HD** x 130 Inside #1 Effective Size= 45.6"W x 30.0"H => 6.53 sf x 7.08'L = 46.2 cf Overall Size= 51.0"W x 30.0"H x 7.54'L with 0.46' Overlap 130 Chambers in 10 Rows Cap Storage= 2.7 cf x 2 x 10 rows = 53.1 cf
		0.213 af	Total Available Storage

Storage Group A created with Chamber Wizard

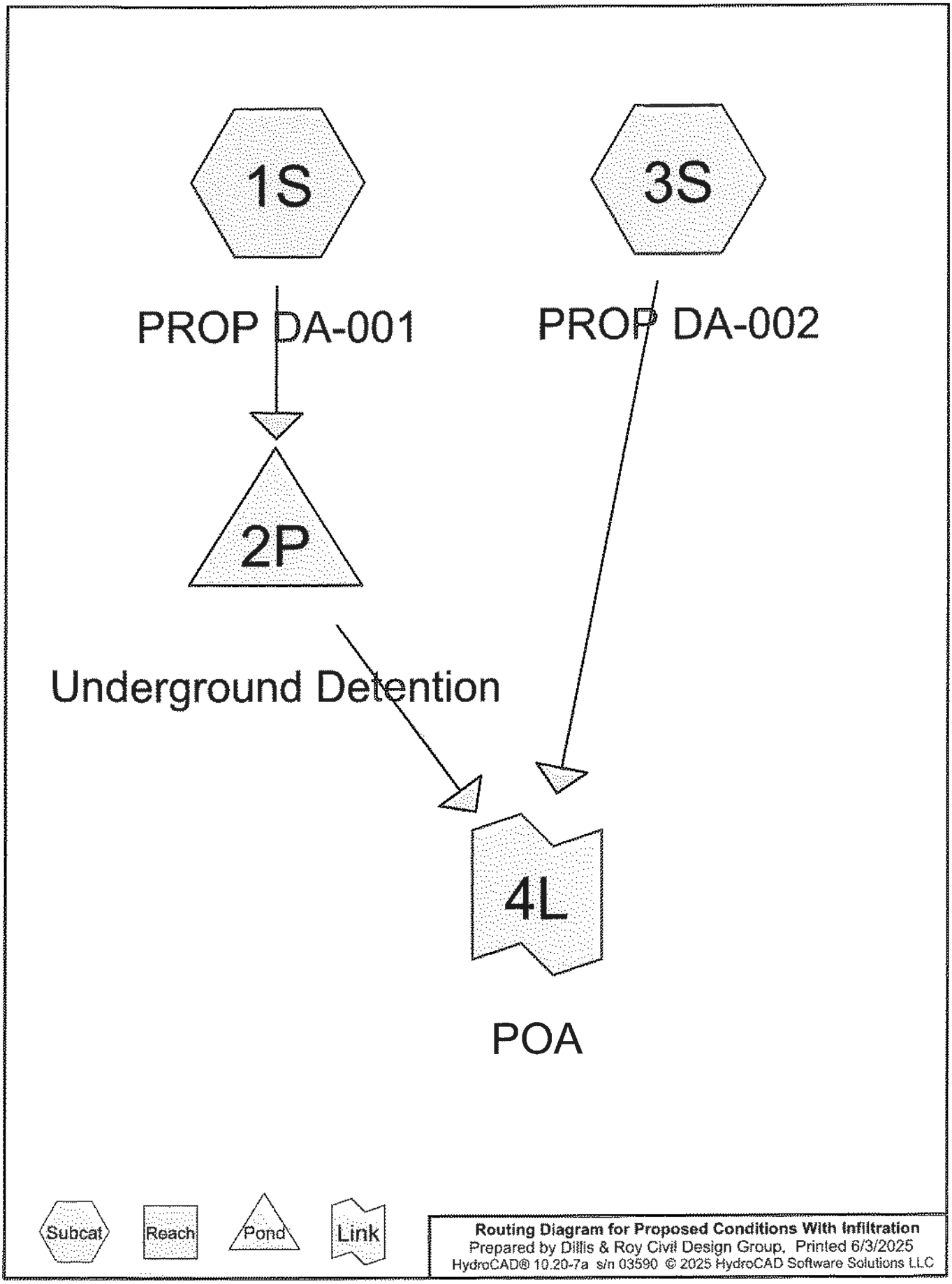
Device	Routing	Invert	Outlet Devices
#1	Primary	69.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	69.30'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	70.00'	**48.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.37 cfs @ 12.59 hrs HW=69.58' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.16 cfs @ 3.25 fps)
- **2=Orifice/Grate** (Orifice Controls 0.21 cfs @ 1.81 fps)
- **3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Link 4L: POA

Inflow Area = 1.770 ac, 74.28% Impervious, Inflow Depth = 3.30" for 010-YEAR event
Inflow = 4.86 cfs @ 12.13 hrs, Volume= 0.486 af
Primary = 4.86 cfs @ 12.13 hrs, Volume= 0.486 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs



Routing Diagram for Proposed Conditions With Infiltration
Prepared by Dillis & Roy Civil Design Group, Printed 6/3/2025

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC	P2 (inches)
1	002-YEAR	NOAA 24-hr	D	Default	24.00	1	3.35	2	3.35
2	010-YEAR	NOAA 24-hr	D	Default	24.00	1	5.12	2	3.35
3	100-YEAR	NOAA 24-hr	D	Default	24.00	1	8.63	2	3.35

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.455	39	>75% Grass cover, Good, HSG A (1S, 3S)
1.315	98	Paved parking, HSG A (1S, 3S)
1.770	**83**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
1.770	HSG A	1S, 3S
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
1.770		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.455	0.000	0.000	0.000	0.000	0.455	>75% Grass cover, Good	1S, 3S
1.315	0.000	0.000	0.000	0.000	1.315	Paved parking	1S, 3S
1.770	**0.000**	**0.000**	**0.000**	**0.000**	**1.770**	**TOTAL AREA**	

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: PROP DA-001 Runoff Area=29,954 sf 58.44% Impervious Runoff Depth=1.08"
Tc=6.0 min CN=73 Runoff=0.85 cfs 0.062 af

Subcatchment3S: PROP DA-002 Runoff Area=47,160 sf 84.35% Impervious Runoff Depth=2.22"
Tc=6.0 min CN=89 Runoff=2.77 cfs 0.200 af

Pond 2P: Underground Detention Peak Elev=68.61' Storage=0.005 af Inflow=0.85 cfs 0.062 af
Discarded=0.45 cfs 0.062 af Primary=0.00 cfs 0.000 af Outflow=0.45 cfs 0.062 af

Link 4L: POA Inflow=2.77 cfs 0.200 af
Primary=2.77 cfs 0.200 af

Total Runoff Area = 1.770 ac Runoff Volume = 0.262 af Average Runoff Depth = 1.78"
25.72% Pervious = 0.455 ac 74.28% Impervious = 1.315 ac

Summary for Subcatchment 1S: PROP DA-001

Runoff = 0.85 cfs @ 12.14 hrs, Volume= 0.062 af, Depth= 1.08"
Routed to Pond 2P : Underground Detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 002-YEAR Rainfall=3.35", P2=3.35"

Area (sf)	CN	Description
12,450	39	>75% Grass cover, Good, HSG A
17,504	98	Paved parking, HSG A
29,954	73	Weighted Average
12,450		41.56% Pervious Area
17,504		58.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Summary for Subcatchment 3S: PROP DA-002

Runoff = 2.77 cfs @ 12.13 hrs, Volume= 0.200 af, Depth= 2.22"
Routed to Link 4L : POA

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 002-YEAR Rainfall=3.35", P2=3.35"

Area (sf)	CN	Description
7,380	39	>75% Grass cover, Good, HSG A
39,780	98	Paved parking, HSG A
47,160	89	Weighted Average
7,380		15.65% Pervious Area
39,780		84.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Summary for Pond 2P: Underground Detention

Inflow Area = 0.688 ac, 58.44% Impervious, Inflow Depth = 1.08" for 002-YEAR event
Inflow = 0.85 cfs @ 12.14 hrs, Volume= 0.062 af
Outflow = 0.45 cfs @ 12.08 hrs, Volume= 0.062 af, Atten= 47%, Lag= 0.0 min
Discarded = 0.45 cfs @ 12.08 hrs, Volume= 0.062 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link 4L : POA

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Peak Elev= 68.61' @ 12.24 hrs Surf.Area= 0.108 ac Storage= 0.005 af

Plug-Flow detention time= 3.3 min calculated for 0.062 af (100% of inflow)
Center-of-Mass det. time= 3.3 min (878.8 - 875.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	68.50'	0.095 af	**49.00'W x 95.68'L x 3.50'H Field A** 0.377 af Overall - 0.139 af Embedded = 0.237 af x 40.0% Voids
#2A	69.00'	0.139 af	**Cultec R-300HD** x 130 Inside #1 Effective Size= 45.6"W x 30.0"H => 6.53 sf x 7.08'L = 46.2 cf Overall Size= 51.0"W x 30.0"H x 7.54'L with 0.46' Overlap 130 Chambers in 10 Rows Cap Storage= 2.7 cf x 2 x 10 rows = 53.1 cf
		0.234 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	68.50'	**4.130 in/hr Exfiltration over Surface area**
#2	Primary	69.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	69.30'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	70.00'	**48.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.45 cfs @ 12.08 hrs HW=68.54' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.45 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=68.50' (Free Discharge)
├**2=Orifice/Grate** (Controls 0.00 cfs)
├**3=Orifice/Grate** (Controls 0.00 cfs)
└**4=Orifice/Grate** (Controls 0.00 cfs)

Summary for Link 4L: POA

Inflow Area = 1.770 ac, 74.28% Impervious, Inflow Depth = 1.36" for 002-YEAR event
Inflow = 2.77 cfs @ 12.13 hrs, Volume= 0.200 af
Primary = 2.77 cfs @ 12.13 hrs, Volume= 0.200 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: PROP DA-001 Runoff Area=29,954 sf 58.44% Impervious Runoff Depth=2.37"
Tc=6.0 min CN=73 Runoff=1.93 cfs 0.136 af

Subcatchment3S: PROP DA-002 Runoff Area=47,160 sf 84.35% Impervious Runoff Depth=3.89"
Tc=6.0 min CN=89 Runoff=4.71 cfs 0.351 af

Pond 2P: Underground Detention Peak Elev=69.05' Storage=0.026 af Inflow=1.93 cfs 0.136 af
Discarded=0.45 cfs 0.136 af Primary=0.01 cfs 0.000 af Outflow=0.45 cfs 0.136 af

Link 4L: POA Inflow=4.71 cfs 0.351 af
Primary=4.71 cfs 0.351 af

Total Runoff Area = 1.770 ac Runoff Volume = 0.487 af Average Runoff Depth = 3.30"
25.72% Pervious = 0.455 ac 74.28% Impervious = 1.315 ac

Summary for Subcatchment 1S: PROP DA-001

Runoff = 1.93 cfs @ 12.13 hrs, Volume= 0.136 af, Depth= 2.37"
Routed to Pond 2P : Underground Detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 010-YEAR Rainfall=5.12", P2=3.35"

Area (sf)	CN	Description
12,450	39	>75% Grass cover, Good, HSG A
17,504	98	Paved parking, HSG A
29,954	73	Weighted Average
12,450		41.56% Pervious Area
17,504		58.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Summary for Subcatchment 3S: PROP DA-002

Runoff = 4.71 cfs @ 12.13 hrs, Volume= 0.351 af, Depth= 3.89"
Routed to Link 4L : POA

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 010-YEAR Rainfall=5.12", P2=3.35"

Area (sf)	CN	Description
7,380	39	>75% Grass cover, Good, HSG A
39,780	98	Paved parking, HSG A
47,160	89	Weighted Average
7,380		15.65% Pervious Area
39,780		84.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Summary for Pond 2P: Underground Detention

Inflow Area = 0.688 ac, 58.44% Impervious, Inflow Depth = 2.37" for 010-YEAR event
Inflow = 1.93 cfs @ 12.13 hrs, Volume= 0.136 af
Outflow = 0.45 cfs @ 12.46 hrs, Volume= 0.136 af, Atten= 76%, Lag= 19.8 min
Discarded = 0.45 cfs @ 11.91 hrs, Volume= 0.136 af
Primary = 0.01 cfs @ 12.46 hrs, Volume= 0.000 af
Routed to Link 4L : POA

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Peak Elev= 69.05' @ 12.46 hrs Surf.Area= 0.108 ac Storage= 0.026 af

Plug-Flow detention time= 14.8 min calculated for 0.136 af (100% of inflow)
Center-of-Mass det. time= 14.8 min (864.4 - 849.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	68.50'	0.095 af	**49.00'W x 95.68'L x 3.50'H Field A** 0.377 af Overall - 0.139 af Embedded = 0.237 af x 40.0% Voids
#2A	69.00'	0.139 af	**Cultec R-300HD** x 130 Inside #1 Effective Size= 45.6"W x 30.0"H => 6.53 sf x 7.08'L = 46.2 cf Overall Size= 51.0"W x 30.0"H x 7.54'L with 0.46' Overlap 130 Chambers in 10 Rows Cap Storage= 2.7 cf x 2 x 10 rows = 53.1 cf
		0.234 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	68.50'	**4.130 in/hr Exfiltration over Surface area**
#2	Primary	69.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	69.30'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	70.00'	**48.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.45 cfs @ 11.91 hrs HW=68.54' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.45 cfs)

Primary OutFlow Max=0.00 cfs @ 12.46 hrs HW=69.05' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.00 cfs @ 0.73 fps)
—**3=Orifice/Grate** (Controls 0.00 cfs)
—**4=Orifice/Grate** (Controls 0.00 cfs)

Summary for Link 4L: POA

Inflow Area = 1.770 ac, 74.28% Impervious, Inflow Depth = 2.38" for 010-YEAR event
Inflow = 4.71 cfs @ 12.13 hrs, Volume= 0.351 af
Primary = 4.71 cfs @ 12.13 hrs, Volume= 0.351 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: PROP DA-001 Runoff Area=29,954 sf 58.44% Impervious Runoff Depth=5.37"
Tc=6.0 min CN=73 Runoff=4.30 cfs 0.308 af

Subcatchment3S: PROP DA-002 Runoff Area=47,160 sf 84.35% Impervious Runoff Depth=7.31"
Tc=6.0 min CN=89 Runoff=8.51 cfs 0.659 af

Pond 2P: Underground Detention Peak Elev=69.66' Storage=0.081 af Inflow=4.30 cfs 0.308 af
Discarded=0.45 cfs 0.260 af Primary=0.48 cfs 0.048 af Outflow=0.93 cfs 0.308 af

Link 4L: POA Inflow=8.61 cfs 0.707 af
Primary=8.61 cfs 0.707 af

Total Runoff Area = 1.770 ac Runoff Volume = 0.967 af Average Runoff Depth = 6.55"
25.72% Pervious = 0.455 ac 74.28% Impervious = 1.315 ac

Summary for Subcatchment 1S: PROP DA-001

Runoff = 4.30 cfs @ 12.13 hrs, Volume= 0.308 af, Depth= 5.37"
Routed to Pond 2P : Underground Detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-YEAR Rainfall=8.63", P2=3.35"

Area (sf)	CN	Description
12,450	39	>75% Grass cover, Good, HSG A
17,504	98	Paved parking, HSG A
29,954	73	Weighted Average
12,450		41.56% Pervious Area
17,504		58.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Summary for Subcatchment 3S: PROP DA-002

Runoff = 8.51 cfs @ 12.13 hrs, Volume= 0.659 af, Depth= 7.31"
Routed to Link 4L : POA

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-YEAR Rainfall=8.63", P2=3.35"

Area (sf)	CN	Description
7,380	39	>75% Grass cover, Good, HSG A
39,780	98	Paved parking, HSG A
47,160	89	Weighted Average
7,380		15.65% Pervious Area
39,780		84.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct**

Summary for Pond 2P: Underground Detention

Inflow Area = 0.688 ac, 58.44% Impervious, Inflow Depth = 5.37" for 100-YEAR event
Inflow = 4.30 cfs @ 12.13 hrs, Volume= 0.308 af
Outflow = 0.93 cfs @ 12.48 hrs, Volume= 0.308 af, Atten= 78%, Lag= 20.9 min
Discarded = 0.45 cfs @ 11.56 hrs, Volume= 0.260 af
Primary = 0.48 cfs @ 12.48 hrs, Volume= 0.048 af
Routed to Link 4L : POA

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Peak Elev= 69.66' @ 12.48 hrs Surf.Area= 0.108 ac Storage= 0.081 af

Plug-Flow detention time= 35.9 min calculated for 0.308 af (100% of inflow)
Center-of-Mass det. time= 35.9 min (859.5 - 823.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	68.50'	0.095 af	**49.00'W x 95.68'L x 3.50'H Field A** 0.377 af Overall - 0.139 af Embedded = 0.237 af x 40.0% Voids
#2A	69.00'	0.139 af	**Cultec R-300HD** x 130 Inside #1 Effective Size= 45.6"W x 30.0"H => 6.53 sf x 7.08'L = 46.2 cf Overall Size= 51.0"W x 30.0"H x 7.54'L with 0.46' Overlap 130 Chambers in 10 Rows Cap Storage= 2.7 cf x 2 x 10 rows = 53.1 cf
		0.234 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	68.50'	**4.130 in/hr Exfiltration over Surface area**
#2	Primary	69.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	69.30'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	70.00'	**48.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.45 cfs @ 11.56 hrs HW=68.54' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.45 cfs)

Primary OutFlow Max=0.48 cfs @ 12.48 hrs HW=69.66' (Free Discharge)
├─**2=Orifice/Grate** (Orifice Controls 0.17 cfs @ 3.52 fps)
├─**3=Orifice/Grate** (Orifice Controls 0.31 cfs @ 2.04 fps)
└─**4=Orifice/Grate** (Controls 0.00 cfs)

Summary for Link 4L: POA

Inflow Area = 1.770 ac, 74.28% Impervious, Inflow Depth = 4.80" for 100-YEAR event
Inflow = 8.61 cfs @ 12.13 hrs, Volume= 0.707 af
Primary = 8.61 cfs @ 12.13 hrs, Volume= 0.707 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

APPENDIX E

BASIN SUMMARY FORM
NJDEP IDF CURVES
ON-SITE STORM SEWER COMPUTATIONS

New Jersey Department of Agriculture

Hydrologic Modeling Database – Data Entry Form

Project Site Details

Chpt. 251 Application Number:

Start Date (if known): 06/2025

Street Address: 601 Ernston Road

County: Middlesex

Municipality: . Borough of Sayreville

Block: 447.06

Lot: 2102

NJDEP Anderson Landuse Code (4 digits): 1207

Landuse description: School facility with parking and playgrounds

Site Centroid Location (NJ State Plane Feet): [1]

Northing: 592,531 Easting: 552,547

Project Contact Details

Applicant: Sayreville Board of Education

Address: 150 lincoln Street, South Amboy, NJ 08879

Phone: 732 525 5200 ext 5205

Email: erin.hill@sayrevillek12.net

Post Construction Operation & Maintenance:[2]

Party Name: Sayreville Board of Education

Address: 150 lincoln Street, South Amboy, NJ 08879

Phone: 732 525 5200, ext 5205

Email: erin.hill@sayrevillek12.net

Party type: School Business Administrator

New Jersey Department of Agriculture

Hydrologic Modeling Database – Data Entry Form

Basin Details:[3]

Basin Centroid (NJ State Plane Feet):[4]

Northing: 552299.31257 Easting: 592344.65407

Basin Type: SUBSURFACE

Construction:

Status phase:[5] Design ☑ As-built ☐

Dam Height (ft) top width (ft)

Dam Classification:

Drainage Area(s) to Basin [note- include any bypass areas][6]

Drainage Area Name	Drainage Area (acres)	Post-Development CN#	Percent Impervious	Time of Concentration (min)
PROP DA 001	0.665	73	57%	6.0

Basin Outlet Structure(s)[7]

ID: UNDERGROUND DETENTION

End of Pipe Location:[8] Northing: Easting:

Discharge Type[9] (weir, orifice, etc)	Dimensions (diameter, length)	Elevation (USGS)	Discharge [10]Coefficient	Equation Used[11]
Orifice	3.0	69.00	0.6	V= C(2gh)^0.5 Q=VA
Orifice	6.0	69.30	0.6	V= C(2gh)^0.5 Q=VA
Orifice	6" x 48"	70.00	0.6	Q= 2/3 CL * (2g)^0.5

New Jersey Department of Agriculture

Hydrologic Modeling Database – Data Entry Form

Basin Outlet Structure(s)

ID.

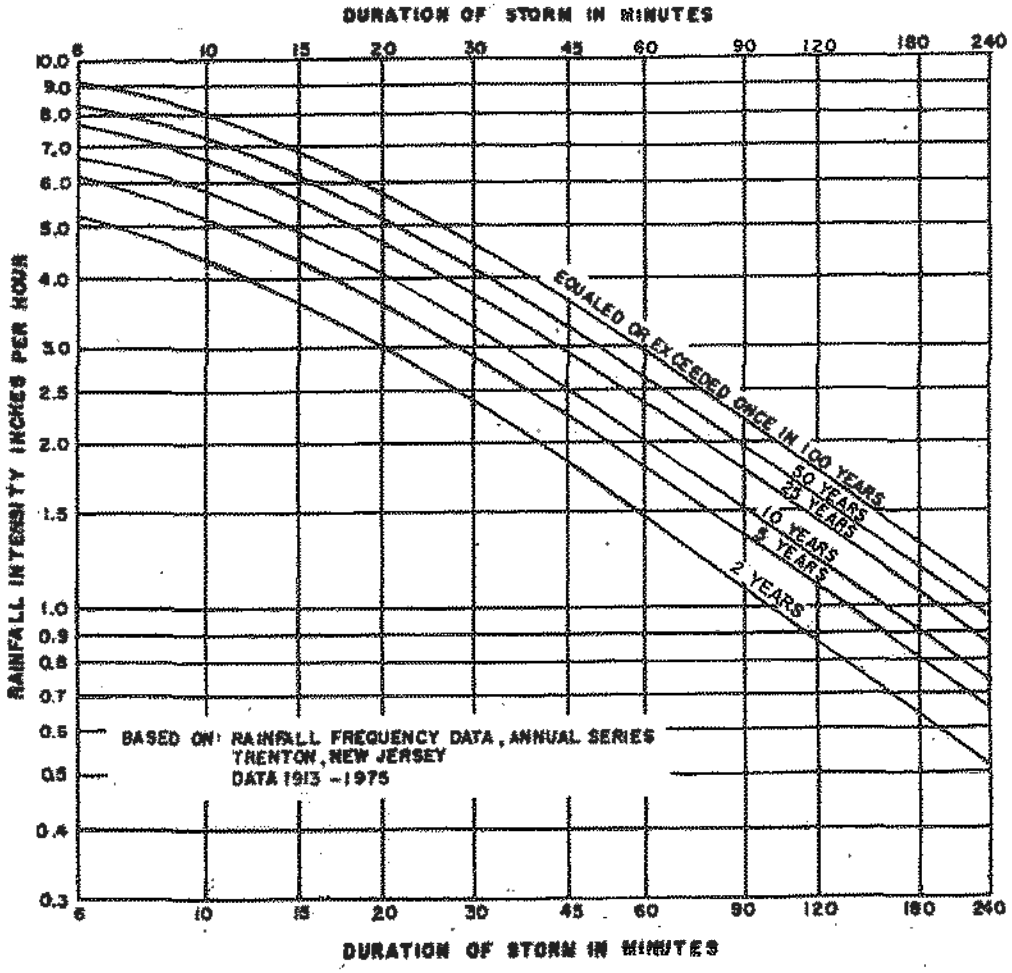
End of Pipe Location: Northing: Easting:

Discharge Type (weir, orifice, etc)	Dimensions (diameter, length)	Elevation (USGS)	Discharge Coefficient	Equation Used

Basin Stage-Discharge Rating Table[12]

Elevation (USGS Feet)	Storage (Acre-Ft)	Total Outlet Structure Discharge (cfs)
68.50	0.000	0.000
69.00	0.022	0.000
70.00	0.110	0.86
71.00	0.186	9.76
72.00	0.234	14.61

FIGURE 7.2 RAINFALL INTENSITY CURVES



Note: Adapted from Figure 2.1-2 in the NJDEP *Technical Manual for Stream Encroachment Permits.*

PARKING LOT EXPANSION AT EISENHOWE PROJECT NAME: | COMPUTED BY: BP

BOROUGH SAYREVILLE COUNTY: PASSAIC | CHECKED BY: BP

25 YR STORM SEWER SYSTEM COMPUTATIONS DATE: MAY 2025

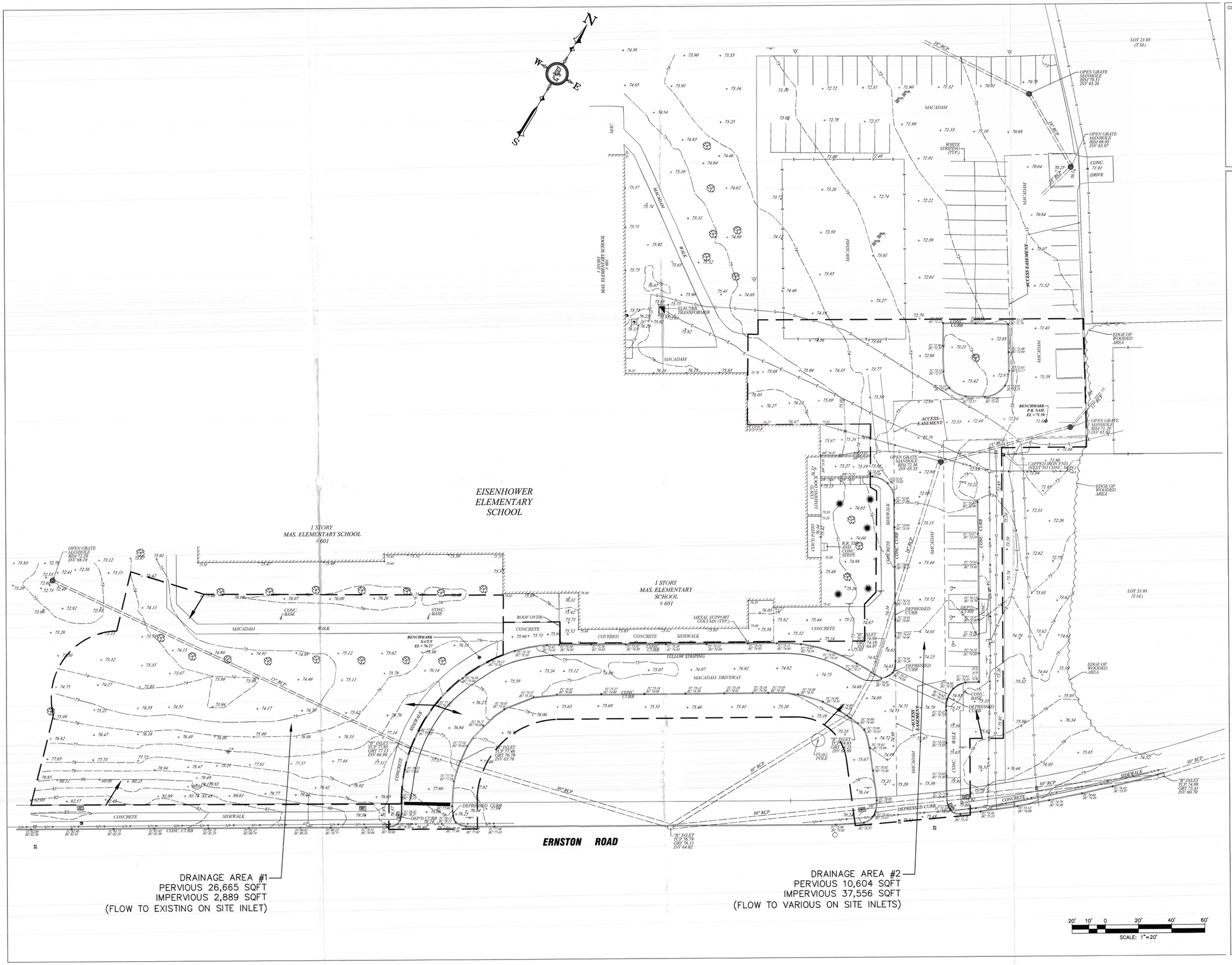
LOCATION							TIME OF CONCEN.			Q (CFS)		DESIGN							PROFILE		
FROM	TO	STRUCT TYPE	AREA (Ac.)	RUNOFF "C" FACTOR	CXA INCR	CXA ACCUM	TIME OF CONC. (MIN)	STORM FREQ. (YRS)	INTEN. "I" (IN/HR)	"Q" INCREM. (CFS)	"Q" TOTAL (CFS)	PIPE SIZE (INCH)	PIPE SLOPE (FT/FT)	MANN. "n"	"Q" FULL (CFS)	"Q" VAR. (CFS)	VEL. FULL Q (FPS)	PIPE LENGTH (FEET)	UPPER INVERT (FEET)	LOWER INVERT (FEET)	TOP ELEV (FEET)
DRAINAGE SYSTEM TO DETENTION BASIN NO 1																					
# B-1		B	0.34	0.57	0.194		10	25	6.80	1.32				0.013					69.68		73.40
	# B-2					0.194					**1.32**	15	0.0100		**6.48**	**5.16**	5.28	24		69.44	
# B-2		B	0.30	0.72	0.216		10	25	6.80	1.47				0.013					69.44		74.31
	MH # 4					0.410					**2.79**	15	0.0267		**10.58**	**7.79**	8.62	9		69.20	
MH # 4		B	0.00	0.00	0.000		10	25	6.80	0.00				0.013					69.20		64.50
	BASIN # 1					0.410					**2.79**	15	0.0050		**4.58**	**1.79**	3.73	40		69.00	
OS# 1			0.00	0.00	0.000		10	25	6.80	0.00				0.013					69.00		76.13
	MH # 3	B				0.000					**4.32**	15	0.0200		**9.16**	**4.84**	7.46	9		68.82	
# B-3			0.28	0.64	0.179		10	25	6.80	1.22				0.013					70.45		74.45
	MH # 5					0.179					**1.22**	15	0.0100		**6.48**	**5.26**	5.28	**54**		69.91	

THE ENTIRE 25 YR RUNOFF WILL INFILTRATE THE UNDERLYING SOIL AT THE DETENTION BASIN
ASSUMING SYSTEM FAILURE A 100YR OUTLFOW OF 4.32 CFS WILL LEAVE BASIN

PROJECT NAME:			PARKING LOT EXPANSION AT EISENHOWER ELEMENTARY SCHOOL																	COMPUTED BY:	BP	
BOROUGH			SAYREVILLE					COUNTY:		PASSAIC										CHECKED BY:	BP	
			100 YR STORM SEWER SYSTEM COMPUTATIONS														DATE: MAY 2025					
							TIME OF CONCEN.		Q (CFS)		DESIGN							PROFILE				
LOCATION		STRUCT TYPE	AREA (Ac.)	RUNOFF "C" FACTOR	CXA INCR	CXA ACCUM	TIME OF CONC. (MIN)	STORM FREQ (YRS)	INTEN. "I" (IN/HR)	"Q" INCREM. (CFS)	"Q" TOTAL (CFS)	PIPE SIZE (INCH)	PIPE SLOPE (FT/FT)	MANN. "n"	"Q" FULL (CFS)	"Q" VAR. (CFS)	VEL. FULL Q (FPS)	PIPE LENGTH (FEET)	UPPER INVERT (FEET)	LOWER INVERT (FEET)	TOP ELEV (FEET)
FROM	TO																					
DRAINAGE SYSTEM TO DETENTION BASIN NO 1																						
# B-1		B	0.34	0.57	0.194		10	25	8.00	1.55				0.013					69.68		73.40
	# B-2					0.194					**1.55**	15	0.0100		**6.48**	**4.93**	5.28	24		69.44	
# B-2		B	0.30	0.72	0.216		10	25	8.00	1.73				0.013					69.44		74.31
	MH # 4					0.410					**3.28**	15	0.0267		**10.58**	**7.30**	8.62	9		69.20	
MH # 4		B	0.00	0.00	0.000		10	25	8.00	0.00				0.013					69.20		64.59
	BASIN # 1					0.410					**3.28**	15	0.0050		**4.58**	**1.30**	3.73	40		69.00	
OS# 1			0.00	0.00	0.000		10	25	8.00	0.00				0.013					69.00		76.13
	MH # 3	B				0.000					**4.32**	15	0.0200		**9.16**	**4.84**	7.46	9		68.82	
# B-3			0.28	0.64	0.179		10	25	8.00	1.43				0.013					70.45		74.45
	MH # 5					0.179					**1.43**	15	0.0100		**6.48**	**5.04**	5.28	54		69.91	

APPENDIX F

STORM SEWER DRAINAGE AREA MAP
PRE & POST DEVELOPMENT DRAINAGE AREA MAPS



CODE REVIEW:

CERTIFICATE:

spiezle

SPIEZLE ARCHITECTURAL GROUP INC.
1395 YARDVILLE HAMILTON SQUARE ROAD
SUITE 2A
HAMILTON, NJ 08691
PHONE: 609-695-7400

SIGNATURE:

THOMAS E. PERRINO	21AB01554400
SCOTT J. DOWNIE	21AB01674400
STEVEN D. LEE	21AB01170100
STEVEN G. DIEGEL	21AB01584200
ANGELO ALBERTO	21AB01566700
JOHN F. WRIGHT	21AB01784200
SPIEZLE ARCHITECTURAL GROUP, INC.	21AC00653600

SEAL:

CONSULTANTS:

B&G Engineering LLC
State of N.J. Certificate of Authorization: 24GA28160000
30 BERNARD DRIVE
EWING, N.J. 08628
Phone (732) 598-6618
Fax (609) 671-0715
BESRICK G. PLUMMER
PROFESSIONAL ENGINEER
NEW JERSEY LIC. NO. 39534

ISSUED FOR BID 05/12/2025

PROJECT:

PARKING LOT EXPANSION AT EISENHOWER ELEMENTARY SCHOOL

601 ERNSTON ROAD, PARLIN, NJ 08859
LOT 2102, BLOCK 447.06
BOROUGH OF SAYREVILLE,
MIDDLESEX COUNTY, NJ

FOR

SAYREVILLE PUBLIC SCHOOLS
298 ERNSTON ROAD, PARLIN, NJ 08859

FOR CODE REVIEW:

REVISIONS:

	REVISION NAME	DATE

FOR BID: MAY 12, 2025

DRAWING TITLE:

PREDEVELOPMENT DRAINAGE AREA MAP

DATE: APRIL 30, 2025

COMMISSION NUMBER:

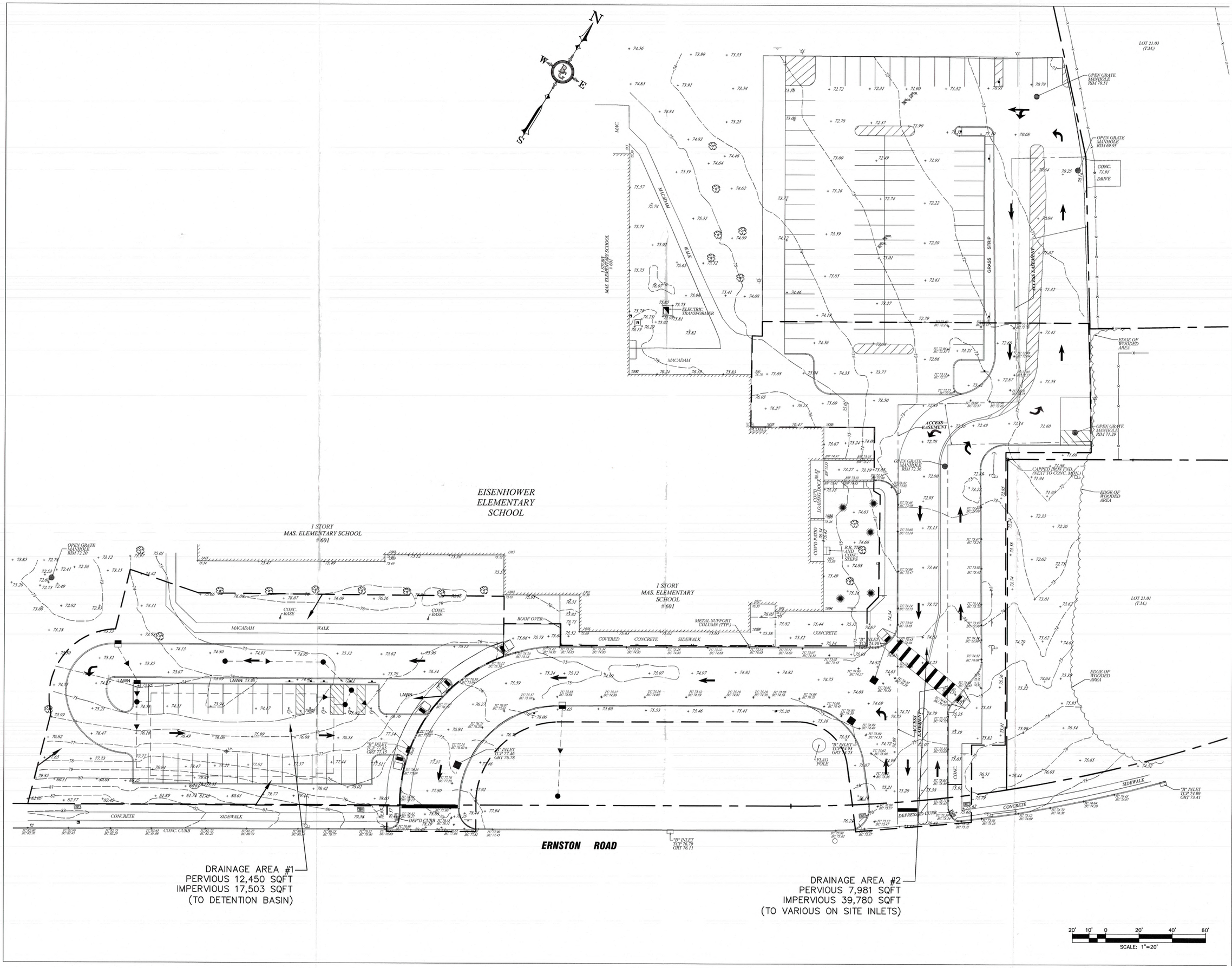
25K011

B&G PROJECT NO.: 2401A

DRAWING NUMBER:

DA-1

THIS DRAWING IS FORMATTED TO BE PRINTED AT 30"x42"



CODE REVIEW:

CERTIFICATE:

spiezle

SPIEZLE ARCHITECTURAL GROUP INC.
1395 YARDVILLE HAMILTON SQUARE ROAD
SUITE 2A
HAMILTON, NJ 08691
PHONE: 609-695-7400

SIGNATURE:

THOMAS S. PERRINO	21AI01505400
SCOTT L. DOWNIE	21AI01674400
STEVEN J. DINO	21AI01737000
STEVEN G. BEEDLE	21AI01994700
ANTHONY J. FIORE	21AI01736200
JOHN F. WRIGHT	21AI01736200
SPIEZLE ARCHITECTURAL GROUP, INC.	21AC00080600

SEAL:

CONSULTANTS:

B&G
Engineering LLC
State of N.J. Certificate of Authorization: 24GA28168000
30 BERNARD DRIVE
EWING, N.J. 08628
Phone (732) 598-6816
Fax (609) 671-0715
BESRICK G. PLUMMER
PROFESSIONAL ENGINEER
NEW JERSEY LIC. NO. 39534

ISSUED FOR BID 05/12/2025

PROJECT:
PARKING LOT EXPANSION AT EISENHOWER ELEMENTARY SCHOOL
601 ERNSTON ROAD, PARLIN, NJ 08859
LOT 2102, BLOCK 447.06
BOROUGH OF SAYREVILLE,
MIDDLESEX COUNTY, NJ
FOR
SAYREVILLE PUBLIC SCHOOLS
298 ERNSTON ROAD, PARLIN, NJ 08859

FOR CODE REVIEW:

REVISIONS:

	REVISION NAME	DATE

FOR BID: MAY 12, 2025

DRAWING TITLE:
POST DEVELOPMENT DRAINAGE AREA MAP

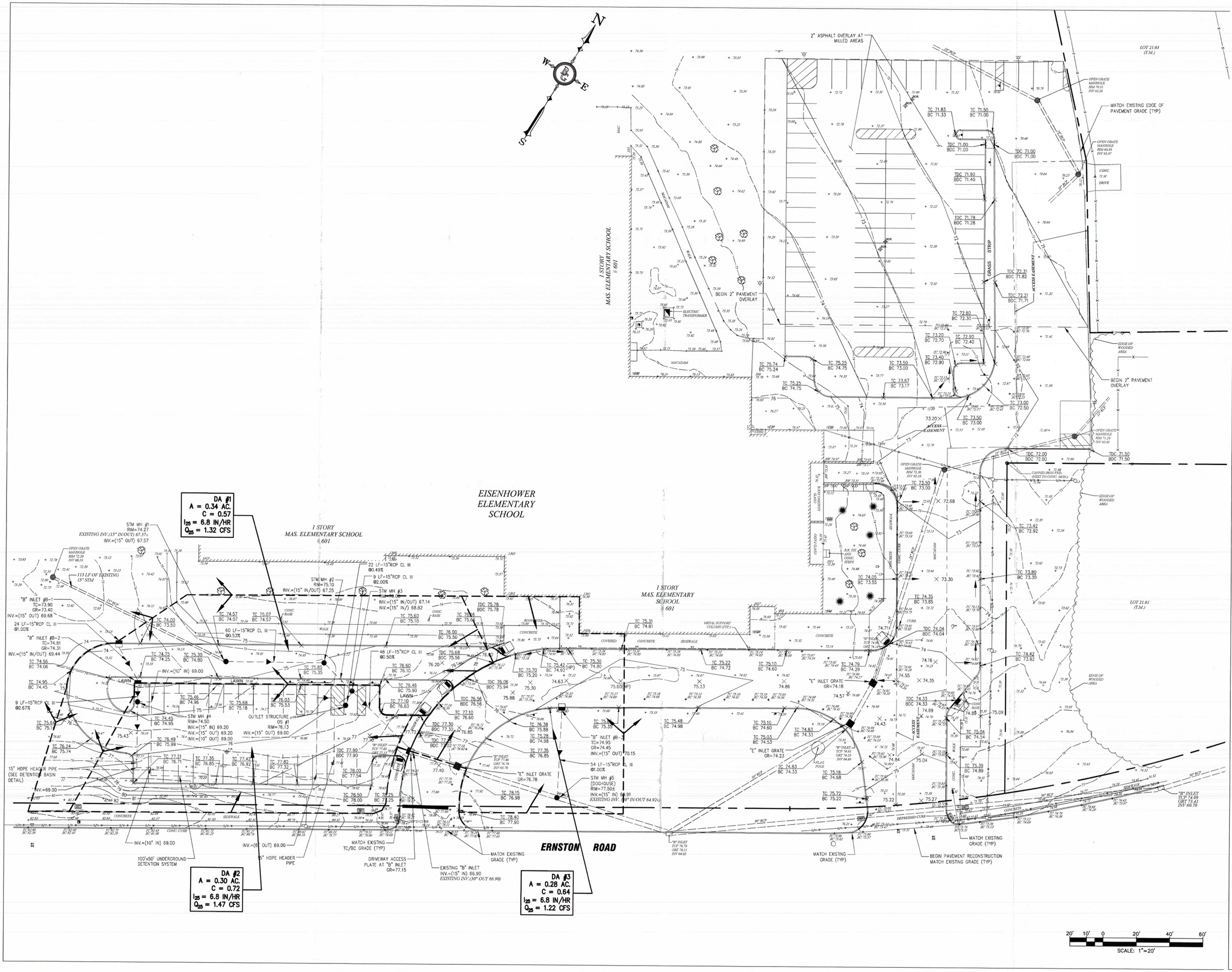
DATE: APRIL 30, 2025

COMMISSION NUMBER:
25K011

B&G PROJECT NO.: 2401A

DRAWING NUMBER:
DA-2

THIS DRAWING IS FORMATTED TO BE PRINTED AT 30"x42"



CODE REVIEW:

CERTIFICATE:

spiezle

SPIEZLE ARCHITECTURAL GROUP INC.
1395 YARDVILLE HAMILTON SQUARE ROAD
SUITE 2A
HAMILTON, NJ 08691
PHONE: 609-695-7400

SIGNATURE:

THOMAS G. PERRAD	21AS19295400
SCOTT E. DOWNIE	21AS19574400
STEVEN LEONI	21AS19139300
STEVEN G. SIEGEL	21AS19356200
ANGELO ALBERTO	21AS19496700
JOHN F. WRIGHT	21AS19796300
SPIEZLE ARCHITECTURAL GROUP, INC.	21AC00093000

SEAL:

CONSULTANTS:

B&G Engineering LLC
State of N.J. Certificate of Authorization: 24GA28168000
30 BERNARD DRIVE
EWING, N.J. 08628
Phone (732) 588-6616
Fax (609) 671-0715

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PROJECT:
PARKING LOT EXPANSION AT EISENHOWER ELEMENTARY SCHOOL
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BOROUGH OF SAYREVILLE, MIDDLESEX COUNTY, NJ
FOR
SAYREVILLE PUBLIC SCHOOLS
298 ERNSTON ROAD, PARLIN, NJ 08859

FOR CODE REVIEW:

REVISIONS:

	REVISION NAME	DATE

FOR BID: MAY 12, 2025

DRAWING TITLE:
PROPOSED STORM SEWER DRAINAGE AREA MAP

DATE: APRIL 30, 2025

COMMISSION NUMBER:
25K011

B&G PROJECT NO.: 2401A

DRAWING NUMBER:
DA-3

THIS DRAWING IS FORMATTED TO BE PRINTED AT 30"x42"