ECS Mid-Atlantic, LLC

Geotechnical Engineering Report

Wilkes-Barre VA Medical Center

1111 East End Blvd.
Plains Township, Pennsylvania

ECS Project Number 18:6007

July 25, 2023

July 25, 2023

Mr. John J. Foley, AIA, LEED AP
Apogee Consulting Group, PA
1151 Kildaire Farm Road
Raleigh, NC 27511

ECS Project No. 18:6007

Reference: Geotechnical Engineering Report
Wilkes-Barre VA Medical Center
Plains Township, Pennsylvania

Dear Mr. Foley:

ECS Mid-Atlantic, LLC (ECS) has completed the subsurface exploration and geotechnical engineering analyses for the above-referenced project. Our services were performed in general accordance with our Proposal No. 18:8614-GP, dated May 23, 2023. This report presents our understanding of the geotechnical aspects of the project, results of the field exploration, laboratory testing, and our design and construction recommendations.

It has been our pleasure to be of service to Apogee Consulting Group, PA, during this phase of this project. We would appreciate the opportunity to remain involved during the continuation of the design phase and to provide our services during construction phase operations as well to verify the assumptions of subsurface conditions made for this report. Should you have any questions concerning the information contained in this report, or if we can be of further assistance to you, please contact us.

Respectfully submitted,

ECS Mid-Atlantic, LLC

Digitally signed by Derek G Ridinger
Date: 2023.07.25 11:28:57 -04'00'

Kyle T. Eldridge
Geotechnical Staff Project Manager
keldridge@ecslimited.com

Derek G. Ridinger, P.E.
Associate Principal
dridinger@ecslimited.com

TABLE OF CONTENTS

APPENDICES

Appendix A – Drawings & Reports

- Site Location Diagram
- Exploration Location Diagram
- Subsurface Cross-Section A-A'
- Geologic Map
- Soil Survey Map

Appendix B – Field Operations

- Subsurface Exploration Procedure: Standard Penetration Testing (SPT)
- Reference Notes for Boring Logs
- Reference Notes for Rock Cores
- Boring Logs
- Photographs

Appendix C – Laboratory Testing

- Laboratory Test Results Summary
- Plasticity Chart
- Grain Size Analyses

EXECUTIVE SUMMARY

The following summarizes the main findings of the exploration, particularly those that may have a cost impact on the planned development. Further, our principal foundation recommendations are summarized. Information gleaned from the Executive Summary should not be utilized in lieu of reading the entire geotechnical report.

- Provided the subgrades are prepared to the specifications provided herein, the proposed building can be supported by conventional shallow foundations consisting of column and/or strip footings. The foundations can be designed for an allowable bearing pressure of 4,000 psf based on anticipated design loads.

- Significant excavation difficulties which may slow down the construction process may occur, especially in areas of deep utility excavations and foundation excavations. Bedrock encountered prior to reaching the designed bottom of footing elevations should be overexcavated a minimum of 6 inches below the proposed footing elevations and replaced with compacted 2A aggregate.

- Groundwater seepage into our borings was not observed during our exploration at the depths explored.

- Up to approximately 3 feet of existing fill was noted within the proposed building footprint during the subsurface exploration. Due to the presence of fill on-site, select over-excavation of unsuitable fill material should be anticipated at some locations within the building pad where proofrolling reveals instability.

- Natural deposits of soils that meet the definition of Satisfactory Structural Fill do appear to be present on the site at possible excavation depths.

- The site can be designed utilizing a Seismic Site Classification of “C.”

Refer to the text of the report for site specific design and construction recommendations.

1.0 INTRODUCTION

The purpose of this study was to provide geotechnical information for design and construction of a proposed building addition at the project site. The recommendations developed for this report are based on project information supplied by Apogee Consulting Group, PA.

Our services were provided in accordance with the Proposal No. 18:8614-GP, dated May 23, 2023, as authorized by Apogee Consulting Group, PA, which includes our Terms and Conditions of Service.

This report contains the results of our subsurface exploration, site characterization, laboratory testing, engineering analyses, and recommendations for the design and construction of the proposed development.

This report includes the following:

- A review of area and site geologic conditions.
- A review of surface topographical features and site conditions.
- A brief review and description of our field procedures.
- A brief review and description of our field and laboratory test procedures and the results of testing conducted.
- A review of subsurface soil stratigraphy with pertinent available physical properties.
- Final copies of our boring logs.
- Discussion of site preparation including depth of removal of soil or rock and over-excavation.
- Discussion of groundwater concerns relative to the planned construction.
- Recommended allowable soil bearing pressure and recommendations for suitable shallow foundations and anticipated maximum settlement.
- Recommended frost depth.
- Recommendations regarding specifications for Structural Fill.
- Discussion of parameters for slab on grade construction and modulus of subgrade reaction.
- Recommendations for site seismic design coefficients based on the 2018 IBC parameters.
- Design and construction recommendations for below-grade or site retaining wall construction, including lateral earth pressures, sliding resistance coefficients and allowable bearing pressures, if applicable.

2.0 PROJECT INFORMATION

2.1 PROJECT LOCATION

The project site is located at the physical address of 1111 East End Blvd. in Plains Township, Pennsylvania. The site is located on the Wilkes Barre VA Medical Center Campus, just North of the American Legion onsite. At the time of exploration, the project site consisted of an undeveloped courtyard and the site was generally flat with a total topographic relief on the order of approximately ±2 feet.

Refer to Figure 2.1.A and the Site Location Map in Appendix A for a detailed depiction of the project site location.

Figure 2.1.A – Site Location

2.2 PROPOSED CONSTRUCTION

Based on the provided *Foundation Plan- Area A,* by Apogee Consulting Group, PA, dated January 27, 2023, we understand that the proposed construction consists of an addition to the existing building. The following information explains our understanding of the structure and assumed loads:

DESIGN VALUES	
SUBJECT	**DESIGN INFORMATION / EXPECTATIONS**
Approximate Building Footprint	Approximately 3,200 S.F.
# of Stories	Assumed 1 to 3 stories above grade
Usage	VA Medical Center
Column Loads	75.0 Kips maximum
Wall Loads	10.0 kips/ft maximum
Lowest Finish Floor Elevation	Estimated ±1 foot of existing; estimated approximate El. 894.0

3.0 FIELD EXPLORATION AND LABORATORY TESTING

Our exploration procedures are explained in greater detail in Appendix B including the insert titled Subsurface Exploration Procedure. Our scope of work included drilling a total of two (2) geotechnical borings. Our exploration locations were located with a handheld GPS unit and their approximate locations are shown on the Exploration Location Diagram in Appendix A.

3.1 SUBSURFACE CHARACTERIZATION

The following sections provide generalized characterizations of the soil strata. Please refer to both the Subsurface Cross-Section in Appendix A and the boring logs in Appendix B.

SUBSURFACE STRATIGRAPHY	
Stratum	**Description**
n/a	Surficial Material: Topsoil approximately 6 to 8 inches thick
I	FILL Materials sampled as GRAVEL (GW/GM) with varying amounts of silt and sand, brown and gray, moist, medium dense to very dense
II	SANDSTONE, moderately weathered, soft, highly fractured, and gray, resulted in auger refusal as shallow as 2.5 feet below existing grade

3.2 SITE GEOLOGY

According to the Geologic Map of Pennsylvania (1980)[1], the site is underlain by the Llewellyn Formation. This formation is included in The *Engineering Characteristics of the Rocks of Pennsylvania*[2], and are described as having the following characteristics.

The Llewellyn formation is an interbedded sandstone, siltstone, and conglomerate, exhibiting medium to coarse grain sizes. The formation is light gray to brown containing coal and dark gray to black shales. The joints are moderately developed, moderately abundant, exhibiting a blocky pattern with moderate spacing. The bedrock formation is slightly too moderately weathered and found to be slightly weathered to a shallow depth. The Llewellyn formation possesses good surface drainage with moderate secondary porosity and permeability.

3.3 SOIL SURVEY MAPPING

Based on our review of the Soil Survey (USDA - Natural Resources Conservation Service (websoilsurvey.ncrs.usda.gov), the site soils are mapped as cut and fill land. This soil type is described as having the following properties:

[1] Berg, T. M., Edmunds, W. E., Geyer, A. R., and others, compilers, 1980, Geologic map of Pennsylvania (2nd ed.): Pennsylvania Geological Survey, 4th ser., Map 1, 3 sheets, scale 1:250,000

[2] Geyer, A. R., and Wilshusen, J. P., (1982), Engineering Characteristics of the Rocks of Pennsylvania. Bureau of Topographic and Geologic Survey.

SOIL MAPPING SUMMARY						
Mapped Soil Unit	**Soil Unit Symbol**	**Origin/ Type**	**Depth to Restrictive Feature**	**Depth to Water Table**	**Hydrologic Soil Group**	**KSat (in/hr)**
Cut and Fill Land	CF	Man made	>80 inches	>80 inches	N/A	N/A

3.4 GROUNDWATER OBSERVATIONS

Groundwater was not encountered during our subsurface exploration at the locations and depths explored. Additionally, no apparent signs of the seasonal high ground water table were observed while probing below the infiltration testing depths.

Variations in the long term water table may occur as a result of changes in precipitation, evaporation, surface water runoff, construction activities, and other factors.

3.5 LABORATORY TESTING

The laboratory testing consisted of selected tests performed on samples obtained during our field exploration operations. Classification and index property tests were performed on representative soil samples.

Each sample was visually classified on the basis of texture and plasticity in accordance with ASTM D2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedures) and including USCS classification symbols, and ASTM D2487 Standard Practice for Classification for Engineering Purposes (Unified Soil Classification System (USCS)). After classification, the samples were grouped in the major zones noted on the boring logs in Appendix B. The group symbols for each soil type are indicated in parentheses along with the soil descriptions. The stratification lines between strata on the logs are approximate; in situ, the transitions may be gradual.

4.0 DESIGN RECOMMENDATIONS

4.1 FOUNDATION DESIGN

Provided subgrades and engineered fills are prepared as discussed herein, the proposed addition can be supported by conventional shallow foundations consisting of column and continuous wall footings. The design of the foundations shall utilize the following parameters:

FOUNDATION DESIGN PARAMETERS		
Design Parameter	**Column Footing**	**Wall Footing**
Net Allowable Bearing Pressure[1]	4,000 psf	4,000 psf
Acceptable Bearing Soil Material	Stratum II or Structural Fill	Stratum II or Structural Fill
Minimum Width	24 inches	18 inches
Minimum Footing Embedment Depth for Interior Foundations (below slab or finished grade)	24 inches	24 inches
Minimum Footing Embedment Depth for Exterior Foundations (below slab or finished grade)	36 inches	36 inches
Estimated Total Settlement (max.)	1 inch	1 inch
Estimated Differential Settlement	Less than ½ inch between columns	Less than ½ inch over 35 feet

Note[1]: Net allowable bearing pressure is the applied pressure in excess of the surrounding overburden soils above the base of the foundation.

The materials at the foundation bearing elevation are anticipated to be a combination of existing fill materials, new structural fill, and/or bedrock. If soft soils, existing fill, or otherwise unsuitable soils are observed at the footing bearing elevations, the unsuitable soils should be undercut and removed.

Foundation undercut excavations should be widened 1 foot beyond the footing dimension on each side and then 1 foot for every 1 foot of over excavation (equivalent to a 1(H):1(V) slope for improved bearing area) where overexcavation exceeds 2 feet in depth. The undercut areas should be backfilled with Structural Fill (such as 2A aggregate) and compacted under engineering review until the designed bearing elevation has been reached. As an alternate, lean concrete (f'c=1,000 psi) may be used to backfill the undercut. If lean concrete is used, the excavation should be 6 inches larger than the footing on each side and no additional lateral overexcavation is necessary.

Bedrock encountered prior to reaching the designed bottom of footing elevations should be overexcavated a minimum of 6 inches below the proposed footing elevations and replaced with compacted 2A aggregate. Transition zones from rock to soil should incorporate a minimum of 15 lineal feet of footing with overexcavation and replacement with 2A aggregate to a minimum depth of 1 foot to reduce the potential for differential settlement in the soil section.

4.2 FLOOR SLABS

Provided subgrades and Structural Fills are prepared as discussed herein, the proposed floor slabs can be constructed as Ground Supported Slabs (or Slab-On-Grade). Based on a lowest finished floor elevation of EL. 894.0 ft, it appears that the slabs will bear on *Stratum I – Fill, GRAVEL* (GW/GM). Stratum I can be used for support of the slabs-on-grade provided the exposed subgrade passes a proofroll as described in this report. It should be noted that the long-term performance across the slab may be variable due to the presence of existing fill The following graphic depicts our soil-supported slab recommendations:

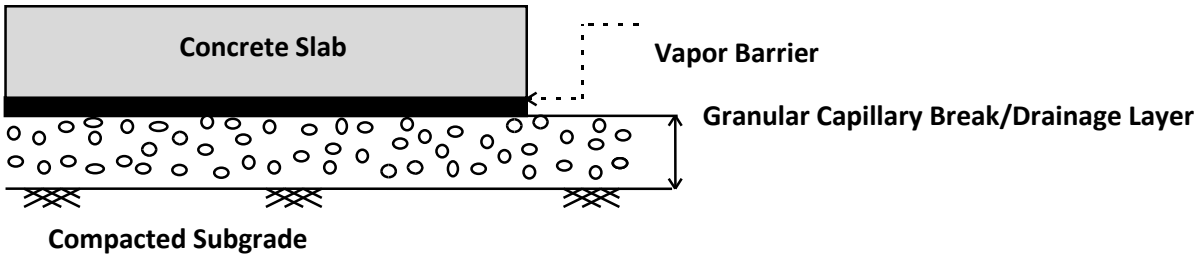


Figure 4.2.A

1. Drainage Layer Thickness: 6 inches minimum recommended
2. Drainage Layer Material: Coarse Graded Aggregate
3. Subgrade compacted to ***95%*** maximum dry density in Accordance with ASTM D698

Soft or yielding soils may be encountered in some areas. Those soils should be removed and replaced with compacted Structural Fill in accordance with the recommendations included in this report.

Subgrade Modulus: Provided the Structural Fill and Granular Drainage Layer are constructed in accordance with our recommendations, the slab may be designed assuming a modulus of subgrade reaction, k_1 of 150 pci (lbs./cu. inch). The modulus of subgrade reaction value is based on a 1 ft by 1 ft plate load test basis.

Vapor Barrier: Before the placement of concrete, a vapor barrier may be placed on top of the granular drainage layer to provide additional protection against moisture penetration through the floor slab. When a vapor barrier is used, special attention should be given to surface curing of the slab to reduce the potential for uneven drying, curling and/or cracking of the slab. Depending on proposed flooring material types, the structural engineer and/or the architect may choose to eliminate the vapor barrier.

Slab Isolation: Soil-supported slabs should be isolated from the foundations and foundation-supported elements of the structure so that differential movement between the foundations and slab will not induce excessive shear and bending stresses in the floor slab. Where the structural configuration prevents the use of a free-floating slab such as in a drop down footing/monolithic slab configuration, the slab should be designed with suitable reinforcement and load transfer devices to preclude overstressing of the slab.

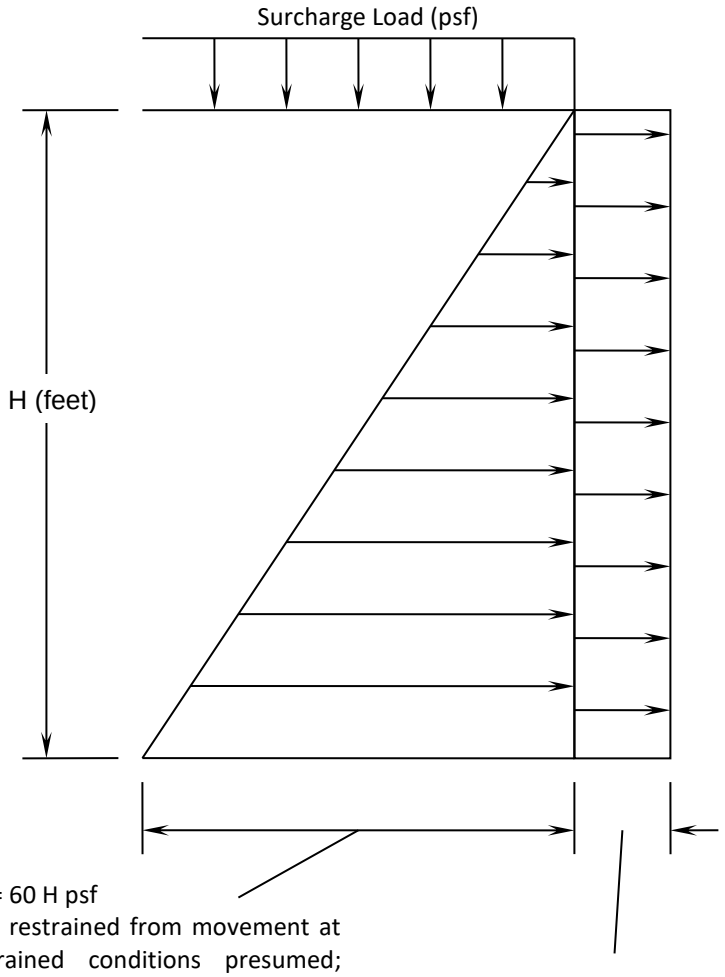
4.3 BELOW GRADE WALLS

We recommend that below grade walls be designed to withstand at-rest lateral earth pressures and surcharge loads from adjacent building foundations, and/or streets. These recommendations apply to a "drained" condition which is where there is drainage material behind below grade walls that prevents hydrostatic water pressures on the back of the below grade wall.

To accomplish a drained condition, drainage materials such as a free draining gravel, geocomposite drainage panels, weep holes, and an underslab drainage system should be used.

We recommend that walls that are restrained from movement at the top be designed for a linearly increasing lateral earth pressure. The following Figure depicts our recommended at-rest lateral earth pressure condition for a "drained below-grade wall" with restrained wall top:

This diagram is not suitable for the design of Support of Excavation or temporary shoring systems.



Lateral Earth Pressure = 60 H psf
(For below grade walls restrained from movement at top and bottom, drained conditions presumed; Internal angle of friction of 30 degrees and a unit weight of 120 pcf.

Horizontal Pressure from Surcharge
= 0.5 x Vertical Surcharge

Surcharge loads imposed within a 45-degree slope of the base of the wall should be considered in the below grade wall design. The influence of these surcharge loads on the below grade walls should be based on an at-rest pressure coefficient, k_0, of 0.5 in the case of restrained walls.

4.4 SEISMIC DESIGN CHARACTERISTICS

The International Building Code (IBC) 2018 requires site classification for seismic design based on the upper 100 feet of a soil profile. At least two methods are utilized in classifying sites, namely the shear wave velocity (v_s) method and the Standard Penetration Resistance (N-value) method. The latter method (Standard Penetration Resistance) was used in classifying this site.

SEISMIC SITE CLASSIFICATION			
Site Class	**Soil Profile Name**	**Shear Wave Velocity, Vs, (ft./s)**	**N value (bpf)**
A	Hard Rock	Vs > 5,000 fps	N/A
B	Rock	2,500 < Vs ≤ 5,000 fps	N/A
C	Very dense soil and soft rock	1,200 < Vs ≤ 2,500 fps	>50
D	Stiff Soil Profile	600 ≤ Vs ≤ 1,200 fps	15 to 50
E	Soft Soil Profile	Vs < 600 fps	<15

Based upon our interpretation of the subsurface conditions, the appropriate Seismic Site Classification is "C" as shown in the preceding table.

Ground Motion Parameters: In addition to the seismic site classification noted above, ECS has determined the design spectral response acceleration parameters following the IBC 2018 methodology. The Mapped Reponses were estimated from the free seismic design maps available from *Structural Engineers Association of California (SEAOC) (http://seismicmaps.org*). The design responses for the short (0.2 sec, S_{DS}) and 1-second period (S_{D1}) are noted in bold at the far right end of the following table.

GROUND MOTION PARAMETERS [IBC 2018 METHOD]								
Period (sec)	**Mapped Spectral Response Accelerations (g)**		**Values of Site Coefficient for Site Class**		**Maximum Spectral Response Acceleration Adjusted for Site Class (g)**		**Design Spectral Response Acceleration (g)**	
Reference	Figures 1613.2.1 (1) & (2)		Tables 1613.2.3 (1) & (2)		Eqs. 16-37 & 16-38		Eqs. 16-39 & 16-40	
0.2	S_S	0.153	F_a	1.3	$S_{MS}=F_aS_s$	0.199	$S_{DS}=2/3\ S_{MS}$	0.133
1.0	S_1	0.058	F_v	1.5	$S_{M1}=F_vS_1$	0.087	$S_{D1}=2/3\ S_{M1}$	0.058

The Site Class definition should not be confused with the Seismic Design Category designation which the Structural Engineer typically assesses. If a higher site classification is beneficial to the project, we can provide additional testing methods that may yield more favorable results.

5.0 SITE CONSTRUCTION RECOMMENDATIONS

5.1 SUBGRADE PREPARATION

5.1.1 Stripping and Grubbing

The subgrade preparation should consist of stripping all vegetation, rootmat, topsoil, unsuitable existing fill, asphalt, and other soft or unsuitable materials from the 10-foot expanded building and 5-foot expanded pavement limits, and 5 feet beyond the toe of Structural Fills. Deep topsoil or organic laden soils may be present within the existing mulched areas. Additionally, organic materials such as roots were observed within the existing fill materials. ECS should be retained to verify that topsoil and unsuitable surficial materials have been removed prior to the placement of Structural Fill or construction of structures.

5.1.2 Proofrolling

Prior to fill placement or other construction on subgrades, the subgrades should be evaluated by an ECS field technician. The exposed subgrade should be thoroughly proofrolled with construction equipment having a minimum axle load of 10 tons [e.g. fully loaded tandem-axle dump truck]. Proofrolling should be traversed in two perpendicular directions with overlapping passes of the vehicle under the observation of an ECS technician. This procedure is intended to assist in identifying localized yielding materials.

Where proofrolling identifies areas that are unstable or "pumping" subgrade those areas should be repaired prior to the placement of subsequent Structural Fill or other construction materials. Methods of stabilization include undercutting, moisture conditioning, or chemical stabilization. The situation should be discussed with ECS to determine the appropriate procedure. Test pits may be excavated to explore the shallow subsurface materials to help in determining the cause of the observed unstable materials, and to assist in the evaluation of appropriate remedial actions to stabilize the subgrade.

5.2 EARTHWORK OPERATIONS

5.2.1 Removal of Existing Structures

Development of the project will include removal of existing sidewalks, a covered shelter, and electrical utilities present onsite.

Existing foundation elements and utilities within the footprint of the proposed buildings should be removed and backfilled with compacted Structural Fill placed under engineering review. Existing foundations or slabs situated within the proposed pavement areas should be over-excavated and removed such that the top of the concrete is a minimum of 2 feet below the finished subgrade elevation. The foundations and pavements may be processed for reuse as Structural Fill provided all steel reinforcement is removed and the material is well-graded containing no fragments larger than 4-inches in diameter and conforms to the parameters presented in **Section 5.2.4**. If existing slabs are to remain, they should be rubblized to allow downward migration of water.

5.2.2 Existing Man-Placed Fill

Fill Content: Up to approximately 3 feet of existing fill was noted within the proposed building footprint during the subsurface exploration. Due to the presence of fill on-site, select over-excavation of unsuitable fill material should be anticipated at some footing locations, and some locations within the building pad where proofrolling reveals instability.

5.2.3 Rock Excavation

Bedrock was encountered in both borings performed, signified by auger refusal. Rock coring was performed in each boring, with samples indicating that the underlying rock was composed of gray Sandstone that is moderately weathered, soft, and highly fractured. The Sandstone was encountered at depths as shallow as approximately 2.5 foot below existing grade. Significant excavation difficulties which may slow down the construction process may occur, especially in areas of deep utility excavations and foundation excavations. Usually, rock saws employed for trench excavations are capable of exceeding our refusal depths by several feet, but with some difficulty. The use of hydraulic rams on heavy duty excavation equipment may be required depending on the proposed excavations depths.

We recommend that no "rock" fills be placed, and that fills meet the grain size criteria provided. Rock fill consists of rock particles that have a high void content between the rock particles. Rock fills are not suitable for satisfactory long term performance. These rock materials can be blended with other soils types to form a suitable particle size distribution for reuse as Structural Fill as outlined above.

5.2.4 Structural Fill Materials

Prior to placement of Structural Fill, representative bulk samples (about 50 pounds) of on-site and/or off-site borrow should be submitted to ECS for laboratory testing, which will typically include Atterberg limits, natural moisture content, grain-size distribution, and moisture-density relationships (i.e., Proctors) for compaction. Import materials should be tested prior to being hauled to the site to determine if they meet project specifications.

Satisfactory Structural Fill Materials: Materials satisfactory for use as Structural Fill should consist of inorganic soils with the following engineering properties and compaction requirements.

STRUCTURAL FILL INDEX PROPERTIES	
Subject	**Property**
Building and Pavement Areas	LL < 40, PI <20
Max. Particle Size	4 inches
Minimum Dry Density	105 pcf

STRUCTURAL FILL COMPACTION REQUIREMENTS	
Subject	**Requirement**
Compaction Standard	Standard Proctor, ASTM D698
Required Compaction	95% of Max. Dry Density
Moisture Content	±2 % points of the soil's optimum value
Loose Thickness	8 inches prior to compaction

On-Site Borrow Suitability: Natural deposits of soils that meet the definition of Satisfactory Structural Fill do appear to be present on the site at possible excavation depths.

Fill Placement: Fill materials should not be placed on frozen soils, on frost-heaved soils, and/or on excessively wet soils. Borrow fill materials should not contain frozen materials at the time of placement, and all frozen or frost-heaved soils should be removed prior to placement of Structural Fill or other fill soils and aggregates. Excessively wet soils or aggregates should be scarified, aerated, and moisture conditioned.

5.2.5 Proposed Fill Slopes

Slopes comprised of Structural Fill may be constructed at a slope of 3(H):1(V) or flatter. Slopes steeper than 3(H):1(V) should be evaluated by ECS. All slopes should be properly vegetated to reduce the likelihood of surficial erosion and sloughing.

5.3 FOUNDATION AND SLAB OBSERVATIONS

Protection of Foundation Excavations: Exposure to the environment may weaken the soils at the footing bearing level if the foundation excavations remain open for too long a time. Therefore, foundation concrete should be placed the same day that excavations are made. If the bearing soils are softened by surface water intrusion or exposure, the softened soils must be removed from the foundation excavation bottom immediately prior to placement of concrete. If the excavation must remain open overnight, or if rainfall becomes imminent while the bearing soils are exposed, a 1 to 3-inch thick “mud mat” of “lean” concrete should be placed on the bearing soils before the placement of reinforcing steel.

Footing Subgrade Observations: Most of the soils at the foundation bearing elevation are anticipated to be suitable for support of the proposed structure. It is important to have ECS observe the foundation subgrade prior to placing foundation concrete, to confirm the bearing soils are what was anticipated.

Slab Subgrade Verification: Prior to placement of a drainage layer, the subgrade should be prepared in accordance with the recommendations found in **Section 5.1.2 Proofrolling**.

5.4 UTILITY INSTALLATIONS

Utility Subgrades: The soils encountered in our exploration are expected to be generally suitable for support of utility pipes. The pipe subgrades should be observed and probed for stability by ECS. Loose or unsuitable materials encountered should be removed and replaced with suitable compacted Structural Fill, or pipe stone bedding material.

Utility Backfilling: The granular bedding material (often AASHTO #57 stone) should be at least 4 inches thick, but not less than that specified by the civil engineer’s project drawings and specifications. We recommend that the bedding materials be placed up to the springline of the pipe. Fill placed for support of the utilities, as well as backfill over the utilities, should satisfy the requirements for Structural Fill and Fill Placement.

Utility Excavation Dewatering: It is possible that perched water may be encountered by utility excavations which extend below existing grades. It is expected that removal of perched water which

seeps into excavations could be accomplished by pumping from sumps excavated in the trench bottom and which are backfilled with AASHTO No. 57 Stone or open graded bedding material. Should water conditions beyond the capability of sump pumping be encountered, the contractor should submit a Dewatering Plan in accordance with project specifications.

Excavation Safety: All excavations and slopes should be constructed and maintained in accordance with OSHA excavation safety standards. The contractor is solely responsible for designing, constructing, and maintaining stable temporary excavations and slopes. The contractor's responsible person, as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations. ECS is providing this information solely as a service to our client. ECS is not assuming responsibility for construction site safety or the contractor's activities; such responsibility is not being implied and should not be inferred.

6.0 CLOSING

ECS has prepared this report to guide the geotechnical-related design and construction aspects of the project. We performed these services in accordance with the standard of care expected of professionals in the industry performing similar services on projects of like size and complexity at this time in the region. No other representation, expressed or implied, and no warranty or guarantee is included or intended in this report.

The description of the proposed project is based on information provided to ECS by Apogee Consulting Group. If any of this information is inaccurate, either due to our interpretation of the documents provided or if the site's design changed, ECS should be contacted immediately to review the report in light of the changes and provide additional or alternate recommendations as required to reflect the proposed construction.

We recommend that ECS review the project plans and specifications so we can confirm that those plans/specifications are in accordance with the recommendations of this geotechnical report.

Field observations, and quality assurance testing during earthwork and foundation installation are an extension of, and integral to, the geotechnical design. We recommend that ECS be retained to apply our expertise throughout the geotechnical phases of construction, and to provide consultation and recommendation should issues arise.

ECS is not responsible for the conclusions, opinions, or recommendations of others based on the data in this report.

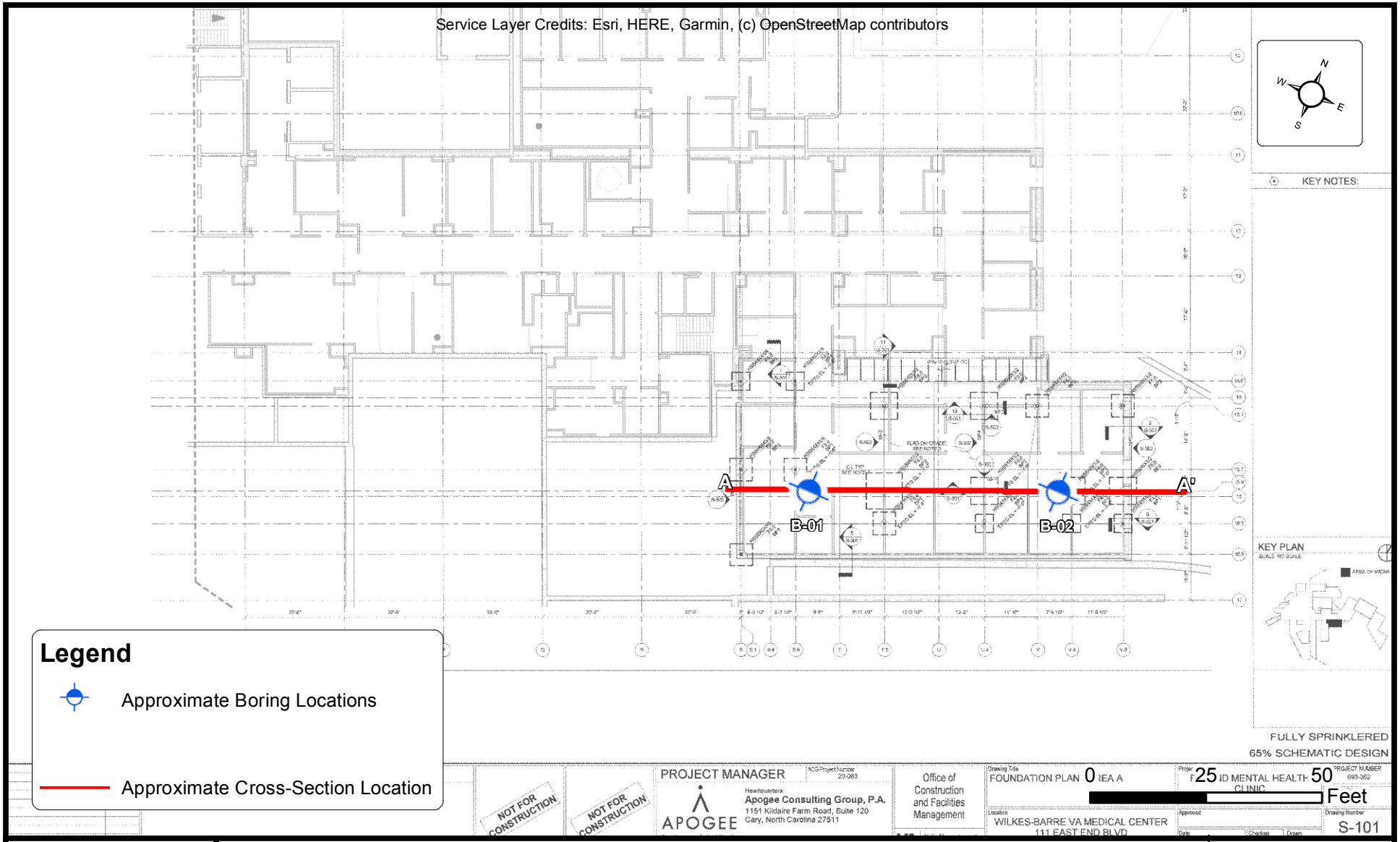
Appendix A - Drawings and Reports

Site Location Diagram
Exploration Location Diagram(s)
Subsurface Cross-Section(s)
Geologic Survey Map
Soil Survey Map

SITE LOCATION DIAGRAM
WILKES-BARRE VA MEDICAL CENTER

1111 EAST END BLVD, PLAINS TWP, PENNSYLVANIA
APOGEE CONSULTING GROUP, PA

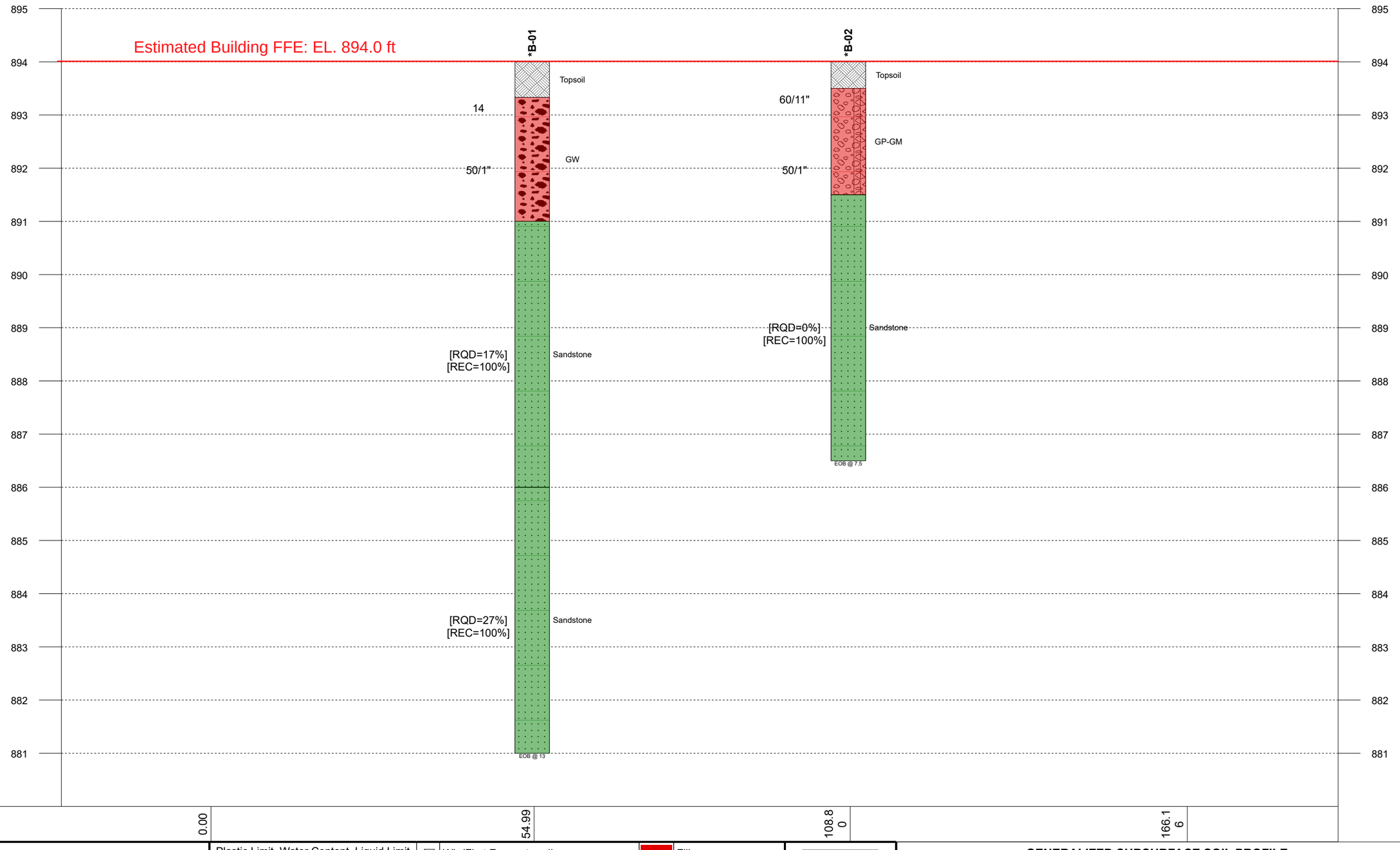
ENGINEER	DGR
SCALE	AS NOTED
PROJECT NO.	18:6007
FIGURE	1 OF 1
DATE	7/18/2023



EXPLORATION LOCATION DIAGRAM
WILKES-BARRE VA MEDICAL CENTER

1111 EAST END BLVD, PLAINS TWP, PENNSYLVANIA
APOGEE CONSULTING GROUP, PA

ENGINEER	DGR
SCALE	AS NOTED
PROJECT NO.	18:6007
FIGURE	1 OF 1
DATE	7/18/2023



Legend Key

- Topsoil
- Poorly Graded GRAVEL
- Well Graded GRAVEL
- Sandstone

Notes:

1- EOB: END OF BORING AR: AUGER REFUSAL SR: SAMPLER REFUSAL.
2- THE NUMBER BELOW THE STRIPS IS THE DISTANCE ALONG THE BASELINE.
3- SEE INDIVIDUAL BORING LOG AND GEOTECHNICAL INFORMATION.
4- STANDARD PENETRATION TEST RESISTANCE (LEFT OF BORING) IN BLOWS PER FOOT (ASTM D1586).

Plastic Limit Water Content Liquid Limit X——●——△			
[FINES CONTENT %]			
BOTTOM OF CASING	WL (First Encountered)	Fill	
LOSS OF CIRCULATION	WL (Completion)	Possible Fill	
CALIBRATED PENETROMETER	WL (Estimated Seasonal High Water)	Probable Fill	
	WL (Stabilized)	Rock	

GENERALIZED SUBSURFACE SOIL PROFILE

A-A'

Wilkes-Barre VA Medical Center

Apogee Consulting Group, PA

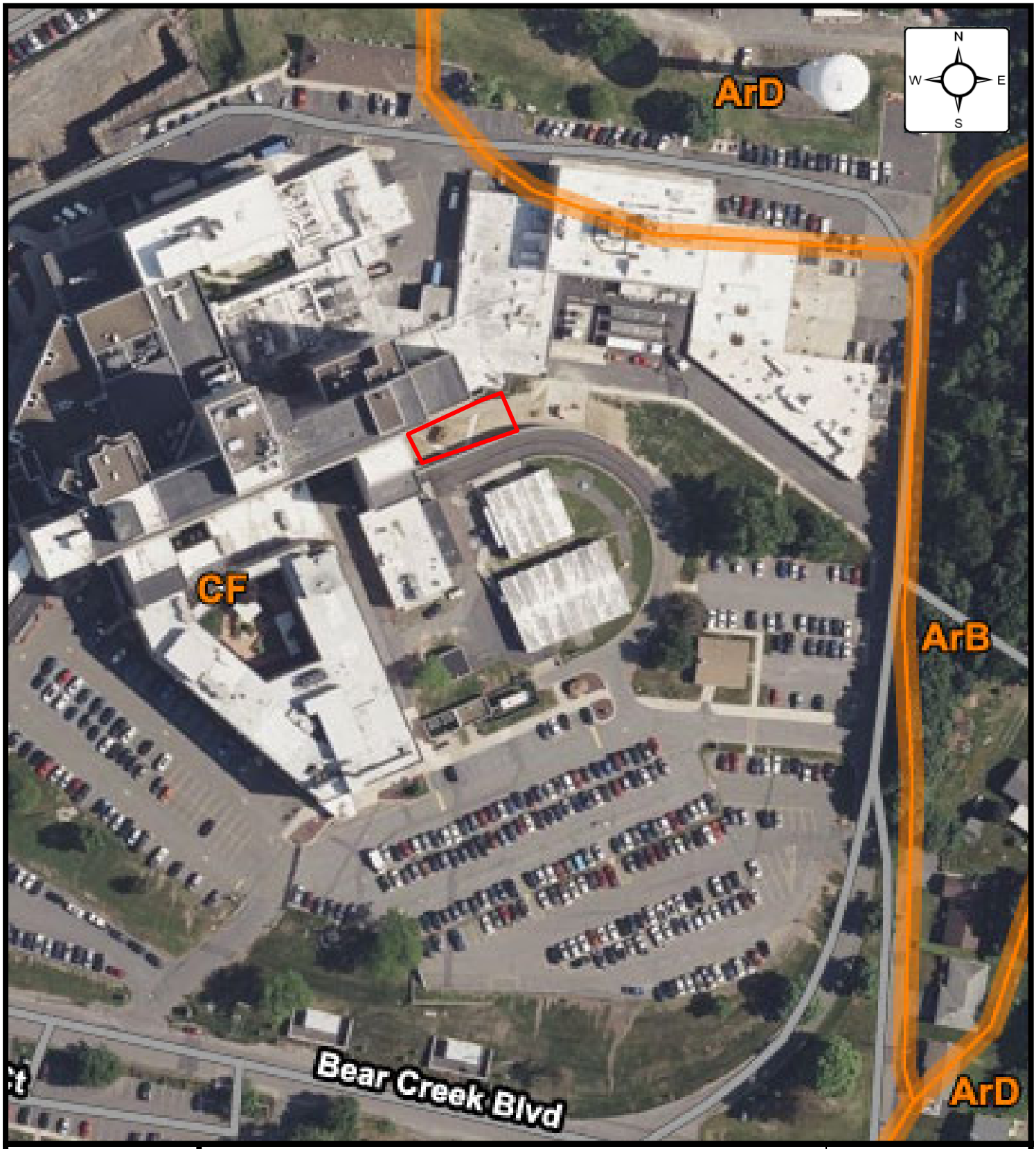
1111 East End Blvd, Plains Twp, Pennsylvania, 18711

Project No: 18:6007 Date: 07/18/2023

GEOLOGIC SURVEY MAP
WILKES-BARRE VA MEDICAL CENTER

1111 EAST END BLVD, PLAINS TWP, PENNSYLVANIA
APOGEE CONSULTING GROUP, PA

ENGINEER	DGR
SCALE	AS NOTED
PROJECT NO.	18:6007
FIGURE	1 OF 1
DATE	7/18/2023



SOIL SURVEY MAP
WILKES-BARRE VA MEDICAL CENTER

1111 EAST END BLVD, PLAINS TWP, PENNSYLVANIA
APOGEE CONSULTING GROUP, PA

DRAFTER	CBP
SCALE	NTS
PROJECT NO.	18:6007
DATE	6/21/2023
SOURCE	Web Soil Survey https://websoilsurvey.nrcs.usda.gov

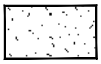
Appendix B – Field Operations

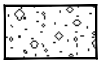
Reference Notes
Exploration Procedures
Boring Logs
Photographs

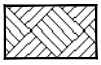
REFERENCE NOTES FOR BORING LOGS

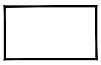
MATERIAL[1,2]

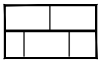

ASPHALT


CONCRETE


GRAVEL

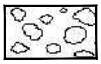

TOPSOIL

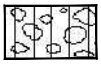

VOID


BRICK

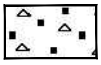

AGGREGATE BASE COURSE

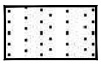

GW **WELL-GRADED GRAVEL**
gravel-sand mixtures, little or no fines

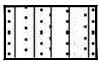

GP **POORLY-GRADED GRAVEL**
gravel-sand mixtures, little or no fines


GM **SILTY GRAVEL**
gravel-sand-silt mixtures

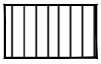

GC **CLAYEY GRAVEL**
gravel-sand-clay mixtures

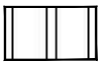

SW **WELL-GRADED SAND**
gravelly sand, little or no fines

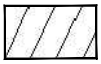

SP **POORLY-GRADED SAND**
gravelly sand, little or no fines


SM **SILTY SAND**
sand-silt mixtures

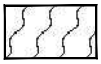

SC **CLAYEY SAND**
sand-clay mixtures

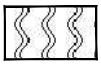

ML **SILT**
non-plastic to medium plasticity

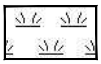

MH **ELASTIC SILT**
high plasticity


CL **LEAN CLAY**
low to medium plasticity


CH **FAT CLAY**
high plasticity


OL **ORGANIC SILT or CLAY**
non-plastic to low plasticity


OH **ORGANIC SILT or CLAY**
high plasticity


PT **PEAT**
highly organic soils

DRILLING SAMPLING SYMBOLS & ABBREVIATIONS

SS	Split Spoon Sampler	PM	Pressuremeter Test
ST	Shelby Tube Sampler	RD	Rock Bit Drilling
WS	Wash Sample	RC	Rock Core, NX, BX, AX
BS	Bulk Sample of Cuttings	REC	Rock Sample Recovery %
PA	Power Auger (no sample)	RQD	Rock Quality Designation %
HSA	Hollow Stem Auger		

PARTICLE SIZE IDENTIFICATION

DESIGNATION		PARTICLE SIZES
Boulders		12 inches (300 mm) or larger
Cobbles		3 inches to 12 inches (75 mm to 300 mm)
Gravel:	Coarse	¾ inch to 3 inches (19 mm to 75 mm)
	Fine	4.75 mm to 19 mm (No. 4 sieve to ¾ inch)
Sand:	Coarse	2.00 mm to 4.75 mm (No. 10 to No. 4 sieve)
	Medium	0.425 mm to 2.00 mm (No. 40 to No. 10 sieve)
	Fine	0.074 mm to 0.425 mm (No. 200 to No. 40 sieve)
Silt & Clay ("Fines")		<0.074 mm (smaller than a No. 200 sieve)

COHESIVE SILTS & CLAYS

UNCONFINED COMPRESSIVE STRENGTH, Q_P[4]	SPT[5] (BPF)	CONSISTENCY[7] (COHESIVE)
<0.25	<2	Very Soft
0.25 - <0.50	2 - 4	Soft
0.50 - <1.00	5 - 8	Firm
1.00 - <2.00	9 - 15	Stiff
2.00 - <4.00	16 - 30	Very Stiff
4.00 - 8.00	31 - 50	Hard
>8.00	>50	Very Hard

GRAVELS, SANDS & NON-COHESIVE SILTS

SPT[5]	DENSITY
<5	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
>50	Very Dense

RELATIVE AMOUNT[7]	COARSE GRAINED (%)[8]	FINE GRAINED (%)[8]
Trace	≤5	≤5
With	10 - 20	10 - 25
Adjective *(ex: "Silty")*	25 - 45	30 - 45

WATER LEVELS[6]

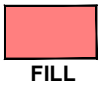

WL (First Encountered)


WL (Completion)


WL (Seasonal High Water)


WL (Stabilized)

FILL AND ROCK


FILL


POSSIBLE FILL


PROBABLE FILL


ROCK

[1]Classifications and symbols per ASTM D 2488-17 (Visual-Manual Procedure) unless noted otherwise.

[2]To be consistent with general practice, "POORLY GRADED" has been removed from GP, GP-GM, GP-GC, SP, SP-SM, SP-SC soil types on the boring logs.

[3]Non-ASTM designations are included in soil descriptions and symbols along with ASTM symbol [Ex: (SM-FILL)].

[4]Typically estimated via pocket penetrometer or Torvane shear test and expressed in tons per square foot (tsf).

[5]Standard Penetration Test (SPT) refers to the number of hammer blows (blow count) of a 140 lb. hammer falling 30 inches on a 2 inch OD split spoon sampler required to drive the sampler 12 inches (ASTM D 1586). "N-value" is another term for "blow count" and is expressed in blows per foot (bpf). SPT correlations per 7.4.2 Method B and need to be corrected if using an auto hammer.

[6]The water levels are those levels actually measured in the borehole at the times indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids, in granular soils. In clay and cohesive silts, the determination of water levels may require several days for the water level to stabilize. In such cases, additional methods of measurement are generally employed.

[7]Minor deviation from ASTM D 2488-17 Note 14.

[8]Percentages are estimated to the nearest 5% per ASTM D 2488-17.

REFERENCE NOTES FOR ROCK CORES

ROCK CLASSIFICATION TYPES		
Igneous	**Sedimentary**	**Metamorphic**
Coarse Grained	**Clastic (sediment)**	**Foliated**
DIABASE	SHALE	GNEISS
DIORITE	SILTSTONE	PHYLLITE
GABBRO	SANDSTONE	SCHIST
GRANITE	CONGLOMERATE	SLATE
PEGMATITE	LIMESTONE, OOLITIC	**Non-Foliated**
PERIDOTITE	**Chemically Formed**	AMPHIBOLITE
SYENITE	DOLOSTONE	HORNFELS
Fine Grained	GYPSUM	MARBLE
ANDESITE	HALITE	QUARTZITE
BASALT	LIMESTONE	
RHYOLITE	**Organic Remains**	
TRACHYTE	CHALK	
Pyroclastic	COAL	
OBSIDIAN	COQUINA	
PUMICE		
TUFF		

HARDNESS	
Very Soft	Deformed by hand
Soft	Scratched with a fingernail
Moderately Hard	Scratched easily with a knife
Hard	Scratched with difficulty with a knife
Very Hard	Cannot be scratched with a knife

JOINT/FRACTURE SPACING	
Fractured/Jointed	**Spacing**
Very Widely	> 10 feet
Slightly	3 - 10 feet
Moderately	1 - 3 feet
Highly	2 inches - 1 foot
Intensely	< 2 inches

BEDDING	
Thinly	≤ 0.3 ft.
Medium	>0.3 ft. ≤ 1 ft.
Thickly	>1 ft. ≤ 3 ft.
Massive	>3 ft.

JOINT OR FRACTURE CONTINUITY

It shall be noted whether the joints or fractures are continuous or discontinuous. If continuity of joints is not discernable at the scale of the rock core, continuous joints or fractures shall be assumed.

JOINT/FRACTURE ORIENTATION

The range or average orientation of each joint set or fracture trend shall be measured in degrees from a horizontal plane where possible. If no measurement is possible, the qualitative terms High, Moderate or Low-angle shall be used. Record whether the joints are present in Conjugate sets (i.e. having an opposite sense of dip)

High	61-90 degree
Moderate	31-60 degree
Low-angle	0-30 degree
Dip-angle	(1-90) ____ degrees (if measured)

Recovery (REC(%))

$$\frac{\text{Total rock recovered from run}}{\text{Total Run Length}}$$

Rock Quality Designation (RQD(%))*

$$\frac{\text{Sum of core pieces} \geq 4 \text{ inches long}}{\text{Total Run Length}}$$

RQD%	Description of Rock Quality
0-25%	Very Poor
>25%-50%	Poor
>50%-75%	Fair
>75%-90%	Good
>90%	Excellent

WEATHERING	
Unweathered	No evidence of any chemical or mechanical alteration.
Slightly Weathered	Slight discoloration on surface, slight alteration along discontinuities, less than 10 percent of the rock volume altered.
Moderately Weathered	Discoloring evident, surface pitted and altered with alteration penetrating well below rock surfaces, weathering 'halos' evident. 10 to 50 percent of the rock altered.
Highly Weathered	Entire mass discolored, alteration pervading nearly all of the rock, with some pockets of slightly weathered rock noticeable, some minerals leached away.
Decomposed	Rock reduced to a soil with relict rock structure remaining (i.e. saprolite). Generally molded and crumbled by hand (friable).

JOINT/FRACTURE SURFACE CONDITION

The following qualitative terms shall be used to describe surface condition of joints and fractures. Multiple terms can be used.

Very rough	Slightly rough	Slickensided	Gouge

WALL ROCK CONDITION

The qualitative terms 'hard wall rock' or 'soft wall rock' shall be used to describe the condition of the parent rock on either side of the joint or fracture.

Description Sequence	Example Rock Classification Description
ROCK TYPE, [REC=_%,RQD=_%], Weathering, Hardness, Bedding, Joint/Fracture Spacing, Joint/Fracture Surface Condition, Wall Rock Condition, Joint or Fracture Continuity, Joint/Fracture Orientation, Color, Additional Features	LIMESTONE, [REC=95%,RQD=60%], Highly Weathered, Hard, Thinly Bedded, Slightly Fractured/Jointed, Slightly Rough, Hard Wall Rock, Continuous, Moderate-angle Dip, Gray White

*ASTM D6032-17: RQD is performed on cores using BQ to PQ sized bits (1.433 to 3.345 inch diameter cores, respectively)

SUBSURFACE EXPLORATION PROCEDURE: STANDARD PENETRATION TESTING (SPT) ASTM D 1586 Split-Barrel Sampling

Standard Penetration Testing, or **SPT**, is the most frequently used subsurface exploration test performed worldwide. This test provides samples for identification purposes, as well as a measure of penetration resistance, or N-value. The N-Value, or blow counts, when corrected and correlated, can approximate engineering properties of soils used for geotechnical design and engineering purposes.

SPT Procedure:

- Involves driving a hollow tube (split-spoon) into the ground by dropping a 140-lb hammer a height of 30-inches at desired depth
- Recording the number of hammer blows required to drive split-spoon a distance of 18-24 inches (in 3 or 4 Increments of 6 inches each)

- Auger is advanced* and an additional SPT is performed
- One SPT typically performed for every two to five feet. An approximate 1.5 inch diameter soil sample is recovered.

**Drilling Methods May Vary*— The predominant drilling methods used for SPT are open hole fluid rotary drilling and hollow-stem auger drilling.

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Apogee Consulting Group, PA	**18:6007**	**B-01**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Wilkes-Barre VA Medical Center	**Negley's Well Drilling, Inc.**		
SITE LOCATION:			LOSS OF CIRCULATION
1111 East End Blvd, Plains Twp, Pennsylvania, 18711			
NORTHING:	EASTING:	STATION:	SURFACE ELEVATION:
703282.0	**2495003.4**		**894**

BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0	S-1	SS	21	15	Topsoil Thickness[8.00"] (GW FILL) FILL, WELL-GRADED GRAVEL, brown and gray, moist, medium dense to very dense		894	2-8-6-50/3" (14)
	S-2	SS	1	1				50/1" (50/1")
5	R-1	RC	60	60	SANDSTONE, [REC=100%,RQD=17%], Moderately Weathered, Soft, Highly Fractured/Jointed, Gray		889	
10	R-2	RC	60	60	SANDSTONE, [REC=100%,RQD=27%], Moderately Weathered, Soft, Highly Fractured/Jointed, Gray		884	
13					**END OF BORING AT 13 FT**			
15							879	
20							874	
25							869	
30							864	

STANDARD PENETRATION BLOWS/FT (20 40 60 80 100)
ROCK QUALITY DESIGNATION & RECOVERY
RQD
REC
14
50/1"
17
100
27
100

LIQUID LIMIT
PLASTIC LIMIT
CALIBRATED PENETROMETER TSF (1 2 3 4 5)
WATER CONTENT %
[FINES CONTENT] %
(10 20 30 40 50)
1.7
[0.8%]
2.7

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered) **N/E**	BORING STARTED: **Jun 29 2023**	CAVE IN DEPTH:	
WL (Completion) **N/E**	BORING COMPLETED: **Jun 29 2023**	HAMMER TYPE: **Auto**	
WL (Seasonal High Water) **N/E**	EQUIPMENT: **Acker Rebel**	LOGGED BY: **MSD2**	DRILLING METHOD: **3.25" HSA**
WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Apogee Consulting Group, PA	**18:6007**	**B-02**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Wilkes-Barre VA Medical Center	**Negley's Well Drilling, Inc.**		
SITE LOCATION: **1111 East End Blvd, Plains Twp, Pennsylvania, 18711**			LOSS OF CIRCULATION
NORTHING: **703302.9**	EASTING: **2495053.2**	STATION:	SURFACE ELEVATION: **894**
			BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"	STANDARD PENETRATION BLOWS/FT (20 40 60 80 100) / ROCK QUALITY DESIGNATION & RECOVERY (RQD, REC)	LIQUID LIMIT / PLASTIC LIMIT / CALIBRATED PENETROMETER TSF (1 2 3 4 5) / WATER CONTENT % [FINES CONTENT] % (10 20 30 40 50)
	S-1	SS	17	17	Topsoil Thickness[6.00"] (GP-GM FILL) FILL, GRAVEL WITH SILT And SAND, brown and gray, moist, very dense			4-10-50/5" (60/11")	60/11"	3.7
	~~S-2~~	~~SS~~	~~1~~	~~1~~				50/1" (50/1")	50/1"	5.7
5	R-1	RC	60	60	SANDSTONE, [REC=100%,RQD=0%], Moderately Weathered, Soft, Highly Fractured/Jointed, Gray		889		100	
					END OF BORING AT 7.5 FT					
10							884			
15							879			
20							874			
25							869			
30							864			

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered) **N/E**	BORING STARTED: **Jun 29 2023**		CAVE IN DEPTH:
WL (Completion) **N/E**	BORING COMPLETED: **Jun 29 2023**		HAMMER TYPE: **Auto**
WL (Seasonal High Water) **N/E**	EQUIPMENT: **Acker Rebel**	LOGGED BY: **MSD2**	DRILLING METHOD: **3.25" HSA**
WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

RUN	DEPTH	RECOVERY	RQD
1	2.5’ to 7.5’	100%	0%

Rock Core Photographs
WILKES-BARRE VA MEDICAL CENTER

1111 EAST END BLVD, PLAINS TWP, PENNSYLVANIA
APOGEE CONSULTING GROUP, PA

Project Number:6007
Boring Number: B-01
Boring Completed: June 2023

R-1

R-2

RUN	DEPTH	RECOVERY	RQD
1	2.5’ to 7.5’	100%	0%

Rock Core Photographs
WILKES-BARRE VA MEDICAL CENTER

1111 EAST END BLVD, PLAINS TWP, PENNSYLVANIA
APOGEE CONSULTING GROUP, PA

Project Number:6007
Boring Number: B-01
Boring Completed: June 2023

Appendix C – Laboratory Testing

Laboratory Testing Summary
Grain Size Analysis/Analyses
Plasticity Chart(s)

Laboratory Testing Summary

Sample Location	Sample Number	Depth ()	^MC (%)	Soil Type	Atterberg Limits			**Percent Passing No. 200 Sieve	Moisture - Density		CBR (%)		#Organic Content (%)
					LL	PL	PI		<Maximum Density (pcf)	<Optimum Moisture (%)	0.1 in.	0.2 in.	
B-01	S-1	0.0-1.8	1.7	GW	NP	NP	NP	0.8					
B-01	S-2	2.0-2.1	2.7										
B-02	S-1	0.0-1.4	3.7										
B-02	S-2	2.0-2.1	5.7										

Notes: See test reports for test method, ^ASTM D2216-19, *ASTM D2488, **ASTM D1140-17, #ASTM D2974-20e1 < See test report for D4718 corrected values

Definitions: MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content

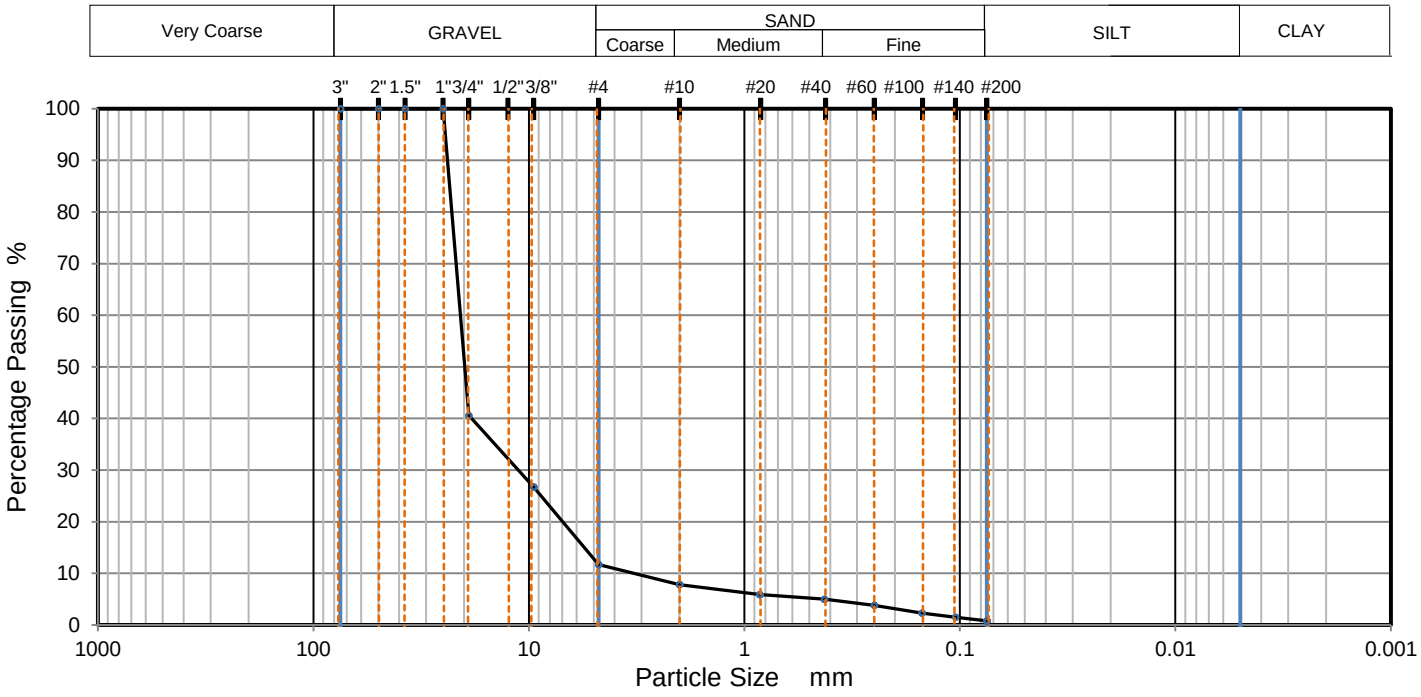
Project: Wilkes-Barre VA Medical Center
Client: Apogee Consulting Group, PA

Project No.: 18:6007
Date Reported: 7/6/2023

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - York	52-6 Grumbacher Road York, PA 17406	(717)767-4788 (717)767-5658

Tested by	Checked by	Approved by	Date Received
JGates		agolihew	

PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D6913M-17-METHOD A)

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100		
2"	100		
1 1/2"	100		
1"	100		
3/4"	41		
3/8"	27		
#4	12		
#10	8		
#20	6		
#40	5		
#60	4		
#100	2		
#140	2		
#200	1		

Dry Mass of sample, g	78.6

Sample Proportions	% dry mass
Very coarse, >3" sieve	0
Gravel, 3" to # 4 sieve	88
Coarse Sand, #4 to #10 sieve	4
Medium Sand, #10 to #40	3
Fine Sand, #40 to #200	4
Fines <#200	1

USCS	GW	Liquid Limit	NP	D90	23.870	D50	19.840	D10	3.258
AASHTO	A-1-a	Plastic Limit	NP	D85	23.330	D30	11.200	Cu	6.378
USCS Group Name	Well graded gravel	Plasticity Index	NP	D60	20.780	D15	5.532	Cc	1.853

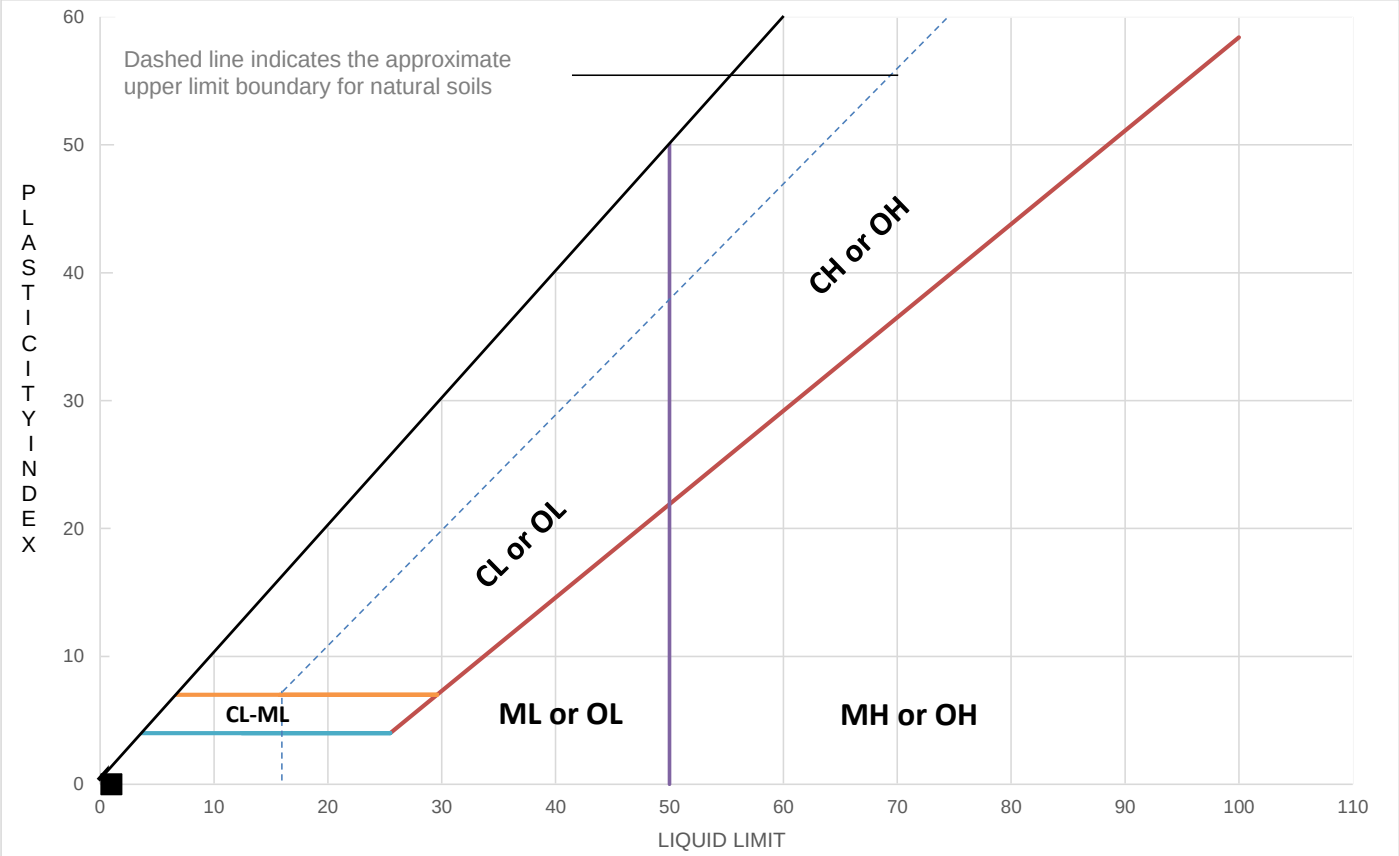
Project: Wilkes-Barre VA Medical Center
Client: Apogee Consulting Group, PA
Sample Description: Well Graded Gravel
Sample Source: B-01

Project No.: 18:6007
Depth (ft): 0.0 - 1.8
Sample No.: S-1
Date Reported: 7/6/2023

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - York	52-6 Grumbacher Road York, PA 17406	(717)767-4788 (717)767-5658

Tested by	Checked by	Approved by	Date Received	Remarks
JGates		agolihew		

LIQUID AND PLASTIC LIMITS TEST REPORT



TEST RESULTS (ASTM D4318-10 (MULTIPOINT TEST))

	Sample Location	Sample Number	Sample Depth (ft)	LL	PL	PI	%<#40	%<#200	AASHTO	USCS	Material Description
■	B-01	S-1	0.00-1.75	NP	NP	NP	5.0	0.8	A-1-a	GW	Well Graded Gravel

Project: Wilkes-Barre VA Medical Center
Client: Apogee Consulting Group, PA

Project No.: 18:6007
Date Reported: 7/6/2023

Office / Lab	Address	Office Number / Fax
ECS Mid-Atlantic LLC - York	52-6 Grumbacher Road York, PA 17406	(717)767-4788 (717)767-5658

Tested by	Checked by	Approved by	Date Received
JGates		agolihew	