

Delaware Army National Guard Readiness Center
DEARNG #20017-RRTSRCCONS; NGB #100093

Addendum 2
August 9, 2023

1. Bidder Questions and Answers. (attached)
2. The Project Manual is amended in accordance with Amendment No. 1. (attached)
3. For the drawings indicated in the table below, replace the previous issued drawings with new drawings. (attached)

Drawing	Title	Rev	Date
G-000	COVER SHEET	1	08/07/23
LS-001	CODE REVIEW	1	08/07/23
C-101	EXISTING CONDITIONS PLAN	1	08/07/23
C-104	DEMOLITION PLAN	1	08/07/23
C-105	DEMOLITION PLAN – BID ALTERNATE #9	1	08/07/23
C-106	SITE LAYOUT PLAN	1	08/07/23
C-107	SITE LAYOUT PLAN – BID ALTERNATE #1 AND #9	1	08/07/23
C-108	GEOMETRY PLAN	1	08/07/23
C-109	GEOMETRY PLAN – BID ALTERNATE #1 AND #9	1	08/07/23
C-110	SITE DETAILS	1	08/07/23
C-111	SITE DETAILS	1	08/07/23
C-112	GRADING PLAN	1	08/07/23
C-113	GRADING PLAN – BID ALTERNATE #1 AND #9	1	08/07/23
C-114	UTILITY PLAN	1	08/07/23
C-115	STORM SEWER PROFILES	1	08/07/23
C-116	SANITARY SEWER PROFILES	1	08/07/23
C-117	WATER PROFILES	1	08/07/23
C-119	UTILITY DETAILS	1	08/07/23
C-120	COVER SHEET AND GENERAL NOTES	1	08/07/23
C-121	PRE-CONSTRUCTION STORMWATER MANAGEMENT PLAN	1	08/07/23
C-122	CONSTRUCTION SITE STORMWATER MANAGEMENT PLAN	1	08/07/23
C-123	CONSTRUCTION SITE NOTES AND DETAILS	1	08/07/23
C-124	CONSTRUCTION SITE NOTES AND DETAILS	1	08/07/23
C-125	CONSTRUCTION SITE NOTES AND DETAILS	1	08/07/23
C-126	STORMWATER MANAGEMENT PLAN FACILITY #1	1	08/07/23

C-127	STORMWATER MANAGEMENT PLAN FACILITY #1	1	08/07/23
C-129	STORMWATER MANAGEMENT PLAN FACILITY #3	1	08/07/23
A-006	SQUARE FOOTAGE ANALYSIS	1	08/07/23
A-101	FLOOR PLAN	1	08/07/23
A-102	FF&E PLAN	1	08/07/23
A-103	REFLECTED CEILING PLAN	1	08/07/23
A-105	FINISH PLAN	1	08/07/23
A-408	ENLARGED OFFICE PLAN	1	08/07/23
A-601	DOOR & WINDOW SCHEDULES	1	08/07/23
A-703	ALTERNATE 7 – FLOOR FINISHES	1	08/07/23
FP-101	CEILING PLAN – FIRE PROTECTION	1	08/07/23
FA-101	CEILING PLAN – FIRE ALARM	1	08/07/23
M-101	FLOOR PLAN – HVAC	1	08/07/23
M-201	FLOOR PLAN – REFRIGERANT PIPING	1	08/07/23
P-102	FLOOR PLAN – DOMESTIC WATER	1	08/07/23
P-103	FLOOR PLAN – GAS, VENT AND CONDENSATE	1	08/07/23
E-002	ELECTRICAL SITE PLAN	1	08/07/23
E-101	FLOOR PLAN – LIGHTING	1	08/07/23
E-201	FLOOR PLAN – POWER	1	08/07/23
E-203	FLOOR PLAN – UNDERSLAB CONDUITS	1	08/07/23
E-301	FLOOR PLAN – LOW VOLTAGE	1	08/07/23
E-703	EQUIPMENT AND LIGHTING SCHEDULES	1	08/07/23
E-801	SITE PLAN – BID ALTERNATE #1 AND #9	1	08/07/23
E-803	PHOTOVOLTAIC – BID ALTERNATE #3	1	08/07/23

Attachments:

1. Bidder Questions and Answers
2. Amendment No. 1
3. Revised Drawings

John Sclesky, PE



Century Engineering, LLC

DEARNG # 20017-RRTSRCCONS, NGB # 100093

BIDDER QUESTIONS AND ANSWERS

Q1: Please clarify who the bid bond is made payable to?

A1: Delaware Army National Guard

Q2: Specification 00 21 13-7 Section 4.1.11 (Instructions to Bidders) calls for Affidavit of Employee Drug Testing Program to be submitted with bid and Section 5.4.5 stating the program to be submitted 2 days prior to contract execution. During site visit it was inferred the program itself was required to be submitted with bid. Please clarify.

A2: The DTP affidavit for the bidder is required with the bid. The selected firm typically has 20 days to get all contract documents to DEARNG after the notice of intent to award and that includes the DTP affidavits for all the listed subs.

Q3: Are all named subcontractors required to complete the Affidavit of Employee Drug Testing Program and be submitted with the bid?

A3: See A2 above.

Q4: Please advise government estimate for this project including additive alternates.

A4: No determination as of this response.

DEARNG # 20017-RRTSRCCONS, NGB # 100093

AMENDMENT NO. 1

The Project Manual is amended as follows:

1. Specification Section 00 01 10 TABLE OF CONTENTS. Remove previous specification section in its entirety and replace with the revised section. Attached.
2. Specification Section 00 41 13 BID FORMS. Remove previous specification section in its entirety and replace with the revised section. Attached.
3. Specification Section 01 23 00 ALTERNATES. Remove previous specification section in its entirety and replace with the revised section. Attached.
4. Add Specification Section 01 41 00 CONTRACTOR PROVIDED MATERIALS TESTING. Attached.
5. Specification Section 02 41 19 SELECTIVE DEMOLITION. Remove previous specification section in its entirety and replace with revised section. Attached.
6. Add Specification Section 02 61 13 CONTAMINATED MATERIALS MANAGEMENT. Attached.
7. Specification Section 08 71 00 DOOR HARDWARE. Remove previous specification section in its entirety and replace with revised section. Attached.
8. Add Specification Section 26 27 43 ELECTRIC-VEHICLE SERVICE EQUIPMENT – AC LEVEL 2. Attached.
9. Add APPENDIX 9 SOIL ANALYTICAL RESULTS cover sheet and the Soil Analytical Results data sheets. Attached.
10. Add APPENDIX 10 GEOTECHNICAL INVESTIGATION REPORT cover sheet and the Geotechnical Investigation Report. Attached.

10 Attachments:

1. Section 00 01 10 TABLE OF CONTENTS
2. Section 00 41 13 BID FORMS
3. Section 01 23 00 ALTERNATES
4. Section 01 41 00 CONTRACTOR PROVIDED MATERIALS TESTING
5. Section 02 41 19 SELECTIVE DEMOLITION

6. Section 02 61 13 CONTAMINATED MATERIALS MANAGEMENT
7. Section 08 71 00 DOOR HARDWARE
8. Section 26 27 43 ELECTRIC-VEHICLE SERVICE EQUIPMENT – AC LEVEL 2
9. Appendix 9 – SOIL ANALYTICAL RESULTS cover sheet and data sheets.
10. Appendix 10 – GEOTECHNICAL INVESTIGATION REPORT cover sheet and report.

End of Amendment No. 1

SECTION 00 01 10 – TABLE OF CONTENTS

A. Specifications for this project are arranged in accordance with the Construction Specification Institute numbering system and format. Section numbering is discontinuous and all numbers not appearing in the Table of Contents are not used for this Project.

B. DOCUMENTS BOUND HEREWITH

Division	Section Title
----------	---------------

DIVISION 00 – PROCUREMENT AND CONTRACT REQUIREMENTS

INTRODUCTORY INFORMATION

00 01 07SEALS PAGE
00 01 10TABLE OF CONTENTS
00 01 15LIST OF DRAWING SHEETS

PROCUREMENT REQUIREMENTS

00 11 16INVITATION TO BID
00 21 13INSTRUCTIONS TO BIDDERS
00 26 00PROCUREMENT SUBSTITUTION PROCEDURES
00 31 46PERMITS
00 41 13BID FORMS
00 43 13BID BOND

CONTRACTING REQUIREMENTS

00 52 13STANDARD FORM OF AGREEMENT BETWEEN OWNER AND
.....CONTRACTOR
.....(SAMPLE AIA A101-2017)
.....(SAMPLE AIA A101-2017 – EXHIBIT A)
00 54 13SUPPLEMENT TO AGREEMENT BETWEEN OWNER & CONTRACTOR
.....A101-2017
00 54 14SUPPLEMENT TO A101-2017 – EXHIBIT A – INSURANCE & BONDS
00 61 13.13.....PERFORMANCE BOND
00 61 13.16.....PAYMENT BOND
00 62 76APPLICATION AND CERTIFICATE FOR PAYMENT FORMS
.....(SAMPLE AIA G702 & G703)
00 72 13GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION
.....A201-2017
.....(SAMPLE AIA A201-2017)
00 73 13SUPPLEMENTARY GENERAL CONDITIONS A201 - 2017
00 73 46WAGE DETERMINATION SCHEDULE
00 81 13GENERAL REQUIREMENTS
00 81 14DRUG TESTING FORMS
00 81 15AFFIDAVIT OF CRAFT TRAINING COMPLIANCE

DIVISION 01 - GENERAL REQUIREMENTS

01 11 00SUMMARY OF WORK
01 14 00WORK RESTRICTIONS
01 22 00UNIT PRICES
01 23 00ALTERNATES

01 25 00	SUBSTITUTION PROCEDURES
01 26 00	CONTRACT MODIFICATION PROCEDURES
01 29 00	PAYMENT PROCEDURES
01 31 00	PROJECT MANAGEMENT AND COORDINATION
01 31 50	FIELD ENGINEERING
01 32 00	CONSTRUCTION PROGRESS DOCUMENTATION
01 33 00	SUBMITTAL PROCEDURES
01 35 43	ENVIRONMENTAL PROCEDURES
01 40 00	QUALITY REQUIREMENTS
01 41 00	CONTRACTOR PROVIDED MATERIALS TESTING
01 42 00	REFERENCES
01 50 00	TEMPORARY FACILITIES AND CONTROLS
01 60 00	PRODUCT REQUIREMENTS
01 73 00	EXECUTION
01 74 19	CONSTRUCTION WASTE MANAGEMENT
01 77 00	CLOSEOUT PROCEDURES
01 78 23	OPERATIONS AND MAINTENANCE DATA
01 78 39	PROJECT RECORD DOCUMENTS
01 91 13	GENERAL COMMISSIONING REQUIREMENTS (To be provided by future addendum)
01 91 19.43.....	EXTERIOR ENCLOSURE COMMISSIONING (To be provided by future addendum)

DIVISION 02 – EXISTING CONDITIONS

02 41 19	SELECTIVE DEMOLITION
02 61 13	CONTAMINATED MATERIALS MANAGEMENT

DIVISION 03 – CONCRETE

03 10 00	CONCRETE FORMING AND ACCESSORIES
03 20 00	CONCRETE REINFORCING
03 30 00	CAST-IN-PLACE CONCRETE

DIVISION 04 – MASONRY

04 22 00	CONCRETE UNIT MASONRY
04 26 13	MASONRY VENEER
04 72 00	CAST STONE MASONRY
04 73 00	MANUFACTURED STONE CLADDING

DIVISION 05 – METALS

05 12 00	STRUCTURAL STEEL FRAMING
05 21 00	STEEL JOIST FRAMING
05 31 00	STEEL DECKING
05 50 00	METAL FABRICATIONS
05 51 33	METAL LADDERS
05 52 13	PIPE AND TUBE RAILINGS

DIVISION 06 – WOOD, PLASTICS, COMPOSITES

06 10 53	MISCELLANEOUS ROUGH CARPENTRY
06 41 13	WOOD-VENEER-FACED ARCHITECTURAL CABINETS
06 41 16	PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

07 11 13BITUMINOUS DAMPPROOFING
07 21 00THERMAL INSULATION
07 21 16SOUND ATTENUATION BLANKETS
07 27 02CLOSED-CELL SPRAY POLYURETHANE FOAM
07 42 13.16.....METAL PLATE WALL PANELS
07 54 23THERMOPLASTIC-POLYOLEFIN (TPO) ROOFING
07 62 00SHEET METAL FLASHING AND TRIM
07 72 00ROOF ACCESSORIES
07 72 33ROOF HATCH RAIL SYSTEM
07 84 13PENETRATION FIRESTOPPING
07 92 00JOINT SEALANTS

DIVISION 08 – OPENINGS

08 11 13HOLLOW METAL DOORS AND FRAMES
08 14 16FLUSH WOOD DOORS
08 31 13ACCESS DOORS AND FRAMES
08 33 13COILING COUNTER DOORS
08 33 23OVERHEAD COILING DOORS
08 34 59VAULT DOORS AND DAY GATES
08 43 00ALUMINUM-FRAMED STOREFRONT SYSTEMS – BLAST RESISTANT
08 71 00DOOR HARDWARE
08 80 00GLAZING
08 91 19FIXED LOUVERS
08 95 00VERTICAL TRANSLUCENT PANEL SYSTEM

DIVISION 09 – FINISHES

09 21 16GYPSUM BOARD SYSTEMS
09 30 13CERAMIC TILING
09 51 23ACOUSTICAL TILE CEILINGS
09 65 13RESILIENT BASE AND ACCESSORIES
09 65 19RESILIENT TILE FLOORING
09 68 13TILE CARPETING
09 77 20FIBERGLASS REINFORCED WALL PANELS
09 84 33SOUND-ABSORBING WALL UNITS
09 91 13EXTERIOR PAINTING
09 91 23INTERIOR PAINTING

DIVISION 10 – SPECIALTIES

10 12 00DISPLAY CASES
10 14 16PLAQUES
10 14 19DIMENSIONAL LETTER SIGNAGE
10 14 23.16.....ROOM-IDENTIFICATION PANEL SIGNAGE
10 22 13WIRE MESH PARTITIONS
10 22 39FOLDING PANEL PARTITIONS
10 26 00WALL AND DOOR PROTECTION
10 28 00TOILET, BATH, AND LAUNDRY ACCESSORIES
10 44 13FIRE PROTECTION CABINETS
10 44 16FIRE EXTINGUISHERS
10 51 13METAL LOCKERS

10 53 00EXTRUDED ALUMINUM WALKWAY CANOPIES

DIVISION 11 – EQUIPMENT

11 13 13LOADING DOCK BUMPERS

11 13 19STATIONARY LOADING DOCK EQUIPMENT

11 40 00FOODSERVICE EQUIPMENT

DIVISION 12 – FURNISHINGS

12 24 13MANUAL ROLLER SHADES

12 32 16MANUFACTURED PLASTIC-LAMINATE-CLAD CASEWORK

12 36 23.13.....PLASTIC-LAMINATE-CLAD COUNTERTOPS

12 48 13ENTRANCE FLOOR MATS AND FRAMES

DIVISION 13 – SPECIAL CONSTRUCTION

13 34 19METAL BUILDING SYSTEMS

DIVISION 20 – MECHANICAL

20 00 00GENERAL MECHANICAL REQUIREMENTS

DIVISION 21 – FIRE SUPPRESSION

21 00 00FIRE PROTECTION

21 08 00COMMISSIONING OF FIRE SUPPRESSION (To be provided by future addendum)

DIVISION 22 – PLUMBING

22 00 00GENERAL PLUMBING REQUIREMENTS

22 08 00COMMISSIONING OF PLUMBING (To be provided by future addendum)

22 11 13FACILITY WATER DISTRIBUTION PIPING

22 13 13FACILITY SANITARY SEWERS

22 13 23GREASE WASTE INTERCEPTORS

DIVISION 23 – HEATING, VENTILATING, AND AIR CONDITIONING

23 00 00HEATING & AIR CONDITIONING

23 08 00COMMISSIONING OF HVAC (To be provided by future addendum)

DIVISION 26 – ELECTRICAL

26 00 00GENERAL ELECTRICAL REQUIREMENTS

26 05 00ELECTRICAL METHODS AND MATERIALS

26 08 00COMMISSIONING OF ELECTRICAL SYSTEMS (To be provided by future addendum)

26 27 43ELECTRIC-VEHICLE SERVICE EQUIPMENT – AC Level 2

26 31 00PHOTOVOLTAIC COLLECTORS

26 32 13EMERGENCY POWER SYSTEM

26 41 13LIGHTNING PROTECTION SYSTEM

26 50 00LIGHTING

DIVISION 27 - COMMUNICATIONS

27 05 00COMMUNICATION SYSTEMS

27 50 00DISTRIBUTED ANTENNA SYSTEM

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

TABLE OF CONTENTS

00 01 10 - 4

28 10 00ELECTRONIC SAFETY AND SECURITY
28 31 76FIRE ALARM AND MASS NOTIFICATION SYSTEM

DIVISION 31 – EARTHWORK

31 31 16TERMITE CONTROL

DIVISION 32 – EXTERIOR IMPROVEMENTS

32 31 13.53.....HIGH-SECURITY CHAIN LINK FENCES AND GATES
32 33 13SITE BICYCLE RACKS

DIVISION 33 – UTILITIES

33 05 00COMMON WORK RESULTS FOR UTILITIES
33 42 00STORMWATER CONVEYANCE

REFERENCED STANDARDS

DELAWARE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION (JUNE 2022, OR MOST CURRENT AT THE DATE OF ADVERTISEMENT)

NOTE: Provisions within the referenced specification sections regarding material and execution requirements are applicable. The provisions regarding DelDOT provided services including survey, testing, inspection, measurement, payment or other services are not applicable.

SECTION 201 – CLEARING AND GRUBBING
SECTION 202 – EXCAVATION AND EMBANKMENT
SECTION 207 – STRUCTURAL EXCAVATION AND BACKFILLING
SECTION 209 – BORROW
SECTION 211 – REMOVAL OF STRUCTURES AND OBSTRUCTIONS
SECTION 301 – GRADED AGGREGATE BASE COURSE
SECTION 401 – BITUMINOUS PAVEMENT
SECTION 501 – PORTLAND CEMENT CONCRETE PAVEMENT
SECTION 504 – CRACK AND JOINT SEALING
SECTION 601 – PIPE CULVERTS
SECTION 602 – DRAINAGE STRUCTURES
SECTION 611 – CONCRETE REINFORCEMENT
SECTION 701 – PCC CURB, INTEGRAL PCC CURB, PCC MONOLITHIC MEDIAN, AND CURB OPENINGS
SECTION 705 – PCC SIDEWALK, PEDESTRIAN CONNECTIONS, AND DETECTABLE WARNING SURFACE
SECTION 707 – RIPRAP
SECTION 708 – GEOTEXTILES
SECTION 709 – UNDERDRAINS
SECTION 762 – SAW CUTTING AND BUTT JOINTS
SECTION 817 – PAVEMENT MARKINGS
SECTION 818 – SIGN PANELS
SECTION 819 – SIGN POSTS
SECTION 908 – SOIL STABILIZATION PRACTICES
SECTION 910 – STORMWATER MANAGEMENT FACILITIES
SECTION 911 – PLANTINGS
SECTION 1001 – BORROW
SECTION 1002 – CLAY BORROW
SECTION 1004 – COARSE AGGREGATE
SECTION 1005 – GRADED AGGREGATES
SECTION 1006 – STONE FOR RIPRAP
SECTION 1022 – PORTLAND CEMENT CONCRETE PRODUCTION
SECTION 1031 – PIPE CULVERTS
SECTION 1037 – EMBEDDED REINFORCEMENT AND HARDWARE
SECTION 1042 – JOINT/CRACK SEALANT MATERIAL
SECTION 1047 – GROUT AND FLOWABLE FILL
SECTION 1060 – GEOTEXTILE
SECTION 1071 – PAVEMENT MARKINGS
SECTION 1072 – SIGN POSTS

**STATE OF DELAWARE DEPARTMENT OF TRANSPORTATION STANDARD
CONSTRUCTION DETAILS (2022 STANDARDS, OR MOST CURRENT AT THE DATE OF
ADVERTISEMENT)**

**STATE OF DELAWARE DEPARTMENT OF NATURAL RESOURCES AND
ENVIRONMENTAL CONTROL EROSION AND SEDIMENT CONTROL HANDBOOK (FEB.
2019 OR MOST CURRENT AT THE DATE OF ADVERTISEMENT)**

SECTION 3.1 – SEDIMENT TRAPPING PRACTICES

SECTION 3.2 – DEWATERING PRACTICES

SECTION 3.3 – WATER CONTROL PRACTICES

SECTION 3.4 – SOIL STABILIZATION PRACTICES

SECTION 3.6 – POLLUTION PREVENTION PRACTICES

SECTION 3.7 – MISCELLANEOUS PRACTICES

APPENDICES

1. DELAWARE ARCHITECTURAL ACCESSIBILITY BOARD APPROVAL
2. STATE HISTORIC PRESERVATION OFFICE FINDING OF NO ADVERSE EFFECT
3. US ARMY CORPS OF ENGINEERS NWP-33 PERMIT – PENDING
4. DNREC STORMWATER MANAGEMENT PERMIT – PENDING
5. DNREC REGULATION 1102 PERMIT FOR STATIONARY EMERGENCY GENERATOR – TO
BE COMPLETED BY CONTRACTOR
6. DELAWARE STATE FIRE MARSHAL PLAN REVIEW - COMPLETE
7. DELAWARE DEPARTMENT OF TRANSPORTATION LETTER OF NO CONTENTION (LONC)
8. FOODSERVICE EQUIPMENT LIST
9. SOIL ANALYTICAL RESULTS
10. GEOTECHNICAL INVESTIGATION REPORT

END OF SECTION 00 01 10

(This Page Intentionally Left Blank)

Addendum No. 2
August 8, 2023

BID FORM

Name of Bidder: _____

Delaware Business License No.: _____ **Taxpayer ID No.:** _____

(Other License Nos.): _____

Phone No.: () - **Fax No.:** () -

\$ _____
(\$ _____)

ALTERNATES

Alternate prices conform to the applicable construction documents. Refer to the applicable construction documents for a complete description of the following Alternates:

ALTERNATE No. 1: Concrete MOV Parking Lot, EAST (Drawings C-107, C-109, C-111, C-113, E-801)

Add: _____
(\$ _____)

ALTERNATE No. 2: Assembly Hall Partitions (Drawings A-411, A-701, S-102, S-501, S-502)

Add: _____
(\$ _____)

ALTERNATE No. 3: Photo Voltaic (Drawings E-802, E-803)

Add: _____
(\$ _____)

ALTERNATE No. 4: Emergency Generator (Drawing E-804)

Add: _____
(\$ _____)

ALTERNATES (CONTINUED)

ALTERNATE No. 5: Faux Masonry (Drawings A-303, A-304, A-305, A-501, A-502, A-700)

Add: _____
(\$ _____)

ALTERNATE No. 6: Lockers (Drawing A-704)

Add: _____
(\$ _____)

ALTERNATE No. 7: Floor Finishes (Drawings A-602, A-703)

Add: _____
(\$ _____)

ALTERNATE No. 8: Full Service Kitchen (Drawings A-702, P-801, E-805)

Add: _____
(\$ _____)

ALTERNATE No. 9: Concrete MOV Parking Lot, WEST (Drawings C-105, C-107, C-109, C-111, C-113, E-801)

Add: _____
(\$ _____)

ALTERNATE No. 10: Pre-Manufactured Flammable Materials Storage (Bldg. 9) and Controlled Waste Handling (Bldg. 10) Facilities (Drawings C-106, M-108)

Add: _____
(\$ _____)

UNIT PRICES

Unit prices conform to the applicable construction documents. Refer to the applicable construction documents for a complete description of the following Unit Prices:

	<u>DESCRIPTION</u>	<u>EST. QTY</u>	<u>UNIT PRICE</u>
UNIT PRICE NO. 1:	Fiber Optic Cable (12 STRAND MM FIBER/12 STRAND SM FIBER/6 PR COPPER/1 635 SERIES COAX)	1,100 LF	\$ _____/LF
UNIT PRICE NO. 2:	Undercut Excavation (This item shall be in accordance with DeIDOT Standard Specification Sections 202, 207, 209, and 1001. Materials excavated under this item shall be disposed of on-site as directed by DEARNG)	500 CY	\$ _____/CY

DELAWARE ARMY NATIONAL GUARD READINESS CENTER
RIVER ROAD TRAINING SITE
NEW CASTLE COUNTY, DELAWARE
DEARNG # 20017-RRTSRCCONS, NGB # 100093

BID FORM

I/We acknowledge Addendums numbered _____ and the price(s) submitted include any cost/schedule impact they may have.

This bid shall remain valid and cannot be withdrawn for thirty (30) days from the date of opening of bids (60 days for School Districts and Department of Education), and the undersigned shall abide by the Bid Security forfeiture provisions. Bid Security is attached to this Bid.

The Owner shall have the right to reject any or all bids, and to waive any informality or irregularity in any bid received.

This bid is based upon work being accomplished by the Sub-Contractors named on the list attached to this bid.

Should I/We be awarded this contract, I/We pledge to achieve substantial completion of all the work within _____ calendar days of the Notice to Proceed.

The undersigned represents and warrants that he has complied and shall comply with all requirements of local, state, and national laws; that no legal requirement has been or shall be violated in making or accepting this bid, in awarding the contract to him or in the prosecution of the work required; that the bid is legal and firm; that he has not, directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken action in restraint of free competitive bidding.

Upon receipt of written notice of the acceptance of this Bid, the Bidder shall, within twenty (20) calendar days, execute the agreement in the required form and deliver the Contract Bonds, and Insurance Certificates, required by the Contract Documents.

I am / We are an Individual / a Partnership / a Corporation

By _____ Trading as _____
(Individual's / General Partner's / Corporate Name)

(State of Corporation)

Business Address: _____

Witness: _____ **By:** _____
(SEAL) (Authorized Signature)

(Title)
Date: _____

ATTACHMENTS

Sub-Contractor List
Non-Collusion Statement
Affidavit of Employee Drug Testing Program
Affidavit of Contractor Qualifications

DELAWARE ARMY NATIONAL GUARD READINESS CENTER
RIVER ROAD TRAININIG SITE
NEW CASTLE COUNTY, DELAWARE
DEARNG # 20017-RRTSRCCONS, NGB # 100093

BID FORM

SUBCONTRACTOR LIST

In accordance with Title 29, Chapter 69, Section 6962(d)(10)b of the Delaware Code, the following subcontractor listing must accompany any bid submittal. The bidder must list **in each category** the full name and address (City & State) of the sub-contractor that the bidder will be using to perform the work and provide material for that subcontractor category. Should the bidder's listed subcontractor intend to provide any of their subcontractor category of work through a third-tier contractor, the bidder shall list that third-tier contractor's full name and address (City & State). **If the bidder intends to perform any category of work itself, it must list its full name and address.** For clarification, if the bidder intends to perform the work themselves, the bidder **may not** insert "not applicable", "N/A", "self" or anything other than its own full name and address (City & State). To do so shall cause the bid to be rejected. In addition, the failure to produce a completed subcontractor list with the bid submittal shall cause the bid to be rejected. If you have more than three (3) third-tier contractors to report in any subcontractor category, print out additional page(s) containing the appropriate category, complete the rest of your list of third-tier contractors for that category, notate the addition in parentheses as (CONTINUATION) next to the subcontractor category and an asterisk (*) next to any additional third-tier contractors, and submit it with your bid.

<u>Subcontractor Category</u>	<u>Subcontractor</u>	<u>Address (City & State)</u>	<u>Subcontractors tax-payer ID # or Delaware Business license #</u>
1. Earthwork	A		
	B		
2. Site Utilities	A		
	B		
3. Site Paving	A		
	B		

DELAWARE ARMY NATIONAL GUARD READINESS CENTER
RIVER ROAD TRAINING SITE
NEW CASTLE COUNTY, DELAWARE
DEARNG # 20017-RRTSRCCONS, NGB # 100093

BID FORM

<u>Subcontractor Category</u>	<u>Subcontractor</u>	<u>Address (City & State)</u>	<u>Subcontractors tax-payer ID # or Delaware Business license #</u>
4. Concrete	A		
	B		
5. Structural Steel	A		
	B		
6. Masonry	A		
	B		
7. Roofing	A		
	B		
8. Carpentry	A		
	B		
9. Glazing	A		
	B		
10. Mechanical	A		
	B		
11. Plumbing	A		
	B		
12. Electrical	A		
	B		

DELAWARE ARMY NATIONAL GUARD READINESS CENTER
RIVER ROAD TRAINING SITE
NEW CASTLE COUNTY, DELAWARE
DEARNG # 20017-RTSRCCONS, NGB # 100093

BID FORM

<u>Subcontractor Category</u>	<u>Subcontractor</u>	<u>Address (City & State)</u>	<u>Subcontractors tax-payer ID # or Delaware Business license #</u>
13. Communications	A		
	B		
14. Fire Protection	A		
	B		

DELAWARE ARMY NATIONAL GUARD READINESS CENTER
RIVER ROAD TRAININIG SITE
NEW CASTLE COUNTY, DELAWARE
DEARNG # 20017-RRTSRCCONS, NGB # 100093

BID FORM

NON-COLLUSION STATEMENT

This is to certify that the undersigned bidder has neither directly nor indirectly, entered into any agreement, participated in any collusion or otherwise taken any action in restraint of free competitive bidding in connection with this proposal submitted this date to the Delaware Army National Guard.

All the terms and conditions of Contract No. DEARNG # 20017-RRTSRCCONS, NGB # 100093 have been thoroughly examined and are understood.

NAME OF BIDDER: _____

**AUTHORIZED REPRESENTATIVE
(TYPED):** _____

**AUTHORIZED REPRESENTATIVE
(SIGNATURE):** _____

TITLE: _____

ADDRESS OF BIDDER: _____

E-MAIL: _____

PHONE NUMBER: _____

Sworn to and Subscribed before me this _____ day of _____ 20____.

My Commission expires _____. NOTARY PUBLIC _____.

THIS PAGE MUST BE SIGNED AND NOTARIZED FOR YOUR BID TO BE CONSIDERED.

DELAWARE ARMY NATIONAL GUARD READINESS CENTER
RIVER ROAD TRAINING SITE
NEW CASTLE COUNTY, DELAWARE
DEARNG # 20017-RRTSRCCONS, NGB # 100093

BID FORM

AFFIDAVIT
OF
EMPLOYEE DRUG TESTING PROGRAM

4104 Regulations for the Drug Testing of Contractor and Subcontractor Employees Working on Large Public Works Projects requires that Contractors and Subcontractors implement a program of mandatory drug testing for Employees who work on Large Public Works Contracts funded all or in part with public funds.

We hereby certify that we have in place or will implement during the entire term of the contract a Mandatory Drug Testing Program for our employees on the jobsite, including subcontractors, that complies with this regulation:

Contractor/Subcontractor Name: _____

Contractor/Subcontractor Address: _____

Authorized Representative (typed or printed): _____

Authorized Representative (signature): _____

Title: _____

Sworn to and Subscribed before me this _____ day of _____ 20____.

My Commission expires _____. NOTARY PUBLIC _____.

THIS PAGE MUST BE SIGNED AND NOTARIZED FOR YOUR BID TO BE CONSIDERED.

DELAWARE ARMY NATIONAL GUARD READINESS CENTER
RIVER ROAD TRAININIG SITE
NEW CASTLE COUNTY, DELAWARE
DEARNG # 20017-RRTSRCCONS, NGB # 100093

BID FORM

AFFIDAVIT
OF
CONTRACTOR QUALIFICATIONS

We hereby certify that we will abide by the contractor's qualifications outlined in the construction bid specifications for the duration of the contract term.

In accordance with Title 29, Chapter 69, Section 6962(d)(10)b.3 of the Delaware Code, after a contract has been awarded the successful bidder shall not substitute another subcontractor whose name was submitted on the Subcontractor Form except for the reasons in the statute and not without written consent from the awarding agency. Failure to utilize the subcontractors on the list will subject the successful bidder to penalties as outlined in the General Requirements Section 5.2 of the contract.

Contractor Name: _____

Contractor Address: _____

Authorized Representative (typed or printed): _____

Authorized Representative (signature): _____

Title: _____

Sworn to and Subscribed before me this _____ day of _____ 20____.

My Commission expires _____. NOTARY PUBLIC _____.

THIS PAGE MUST BE SIGNED AND NOTARIZED FOR YOUR BID TO BE CONSIDERED.

END OF SECTION 00 41 13

This Page Intentionally Left Blank

SECTION 01 23 00 - ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for alternates.

1.2 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
 - 2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternates into the Work. No other adjustments are made to the Contract Sum.

1.3 PROCEDURES

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Execute accepted alternates under the same conditions as other work of the Contract.
- C. Schedule: A schedule of alternates is included at the end of this Section. Drawings referenced in schedule contain requirements necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

- A. Alternate No. 1: Concrete MOV Parking Lot, EAST (Drawings C-107, C-109, C-111, C-113, E-801).

- B. Alternate No. 2: Assembly Hall Partitions (Drawings A-411, A-701, S-102, S-501, S-502)
- C. Alternate No. 3: Photo Voltaic (Drawings E-802, E-803)
- D. Alternate No. 4: Emergency Generator (Drawing E-804)
- E. Alternate No. 5: Faux Masonry (Drawings A-303, A-304, A-305, A-501, A-502, A-700)
- F. Alternate No. 6: Lockers (Drawing A-704)
- G. Alternate No. 7: Floor Finishes (Drawings A-602, A-703)
- H. Alternate No. 8: Full Service Kitchen (Drawings A-702, P-801, E-805)
- I. Alternate No. 9: Concrete MOV Parking Lot, WEST (Drawings C-105, C-107, C-109, C-111, C-113, E-801)
- J. Alternate No. 10: Pre-Manufactured Flammable Materials Storage (Bldg. 9) and Controlled Waste Handling (Bldg. 10) Facilities (Drawings C-106, M-801)

END OF SECTION 01 23 00

SECTION 01 41 00 – CONTRACTOR PROVIDED MATERIALS TESTING

PART 1 - GENERAL

1.1 SUMMARY

- A. For this contract, the Contractor is required to engage an independent testing firm to provide materials sampling and testing in the field and the laboratory in accordance with the applicable sections of the DelDOT Materials and Research Manual that can be viewed online at:

https://deldot.gov/Publications/manuals/mat_research/index.shtml

- B. Sampling and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
1. Specified tests and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
 2. Requirements for Contractor to provide quality-assurance and quality-control services required by other sections of these specifications or authorities having jurisdiction are not limited by provisions of this Section.

1.2 SUBMITTALS

- A. Testing Agency Qualifications: Submit proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority. The firm selected by the Contractor shall be submitted to and approved by DEARNG prior to beginning work on the project.
- B. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, receipts for fee payments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.3 REPORTS AND DOCUMENTS

- A. Test Reporting: Provide test results electronically to DEARNG in PDF format.
1. Failing Tests: Results of any tests failing to meet specifications shall immediately be sent to DEARNG as soon as the results are available in order that necessary field changes can be made.
 2. Passing Tests: Send passing test results to DEARNG within 3 working days.
- B. Prepare and submit certified written reports specified. Include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, telephone number, and email address of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspection.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: The testing firm shall be AASHTO accredited for materials testing and shall be Troxler Certified for nuclear density testing.
- B. Testing: Where testing agency is indicated to perform testing for compliance with specified requirements, comply with the following:
 1. Contractor Responsibilities:
 - a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 2. Testing Agency Responsibilities: Submit a certified written report of each test and quality-assurance service to Engineer, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

1.5 QUALITY CONTROL

- A. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.
 1. Engage a qualified testing agency to perform quality-control services.
 2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspection will be performed.
 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.

4. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- B. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- C. Testing Agency Responsibilities: Cooperate with Engineer and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Engineer and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected Work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform duties of Contractor.
- D. Contractor's Associated Requirements and Services: Cooperate with agencies and representatives performing required tests and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples.
 5. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 6. Security and protection for samples and for testing and inspection equipment at Project site.
- E. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
1. Date test or inspection was conducted.
 2. Description of the Work tested or inspected.
 3. Date test or inspection results were transmitted to Engineer.
 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Engineer's reference during normal working hours.
1. Submit log at Project closeout as part of Project Record Documents.

3.2 SAMPLING AND TESTING REQUIREMENTS

- A. The testing firm shall perform in the field sampling and testing, and laboratory testing as listed below.
- B. The chart below lists the items requiring sampling and/or testing. The sampling and testing is to be performed per the Sections of the DelDOT Materials and Research Manual noted for each work item. Note that Tables B-1 and C-15 in the DelDOT Materials and Research Manual also include the minimum testing frequency required for each item.

Work Item Sampled/Tested	Anticipated Testing Locations	Materials & Research Manual Sections
Soil Sampling and Moisture/Density Testing	Road and Structure Subgrade, Embankment, Borrow, Pipe and Utility Backfill	Division C200; DOH 2, DOH 3, Table B-1 (Items 202000, 208000, 209003 and 209006)
Graded Aggregate (GABC)	Roadway, Structure, and/or Sidewalk bases	Division C300; DOH 2, DOH 3, Table B-1 (Item 302007)
Asphalt Pavement	Compaction tests for all Paved Areas Shown on the Plans	Division C400; DOH 16
Concrete Pavement	Air, Slump, required cores, and cylinders for all Paved Areas Shown on the Plans	Division C500; DOH 11, DOH 12, Table C-15, ASTM C 39, AASHTO T23
Sidewalk, Curb, and Gutter Concrete	Air, Slump, and required cylinders for all Areas Shown on the Plans	Division C700; DOH 11, Table B-1 (Items 701022 and 705001)

CONTRACTOR PROVIDED MATERIALS TESTING

Note that testing frequency above the minimum requirements may be needed in the field to control the work and assure specification compliance.

3.3 REPAIR AND PROTECTION

- A. General: On completion of sampling and testing and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified. Restore patched areas and extend restoration into adjoining areas.
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

3.4 MEASUREMENT AND PAYMENT

- A. The sampling and testing work will not be measured separately. All costs shall be included in the contractor's Lump Sum bid price for the contract. Costs shall include selecting and submitting the independent testing firm for approval by DEARNG, performing all materials sampling and testing in the field and the laboratory, and preparing and submitting all test reports to DEARNG.

END OF SECTION 01 41 00

This Page Intentionally Left Blank

SECTION 02 41 19 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Demolition and removal of selected site elements.

1.2 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.

1.3 PREINSTALLATION MEETINGS

- A. Predemolition Conference: Conduct conference at Project site .

1.4 INFORMATIONAL SUBMITTALS

- A. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property , for environmental protection , for dust control and , for noise control. Indicate proposed locations and construction of barriers.

1.5 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- C. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
1. Hazardous materials will be removed by Owner before start of the Work.
 2. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- D. Storage or sale of removed items or materials on-site is not permitted.
- E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.
- F. Arrange selective demolition schedule so as not to interfere with Owner's operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
1. Arrange to shut off utilities with utility companies.
 2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
 - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.

3.3 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

- B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
- C. Remove temporary barricades and protections where hazards no longer exist.

3.4 SELECTIVE DEMOLITION

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
 - 2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
 - 4. Maintain fire watch during and for at least 2 hours after flame-cutting operations.
 - 5. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 - 6. Dispose of demolished items and materials promptly. Comply with requirements in Section 01 74 19 "Construction Waste Management."
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

3.5 CLEANING

- A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction. and recycle or dispose of them according to Section 01 74 19 "Construction Waste Management."
 - 1. Do not allow demolished materials to accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
 - 4. Comply with requirements specified in Section 01 74 19 "Construction Waste Management."
 - 5. Burning: Do not burn demolished materials.

- B. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 02 41 19

SECTION 06 61 13 – CONTAMINATED MATERIALS MANAGEMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. The sample results from preliminary sampling indicate that the soils at the site are contaminated with low levels of TPH and metals. The work consists of excavation, temporary storage, and final placement of contaminated material. Characterization data on the nature and extent of the contaminated material is shown in Appendix 9 – Soil Analytical Results. Submit a Work Plan as specified below. Notify the Contracting Officer within 24 hours if contaminated material is discovered that has not been previously identified or if other discrepancies between data provided and actual field conditions are discovered. Place excavated material at the existing firing range berm as directed by DEARNG.
- B. Work Plan. Submit a Work Plan, prepared by a HSCA-certified consultant, within 30 calendar days after notice to proceed. Do not perform work at the site, with the exception site inspections and surveys, until the Work Plan is approved. Allow 30 calendar days in the schedule for the Government's review. No adjustment for time or money will be made if resubmittals of the Work Plan are required due to deficiencies in the plan. At a minimum, include the following in the Work Plan:
 - 1. Schedule of activities.
 - 2. Method of excavation and equipment to be used.
 - 3. Erosion and sediment control measures.
 - 4. Health & Safety Plan.
 - 5. Risk assessment for construction worker.
 - 6. Air monitoring plan, including action levels for contaminants and dust.
 - 7. Decontamination procedures.
 - 8. Shoring or side-wall slopes proposed.
 - 9. Dewatering plan.
 - 10. Storage methods and locations for liquid (if encountered) and solid contaminated material.
 - 11. Borrow sources and haul routes.
 - 12. Decontamination procedures.
 - 13. Spill contingency plan.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

- A. ASTM INTERNATIONAL (ASTM)

ASTM D2487(2017; E 2020) Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)

ASTM D5434(2012) Field Logging of Subsurface Explorations of Soil and Rock

B. U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1 (2014) Safety -- Safety and Health Requirements Manual

C. U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1926 Safety and Health Regulations for Construction

40 CFR 302 Designation, Reportable Quantities, and Notification

D. DELAWARE DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL (DNREC)

DNREC, 2015, Delaware Regulations Governing Hazardous Substance Cleanup, September 1996, Amended February 2002, August 2012, July 2015.

DNREC, 2010, Policy Soil/Material Re-use Policy at HSCA Regulated Sites, May 2010.

DNREC, 2005, Delaware Hazardous Substance Cleanup Act, 7 Del. C. Part IX Chapter 91, Subchapter II Brownfields Development Program, September 2005.

DNREC, 1995, Delaware Hazardous Substance Cleanup Act 7 Del. C., Chapter 91, July 1995.

1.3 ACTION SUBMITTALS

A. Work Plan.

B. Closure Report.

1.4 INFORMATIONAL SUBMITTALS

A. Surveys and sample results.

1.5 REGULATORY REQUIREMENTS

A. Permits and Licenses. Obtain required federal, state, and local permits for excavation and storage of contaminated material. Obtain permits at no additional cost to the Government.

B. Air Emissions. Monitor and control air emissions in accordance with the Work Plan.

PART 2 - PRODUCTS

2.1 SPILL RESPONSE MATERIALS

A. Provide appropriate spill response materials including, but not limited to the following: containers, adsorbents, shovels, and personal protective equipment (PPE). Make spill response materials available at all times when contaminated materials/wastes are being handled or

transported. Provide spill response materials that are compatible with the type of materials and contaminants being handled.

PART 3 - EXECUTION

3.1 EXISTING STRUCTURES AND UTILITIES

Do not perform Excavation until site utilities have been field located. Take the necessary precautions to ensure no damage occurs to existing structures and utilities. Repair damage to existing structures and utilities resulting from the Contractor's operations at no additional cost to the Government. Do not disturb utilities encountered that were not previously shown or otherwise located without approval from the Contracting Officer.

3.2 CONTAMINATED MATERIAL REMOVAL

- A. Excavation. Perform excavation in a manner that will limit spills and the potential for contaminated material to be mixed with uncontaminated material. Maintain an excavation log describing visible signs of contamination encountered for each area of excavation. Prepare excavation logs in accordance with ASTM D5434.
- B. Shoring. If workers must enter the excavation, evaluate, shore, slope or brace it as required by EM 385-1-1 and 29 CFR 1926 section 650.
- C. Dewatering. Divert surface water to prevent entry into the excavation. Limit dewatering to that necessary to assure adequate access, a safe excavation, prevent the spread of contamination, and to ensure that compaction requirements can be met. Do not perform dewatering without prior approval of the Contracting Officer. Groundwater is not anticipated to be encountered, however, perched groundwater may be encountered.

3.3 TEMPORARY CONTAMINATED MATERIAL STORAGE

If the excavated soil is not immediately placed in final location or is deemed potentially hazardous, place material in temporary storage immediately after excavation. The following paragraphs describe acceptable methods of material storage. Provide storage units that are in good condition and constructed of materials that are compatible with the material or liquid to be stored. If multiple storage units are required, clearly label each unit with an identification number and keep a written log to track the source of contaminated material in each temporary storage unit.

- A. Stockpiles. Construct stockpiles to isolate stored contaminated material from the environment. Stockpile size greater than 1,000 cubic yards is prohibited. Construct stockpiles to include:
 - 1. A chemically resistant geomembrane liner free of holes and other damage. Provide non-reinforced geomembrane liners that have a minimum thickness of 20 mils. Provide scrim reinforced geomembrane liners that have a minimum weight of 40 lbs/1000 square feet. Place the geomembrane on a ground surface that is free of rocks greater than 0.5 inch in diameter and any other object which could damage the membrane.

2. Geomembrane cover free of holes or other damage to prevent precipitation from entering the stockpile. Provide non-reinforced geomembrane covers that have a minimum thickness of 10 mils. Provide scrim reinforced geomembrane covers that have a minimum weight of 26 lbs/1000 square feet. Extend the cover material over the berms and anchor or ballast to prevent it from being removed or damaged by wind.
 3. Berms surrounding the stockpile, a minimum of 12 inches in height. Berm vehicle access points.
 4. Slope the liner system to allow collection of leachates. Storage and removal of liquid which collects in the stockpile, in accordance with paragraph Liquid Storage.
- B. Roll-off Units. Use water-tight roll-off units used to temporarily store contaminated material. Place a cover over the units to prevent precipitation from contacting the stored material. Locate the units in an area approved by the Contracting Officer. Remove liquid which collects inside the units and store in accordance with paragraph Liquid Storage.
- C. Liquid Storage. Temporarily store liquid collected from excavations and stockpiles in 55-gallon barrels or 500-gallon tanks. Provide water-tight liquid storage containers and locate in an area approved by the Contracting Officer.

3.4 ADDITIONAL SAMPLING

If potentially contaminated liquids are encountered and/or if soils are potentially hazardous, additional sampling may be required. The Contracting Officer shall be notified prior to additional sampling.

- A. Sampling of Stored Material. Collect samples of stored material at a frequency of one 30-point composite sample per 1,000 cubic yards and 5 volatile discrete samples. Test samples for the following as directed by DEARNG:
1. TCL VOCs (discrete samples only)
 2. TCL SVOCs
 3. TAL Metals and Mercury
 4. TCL PCBs

The soils should not contain asphalt, trash, solid waste or yard-type waste. Composite sampling will not be considered appropriate for volatile sampling. Results shall be submitted to the client. If contaminant levels indicate potentially hazardous soils (per the 20:1 ratio or similar), perform sampling for RCRA characteristics. If sampling results indicate hazardous materials, the soils must be disposed off-site. Additional sample analyses will likely be required depending upon the disposal facility. Client approval must be obtained before disposal of soils.

- B. Sampling Liquids. Sample liquid collected from excavations, storage areas, and/or decontamination facilities at a frequency of once for every 500 gal of liquid collected. Test samples for the following as directed by DEARNG:
1. TCL VOCs
 2. TCL SVOCs
 3. TAL Metals
 4. TCL PCBs

Additional analysis methods may be required for treatment system design and/or disposal. If contaminant levels exceed HSCA screening levels or site-specific criteria, treat on-site or send to an approved disposal facility. Water can also be discharged to a pre-approved sanitary sewer location. If the contractor wishes to discharge to a pre-approved sanitary sewer location, a wastewater discharge permit must be issued by New Castle County prior to dewatering activities. If liquids concentrations are below HSCA screening levels, the water can be discharged to the ground surface.

3.5 SPILLS

In the event of a spill or release of a hazardous substance (as designated in 40 CFR 302), pollutant, contaminant, or oil (as governed by the Oil Pollution Act (OPA), 33 U.S.C. 2701 et seq.), notify the Contracting Officer immediately. If the spill exceeds the reporting threshold, follow the pre-established procedures as described in the Contingency Plan for immediate reporting and containment. Take immediate containment actions to minimize the effect of any spill or leak. Perform cleanup in accordance with applicable federal, state, and local regulations. As directed by the Contracting Officer, perform additional sampling and testing to verify spills have been cleaned up. Perform spill cleanup and testing at no additional cost to the Government.

3.6 DISPOSAL REQUIREMENTS

If soil is hazardous, it will require off-site disposal. Perform offsite disposal of contaminated material in accordance with federal, state, and local regulations.

3.7 DISPOSAL REQUIREMENTS

Submit 3 copies of a Closure Report within 14 calendar days of completing work at the site. Label the report with the contract number, project name, location, date, name of general Contractor, and the Delaware Army National Guard. As a minimum, include the following information:

- A. A cover letter signed by a Professional Engineer or Geologist registered in the State of Delaware who is a responsible company official certifying that all services involved have been performed in accordance with the terms and conditions of the contract documents and regulatory requirements.
- B. A Closure Report including, but not limited to, the following:
 - 1. site conditions, ground water elevation, and cleanup criteria;
 - 2. excavation logs;
 - 3. field screening readings;
 - 4. quantity of materials removed from each area of contamination;
 - 5. quantity of water/product removed during dewatering;
 - 6. sampling locations and sampling methods;
 - 7. sample collection data such as time of collection and method of preservation;
 - 8. sample chain-of-custody forms; and
 - 9. source of backfill if used.
- C. Copies of all chemical and physical test results.

- D. Copies of all manifests and land disposal restriction notifications if soil is hazardous.
- E. Copies of all certifications of final disposal signed by the responsible disposal facility official if soil is hazardous.
- F. Waste profile sheets if soil is hazardous.

END OF SECTION 02 61 13

SECTION 08 71 00 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Special Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes items known commercially as finish or door hardware that are required for swing, sliding, and folding doors, except special types of unique hardware specified in the same sections as the doors and door frames on which they are installed.
- B. This Section includes the following:
 - 1. Hinges.
 - 2. Pivots.
 - 4. Lock cylinders and keys.
 - 5. Lock and latch sets.
 - 6. Bolts.
 - 7. Exit devices.
 - 8. Push/pull units.
 - 9. Closers.
 - 10. Overhead holders.
 - 11. Miscellaneous door control devices.
 - 12. Door trim units.
 - 13. Protection plates.
 - 15. Weatherstripping for exterior doors.
 - 16. Sound stripping for interior doors.
 - 17. Astragals or meeting seals on pairs of doors.
 - 18. Thresholds.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 8 Section "Hollow Metal Doors and Frames" for silencers integral with hollow metal frames.
 - 2. Division 8 Section "Flush Wood Doors" for factory prefitting and factory premachining of doors for door hardware.
 - 3. Division 8 Section "Aluminum Entrances and Storefronts".

1.3 HARDWARE ALLOWANCE

- A. Selection and Ordering: Furnish door hardware as selected by Architect and other general provisions of the Contract. Owner will provide and install electronic security entrance system devices at guest entry doors and exterior doors accessible to the public.
- B. Door hardware supplier's responsibilities shall be as follows:

1. Submittals: Submit through Contractor required product data, final hardware schedule, separate keying schedule, and samples as specified in this Section, unless otherwise indicated.
2. Construction Schedule: Inform Contractor promptly of estimated times and dates that will be required to process submittals, to furnish templates, to deliver hardware, and to perform other work associated with furnishing door hardware for purposes of including this data in construction schedule. Comply with this schedule.
3. Coordination and Templates: Assist Contractor as required to coordinate hardware with other work in respect to both fabrication and installation. Furnish Contractor with templates and deliver hardware to proper locations.
4. Product Handling: Package, identify, deliver, and inventory door hardware specified in this Section.
5. Discrepancies: Based on requirements indicated in Contract Documents in effect at time of door hardware selection, furnish types, finishes, and quantities of door hardware, including fasteners, and Owner's maintenance tools required to comply with specified requirements and as needed to install and maintain hardware. Furnish or replace any items of door hardware resulting from shortages and incorrect items at no cost to the Owner or Contractor. Obtain signed receipts from Contractor for all delivered materials.

C. Contractor's responsibilities shall be as follows:

1. Submittals: Coordinate and process submittals for door hardware in same manner as submittals for other work.
2. Construction Schedule: Cooperate with door hardware supplier in establishing scheduled dates for submittals and delivery of templates and door hardware. Incorporate in construction schedule the times and dates related to furnishing hardware by door hardware supplier.
3. Coordination: Coordinate door hardware with other Work. Furnish hardware supplier or manufacturer, including Owner retained electronic security device supplier, with shop drawings of other work where required or requested. Verify completeness and suitability of hardware with supplier.
4. Product Handling: Provide secure lock-up for hardware delivered to the site. Inventory hardware jointly with representative of hardware supplier and issue signed receipts for all delivered materials.
5. Installation Information: The general types and approximate quantities of hardware required for this Project are indicated at the end of this Section in order to establish Contractor's costs for installation and other work not included in allowance.

1.4 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification sections.
- B. Product data including manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.

- C. Final hardware schedule coordinated with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - 1. Final Hardware Schedule Content: Based on hardware indicated, organize schedule into "hardware sets" indicating complete designations of every item required for each door or opening. Include the following information:
 - a. Type, style, function, size, and finish of each hardware item.
 - b. Name and manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of each hardware set cross referenced to indications on Drawings both on floor plans and in door and frame schedule.
 - e. Explanation of all abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for hardware.
 - g. Door and frame sizes and materials.
 - h. Keying information.
 - 2. Submittal Sequence: Submit final schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work that is critical in the Project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by door hardware, and other information essential to the coordinated review of schedule.
 - 4. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.

1.5 QUALITY ASSURANCE

- A. Single Source Responsibility: Obtain each type of hardware (latch and lock sets, hinges, closers, etc.) from a single manufacturer.
- B. Supplier Qualifications: A recognized architectural door hardware supplier, with warehousing facilities in the Project's vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that employs an experienced architectural hardware consultant (AHC) who is available to Owner, Architect, and Contractor, at reasonable times during the course of the Work, for consultation.
 - 1. Require supplier to meet with Owner to finalize keying requirements and to obtain final instructions in writing.
- C. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and are identical to products tested by UL, Warnock Hersey, FM, or other testing and inspecting organization acceptable to authorities having jurisdiction for use on types and sizes of doors indicated in compliance with requirements of fire-rated door and door frame labels.

1.6 PRODUCT HANDLING

- A. Tag each item or package separately with identification related to final hardware schedule, and include basic installation instructions with each item or package.
- B. Packaging of door hardware is responsibility of supplier. As material is received by hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set number to match set numbers of approved hardware schedule. Two or more identical sets may be packed in same container.
- C. Inventory door hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.
- D. Deliver individually packaged door hardware items promptly to place of installation (shop or Project site).
- E. Provide secure lock-up for door hardware delivered to the Project, but not yet installed. Control handling and installation of hardware items that are not immediately replaceable so that completion of the Work will not be delayed by hardware losses both before and after installation.

1.7 MAINTENANCE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following
 - 1. Butts and Hinges:
 - a. Hager Hinge Co.
 - b. McKinney Products Co., (ASSA Abloy).
 - c. Best, (dormakaba).
 - d. Ives, (Allegion).
 - 2. Pivots:
 - a. Glynn-Johnson Corp., (Allegion).
 - b. Hager Hinge Co.
 - c. LCN, (Allegion).
 - d. Rixson-Firemark, (ASSA Abloy)
 - e. Dorma, (dormakaba).
 - 3. Key Control System:

- a. Key Control Systems, Inc.
 - b. Telkee Inc.
4. Cylinders and Locks:
- a. Best Lock Corp., (dormakaba).
 - b. Corbin & Russwin Architectural Hardware (ASSA Abloy).
 - c. Sargent Manufacturing Company, (ASSA Abloy).
 - d. Schlage Lock, (Allegion).
5. Bolts:
- a. Burns Manufacturing
 - b. Glynn-Johnson Corp., (Allegion).
 - c. Hager Hinge Co.
 - d. Ives, (Allegion).
 - e. Rockwood Manufacturing, (ASSA Abloy).
 - f. Trimco Hardware.
6. Exit/Panic Devices:
- a. Precision Hardware, Inc., (dormakaba).
 - b. Sargent Manufacturing Company, (ASSA Abloy).
 - c. Von Duprin, (Allegion).
 - d. Detex Manufacturing.
7. Push/Pull Units:
- a. Burns Manufacturing.
 - b. Rockwood Manufacturing, (ASSA Abloy).
 - c. Ives, (Allegion).
 - d. Trimco Hardware.
8. Overhead Closers:
- a. Best, (dormakaba).
 - b. Dorma Door Controls, (dormakaba).
 - c. LCN, (Allegion).
 - d. Norton Door Controls, (ASSA Abloy).
 - e. Sargent Manufacturing Company, (ASSA Abloy).
11. Door Control Devices:
- a. Burns Manufacturing
 - b. Trimco Hardware
 - c. Glynn-Johnson Corp., (Allegion).
 - d. Rockwood Manufacturing.

- 12. Kick, Mop, and Armor Plates:
 - a. Trimco Hardware.
 - b. Burns Manufacturing.
 - c. Hager Hinge Co.
 - d. Hiawatha, Inc.
- 14. Door Stripping and Seals:
 - a. National Guard Products, Inc.
 - b. Pemko Manufacturing Co., Inc.
 - c. Reese Enterprises, Inc.
 - d. Sealeze Corp.
 - e. Zero International, Inc.
- 15. Thresholds:
 - a. National Guard Products, Inc.
 - b. Pemko Manufacturing Co., Inc.
 - c. Reese Enterprises, Inc.
 - d. Sealeze Corp.
 - e. Zero International, Inc.
- 16. Sound Stripping:
 - a. National Guard Products, Inc.
 - b. Pemko Manufacturing Co., Inc.
 - c. Reese Enterprises, Inc.
 - d. Zero International, Inc.
- 17. Astragals:
 - a. National Guard Products, Inc.
 - b. Pemko Manufacturing Co., Inc.
 - c. Reese Enterprises, Inc.
 - d. Zero International, Inc.

2.2 MATERIALS AND FABRICATION

- A. Manufacturer's Name Plate: Do not use manufacturers' products that have manufacturer's name or trade name displayed in a visible location (omit removable nameplates) except in conjunction with required fire-rated labels and as otherwise acceptable to Architect.
 - 1. Manufacturer's identification will be permitted on rim of lock cylinders only.
- B. Base Metals: Produce hardware units of basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units by applicable ANSI/BHMA A156 series standards for each type of hardware item and with ANSI/BHMA A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.

- C. Base Metals: Produce hardware units of basic metal and forming method indicated using manufacturer's standard metal alloy, composition, temper, and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units for finish designations indicated.
- D. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware that has been prepared for self-tapping sheet metal screws, except as specifically indicated.
- E. Furnish screws for installation with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including "prepared for paint" surfaces to receive painted finish.
- F. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless their use is the only means of reinforcing the work adequately to fasten the hardware securely. Where thru-bolts are used as a means of reinforcing the work, provide sleeves for each thru-bolt or use sex screw fasteners.

2.3 HINGES, BUTTS, AND PIVOTS

- A. Templates: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.
- B. Screws: Provide Phillips flat-head screws complying with the following requirements:
 - 1. For metal doors and frames install machine screws into drilled and tapped holes.
 - 2. For wood doors and frames install wood screws.
 - 3. For fire-rated wood doors install #12 x 1-1/4-inch (32-mm), threaded-to-the-head steel wood screws.
 - 4. Finish screw heads to match surface of hinges or pivots.
- C. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
 - 1. Out-Swing Exterior Doors: Nonremovable pins.
 - 2. Out-Swing Corridor Doors with Locks: Nonremovable pins.
 - 3. Interior Doors: Non rising pins.
 - 4. Tips: Flat button and matching plug, finished to match leaves, except where hospital tip (HT) indicated.
- D. Number of Hinges: Provide not less than 3 hinges per door leaf for doors 90 inches (2250 mm) or less in height and one additional hinge for each 30 inches (750 mm) of additional height.
 - 1. Fire-Rated Doors: Not less than 3 hinges per door leaf for doors 86 inches (2150 mm) or less in height with same rule for additional hinges.

2.4 LOCK CYLINDERS AND KEYING

- A. Existing System: Grandmaster key the locks to the Owner's existing system, with a new master key for the Project. The Owner's existing system is "Best" "Cormax". Locks, Best Model 9K3. Final cores to be furnished by owner.
- B. Review the keying system with the Owner and provide the type required (master, grandmaster or great-grandmaster), either integrated with Owner's existing system.
- C. Prepare all locksets and cylinders to receive 7-pin interchangeable Cormax tumbler cylinder with construction master key feature that permits voiding of construction keys without cylinder removal, or equip locks with cylinders for interchangeable-core pin tumbler inserts. Furnish only temporary inserts for the construction period, and remove these when directed.
 - 1. Final cores and keys to be furnished by and installation by Owner.
- D. Metals: Construct lock cylinder parts from stainless steel.
- E. Comply with Owner's instructions for master keying and, except as otherwise indicated, provide individual change key for each lock that is not designated to be keyed alike with a group of related locks.
 - 1. Permanently inscribe each key with number of lock that identifies cylinder manufacturer's key symbol, and notation, "DO NOT DUPLICATE."
- F. Key Material: Provide keys of nickel silver only.
- G. Key Quantity: Furnish 3 change keys for each lock, 5 master keys for each master system, and 5 grandmaster keys for each grandmaster system.
 - 1. Furnish one extra blank for each lock.
 - 2. Deliver keys to Owner.

2.5 LOCKS, LATCHES, AND BOLTS

- A. Strikes: Provide manufacturer's standard wrought box strike for each latch or lock bolt, with curved lip extended to protect frame, finished to match hardware set, unless otherwise indicated.
 - 1. Provide flat lip strikes for locks with 3-piece, antifriction latch bolts as recommended by manufacturer.
 - 2. Provide extra-long strike lips for locks used on frames with applied wood casing trim.
 - 3. Provide recess type top strikes for bolts locking into head frames, unless otherwise indicated.
 - 4. Provide dust-proof strikes for foot bolts, except where special threshold construction provides non recessed strike for bolt.
 - 5. Provide roller type strikes where recommended by manufacturer of the latch and lock units.

- B. Lock Throw: Provide 5/8-inch (16-mm) minimum throw of latch on pairs of doors. Comply with UL requirements for throw of bolts and latch bolts on rated fire openings.
 - 1. Provide 1/2-inch (13-mm) minimum throw of latch for other bored, 3/4-inch (19-mm) minimum throw of latch for mortise locks. Provide 1-inch (25-mm) minimum throw for all dead bolts.
- C. Flush Bolt Heads: Minimum of 1/2-inch- (13-mm-) diameter rods of brass, bronze, or stainless steel with minimum 12-inch- (300-mm-) long rod for doors up to 84 inches (2100 mm) in height. Provide longer rods as necessary for doors exceeding 84 inches (2100 mm) in height.
- D. Exit Device Dogging: Except on fire-rated doors where closers are provided on doors equipped with exit devices, equip the units with keyed dogging device to keep the latch bolt retracted, when engaged.

2.6 PUSH/PULL UNITS

- A. Exposed Fasteners: Provide manufacturer's standard exposed fasteners for installation, thru-bolted for matched pairs but not for single units.
- B. Concealed Fasteners: Provide manufacturer's special concealed fastener system for installation, thru-bolted for matched pairs but not for single units.

2.7 CLOSERS AND DOOR CONTROL DEVICES

- A. Size of Units: Except as otherwise specifically indicated, comply with the manufacturer's recommendations for size of door control unit depending on size of door, exposure to weather, and anticipated frequency of use.
 - 1. Provide parallel arms for all overhead closers, except as otherwise indicated.
- B. Access-Free Manual Closers: Where manual closers are indicated for doors required to be accessible to the physically handicapped, provide adjustable units complying with ANSI A117.1 provisions for door opening force and delayed action closing.

2.8 DOOR TRIM UNITS

- A. Fasteners: Provide manufacturer's standard exposed fasteners for door trim units consisting of either machine screws or self-tapping screws.
- B. Fabricate protection plates not more than 1-1/2 inches (38 mm) less than door width on hinge side and not more than 1/2 inch (13 mm) less than door width on pull side by height indicated.
 - 1. Metal Plates: Stainless steel, 0.050 inch (U.S. 18 gage) (1.3 mm).

2.9 HARDWARE FOR INTERIOR SLIDING DOORS

- A. General: Provide manufacturer's standard hardware for interior sliding doors when not furnished as part of complete door package.

- B. Operating Hardware for Pocket Doors: Provide manufacturer's complete set consisting of extruded aluminum or galvanized steel overhead track, adjustable hangers (carriages), galvanized steel split-jambs and split-studs, wood nailers for head track, jambs and studs, galvanized steel brackets for assembly and attachment to floor and wall framing, bumpers, and nylon floor guides designed to accommodate the number (single and BiParting), size, thickness, and weight of door leaves indicated. Provide flush pull and edge pull for each door leaf.

2.10 WEATHERSTRIPPING AND SEALS

- A. General: Provide continuous weatherstripping on exterior doors and smoke, light, or sound seals on interior doors where indicated or scheduled. Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.
- B. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strip is easily replaceable and readily available from stocks maintained by manufacturer.
- C. Weatherstripping at Jambs and Heads: Provide bumper-type resilient insert and metal retainer strips, surface applied unless shown as mortised or semi mortised, and of following metal, finish, and resilient bumper material:
 - 1. Extruded aluminum with natural anodized finish, 0.062-inch (1.6-mm) minimum thickness of main walls and flanges.
 - 2. Solid neoprene conforming to MIL R 6855, Class II, Grade 40.
 - a. Flexible, hollow bulb or loop insert.
- D. Weatherstripping at Door Bottoms: Provide threshold consisting of contact-type resilient insert and metal housing of design and size shown and of following metal, finish, and resilient seal strip:
 - 1. Extruded aluminum with natural anodized finish, 0.062-inch (1.6-mm) minimum thickness of main walls and flanges.
 - 2. Flexible vinyl wiper or sweep seal strip.

2.11 THRESHOLDS

- A. General: Except as otherwise indicated, provide standard metal threshold unit of type, size, and profile as shown or scheduled.
- B. Exterior Hinged or Pivoted Doors: Provide units not less than 4 inches (100 mm) wide, formed to accommodate change in floor elevation where indicated, fabricated to accommodate door hardware and to fit door frames, and as follows:
 - 1. For in-swinging doors provide units with interlocking lip and interior drain channel; include hook on bottom edge of door and drain pan.
 - 2. For out-swinging doors provide units with interlocking lip and with hook on bottom edge of door to act as weather bar.
 - 3. For out-swinging doors provide rabbeted type units with replaceable weatherstrip insert in stop.

2.12 HARDWARE FINISHES

- A. Match items to the manufacturer's standard color and texture finish for the latch and lock sets (or push-pull units if no latch or lock sets).
- B. Provide finishes that match those established by BHMA or, if none established, match the Architect's sample.
- C. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.
- D. Provide protective lacquer coating on all exposed hardware finishes of brass, bronze, and aluminum, except as otherwise indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Mount hardware units at heights indicated in following applicable publications, except as specifically indicated or required to comply with governing regulations and except as otherwise directed by Architect.
 - 1. "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute.
 - 2. "Recommended Locations for Builders Hardware for Custom Steel Doors and Frames" by the Door and Hardware Institute.
 - 3. NWWDA Industry Standard I.S.1.7, "Hardware Locations for Wood Flush Doors."
- B. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation or application of surface protection with finishing work specified in the Division 9 Sections. Do not install surface-mounted items until finishes have been completed on the substrates involved.
- C. Set units level, plumb, and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- D. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- E. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements specified in Division 7 Section "Joint Sealers."
- F. Weatherstripping and Seals: Comply with manufacturer's instructions and recommendations to the extent installation requirements are not otherwise indicated.

3.2 ADJUSTING, CLEANING, AND DEMONSTRATING

- A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.
 - 1. Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to acceptance or occupancy and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.
- B. Clean adjacent surfaces soiled by hardware installation.
- C. Instruct Owner's personnel in the proper adjustment and maintenance of door hardware and hardware finishes.

3.3 HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

Manufacturer List

Code	Name
AB	ABH Manufacturing Inc.
BE	Best Access Systems
BY	By Related Section
DM	Dorma Door Controls
NA	National Guard
PR	BEST Precision Exit Devices
RC	RCI
SPEC	Special Lite
ST	BEST Hinges and Sliding
TR	Trimco

Option List

Code	Description
1/4-20 SSMS/EA	STAINLESS MACHINE SCREWS/EXPANSION ANC.
B4E-HEAVY-KP	BEVELED 4 EDGES - KICK PLATES
BSHD	Blade Stop Spacer - Heavy Duty Arms
C	QUICK CONNECT WIRING OPTION

Code	Description
C	Quick Connect Wiring System
CA-03	Cylinder Attachment Kit (Rim/SVR Device)
CSK	COUNTER SINKING OF KICK and MOP PLATES
EPT Prep	EPT Prep
EPT Prep	EPT Prep (full mortise)
FC	Full Plastic Cover
LBR	LESS BOTTOM ROD
MLR	MOTORIZED LATCH RETRACTION
NC	NO CYLINDER CUT
NCA-03	Cylinder Attachment Kit(24/2500 Devices)
NRP	NON REMOVEABLE PIN STD/HEAVY WT HINGE
RQE	Request to Exit
S4	Strike Box Only
SIA	ABRASIVE COATING-5" WIDTH-AL OR SS
TS	TOUCHBAR MONITORING SWITCH
VIB	Double Visual Indicator Option

Finish List

Code	Description
26D	Satin Chrome
313	Dark Bronze Duranodic
32D	Satin Stainless Steel
600	Primed for Painting
613E	Dark Oxidized Satin Bronze - Equivalent
626	Satin Chromium Plated
626W	Weatherized Satin Chrome
630	Satin Stainless Steel
689	Aluminum Painted
690	Statuary Bronze, Painted
AL	Aluminum
BLACK	Black
DB	Dark Bronze Anodized
GREY	Grey
US26D	Chromium Plated, Dull

Hardware Sets

Set #01

Doors: 100

Set #01

2	Continuous Hinge	661HD UL 83" EPT Prep	DB	ST
1	Exit Device	C MLR TS 2403 NCA-03	690	PR
1	Exit Device	C MLR TS 2401	690	PR
1	Mortise Cylinder	1E-74	690	BE
1	Rim Cylinder	Rim Type	690	BE
2	Door Pull	1191-4	613E	TR
2	Closer	8916 S-DS BSHD FC	690	DM
1	Card Reader/Badge Reader	By Security Contractor		BY
1	Removable Mullion	KR-SL60	313	SPEC
2	Power Transfer	EPT-12C	690	PR
1	Power Supply	RPSMLR2BB		PR
2	Harness	WH-6E		ST
NOTE: 12 PIN CONNECTOR TO POWER SOURCE				
2	Harness	WH-192P		ST
NOTE: 12 PIN CONNECTOR HINGE TO JUNCTION BOX				
2	Harness	WH-XX Length as Req.		ST
1	Position Switch	9540	BLACK	RC
1	Airphone	By Security Contractor		BY
1	Pedestal	By Security Contractor		BY
1	Meeting Stile Seal	By Alum Storefront Mfg.		BY
1	Weatherstrip	By Alum Dr. Mfg.		BY
1	Drip Cap	16 DKB x 4" Plus DW		NA
2	Door Sweep	101 VDKB 36"		NA
1	Saddle Threshold	425 HD x SIA x LOD x 1/4-20 SSMS/EA	AL	NA

NOTE: OPERATIONAL DESCRIPTION: DOORS ARE NORMALLY CLOSED AND SECURE. ACCESS VIA AUTHORIZED CREDENTIAL AT CARD READER OR MECHANICAL KEY AT ONE LEAF. LATCHBOLT MAY BE HELD RETRACTED ON MLR DEVICE BY SECURITY SOFTWARE. TS SWITCH IN EXIT DEVICE SERVES AS RX SWITCH. DOOR POSITION SWITCH MONITORS DOOR OPEN/CLOSED STATUS. ALL WIRING AND CONDUIT BY ELECTRICAL CONTRACTOR. COORDINATE WIRING AND INSTALLATION WITH EC / GC / SECURITY CONTRACTOR.

Set #01A

Doors: 118A

6	Hinges	FBB199 4.5" x 4.5" NRP	32D	ST
1	Removable Mullion	KR822	600	PR
1	Anti-Vandal Pull	1097 PHI-2100-TL-C	630	TR
1	Anti-Vandal Pull	1097 PHI-2100-TL-N	630	TR
1	Exit Device	C MLR TS 2103	626W	PR
1	Exit Device	C MLR TS 2101	626W	PR
2	Rim Cylinder	12E-72	626	BE
2	Closer	8916 S-DS BSHD FC	689	DM
1	Card Reader/Badge Reader	By Security Contractor		BY
1	Power Supply	RPSMLR2BB		PR
2	Harness	WH-6E		ST
NOTE: 12 PIN CONNECTOR TO POWER SOURCE				
2	Harness	WH-192P		ST

Set #01A

NOTE: 12 PIN CONNECTOR HINGE TO JUNCTION BOX				
2	Harness	WH-XX Length as Req.		ST
2	Position Switch	9540	BLACK	RC
1	Airphone	By Security Contractor		BY
1	Pedestal	By Security Contractor		BY
2	Power Transfer	EPT-12C	630	PR
1	Mullion Seal	5100N x LOD		NA
1	Drip Cap	16 A - 4" ODW		NA
1	Gasketing	700 NA @ Head and Jambs		NA
2	Door Sweep	101 V x LOD		NA
1	Threshold	896ADJ S x LOD x 1/4-20 SSMS/EA x SIA	AL	NA

NOTE: OPERATIONAL DESCRIPTION: DOORS ARE NORMALLY CLOSED AND SECURE. ACCESS VIA AUTHORIZED CREDENTIAL AT CARD READER OR MECHANICAL KEY AT ONE LEAF. LATCHBOLT MAY BE HELD RETRACTED ON MLR DEVICE BY SECURITY SOFTWARE. TS SWITCH IN EXIT DEVICE SERVES AS RX SWITCH. DOOR POSITION SWITCH MONITORS DOOR OPEN/CLOSED STATUS. ALL WIRING AND CONDUIT BY ELECTRICAL CONTRACTOR. COORDINATE WIRING AND INSTALLATION WITH EC / GC / SECURITY CONTRACTOR.

Set #02

Doors: 150

2	Continuous Hinge	651HD x LOD x EPT Prep	32D	ST
1	Removable Mullion	KR822	600	PR
1	Anti-Vandal Pull	1097 PHI-2100-TL-C	630	TR
1	Anti-Vandal Pull	1097 PHI-2100-TL-N	630	TR
1	Exit Device	C MLR TS 2103	626W	PR
1	Exit Device	C MLR TS 2101	626W	PR
2	Rim Cylinder	12E-72	626	BE
2	Closer W/SPR Stop/HO	8916 S-DST FC	689	DM
2	Kick Plate	K0050 10" x 1" LDW B4E CSK	630	TR
1	Card Reader/Badge Reader	By Security Contractor		BY
1	Power Supply	RPSMLR2BB		PR
2	Harness	WH-6E		ST
NOTE: 12 PIN CONNECTOR TO POWER SOURCE				
2	Harness	WH-192P		ST
NOTE: 12 PIN CONNECTOR HINGE TO JUNCTION BOX				
2	Harness	WH-XX Length as Req.		ST
2	Position Switch	9540	BLACK	RC
1	Mullion Seal	5100N x LOD		NA
1	Drip Cap	16 A - 4" ODW		NA
1	Gasketing	700 NA @ Head and Jambs		NA
2	Door Sweep	101 V x LOD		NA
1	Saddle Threshold	425HD x SIA x LOD x 1/4-20 SSMS/EA	AL	NA

NOTE: OPERATIONAL DESCRIPTION: DOORS ARE NORMALLY CLOSED AND SECURE. ACCESS VIA AUTHORIZED CREDENTIAL AT CARD READER OR MECHANICAL KEY AT ONE LEAF. LATCHBOLT MAY BE HELD RETRACTED ON MLR DEVICE BY SECURITY SOFTWARE. TS SWITCH IN EXIT DEVICE SERVES AS RX SWITCH. DOOR POSITION SWITCH MONITORS DOOR OPEN/CLOSED STATUS. ALL WIRING AND CONDUIT BY ELECTRICAL CONTRACTOR. COORDINATE WIRING AND INSTALLATION WITH EC / GC / SECURITY CONTRACTOR.

Set #02A

Doors: 153

2 Continuous Hinge	651HD	32D	ST
1 Removable Mullion	KR822	600	PR
1 Anti-Vandal Pull	1097 PHI-2100-TL-C	630	TR
1 Anti-Vandal Pull	1097 PHI-2100-TL-N	630	TR
1 Exit Device	2103	626W	PR
1 Exit Device	2101	626W	PR
2 Rim Cylinder	12E-72	626	BE
2 Closer W/SPR Stop/HO	8916 S-DST FC	689	DM
2 Kick Plate	K0050 10" x 1" LDW B4E CSK	630	TR
2 Position Switch	9540	BLACK	RC
1 Mullion Seal	5100N x LOD		NA
1 Drip Cap	16 A - 4" ODW		NA
1 Gasketing	700 NA @ Head and Jambs		NA
2 Door Sweep	101 V x LOD		NA
1 Saddle Threshold	425HD x SIA x LOD x 1/4-20 SSMS/EA	AL	NA

Set #03

Doors: 130, 147B

2 Continuous Hinge	651HD x LOD	32D	ST
1 Exit Device	2208 X 4908D LBR	626W	PR
1 Exit Device	2202 X 4902D LBR	626W	PR
1 Rim Cylinder	12E-72	626	BE
2 Closer	8916 DS FC	689	DM
2 Kick Plate	K0050 10" x 1" LDW B4E CSK	630	TR
2 Position Switch	9540	BLACK	RC
1 Gasketing	700 NA @ Head and Jambs		NA
2 Door Sweep	101 V x LOD		NA
1 Saddle Threshold	425 HD x SIA x LOD x 1/4-20 SSMS/EA	AL	NA

Set #03A

Doors: 149

2 Continuous Hinge	651HD x LOD	32D	ST
2 Manual Flushbolt	3917-12	626	TR
1 Dust Proof Strike	3910N	630	TR
1 Lockset	45H-7D14H	626	BE
2 Closer	8916 DST FC	689	DM
2 Kick Plate	K0050 10" x 1" LDW B4E CSK	630	TR
2 Position Switch	9540	BLACK	RC
1 Drip Cap	16 DKB x 4" Plus DW		NA
2 Door Sweep	101 V x LOD		NA
1 Saddle Threshold	425 HD x SIA x LOD x 1/4-20 SSMS/EA	AL	NA

Set #04

Doors: 152

Set #04

1 Continuous Hinge	661HD x LOD	AL	ST
1 Anti-Vandal Pull	1097 PHI-2100-TL-C	630	TR
1 Exit Device	2103 CA-03	626W	PR
1 Rim Cylinder	12E-72	626	BE
1 Closer W/SPR Stop/HO	8916 S-DST FC	689	DM
1 Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1 Drip Cap	16 A - 4" ODW		NA
1 Gasketing	700 NA @ Head and Jambs		NA
1 Door Sweep	101 V x LOD		NA
1 Threshold	896ADJ S x LOD x 1/4-20 SSMS/EA x SIA	AL	NA

Set #04A

Doors: 151

1 Continuous Hinge	661HD x LOD	AL	ST
1 Lockset	45H-7XR14H	626	BE
NOTE: No outside lever			
1 Anti-Vandal Pull	1097 PHI-2100-TL-C	630	TR
1 Closer W/SPR Stop/HO	8916 S-DST FC	689	DM
1 Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1 Position Switch	9540	BLACK	RC
1 Drip Cap	16 A - 4" ODW		NA
1 Gasketing	700 NA @ Head and Jambs		NA
1 Door Sweep	101 V x LOD		NA
1 Threshold	896ADJ S x LOD x 1/4-20 SSMS/EA x SIA	AL	NA

Set #05 - Alum

Doors: 101

2 Continuous Hinge	662HD UL x LOD	DB	ST
2 Door Pulls	1191-4	613E	TR
2 Dummy Touch Bars	671DR3	690	PR
2 Closer	8916 S-DS BSHD FC	690	DM
2 Position Switch	9540	BLACK	RC
1 Meeting Stile Seal	By Alum Storefront Mfg.		BY
1 Weatherstrip	By Alum Dr. Mfg.		BY

Set #05A

Doors: 118

6 Butt Hinge	FBB168 4.5" x 4.5"	26D	ST
2 Door Pulls	1191-4	630	TR
2 Dummy Touch Bars	671DR3	630	PR
2 Closer	8916 S-DS FC	689	DM
2 Position Switch	9540	BLACK	RC
1 Gasketing	5050 B @Head and Jambs		NA

Set #06

Doors: 102, 103, 141, 142

3 Butt Hinge	FBB179 4.5" x 4.5"	26D	ST
--------------	--------------------	-----	----

Set #06

NOTE: Use NRP on locked outswing doors.

1 Privacy Set	45H-0L14H VIB	626	BE
1 Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1 Mop Plate	KM050 4" x 1" LDW B4E CSK	630	TR
1 Floor Stop	1270CXSV	626	TR
3 Silencer	1229A	GREY	TR

Set #07

Doors: 137, 138

3 Butt Hinge	FBF179 4.5" x 4.5"	26D	ST
NOTE: Use NRP on locked outswing doors.			
1 Privacy Set	45H-0L14H VIB	626	BE
1 Overhead Stop	700 S Series Size as Req.	626	DM
1 Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1 Mop Plate	KM050 4" x 1" LDW B4E CSK	630	TR
3 Silencer	1229A	GREY	TR

Set #08

Doors: 119, 122, 123, 124, 127, 128, 129, 144, 155, 156, 162, 163

3 Butt Hinge	FBF179 4.5" x 4.5"	26D	ST
NOTE: Use NRP on locked outswing doors.			
1 Lockset	9K3-7R14D	626	BE
1 Floor Stop	1270CXSV	626	TR
1 Coat Hook	3071	626	TR
2 Gasketing	5050 B @Head and Jambs		NA
1 Auto Door Bottom	335 N x LOD		NA

NOTE: To achieve STC 35+ gasketing Install two rows of 5050B and Auto door bottom per Gasketing Manufacturer "National Guard Products" instructions

Set #09

Doors: 125, 126

3 Butt Hinge	FBF179 4.5" x 4.5"	26D	ST
NOTE: Use NRP on locked outswing doors.			
1 Lockset	9K3-7R14D	626	BE
1 Floor Stop	1270CXSV	626	TR
2 Gasketing	5050 B @Head and Jambs		NA
1 Auto Door Bottom	335 N x LOD		NA

NOTE: To achieve STC 35+ gasketing Install two rows of 5050B and Auto door bottom per Gasketing Manufacturer "National Guard Products" instructions

Set #09A

Doors: 104, 114, 114A, 121, 132, 143, 158

3 Butt Hinge	FBF179 4.5" x 4.5"	26D	ST
NOTE: Use NRP on locked outswing doors.			
1 Lockset	9K3-7R14D	626	BE
1 Floor Stop	1270CXSV	626	TR
1 Gasketing	2525 B @Head and Jambs		NA

Set #10

Doors: 147D

1 Cylinder & Core	Mortise or Rim as Req.	626	BE
-------------------	------------------------	-----	----

Set #11

Doors: 106, 106A, 108, 161, 161A

3 Butt Hinge	FBB179 4.5" x 4.5"	26D	ST
NOTE: Use NRP on locked outswing doors.			
1 Lockset	9K3-7R14D	626	BE
1 Closer	8916 DS FC	689	DM
1 Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1 Gasketing	2525 B @Head and Jambs		NA

Set #11A

Doors: 145

3 Butt Hinge	FBB179 4.5" x 4.5"	26D	ST
NOTE: Use NRP on locked outswing doors.			
1 Lockset	9K3-7R14D	626	BE
1 Closer	8916 AF89 FC	689	DM
1 Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1 Floor Stop	1270CXSV	626	TR
1 Gasketing	2525 B @Head and Jambs		NA

Set #11B

Doors: 160

3 Butt Hinge	FBB179 4.5" x 4.5"	26D	ST
NOTE: Use NRP on locked outswing doors.			
1 Lockset	9K3-7R14D	626	BE
1 Closer	8916 DS FC	689	DM
1 Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
2 Gasketing	5050 B @Head and Jambs		NA
1 Auto Door Bottom	335 N x LOD		NA

NOTE: To achieve STC 35+ gasketing Install two rows of 5050B and Auto door bottom per Gasketing Manufacturer "National Guard Products" instructions

Set #12 - CR

Doors: 105

6 Butt Hinge	FBB168 4.5" x 4.5" NRP	26D	ST
1 Exit Device	C MLR TS 2203 X 4903D LBR	630	PR
1 Exit Device	C TS 2202 X 4902D LBR	630	PR
1 Rim Cylinder	12E-72	626	BE
2 Closer	8916 DS FC	689	DM
2 Kick Plate	K0050 10" x 1" LDW B4E CSK	630	TR
1 Card Reader/Badge Reader	By Security Contractor		BY
1 Power Supply	RPSMLR2BB		PR
2 Harness	WH-6E		ST
NOTE: 12 PIN CONNECTOR TO POWER SOURCE			
2 Harness	WH-192P		ST

Set #12 - CR

NOTE: 12 PIN CONNECTOR HINGE TO JUNCTION BOX

2 Harness	WH-XX Length as Req.		ST
2 Position Switch	9540	BLACK	RC
2 Power Transfer	EPT-12C	630	PR
1 Gasketing	2525 B @Head and Jambs		NA

NOTE: OPERATIONAL DESCRIPTION: DOORS ARE NORMALLY CLOSED AND SECURE. ACCESS VIA AUTHORIZED CREDENTIAL AT CARD READER OR MECHANICAL KEY AT ONE LEAF. LATCHBOLT MAY BE HELD RETRACTED ON MLR DEVICE BY SECURITY SOFTWARE. TS SWITCH IN EXIT DEVICE SERVES AS RX SWITCH. DOOR POSITION SWITCH MONITORS DOOR OPEN/CLOSED STATUS. ALL WIRING AND CONDUIT BY ELECTRICAL CONTRACTOR. COORDINATE WIRING AND INSTALLATION WITH EC / GC / SECURITY CONTRACTOR.

Set #12A

Doors: 107, 164, 164A, 164B, 164C, 164D

6 Butt Hinge	FBB168 4.5" x 4.5" NRP	26D	ST
1 Exit Device	2208 X 4908D LBR	630	PR
1 Exit Device	2202 X 4902D LBR	630	PR
1 Rim Cylinder	12E-72	626	BE
2 Closer	8916 DS FC	689	DM
2 Kick Plate	K0050 10" x 1" LDW B4E CSK	630	TR
1 Gasketing	2525 B @Head and Jambs		NA

Set #12B

Doors: 110

6 Butt Hinge	FBB168 4.5" x 4.5"	26D	ST
NOTE: Use NRP on outswing locked doors			
2 Push Plate	1001-3	630	TR
2 Pull Plate	1018-3	630	TR
2 Closer	8916 AF89 FC	689	DM
2 Kick Plate	K0050 10" x 1" LDW B4E CSK	630	TR
2 Mop Plate	KM050 4" x 1" LDW B4E CSK	630	TR
2 Floor Stop	1270CXSV	626	TR
1 Gasketing	2525 B @Head and Jambs		NA

Set #12C - CR

Doors: 139

6 Butt Hinge	FBB168 4.5" x 4.5"	26D	ST
NOTE: Use NRP on outswing locked doors			
1 Dust Proof Strike	3910N	630	TR
1 Automatic Flush Bolt	3810 X 3810	630	TR
1 Electromechanical Lock	9KW3-7DEU14D C RQE	626	BE
1 Coordinator	3094B2	BLACK	TR
2 Closer	8916 AF89 FC	689	DM
2 Kick Plate	K0050 10" x 1" LDW B4E CSK	630	TR
2 Floor Stop	1270CXSV	626	TR
1 Card Reader/Badge Reader	By Security Contractor		BY
1 Harness	WH-192P		ST

Set #12C - CR

NOTE: 12 PIN CONNECTOR HINGE TO JUNCTION BOX

1	Harness	WH-XX Length as Req.		ST
2	Position Switch	9540	BLACK	RC
1	Power Transfer	EPT-12C	630	PR
1	Power Supply	DKPS-2A x BB		RC
1	Relay Board	9310RB		RC
1	Astragal	By Dr. Mfg.		BY
1	Gasketing	2525 B @Head and Jambs		NA

NOTE: Doors are normally closed and locked. Presentation of authorized credential at exterior credential reader unlocks the lever allowing entry. Door(s) secure (Fail Secure) during emergency event or loss of power. Free egress at all times.

RQE switch signals authorized exiting.

Door Position Switch (DS) monitors door position.

Set #13

Doors: 153A

6	Butt Hinge	FBF168 4.5" x 4.5"	26D	ST
1	Dust Proof Strike	3910N	630	TR
1	Automatic Flush Bolt	3810 X 3810	630	TR
1	Classroom Lock	9KW3-7R14D	626	BE
1	Coordinator	3094B2	BLACK	TR
2	Closer	8916 AF89 FC	689	DM
2	Kick Plate	K0050 10" x 1" LDW B4E CSK	630	TR
2	Floor Stop	1270CXSV	626	TR
2	Position Switch	9540	BLACK	RC
1	Astragal	By Dr. Mfg.		BY
1	Gasketing	5050 B @Head and Jambs		NA
1	Gasketing	5060 B x LOD		NA

NOTE: Doors are normally closed and locked. Presentation of authorized credential at exterior credential reader unlocks the lever allowing entry. Door(s) secure (Fail Secure) during emergency event or loss of power. Free egress at all times.

RQE switch signals authorized exiting.

Door Position Switch (DS) monitors door position.

Set #14 - Vault

Doors: 154, 154A, 154B

NOTE: All hardware by the door and frame manufacturer. Access control furnished by the access control provider per the low voltage drawings where indicated.

Set #15 - CR

Doors: 109, 146

3	Butt Hinge	FBF179 4.5" x 4.5"	26D	ST
---	------------	--------------------	-----	----

Set #15 - CR

NOTE: Use NRP on locked outswing doors.

1	Lockset	9K3-7D14D	626	BE
1	Electric Strike	F2164	32D	RC
1	Closer	8916 AF89 FC	689	DM
1	Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1	Floor Stop	1270CXSV	626	TR
1	Card Reader/Badge Reader	By Security Contractor		BY
1	Position Switch	9540	BLACK	RC
1	Power Supply	DKPS-2A x BB		RC
1	Relay Board	9310RB		RC
3	Silencer	1229A	GREY	TR

NOTE: OPERATIONAL DESCRIPTION: DOOR IS NORMALLY CLOSED AND SECURE.
ACCESS VIA AUTHORIZED CREDENTIAL AT CARD READER OR MECHANICAL KEY.

Set #16

Doors: 111, 116

3	Butt Hinge	FBF168 4.5" x 4.5"	26D	ST
NOTE: Use NRP on outswing locked doors				
1	Push/Pull Plate	1895-4	630	TR
1	Closer	8916 DS FC	689	DM
1	Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1	Kick Plate	K0050 10" x 1" LDW B4E CSK	630	TR
1	Gasketing	2525 B @Head and Jambs		NA

Set #17

Doors: 120, 120A, 131, 131A, 135

3	Butt Hinge	FBF179 4.5" x 4.5"	26D	ST
NOTE: Use NRP on locked outswing doors.				
1	Lockset	9K3-7R14D	626	BE
1	Closer	8916 DS FC	689	DM
1	Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
3	Silencer	1229A	GREY	TR

Set #17A

Doors: 136

3	Butt Hinge	FBF179 4.5" x 4.5"	26D	ST
NOTE: Use NRP on locked outswing doors.				
1	Privacy Set	45H-0L14H VIB	626	BE
1	Closer	8916 DS FC	689	DM
1	Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
3	Silencer	1229A	GREY	TR

Set #18

Doors: 106B, 160A, 161B

6	Butt Hinge	FBF179 4.5" x 4.5"	26D	ST
---	------------	--------------------	-----	----

Set #18

NOTE: Use NRP on locked outswing doors.

1 Self-Latching Flush Bolts	1864P	US26D	AB
1 Dust Proof Strike	1870	US26D	AB
1 Lockset	9K3-7R14D	626	BE
2 Overhead Stop	700 S Series Size as Req.	626	DM
2 Silencer	1229A	GREY	TR

Set #18A

Doors: 157

6 Butt Hinge	FBF179 4.5" x 4.5"	26D	ST
NOTE: Use NRP on locked outswing doors.			
1 Self-Latching Flush Bolts	1864P	US26D	AB
1 Dust Proof Strike	1870	US26D	AB
1 Lockset	9K3-7R14D	626	BE
2 Overhead Stop	71_ S x Size as Req.	626	DM
2 Silencer	1229A	GREY	TR

Set #19

Doors: 133

3 Butt Hinge	FBF179 4.5" x 4.5"	26D	ST
NOTE: Use NRP on locked outswing doors.			
1 Lockset	9K3-7R14D	626	BE
1 Overhead Stop	71_ S x Size as Req.	626	DM
3 Silencer	1229A	GREY	TR

Set #20

Doors: 134

3 Butt Hinge	FBF179 4.5" x 4.5"	26D	ST
NOTE: Use NRP on locked outswing doors.			
1 Lockset	9K3-7R14D	626	BE
1 Closer	8916 DS FC	689	DM
1 Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
3 Silencer	1229A	GREY	TR

Set #21

Doors: 147

6 Butt Hinge	FBF179 4.5" x 4.5"	26D	ST
NOTE: Use NRP on locked outswing doors.			
1 Dust Proof Strike	1870	US26D	AB
2 Manual Flush Bolt	1857S	US26D	AB
1 Lockset	9K3-7R14D	626	BE
2 Closer	8916 DS FC	689	DM
2 Kick Plate	K0050 10" x 1" LDW B4E CSK	630	TR
2 Mop Plate	KM050 4" x 1" LDW B4E CSK	630	TR
1 Gasketing	700 NA @ Head and Jambs		NA
1 Gasketing	5050C		NA

NOTE: STC 25+

Set #21A

Doors: 147A

6 Butt Hinge	FBF179 4.5" x 4.5"	26D	ST
NOTE: Use NRP on locked outswing doors.			
1 Dust Proof Strike	1870	US26D	AB
2 Manual Flush Bolt	1857S	US26D	AB
1 Lockset	9K3-7R14D	626	BE
2 Overhead Stop	71_ S x Size as Req.	626	DM
2 Silencer	1229A	GREY	TR

Set #22

Doors: 200, 200C, 200D

3 Hinges	FBF199 4.5" x 4.5" NRP	32D	ST
1 Lockset	9K3-7D14D	626	BE
1 Closer	8916 DS FC	689	DM
1 Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1 Drip Cap	16 A - 4" ODW		NA
1 Gasketing	700 NA @ Head and Jambs		NA
1 Door Sweep	101 V x LOD		NA
1 Threshold	896ADJ S x LOD x 1/4-20 SSMS/EA x SIA	AL	NA

Set #23

Doors: 200A, 200B

1 Cylinder & Core	Mortise or Rim as Req.	626	BE
-------------------	------------------------	-----	----

NOTE: Provide cylinder as required, balance of hardware furnished by the overhead/coiling door Mfg.

Set #24

Doors: 115

6 Butt Hinge	FBF168 4.5" x 4.5" NRP	26D	ST
1 Exit Device	C MLR TS 2203 X 4903D LBR	630	PR
1 Exit Device	C MLR TS 2202 X 4902D LBR	630	PR
1 Rim Cylinder	12E-72	626	BE
2 Closer	8916 DS FC	689	DM
2 Kick Plate	K0050 10" x 1" LDW B4E CSK	630	TR
1 Card Reader/Badge Reader	By Security Contractor		BY
1 Power Supply	RPSMLR2BB		PR
2 Harness	WH-6E		ST
NOTE: 12 PIN CONNECTOR TO POWER SOURCE			
2 Harness	WH-192P		ST
NOTE: 12 PIN CONNECTOR HINGE TO JUNCTION BOX			
2 Harness	WH-XX Length as Req.		ST
2 Position Switch	9540	BLACK	RC
1 Power Transfer	EPT-12C	630	PR
1 Gasketing	2525 B @Head and Jambs		NA

Set #24

NOTE: OPERATIONAL DESCRIPTION: DOORS ARE NORMALLY CLOSED AND SECURE. ACCESS VIA AUTHORIZED CREDENTIAL AT CARD READER OR MECHANICAL KEY AT ONE LEAF. LATCHBOLT MAY BE HELD RETRACTED ON MLR DEVICE BY SECURITY SOFTWARE. TS SWITCH IN EXIT DEVICE SERVES AS RX SWITCH. DOOR POSITION SWITCH MONITORS DOOR OPEN/CLOSED STATUS. ALL WIRING AND CONDUIT BY ELECTRICAL CONTRACTOR. COORDINATE WIRING AND INSTALLATION WITH EC / GC / SECURITY CONTRACTOR.

Set #25 - Cased Opening

Doors: O112, O117, O145, O145B, O148, O164A, O164B

NOTE: Cased opening no hardware required.

END OF SECTION 08 71 00

SECTION 26 27 43 - ELECTRIC-VEHICLE SERVICE EQUIPMENT - AC LEVEL 2

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes EVSE that provides Level 2 EV charging.

1.3 DEFINITIONS

- A. EV: Electric vehicle.
- B. EV Cable: The off-board cable containing the conductor(s) to connect the EV power controller to the EV that provides both power and communications during energy transfer.
- C. EV Charger or EV Charging Equipment: See "EVSE."
- D. EV Connector: A conductive device that, when electrically coupled to an EV inlet, establishes an electrical connection to the EV for the purpose of power transfer and information exchange. This device is part of the EV coupler.
- E. EV Coupler: A mating EV inlet and connector set.
- F. EV Inlet: The device in the vehicle into which the EV connector is inserted, and a conductive connection is made for the transfer of power and communication. This device is part of the EV coupler.
- G. EVSE: Electric-Vehicle Supply Equipment. It includes the EV charging equipment and conductors, including the ungrounded, grounded, and equipment grounding conductors and EV cables, attachment plugs, and all other fittings, devices, power outlets, or apparatus installed specifically for transferring energy between the premise wiring and the EV.

1.4 SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for EV charging equipment.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

- B. Qualification Data: For installer.
- C. Field quality-control reports.
- D. Sample Warranty: For manufacturer's warranty.
- E. Operation and Maintenance Data: For EVSE to include in operation and maintenance manuals.

1.5 SPARE PARTS

- A. Provide one spare cord and connector assembly for every three stations installed or a minimum of 1 assembly if less than 3 stations are installed.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.
- B. Manufacturer Qualifications:
 - 1. Have been in satisfactory commercial or industrial use for 2 years prior to bid opening including applications of equipment and materials under comparable circumstances and of similar size.
 - 2. Have been on sale on the commercial market through advertisement, manufacturers' catalogs, or brochures during the 2-year period.

1.7 FIELD CONDITIONS

- A. Rate equipment for continuous operation under the following conditions unless otherwise indicated:
 - 1. Ambient Temperature: Not exceeding minus 22 to plus 122 deg F.

1.8 WARRANTY

- A. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace components of EVSE that fail(s) in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide Chargepoint Power Select 24A CT4021-GW1 Series or engineer approved equal.

2.2 PERFORMANCE REQUIREMENTS

- A. Relative Humidity: Zero to 95 percent.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
- C. Surge Withstand: 6 kV at 3000 A.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
- E. EV Charging Levels:
 - 1. Single vehicle, AC Level 2 at up to 7.2 kW per vehicle.
 - 2. Dual vehicles, AC Level 2 at up to 7.2 kW per vehicle.

2.3 EVSE DESCRIPTION

- A. Comply with NFPA 70.
- B. Comply with:
 - 1. UL 2231-1.
 - 2. UL 2594.
- C. Comply with ADA-ABA Accessibility Guidelines.
- D. Input Power:
 - 1. Two 40 A, 208/240-V ac, 60 Hz, single-phase services per charger.
- E. Integral GFCI.
- F. Auto-GFCI fault retry.
- G. EVSE Mounting: Bollard mount
- H. Enclosures:
 - 1. Rated for environmental conditions at installed location.
 - a. Outdoor Locations: NEMA 250, Type 3R.
 - b. Aluminum.
 - c. Anodized.

- d. Lockable.
- e. Tamper resistant.

I. EV Cable and Connectors:

- 1. SAE J1772 connector.
- 2. Double connectors with locking holster.
- 3. 18-foot with cable management system.
- 4. Field-replaceable connector and cable assembly.

J. Status Indicators:

- 1. LEDs to indicate power, charging, charging complete, system status, faults, and service.

K. Display Screen:

- 1. Daylight viewable, UV-protected display with human-machine interface capability.
- 2. Displays power, charging, charging complete, remote control, system status, faults, and service.

2.4 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by utilizing cushioning materials or foam or by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved samples and are assembled or installed to minimize contrast.

2.5 SIGNAGE

- A. Provide signage per MUTCD standards.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for EVSE electrical conduit to verify actual locations of conduit connections before equipment installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with NECA 1 and NECA 413.
- B. Concrete Base Mounting:
 - 1. Install EVSE on minimum 48 inch deep round (42" inches in ground and 6 inches above finished grade) concrete steel reinforced base. Provide (6)#6 vertical rebar and #4 hoops at 12" on center in base. Diameter of base to be minimum 18" in diameter or 3" bigger than base on all sides (whichever is larger). Provide 1" x 45 degree chamfered edge on base.
 - a. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - b. Install anchor bolts to elevations required for proper attachment to supported equipment.
 - c. Secure EVSE to concrete base according to manufacturer's written instructions.
 - d. All conduits entering charger to be concealed in concrete base.
- C. Provide a 3/4" diameter by 10'-0" long copper clad ground rod at each charger and connect to charger ground lug with #6 bare copper ground conductor in 3/4" conduit. Ground rod to be installed outside of charger concrete base with ground conductor routed into charger base via conduit concealed in concrete base. Utilize exothermic weld for connection at ground rod. Top of ground rod to be 24" below finished grade.
- D. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.
- E. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.
- F. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking from enclosures and components.
- G. Secure covers to enclosure.

3.3 CONNECTIONS

- A. Connect wiring according to Section 260500 "Electrical Materials and Methods."
- B. Comply with grounding requirements in Section 260500 "Electrical Materials and Methods."
- C. Comply with requirements for installation of conduit in Section 260500 "Electrical Materials and Methods." Drawings indicate general arrangement of conduit, fittings, and specialties.
- D. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.

- E. Verify that all electrical connections have been made according to the manufacturer's instructions. Remove all burrs, shavings, and detritus from inside the enclosure.
- F. After confirming all connections, install covers and tighten fasteners to according to manufacturer's instructions.

3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- B. Perform tests and inspections.
- C. Tests and Inspections:
 - 1. For each unit of EVSE, perform the following tests and inspections:
 - a. Unit self-test.
 - b. Operation test with load bank.
 - c. Operation test with EV.
 - d. Verify voltage levels.
 - e. Check ground fault circuit interrupt.
 - f. Verify current limit.
 - g. Verify operation of alarms.
 - h. Perform resistance measurements.
 - i. Verify EVSE electronic data interface.
- D. EVSE will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.
- F. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain EV charging equipment.

END OF SECTION 26 27 43

APPENDIX 9

SOIL ANALYTICAL RESULTS

TABLE 1a

Soil Analytical Results - Metals (mg/Kg)
DEARING River Road Training Site Readiness Center
1197 River Road
New Castle, Delaware 19720

July 1, 2023

Analyte (mg/Kg)	HSCA SL (Human Soil Contact)	SL (Ecological Surface Soil)	ENT-1	ENT-2	MBA-1	MBA-2	PLA1-1	PLA2-1	PLA3-1	DUP-1	PLA3-2	PLA4-1	PLA4-2	SA-1	SWM1-1	SWM2-1	SWM3-1	SWM4-1	SWM4-2	SWM4-3	SWM4-4
Aluminum	51200	NA	24000	17000	15000	13000	18000	13000	19000	19000 *2	18000	17000	15000	17000	17000 *2	10000 *2	10000 *2	12000 *2	18000 *2	17000 *2	15000 *2
Antimony	3.1	5	0.8	0.35	0.19 J	0.4	0.61	0.77	0.28	0.26	0.18 J	0.27	0.15 J	0.74	0.14 J	0.51	0.32	0.32	0.17	0.19	0.24
Arsenic	11	10	6.9	4.7	3.2	3	4.4	3.7	4.8	4.5	4.7	6.1	6.2	5.9	4.2	2.2	2.2	4	4.5	5.7	5.7
Barium	1500	283	98	70	48	60	130	60	70	73	59	58	44 F1	75	47	41	59	56	54	62	62
Beryllium	16	10	1.2	0.63	0.47	0.57	1	0.64	0.89	0.85	0.66	0.52	0.58	0.58	0.44	0.34	0.37	0.65	0.56	0.59	0.59
Cadmium	0.71	3	0.3	0.16	0.089 J	0.35	0.84	0.56	0.13	0.11	ND (0.10)	ND (0.099)	ND (0.084)	0.48	0.054 J	0.26	0.27	0.14	ND (0.081)	0.042 J	ND (0.11)
Calcium	NA	NA	700	1600	1100	3600	4100	10000	610	620	240	280	380	1400	5800	9600	6900	300	360	250	320
Chromium	214	0.4	28	25	24	18	24	23	24	23	22	24	23	26	23	16	29	16	22	22	19
Cobalt	34	20	52	9	4.8	6	10	7.6	10	9.3	8.3	4.6	5.2	6.7	4.5	4.3	7.9	6.7	4.8	13	5
Copper	310	50	9.9	11	8.6	13	15	15	9	9.1	7.4	14	7.1	13 *2	8.8	20	37	7.6	6.7	6.9	5.8
Iron	74767	NA	27000	19000	14000	15000	16000	15000	17000	18000 *2	17000	17000	23000	21000	18000	14000	19000	14000	19000	19000	16000
Lead	400	41	32	23	11	19	62	30	19	18	14	22	12 F1	32 *2	9.2	20	12	43	17	22	24
Magnesium	NA	NA	1800	1900	2400	2200	1800	3300	1700	1700	1600	1700	1700 F1	2300	2700	4100	5500	910	1800	1500	1100
Manganese	2100	NA	4300	380	160	220	960	310	390	350 *2	150	90	110 F1 F2	370	140 *2	180 *2	360 *2	200 *2	88 *2	660 *2	110 *2
Nickel	150	30	20	15	10	11	14	15	16	17	15	11	11	16	15	8.6	16	9.2	12	11	11
Potassium	NA	NA	970	1000	980	1100	990	980	870	770	900	1000	880 F1	1200	1200	1000	1100	550	880	880	770
Selenium	39	0.2	0.56	0.42	0.17 J	0.21 J	0.38 J	0.29 J	0.34 J	0.35 J	0.38 J	0.32 J	0.36	0.33 J	0.25 J	0.18 J	0.22 J	0.34 J	0.35	0.33 J	0.36 J
Silver	39	2	0.057 J	0.051 J	ND (0.099)	ND (0.11)	0.074 J	0.052 J	0.054 J	0.055 J	ND (0.10)	ND (0.099)	ND (0.084)	0.048 J	ND (0.085)	ND (0.1)	ND (0.11)	0.055 J	0.035 J	ND (0.092)	0.054 J
Sodium	NA	NA	100	100	90	190	97	58	78	71	41 J	50	61	170	110	98	150	35 J	83	50	60
Thallium	0.078	1	0.3	0.23	0.17	0.15	0.24	0.16	0.24	0.23	0.23	0.21	0.15	0.21	0.16	0.14	0.11	0.18	0.2	0.19	0.2
Zinc	2300	8.5	56	50	30	40	69	81	39	41	38	37	26	52	46	48	63	37	28	28	28 J
Vanadium	134	2	48	37	35	25	36	32	38	36	36	40	38	40	32	27	37	32	33	35	37
Mercury	1.1	0.0005	0.066	0.042 J	0.029 J	0.032 J	0.068 J	0.054 J	0.046 J	0.045 J	0.037 J	0.033 J	0.025 J	0.040 J	0.022 J	ND (0.06)	ND (0.063)	0.083	0.039 J	0.038 J	0.044 J

Notes:

mg/kg - milligrams per kilogram (parts per million)
NA - Not applicable
ND(0.005) - Not detected at or above the laboratory reporting or method detection limit, laboratory reporting limit included.
J - Analyte detected above MDL but below RL
*2 - Calibration Blank (ICB and/or CCB) is outside acceptance limits
F1 - MS and/or MSD recovery exceeds control limits
F2 - MS/MSD RPD exceeds control limits

TABLE 1a
Soil Analytical Results - Volatiles (µg/Kg)
 DEARING River Road Training Site Readiness Center
 1197 River Road
 New Castle, Delaware 19720

July 1, 2023

Analyte (µg/Kg)	HSCA SL (Human Soil Contact)	SL (Ecological Surface Soil)	ENT-1	ENT-2	MBA-1	MBA-2	PLA1-1	PLA2-1	PLA3-1	DUP-1	PLA3-2	PLA4-1	PLA4-2	SA-1	SWM1-1	SWM2-1	SWM3-1	SWM4-1	SWM4-2	SWM4-3	SWM4-4
Ethylbenzene	5800	NA	ND (5.9)	ND (4.4)	2.2 J	ND (4.6)	ND (3.9)	ND (4.7)	ND (5.2)	ND (5.0)	ND (5.4)	ND (6.0)	ND (6.3)	ND (7.0)	ND (4.3)	ND (4.3)	ND (3.6)	ND (6.0)	ND (4.7)	ND (4.5)	ND (4.1)
4-Methyl-2-pentanone	5400000	NA	ND (12)	ND (8.8)	ND (10)	ND (9.2)	ND (7.9)	ND (9.4)	ND (10)	ND (10)	ND (11)	ND (12)	ND (13)	ND (14)	0.91 J	ND (4.3)	ND (7.3)	ND (12)	ND (9.4)	ND (9)	ND (8.3)
Methylcyclohexane	NA	NA	ND (5.9)	ND (4.4)	2.6 J	ND (4.6)	ND (3.9)	ND (4.7)	ND (5.2)	ND (5.0)	ND (5.4)	ND (6.0)	ND (6.3)	ND (7.0)	ND (4.3)	ND (4.3)	ND (3.6)	ND (6.0)	ND (4.7)	ND (4.5)	ND (4.1)
Toluene	490000	200000	ND (5.9)	ND (4.4)	ND (5.2)	2.2 J	ND (3.9)	ND (4.7)	ND (5.2)	ND (5.0)	ND (5.4)	ND (6.0)	ND (6.3)	ND (7.0)	ND (4.3)	ND (4.3)	ND (3.6)	ND (6.0)	ND (4.7)	ND (4.5)	ND (4.1)
Acetone	7000000	NA	200	85	21	72	52	100	170	190	110	57	44	99	17	44	18	150	31	40	25
Carbon Disulfide	77000	NA	ND (5.9)	1.1 J	4.3 J	2.4 J	2.1 J	4.8	0.81 J	1.6 J	ND (5.4)	ND (6.0)	ND (6.3)	1.8 J	13	2.5 J	0.98 J	0.76 J	ND (4.7)	ND (4.5)	ND (4.1)
Trichlorofluoromethane	2300000	NA	ND (5.9)	ND (4.4)	ND (5.2)	ND (4.6)	1.3 J	ND (4.7)	ND (5.2)	ND (5.0)	ND (5.4)	ND (6.0)	ND (6.3)	ND (7.0)	ND (4.3)	ND (4.3)	ND (3.6)	ND (6.0)	ND (4.7)	ND (4.5)	ND (4.1)
2-Butanone	2700000	NA	11 J	5.5 J	ND (10)	4.4 J	5.5 J	6.8 J	8.9 J	8.0 J	4.8 J	2.8 J	2.8 J	4.9 J	ND (8.6)	5.7 J	ND (7.3)	9.5 J	ND (9.4)	ND (9)	ND (8.3)
Methyl Acetate	7800000	NA	1.4 J	1.3 J	ND (5.2)	ND (4.6)	2.5 J	ND (4.7)	17	4.6 J	ND (5.4)	69	1.6 J F1	7.1	ND (4.3)	ND (4.3)	ND (3.6)	4.6 J	ND (4.7)	14	12
Isopropylbenzene	NA	NA	ND (5.9)	ND (4.4)	2.9 J	ND (4.6)	ND (3.9)	ND (4.7)	ND (5.2)	ND (5.0)	ND (5.4)	ND (6.0)	ND (6.3)	ND (7.0)	ND (4.3)	ND (4.3)	ND (3.6)	ND (6.0)	ND (4.7)	ND (4.5)	ND (4.1)
PID Reading			0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Notes:
 mg/Kg - milligrams per kilogram (parts per million)
 NA - Not applicable
 ND(0.005) - Not detected at or above the laboratory reporting or method detection limit; laboratory reporting limit included.
 J - Analyte detected above MDL but below RL

TABLE 1a

Soil Analytical Results - DROIGROIRO (mg/Kg)
 DEARNG River Road Training Site Readiness Center
 1197 River Road
 New Castle, Delaware 19720

July 1, 2023

Analyte (mg/Kg)	HSCA SL (Human Soil Contact)	SL (Ecological Surface Soil)	ENT-1	ENT-2	MBA-1	MBA-2	PLA1-1	PLA2-1	PLA3-1	DUP-1	PLA3-2	PLA4-1	PLA4-2	SA-1	SWM1-1	SWM2-1	SWM3-1	SWM4-1	SWM4-2	SWM4-3	SWM4-4
Diesel Range Organics	1000	NA	6.8 J	9.9 J	ND (13)	8.6 J	62 J	13	9.6 J	7.1 J	15	120	ND (14)	8.4 J	160	29	ND (13)	26	5.9 J	12 J	13 J
Gasoline Range Organics	100	NA	1.7	1.9	16	1.5	1.9	0.86 J	4.6	1.8	0.90 J	1.8	3.4	ND (9.5)	2.4	1.2	1.5	11	7.6	3.5	2.2
Oil Range Organics	3000	NA	23	34	ND (13)	20	190	26	19	12 J	17	41	16	21	100	57	7.0 J	44	13 J	25	13 J
PID Reading			0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Notes:

mg/Kg - milligrams per kilogram (parts per million)

NA - Not applicable

ND(0.005) - Not detected at or above the laboratory reporting or method detection limit, laboratory reporting limit included.

J - Analyte detected above MDL but below RL

TABLE 1a
Soil Analytical Results - PCBs (mg/Kg)
DEARNG River Road Training Site Readiness Center
1197 River Road
New Castle, Delaware 19720

July 31, 2023

Analyte (mg/kg)	HSCA SL (Human Soil Contact)	SL (Ecological Surface Soil)	ENT-1	ENT-2	MBA-1	MBA-2	PLA1-1	PLA2-1	PLA3-1	DUP-1	PLA3-2	PLA4-1	PLA4-2	SA-1	SWM1-1	SWM2-1	SWM3-1	SWM4-1	SWM4-2	SWM4-3	SWM4-4
PCB-1016	0.41	NA	ND(0.020)	ND(0.019)	ND (0.037)	ND(0.019)	ND(0.020)	ND(0.019)	ND (0.040)	ND(0.021)	ND(0.020)	ND (0.040)	ND(0.020)	ND(0.020)	ND (0.039)	ND (0.036)	ND(0.019)	ND(0.020)	ND(0.020)	ND(0.020)	ND(0.020)
PCB-1221	0.2	NA	ND(0.020)	ND(0.019)	ND (0.037)	ND(0.019)	ND(0.020)	ND(0.019)	ND (0.040)	ND(0.021)	ND(0.020)	ND (0.040)	ND(0.020)	ND(0.020)	ND (0.039)	ND (0.036)	ND(0.019)	ND(0.020)	ND(0.020)	ND(0.020)	ND(0.020)
PCB-1232	0.17	NA	ND(0.020)	ND(0.019)	ND (0.037)	ND(0.019)	ND(0.020)	ND(0.019)	ND (0.040)	ND(0.021)	ND(0.020)	ND (0.040)	ND(0.020)	ND(0.020)	ND (0.039)	ND (0.036)	ND(0.019)	ND(0.020)	ND(0.020)	ND(0.020)	ND(0.020)
PCB-1242	0.23	NA	ND(0.020)	ND(0.019)	ND (0.037)	ND(0.019)	ND(0.020)	ND(0.019)	ND (0.040)	ND(0.021)	ND(0.020)	ND (0.040)	ND(0.020)	ND(0.020)	ND (0.039)	ND (0.036)	ND(0.019)	ND(0.020)	ND(0.020)	ND(0.020)	ND(0.020)
PCB-1248	0.23	NA	ND(0.020)	ND(0.019)	ND (0.037)	ND(0.019)	ND(0.020)	ND(0.019)	ND (0.040)	ND(0.021)	ND(0.020)	ND (0.040)	ND(0.020)	ND(0.020)	ND (0.039)	ND (0.036)	ND(0.019)	ND(0.020)	ND(0.020)	ND(0.020)	ND(0.020)
PCB-1254	0.12	NA	ND(0.020)	ND(0.019)	ND (0.037)	ND(0.019)	ND(0.020)	ND(0.019)	ND (0.040)	ND(0.021)	ND(0.020)	ND (0.040)	ND(0.020)	ND(0.020)	ND (0.039)	ND (0.036)	ND(0.019)	ND(0.020)	ND(0.020)	ND(0.020)	ND(0.020)
PCB-1280	0.24	NA	ND(0.020)	ND(0.019)	ND (0.037)	ND(0.019)	ND(0.020)	0.12	0.018 J	ND(0.021)	ND(0.020)	ND (0.040)	ND(0.020)	0.01 J	ND (0.039)	ND (0.036)	ND(0.019)	ND(0.020)	ND(0.020)	ND(0.020)	ND(0.020)

Notes:
mg/kg - milligrams per kilogram (parts per million)

J - Analyte detected above MDL but below RL

ND(0.005) - Not detected at or above the laboratory reporting or method detection limit, laboratory reporting limit included.

NA - Not applicable

APPENDIX 10

GEOTECHNICAL INVESTIGATION REPORT

GEOTECHNICAL INVESTIGATION REPORT

***DEARNG River Road Readiness Center
New Castle, Delaware***

PREPARED FOR:

Delaware Army National Guard

1 Vavala Way

New Castle, Delaware 19720

PREPARED BY:



550 BAY ROAD

DOVER, DELAWARE 19901

JANUARY 2023

CEI Project No. 20232961.001A

January 2023

Mr. Marc Orndorff
Design & Project Manager
Delaware Army National Guard
1 Vavala Way
New Castle, DE 19720

**SUBJECT: DEARNG Readiness Center Site Development
Geotechnical Investigation Report
New Castle, Delaware
CEI Project No. 20232961.001A**

Dear Mr. Orndorff:

In accordance with our proposal for engineering services, we have performed a geotechnical investigation for the proposed construction for the DEARNG River Road Training Site Readiness Center in New Castle, Delaware. The purpose of the investigation was to evaluate the subsurface conditions for the design and construction of a Readiness Center. The conclusions and recommendations presented in this report are subject to the limitations presented herein.

Project Description: The Delaware Army National Guard (DEARNG) requested site development services for a 43,623 SF Readiness Center at the River Road Training Site, New Castle County, Delaware. The new facility will support the training needs for the Military Police and the Field Feeding Team-using agencies. The River Road site is located at 1197 River Road in New Castle, Delaware (see Location Map – Figure 1).

The project site is roughly rectangular in shape and is bordered by River Road to the northwest, the DEARNG CSMS Vehicle Maintenance Building to the southwest, another DEARNG building to the northeast, and the Delaware River to the southeast of the site. Wetlands are also located along the coast of the Delaware River (see Boring Location Plan – Figure 2). Based on the topographic information on the Site Plan developed by Century, the site is situated at approximate elevation +11 to +30 feet, generally sloping down to the southeast. Ground cover at the time of our site visit consisted primarily of existing topsoil with grass throughout the site.

Development of the site will likely include construction of the following:

- Site entrance and exit to and from adjacent roads.
- Heavy vehicle drive lanes (heavy-duty asphalt pavement).

- Passenger vehicle parking areas (light-duty asphalt pavement).
- Portland Cement Concrete truck apron and parking areas.
- Water, storm drain and sanitary utilities.
- Stormwater management areas.

New structural fills and cuts will likely be required to bring building pads to design subgrade elevations. Preliminary structural loads were estimated to be 50 kips for columns and wall loads up to 4 kips per lineal foot. Slab loads can be up to 250 pounds per square foot (psf).

Scope of Work: The scope of the geotechnical investigation included the following:

- Drilling a total of 23 test borings to depths up to 30 feet below grade, with one test boring to 100 feet below grade (for seismic site classification). The drilling included Standard Penetration Testing and sampling of the soils.
- Performing laboratory testing to determine the classification of the soils.
- Preparing boring logs and subsurface profiles.
- Evaluating the subsurface conditions and design requirements for the structure foundations, as well as groundwater conditions, frost depth, recommended safety factors, lateral earth properties, soil bearing capacity, soil strength design parameters (phi angle and cohesion), seismic design criteria, laboratory test results, subgrade preparation, and geotechnical and construction considerations.
- Preparing a geotechnical report with findings and recommendations.

Area Geology: The site lies in the Coastal Plain Geologic Region in an area where the underlying soils are known as the middle Pliocene Lynch Heights Formation (Qlh) which outcrop in the northwest portion of the site and the upper Pleistocene Scotts Corners Formation (Qsc) which outcrop in the southeast portion of the site (see Figure 3 – Geology Map). The soils of the Lynch Heights Formation are characterized as a heterogeneous unit of light gray to brown to light yellow-brown, medium to fine sand with discontinuous beds of coarse sand, gravel, silt, fine to very fine sand, and organic-rich clayey silt to silty sand. Vertical sequences are variable, but generally consist of a lower medium to coarse sand, a middle interbedded clayey silt and fine to medium sand, and an upper medium sand fining upward to a fine sand to fine sandy silt. Small-scale cross-

bedding within the sands is common. Some of the interbedded clayey silts and silty sands are burrowed. Sands are quartzose and slightly feldspathic, and typically micaceous where very fine to fine grained. The unit is up to 50 feet thick to the east and thins to the west. The Lynch Heights formation is interpreted to be a fluvial to estuarine unit of fluvial channel, tidal flat, tidal channel, beach, and bay deposits.

The Scotts Corners Formation soils are a heterogeneous unit of light-gray to brown to light yellow-brown, coarse to fine sand, gravelly sand, and pebble gravel with rare discontinuous beds of organic-rich clayey silt, clayey silt, and pebble gravel. These soils are commonly capped with a few feet of silt to fine sandy silt. The formation is interpreted to be a transgressive unit consisting of swamp, marsh, estuarine channel, beach, and bay deposits. The unit is up to 15 feet thick. The Lynch Heights Formation underlies this unit in some areas. The Calvert Formation (Tc) underlies both units and is composed of gray to gray-brown clayey silt to silty clay interbedded with gray to light-gray silty to fine to coarse quartz sands. Discontinuous beds of shell are common in the sands and in the clayey silts. The unit is up to 100 feet thick in the area.

Based upon the USDA Soil Survey of the area, there are four primary soil units within the site boundaries (Figure 4). Specific characteristics of the soil types are listed below:

- Nassawango silt loam, 2 to 5 percent slopes (NsB). The Nassawango silt loam consists of 0 to 10 inches of Ap silt loam, 10 to 16 inches of E silt loam, 16 to 44 inches of Bt silt loam, 44 to 60 inches of 2C loamy sand, and 60 to 80 inches of 2Cg fine sandy loam. The unit has a hydrologic soil group rating of C. Depth to groundwater is 40 to 72 inches. The risk of corrosion to uncoated steel and concrete is moderate and high, respectively.
- Udorthents, 0 to 10 percent slopes (UzC). The Udorthents soil consists of 0 to 4 inches of C1 sandy loam and 4 to 80 inches of C2 sandy loam. The unit has a hydrologic soil group rating of A. Depth to groundwater is 40 to 72 inches. The risk of corrosion to uncoated steel and concrete is moderate and high, respectively.
- Woodstown loam, 0 to 2 percent slopes and 2 to 5 percent slopes (WoaA, WoaB). The Woodstown loam consists of 0 to 7 inches of Ap loam, 7 to 11 inches of E sandy loam, 11 to 29 inches of Bt sandy loam, 29 to 45 inches of BCg fine loamy sand, and 45 to 80 inches of Cg loamy sand. The unit has a hydrologic soil group rating of C. Depth to groundwater is 40

to 72 inches. The risk of corrosion to uncoated steel and concrete is moderate and high, respectively.

Test Borings: Twenty-three (23) test borings were drilled up to 30 feet below grade (except for SB-3 which was 100 feet deep) at the locations shown on the Boring Location Plan (Figure 2), using a Geoprobe 3230DT track-mounted drill rig that was equipped with hollow stem augers. Continuous standard penetration testing and sampling of the soils were performed at 2 feet intervals to 10 feet below grade followed by 5-foot intervals thereafter to the bottom of each boring, except for the SWM borings which were continuously sampled to 16 feet below grade. During drilling, groundwater was encountered within only 8 of 23 borings after removing the hollow stem augers, from 0.5 to 22 feet below grade, averaging 6.9 feet below grade. Cave-in depths ranged from 2 to 25 feet below grade, averaging 11.4 feet below grade. Groundwater and cave-in depths were recorded on the boring logs.

The soil samples were visually inspected and classified by a geotechnical engineer. The soil classifications were corroborated or modified based on the results of the laboratory classification tests performed on representative soil samples. The boring logs and sample analyses are included in Appendix B.

Laboratory Testing: Laboratory testing was performed on selected soil samples to determine the natural moisture contents and classifications testing. A total of 31 moisture content tests, 31 classification tests, one unconfined compressive strength, and one unconsolidated-undrained triaxial compressive shear strength test were performed in accordance with the following standards:

- Water Content (ASTM D2216)
- Sieve Analysis (ASTM D422)
- Atterberg Limits (ASTM D4318)
- Unconfined Compressive Strength (ASTM D2166)
- Unconsolidated-Undrained Triaxial Compression Shear Strength (ASTM D2850)

The laboratory test results are included in Appendix C.

Subsurface Conditions: The subsurface profile of the site is shown on Figure 5. The following soil stratum was encountered:

Topsoil: Based on the boring results, topsoil is present in 17 of 23 borings from 0.2 to 1.5 feet

below grade, averaging 0.8 feet below grade. The topsoil consisted of organic-rich, very soft to medium stiff, silt (ml) to sandy silt (ml). These soils were primarily non-plastic.

Gravel Fill: Gravel FILL soils were present in 6 of 23 borings from 0.3 to 4 feet below grade, averaging 2.1 feet below grade. The FILL soils consisted of very loose to medium dense, sandy well-graded gravel (gw). These soils were primarily non-plastic. A petroleum odor was detected in SB-11 close to ground surface.

Coarse-Grained Fluvial Deposits: Coarse-grained soils are present in 13 of 23 borings as isolated lenses within cohesive soils. The soils primarily consisted of very loose to very dense, poorly-graded sand (sp), poorly-graded sand with silt (sp-sm), silty sand (sm), clayey sand (sc), poorly-graded gravel (gp), and silty gravel (gm). The Standard Penetration Test blow counts ranged from 4 to 28 blows per foot, averaging roughly 16 blows per foot. These soils were primarily non-plastic.

Fine-Grained Fluvial Deposits: Fine-grained soils are present in all borings. These soils primarily consisted of very soft to hard, silt (ml), sandy silt (ml), and clayey silt (ml) to silty lean clay (cl), sandy lean clay (cl), and lean clay (cl). The Standard Penetration Test blow counts ranged from 2 to 100 blows per foot, averaging roughly 17 blows per foot. These soils were primarily plastic. A petroleum odor was also detected in boring SB-10 at 6 feet below grade.

As stated earlier, groundwater was encountered within 8 of 23 borings after removing the hollow stem augers, from 0.5 to 22 feet below grade, averaging 6.9 feet below grade. Cave-in depths ranged from 2 to 25 feet below grade, averaging 11.4 feet below grade. It's likely the groundwater encountered was perched. The groundwater and cave-in depths are presented in the table below.

Groundwater and Cave-in Depths

Boring(s)	Water on Rods Depth (ft)	0-Hour Groundwater Depth (ft)	0-Hour Cave-In Depth (ft)	24-Hour Groundwater Depth (ft)	24-Hour Cave-In Depth (ft)
SB-1	Dry	Dry	24	22	24
SB-2	Dry	Dry	23.5	Dry	23.5
SB-3	Dry	Dry	7	Dry	7
SB-4	7	6	25	4.5	25
SB-5	Dry	Dry	24	13	24
SB-6	Dry	Dry	6	Dry	6

Boring(s)	Water on Rods Depth (ft)	0-Hour Groundwater Depth (ft)	0-Hour Cave-In Depth (ft)	24-Hour Groundwater Depth (ft)	24-Hour Cave- In Depth (ft)
SB-7	4	Dry	2	0.5	2
SB-8	Dry	Dry	4	Dry	4
SB-9	Dry	Dry	4.5	3	3.5
SB-10	Dry	Dry	4	Dry	4
SB-11	3	2.5	5	1.5	5
SB-12	Dry	Dry	4	NR	NR
SB-13	Dry	Dry	4	NR	NR
SB-14	8	Dry	4	NR	NR
SB-15	Dry	Dry	NR	NR	NR
SB-16	Dry	Dry	23	NR	NR
SB-17	Dry	Dry	23	NR	NR
SB-18	Dry	Dry	10.5	Dry	10.5
SB-19	13	Dry	11	Dry	11
SB-20	Dry	Dry	10.5	NR	NR
SB-21	Dry	Dry	11	Dry	11
SB-22	13	Dry	11.5	8	11.5
SB-23	Dry	Dry	11	NR	NR

NR = not recorded

A more accurate determination of the hydrostatic water table would require the installation of monitoring wells or piezometers. It should be noted that the actual level of the hydrostatic water table and the amount and level of perched water should be anticipated to fluctuate throughout the year, depending upon variations in precipitation, surface run-off, infiltration, site topography, and drainage.

Foundation Design Recommendations: The subsurface conditions at the site generally consist of medium to very stiff cohesive silts and clays, with occasional lenses of loose to medium dense sands and silty sands. Based on the results of the field exploration, the site appears to be geotechnically suitable for development. Shallow foundations may be used for the proposed structures, unless there are significantly higher loads than provided. Within the following sections, foundation design recommendations and constructability considerations are provided.

Shallow Foundations: Shallow footings or mat foundations may be used for the support of any proposed structures. Century recommends the subgrades be evaluated prior to concrete placement. Any loose soils should be removed and replaced with compacted structural fill. Slabs or shallow spread footings constructed on structural fill or natural soil, above the groundwater table at least as deep as the width of the footing (B), should be designed for a maximum allowable bearing pressure of 3,000 psf in conjunction with a modulus of subgrade reaction of 75 psi per inch of deflection. Total and differential settlements for footings were not determined and should be estimated using actual loads.

The edges of the slabs should be turned down to the frost depth (30 inches) or be constructed on free-draining fill. The surrounding ground surface should be sloped to drain away from slabs with a grade. Footings should have a minimum dimension of 24 inches. Uplift loads should be resisted by the mass of the footing alone, unless the backfill is controlled and compacted. There is shallow groundwater in some areas of the site, therefore limited dewatering may be required.

For resistance to sliding, Century recommends using an allowable passive earth pressure calculated utilizing an equivalent fluid density of 240 pounds per cubic foot (pcf) for design of footings confined by undisturbed natural soil or structural fill. To develop this capacity, concrete must be placed neat in excavations. Passive pressure should be neglected from the ground surface to the frost depth. It includes a factor of safety of approximately 1.5, which generally corresponds to a predicted lateral deflection of less than ½ inch. The above resistance value can be increased by one-third for transient loads such as wind or seismic forces. A coefficient of friction ($\tan \delta$) equal to 0.35 may be used when calculating resistance to sliding. Passive pressure and bottom friction can also be combined without reduction.

Seismic Site Class: The seismic site classification was determined based on the 2021 Edition of the International Building Code (IBC), which references Publication ASCE 7 “Minimum Design Loads for Buildings and Other Structures”. One boring was drilled to a maximum depth of 100 feet. Using the $\bar{N}$ method for site classification, we have assumed that the typical soil profile for the area of the proposed structures can be represented by a 100 feet thick layer of stiff soil, indicating a site classification of D (Stiff Soil). The classification is based on average properties of the soil to a depth

of 100 feet. For Seismic Site Class D, the following seismic design parameters were obtained for the site location.

Period	Mapped Maximum Considered Earthquake Ground Motion Acceleration	Site Coefficient	Maximum Considered Earthquake Spectral Response Acceleration	Design Spectral Response Acceleration
Short (0.2 sec.)	$S_S = 0.172g$	$F_a = 1.6$	$S_{MS} = 0.276g$	$S_{DS} = 0.184g$
1.0 Second	$S_1 = 0.046g$	$F_v = 2.4$	$S_{M1} = 0.110g$	$S_{D1} = 0.073g$

Dewatering and Drainage: Groundwater was not encountered close to ground surface, except as perched groundwater. Therefore, limited groundwater dewatering will likely be required for trench and shallow foundation excavations. Gravel-lined sump pits with pumps would likely handle any perched groundwater entering shallow excavations. Deeper excavations for basements may require more extensive dewatering techniques using wellpoints or pumping wells. Adequate above-ground drainage should be provided at the site at all times, including during construction, to minimize any increase in moisture content of the foundation soils. All run-off from adjacent areas should be diverted away from the excavation to prevent ponding of water in the excavation. After construction, all areas should be sloped away from proposed structures to prevent ponding of water around the building. The site drainage should also be such that the run-off onto adjacent properties is controlled properly.

Subgrade Preparation: It is recommended that the subgrade for all spread footings and slabs be inspected by a geotechnical engineer or qualified soils technician. The subgrade for slabs should be inspected by proof-rolling using a loaded 10-ton dump truck, 8-ton drum roller, or similar equipment. Subgrade areas that are soft or “pump” during proof-rolling should be re-compacted or undercut and backfilled with compacted fill. Subgrades for the foundations should be inspected by testing with a Dynamic Cone Penetrometer (DCP) to confirm that the subgrade is firm and acceptable for the design bearing pressure. Subgrades that are soft should be undercut to firm subgrade soil and backfilled with compacted backfill.

Fill Selection, Placement & Compaction: It is anticipated that the proposed site grading will not vary substantially from existing grades and that minimal cuts and fills will be required. All material used for fill or backfill should be inspected and approved by the Geotechnical Engineer. The on-site soils are considered to be suitable for use as backfill for foundation walls, structural fill, and site

grading. If fill material is needed for backfilling areas beneath slabs or foundations where unsuitable subgrade was undercut, it is recommended that a select granular backfill such as DelDOT Type B Borrow or granular backfill be used.

Fill that will support slabs, foundations or pavements should be placed in 8-inch layers and be compacted to at least 95 percent of the Modified Proctor maximum dry density as determined by ASTM D 1557. Fill for non-structural areas should be compacted to at least 90 percent. The on-site soils have an optimum moisture content for compaction of about 15 to 25 percent. It should therefore be anticipated that some of the on-site soils will need to be spread, aerated and dried to achieve proper compaction.

Inspection & Testing: The additional foundation engineering, inspection and testing services that are recommended for this project are summarized below:

- **Subgrade Inspection & Approval:** A Geotechnical Engineer or experienced Soils Technician should inspect and approve the subgrade for the slabs and foundations. Direction should be provided, as required, for any additional undercutting or improvement that may be needed to achieve a suitable subgrade.
- **Undercutting & Backfilling:** If undercutting of unsuitable subgrade is required beneath slabs and foundations, a Geotechnical Engineer or experienced Soils Technician should inspect the undercut and determine the depth needed to excavate all soft or unsuitable subgrade soils. Compaction testing should be performed to verify that the backfill has been placed and compacted as specified.
- **Fill Placement and Compaction:** A Geotechnical Engineer or experienced Soils Technician should witness any required filling operations and should take sufficient in-place density tests to verify that the specified degree of fill compaction is achieved. The technician should observe and approve borrow materials used and should determine if their existing moisture contents are suitable. A Geotechnical Engineer or experienced Soils Technician should closely monitor all structural fill placement and compaction operations for footings and all other areas of structural support.

Remarks: This report has been prepared to aid in the evaluation of the subsurface conditions for the site construction. It is considered that adequate recommendations have been provided to serve

as a basis for design and preparation of plans and specifications. Additional recommendations can be provided as needed.

These analyses and recommendations are, of necessity, based on the information made available to us at the time of the actual writing of the report and the on-site conditions, surface and subsurface, that existed at the time the exploratory borings were drilled. Further assumption has been made that the limited exploratory borings, in relation both to the lateral extent of the site and to depth, are representative of conditions across the site.

The nature and extent of variations between explorations may not become evident until construction. If variations from the anticipated conditions are encountered, it may be necessary to revise the recommendations in this report. We cannot accept responsibility for designs based on recommendations in this report unless we are engaged to make site visits during construction to: a) check that the subsurface conditions exposed during construction are in general conformance with our design assumptions and b) ascertain that, in general, the work is being performed in compliance with the contract documents.

Our professional services have been performed in accordance with generally accepted engineering principles and practices; no other warranty, expressed or implied, is made. Century Engineering, LLC, assumes no responsibility for interpretations made by others on the work performed by Century. We appreciate the opportunity to have been of service to you on this project. Please contact us if you have any questions or need additional information.

Sincerely,

CENTURY ENGINEERING, LLC, A KLEINFELDER COMPANY



Alex Schmidt, PE
Vice President

cc: File
T:\Geotech - Inspection\DEARNG Readiness Center - 20232961.001A\Report\DEARNG Report Draft.doc

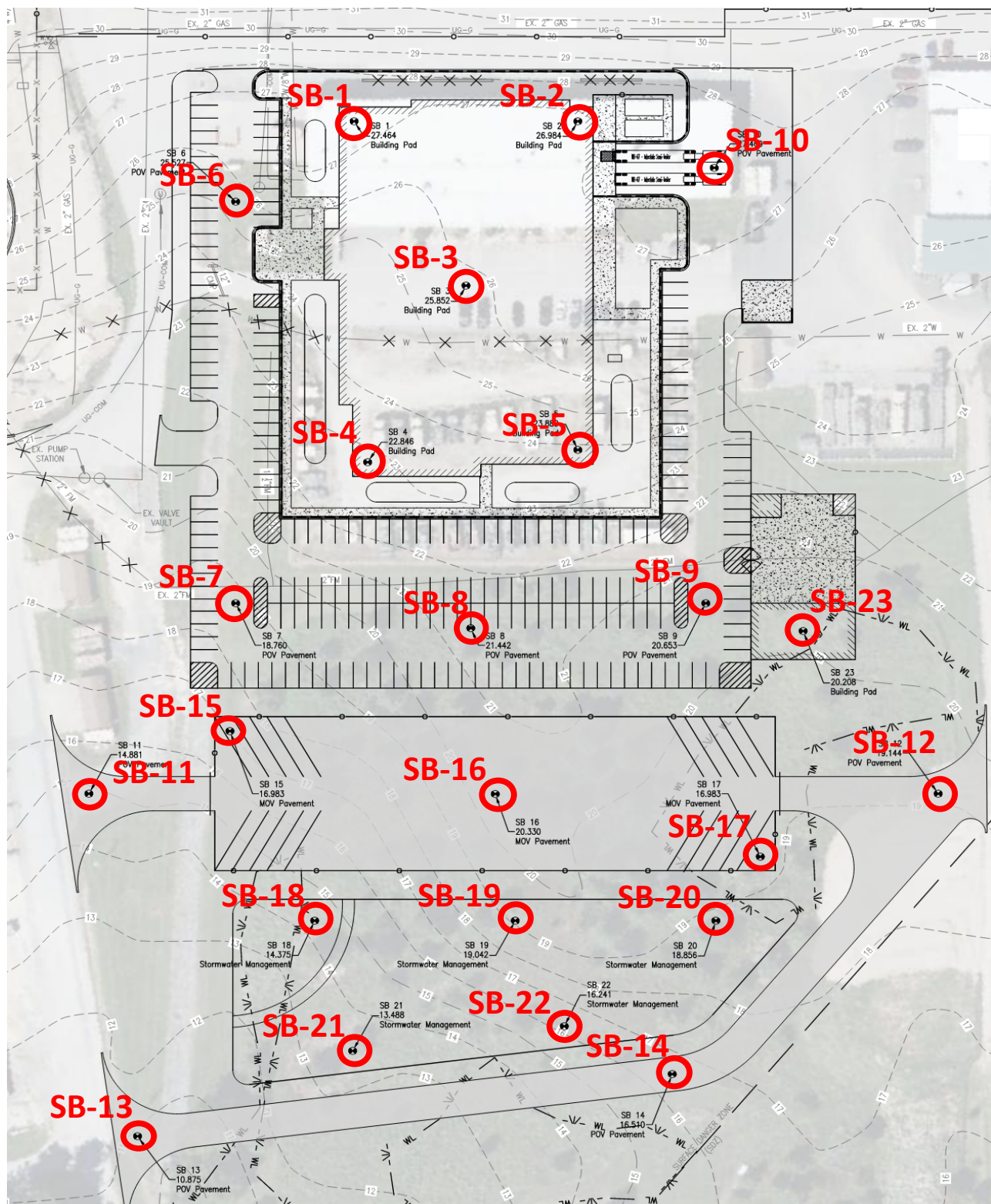
APPENDIX A

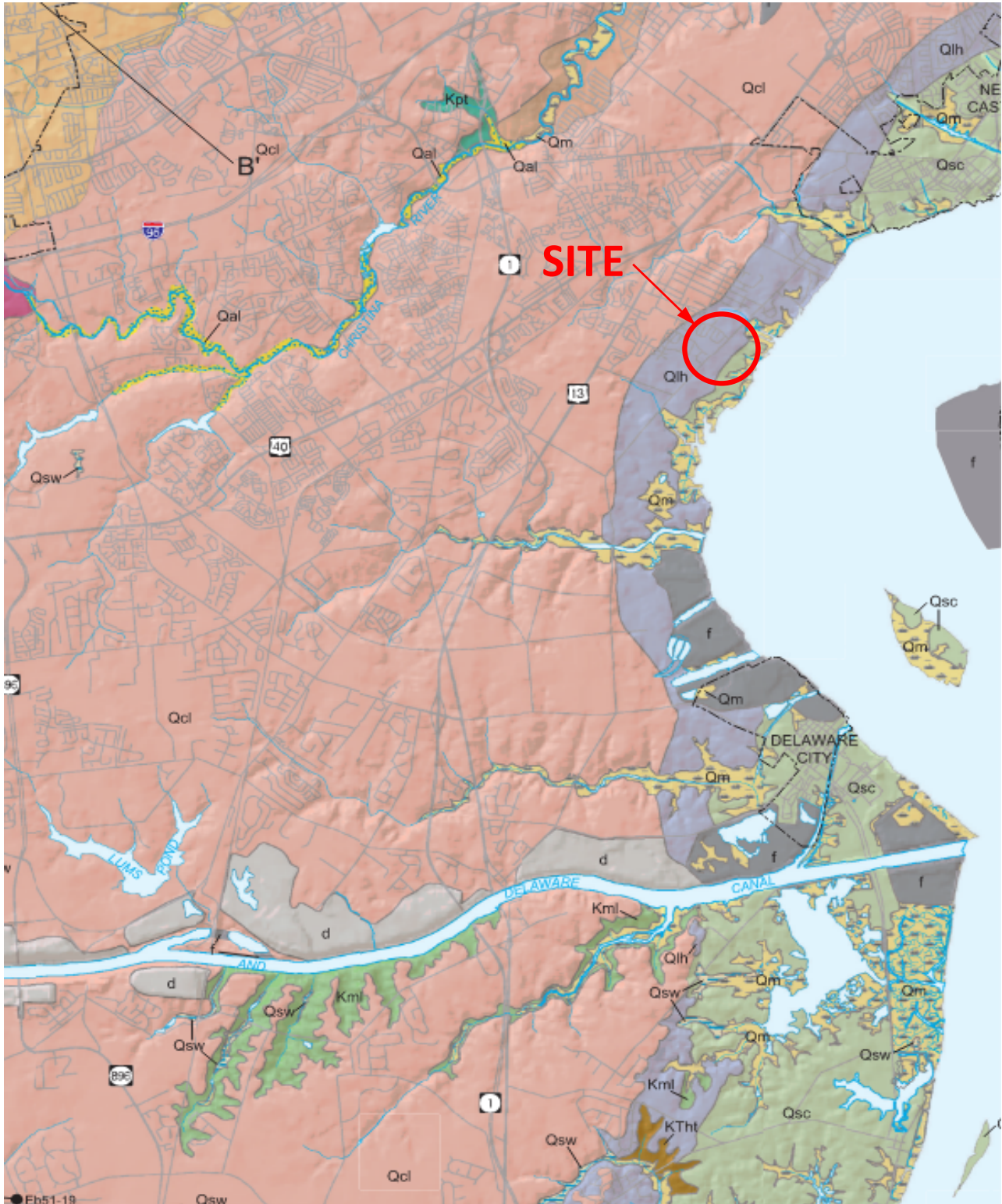
Figures

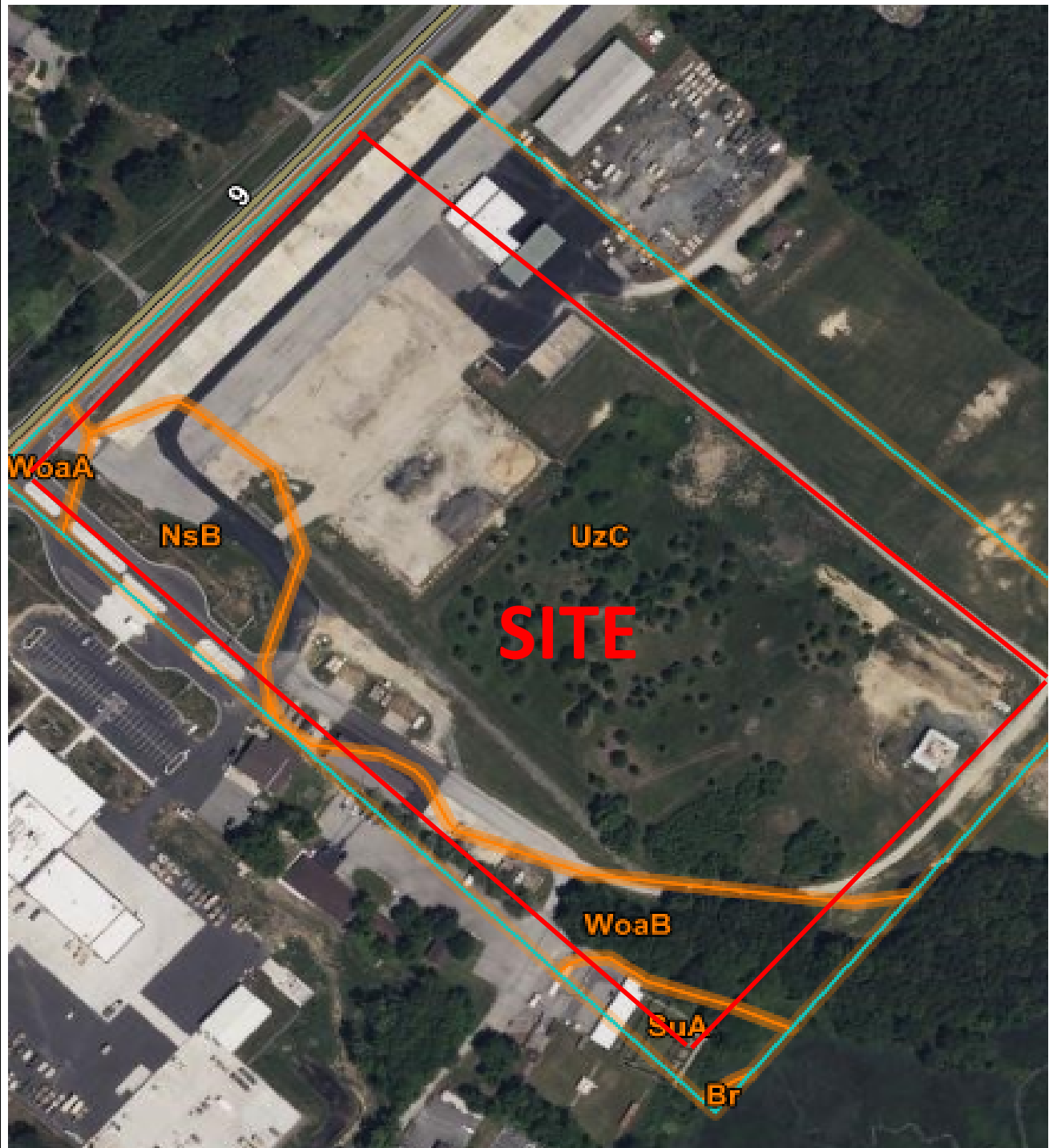
Figure: 1	Designed By:	Drawn By:
Date: 12/11/2022	Project#: 20232961.001A	Scale: None



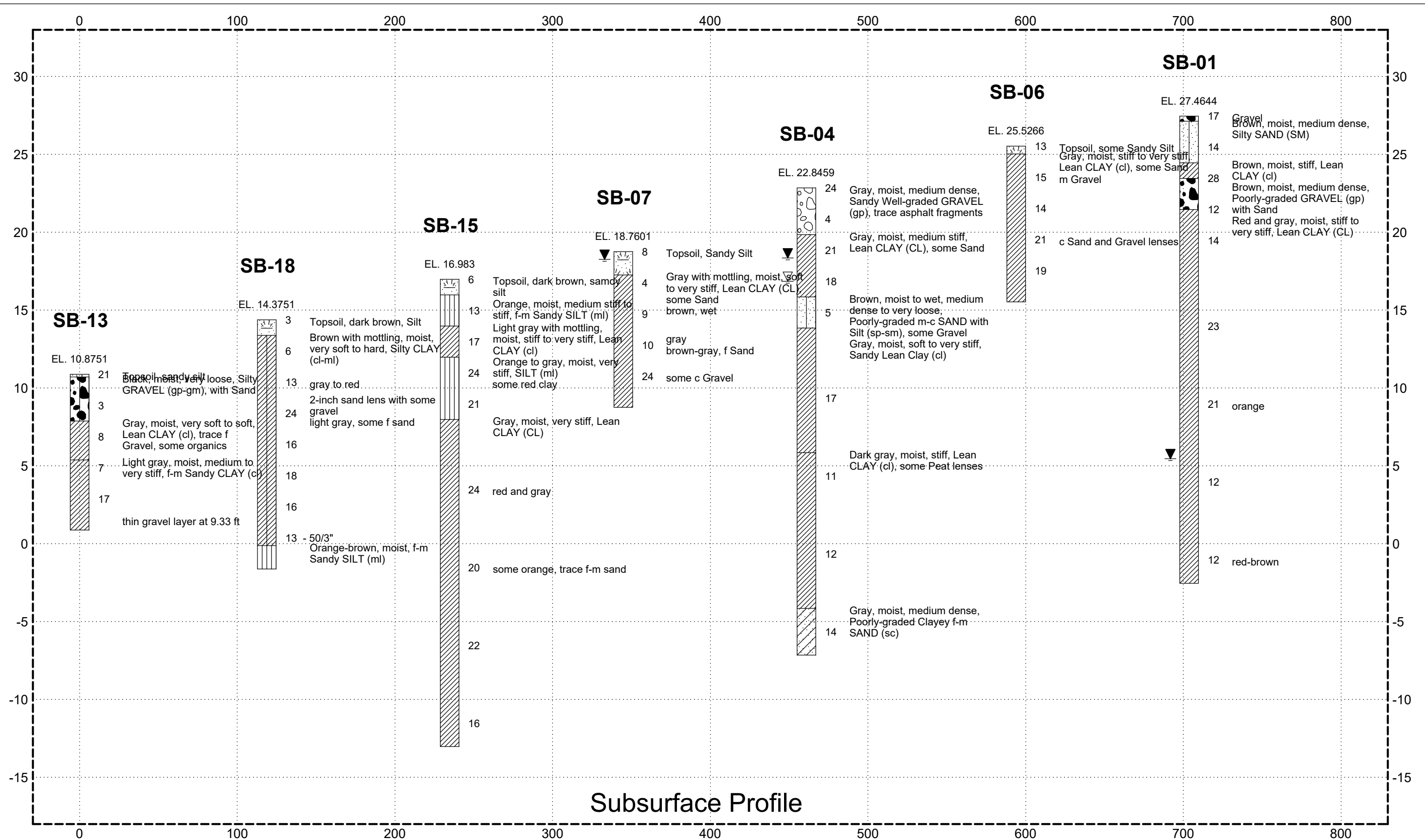
Figure: 2	Designed By:	Drawn By:
Date: 12/11/2022	Project#: 20232961.001A	Scale: None







CEI 11 X 17 DEARNG.GPJ SLHTEST2.GDT 1/21/23



10710 Gilroy Road
Hunt Valley, MD 21031
(443) 589-2400
FAX: (443) 589-2401

PROJECT :

DEARNG Readiness Center

DRAWN BY :

TEM

APPROVED BY :

DATE :

1/21/23

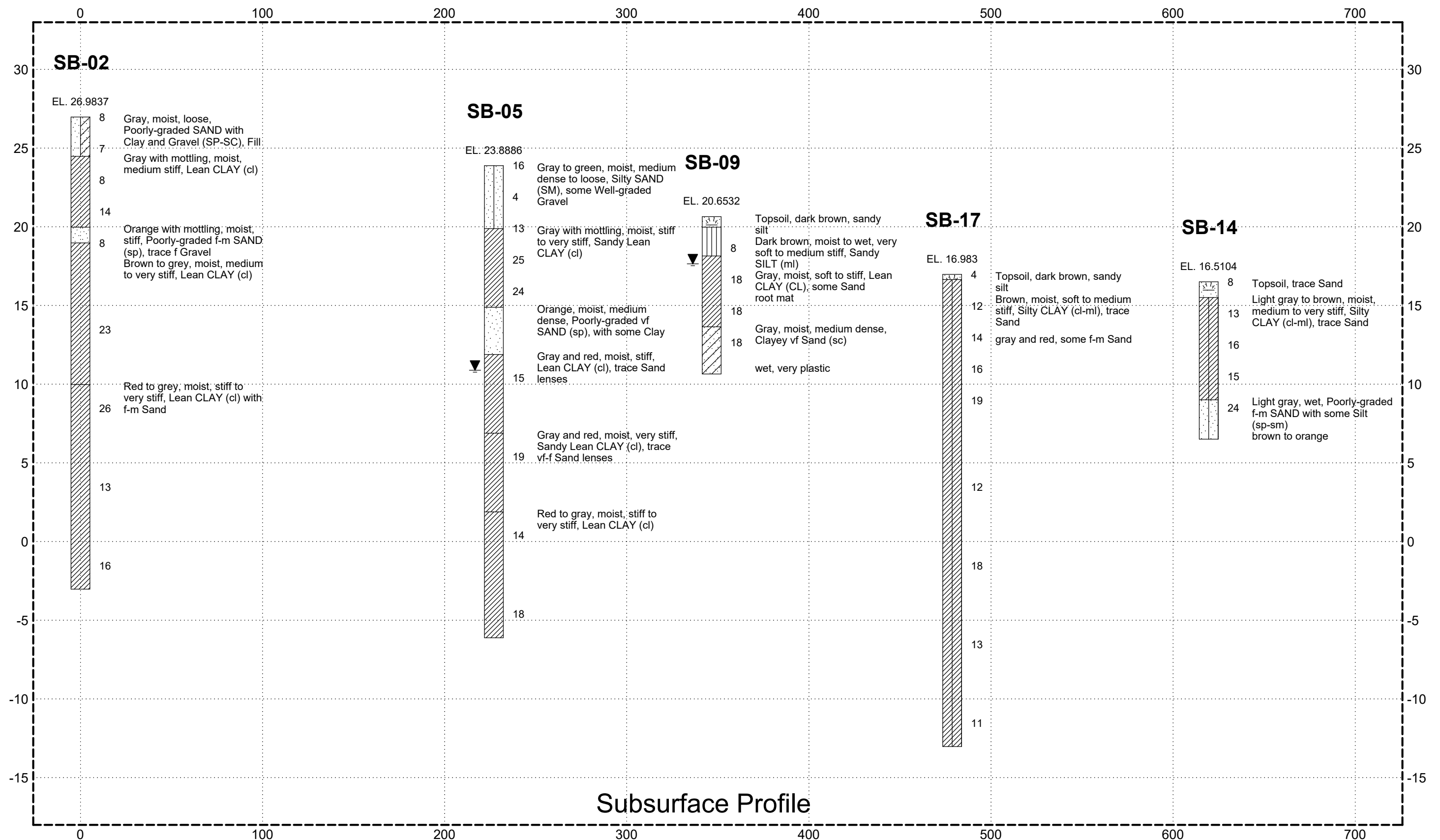
FIGURE NO.

5a

CONTRACT NO.

195063.03

CEI 11 X 17 DEARNG.GPJ SLHTEST2.GDT 1/21/23



10710 Gilroy Road
Hunt Valley, MD 21031
(443) 589-2400
FAX: (443) 589-2401

PROJECT :

DEARNG Readiness Center

DRAWN BY :

TEM

APPROVED BY :

DATE :

1/21/23

FIGURE NO.

5b

CONTRACT NO.

195063.03

APPENDIX B

Boring Logs

TEST BORING LOG

BORING **SB-01**

PROJECT : **DEARNG Readiness Center**
 CLIENT : **DEARNG**
 CONTRACTOR : **Earth Data**

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE	CONTRACT NO.: 195063.03
Date	Time	Water	Casing	Hole	Type:	Casing	S		SHEET NO. : 1 of 1
11/30/22	0 Hr	Dry		24	Size I.D.:	3"	2"		NORTHING : 595176.7714
12/1/22	24 Hr	22		24	Hammer Wt.:		140	----	EASTING : 601327.1311
					Hammer Fall:		30	----	ELEVATION : 27.4644
									DATE START : 11-30-22
									END : 11-30-22
									DRILLER : Earth Data
									INSPECTOR : E. Chandler

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			5 9-8 7	S-1	0.0 2.0	18"	27.1 0.3	Gravel
			3 6-8 8	S-2	2.0 4.0	12"	24.5 3.0	Brown, moist, medium dense, Silty SAND (SM)
			4 14-14 15	S-3	4.0 6.0	12"	23.5 4.0	Brown, moist, stiff, Lean CLAY (cl)
5			3 5-7 9	S-4	6.0 8.0	12"	21.5 6.0	Brown, moist, medium dense, Poorly-graded GRAVEL (gp) with Sand
			4 7-7 9	S-5	8.0 10.0	18"		Red and gray, moist, stiff to very stiff, Lean CLAY (CL)
10								
			5 8-15	S-6	13.5 15.0	18"		
15								
			4 8-13	S-7	18.5 20.0	18"		orange
20								
			3 5-7	S-8	23.5 25.0	18"		
25								
			2 5-7	S-9	28.5 30.0	18"		red-brown
30							-2.5 30.0	

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-5	Very Loose	0-3	Very Soft	- S - Split Spoon	Overburden:
6-10	Loose	4-5	Soft	- T - Thin Wall Tube	Rock:
11-30	Medium Dense	6-10	Medium Stiff	- U - Undisturbed Piston	Samples:
31-50	Dense	11-15	Stiff	- C - Diamond Core	
51+	Very Dense	16-30	Very Stiff	- W - Wash Sample	
		31+	Hard	- See Remarks	

BORING **SB-01**

TEST BORING LOG

BORING **SB-02**

PROJECT : **DEARNG Readiness Center**
 CLIENT : **DEARNG**
 CONTRACTOR : **Earth Data**

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE	CONTRACT NO.: 195063.03	
Date	Time	Water	Casing	Hole	Type:	Casing	S		SHEET NO. :	1 of 1
11/30/22	0 Hr	Dry		23.5	Size I.D.:	3"	2"		NORTHING :	595285.2391
12/1/22	24 Hr	Dry		23.5	Hammer Wt.:		140	----	EASTING :	601428.5555
					Hammer Fall:		30	----	ELEVATION :	26.9837
									DATE START :	11-30-22
									END :	11-30-22
									DRILLER :	Earth Data
									INSPECTOR :	E. Chandler

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/Depth (ft)	FIELD CLASSIFICATION AND REMARKS	
5			4 5-3 3	S-1	0.0 2.0	18"	24.5 2.5	Gray, moist, loose, Poorly-graded SAND with Clay and Gravel (SP-SC), Fill	
			3 1-6 7	S-2	2.0 4.0	20"		Gray with mottling, moist, medium stiff, Lean CLAY (cl)	
			3 3-5 9	S-3	4.0 6.0	24"			
			1 4-10 14	S-4	6.0 8.0	24"		Orange with mottling, moist, stiff, Poorly-graded f-m SAND (sp), trace f Gravel	
			1 3-5 5	S-5	8.0 10.0	24"		Brown to grey, moist, medium to very stiff, Lean CLAY (cl)	
10							10.0 17.0		
			6 10-13	S-6	13.5 15.0	18"			
			6 11-15	S-7	18.5 20.0	18"		Red to grey, moist, stiff to very stiff, Lean CLAY (cl) with f-m Sand	
			3 5-8	S-8	23.5 25.0	18"			
25							-3.0 30.0		
			5 6-10	S-9	28.5 30.0	18"			

BLOWS/FT.		DENSITY		BLOWS/FT.		CONSISTENCY		SAMPLE IDENTIFICATION		SUMMARY	
0-5	Very Loose	0-3	Very Soft		- S - Split Spoon	 - T - Thin Wall Tube  - U - Undisturbed Piston  - C - Diamond Core  - W - Wash Sample  - See Remarks				Overburden:	
6-10	Loose	4-5	Soft	Rock:							
11-30	Medium Dense	6-10	Medium Stiff	Samples:							
31-50	Dense	11-15	Stiff								
51+	Very Dense	16-30	Very Stiff								
		31+	Hard			BORING SB-02					

TEST BORING LOG

BORING SB-03



PROJECT : DEARNG Readiness Center
CLIENT : DEARNG
CONTRACTOR : Earth Data

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE	CONTRACT NO.:	195063.03
Date	Time	Water	Casing	Hole	Type:	Open-Hole	Mud	Drilling	SHEET NO.:	1 of 3
11/29/22	0 Hr	Dry		7	Size I.D.:	3"	2"		NORTHING	595152.4539
11/30/22	24 Hr	Dry		7	Hammer Wt.:		140	----	EASTING	601461.8497
					Hammer Fall:		30	----	ELEVATION	25.8519
									DATE START	11-29-22
									END	11-29-22
									DRILLER	Earth Data
									INSPECTOR	E. Chandler

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/Depth (ft)	FIELD CLASSIFICATION AND REMARKS
0			12	S-1	0.0	18"	25.4	Gravel
0.5			7-6		2.0		23.5	Dark gray, moist, stiff, SILT with Sand (ML)
6			9	S-2	2.0	20"	2.3	Gray with mottling, moist to wet, stiff to very stiff, m Sandy Lean Clay (cl)
9			4-9		4.0			
12			4	S-3	4.0	24"		
6			6-10		6.0			
11			1	S-4	6.0	18"		
2-10			11		8.0			perched groundwater @ 7 ft
11			5	S-5	8.0	24"		
10-12			18		10.0		16.4	red
18							9.5	Red-Brown, moist, medium dense to dense, Poorly-graded vf SAND (sp)
							13.9	Orange, moist, hard, Sandy Lean CLAY (cl)
			6	S-6	13.5	18"	12.0	
16-20					15.0			
							8.9	Orange to red, moist, medium stiff to hard, Lean CLAY (cl)
			4	S-7	18.5	18"	17.0	red to light gray
5-10					20.0			
			3	S-8	23.5	18"		
5-7					25.0			
			5	S-9	28.5	18"		some vf Sand lenses
7-10					30.0			

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-5	Very Loose	0-3	Very Soft	- S - Split Spoon	Overburden:
6-10	Loose	4-5	Soft	- T - Thin Wall Tube	Rock:
11-30	Medium Dense	6-10	Medium Stiff	- U - Undisturbed Piston	Samples:
31-50	Dense	11-15	Stiff	- C - Diamond Core	
51+	Very Dense	16-30	Very Stiff	- W - Wash Sample	
		31+	Hard	- See Remarks	

BORING SB-03

TEST BORING LOG

BORING **SB-03**

PROJECT : DEARNG Readiness Center
 CLIENT : DEARNG
 CONTRACT NO.: 195063.03
 SHEET NO. : 2 of 3

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number Type	Sample Depth Range (ft)	Sample Recov- ery (in)	Elev- ation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS	
								switched from HSA to mud rotary	
35			2 4-6	S-10	 33.5 35.0	18"			
40			3 5-11	S-11	 38.5 40.0	18"			
45			2 3-6	S-12	 43.5 45.0	18"			
50			3 9-12	S-13	 48.5 50.0	18"			
55			4 8-12	S-14	 53.5 55.0	18"			
60			6 8-14	S-15	 58.5 60.0	18"			
65			8 30-50/5"	S-16	 63.5 65.0	17"			

BORING SB-03



PROJECT : DEARNG Readiness Center
CLIENT : DEARNG
CONTRACT NO.: 195063.03
SHEET NO. : 3 of 3

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number Type	Sample Depth Range (ft)	Sample Recov- ery (in)	Elev- ation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS	
-70			19-26		70.0				
-75			18 12-17	S-18	73.5 75.0	18"	-48.1 74.0	Orange to red, moist, medium stiff to hard, Sandy Lean CLAY (cl), some light gray vf Sand	
-80			23 50/4"	S-19	78.5 80.0	10"	-51.1 77.0	Light gray, wet, hard to very stiff, Sandy SILT (ML)	
-85			9 13-11	S-20	83.5 85.0	18"	-58.8 84.7	Black, moist, very stiff, PEAT (pt)	
-90			5 8-15	S-21	88.5 90.0	18"	-61.1 87.0	Orange to red, moist, medium stiff to hard, Sandy Lean CLAY (cl)	
-95			21 25-25	S-22	93.5 95.0	18"	-68.1 94.0 -68.6 94.5	Black, moist, very stiff, PEAT (pt), with m-c Sand Dark gray, moist, hard, Lean CLAY (cl), some maroon f Sand	
-100			10 24-27	S-23	98.5 100.0	18"	-74.1 100.0		
-105									
BLOWS/FT.		DENSITY	BLOWS/FT.		CONSISTENCY	SAMPLE IDENTIFICATION		SUMMARY	
0-5		Very Loose	0-3		Very Soft	- S - Split Spoon		Overburden:	
6-10		Loose	4-5		Soft	- T - Thin Wall Tube		Rock:	
11-30		Medium Dense	6-10		Medium Stiff	- U - Undisturbed Piston		Samples:	
31-50		Dense	11-15		Stiff	- C - Diamond Core			
51+		Very Dense	16-30		Very Stiff	- W - Wash Sample			
			31+		Hard	- See Remarks			
								BORING SB-03	

TEST BORING LOG

BORING **SB-04**

PROJECT : DEARNG Readiness Center
 CLIENT : DEARNG
 CONTRACTOR : Earth Data

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE	CONTRACT NO.: 195063.03
Date	Time	Water	Casing	Hole	Type:	Casing	S		SHEET NO. : 1 of 1
11/30/22	0 Hr	6		25	Size I.D.:	3"	2"		NORTHING : 595020.3737
12/1/22	24 Hr	4.5		25	Hammer Wt.:		140	----	EASTING : 601507.5652
					Hammer Fall:		30	----	ELEVATION : 22.8459
									DATE START : 11-30-22
									END : 11-30-22
									DRILLER : Earth Data
									INSPECTOR : E. Chandler

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			15 16-8 5	S-1	0.0 2.0	12"		Gray, moist, medium dense, Sandy Well-graded GRAVEL (gp), trace asphalt fragments
			5 2-2 8	S-2	2.0 4.0	18"	19.8 3.0	Gray, moist, medium stiff, Lean CLAY (CL), some Sand
			8 9-12 12	S-3	4.0 6.0	24"		
			5 8-10 8	S-4	6.0 8.0	24"	15.8 7.0	Brown, moist to wet, medium dense to very loose, Poorly-graded m-c SAND with Silt (sp-sm), some Gravel
			3 1-4 9	S-5	8.0 9.5	24"	13.8 9.0	Gray, moist, soft to very stiff, Sandy Lean Clay (cl)
			4 7-10	S-6	13.5 15.0	18"		
							5.8 17.0	Dark gray, moist, stiff, Lean CLAY (cl), some Peat lenses
			2 4-7	S-7	18.5 20.0	18"		
				T-1	21.5 23.5	24"		
			3 5-7	S-8	23.5 25.0	18"		
							-4.2 27.0	Gray, moist, medium dense, Poorly-graded Clayey f-m SAND (sc)
			5 6-8	S-9	28.5 30.0	18"	-7.2 30.0	

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-5	Very Loose	0-3	Very Soft	- S - Split Spoon	Overburden:
6-10	Loose	4-5	Soft	- T - Thin Wall Tube	Rock:
11-30	Medium Dense	6-10	Medium Stiff	- U - Undisturbed Piston	Samples:
31-50	Dense	11-15	Stiff	- C - Diamond Core	
51+	Very Dense	16-30	Very Stiff	- W - Wash Sample	
		31+	Hard	- See Remarks	

BORING **SB-04**

TEST BORING LOG										BORING SB-05	
PROJECT : DEARNG Readiness Center CLIENT : DEARNG CONTRACTOR : Earth Data										CONTRACT NO.: 195063.03 SHEET NO. : 1 of 1 NORTHING : 595128.1363 EASTING : 601596.5683 ELEVATION : 23.8886 DATE START : 11-30-22 END : 11-30-22 DRILLER : Earth Data INSPECTOR : E. Chandler	
GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE			
Date	Time	Water	Casing	Hole	Type:	Casing	S				
11/30/22	0 Hr	Dry		24	Size I.D.:	3"	2"				
12/1/22	24 Hr	13		24	Hammer Wt.:		140	----			
					Hammer Fall:		30	----			
Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/Depth (ft)	FIELD CLASSIFICATION AND REMARKS			
			10 10-6 4	S-1	0.0 2.0	20"	19.9 4.0	Gray to green, moist, medium dense to loose, Silty SAND (SM), some Well-graded Gravel			
			4 2-2 2	S-2	2.0 4.0	6'					
	5			3 5-8 12	S-3	4.0 6.0	24"	14.9 9.0	Gray with mottling, moist, stiff to very stiff, Sandy Lean CLAY (cl)		
				7 10-15 21	S-4	6.0 8.0	24"				
	10			5 10-14 17	S-5	8.0 10.0	24"	11.9 12.0	Orange, moist, medium dense, Poorly-graded vf SAND (sp), with some Clay		
	15			3 6-9	S-6	13.5 15.0	18"	6.9 17.0	Gray and red, moist, stiff, Lean CLAY (cl), trace Sand lenses		
	20			4 8-11	S-7	18.5 20.0	18'	1.9 22.0	Gray and red, moist, very stiff, Sandy Lean CLAY (cl), trace vf-f Sand lenses		
	25			3 5-9	S-8	23.5 25.0	18"	-6.1 30.0	Red to gray, moist, stiff to very stiff, Lean CLAY (cl)		
	30			4 7-11	S-9	28.5 30.0	18"				
	BLOWS/FT.		DENSITY	BLOWS/FT.		CONSISTENCY	SAMPLE IDENTIFICATION		SUMMARY		
	0-5		Very Loose	0-3		Very Soft			Overburden: Rock: Samples:		
6-10		Loose	4-5		Soft						
11-30		Medium Dense	6-10		Medium Stiff						
31-50		Dense	11-15		Stiff						
51+		Very Dense	16-30		Very Stiff						
			31+		Hard						
BORING SB-05											

TEST BORING LOG										BORING SB-06	
PROJECT : DEARNG Readiness Center CLIENT : DEARNG CONTRACTOR : Earth Data										CONTRACT NO.: 195063.03 SHEET NO. : 1 of 1 NORTHING : 595080.939 EASTING : 601314.5593 ELEVATION : 25.5266 DATE START : 11-30-22 END : 11-30-22 DRILLER : Earth Data INSPECTOR : E. Chandler	
GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT		CASING SAMPLER CORE				
Date	Time	Water	Casing	Hole	Type:	Casing	S				
12/1/22	0 Hr	Dry		6	Size I.D.:	3"	2"				
12/2/22	24 Hr	Dry		6	Hammer Wt.:		140	----			
					Hammer Fall:		30	----			
Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/Depth (ft)	FIELD CLASSIFICATION AND REMARKS			
5		3	S-1	0.0	24"	25.0	Topsoil, some Sandy Silt				
		5-8		2.0		0.5					
		10									
		6	S-2	2.0	24"						
		7-8		4.0							
5		4	S-3	4.0	24"		Gray, moist, stiff to very stiff, Lean CLAY (cl), some Sand m Gravel				
		5-9		6.0							
		14									
		5	S-4	6.0	24"						
5		8-13		8.0			c Sand and Gravel lenses				
		10		10.0							
		4	S-5	8.0	24"						
10		8-11		10.0		15.5					
		13				10.0					
15											
20											
25											
30											
BLOWS/FT.		DENSITY		BLOWS/FT.		CONSISTENCY		SAMPLE IDENTIFICATION		SUMMARY	
0-5		Very Loose		0-3		Very Soft		- S - Split Spoon - T - Thin Wall Tube - U - Undisturbed Piston - C - Diamond Core - W - Wash Sample - See Remarks		Overburden: Rock: Samples:	
6-10		Loose		4-5		Soft					
11-30		Medium Dense		6-10		Medium Stiff					
31-50		Dense		11-15		Stiff					
51+		Very Dense		16-30		Very Stiff					
				31+		Hard		BORING SB-06			

TEST BORING LOG										BORING SB-07	
PROJECT : DEARNG Readiness Center CLIENT : DEARNG CONTRACTOR : Earth Data										CONTRACT NO.: 195063.03 SHEET NO. : 1 of 1 NORTHING : 594888.9549 EASTING : 601519.8756 ELEVATION : 18.7601 DATE START : 12-1-22 END : 12-1-22 DRILLER : Earth Data INSPECTOR : E. Chandler	
GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE			
Date	Time	Water	Casing	Hole	Type:	Casing	S				
12/1/22	0 Hr	Dry		2	Size I.D.:	3"	2"				
12/2/22	24 Hr	0.5		2	Hammer Wt.:		140	----			
					Hammer Fall:		30	----			
Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/Depth (ft)	FIELD CLASSIFICATION AND REMARKS			
5			2 3-5 5	S-1	0.0 2.0	24"	17.3 1.5	Topsoil, Sandy Silt			
			1 2-2 3	S-2	2.0 4.0	6"		Gray with mottling, moist, soft to very stiff, Lean CLAY (CL), some Sand brown, wet			
			4 4-5 6	S-3	4.0 6.0	24"		gray brown-gray, f Sand			
			2 3-7 9	S-4	6.0 8.0	12"		some c Gravel			
			6 11-13 18	S-5	8.0 10.0	6"					
10							8.8 10.0				
15											
20											
25											
30											
BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION			SUMMARY				
0-5 6-10 11-30 31-50 51+	Very Loose Loose Medium Dense Dense Very Dense	0-3 4-5 6-10 11-15 16-30 31+	Very Soft Soft Medium Stiff Stiff Very Stiff Hard	- S - Split Spoon - T - Thin Wall Tube - U - Undisturbed Piston - C - Diamond Core - W - Wash Sample - See Remarks			Overburden: Rock: Samples:				
							BORING SB-07				

TEST BORING LOG

BORING **SB-08**

PROJECT : DEARNG Readiness Center
 CLIENT : DEARNG
 CONTRACTOR : Earth Data

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE	CONTRACT NO.: 195063.03	
Date	Time	Water	Casing	Hole	Type:	Casing	S		SHEET NO. : 1 of 1	
11/30/22	0 Hr	Dry		4	Size I.D.:	3"	2"		NORTHING : 594990.6072	
2/2/22	24 Hr	Dry		4	Hammer Wt.:		140	----	EASTING : 601639.5703	
					Hammer Fall:		30	----	ELEVATION : 21.4417	
									DATE START : 12-1-22	
									END : 12-1-22	
									DRILLER : Earth Data	
									INSPECTOR : E. Chandler	

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/Depth (ft)	FIELD CLASSIFICATION AND REMARKS
0.0			1	S-1	0.0	22"	20.4	Topsoil, dark brown, sandy silt
1.0			1-3		2.0		1.0	
2.0			5				18.9	Red-brown, moist, soft to medium stiff, m-c Sandy SILT (ml), some Gravel
4.0			1	S-2	2.0	24"	2.5	
5.0			1-3		4.0			Gray and red, moist, soft to stiff, Silty CLAY (cl-ml), trace Sand some orange, f Sand
6.0			2	S-3	4.0	18"		
8.0			5-8		6.0			
10.0			13		8.0			
11.4			2	S-4	6.0	24"		
10.0			6-8		8.0			
			9		10.0			
			2	S-5	8.0	20"		
			4-4		10.0			wet, very plastic
			6					
15								
20								
25								
30								

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-5	Very Loose	0-3	Very Soft	- S - Split Spoon	Overburden:
6-10	Loose	4-5	Soft	- T - Thin Wall Tube	Rock:
11-30	Medium Dense	6-10	Medium Stiff	- U - Undisturbed Piston	Samples:
31-50	Dense	11-15	Stiff	- C - Diamond Core	
51+	Very Dense	16-30	Very Stiff	- W - Wash Sample	
		31+	Hard	- See Remarks	

BORING **SB-08**

TEST BORING LOG

BORING **SB-09**

PROJECT : **DEARNG Readiness Center**
 CLIENT : **DEARNG**
 CONTRACTOR : **Earth Data**

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE	CONTRACT NO.: 195063.03
Date	Time	Water	Casing	Hole	Type:	Casing	S		SHEET NO. : 1 of 1
12/1/22	0 Hr	Dry		4.5	Size I.D.:	3"	2"		NORTHING : 595116.8473
12/2/22	24 Hr	3		3.5	Hammer Wt.:		140	----	EASTING : 601732.9697
					Hammer Fall:		30	----	ELEVATION : 20.6532
									DATE START : 12-1-22
									END : 12-1-22
									DRILLER : Earth Data
									INSPECTOR : E. Chandler

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/Depth (ft)	FIELD CLASSIFICATION AND REMARKS
0.0			WOH	S-1	0.0	24"	20.0	Topsoil, dark brown, sandy silt
2.0			WOH-2		2.0		0.7	
18.2			1	S-2	2.0	18"	18.2	Dark brown, moist to wet, very soft to medium stiff, Sandy SILT (ml)
2.5			3-5		4.0		2.5	
10			4	S-3	4.0	24"		Gray, moist, soft to stiff, Lean CLAY (CL), some Sand root mat
			8-10		6.0			
			17		6.0	24"	13.7	
			3	S-4	6.0		7.0	Gray, moist, medium dense, Clayey vf Sand (sc)
			6-12		8.0			
			19		8.0	24"	10.7	
10			6	S-5	8.0		10.7	wet, very plastic
			8-10		10.0		10.0	
			10					
15								
20								
25								
30								

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-5	Very Loose	0-3	Very Soft	- S - Split Spoon	Overburden:
6-10	Loose	4-5	Soft	- T - Thin Wall Tube	Rock:
11-30	Medium Dense	6-10	Medium Stiff	- U - Undisturbed Piston	Samples:
31-50	Dense	11-15	Stiff	- C - Diamond Core	
51+	Very Dense	16-30	Very Stiff	- W - Wash Sample	
		31+	Hard	- See Remarks	

BORING **SB-09**

TEST BORING LOG										BORING SB-10	
PROJECT : DEARNG Readiness Center CLIENT : DEARNG CONTRACTOR : Earth Data										CONTRACT NO.: 195063.03 SHEET NO. : 1 of 1 NORTHING : 595329.0922 EASTING : 601514.1533 ELEVATION : 27.4689 DATE START : 11-30-22 END : 11-30-22 DRILLER : Earth Data INSPECTOR : E. Chandler	
GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE			
Date	Time	Water	Casing	Hole	Type:	Casing	S				
12/1/22	0 Hr	Dry		4	Size I.D.:	3"	2"				
12/2/22	24 Hr	2.5		4	Hammer Wt.:		140	----			
					Hammer Fall:		30	----			
Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/Depth (ft)	FIELD CLASSIFICATION AND REMARKS			
5			4 5-7 6	S-1	0.0 2.0	20"	27.1 0.3	Gravel			
			2 1-3 6	S-2	2.0 4.0	20"		Light gray, moist, very soft to very stiff, Silty CLAY (cl-ml), trace Sand			
			2 4-13 22	S-3	4.0 6.0	24"	23.0 4.5	Light gray, moist to wet, Poorly-graded SAND (sp), with Gravel			
			2 3-5 7	S-4	6.0 8.0	24"	21.5 6.0	Gray, moist, very stiff, Silty CLAY (cl-ml), f Sand, petroleum odor			
			3 6-10 13	S-5	8.0 10.0	24"	19.0 8.5	Red-gray, moist, very stiff, Lean CLAY (cl)			
10							17.5 10.0				
15											
20											
25											
30											
BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION			SUMMARY				
0-5 6-10 11-30 31-50 51+	Very Loose Loose Medium Dense Dense Very Dense	0-3 4-5 6-10 11-15 16-30 31+	Very Soft Soft Medium Stiff Stiff Very Stiff Hard	- S - Split Spoon - T - Thin Wall Tube - U - Undisturbed Piston - C - Diamond Core - W - Wash Sample - See Remarks			Overburden: Rock: Samples:				
							BORING SB-10				

TEST BORING LOG										BORING SB-11	
PROJECT : DEARNG Readiness Center CLIENT : DEARNG CONTRACTOR : Earth Data										CONTRACT NO.: 195063.03 SHEET NO. : 1 of 1 NORTHING : 594726.2482 EASTING : 601551.1894 ELEVATION : 14.8813 DATE START : 12-1-22 END : 12-1-22 DRILLER : Earth Data INSPECTOR : E. Chandler	
GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE			
Date	Time	Water	Casing	Hole	Type:	Casing	S				
12/1/22	0 Hr	2.5		5	Size I.D.:	3"	2"				
12/2/22	24 Hr	1.5		5	Hammer Wt.:		140	----			
					Hammer Fall:		30	----			
Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/Depth (ft)	FIELD CLASSIFICATION AND REMARKS			
5			10 9-8 8	S-1	0.0 2.0	12"	12.9	Gray, moist to wet, medium dense, Sandy GRAVEL (gw), petroleum odor			
			2 2-3 9	S-2	2.0 4.0	18"	2.0	Gray with mottling, moist, soft, Silty CLAY (cl-ml)			
			5 7-9 11	S-3	4.0 6.0	18"	10.9	Brown, moist, wet, Sandy Lean CLAY (cl), with organics and m-c Sand			
			4 6-8 13	S-4	6.0 8.0	24"	8.9	Gray with mottling, moist, stiff, Silty CLAY (cl-ml), trace Sand			
			2 4-8 14	S-5	8.0 10.0	24"	6.0				
10							4.9 10.0				
15											
20											
25											
30											
BLOWS/FT.	DENSITY	BLOWS/FT.		CONSISTENCY		SAMPLE IDENTIFICATION		SUMMARY			
0-5	Very Loose	0-3	Very Soft	- S - Split Spoon - T - Thin Wall Tube - U - Undisturbed Piston - C - Diamond Core - W - Wash Sample - See Remarks		Overburden: Rock: Samples:					
6-10	Loose	4-5	Soft								
11-30	Medium Dense	6-10	Medium Stiff								
31-50	Dense	11-15	Stiff								
51+	Very Dense	16-30	Very Stiff								
		31+	Hard								
								BORING SB-11			

TEST BORING LOG

BORING **SB-12**

PROJECT : **DEARNG Readiness Center**
 CLIENT : **DEARNG**
 CONTRACTOR : **Earth Data**

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE	CONTRACT NO.:	195063.03
Date	Time	Water	Casing	Hole	Type:	Casing	S		SHEET NO.:	1 of 1
11/30/22	0 Hr	Dry		4	Size I.D.:	3"	2"		NORTHING	595137.9863
					Hammer Wt.:		140	----	EASTING	601936.1912
					Hammer Fall:		30	----	ELEVATION	19.1438
									DATE START	12-1-22
									END	12-1-22
									DRILLER	Earth Data
									INSPECTOR	E. Chandler

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			3 3-3 5	S-1	0.0 2.0	18"	18.8 0.3	Topsoil sandy silt with some Gravel
			5 3-4 6	S-2	2.0 4.0	18"	17.1 2.0	Gray, moist, medium stiff, Sandy SILT (ml)
			3 3-6 9	S-3	4.0 6.0	24"		Gray with mottling, moist, Lean CLAY (CL), trace Sand
5			6 9-13 17	S-4	6.0 8.0	24"	12.1 7.0	Orange, wet, medium dense, Poorly-graded f-m SAND with Silt (sp-sm)
			5 7-8 10	S-5	8.0 10.0	24"	10.1 9.0 9.1 10.0	Orange, moist, stiff, Clayey SILT (ml)
10								
15								
20								
25								
30								

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-5	Very Loose	0-3	Very Soft	- S - Split Spoon	Overburden:
6-10	Loose	4-5	Soft	- T - Thin Wall Tube	Rock:
11-30	Medium Dense	6-10	Medium Stiff	- U - Undisturbed Piston	Samples:
31-50	Dense	11-15	Stiff	- C - Diamond Core	
51+	Very Dense	16-30	Very Stiff	- W - Wash Sample	
		31+	Hard	- See Remarks	

BORING **SB-12**

TEST BORING LOG										BORING SB-13	
PROJECT : DEARNG Readiness Center CLIENT : DEARNG CONTRACTOR : Earth Data										CONTRACT NO.: 195063.03 SHEET NO. : 1 of 1 NORTHING : 594585.863 EASTING : 601748.6367 ELEVATION : 10.8751 DATE START : 12-1-22 END : 12-1-22 DRILLER : Earth Data INSPECTOR : E. Chandler	
GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT		CASING SAMPLER CORE				
Date	Time	Water	Casing	Hole	Type:	Casing	S				
12/1/22	0 Hr	Dry		4	Size I.D.:	3"	2"				
					Hammer Wt.:		140	----			
					Hammer Fall:		30	----			
Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/Depth (ft)	FIELD CLASSIFICATION AND REMARKS			
5			4 8-13 7	S-1	0.0 2.0	18"	10.7 0.2	Topsoil, sandy silt			
			1 1-2 2	S-2	2.0 4.0	24"	7.9 3.0	Black, moist, very loose, Silty GRAVEL (gp-gm), with Sand			
			3 3-5 7	S-3	4.0 6.0	24"	5.4 5.5	Gray, moist, very soft to soft, Lean CLAY (cl), trace f Gravel, some organics			
			3 3-4 6	S-4	6.0 8.0	24"		Light gray, moist, medium to very stiff, f-m Sandy CLAY (cl)			
			14 8-9 10	S-5	8.0 10.0	12"	0.9 10.0	thin gravel layer at 9.33 ft			
10											
15											
20											
25											
30											
BLOWS/FT.		DENSITY		BLOWS/FT.		CONSISTENCY		SAMPLE IDENTIFICATION		SUMMARY	
0-5		Very Loose		0-3		Very Soft		- S - Split Spoon - T - Thin Wall Tube - U - Undisturbed Piston - C - Diamond Core - W - Wash Sample - See Remarks		Overburden: Rock: Samples:	
6-10		Loose		4-5		Soft					
11-30		Medium Dense		6-10		Medium Stiff					
31-50		Dense		11-15		Stiff					
51+		Very Dense		16-30		Very Stiff					
				31+		Hard					
										BORING SB-13	

BORING SB-14



PROJECT : **DEARNG Readiness Center**
 CLIENT : **DEARNG**
 CONTRACTOR : **Earth Data**

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE	CONTRACT NO.: 195063.03
Date	Time	Water	Casing	Hole	Type:	Casing	S		SHEET NO. : 1 of 1
12/1/22	0 Hr	Dry		4	Size I.D.:	3"	2"		NORTHING : 594874.8306
					Size I.D.:	3"	2"		EASTING : 601959.1785
					Hammer Wt.:		140	----	ELEVATION : 16.5104
					Hammer Fall:		30	----	DATE START : 12-1-22
									END : 12-1-22
									DRILLER : Earth Data
									INSPECTOR : E. Chandler

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number Type	Sample Depth Range (ft)	Sample Recov- ery (in)	Elev- ation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			3	S-1	0.0	24"	15.5	Topsoil, trace Sand
			4-4		2.0		1.0	Light gray to brown, moist, medium to very stiff, Silty CLAY (cl-ml), trace Sand
			5					
			1	S-2	2.0	24"		
			4-9		4.0			
			13					
5			4	S-3	4.0	24"		
			6-10		6.0			
			10					
			3	S-4	6.0	24"		
			4-11		8.0			
			13					
			8	S-5	8.0	24"	9.0	Light gray, wet, Poorly-graded f-m SAND with some Silt (sp-sm) brown to orange
			11-13		10.0		7.5	
10			15				6.5	
							10.0	
15								
20								
25								
30								

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-5	Very Loose	0-3	Very Soft	 - S - Split Spoon  - T - Thin Wall Tube  - U - Undisturbed Piston  - C - Diamond Core  - W - Wash Sample  - See Remarks	Overburden:
6-10	Loose	4-5	Soft		Rock:
11-30	Medium Dense	6-10	Medium Stiff		Samples:
31-50	Dense	11-15	Stiff		
51+	Very Dense	16-30	Very Stiff		
		31+	Hard		BORING SB-14

TEST BORING LOG										BORING SB-15	
PROJECT : DEARNG Readiness Center CLIENT : DEARNG CONTRACTOR : Earth Data										CONTRACT NO.: 195063.03 SHEET NO. : 1 of 1 NORTHING : 594824.5924 EASTING : 601583.106 ELEVATION : 16.983 DATE START : 12-2-22 END : 12-2-22 DRILLER : Earth Data INSPECTOR : E. Chandler	
GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE			
Date	Time	Water	Casing	Hole	Type:	Casing	S				
12/1/22	0 Hr	Dry			Size I.D.:	3"	2"				
					Hammer Wt.:		140	----			
					Hammer Fall:		30	----			
Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/Depth (ft)	FIELD CLASSIFICATION AND REMARKS			
5			1 2-4 8	S-1	0.0 2.0	24"	16.0 1.0	Topsoil, dark brown, sandy silt			
			3 4-9 11	S-2	2.0 4.0	24"	14.0 3.0	Orange, moist, medium stiff to stiff, f-m Sandy SILT (ml)			
			6 7-10 11	S-3	4.0 6.0	24"	12.0 5.0	Light gray with mottling, moist, stiff to very stiff, Lean CLAY (cl)			
			7 9-15 20	S-4	6.0 8.0	24"		Orange to gray, moist, very stiff, SILT (ml) some red clay			
			6 8-13 14	S-5	8.0 10.0	24"	8.0 9.0	Gray, moist, very stiff, Lean CLAY (CL)			
			5 10-14	S-6	13.5 15.0	18"		red and gray			
			4 9-11	S-7	18.5 20.0	18"		some orange, trace f-m sand			
		7 9-13	S-8	23.5 25.0	18"						
		5 7-9	S-9	28.5 30.0	18"						
30							-13.0 30.0				
BLOWS/FT.		DENSITY		BLOWS/FT.		CONSISTENCY		SAMPLE IDENTIFICATION		SUMMARY	
0-5		Very Loose		0-3		Very Soft		- S - Split Spoon - T - Thin Wall Tube - U - Undisturbed Piston - C - Diamond Core - W - Wash Sample - See Remarks		Overburden: Rock: Samples:	
6-10		Loose		4-5		Soft					
11-30		Medium Dense		6-10		Medium Stiff					
31-50		Dense		11-15		Stiff					
51+		Very Dense		16-30		Very Stiff					
				31+		Hard					
										BORING SB-15	

TEST BORING LOG

BORING **SB-16**

PROJECT : DEARNG Readiness Center
 CLIENT : DEARNG
 CONTRACTOR : Earth Data

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE	CONTRACT NO.: 195063.03
Date	Time	Water	Casing	Hole	Type:	Casing	S		SHEET NO. : 1 of 1
12/1/22	0 Hr	Dry		23	Size I.D.:	3"	2"		NORTHING : 594923.0969
					Hammer Wt.:		140	----	EASTING : 601735.5519
					Hammer Fall:		30	----	ELEVATION : 20.3297
									DATE START : 12-2-22
									END : 12-2-22
									DRILLER : Earth Data
									INSPECTOR : E. Chandler

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			3 4-5 6	S-1	0.0 2.0	24"	19.8 0.5	Topsoil, dark brown, sandy silt
			3 7-9 13	S-2	2.0 4.0	20"		Orange-brown, moist, stiff to very stiff, Sandy SILT (ml), trace c Gravel
5			2 4-11 17	S-3	4.0 6.0	24"	15.3 5.0	
			7 8-10 10	S-4	6.0 8.0	24"	14.3 6.0	Brown, moist, medium dense, Silty well-graded GRAVEL with Sand (gw-gm)
			2 3-3 8	S-5	8.0 10.0	24"	11.8 8.5	Brown, Silty Poorly-graded vf-f SAND (sm)
10								Dark gray, moist, medium stiff, Silty CLAY (cl), trace f Sand, some mica
							8.3 12.0	Light gray, moist, very stiff, f-m Sandy Lean CLAY (cl), some Sil
15			7 8-10	S-6	13.5 15.0	18"		
							3.3 17.0	Light gray with mottling, moist, stiff to very stiff, Silty CLAY (cl-ml)
20			3 4-7	S-7	18.5 20.0	18"		
								gray and red
25			4 5-9	S-8	23.5 25.0	18"		
30			4 7-11	S-9	28.5 30.0	18"	-9.7 30.0	

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-5	Very Loose	0-3	Very Soft	- S - Split Spoon	Overburden:
6-10	Loose	4-5	Soft	- T - Thin Wall Tube	Rock:
11-30	Medium Dense	6-10	Medium Stiff	- U - Undisturbed Piston	Samples:
31-50	Dense	11-15	Stiff	- C - Diamond Core	
51+	Very Dense	16-30	Very Stiff	- W - Wash Sample	
		31+	Hard	- See Remarks	

BORING **SB-16**

TEST BORING LOG

BORING **SB-17**

PROJECT : DEARNG Readiness Center
 CLIENT : DEARNG
 CONTRACTOR : Earth Data

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE	CONTRACT NO.:
Date	Time	Water	Casing	Hole	Type:	Casing	S		SHEET NO. :
12/2/22	0 Hr	Dry		23	Size I.D.:	3"	2"		NORTHING : 595021.5982
					Hammer Wt.:		140	----	EASTING : 601887.7972
					Hammer Fall:		30	----	ELEVATION : 16.983
									DATE START : 12-2-22
									END : 12-2-22
									DRILLER : Earth Data
									INSPECTOR : E. Chandler

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/Depth (ft)	FIELD CLASSIFICATION AND REMARKS
0			1 1-3	S-1	0.0 2.0	12"	16.7 0.3	Topsoil, dark brown, sandy silt
3			3 4-8	S-2	2.0 4.0	20"		Brown, moist, soft to medium stiff, Silty CLAY (cl-ml), trace Sand
4			4 6-8	S-3	4.0 6.0	24"		gray and red, some f-m Sand
6			4 6-10	S-4	6.0 8.0	24"		
8			5 9-10	S-5	8.0 10.0	24"		
10								
13			2 5-7	S-6	13.5 15.0	18"		
15								
18			4 8-10	S-7	18.5 20.0	18"		
20								
23			5 6-7	S-8	23.5 25.0	18"		
25								
28			3 5-6	S-9	28.5 30.0	18"		
30							-13.0 30.0	

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-5	Very Loose	0-3	Very Soft	- S - Split Spoon	Overburden:
6-10	Loose	4-5	Soft	- T - Thin Wall Tube	Rock:
11-30	Medium Dense	6-10	Medium Stiff	- U - Undisturbed Piston	Samples:
31-50	Dense	11-15	Stiff	- C - Diamond Core	
51+	Very Dense	16-30	Very Stiff	- W - Wash Sample	
		31+	Hard	- See Remarks	

BORING **SB-17**

TEST BORING LOG										BORING SB-18	
PROJECT : DEARNG Readiness Center CLIENT : DEARNG CONTRACTOR : Earth Data										CONTRACT NO.: 195063.03 SHEET NO. : 1 of 1 NORTHING : 594774.9295 EASTING : 601718.5566 ELEVATION : 14.3751 DATE START : 12-1-22 END : 12-1-22 DRILLER : Earth Data INSPECTOR : E. Chandler	
GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE			
Date	Time	Water	Casing	Hole	Type:	Casing	S				
12/2/22	0 Hr	Dry		10.5	Size I.D.:	3"	2"				
12/3/22	24 Hr	Dry		10.5	Hammer Wt.:		140	----			
					Hammer Fall:		30	----			
Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/Depth (ft)	FIELD CLASSIFICATION AND REMARKS			
5			1 1-2 3	S-1	0.0 2.0	24"	13.4 1.0	Topsoil, dark brown, Silt			
			1 1-5 7	S-2	2.0 4.0	20"		Brown with mottling, moist, very soft to hard, Silty CLAY (cl-ml)			
			3 5-8 14	S-3	4.0 6.0	24"		gray to red			
			7 11-13 15	S-4	6.0 8.0	24"		2-inch sand lens with some gravel			
			4 6-10 19	S-5	8.0 10.0	24"		light gray, some f sand			
			4 6-12 15	S-6	10.0 12.0	18"					
			5 6-10 13	S-7	12.0 14.0	24"					
			6 13-50/3"	S-8	14.0 15.3	15"					
15							-0.1 14.5 -1.6 16.0	Orange-brown, moist, f-m Sandy SILT (ml)			
20											
25											
30											
BLOWS/FT.		DENSITY		BLOWS/FT.		CONSISTENCY		SAMPLE IDENTIFICATION		SUMMARY	
0-5		Very Loose		0-3		Very Soft		- S - Split Spoon - T - Thin Wall Tube - U - Undisturbed Piston - C - Diamond Core - W - Wash Sample - See Remarks		Overburden:	
6-10		Loose		4-5		Soft				Rock:	
11-30		Medium Dense		6-10		Medium Stiff				Samples:	
31-50		Dense		11-15		Stiff					
51+		Very Dense		16-30		Very Stiff					
				31+		Hard					
										BORING SB-18	

TEST BORING LOG

BORING SB-19



PROJECT : DEARNG Readiness Center
CLIENT : DEARNG
CONTRACTOR : Earth Data

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE	CONTRACT NO.: 195063.03
Date	Time	Water	Casing	Hole	Type:	Casing	S		SHEET NO. : 1 of 1
12/2/22	0 Hr	Dry		11	Size I.D.:	3"	2"		NORTHING : 594872.1702
12/3/22	24 Hr	Dry		11	Hammer Wt.:		140	----	EASTING : 601809.4829
					Hammer Fall:		30	----	ELEVATION : 19.0424
									DATE START : 12-1-22
									END : 12-1-22
									DRILLER : Earth Data
									INSPECTOR : E. Chandler

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number Type	Sample Depth Range (ft)	Sample Recovery (in)	Elev-ation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
5 								

BORING SB-20



PROJECT : DEARNG Readiness Center
CLIENT : DEARNG
CONTRACTOR : Earth Data

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE	CONTRACT NO.: 195063.03
Date	Time	Water	Casing	Hole	Type:	Casing	S		SHEET NO. : 1 of 1
12/1/22	0 Hr	Dry		10.5	Size I.D.:	3"	2"		NORTHING : 594969.4109
					Size O.D.:	3"	2"		EASTING : 601900.4093
					Hammer Wt.:		140	----	ELEVATION : 18.8557
					Hammer Fall:		30	----	DATE START : 12-1-22
									END : 12-1-22
									DRILLER : Earth Data
									INSPECTOR : E. Chandler

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number Type	Sample Depth Range (ft)	Sample Recov- ery (in)	Elev- ation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			1 1-2 6	S-1		0.0 2.0	24"	17.9 1.0 Topsoil, wet, dark brown, silt Orange to gray with mottling, moist, very soft to very stiff, Silty CLAY (cl-ml), trace Sand brown and gray
			3 5-9 14	S-2		2.0 4.0	24"	
5			3 7-19 12	S-3		4.0 6.0	24"	
			3 5-11 13	S-4		6.0 8.0	24"	
			7 9-14 17	S-5		8.0 10.0	24"	
10			4 9-11 15	S-6		10.0 12.0	24"	
			5 8-14 14	S-7		12.0 14.0	24"	
15			6 8-11 13	S-8		14.0 16.0	24"	
								2.9 16.0
20								
25								
30								

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-5	Very Loose	0-3	Very Soft	 - S - Split Spoon  - T - Thin Wall Tube  - U - Undisturbed Piston  - C - Diamond Core  - W - Wash Sample  - See Remarks	Overburden:
6-10	Loose	4-5	Soft		Rock:
11-30	Medium Dense	6-10	Medium Stiff		Samples:
31-50	Dense	11-15	Stiff		
51+	Very Dense	16-30	Very Stiff		
		31+	Hard		BORING SB-20

BORING SB-21

Jan 21, 23

TEST BORING LOG

BORING **SB-22**

PROJECT : DEARNG Readiness Center
 CLIENT : DEARNG
 CONTRACTOR : Earth Data

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE	CONTRACT NO.: 195063.03
Date	Time	Water	Casing	Hole	Type:	Casing	S		SHEET NO. : 1 of 1
12/1/22	0 Hr	Dry		11.5	Size I.D.:	3"	2"		NORTHING : 594845.389
12/2/22	24 Hr	8		11.5	Hammer Wt.:		140	----	EASTING : 601885.7616
					Hammer Fall:		30	----	ELEVATION : 16.2411
									DATE START : 12-1-22
									END : 12-1-22
									DRILLER : Earth Data
									INSPECTOR : E. Chandler

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			1 2-3 6	S-1	0.0 2.0	24"	15.2 1.0	Topsoil, dark brown, sandy silt
			5 5-8 9	S-2	2.0 4.0	24"		Light gray with mottling, moist, soft to stiff, SILT (ml), some Sand
5			3 3-6 6	S-3	4.0 6.0	24"	11.7 4.5	Light gray, moist, medium stiff to stiff, Silty CLAY (cl-ml)
			3 4-6 11	S-4	6.0 8.0	24"		
			3 6-9 11	S-5	8.0 10.0	24"		
10			2 5-8 11	S-6	10.0 12.0	24"		some vf Sand
			3 4-5 3	S-7	12.0 14.0	20"	3.7 12.5	Light gray, wet, Poorly-graded f-m SAND (sp), some Silt
15			3 4-6 7	S-8	14.0 16.0	20"	0.7 15.5	orange
20								
25								
30								

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-5	Very Loose	0-3	Very Soft	- S - Split Spoon	Overburden:
6-10	Loose	4-5	Soft	- T - Thin Wall Tube	Rock:
11-30	Medium Dense	6-10	Medium Stiff	- U - Undisturbed Piston	Samples:
31-50	Dense	11-15	Stiff	- C - Diamond Core	
51+	Very Dense	16-30	Very Stiff	- W - Wash Sample	
		31+	Hard	- See Remarks	

BORING **SB-22**

BORING SB-23



PROJECT : DEARNG Readiness Center
CLIENT : DEARNG
CONTRACTOR : Earth Data

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE	CONTRACT NO.: 195063.03
Date	Time	Water	Casing	Hole	Type:	Casing	S		SHEET NO. : 1 of 1
12/1/22	0 Hr	Dry		11	Size I.D.:	3"	2"		NORTHING : 595150.3728
					Size O.D.:	3"	2"		EASTING : 601791.6996
					Hammer Wt.:		140	----	ELEVATION : 20.2079
					Hammer Fall:		30	----	DATE START : 12-1-22
									END : 12-1-22
									DRILLER : Earth Data
									INSPECTOR : E. Chandler

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number Type	Sample Depth Range (ft)	Sample Recov- ery (in)	Elev- ation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			2 2-3 6	S-1	0.0 2.0	24"	19.7 0.5	Topsoil, silt with trace sand
			2 3-7 9	S-2	2.0 4.0	22"		Gray, moist, very soft to hard, SILT (ml), some Sand and f Gravel more orange
5			4 5-7 8	S-3	4.0 6.0	24"		mottling
			3 4-7 10	S-4	6.0 8.0	24"		
			5 7-10 17	S-5	8.0 10.0	18"	11.7 8.5	Gray to red, moist, very stiff, Lean CLAY (cl)
10			4 8-14 15	S-6	10.0 12.0	24"		
			3 6-11 15	S-7	12.0 14.0	24"		orange and grey
15			4 9-9 17	S-8	14.0 16.0	24"	4.2 16.0	
20								
25								
30								

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-5	Very Loose	0-3	Very Soft	 - S - Split Spoon  - T - Thin Wall Tube  - U - Undisturbed Piston  - C - Diamond Core  - W - Wash Sample  - See Remarks	Overburden:
6-10	Loose	4-5	Soft		Rock:
11-30	Medium Dense	6-10	Medium Stiff		Samples:
31-50	Dense	11-15	Stiff		
51+	Very Dense	16-30	Very Stiff		
		31+	Hard		BORING SB-23

INTERPRETATION OF BORING LOGS

The borings were drilled using the method(s) indicated on the boring logs. The various methods include hollow stem augers, solid flight augers, driven casing, rotary drilling, and rock coring using a diamond bit core barrel.

Penetration testing and split barrel sampling of the soils were conducted in the borings at regular intervals in accordance with ASTM Specification D-1586. The Standard Penetration Test (SPT) is conducted by driving a split-barrel sampler into the soil using a 140 lbs. hammer falling 30 inches. The sampler is attached to drilling rods and lowered to the bottom of the borehole. The sampler is first seated 6 inches into the soil to penetrate any loose material and then driven an additional 12 inches to obtain the SPT blow count. The number of blows is recorded for each 6 inch interval. For example, a blow count of 4-6-8 indicates that 4 blows were needed to drive the sampler the first 6 inches, 6 blows the next 6 inches and 8 blows the final 6 inches. The SPT blow count (blows/foot) is obtained by adding the blow counts for the second and third 6 inch interval (i.e. 6+8 = 14 blows/foot).

A representative portion of the soil obtained from each split-barrel sample is placed in a sealed glass jar and transported to our office. Descriptions of the soil samples and penetration resistance (SPT blow count) are shown on the boring logs. The soils are described by color, moisture, major component and minor components based on the following relationships:

The MAJOR component represents more than 50 percent of the soil sample. The components are described based on the following particle size designations:

The following terms are used to describe the percentage of Minor components:

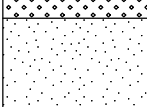
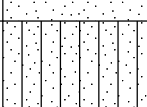
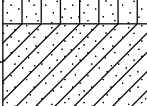
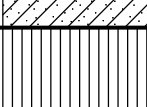
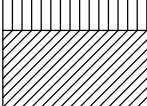
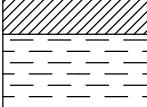
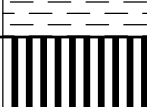
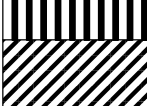
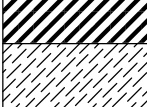
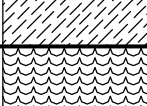
<u>Component</u>	<u>Particle Size</u>	<u>Adjective</u>	<u>Percent</u>
Boulders	>12"	"and"	35 to 50
		"some"	20 to 35
		"little"	10 to 20
Cobbles	3" to 12"	"trace"	0 to 10
Gravel - coarse	3/4" to 3"		
- fine	#4 sieve (4.76 mm) to 3/4"		
Sand - coarse	#10 sieve (2.0 mm) to #4 sieve		
- medium	#40 sieve (0.42 mm) to #10 sieve	"Dry"	Dusty, Dry to touch
- fine	#200 sieve (0.074 mm) to #40 sieve	"Moist"	Damp
		"wet"	Visible free water
Silt & Clay	< #200 sieve (0.074 mm)		

The SPT blow counts are used to describe the RELATIVE DENSITY of coarse-grained soils and the CONSISTENCY of fine-grained soils according to the following relationships:

<u>Relative Density</u>		<u>Consistency</u>	
<u>SPT (Blows/Foot)*</u>	<u>Relative Density</u>	<u>SPT (Blows/Foot)*</u>	<u>Relative Density</u>
0 to 4	Very Loose	0 to 2	Very Soft
5 to 10	Loose	3 to 4	Soft
11 to 30	Medium Dense	5 to 8	Medium Stiff
31 to 50	Dense	9 to 15	Stiff
51+	Very Dense	16 to 30	Very Stiff
		31+	Hard

*Note: The notations "WOR" (weight-of-rods) and "WOH" (weight-of-hammer) mean that the sampler penetrated the soil under the weight of the rods or hammer. This penetration resistance corresponds to a SPT blow count of 0 blows per foot.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50			ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

USCS LEGEND 6/7/11

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

APPENDIX C

Geotechnical Laboratory Results



DEARNG River Road Development Site

LABORATORY SOIL TEST SUMMARY

[illegible]

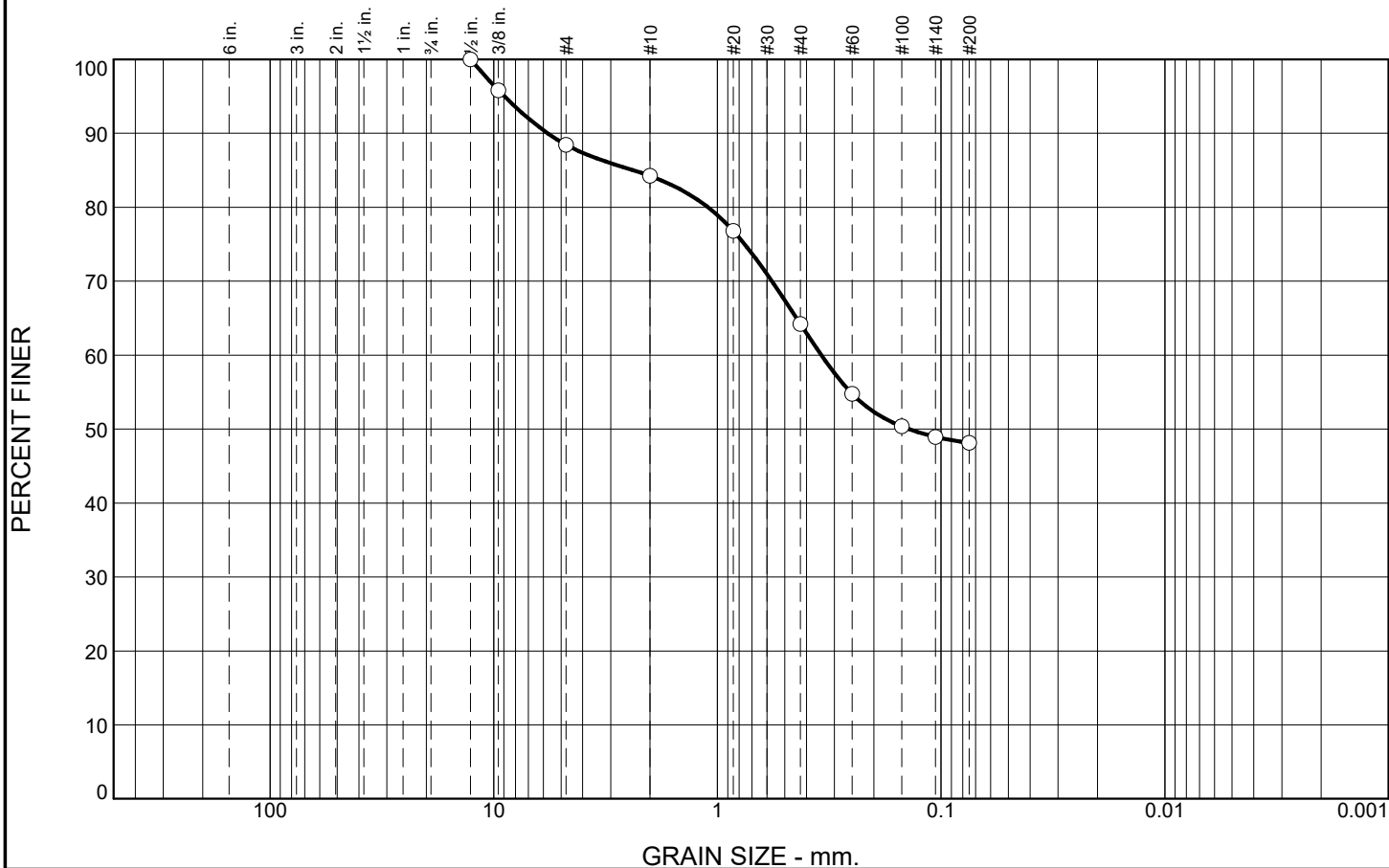


DEARNG River Road Development Site

LABORATORY TEST SUMMARY

[illegible]

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	11.5	4.3	20.0	16.1	48.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2"	100.0		
3/8"	95.8		
#4	88.5		
#10	84.2		
#20	76.8		
#40	64.2		
#60	54.8		
#100	50.4		
#140	48.9		
#200	48.1		

* (no specification provided)

Material Description

Brown Silty SAND

Atterberg Limits

PL= NP

LL= NV

PI= NP

Coefficients

D₉₀= 5.7311

D₈₅= 2.3693

D₆₀= 0.3432

D₅₀= 0.1392

D₃₀=

D₁₅=

D₁₀=

C_u=

C_c=

Classification

USCS= SM

AASHTO= A-4(0)

Remarks

Natural Moisture 11.6%

Source of Sample: SB-01

Depth: 0 - 2'

Sample Number: S-1

Date: 1-5-2023

Century Engineering, Inc.

Hunt Valley, MD

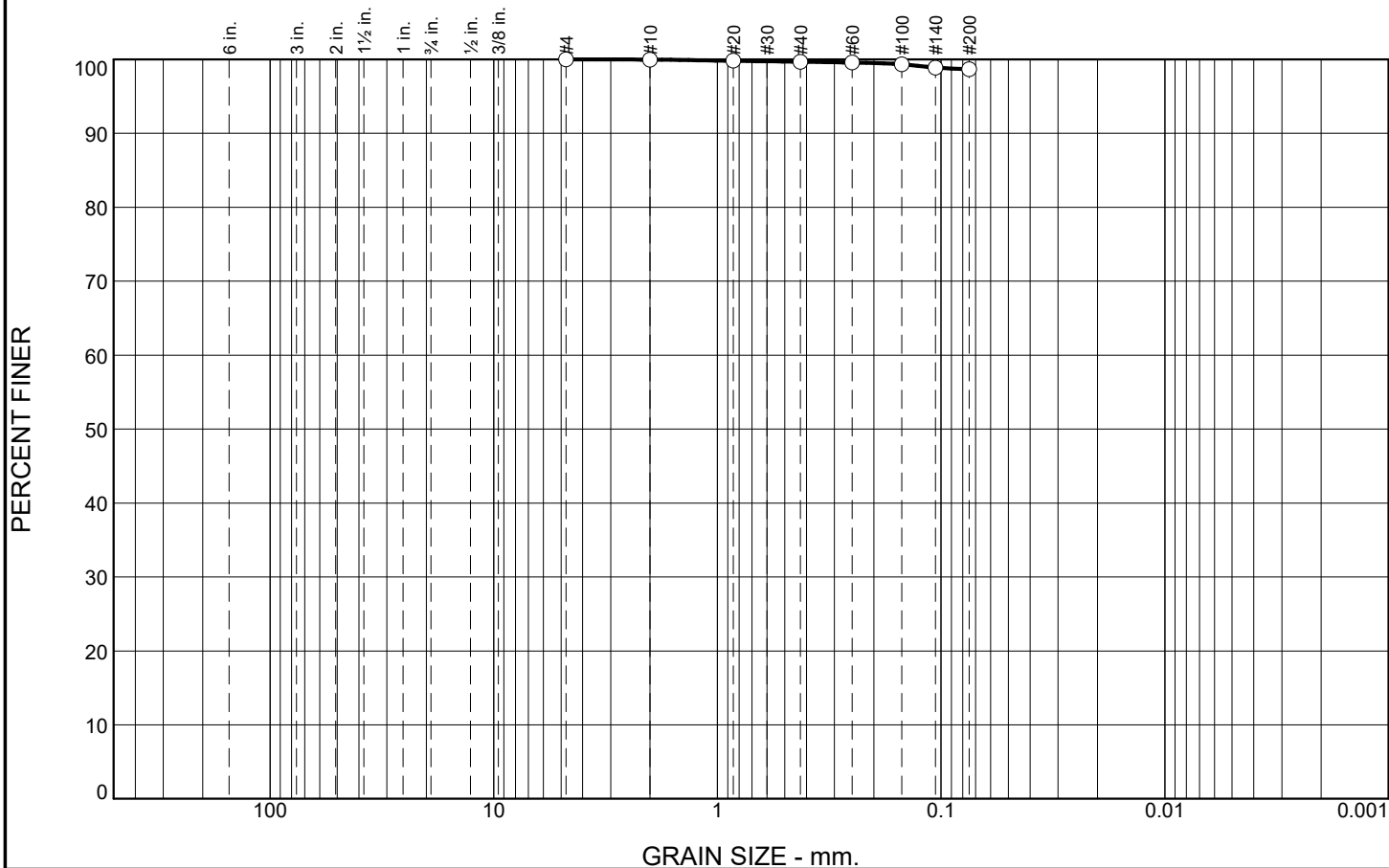
Client: Delaware Army National Guard

Project: DEARNG Readiness Center

Project No: 20232961.001A

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.3	1.0	98.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	100.0		
#20	99.8		
#40	99.7		
#60	99.6		
#100	99.3		
#140	98.9		
#200	98.7		

* (no specification provided)

<u>Material Description</u>		
Maroon Lean CLAY		
<u>Atterberg Limits</u>		
PL= 19.5	LL= 37.2	PI= 17.7
<u>Coefficients</u>		
D ₉₀ =	D ₈₅ =	D ₆₀ =
D ₅₀ =	D ₃₀ =	D ₁₅ =
D ₁₀ =	C _u =	C _c =
<u>Classification</u>		
USCS= CL	AASHTO= A-6(18)	
<u>Remarks</u>		
Natural Moisture 21.1%		

Source of Sample: SB-01
Sample Number: S-5

Depth: 8 - 10'

Date: 1-5-2023

Century Engineering, Inc.

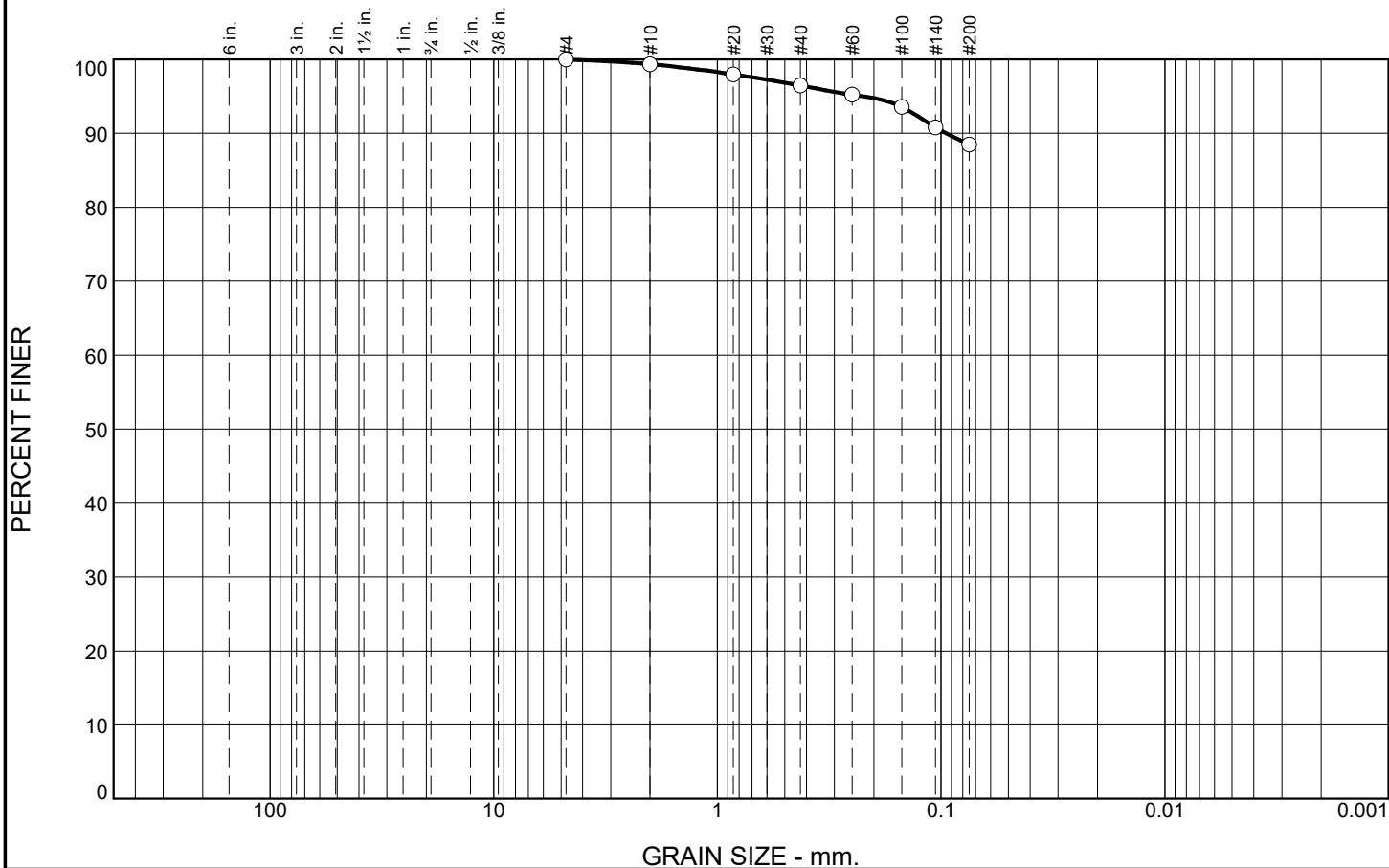
Hunt Valley, MD

Client: Delaware Army National Guard
Project: DEARNG Readiness Center

Project No: 20232961.001A

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.6	2.9	8.0	88.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.4		
#20	98.0		
#40	96.5		
#60	95.2		
#100	93.6		
#140	90.8		
#200	88.5		

* (no specification provided)

Material Description

Maroon Lean CLAY

Atterberg Limits

PL= 15.5

LL= 36.0

PI= 20.5

Coefficients

D₉₀= 0.0952

D₈₅=

D₆₀=

D₅₀=

D₃₀=

D₁₅=

D₁₀=

C_u=

C_c=

Classification

USCS= CL

AASHTO= A-6(17)

Remarks

Natural Moisture 16.1%

Source of Sample: SB-01
Sample Number: S-7

Depth: 18.5 - 20'

Date: 1-5-2023

Century Engineering, Inc.

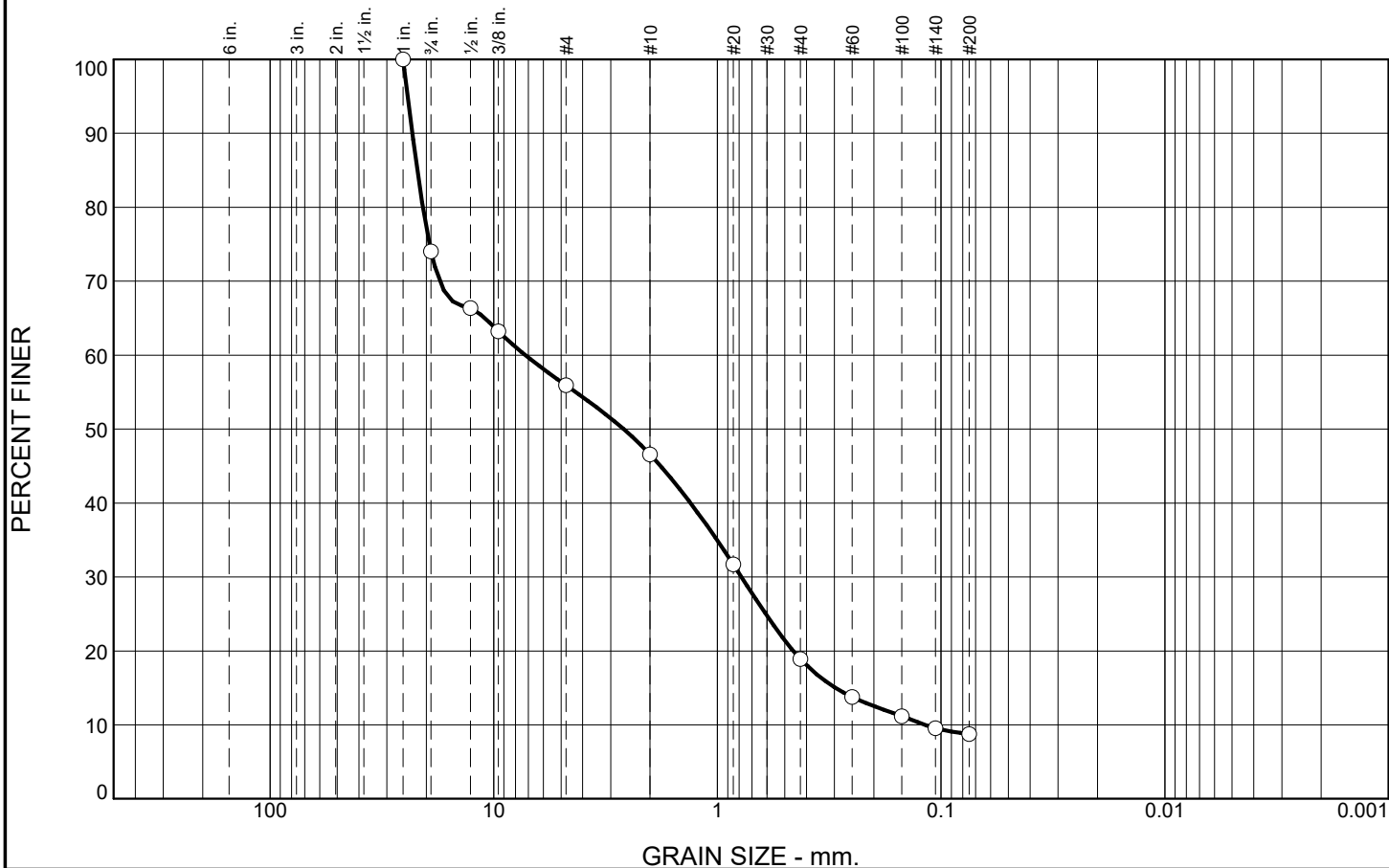
Hunt Valley, MD

Client: Delaware Army National Guard
Project: DEARNG Readiness Center

Project No: 20232961.001A

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	26.0	18.1	9.3	27.7	10.1	8.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	74.0		
1/2"	66.4		
3/8"	63.2		
#4	55.9		
#10	46.6		
#20	31.7		
#40	18.9		
#60	13.8		
#100	11.2		
#140	9.6		
#200	8.8		

* (no specification provided)

Material Description

Brown Poorly Graded SAND With Clay And Gravel

Atterberg Limits

PL= 17.6 LL= 27.5 PI= 9.9

Coefficients

D₉₀= 23.0760 D₈₅= 21.9215 D₆₀= 7.2224
D₅₀= 2.6240 D₃₀= 0.7802 D₁₅= 0.2965
D₁₀= 0.1182 C_u= 61.12 C_c= 0.71

Classification

USCS= SP-SC AASHTO= A-2-4(0)

Remarks

Natural Moisture 10.1%

Source of Sample: SB-02
Sample Number: S-1

Depth: 0 - 2'

Date: 1-5-2023

Century Engineering, Inc.

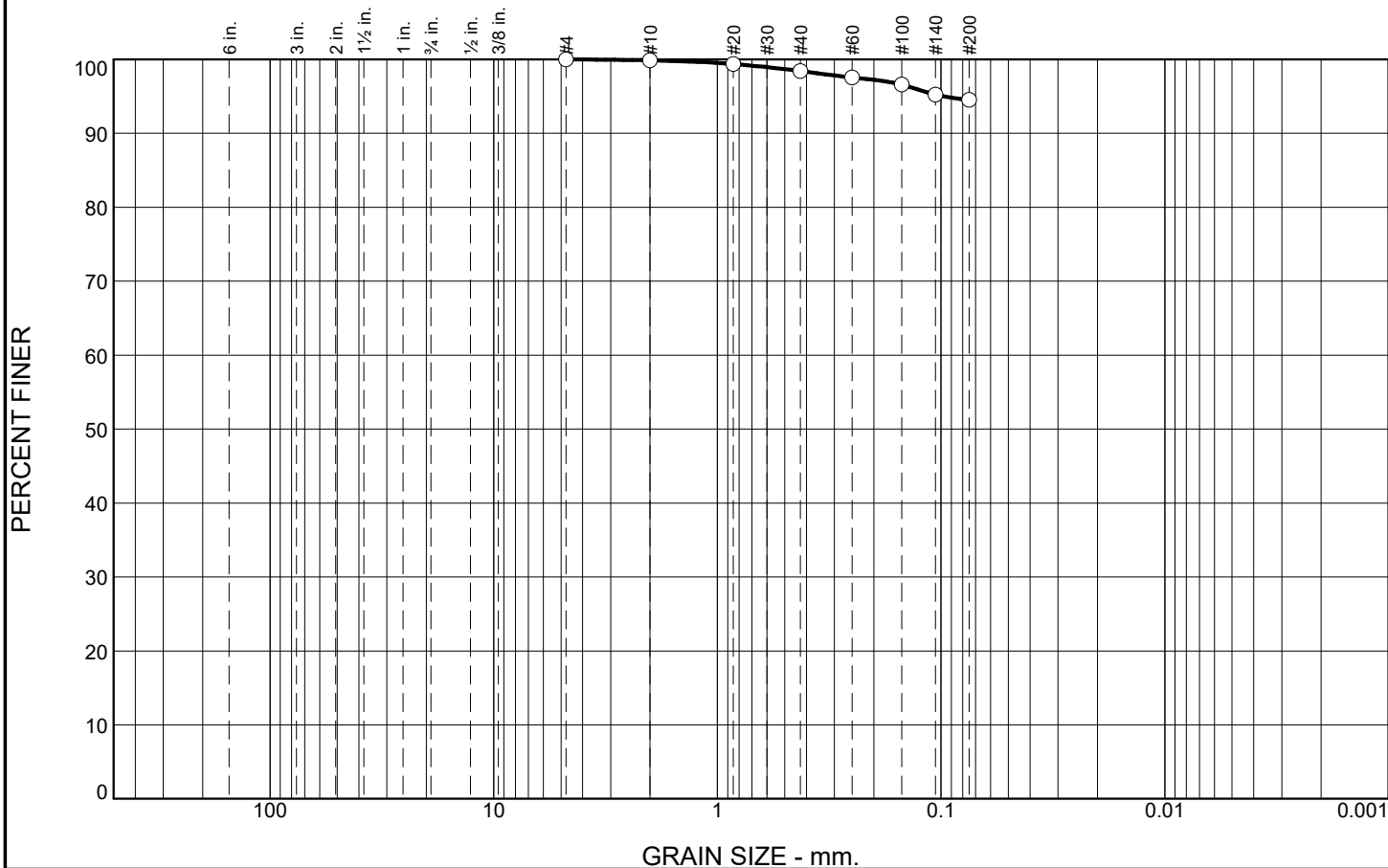
Hunt Valley, MD

Client: Delaware Army National Guard
Project: DEARNG Readiness Center

Project No: 20232961.001A

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	1.5	3.9	94.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#20	99.4		
#40	98.4		
#60	97.5		
#100	96.6		
#140	95.2		
#200	94.5		

* (no specification provided)

<u>Material Description</u>		
Maroon Lean CLAY		
<u>Atterberg Limits</u>		
PL= 18.4	LL= 36.7	PI= 18.3
<u>Coefficients</u>		
D ₉₀ =	D ₈₅ =	D ₆₀ =
D ₅₀ =	D ₃₀ =	D ₁₅ =
D ₁₀ =	C _u =	C _c =
<u>Classification</u>		
USCS= CL	AASHTO= A-6(18)	
<u>Remarks</u>		
Natural Moisture 17.0%		

Source of Sample: SB-02
Sample Number: S-6

Depth: 13.5 - 15'

Date: 1-5-2023

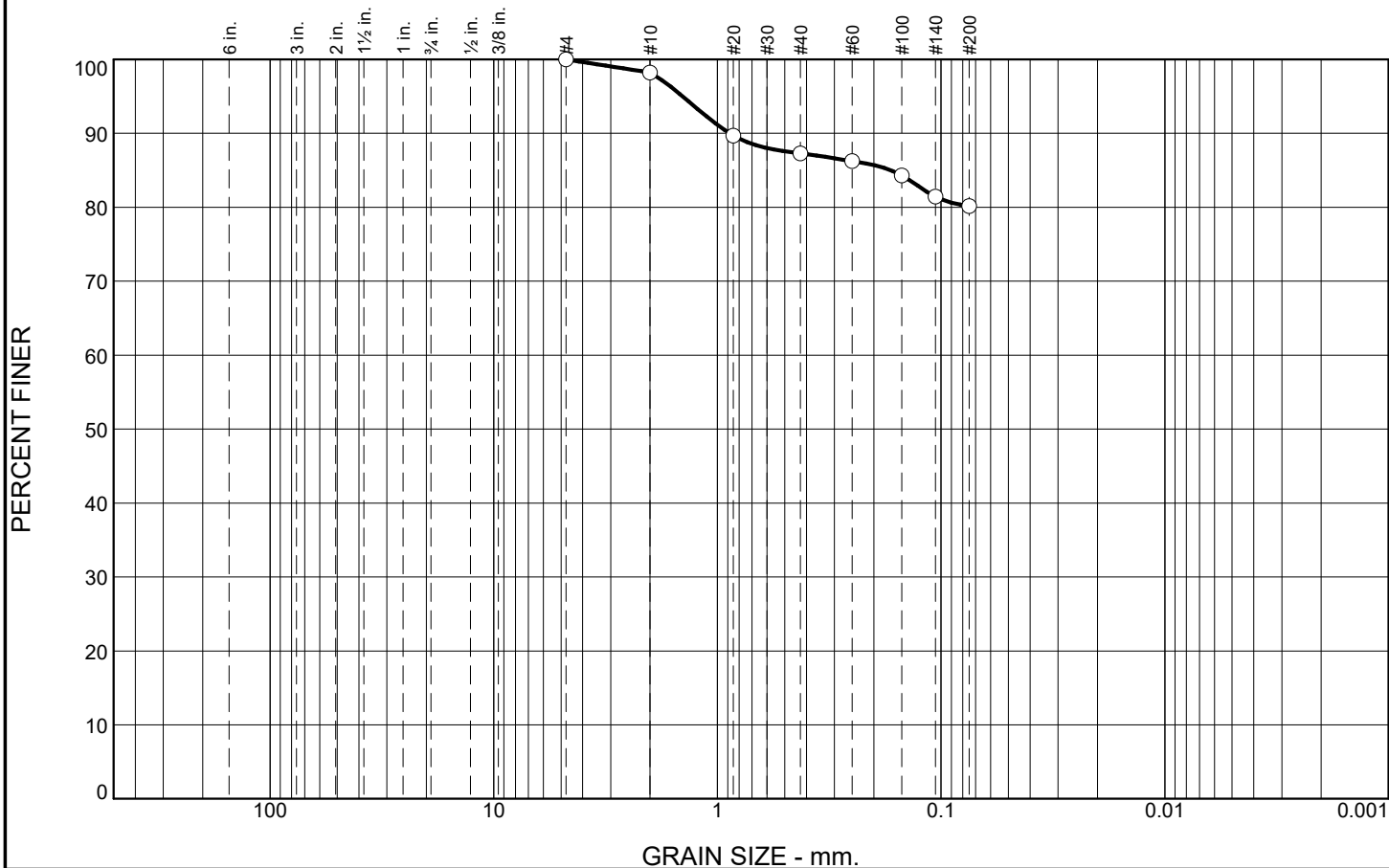
Century Engineering, Inc.
Hunt Valley, MD

Client: Delaware Army National Guard
Project: DEARNG Readiness Center

Project No: 20232961.001A

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	1.8	10.9	7.2	80.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	98.2		
#20	89.7		
#40	87.3		
#60	86.2		
#100	84.3		
#140	81.4		
#200	80.1		

* (no specification provided)

Material Description

Maroon Lean CLAY With Sand

Atterberg Limits

PL= 16.5

LL= 39.7

PI= 23.2

Coefficients

D₉₀= 0.8827

D₈₅= 0.1674

D₆₀=

D₅₀=

D₃₀=

D₁₅=

D₁₀=

C_u=

C_c=

Classification

USCS= CL

AASHTO= A-6(18)

Remarks

Natural Moisture 16.1%

Source of Sample: SB-02
Sample Number: S-8

Depth: 23.5 - 25'

Date: 1-5-2023

Century Engineering, Inc.

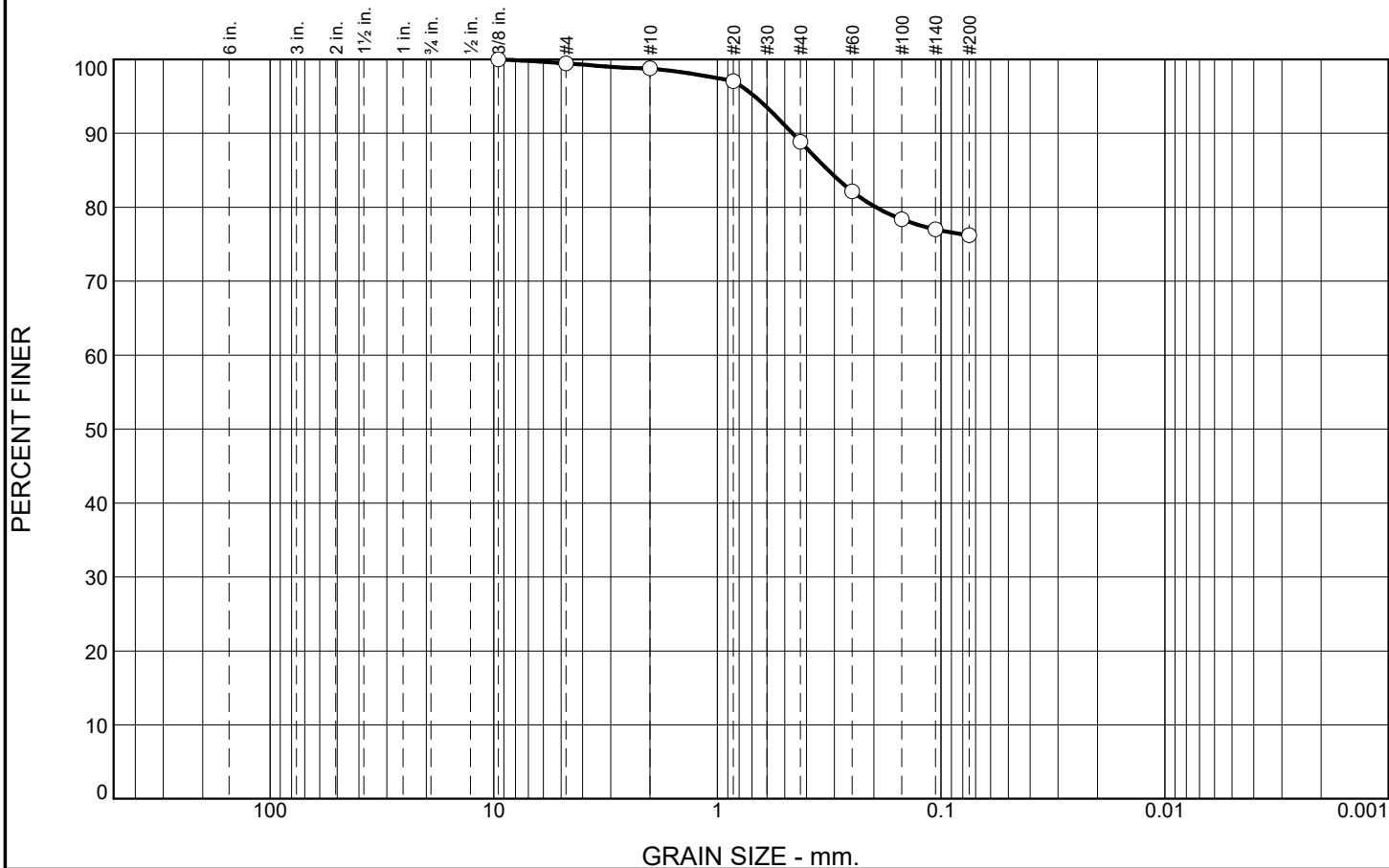
Hunt Valley, MD

Client: Delaware Army National Guard
Project: DEARNG Readiness Center

Project No: 20232961.001A

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.5	0.7	9.9	12.7	76.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100.0		
#4	99.5		
#10	98.8		
#20	97.1		
#40	88.9		
#60	82.1		
#100	78.4		
#140	77.0		
#200	76.2		

* (no specification provided)

<u>Material Description</u>		
Gray SILT With Sand		
<u>Atterberg Limits</u>		
PL= NP	LL= NV	PI= NP
<u>Coefficients</u>		
D ₉₀ = 0.4611	D ₈₅ = 0.3198	D ₆₀ =
D ₅₀ =	D ₃₀ =	D ₁₅ =
D ₁₀ =	C _u =	C _c =
<u>Classification</u>		
USCS= ML	AASHTO= A-4(0)	
<u>Remarks</u>		
Natural Moisture 18.9%		

Source of Sample: SB-03 Depth: 0 - 2'
Sample Number: S-1

Date: 1-6-2023

Century Engineering, Inc.

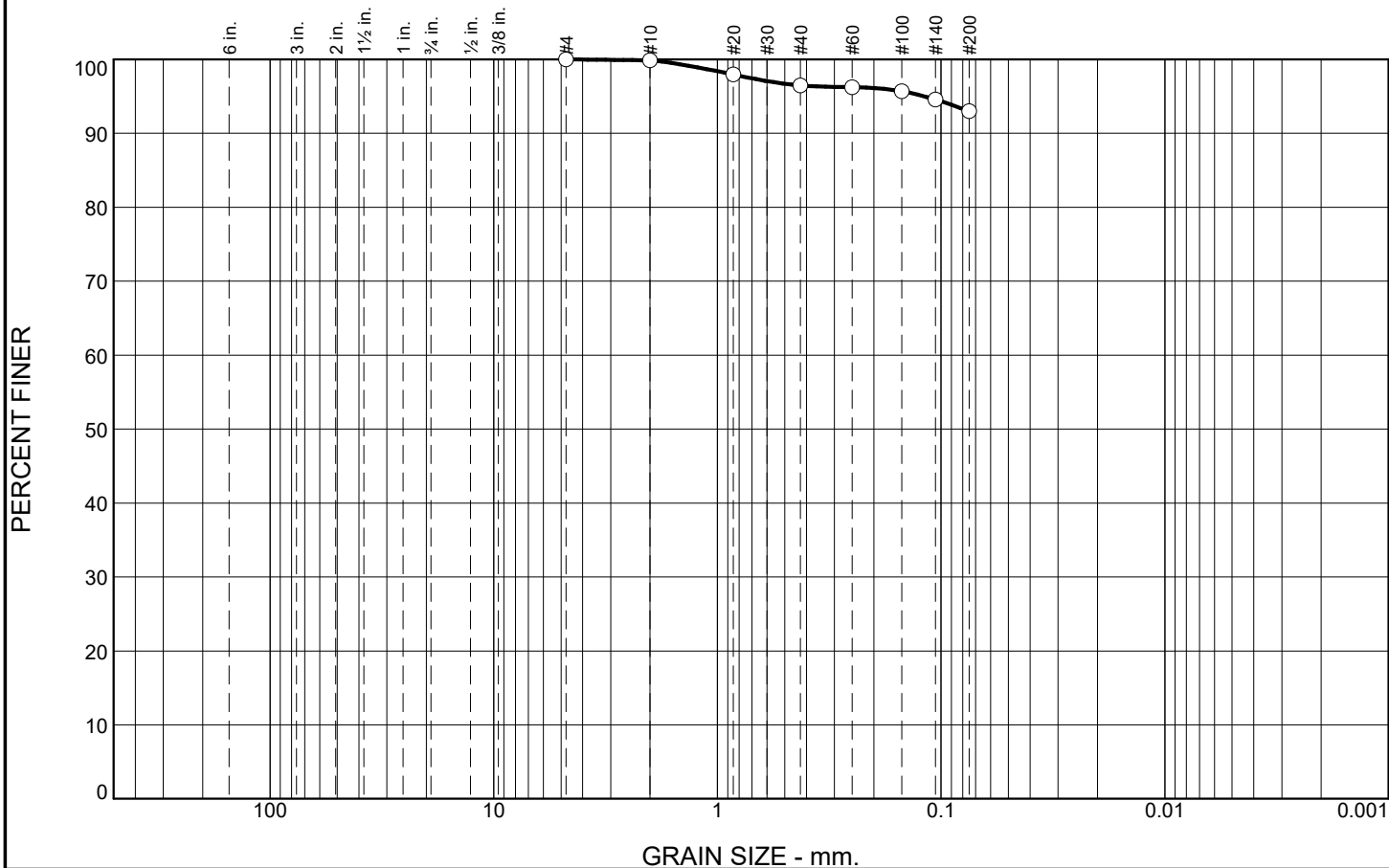
Hunt Valley, MD

Client: Delaware Army National Guard
Project: DEARNG Readiness Center

Project No: 20232961.001A

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	3.4	3.5	93.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#20	98.0		
#40	96.5		
#60	96.2		
#100	95.7		
#140	94.6		
#200	93.0		

* (no specification provided)

Material Description

Maroon Lean CLAY

Atterberg Limits

PL= 17.6

LL= 44.2

PI= 26.6

Coefficients

D₉₀=

D₈₅=

D₆₀=

D₅₀=

D₃₀=

D₁₅=

D₁₀=

C_u=

C_c=

Classification

USCS= CL

AASHTO= A-7-6(25)

Remarks

Natural Moisture 15.7%

Source of Sample: SB-03
Sample Number: S-7

Depth: 18.5 - 20'

Date: 1-6-2023

Century Engineering, Inc.

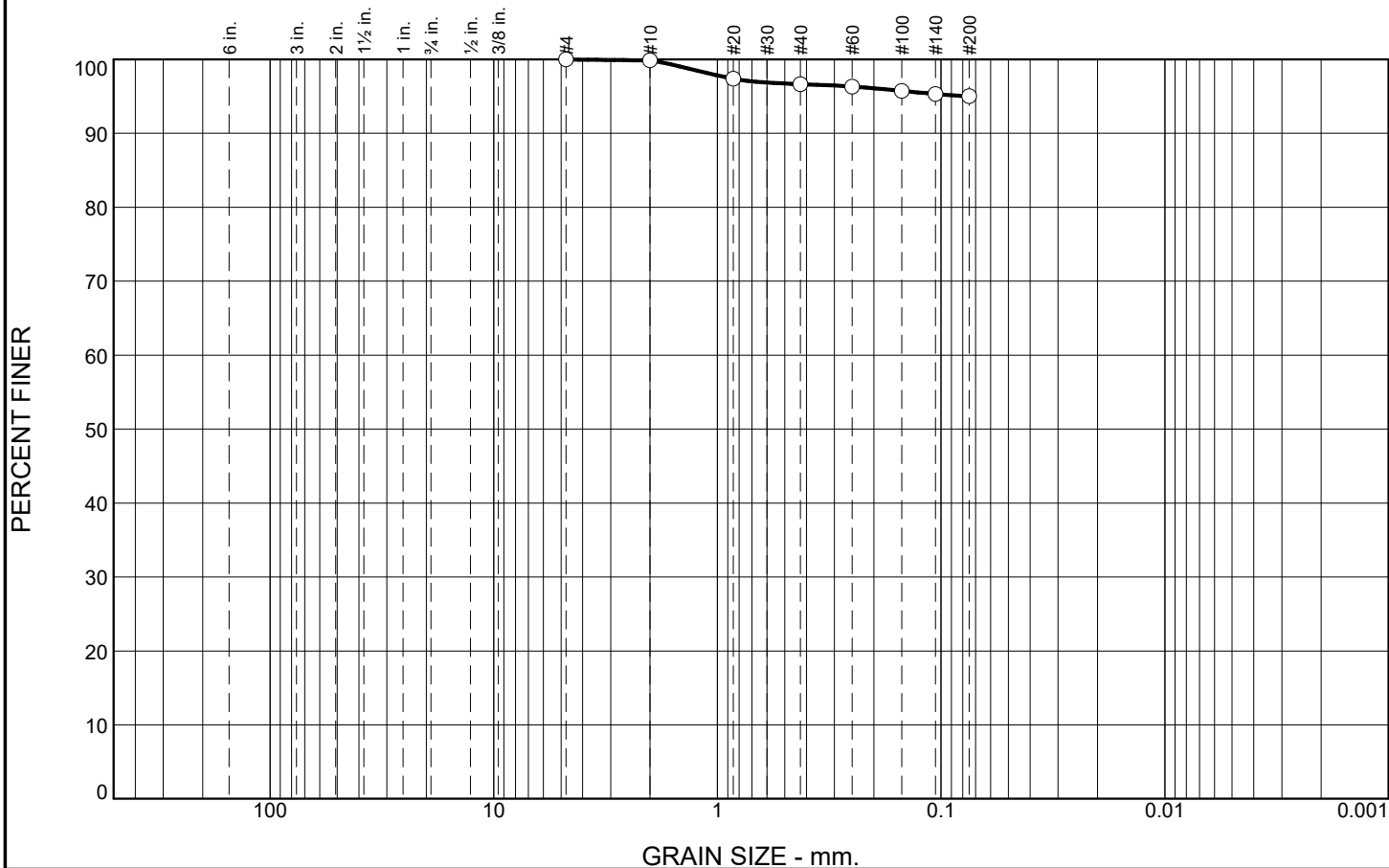
Hunt Valley, MD

Client: Delaware Army National Guard
Project: DEARNG Readiness Center

Project No: 20232961.001A

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	3.2	1.7	95.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#20	97.4		
#40	96.7		
#60	96.3		
#100	95.7		
#140	95.3		
#200	95.0		

* (no specification provided)

Material Description		
Maroon Lean CLAY		
Atterberg Limits PL= 19.8 LL= 41.2 PI= 21.4		
Coefficients D₉₀= D₅₀= D₁₀= D₈₅= D₃₀= C_u= D₆₀= D₁₅= C_c=		
Classification USCS= CL AASHTO= A-7-6(21)		
Remarks Natural Moisture 19.7%		

Source of Sample: SB-03
Sample Number: S-9

Depth: 28.5 - 30'

Date: 1-6-2023

Century Engineering, Inc.

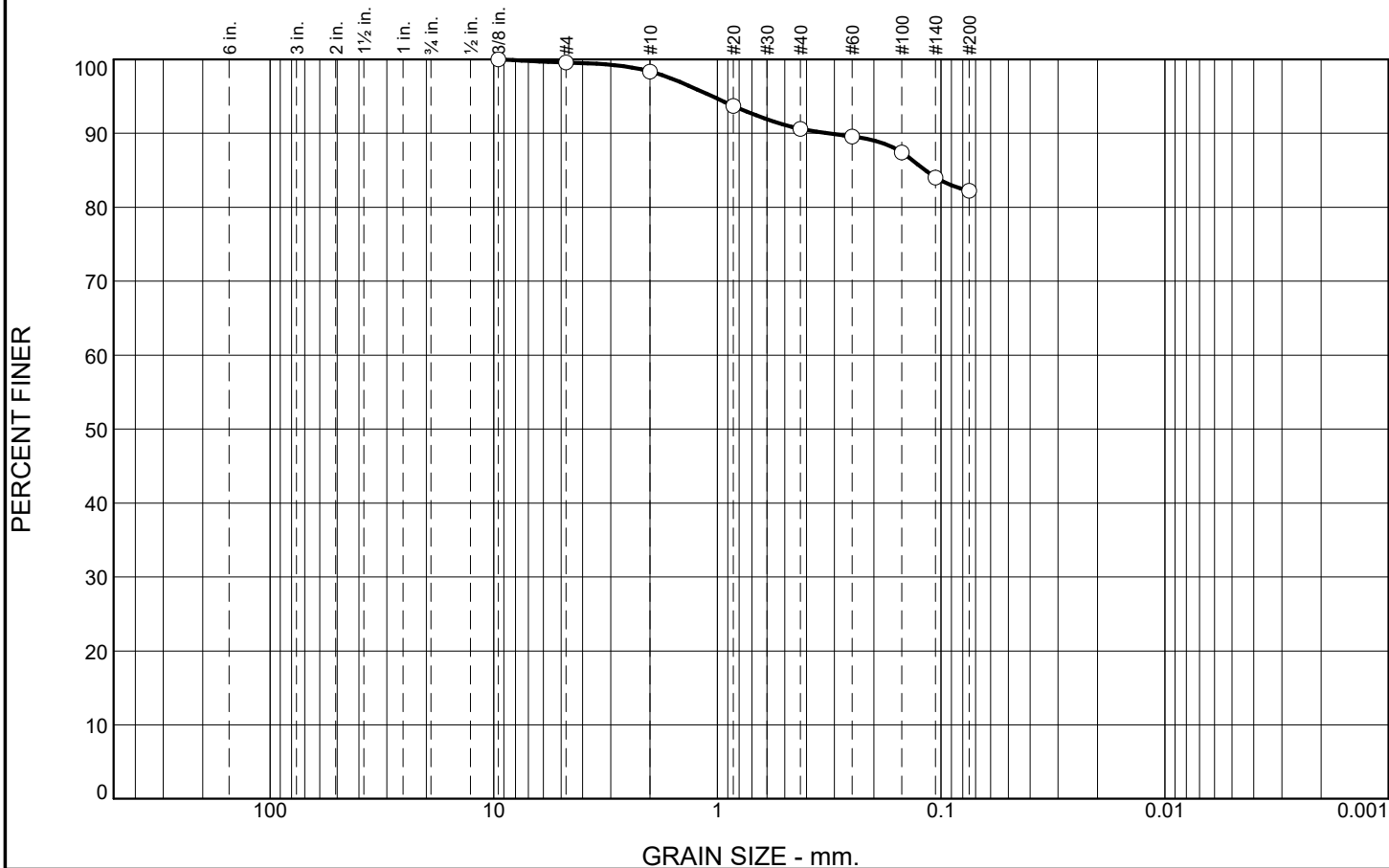
Hunt Valley, MD

Client: Delaware Army National Guard
Project: DEARNG Readiness Center

Project No: 20232961.001A

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.4	1.2	7.8	8.4	82.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100.0		
#4	99.6		
#10	98.4		
#20	93.7		
#40	90.6		
#60	89.6		
#100	87.4		
#140	84.0		
#200	82.2		

* (no specification provided)

<u>Material Description</u>		
Maroon Lean CLAY With Sand		
<u>Atterberg Limits</u>		
PL= 15.7	LL= 37.0	PI= 21.3
<u>Coefficients</u>		
D ₉₀ = 0.3199	D ₈₅ = 0.1177	D ₆₀ =
D ₅₀ =	D ₃₀ =	D ₁₅ =
D ₁₀ =	C _u =	C _c =
<u>Classification</u>		
USCS= CL	AASHTO= A-6(16)	
<u>Remarks</u>		
Natural Moisture 24.2%		

Source of Sample: SB-03
Sample Number: S-13

Depth: 48.5 - 50'

Date: 1-6-2023

Century Engineering, Inc.

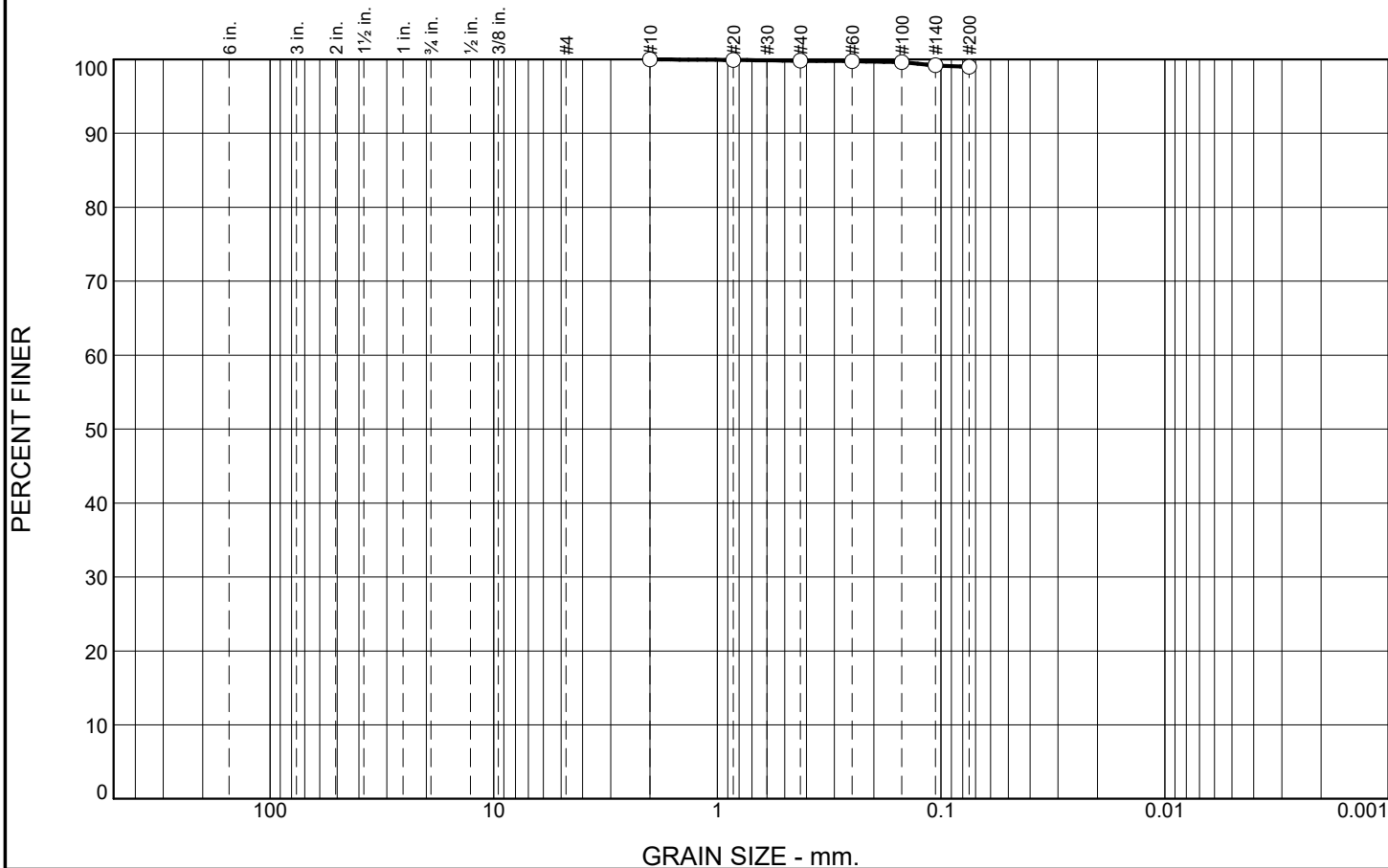
Hunt Valley, MD

Client: Delaware Army National Guard
Project: DEARNG Readiness Center

Project No: 20232961.001A

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.2	0.8	99.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.9		
#40	99.8		
#60	99.8		
#100	99.6		
#140	99.2		
#200	99.0		

* (no specification provided)

Material Description

Light Gray SILT

Atterberg Limits

PL= NP

LL= NV

PI= NP

Coefficients

D₉₀=

D₈₅=

D₆₀=

D₅₀=

D₃₀=

D₁₅=

D₁₀=

C_u=

C_c=

Classification

USCS= ML

AASHTO= A-4(0)

Remarks

Natural Moisture 15.5%

Source of Sample: SB-03
Sample Number: S-17

Depth: 68.5 - 70'

Date: 1-6-2023

Century Engineering, Inc.

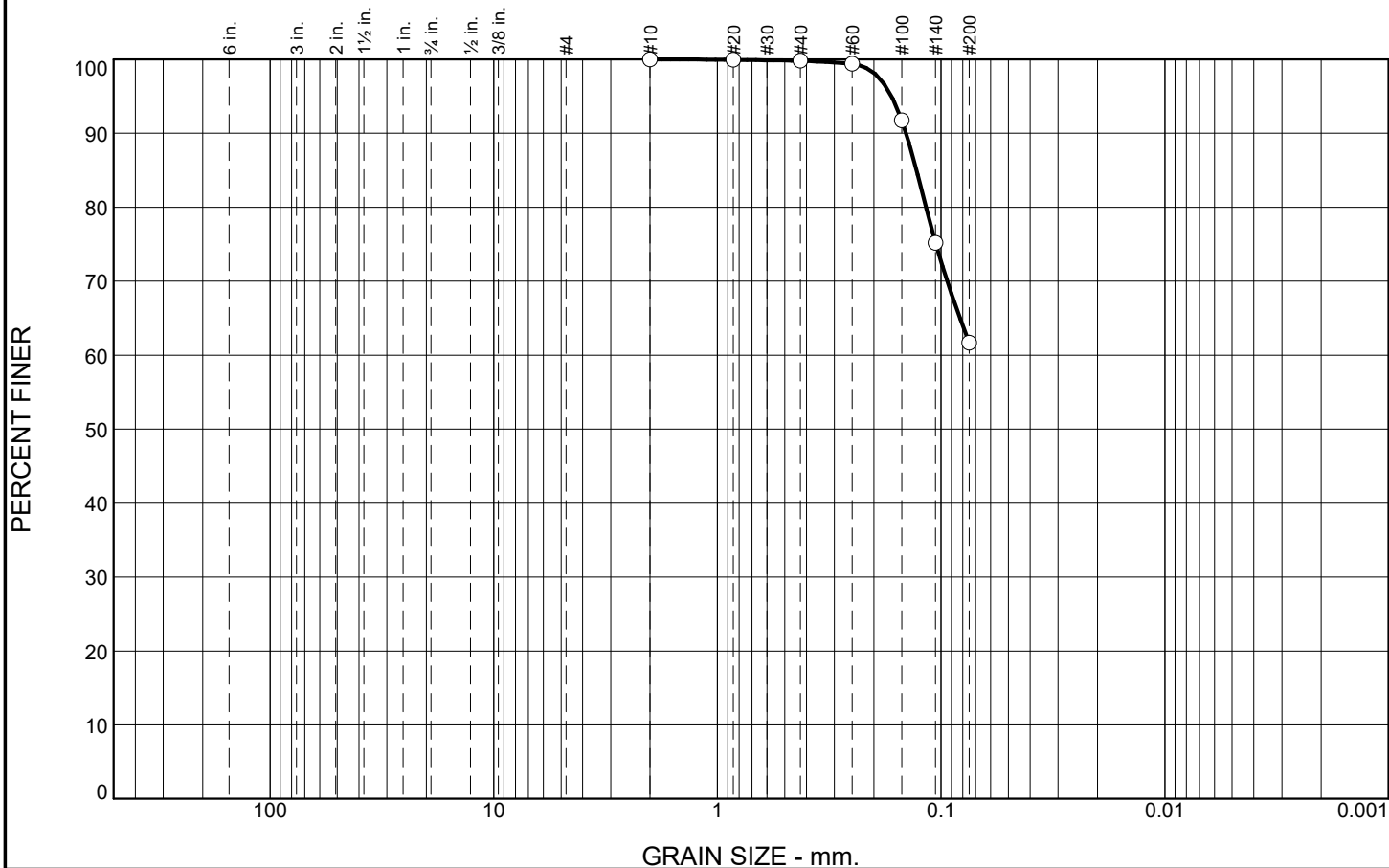
Hunt Valley, MD

Client: Delaware Army National Guard
Project: DEARNG Readiness Center

Project No: 20232961.001A

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.2	38.1	61.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.9		
#40	99.8		
#60	99.4		
#100	91.8		
#140	75.2		
#200	61.7		

* (no specification provided)

Material Description

Gray Sandy SILT

Atterberg Limits

PL= NP

LL= NV

PI= NP

Coefficients

D₉₀= 0.1435

D₈₅= 0.1289

D₆₀=

D₅₀=

D₃₀=

D₁₅=

D₁₀=

C_u=

C_c=

Classification

USCS= ML

AASHTO= A-4(0)

Remarks

Natural Moisture 18.5%

Source of Sample: SB-03
Sample Number: S-19

Depth: 78.5 - 80'

Date: 1-6-2023

Century Engineering, Inc.

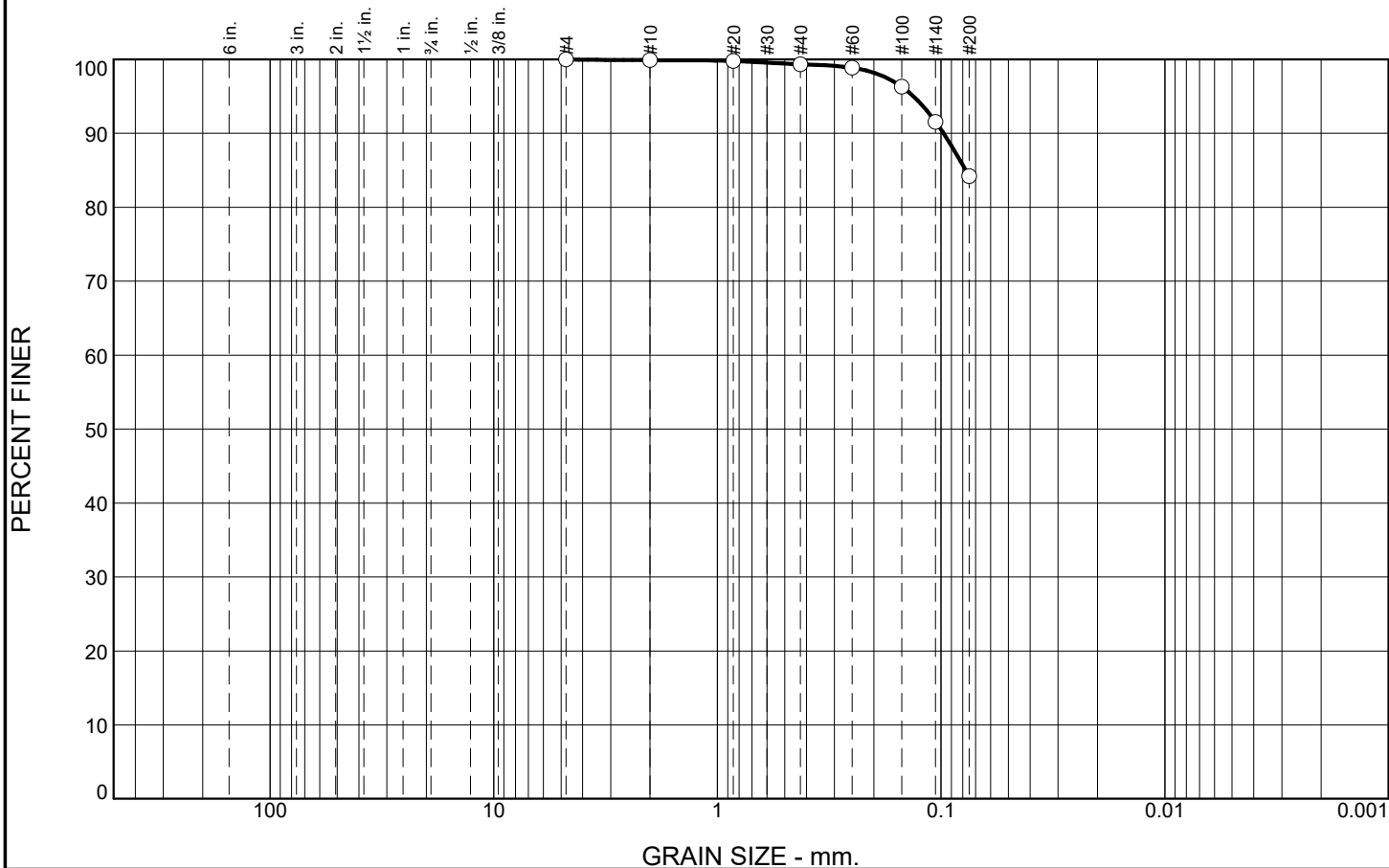
Hunt Valley, MD

Client: Delaware Army National Guard
Project: DEARNG Readiness Center

Project No: 20232961.001A

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	0.6	15.1	84.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#20	99.8		
#40	99.3		
#60	98.9		
#100	96.3		
#140	91.6		
#200	84.2		

* (no specification provided)

Material Description		
Gray Lean CLAY With Sand		
Atterberg Limits PL= 16.8 LL= 29.1 PI= 12.3 Coefficients D₉₀= 0.0977 D₈₅= 0.0776 D₆₀= D₅₀= D₃₀= D₁₅= D₁₀= C_u= C_c= Classification USCS= CL AASHTO= A-6(8) Remarks Natural Moisture 16.4%		

Source of Sample: SB-03
Sample Number: S-21

Depth: 88.5 - 90'

Date: 1-6-2023

Century Engineering, Inc.

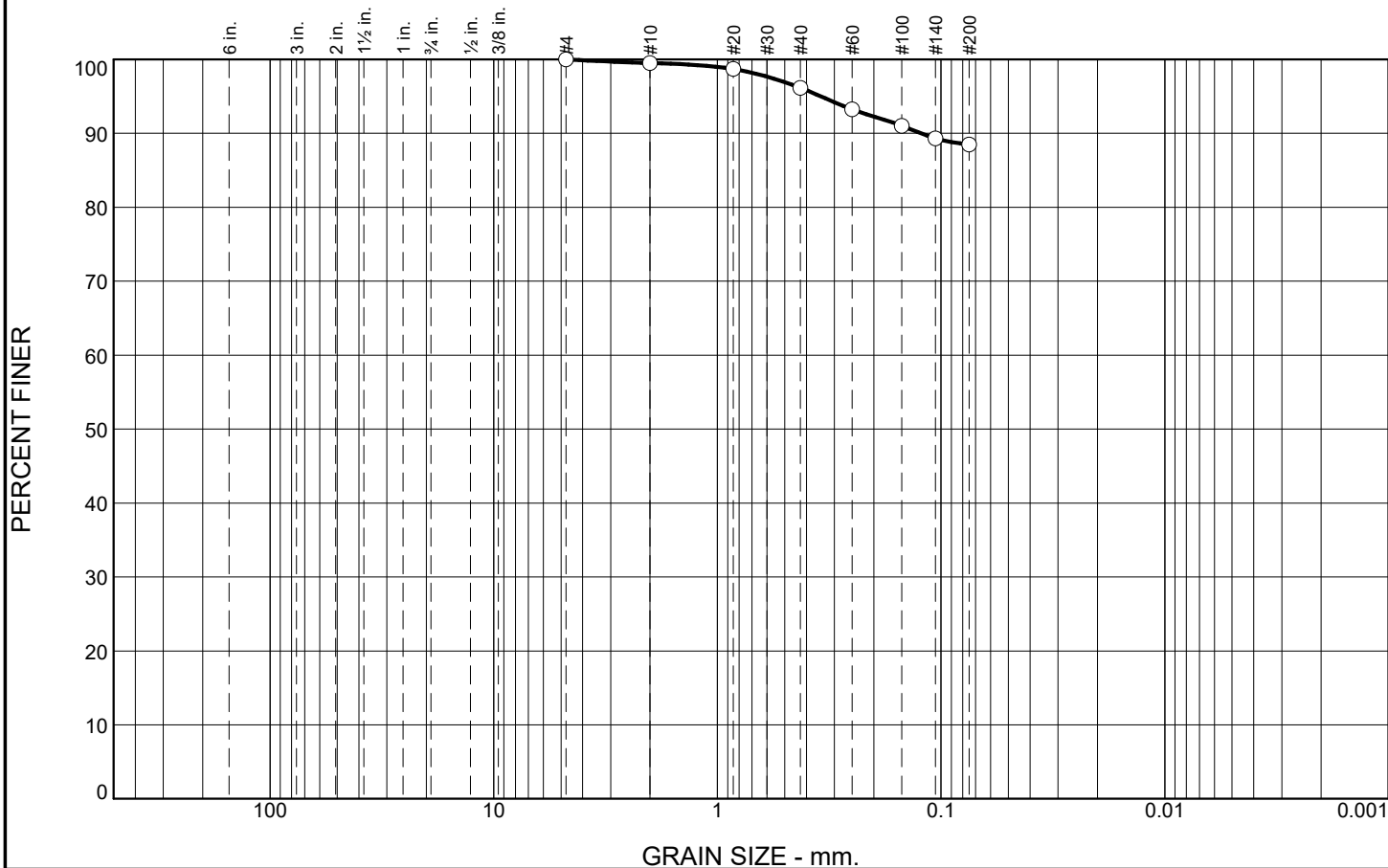
Hunt Valley, MD

Client: Delaware Army National Guard
Project: DEARNG Readiness Center

Project No: 20232961.001A

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.5	3.4	7.6	88.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.5		
#20	98.7		
#40	96.1		
#60	93.3		
#100	91.0		
#140	89.3		
#200	88.5		

* (no specification provided)

Material Description

Grey Lean Clay

Atterberg Limits

PL= 15

LL= 27

PI= 12

Coefficients

D₉₀= 0.1230

D₈₅=

D₆₀=

D₅₀=

D₃₀=

D₁₅=

D₁₀=

C_u=

C_c=

Classification

USCS= CL

AASHTO= A-6(9)

Remarks

Source of Sample: SB-04
Sample Number: S-3

Depth: 4' - 6'

Date:

Century Engineering, Inc.

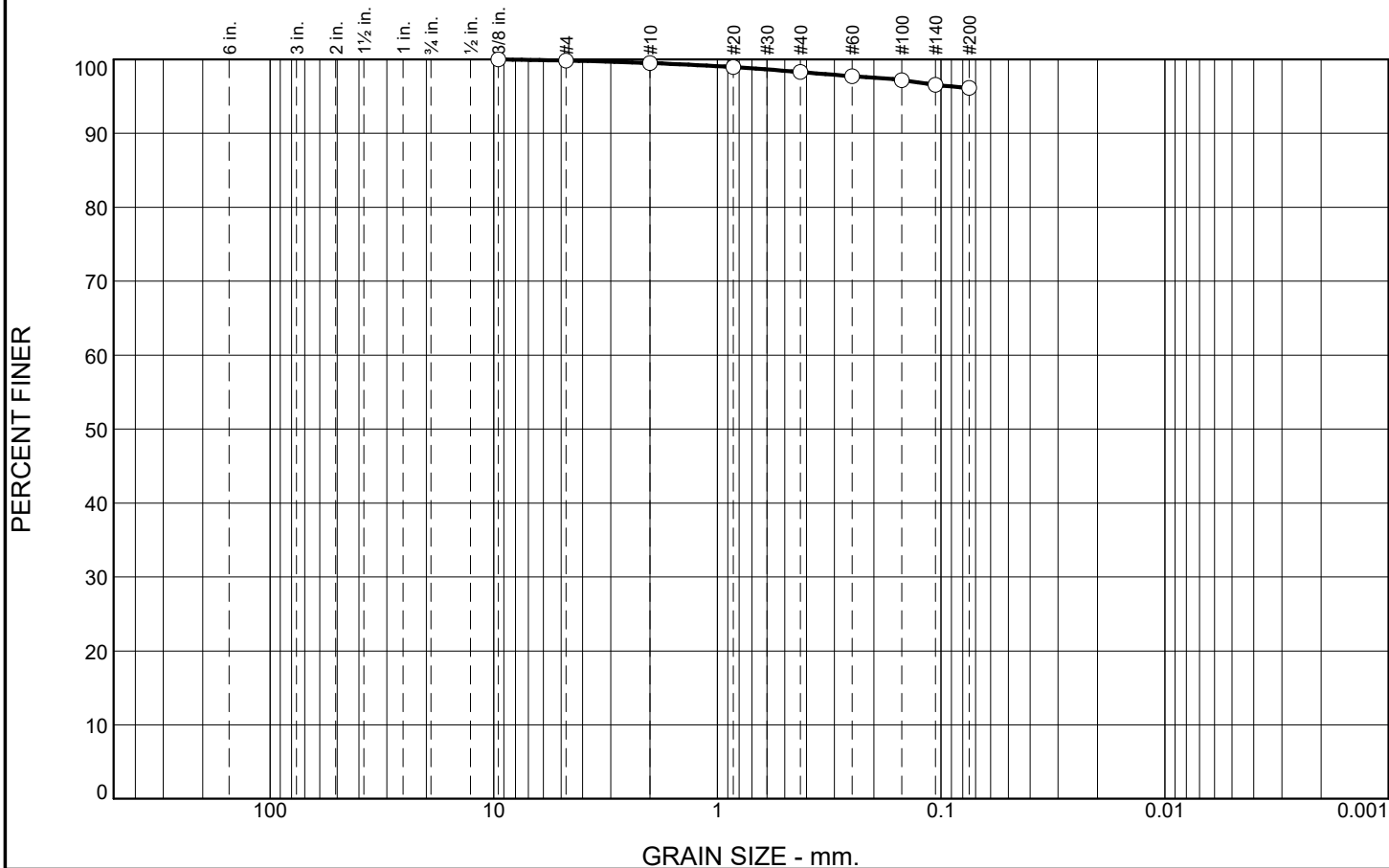
Hunt Valley, MD

Client: Delaware Army National Guard
Project: DEARNG Readiness Center

Project No: 20232961.001A

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	0.3	1.2	2.1	96.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100.0		
#4	99.8		
#10	99.5		
#20	99.0		
#40	98.3		
#60	97.7		
#100	97.2		
#140	96.6		
#200	96.2		

* (no specification provided)

Material Description

Gray Lean Clay

Atterberg Limits

PL= 19

LL= 41

PI= 22

Coefficients

D₉₀=

D₈₅=

D₆₀=

D₅₀=

D₃₀=

D₁₅=

D₁₀=

C_u=

C_c=

Classification

USCS= CL

AASHTO= A-7-6(22)

Remarks

Source of Sample: SB-04
Sample Number: S-7

Depth: 18.5' - 20'

Date:

Century Engineering, Inc.

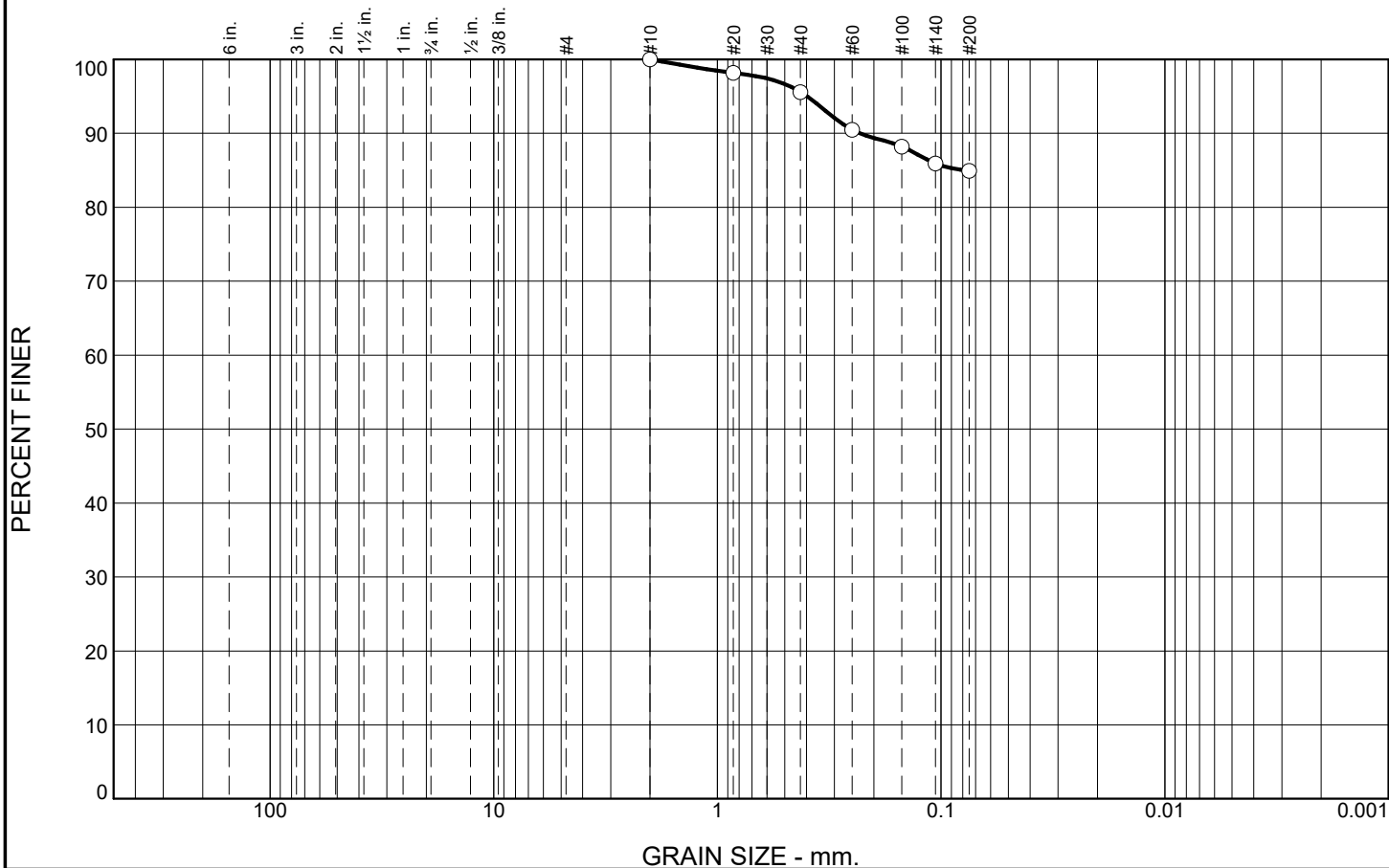
Hunt Valley, MD

Client: Delaware Army National Guard
Project: DEARNG Readiness Center

Project No: 20232961.001A

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	4.4	10.7	84.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	98.2		
#40	95.6		
#60	90.5		
#100	88.2		
#140	85.9		
#200	84.9		

* (no specification provided)

Material Description

Light brown Lean Clay

Atterberg Limits

PL= 16

LL= 38

PI= 22

Coefficients

D₉₀= 0.2305

D₈₅= 0.0782

D₆₀=

D₅₀=

D₃₀=

D₁₅=

D₁₀=

C_u=

C_c=

Classification

USCS= CL

AASHTO= A-6(18)

Remarks

Source of Sample: SB-04
Sample Number: S-8

Depth: 23.5' - 25'

Date:

Century Engineering, Inc.

Hunt Valley, MD

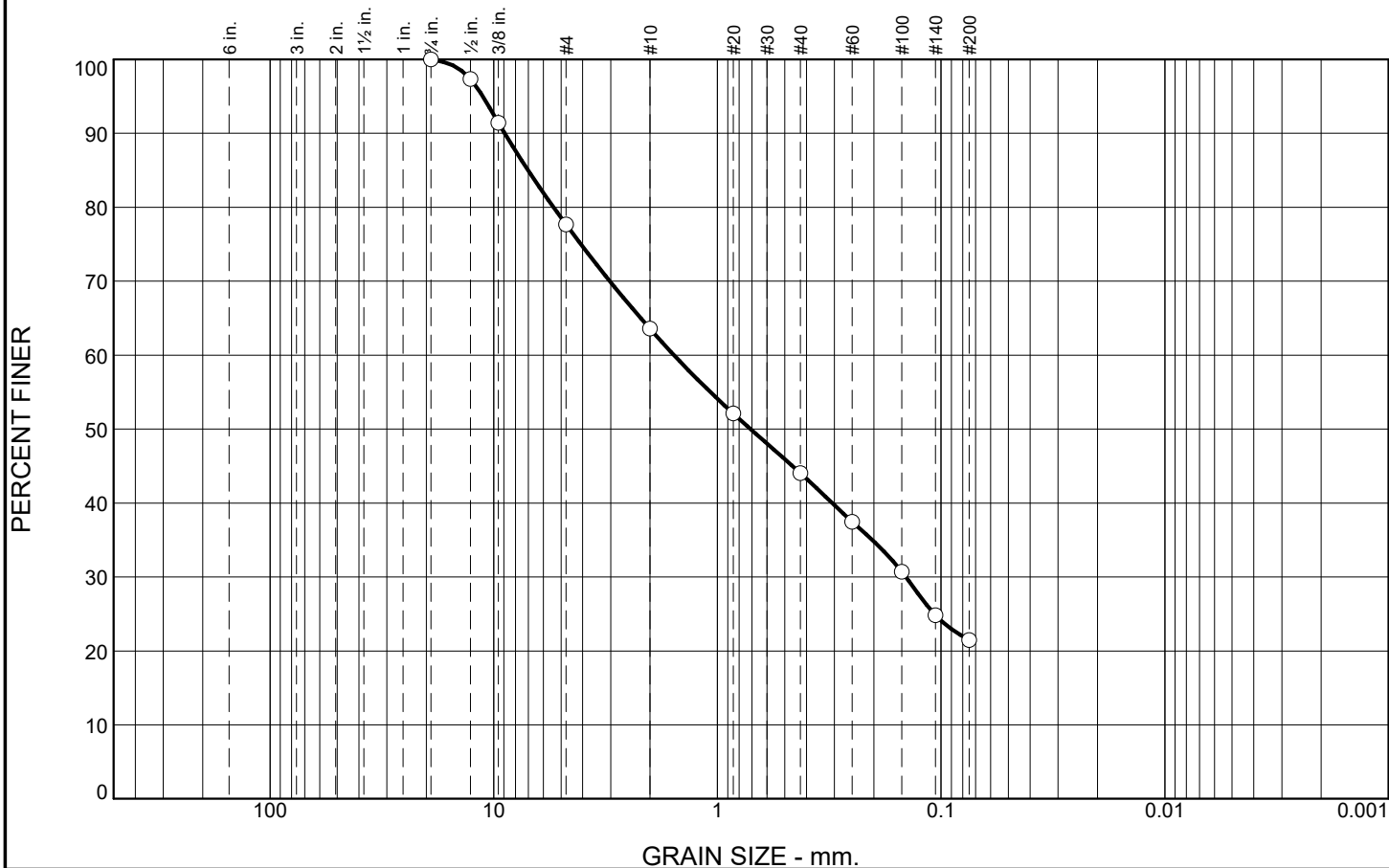
Client: Delaware Army National Guard

Project: DEARNG Readiness Center

Project No: 20232961.001A

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	22.3	14.1	19.6	22.5	21.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
1/2"	97.3		
3/8"	91.4		
#4	77.7		
#10	63.6		
#20	52.1		
#40	44.0		
#60	37.5		
#100	30.7		
#140	24.8		
#200	21.5		

* (no specification provided)

Material Description

Gray Silty Sand

Atterberg Limits

PL= NP

LL= NV

PI= NP

Coefficients

D₉₀= 8.9358

D₈₅= 7.0287

D₆₀= 1.5604

D₅₀= 0.7105

D₃₀= 0.1439

D₁₅=

D₁₀=

C_u=

C_c=

Classification

USCS= SM

AASHTO= A-1-b

Remarks

Source of Sample: SB-05
Sample Number: S-1

Depth: 0 - 2'

Date:

Century Engineering, Inc.

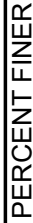
Hunt Valley, MD

Client: Delaware Army National Guard
Project: DEARNG Readiness Center

Project No: 20232961.001A

Figure

PERCENT FINER



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.2	2.9	12.4	84.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.8		
#20	99.1		
#40	96.9		
#60	94.1		
#100	91.4		
#140	88.6		
#200	84.5		

Country	Year	Value	Unit	Source
Algeria	2010	1.0	kg	FAO
Algeria	2011	1.0	kg	FAO
Algeria	2012	1.0	kg	FAO
Algeria	2013	1.0	kg	FAO
Algeria	2014	1.0	kg	FAO
Algeria	2015	1.0	kg	FAO
Algeria	2016	1.0	kg	FAO
Algeria	2017	1.0	kg	FAO
Algeria	2018	1.0	kg	FAO
Algeria	2019	1.0	kg	FAO
Algeria	2020	1.0	kg	FAO
Algeria	2021	1.0	kg	FAO
Algeria	2022	1.0	kg	FAO
Algeria	2023	1.0	kg	FAO
Algeria	2024	1.0	kg	FAO
Algeria	2025	1.0	kg	FAO
Algeria	2026	1.0	kg	FAO
Algeria	2027	1.0	kg	FAO
Algeria	2028	1.0	kg	FAO
Algeria	2029	1.0	kg	FAO
Algeria	2030	1.0	kg	FAO
Algeria	2031	1.0	kg	FAO
Algeria	2032	1.0	kg	FAO
Algeria	2033	1.0	kg	FAO
Algeria	2034	1.0	kg	FAO
Algeria	2035	1.0	kg	FAO
Algeria	2036	1.0	kg	FAO
Algeria	2037	1.0	kg	FAO
Algeria	2038	1.0	kg	FAO
Algeria	2039	1.0	kg	FAO
Algeria	2040	1.0	kg	FAO
Algeria	2041	1.0	kg	FAO
Algeria	2042	1.0	kg	FAO
Algeria	2043	1.0	kg	FAO
Algeria	2044	1.0	kg	FAO
Algeria	2045	1.0	kg	FAO
Algeria	2046	1.0	kg	FAO
Algeria	2047	1.0	kg	FAO
Algeria	2048	1.0	kg	FAO
Algeria	2049	1.0	kg	FAO
Algeria	2050	1.0	kg	FAO
Algeria	2051	1.0	kg	FAO
Algeria	2052	1.0	kg	FAO
Algeria	2053	1.0	kg	FAO
Algeria	2054	1.0	kg	FAO
Algeria	2055	1.0	kg	FAO
Algeria	2056	1.0	kg	FAO
Algeria	2057	1.0	kg	FAO
Algeria	2058	1.0	kg	FAO
Algeria	2059	1.0	kg	FAO
Algeria	2060	1.0	kg	FAO
Algeria	2061	1.0	kg	FAO
Algeria	2062	1.0	kg	FAO
Algeria	2063	1.0	kg	FAO
Algeria	2064	1.0	kg	FAO
Algeria	2065	1.0	kg	FAO
Algeria	2066	1.0	kg	FAO
Algeria	2067	1.0	kg	FAO
Algeria	2068	1.0	kg	FAO
Algeria	2069	1.0	kg	FAO
Algeria	2070	1.0	kg	FAO
Algeria	2071	1.0	kg	FAO
Algeria	2072	1.0	kg	FAO
Algeria	2073	1.0	kg	FAO
Algeria	2074	1.0	kg	FAO
Algeria	2075	1.0	kg	FAO
Algeria	2076	1.0	kg	FAO
Algeria	2077	1.0	kg	FAO
Algeria	2078	1.0	kg	FAO
Algeria	2079	1.0	kg	FAO
Algeria	2080	1.0	kg	FAO
Algeria	2081	1.0	kg	FAO
Algeria	2082	1.0	kg	FAO
Algeria	2083	1.0	kg	FAO
Algeria	2084	1.0	kg	FAO
Algeria	2085	1.0	kg	FAO
Algeria	2086	1.0	kg	FAO
Algeria	2087	1.0	kg	FAO
Algeria	2088	1.0	kg	FAO
Algeria	2089	1.0	kg	FAO
Algeria	2090	1.0	kg	

Material Description

Light gray Lean Clay

Atterberg Limits

$P| = 9$

Coefficients

$$\begin{matrix} D_{60}= \\ D_{15}= \\ C_c= \end{matrix}$$

Classification

AASHTO= A-4(6)

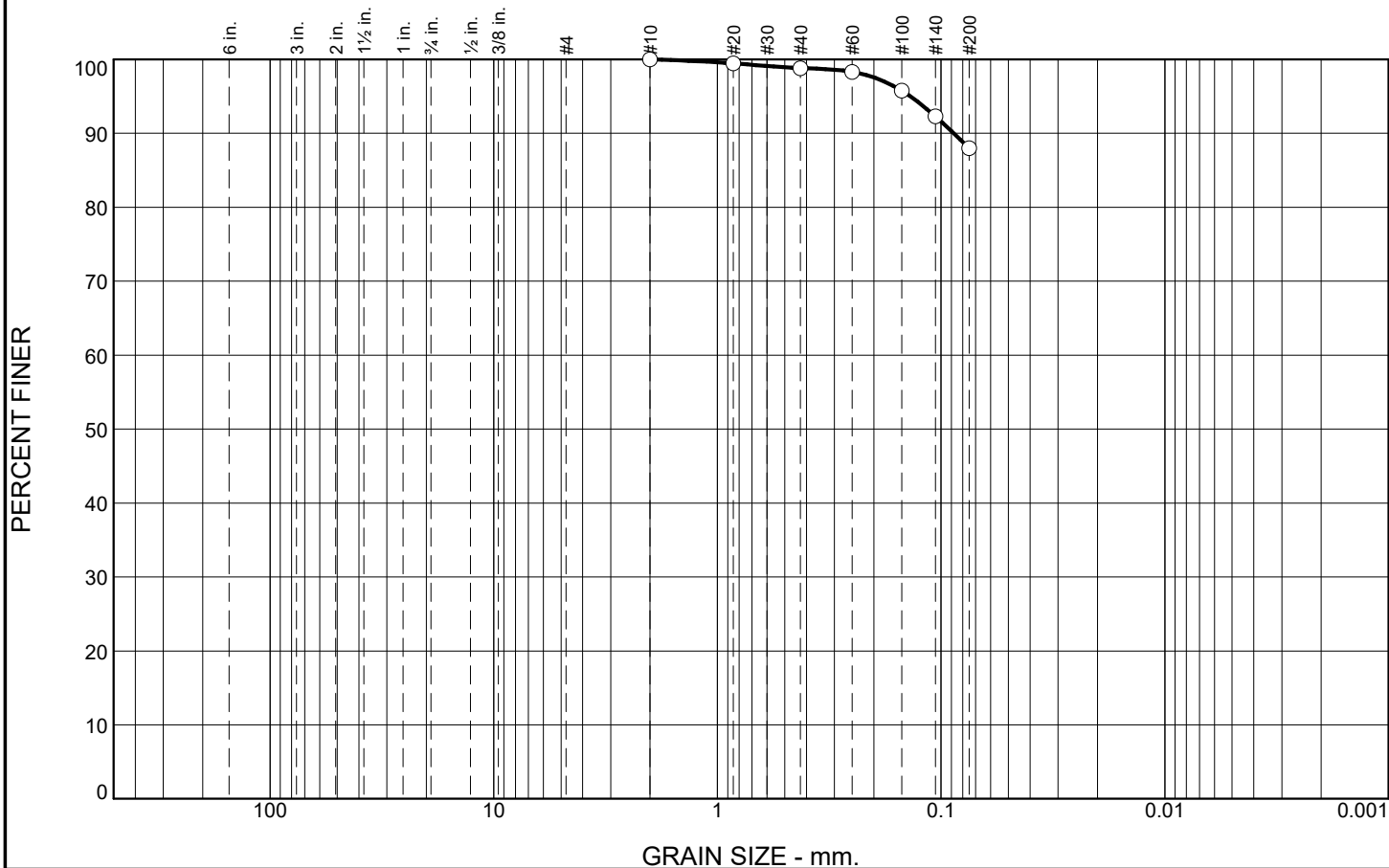
Remarks

Date:

Project: DEARNG Readiness Center

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	1.2	10.8	88.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.5		
#40	98.8		
#60	98.3		
#100	95.8		
#140	92.3		
#200	88.0		

* (no specification provided)

Material Description

Light brown Lean Clay

Atterberg Limits

PL= 17

LL= 36

PI= 19

Coefficients

D₉₀= 0.0879

D₈₅=

D₆₀=

D₅₀=

D₃₀=

D₁₅=

D₁₀=

C_u=

C_c=

Classification

USCS= CL

AASHTO= A-6(16)

Remarks

Source of Sample: SB-09
Sample Number: S-3

Depth: 4' - 6'

Date:

Century Engineering, Inc.

Hunt Valley, MD

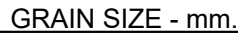
Client: Delaware Army National Guard

Project: DEARNG Readiness Center

Project No: 20232961.001A

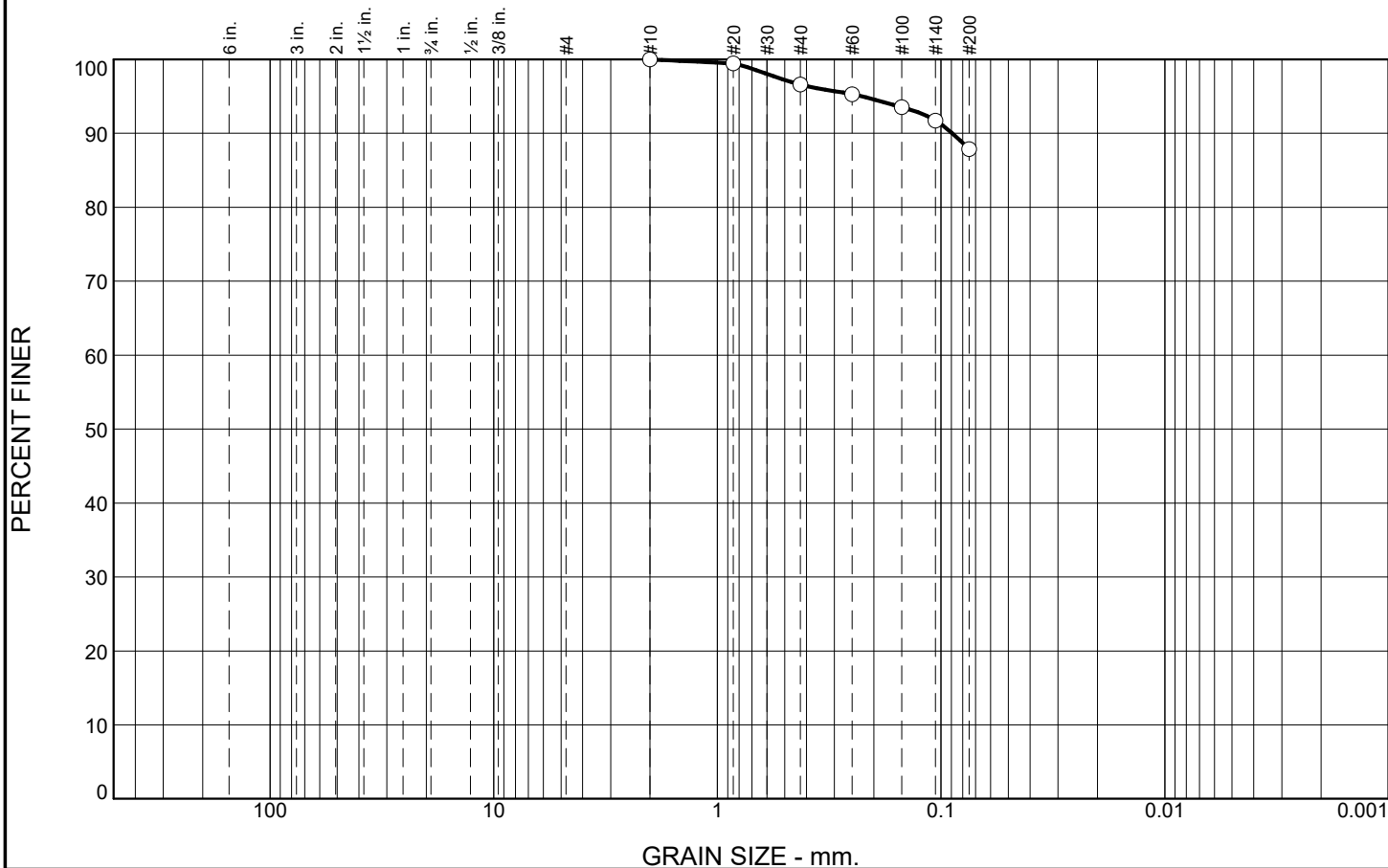
Figure

PERCENT FINER

* (no specification provided)

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	3.4	8.7	87.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.5		
#40	96.6		
#60	95.3		
#100	93.5		
#140	91.7		
#200	87.9		

* (no specification provided)

Material Description

Orange-brown Lean Clay

Atterberg Limits

PL= 20

LL= 41

PI= 21

Coefficients

D₉₀= 0.0892

D₈₅=

D₆₀=

D₅₀=

D₃₀=

D₁₅=

D₁₀=

C_u=

C_c=

Classification

USCS= CL

AASHTO= A-7-6(19)

Remarks

Source of Sample: SB-15
Sample Number: S-7

Depth: 18.5' - 20'

Date:

Century Engineering, Inc.

Hunt Valley, MD

Client: Delaware Army National Guard

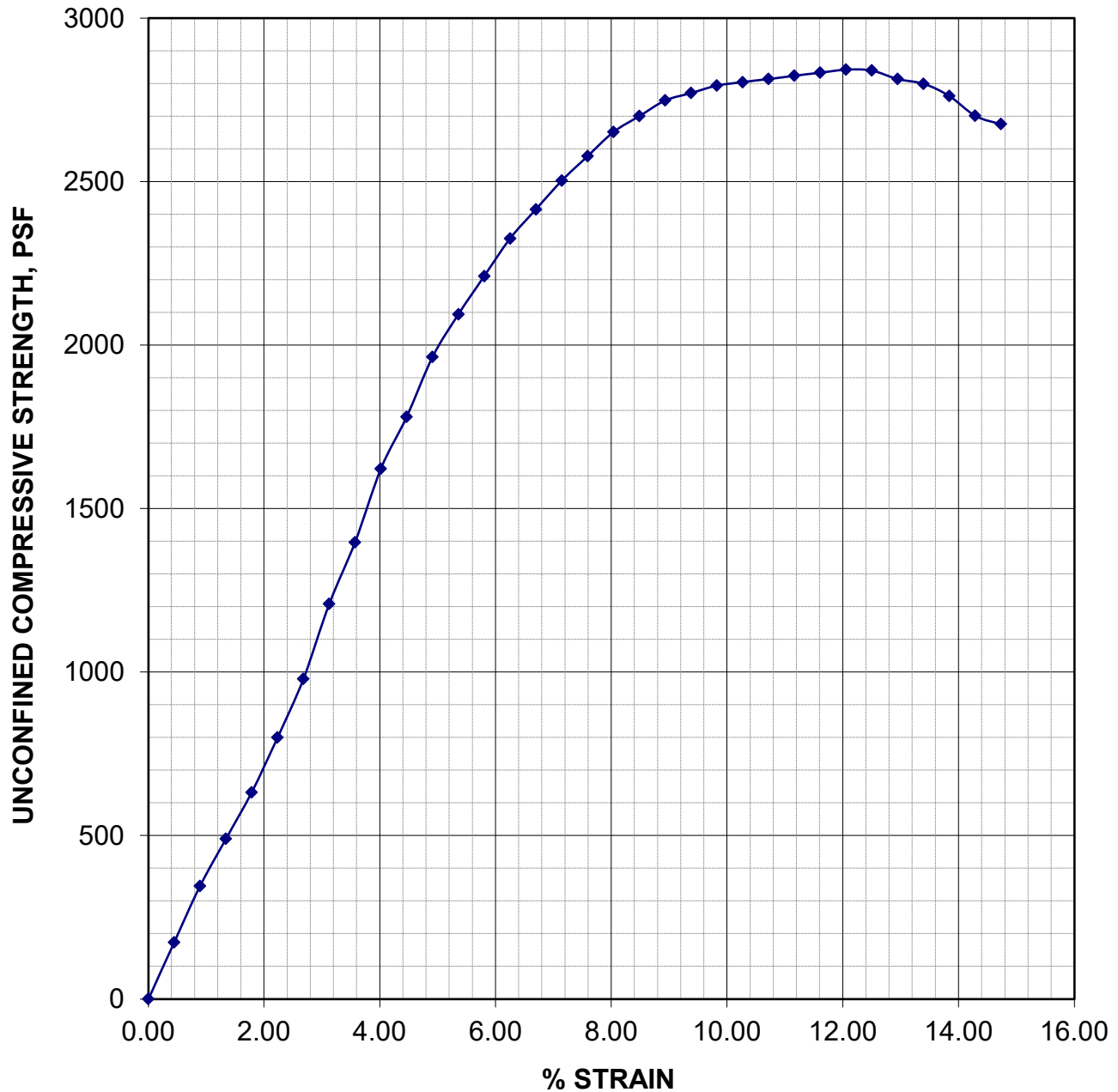
Project: DEARNG Readiness Center

Project No: 20232961.001A

Figure

UNCONFINED COMPRESSIVE STRENGTH

(ASTM D2166)



Boring No.: Boring SB-4
 Sample No.: T-1
 Depth: 21.0' - 23.5'
 Description: Gray Silty CLAY, trace lignite

Unconfined Compressive Strength: 2843 psf
 Cohesion: 1421.5 psf

Wet Unit Weight, PCF: 128.5

Dry Unit Weight, PCF: 106.6

% Moisture: 20.6

Rate of Strain: 0.05"/min.



Client: Delaware Army National Guard
 Project: DEARNG Readiness Center

CEI Project No. 20232961.001A
 Date: 1/10/2023



Triaxial Compression Test UU (ASTM D2850-15)

Boring No: SB-4

Sample No: T-1

Depth: 21.0' - 23.5'

Project: DEARNG RRTS Readiness Center

Soil Description: Gray moist Silty CLAY, trace lignite

Project No: 20232961.001A Date: January 18, 2023

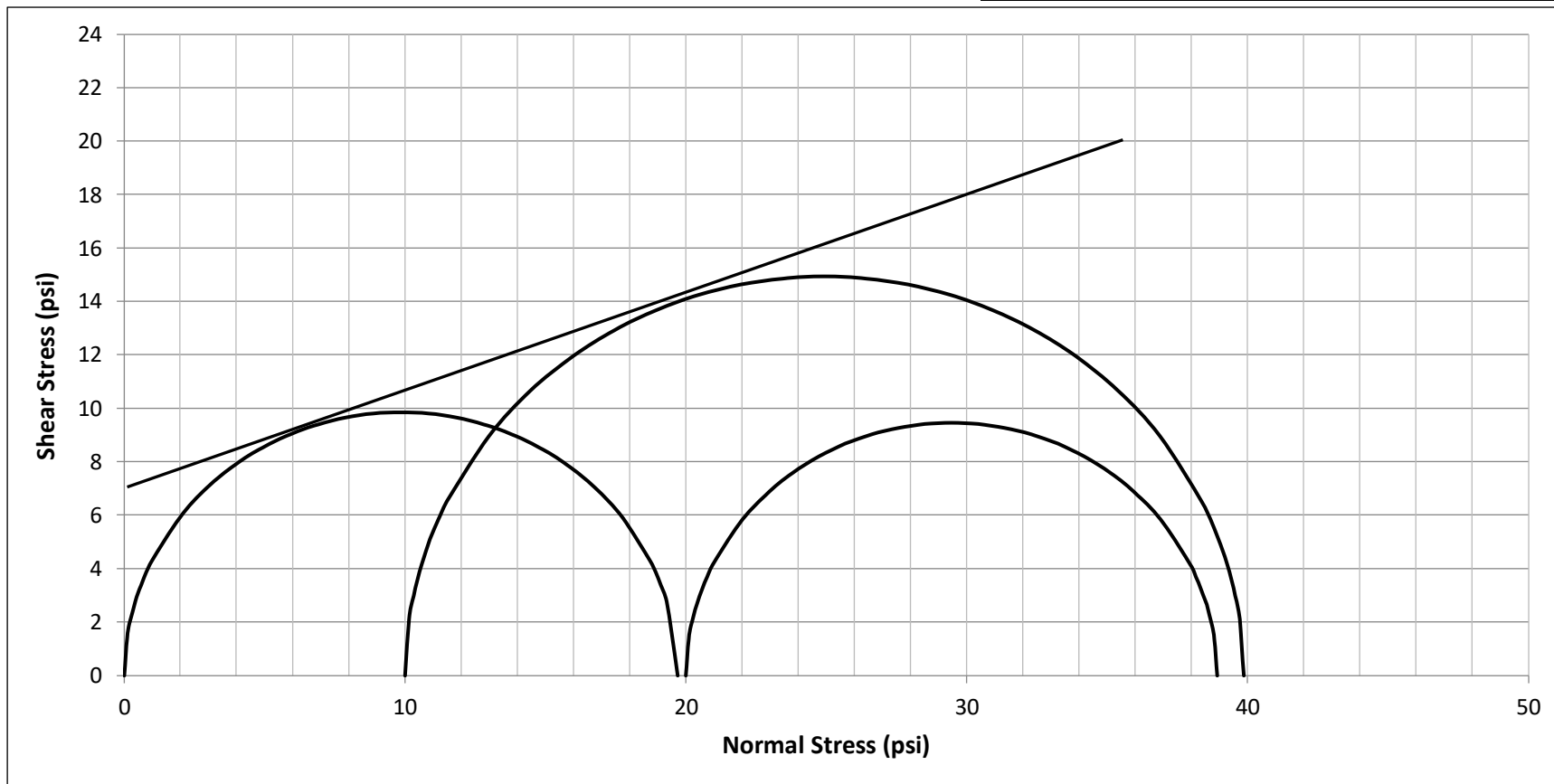
Test Method: UU Rate of Strain: 1.0 % per min.

Prepared By: PAD

Cohesion = 7.0 psi

Friction Angle = 19.3 degrees

Cell Pressure (psi)	Dry Unit Weight (pcf)	Moisture Content (%)
0.0	106.6	20.6
10.0	106.6	20.6
20.0	109.7	14.5





Project: DEARNG RRTS Readiness Center
Project No: 20232961.001A
Boring: SB-4 Depth: 21.0' - 23.5'
Sample No: T-1
Sample Description: Gray moist Silty Clay, trace lignite

**Triaxial Compression Test UU
(ASTM D2850-15)**

Deviator Stress (σ_d) vs. % Strain

