Fearn Clendaniel
Architects INC
6 Larch Avenue - Suite 398 - Wilmington, DE 19804 - (P) 302-998-7615 - (F) 302-998-7685

INDIAN RIVER SCHOOL DISTRICT
Howard T. Ennis School – New Building
BID NO. IRD19004-HTES

ADDENDUM NO. 1 18 September 2020
ARCHITECT'S PROJECT NO: 17004

Indian River School District,
Howard T. Ennis School
26351 Patriots Way, Georgetown, DE 19947

Fearn-Clendaniel Architects, Inc.
6 Larch Avenue Suite 398, Wilmington, Delaware, 19804
Phone: (302) 998-7615

BIDS DUE: **2:00 p.m. on October 15, 2020**

LOCATION: **Indian River School District Administrative Offices**
31 Hosier Street, Selbyville, DE 19975

1.0 NOTICE TO ALL BIDDERS:

1.1. Bidders are hereby notified that this Addendum shall be and hereby becomes part of their Contract Documents, and shall be attached to the Project Manual for this project.

1.2. The following items are intended to revise and clarify the Contract Documents, and shall be included by the Bidder in their proposal.

1.3. Bidders shall verify that their sub-bidders are in full receipt of the information contained herein. Bidders shall acknowledge receipt of each addendum on their Bid Form.

1.4. Substitution requests received since the pre-bid meeting will be addressed in addendum No. 2.

2.0 CLARIFICATIONS:

2.1 Drawings and specifications provided on the State of Delaware procurement website for advertisement purposes should not be used for bidding. Only the documents issued at the Pre-bid Meeting or via download link provided directly by F-C Architects should be used for bidding purposes.

2.2 This addendum will be emailed to all pre-bid attendees at the addresses given on the sign-in sheet. All future addenda will be emailed to plan holders of documents provided directly by F-C Architects.

2.3 Please see attached Pre-bid Meeting Minutes dated 09-18-2020 and Attendees Sign-In Sheet dated 16 September 2020. These are incorporated into this Addendum No 1.

2.4 Please see attached Geotechnical Reports:

2.4.1 GTA Report of Subsurface Exploration dated May 21, 2019
2.4.2 GTA report of Stormwater Management Subsurface Exploration dated May 21, 2019

2.5 Please see attached bid form with updated Subcontractors Listing.

3.0 QUESTIONS:

3.1 **Q:** Can the AISC certification be waived for a fabricator for this project?

A: Yes, we will revise specification section 051200; 1.8; A to indicate "Engage a firm experienced in fabricating structural steel similar to that indicated for this project and with a record of successful in-service performance, as well as sufficient production capacity to fabricate structural steel without delaying the work."

4.0 CHANGES TO THE DRAWINGS:

4.1 There are no changes at this time.

5.0 CHANGES TO THE PROJECT MANUAL:

5.1 Section 004113 - Bid Form: Replace Bid Form with the attached revised Subcontractor List version.

5.2 Section 051200 – Structural Steel Framing: 1.8; A, revise paragraph to read: "Fabricator Qualifications: Engage a firm experienced in fabricating structural steel similar to that indicated for this project and with a record of successful in-service performance, as well as sufficient production capacity to fabricate structural steel without delaying the work."

END OF ADDENDUM NO. 1

Fearn Clendaniel
Architects INC
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Indian River School District

HOWARD T. ENNIS SCHOOL

PRE-BID MEETING NOTES

09-18-2020

MTG DATE: Wednesday, 09-16-2020

TIME: 1:00p

LOCATION: Sussex Central High School Auditorium

PROJECT NO: IRD19004-HTES

ATTENDEES:

IRSD	Joe Booth	
FCA	Ken Fearn	Mark Ballintyn
CDA	Colm DeAscanis	
Gipe	Dave Hoffman	

CONTRACTORS/OTHER: See attached Sign-in Sheet

1.0 NOTES –

1.1 The project is a state of Delaware project and is subject to Delaware bidding requirements. See bid documents.

1.2 Attendance at this meeting was mandatory for General Contractors bidding the project.

1.3 Drawings and specifications provided on the State of Delaware procurement website for advertisement purposes should not be used for bidding. Documents purchased at the Pre-bid meeting include drawing and specification revisions that are not currently posted on the state MyMarketPlace web portal. FCA will email all future addenda directly to purchased plan holders and to the MyMarketPlace web portal.

1.4 FCA will email Addenda No. 1 with sign-in sheets to all pre-bid attendees.

1.5 Prevailing wage rates and reporting are required. Prevailing wage rates are indicated in the specification.

1.6 Bid due date was indicated as identified in specification: 2:00 p.m. local time on Thursday, October 15, 2020, at the IR School District Office. One hard copy of bid documents will be acceptable.

1.7 Scope of work was discussed noting the new school is 94,500+/- square feet on a 32.43 +/- acre site located at 26351 Patriots Way. The project will support students with disabilities within Sussex County, DE, from preschool through age 21. Some of the building spaces included in the building were highlighted on the Floor plan.

1.8 Out buildings included in base bid are a Wellhouse/pumphouse/storage building and a detached chiller enclosure yard.

1.9 Future construction that will be bid separately include:

1.9.1 IT: security cameras, structured cabling, and telecom systems. This will allow the Owner to delay purchasing tech items that may become dated prior to actual installation. We anticipate these bid packages be awarded approximately 10-12 months after initial construction. The actual date will be determined and coordinated with the Owner and GC awarded the project.

Note: All pathways, conduits and backboxes for items above are included in the base bid.

Also included in the base bid is security relating to access control (Card readers, electronic door hardware etc.). See drawings and specifications for detail. For coordination purposes, we have listed electronic door hardware items as “By Security” in the specifications. This includes electronic hardware, transfer hinges, door operators, etc. The intent is to have the security vendor responsible for providing door/frame security hardware preparation/coordination, and installing these devices so security components are warrantied through one subcontractor.

1.9.2 Pole Barn, Greenhouse, and Playground. The owner would like to bid and award these packages prior to the end of the base bid package. Remaining project funding will determine scope and ability to incorporate these items. Note: Base Bid requires utility pathways to proposed pole barn and greenhouse locations as indicated in the construction documents.

1.10 CDA and FCA reviewed Site improvements which included utilities, building pad. Site grading, SWM, entrance improvements (crosswalk), sidewalks, parking, and landscaping, on-site water system and sanitary forced main. The on-site water system includes two wells, treatment, and feeds separate storage tanks for domestic and fire protection. Athletic field to be graded per plans, but no field/turf system is designed.

1.11 Gipe Associates gave a brief summary of the mechanical and electrical systems. Mechanical systems are based on a Based upon a Four-Pipe Fan Coil system with Chiller / Boiler. A transformer is required to support emergency building systems as identified within the drawings and specifications.

1.12 An electrical power study will be needed to encompass the entire building per code and as identified in the documents.

1.13 FCA reviewed the allowances and alternates listed in the specifications.

1.14 FCA and CDA reviewed the unit prices listed in the specifications. CDA noted that the site is flat with low areas. All import soils required to match grading indicated in the construction documents are included in base bid. Unit pricing of soil is listed in the event of unforeseen conditions.

1.15 All Geotechnical reports will be provided in Addenda No. 1.

1.16 FCA reviewed construction duration. As specified, Work to begin by November 16, 2020, 100% completion on May 17, 2022.

1.17 The IRSD would like to hold a ground breaking ceremony with the awarded contractor on November 4, 2020.

1.18 The state has allocated funding for the project in phased increments to fund throughout the project duration.

1.19 As specified, a construction trailer and temporary sanitary facilities are required. Temporary utility (electric, water) connections are contractor responsibility.

1.20 There are No Liquidated Damages specified – however if the project extends beyond the scheduled completion date, the contractor may be liable for any associated costs impacting the district and will applied against retainage.

1.21 The contractor will be responsible for obtaining permits. The Indian River School District will pay for all permit impact fees. The contractor will be responsible for any permitting fee associated with re-inspections. Plans are currently approved by all required regulatory agencies.

1.22 IRSD will hire 3rd party inspection for earthwork, concrete, masonry and steel. GC will need to coordinate with these testing agencies.

1.23 The contractor is responsible for CCR. Note: CDA indicated that the SWM pond has a clay liner. This will need to be reviewed by both CCR and earthwork agency.

1.24 The project is not seeking LEED certification.

1.25 A listing of the subcontractor list was read aloud. One request to eliminate "Painting" from the list was offered without consensus from the attendees. FCA indicated they would discuss with the IRSD. The Bid form with official sub-contractor listing will be provided in Addenda No. 1.

1.26 Warranties must meet minimum State of Delaware two year requirement or greater as indicated in specifications.

1.27 Substitutions must meet specification requirements and must be submitted not later than 10 days prior to bid due date. Approval or denial of substitution requests will be listed in addenda. Substitutions be submitted through a GC that attended the Pre-bid meeting.

1.28 **Questions during the Bidding Period**: Email all question to the Architect : send to Mark Ballintyn : Email: mark@fcarchitects.net

1.29 Questions must be written and will be answered in addenda. Bidders questions will only be accepted by Plan holders or through Plan holders on letterhead of plan holder.

1.30 All questions must be submitted at least 7 days prior to the bid due date.

1.31 The last addenda will be issued no later than 4 days prior to the bid due date. Exception: withdraw of bid or extension or change of opening location.

1.32 **Access to Site:** Contractors are welcome to visit the site at any time, but should let the district know when they are on site by contacting IRSD Supervisor of buildings and Grounds, Joe Booth. Office: 302-436-1000 or Cell: 302-542-6409.

Fearn-Clendaniel Architects, Inc., prepared these minutes for the purpose of recording significant information covered during the meeting. Should anyone object to the statements or interpretations contained herein, please advise within one week of the date of this report.

Submitted by:
Kenneth B. Fearn, AIA, LEED®AP
FC Architects

Fearn Clendaniel
Architects INC
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Howard T. Ennis School

Sign in sheet – PLEASE PRINT

Pre-bid: #IRD19004-HTES Date: 16 September 2020

Name / Company: **Fearn Clendaniel Architects / Ken Fearn & Mark Ballintyn**			GC: yes / no
Address (no POBs): **6 Larch Ave. Suite 398, Wilmington, DE 19804**			
Phone: **302-998-7615**		Email: **mark@fcarchitects.net**	
Name / Company: CDA Engineering / Colm DeAscanis			GC: yes / no
Address (no POBs): 6 Larch Avenue, Suite 401, Wilmington, DE 19804			
Phone: 302-998-9202		Email:	
Name / Company: Gipe Associates / Dave Hoffman			GC: yes / no
Address (no POBs): 8719 Brooks Drive, Easton, MD 21601			
Phone: 410-822-8688		Email:	
Name / Company: A-Del Construction / Mitch Seitz			GC: yes / no
Address (no POBs): 20139 Lowes Road, Millsboro, DE 19966			
Phone: 302-933-8733		Email: mseitz@a-del.com	
Name / Company: ARG Communications, Inc.			GC: yes / no
Address (no POBs): 612 Colonial Ave, Suite A, Wilmington, DE 19805			
Phone: 302-225-2000		Email: jeff@whyarg.com	
Name / Company: Advantech / Eric Schaeffer			GC: yes / no
Address (no POBs): 151 Garrison Oak Drive, Dover, DE 19901			
Phone: 302-674-8405		Email: eric.schaeffer@advantechsecurity.net	
Name / Company: Precision Door & Hardware / Peter Zavres			GC: yes / no
Address (no POBs): 4660 New Design Road, Suite 1, Frederick, MD 21703			
Phone: 301-682-4498		Email: pzavras@pdoor.com	
Name / Company: Wohlsen Construction / Suzanne Murphy			GC: yes / no
Address (no POBs): 501 Carr Road, Suite 101, Wilmington, DE 19809			
Phone: 302-324-9900		Email: smurphy@wohlsen.com	
Name / Company: Performance Roofing Associates / Kevin Molesig			GC: yes / no
Address (no POBs): 93 W. Devon Drive, Suite 200, Exton, PA 19341			
Phone: 610-594-6700		Email: kevinm@prarfg.com	
Name / Company: JJID, Inc / Susan Trentham			GC: yes / no
Address (no POBs): 100 Julian Lane, Bear, DE 19701			
Phone: 302-836-0414		Email: strentham@jjid.com	

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Name / Company: APEX Piping / M. Scott Macknis			GC: yes / no
Address (no POBs): 330 Falco Drive, Newport, DE 19804			
Phone: 302-442-0353		Email: smacknis@apexpiping.com	
Name / Company: Tudor Electric, Inc / B.J. Fibelkorn			GC: yes / no
Address (no POBs): 801 Otis Drive, Dover, DE 19901			
Phone: 302-736-1444		Email: tudorelectric@comcast.net	
Name / Company: Richard Y. Johnson & Son, Inc / Tony Vassalotti			GC: yes / no
Address (no POBs): 18404 Johnson Road, Lincoln, DE 19960			
Phone: 302-422-3732		Email: tvassalotti@ryj.com	
Name / Company: EDIS Company / Kurt Vandenbraak			GC: yes / no
Address (no POBs): 110 South Poplar Street, Suite 400, Wilmington, DE 19801			
Phone: 302-421-2887		Email: kurt@ediscompany.com	
Name / Company: Corrado Construction / Jerry Denney			GC: yes / no
Address (no POBs): 29864 Millsboro Highway, Millsboro, DE 19966			
Phone: 302-420-5213		Email: jdenney@corradoconstruction.com	
Name / Company: Conventional Builders, Inc.			GC: yes / no
Address (no POBs): 846 School Street, Houston, DE 19954			
Phone: 302-422-2135		Email: conventionalbuilders@comcast.net	
Name / Company: Whiting-Turner Contracting Co / Frank Lerro			GC: yes / no
Address (no POBs): 131 Continental Drive, Suite 404, Newark, DE 19713			
Phone: 302-292-0676		Email: Delaware.bids@whiting-turner.com	
Name / Company: Nickle Electrical Companies / Sherry Perry			GC: yes / no
Address (no POBs): 540 S. Bedford Street, Georgetown, DE 19947			
Phone: 302-856-1006		Email: sperry@nickle.email	
Name / Company: Barbizon Lighting Company / Lisa Friday			GC: yes / no
Address (no POBs): 6437 G, General Green Way, Alexandria, VA 22312			
Phone: 703-750-3900		Email: lfriday@barbizon.com	
Name / Company: Mumford and Miller Concrete / Marcel			GC: yes / no
Address (no POBs): 1005 Industrial Drive, Middletown, DE 19709			
Phone: 302-378-7736		Email: mfene@mumfordandmiller.com	
Name / Company: Northeast Contractors, Inc.			GC: yes / no
Address (no POBs): 87 Blue Hen Drive, Newark, DE 19713			
Phone: 302-286-6324		Email: don.smith@northeastcontractorsinc.com	

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Name / Company: Delmarva Veteran Builders / Corey Nichols			GC: yes / no
Address (no POBs): 120 E. Market Street, Salisbury, MD 21801			
Phone: 443-736-1584		Email: corey@delmarvaveteranbuilders.com	
Name / Company: Assurance Media			GC: yes / no
Address (no POBs): 590 Century Blvd, Suite B, Wilmington, DE 19808			
Phone: 302-892-3637		Email: mgreenlee@assurancemedia.net	
Name / Company: Bancroft Construction Co.			GC: yes / no
Address (no POBs): 1300 N Grant Ave, Suite 101, Wilmington, DE 19806			
Phone: 302-655-3434		Email: mdawkins@bancroftusa.com	
Name / Company: Radius Systems LLC / David Williamson			GC: yes / no
Address (no POBs): 101 Ponds Edge Drive, Chadds Ford, PA 19317			
Phone: 484-800-6344		Email: dwilliamson@radiussystemsllc.com	
Name / Company: Superior Electric Service Company			GC: yes / no
Address (no POBs): 36 Germay Drive, Wilmington, DE 19804			
Phone: 302-658-5949		Email: jamie@superiorelectric.biz	
Name / Company: Commonwealth Construction Co. / Bill Booth			GC: yes / no
Address (no POBs): 2317 Pennsylvania Ave, Wilmington, DE 19806			
Phone: 302-654-6611		Email: bbooth@itscommonwealth.com	
Name / Company: Exterior Building Solutions / Ed Barrar			GC: yes / no
Address (no POBs): 914 Shiloh Road, West Chester, PA 19382			
Phone: 302-666-8870		Email: ed@ebsreps.com	
Name / Company:			GC: yes / no
Address (no POBs):			
Phone:		Email:	
Name / Company:			GC: yes / no
Address (no POBs):			
Phone:		Email:	
Name / Company:			GC: yes / no
Address (no POBs):			
Phone:		Email:	
Name / Company:			GC: yes / no
Address (no POBs):			
Phone:		Email:	

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BID SET REGISTERY - PLAN HOLDER

Pre-bid: #IRD19004-HTES Date: 16 September 2020
Howard T Ennis School

Name / Company: EDIS Company			GC: yes / no
Date Received: 09-17-2020	CD: yes	Cash or Check	Initial:
Name / Company: Bancroft Construction Co.			GC: yes / no
Date Received: 09-17-2020	CD: yes	Cash or Check	Initial:
Name / Company: Richard Y. Johnson & Son, Inc			GC: yes / no
Date Received: 09-17-2020	CD: yes	Cash or Check	Initial:
Name / Company: Barbizon Lighting Company			GC: yes / no
Date Received: 09-17-2020	CD: yes	Cash or Check	Initial:
Name / Company: Mumford and Miller Concrete			GC: yes / no
Date Received: 09-17-2020	CD: yes	Cash or Check	Initial:
Name / Company: Whiting-Turner Contracting Co.			GC: yes / no
Date Received: 09-17-2020	CD: yes	Cash or Check	Initial:
Name / Company: Delaware Contractors Association			GC: yes / no
Date Received:	CD:	Cash or Check	Initial:
Name / Company: Associated Builders and Contractors			GC: yes / no
Date Received:	CD:	Cash or Check	Initial:
Name / Company:			GC: yes / no
Date Received:	CD:	Cash or Check	Initial:
Name / Company:			GC: yes / no
Date Received:	CD:	Cash or Check	Initial:
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Name / Company:			GC: yes / no
Date Received:	CD:	Cash or Check	Initial:

REPORT OF SUBSURFACE EXPLORATION

HOWARD T. ENNIS SCHOOL

Sussex County, Delaware

May 21, 2019

Prepared For:

Fearn-Clendaniel Architects, Inc.
6 Larch Avenue #398
Wilmington, Delaware 19804

Attn: Mr. Wayde B. Clendaniel, AIA

Prepared By:

GEO-TECHNOLOGY ASSOCIATES, INC.
Geotechnical and Environmental Consultants
21133 Sterling Avenue, Suite 7
Georgetown, Delaware 19947
302-855-9761 / Fax 302-856-3388

GTA Job No: 31190199

GEO-TECHNOLOGY ASSOCIATES, INC.

GEOTECHNICAL AND
ENVIRONMENTAL CONSULTANTS

A Practicing Geoprofessional Business Association Member Firm

May 21, 2019

Fearn-Clendaniel Architects, Inc.
6 Larch Avenue #398
Wilmington, Delaware 19804

Attn: Wayde B. Clendaniel, AIA
Principal

Re: Report of Subsurface Exploration
Howard T. Ennis School
Sussex County, Delaware

Ladies & Gentlemen:

In accordance with our agreement dated January 18, 2019, Geo-Technology Associates (GTA) has completed subsurface exploration for the Howard T. Ennis School project located in Sussex County, Delaware. The exploration consisted of performing 13 Standard Penetration Test (SPT) borings, ten Cone Penetration Test (CPT) soundings, eight auger borings and nine infiltration tests within the proposed school property, visually classifying the soils, and performing limited laboratory testing. Transmitted herein is a report of our findings and conclusions about our preliminary recommendations regarding foundation support, slab support, earthwork, subsurface utilities, seismic site classification, lateral earth pressures, pavements and stormwater management (SWM). The topsoil thickness and groundwater depth encountered at the explorations are presented. A SWM report including infiltration results and recommendations will be forwarded separately.

Unless Fearn-Clendaniel Architects, Inc. specifies otherwise, the samples collected as a part of the subsurface exploration will be disposed of after a period of 60 days from the date of this report. Thank you for the opportunity to be of assistance. If you have any questions or require additional information, please do not hesitate to contact our office.

Sincerely,
GEO-TECHNOLOGY ASSOCIATES, INC.

GREGORY R. SAUTER
REGISTERED
NO. 13047
DELAWARE
PROFESSIONAL ENGINEER

Travis P. Caraway, EIT
Staff Geotechnical Professional

Gregory R. Sauter, P.E.
Vice President

TPC/GRS/llh 31190199

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GBA—Important Information About Your Geotechnical Engineering Report

APPENDICES

Appendix A – Figures
- Figure No. 1, Site Location Plan
- Figure No. 2, Exploration Location Plan
- Figure Nos. 3 through 9, Subsurface Profile

Appendix B – Exploration Data
- Table 1, Exploration Data Summary (2 Sheets)
- Notes For Exploration Logs (1 Sheet)
- Exploration Logs (22 Sheets)

Appendix C – Laboratory Data
- Particle Size Distribution Report (4 Sheets)
- Moisture Density Relationship Test Report (1 Sheet)
- Bearing Ratio Test Report (1 Sheet)

REPORT OF SUBSURFACE EXPLORATION

HOWARD T. ENNIS SCHOOL
SUSSEX COUNTY, DELAWARE
MAY 2019

INTRODUCTION

Indian River School District is proposing a new campus for the Howard T. Ennis School on the property situated along the east side of Patriots Way across from Sussex Central High School, in Sussex County, Delaware. The project entails the construction of a one-story school building; including a gymnasium, indoor pool, several outbuildings, drive lanes and parking areas, and stormwater management (SWM) systems.

Geo-Technology Associates, Inc. (GTA) was retained by Fearn-Clendaniel Architects, Inc. to perform a geotechnical exploration of the site. The scope of this study included field exploration, review of a site plan, limited laboratory testing, and engineering analysis. The field exploration consisted of four Standard Penetration Test (SPT) borings, ten Cone Penetration Test (CPT) soundings, and eight infiltration tests located within the area of the proposed school building and outbuildings, stormwater management areas, drive lanes and parking lots. A concept plan prepared by Fearn-Clendaniel Architects and a plan titled *Record Plan prepared for Indian River School District* prepared by Colm DeAscanis Engineering, Inc. (CDA) and dated January 25, 2019, were referenced for this report.

A stormwater management report including infiltration results and recommendations will be forwarded separately.

SITE CONDITIONS

Referring to the Site Location Plan and the Exploration Location Plan included as Figures 1 and 2, respectively, in Appendix A, the project site is located along the east side of Patriots Way across from Sussex Central High School, in Sussex County, Delaware. The project site is situated within a rectangular shaped parcel with open farrow farm fields. A cemetery is located at the

northeast corner of the property. The project site is generally flat with the ground surface ranging from Elevation 27 to 32 Mean Sea Level (MSL).

PROPOSED CONSTRUCTION

The proposed construction will consist of a new one-story school with classrooms, laboratories, administration, library, a gymnasium and an indoor pool. The building is proposed with a total gross area of approximately 92,800 square feet (sq ft). The building will generally consist of structural steel framing and open web steel roof joists and metal roof deck. Exterior walls will have a masonry veneer with a cold-formed steel stud back-up. A shallow spread foundation system and ground supported slabs are anticipated. Preliminary foundation loads of 150 kips for columns and 5 kips per linear foot are anticipated for the school building. A well house is proposed along the eastern, center portion of the property. At proposed finished floor Elevation 34.5 MSL, 2 to 4 feet of fill will be required in the building area to achieve slab subgrade.

Parking and access drives are proposed for the north, west and east portions of the campus. Three stormwater management facilities are proposed, two on the west side of the property along Patriots Way and one towards the east end of the property. A sports field is proposed along the south side of the property. Final grades for the paved areas were not available at the time of this report, but are assumed to be within several feet of existing grades with cuts to fills limited to on the order of 1 to 3 feet or less to achieve final grades.

SITE GEOLOGY

According to the Geologic Map of the Harbeson Quadrangle, Delaware (2011) published by the Delaware Geological Survey, the site is within the Coastal Plain Physiographic Province. Coastal Plain sediments below the surficial deposits exposed in the site area were generally deposited in commonly estuarine environments of Quaternary geologic age. The Pleistocene deposits are designated as the Lynch Heights Formation of the Delaware Bay Group and typically consist of "… silty, clayey, very coarse to fine sand … to gravelly sand to sandy gravel." Please refer to the publication for additional information.

SUBSURFACE EXPLORATION

The field exploration consisted of drilling Standard Penetration Test (SPT) borings at 13 locations. Four borings, designated as B-4, B-7, B-11 and B-14, in the areas of the proposed building footprint areas, and nine borings designated as SWM-1 through SWM-9 in the stormwater management areas. The SPT borings were drilled using an ATV-mounted CME-55 drill rig on February 26, and April 1, 2019, to depths of 10 to 30 feet below the existing ground surface. In addition, ten electronic Cone Penetration Test (CPT) soundings, designated as B-1 through B-3, B-5 and B-6 and B-8 through B-13, were performed within the proposed building area. The CPT soundings were advanced on February 28, 2019, to depths of 20 to 30 feet below the existing ground surface. Eight auger borings, designated as P-1 through P-8, in the proposed pavement areas, on March 22, 2019.

The SPT borings, CPT soundings and auger borings were performed at the approximate locations shown on the Exploration Location Plan, presented as Figure 2 in Appendix A. The exploration locations were selected by GTA. The explorations were staked with elevations determined by CDA Engineering, Inc. The exploration locations indicated on the plan should be considered approximate.

Standard Penetration Testing was performed in the SPT boreholes, with soil samples obtained at 2 ½-foot intervals in the upper 10 feet and then at 5-foot intervals thereafter. Standard Penetration Testing involves driving a 2-inch O.D., 1 ⅜ -inch I.D. split-spoon sampler with a 140-pound hammer free-falling 30 inches. The SPT N-value, given as blows per foot (bpf), is defined as the total number of blows required to drive the sampler from the 6 to 18 inches below the sampling depth.

The CPT soundings were performed using a 10-ton, 10 cm^2 single-element Hogentogler cone capable of measuring pore pressures at the u_2 position. The soundings were performed by pushing an electronically instrumented cone shaped probe into the soil with the hydraulic system of a track-mounted reaction device. The cone is equipped with an instrumented tip and friction sleeve that

measures tip resistance and soil-to-steel friction, respectively, as the cone is being pushed. In addition, the pore water pressure response to cone penetration is measured. Measurements of tip resistance, sleeve friction, and pore pressure were taken at approximately 1-inch depth intervals. This data was transmitted via computer to recording devices at the ground surface. Graphical cone sounding logs were constructed to show the variations of tip resistance, local friction, friction ratio, and pore pressure with depth. When properly interpreted, these values are an index to soil strength, compressibility, and classification. The tip resistance profile graphically presents the relative strength of the soil strata. The friction ratio, the numerical ratio of the local friction to the tip resistance, was computed for each depth interval. This ratio is an indicator of the material type, i.e. sand, silt, or clay. The friction, friction ratio, and pore pressure profiles are used primarily to interpret soil type. Refer to the attached CPT logs for detailed graphical interpretation of the subsurface conditions at each sounding.

Samples obtained from the borings were returned to GTA's office for visual classification by GTA personnel. Selected samples recovered from the field exploration were submitted for limited laboratory analysis. The soil layers were classified in accordance with the Unified Soil Classification System (USCS), the USDA Soil Classification System (USDA), and the American Association of State Highway and Transportation Officials (AASHTO) classification system. Classifications provided on the logs are visual descriptions, supplemented by available laboratory data. The exploration logs are presented in Appendix B. The logs represent our interpretation of the field data based on observation and limited soil classification tests. The interfaces indicated on the logs may be gradual.

SUBSURFACE CONDITIONS

The explorations generally confirm the description of subsurface conditions provided in the *SITE GEOLOGY* section of this report. Below a 4 to 13-inch thick topsoil layer, the explorations encountered native soils visually classified at the borings or correlated from the CPT sounding as consisting of Poorly-graded SANDs (USCS SP; USDA Sand), Poorly-graded SANDs with Silt (SP-

SM; Loamy Sand), Silty SANDs (SM; Sandy Loam), Clayey SANDs (SC; Sandy Clay Loam), Sandy Lean CLAYS and Lean CLAYS (CL; Clay).

The relative densities of the granular soils were very loose to dense based on SPT N-values of 2 to 34 blows per foot (bpf). The consistency of the fine-grained soils encountered at the SPT borings was medium stiff to stiff based on SPT N-values of 8 to 13 bpf.

Cone tip resistances typically ranged from approximately 200 to 1,100 pounds per square inch (psi), and had an average of approximately 800 psi. The CPT sounding indicated generally very loose to medium dense relative densities based on tip and sleeve resistance and estimated N-values on the order of 3 to 20 blows per foot (bpf) with an average of approximately 10 bpf.

With the exception of shallow Borings P-1 through P-7, water was encountered at completion of the borings and CPT soundings at depths of 2½ to 11 feet below the ground surface. Longer term water levels recorded one to three days after completion ranged between 3 and 12 feet below the existing ground surface. The longer-term water levels varied between Elevation 21 and 25 MSL. At Borings P-1, P-5, P-6 and SWM-1 and SWM-4, the water levels range from approximate Elevation 27 and 30 MSL, and it is our opinion that these water levels represent a perched water condition. The CPT soundings were backfilled upon completion.

GTA's estimate of the seasonal high groundwater level is based upon water levels near seasonal highs; and soil coloring and mottling. The results of the groundwater level readings and GTA's opinion of the estimated seasonal high groundwater depth are summarized as follows:

GROUNDWATER DATA SUMMARY

Exploration No.	*Existing Ground Surface El. (MSL)	Depth to Groundwater/ Groundwater El. at Completion (ft./MSL)	Depth to Groundwater/ Groundwater El. at One to Three Days After Completion of Exploration (ft./ MSL)	Depth Below Existing Ground Surface (ft.)/ Elevation (MSL) to Estimated Seasonal High Groundwater
B-1	EL 31.3	9.0/ EL 21.3	Backfilled at completion	9 / EL 22
B-2	EL 30.7	9.6 / EL 22.1	10.0 / EL 21.7	9 / EL 22
B-3	EL 32.0	9.8/ EL 22.2	Backfilled at completion	9 / EL 22
B-4	EL 31.5	10.1 / EL 21.4	10.3 / EL 21.2	10 / EL 22
B-5	EL 31.4	9.4/ EL 22.0	Backfilled at completion	9 / EL 22
B-6	EL 30.8	9.0/ EL 21.8	Backfilled at completion	9 / EL 22
B-7	EL 31.6	9.9 / EL 21.7	9.5 / EL 22.1	9 / EL 23
B-8	EL 31.5	9.5/ EL 22.0	Backfilled at completion	9 / EL 23
B-9	EL 31.2	9.2/ EL 22.0	Backfilled at completion	9 / EL 22
B-10	EL 31.2	10.0/ EL 21.2	Backfilled at completion	9 / EL 21
B-11	EL 30.9	9.8/ EL 21.1	Backfilled at completion	9 / EL 21
B-12	EL 30.3	9.4/ EL 20.9	Backfilled at completion	9 / EL 21
B-13	EL 30.8	10.1/ EL 20.7	Backfilled at completion	10 / EL 21
B-14	EL 31.3	10.9 / EL 20.4	11.9 / EL 19.4	10 / EL 21
P-1	EL 32.9	Dry to 5.0/ Dry to EL 27.9	4.8 / EL 28.1	4 / EL 29 (Perched)
P-2	EL 31.4	Dry to 5.0/ Dry to EL 26.4	Dry to 5.0/ Dry to EL 26.4	Deeper than 5 / Deeper than EL 26
P-3	EL 31.1	Dry to 5.0/ Dry to EL 26.1	Dry to 5.0/ Dry to EL 26.1	Deeper than 5 / Deeper than EL 26
P-4	EL 31.9	Dry to 5.0/ Dry to EL 26.9	Dry to 5.0/ Dry to EL 26.9	Deeper than 5 / Deeper than EL 27
P-5	EL 31.0	3.0 / EL 28.0	3.8 / EL 27.2	3 / EL 28 (Perched)
P-6	EL 32.2	2.6 / EL 29.6	3.2 / EL 29.0	2 / EL 30 (Perched)
P-7	EL 31.4	Dry to 5.0/ Dry to EL 26.4	Dry to 5.0/ Dry to EL 26.4	Deeper than 5 / Deeper than EL 26
P-8	EL 31.2	Dry to 5.0/ EL 26.2	Dry to 5.0/ EL 26.2	Deeper than 5 / Deeper than EL 26
SWM-1	EL 31.6	6.0 / EL 25.6	4.5 / EL 27.1	4 / EL 28 (Perched)
SWM-2	EL 31.1	6.5 / EL 24.6	7.0 / EL 24.1	6 / EL 25
SWM-3	EL 31.4	8.1 / EL 23.3	6.2 / EL 25.2	6 / EL 25
SWM-4	EL 32.0	5.2 / EL 26.8	9.4 / EL 22.6	5 / EL 27 (Perched)
SWM-5	EL 30.9	7.8 / EL 23.1	8.8 / EL 22.1	7 / EL 24
SWM-6	EL 27.6	4.5 / EL 23.1	5.1 / EL 22.5	4 / EL 24
SWM-7	EL 30.2	9.3 / EL 20.9	6.5 / EL 23.7	6 / EL 24
SWM-8	EL 29.8	8.5 / EL 21.3	8.7 / EL 21.1	8 / EL 22
SWM-9	EL 31.1	9.5 / EL 21.6	9.6 / EL 21.5	9 / EL 22

The groundwater levels can be expected to fluctuate with seasonal changes, precipitation, and other factors such as development activity. Additionally, perched water conditions develop in granular soils overlying fine-grained soils during the "wet season" and during heavy periods of precipitation. Please refer to the exploration logs and Table 1, Exploration Data Summary provided in Appendix B for further information. Idealized subsurface profiles are shown on Figure Nos. 3 through 9 in Appendix A.

LABORATORY TESTING

Selected samples obtained from the borings were tested for grain-size analysis, Atterberg Limits, moisture density relationships, California Bearing Ratio (CBR), and/or natural moisture contents. The grain-size analysis, and Atterberg Limits testing were performed to identify the Unified Soil Classification System (USCS) designation for the soil. The results of testing are:

SUMMARY OF LABORATORY TESTING

EXPLORATION NO.	DEPTH (FT.)	USCS CLASSIFICATION	LL (%)	PI (%)	NMC (%)
B-2	13.5 – 15	Silty SAND (SM)	NP	NP	33.8
B-3	1 – 4	Poorly-graded SAND with Silt (SP-SM)	NP	NP	5.5
B-4	0.7 – 2	Silty SAND (SM)	NP	NP	10.8
B-7	2 – 4	Silty SAND (SM)	NP	NP	30.2

Note: LL=Liquid Limit PI=Plastic Index NP=Non-plastic NT=Not Tested NMC=Natural Moisture Contents

One bulk sample, obtained from near surface at exploration B-3 was tested for moisture-density relationships in accordance with the Modified Proctor (ASTM D-1557, AASHTO T-180) for use in evaluating the suitability of these soils for reuse as fill and subjected to California Bearing Ratio (CBR) testing for use in evaluation of pavement subgrade supporting quality. Results of these tests are summarized in the following table:

SUMMARY OF COMPACTION AND CBR DATA
(ASTM D-1557/AASHTO T-180, the Modified Proctor; ASTM D-1883, CBR)

EXPLORATION NO.	DEPTH (FT.)	MAXIMUM DRY DENSITY (PCF)	OPTIMUM MOISTURE (%)	NATURAL MOISTURE (%)	APPROXIMATE CBR AT 95% COMPACTION AND 0.1 INCH PENETRATION (%)
B-3	1 – 4	122.7	8.3	5.5	15

Note: *NT= Not Tested

Please refer to the laboratory test results included within Appendix C for additional information.

CONCLUSIONS AND RECOMMENDATIONS

Based upon the results of this study, it is our opinion that construction of the proposed improvements is feasible, given that the geotechnical recommendations are followed and that the standard level of care is maintained during construction. GTA's preliminary recommendations are provided in the following paragraphs.

Earthwork

Before the placement of compacted fill, areas below proposed foundations, slabs, and pavements should be stripped and grubbed to remove all topsoil, organic matter and soft materials. The stripping thickness will be dependent on localized topsoil development, historic plow depth, precipitation, soil moisture, construction traffic disturbance, and contractor care.

After stripping, subgrade areas should be proof-rolled with a loaded tandem-axle dump truck, performed as recommended by GTA. No fill should be placed until the geotechnical engineer approves the subgrade. Wet soils near surface grade will result in poor trafficability. Positive drainage should be maintained during construction.

Most near surface on-site soils beneath the topsoil similar to the materials tested are considered suitable for reuse as structural fill material. Excavated site materials conforming to SP, SP-SM, SM, or SC classifications will be suitable for reuse as structural utility backfill and in

structural areas of mass earthwork construction. The moisture of the bulk sample tested was approximately 3 percent below the optimum moisture content. At these indicated moisture levels, granular site materials similar to the samples tested will require limited, if any, moisture adjustment. During wet weather or when excavating below or near groundwater, delays and expense will likely be associated with reducing soil moistures to acceptable levels.

Materials conforming to USCS SC and CL may be used in designated low permeability zones of the pond construction. During prevailing wet weather, fine-grained soils will likely require drying by aeration after spreading over a large area and prior to compaction in fill construction.

For utility and site earthwork construction, the success of these operations will be largely dependent upon the weather conditions at the time of the earthwork construction. Summer construction season is recommended to reduce the premium cost for drying. A contingency should be established for moisture adjustments and importing suitable materials. If the work is performed during wet weather, offsite borrow may be required to complete the earthwork construction.

Off-site borrow, if required, should meet Unified Soil Classification System (USCS) designation SM, SP, SW, GM, GP, or GW and be approved by GTA. All fills should be constructed in maximum 8-inch thick loose lifts and be compacted to the following specifications:

COMPACTION SPECIFICATIONS

Structure / Fill Location	Compaction / Moisture Specification
Below foundations, retaining walls and floor slab subgrades and within wall backfill	95% of ASTM D-1557/AASHTO T-180 Moisture: optimum to ± 3% of optimum
Lawn or unimproved areas	90% of ASTM D-1557/AASHTO T-180 Moisture: optimum to ± 3% of optimum
SWM Pond Areas	95% of ASTM D-698/AASHTO T-99 Moisture: optimum to ± 3% of optimum

A full-time soils-technician under guidance of GTA should observe fill construction. Compactive effort should be verified by in-place density testing.

Surface and Subsurface Drainage

Final building pad and pavement grades should be carefully established to provide adequate surface drainage away from the foundations. Groundwater levels referenced in the *SUBSURFACE CONDITIONS* section and in Table 1, Exploration Data Summary of the report are, in our opinion, at near seasonal high groundwater levels. Furthermore, soil layers containing appreciable amounts of silt or clay tend to perch groundwater at higher levels during wetter periods.

Foundations

Based upon the exploration data, it is GTA's opinion that the proposed buildings, including well house, may be supported on structural fill or firm native soils using shallow spread footings designed for a maximum net allowable bearing pressure of 3,000 pounds per square foot (psf). Minimum widths for wall footings of 16 inches and column footings of 24 inches are recommended. Settlement of 1-inch total and ½-inch differential over a 50 foot horizontal span is estimated considering preliminary wall loads of 5 kips per foot and column loads of 150 kips. Exterior footings should be founded a minimum of 24 inches below the final exterior grades to provide protection from frost action. For pad/mat foundation construction, a modulus of subgrade reaction value of 110 kips per cubic foot is recommended.

Detailed foundation evaluations should be performed in each footing excavation prior to the placement of reinforcing steel or concrete. These evaluations should be performed by a representative of GTA to confirm that the allowable soil bearing capacity is available. The foundation bearing surface evaluations should be performed using a combination of visual observation, comparison with the borings, hand-rod probing, and Dynamic Cone Penetrometer (DCP) testing. Footings should be concreted on the day they are excavated.

Seismic Information

It is GTA's opinion that the soil conditions at this site can be categorized as Site Class E per the ASCE/SEI Standard 7-16 and the 2012 International Building Code. This categorization is based on the near surface test boring results, general geologic information for the region, and the information contained in the ASCE/SEI Standard 7-16 and IBC 2012 codes.

Floor Slabs

The ground floor should be designed as concrete slab-on-grade. GTA recommends that the concrete floor slabs supported on grade be founded on a four-inch thick open-graded stone layer covered with a polyethylene vapor retarder to interrupt the rise of moisture through the slab. Natural and compacted fill subgrades for support of the floor slabs should be tested to verify stability and compaction in accordance with GTA's earthwork recommendations prior to placement of concrete. Control joints should be provided to control shrinkage cracking of the concrete floor system. Isolation joints should be present at the location of walls, columns, and footings to allow for differential movement. A modulus of subgrade reaction value of 125 psi per inch is recommended for the design of the building slabs.

Subsurface Utilities

The natural soils are considered suitable for support of below grade utilities; however, GTA recommends a minimum 6-inch granular bedding to provide uniform support where wet or plastic soils are encountered at the subgrade and as dictated by site conditions. Where HDPE or PVC pipe is used, GTA recommends that the stone bedding materials and stone backfill, at least to haunch elevations, be used. GTA should be consulted for additional recommendations where HDPE or PVC pipes are used. GTA recommends evaluation and testing of utility backfill during installation.

Based upon the results of the explorations, GTA anticipates that standard excavating techniques should be suitable for utility installation to depths of 10 feet. Firm natural soil and controlled compacted fill are considered suitable for support of the proposed pipe systems. Due to the potential for collapse of unsupported excavation in granular soils, the utility contractor should be

prepared to provide adequate earth support systems during utility construction. Dewatering through the use of well point techniques will be required in areas where utility installation occurs more than two feet below the groundwater level. During prevailing wet weather, groundwater will likely be encountered at depths extending to 10 feet below the ground surface. Consideration must be given to supplementing dewatering using well points with "sump and pump" techniques, especially in areas where clay or silt layers are present and well points will not be particularly effective.

Compaction of the soils to the degree specified in the *Earthwork* section of this report may require that the soils be moisture conditioned prior to placement and compaction within the trench. If the excavated materials are wet of the optimum moisture content, they should be spread in thin layers and aerated by disking to within 2 or 3 percentage points of the optimum moisture, as applicable. If soils are not dried, suitable borrow material will need to be imported from other areas of the site for utility trench backfill. Settlement and instability are likely if the on-site soils are used as backfill at moisture levels more than 4 percentage points above optimum.

Below Grade Wall Construction

Unless designated otherwise, all structural fill should meet Unified Soil Classification System (USCS) designation SP-SM, SP, SW, GP, GM, or GW and should be approved by the geotechnical engineer. Unless specified otherwise, all fills should be constructed in 8-inch loose lifts and compacted to 95 percent of the maximum dry density as determined by ASTM D-1557 (AASHTO T-180), the Modified Proctor.

Below grade walls should be designed to resist lateral earth pressures and be provided with a properly outletted drain system in an effort to minimize the buildup of hydrostatic pressure from natural or unnatural sources following construction. An appropriate surface surcharge should be considered in the design to reflect the uses of the areas adjacent to the walls following construction. GTA recommends that the following soil design parameters be used for the design of the retaining walls:

Friction Angle	φ = 30 degrees
Active Pressure Coefficient*	K_a = 0.33
At Rest Pressure Coefficient*	K_o = 0.5
Passive Pressure Coefficient*	K_p = 3.0
Moist Unit Weight of Soil	125 pcf
Saturated Unit Weight of Soil	130 pcf
Submerged Unit Weight of Soil	68 pcf
*Level backfill condition	

Soil used for backfill against below grade walls should be non-plastic and have less than 20 percent passing the No. 200 sieve. Select borrow material meeting these requirements may need to be borrowed from other areas of the site or imported from an approved borrow source. Select borrow material used for the loading dock and retaining walls should be approved by GTA for the intended usage.

The pool contractor should anticipate dewatering in pool excavations extending deeper than 5 feet below the ground surface. The pool construction should be designed to resist buoyancy. GTA recommends to incorporate pressure relief valves to resist uplift from potential build-up of hydrostatic pressure following construction.

Pavements

Pavement sections should be designed based on anticipated subgrade conditions and traffic intensity. Laboratory testing of selected site soils indicated a CBR value of approximately 15-percent for the Poorly-graded SAND with Silt (AASHTO A-3) sample tested. The CBR value is based upon a relative compaction of 95 percent of maximum dry density (Modified Proctor, ASTM D-1557). Based upon the CBR value and the field conditions encountered at the borings, the site soils tested are considered to be generally medium to good for supporting standard pavement sections.

Based on GTA's experience with similar developments, construction traffic is likely to be more significant for the design of the pavements. The pavement section thickness should be designed

to reflect construction traffic and the subgrade supporting quality of the site soils. It is likely that the majority of the on-site soils will be suitable for the support of the pavement thickness sections indicated in the following paragraphs. However, subgrade materials should be carefully evaluated prior to graded aggregate base placement and paving. Therefore, GTA recommends that the upper 12 inches of roadway subgrade be constructed of fill with the following characteristics:

PAVEMENT SUBGRADE SPECIFICATIONS

Liquid Limit	35 or less
Plasticity Index	Non-Plastic
Maximum Dry Density	105 pcf or greater
California Bearing Ratio	10 or greater

Prior to construction of pavement sections, the pavement subgrade should be proof-rolled with a loaded tandem-axle dump truck under the observation of GTA to verify stability. Unstable or unsuitable soils should be over-excavated to a stable bearing layer. The subgrade may be re-established with approved, controlled, compacted stabilized fill. A contingency for undercutting and replacement of unsuitable materials should be provided.

For pavement construction, it is recommended that two different pavement sections be utilized to reduce the potential for pavement failures during construction. The heavy-duty pavement section can be constructed at the main roadway connecting to Patriots Way and the bus loop. The standard-duty pavement section can be constructed in the parking lots. It is recommended that construction traffic be limited to the heavy-duty pavement sections. The recommended preliminary pavement sections are as follows:

PRELIMINARY PAVEMENT SECTION

Layer	Standard Duty	Heavy Duty
Bituminous Concrete Surface Course (Type C)	1 ¼ inches	1 ¼ inches
Bituminous Concrete Intermediate Course (Type C)*	-	1 ¼ inches
Bituminous Concrete Base Course (Type B)	3 inches	3 ¾ inches
Graded Aggregate Base (Type B)	6 inches	8 inches
Approved Subgrade (CBR of 8 or greater)	12 inches	12 inches
*Intermediate and Base Course placed during same construction sequence (e.g., intermediate course placement immediately following base course placement).		

When roadways are established to approximate pavement subgrade, the pavement subgrade material should be observed by GTA to allow for additional recommendations based upon subgrade conditions observed at the time of construction. All pavement materials and construction should conform to the State of Delaware, Department of Transportation (DelDOT), STANDARD SPECIFICATIONS, latest edition, and Sussex County standards, as applicable.

ADDITIONAL SERVICES

We recommended that during construction of the subject project, GTA be retained to provide observation and testing services for the following items.

- Review of final grades, structural loads and construction plans when established to evaluate if they conform with the intent of this report.
- Provide testing observation and services during fill placement to evaluate if the work is being performed in accordance with the project specifications and intent of this report.
- Observe the proof-rolling of pad and pavement subgrades prior to placing fill or base course to evaluate stability.
- Review excavated footings for compliance with the project drawings and the intent of this geotechnical report.
- Provide “special inspection” services during building construction for compliance with building code requirements.
- Provide post-construction infiltration testing and observe groundwater depth within

proposed SWM facilities and report the results to CDA for conformance with the facility design parameters.

LIMITATIONS

This report, including all supporting exploration logs, field data, field notes, laboratory test data, calculations, estimates, and other documents prepared by GTA in connection with this project, has been prepared for the exclusive use of Fearn-Clendaniel Architects, Inc. pursuant to the agreement between GTA and Fearn-Clendaniel Architects, Inc. dated January 18, 2019, and in accordance with generally accepted engineering practice. All terms and conditions set forth in the Agreement and the General Provisions attached thereto are incorporated herein by reference. No warranty, express or implied, is given herein. Use and reproduction of this report by any other person without the expressed written permission of GTA and Fearn-Clendaniel Architects, Inc. is unauthorized and such use is at the sole risk of the user.

The analysis and preliminary recommendations contained in this report are based on the data obtained from limited observation and testing of the encountered materials. Test borings indicate soil conditions only at specific locations and times and only at the depths penetrated. They do not necessarily reflect strata or variations that may exist between test boring locations. Consequently, the analysis and recommendations must be considered preliminary until the subsurface conditions can be verified by direct observation at the time of construction. If variations of subsurface conditions from those described in this report are noted during construction, recommendations in this report may need to be re-evaluated.

In the event that any changes in the nature, design, or location of the facilities are planned, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and conclusions of this report are verified in writing. Geo-Technology Associates, Inc. is not responsible for any claims, damages, or liability associated with interpretation

of subsurface data or reuse of the subsurface data or engineering analysis without the expressed written authorization of Geo-Technology Associates, Inc.

The scope of our services for this geotechnical exploration did not include any environmental assessment or investigation for the presence or absence of wetlands, or hazardous or toxic materials in the soil, surface water, groundwater or air, on or below or around this site. Any statements in this report or on the logs regarding odors or unusual or suspicious items or conditions observed are strictly for the information of our Client. This report and the attached logs are instruments of service. The subject matter of this report is limited to the facts and matters stated herein. Absence of a reference to any other conditions or subject matter shall not be construed by the reader to imply approval by the writer.

31190199 **GEO-TECHNOLOGY ASSOCIATES, INC.**

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, clients can benefit from a lowered exposure to the subsurface problems that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed below, contact your GBA-member geotechnical engineer. Active involvement in the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Geotechnical-Engineering Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. *Those who rely on a geotechnical-engineering report prepared for a different client can be seriously misled*. No one except authorized client representatives should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one – not even you – should apply this report for any purpose or project except the one originally contemplated.*

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read it *in its entirety*. Do not rely on an executive summary. Do not read selected elements only. *Read this report in full.*

You Need to Inform Your Geotechnical Engineer about Change

Your geotechnical engineer considered unique, project-specific factors when designing the study behind this report and developing the confirmation-dependent recommendations the report conveys. A few typical factors include:

- the client's goals, objectives, budget, schedule, and risk-management preferences;
- the general nature of the structure involved, its size, configuration, and performance criteria;
- the structure's location and orientation on the site; and
- other planned or existing site improvements, such as retaining walls, access roads, parking lots, and underground utilities.

Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

This Report May Not Be Reliable

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, that it could be unwise to rely on a geotechnical-engineering report whose reliability may have been affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If your geotechnical engineer has not indicated an "apply-by" date on the report, ask what it should be*, and, in general, *if you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying it. A minor amount of additional testing or analysis – if any is required at all – could prevent major problems.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface through various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing were performed*. The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgment to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team from project start to project finish, so the individual can provide informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, *they are not final*, because the geotechnical engineer who developed them relied heavily on judgment and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* revealed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation*.

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a full-time member of the design team, to:

- confer with other design-team members,
- help develop specifications,
- review pertinent elements of other design professionals' plans and specifications, and
- be on hand quickly whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction observation.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for informational purposes only*. To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report, but they may rely on the factual data relative to the specific times, locations, and depths/elevations referenced. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely*. Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures*. If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. As a general rule, *do not rely on an environmental report prepared for a different client, site, or project, or that is more than six months old.*

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, none of the engineer's services were designed, conducted, or intended to prevent uncontrolled migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration.*** Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org

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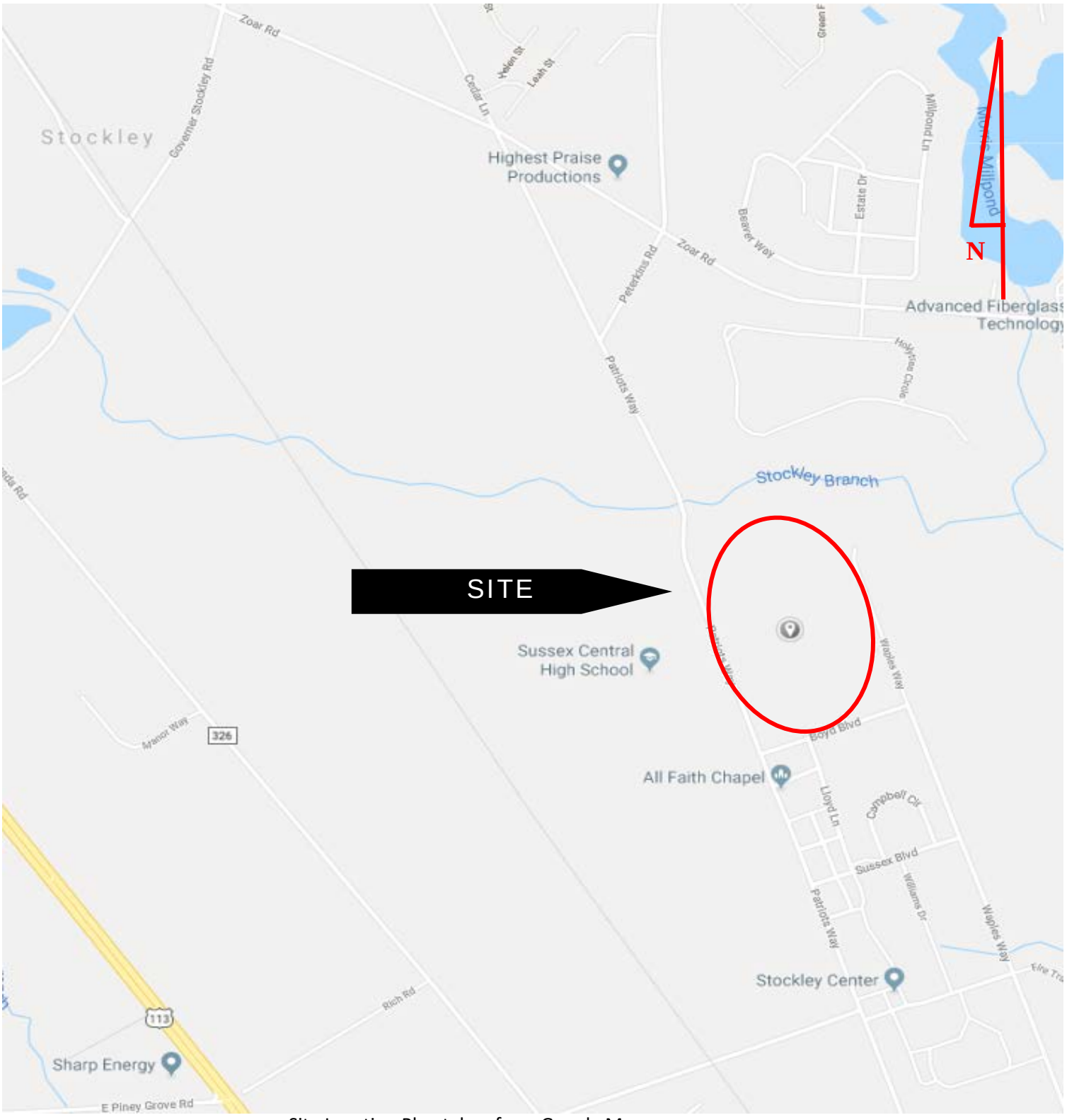
APPENDIX A

FIGURES

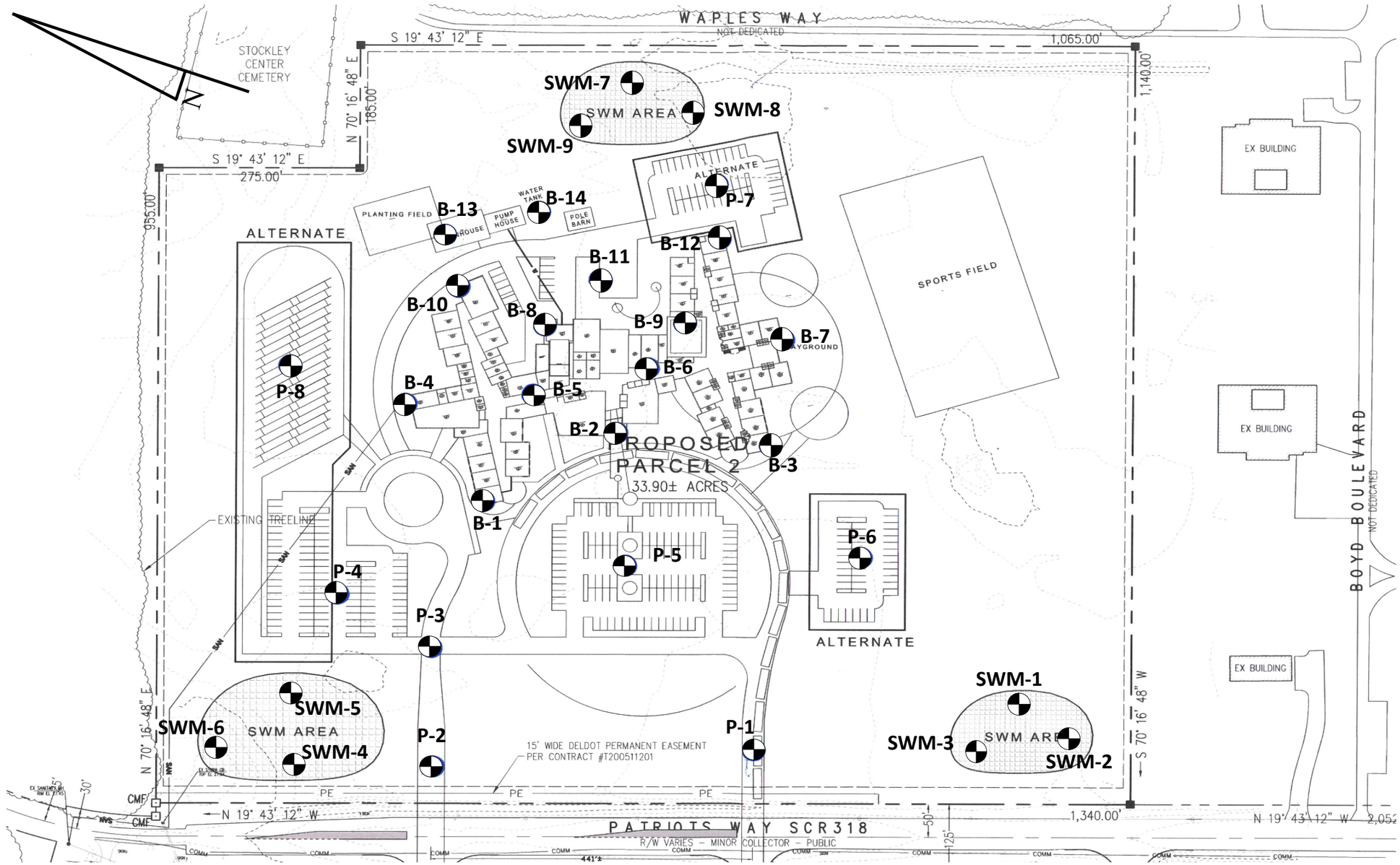


Site Location Plan taken from Google Maps

GEO-TECHNOLOGY ASSOCIATES, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
21133 Sterling Avenue, Suite 7
Georgetown, Delaware 19947
(302) 855-9761 Fax (302) 856-3388

Site Location Plan
Howard T. Ennis School
Sussex County, Delaware

SCALE	DATE	DRAWN BY	DESIGN BY	REVIEW BY	JOB NO.
NTS	April 2019	GTA	Google Maps	GRS	31190199



Exploration Location Plan taken from a concept plan prepared by Fearn-Clendaniel Architects.

- Boring Location

GEO-TECHNOLOGY ASSOCIATES, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
21133 Sterling Avenue, Suite 7
Georgetown, Delaware 19947
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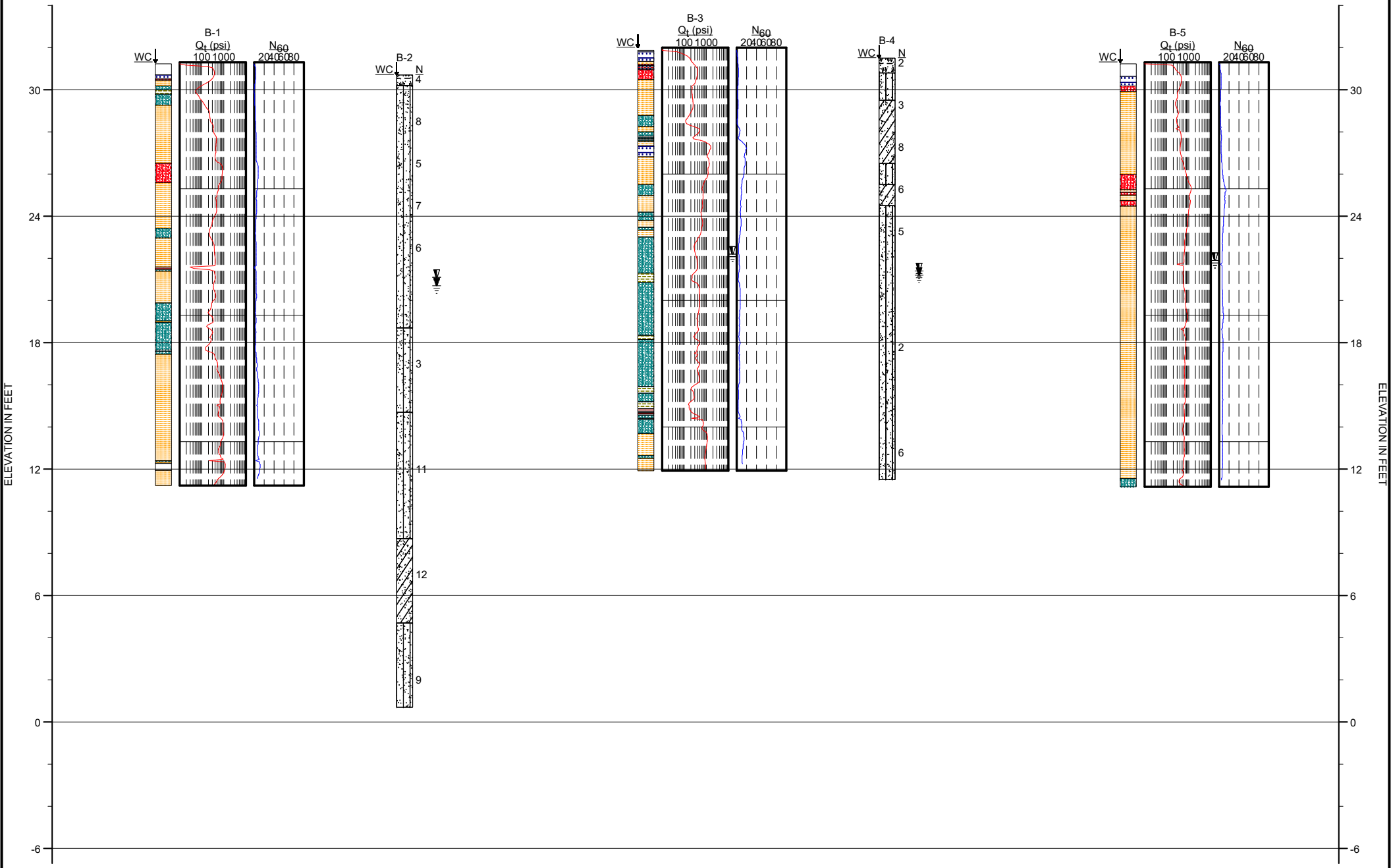
Exploration Location Plan
Howard T. Ennis School
Sussex County, Delaware

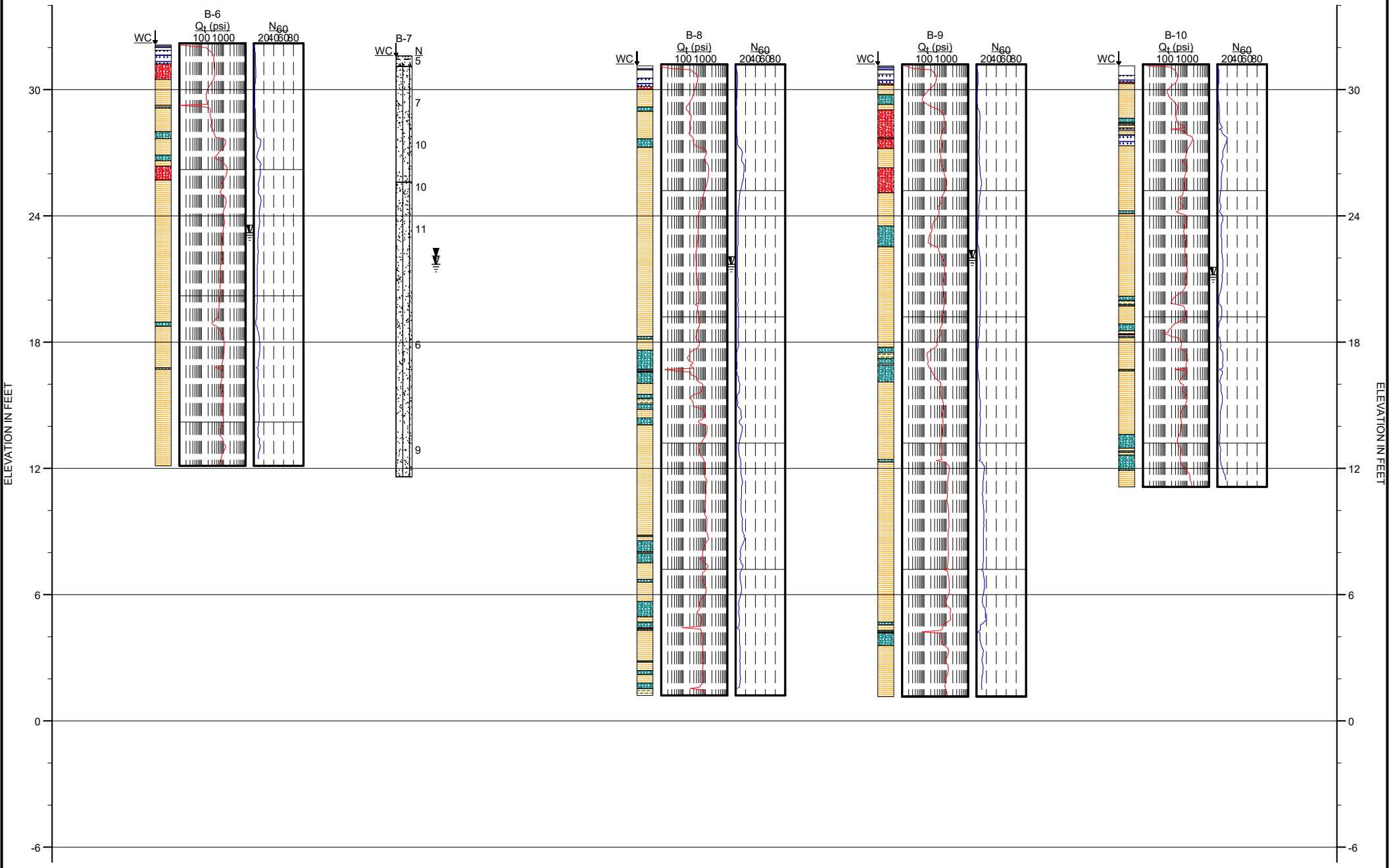
SCALE	DATE	DRAWN BY	DESIGN BY	REVIEW BY	JOB NO.	Figure
NTS	May 2019	GTA	Fearn-Clendaniel	GRS	31190199	2



Symbol Description

- Topsoil
- SP-SM - Poorly Graded Sand with Silt
- SM - Silty Sand
- SC - Clayey Sand
- Approximate horizontal location of exploration
- Water table during drilling
- Water table at completion
- Water table at 3rd check
- (classification not obtained)
- V. stiff to clayey sand
- Dense to gravelly sand
- Sands -- clean to silty
- Sand mixtures
- Silt mixtures
- Clays

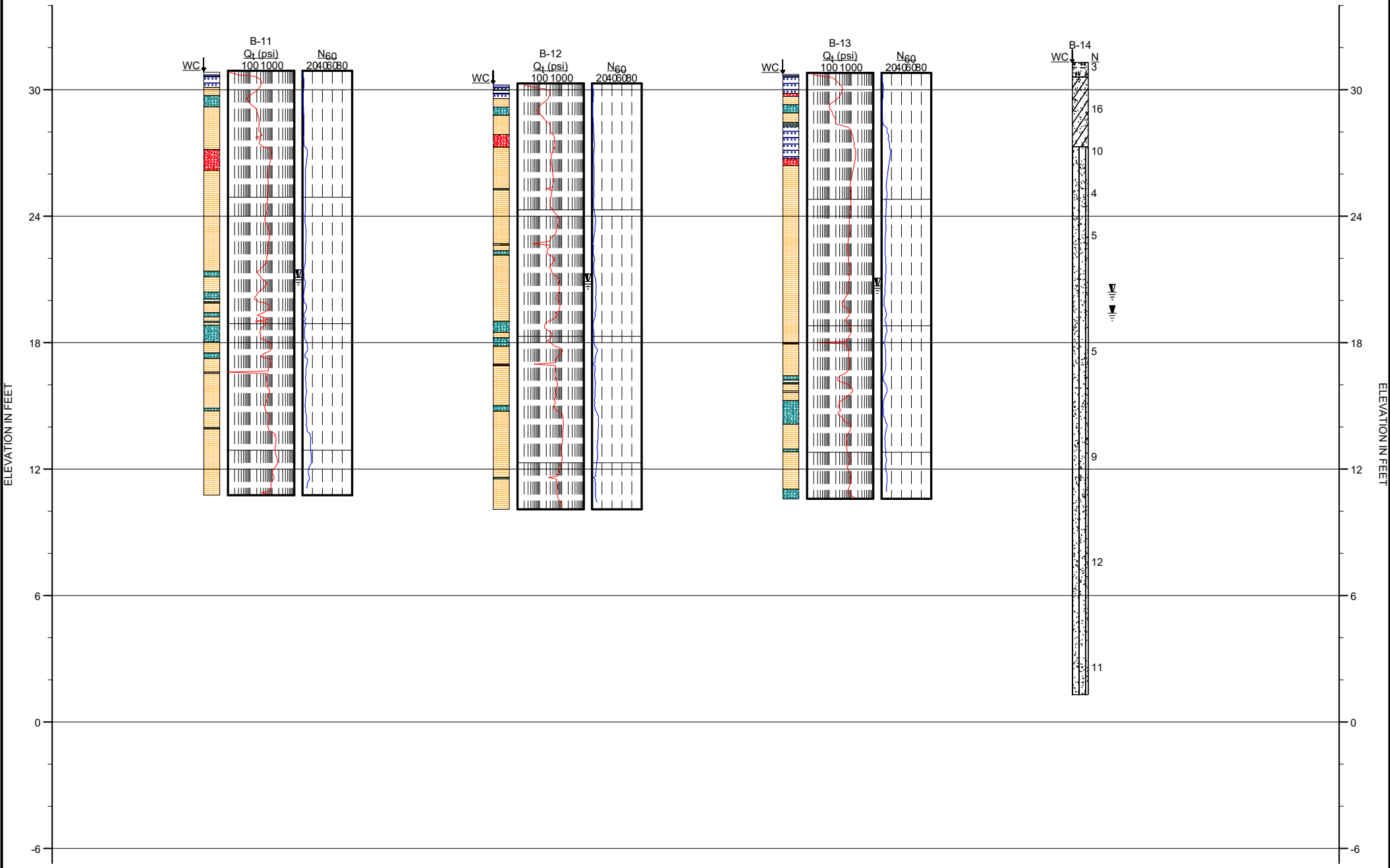
Geo-Technology Associates, Inc.			
SUBSURFACE PROFILE			
VERTICAL SCALE:1"=6'	DRAWN BY TPC	APPROVED BY GRS	DATE:5/20/2019
Howard T. Ennis School Georgetown, Delaware			
PROJECT NO. 31190199		3	



Symbol Description

- Topsoil
- SM - Silty Sand
- SP-SM - Poorly Graded Sand with Silt
- Approximate horizontal location of exploration
- Water table during drilling
- Water table at completion
- Water table at 3rd check
- (classification not obtained)
- V. stiff fine grained
- V. stiff to clayey sand
- Dense to gravelly sand
- Sands -- clean to silty
- Sand mixtures
- Clays
- Silt mixtures

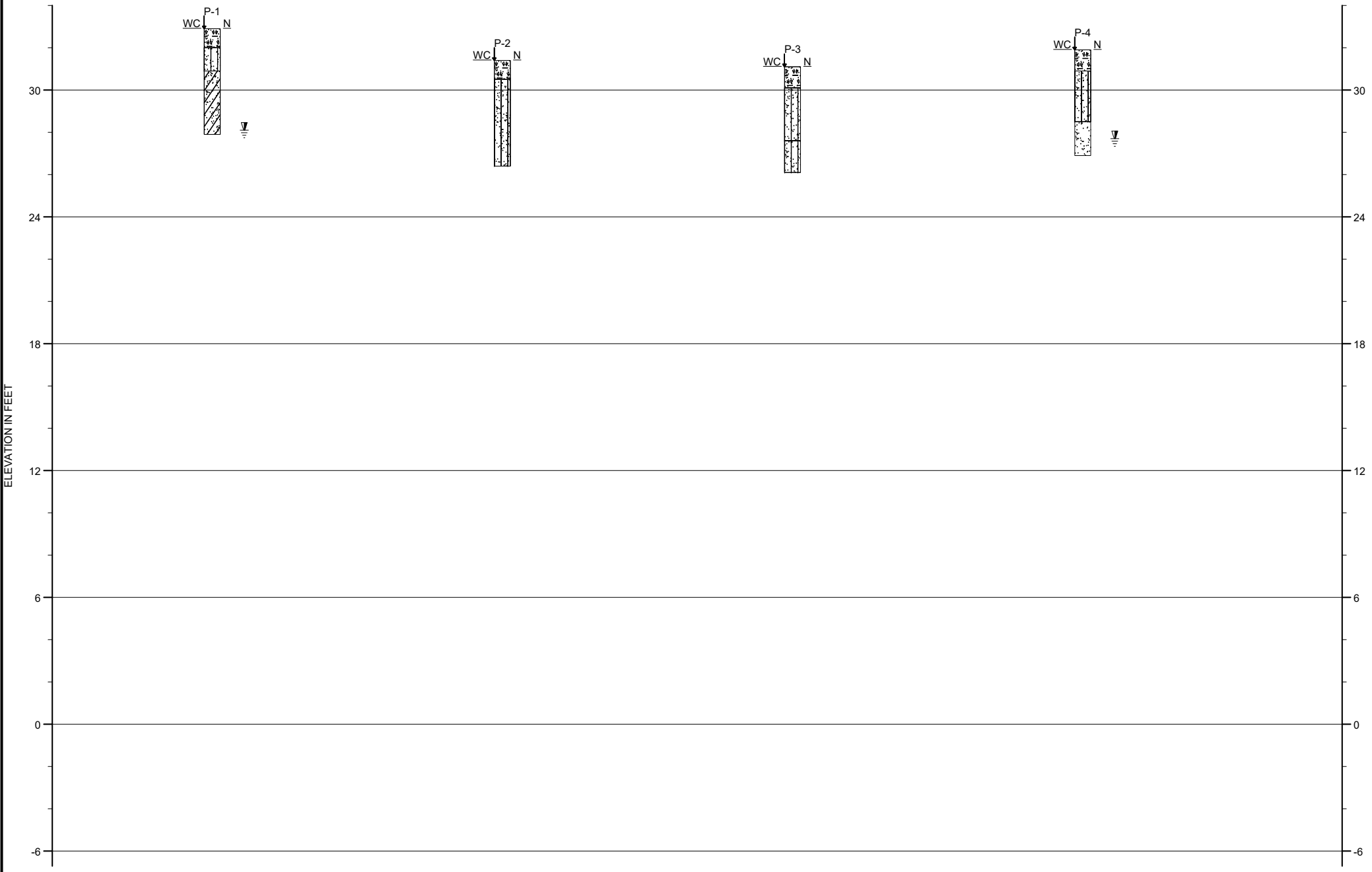
Geo-Technology Associates, Inc.			
SUBSURFACE PROFILE			
VERTICAL SCALE:1"=6'	DRAWN BY TPC	APPROVED BY GRS	DATE:5/20/2019
Howard T. Ennis School Georgetown, Delaware			
PROJECT NO. 31190199		4	



Symbol Description

- Topsoil
- SC - Clayey Sand
- SP-SM - Poorly Graded Sand with Silt
- Approximate horizontal location of exploration
- Water table during drilling
- Water table at completion
- Water table at 3rd check
- (classification not obtained)
- V. stiff fine grained
- V. stiff to clayey sand
- Sands -- clean to silty
- Sand mixtures
- Dense to gravelly sand
- Silt mixtures
- Clays

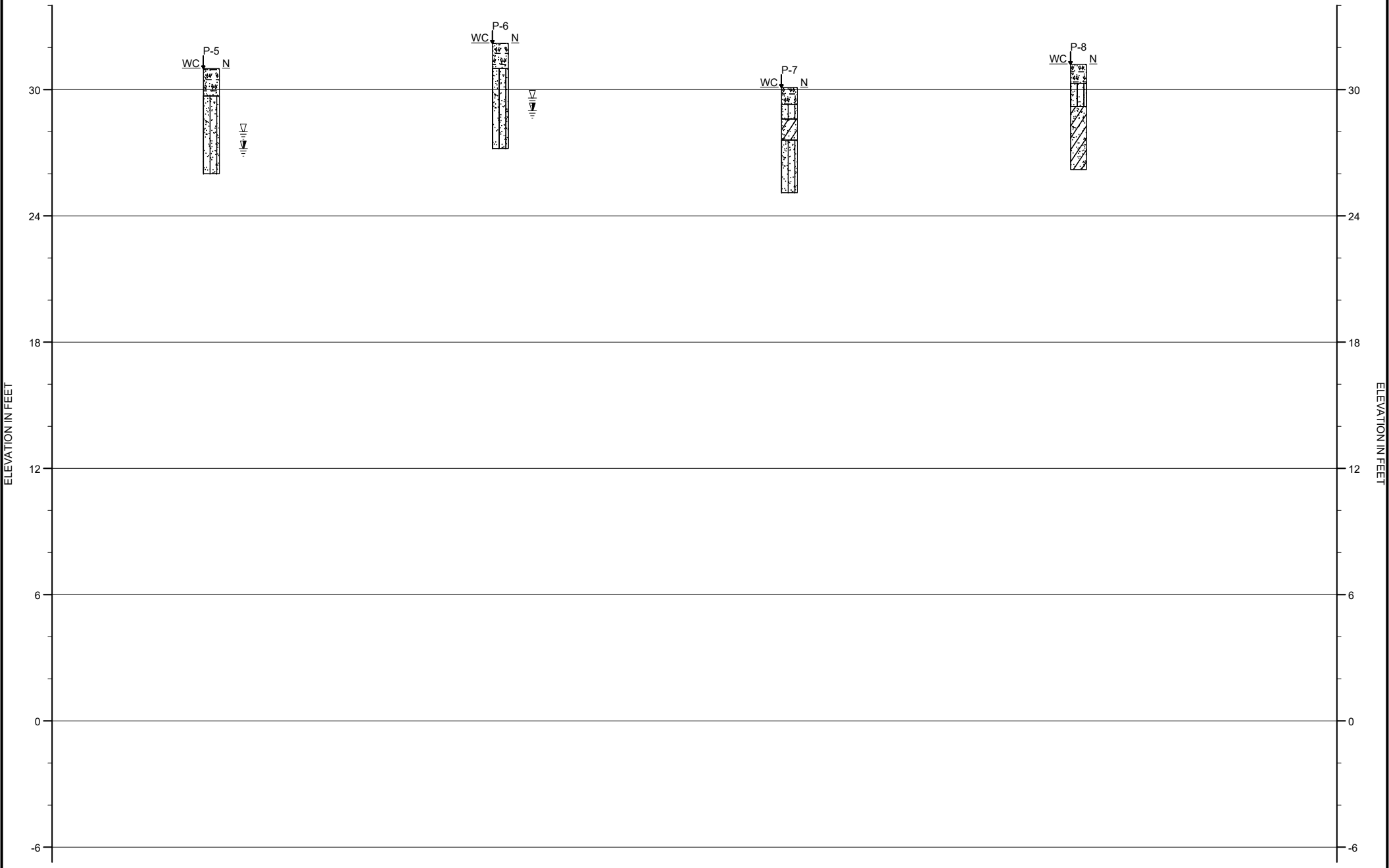
Geo-Technology Associates, Inc.			
SUBSURFACE PROFILE			
VERTICAL SCALE:1"=6'	DRAWN BY TPC	APPROVED BY GRS	DATE:5/20/2019
Howard T. Ennis School Georgetown, Delaware			
PROJECT NO. 31190199		5	



Symbol Description

- Topsoil
- SP-SM - Poorly Graded Sand with Silt
- SC - Clayey Sand
- SM - Silty Sand
- SP - Poorly Graded Sand
- Approximate horizontal location of exploration
- Water table after 24 hours

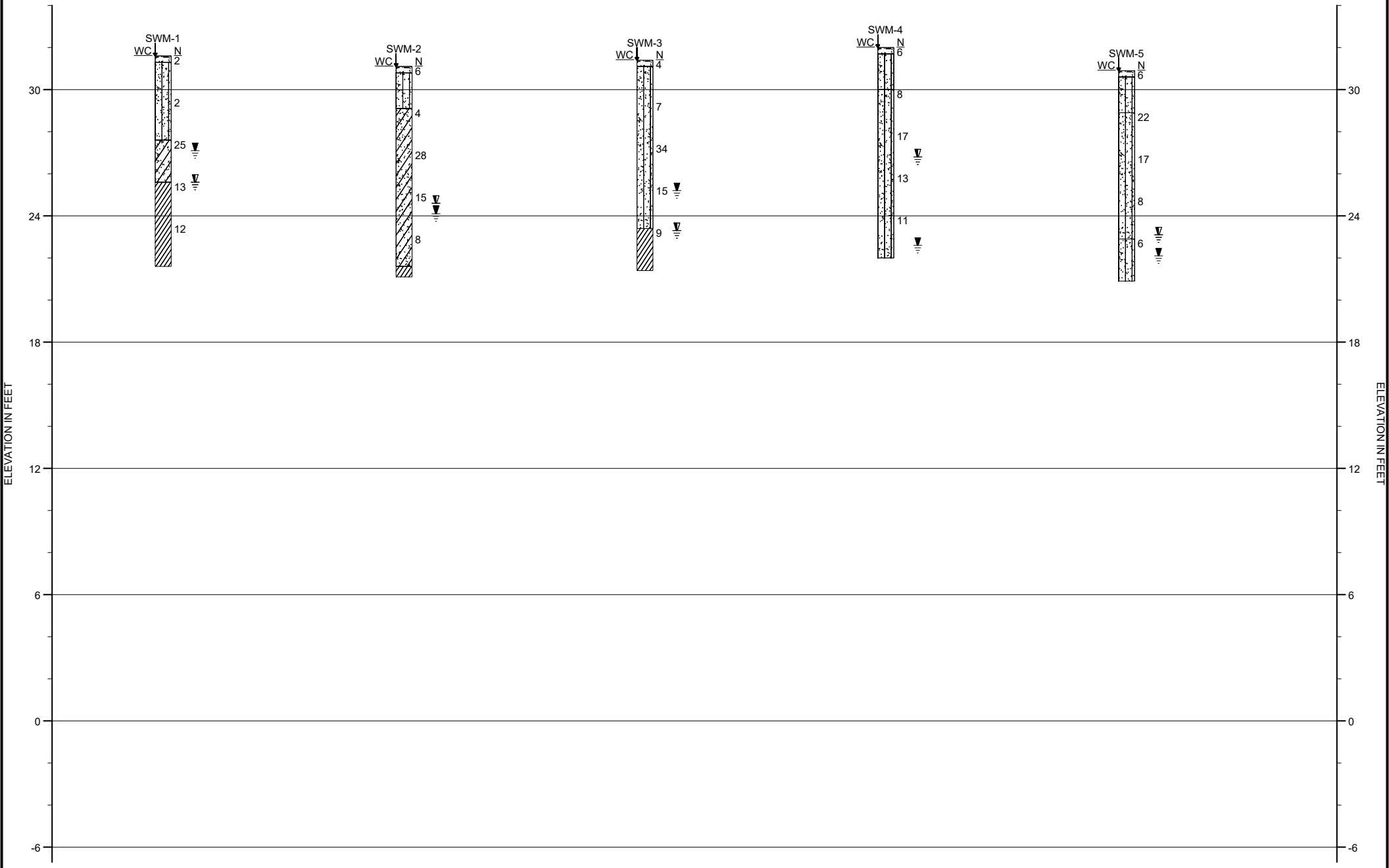
Geo-Technology Associates, Inc.			
SUBSURFACE PROFILE			
VERTICAL SCALE:1"=6'	DRAWN BY TPC	APPROVED BY GRS	DATE:5/20/2019
Howard T. Ennis School Georgetown, Delaware			
PROJECT NO. 31190199	6		



Symbol Description

- Topsoil
- SP-SM - Poorly Graded Sand with Silt
- SC - Clayey Sand
- Approximate horizontal location of exploration
- Water table during drilling
- Water table after 24 hours

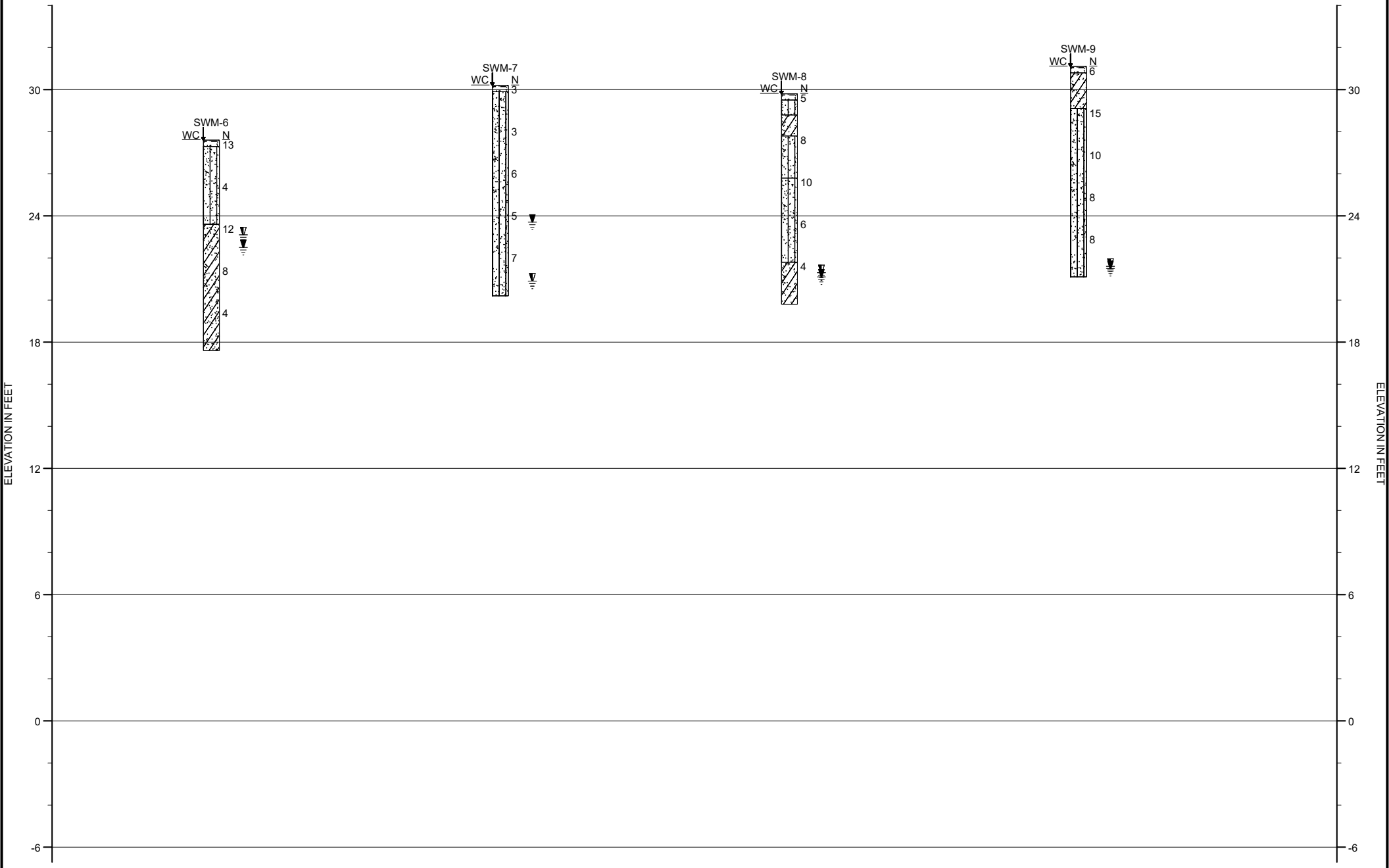
Geo-Technology Associates, Inc.			
SUBSURFACE PROFILE			
VERTICAL SCALE:1"=6'	DRAWN BY TPC	APPROVED BY GRS	DATE:5/20/2019
Howard T. Ennis School Georgetown, Delaware			
PROJECT NO. 31190199		7	



Symbol Description

- Topsoil
- SM - Silty Sand
- SC - Clayey Sand
- CL - Lean Clay
- SP-SM - Poorly Graded Sand with Silt
- Approximate horizontal location of exploration
- Water table during drilling
- Water table at completion
- Water table at 3rd check

Geo-Technology Associates, Inc.			
SUBSURFACE PROFILE			
VERTICAL SCALE:1"=6'	DRAWN BY TPC	APPROVED BY GRS	DATE:5/21/2019
Howard T. Ennis School Georgetown, Delaware			
PROJECT NO. 31190199		8	



Symbol Description

- Topsoil
- SP-SM - Poorly Graded Sand with Silt
- SC - Clayey Sand
- SM - Silty Sand
- Approximate horizontal location of exploration
- Water table during drilling
- Water table at completion
- Water table at 3rd check

Geo-Technology Associates, Inc.			
SUBSURFACE PROFILE			
VERTICAL SCALE:1"=6'	DRAWN BY TPC	APPROVED BY GRS	DATE:5/21/2019
Howard T. Ennis School Georgetown, Delaware			
PROJECT NO. 31190199	9		

APPENDIX B

EXPLORATION DATA

GEO-TECHNOLOGY ASSOCIATES, INC.

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
21133 Sterling Avenue, Suite 7 Georgetown, Delaware 19947
302-855-9761 302-856-3388 FAX

TABLE 1
Exploration Data Summary
Howard T. Ennis
Sussex County, Delaware
GTA Project No.: 31190199

Exploration No.	*Existing Ground Surface El. (MSL)	Total Depth of Exploration (ft.)	Topsoil Thickness (In.)	Extent of USCS SP, SP-SM, SM, or SC Soils From - To (ft.)	Extent of USCS ML or CL Soils From - To (ft.)	Depth to Groundwater/ Groundwater El. at Completion (ft./MSL)	Depth to Groundwater/ Groundwater El. at One to Three Days After Completion of Exploration (ft./ MSL)
B-1	EL 31.3	20	10	0.9 - 20.0	NE	9.0/ EL 21.3	Backfilled at completion
B-2	EL 30.7	30	6	0.5 – 30.0	NE	9.6 / EL 22.1	10.0 / EL 21.7
B-3	EL 32.0	20	11	0.9 - 20.0	NE	9.8/ EL 22.2	Backfilled at completion
B-4	EL 31.5	20	8	0.7 – 20.0	NE	10.1 / EL 21.4	10.3 / EL 21.2
B-5	EL 31.4	20	12	1.0 - 20.0	NE	9.4/ EL 22.0	Backfilled at completion
B-6	EL 30.8	20	9	0.8 - 20.0	NE	9.0/ EL 21.8	Backfilled at completion
B-7	EL 31.6	20	6	0.5 – 20.0	NE	9.9 / EL 21.7	9.5 / EL 22.1
B-8	EL 31.5	30	12	1.0 – 30.0	NE	9.5/ EL 22.0	Backfilled at completion
B-9	EL 31.2	30	13	1.1 – 30.0	NE	9.2/ EL 22.0	Backfilled at completion
B-10	EL 31.2	20	10	0.9 – 20.0	NE	10.0/ EL 21.2	Backfilled at completion
B-11	EL 30.9	20	10	0.9 – 20.0	NE	9.8/ EL 21.1	Backfilled at completion
B-12	EL 30.3	20	12	1.0 – 20.0	NE	9.4/ EL 20.9	Backfilled at completion
B-13	EL 30.8	20	10	0.9 – 20.0	NE	10.1/ EL 20.7	Backfilled at completion
B-14	EL 31.3	30	8	0.7 – 30.0	NE	10.9 / EL 20.4	11.9 / EL 19.4
P-1	EL 32.9	5	10	0.9 – 5.0	NE	Dry to 5.0/ Dry to EL 27.9	4.8 / EL 28.1
P-2	EL 31.4	5	10	0.9 – 5.0	NE	Dry to 5.0/ Dry to EL 26.4	Dry to 5.0/ Dry to EL 26.4
P-3	EL 31.1	5	12	1.0 – 5.0	NE	Dry to 5.0/ Dry to EL 26.1	Dry to 5.0/ Dry to EL 26.1

*Existing Elevations determined by CDA Engineering.
**NE – Not Encountered.

GEO-TECHNOLOGY ASSOCIATES, INC.

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
21133 Sterling Avenue, Suite 7 Georgetown, Delaware 19947
302-855-9761 302-856-3388 FAX

TABLE 1
Exploration Data Summary
Howard T. Ennis
Sussex County, Delaware
GTA Project No.: 31190199

Exploration No.	*Existing Ground Surface El. (MSL)	Total Depth of Exploration (ft.)	Topsoil Thickness (In.)	Extent of USCS SP, SP-SM, SM, or SC Soils From - To (ft.)	Extent of USCS ML or CL Soils From - To (ft.)	Depth to Groundwater/ Groundwater El. at Completion (ft./MSL)	Depth to Groundwater/ Groundwater El. at One to Three Days After Completion of Exploration (ft./ MSL)
P-4	EL 31.9	5	12	1.0 – 5.0	NE	Dry to 5.0/ Dry to EL 26.9	Dry to 5.0/ Dry to EL 26.9
P-5	EL 31.0	5	16	1.5 – 5.0	NE	3.0 / EL 28.0	3.8 / EL 27.2
P-6	EL 32.2	5	14	1.3 – 5.0	NE	2.6 / EL 29.6	3.2 / EL 29.0
P-7	EL 30.2	5	9	0.8 – 5.0	NE	Dry to 5.0/ Dry to EL 25.2	Dry to 5.0/ Dry to EL 25.2
P-8	EL 31.2	5	10	0.9 – 5.0	NE	Dry to 5.0/ EL 26.2	Dry to 5.0/ EL 26.2
SWM-1	EL 31.6	10	4	0.3 – 9.0	9.0 – 10.0	6.0 / EL 25.6	4.5 / EL 27.1
SWM-2	EL 31.1	10	4	0.3 – 9.5	9.5 – 10.0	6.5 / EL 24.6	7.0 / EL 24.1
SWM-3	EL 31.4	10	4	0.3 – 8.0	8.0 – 10.0	8.1 / EL 23.3	6.2 / EL 25.2
SWM-4	EL 32.0	10	4	0.3 – 10.0	NE	5.2 / EL 26.8	9.4 / EL 22.6
SWM-5	EL 30.9	10	4	0.3 – 10.0	NE	7.8 / EL 23.1	8.8 / EL 22.1
SWM-6	EL 27.6	10	4	0.3 – 10.0	NE	4.5 / EL 23.1	5.1 / EL 22.5
SWM-7	EL 30.2	10	4	0.3 – 10.0	NE	9.3 / EL 20.9	6.5 / EL 23.7
SWM-8	EL 29.8	10	4	0.3 – 10.0	NE	5.8 / EL 24.0	8.7 / EL 21.1
SWM-9	EL 31.1	10	4	0.3 – 10.0	NE	9.5 / EL 21.6	9.6 / EL 21.5

*Existing Elevations determined by CDA Engineering.
**NE – Not Encountered.

NOTES FOR EXPLORATION LOGS

KEY TO USCS TERMINOLOGY AND GRAPHIC SYMBOLS

MAJOR DIVISIONS (BASED UPON ASTM D 2488)				SYMBOLS GRAPHIC	SYMBOLS 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 (LESS THAN 15% PASSING THE NO. 200 SIEVE)			GW
					GP
		GRAVELS WITH FINES (MORE THAN 15% PASSING THE NO. 200 SIEVE)			GM
					GC
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LESS THAN 15% PASSING THE NO. 200 SIEVE)			SW
					SP
		SANDS WITH FINES (MORE THAN 15% PASSING THE NO. 200 SIEVE)			SM
					SC
FINE-GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILT OR CLAY (<15% RETAINED ON THE NO. 200 SIEVE) SILT OR CLAY WITH SAND OR GRAVEL (15% TO 30% RETAINED ON THE NO. 200 SIEVE) SANDY OR GRAVELLY SILT OR CLAY (>30% RETAINED ON THE NO. 200 SIEVE)		SILTS AND LEAN CLAYS LIQUID LIMIT LESS THAN 50		ML
					CL
					OL
			ELASTIC SILTS AND FAT CLAYS LIQUID LIMIT GREATER THAN 50		MH
					CH
					OH
HIGHLY ORGANIC SOILS					PT

NOTE: DUAL SYMBOLS ARE USED TO INDICATE COARSE-GRAINED SOILS WHICH CONTAIN AN ESTIMATED 5 TO 15% FINES BASED ON VISUAL CLASSIFICATION OR BETWEEN 5 AND 12% FINES BASED ON LABORATORY TESTING; AND FINE-GRAINED SOILS WHEN THE PLOT OF LIQUID LIMIT & PLASTICITY INDEX VALUES FALLS IN THE PLASTICITY CHART'S CROSS-HATCHED AREA. FINE-GRAINED SOILS ARE CLASSIFIED AS ORGANIC (OL OR OH) WHEN ENOUGH ORGANIC PARTICLES ARE PRESENT TO INFLUENCE ITS PROPERTIES. LABORATORY TEST RESULTS ARE USED TO SUPPLEMENT SOIL CLASSIFICATION BY THE VISUAL-MANUAL PROCEDURES OF ASTM D 2488.

ADDITIONAL TERMINOLOGY AND GRAPHIC SYMBOLS

	DESCRIPTION		GRAPHIC SYMBOLS
ADDITIONAL DESIGNATIONS	TOPSOIL		
	MAN MADE FILL		
	GLACIAL TILL		
	COBBLES AND BOULDERS		
RESIDUAL SOIL DESIGNATIONS	DESCRIPTION	"N" VALUE	
	HIGHLY WEATHERED ROCK	50 TO 50/1"	
	PARTIALLY WEATHERED ROCK	MORE THAN 50 BLOWS FOR 1" OF PENETRATION OR LESS, AUGER PENETRABLE	

COARSE-GRAINED SOILS
(GRAVEL AND SAND)

DESIGNATION	BLOWS PER FOOT (BPF) "N"
VERY LOOSE	0 - 4
LOOSE	5 - 10
MEDIUM DENSE	11 - 30
DENSE	31 - 50
VERY DENSE	>50

NOTE: "N" VALUE DETERMINED AS PER ASTM D 1586

FINE-GRAINED SOILS
(SILT AND CLAY)

CONSISTENCY	BPF "N"
VERY SOFT	<2
SOFT	2 - 4
MEDIUM STIFF	5 - 8
STIFF	9 - 15
VERY STIFF	16 - 30
HARD	>30

NOTE: ADDITIONAL DESIGNATIONS TO ADVANCE SAMPLER INDICATED IN BLOW COUNT COLUMN:
WOH = WEIGHT OF HAMMER
WOR = WEIGHT OF ROD(S)

SAMPLE TYPE

DESIGNATION	SYMBOL
SOIL SAMPLE	S-
SHELBY TUBE	U-
ROCK CORE	R-

WATER DESIGNATION

DESCRIPTION	SYMBOL
ENCOUNTERED DURING DRILLING	
UPON COMPLETION OF DRILLING	
24 HOURS AFTER COMPLETION	

NOTE: WATER OBSERVATIONS WERE MADE AT THE TIME INDICATED. POROSITY OF SOIL STRATA, WEATHER CONDITIONS, SITE TOPOGRAPHY, ETC. MAY CAUSE WATER LEVEL CHANGES.

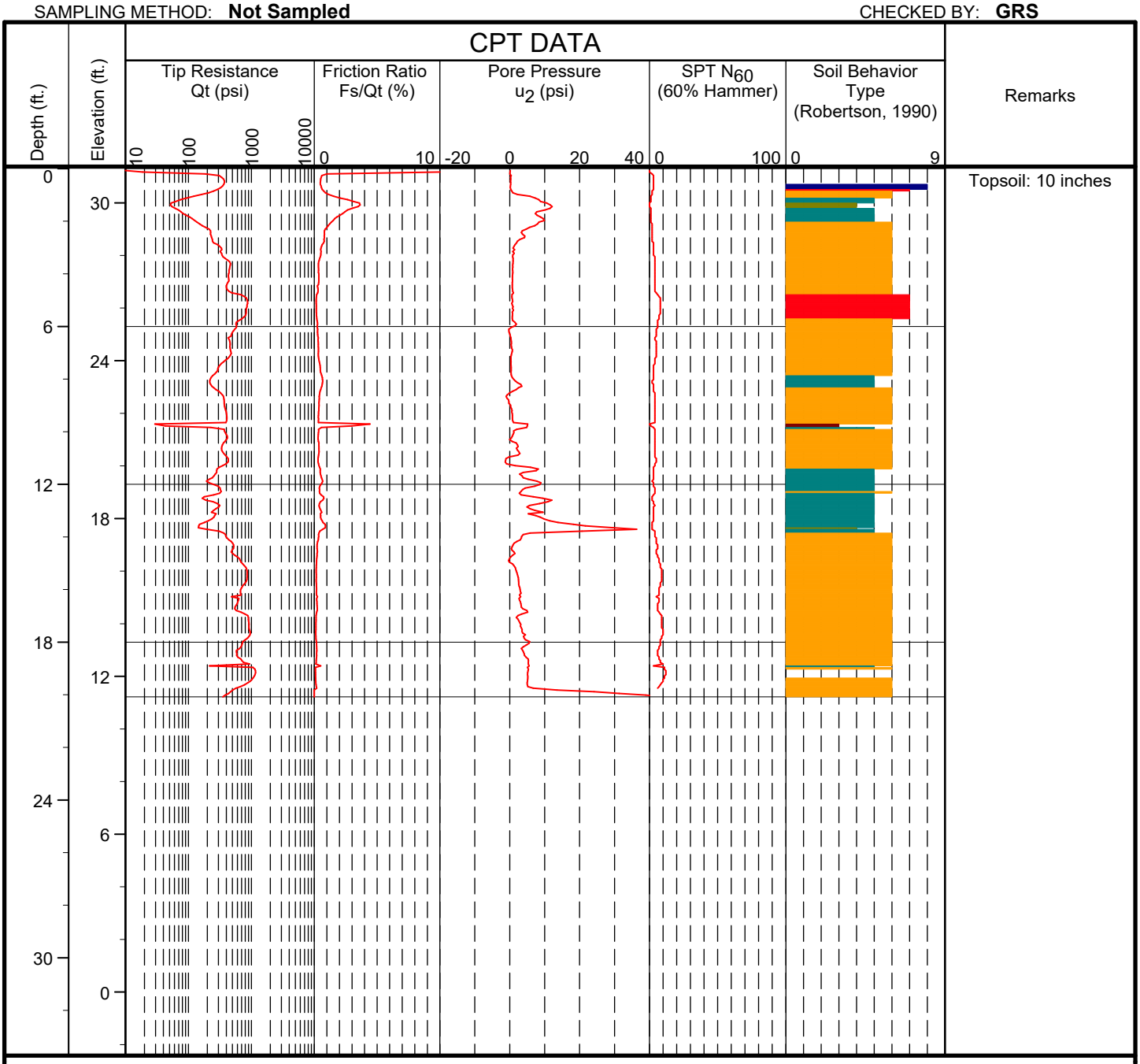
LOG OF CPT SOUNDING NO. B-1

PROJECT: **Howard T. Ennis School**
PROJECT NO.: **31190199**
PROJECT LOCATION: **Georgetown, Delaware**

WATER LEVEL (ft): **Dry 9.0**
DATE: **2/28/19**
CAVED (ft): **9.0**

DATE STARTED: **2/28/19**
DATE COMPLETED: **2/28/19**
DRILLING CONTRACTOR: **Geo-Technology Associates, Inc.**
DRILLER: **K. Kozak**
DRILLING METHOD: **CPT**
SAMPLING METHOD: **Not Sampled**

GROUND SURFACE ELEVATION: **31.3**
DATUM: **Survey**
CONE NO.: **DSG0857**
LOGGED BY: **TPC**
CHECKED BY: **GRS**



- 1 - sensitive fine grained
- 2 - organic
- 3 - clays
- 4 - silt mixtures
- 5 - sand mixtures
- 6 - sands - clean to silty
- 7 - dense to gravelly sand
- 8 - v. stiff to clayey sand
- 9 - v. stiff fine-grained

NOTES: **Hole backfilled upon completion**

GEO-TECHNOLOGY ASSOCIATES, INC.
21133 Sterling Avenue, Suite 7
Georgetown, DE 19947

LOG OF SOUNDING NO. B-1

LOG OF BORING NO. B-2

PROJECT: **Howard T. Ennis School**
PROJECT NO.: **31190199**
PROJECT LOCATION: **Georgetown, Delaware**

WATER LEVEL (ft):	9.6		10.0
DATE:	02/26/19		02/27/19
CAVED (ft):	-		-

DATE STARTED: **02/26/19**
DATE COMPLETED: **02/26/19**
DRILLING CONTRACTOR: **Manos Drilling Associates**
DRILLER: **K. Manos**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING METHOD: **Splitspoon**

WATER ENCOUNTERED DURING DRILLING (ft) **9.6**
GROUND SURFACE ELEVATION: **30.7**
DATUM: **Survey**
EQUIPMENT: **CME 55**
LOGGED BY: **RC**
CHECKED BY: **GRS**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					30.7	0	TS		Topsoil: 6 in	
1	0.0	12	1-2-2-1	4	30.2		SP-SM		Brown, moist, very loose, Poorly-graded SAND with Silt	
2	2.0	16	3-4-4-3	8			SP-SM		Brown, moist to wet, loose, Poorly-graded SAND with Silt with gravel	
3	4.0	18	2-3-2-2	5						
						6				
4	6.0	18	2-3-4-3	7						
5	8.0	18	2-3-3-4	6						
					18.7	12	SM		Brown, wet, very loose, Silty SAND	
6	13.5	12	WOH 6"-2-1	3						
					14.7		SP-SM		Gray, wet, medium dense, Poorly-graded SAND with Silt	
						18				
7	18.5	18	3-6-5	11						
					8.7		SC		Orange-gray, wet, medium dense, Clayey SAND	
8	23.5	18	3-5-7	12		24				
					4.7		SP-SM		Gray, wet, loose, Poorly-graded SAND with Silt	
9	28.5	18	3-4-5	9						
					0.7	30			Bottom of hole 30 ft	
						36				

NOTES:

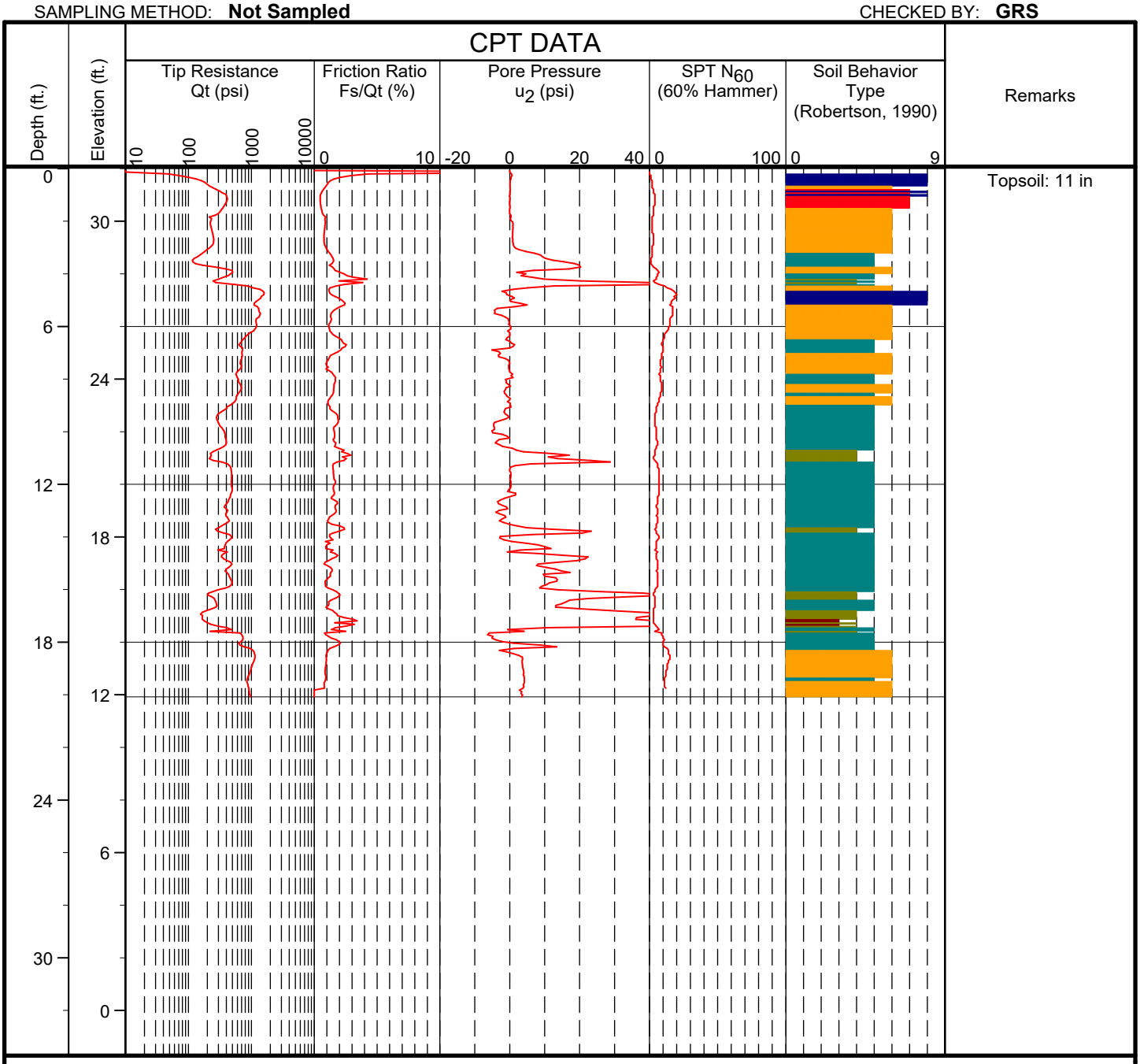
GEO-TECHNOLOGY ASSOCIATES, INC.
21133 Sterling Avenue, Suite 7
Georgetown, DE 19947

LOG OF BORING NO. B-2

LOG OF CPT SOUNDING NO. B-3

PROJECT:	**Howard T. Ennis School**	WATER LEVEL (ft):	**9.8**		
PROJECT NO.:	**31190199**	DATE:	**2/28/19**		
PROJECT LOCATION:	**Georgetown, Delaware**	CAVED (ft):	**9.9**		

DATE STARTED:	**2/28/19**		
DATE COMPLETED:	**2/28/19**	GROUND SURFACE ELEVATION:	**32.0**
DRILLING CONTRACTOR:	**Geo-Technology Associates, Inc.**	DATUM:	**Survey**
DRILLER:	**K. Kozak**	CONE NO.:	**DSG0857**
DRILLING METHOD:	**CPT**	LOGGED BY:	**TPC**
SAMPLING METHOD:	**Not Sampled**	CHECKED BY:	**GRS**



- 1 - sensitive fine grained
- 2 - organic
- 3 - clays
- 4 - silt mixtures
- 5 - sand mixtures
- 6 - sands - clean to silty
- 7 - dense to gravelly sand
- 8 - v. stiff to clayey sand
- 9 - v. stiff fine-grained

NOTES: **Hole backfilled upon completion**

GEO-TECHNOLOGY ASSOCIATES, INC.
21133 Sterling Avenue, Suite 7
Georgetown, DE 19947

LOG OF SOUNDING NO. B-3

LOG OF BORING NO. B-4

PROJECT:	Howard T. Ennis School	WATER LEVEL (ft):	10.1	10.3
PROJECT NO.:	31190199	DATE:	02/26/19	02/27/19
PROJECT LOCATION:	Georgetown, Delaware	CAVED (ft):	-	-

DATE STARTED:	02/26/19	WATER ENCOUNTERED DURING DRILLING (ft)	10.1
DATE COMPLETED:	02/26/19	GROUND SURFACE ELEVATION:	31.5
DRILLING CONTRACTOR:	Manos Drilling Associates	DATUM:	Survey
DRILLER:	K. Manos	EQUIPMENT:	CME 55
DRILLING METHOD:	Hollow Stem Auger	LOGGED BY:	RC
SAMPLING METHOD:	Splitspoon	CHECKED BY:	GRS

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	DESCRIPTION	REMARKS
					31.5	0	TS	Topsoil: 8 in	
1	0.0	18	1-1-1-2	2	30.8		SM	Brown, moist, very loose, Silty SAND	
					29.5		SC	Brown, moist, very loose to loose, Clayey SAND	
2	2.0	18	1-1-2-4	3					
3	4.0	16	3-4-4-3	8	26.5		SP-SM	Brown-gray, moist, loose, Poorly-graded SAND with Silt with Gravel	
					25.5	6	SC	Brown, moist, loose, Clayey SAND	
4	6.0	18	2-3-3-4	6	24.5		SP-SM	Gray, moist to wet, very loose to loose, Poorly-graded SAND with Silt with Gravel	
5	8.0	18	2-2-3	5					
						12			
6	13.5	18	1-1-1	2					
						18			
7	18.5	18	2-3-3	6					
					11.5			Bottom of hole 20 ft.	
						24			
						30			
						36			

NOTES:

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Georgetown, DE 19947

LOG OF BORING NO. B-4

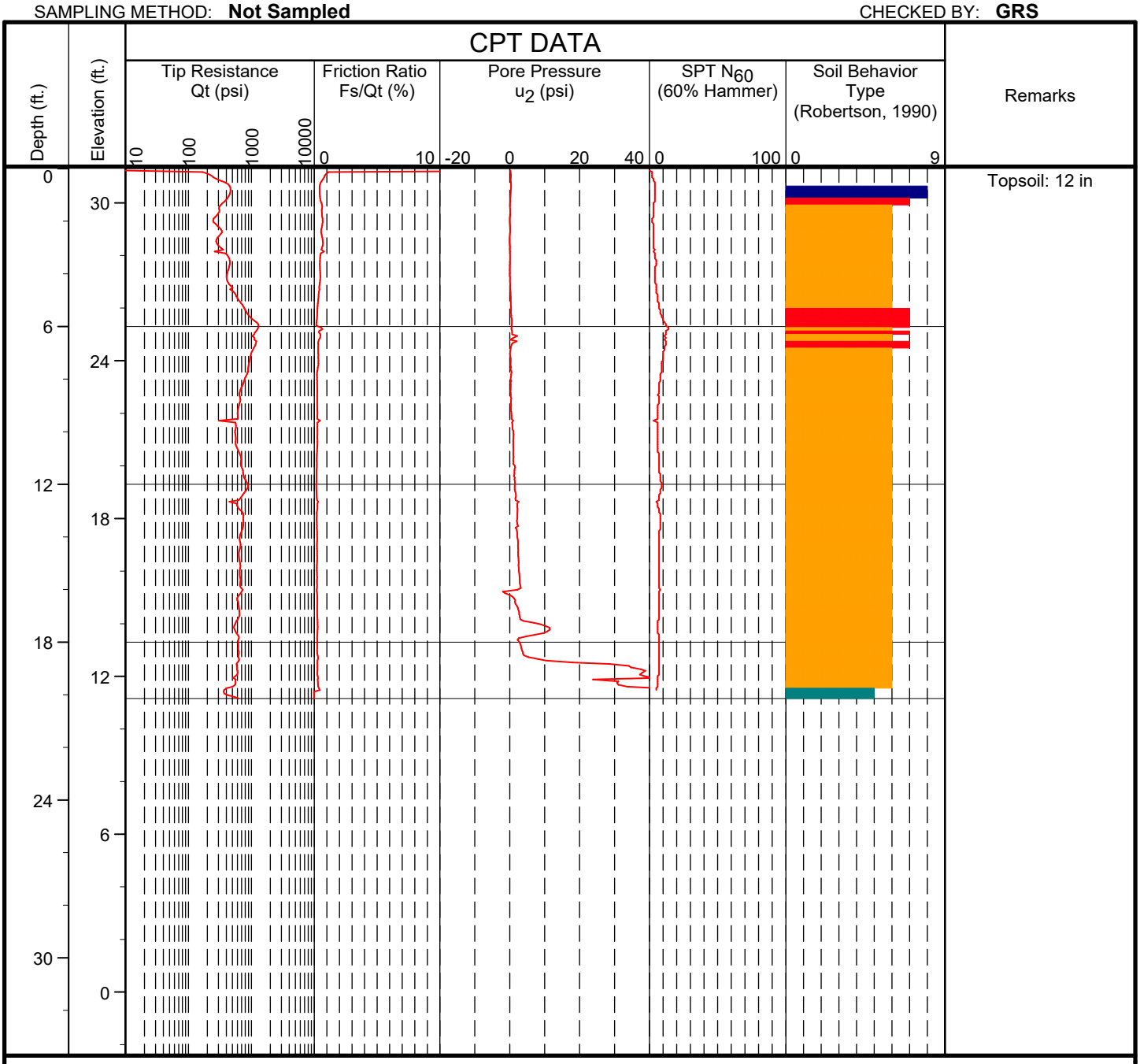
LOG OF CPT SOUNDING NO. B-5

PROJECT: **Howard T. Ennis School**
PROJECT NO.: **31190199**
PROJECT LOCATION: **Georgetown, Delaware**

WATER LEVEL (ft): **9.4**
DATE: **2/28/19**
CAVED (ft): **9.5**

DATE STARTED: **2/28/19**
DATE COMPLETED: **2/28/19**
DRILLING CONTRACTOR: **Geo-Technology Associates, Inc.**
DRILLER: **K. Kozak**
DRILLING METHOD: **CPT**
SAMPLING METHOD: **Not Sampled**

GROUND SURFACE ELEVATION: **31.3**
DATUM: **Survey**
CONE NO.: **DSG0857**
LOGGED BY: **TPC**
CHECKED BY: **GRS**



- 1 - sensitive fine grained
- 2 - organic
- 3 - clays
- 4 - silt mixtures
- 5 - sand mixtures
- 6 - sands - clean to silty
- 7 - dense to gravelly sand
- 8 - v. stiff to clayey sand
- 9 - v. stiff fine-grained

NOTES: **Hole backfilled upon completion**

GEO-TECHNOLOGY ASSOCIATES, INC.
21133 Sterling Avenue, Suite 7
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LOG OF SOUNDING NO. B-5

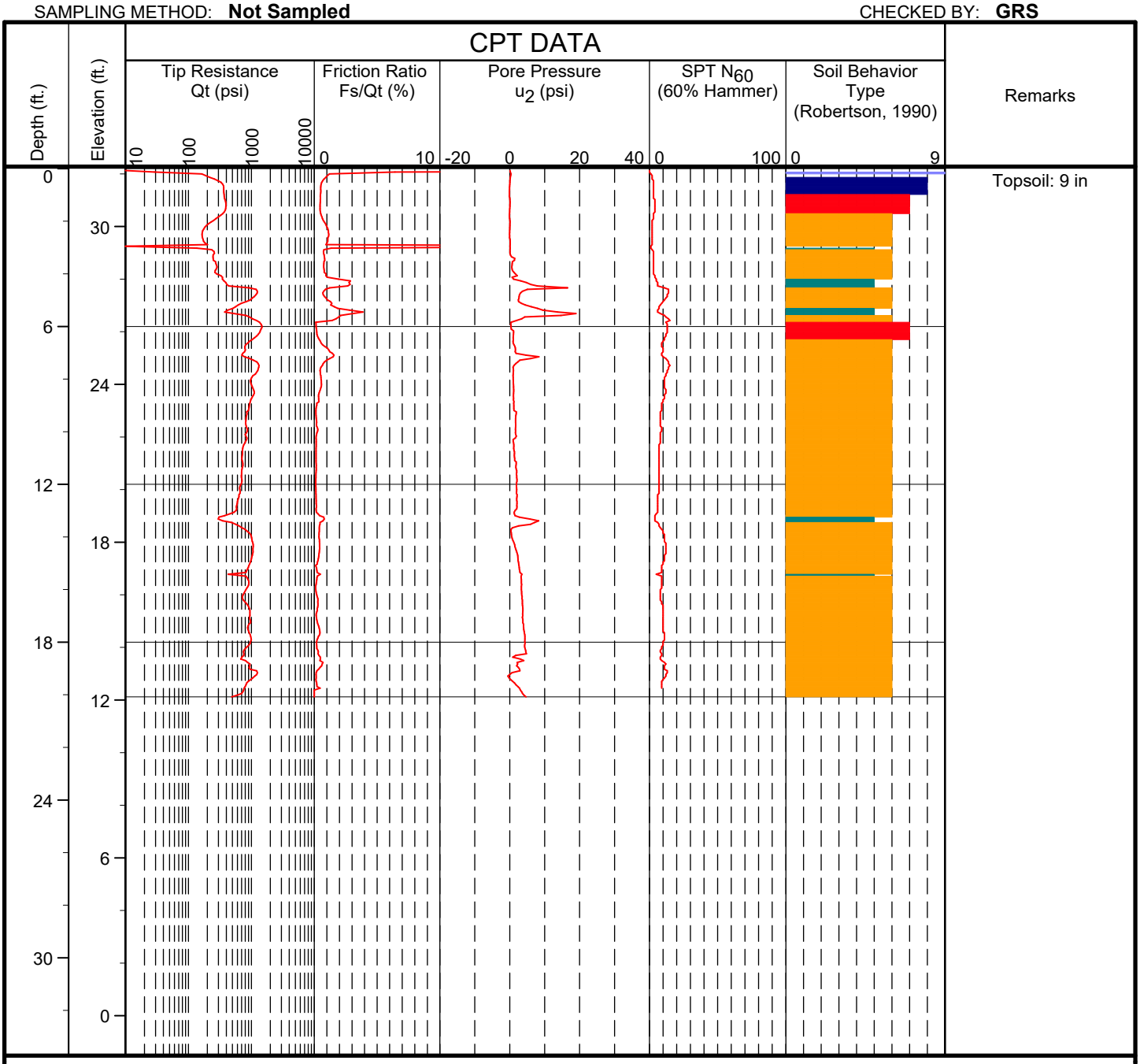
LOG OF CPT SOUNDING NO. B-6

PROJECT: **Howard T. Ennis School**
PROJECT NO.: **31190199**
PROJECT LOCATION: **Georgetown, Delaware**

WATER LEVEL (ft): **9.0**
DATE: **2/28/19**
CAVED (ft): **9.0**

DATE STARTED: **2/28/19**
DATE COMPLETED: **2/28/19**
DRILLING CONTRACTOR: **Geo-Technology Associates, Inc.**
DRILLER: **K. Kozak**
DRILLING METHOD: **CPT**
SAMPLING METHOD: **Not Sampled**

GROUND SURFACE ELEVATION: **32.2**
DATUM: **Survey**
CONE NO.: **DSG0857**
LOGGED BY: **TPC**
CHECKED BY: **GRS**



1 - sensitive fine grained
2 - organic
3 - clays
4 - silt mixtures
5 - sand mixtures
6 - sands - clean to silty
7 - dense to gravelly sand
8 - v. stiff to clayey sand
9 - v. stiff fine-grained

NOTES: **Hole backfilled upon completion**

GEO-TECHNOLOGY ASSOCIATES, INC.
21133 Sterling Avenue, Suite 7
Georgetown, DE 19947

LOG OF SOUNDING NO. B-6

LOG OF BORING NO. B-7

PROJECT:	Howard T. Ennis School	WATER LEVEL (ft):	9.9	9.5
PROJECT NO.:	31190199	DATE:	02/26/19	02/27/19
PROJECT LOCATION:	Georgetown, Delaware	CAVED (ft):	-	-

DATE STARTED:	02/26/19	WATER ENCOUNTERED DURING DRILLING (ft)	9.9
DATE COMPLETED:	02/26/19	GROUND SURFACE ELEVATION:	31.6
DRILLING CONTRACTOR:	Manos Drilling Associates	DATUM:	Survey
DRILLER:	K. Manos	EQUIPMENT:	CME 55
DRILLING METHOD:	Hollow Stem Auger	LOGGED BY:	RC
SAMPLING METHOD:	Splitspoon	CHECKED BY:	GRS

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					31.6	0	TS		Topsoil: 6 in	
1	0.0	18	2-3-2-2	5	31.1		SM		Brown, moist, loose, Silty SAND	
2	2.0	16	2-3-4-4	7						
3	4.0	18	2-3-7-6	10						
					25.6	6	SP-SM		Brown, moist to wet, loose to medium dense, Poorly-graded SAND with Silt	
5	6.0	18	3-5-5-6	10						
5	8.0	16	4-5-6-8	11						
						12				
6	13.5	16	2-2-4	6			SP-SM		Grey, wet, loose, Poorly-graded SAND with Silt with Gravel	
						18				
7	18.5	18	2-3-6	9						
					11.6				Bottom of hole 20 ft.	
						24				
						30				
						36				

NOTES:

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21133 Sterling Avenue, Suite 7
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LOG OF BORING NO. B-7

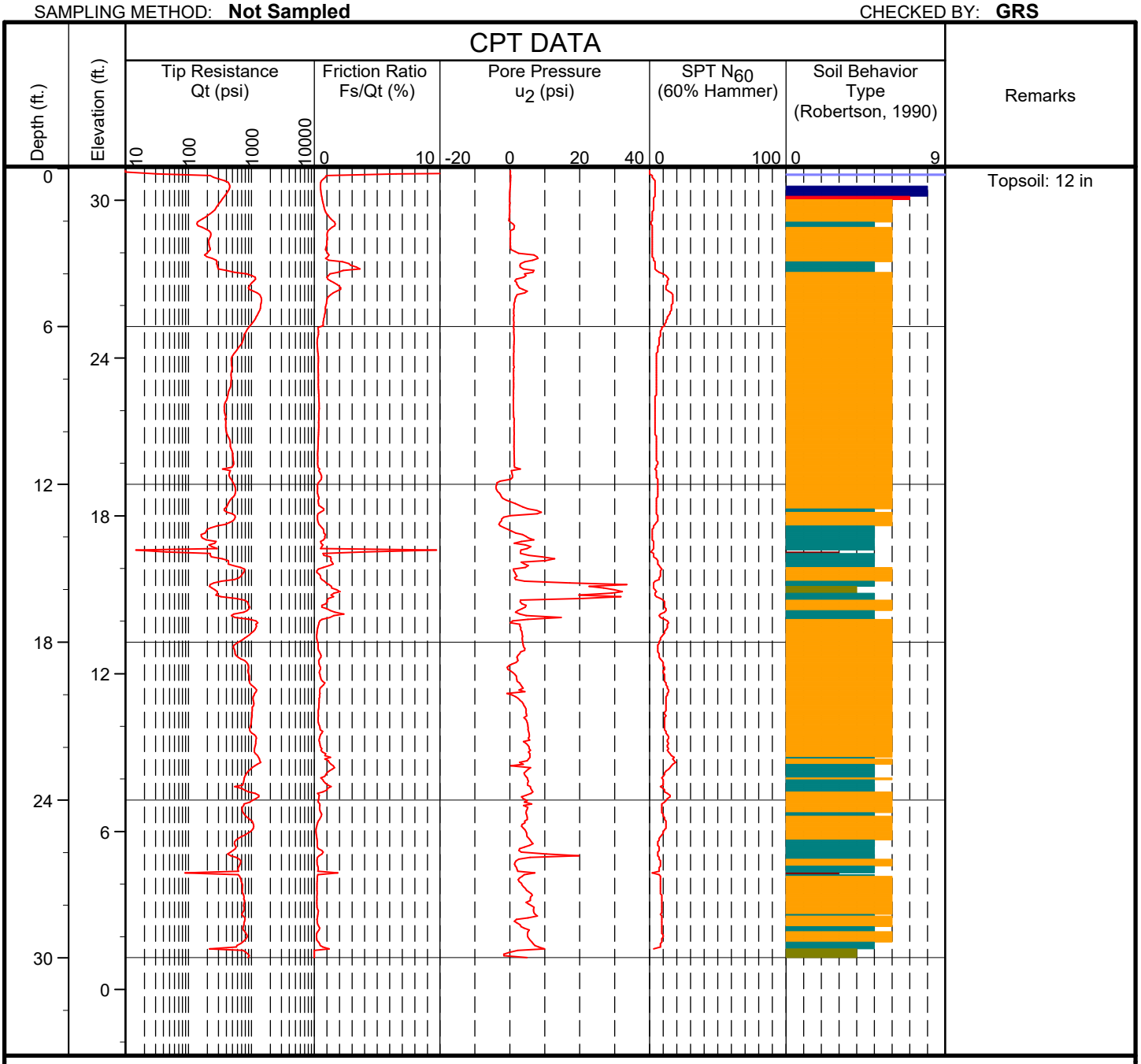
LOG OF CPT SOUNDING NO. B-8

PROJECT: **Howard T. Ennis School**
PROJECT NO.: **31190199**
PROJECT LOCATION: **Georgetown, Delaware**

WATER LEVEL (ft): **9.5**
DATE: **2/28/19**
CAVED (ft): **9.5**

DATE STARTED: **2/28/19**
DATE COMPLETED: **2/28/19**
DRILLING CONTRACTOR: **Geo-Technology Associates, Inc.**
DRILLER: **K. Kozak**
DRILLING METHOD: **CPT**
SAMPLING METHOD: **Not Sampled**

GROUND SURFACE ELEVATION: **31.2**
DATUM: **Survey**
CONE NO.: **DSG0857**
LOGGED BY: **TPC**
CHECKED BY: **GRS**



1 - sensitive fine grained
2 - organic
3 - clays
4 - silt mixtures
5 - sand mixtures
6 - sands - clean to silty
7 - dense to gravelly sand
8 - v. stiff to clayey sand
9 - v. stiff fine-grained

NOTES: **Hole backfilled upon completion**

GEO-TECHNOLOGY ASSOCIATES, INC.
21133 Sterling Avenue, Suite 7
Georgetown, DE 19947

LOG OF SOUNDING NO. B-8

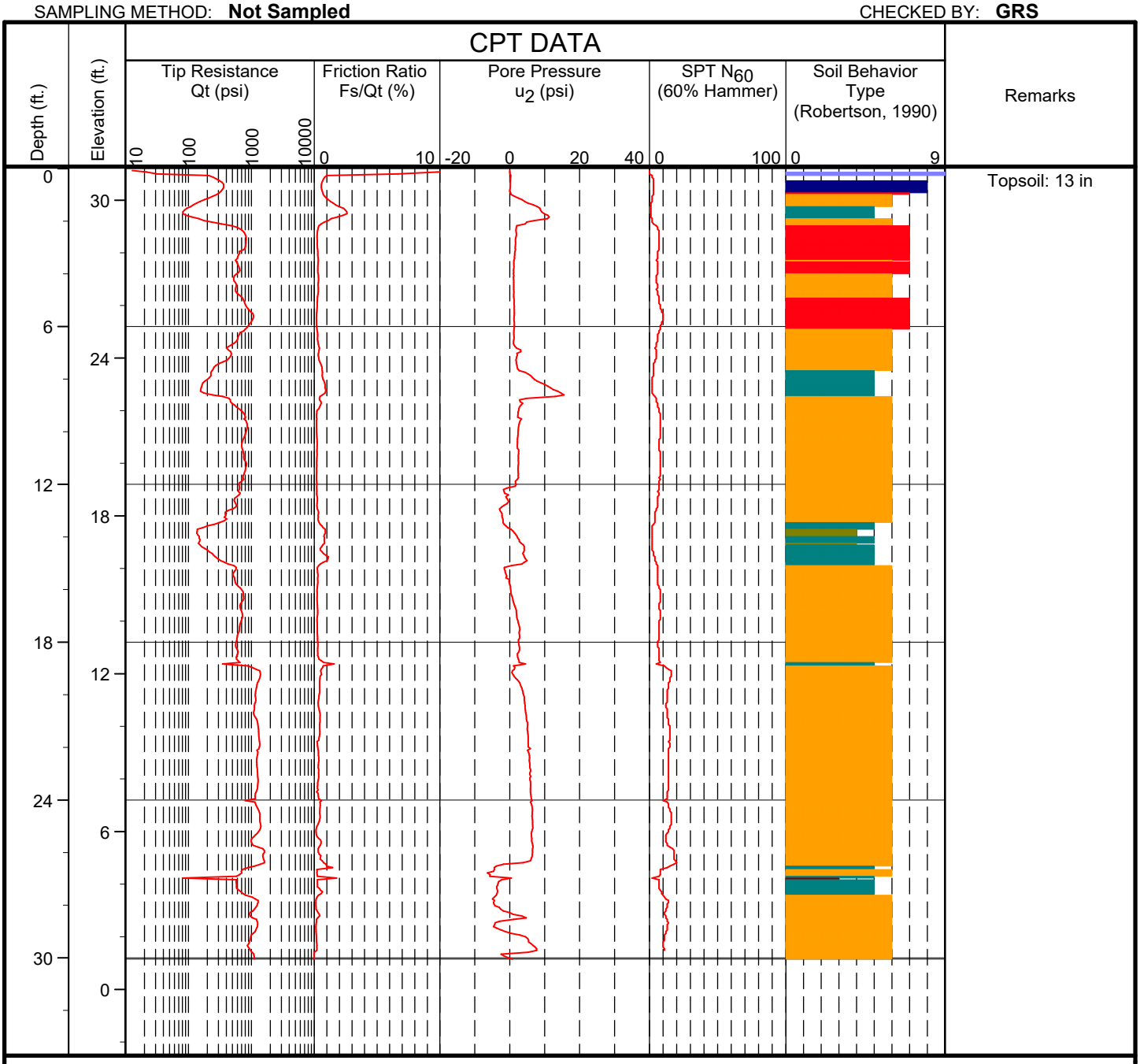
LOG OF CPT SOUNDING NO. B-9

PROJECT: **Howard T. Ennis School**
PROJECT NO.: **31190199**
PROJECT LOCATION: **Georgetown, Delaware**

WATER LEVEL (ft): **9.2**
DATE: **2/28/19**
CAVED (ft): **10.2**

DATE STARTED: **2/28/19**
DATE COMPLETED: **2/28/19**
DRILLING CONTRACTOR: **Geo-Technology Associates, Inc.**
DRILLER: **K. Kozak**
DRILLING METHOD: **CPT**
SAMPLING METHOD: **Not Sampled**

GROUND SURFACE ELEVATION: **31.2**
DATUM: **Survey**
CONE NO.: **DSG0857**
LOGGED BY: **TPC**
CHECKED BY: **GRS**



- 1 - sensitive fine grained
- 2 - organic
- 3 - clays
- 4 - silt mixtures
- 5 - sand mixtures
- 6 - sands - clean to silty
- 7 - dense to gravelly sand
- 8 - v. stiff to clayey sand
- 9 - v. stiff fine-grained

NOTES: **Hole backfilled upon completion**

GEO-TECHNOLOGY ASSOCIATES, INC.
21133 Sterling Avenue, Suite 7
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LOG OF SOUNDING NO. B-9

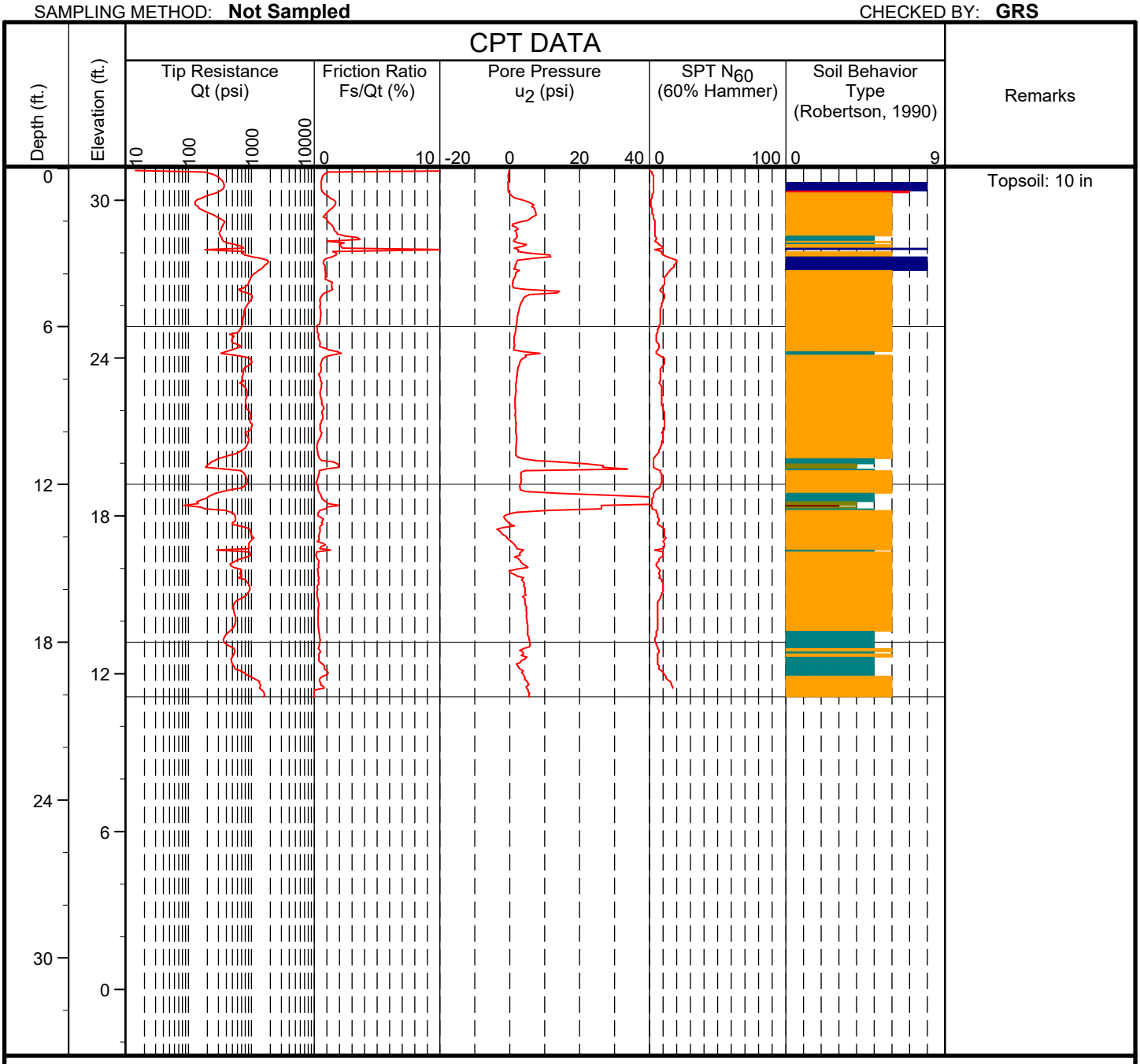
LOG OF CPT SOUNDING NO. B-10

PROJECT: **Howard T. Ennis School**
PROJECT NO.: **31190199**
PROJECT LOCATION: **Georgetown, Delaware**

WATER LEVEL (ft): **10.0**
DATE: **2/28/19**
CAVED (ft): **10.1**

DATE STARTED: **2/28/19**
DATE COMPLETED: **2/28/19**
DRILLING CONTRACTOR: **Geo-Technology Associates, Inc.**
DRILLER: **K. Kozak**
DRILLING METHOD: **CPT**
SAMPLING METHOD: **Not Sampled**

GROUND SURFACE ELEVATION: **31.2**
DATUM: **Survey**
CONE NO.: **DSG0857**
LOGGED BY: **TPC**
CHECKED BY: **GRS**



- 1 - sensitive fine grained
- 2 - organic
- 3 - clays
- 4 - silt mixtures
- 5 - sand mixtures
- 6 - sands - clean to silty
- 7 - dense to gravelly sand
- 8 - v. stiff to clayey sand
- 9 - v. stiff fine-grained

NOTES: **Hole backfilled upon completion**

GEO-TECHNOLOGY ASSOCIATES, INC.
21133 Sterling Avenue, Suite 7
Georgetown, DE 19947

LOG OF SOUNDING NO. B-10

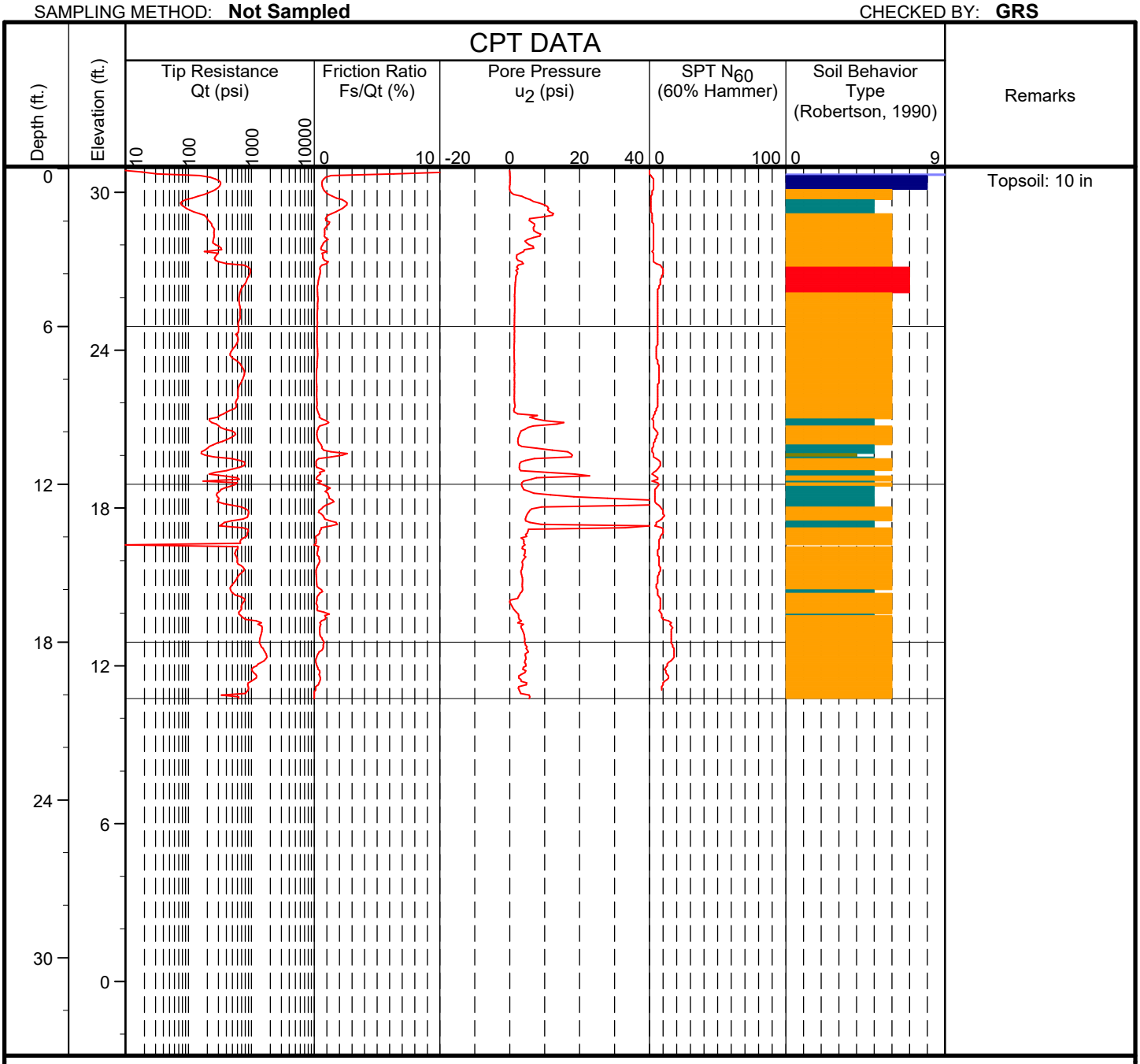
LOG OF CPT SOUNDING NO. B-11

PROJECT: **Howard T. Ennis School**
PROJECT NO.: **31190199**
PROJECT LOCATION: **Georgetown, Delaware**

WATER LEVEL (ft): **9.8**
DATE: **2/28/19**
CAVED (ft): **10.5**

DATE STARTED: **2/28/19**
DATE COMPLETED: **2/28/19**
DRILLING CONTRACTOR: **Geo-Technology Associates, Inc.**
DRILLER: **K. Kozak**
DRILLING METHOD: **CPT**
SAMPLING METHOD: **Not Sampled**

GROUND SURFACE ELEVATION: **30.9**
DATUM: **Survey**
CONE NO.: **DSG0857**
LOGGED BY: **TPC**
CHECKED BY: **GRS**



- 1 - sensitive fine grained
- 2 - organic
- 3 - clays
- 4 - silt mixtures
- 5 - sand mixtures
- 6 - sands - clean to silty
- 7 - dense to gravelly sand
- 8 - v. stiff to clayey sand
- 9 - v. stiff fine-grained

NOTES: **Hole backfilled upon completion**

GEO-TECHNOLOGY ASSOCIATES, INC.
21133 Sterling Avenue, Suite 7
Georgetown, DE 19947

LOG OF SOUNDING NO. B-11

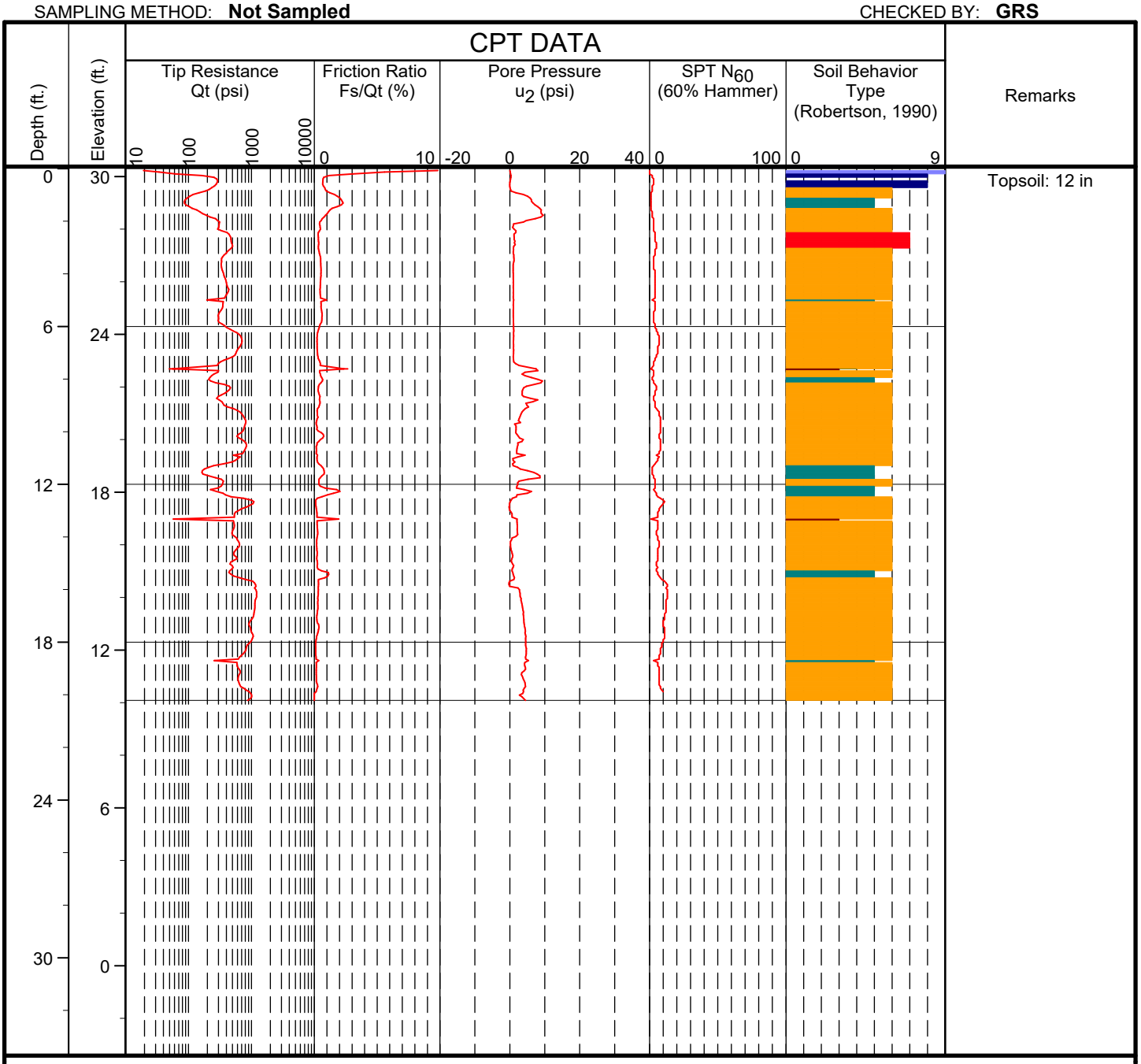
LOG OF CPT SOUNDING NO. B-12

PROJECT: **Howard T. Ennis School**
PROJECT NO.: **31190199**
PROJECT LOCATION: **Georgetown, Delaware**

WATER LEVEL (ft): **9.4**
DATE: **2/28/19**
CAVED (ft): **10.4**

DATE STARTED: **2/28/19**
DATE COMPLETED: **2/28/19**
DRILLING CONTRACTOR: **Geo-Technology Associates, Inc.**
DRILLER: **K. Kozak**
DRILLING METHOD: **CPT**
SAMPLING METHOD: **Not Sampled**

GROUND SURFACE ELEVATION: **30.3**
DATUM: **Survey**
CONE NO.: **DSG0857**
LOGGED BY: **TPC**
CHECKED BY: **GRS**



1 - sensitive fine grained
2 - organic
3 - clays
4 - silt mixtures
5 - sand mixtures
6 - sands - clean to silty
7 - dense to gravelly sand
8 - v. stiff to clayey sand
9 - v. stiff fine-grained

NOTES: **Hole backfilled upon completion**

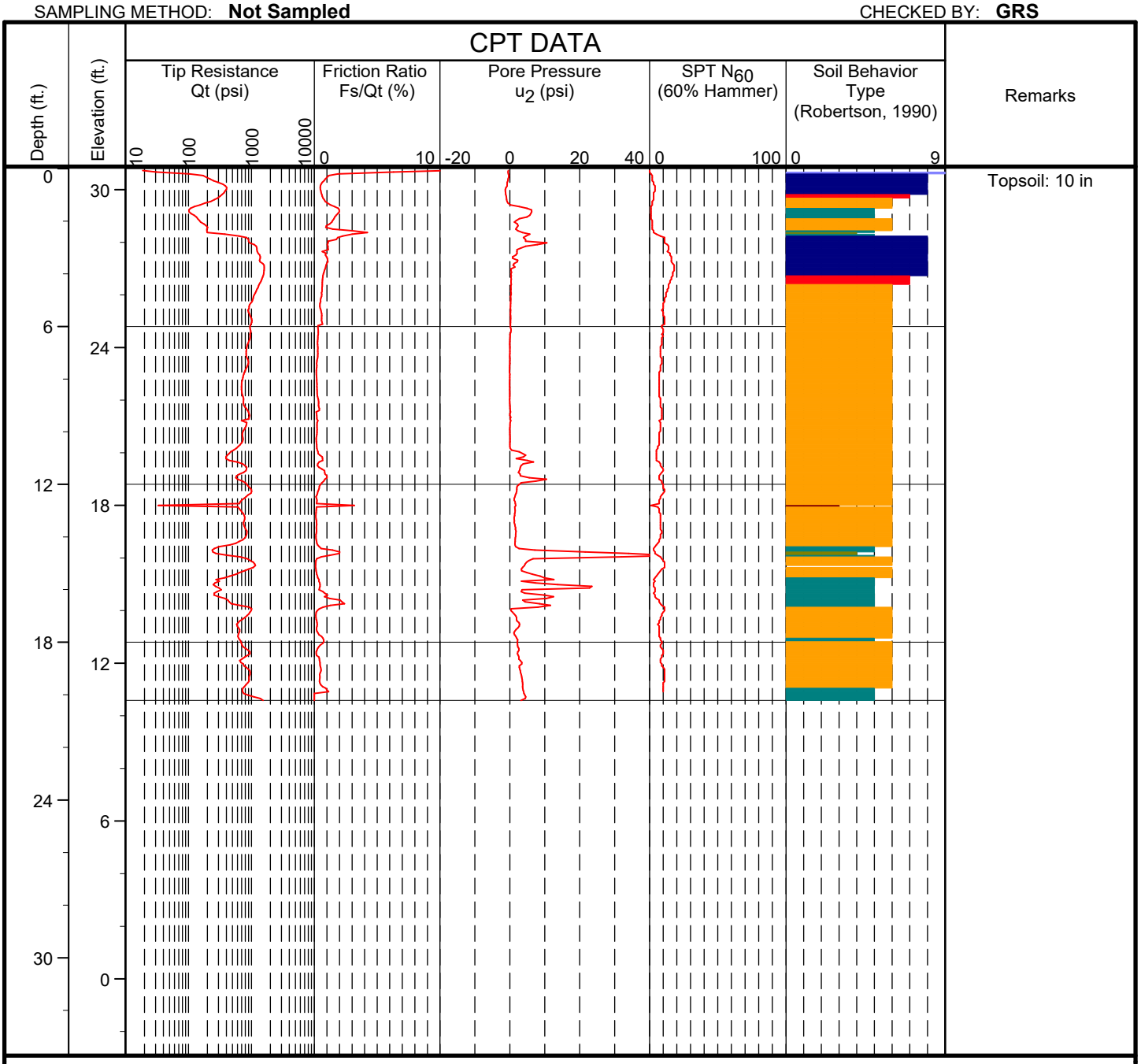
GEO-TECHNOLOGY ASSOCIATES, INC.
21133 Sterling Avenue, Suite 7
Georgetown, DE 19947

LOG OF SOUNDING NO. B-12

LOG OF CPT SOUNDING NO. B-13

PROJECT:	**Howard T. Ennis School**	WATER LEVEL (ft):	**10.1**		
PROJECT NO.:	**31190199**	DATE:	**2/28/19**		
PROJECT LOCATION:	**Georgetown, Delaware**	CAVED (ft):	**10.3**		

DATE STARTED:	**2/28/19**		
DATE COMPLETED:	**2/28/19**	GROUND SURFACE ELEVATION:	**30.8**
DRILLING CONTRACTOR:	**Geo-Technology Associates, Inc.**	DATUM:	**Survey**
DRILLER:	**K. Kozak**	CONE NO.:	**DSG0857**
DRILLING METHOD:	**CPT**	LOGGED BY:	**TPC**
SAMPLING METHOD:	**Not Sampled**	CHECKED BY:	**GRS**



1 - sensitive fine grained	4 - silt mixtures	7 - dense to gravelly sand
2 - organic	5 - sand mixtures	8 - v. stiff to clayey sand
3 - clays	6 - sands - clean to silty	9 - v. stiff fine-grained

NOTES: **Hole backfilled upon completion**

GEO-TECHNOLOGY ASSOCIATES, INC.
21133 Sterling Avenue, Suite 7
Georgetown, DE 19947

LOG OF SOUNDING NO. B-13

LOG OF BORING NO. B-14

PROJECT:	Howard T. Ennis School	WATER LEVEL (ft):	10.9	11.9
PROJECT NO.:	31190199	DATE:	02/26/19	02/27/19
PROJECT LOCATION:	Georgetown, Delaware	CAVED (ft):	-	-

DATE STARTED:	02/26/19	WATER ENCOUNTERED DURING DRILLING (ft)	10.9
DATE COMPLETED:	02/26/19	GROUND SURFACE ELEVATION:	31.3
DRILLING CONTRACTOR:	Manos Drilling Associates	DATUM:	Survey
DRILLER:	K. Manos	EQUIPMENT:	CME 55
DRILLING METHOD:	Hollow Stem Auger	LOGGED BY:	RC
SAMPLING METHOD:	Splitspoon	CHECKED BY:	GRS

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					31.3	0	TS		Topsoil: 8 in	
1	0.0	16	2-2-1-2	3	30.6		SC		Gray-brown, moist, very loose to medium dense, Clayey SAND	
2	2.0	18	3-5-11-11	16						
					27.3		SP-SM		Brown-gray, moist to wet, very loose to loose, Poorly-graded SAND with Silt	
3	4.0	18	6-5-5-6	10		6				
4	6.0	18	2-2-2-3	4						
5	8.0	18	2-2-3-4	5						
						12				
6	13.5	18	2-2-3	5			SP-SM		Brown, wet, loose to medium dense, Poorly-graded SAND with Silt with Gravel	
						18				
7	18.5	18	3-3-6	9						
						24				
8	23.5	18	3-5-7	12						
9	28.5	18	3-5-6	11						
					1.3	30			Bottom of hole 30 ft	
						36				

NOTES:

GEO-TECHNOLOGY ASSOCIATES, INC.
21133 Sterling Avenue, Suite 7
Georgetown, DE 19947

LOG OF BORING NO. B-14

LOG OF BORING NO. SWM-1

PROJECT:	Howard T. Ennis School	WATER LEVEL (ft):	6.0	4.5
PROJECT NO.:	31190199	DATE:	04/01/19	04/02/19
PROJECT LOCATION:	Georgetown, Delaware	CAVED (ft):	-	-

DATE STARTED:	04/01/19	WATER ENCOUNTERED DURING DRILLING (ft)	6.0
DATE COMPLETED:	04/01/19	GROUND SURFACE ELEVATION:	31.6
DRILLING CONTRACTOR:	Manos Drilling Associates	DATUM:	Survey
DRILLER:	K. Manos	EQUIPMENT:	Mobile B-57
DRILLING METHOD:	Hollow Stem Auger	LOGGED BY:	RC
SAMPLING METHOD:	Splitspoon	CHECKED BY:	GRS

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					31.6	0	TS		Topsoil; 4 in	
1	0.0	16	1-1-1-1	2	31.3		SM		Tan, moist, very loose, Silty SAND USDA: Sandy Loam	
2	2.0	16	1-1-1-1	2						
					27.6		SC		Tan, moist, medium dense, Clayey SAND USDA: Sandy Clay Loam	
3	4.0	18	11-12-13-13	25						
					25.6	6	CL		Gray, wet, stiff, Lean CLAY USDA: Clay Loam	
4	6.0	16	2-5-8-5	13						
5	8.0	18	5-6-6-7	12						
									Bottom of hole 10 feet.	
						12				
						18				
						24				
						30				
						36				

NOTES:

GEO-TECHNOLOGY ASSOCIATES, INC.
21133 Sterling Avenue, Suite 7
Georgetown, DE 19947

LOG OF BORING NO. SWM-1

LOG OF BORING NO. SWM-2

PROJECT:	Howard T. Ennis School	WATER LEVEL (ft):	6.5		7.0
PROJECT NO.:	31190199	DATE:	04/01/19		04/02/19
PROJECT LOCATION:	Georgetown, Delaware	CAVED (ft):	-		-

DATE STARTED:	04/01/19	WATER ENCOUNTERED DURING DRILLING (ft)	6.5
DATE COMPLETED:	04/01/19	GROUND SURFACE ELEVATION:	31.1
DRILLING CONTRACTOR:	Manos Drilling Associates	DATUM:	Survey
DRILLER:	K. Manos	EQUIPMENT:	Mobile B-57
DRILLING METHOD:	Hollow Stem Auger	LOGGED BY:	RC
SAMPLING METHOD:	Splitspoon	CHECKED BY:	GRS

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
1	0.0	18	1-3-3-3	6	31.1	0	TS		Topsoil; 4 in	
					30.8		SP-SM		Tan, moist, loose, Poorly-graded SAND with Silt USDA: Sandy Loam	
2	2.0	14	3-3-1-8	4	29.1		SC		Tan, moist to wet, very loose to medium dense, Clayey SAND USDA: Sandy Loam/Sandy Clay Loam	
3	4.0	18	10-11-17-15	28		6				
4	6.0	18	6-8-7-8	15						
5	8.0	18	5-4-4-6	8	21.6		CL		Tan, wet, medium stiff, Lean CLAY USDA: Clay Loam	
									Bottom of hole 10 feet	
						12				
						18				
						24				
						30				
						36				

NOTES:

GEO-TECHNOLOGY ASSOCIATES, INC.
21133 Sterling Avenue, Suite 7
Georgetown, DE 19947

LOG OF BORING NO. SWM-2

LOG OF BORING NO. SWM-3

PROJECT: **Howard T. Ennis School**
PROJECT NO.: **31190199**
PROJECT LOCATION: **Georgetown, Delaware**

WATER LEVEL (ft): 8.1 | | 6.2
DATE: 04/01/19 | | 04/02/19
CAVED (ft): - | | -

DATE STARTED: **04/01/19**
DATE COMPLETED: **04/01/19**
DRILLING CONTRACTOR: **Manos Drilling Associates**
DRILLER: **K. Manos**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING METHOD: **Splitspoon**

WATER ENCOUNTERED DURING DRILLING (ft) **8.1**
GROUND SURFACE ELEVATION: **31.4**
DATUM: **Survey**
EQUIPMENT: **Mobile B-57**
LOGGED BY: **RC**
CHECKED BY: **GRS**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					31.4	0	TS		Topsoil 4 in	
1	0.0	18	2-2-2-2	4	31.1		SM		Tan, moist, very loose to dense, Silty SAND USDA: Sandy Loam	
2	2.0	14	3-3-4-3	7						
3	4.0	18	7-13-21-14	34						
4	6.0	18	5-8-7-6	15		6				▼
5	8.0	18	3-3-6-6	9	23.4		CL		Tan, moist to wet, stiff, Sandy Lean CLAY USDA: Sandy Clay Loam	▼
									Bottom of hole 10 feet.	
						12				
						18				
						24				
						30				
						36				

NOTES:

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LOG OF BORING NO. SWM-3

LOG OF BORING NO. SWM-4

PROJECT:	Howard T. Ennis School	WATER LEVEL (ft):	5.2	9.4
PROJECT NO.:	31190199	DATE:	04/01/19	04/02/19
PROJECT LOCATION:	Georgetown, Delaware	CAVED (ft):	-	-

DATE STARTED:	04/01/19	WATER ENCOUNTERED DURING DRILLING (ft)	5.2
DATE COMPLETED:	04/01/19	GROUND SURFACE ELEVATION:	32.0
DRILLING CONTRACTOR:	Manos Drilling Associates	DATUM:	Survey
DRILLER:	K. Manos	EQUIPMENT:	Mobile B-57
DRILLING METHOD:	Hollow Stem Auger	LOGGED BY:	RC
SAMPLING METHOD:	Splitspoon	CHECKED BY:	GRS

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
1	0.0	18	1-3-3-3	6	32.0	0	TS		Topsoil; 4 in	
					31.7		SP-SM		Tan, moist, loose, Poorly-graded SAND with Silt USDA: Loamy Sand	
2	2.0	18	2-4-4-4	8	30.0		SM		Tan, moist to wet, loose to medium dense, Silty SAND USDA: Sandy Loam	
3	4.0	18	7-8-9-10	17		6				Perched water at 5 feet
4	6.0	18	4-6-7-8	13						
5	8.0	18	4-5-6-6	11						
						12			Bottom of hole 10 feet.	Air Temp: 70 deg. Weather: Part Cloudy Precipitation: Past 48 hrs: 0.0
						18				
						24				
						30				
						36				

NOTES:

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LOG OF BORING NO. SWM-4

LOG OF BORING NO. SWM-5

PROJECT: **Howard T. Ennis School**
PROJECT NO.: **31190199**
PROJECT LOCATION: **Georgetown, Delaware**

WATER LEVEL (ft):	7.8		8.8
DATE:	04/01/19		04/02/19
CAVED (ft):	-		-

DATE STARTED: **04/01/19**
DATE COMPLETED: **04/01/19**
DRILLING CONTRACTOR: **Manos Drilling Associates**
DRILLER: **K. Manos**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING METHOD: **Splitspoon**

WATER ENCOUNTERED DURING DRILLING (ft) **7.8**
GROUND SURFACE ELEVATION: **30.9**
DATUM: **Survey**
EQUIPMENT: **Mobile B-57**
LOGGED BY: **RC**
CHECKED BY: **GRS**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					30.9	0	TS		Topsoil; 4 in	
1	0.0	12	2-3-3-4	6	30.6		SP-SM		Tan, moist, loose, Poorly-graded SAND with Silt USDA: Loamy Sand	
					28.9		SM		Tan, moist to wet, loose to medium dense, Silty SAND USDA: Sandy Loam	
2	2.0	18	9-10-12-13	22						
3	4.0	18	8-8-9-9	17		6				
4	6.0	18	5-4-4-4	8						
					22.9		SP-SM		Tan, wet, loose, Poorly-graded SAND with Silt USDA: Loamy Sand	
5	8.0	18	3-3-3-4	6						
					20.9				Bottom of hole 10 feet	Air Temp: 70 deg. Weather: Part Cloudy Precipitation: Past 48 hrs: 0.0
						12				
						18				
						24				
						30				
						36				

NOTES:

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LOG OF BORING NO. SWM-5

LOG OF BORING NO. SWM-6

PROJECT: **Howard T. Ennis School**
PROJECT NO.: **31190199**
PROJECT LOCATION: **Georgetown, Delaware**

WATER LEVEL (ft):	4.5		5.1
DATE:	04/01/19		04/02/19
CAVED (ft):	-		-

DATE STARTED: **04/01/19**
DATE COMPLETED: **04/01/19**
DRILLING CONTRACTOR: **Manos Drilling Associates**
DRILLER: **K. Manos**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING METHOD: **Splitspoon**

WATER ENCOUNTERED DURING DRILLING (ft) **4.5**
GROUND SURFACE ELEVATION: **27.6**
DATUM: **Survey**
EQUIPMENT: **Mobile B-57**
LOGGED BY: **RC**
CHECKED BY: **GRS**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
1	0.0	18	6-7-6-6	13	27.6	0	TS		Topsoil; 4 in	
2	2.0	18	2-2-2-2	4	27.3		SP-SM		Tan, moist, very loose to medium dense, Poorly-graded SAND with Silt USDA: Loamy Sand	
3	4.0	18	6-6-6-6	12	23.6		SC		Tan, moist to wet, very loose to medium dense, Clayey SAND USDA: Sandy Clay Loam	
4	6.0	18	3-4-4-5	8		6				
5	8.0	9	2-3-1-2	4						
									Bottom of hole 10 feet	
						12				
						18				
						24				
						30				
						36				

NOTES:

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LOG OF BORING NO. SWM-6

LOG OF BORING NO. SWM-7

PROJECT: **Howard T. Ennis School**
PROJECT NO.: **31190199**
PROJECT LOCATION: **Georgetown, Delaware**

WATER LEVEL (ft):	9.3		6.5
DATE:	04/01/19		04/02/19
CAVED (ft):	-		-

DATE STARTED: **04/01/19**
DATE COMPLETED: **04/01/19**
DRILLING CONTRACTOR: **Manos Drilling Associates**
DRILLER: **K. Manos**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING METHOD: **Splitspoon**

WATER ENCOUNTERED DURING DRILLING (ft) **9.3**
GROUND SURFACE ELEVATION: **30.2**
DATUM: **Survey**
EQUIPMENT: **Mobile B-57**
LOGGED BY: **RC**
CHECKED BY: **GRS**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
1	0.0	18	3-2-1-2	3	30.2	0	TS		Topsoil; 4 in	
2	2.0	14	1-2-1-2	3	29.9		SP-SM		Tan, moist to wet, very loose to loose, Poorly-graded SAND with Silt USDA: Loamy Sand	
3	4.0	18	2-3-3-2	6						
4	6.0	18	2-2-3-5	5		6				
5	8.0	18	3-4-3-6	7						
									Bottom of hole 10 feet	
						12				
						18				
						24				
						30				
						36				

NOTES:

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LOG OF BORING NO. SWM-7

LOG OF BORING NO. SWM-8

PROJECT: **Howard T. Ennis School**
PROJECT NO.: **31190199**
PROJECT LOCATION: **Georgetown, Delaware**

WATER LEVEL (ft):	8.5		8.7
DATE:	04/01/19		04/02/19
CAVED (ft):	-		-

DATE STARTED: **04/01/19**
DATE COMPLETED: **04/01/19**
DRILLING CONTRACTOR: **Manos Drilling Associates**
DRILLER: **K. Manos**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING METHOD: **Splitspoon**

WATER ENCOUNTERED DURING DRILLING (ft) **8.5**
GROUND SURFACE ELEVATION: **29.8**
DATUM: **Survey**
EQUIPMENT: **Mobile B-57**
LOGGED BY: **RC**
CHECKED BY: **GRS**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)
1	0.0	13	2-2-3-4	5
2	2.0	18	3-4-4-5	8
3	4.0	18	5-5-5-4	10
4	6.0	18	4-3-3-3	6
5	8.0	18	3-2-2-3	4

ELEVATION (ft.)	DEPTH (ft.)	USCS	DESCRIPTION	REMARKS
29.8	0	TS	Topsoil; 4 in	
29.5		SP-SM	Tan, moist, loose, Poorly-graded SAND with Silt USDA: Loamy Sand	
28.8		SC	Tan, moist, loose, Clayey SAND USDA: Sandy Clay Loam	
27.8		SM	Tan, moist, loose, Silty SAND USDA: Sandy Loam / Loamy Sand	
25.8		SP-SM	Tan, moist, loose, Poorly-graded SAND with Silt USDA: Loamy Sand	
	6			
21.8		SC	Tan, moist to wet, very loose, Clayey SAND USDA: Sandy Clay Loam	
19.8			Bottom of hole 10 feet	Air Temp: 70 deg. Weather: Part Cloudy Precipitation: Past 48 hrs: 0.0
	12			
	18			
	24			
	30			
	36			

NOTES:

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LOG OF BORING NO. SWM-8

LOG OF BORING NO. SWM-9

PROJECT: **Howard T. Ennis School**
PROJECT NO.: **31190199**
PROJECT LOCATION: **Georgetown, Delaware**

WATER LEVEL (ft):	9.5		9.6
DATE:	04/01/19		04/02/19
CAVED (ft):	-		-

DATE STARTED: **04/01/19**
DATE COMPLETED: **04/01/19**
DRILLING CONTRACTOR: **Manos Drilling Associates**
DRILLER: **K. Manos**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING METHOD: **Splitspoon**

WATER ENCOUNTERED DURING DRILLING (ft) **9.5**
GROUND SURFACE ELEVATION: **31.1**
DATUM: **Survey**
EQUIPMENT: **Mobile B-57**
LOGGED BY: **RC**
CHECKED BY: **GRS**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
1	0.0	18	2-3-3-4	6	31.1	0	TS		Topsoil; 4 in	
					30.8		SC		Tan, moist, loose, Clayey SAND USDA: Sandy Clay Loam	
2	2.0	18	3-6-9-4	15	29.1		SP-SM		Tan, moist to wet, loose to medium dense, Poorly-graded SAND with Silt USDA: Loamy Sand	
3	4.0	18	5-5-5-5	10		6				
4	6.0	18	5-4-4-5	8						
5	8.0	18	4-4-4-8	8						
					21.1				Bottom of hole 10 feet	Air Temp: 70 deg. Weather: Part Cloudy Precipitation: Past 48 hrs: 0.0
						12				
						18				
						24				
						30				
						36				

NOTES:

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LOG OF BORING NO. SWM-9

LOG OF EXPLORATION NO. P-1

PROJECT: **Howard T. Ennis School**
PROJECT NO.: **31190199**
PROJECT LOCATION: **Georgetown, Delaware**

WATER LEVEL (ft):	Dry 5		4.8
DATE:	3/22/19		3/25/19
CAVED (ft):	-		-

DATE STARTED: **03/22/19**
DATE COMPLETED: **03/22/19**
DRILLING CONTRACTOR: **Geo-Technology Associates, Inc.**
DRILLER: **K. Mitchell**
DRILLING METHOD: **Auger**
SAMPLING METHOD: **Discrete**

GROUND SURFACE ELEVATION: **32.9**
DATUM: **Survey**
EQUIPMENT: **Hand Auger**
LOGGED BY: **RC**
CHECKED BY: **GRS**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE BLOWS/1¾ inches	DCP (see notes)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
				32.9	0	TS		Topsoil: 10 in	
				32.0		SP-SM		Light brown, moist, Poorly-graded SAND with Silt	
				30.9		SC		Brown, moist, Clayey SAND	
				27.9				Bottom of hole 5 ft.	
					6			Dynamic Cone Penetrometer is the approximate average per interval.	
					12				
					18				
					24				
					30				
					36				

NOTES:

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LOG OF EXPLORATION NO. P-1

LOG OF EXPLORATION NO. P-2

PROJECT: **Howard T. Ennis School**
PROJECT NO.: **31190199**
PROJECT LOCATION: **Georgetown, Delaware**

WATER LEVEL (ft):	Dry to 5		Dry to 5
DATE:	3/22/19		3/25/19
CAVED (ft):			

DATE STARTED: **03/22/19**
DATE COMPLETED: **03/22/19**
DRILLING CONTRACTOR: **Geo-Technology Associates, Inc.**
DRILLER: **K. Mitchell**
DRILLING METHOD: **Auger**
SAMPLING METHOD: **Discrete**

GROUND SURFACE ELEVATION: **31.4**
DATUM: **Survey**
EQUIPMENT: **Hand Auger**
LOGGED BY: **RC**
CHECKED BY: **GRS**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE BLOWS/1¾ inches	DCP (see notes)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
				31.4	0	TS		Topsoil: 10 in	
				30.5		SP-SM		Brown, moist, Poorly-graded SAND with Silt	
						SP-SM		Orange-gray, moist, Poorly-graded SAND with Silt with Gravel	
				26.4				Bottom of hole 5 ft.	
					6				
								Dynamic Cone Penetrometer is the approximate average per interval.	
					12				
					18				
					24				
					30				
					36				

NOTES:

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LOG OF EXPLORATION NO. P-2

LOG OF EXPLORATION NO. P-3

PROJECT:	**Howard T. Ennis School**	WATER LEVEL (ft):	**Dry to 5**		**Dry to 5**
PROJECT NO.:	**31190199**	DATE:	**3/22/19**		**3/25/19**
PROJECT LOCATION:	**Georgetown, Delaware**	CAVED (ft):			

DATE STARTED:	**03/22/19**	GROUND SURFACE ELEVATION:	**31.1**
DATE COMPLETED:	**03/22/19**	DATUM:	**Survey**
DRILLING CONTRACTOR:	**Geo-Technology Associates, Inc.**	EQUIPMENT:	**CME 55**
DRILLER:	**K. Mitchell**	LOGGED BY:	**RC**
DRILLING METHOD:	**Auger**	CHECKED BY:	**GRS**
SAMPLING METHOD:	**Discrete**		

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE BLOWS/1¾ inches	DCP (see notes)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
				31.1	0	TS		Topsoil: 12 in	
				30.1		SP-SM		Brown, moist, Poorly-graded SAND with Silt	
				27.6		SM		Tan, moist, Silty SAND	
				26.1				Bottom of hole 5 ft.	
					6				
								Dynamic Cone Penetrometer is the approximate average per interval.	
					12				
					18				
					24				
					30				
					36				

NOTES:

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LOG OF EXPLORATION NO. P-3

LOG OF EXPLORATION NO. P-4

PROJECT: **Howard T. Ennis School**
PROJECT NO.: **31190199**
PROJECT LOCATION: **Georgetown, Delaware**

WATER LEVEL (ft): **Dry to 5** | | **4.2**
DATE: **3/22/19** | | **3/25/19**
CAVED (ft): | | |

DATE STARTED: **03/22/19**
DATE COMPLETED: **03/22/19**
DRILLING CONTRACTOR: **Geo-Technology Associates, Inc.**
DRILLER: **K. Mitchell**
DRILLING METHOD: **Auger**
SAMPLING METHOD: **Discrete**

GROUND SURFACE ELEVATION: **31.9**
DATUM: **Survey**
EQUIPMENT: **Hand Auger**
LOGGED BY: **RC**
CHECKED BY: **GRS**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE BLOWS/1¾ inches	DCP (see notes)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
				31.9	0	TS		Topsoil: 12 in	
				30.9		SP-SM		Brown, moist, Poorly-graded SAND with Silt	
				28.5		SP		Orange, moist, Poorly-graded SAND	
				26.9				Bottom of hole 5 ft.	
					6				
								Dynamic Cone Penetrometer is the approximate average per interval.	
					12				
					18				
					24				
					30				
					36				

NOTES:

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LOG OF EXPLORATION NO. P-4

LOG OF EXPLORATION NO. P-5

PROJECT:	**Howard T. Ennis School**	WATER LEVEL (ft):	**3.0**		**3.8**
PROJECT NO.:	**31190199**	DATE:	**03/22/19**		**3/25/19**
PROJECT LOCATION:	**Georgetown, Delaware**	CAVED (ft):		-	

DATE STARTED:	**03/22/19**	GROUND SURFACE ELEVATION:	**31.0**
DATE COMPLETED:	**03/22/19**	DATUM:	**Survey**
DRILLING CONTRACTOR:	**Geo-Technology Associates, Inc.**	EQUIPMENT:	**Hand Auger**
DRILLER:	**K. Mitchell**	LOGGED BY:	**RC**
DRILLING METHOD:	**Auger**	CHECKED BY:	**GRS**
SAMPLING METHOD:	**Discrete**		

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE BLOWS/1¾ inches	DCP (see notes)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
				31.0	0	TS		Topsoil: 16 in	
				29.7		SP-SM		Brown, moist, Poorly-graded SAND with Silt	
				26.0				Bottom of hole 5 ft.	
					6			Dynamic Cone Penetrometer is the approximate average per interval.	
					12				
					18				
					24				
					30				
					36				

NOTES:

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LOG OF EXPLORATION NO. P-5

LOG OF EXPLORATION NO. P-6

PROJECT:	**Howard T. Ennis School**	WATER LEVEL (ft):	**2.6**		**3.2**
PROJECT NO.:	**31190199**	DATE:	**03/22/19**		**3/25/19**
PROJECT LOCATION:	**Georgetown, Delaware**	CAVED (ft):			

DATE STARTED:	**03/22/19**	GROUND SURFACE ELEVATION:	**32.2**
DATE COMPLETED:	**03/22/19**	DATUM:	**Survey**
DRILLING CONTRACTOR:	**Geo-Technology Associates, Inc.**	EQUIPMENT:	**CME 55**
DRILLER:	**K. Mitchell**	LOGGED BY:	**RC**
DRILLING METHOD:	**Auger**	CHECKED BY:	**GRS**
SAMPLING METHOD:	**Discrete**		

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE BLOWS/1¾ inches	DCP (see notes)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
				32.2	0	TS		Topsoil: 14 in	
				31.0		SP-SM		Brown, moist, Poorly-graded SAND with Silt	
				27.2				Bottom of hole 5 ft.	
					6			Dynamic Cone Penetrometer is the approximate average per interval.	
					12				
					18				
					24				
					30				
					36				

NOTES:

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LOG OF EXPLORATION NO. P-6

LOG OF EXPLORATION NO. P-7

PROJECT: **Howard T. Ennis School**
PROJECT NO.: **31190199**
PROJECT LOCATION: **Georgetown, Delaware**

WATER LEVEL (ft): **Dry to 5** | | **Dry to 5**
DATE: **3/22/19** | | **3/25/19**
CAVED (ft): | |

DATE STARTED: **03/22/19**
DATE COMPLETED: **03/22/19**
DRILLING CONTRACTOR: **Geo-Technology Associates, Inc.**
DRILLER: **K. Mitchell**
DRILLING METHOD: **Auger**
SAMPLING METHOD: **Discrete**

GROUND SURFACE ELEVATION: **30.1**
DATUM: **Survey**
EQUIPMENT: **Hand Auger**
LOGGED BY: **RC**
CHECKED BY: **GRS**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE BLOWS/1¾ inches	DCP (see notes)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
				30.1	0	TS		Topsoil: 9 in	
				29.3		SP-SM		Brown, moist, Poorly-graded SAND with Silt	
				28.6		SC		Brown, moist, Clayey SAND	
				27.6		SP-SM		Brown-orange, moist, Poorly-graded SAND with Silt with Gravel	
				25.1				Bottom of hole 5 ft.	
					6			Dynamic Cone Penetrometer is the approximate average per interval.	
					12				
					18				
					24				
					30				
					36				

NOTES:

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LOG OF EXPLORATION NO. P-7

LOG OF EXPLORATION NO. P-8

PROJECT: **Howard T. Ennis School**
PROJECT NO.: **31190199**
PROJECT LOCATION: **Georgetown, Delaware**

WATER LEVEL (ft):	Dry to 5		Dry to 5
DATE:	3/22/19		3/25/19
CAVED (ft):			

DATE STARTED: **03/22/19**
DATE COMPLETED: **03/22/19**
DRILLING CONTRACTOR: **Geo-Technology Associates, Inc.**
DRILLER: **K. Mitchell**
DRILLING METHOD: **Auger**
SAMPLING METHOD: **Discrete**

GROUND SURFACE ELEVATION: **31.2**
DATUM: **Survey**
EQUIPMENT: **Hand Auger**
LOGGED BY: **RC**
CHECKED BY: **GRS**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE BLOWS/1¾ inches	DCP (see notes)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
				31.2	0	TS		Topsoil: 10 in	
				30.3		SP-SM		Brown, moist, Poorly-graded SAND with Silt	
				29.2		SC		Brown-orange, moist, Clayey SAND	
				26.2				Bottom of hole 5 ft	
					6				
								Dynamic Cone Penetrometer is the approximate average per interval.	
					12				
					18				
					24				
					30				
					36				

NOTES:

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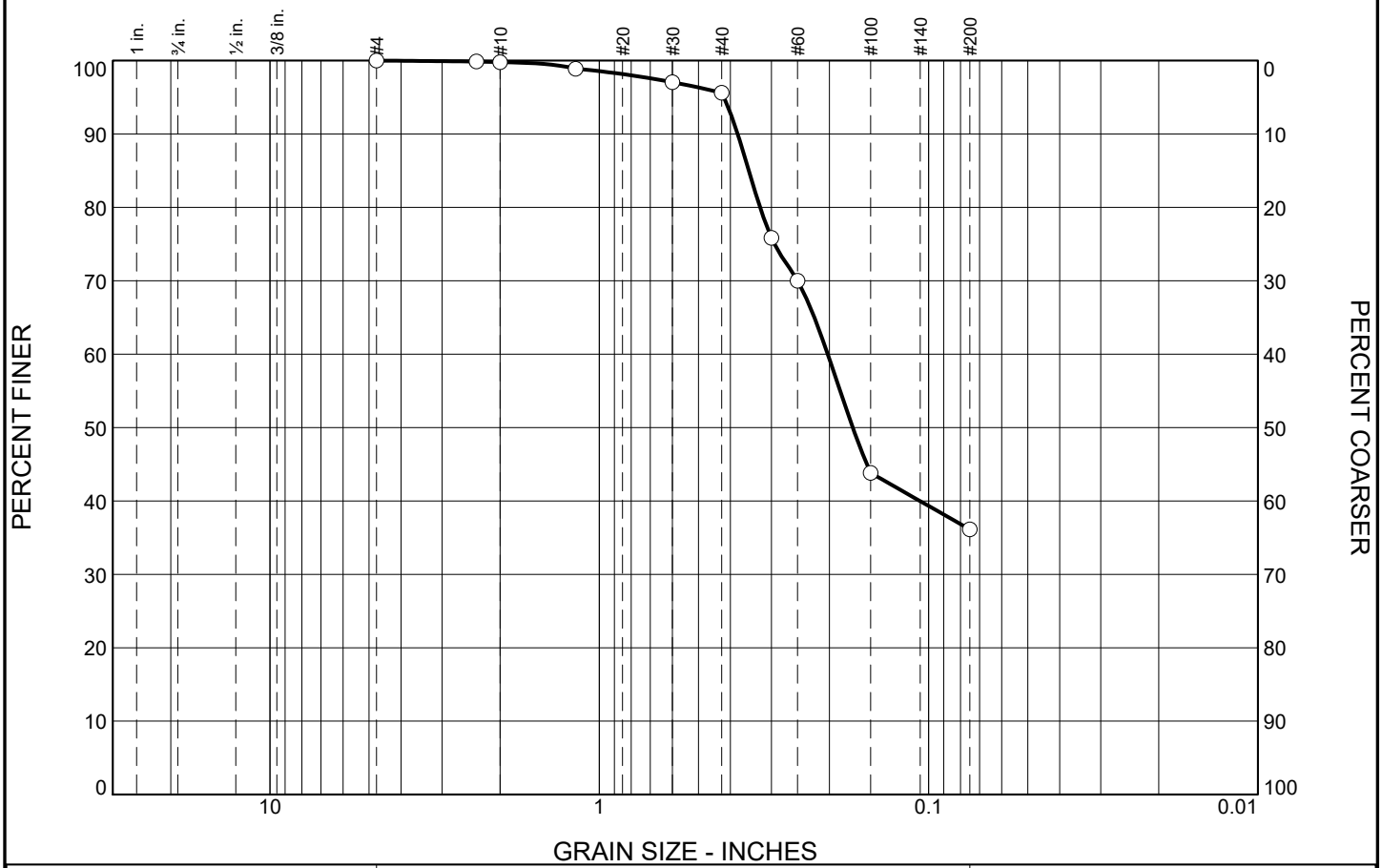
LOG OF EXPLORATION NO. P-8

APPENDIX C

LABORATORY DATA

Particle Size Distribution Report



% Gravel		% Sand			% Fines
Coarse	Fine	Coarse	Medium	Fine	
0.0	0.0	0.2	4.2	59.5	36.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
# 4	100.0		
# 8	99.9		
# 10	99.8		
# 16	98.9		
# 30	97.1		
# 40	95.6		
# 50	75.8		
# 60	70.0		
# 100	43.8		
# 200	36.1		

* (no specification provided)

Soil Description

Brown, Silty SAND

Atterberg Limits

PL= NP LL= NP PI= NP NM= 33.8

Coefficients

D_{90}= 0.3802 D_{85}= 0.3515 D_{60}= 0.2025
D_{50}= 0.1700 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-4(0)

Remarks

Location: B-2
Depth: 13.5'-15'

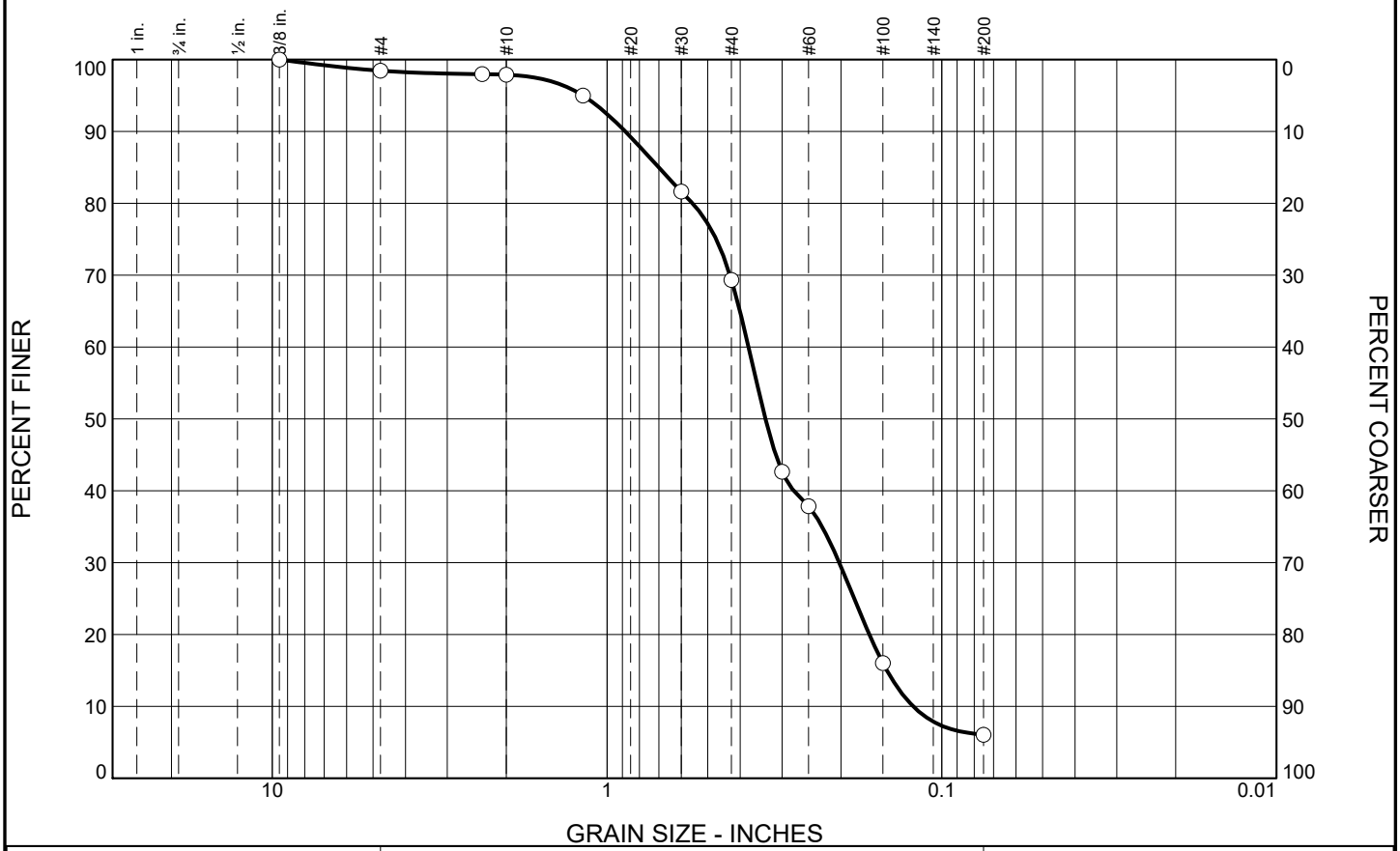
Date: 2/27/19

GEO-TECHNOLOGY ASSOCIATES, INC.
21133 Sterling Avenue, Suite 7
Georgetown, DE 19947

Client: Fearn-Clandaniel Architects
Project: Howard T. Ennis School

Project No: 31190199 **Figure**

Particle Size Distribution Report



% Gravel		% Sand			% Fines
Coarse	Fine	Coarse	Medium	Fine	
0.0	1.5	0.6	28.6	63.2	6.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8 in	100.0		
# 4	98.5		
# 8	98.0		
# 10	97.9		
# 16	95.0		
# 30	81.6		
# 40	69.3		
# 50	42.6		
# 60	37.9		
# 100	16.0		
# 200	6.1		

* (no specification provided)

Soil Description

Gray, Poorly-graded SAND with Silt

Atterberg Limits

PL= NP LL= NP PI= NP NM= 5.5

Coefficients

D_{90}= 0.8823 D_{85}= 0.7005 D_{60}= 0.3779
D_{50}= 0.3361 D_{30}= 0.2024 D_{15}= 0.1459
D_{10}= 0.1217 C_u= 3.10 C_c= 0.89

Classification

USCS= SP-SM AASHTO= A-3

Remarks

Location: B-3
Depth: 1'-4'

Date: 03/05/19

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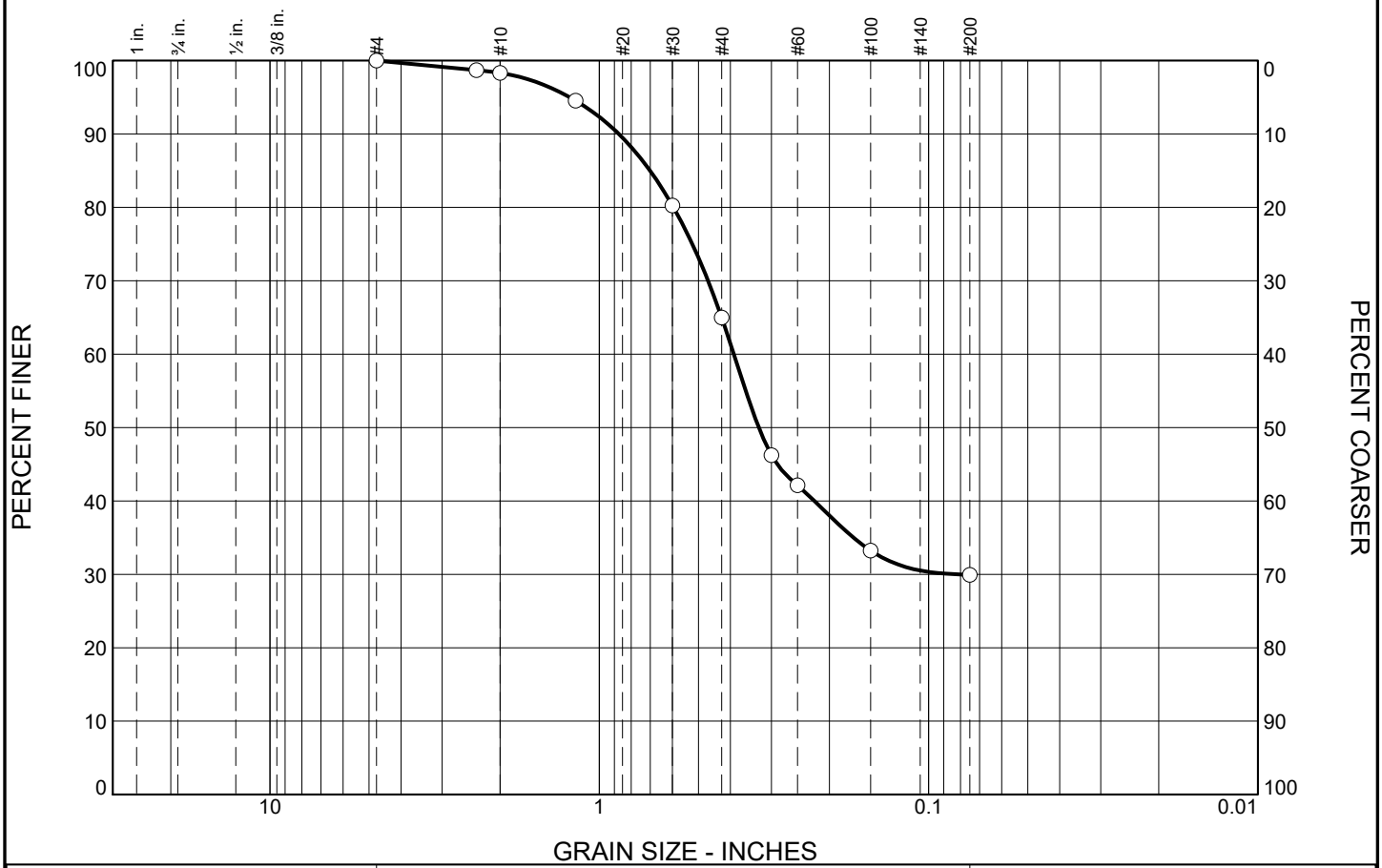
21133 Sterling Avenue, Suite 7
Georgetown, DE 19947

Client: Fearn-Clandaniel Architects
Project: Howard T. Ennis School

Project No: 31190199 **Figure**

Tested By: JNJ **Checked By:** GRS

Particle Size Distribution Report



% Gravel		% Sand			% Fines
Coarse	Fine	Coarse	Medium	Fine	
0.0	0.0	1.7	33.3	35.1	29.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
# 4	100.0		
# 8	98.7		
# 10	98.3		
# 16	94.5		
# 30	80.3		
# 40	65.0		
# 50	46.2		
# 60	42.1		
# 100	33.2		
# 200	29.9		

* (no specification provided)

Soil Description

Brown, Silty SAND

Atterberg Limits

PL= NP LL= NP PI= NP NM= 10.8

Coefficients

D_{90}= 0.8723 D_{85}= 0.7011 D_{60}= 0.3904
D_{50}= 0.3277 D_{30}= 0.0818 D_{15}=
D_{10}= C_u= C_c=

Classification

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

Remarks

Location: B-4
Depth: 0.7'-2'

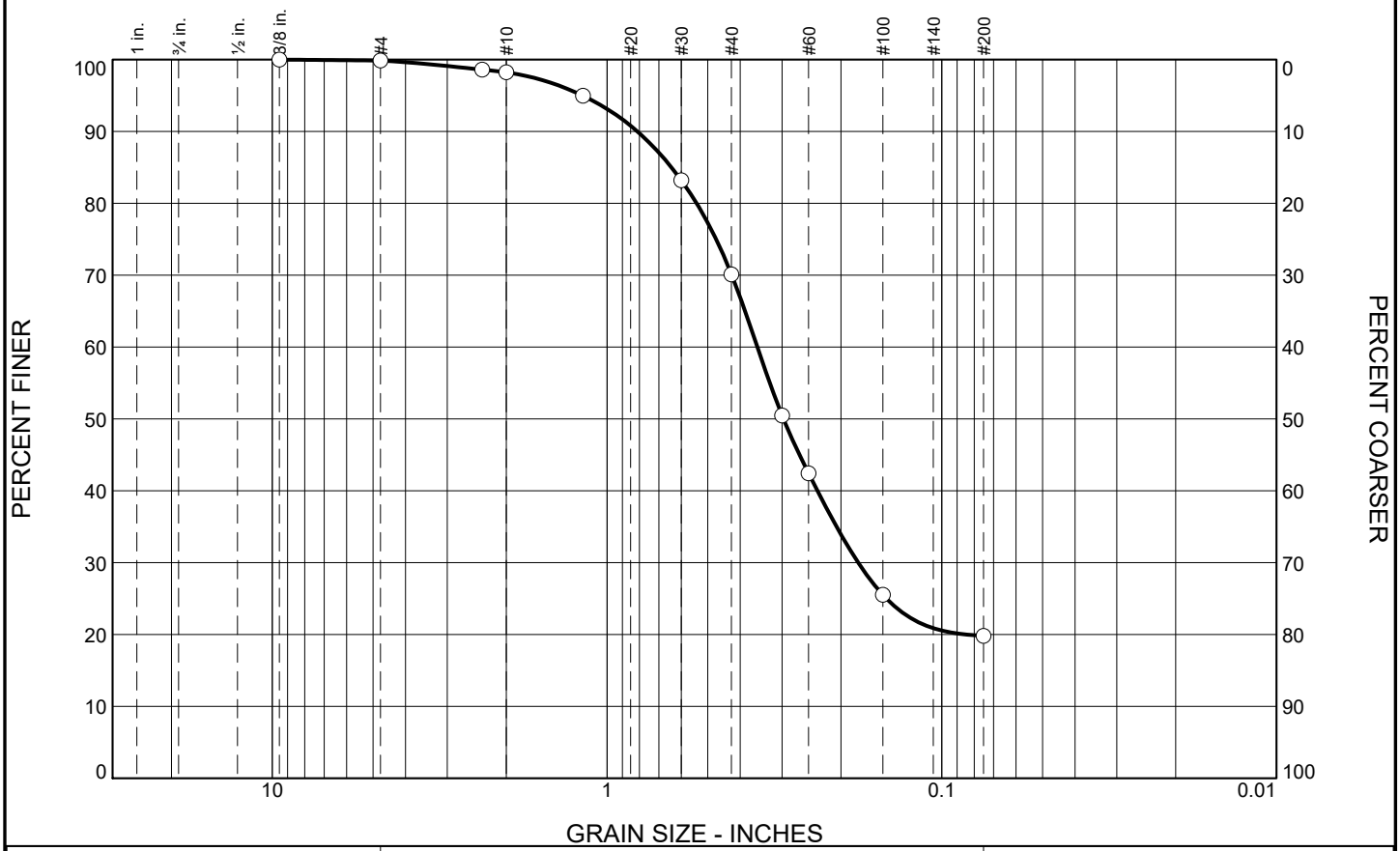
Date: 2/27/19

GEO-TECHNOLOGY ASSOCIATES, INC.
21133 Sterling Avenue, Suite 7
Georgetown, DE 19947

Client: Fearn-Clandaniel Architects
Project: Howard T. Ennis School

Project No: 31190199 **Figure**

Particle Size Distribution Report



% Gravel		% Sand			% Fines
Coarse	Fine	Coarse	Medium	Fine	
0.0	0.1	1.7	28.1	50.3	19.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8 in	100.0		
# 4	99.9		
# 8	98.6		
# 10	98.2		
# 16	95.0		
# 30	83.2		
# 40	70.1		
# 50	50.5		
# 60	42.4		
# 100	25.5		
# 200	19.8		

* (no specification provided)

Soil Description

Brown, Silty SAND

Atterberg Limits

PL= NP LL= NP PI= NP NM= 30.2

Coefficients

D_{90}= 0.8113 D_{85}= 0.6420 D_{60}= 0.3554
D_{50}= 0.2972 D_{30}= 0.1776 D_{15}=
D_{10}= C_u= C_c=

Classification

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

Remarks

Location: B-7
Depth: 2'-4'

Date: 2/27/19

GEO-TECHNOLOGY ASSOCIATES, INC.
21133 Sterling Avenue, Suite 7
Georgetown, DE 19947

Client: Fearn-Clandaniel Architects
Project: Howard T. Ennis School

Project No: 31190199 **Figure**

Tested By: SW **Checked By:** GRS

MOISTURE DENSITY RELATIONSHIP TEST REPORT
ASTM D 1557-12 Method A Modified

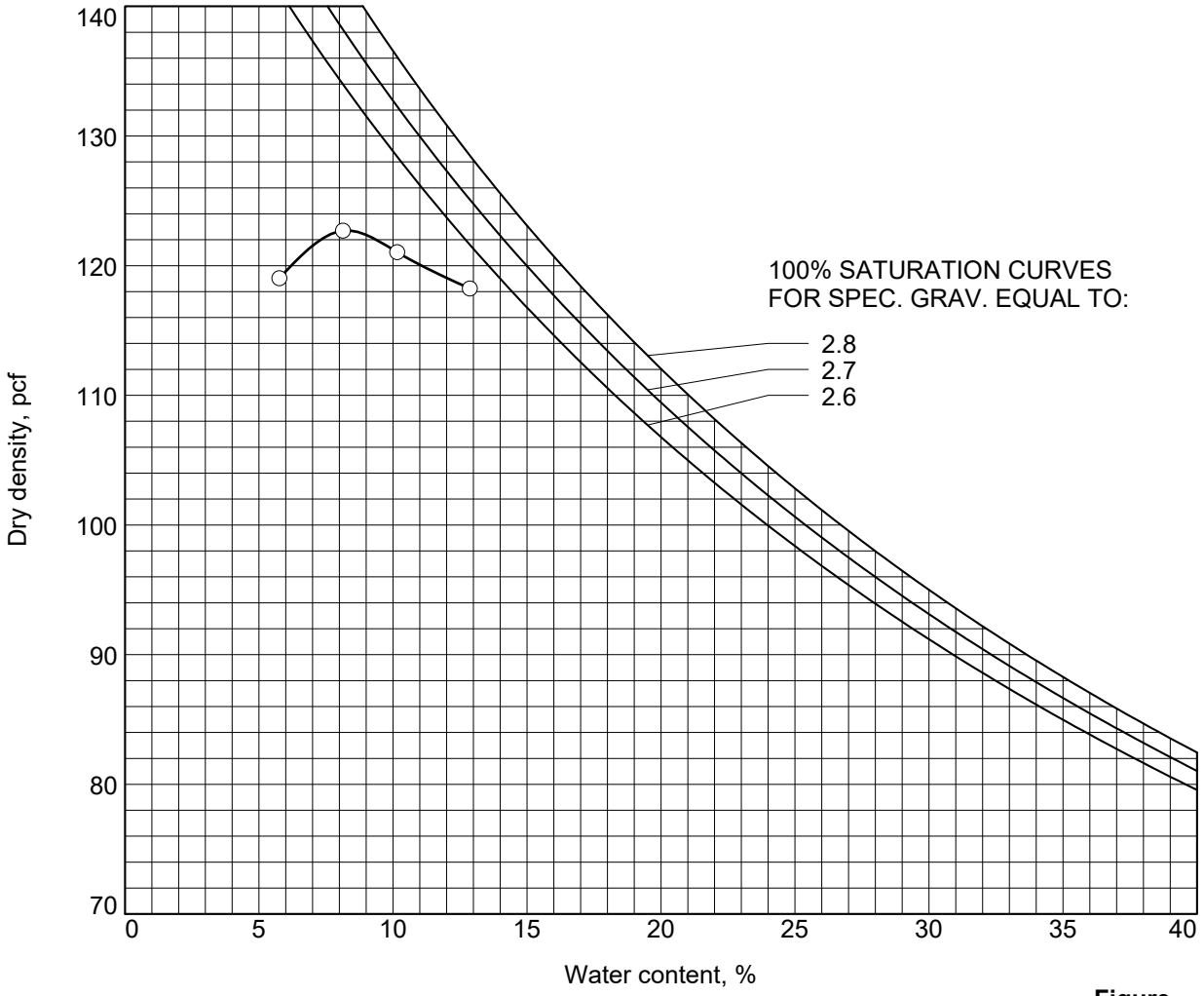
Project No.: 31190199 **Date:** 03/05/19
Project: Howard T. Ennis School
Client: Fearn-Clandaniel Architects
Location: B-3
Depth: 1'-4'
Remarks:

MATERIAL DESCRIPTION

Description: Gray, Poorly-graded SAND with Silt

Classifications - **USCS:** SP-SM **AASHTO:** A-3
Nat. Moist. = 5.5 % **Sp.G. =**
Liquid Limit = NP **Plasticity Index =** NP
% < No.200 = 6.1 %

TEST RESULTS
Maximum dry density = 122.7 pcf
Optimum moisture = 8.3 %

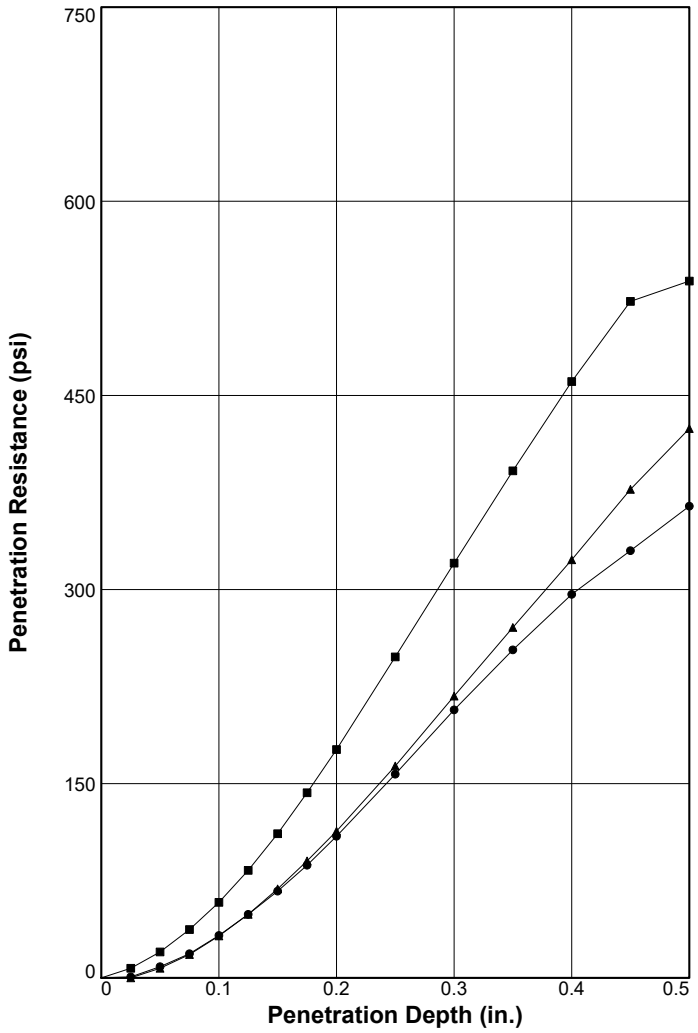


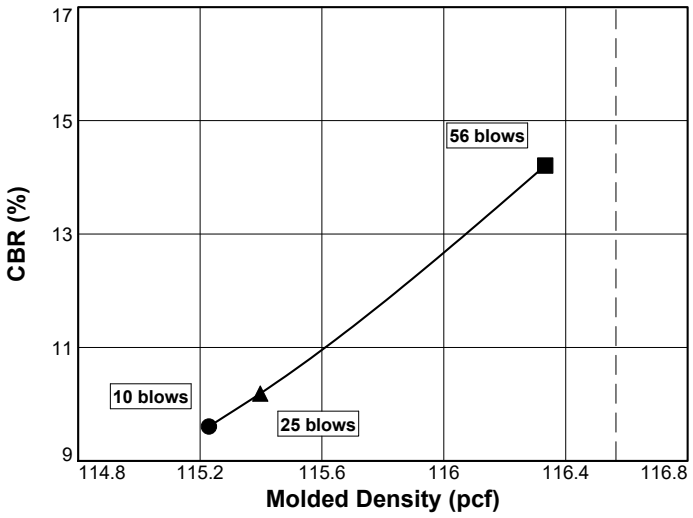
Figure

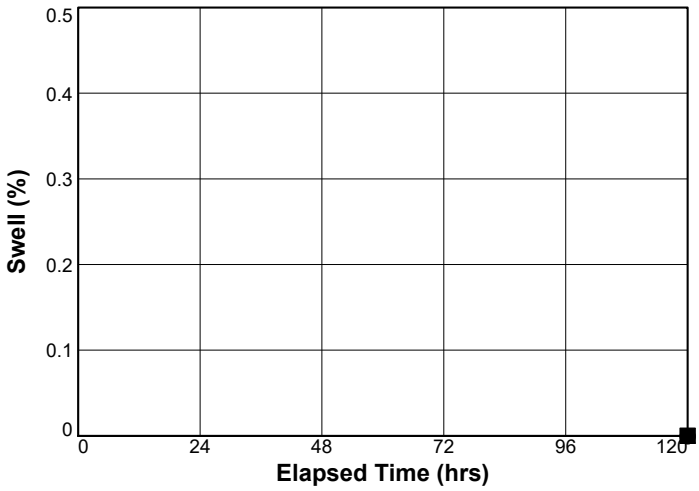
Geo-Technology Associates, Inc.

Tested By: JNJ **Checked By:** GRS

BEARING RATIO TEST REPORT
ASTM D1883-14







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ●	115.2	93.9	10.4	115.2	93.9	11.1	9.6	12.8	0.085	10	0
2 ▲	115.4	94.1	10.8	115.4	94	11.0	10.2	13.6	0.088	10	0
3 ■	116.3	94.8	10.2	116.3	94.8	11.1	14.2	18.9	0.074	10	0

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Gray, Poorly-graded SAND with Silt	SP-SM	122.7	8.3	NP	NP

Project No: 31190199

Project: Howard T. Ennis School

Location: B-3

Depth: 1'-4'

Date: 03/05/19

GEO-TECHNOLOGY ASSOCIATES, INC.
21133 Sterling Avenue, Suite 7
Georgetown, DE 19947

Test Description/Remarks:

Figure _____

GEO-TECHNOLOGY ASSOCIATES, INC.

GEOTECHNICAL AND
ENVIRONMENTAL CONSULTANTS

A Practicing Geoprofessional Business Association Member Firm

June 21, 2019

Fearn-Clendaniel Architects, Inc.
6 Larch Avenue #398
Wilmington, Delaware 19804

Attn: Wayde B. Clendaniel, AIA
Principal

Re: Report of Stormwater Management Subsurface Exploration
Howard T. Ennis School
Sussex County, Delaware

Ladies & Gentlemen:

In accordance with our agreement dated January 18, 2019, Geo-Technology Associates, Inc. (GTA) has performed a subsurface exploration for stormwater management (SWM) areas for the above referenced project. The purpose of the subsurface exploration was to evaluate the estimated normal seasonal high groundwater elevation; discuss suitability of the subsoils to facilitate infiltration practices at selected test locations; and to present the subsoil conditions encountered at selected borings. A concept plan prepared by Fearn-Clendaniel Architects, Inc. and a plan titled Record Plan prepared for Indian River School District prepared by Colm DeAscanis Engineering, Inc. (CDA) and dated January 25, 2019, were referenced for this report. This report supplements our report dated May 21, 2019. The results of our subsurface exploration are summarized below.

Referring to the attached Site Location Plan, the site is situated along the east side of Patriots Way across from Sussex Central High School, in Sussex County, Delaware. The project site is situated within a rectangular shaped parcel with open farrow farm fields. A cemetery is located at the northeast corner of the property. The project site is generally flat with the ground surface ranging from Elevation 27 to 32 Mean Sea Level (MSL), as determined by CDA Engineering, Inc.

According to the Geologic Map of the Harbeson Quadrangle, Delaware (2011) published by the Delaware Geological Survey, the site is within the Coastal Plain Physiographic Province. Coastal Plain sediments below the surficial deposits exposed in the site area were generally deposited in commonly estuarine environments of Quaternary geologic age. The Pleistocene deposits are designated as the Lynch Heights Formation of the Delaware Bay Group and typically consist of "… silty, clayey, very coarse to fine sand … to gravelly sand to sandy gravel." Please refer to the publication for additional information.

From review of the USDA Soil Survey, the soils in the proposed SWM areas conform to Pepperbox-Rosedale Complex (0 to 2 percent slopes). The proposed northwest SWM area (Borings SWM-4, SWM-5 and SWM-6) also has soils conforming to Fort Mott-Henlopen complex (2 to 5 percent slopes). The soils map information is attached.

From review of the attached Monthly Groundwater Depth for Qe44-01, Columbia Aquifer, taken from the Delaware Geological Survey website, the groundwater depth at Well Qe44-01, was near the normal seasonal high during the period when the borings were performed April 1, 2019 (end of March 2019 period).

GTA performed nine borings, designated as SWM-1 through SWM-9, to a depth of 10 feet below the ground surface, except where wet or caving conditions were encountered at a nominal depth of 7 to 9½ feet below the ground surface. Temporary piezometers were placed in each test hole and longer-term water readings were taken one day after completion. The piezometers were removed after the long-term readings. Exploration locations SWM-1 through SWM-9 were selected and staked with elevations determined by CDA. Relative locations are shown on the attached Exploration Location Plan. The exploration locations indicated on the plan should be considered approximate.

The soils were visually classified in accordance with the Unified Soil Classification System (USCS) and the United States Department of Agriculture (USDA) classification system. Beneath an approximately 4-inch thick surface topsoil layer, the explorations generally encountered native subsoils visually classified as predominately consisting of Poorly-graded SANDs with Silt (USCS: SP-SM; USDA: Loamy Sand/Sand), Poorly-graded SANDs (SP; Sand), Silty SANDs (SM; Sandy Loam/Loamy Sand), Clayey SAND (SC; Sandy Loam/Sandy Clay Loam) and Lean CLAY (CL; Clay Loam).

GTA's estimate of the seasonal high groundwater level at the borings is based upon water levels near seasonal high; and soil coloring, mottling and/or saturation. The results of the groundwater level readings and GTA's opinion of the estimated seasonal high groundwater depth are summarized as follows:

GROUNDWATER DATA SUMMARY

Exploration No.	Existing Ground Surface Elevation (MSL)	Depth Below Existing Ground Surface (ft.)/ Elevation (MSL) to Groundwater at Completion	Depth Below Existing Ground Surface (ft.)/ Elevation (MSL) to Groundwater At One Day After Completion	*Depth Below Existing Ground Surface (ft.)/ Elevation (MSL) to Estimated Seasonal High Groundwater
SWM-1	EL 31.6	6.0 / EL 25.6	4.5 / EL 27.1	4 / EL 28 (Perched)
SWM-2	EL 31.1	6.5 / EL 24.6	7.0 / EL 24.1	6 / EL 25
SWM-3	EL 31.4	8.1 / EL 23.3	6.2 / EL 25.2	6 / EL 25
SWM-4	EL 32.0	5.2 / EL 26.8	9.4 / EL 22.6	5 / EL 27 (Perched)
SWM-5	EL 30.9	7.8 / EL 23.1	8.8 / EL 22.1	7 / EL 24

Exploration No.	Existing Ground Surface Elevation (MSL)	Depth Below Existing Ground Surface (ft.)/ Elevation (MSL) to Groundwater at Completion	Depth Below Existing Ground Surface (ft.)/ Elevation (MSL) to Groundwater At One Day After Completion	*Depth Below Existing Ground Surface (ft.)/ Elevation (MSL) to Estimated Seasonal High Groundwater
SWM-6	EL 27.6	4.5 / EL 23.1	5.1 / EL 22.5	4 / EL 24
SWM-7	EL 30.2	9.3 / EL 20.9	6.5 / EL 23.7	6 / EL 24
SWM-8	EL 29.8	8.5 / EL 21.3	8.7 / EL 21.1	8 / EL 22
SWM-9	EL 31.1	9.5 / EL 21.6	9.6 / EL 21.5	9 / EL 22

*Seasonal high groundwater estimate based upon observed soil mottling, color and/or saturation and should be considered approximate.

The groundwater levels can be expected to fluctuate with seasonal changes, precipitation, and other factors such as development activity. Additionally, perched water conditions develop in granular soils overlying fine-grained soils during the "wet season" as well as during periods of precipitation. Please refer to the exploration logs provided in the attachments for further information.

Single ring, 5 to 12-inch diameter, falling head infiltration tests were also performed offset from the borings. The single rings were seated approximately 1-inch deep. Deeper test depths were performed using a 5-inch inside diameter ring setup as a single ring test (e.g., test is not run as a cased borehole permeameter with a significant soil column driven up inside the casing). For comparative purposes, companion 5-inch and 12-inch diameter tests were performed which indicated similar test results. The infiltration test holes were pre-soaked prior to the falling 6-inch head tests. The results of the infiltration tests and the estimated seasonal high groundwater, soil type, and our opinion of infiltration suitability are summarized as follows:

SUMMARY OF INFILTRATION DATA

TEST NO.	CASING DIAMETER (IN)	*Depth Below Existing Ground Surface (ft.)/ Elevation (MSL) to Estimated Seasonal High Groundwater	INFILTRATION TEST DEPTH BELOW EXISTING GROUND SURFACE (FT)/ ELEVATION (MSL)	**INFILTRATION TEST INFILTRATION RATE (IN/HR)	ESTIMATED VISUAL USDA SOIL CLASSIFICATION	SUITABILITY OF LOCATION FOR INFILTRATION PRACTICE
SWM-1	5	4 / EL 28 (Perched)	2.5 / EL 28.8	1.1	Sandy Loam	Marginal
SWM-2	5	6 / EL 25	4.0 / EL 27.1	0.5	Sandy Clay Loam	Unsuitable
SWM-3	5	6 / EL 25	4.0 / EL 27.4	0.8	Sandy Loam	Unsuitable
SWM-4	5	5 / EL 27 (Perched)	3.0 / EL 29.0	1.4	Sandy Loam	Marginal
SWM-4	12	5 / EL 27 (Perched)	3.0 / EL 29.0	1.6	Sandy Loam	Marginal
SWM-4	5	5 / EL 27 (Perched)	4.0 / EL 28	1.1	Sandy Loam	Marginal
SWM-5	5	7 / EL 24	2.0 / EL 28.9	0.2	Sandy Loam	Unsuitable

TEST NO.	CASING DIAMETER (IN)	*Depth Below Existing Ground Surface (ft.)/ Elevation (MSL) to Estimated Seasonal High Groundwater	INFILTRATION TEST DEPTH BELOW EXISTING GROUND SURFACE (FT)/ ELEVATION (MSL)	**INFILTRATION TEST INFILTRATION RATE (IN/HR)	ESTIMATED VISUAL USDA SOIL CLASSIFICATION	SUITABILITY OF LOCATION FOR INFILTRATION PRACTICE
SWM-5	12	7 / EL 24	2.0 / EL 28.9	0.6	Sandy Loam	Unsuitable
SWM-5	5	7 / EL 24	4.0 / EL 26.9	1.8	Sandy Loam	Marginal
SWM-5	5	7 / EL 24	6.0 / EL 24.9	0.6	Sandy Loam	Unsuitable
SWM-6	5	4 / EL 24	2.0 / EL 25.6	3.0	Loamy Sand	Suitable
SWM-6	12	4 / EL 24	2.0 / EL 25.6	3.0	Loamy Sand	Suitable
SWM-6	5	4 / EL 24	3.0 / EL 24.6	2.7	Loamy Sand	Suitable
SWM-7	5	6 / EL 24	4.5 / EL 25.7	3.0	Loamy Sand	Suitable
SWM-8	5	8 / EL 22	6.5 / EL 23.3	1.4	Loamy Sand/ Sandy Loam	Marginal
SWM-9	5	9 / EL 22	7.5 / EL 23.6	2.7	Loamy Sand	Suitable

*Seasonal high groundwater estimate based upon observed soil mottling, color and/or saturation and should be considered approximate.
** Infiltration tests performed in general accordance with ASTM D-5126.

The guidelines established in the *Delaware Post Construction Stormwater BMP Standards & Specifications*, dated February 2019 indicate that the minimum infiltration rate for all runoff reduction and infiltration practices is one-inch per hour. Also, a vertical separation of at least two-feet from the seasonal high groundwater elevation or limiting layer is required for all infiltration practices unless an underdrain is provided.

Based on our observations and testing made during the subsurface exploration, our opinion of managing stormwater quality through the use of infiltration practices in the proposed SWM areas is summarized below:

SUMMARY OF INFILTRATION SUITABILITY

SWM AREA	SUITABILITY OF LOCATION FOR INFILTRATION PRACTICE	RECOMMENDED FACILITY BOTTOM RANGE OF ELEVATION (MSL)	RECOMMENDED (FS=2) MAXIMUM DESIGN INFILTRATION RATE (IN/HR)
SWM-1	Unsuitable	None	None
SWM-2	Unsuitable	None	None
SWM-3	Unsuitable	None	None
SWM-4	Marginal	EL 31 to 29	0.8

SWM AREA	SUITABILITY OF LOCATION FOR INFILTRATION PRACTICE	RECOMMENDED FACILITY BOTTOM RANGE OF ELEVATION (MSL)	RECOMMENDED (FS=2) MAXIMUM DESIGN INFILTRATION RATE (IN/HR)
SWM-5	Marginal	EL 27	0.9
SWM-6	Suitable	EL 26	1.5
SWM-7	Suitable	EL 29 to 26	1.5
SWM-8	Marginal	EL 26 to 24	0.7
SWM-9	Suitable	EL 28 to 24	1.4

GTA recommends placing the facility bottoms through less permeable soils and into Sandy Loam to Loamy Sand layers at the facility bottom elevation recommended in the above summary. To facilitate placement in Sandy Loam to Loamy Sand layers, the actual facility bottom elevation may vary and should be adjusted as required in the field based upon the observed conditions at the time of construction. In areas where less permeable soil is encountered within 2 feet below the infiltration facility bottom, the soils should be tilled to increase permeability or over excavated and replaced with ASTM C33 Concrete Sand.

GTA recommends that the infiltration facilities be excavated using a track-mounted excavator, which will generally eliminate the need to operate equipment directly on the subgrade. If underground facilities are used, the subgrade should be hand cleaned using a shovel to remove any disturbed soil prior to placing the foundation stone below the chambers.

Post-construction infiltration testing should be provided and the groundwater depth observed within proposed SWM facilities with the results reported to CDA for conformance with the facility design parameters.

For wet pond construction, groundwater levels may be above the pond bottom level during construction. The contractor should be prepared to stabilize and dewater pond excavations. Subgrades excavated below the water table will be prone to instability and softening. GTA recommends that wet ponds be provided with PVC, GCL or natural clay liner construction. All SWM pond construction should conform to *Delaware Conservation Practice Standard Pond Code 378* and *Code 521*, latest editions and *Delaware Sediment and Stormwater Regulations*, latest edition, as applicable.

Limitations

This report, including all supporting exploration logs, field data, field notes, estimates, and other documents prepared by GTA in connection with this project, has been prepared for the exclusive use of Fearn-Clendaniel Architects, Inc. pursuant to the agreement between GTA and Fearn-Clendaniel Architects, Inc. dated January 18, 2019, and in accordance with generally accepted engineering practice. All terms and conditions set forth in the Agreement are incorporated herein by reference. No warranty, express or implied, is given herein. Use and reproduction of this report by any other person without the expressed written permission of GTA and Fearn-Clendaniel Architects, Inc. is unauthorized and such use is at the sole risk of the user.

The analysis and recommendations contained in this report are based on the data obtained from limited observation and testing of the encountered materials. Explorations indicate soil and groundwater conditions only at specific locations and times and only to the depths penetrated. They do not necessarily reflect strata variations that may exist between the exploration locations. Consequently, the analysis and recommendations must be considered preliminary until the subsurface conditions can be verified by direct observation at the time of construction. If variations in subsurface conditions from those described are noted during construction, recommendations in this report may need to be re-evaluated.

In the event that any changes in the nature, design, or location of the facilities are planned, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and conclusions of this report are verified in writing. Geo-Technology Associates, Inc. is not responsible for any claims, damages, or liability associated with interpretation of subsurface data or reuse of the subsurface data or engineering analysis without the expressed written authorization of Geo-Technology Associates, Inc.

The scope of our services for this geotechnical exploration did not include any environmental assessment or investigation for the presence or absence of wetlands, or hazardous or toxic materials in the soil, surface water, groundwater or air, on or below or around this site. Any statements in this report or on the logs regarding odors or unusual or suspicious items or conditions observed are strictly for the information of our Client. The subject matter of this report is limited to the facts and matters stated herein. Absence of a reference to any other conditions or subject matter shall not be constructed by the reader to imply approval by the writer.

We appreciate the opportunity to be of assistance on this project. Should you have any questions or require additional information, please contact our office at (302) 855-9761.

Sincerely,
GEO-TECHNOLOGY ASSOCIATES, INC.

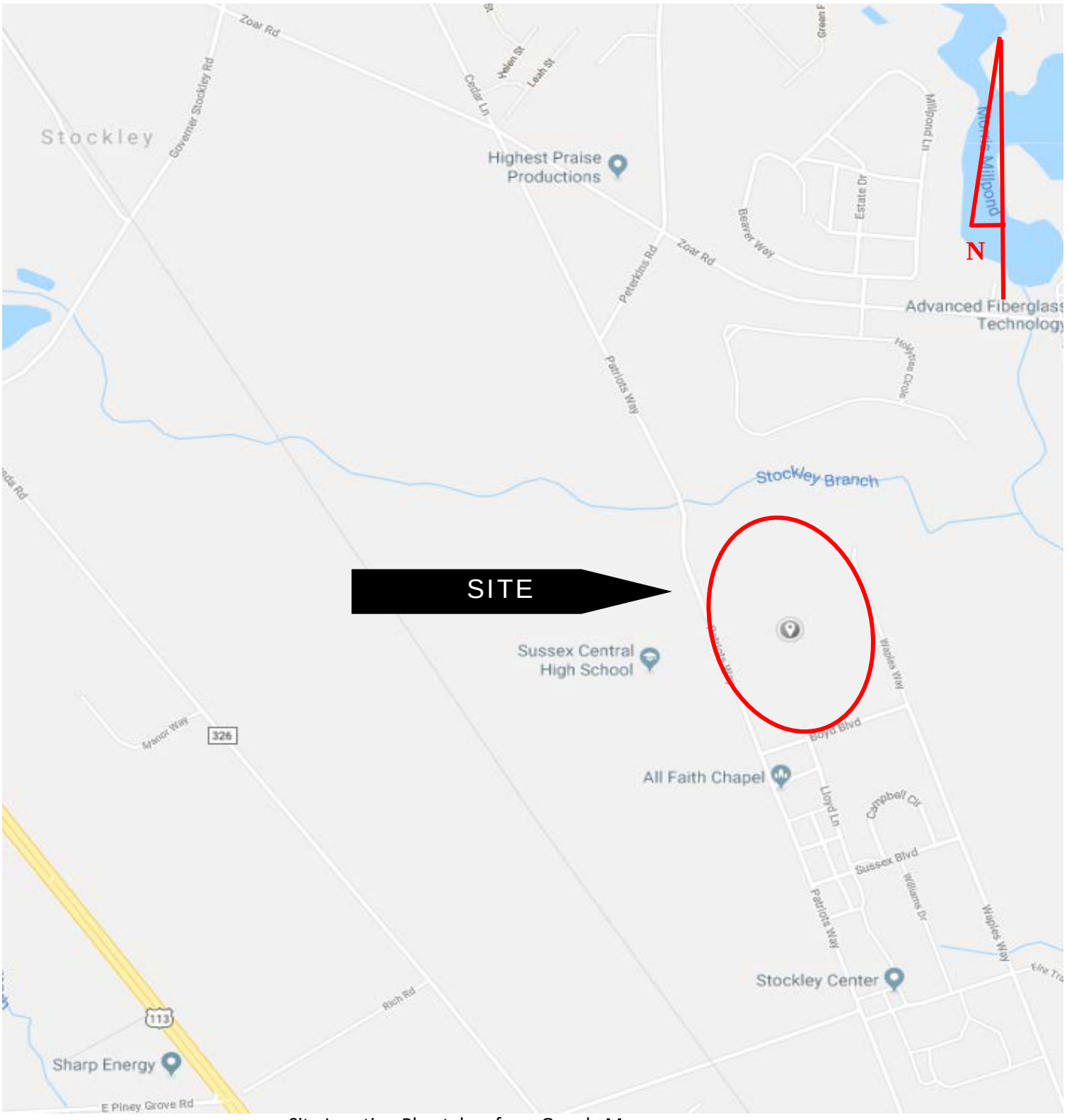
Travis P. Caraway, EIT
Staff Geotechnical Professional

GREGORY R. SAUTER
REGISTERED
NO. 13047
DELAWARE
PROFESSIONAL ENGINEER

Gregory R. Sauter, P.E
Vice President

GRS/TPC/llh
31190275
\\Gt-data\gta\1 Job File\2019 Projects\31190199-Howard T Ennis School\Report\Howard T. Ennis Stormwater Managment Report.doc

Attachments: Site Location Plan (1 page)
Exploration Location Plan (1 page)
USDA Soil Survey Map (3 pages)
Qe44-01 Monthly Groundwater Depth (1 page)
Notes for Exploration Logs (1 page)
Exploration Logs (9 pages)
Infiltration Logs (16 pages)
GBA – Important Information about your Geotechnical Engineering Report (2 pages)

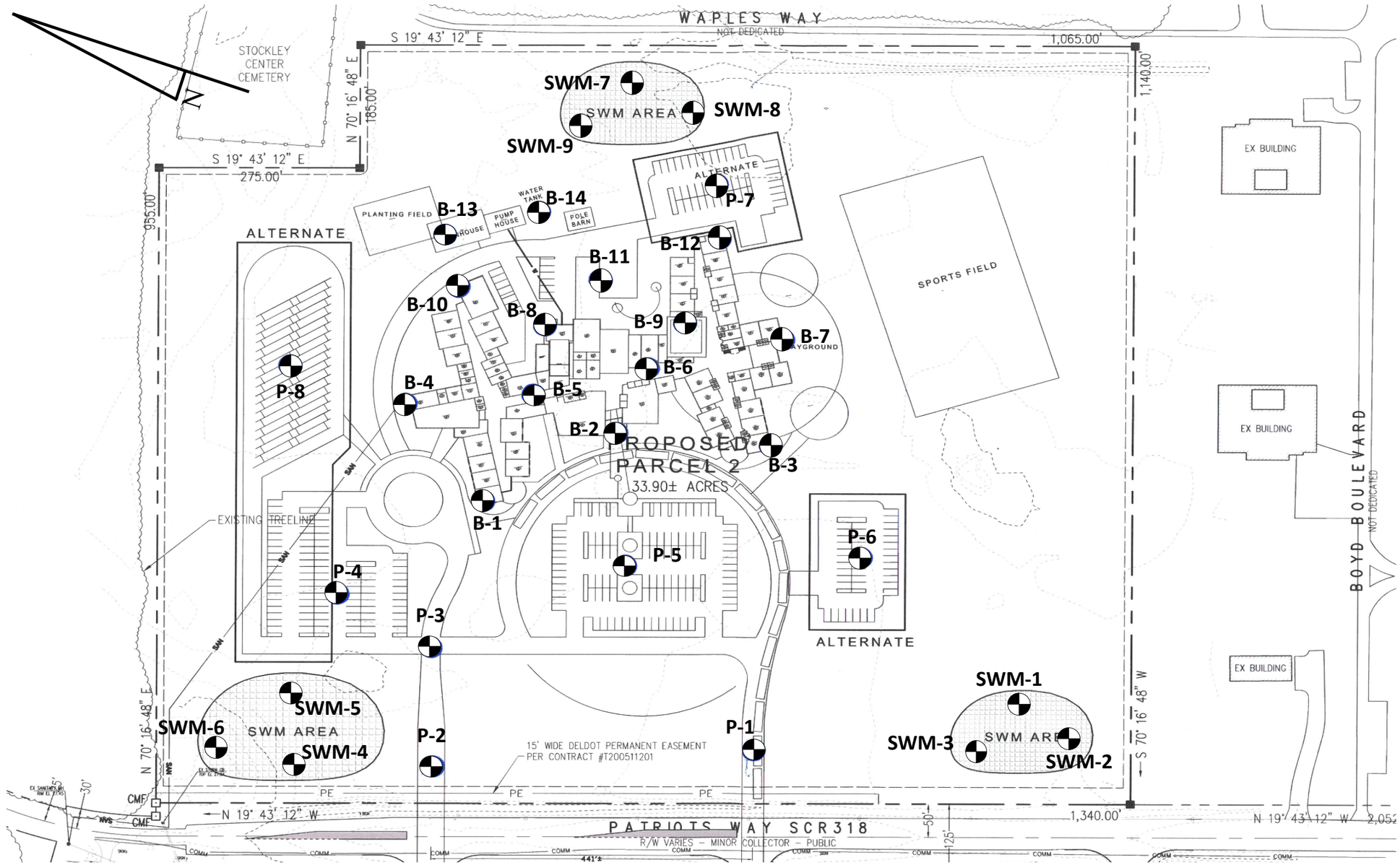


Site Location Plan taken from Google Maps

GEO-TECHNOLOGY ASSOCIATES, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
21133 Sterling Avenue, Suite 7
Georgetown, Delaware 19947
(302) 855-9761 Fax (302) 856-3388

Site Location Plan
Howard T. Ennis School
Sussex County, Delaware

SCALE	DATE	DRAWN BY	DESIGN BY	REVIEW BY	JOB NO.
NTS	April 2019	GTA	Google Maps	GRS	31190199



Exploration Location Plan taken from a concept plan prepared by Fearn-Clendaniel Architects.

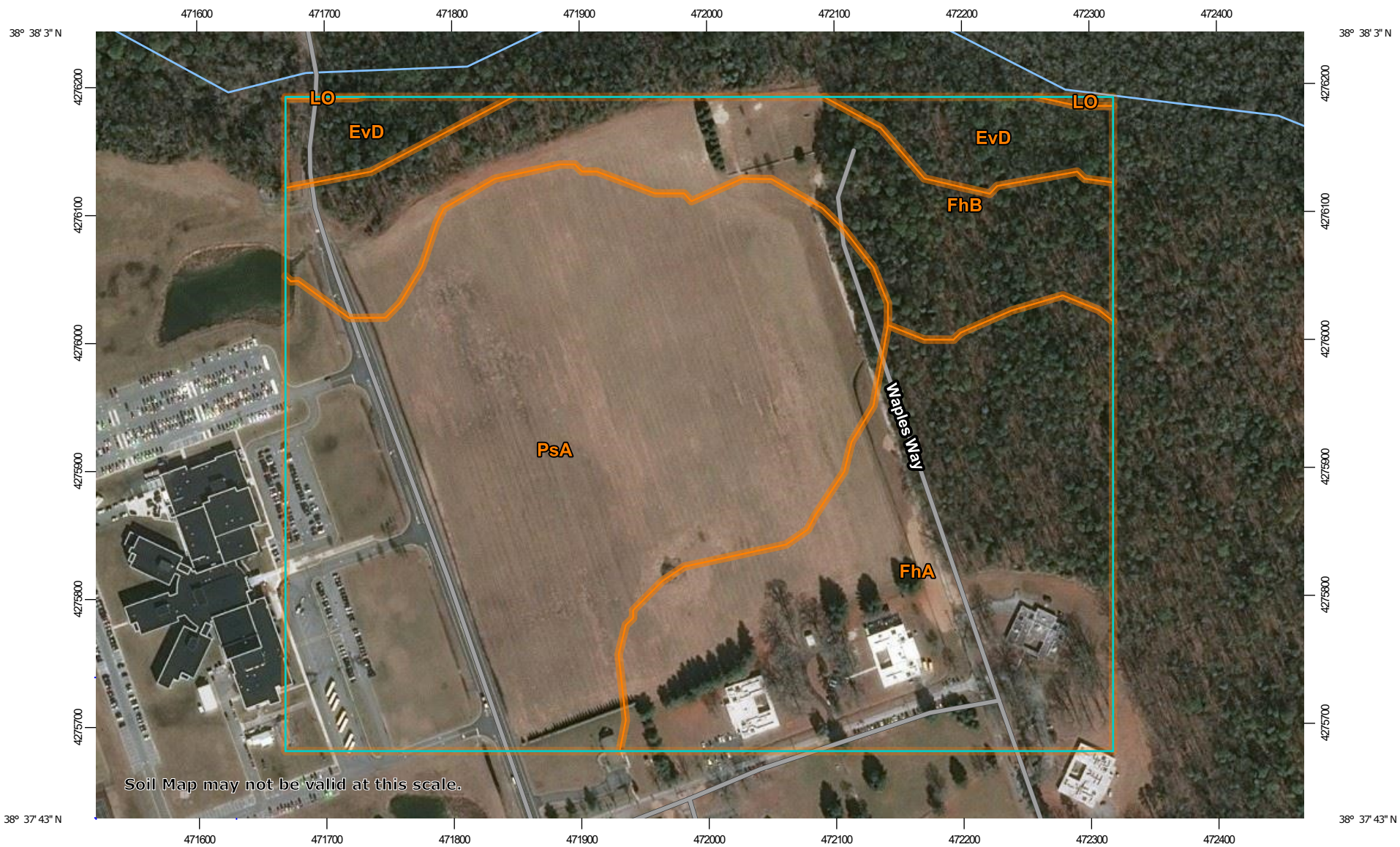
- Boring Location

GEO-TECHNOLOGY ASSOCIATES, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
21133 Sterling Avenue, Suite 7
Georgetown, Delaware 19947
(302) 855-9761 Fax (302) 856-3388

Exploration Location Plan
Howard T. Ennis School
Sussex County, Delaware

SCALE	DATE	DRAWN BY	DESIGN BY	REVIEW BY	JOB NO.	Figure
NTS	May 2019	GTA	Fearn-Clendaniel	GRS	31190199	2

Soil Map—Sussex County, Delaware
(Howard T Ennis School Property)



Map Scale: 1:4,330 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Sussex County, Delaware
Survey Area Data: Version 19, Sep 14, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Nov 21, 2018—Mar 12, 2019

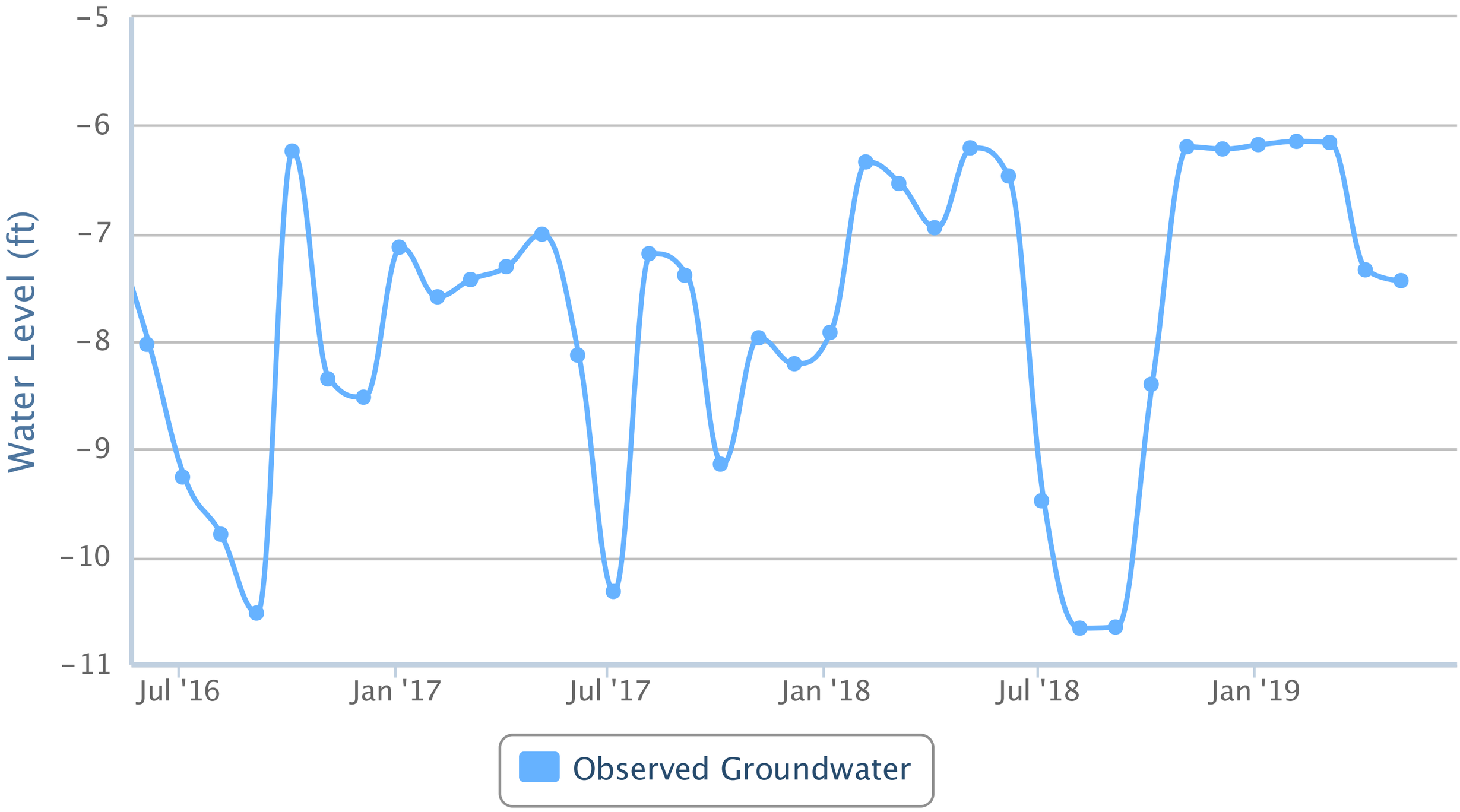
The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
EvD	Evesboro loamy sand, 5 to 15 percent slopes	4.7	5.8%
FhA	Fort Mott-Henlopen complex, 0 to 2 percent slopes	23.7	28.8%
FhB	Fort Mott-Henlopen complex, 2 to 5 percent slopes	14.0	17.0%
LO	Longmarsh and Indiantown soils, frequently flooded	0.1	0.1%
PsA	Pepperbox-Rosedale complex, 0 to 2 percent slopes	39.9	48.4%
Totals for Area of Interest		**82.4**	**100.0%**

Monthly Groundwater Depth for Qe44-01, Columbia Aquifer

Delaware Geological Survey



NOTES FOR EXPLORATION LOGS

KEY TO USCS TERMINOLOGY AND GRAPHIC SYMBOLS

MAJOR DIVISIONS (BASED UPON ASTM D 2488)				SYMBOLS GRAPHIC	SYMBOLS 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 (LESS THAN 15% PASSING THE NO. 200 SIEVE)			GW
					GP
		GRAVELS WITH FINES (MORE THAN 15% PASSING THE NO. 200 SIEVE)			GM
					GC
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LESS THAN 15% PASSING THE NO. 200 SIEVE)			SW
					SP
		SANDS WITH FINES (MORE THAN 15% PASSING THE NO. 200 SIEVE)			SM
					SC
FINE-GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILT OR CLAY (<15% RETAINED ON THE NO. 200 SIEVE) SILT OR CLAY WITH SAND OR GRAVEL (15% TO 30% RETAINED ON THE NO. 200 SIEVE) SANDY OR GRAVELLY SILT OR CLAY (>30% RETAINED ON THE NO. 200 SIEVE)		SILTS AND LEAN CLAYS LIQUID LIMIT LESS THAN 50		ML
					CL
					OL
			ELASTIC SILTS AND FAT CLAYS LIQUID LIMIT GREATER THAN 50		MH
					CH
					OH
HIGHLY ORGANIC SOILS					PT

NOTE: DUAL SYMBOLS ARE USED TO INDICATE COARSE-GRAINED SOILS WHICH CONTAIN AN ESTIMATED 5 TO 15% FINES BASED ON VISUAL CLASSIFICATION OR BETWEEN 5 AND 12% FINES BASED ON LABORATORY TESTING; AND FINE-GRAINED SOILS WHEN THE PLOT OF LIQUID LIMIT & PLASTICITY INDEX VALUES FALLS IN THE PLASTICITY CHART'S CROSS-HATCHED AREA. FINE-GRAINED SOILS ARE CLASSIFIED AS ORGANIC (OL OR OH) WHEN ENOUGH ORGANIC PARTICLES ARE PRESENT TO INFLUENCE ITS PROPERTIES. LABORATORY TEST RESULTS ARE USED TO SUPPLEMENT SOIL CLASSIFICATION BY THE VISUAL-MANUAL PROCEDURES OF ASTM D 2488.

ADDITIONAL TERMINOLOGY AND GRAPHIC SYMBOLS

	DESCRIPTION		GRAPHIC SYMBOLS
ADDITIONAL DESIGNATIONS	TOPSOIL		
	MAN MADE FILL		
	GLACIAL TILL		
	COBBLES AND BOULDERS		
RESIDUAL SOIL DESIGNATIONS	DESCRIPTION	"N" VALUE	
	HIGHLY WEATHERED ROCK	50 TO 50/1"	
	PARTIALLY WEATHERED ROCK	MORE THAN 50 BLOWS FOR 1" OF PENETRATION OR LESS, AUGER PENETRABLE	

COARSE-GRAINED SOILS
(GRAVEL AND SAND)

DESIGNATION	BLOWS PER FOOT (BPF) "N"
VERY LOOSE	0 - 4
LOOSE	5 - 10
MEDIUM DENSE	11 - 30
DENSE	31 - 50
VERY DENSE	>50

NOTE: "N" VALUE DETERMINED AS PER ASTM D 1586

FINE-GRAINED SOILS
(SILT AND CLAY)

CONSISTENCY	BPF "N"
VERY SOFT	<2
SOFT	2 - 4
MEDIUM STIFF	5 - 8
STIFF	9 - 15
VERY STIFF	16 - 30
HARD	>30

NOTE: ADDITIONAL DESIGNATIONS TO ADVANCE SAMPLER INDICATED IN BLOW COUNT COLUMN:
WOH = WEIGHT OF HAMMER
WOR = WEIGHT OF ROD(S)

SAMPLE TYPE

DESIGNATION	SYMBOL
SOIL SAMPLE	S-
SHELBY TUBE	U-
ROCK CORE	R-

WATER DESIGNATION

DESCRIPTION	SYMBOL
ENCOUNTERED DURING DRILLING	
UPON COMPLETION OF DRILLING	
24 HOURS AFTER COMPLETION	

NOTE: WATER OBSERVATIONS WERE MADE AT THE TIME INDICATED. POROSITY OF SOIL STRATA, WEATHER CONDITIONS, SITE TOPOGRAPHY, ETC. MAY CAUSE WATER LEVEL CHANGES.

LOG OF BORING NO. SWM-1

PROJECT: **Howard T. Ennis School**
PROJECT NO.: **31190199**
PROJECT LOCATION: **Georgetown, Delaware**

WATER LEVEL (ft):	6.0		4.5
DATE:	04/01/19		04/02/19
CAVED (ft):	-		-

DATE STARTED: **04/01/19**
DATE COMPLETED: **04/01/19**
DRILLING CONTRACTOR: **Manos Drilling Associates**
DRILLER: **K. Manos**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING METHOD: **Splitspoon**

WATER ENCOUNTERED DURING DRILLING (ft) **6.0**
GROUND SURFACE ELEVATION: **31.6**
DATUM: **Survey**
EQUIPMENT: **Mobile B-57**
LOGGED BY: **RC**
CHECKED BY: **GRS**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					31.6	0	TS		Topsoil; 4 in	
					31.3		SM		Tan, moist, very loose, Silty SAND USDA: Sandy Loam	
1	0.0	16	1-1-1-1	2						
						2				
2	2.0	16	1-1-1-1	2						
					27.6	4	SC		Tan, moist, medium dense, Clayey SAND USDA: Sandy Clay Loam	
3	4.0	18	11-12-13-13	25						
					25.6	6	CL		Gray, wet, stiff, Lean CLAY USDA: Clay Loam	
4	6.0	16	2-5-8-5	13						
						8				
5	8.0	18	5-6-6-7	12						
						10			Bottom of hole 10 feet.	
						12				

NOTES: **Estimated Seasonal High Groundwater: 4 / EL 28 (Perched)**
Air Temp: 70 deg. Weather: Part Cloudy Precipitation:0.0 Past 48 hrs: 0.0

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LOG OF BORING NO. SWM-1

LOG OF BORING NO. SWM-2

PROJECT:	Howard T. Ennis School	WATER LEVEL (ft):	6.5		7.0
PROJECT NO.:	31190199	DATE:	04/01/19		04/02/19
PROJECT LOCATION:	Georgetown, Delaware	CAVED (ft):	-		-

DATE STARTED:	04/01/19	WATER ENCOUNTERED DURING DRILLING (ft)	6.5
DATE COMPLETED:	04/01/19	GROUND SURFACE ELEVATION:	31.1
DRILLING CONTRACTOR:	Manos Drilling Associates	DATUM:	Survey
DRILLER:	K. Manos	EQUIPMENT:	Mobile B-57
DRILLING METHOD:	Hollow Stem Auger	LOGGED BY:	RC
SAMPLING METHOD:	Splitspoon	CHECKED BY:	GRS

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					31.1	0	TS		Topsoil; 4 in	
					30.8		SP-SM		Tan, moist, loose, Poorly-graded SAND with Silt USDA: Sandy Loam	
1	0.0	18	1-3-3-3	6						
					29.1	2	SC		Tan, moist to wet, very loose to medium dense, Clayey SAND USDA: Sandy Loam/Sandy Clay Loam	
2	2.0	14	3-3-1-8	4						
						4				
3	4.0	18	10-11-17-15	28						
						6				
4	6.0	18	6-8-7-8	15						
						8				
5	8.0	18	5-4-4-6	8						
					21.6		CL		Tan, wet, medium stiff, Lean CLAY USDA: Clay Loam	
						10			Bottom of hole 10 feet	
						12				

NOTES: **Estimated Seasonal High Groundwater: 6 / EL 25**
Air Temp: 70 deg. Weather: Part Cloudy Precipitation:0.0 Past 48 hrs: 0.0

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LOG OF BORING NO. SWM-2

LOG OF BORING NO. SWM-3

PROJECT: **Howard T. Ennis School**
PROJECT NO.: **31190199**
PROJECT LOCATION: **Georgetown, Delaware**

WATER LEVEL (ft):	8.1		6.2
DATE:	04/01/19		04/02/19
CAVED (ft):	-		-

DATE STARTED: **04/01/19**
DATE COMPLETED: **04/01/19**
DRILLING CONTRACTOR: **Manos Drilling Associates**
DRILLER: **K. Manos**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING METHOD: **Splitspoon**

WATER ENCOUNTERED DURING DRILLING (ft) **8.1**
GROUND SURFACE ELEVATION: **31.4**
DATUM: **Survey**
EQUIPMENT: **Mobile B-57**
LOGGED BY: **RC**
CHECKED BY: **GRS**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					31.4	0	TS		Topsoil 4 in	
					31.1		SM		Tan, moist, very loose to dense, Silty SAND USDA: Sandy Loam	
1	0.0	18	2-2-2-2	4						
						2				
2	2.0	14	3-3-4-3	7						
						4				
3	4.0	18	7-13-21-14	34						
						6				
4	6.0	18	5-8-7-6	15						
					23.4	8	CL		Tan, moist to wet, stiff, Sandy Lean CLAY USDA: Sandy Clay Loam	
5	8.0	18	3-3-6-6	9						
						10			Bottom of hole 10 feet.	
						12				

NOTES: **Estimated Seasonal High Groundwater: 6 / EL 25**
Air Temp: 70 deg. Weather: Part Cloudy Precipitation:0.0 Past 48 hrs: 0.0

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LOG OF BORING NO. SWM-3

LOG OF BORING NO. SWM-4

PROJECT:	**Howard T. Ennis School**	WATER LEVEL (ft):	**5.2**		**9.4**
PROJECT NO.:	**31190199**	DATE:	**04/01/19**		**04/02/19**
PROJECT LOCATION:	**Georgetown, Delaware**	CAVED (ft):	**-**		**-**

DATE STARTED:	**04/01/19**	WATER ENCOUNTERED DURING DRILLING (ft)	**5.2**
DATE COMPLETED:	**04/01/19**	GROUND SURFACE ELEVATION:	**32.0**
DRILLING CONTRACTOR:	**Manos Drilling Associates**	DATUM:	**Survey**
DRILLER:	**K. Manos**	EQUIPMENT:	**Mobile B-57**
DRILLING METHOD:	**Hollow Stem Auger**	LOGGED BY:	**RC**
SAMPLING METHOD:	**Splitspoon**	CHECKED BY:	**GRS**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					32.0	0	TS		Topsoil; 4 in	
					31.7		SP-SM		Tan, moist, loose, Poorly-graded SAND with Silt USDA: Loamy Sand	
1	0.0	18	1-3-3-3	6						
					30.0	2	SM		Tan, moist to wet, loose to medium dense, Silty SAND USDA: Sandy Loam	
2	2.0	18	2-4-4-4	8						
						4				Perched water at 5 feet
3	4.0	18	7-8-9-10	17						
						6				
4	6.0	18	4-6-7-8	13						
						8				
5	8.0	18	4-5-6-6	11						
						10			Bottom of hole 10 feet.	Air Temp: 70 deg. Weather: Part Cloudy Precipitation: Past 48 hrs: 0.0
						12				

NOTES: **Estimated Seasonal High Groundwater: 5 / EL 27 (Perched)**
Air Temp: 70 deg. Weather: Part Cloudy Precipitation:0.0 Past 48 hrs: 0.0

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LOG OF BORING NO. SWM-4

LOG OF BORING NO. SWM-5

PROJECT:	Howard T. Ennis School	WATER LEVEL (ft):	7.8	8.8
PROJECT NO.:	31190199	DATE:	04/01/19	04/02/19
PROJECT LOCATION:	Georgetown, Delaware	CAVED (ft):	-	-

DATE STARTED:	04/01/19	WATER ENCOUNTERED DURING DRILLING (ft)	7.8
DATE COMPLETED:	04/01/19	GROUND SURFACE ELEVATION:	30.9
DRILLING CONTRACTOR:	Manos Drilling Associates	DATUM:	Survey
DRILLER:	K. Manos	EQUIPMENT:	Mobile B-57
DRILLING METHOD:	Hollow Stem Auger	LOGGED BY:	RC
SAMPLING METHOD:	Splitspoon	CHECKED BY:	GRS

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					30.9	0	TS		Topsoil; 4 in	
					30.6		SP-SM		Tan, moist, loose, Poorly-graded SAND with Silt USDA: Loamy Sand	
1	0.0	12	2-3-3-4	6						
					28.9	2	SM		Tan, moist to wet, loose to medium dense, Silty SAND USDA: Sandy Loam	
2	2.0	18	9-10-12-13	22						
						4				
3	4.0	18	8-8-9-9	17						
						6				
4	6.0	18	5-4-4-4	8						
					22.9	8	SP-SM		Tan, wet, loose, Poorly-graded SAND with Silt USDA: Loamy Sand	
5	8.0	18	3-3-3-4	6						
					20.9	10			Bottom of hole 10 feet	Air Temp: 70 deg. Weather: Part Cloudy Precipitation: Past 48 hrs: 0.0
						12				

NOTES: **Estimated Seasonal High Groundwater: 7 / EL 24**
Air Temp: 70 deg. Weather: Part Cloudy Precipitation:0.0 Past 48 hrs: 0.0

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LOG OF BORING NO. SWM-5

LOG OF BORING NO. SWM-6

PROJECT: **Howard T. Ennis School**
PROJECT NO.: **31190199**
PROJECT LOCATION: **Georgetown, Delaware**

WATER LEVEL (ft):	4.5		5.1
DATE:	04/01/19		04/02/19
CAVED (ft):	-		-

DATE STARTED: **04/01/19**
DATE COMPLETED: **04/01/19**
DRILLING CONTRACTOR: **Manos Drilling Associates**
DRILLER: **K. Manos**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING METHOD: **Splitspoon**

WATER ENCOUNTERED DURING DRILLING (ft) **4.5**
GROUND SURFACE ELEVATION: **27.6**
DATUM: **Survey**
EQUIPMENT: **Mobile B-57**
LOGGED BY: **RC**
CHECKED BY: **GRS**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					27.6	0	TS		Topsoil; 4 in	
					27.3		SP-SM		Tan, moist, very loose to medium dense, Poorly-graded SAND with Silt USDA: Loamy Sand	
1	0.0	18	6-7-6-6	13						
						2				
2	2.0	18	2-2-2-2	4						
					23.6	4	SC		Tan, moist to wet, very loose to medium dense, Clayey SAND USDA: Sandy Clay Loam	
3	4.0	18	6-6-6-6	12						
						6				
4	6.0	18	3-4-4-5	8						
						8				
5	8.0	9	2-3-1-2	4						
						10			Bottom of hole 10 feet	
						12				

NOTES: **Estimated Seasonal High Groundwater: 4 / EL 24**
Air Temp: 70 deg. Weather: Part Cloudy Precipitation:0.0 Past 48 hrs: 0.0

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LOG OF BORING NO. SWM-6

LOG OF BORING NO. SWM-7

PROJECT: **Howard T. Ennis School**
PROJECT NO.: **31190199**
PROJECT LOCATION: **Georgetown, Delaware**

WATER LEVEL (ft):	9.3		6.5
DATE:	04/01/19		04/02/19
CAVED (ft):	-		-

DATE STARTED: **04/01/19**
DATE COMPLETED: **04/01/19**
DRILLING CONTRACTOR: **Manos Drilling Associates**
DRILLER: **K. Manos**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING METHOD: **Splitspoon**

WATER ENCOUNTERED DURING DRILLING (ft) **9.3**
GROUND SURFACE ELEVATION: **30.2**
DATUM: **Survey**
EQUIPMENT: **Mobile B-57**
LOGGED BY: **RC**
CHECKED BY: **GRS**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					30.2	0	TS		Topsoil; 4 in	
					29.9		SP-SM		Tan, moist to wet, very loose to loose, Poorly-graded SAND with Silt USDA: Loamy Sand	
1	0.0	18	3-2-1-2	3						
						2				
2	2.0	14	1-2-1-2	3						
						4				
3	4.0	18	2-3-3-2	6						
						6				
4	6.0	18	2-2-3-5	5						
						8				
5	8.0	18	3-4-3-6	7						
						10			Bottom of hole 10 feet	
						12				

NOTES: **Estimated Seasonal High Groundwater: 6 / EL 24**
Air Temp: 70 deg. Weather: Part Cloudy Precipitation:0.0 Past 48 hrs: 0.0

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LOG OF BORING NO. SWM-7

LOG OF BORING NO. SWM-8

PROJECT:	Howard T. Ennis School	WATER LEVEL (ft):	8.5	8.7
PROJECT NO.:	31190199	DATE:	04/01/19	04/02/19
PROJECT LOCATION:	Georgetown, Delaware	CAVED (ft):	-	-

DATE STARTED:	04/01/19	WATER ENCOUNTERED DURING DRILLING (ft)	8.5
DATE COMPLETED:	04/01/19	GROUND SURFACE ELEVATION:	29.8
DRILLING CONTRACTOR:	Manos Drilling Associates	DATUM:	Survey
DRILLER:	K. Manos	EQUIPMENT:	Mobile B-57
DRILLING METHOD:	Hollow Stem Auger	LOGGED BY:	RC
SAMPLING METHOD:	Splitspoon	CHECKED BY:	GRS

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					29.8	0	TS		Topsoil; 4 in	
					29.5		SP-SM		Tan, moist, loose, Poorly-graded SAND with Silt USDA: Loamy Sand	
1	0.0	13	2-2-3-4	5	28.8		SC		Tan, moist, loose, Clayey SAND USDA: Sandy Clay Loam	
					27.8	2	SM		Tan, moist, loose, Silty SAND USDA: Sandy Loam / Loamy Sand	
2	2.0	18	3-4-4-5	8						
					25.8	4	SP-SM		Tan, moist, loose, Poorly-graded SAND with Silt USDA: Loamy Sand	
3	4.0	18	5-5-5-4	10						
						6				
4	6.0	18	4-3-3-3	6						
					21.8	8	SC		Tan, moist to wet, very loose, Clayey SAND USDA: Sandy Clay Loam	
5	8.0	18	3-2-2-3	4						
					19.8	10			Bottom of hole 10 feet	Air Temp: 70 deg. Weather: Part Cloudy Precipitation: Past 48 hrs: 0.0
						12				

NOTES: **Estimated Seasonal High Groundwater: 8 / EL 22**
Air Temp: 70 deg. Weather: Part Cloudy Precipitation:0.0 Past 48 hrs: 0.0 8 / EL 22

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LOG OF BORING NO. SWM-8

LOG OF BORING NO. SWM-9

PROJECT:	Howard T. Ennis School	WATER LEVEL (ft):	9.5	9.6
PROJECT NO.:	31190199	DATE:	04/01/19	04/02/19
PROJECT LOCATION:	Georgetown, Delaware	CAVED (ft):	-	-

DATE STARTED:	04/01/19	WATER ENCOUNTERED DURING DRILLING (ft)	9.5
DATE COMPLETED:	04/01/19	GROUND SURFACE ELEVATION:	31.1
DRILLING CONTRACTOR:	Manos Drilling Associates	DATUM:	Survey
DRILLER:	K. Manos	EQUIPMENT:	Mobile B-57
DRILLING METHOD:	Hollow Stem Auger	LOGGED BY:	RC
SAMPLING METHOD:	Splitspoon	CHECKED BY:	GRS

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					31.1	0	TS		Topsoil; 4 in	
					30.8		SC		Tan, moist, loose, Clayey SAND USDA: Sandy Clay Loam	
1	0.0	18	2-3-3-4	6						
					29.1	2	SP-SM		Tan, moist to wet, loose to medium dense, Poorly-graded SAND with Silt USDA: Loamy Sand	
2	2.0	18	3-6-9-4	15						
						4				
3	4.0	18	5-5-5-5	10						
						6				
4	6.0	18	5-4-4-5	8						
						8				
5	8.0	18	4-4-4-8	8						
					21.1	10			Bottom of hole 10 feet	Air Temp: 70 deg. Weather: Part Cloudy Precipitation: Past 48 hrs: 0.0
						12				

NOTES: **Estimated Seasonal High Groundwater: 8 / EL 22**
Air Temp: 70 deg. Weather: Part Cloudy Precipitation:0.0 Past 48 hrs: 0.0

GEO-TECHNOLOGY ASSOCIATES, INC.
21133 Sterling Avenue, Suite 7
Georgetown, DE 19947

LOG OF BORING NO. SWM-9

Geo-Technology Associates, Inc.

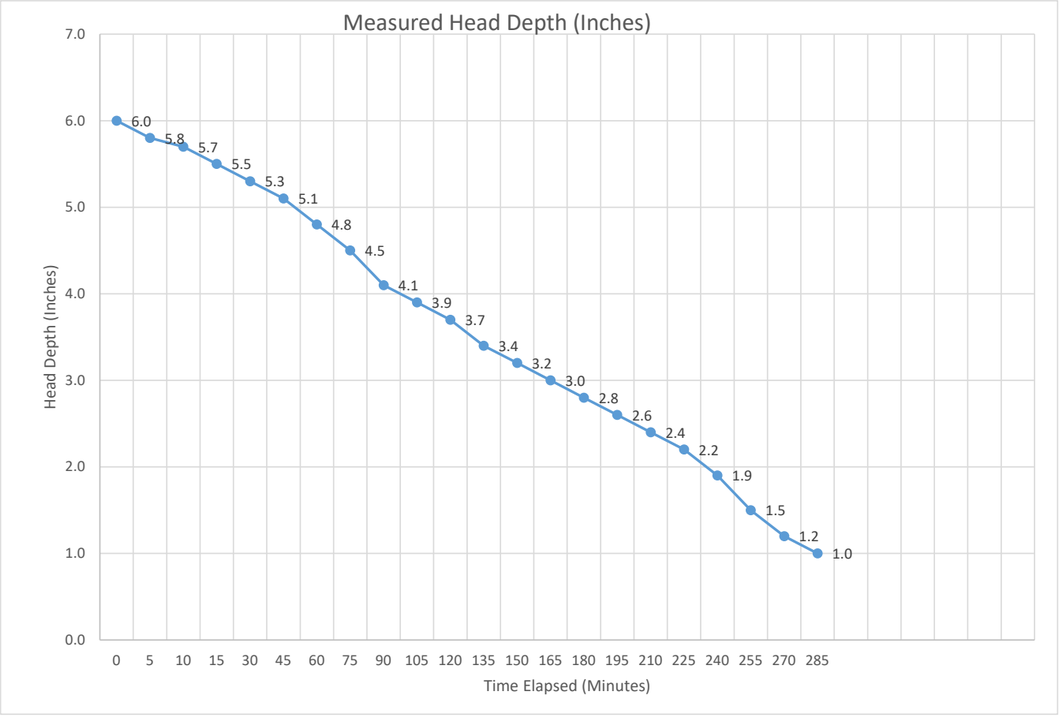
Single Ring Falling Head Infiltration Testing

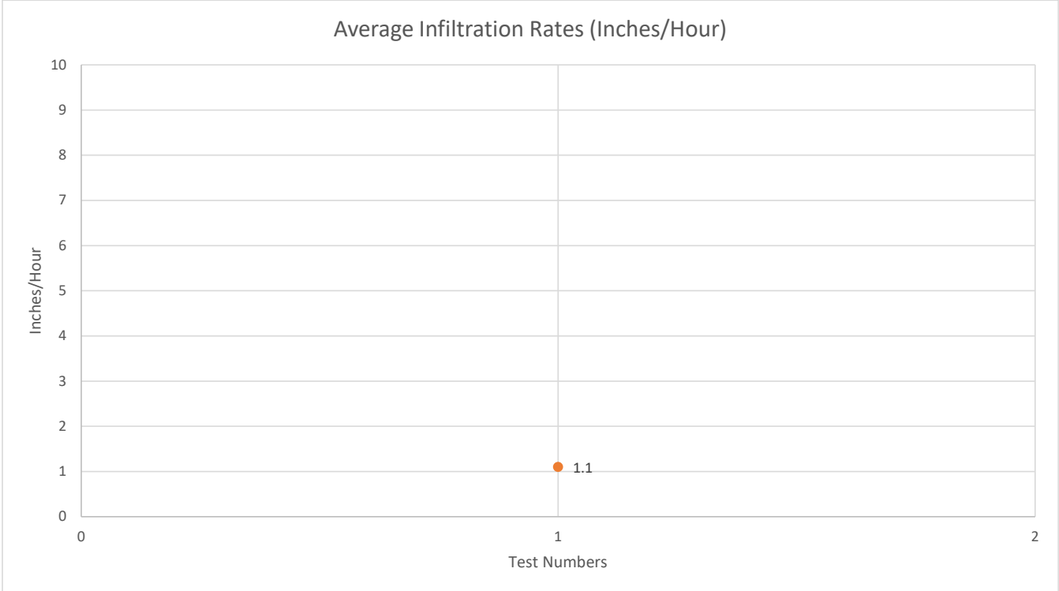
Name: Young, Caraway
I. D. of Pipe: 5 in.
Test Depth: 2.5/ 28.8 ft. / EL
Depth of Casing Penetration: 1"
Soil Type Tested: Sandy Loam

Date 4/3/19
Temp _70°F_ Weather: No Rain
Rainfall Last 24 hrs. __0.0"___
Location: ___SWM-1_____
Presoak : 12" drop / 1+ hour

Date	Time	Δt (min.)		Head of Water (in.)	Comments
4/3/2019	11:10	0		6.0	
	11:15	5		5.8	
	11:20	10		5.7	
	11:25	15		5.5	
	11:40	30		5.3	
	11:55	45		5.1	
	12:10	60		4.8	
	12:25	75		4.5	
	12:40	90		4.1	
	12:55	105		3.9	
	1:10	120		3.7	
	1:25	135		3.4	
	1:40	150		3.2	
	1:55	165		3.0	
	2:10	180		2.8	
	2:25	195		2.6	
	2:40	210		2.4	
	2:55	225		2.2	
	3:10	240		1.9	
	3:25	255		1.5	
	3:40	270		1.2	
	3:55	285		1.0	Rate: 1.1 in/hr

1.1 1





Howard T. Ennis
31190199

Location: SWM-1
Test Depth: 2.5

Geo-Technology Associates, Inc.

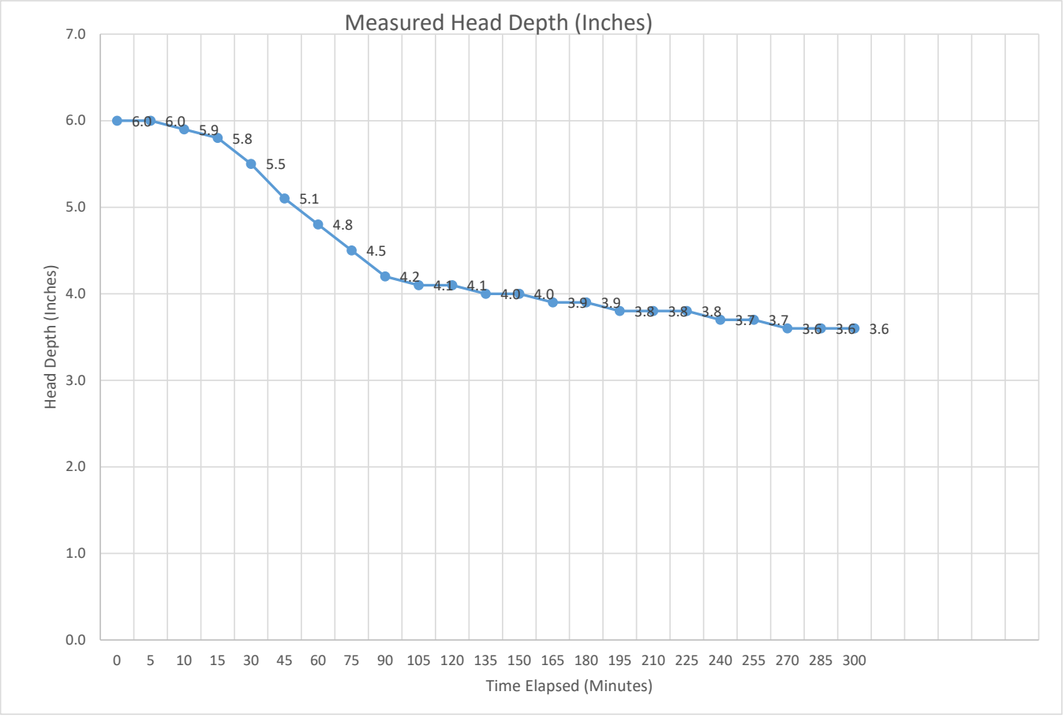
Single Ring Falling Head Infiltration Testing

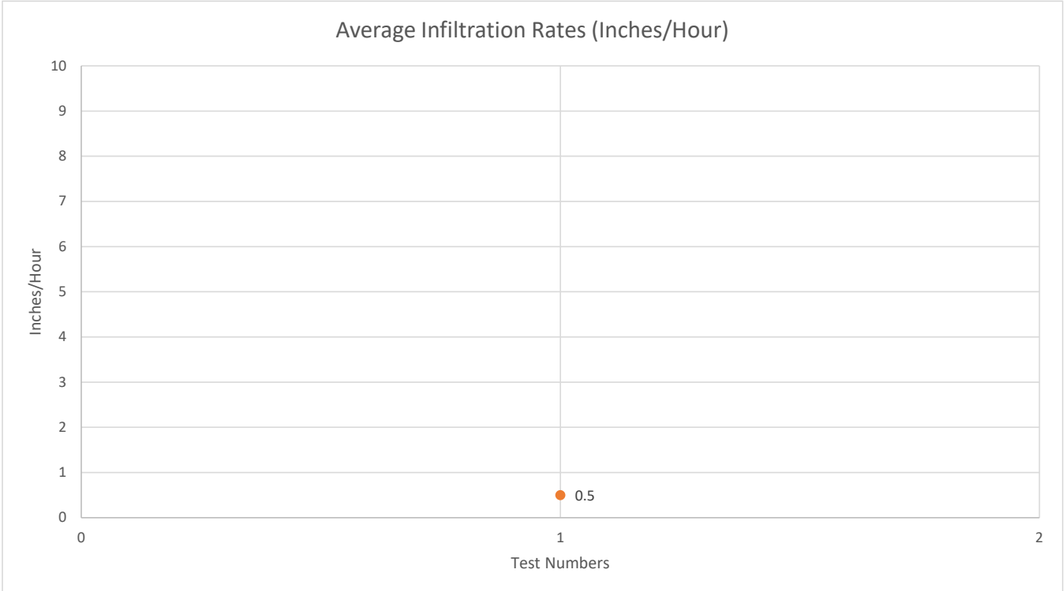
Name: Young, Caraway
I. D. of Pipe: 5 in.
Test Depth: 4.0/ 27.1 ft. / EL
Depth of Casing Penetration: 1"
Soil Type Tested: Sandy Clay Loam

Date 4/3/19
Temp _70°F_ Weather: No Rain
Rainfall Last 24 hrs. __0.0"___
Location: ___SWM-2_____
Presoak : 12" drop / 1+ hour

Date	Time	Δt (min.)		Head of Water (in.)	Comments
4/3/2019	11:00	0		6.0	
	11:05	5		6.0	
	11:10	10		5.9	
	11:15	15		5.8	
	11:30	30		5.5	
	11:45	45		5.1	
	12:00	60		4.8	
	12:15	75		4.5	
	12:30	90		4.2	
	12:45	105		4.1	
	1:00	120		4.1	
	1:15	135		4.0	
	1:30	150		4.0	
	1:45	165		3.9	
	2:00	180		3.9	
	2:15	195		3.8	
	2:30	210		3.8	
	2:45	225		3.8	
	3:00	240		3.7	
	3:15	255		3.7	
	3:30	270		3.6	
	3:45	285		3.6	
	4:00	300		3.6	Rate: 0.5 in/hr

0.5 1





Howard T. Ennis
31190199

Location: SWM-2
Test Depth: 4.0

Geo-Technology Associates, Inc.

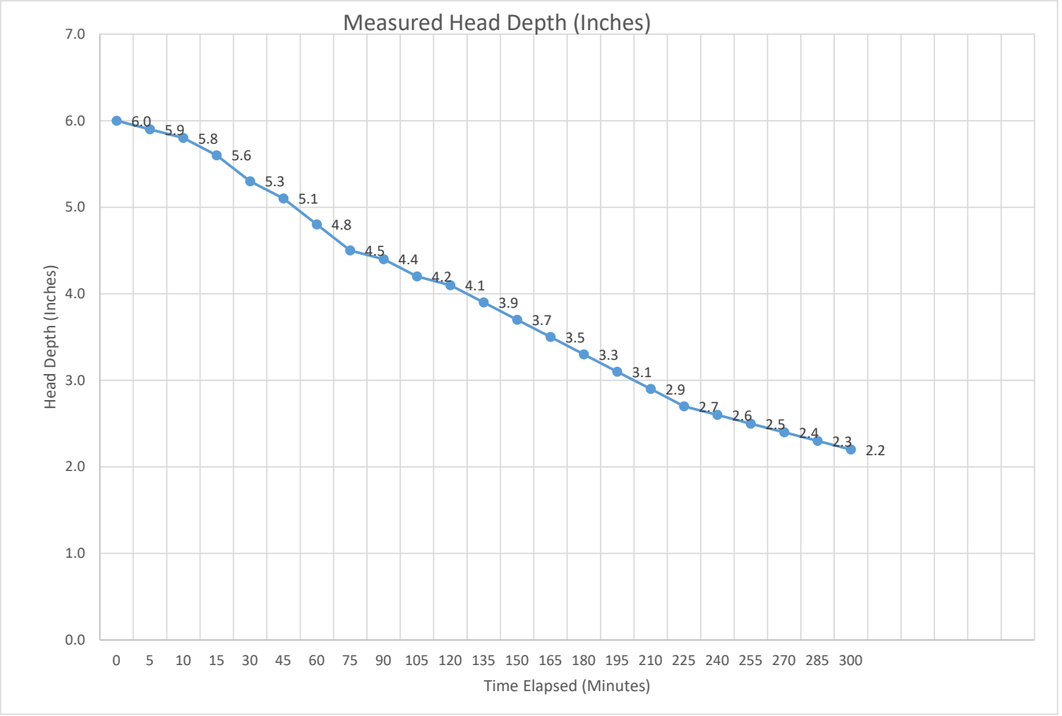
Single Ring Falling Head Infiltration Testing

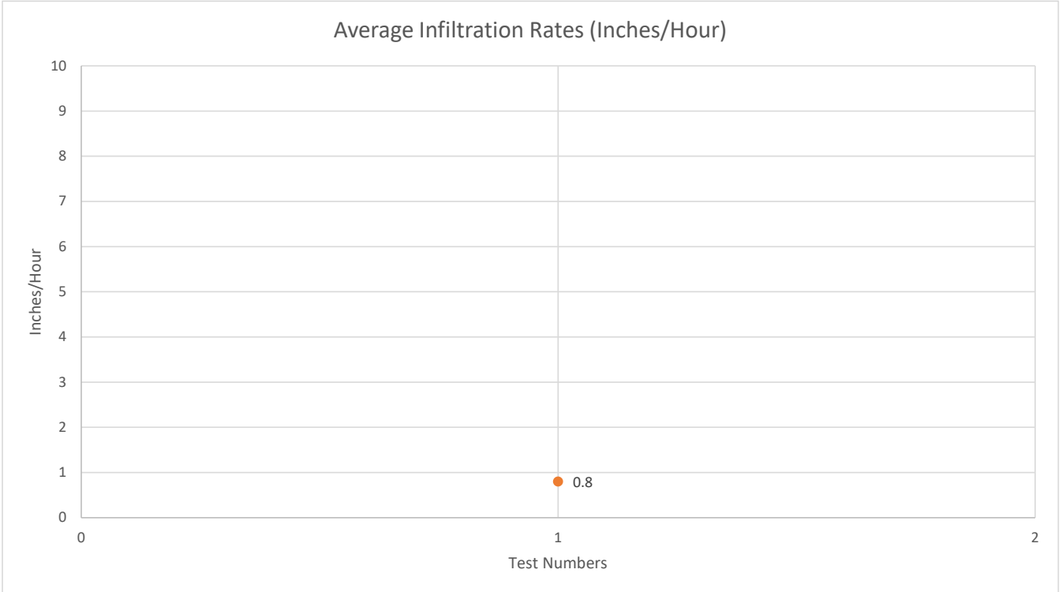
Name: Young, Mitchell, Caraway
I. D. of Pipe: 5 in.
Test Depth: 4.0/ 27.4 ft. / EL
Depth of Casing Penetration: 1"
Soil Type Tested: Sandy Loam

Date 4/3/19
Temp _70°F_ Weather: No Rain
Rainfall Last 24 hrs. __0.0"___
Location: ___SWM-3_____
Presoak : 12" drop / 1+ hour

Date	Time	Δt (min.)		Head of Water (in.)	Comments
4/3/2019	11:00	0		6.0	
	11:05	5		5.9	
	11:10	10		5.8	
	11:15	15		5.6	
	11:30	30		5.3	
	11:45	45		5.1	
	12:00	60		4.8	
	12:15	75		4.5	
	12:30	90		4.4	
	12:45	105		4.2	
	1:00	120		4.1	
	1:15	135		3.9	
	1:30	150		3.7	
	1:45	165		3.5	
	2:00	180		3.3	
	2:15	195		3.1	
	2:30	210		2.9	
	2:45	225		2.7	
	3:00	240		2.6	
	3:15	255		2.5	
	3:30	270		2.4	
	3:45	285		2.3	
	4:00	300		2.2	Rate: 0.8 in/hr

0.8 1





Howard T. Ennis
31190199

Location: SWM-3
Test Depth: 2.5

Geo-Technology Associates, Inc.

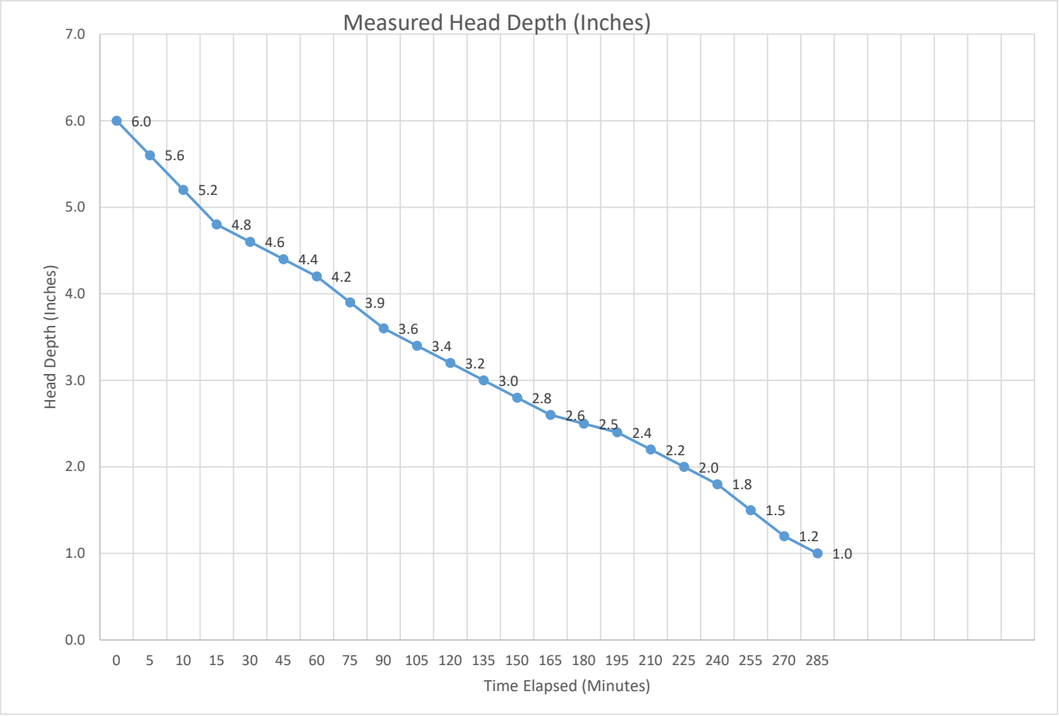
Single Ring Falling Head Infiltration Testing

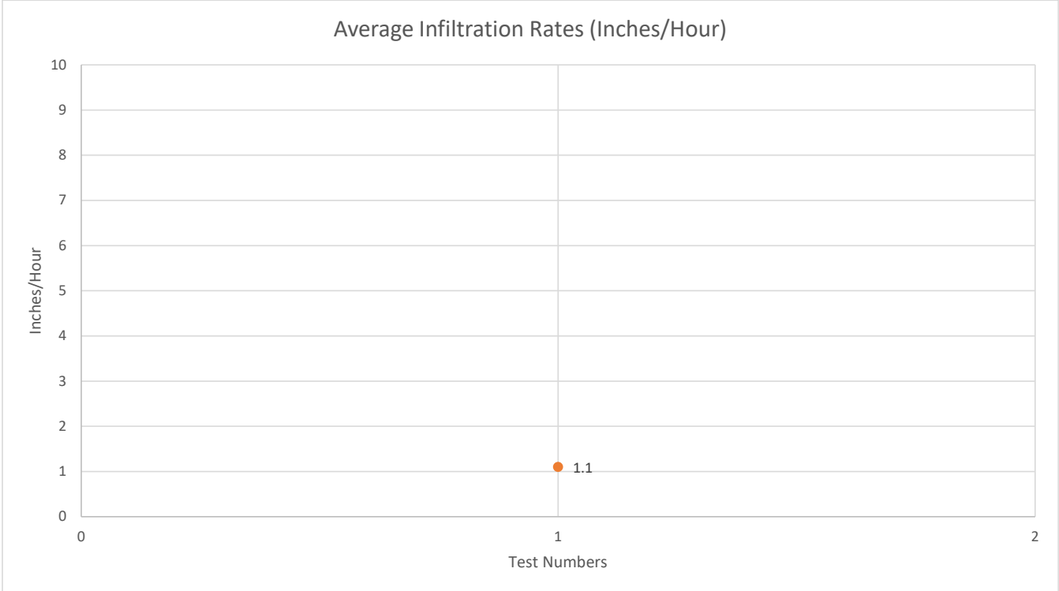
Name: Young, Caraway
I. D. of Pipe: 5 in.
Test Depth: 4.0/ 28.0 ft. / EL
Depth of Casing Penetration: 1"
Soil Type Tested: Sandy Loam

Date 4/3/19
Temp _70°F_ Weather: No Rain
Rainfall Last 24 hrs. __0.0"___
Location: ___SWM-4
Presoak : 12" drop / 1+ hour

Date	Time	Δt (min.)		Head of Water (in.)	Comments
4/3/2019	11:20	0		6.0	
	11:25	5		5.6	
	11:30	10		5.2	
	11:35	15		4.8	
	11:50	30		4.6	
	12:05	45		4.4	
	12:20	60		4.2	
	12:35	75		3.9	
	12:50	90		3.6	
	1:05	105		3.4	
	1:20	120		3.2	
	1:35	135		3.0	
	1:50	150		2.8	
	2:05	165		2.6	
	2:20	180		2.5	
	2:35	195		2.4	
	2:50	210		2.2	
	3:05	225		2.0	
	3:20	240		1.8	
	3:35	255		1.5	
	3:50	270		1.2	
	4:05	285		1.0	Rate: 1.1 in/hr

1.1 1





Howard T. Ennis
31190199

Location: SWM-4
Test Depth 4

Geo-Technology Associates, Inc.

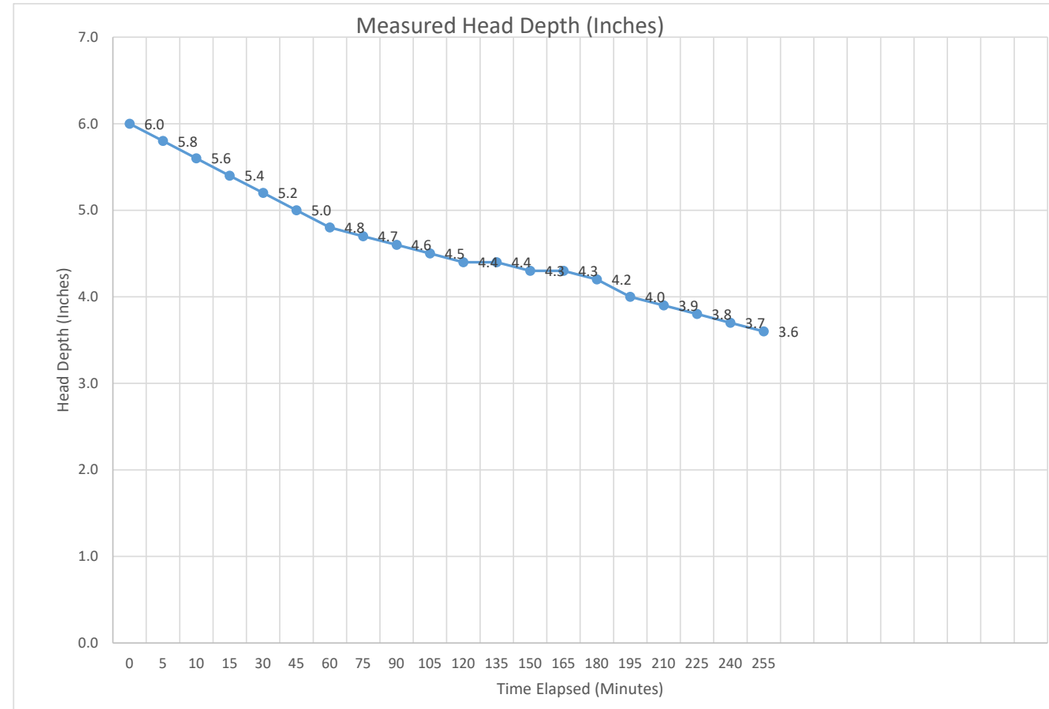
Single Ring Falling Head Infiltration Testing

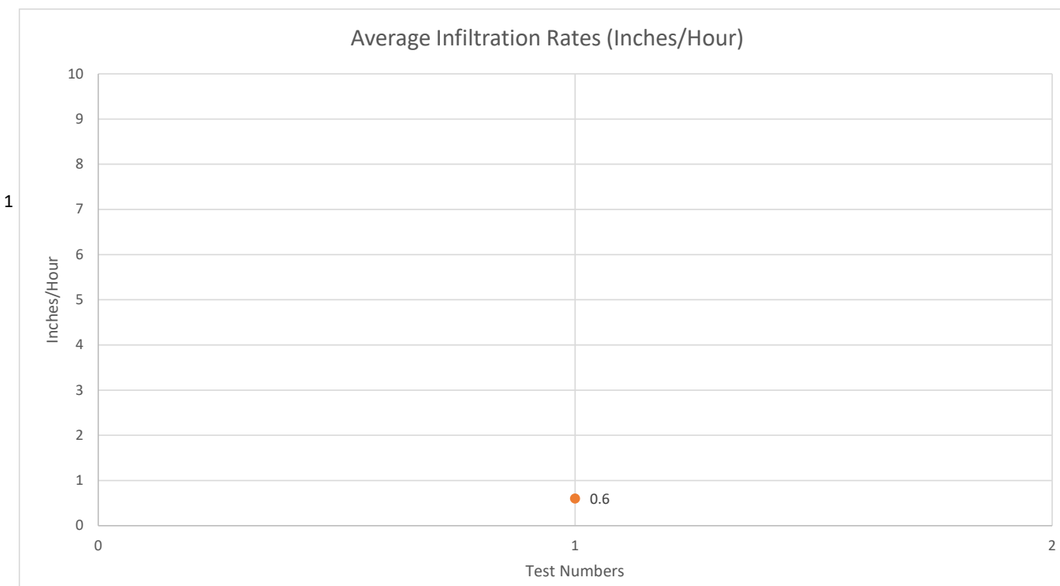
Name: Young, Caraway
I. D. of Pipe: 5 in.
Test Depth: 6.0/ 24.9 ft. / EL
Depth of Casing Penetration: 1"
Soil Type Tested: Sandy Loam

Date 4/3/19
Temp _70°F_ Weather: No Rain
Rainfall Last 24 hrs. __0.0"___
Location: ___SWM-5_____
Presoak : 12" drop / 1+ hour

Date	Time	Δt (min.)		Head of Water (in.)	Comments
4/3/2019	11:30	0		6.0	
	11:35	5		5.8	
	11:40	10		5.6	
	11:45	15		5.4	
	12:00	30		5.2	
	12:15	45		5.0	
	12:30	60		4.8	
	12:45	75		4.7	
	1:00	90		4.6	
	1:15	105		4.5	
	1:30	120		4.4	
	1:45	135		4.4	
	2:00	150		4.3	
	2:15	165		4.3	
	2:30	180		4.2	
	2:45	195		4.0	
	3:00	210		3.9	
	3:15	225		3.8	
	3:30	240		3.7	
	3:45	255		3.6	Rate: 0.6 in/hr

0.6 1





Howard T. Ennis
31190199

Location: SWM-5
Test Depth 6

Geo-Technology Associates, Inc.

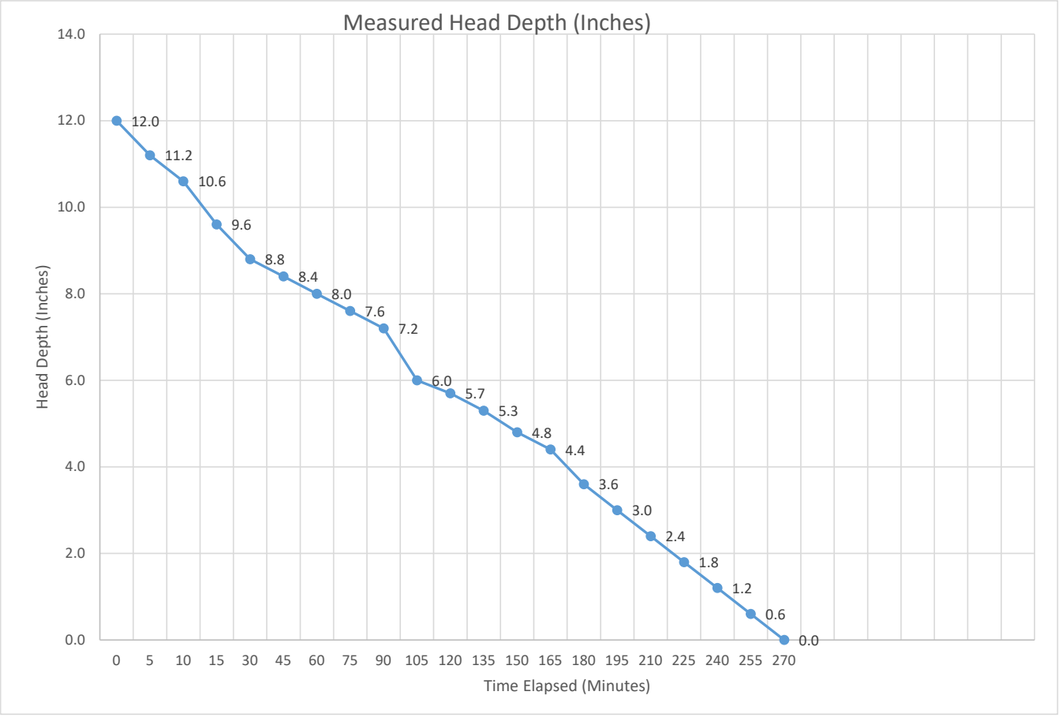
Single Ring Falling Head Infiltration Testing

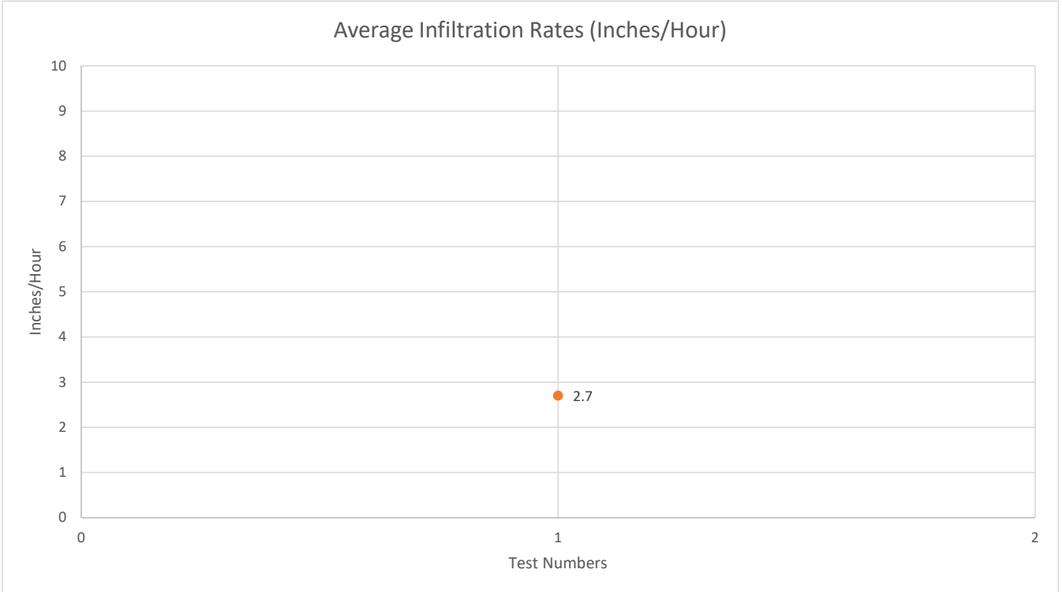
Name: Young, Caraway
I. D. of Pipe: 5 in.
Test Depth: 3.0/ 24.6 ft. / EL
Depth of Casing Penetration: 1"
Soil Type Tested: Loamy Sand

Date 4/3/19
Temp _70°F_ Weather: No Rain
Rainfall Last 24 hrs. __0.0"___
Location: ___SWM-6_____
Presoak : 12" drop / 1+ hour

Date	Time	Δt (min.)		Head of Water (in.)	Comments
4/3/2019	11:25	0		12.0	
	11:30	5		11.2	
	11:35	10		10.6	
	11:40	15		9.6	
	11:55	30		8.8	
	12:10	45		8.4	
	12:25	60		8.0	
	12:40	75		7.6	
	12:55	90		7.2	
	1:10	105		6.0	
	1:25	120		5.7	
	1:40	135		5.3	
	1:55	150		4.8	
	2:10	165		4.4	
	2:25	180		3.6	
	2:40	195		3.0	
	2:55	210		2.4	
	3:10	225		1.8	
	3:25	240		1.2	
	3:40	255		0.6	
	3:55	270		0.0	Rate: 2.7 in/hr

2.7 1





Howard T. Ennis
31190199

Location: SWM-6
Test Depth 3

Geo-Technology Associates, Inc.

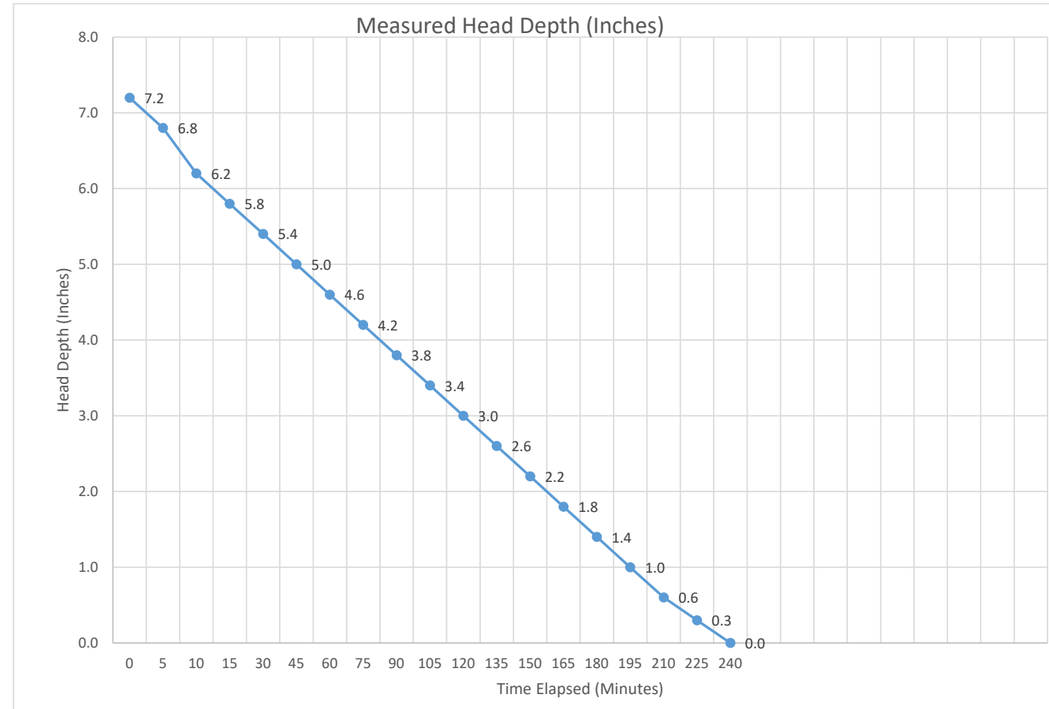
Single Ring Falling Head Infiltration Testing

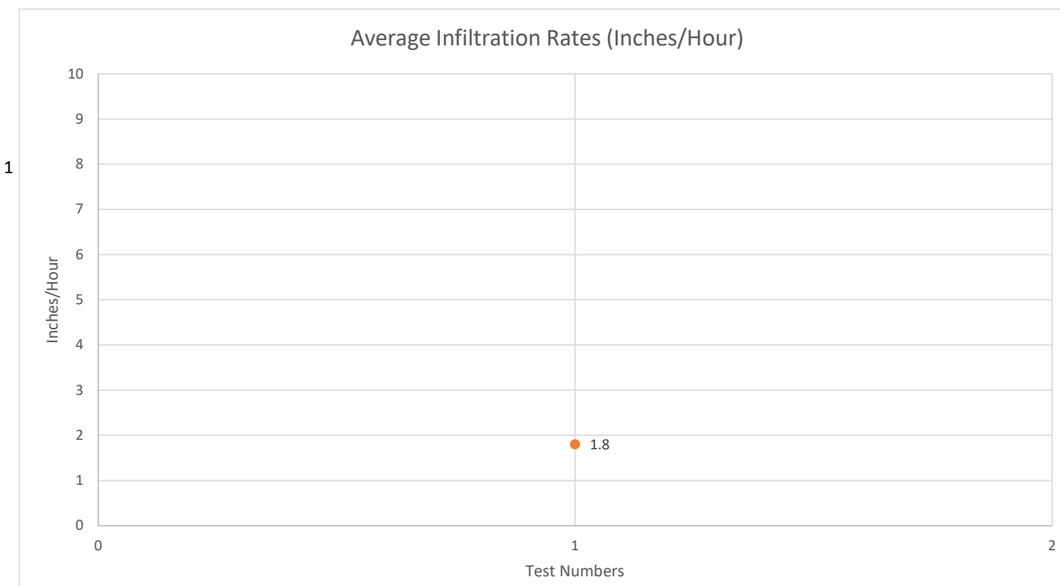
Name: Young, Caraway
I. D. of Pipe: 5 in.
Test Depth: 4.0/ 26.9 ft. / EL
Depth of Casing Penetration: 1"

Date 4/4/19
Temp _70°F_ Weather: No Rain
Rainfall Last 24 hrs. __0.0"___
Location: ___SWM-5_____
Presoak : 12" drop / 1+ hour

Date	Time	Δt (min.)		Head of Water (in.)	Comments
4/4/2019	10:40	0		7.2	
	10:45	5		6.8	
	10:50	10		6.2	
	10:55	15		5.8	
	11:10	30		5.4	
	11:25	45		5.0	
	11:40	60		4.6	
	11:55	75		4.2	
	12:10	90		3.8	
	12:25	105		3.4	
	12:40	120		3.0	
	12:55	135		2.6	
	1:10	150		2.2	
	1:25	165		1.8	
	1:40	180		1.4	
	1:55	195		1.0	
	2:10	210		0.6	
	2:25	225		0.3	
	2:40	240		0.0	Rate: 1.8 in/hr

1.8 1





Howard T. Ennis
31190199

Location: SWM-5
Test Depth 4

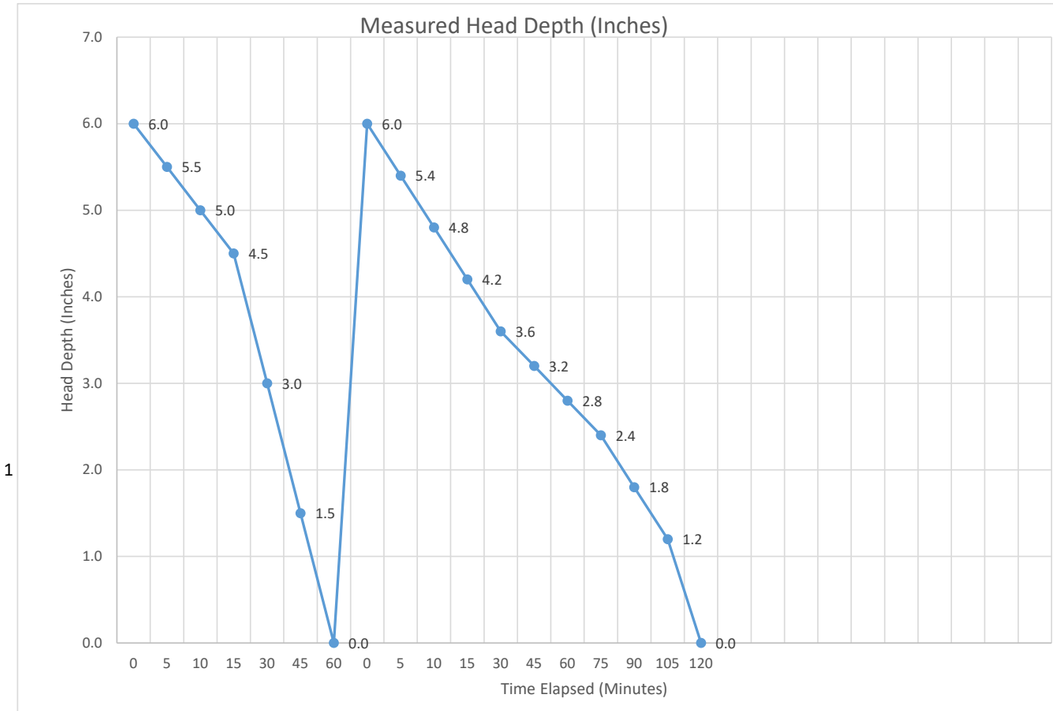
Geo-Technology Associates, Inc.

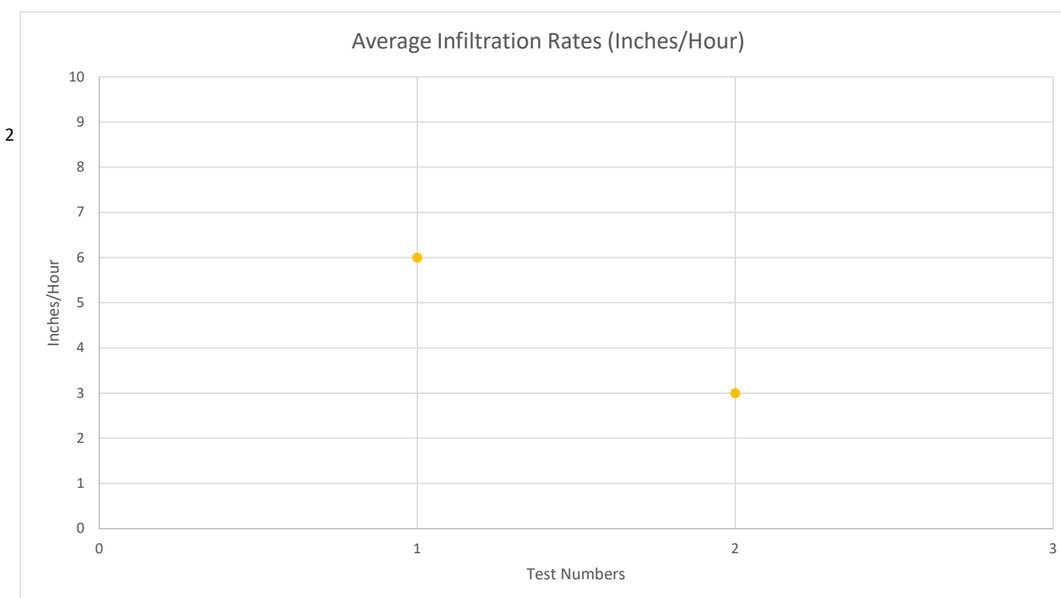
Single Ring Falling Head Infiltration Testing

Name: Young, Caraway
I. D. of Pipe: 5 in.
Test Depth: 4.5/ 25.7 ft. / EL
Depth of Casing Penetration: 1"
Soil Type Tested: Loamy Sand

Date 4/4/19
Temp _70°F_ Weather: No Rain
Rainfall Last 24 hrs. __0.0"___
Location: ___SWM-7
Presoak : 12" drop / 1+ hour

Date	Time	Δt (min.)		Head of Water (in.)	Comments		
4/4/2019	9:50	0		6.0			
	9:55	5		5.5			
	10:00	10		5.0			
	10:05	15		4.5			
	10:20	30		3.0			
	10:35	45		1.5			
	10:50	60		0.0	Rate: 6 in/hr	6	1
	10:50	0		6.0			
	10:55	5		5.4			
	11:00	10		4.8			
	11:05	15		4.2			
	11:20	30		3.6			
	11:35	45		3.2			
	11:50	60		2.8			
	12:05	75		2.4			
	12:20	90		1.8			
	12:35	105		1.2			
	12:50	120		0.0	Rate: 3 in/hr	3	2





Howard T. Ennis
31190199

Location: SWM-7
Test Depth 4.5

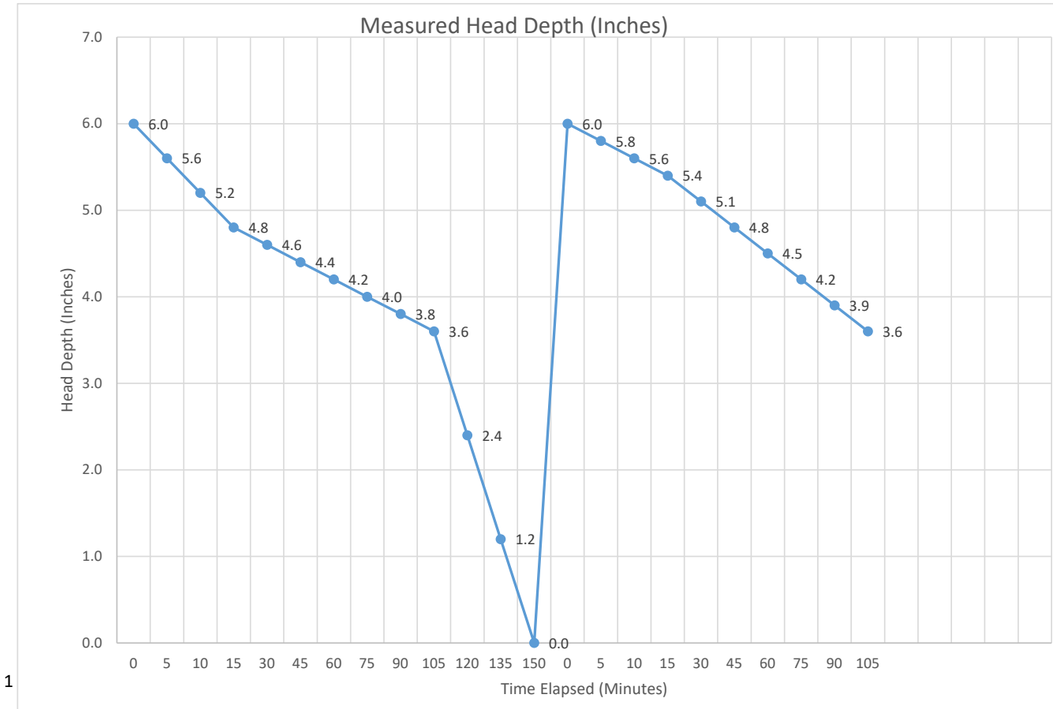
Geo-Technology Associates, Inc.

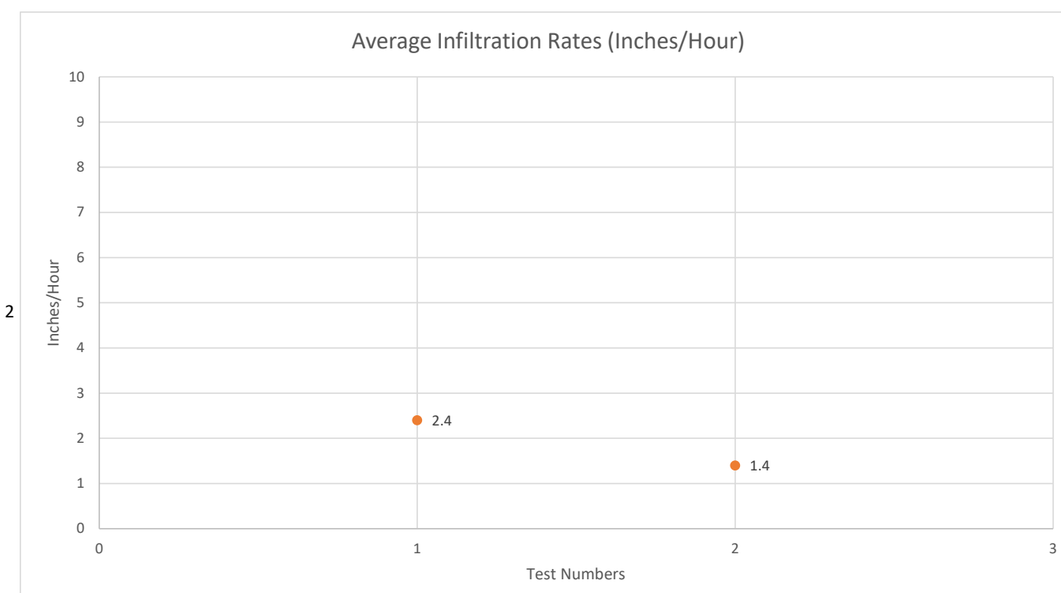
Single Ring Falling Head Infiltration Testing

Name: Young, Caraway
I. D. of Pipe: 5 in.
Test Depth: 6.5/ 23.3 ft. / EL
Depth of Casing Penetration: 1"
Soil Type Tested: Loamy Sand/Sandy Loam

Date 4/4/19
Temp _70°F_ Weather: No Rain
Rainfall Last 24 hrs. __0.0"___
Location: ___SWM-8
Presoak : 12" drop / 1+ hour

Date	Time	Δt (min.)		Head of Water (in.)	Comments		
4/4/2019	10:00	0		6.0			
	10:05	5		5.6			
	10:10	10		5.2			
	10:15	15		4.8			
	10:30	30		4.6			
	10:45	45		4.4			
	11:00	60		4.2			
	11:15	75		4.0			
	11:30	90		3.8			
	11:45	105		3.6			
	12:00	120		2.4			
	12:15	135		1.2			
	12:30	150		0.0	Rate: 2.4 in/hr	2.4	1
	12:55	0		6.0			
	1:00	5		5.8			
	1:05	10		5.6			
	1:10	15		5.4			
	1:25	30		5.1			
	1:40	45		4.8			
	1:55	60		4.5			
	2:10	75		4.2			
	2:25	90		3.9			
	2:40	105		3.6	Rate: 1.4 in/hr	1.4	2





Howard T. Ennis
31190199

Location: SWM-8
Test Depth 6.5

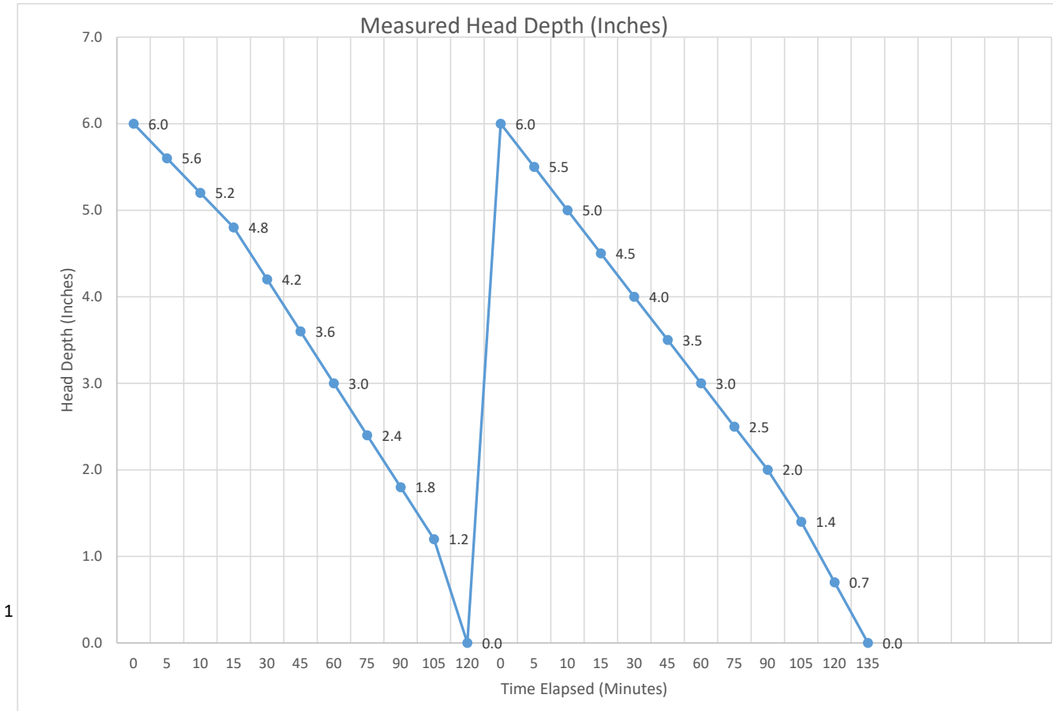
Geo-Technology Associates, Inc.

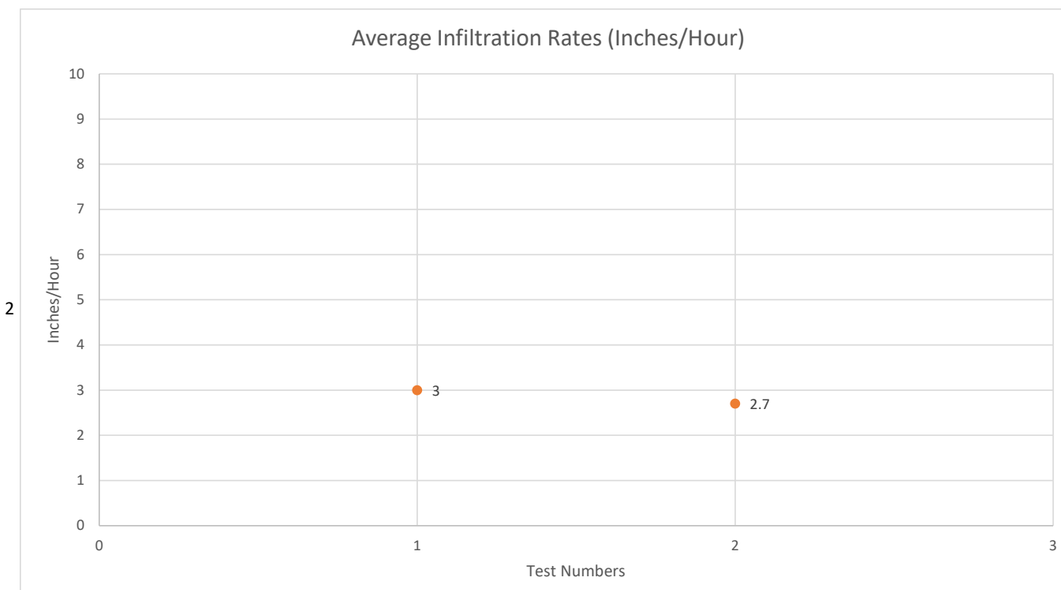
Single Ring Falling Head Infiltration Testing

Name: Young, Caraway
I. D. of Pipe: 5 in.
Test Depth: 7.5/ 23.6 ft. / EL
Depth of Casing Penetration: 1"
Soil Type Tested: Loamy Sand

Date 4/4/19
Temp _70°F_ Weather: No Rain
Rainfall Last 24 hrs. __0.0"___
Location: ___SWM-9
Presoak : 12" drop / 1+ hour

Date	Time	Δt (min.)		Head of Water (in.)	Comments		
4/4/2019	9:55	0		6.0			
	10:00	5		5.6			
	10:05	10		5.2			
	10:10	15		4.8			
	10:25	30		4.2			
	10:40	45		3.6			
	10:55	60		3.0			
	11:10	75		2.4			
	11:25	90		1.8			
	11:40	105		1.2			
	11:55	120		0.0	Rate: 3 in/hr	3	1
	12:25	0		6.0			
	12:30	5		5.5			
	12:35	10		5.0			
	12:40	15		4.5			
	12:55	30		4.0			
	1:10	45		3.5			
	1:25	60		3.0			
	1:40	75		2.5			
	1:55	90		2.0			
	2:10	105		1.4			
	2:25	120		0.7			
	2:40	135		0.0	Rate: 2.7 in/hr	2.7	2





Howard T. Ennis
31190199

Location: SWM-9
Test Depth 7.5

Geo-Technology Associates, Inc.

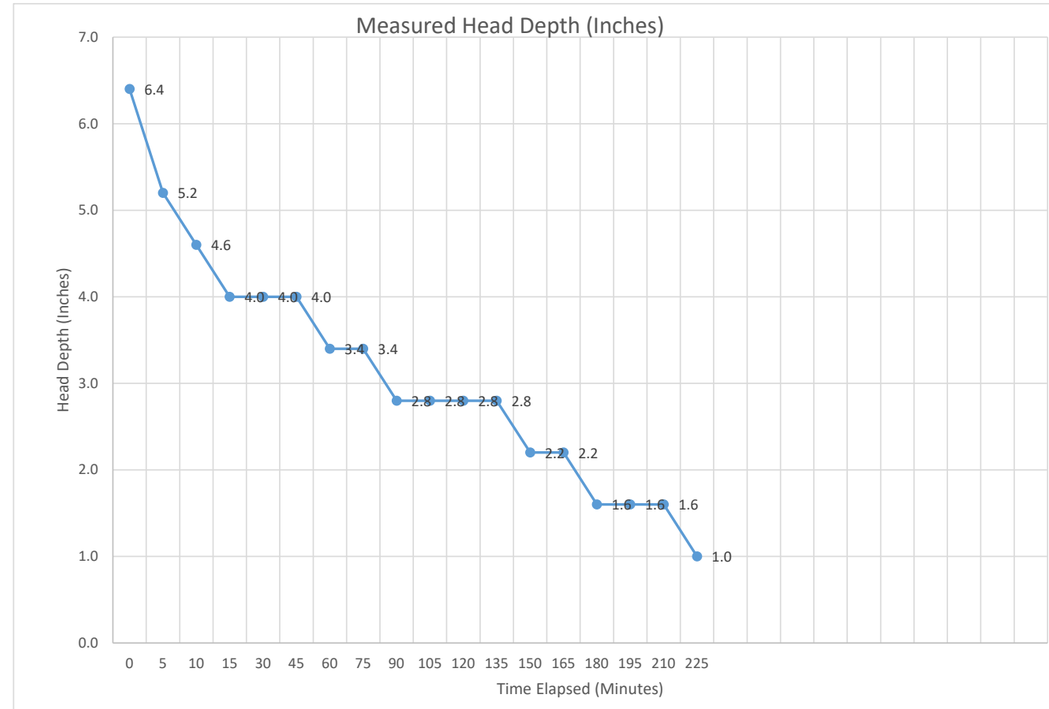
Single Ring Falling Head Infiltration Testing

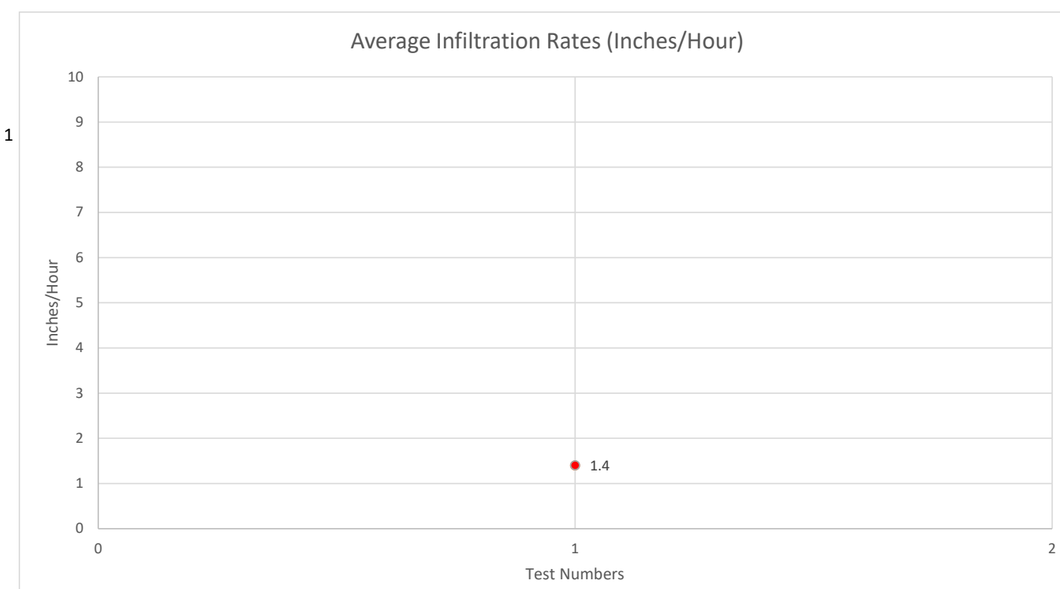
Name: Wright, Mitchell
I. D. of Pipe: 5 in.
Test Depth: 3.0 / 29.0 ft. / EL
Depth of Casing Penetration: 1"
Soil Type Tested: Sandy Loam

Date 5/21/19
Temp _70°F_ Weather: No Rain
Rainfall Last 24 hrs. __0.0"___
Location: ___SWM-4
Presoak : 12" drop / 1+ hour

Date	Time	Δt (min.)		Head of Water (in.)	Comments
5/21/2019	11:30	0		6.4	
	11:35	5		5.2	
	11:40	10		4.6	
	11:45	15		4.0	
	12:00	30		4.0	
	12:15	45		4.0	
	12:30	60		3.4	
	12:45	75		3.4	
	1:00	90		2.8	
	1:15	105		2.8	
	1:30	120		2.8	
	1:45	135		2.8	
	2:00	150		2.2	
	2:15	165		2.2	
	2:30	180		1.6	
	2:45	195		1.6	
	3:00	210		1.6	
	3:15	225		1.0	Rate: 1.4 in/hr"

1.4 1





Howard T. Ennis
31190199

Location: SWM-4
Test Depth: 3.0

Geo-Technology Associates, Inc.

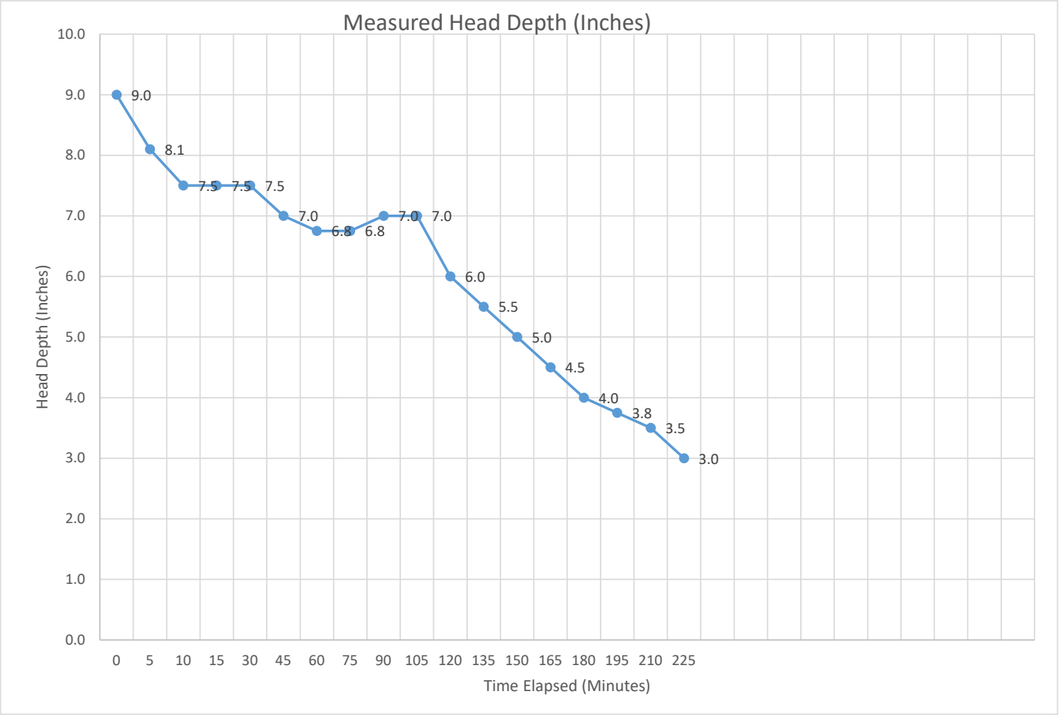
Single Ring Falling Head Infiltration Testing

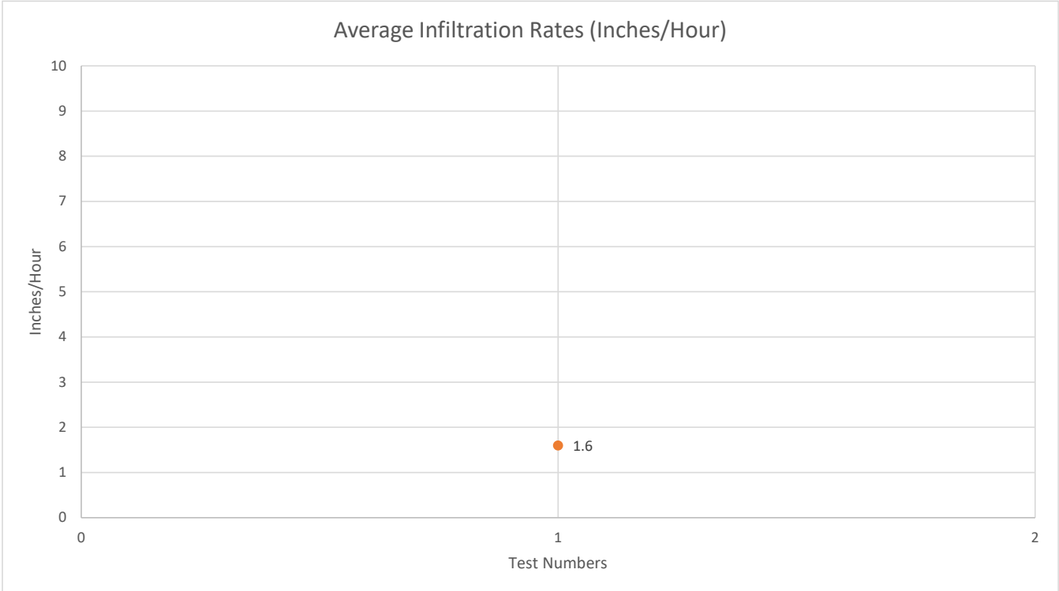
Name: Mitchell, Wright
I. D. of Pipe: 12 in.
Test Depth: 3.0 / 29.0 ft. / EL
Depth of Casing Penetration: 1"
Soil Type Tested: Sandy Loam

Date 5/21/19
Temp _70°F_ Weather: No Rain
Rainfall Last 24 hrs. __0.0"___
Location: ___SWM-4
Presoak : 12" drop / 1+ hour

Date	Time	Δt (min.)		Head of Water (in.)	Comments
5/21/2019	11:30	0		9.0	
	11:35	5		8.1	
	11:40	10		7.5	
	11:45	15		7.5	
	12:00	30		7.5	
	12:15	45		7.0	
	12:30	60		6.8	
	12:45	75		6.8	
	1:00	90		7.0	
	1:15	105		7.0	
	1:30	120		6.0	
	1:45	135		5.5	
	2:00	150		5.0	
	2:15	165		4.5	
	2:30	180		4.0	
	2:45	195		3.8	
	3:00	210		3.5	
	3:15	225		3.0	Rate: 1.6 in/hr

1.6 1





Howard T. Ennis
31190199

Location: SWM-4
Test Depth: 3.0

Geo-Technology Associates, Inc.

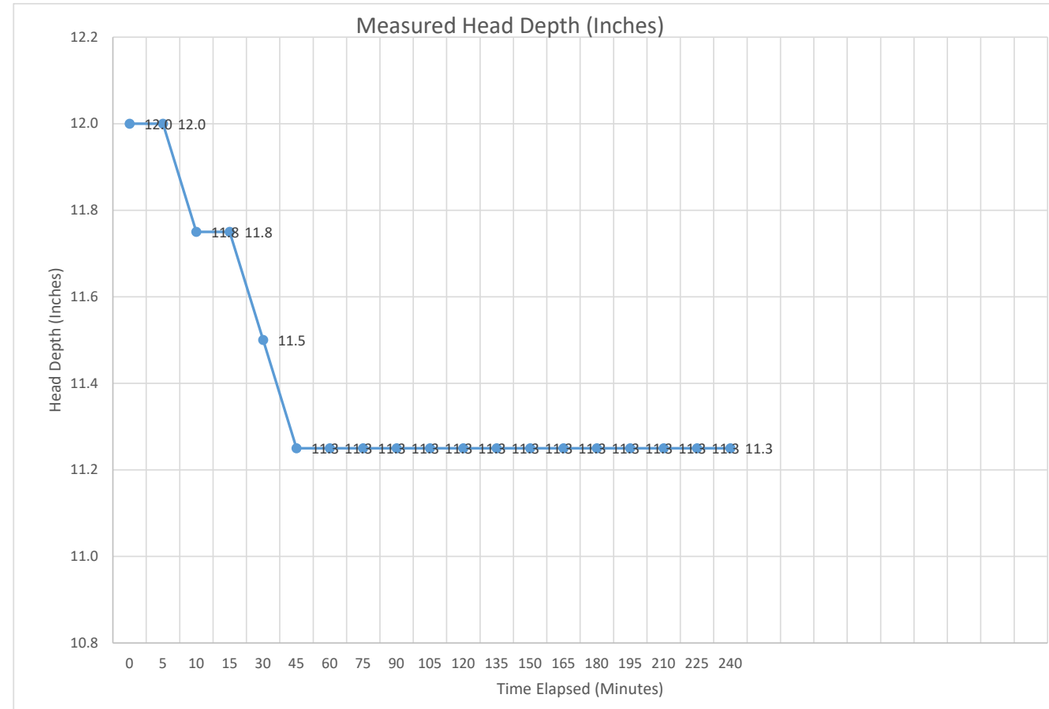
Single Ring Falling Head Infiltration Testing

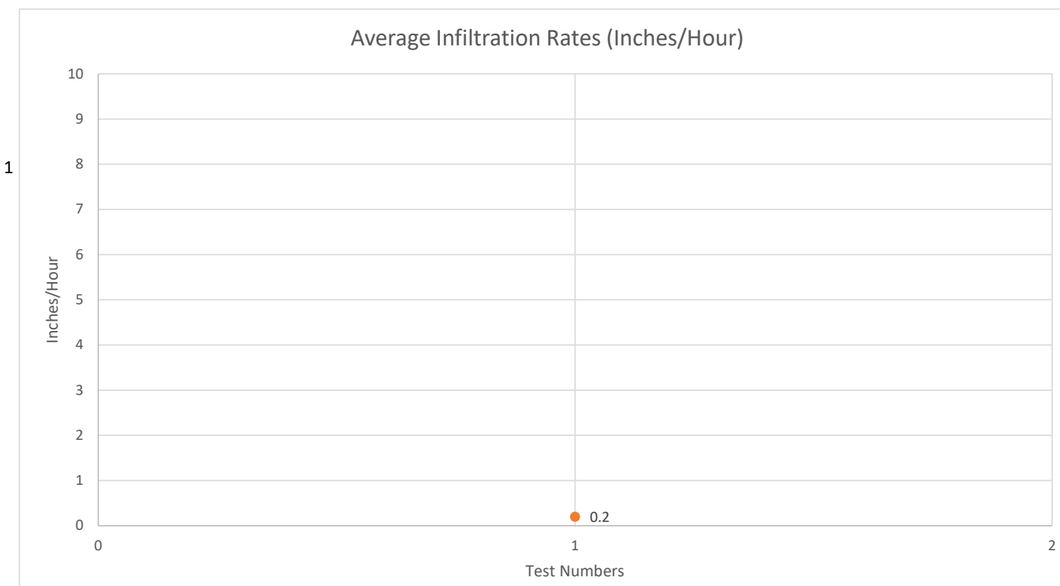
Name: Mitchell, Wright
I. D. of Pipe: 5 in.
Test Depth: 2.0/ 28.9 ft. / EL
Depth of Casing Penetration: 1"
Soil Type Tested: Sandy Loam

Date 5/21/19
Temp _70°F_ Weather: No Rain
Rainfall Last 24 hrs. __0.0"___
Location: ___SWM-5_____
Presoak : 12" drop / 1+ hour

Date	Time	Δt (min.)		Head of Water (in.)	Comments
5/21/2019	11:35	0		12.0	
	11:40	5		12.0	
	11:45	10		11.8	
	11:50	15		11.8	
	12:05	30		11.5	
	12:20	45		11.3	
	12:35	60		11.3	
	12:50	75		11.3	
	1:05	90		11.3	
	1:20	105		11.3	
	1:35	120		11.3	
	1:50	135		11.3	
	2:05	150		11.3	
	2:20	165		11.3	
	2:35	180		11.3	
	2:50	195		11.3	
	3:05	210		11.3	
	3:20	225		11.3	
	3:35	240		11.3	Rate: 0.2 in/hr

0.2 1





Howard T. Ennis
31190199

Location: SWM-5
Test Depth: 2.0

Geo-Technology Associates, Inc.

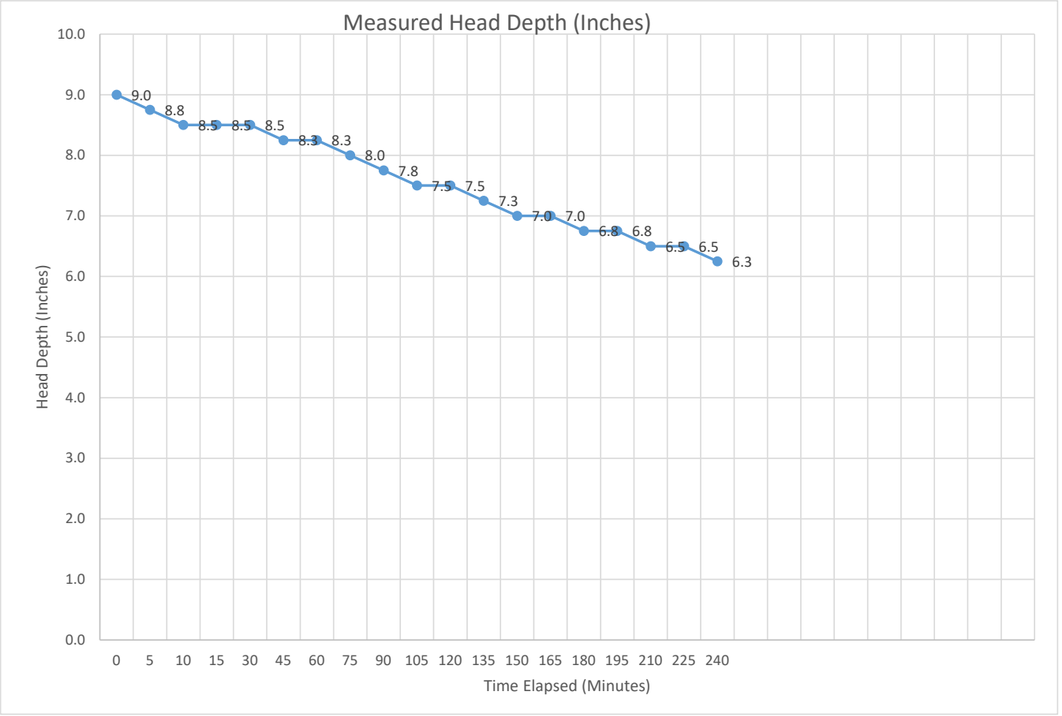
Single Ring Falling Head Infiltration Testing

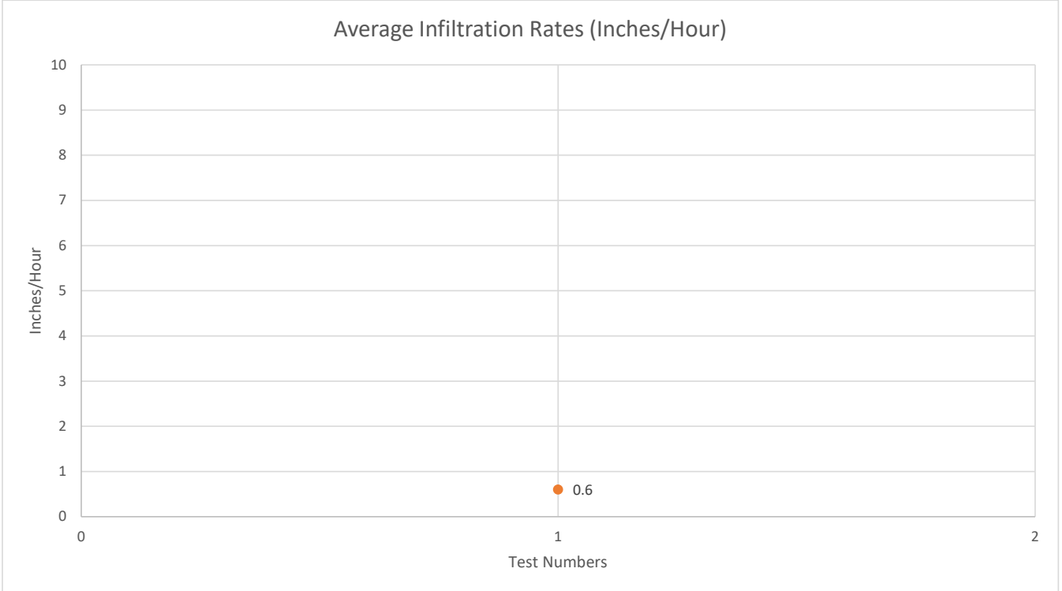
Name: Mitchell, Wright
I. D. of Pipe: 12 in.
Test Depth: 2.0/ 28.9 ft. / EL
Depth of Casing Penetration: 1"
Soil Type Tested: Sandy Loam

Date 5/21/19
Temp _70°F_ Weather: No Rain
Rainfall Last 24 hrs. __0.0"___
Location: ___SWM-5_____
Presoak : 12" drop / 1+ hour

Date	Time	Δt (min.)		Head of Water (in.)	Comments
5/21/2019	11:35	0		9.0	
	11:40	5		8.8	
	11:45	10		8.5	
	11:50	15		8.5	
	12:05	30		8.5	
	12:20	45		8.3	
	12:35	60		8.3	
	12:50	75		8.0	
	1:05	90		7.8	
	1:20	105		7.5	
	1:35	120		7.5	
	1:50	135		7.3	
	2:05	150		7.0	
	2:20	165		7.0	
	2:35	180		6.8	
	2:50	195		6.8	
	3:05	210		6.5	
	3:20	225		6.5	
	3:35	240		6.3	Rate: 0.6 in/hr

0.6 1





Howard T. Ennis
31190199

Location: SWM-5
Test Depth: 2.0

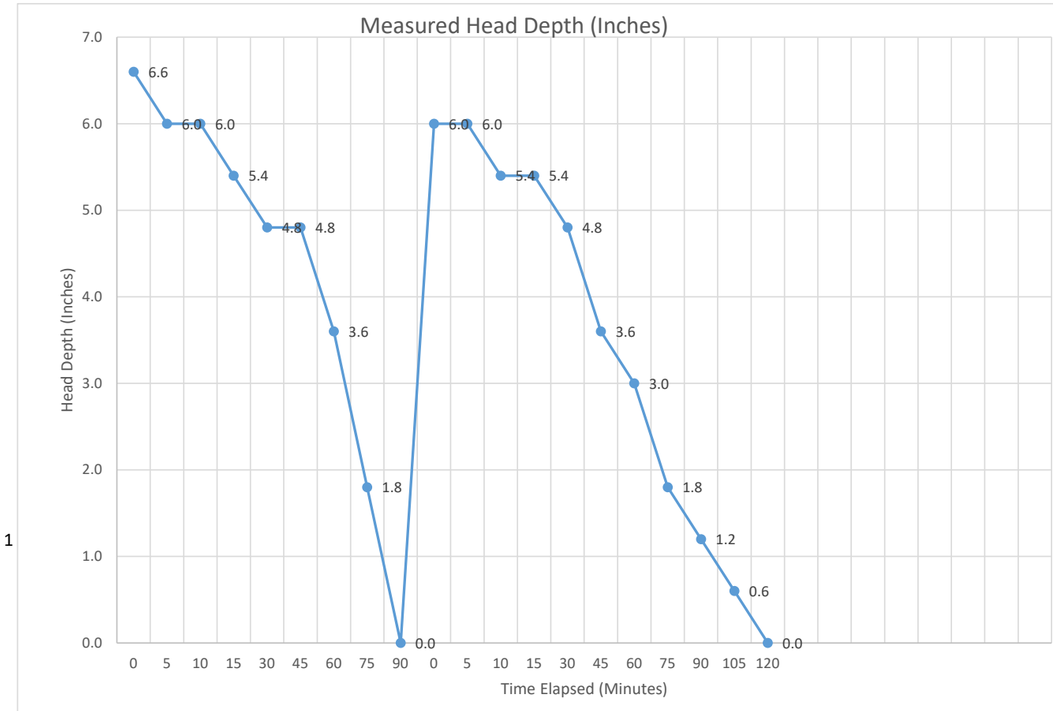
Geo-Technology Associates, Inc.

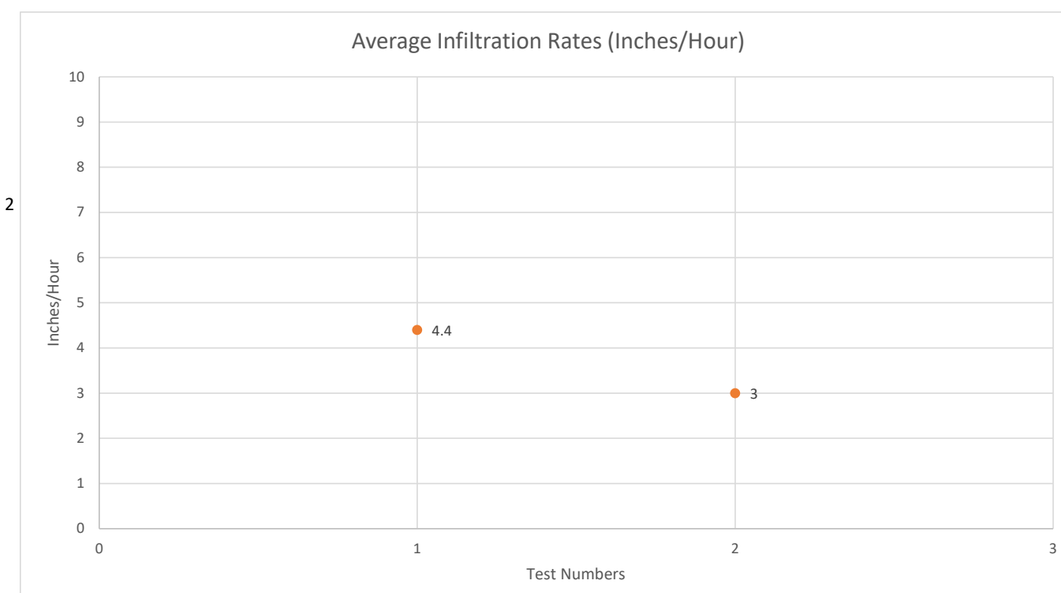
Single Ring Falling Head Infiltration Testing

Name: Mitchell, Wright
I. D. of Pipe: 5 in.
Test Depth: 2.0/ 25.6 ft. / EL
Depth of Casing Penetration: 1"
Soil Type Tested: Loamy Sand

Date 5/21/19
Temp _70°F_ Weather: No Rain
Rainfall Last 24 hrs. __0.0"___
Location: ___SWM-6_____
Presoak : 12" drop / 1+ hour

Date	Time	Δt (min.)		Head of Water (in.)	Comments		
5/21/2019	11:40	0		6.6			
	11:45	5		6.0			
	11:50	10		6.0			
	11:55	15		5.4			
	12:10	30		4.8			
	12:25	45		4.8			
	12:40	60		3.6			
	12:55	75		1.8			
	1:10	90		0.0	Rate: 4.4 in/hr	4.4	1
	1:10	0		6.0			
	1:15	5		6.0			
	1:20	10		5.4			
	1:25	15		5.4			
	1:40	30		4.8			
	1:55	45		3.6			
	2:10	60		3.0			
	2:25	75		1.8			
	2:40	90		1.2			
	2:55	105		0.6			
	3:10	120		0.0	Rate: 3 in/hr	3	2





Howard T. Ennis
31190199

Location: SWM-6
Test Depth: 2.0

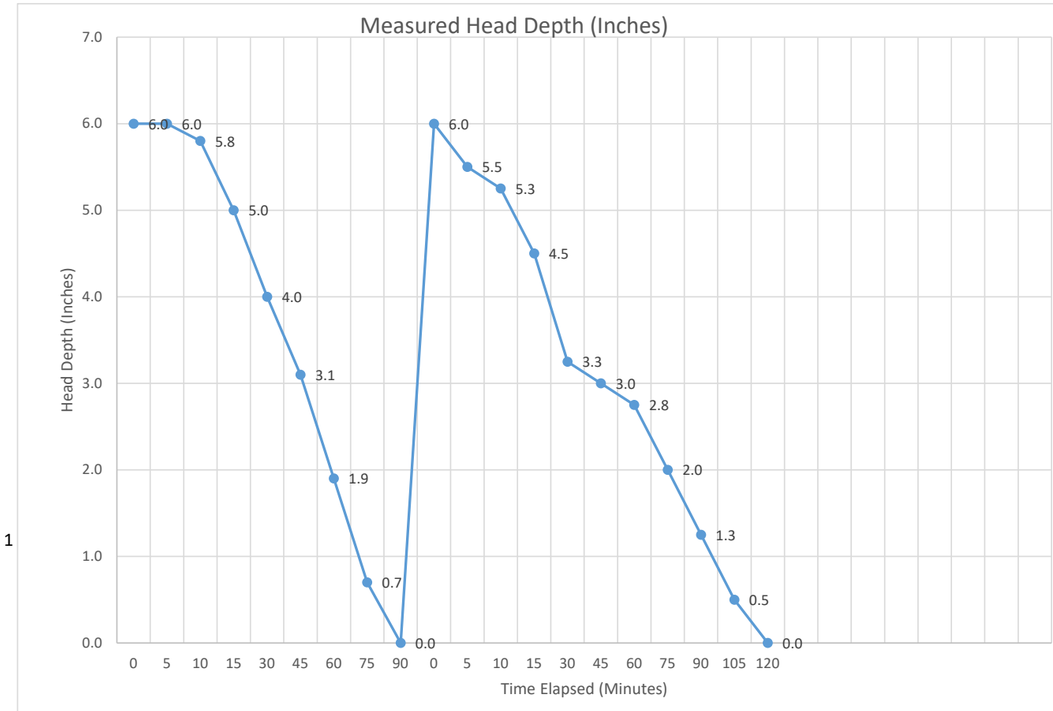
Geo-Technology Associates, Inc.

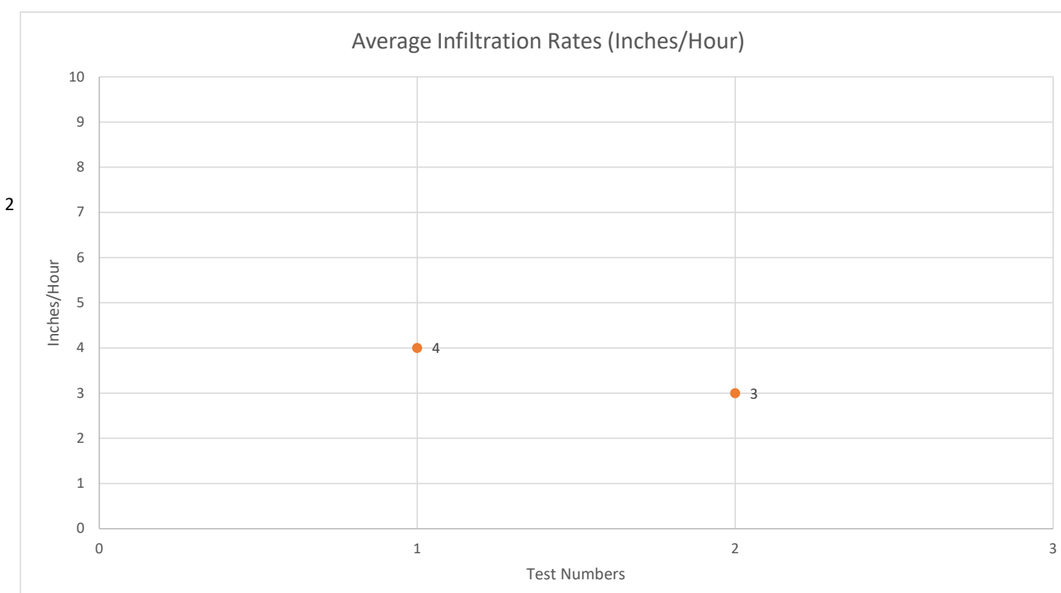
Single Ring Falling Head Infiltration Testing

Name: Mitchell, Wright
I. D. of Pipe: 12 in.
Test Depth: 2.0/ 25.6 ft. / EL
Depth of Casing Penetration: 1"
Soil Type Tested: Loamy Sand

Date 5/21/19
Temp _70°F_ Weather: No Rain
Rainfall Last 24 hrs. __0.0"___
Location: ___SWM-6
Presoak : 12" drop / 1+ hour

Date	Time	Δt (min.)		Head of Water (in.)	Comments		
5/21/2019	11:40	0		6.0			
	11:45	5		6.0			
	11:50	10		5.8			
	11:55	15		5.0			
	12:10	30		4.0			
	12:25	45		3.1			
	12:40	60		1.9			
	12:55	75		0.7			
	1:10	90		0.0	Rate: 4 in/hr	4	1
	1:10	0		6.0			
	1:15	5		5.5			
	1:20	10		5.3			
	1:25	15		4.5			
	1:40	30		3.3			
	1:55	45		3.0			
	2:10	60		2.8			
	2:25	75		2.0			
	2:40	90		1.3			
	2:55	105		0.5			
	3:10	120		0.0	Rate: 3 in/hr	3	2





Howard T. Ennis
31190199

Location: SWM-6
Test Depth: 2.0

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, clients can benefit from a lowered exposure to the subsurface problems that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed below, contact your GBA-member geotechnical engineer. Active involvement in the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Geotechnical-Engineering Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. *Those who rely on a geotechnical-engineering report prepared for a different client can be seriously misled*. No one except authorized client representatives should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one – not even you – should apply this report for any purpose or project except the one originally contemplated.*

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read it *in its entirety*. Do not rely on an executive summary. Do not read selected elements only. *Read this report in full.*

You Need to Inform Your Geotechnical Engineer about Change

Your geotechnical engineer considered unique, project-specific factors when designing the study behind this report and developing the confirmation-dependent recommendations the report conveys. A few typical factors include:

- the client's goals, objectives, budget, schedule, and risk-management preferences;
- the general nature of the structure involved, its size, configuration, and performance criteria;
- the structure's location and orientation on the site; and
- other planned or existing site improvements, such as retaining walls, access roads, parking lots, and underground utilities.

Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

This Report May Not Be Reliable

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, that it could be unwise to rely on a geotechnical-engineering report whose reliability may have been affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If your geotechnical engineer has not indicated an "apply-by" date on the report, ask what it should be*, and, in general, *if you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying it. A minor amount of additional testing or analysis – if any is required at all – could prevent major problems.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface through various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing were performed*. The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgment to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team from project start to project finish, so the individual can provide informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, *they are not final*, because the geotechnical engineer who developed them relied heavily on judgment and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* revealed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation*.

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a full-time member of the design team, to:

- confer with other design-team members,
- help develop specifications,
- review pertinent elements of other design professionals' plans and specifications, and
- be on hand quickly whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction observation.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for informational purposes only*. To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report, but they may rely on the factual data relative to the specific times, locations, and depths/elevations referenced. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely*. Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures*. If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. As a general rule, *do not rely on an environmental report prepared for a different client, site, or project, or that is more than six months old.*

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, none of the engineer's services were designed, conducted, or intended to prevent uncontrolled migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration.*** Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org

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INDIAN RIVER SCHOOL DISTRICT
HOWARD T. ENNIS SCHOOL
PATRIOTS WAY, GEORGETOWN, DE 19947
Bid No. IRD19004-HTES

BID FORM

For Bids Due: **October 15, 2020 @ 2:00 PM**

To: Indian River School District
District Administrative Offices
31 Hosier Street
Selbyville, DE 19975

Name of Bidder: _____

Delaware Business License No.: _____ **Taxpayer ID No.:** _____
"(A copy of a Bidders Delaware Business License must be attached to this form.)"

(Other License Nos.): _____

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

The undersigned, representing that he has read and understands the Bidding Documents and that this bid is made in accordance therewith, that he has visited the site and has familiarized himself with the local conditions under which the Work is to be performed, and that his bid is based upon the materials, systems and equipment described in the Bidding Documents without exception, hereby proposes and agrees to provide all labor, materials, plant, equipment, supplies, transport and other facilities required to execute the work described by the aforesaid documents for the lump sum itemized below:

$_____
($)

ALLOWANCE ACKNOWLEDGEMENTS

ALLOWANCE No. 1: Include a Lump Sum Allowance equal to Five hundred thousand dollars ($500,000.00) for costs associated with any unforeseen or concealed conditions and / or Owner requested revisions during the construction period. Upon Owner/Architect approval, a Credit or Add Change Order will be applied to the Allowance. I/We have reviewed and familiarized ourselves with the requirements contained in Specification Section 012100 Allowances.

Acknowledged by: _____

ALLOWANCE No. 2: Lump Sum Allowance – Short Circuit Analysis Gear Revisions

1. Include the sum of Twenty thousand dollars ($20,000.00) for electrical gear revisions resulting from the short circuit analysis specified in Section 260573 "Electrical Systems Analysis".
2. This allowance includes material cost, receiving, handling, installation, and Contractor overhead and profit. I/We have reviewed and familiarized ourselves with the requirements contained in Specification Section 012100 Allowances.

Acknowledged by: _____

ALLOWANCE No. 3: Lump Sum Allowance – Future Greenhouse Electrical Service

1. Include the sum of Thirty thousand dollars ($30,000.00) for providing electrical power from the building's electrical power supply system to the future greenhouse, including power distribution equipment and equipment and/or device connections within the greenhouse.
2. This allowance includes material cost, receiving, handling, installation, and Contractor overhead and profit. I/We have reviewed and familiarized ourselves with the requirements contained in Specification Section 012100 Allowances.

Acknowledged by: _____

ALLOWANCE No. 4: Lump Sum Allowance – Future Pole Barn Electrical Service

1. Include the sum of Thirty thousand dollars ($30,000.00) for providing electrical power from the building's electrical power supply system to the future pole barn, including power distribution equipment and equipment and/or device connections within the pole barn.
2. This allowance includes material cost, receiving, handling, installation, and Contractor overhead and profit. I/We have reviewed and familiarized ourselves with the requirements contained in Specification Section 012100 Allowances.

Acknowledged by: _____

ALTERNATES

Alternate prices conform to applicable project specification section. Refer to specifications for a complete description of the following Alternates. An "ADD" or "DEDUCT" amount is indicated by the crossed out part that does not apply.

ALTERNATE No. 1: Additional Parking Lot (South Lot):

1. Base Bid: Includes scope of work for all parking drives and lots indicated on drawings.
2. Alternate: Work associated with this Alternate includes the construction of a new parking lot containing 72 parking spaces, drives and associated lighting located at the Southern portion of the site.

Add/Deduct: _____

($)

ALTERNATE No. 2: Additional Parking Lot (East Lot):

1. Base Bid: Includes scope of work for all parking drives and lots indicated on drawings.
2. Alternate: Work associated with this Alternate includes the construction of a new parking lot containing 42 parking spaces, drives and associated lighting located at the Eastern portion of the site.

Add/Deduct: _____

($)

ALTERNATE No. 3: Additional Parking Lot (North Lot):

1. Base Bid: Includes scope of work for all parking drives and lots indicated on drawings.
2. Alternate: Work associated with this Alternate include the construction of a new bus parking lot containing 35 bus parking spaces, 44 car parking spaces, drives and associated lighting located at the Northern portion of the site.

Add/Deduct: _____

($)

ALTERNATE No. 4: Detached Front Entry Canopy:

1. Base Bid: Provide no Detached Front Entry Canopy.
2. Alternate: Provide a detached entry canopy extending from the building front entry canopy to and along the bus unloading/loading walkway.

Add/Deduct: _____

($)

ALTERNATE No. 5: Decorative Hardscaping adjacent the Cafeteria and Gymnasium:

1. Base Bid: Provide Cafeteria and Gymnasium exterior concrete egress walkways and slabs as indicated.
2. Alternate: In lieu of concrete, provide Decorative Hardscaping Pavers where indicated adjacent the Cafeteria and Gymnasium.

Add/Deduct: _____

($)

ALTERNATE No. 6: Decorative Hardscaping Memorial Path:

1. Base Bid: Provide no Decorative Hardscaping Memorial Path.
2. Alternate: Provide Decorative Hardscaping Pavers and associated and landscaping to create a Memorial Path adjacent the front entry drive where indicated.

Add/Deduct: _____

($)

ALTERNATE No. 7: Remove Classrooms 312, 313, 314, 315 and associated toilets and reduce/revise Hallway H303:

1. Base Bid: Provide classrooms 312, 313, 314, 315, associated toilets and hallway H303 as documented in the base bid documents.
2. Alternate: Revise base bid to Remove Classrooms 312, 313, 314, 315 and associated toilets and reduce/revise Hallway H303 as indicated on drawing ALT9 A01and all associated Engineering disciplines.

Add/Deduct: _____

($)

ALTERNATE No. 8: Wellhouse Roofing - Material Revision:

1. Base Bid: Provide Standing Seam Metal Roofing System on specified nailable composite insulation as indicated on drawings and specifications.
2. Alternate: Replace the Standing Seam Metal Roofing system with an Asphalt Shingle Roofing System on specified nailable composite insulation. See specification section 073113 - Asphalt Shingles.

Add/Deduct: _____

($)

ALTERNATE No. 9: Lightning Protection System:

1. Base Bid: Do not furnish and install lightning protection system per Specification Section 264113 “Lightning Protection System”.
2. Alternate: Furnish and install lightning protection system per Specification Section 264113 “Lightning Protection System”.

Add/Deduct: _____

($)

ALTERNATE No. 10: Disconnect Switch Enclosure Ratings:

1. Base Bid: Provide NEMA 3R enclosures for disconnect switches located in damp/wet exterior locations per Specification Section 262816 “Disconnect Switches & Circuit Breakers”.
2. Alternate: Provide NEMA 4X stainless steel enclosures for disconnect switches located in damp/wet exterior locations per Specification Section 262816 “Disconnect Switches & Circuit Breakers”.

Add/Deduct: _____

($)

ALTERNATE No. 11: Square D Company Electrical Gear:

1. Base Bid: Provide transformers, switchboards, panelboards, disconnect switches, motor controllers per Specification Sections 262200"Transformers", 262413 "Switchboards", 262416 "Panelboards", 262816 "Disconnect Switches & Circuit Breakers", and 262913 "Motor Controllers" by any of the listed manufacturers.
2. Alternate: Provide transformers, switchboards, panelboards, disconnect switches, motor controllers per Specification Sections 262200 "Transformers", 262413 "Switchboards", 262416 "Panelboards", 262816 "Disconnect Switches & Circuit Breakers", and 262913 "Motor Controllers" by Square D Company. If Square D Company is the low cost, the alternate value shall be zero ($0) dollars.

Add/Deduct: _____

($)

UNIT PRICES

Unit prices conform to applicable project specification section. Refer to the specifications for a complete description of the following Unit Prices:

		ADD	DEDUCT
A.	Unit Price No. 1 - Structural Fill (DelDot Type G):	$ _____	$ _____
	1. Description: Additional quantity required of less than **500** cubic yards, with work performed according to Division 312000 Section "Earthwork." 2. Unit of Measurement: Cubic Yard (c.y.)		
B.	Unit Price No. 2 - Structural Fill (DelDot Type G):	$ _____	$ _____
	1. Description: Additional quantity required of more than 500 cubic yards, with work performed according to Division 312000 Section "Earthwork." 2. Unit of Measurement: Cubic Yard (c.y.)		
C.	Unit Price No. 3 - Cut:	$ _____	$ _____
	1. Description: Removal from site of less than 500 cubic yards according to Division 312000 Section "Earthwork." 2. Unit of Measurement: Cubic Yard (c.y.)		
D.	Unit Price No. 4 - Cut:	$ _____	$ _____
	1. Description: Removal from site of more than 500 cubic yards according to Division 312000 Section "Earthwork." 2. Unit of Measurement: Cubic Yard (c.y.)		
E.	Unit Price No. 5– Silt Fence:	$ _____	$ _____
	1. Description: Additional quantity of silt fence material and installation. 2. Unit of Measurement: Linear Foot (l.f.)		
F.	Unit Price No. 6 Geogrid Reinforcement	$ _____	$ _____
	1. Description: Placement of Tensar BX1100 geogrid reinforcement material and installation per section 2.03 of the Earthwork specification. 2. Unit of Measurement: Square Yard (s.y.)		

INDIAN RIVER SCHOOL DISTRICT
HOWARD T. ENNIS SCHOOL
PATRIOTS WAY, GEORGETOWN, DE 19947
Bid No. IRD19004-HTES

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:** _____
(Authorized Signature)

(SEAL)

_____
(Title)

Date: _____

ATTACHMENTS

Sub-Contractor List
Non-Collusion Statement
Affidavit of Employee Drug Testing Program
Bid Security
(Others as Required by Project Manuals)

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.

Subcontractor Category	Subcontractor	Address (City & State)	Subcontractors tax payer ID # or Delaware Business license #
1. Sitework			
A.			
B.			
C.			
2. Concrete			
A.			
B.			
C.			
3. Masonry			
A.			
B.			
C.			

4. Structural Steel			
A.			
B.			
C.			
5. Low Slope Roofing			
A.			
B.			
C.			
6. 23. Exterior Siding			
A.			
B.			
C.			
7. Doors/Frames/ Hardware Installer			
A.			
B.			
C.			
8. Window Installer			
A.			
B.			
C.			

9. Metal Stud/Drywall			
A.			
B.			
C.			
10. Painting			
A.			
B.			
C.			
11. Resilient/Carpet Floors			
A.			
B.			
C.			
12. Acoustical Ceilings			
A.			
B.			
C.			
13. Institutional Casework Installer			
A.			
B.			
C.			

14. Security Systems Installer			
A.			
B.			
C.			
15. Fire Alarm Installer			
A.			
B.			
C.			
16. Plumbing			
A.			
B.			
C.			
17. Sprinklers			
A.			
B.			
C.			
18. HVAC			
A.			
B.			
C.			

19. DDC Controls			
A.			
B.			
C.			
20. Electrical			
A.			
B.			
C.			

INDIAN RIVER SCHOOL DISTRICT
HOWARD T. ENNIS SCHOOL
PATRIOTS WAY, GEORGETOWN, DE 19947
Bid No. IRD19004-HTES

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 Indian River School District.

All the terms and conditions of Architect Project No. 17004, IRSD Bid No. IRD19004-HTES 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.

INDIAN RIVER SCHOOL DISTRICT
HOWARD T. ENNIS SCHOOL
PATRIOTS WAY, GEORGETOWN, DE 19947
Bid No. IRD19004-HTES

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.

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.

INDIAN RIVER SCHOOL DISTRICT
HOWARD T. ENNIS SCHOOL
PATRIOTS WAY, GEORGETOWN, DE 19947
Bid No. IRD19004-HTES

AFFIDAVIT OF
CRAFT TRAINING COMPLIANCE

We, the contractor, hereby certify that we and all applicable subcontractors will abide by the contractor and subcontractor craft training requirements outlined below for the duration of the contract. Craft training must be provided by a contractor and/or subcontractor for each craft on a project for which there are Delaware Department of Labor approved and registered training programs. A list of crafts for which there are approved and registered training programs is maintained by the Delaware Department of Labor and can be found at https://det.delawareworks.com/apprenticeship/documents/Apprenticeship Occupation List for 29Del6962 Compliance.pdf
If you have questions regarding craft training programs, please submit them in writing to the Delaware Department of Labor at: apprenticeship@delaware.gov. The Craft Training Compliance Affidavit must be submitted prior to contract execution. In addition to this Affidavit, all information pertaining to craft training for subcontractors must also be submitted prior to contract execution. Information to be provided is the craft, company name, registration number (indicate DE, US DOL or identify other state) or that craft training requirements do not apply and the reason.

In accordance with Title 29, Chapter 69, Section 6962(d)(13) of the Delaware Code, contractors and subcontractors must provide craft training for journeyman and apprentice levels if **all** of the following apply:

A. A project meets the prevailing wage requirement under Title 29, Chapter 69, Section 6960 of the Delaware Code.
B. The contractor employs 10 or more total employees.
C. The project is not a federal highway project

Failure to provide required craft training on the project may subject the successful contractor and/or subcontractor(s) to penalties as outlined in Title 29, Chapter 69, Section 6962(d)(13) of the Delaware Code.

Craft(s) _____

Contractor Name: _____

Contractor Address: _____

_____

_____

Contractor Program
Registration Number(s) _____
On this line also indicate whether DE, Other State (identify) or US Registration Number

Or

❑ **Craft Training requirements are not applicable because:** _____

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 TO BE CONSIDERED.