Troy Schools District

RFP #2324-15
BP#3A Smith Middle School – Foundations and Steel - Addendum #1
February 1st, 2024

Content Included in this Addendum:

Cover Page (1 Pages)
Barton Malow Write Up (1 Pages)
Pre-Bid Walk Sign-In Sheet (1 Pages)
Temporary Road and Laydown Drawings (1Pages)
Geotechnical Investigation Report (29 Pages)

TOTAL PAGES: 33 Pages

February 1st, 2024

Troy Schools District – BP#3A Smith Middle School – Foundations and Steel

Addendum #1 Bidder Clarifications

A. General Clarifications

- Geotechnical report
  - Geotechnical report referenced in the specifications has been attached to this addendum.
  - Geotechnical report references a different building location than current plans. This report has significant overlap with current building layout an additional report with the remaining borings will be issued in Addendum 2. Assume consistent soil composition in missing locations.

B. Clarifications and Additions to Work Scopes

- Site Preparation and SESC (Bid Category)
  - Temporary Road and Laydown Plans
    - Added temporary road and laydown plans. Markups made by Barton Malow.
    - All site preparation, stone, and installation indicated on this plan is the responsibility of this contractor.
  - Alternate #1: Save and Stockpile Site Soils
    - Base Bid: Haul off all topsoil and legally dispose.
    - Alternate: Screen all topsoil and stockpile in shaded area on drawing.

C. RFI Responses

Q: Who is responsible for all site utilities and building leads?
A: Site utilities responsibility to be issued in a separate package. Locations will be known and communicated prior to the start of construction.

Q: Is the building pad the responsibility of the concrete contractor? Who is responsible for scrapping the existing site and prepping for the building pad?
A: The concrete contractor will be responsible for both within the confines of the building.

Barton Malow

MEETING SIGN-IN SHEET

DATE: 01/31/2024

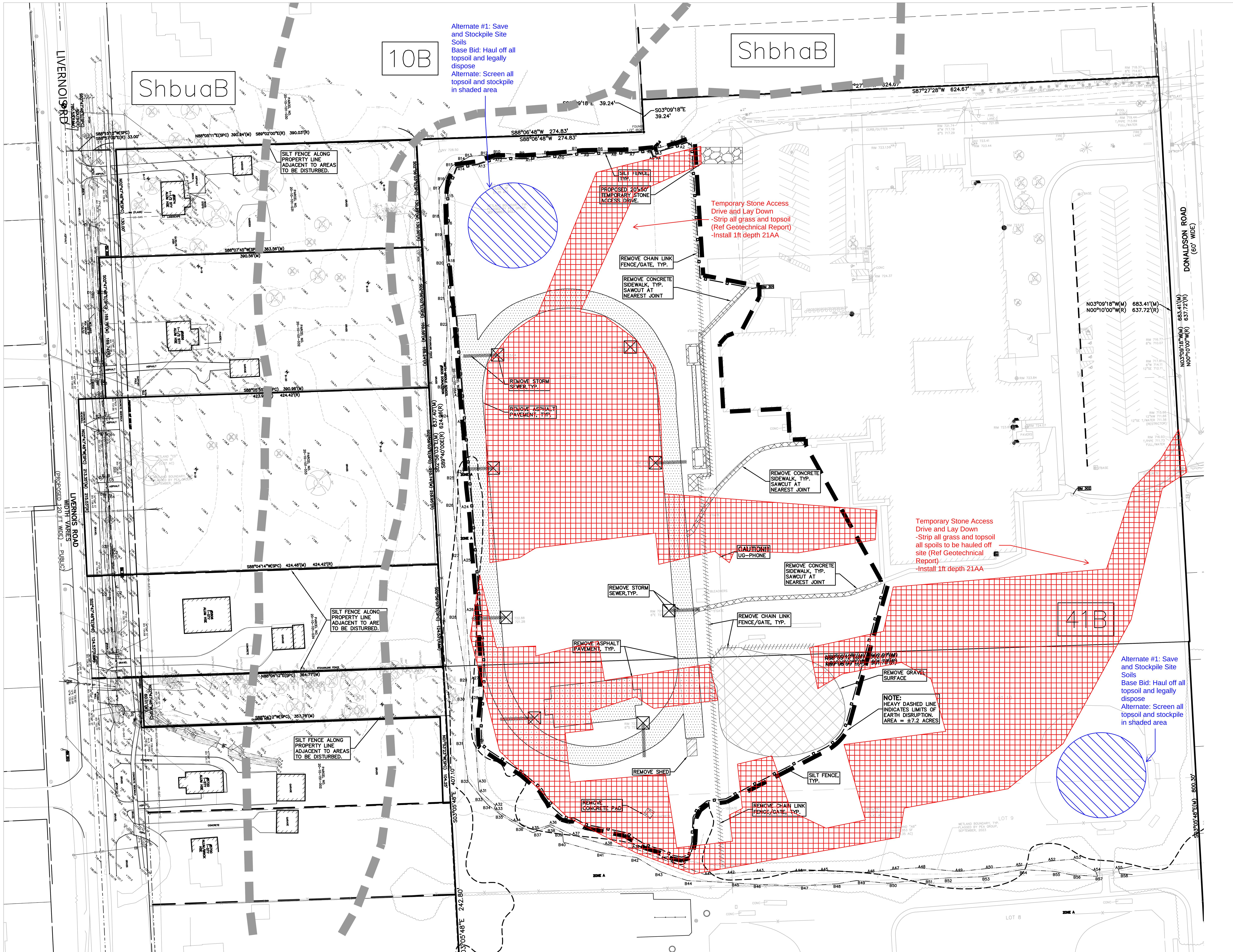
TIME: 1:00PM

LOCATION: SMITH MIDDLE SCHOOL – 5835 DONALDSON DR, TROY, MI, 48085

PROJECT: BP#3A NEW SMITH MIDDLE SCHOOL FOUNDATIONS AND STEEL

SUBJECT: PRE-BID MEETING

ATTENDEES (Please print legibly)	COMPANY	CATEGORY BIDDING	TELEPHONE	E-MAIL ADDRESS
Josh Eisenman	Barton Malow Builders		(586) 651-2658	Josh.eisenman@bartonmalow.cor
Shawn Mow	Barton Malow Builders		(810) 560-7159	Shawn.mow@bartonmalow.com
Adam Lewis	Barton Malow Builders		(248) 953-5682	adam.lewis@bartonmalow.com
Jim Hopper	Culver Development	Concrete	248-561-3664	jhopper@Culverteam.com
Jacob Steller	Simone	Concrete Demo	586-420-5492	jacob@simonecompanies.com
Franco Antonnicola	TMP		313-378-2716	FAntonnicola@TMP-Archit.com
Joe Trionfo	B&A Steel	Steel	586-615-6084	Jtrionfo@grillco.com



FLOODPLAIN:
PER FLOOD INSURANCE RATE MAP NUMBER 26125C0532F, DATED SEPTEMBER 29, 2006

BY GRAPHICAL PLOTTING, THE SITE LIES WITHIN:

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD
THE 1% ANNUAL CHANCE FLOOD (100 YEAR FLOOD), ALSO KNOWN AS THE BASE FLOOD, IS THE FLOOD THAT HAS A 1% CHANCE OF BEING EQUALED OR EXCEEDED IN ANY GIVEN YEAR. THE SPECIAL FLOOD HAZARD AREA IS THE AREA SUBJECT TO FLOODING BY THE 1% ANNUAL CHANCE FLOOD. AREAS OF SPECIAL FLOOD HAZARD INCLUDE ZONES A, AE, AH, AO, AR, A99, V AND VE. THE BASE FLOOD ELEVATION IS THE WATER-SURFACE ELEVATION OF THE 1% ANNUAL CHANCE FLOOD.

ZONE A - NO BASE FLOOD ELEVATIONS DETERMINED.

OTHER AREAS
ZONE X
AREA TO BE DETERMINED OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOODPLAIN.

LEGAL DESCRIPTION:

PARCEL ID 20-10-101-054
Land in the City of Troy, Oakland County, Michigan, described as follows:

T2N, R11E, SEC 10 PART OF NW 1/4 BEG AT PT DIST S 571.05 FT & S 88-57-00 E 697.50 FT & S 00-10-00 E 169.24 FT FROM NW SEC COR, TH S 89-40-00 E 624.96 FT, TH S 00-10-00 E 683.20 FT, TH N 89-08-00 W 901.78 FT, TH N 00-10-00 W 637.72 FT, TH S 89-02-00 E 275.00 FT, TH N 00-10-00 W 39.24 FT TO BEG 13.79 A

PARCEL ID 20-10-151-022
Land in the City of Troy, Oakland County, Michigan, described as follows:

T2N, R11E, SEC 10 SUPERVISOR'S PLAT NO 25 LOTS 5, 6 & 7, ALSO E 900 FT OF LOTS 8 & 9, ALSO LOT 10 EXC W 357.82 FT OF S 104.29 FT

BENCHMARKS:
(GPS DERIVED - NAVD88)

BM #300
ARROW ON A HYDRANT LOCATED AT THE SOUTHWEST CORNER OF THE FRONT PARKING LOT.
ELEV. - 724.13

BM #301
ARROW ON A HYDRANT LOCATED ON THE SOUTHWEST CORNER OF THE BACK PARKING LOT.
ELEV. - 726.34

GENERAL DEMOLITION NOTES:

THESE NOTES APPLY TO ALL CONSTRUCTION ACTIVITIES ON THIS PROJECT:

1. ALL MATERIAL TO BE REMOVED, WHETHER SPECIFICALLY NOTED IN THE PLANS OR NOT, SHALL BE REMOVED FROM THE SITE BY THE CONTRACTOR AND DISPOSED OF OFF-SITE IN A LEGAL MANNER. NO ON-SITE BURY OR BURN PITS SHALL BE ALLOWED.
2. ALL DEMOLITION WORK SHALL CONFORM TO ALL LOCAL CODES AND ORDINANCES.
3. STAGING/PHASING OF DEMOLITION AND CONSTRUCTION IS TO BE COORDINATED WITH THE OWNER AND THE CONTRACTOR PRIOR TO CONSTRUCTION.
4. SPECIFIC DEMOLITION ITEMS HAVE BEEN INDICATED ON THE PLANS AS A GUIDE TO THE GENERAL SCOPE OF THE WORK. IT IS THE INTENT THAT THESE ITEMS SHALL BE COMPLETELY REMOVED BY THE CONTRACTOR ABOVE AND BELOW GROUND, UNLESS SPECIFICALLY NOTED OTHERWISE, AND THAT DEMOLITION WILL INCLUDE BUT WILL NOT NECESSARILY BE LIMITED TO THESE ITEMS. CONTRACTOR SHALL VISIT SITE TO VERIFY EXISTING CONDITIONS AND EXTENTS OF THE DEMOLITION THAT WILL BE REQUIRED PRIOR TO SUBMITTING A BID.
5. REMOVE ALL STRUCTURES DESIGNATED FOR REMOVAL ACCORDING TO THE DEMOLITION PLAN. THIS INCLUDES FOUNDATIONS, FOOTINGS, FOUNDATION WALLS, FLOOR SLABS, UNDERGROUND UTILITIES, CONCRETE, ASPHALT, TREES, ETC.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEAN UP, NOISE, DUST CONTROL, STREET SWEEPING AND HOURS OF OPERATION IN ACCORDANCE WITH THE LOCAL CODES.
7. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY BARRICADES, SIGNAGE, MARKINGS, LIGHTS AND OTHER TRAFFIC CONTROL DEVICES TO PROTECT THE WORK ZONE AND SAFELY MAINTAIN TRAFFIC PER AGENCY REQUIREMENTS AND IN ACCORDANCE WITH THE LATEST EDITION OF THE STATE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
8. THE CONTRACTOR SHALL CONTACT THE APPROPRIATE UTILITY COMPANIES TO CONFIRM THAT UTILITY LEADS HAVE BEEN TAKEN OUT OF SERVICE PRIOR TO DEMOLITION.
9. ALL BUILDING GAS LEADS, METERS AND ASSOCIATED EQUIPMENT SHALL BE REMOVED AS SHOWN ON THE PLANS. COORDINATE ALL ASSOCIATED WORK WITH THE APPROPRIATE UTILITY COMPANY.
10. REMOVE ALL OVERHEAD AND UNDERGROUND ELECTRICAL LINES WITHIN THE AREA OF CONSTRUCTION AS SHOWN ON THE PLANS. COORDINATE SHUTDOWNS AND REMOVALS WITH ELECTRICAL SERVICE PROVIDER OR THE APPROPRIATE UTILITY COMPANY. (NOTE: PHONE AND CABLE T.V. SERVICES MAY ALSO BE LOCATED ON OVERHEAD LINES.)
11. THE CONTRACTOR IS RESPONSIBLE FOR THE REMOVAL AND REPLACEMENT OF SIGNS AND SUPPORTS WITHIN THE WORK AREA, AS NECESSARY TO FACILITATE CONSTRUCTION. SIGNS SHALL BE PROTECTED OR STOCKPILED FOR REUSE AS SPECIFIED IN THE PLANS OR AS REQUIRED BY THE AGENCY OF JURISDICTION. THE CONTRACTOR SHALL REPLACE ANY DAMAGED SIGNS AND SUPPORTS AT NO ADDITIONAL COST TO THE OWNER.
12. THE CONTRACTOR SHALL NOTIFY THE APPROPRIATE 811/ONE CALL UTILITY LOCATING CENTER, THE CITY ENGINEER AND/OR THE AUTHORITY HAVING JURISDICTION 3 BUSINESS DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION.

DEMOLITION LEGEND:

ITEM TO BE REMOVED
CURB/FENCE REMOVAL
CONCRETE PAVEMENT AND SIDEWALK REMOVAL
AREA OR ITEMS TO BE REMOVED
UTILITY REMOVAL
ASPHALT REMOVAL
SAWCUT LINE

SYMBOLS: EROSION CONTROL:

(SP-2) SILT FENCE
(SP-9) TEMPORARY STONE ACCESS DRIVE

REFER TO O.C.W.R.C. SOIL EROSION AND SEDIMENTATION CONTROL DETAILS SHEET FOR ALL DEVICE DETAILS.

GENERAL SITE CONDITIONS:

1. ACCORDING TO THE SOIL SURVEY INFORMATION SUPPLIED BY THE USDA NRCS, THE SITE CONSISTS OF THE FOLLOWING SOIL TYPES:
   - 10B MARLETTE SANDY LOAM, 1 TO 6 PERCENT SLOPES
   - 41B AQUENTS, SANDY, LOAMY, UNDULATING
   - ShbhaB SHEBEON SANDY LOAM, 0 TO 4 PERCENT SLOPES
   - ShbuaB SHEBEON-URBAN LAND COMPLEX, 0 TO 4 PERCENT SLOPES
2. TOTAL DISTURBED AREA = ±12.7 ACRES
3. N.P.D.E.S. NOTICE OF COVERAGE IS REQUIRED

EROSION CONTROL QUANTITIES:

SILT FENCE	4,602 LF
TEMPORARY CONSTRUCTION ACCESS DRIVE	1 EA.

SEQUENCE OF CONSTRUCTION:

START DAY	END DAY	
1	750	INSTALL CRUSHED CONCRETE ACCESS APPROACH AT SITE ROAD APPROACH.
1	750	INSTALL TEMPORARY SOIL EROSION CONTROL MEASURES, SILT FENCES, INLET PROTECTION, ETC. AS NECESSARY.
1	750	MAINTAIN A 25' BUFFER OF VEGETATION AROUND PERIMETER OF SITE WHERE POSSIBLE.
1	15	REMOVE ALL VEGETATION, TREES AND BRUSH FROM THE PROPOSED CONSTRUCTION AREA UNLESS MARKED TO REMAIN. STRIP AND STOCKPILE TOPSOIL AS REQUIRED. ALL STOCKPILES MUST BE GRADED AND SEEDED.
5	14	REMOVE ALL PAVEMENT, CURB, UTILITIES, ETC. AS REQUIRED TO INSTALL THE PROPOSED WORK AS SHOWN ON THE TOPOGRAPHIC SURVEY AND DEMOLITION PLAN.
5	14	DISPOSE OF ALL EXCESS/UNSUITABLE MATERIALS OFF SITE IN A LEGAL MANNER. NO ON-SITE BURN OR BURY PITS ALLOWED.
14	28	ROUGH GRADE SITE. SEED AND MULCH BLANKETS MUST BE INSTALLED AS SHOWN WITHIN 5 DAYS OF FINAL GRADE. REPAIR AND/OR RE-INSTALL ANY TEMPORARY SOIL EROSION CONTROL MEASURES THAT WERE DAMAGED DURING GRADING OPERATIONS.
28	60	INSTALL SITE UTILITIES (STORM SEWER, SANITARY SEWER, WATER MAIN ETC.). INSTALL INLET PROTECTION AT ALL PROPOSED CATCH BASINS.
28	90	TEMPORARY SEEDING MUST BE PROVIDED IN AREAS NOT TO BE WORKED ON FOR 15 DAYS OR LONGER.
30	80	BEGIN CONSTRUCTION OF BUILDING.
70	80	FINE GRADE SITE AND PREPARE FOR SITE PAVING OPERATIONS.
80	110	INSTALL ALL PAVEMENT, SIDEWALKS, CURBING AS PROPOSED. IF PERMANENT LANDSCAPING IS NOT TO BE INSTALLED SOON AFTER PAVING IS COMPLETE, ALL AREAS WITHIN 20 FEET OF BACK OF CURB MUST BE TEMPORARILY SEEDED. REPAIR INLET PROTECTION, SILT FENCE AND ANY OTHER DAMAGED SOIL EROSION CONTROL MEASURES AS NECESSARY.
90	119	FINAL GRADE, REDISTRIBUTE STOCKPILED TOPSOIL, ESTABLISH VEGETATION AND INSTALL ALL PERMANENT LANDSCAPING IN ALL DISTURBED AREAS NOT BUILT.
118	120	CLEAN PAVEMENT AND REMOVE ALL TEMPORARY SOIL EROSION CONTROL MEASURES. RE-ESTABLISH VEGETATION AS REQUIRED.
750	750	REMOVE SEDIMENTATION CONTROLS ONCE ENTIRE SITE HAS BEEN PERMANENTLY STABILIZED.

SOIL EROSION AND SEDIMENTATION CONTROL SEQUENCE OF CONSTRUCTION

1. SEE OAKLAND COUNTY W.R.C. SOIL EROSION AND SEDIMENTATION CONTROL DETAILS SHEET FOR ALL SOIL EROSION CONTROL RELATED DETAILS.
2. PLACE SILT FENCE ON EXISTING STORM SEWER STRUCTURES, ACCORDING TO PLANS.
3. INSTALL TEMPORARY CRUSHED CONCRETE ACCESS DRIVE AT ALL CONSTRUCTION ENTRANCES. (80'x24'x8" W/MINIMUM OF 1"-3" CRUSHED CONCRETE – NO FINES).
4. REMOVE CURB, PAVEMENT, TREES, ETC. AS DIRECTED ON THE DEMOLITION PLAN.
5. STRIP AND STOCKPILE TOPSOIL FOR RESTORATION REQUIREMENTS.
6. DISPOSE OF ALL EXCESS, UNSUITABLE MATERIALS OFF SITE IN A LEGAL MANNER. NO BURN OR BURY PITS ALLOWED.
7. UNSUITABLE MATERIALS CONSIST OF, BUT ARE NOT NECESSARILY LIMITED TO THE FOLLOWING: CONCRETE, ASPHALT, TREES, BRUSH, STUMPS, ROOTS, OR OTHER MISCELLANEOUS DEBRIS OR TRASH.
8. MASS GRADE THE SITE IN ACCORDANCE WITH THE PLANS.
9. INSTALL SEED, MULCH AND EROSION CONTROL BLANKETS AS SHOWN ON THE PLAN WITHIN 5 DAYS OF COMPLETION OF MASS GRADING OR WHENEVER DISTURBED AREAS WILL REMAIN UNCHANGED FOR 30 DAYS OR GREATER. 3-4" TOPSOIL WILL BE USED WHERE VEGETATION IS REQUIRED.
10. COMPLETE ROUGH GRADING OF SITE AND INSTALL UTILITIES. PLACE INLET FILTERS AT ALL INLETS AND CATCH BASINS, AS SHOWN.
11. FINISH GRADE AND PAVE SITE AS PROPOSED TO DRAIN TO STORM SEWER SYSTEM. REPAIR INLET FILTERS AS REQUIRED.
12. APPLY TOPSOIL, SEED AND MULCH/SOD TO ALL DISTURBED AREAS UPON COMPLETION OF GRADING. THE CONTRACTOR SHALL STAGE CONSTRUCTION ACTIVITIES IN ORDER TO MINIMIZE THE EXPOSURE OF UNSTABILIZED AREAS.
13. CLEAN PAVEMENT AND STORM SEWERS. REMOVE SILT FENCE, AND INLET FILTERS ONCE VEGETATION HAS BEEN ESTABLISHED.
14. ALL DIRT AND MUD TRACKED ONTO PUBLIC ROADS SHALL BE REMOVED DAILY.

SOIL EROSION MAINTENANCE SCHEDULE AND NOTES:

1. THE SOIL EROSION CONTROLS WILL BE MAINTAINED WEEKLY AND AFTER EVERY STORM EVENT BY:

   JOSH EISENMAN
   BARTON MALOW BUILDERS
   26500 AMERICAN DRIVE
   SOUTHFIELD, MI 48034
   586.651.2658

2. IF ANY DAMAGE HAS OCCURRED AS A RESULT OF STORM WATER DISCHARGE FROM THE SITE, THE FOLLOWING STEPS SHALL BE IMPLEMENTED.
3. ANY DEBRIS OR DIRT ON ANY PAVED AREA RESULTING FROM CONSTRUCTION TRAFFIC SHALL BE CLEANED IN A PROMPT MANNER BY THE CONTRACTOR. THE CONSTRUCTION DRIVE SHALL BE CLEANED AT THE END OF EACH DAY.
4. ALL DIRT AND MUD TRACKED ONTO PAVED AREAS SHALL BE REMOVED BY THE CONTRACTOR DAILY BY SCRAPING. STREET SWEEPING IS REQUIRED WEEKLY.
5. SILT FENCE MAINTENANCE SHALL INCLUDE THE REMOVAL OF ANY BUILT UP SEDIMENT WHEN THE SEDIMENT HEIGHT ACCUMULATES TO 1/3 TO 1/2 OF THE HEIGHT OF THE FENCE. THE CONTRACTOR IS RESPONSIBLE TO REMOVE, REPLACE, RETRENCH OR REBACKFILL THE SILTATION FENCE SHOULD IT FALL OR BE DAMAGED DURING CONSTRUCTION.
6. CONTRACTOR SHALL PROVIDE WATER TRUCK TO WATER DOWN THE SITE ON A DAILY BASIS AS REQUIRED TO MAINTAIN DUST CONTROL.
7. IF HIGH GROUNDWATER IS ANTICIPATED OR ENCOUNTERED DURING CONSTRUCTION A DEWATERING PLAN MUST BE SUBMITTED TO THE CITY ENGINEERING DIVISION FOR REVIEW.

NORTH

0 25 50 100
SCALE: 1" = 50'

811 Know what's below. Call before you dig.

CAUTION!!
THE LOCATIONS AND ELEVATIONS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THIS DRAWING ARE ONLY APPROXIMATE. NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL BE EXCLUSIVELY RESPONSIBLE FOR DETERMINING THE EXACT UTILITY LOCATIONS AND ELEVATIONS PRIOR TO THE START OF CONSTRUCTION.

TMP ARCHITECTURE

TMP ARCHITECTURE INC
1191 WEST SQUARE LAKE ROAD
BLOOMFIELD HILLS · MICHIGAN · 48302
PH · 248.338.4561 FX · 248.338.0223
EM · INFO@TMP-ARCHITECTURE.COM

REGISTRATION SEAL

CONSULTANT

PEA GROUP
t: 844.813.2949
www.peagroup.com

PROJECT TITLE

New Smith Middle School Bid Package No. 03A

Troy School District
Troy, Michigan

DRAWING TITLE

DEMOLITION AND SESC PLAN

ISSUE DATES

DATE:	ISSUED FOR:
01-23-2024	CONSTRUCTION DOCUMENTS

DRAWN	JW
CHECKED	TD
APPROVED	TD

PROJECT NO.
22102

DRAWING NO.
C-2.0

CONSULTING GROUP

Report on
Geotechnical Investigation

Smith Middle School Building
5835 Donaldson Road
Troy, Michigan 48085

Latitude 42.603756˚ N
Longitude 83.147882˚ W

Prepared for:

Lecole Planners, LLC
145 North Center Street B
Northville, Michigan 48167

G2 Project No. 230618
September 6, 2023

g2consultinggroup.com

Headquarters	1866 Woodslee St	Troy, MI 48083	P 248.680.0400	F 248.680.9745
Ann Arbor	1350 Eisenhower Pl	Ann Arbor, MI 48108	P 734.390.9330	F 734.390.9331
Chicagoland	1186 Heather Dr	Lake Zurich, IL 60047	P 847.353.8740	F 847.353.8742

CONSULTING GROUP

September 6, 2023

Ms. Michelle Kerns
Lecole Planners, LLC
145 North Center Street B
Northville, Michigan 48167

Re: Report on Geotechnical Investigation
Smith Middle School Building
5835 Donaldson Road
Troy, Michigan 48085
G2 Project No. 230618

Dear Ms. Kerns:

We have completed the geotechnical investigation for the proposed new Smith Middle School building in Troy, Michigan. This report presents the results of our observations and analyses, our recommendations for subgrade preparation and foundation design, and construction considerations as they relate to the geotechnical conditions at the proposed building location.

We appreciate the opportunity to be of service to Lecole Planners and Troy School District look forward to discussing the recommendations presented. In the meantime, if you have any questions regarding the report or any other matter pertaining to the project, please call us.

Sincerely,

G2 Consulting Group, LLC

Michael J. Bajorek, E.I.T.
Staff Engineer

Amy L. Schneider, P.E.
Project Manager, Associate

MJB/ALS/ljv

Enclosures

EXECUTIVE SUMMARY

Smith Middle School will be reconstructed west of the existing school building in the footprint of the athletic field and running track. The new building will be a predominantly single-story, slab-on-grade structure except for the northeast quadrant which will be two-stories. The proposed building will have a finished floor elevation of 726.0 feet. Pavements, utilities, and detention basins will also be constructed in conjunction with the new school; however, additional borings and a future report will address these items due lack of access currently.

Approximately 4-1/2 to 11 inches of topsoil are present at the soil boring locations. Medium compact silty sand fill underlies the topsoil at boring B-7 and extends to an approximate depth of 3 feet. Stiff to very stiff sandy clay fill with 1 to 2-1/2 percent organic matter is present below the topsoil at borings B-6, B-8, B-13, and B-14 and extends to approximate depths ranging from 2 to 4 feet, corresponding to elevations ranging from 719 to 722-1/2 feet. A layer of stiff sandy clay underlies the fill soils at boring B-6 and extends to an approximate depth of 6 feet. Native very stiff to hard silty clay and sandy clay underlie the topsoil, fill, and stiff sandy clay and extend to the explored depths ranging from 20 to 25 feet. Groundwater was encountered during drilling operations at borings B-6 at an approximate depth of 6 feet, corresponding to an elevation of 718 feet. No measurable groundwater was encountered during or upon completion of drilling operations at the remaining boring locations.

Based on the topographic survey and proposed finished floor elevation, up to approximately 3 feet of engineered fill will be required to achieve proposed finished grades across the majority of the building footprint; however, up to 6 feet of fill will be required to achieve proposed finished grade at the vestibule entrance (northwest quadrant) which extends into the drainage swale alignment.

Based on the existing soil conditions and following completion of earthwork operations (including removal and replacement of unsuitable fill soils), we anticipate the building can be supported on conventional shallow strip and spread foundations extending through any remaining existing fill and bearing on the underlying native stiff to hard silty clay and sandy clay or engineered fill overlying native soils (demolished foundation or utility excavations or undercuts). Foundations bearing on the native stiff to hard silty clay and sandy clay and engineered fill overlying native soils can be designed on a net allowable soil bearing capacity of 3,000 pounds per square foot (psf). Alternatively, if a higher bearing capacity is desired, foundations can extend through any existing fill, engineered fill, and stiff sandy clay to bear on the underlying native very stiff to hard silty clay and be designed for a net allowable soil bearing capacity of 5,000 psf. Foundations may need to extend to depths of up to 7 feet below finished grade, including interior foundations. Exterior foundations should bear at a minimum depth of 3-1/2 feet below finished grade for protection against frost heave. Interior foundations can bear at shallower depths provided suitable bearing soils are present and foundations are protected from frost during construction operations. G2 Consulting Group, LLC (G2) must be on site during construction to observe the excavations, measure the bearing depths, and verify the adequacy of the bearing soils.

The existing fill soils (with the exception of boring B-8) are very stiff in consistency with relatively low moisture contents and have been in place upwards of 20 years. Following completion of earthwork operations and removal and replacement of unsuitable fill soils as described in the SITE PREPARATION section of this report, we anticipate the existing fill and engineered fill placed to achieve proposed finished grades will be suitable for support of floor slabs. Floor slabs supported by the existing fill and engineered fill to achieve proposed finished grades may be designed using a subgrade modulus of up to 125 pounds per cubic inch (pci).

This summary is not to be considered separate from the entire text of this report, with all the conclusions and qualifications mentioned herein. Details of our analysis and recommendations are discussed in the following sections and in the Appendix of this report.

PROJECT DESCRIPTION

We understand Smith Middle School will be reconstructed west of the existing building in the area of the athletic field and perimeter running track. The proposed building will be of slab-on-grade construction with the southeast, southwest, and northwest quadrants of the proposed new building being single story, while the northeast quadrant and center of the building being two stories. The proposed finished floor elevation for the building is 726.0 feet. The gymnasium will be situated at the northwest quadrant and the orchestra room will be located at the southwest quadrant, both of which will have high ceilings. The remainder of the structure will be classroom, office, or learning space. These areas are indicated on the Soil Boring Location Plan.

Structural loading conditions for the proposed building were not available at the time of this investigation. We anticipate column loads may be on the order of 100 to 150 kips and wall loads may range from 2 to 5 kips per lineal foot, with the higher loads anticipated in the areas of the gymnasium, orchestra, and two-story portion. If the proposed finished floor elevation or estimated loaded conditions vary, G2 must be notified to evaluate the potential effect on the provided design and construction recommendations.

New pavements are proposed west of the school and detention basins are proposed northwest and south of the school. Access to the properties where these structures will be constructed was not available at the time of this investigation. Additional borings will be performed and recommendations for these areas will be provided in an additional report once access is available.

SCOPE OF SERVICES

The field operations, laboratory testing, and engineering report preparation were performed under direction and supervision of a licensed professional engineer. Our services were performed according to generally accepted standards and procedures in the practice of geotechnical engineering in this area. Our scope of services for this initial project investigation is as follows:

1. We drilled fifteen borings in or adjacent to the footprint of the proposed building extending to depths of 20 to 25 feet each below existing grade. The building layout altered slightly after completion of the soil borings; therefore, several of the borings are outside the revised building footprint.

2. We performed laboratory testing on representative samples obtained from the soil borings. Laboratory testing included visual engineering classification, natural moisture content, loss-on-ignition (L.O.I.), dry density, and unconfined compressive strength determination.

3. We prepared this engineering report. Our report includes recommendations regarding foundation types suitable for the encountered subsurface conditions, foundation design, site development issues, and construction considerations related to foundation construction.

FIELD OPERATIONS

G2, in conjunction with Lecole Partners, selected the number, depth, and location of the soil borings. The soil boring locations were located in the field by measuring from existing site features using conventional taping methods and staked by a G2 staff engineer prior to drilling operations. The approximate soil boring locations relative to the existing site layout and proposed building are shown on the Soil Boring Location Plan, Plate No. 1. Ground surface elevations at the boring locations were interpolated from the topographic contour lines and spot elevations presented on the Topographic Survey (Sheets C1.0 through C1.2) within the Bid Package No. 03C drawings prepared by TMP Architecture, Inc, dated June 8, 2023.

The soil borings were drilled using a truck-mounted rotary drilling rig. Continuous flight, 2-1/4 inch inside diameter, hollow-stem augers were used to advance the boreholes to the explored depths. Within

each soil boring, soil samples were obtained at intervals of 2-1/2 feet within the upper 10 feet and at intervals of 5 feet thereafter. These samples were obtained by the Standard Penetration Test method ASTM D 1586, which involves driving a 2-inch diameter split-spoon sampler into the soil with a 140-pound weight falling 30 inches. The sampler is generally driven three successive 6-inch increments with the number of blows for each increment recorded. The number of blows required to advance the sampler the last 12 inches is termed the Standard Penetration Resistance (N). The blow counts for each 6-inch increment and the resulting N-value are presented on the individual soil boring logs.

The soil samples were placed in sealed containers in the field and brought to the laboratory for testing and classification. During field operations, drilling representatives maintained boring logs of the subsurface conditions, including changes in stratigraphy and observed groundwater levels. The final boring logs are based on the field logs and laboratory soil classification and testing results. After completion of the drilling operations, the boreholes were backfilled with auger cuttings.

LABORATORY TESTING

Representative soil samples were subjected to laboratory testing to determine soil parameters pertinent to pavement and foundation design and site preparation. An experienced geotechnical engineer classified the samples in general conformance with the Unified Soil Classification System.

Laboratory testing included organic matter content, natural moisture content, dry density, and unconfined compressive strength determinations. The organic matter content of representative samples was determined in accordance with ASTM Test Method D 2974, "Standard Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils". The unconfined compressive strengths were determined by ASTM Test Method D2166 and a spring-loaded hand penetrometer. Per ASTM Test Method D2166, the unconfined compressive strength of cohesive soils is determined by axially loading a small cylindrical soil sample under a slow rate of strain. The unconfined compressive strength is defined as the maximum stress applied to the soil sample before shear failure. If shear failure does not occur prior to a total strain of fifteen percent, the unconfined compressive strength is defined as the stress at a strain of fifteen percent. The hand penetrometer estimates the unconfined compressive strength to a maximum of 4-1/2 tons per square foot (tsf) by measuring the resistance of the soil sample to the penetration of a calibrated spring-loaded cylinder.

The results of the moisture content, organic matter content, dry density, and unconfined compressive strength test are indicated on the soil boring logs at the depths the samples were collected. The results of the unconfined compressive strengths determined in accordance with ASTM Test Method D2166 are also presented graphically in the Appendix on Figure No. 16. We will hold the soil samples for 60 days from the date of this report, after which time they will be discarded. If you would like the samples, please let us know.

SOIL CONDITIONS

Approximately 4-1/2 to 11 inches of topsoil are present at the soil boring locations. Silty sand fill underlies the topsoil at boring B-7 and extends to an approximate depth of 3 feet. Sandy clay fill is present below the topsoil at borings B-6, B-8, B-13, and B-14 and extends to approximate depths ranging from 2 to 4 feet, corresponding to elevations ranging from 719 to 722-1/2 feet. Native silty clay and sandy clay underlie the topsoil and fill and extend to the explored depths ranging from 20 to 25 feet.

The silty sand fill is medium compact with a Standard Penetration Test N-value of 20 blows per foot. The sandy clay fill is stiff to very stiff in consistency with moisture contents ranging from 14 to 19 percent and unconfined compressive strengths ranging from 3,000 to 6,500 psf. The existing fill soils at borings B-6, B-8, B-13, and B-14 have organic matter contents ranging from approximately 1 to 2-1/2 percent. The native sandy clay extending to an approximate depth of 6 feet at boring B-6 has a natural moisture content of 17 percent, dry density of 120 pounds per cubic foot (pcf), and an unconfined compressive strength of 2,500 psf. The remainder of the native silty clay and sandy clay are very stiff to

hard in consistency with natural moisture contents ranging from 8 to 20 percent, dry densities ranging from 111 to 116 psf, and unconfined compressive strengths ranging from 4,500 to 9,000 psf. The stratification depths shown on the soil boring logs represent the soil conditions at the boring locations. Variations may occur between borings. Additionally, the stratigraphic lines represent the approximate boundaries between soil types. The transitions may be more gradual than what are shown. We have prepared the boring logs on the basis of laboratory classification and testing as well as field logs of the soils encountered.

The Soil Boring Location Plan, Plate No. 1, Soil Boring Logs, Figure Nos. 1 through 15, and Unconfined Compressive Strength Test, Figure No. 16, are presented in the Appendix. The soil profiles described above are generalized descriptions of the conditions encountered at the boring locations. General Notes Terminology defining the nomenclature used on the boring logs and elsewhere in this report are presented on Figure No. 17.

GROUNDWATER CONDITIONS

Groundwater was encountered during drilling operations at borings B-6 at an approximate depth of 6 feet, corresponding to an elevation of 718 feet. Following removal of the augers, groundwater was measured at an approximate depth of 21 feet in the borehole. No measurable groundwater was encountered during or upon completion of drilling operations at the remaining boring locations.

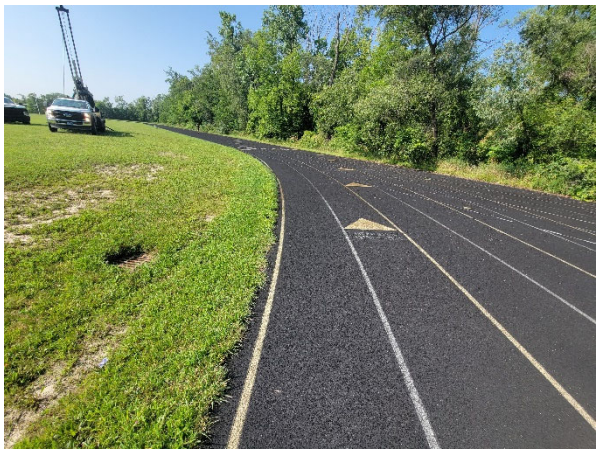
Fluctuations in perched and long-term groundwater levels should be anticipated due to seasonal variations and following periods of prolonged precipitation. It should also be noted that groundwater observations made during drilling operations in cohesive soils are not necessarily indicative of the static groundwater level. This is due to the low permeability of such soils and the tendency of drilling operations to seal off the natural paths of groundwater flow.

SITE CONDITIONS

Smith Middle School is located at 5835 Donaldson Road in Troy, Michigan. The existing school building is situated at the northeast side of the property. The south side of the existing school is currently occupied by baseball fields. An athletic field with a perimeter running track is present west of the existing school where the proposed new building is to be constructed. The fields and area surrounding the fields are currently grass covered with sand fill at the infields. Martell Elementary School is adjacent to the south side of the middle school property. Bituminous concrete pavements are present north and east of the existing school building. Surrounding properties are primarily residential in nature with a church north of the school.

The topography of the proposed building footprint ranges from approximately 723 feet to 726 feet, with the athletic field crowned at the center and sloping downward in all directions. A drainage swale and tree line run parallel to the west side of the track with elevations extending from approximately 724-1/2 feet along the west side of the track to 720 feet at the low point of the swale. Elevations then slope back upward to the west and the residential properties beyond. The drainage swale continues along the south property line and reaches a low elevation of approximately 713 feet at the southeast property corner. The existing school to the east has a finished floor elevation of 724.3 feet and grades slope downward from the building to the north, south, and east.

An underground fiber line extends along the east side of the existing school in a north / south direction, through the proposed building footprint. Additionally, underground storm basins are present at the interior perimeter of the athletic track and extend under the track alignment as shown in the photographs below. The structures have inverts ranging from approximately 621-1/2 to 623 feet.



SITE PREPARATION

Based on the existing conditions, we anticipate earthwork will be required to develop the site within the proposed building footprint. Earthwork operations are expected to consist of removing any existing topsoil, vegetation, trees, pavements, and fencing within the location of the proposed building, demolition of existing utilities and foundations and backfilling the resulting excavations with engineered fill, undercutting unsuitable fill soils for support of foundations, floor slabs, and engineered fill, subgrade preparation for support floor slabs, and placing engineered fill to achieve proposed grade. We recommend all earthwork operations be performed in accordance with comprehensive specifications and be properly monitored in the field by qualified geotechnical engineers and technicians.

At the start of earthwork operations, any vegetation, trees and associated root structures, topsoil, sidewalk, bituminous pavement, and athletic fencing should be completely removed from within the limits of any areas of development. Within the drainage swale, we anticipate soft and/or organic surface soil deposits may be present and should be completely removed to the underlying native very stiff to hard cohesive soil. The existing bleachers, goal posts, and associated foundations must be completely removed within the footprint of the proposed building, and resulting excavations must be backfilled with engineered fill following approval of the excavations by G2 personnel.

Existing utilities in the footprint of the proposed building must be completely removed and excavations backfilled with engineered fill for support of shallow foundations, engineered fill, and floor slabs. Any existing utility lines that will be abandoned and lie outside the proposed building footprint and zone of influence of proposed foundations should either be completely removed or backfilled with cement grout.

The existing sandy clay fill present at boring B-8 is not suitable for support of engineered fill, foundations, or floor slab. We recommend the fill within the vicinity of this boring be removed to the underlying native very stiff to hard silty clay and chased out in all directions and the resulting undercut excavation backfilled with engineered fill.

Based on the topographic survey and the provided finished floor elevation, existing grades are typically 1 to 3 feet below the proposed finished floor elevation. Therefore, up to 3 feet of engineered fill will be required in the building footprint to achieve proposed finished grades within the majority of the building footprint; however, up to 6 feet of engineered fill will be required to achieve proposed finished grade at the vestibule entrance (northwest quadrant) which extends into the drainage swale alignment.

Following satisfactory removal of any trees, vegetation, topsoil, sidewalk, and pavements, removal and backfill of foundations and utilities, and prior to placement of engineered fill, the exposed predominantly cohesive subgrade should be thoroughly proof rolled with a tri-axle fully loaded dump truck. The subgrade should be monitored by a qualified geotechnical engineer or technician. Any unstable or unsuitable areas noted should be improved by additional compaction or removed and replaced with specified engineered fill. Any soils that are disturbed during earthwork operations should be removed and replaced with engineered fill.

Engineered fill should be free of organic matter, frozen soil, clods, or other harmful material. The fill should be placed in uniform horizontal layers that are not more than 9 inches in loose thickness. The engineered fill should be compacted to achieve a density of at least 95 percent of the maximum dry density as determined by the Modified Proctor compaction test (ASTM D 1557). All engineered fill material should be placed and compacted at approximately the optimum moisture content. Frozen material should not be used as fill, nor should fill be placed on a frozen subgrade. Based on the presence of organic matter, we do not anticipate the existing fill will be suitable for reuse as engineered fill within the building footprint or proposed pavement areas. These soils can be used within landscape areas.

We recommend using granular engineered fill within confined areas such as demolished utility trenches. Granular engineered fill is generally more easily compacted than cohesive soils within these confined areas. Additionally, the proper placement and compaction of backfill within these areas is imperative to provide adequate support for overlying foundations and floor slabs.

FOUNDATION RECOMMENDATIONS

Based on the existing soil conditions and following completion of earthwork operations (including removal and replacement of unsuitable fill soils), we anticipate the building can be supported on conventional shallow strip and spread foundations extending through any remaining existing fill and bearing on the underlying native very stiff to hard silty clay and sandy clay or engineered fill overlying native soils (demolished foundation or utility excavations or undercuts) . Foundations bearing on the native stiff to hard silty clay and sandy clay and engineered fill overlying native soils can be designed based on a net allowable soil bearing capacity of 3,000 psf. Alternatively, if a higher bearing capacity is desired, foundations can extend through any existing fill, engineered fill, and stiff sandy clay to bear on the underlying native very stiff to hard silty clay and be designed for a net allowable soil bearing capacity of 5,000 psf. To achieve this capacity, foundations may need to extend to depths of up to 7 feet below finished grade, including interior foundations.

Exterior foundations should bear at a minimum depth of 3-1/2 feet below finished grade for protection against frost heave. Interior foundations can bear at shallower depths provided suitable bearing soils are present and foundations are protected from frost during construction operations. G2 must be onsite during construction to observe the excavations, measure the bearing depths, and verify the adequacy of the bearing soils.

Continuous wall or strip footings should be at least 12 inches in width and isolated spread footings should be at least 30 inches in their least dimension. We recommend all strip footings be suitably reinforced to minimize the effects of differential settlements associated with local variations in subsoil conditions. If required to construct foundations at different levels, the adjacent foundations should be designed and constructed so the least lateral distance between the foundations is equivalent to or more than the difference in their bearing levels. To achieve a change in the level of a strip footing, the footing should be gradually stepped at a grade no steeper than two units horizontal to one unit vertical.

If the recommendations outlined in this report are adhered to, total and differential settlements for the completed structure should be within 1 inch and 1/2 inch, respectively. We expect settlements of these magnitudes are within tolerable limits for the type of addition proposed.

FLOOR SLAB RECOMMENDATIONS

The existing fill soils (with the exception of boring B-8) are very stiff in consistency with relatively low moisture contents and have been in place upwards of 20 years. Following completion of earthwork operations and removal of unsuitable fill soils as described in the SITE PREPARATION section of this report, we anticipate the existing fill and engineered fill to achieve proposed finished grades will be suitable for support of floor slabs. Floor slabs supported by the existing fill and engineered fill to achieve proposed finished grades may be designed using a subgrade modulus of up to 125 pci.

We recommend that at least 4 inches of clean sand or stone be placed between the subgrade and the bottom of the floor slab for use as a capillary break to reduce moisture transmission through the concrete floors and to reduce the potential for concrete curling. If moisture sensitive floor coverings are planned, or if greater protection against vapor transmission is desired, a vapor barrier, consisting of at least 10-mil plastic sheeting, may be placed over the capillary break layer beneath floor slabs. We recommend all concrete floor slabs be suitably reinforced and separated from the foundation system to allow for independent movement.

CONSTRUCTION CONSIDERATIONS

We anticipate the contractor will be able to excavate foundations within open, neat excavations within the existing cohesive soils. However, where granular fill soils are present or granular engineered fill is utilized to backfill excavations or raise grades, caving and sloughing may occur during foundation excavation operations. Therefore, the contractor should be prepared to over excavate and form foundations, as necessary. The sides of the foundations should be constructed straight and vertical to reduce the risk of frozen soil adhering to the concrete and raising the foundation.

We do not anticipate significant groundwater will be encountered within foundation excavations. We further anticipate any surface run-off can typically be controlled with properly constructed sumps and pumps.

Where excavations extend deeper than 5 feet and sufficient space is available, we recommend maximum slopes of 2 horizontal units to 1 vertical unit (2H:1V) for sloped excavations within the existing fill and 1H:1V within the stiff to hard cohesive soil. All excavations should be safely sheeted, shored, sloped, or braced in accordance with MI-OSHA requirements. If material is stored or equipment is operated near an excavation, stronger shoring must be used to resist the extra pressure due to the superimposed loads.

GENERAL COMMENTS

We have formulated the evaluations and recommendations presented in this report relative to site preparation and development on the basis of data provided to us relating to the project location, scope, and surface grade for the proposed site. Any significant change in this data should be brought to our attention for review and evaluation with respect to prevailing subsurface conditions. Furthermore, if changes occur in the design, location, or concept of the project, conclusions and recommendations

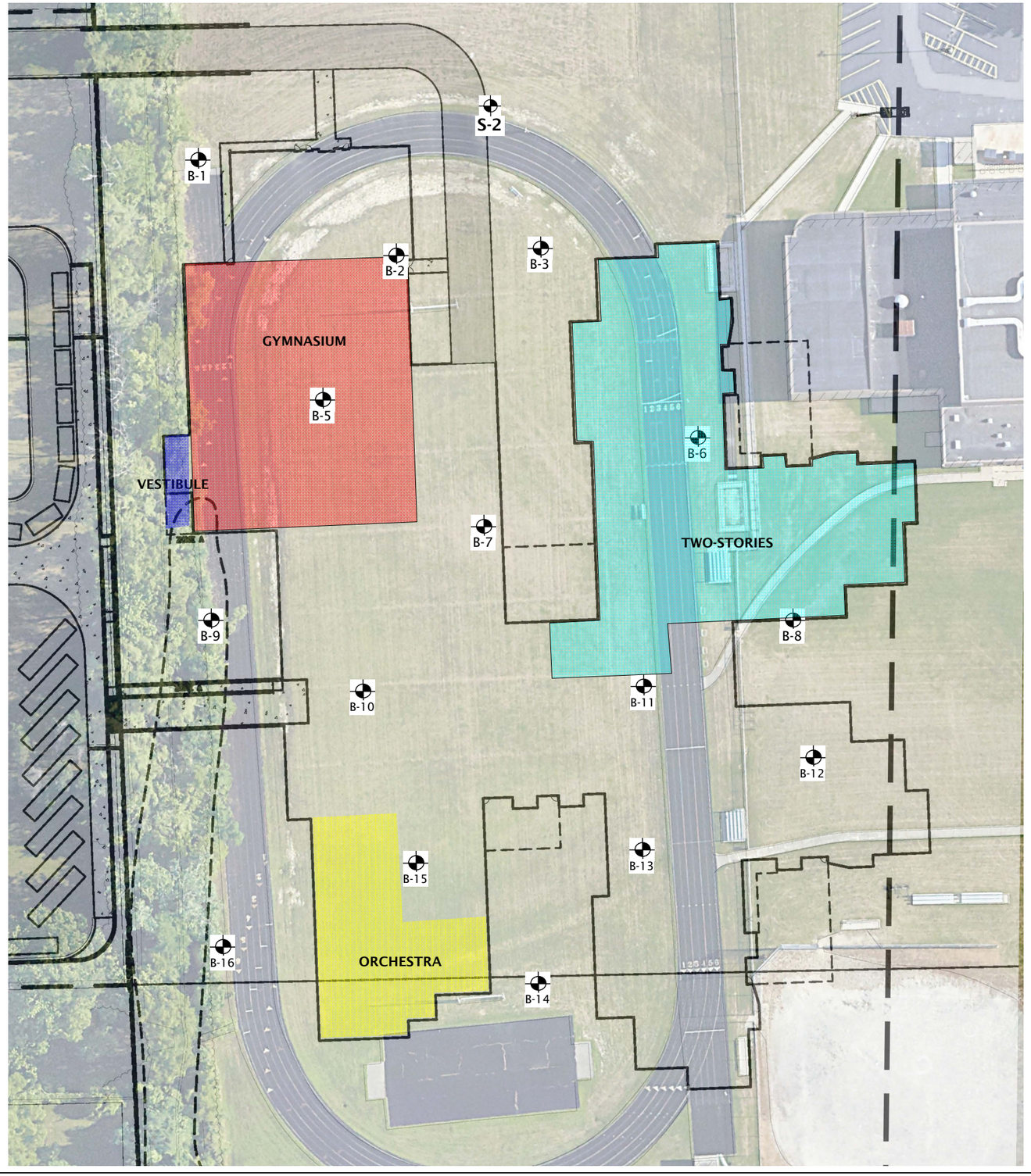
contained in this report are not valid unless G2 Consulting Group, LLC reviews the changes. G2 Consulting Group, LLC will then confirm the recommendations presented herein or make changes in writing.

The scope of the present investigation was limited to evaluation of subsurface conditions for the proposed building and other related aspects of the development. No chemical, environmental, or hydrogeological testing or analyses were included in the scope of this investigation.

We base the analyses and recommendations submitted in this report upon the data from the soil borings performed at the approximate locations shown on the Soil Boring Location Plan, Plate No. 1. This report does not reflect variations that may occur between the actual boring locations and the proposed building location. The nature and extent of any such variations may not become clear until the time of construction. If significant variations then become evident, it may be necessary for us to re-evaluate our report recommendations.

We recommend G2 Consulting Group, LLC observe all geotechnical related work, including foundation construction, subgrade preparation, and engineered fill placement. G2 Consulting Group, LLC will perform the appropriate testing to confirm the geotechnical conditions given in the report are found during construction.

APPENDIX



N

Legend

Soil Borings Completed by 2G Drilling on August 3, 4, 21, and 22, 2023

Soil Boring Location Plan

Smith Middle School - Building
5835 Donaldson Road
Troy, Michigan 48085

2G CONSULTING GROUP

Project No. 230618	
Drawn by: MBJ	
Date: 8/29/23	Plate No. 1
Scale: NTS	

Project Name: Smith Middle School

Project Location: 5835 Donaldson
Troy, Michigan 48085

G2 Project No. 230618

Latitude: N/A Longitude: N/A

Soil Boring No. B-1

CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 724.0 ft ±	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Topsoil: Dark Brown Silty Clay (6 inches) 0.5							
		Very Stiff to Hard Brown Silty Clay with trace sand and gravel		S-1	5 4 3	7	11.9		9000*
719.0		4.0	5	S-2	4 3 4	7	12.7		6500*
				S-3	2 2 3	5	13.7		5000*
714.0			10	S-4	2 2 3	5	14.3		7000*
		Very Stiff to Hard Gray Silty Clay with trace sand and gravel							
709.0			15	S-5	3 3 5	8	15.2		9000*
704.0			20	S-6	3 3 5	8	13.9		8500*
699.0		25.0	25	S-7	3 7 9	16	14.6		8000*
		End of Boring @ 25 ft							

Total Depth: 25 ft
Drilling Date: August 3, 2023
Inspector:
Contractor: 2G Drilling
Driller: H. Pace

Drilling Method:
2-1/4 inch inside diameter hollow stem auger

Water Level Observation:
Dry during and upon completion of drilling

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings

Figure No. 1

SOIL / PAVEMENT BORING 230618.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 9/8/23

Project Name: Smith Middle School

Project Location: 5835 Donaldson
Troy, Michigan 48085

G2 Project No. 230618

Latitude: N/A Longitude: N/A

Soil Boring No. B-2

CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 725.5 ft ±	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Topsoil: Dark Brown Silty Clay (8 inches) 0.7		S-1	6 8 8	16	11.0		9000*
720.5		Hard Brown Silty Clay with trace sand and gravel	5	S-2	6 12 18	30	11.4		9000*
				S-3	5 8 9	17	12.0		9000*
715.5		9.0	10	S-4	4 5 6	11	11.6		9000*
710.5			15	S-5	4 6 6	12	13.7		8500*
705.5		Very Stiff to Hard Gray Silty Clay with trace sand and gravel	20	S-6	3 3 5	8	13.9		5000*
700.5		25.0	25	S-7	4 5 5	10	13.1		6000*
		End of Boring @ 25 ft							

Total Depth: 25 ft
Drilling Date: August 3, 2023
Inspector:
Contractor: 2G Drilling
Driller: H. Pace

Drilling Method:
2-1/4 inch inside diameter hollow stem auger

Water Level Observation:
Dry during and upon completion of drilling

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings

Figure No. 2

SOIL / PAVEMENT BORING 230618.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 9/8/23

Project Name: Smith Middle School

Project Location: 5835 Donaldson
Troy, Michigan 48085

G2 Project No. 230618

Latitude: N/A Longitude: N/A

Soil Boring No. B-3

CONSULTING GROUP

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 724.5 ft ±	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Topsoil: Dark Brown Silty Sand (4-1/2 inches) 0.4							
		Hard Mottled Brown and Gray Silty Clay with trace sand and gravel		S-1	3 4 5	9	14.5		9000*
719.5			5	S-2	4 9 13	22	14.8		9000*
		6.0		S-3	8 10 14	24	12.0		9000*
714.5		Hard Mottled Brown Silty Clay with trace sand and gravel	10	S-4	7 11 13	24	13.4		9000*
		13.0		S-5	3 4 7	11	13.2		6500*
709.5		Very Stiff Gray Silty Clay with trace sand and gravel	15	S-6	4 5 8	13	13.4		6500*
704.5			20	S-7	5 6 8	14	12.4		6500*
699.5		25.0	25						
		End of Boring @ 25 ft							

Total Depth: 25 ft
Drilling Date: August 21, 2023
Inspector:
Contractor: 2G Drilling
Driller: H. Pace

Drilling Method:
2-1/4 inch inside diameter hollow stem auger

Water Level Observation:
Dry during and upon completion of drilling

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings

Figure No. 3

SOIL / PAVEMENT BORING 230618.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 9/8/23

Project Name: Smith Middle School

Project Location: 5835 Donaldson
Troy, Michigan 48085

G2 Project No. 230618

Latitude: N/A Longitude: N/A

Soil Boring No. B-5

CONSULTING GROUP

SUBSURFACE PROFILE

SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 725.0 ft ±	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Topsoil: Brown Silty Clay (7 inches) 0.6							
				S-1	5 8 8	16	11.2		9000*
720.0		Hard Brown Silty Clay with trace sand	5	S-2	6 8 12	20	12.3		9000*
		7.0		S-3	6 7 7	14	10.2		9000*
715.0			10	S-4	5 5 6	11	12.0		9000*
710.0			15	S-5	4 5 7	12	13.5		7000*
705.0		Very Stiff to Hard Gray Silty Clay with trace sand and gravel	20	S-6	4 5 7	12	12.2		7000*
700.0		25.0	25	S-7	4 5 8	13	12.8		6500*
		End of Boring @ 25 ft							

Total Depth: 25 ft
Drilling Date: August 3, 2023
Inspector:
Contractor: 2G Drilling
Driller: H. Pace

Drilling Method:
2-1/4 inch inside diameter hollow stem auger

Water Level Observation:
Dry during and upon completion of drilling

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings

Figure No. 4

SOIL / PAVEMENT BORING 230618.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 9/8/23

Project Name: Smith Middle School

Project Location: 5835 Donaldson
Troy, Michigan 48085

G2 Project No. 230618

Latitude: N/A Longitude: N/A

Soil Boring No. B-6

CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 724.5 ft ±	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Topsoil: Dark Brown Silty Sand (7 inches) 0.6							
		Fill: Very Stiff Dark Brown Sandy Clay with trace silt, gravel, and organic matter (Organic Matter Content = 2.6%) 2.0		S-1	3 4 7	11	16.2		7000*
719.5		Stiff Brown Sandy Clay with trace silt and gravel	5	S-2	2 3 2	5	16.8	120	2500*
		6.0		S-3	6 8 10	18	12.5		9000*
714.5		Very Stiff to Hard Brown Sandy Clay with trace silt and gravel	10	S-4	10 11 12	23	11.4		6000*
		13.0							
709.5			15	S-5	4 6 10	16	13.6		5000*
704.5		Very Stiff to Stiff Gray Silty Clay with trace sand and gravel	20	S-6	3 4 6	10	13.8		3500*
699.5		25.0	25	S-7	5 7 9	16	13.6		5500*
		End of Boring @ 25 ft							

Total Depth: 25 ft
Drilling Date: August 22, 2023
Inspector:
Contractor: 2G Drilling
Driller: H. Pace

Drilling Method:
2-1/4 inch inside diameter hollow stem auger

Water Level Observation:
6 feet during drilling; 21 feet upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings

Figure No. 5

SOIL / PAVEMENT BORING 230618.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 9/8/23

Project Name: Smith Middle School

Project Location: 5835 Donaldson
Troy, Michigan 48085

G2 Project No. 230618

Latitude: N/A Longitude: N/A

Soil Boring No. B-7

CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 725.5 ft ±	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Topsoil: Dark Brown Silty Sand (5 inches) 0.4							
		Fill: Medium Compact Brown Silty Sand with trace clay and gravel		S-1	5 8 12	20			
		3.0							
720.5			5	S-2	4 6 10	16	17.2	113	8250
		Hard Brown Silty Clay with trace sand and gravel		S-3	5 6 9	15	13.7		9000*
715.5			10	S-4	6 8 11	19	12.8		9000*
		13.0							
710.5			15	S-5	3 4 6	10	12.7		8000*
		Very Stiff Gray Silty Clay with trace sand and gravel							
705.5			20	S-6	4 6 8	14	13.6		7500*
700.5		25.0	25	S-7	5 5	---	13.8		5500*
		End of Boring @ 25 ft							

Total Depth: 25 ft
Drilling Date: August 21, 2023
Inspector:
Contractor: 2G Drilling
Driller: H. Pace

Drilling Method:
2-1/4 inch inside diameter hollow stem auger

Water Level Observation:
Dry during and upon completion of drilling

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings

Figure No. 6

SOIL / PAVEMENT BORING 230618.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 9/8/23

Project Name: Smith Middle School

Project Location: 5835 Donaldson
Troy, Michigan 48085

G2 Project No. 230618

Latitude: N/A Longitude: N/A

Soil Boring No. B-8

CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 723.0 ft ±	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Topsoil: Dark Brown Silty Sand (11 inches) 0.9							
		Fill: Stiff Black and Dark Brown Sandy Clay with trace silt, gravel, and organic matter (Organic Matter Content = 2.3%)		S-1	3 3 5	8	19.3		3000*
		4.0							
718.0			5	S-2	3 3 6	9	17.0	115	5240
				S-3	7 11 14	25	12.7		9000*
713.0		Very Stiff to Hard Mottled Brown Silty Clay with trace sand and gravel	10	S-4	7 13 15	28	12.4		9000*
		14.5		S-5	6 8 13	21	12.5		8500*
708.0			15						
703.0		Very Stiff to Hard Gray Silty Clay with trace sand and gravel	20	S-6	6 7 9	16	13.7		7500*
698.0		25.0	25	S-7	5 6 9	15	16.9		9000*
		End of Boring @ 25 ft							

Total Depth: 25 ft
Drilling Date: August 22, 2023
Inspector:
Contractor: 2G Drilling
Driller: H. Pace

Drilling Method:
2-1/4 inch inside diameter hollow stem auger

Water Level Observation:
Dry during and upon completion of drilling

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings

Figure No. 7

SOIL / PAVEMENT BORING 230618.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 9/8/23

Project Name: Smith Middle School

Project Location: 5835 Donaldson
Troy, Michigan 48085

G2 Project No. 230618

Latitude: N/A Longitude: N/A

Soil Boring No. B-9

CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 724.5 ft ±	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Topsoil: Dark Brown Silty Sand (7 inches) 0.6							
				S-1	4 8 9	17	10.4		9000*
719.5		Hard Brown and Gray Silty Clay with trace sand and gravel	5	S-2	8 9 10	19	10.9		9000*
		6.0		S-3	6 6 8	14	11.9		9000*
714.5			10	S-4	5 6 8	14	12.6		9000*
709.5			15	S-5	6 8 10	18	12.1		8000*
704.5		Very Stiff to Hard Gray Silty Clay with trace sand and gravel	20	S-6	5 6 8	14	12.5		7000*
699.5		25.0	25	S-7	6 9 11	20	13.9		6000*
		End of Boring @ 25 ft							

Total Depth: 25 ft
Drilling Date: August 22, 2023
Inspector:
Contractor: 2G Drilling
Driller: H. Pace

Drilling Method:
2-1/4 inch inside diameter hollow stem auger

Water Level Observation:
Dry during and upon completion of drilling

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings

Figure No. 8

SOIL / PAVEMENT BORING 230618.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 9/8/23

Project Name: Smith Middle School

Project Location: 5835 Donaldson
Troy, Michigan 48085

G2 Project No. 230618

Latitude: N/A Longitude: N/A

Soil Boring No. **B-10**

CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 725.5 ft ±	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Topsoil: Brown Silty Clay (7 inches) 0.6							
				S-1	5 9 11	20	8.3		9000*
720.5		Hard Brown Silty Clay with trace with trace sand and gravel	5	S-2	4 6 11	17	12.6		9000*
				S-3	5 9 11	20	12.7		9000*
		9.0							
715.5		Hard Brown and Gray Silty Clay with trace sand and gravel	10	S-4	5 8 10	18	12.7		9000*
		12.0							
710.5			15	S-5	12 15 20	35	12.8		9000*
705.5		Very Stiff to Hard Gray Silty Clay with trace sand and gravel	20	S-6	8 10 10	20	10.3		9000*
700.5		25.0	25	S-7	8 8 11	19	12.5		7000*
		End of Boring @ 25 ft							

Total Depth: 25 ft
Drilling Date: August 4, 2023
Inspector:
Contractor: 2G Drilling
Driller: H. Pace

Drilling Method:
2-1/4 inch inside diameter hollow stem auger

Water Level Observation:
Dry during and upon completion of drilling

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings

Figure No. 9

SOIL / PAVEMENT BORING 230618.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 9/8/23

Project Name: Smith Middle School

Project Location: 5835 Donaldson
Troy, Michigan 48085

G2 Project No. 230618

Latitude: N/A Longitude: N/A

Soil Boring No. **B-11**

CONSULTING GROUP

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 724.0 ft ±	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Topsoil: Dark Brown Silty Sand (6 inches) 0.5							
				S-1	4 5 4	9	15.4		8500*
719.0			5	S-2	4 3 4	7	12.0		7000*
		Very Stiff to Hard Brown Sandy Clay with trace silt and gravel		S-3	4 7 9	16	10.8		9000*
714.0			10	S-4	10 13 13	26	9.5		9000*
		12.0							
		Very Stiff Brown and Gray Silty Clay with trace sand and gravel		S-5	9 11 13	24	13.5		7500*
709.0			15						
		16.0							
				S-6	4 7 9	16	13.8		7000*
704.0		Very Stiff Gray Silty Clay with trace sand and gravel, occassional silt seams	20						
				S-7	4 6 8	14	12.7		6000*
699.0		25.0	25						
		End of Boring @ 25 ft							

Total Depth: 25 ft
Drilling Date: August 21, 2023
Inspector:
Contractor: 2G Drilling
Driller: H. Pace

Drilling Method:
2-1/4 inch inside diameter hollow stem auger

Water Level Observation:
Dry during and upon completion of drilling

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings

Figure No. 10

SOIL / PAVEMENT BORING 230618.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 9/8/23

Project Name: Smith Middle School

Project Location: 5835 Donaldson
Troy, Michigan 48085

G2 Project No. 230618

Latitude: N/A Longitude: N/A

Soil Boring No. B-12

CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 723.0 ft ±	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Topsoil: Dark Brown Silty Sand (7 inches) 0.6							
		Hard Brown Sandy Clay with trace silt and gravel		S-1	8 12 7	19	10.0		9000*
		3.0							
718.0		Very Stiff Mottled Brown and Gray Silty Clay with trace sand and gravel	5	S-2	3 3 3	6	20.0	111	4940
		6.0							
				S-3	3 3 4	7	13.9		6000*
713.0		Very Stiff to Hard Brown Silty Clay with trace sand and gravel	10	S-4	6 9 12	21	12.2		9000*
		13.0							
708.0			15	S-5	7 10 12	22	12.2		9000*
		Very Stiff to Hard Gray Silty Clay with trace sand and gravel							
703.0		20.0	20	S-6	4 6 7	13	13.8		4500*
		End of Boring @ 20 ft							
698.0			25						

Total Depth: 20 ft
Drilling Date: August 22, 2023
Inspector:
Contractor: 2G Drilling
Driller: H. Pace

Drilling Method:
2-1/4 inch inside diameter hollow stem auger

Water Level Observation:
Dry during and upon completion of drilling

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings

Figure No. 11

SOIL / PAVEMENT BORING 230618.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 9/8/23

Project Name: Smith Middle School

Project Location: 5835 Donaldson
Troy, Michigan 48085

G2 Project No. 230618

Latitude: N/A Longitude: N/A

Soil Boring No. B-13

CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 723.0 ft ±	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Topsoil: Dark Brown Silty Sand (5 inches) 0.4							
		Fill: Very Stiff Brown Sandy Clay with trace silt, gravel, and organic matter (Organic Matter Content = 1.1%)		S-1	4 3 4	7	14.3		5000*
		3.0							
718.0			5	S-2	3 3 4	7	17.7		8000*
				S-3	4 6 8	14	14.2		9000*
713.0		Very Stiff to Hard Mottled Brown Silty Clay with trace sand and gravel	10	S-4	8 12 17	29	13.6		9000*
708.0			15	S-5	3 4 7	11	16.9		7500*
		16.0							
		Hard Gray Silty Clay with trace sand and gravel							
703.0		20.0	20	S-6	3 4 7	11	13.1		8000*
		End of Boring @ 20 ft							
698.0			25						

Total Depth: 20 ft
Drilling Date: August 21, 2023
Inspector:
Contractor: 2G Drilling
Driller: H. Pace

Drilling Method:
2-1/4 inch inside diameter hollow stem auger

Water Level Observation:
Dry during and upon completion of drilling

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings

Figure No. 12

SOIL / PAVEMENT BORING 230618.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 9/8/23

Project Name: Smith Middle School

Project Location: 5835 Donaldson
Troy, Michigan 48085

G2 Project No. 230618

Latitude: N/A Longitude: N/A

Soil Boring No. **B-14**

CONSULTING GROUP

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 724.5 ft ±	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Topsoil: Dark Brown Silty Sand (6 inches) 0.5							
		Fill: Very Stiff Dark Brown and Brown Sandy Clay with trace silt, gravel, and organic matter (Organic Matter Content = 1.6%)		S-1	3 3 4	7	15.0		6500*
		3.0							
719.5			5	S-2	1 2 3	5	17.0	116	8550
				S-3	9 12 13	25	13.1		9000*
		Very Stiff to Hard Brown Silty Clay with trace sand and gravel							
714.5			10	S-4	8 12 17	29	12.2		9000*
		13.0							
709.5			15	S-5	3 4 7	11	15.5		7000*
		Very Stiff Gray Silty Clay with trace sand and gravel							
704.5		20.0	20	S-6	2 4 8	12	12.7		8000*
		End of Boring @ 20 ft							
699.5			25						

Total Depth: 20 ft
Drilling Date: August 21, 2023
Inspector:
Contractor: 2G Drilling
Driller: H. Pace

Drilling Method:
2-1/4 inch inside diameter hollow stem auger

Water Level Observation:
Dry during and upon completion of drilling

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings

Figure No. 13

SOIL / PAVEMENT BORING 230618.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 9/8/23

Project Name: Smith Middle School

Project Location: 5835 Donaldson
Troy, Michigan 48085

G2 Project No. 230618

Latitude: N/A Longitude: N/A

Soil Boring No. B-15

CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 725.0 ft ±	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Topsoil: Brown Sandy Clay (6 inches) 0.5							
		Hard Brown Sandy Clay with trace silt and fine roots		S-1	4 7 9	16	14.6		9000*
		3.0							
720.0		Hard Brown and Gray Silty Clay with trace sand and gravel	5	S-2	6 11 10	21	18.9		9000*
		6.0		S-3	10 14 17	31	10.6		9000*
715.0		Hard Brown Silty Clay with trace sand and gravel	10	S-4	8 14 19	33	12.5		9000*
		12.0							
710.0			15	S-5	4 7 9	16	12.5		9000*
		Hard Gray Silty Clay with trace sand and gravel							
705.0		20.0	20	S-6	4 6 9	15	12.3		9000*
		End of Boring @ 20 ft							
700.0			25						

Total Depth: 20 ft
Drilling Date: August 4, 2023
Inspector:
Contractor: 2G Drilling
Driller: H. Pace

Drilling Method:
2-1/4 inch inside diameter hollow stem auger

Water Level Observation:
Dry during and upon completion of drilling

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings

Figure No. 14

SOIL / PAVEMENT BORING 230618.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 9/8/23

Project Name: Smith Middle School

Project Location: 5835 Donaldson
Troy, Michigan 48085

G2 Project No. 230618

Latitude: N/A Longitude: N/A

Soil Boring No. B-16

CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 723.5 ft ±	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Topsoil: Dark Brown Silty Sand (6 inches) 0.5							
				S-1	3 4 5	9	12.9		9000*
718.5			5	S-2	3 9 13	22	12.1		9000*
		Hard Brown Silty Clay with trace sand and gravel		S-3	3 7 11	18	12.7		9000*
713.5			10	S-4	3 7 10	17	12.9		9000*
		12.0							
708.5			15	S-5	4 4 7	11	13.1		7000*
		Very Stiff Gray Silty Clay with trace sand and gravel							
703.5		20.0	20	S-6	4 5 8	13	13.1		7500*
		End of Boring @ 20 ft							
698.5			25						

Total Depth: 20 ft
Drilling Date: August 21, 2023
Inspector:
Contractor: 2G Drilling
Driller: H. Pace

Drilling Method:
2-1/4 inch inside diameter hollow stem auger

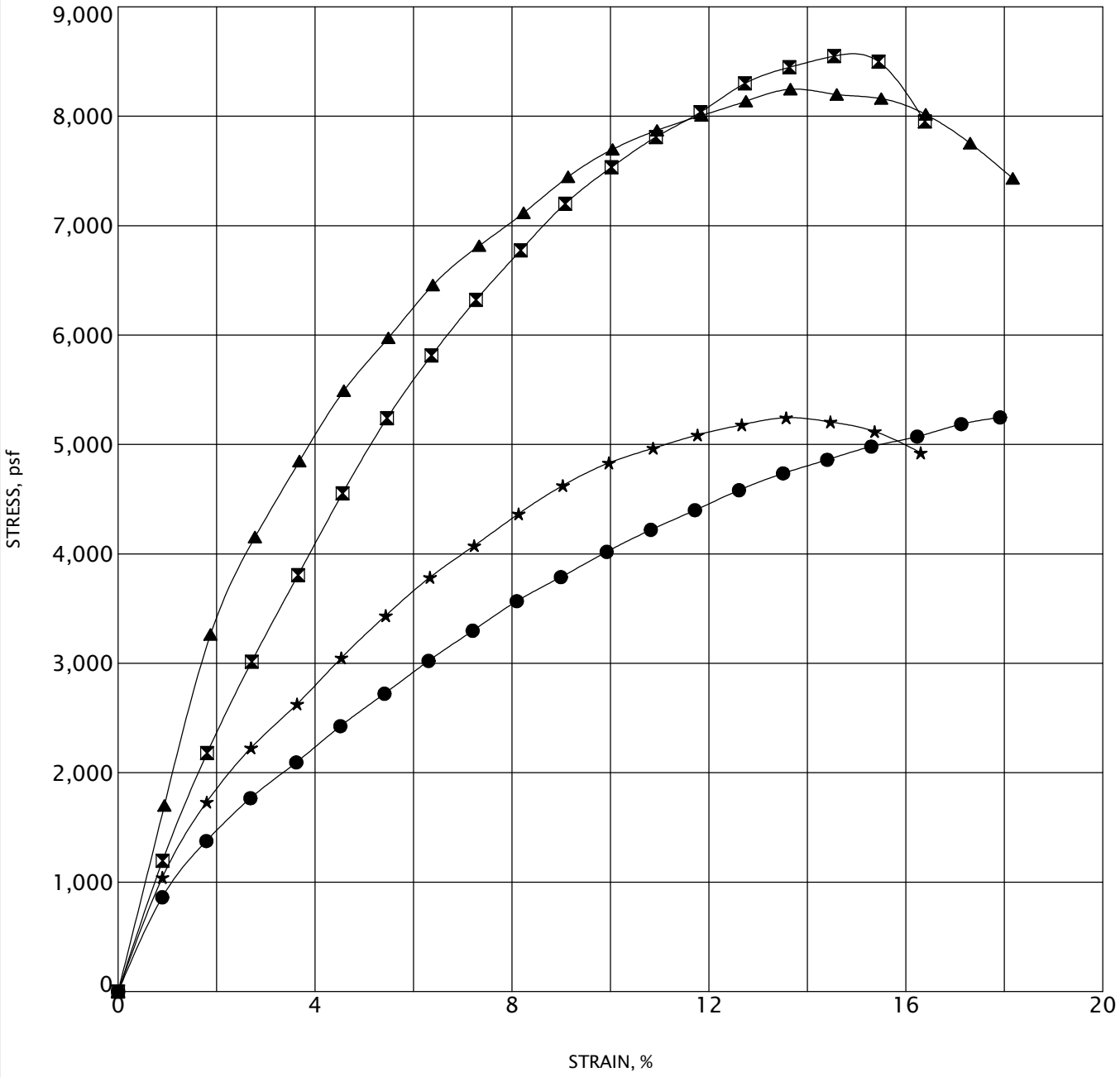
Water Level Observation:
Dry during and upon completion of drilling

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger cuttings

Figure No. 15

SOIL / PAVEMENT BORING 230618.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 9/8/23



Specimen			Classification	MC%	γ_d	UC
●	B-12	S-2	Brown and Gray Silty Clay	20	111	4940
⊠	B-14	S-2	Brown Silty Clay	17	116	8550
▲	B-7	S-2	Brown Silty Clay	17	113	8250
★	B-8	S-2	Brown Silty Clay	17	115	5240

CONSULTING GROUP

UNCONFINED COMPRESSIVE STRENGTH TEST

Project Name: Smith Middle School

Project Location: 5835 Donaldson
Troy, Michigan 48085

G2 Project No.: 230618

Figure No. 16

GENERAL NOTES TERMINOLOGY

Unless otherwise noted, all terms herein refer to the Standard Definitions presented in ASTM 653.

PARTICLE SIZE

Boulders		- greater than 12 inches
Cobbles		- 3 inches to 12 inches
Gravel	- Coarse	- 3/4 inches to 3 inches
	- Fine	- No. 4 to 3/4 inches
Sand	- Coarse	- No. 10 to No. 4
	- Medium	- No. 40 to No. 10
	- Fine	- No. 200 to No. 40
Silt		- 0.005mm to 0.074mm
Clay		- Less than 0.005mm

CLASSIFICATION

The major soil constituent is the principal noun, i.e. clay, silt, sand, gravel. The second major soil constituent and other minor constituents are reported as follows:

Second Major Constituent (percent by weight)	Minor Constituent (percent by weight)
Trace - 1 to 12%	Trace - 1 to 12%
Adjective - 12 to 35%	Little - 12 to 23%
And - over 35%	Some - 23 to 33%

COHESIVE SOILS

If clay content is sufficient so that clay dominates soil properties, clay becomes the principal noun with the other major soil constituent as modifier, i.e. sandy clay. Other minor soil constituents may be included in accordance with the classification breakdown for cohesionless soils, i.e. silty clay, trace sand, little gravel.

Consistency	Unconfined Compressive Strength (psf)	Approximate Range of (N)
Very Soft	Below 500	0 - 2
Soft	500 - 1,000	3 - 4
Medium	1,000 - 2,000	5 - 8
Stiff	2,000 - 4,000	9 - 15
Very Stiff	4,000 - 8,000	16 - 30
Hard	8,000 - 16,000	31 - 50
Very Hard	Over 16,000	Over 50

Consistency of cohesive soils is based upon an evaluation of the observed resistance to deformation under load and not upon the Standard Penetration Resistance (N).

COHESIONLESS SOILS

Density Classification	Relative Density %	Approximate Range of (N)
Very Loose	0 - 15	0 - 4
Loose	16 - 35	5 - 10
Medium Compact	36 - 65	11 - 30
Compact	66 - 85	31 - 50
Very Compact	86 - 100	Over 50

Relative Density of cohesionless soils is based upon the evaluation of the Standard Penetration Resistance (N), modified as required for depth effects, sampling effects, etc.

SAMPLE DESIGNATIONS

AS - Auger Sample – Cuttings directly from auger flight
BS - Bottle or Bag Samples
S - Split Spoon Sample - ASTM D 1586
LS - Liner Sample with liner insert 3 inches in length
ST - Shelby Tube sample - 3 inch diameter unless otherwise noted
PS - Piston Sample - 3 inch diameter unless otherwise noted
RC - Rock Core - NX core unless otherwise noted

STANDARD PENETRATION TEST (ASTM D 1586) - A 2.0 inch outside-diameter, 1-3/8 inch inside-diameter split barrel sampler is driven into undisturbed soil by means of a 140-pound weight falling freely through a vertical distance of 30 inches. The sampler is normally driven three successive 6-inch increments. The total number of blows required for the final 12 inches of penetration is the Standard Penetration Resistance (N).