



ECS Midwest, LLC

Geotechnical Engineering Report

Proposed Maine West High School Synthetic Turf Field

1755 South Wolf Road
Des Plaines, Illinois 60018

ECS Project No. 16:13029-M

October 7, 2025





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ECS Project No. 16:13029-M

Reference: Geotechnical Engineering Report
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1755 South Wolf Road
Des Plaines, Illinois 60018

Dear Mr. Benson:

ECS Midwest, LLC (ECS) has completed the subsurface exploration, laboratory testing, and geotechnical engineering analyses for the above-referenced proposed project. Our services were performed in general accordance with our agreed scope of work (ECS Proposal No. 16:25441-GP, dated on August 21, 2025). This report presents our understanding of the geotechnical aspects of the project along with the results of the field exploration and laboratory testing conducted, and our design and construction recommendations.

It has been our pleasure to be of service to Wight & Company and Maine High School District 207 during the design phase of this project. We would appreciate the opportunity to remain involved during the continuation of the design phase, and we would like to provide our services during construction phase operations as well to verify subsurface conditions assumed for this report. Should you have any questions concerning the information contained in this report, or if we can be of further assistance to you, please contact us.

Respectfully submitted,

ECS Midwest, LLC

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EXECUTIVE SUMMARY

The following text summarizes the main findings of our subsurface exploration program, particularly those that may have a cost or design impact on the planned new synthetic turf field. Information gleaned from this Executive Summary should not be utilized in lieu of reading the entire geotechnical report.

- The proposed project will include the construction of a new synthetic turf football field. The proposed finished grade of the planned synthetic turf field was currently unknown. ECS anticipates the finished grades would approximately match the existing site field grades (or approximately within ½ foot of existing grades). ECS also understands that the proposed synthetic turf field may include a below-grade or above-grade stormwater detention facility. Information regarding type and bottom depth of the possible underground detention facility is currently unknown.
- In general, the subsurface soil conditions encountered below the surface topsoil material in the soil test borings performed within the proposed project area were observed to consist of predominantly stiff to hard lean clay soils.
- The new synthetic turf field should be installed and constructed in accordance with manufacturer's specifications and guidelines including the required base and drainage material. Given the soils encountered in the borings performed at the project area were observed to consist of predominantly lean clay soils which are considered to exhibit very low to practically impermeable characteristics, ECS recommends the proposed synthetic turf field be designed with an underdrainage system connected to an underground site stormwater management system, storm manholes or other suitable outlets.
- Borings performed at the site contained less than 1 foot topsoil, which is recommended to be removed and replaced below new turf field area. The contractor should verify the thickness of the topsoil surface material in the field as the thickness can vary across the site and may differ in areas not explored by our borings. The exposed turf subgrade should be proofrolled as recommended in the **Proofrolling** section of this report.
- For the design of a stormwater management system on the project area, in our opinion an estimated seasonally high groundwater table (SHGWT) elevation of approximately 8 feet below the current site grade (corresponding to approximately EL. 641 feet to EL. 642 feet NAVD88 following the ground surface elevations) can be used based upon our interpretation of the test boring observations and soil coloration.

1.0 INTRODUCTION

The purpose of this study was to provide geotechnical engineering information for the design of the proposed new synthetic turf field at the existing Maine West High School campus located in Des Plaines, Illinois. The recommendations developed for this report are based on project information supplied by Wight & Company.

Our services were provided in accordance with our Proposal No. 25441-GP (dated on August 21, 2025) and included the Terms and Conditions of Service outlined in the proposal. This report contains the procedures and results of our subsurface exploration and laboratory testing programs, review of existing site conditions, engineering analyses, and recommendations for the design and construction of the project.

The report includes the following items:

- Observations from our site reconnaissance including current site conditions, surface drainage features, and surface topographic conditions.
- A brief review and description of our field and laboratory test procedures and the results of testing conducted.
- Records of the field exploration (Test Boring Logs) prepared in accordance with the standard practice for geotechnical engineering.
- Boring location diagram showing the approximate location of the borings performed and subsurface soil profiles within the footprint of the proposed structures and at the selected boring locations.
- Estimate of seasonally high groundwater table (SHGWT) and static long term groundwater table based on the results of the borings.
- Recommendations for site preparation and construction of compacted fills including an evaluation of on-site soils for use as compacted fills and identification of potentially unsuitable soils and/or soils exhibiting excessive moisture at the time of sampling.
- Recommendations for synthetic turf field construction.
- An evaluation of the on-site soil characteristics encountered in the soil borings and suitability of the on-site materials for reuse as engineered fill including compaction requirements and suitable material guidelines.
- General recommendations for dewatering at the project site during construction of the proposed new synthetic field.

2.0 PROJECT INFORMATION

2.1 PROJECT LOCATION AND CURRENT SITE USE

The proposed construction is located within the confines of the existing Maine West High School campus located at 1755 South Wolf Road in Des Plaines, Cook County, Illinois. Specific to this project and geotechnical proposal is the existing football field and soccer field on the southeastern portion of the campus, where the proposed project construction is planned. The existing football and soccer fields are

bounded by Warrior Way to the north, by Maine West Road to the east, by Howard Avenue to the south and by tennis courts, softball fields and South Wolf Road to the west.

The location of the existing field within the campus is shown below and in a wider scope on the Site Location Diagram in Appendix A:



Maine West High School Football and Soccer Field Site Location Map

At the time this report was prepared, a site-specific topographic survey was not available. Based on our review of available online resources (i.e., Cook County GIS 2022 Contours), the existing site grades within the proposed project area/existing field appears to range from approximately EL. 649 feet to EL. 650 feet NAVD88 having relatively flat topography. Please note that site grade elevations determined without a professional site survey are approximate and may not be appropriate to be utilized in the design of proposed project.

2.2 PROPOSED CONSTRUCTION

ECS understands the proposed project will include the construction of a synthetic turf field. The proposed finished grade elevations of the planned turf field were not known at the time that this report was prepared. The finished grades of the new synthetic turf field are anticipated to approximately match the existing grades. Based on the existing and anticipated turf finished grades, it appears that cut and fill will be minimal to reach design grades exclusive of subgrade preparation required due to unsuitable soils.

ECS also understands that the proposed synthetic turf field may include a below-grade or above-grade stormwater detention facility. Information regarding type and bottom depth of the possible underground detention facility is currently unknown. If our understanding of the proposed construction is inaccurate or there are design changes, please contact ECS so we can review (and revise, if necessary) the recommendations provided herein.

3.0 FIELD EXPLORATION AND LABORATORY TESTING

3.1 SOIL TEST BORINGS

ECS' field exploration scope of work included performing three (3) standard penetration test (SPT) soil test borings (designated as Borings B-01, B-02 and B-03) each extending to a terminal depth of 15 feet below ground surface (bgs). The SPT boring field exploration procedures are explained in greater detail in Appendix B including the insert titled '*Subsurface Exploration Procedure: Standard Penetration Testing (SPT)*'.

The borings were marked in the field utilizing a handheld GPS unit and existing site features. The approximate as-drilled boring locations are shown on the Boring Location Diagram in Appendix A. The ground surface elevation at each boring location was estimated from online *Cook County GIS* and should be considered approximate. Prior to the performance of soil test borings, our subcontracted driller contacted the State of Illinois Utility One-Call Center, JULIE, to clear and mark underground utilities in the vicinity of the project site. ECS also engaged a private utility locator to assist in locating the existing underground utilities in the boring areas as an additional safety drilling measure prior to drilling operations.

The soil borings were drilled by our subcontracted driller utilizing a rubber track-mounted drilling rig equipped with an automatic drop hammer and hollow-stem augers. The boreholes were backfilled with spoils after drilling operations. The borehole backfill settlement or expansion can and will occur over time. Monitoring the boreholes after the initial drilling activities is not within our scope. Settlement or expansion of the borehole backfill can create a trip hazard and should be carefully monitored by the client or property owner.

3.2 LABORATORY TESTING

The laboratory testing consisted of selected tests performed on samples obtained during our field exploration operations. Classification and index property tests were performed on representative soil samples. The basic laboratory testing procedures are explained in greater detail in Appendix B including the insert titled '*Laboratory Testing: Index Testing*'. The following tests were performed on soil samples:

- Moisture content determination on fine-grained soil samples in accordance with ASTM D 2166.
- Calibrated hand penetrometer (Q_p) tests on cohesive soil samples to estimate unconfined compressive strength.

Each sample was visually classified on the basis of texture and plasticity in accordance with ASTM D2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedures) and including USCS classification symbols. After classification, the samples were grouped in the major zones noted on the boring logs in Appendix B. The group symbols for each soil type are indicated in parentheses along with the soil descriptions. The stratification lines between strata on the logs are approximate; in situ, the transitions may be gradual. The soil samples will be retained in our laboratory for a period of 60 days, after which they will be discarded, unless other instructions are received as to their disposal.

3.3 SUBSURFACE CHARACTERIZATION

Listed in the following Tables are generalized characterizations of the soil strata at the boring locations during our subsurface exploration. For subsurface information at a specific location, please refer to the Boring Logs in Appendix B of this text:

GENERALIZED SUBSURFACE STRATIGRAPHY					
Approximate Bottom Depth Range (ft., bgs)	Stratum Number	Material Description	SPT N-values (bpf) ⁽¹⁾	Unconfined Compressive Strength ⁽²⁾ (tsf)	Insitu Moisture Content (%)
1	N/A (Surface Material)	Topsoil: Approximately 8 to 9 inches	N/A	N/A	N/A
2½	I ⁽³⁾	Existing Undocumented Clayey Fill Materials Silty Clay Fill (CL/ML Fill), brown, trace sand, trace gravel, very stiff, encountered in Boring B-01	6	3½	21
15 (End of Borings)	II	Native Clayey Soils Lean Clay (CL), brown to gray, transitioned to gray at a depth of about 9 to 11 feet below ground surface, trace sand, trace gravel, moist, stiff to hard	2 to 12	1 to 5	12 – 26 (typical 15 – 22)

(1) Standard penetration test (SPT) in blows per foot (bpf).

(2) Estimated from pocket penetrometer in tons per square foot (tsf).

(3) Stratum I Fill was encountered at Boring B-01 below the topsoil and extended to a depth of approximately 2½ feet below the ground surface.

Graphical presentations of the subsurface conditions encountered at the boring locations are shown on the Generalized Subsurface Soil Profile (Subsurface Cross-Section) included in Appendix B.

The soil stratification shown on the boring logs in Appendix B represents the soil conditions at the actual boring locations. Variations in the stratification can occur between sample intervals and boring locations. The subsurface conditions at other times and locations on the site may differ from those found at boring locations. If different site conditions are encountered during construction, ECS should be contacted to review our recommendations relative to the new information.

3.4 GROUNDWATER OBSERVATIONS

The driller and ECS crews observed the boreholes for the presence of measurable free groundwater during performance of the borings. Free groundwater was encountered at depth of approximately 14 feet below the ground surface during drilling at Boring B-03. A delayed water observation was performed at Boring B-01. After leaving the B-01 borehole open for about 2 hours after drilling, free groundwater was observed at a depth of approximately 6 feet below ground surface. The ground water levels observed are included on the boring logs in Appendix B.

Please note groundwater may take several days or weeks to stabilize in the boreholes in predominantly clayey soils. The boreholes were backfilled immediately after drilling. As such, stabilized groundwater reading was not possible.

Long Term Static Groundwater Table: Soils in the Midwest frequently oxidize from gray to brown above the level where the soil remains saturated. This zone of soil color change, which may be an indication of the long-term static groundwater level, is frequently interpreted to be the groundwater table. Gray soils were observed at the soil boring locations (during this current subsurface exploration) performed on the project area at a depth of approximately 9 to 11 feet below existing grades or approximately EL. 639 feet to EL. 640 feet NAVD88, which is the estimated long-term hydrostatic groundwater table in the boring areas.

Seasonally High Groundwater Table: Based upon our interpretation of the test boring observations and soil coloration, in our opinion, the seasonally high groundwater table (SHGWT) elevation on the project area can be estimated at a depth of approximately 1 to 2 feet above the long-term hydrostatic groundwater table or at an approximate depth of 8 feet below the current site grade (corresponding to approximately EL. 641 feet to EL. 642 feet NAVD88 following the ground surface elevations) for the design of a stormwater management system in the project area. Estimation of the seasonal high water level based on colors (redoximorphic features) may not be reliable. A better estimation of the seasonal high water level would require installation of groundwater observation wells along with observing the wells over a long time period.

Shallow Perched Water Condition: In ECS' opinion, the groundwater encountered at a depth of about 6 feet in Boring B-01 can be associated to perched condition. A perched water condition occurs when surface water infiltrates and is suspended within a more permeable soil layer (i.e., existing fill layer) overlaying a less permeable layer (i.e., native lean clay layer). A perched water condition does not indicate the depth and elevation of the long-term or seasonal high groundwater table.

General: Variations in the groundwater table elevations may occur because of seasonal changes such as precipitation, evaporation and changes in surface water runoff, construction activities, and other factors. Seasonal shallower perched water conditions may also develop or exist within the fill layers and utility trenches.

4.0 DESIGN RECOMMENDATIONS

4.1 NEW SYNTHETIC TURF FIELD

The new synthetic turf field should be installed and constructed in accordance with manufacturer's specifications and guidelines including the required base and drainage material. Given the soils encountered in the borings performed at the project area were observed to consist of predominantly clay soils which are considered to exhibit very low to practically impermeable characteristics, ECS anticipates the proposed synthetic turf field will be designed with an underdrainage system connected to underground stormwater detention system, storm manholes or other suitable outlets. It is also anticipated that the existing topsoil within the limits of the proposed turf field will be removed during construction. From the results of soil test borings performed in the project area of the proposed turf field, the thickness of the topsoil material is approximately 8 to 9 inches. The thickness of the topsoil material should be verified in the field by the project contractor. The turf subgrade should be proofrolled as recommended in the Proofrolling section of this report.

If a new aggregate underdrainage system is considered, ECS anticipates at least 2 feet of open-graded drainage material would be placed beneath the synthetic turf field, replacing the topsoil and underlying clayey (fill and native) soils encountered in our borings below the ground surface. ECS recommends crushed/recycled concrete should not be used as underdrainage fill.

It is recommended to include collector pipes or drain tiles in the design to facilitate the removal of water beneath the synthetic turf field. We recommend the placement of geotextile fabric (suitable for drainage application) as a separator between the open-graded granular material and synthetic turf field subbase to prevent fines from migrating into the open-graded drainage granular layer and between the open-graded material and the underlying clayey subgrade to reduce the potential for intermixing of the subgrade soils with the open-graded aggregate. The minimum physical criteria for the geotextile are recommended to satisfy AASHTO M288-21, Class 2 non-woven separator geotextile. It is recommended that drains or other outlets should be provided at the low points to remove water from the subgrade and direct it to an appropriate drainage facility or outlet.

5.0 SITE CONSTRUCTION RECOMMENDATIONS

5.1 SUBGRADE PREPARATION

5.1.1 Stripping and Grubbing

The turf subgrade preparation should consist of stripping topsoil and soft or unsuitable materials from the 5-foot expanded turf field limits, and 5 feet beyond the toe of Engineered Fills. Borings performed at the site contained less than 1 foot topsoil, which is recommended to be removed and replaced below new turf field area. The contractor should verify the thickness of the topsoil surface material in the field as the thickness can vary across the site and may differ in areas not explored by our borings. ECS should be retained to verify that topsoil and other unsuitable surficial materials have been removed prior to the placement of Engineered Fill or construction of new turf field.

5.1.2 Proofrolling

Prior to fill placement or other construction on the subgrade, the subgrade should be evaluated by ECS personnel. The exposed subgrade should be thoroughly proofrolled with construction equipment having a minimum axle load of 10 tons [e.g., fully loaded tandem-axle dump truck]. Proofrolling should be traversed in two perpendicular directions with overlapping passes of the vehicle under the observation of an ECS technician. This procedure is intended to assist in identifying any localized yielding materials. Do not perform proofrolling when the subgrade is frozen. Where proofrolling identifies areas that are unstable or “pumping” subgrade, those areas should be repaired prior to the placement of subsequent Engineered Fill or other construction materials. Methods of stabilization include undercutting and moisture conditioning. The situation should be discussed with ECS to determine the appropriate procedure. Test pits may be excavated to explore the shallow subsurface materials to help in determining the cause of the observed unstable materials, and to assist in the evaluation of appropriate remedial actions to stabilize the subgrade.

Seasonal reduction of the near surface soil strength can also occur during wet times of the year (such as during the spring and fall months) or immediately following extended periods of rain. This may result in additional unstable or pumping subgrade areas. Some undercutting or repair of unstable subgrade soils should be anticipated during subgrade preparation. Dependent on the results of proofroll observations, additional undercuts of as much as 1 to 2 feet may be necessary to develop a suitable subgrade. The actual depth of subgrade undercut and/or stabilization method should be determined at the time of construction. The improvement method chosen may be influenced by several factors such as weather and schedule, as well as the area, depth and nature of the unstable subgrade soils. Depending on the aforementioned and other factors, subgrade repair methods may include:

Scarification and Compaction: Soils can be scarified, moisture conditioned (i.e., dried or wetted) to within a narrow range of the material’s optimum moisture content, and compacted. Scarification and compaction are generally most applicable where very shallow unstable conditions are encountered and at times when the soil can be properly dried or wetted to within a narrow range of the material’s optimum moisture content.

Undercut and Replacement: ECS recommends soft or yielding soils be evaluated in approximately 6 to 12-inch intervals to help limit the volume of undercuts. If soft or yielding soils are identified, the contractor should remove only 6 to 12 inches of material at a time in the subject area and then proofroll/evaluate the undercut subgrade to determine if additional undercut is needed. This may take more time but could potentially reduce the removal of more soil than necessary.

5.1.3 Site Temporary Dewatering

Seasonal variations in precipitation and site drainage conditions can cause the accumulation of water in the upper soils. Based on the groundwater information in the soil borings, ECS anticipates construction dewatering at this site will be mainly limited to removing accumulated rainwater and some perched water conditions. We anticipate that the removal of accumulated water can be achieved utilizing drainage trenches and a sump and pump system given the predominant clayey soils encountered in the borings at the site.

The contractor shall make their own assessment of temporary dewatering needs based upon the limited subsurface groundwater information presented in this report. Soil sampling is not continuous, and thus

soil and groundwater conditions may vary between sampling intervals (typically 5 feet). If the contractor believes additional subsurface information is needed to assess dewatering needs, they should obtain such information at their own expense.

Dewatering systems are a critical component of many construction projects. The failure to properly design and maintain a dewatering system for a given project can result in delayed construction, unnecessary undercuts, detrimental phenomena such as ‘running sand’ conditions, heaved subgrades, internal erosion (i.e., ‘piping’), the migration of ‘fines’ down-gradient towards the dewatering system, localized settlement of nearby infrastructure, foundations, slabs-on-grade and pavements, etc. Water discharged from site dewatering systems are recommended to be discharged in accordance with local, state and federal requirements.

5.2 EARTHWORK OPERATIONS

5.2.1 Engineered Fill

Prior to placement of Engineered Fill, representative bulk samples (about 50 pounds) of on-site and/or off-site borrow should be submitted to ECS for laboratory testing, which will typically include Atterberg limits, natural moisture content, grain-size distribution, and moisture-density relationships (i.e., Proctors) for compaction. Import materials should be tested prior to being hauled to the site to determine if they meet project specifications. Alternatively, Proctor data from other accredited laboratories can be submitted if the test results are within the last 90 days.

Satisfactory Engineered Fill Materials: Materials satisfactory for use as Engineered Fill must be free of frozen matter, deleterious materials, over-sized material (maximum 3-inch particle diameter), or chemicals that may result in the material being classified as “contaminated.” Materials satisfactory for use as Engineered Fill should consist of inorganic soils with the following engineering properties and compaction requirements.

ENGINEERED FILL INDEX PROPERTIES		
Subject		Property
Plasticity	Upper 2 feet in Turf Field Area	LL ≤ 40, PI ≤ 15
	Below 2 feet in Turf Field Area	LL ≤ 50, PI ≤ 20
Max. Particle Size		3 inches
Max. Organic Content		5% by dry weight

Open-graded materials, such as coarser sands, and gravels (SP and GP), which contain increased void space in their mass may need to be encapsulated within a filter geotextile. If the fill is to provide low-frost susceptible characteristics, it must be classified as a clean GP or GW (or clean coarser SW or SP) per Unified Soil Classification System (ASTM D-2487) and must be properly drained.

Unsatisfactory Materials: Unsatisfactory Engineered Fill materials, which do not satisfy the requirements for suitable materials, include topsoil and organic materials (PT, OH, and OL), frost susceptible silt (ML), and high plasticity soils elastic silt (MH) and fat clay (CH). Pea gravel is not recommended to be used as

Engineered Fill. Pea gravel has round/smooth characteristics, no fines and does not interlock when compacted, which makes it more susceptible to future movement and instability.

On-Site Borrow Suitability: Topsoil should not be used as new fill beneath new turf field area. The on-site native lean clay and silty clay fill soils encountered in the borings may be feasible to use as engineered fill but should be further evaluated by ECS prior to its use. Some on-site soils exhibit high percentage of moisture contents which can be difficult to moisture condition preventing to be re-used as engineered fill. Some conditions at the time of construction, such as wet or freezing weather, may also preclude the use of on-site soil, and use of an imported less moisture sensitive or less frost susceptible granular material may be needed. The suitability of engineered fill materials is recommended to be checked by ECS prior to placement.

5.2.2 Compaction

Engineered Fill Compaction: Place and compact engineered fill in appropriate thickness loose lifts as recommended below. Give as much importance to the moisture content requirements of the material as the density requirements during placement and compaction considering the moisture sensitivity of the soil.

ENGINEERED FILL COMPACTION RECOMMENDATIONS		
Subject		Recommendation
Compaction Standard		Modified Proctor, ASTM D1557
Recommended Compaction		95 percent of Maximum Dry Density
Moisture Content	Fine-grained	-1 to +3 % points of the material's optimum value
	Coarse-grained	-3 to +3 % points of the material's optimum value

ECS understands site conditions or project constraints occur where open-graded aggregate engineered fill is used. If open-graded aggregate material is considered, the installation should be observed by ECS on a full-time basis during placement operations. Open-graded aggregates do not contain fine particles and therefore cannot be tested with a nuclear gauge or similar equipment to determine the appropriateness of compaction. The material should be compacted until no further vertical and lateral movement is noted, and until the stone "closes up" and interlock is observed. Where open-graded aggregate material is used, we recommend at least the top 4 inches of engineered fill consist of well-graded aggregate material as a "choking" layer. Consideration should be given to placing a non-woven geotextile fabric as a separator between the open-graded and well-graded materials to help reduce the potential for migration of fines into the open-graded material.

Fill Compaction Control: The expanded limits of the proposed construction areas should be well defined, including the limits of the fill zones at the time of fill placement. Maintain grade control throughout the filling operations. Backfilling operations are recommended to be observed on a full-time basis by ECS to check and document that the minimum compaction requirements are being achieved. The recommended minimum frequency for field density testing of fills is listed in the Table below but should not be less than 1 test per lift.

FREQUENCY OF COMPACTION TESTS IN ENGINEERED FILL AREAS	
Location	Frequency of Tests
Expanded Turf Field Areas	1 test per 10,000 sq. ft. per lift
Expanded Structure Limits (Detention Facility)	1 test per 2,500 sq. ft. per lift
Utility Trenches	1 test per 200 linear ft. per lift
Other Non-Critical Areas	1 test per 10,000 sq. ft. per lift

Compaction Equipment: Compaction equipment suitable to the soil type being compacted should be used to compact the subgrades and fill materials. Sheepsfoot compaction equipment should be suitable for the fine-grained soils (clays). A vibratory steel drum roller should be used for compaction of coarse-grained soils (sands and gravels) as well as to help seal compacted surfaces. Vibratory compaction methods should be done with caution near the water table because an unstable subgrade condition could develop. Static compaction and thinner lifts may be needed near the water table.

The maximum loose lift thickness depends upon the type of compaction equipment used. For isolated excavations within utility excavations, a hand tamper will likely be required. Listed in the Table below are recommended maximum loose lift thicknesses for compaction based on the utilized compaction equipment.

RECOMMENDED LOOSE LIFT THICKNESS ⁽¹⁾	
Equipment	Maximum Loose Lift Thickness
Large/Heavy, Self-Propelled Equipment	8 to 12 inches
Small Self-Propelled or Remote Controlled (Rammax, etc.)	6 to 8 inches
Hand Operated (Plate Tampers, Jumping Jacks, Wacker-Packers)	4 to 6 inches

Note 1: Density testing during fill placement is important to check and document that the specified compaction is being achieved. Thinner lifts and/or more compactive energy may be needed to achieve the required degree of compaction.

In confined areas such as utility trenches, portable compaction equipment and thin lifts of 4 inches or less may be required to achieve specified degrees of compaction.

5.3 GENERAL CONSTRUCTION CONSIDERATIONS

Existing Old Fill Considerations: Undocumented fill materials were encountered in Boring B-01 performed at the site. Unsuitable materials may be buried beneath the site surface at locations not explored by the borings. If questionable material is encountered, it should be evaluated by ECS to determine if removal and replacement with engineered fill is necessary. Alteration to the recommendations of this report may be needed, if conditions different than those noted on the test boring logs are revealed.

Existing Utilities: Prior to construction, all utilities in the proposed construction areas be positively identified and marked. Active utilities to remain in the construction areas should be exposed and protected during construction to reduce the potential for damage or interruption of service. Abandoned

utilities should be removed and backfilled with compacted engineered fill or grouted full with lean concrete if left in-place.

Adjacent Construction Considerations: Care must be taken during earthwork activities adjacent to existing construction. Vibratory compaction equipment can cause interior and exterior building finishes to crack. Mass or localized undercutting adjacent to existing structures may undermine existing foundations and slabs. Excavation below existing construction such as foundations and slabs must consider appropriate preventative measures, such as shoring and underpinning to help prevent loss of subgrade support. In no case should excavations extend below adjacent foundations and slabs unless underpinning or other forms of engineered support are provided.

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

Erosion Control: The surface soils may be erodible. Therefore, the Contractor should provide and maintain good site drainage during earthwork operations to maintain the integrity of the surface soils. Erosion and sedimentation controls should be in accordance with sound engineering practices and local requirements.

Bidding/Estimating Considerations: Contractors bidding or undertaking any work at the site should examine the results of the subsurface exploration, satisfy themselves as to the adequacy of the information for bidding and construction, make their own interpretation of the data, and consider the effect it may have on their cost proposal, construction techniques, schedule, and equipment capabilities. Furthermore, contractors should complete any additional fieldwork and investigation they deem necessary to properly prepare a cost proposal for the site work. Soil borings do not provide the same wide-scale view of the subsurface conditions that is obtained during site grading, excavation or other aspects of earthwork construction. Additional scope may be required to obtain more detailed subsurface information needed for earthwork bid preparation, which could include test pits to better understand the lateral and vertical extents of the subsurface materials of concern such as existing undocumented fill. Even with this additional information, budget contingencies should be carried in construction to help cover potential variations in subsurface conditions.

6.0 CLOSING

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

The description of the proposed project is based on information provided to ECS by Wight & Company. If any of this information is inaccurate or changes, either because of our interpretation of the documents provided or site or design changes that may occur later, ECS should be contacted so we can review our recommendations and provide additional or alternate recommendations that reflect the proposed construction.

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

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

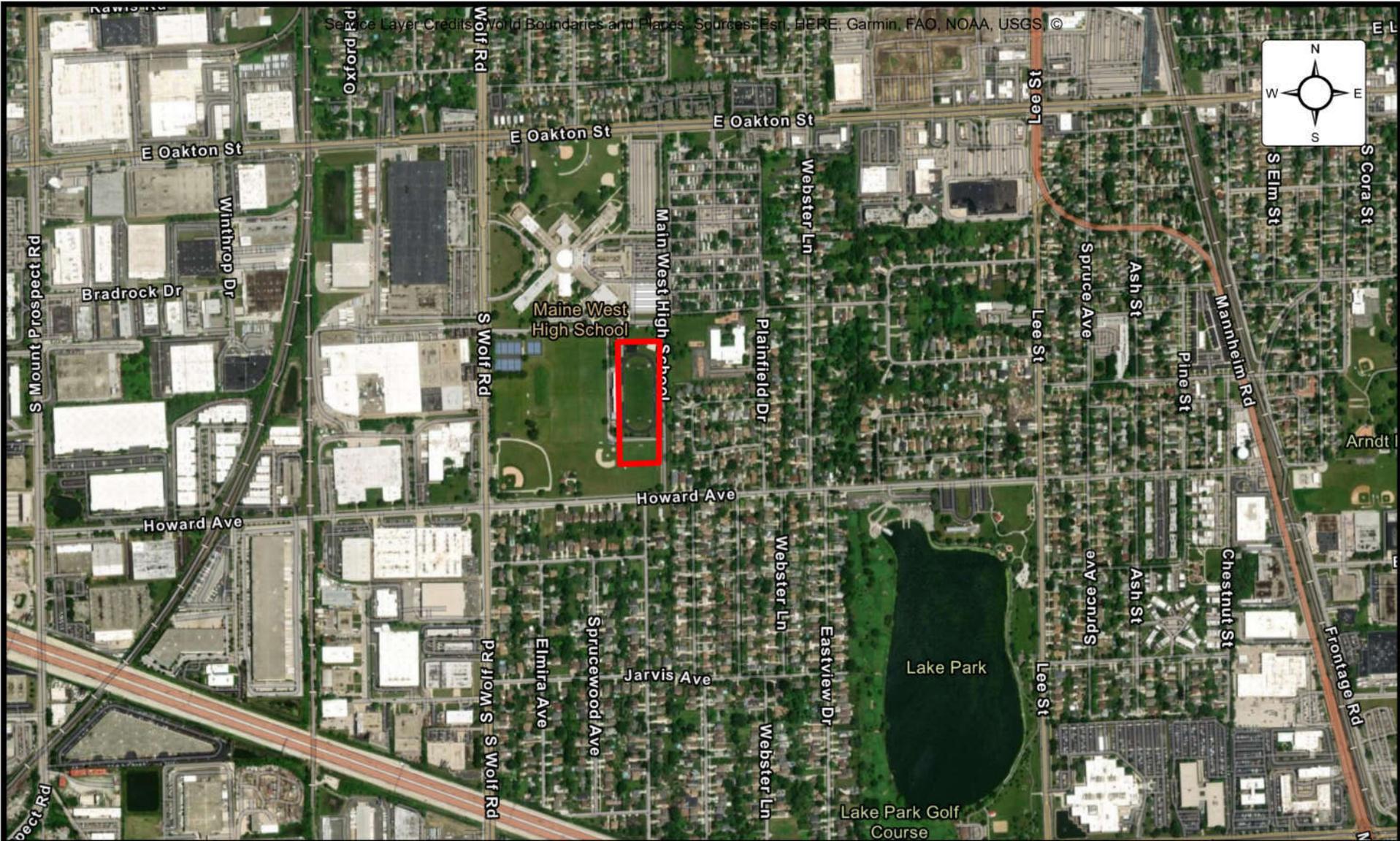
ECS is not responsible for the conclusions, opinions, or recommendations of others based on the data in this report.

Appendix A - Drawings and Reports

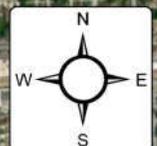
Site Location Diagram

Boring Location Diagram(s)

Subsurface Cross-Section(s)



Source Layer Credits: World Boundaries and Places. Sources: Esri, HERE, Garmin, FAO, NOAA, USGS, ©



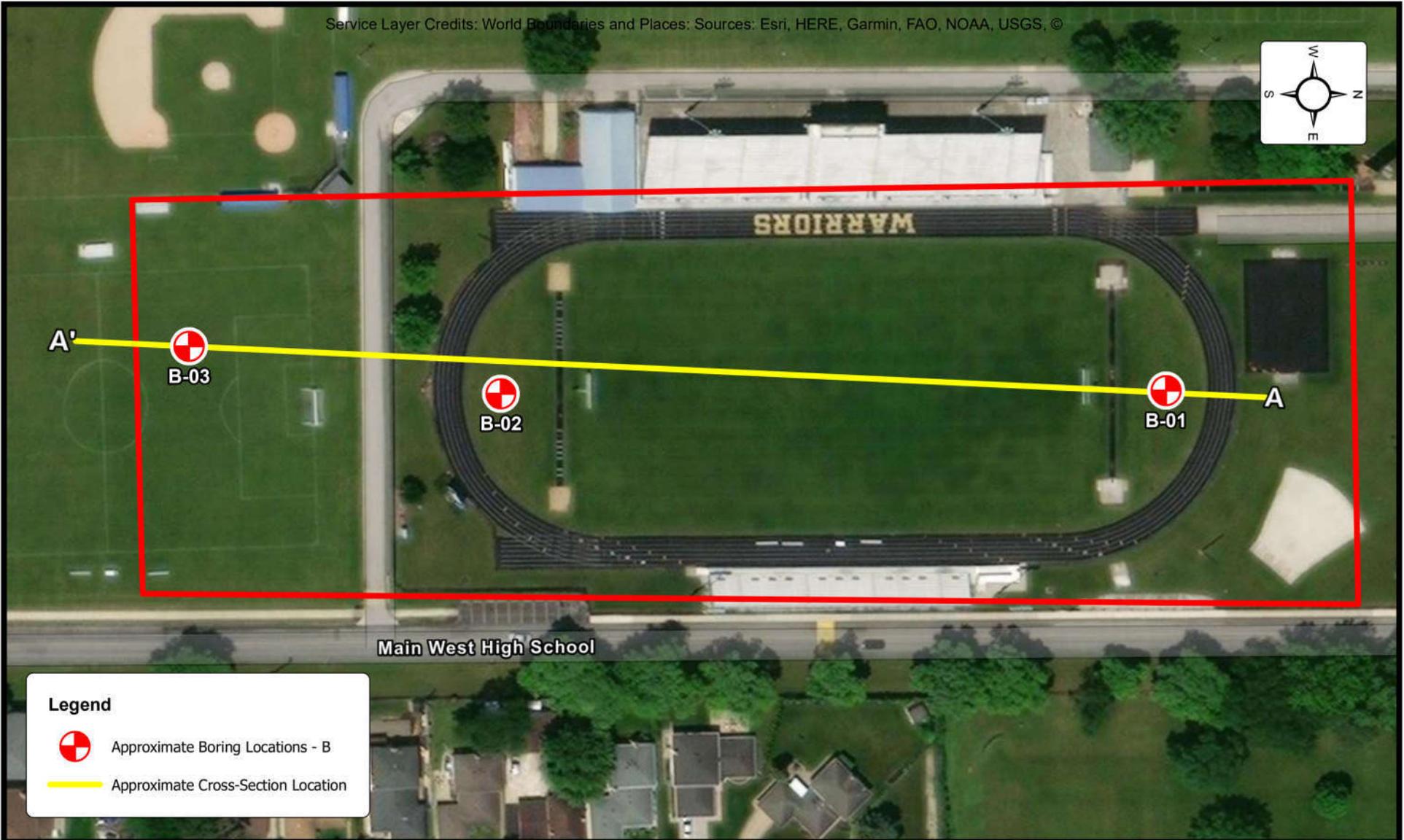
SITE LOCATION DIAGRAM

Maine West HS - Proposed Synthetic Turf Field

1755 South Wolf Road, Des Plaines, Illinois
Maine Township District 207



ENGINEER DTL
SCALE 1" = 1000'
PROJECT NO. 16:13029-M
SHEET 1 of 1
DATE 10/7/2025



Legend



Approximate Boring Locations - B



Approximate Cross-Section Location



BORING LOCATION DIAGRAM

Maine West HS - Proposed Synthetic Turf Field

1755 South Wolf Road, Des Plaines, Illinois
Maine Township District 207

ENGINEER
DTL

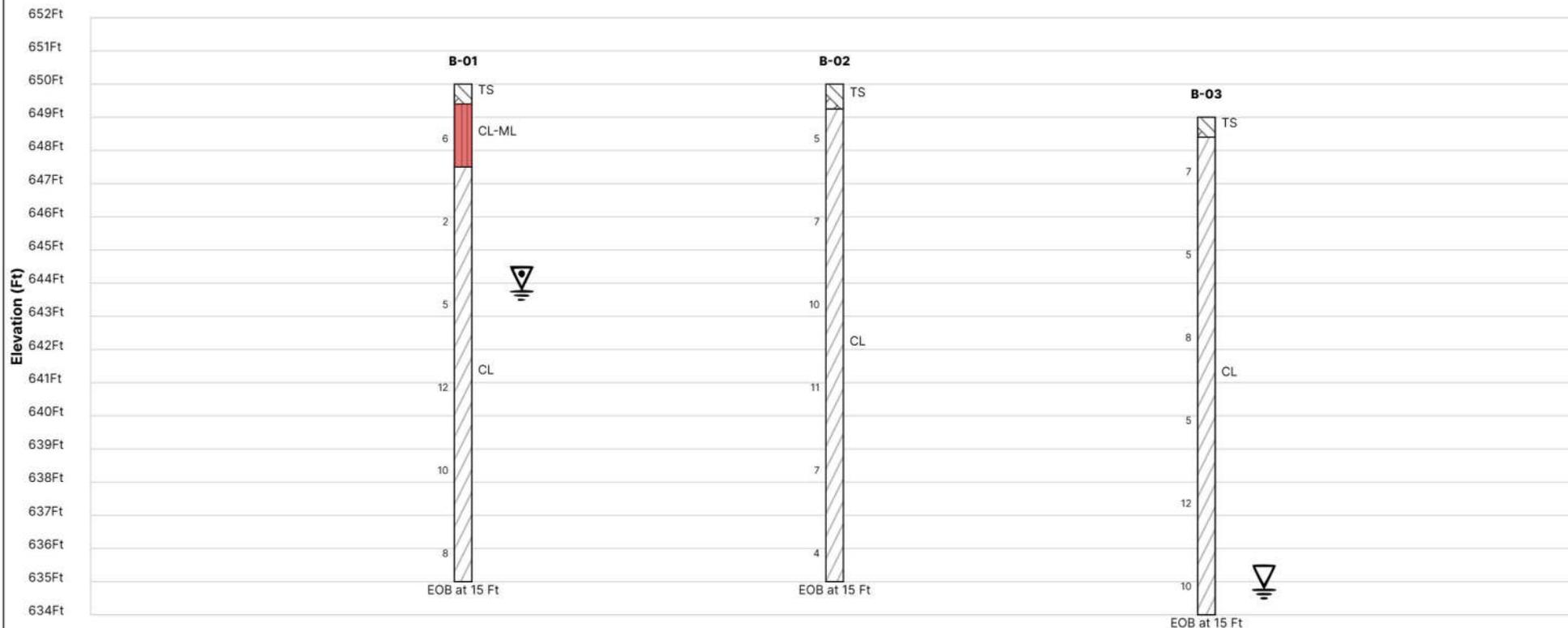
SCALE
1" = 100'

PROJECT NO.
16:13029-M

SHEET
1 of 1

DATE
10/7/2025

Generalized Subsurface Cross Section A-A'



CLIENT:	Maine Township District 207	PROJECT:	Maine West HS - Proposed Synthetic Turf Field
DRAWN DATE:	10/7/2025	PROJECT NO.:	16:13029-M
CHECKED DATE:	10/7/2025	SCALE:	AS SHOWN

<p>Notes:</p> <p>1-EOB: END OF BORING AR: AUGER REFUSALS: SAMPLER REFUSAL</p> <p>2-SEE INDIVIDUAL BORING LOG AND GEOTECHNICAL INFORMATION</p> <p>3-STANDARD PENETRATION TEST RESISTANCE (LEFT OF BORING) IN BLOWS PER FOOT (ASTM D1586)</p> <p>4- TOPOGRAPHIC INFORMATION IS BASED ON PUBLICLY AVAILABLE DATA (GOOGLE OR Cesium) THE TOPOGRAPHIC LINE SHOWN BETWEEN BORINGS IS FOR VISUAL REFERENCE ONLY PLEASE REFER TO THE REFERENCE NOTES FOR BORING LOGS FOR SYMBOLGY MEANING AND ADDITIONAL INFORMATION</p>	<p>Plastic Limit Water Content Liquid Limit</p> <p>X ————— ● ————— Δ</p> <p>[FINES CONTENT %]</p>	▽ WL (First Encountered)	<div style="display: inline-block; width: 20px; height: 10px; background-color: red; border: 1px solid black;"></div> Fill
	<div style="display: inline-block; width: 20px; height: 10px; background-color: black; border: 1px solid black;"></div> BOTTOM OF CASING	▽ WL (Completion)	<div style="display: inline-block; width: 20px; height: 10px; background-color: purple; border: 1px solid black;"></div> Possible Fill
	<div style="display: inline-block; width: 20px; height: 10px; border: 1px solid black; border-style: dashed;"></div> LOSS OF CIRCULATION	▽ WL (Estimated Seasonal High Water)	<div style="display: inline-block; width: 20px; height: 10px; background-color: pink; border: 1px solid black;"></div> Probable Fill
	○ CALIBRATED PENETROMETER	▽ WL (Stabilized)	<div style="display: inline-block; width: 20px; height: 10px; background-color: green; border: 1px solid black;"></div> WR/Rock

Appendix B – Field Operations

Reference Notes

Exploration Procedures

Boring Logs



REFERENCE NOTES FOR BORING LOGS

MATERIAL ^{1,2}	
	ASPHALT
	CONCRETE
	GRAVEL
	TOPSOIL
	VOID
	BRICK
	AGGREGATE BASE COURSE
	GW WELL-GRADED GRAVEL gravel-sand mixtures, little or no fines
	GP POORLY-GRADED GRAVEL gravel-sand mixtures, little or no fines
	GM SILTY GRAVEL gravel-sand-silt mixtures
	GC CLAYEY GRAVEL gravel-sand-clay mixtures
	SW WELL-GRADED SAND gravelly sand, little or no fines
	SP POORLY-GRADED SAND gravelly sand, little or no fines
	SM SILTY SAND sand-silt mixtures
	SC CLAYEY SAND sand-clay mixtures
	ML SILT non-plastic to medium plasticity
	MH ELASTIC SILT high plasticity
	CL LEAN CLAY low to medium plasticity
	CH FAT CLAY high plasticity
	OL ORGANIC SILT or CLAY non-plastic to low plasticity
	OH ORGANIC SILT or CLAY high plasticity
	PT PEAT highly organic soils

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

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

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

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

GRAVELS, SANDS & NON-COHESIVE SILTS	
SPT ⁵	DENSITY
<5	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
>50	Very Dense

WATER LEVELS ⁶	
	WL (First Encountered)
	WL (Completion)
	WL (Seasonal High Water)
	WL (Stabilized)

FILL AND ROCK			
FILL	POSSIBLE FILL	PROBABLE FILL	ROCK

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

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

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

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

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

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

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

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



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

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

SPT Procedure:

- Involves driving a hollow tube (split-spoon) into the ground by dropping a 140-lb hammer a height of 30-inches at desired depth
- Recording the number of hammer blows required to drive split-spoon a distance of 18-24 inches (in 3 or 4 Increments of 6 inches each)
- Auger is advanced* and an additional SPT is performed
- One SPT typically performed for every two to five feet. An approximate 1.5 inch diameter soil sample is recovered.



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

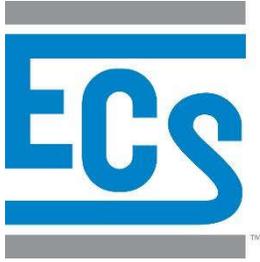
CLIENT: Maine Township District 207				PROJECT NO.: 16:13029-M		BORING NO.: B-01		SHEET: 1 OF 1						
PROJECT NAME: Maine West HS - Proposed Synthetic Turf Field				DRILLER/CONTRACTOR: Subcontractor 07										
SITE LOCATION: 1755 South Wolf Road, Des Plaines, Illinois, 60018								LOSS OF CIRCULATION						
LATITUDE: 42.019019			LONGITUDE: -87.904949			STRUCTURE:		SURFACE ELEVATION: 650		BOTTOM OF CASING				
DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCP/RS/MC/SPT-N VALUE)*	Recovery % ■ RQD % ■		Fines% F MC% ●		
										SPT ⊗	PL ⊗	MC ●	LL ▽	
5.0	S-1	SS	18	12	Topsoil [Thickness=8"] FILL - (CL-ML) SILTY CLAY - trace gravel and sand, brown, contains roots, moist, very stiff.			645	8-4-2 (6)	6		20.2	3.5	
	S-2	SS	18	18	(CL) LEAN CLAY - trace gravel and sand, brown to gray at 10ft, moist, stiff to very stiff.			645	1-1-1 (2)	2		22	2	
	S-3	SS	18	18				645	1-2-3 (5)	3		25.7	1.75	
	S-4	SS	18	18				640	2-5-7 (12)	12		18.9	2.5	
	S-5	SS	18	18				640	3-4-6 (10)	10		15.2	3.5	
	S-6	SS	18	18				635	2-3-5 (8)	8		21.1	3.0	
					END OF BORING AT 15 Ft			635						
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL														
▽ WL (First Encountered):			Dry		BORING STARTED:			09/10/2025		CAVE IN DEPTH:			Not Observed	
▼ WL (Completion):			Dry		BORING COMPLETED:			09/10/2025		HAMMER TYPE:			Automatic	
▽ WL (Seasonal High Water):					EQUIPMENT:			LOGGED BY:		DRILLING METHOD:				
▽ WL (Stabilized):			6 FT		GeoProbe 7822DT			DAG		Hollow Stem Auger (0'-15')				
GEOTECHNICAL BOREHOLE LOG														

CLIENT: Maine Township District 207				PROJECT NO.: 16:13029-M		BORING NO.: B-02		SHEET: 1 OF 1					
PROJECT NAME: Maine West HS - Proposed Synthetic Turf Field				DRILLER/CONTRACTOR: Subcontractor 07									
SITE LOCATION: 1755 South Wolf Road, Des Plaines, Illinois, 60018								LOSS OF CIRCULATION					
LATITUDE: 42.01771		LONGITUDE: -87.904945		STRUCTURE:		SURFACE ELEVATION: 650		BOTTOM OF CASING					
DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TOP/RS/MC/SPT- N VALUE)*	Recovery % ■ RQD % ■		Fines% F MC% ●	
										SPT ⊗	PL ⊗	MC ●	LL ▽
					Topsoil [Thickness=9"].								
5.0	S-1	SS	18	18	(CL) LEAN CLAY - trace gravel and sand, brown to gray at 11ft, moist, stiff to hard.			645	2-3-2 (5)	5		18.6	4
	S-2	SS	18	18					2-3-4 (7)	7		17.6	
	S-3	SS	18	18					2-4-6 (10)	10		18.8	
10.0	S-4	SS	18	18				640	2-5-6 (11)	11		17.6	
	S-5	SS	18	18					2-3-4 (7)	7		18.5	3
	S-6	SS	18	18					2-2-2 (4)	4		15.7	1.5
					END OF BORING AT 15 Ft			635					
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL													
▼ WL (First Encountered):		Dry		BORING STARTED:		09/10/2025		CAVE IN DEPTH: 12.5FT					
▼ WL (Completion):		Dry		BORING COMPLETED:		09/10/2025		HAMMER TYPE: Automatic					
▼ WL (Seasonal High Water):				EQUIPMENT:		LOGGED BY:		DRILLING METHOD:					
▼ WL (Stabilized):				GeoProbe 7822DT		DAG		Hollow Stem Auger (0'-15')					
GEOTECHNICAL BOREHOLE LOG													

CLIENT: Maine Township District 207				PROJECT NO.: 16:13029-M		BORING NO.: B-03		SHEET: 1 OF 1					
PROJECT NAME: Maine West HS - Proposed Synthetic Turf Field				DRILLER/CONTRACTOR: Subcontractor 07									
SITE LOCATION: 1755 South Wolf Road, Des Plaines, Illinois, 60018								LOSS OF CIRCULATION					
LATITUDE: 42.017097			LONGITUDE: -87.905072		STRUCTURE:		SURFACE ELEVATION: 649		BOTTOM OF CASING				
DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TOP/RS/MC/SPT- N VALUE)*	Recovery % ■ RQD % ■		Fines% F MC% ●	
										SPT ⊗	PL ⊗	MC ●	LL ▽
					Topsoil [Thickness=8"]. (CL) LEAN CLAY - trace gravel and sand, brown to gray at 9ft, moist, stiff to very stiff.					0 20 40 60 80 100	0 20 40 60 80 100	0 20 40 60 80 100	0 20 40 60 80 100
5.0	S-1	SS	18	18				645	3-3-4 (7)	7		15.3	2
	S-2	SS	18	18					3-3-2 (5)	5		18.4	1.75
	S-3	SS	18	18					2-3-5 (8)	8		18.3	3.75
10.0	S-4	SS	18	18				640	2-2-3 (5)	5		19.0	2.25
	S-5	SS	18	3					5-5-7 (12)	12		20.4	1.75
	S-6	SS	18	14				635	2-5-5 (10)	10		12.4	1.0
					END OF BORING AT 15 Ft								
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL													
▽ WL (First Encountered):		14 FT		BORING STARTED:		09/10/2025		CAVE IN DEPTH: 12FT					
▼ WL (Completion):		Dry		BORING COMPLETED:		09/10/2025		HAMMER TYPE: Automatic					
▽ WL (Seasonal High Water):				EQUIPMENT:		LOGGED BY:		DRILLING METHOD:					
▽ WL (Stabilized):				GeoProbe 7822DT		DAG		Hollow Stem Auger (0'-15')					
GEOTECHNICAL BOREHOLE LOG													

Appendix C – Laboratory Testing

Laboratory Procedures



LABORATORY PROCEDURES:

Index Testing

Moisture content determination was performed on select fine-grained soil samples in accordance with ASTM D 2216.

Calibrated hand penetrometer tests (Qp) were performed on select cohesive soil samples. In the hand penetrometer test, the unconfined compressive strength of a soil sample is estimated, to a maximum of 4.5 or 6 tons per square foot (tsf), depending on the penetrometer model, by measuring the resistance of a soil sample to penetration by a small, calibrated, spring-loaded cylinder.

Appendix D – Other Information

GBA - Geotechnical Engineering Report Information Sheet

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, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them 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 herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences 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.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

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

- for a different client;
- for a different project or purpose;
- 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, the reliability of a geotechnical-engineering report can be 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 you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site 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.

Most of the “Findings” Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site’s subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual site-wide-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 through project completion to obtain 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 judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed 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 continuing 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 available 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-phase observations.

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 information 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. 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. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. 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 provide 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 obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

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, the engineer’s services were not designed, conducted, or intended to prevent 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.**



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