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GEOTECHNICAL
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GCI PROJECT No. 24-G-29557

Subsurface Exploration and Preliminary Geotechnical Engineering Report

Multi-Family Development Property Due Diligence
2150 Innis Road
Columbus, Ohio

Prepared for:
Nationwide Children's Hospital

October 31, 2024



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October 31, 2024

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**Reference: Subsurface Exploration & Preliminary Geotechnical Engineering
Report
Multi-Family Development Due Diligence Study
2150 Innis Road - Columbus, Ohio
GCI Project No. 24-G-29557**

Geotechnical Consultants, Inc. performed a subsurface exploration and prepared this preliminary geotechnical engineering report for the above referenced project. Our borings encountered a surface cover of topsoil, pavement, and/or possible fill. Where encountered, fill depths were noted to extend to 4 feet. Below the surface cover, we encountered natural clay-based soils overlying glacial till. Bedrock was not encountered in our borings (maximum drilled depth of 20 feet). Groundwater seepage was encountered in one of the borings at 7 feet below grade.

It is our opinion that the site soils are suitable for the anticipated residential construction, with proper site preparation. The primary geotechnical issues will be demolishing existing construction, handling of existing possible fills, subgrade stability, and subgrade preparation. We discuss these and other geotechnical considerations in the report.

After you review the report, feel free to contact GCI with any questions you may have. GCI appreciates the opportunity to provide our services for this project, and we hope to continue providing service through construction.

Respectfully submitted,

Geotechnical Consultants, Inc.

Curtis L. Miller

Curtis L. Miller, P.E.
Principal



Jeffrey M. Holko

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GCI File 24-G-29557

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INTRODUCTION

As requested by Jordan Henderson and authorized by Patricia McClimon, both representing Nationwide Children's Hospital (NCH), Geotechnical Consultants, Inc. (GCI) performed a limited subsurface exploration and prepared this preliminary geotechnical engineering report for the site located at 2150 Innis Road in Columbus, Ohio. Prior to drilling, the client provided GCI with a Zoning Plan (prepared by The Columbus Design Co; dated 9/30/2024). The plan showed the locations of potential multi-family structures and drive/parking areas. Structures will range from 1- to 4-stories with slab-on-grade.

Our subsurface study consisted of eight (8) standard penetration test borings drilled within accessible areas of the site. GCI field-located the borings in reference to site features and landmarks and using handheld GPS; locations should be considered approximate. Ground elevations at the boring locations were not determined within our scope of services. We have attached a boring location plan and test boring logs in the Appendix.

The intent of this study was to evaluate subsurface conditions for due diligence purposes and provide preliminary geotechnical recommendations relative to earthwork, foundations, slabs, and pavements for the potential development. This report is issued prior to the receipt of final site layout and grading plans. GCI should review these plans when available, and provide additional recommendations and borings, if necessary.

This report was prepared for the exclusive use of Nationwide Children's Hospital and their consultants for specific application to the anticipated multi-family development project in Columbus, Ohio, in accordance with generally accepted soil and foundation engineering practices. No warranty, expressed or implied, is made.

SITE AND PROJECT DESCRIPTIONS

The project site has an address of 2150 Innis Road in Columbus, Ohio. The site is located in an area surrounded by a mix of commercial and residential construction. The project property contains an existing building and pavement near the center of the site, with open grass covered land to the south, some open areas and some wooded areas to the north, and an existing cellphone tower on the northeast portion. Below is an aerial image of the site showing conditions generally similar to those encountered during our drilling operations.



Site Image Showing Approximate Site Boundary (Google.com)

A preliminary development plan shows the project could include a 4-story apartment building, three 3-story walk-up residential structures, three 3-story townhome structures, several detached residential structures, and several detached garage structures. We anticipate all structures will be slab-on-grade. The client requested a due diligence study, to assess general subsurface conditions and their impact of future development.

SUBSURFACE CONDITIONS

GCI mobilized a truck-mounted, rotary drill rig (with an automatic sampling hammer) to the site on October 25, 2024 and drilled eight (8) standard penetration borings across the site. We drilled the borings in accessible areas. The borings were extended to 20 feet below grade, except for boring B-7, which was terminated at 17 feet on a possible boulder.

Test boring logs, a boring location plan, and a summary table of the encountered subsurface conditions are attached in the Appendix. We summarize the subsurface findings below. Refer to the individual boring logs and summary table for more detailed subsurface information at specific boring locations.

Surface Cover

Borings B-1 to B-3, and B-7, encountered surface topsoil, ranging in thickness from 0.3 to 0.8 feet. Borings B-4 and B-5 encountered 2 to 3 inches of asphalt cover underlain by 4 inches of aggregate base. Boring B-6 encountered 6 inches of stone cover.

At the surface of B-8, below the pavement in B-4, and below the topsoil in B-7, we encountered possible fill soils consisting of mixtures of lean clay, silt, sand, gravel, and trace topsoil. The possible fill was dry due to the drought conditions that Ohio has experienced, and the exact transition between fill and natural soils was difficult to discern. We listed the bottom of fill depth at 4 feet at each of the locations.

Natural Soils

Below the surface cover in borings B-1 to B-3, B-5, and B-6, we encountered natural soils visually classified as moderate plasticity brown mottled gray lean clay (classified as CL in

the ASTM/Unified Soil Classification System). Standard penetration testing indicated these soils were medium stiff to stiff in cohesive consistency.

At depths of 3 to 4 feet, we encountered medium stiff to very stiff brown glacial till visually classified as moderate plasticity lean clay with sand (CL). The till graded to a low plasticity, gray sandy lean clay with gravel (CL) in the borings at depths of 7 to 11 feet. We noted random silty sand and gravel layers in the till soils. The borings terminated in the gray glacial till at a depth of 20 feet; except at boring B-17, where the drillers terminated the boring at 17 feet on a possible boulder.

Bedrock

We did not encounter bedrock within the maximum drilled depths of our borings (20 feet).

Groundwater

We encountered groundwater seepage in boring B-8 at 7 feet below grade. Upon completion of drilling, the groundwater level was measured at 14 feet in boring B-8. We did not encounter groundwater seepage in the remaining borings.

Soil moisture in the recovered sample was noted as moist and very moist. Soil moisture conditions and groundwater levels fluctuate in response to precipitation events, seasonal changes in climate, stabilization time, and other factors that may differ from the time the measurements were made.

ANALYSES AND CONCLUSIONS

GEOTECHNICAL EVALUATION

It is GCI's opinion that the site is suitable for the anticipated residential construction with proper site preparation. The principal geotechnical considerations relate to the impact that the possible existing fill, existing construction, and potentially soft/high moisture soils will have on site preparation and structure/pavement support. The following paragraphs discuss the impact of the subsurface conditions on site development and structure foundations.

Existing Construction

When demolishing the existing building(s), remove slabs, footings, utilities, pavements (including aggregate base), etc. within the proposed construction area, plus 5 feet laterally. Reroute utilities that are to remain around the proposed building area. Cap the open ends of utilities left in place to prevent loss of soils. Backfill excavations with engineered fill as described later in the *Site Preparation and Earthwork* section of this report.

Existing Fill

Three borings encountered possible existing fill and we expect other areas of existing fill could be encountered during site work. In our opinion, the fill is not suitable for structure support due to settlement concerns. The existing fill can be used for slab and pavement support, provided it is firm and stable below a proof-roll, and it is understood that settlement is still possible. We discuss two approaches for addressing the existing fill in the following paragraphs.

Approach 1 – Leave Existing Fills In-Place

With this approach, the existing fill is allowed to remain in place. Building foundations would extend through the existing fill and any stained soils/trapped topsoil material to bear in firm and stable natural lean clay or glacial till soils. The slab would be supported on-grade and on the existing fill. Due to the dry conditions we encountered in the upper few feet of the soil profile, we recommend the upper 12 to 18 inches of subgrade be reworked (disked, moisture conditioned, and compacted) to provide a stable bearing surface. Prior to construction, the subgrade should be thoroughly proof-rolled using a fully-loaded, tandem-axle dump truck (or equivalent) to identify potential soft, yielding subgrade areas. Soft spots identified during the proof-roll should be undercut to firm, stable conditions, or otherwise stabilized prior to new fill placement.

It must be noted that the option of leaving fill in-place does carry some risk of slab settlement and cracking, albeit a small risk in our opinion. Thoroughly proof-rolling the subgrade to identify soft areas and stabilizing these soft areas can help to reduce, but not eliminate, the potential of slab and pavement settlement and cracking due to existing fills.

Approach 2 – Remove and Replace

With this approach, the existing fills would be removed to expose non-organic natural soils below the building area, plus 10 feet laterally beyond the building footprint. Stained organic natural soils and trapped topsoil should be removed during this process if encountered. After the fill is removed, the exposed soil subgrades should be proof-rolled to check for soft or unstable areas. Soft spots identified during the proof-roll should be undercut to firm, stable conditions, or otherwise stabilized. New fill placement can occur after proof-rolling and stabilization. Foundations and slabs would then bear in either

natural soils or the new structural fill, with normal settlement expectations. Non-organic removed fill can be reused for structural fill, as discussed later in this report.

Site Preparation

Stripping

Remove pavements and abandoned utilities from the proposed development area, plus 5 feet laterally. Resultant excavations from utility trenches, or other removed objects, should be properly backfilled over stable subgrades as described in the *Site Preparation and Earthwork* section of this report. Abandoned utility lines outside the construction limits should be properly capped to prevent loss of soil into the abandoned utility.

Remove trees, roots, surface topsoil, vegetation and other organic material from the development area, plus 5 feet laterally. After the site is stripped, we anticipate the exposed surface will consist of natural clay-based soils or existing fill. We discussed two approaches to address the existing fill previously in this report.

Subgrade Stabilization

After the site is stripped, proof-roll the exposed subgrade using a fully-loaded, tandem-axle dump truck (or equivalent) to identify potential soft, yielding subgrade areas.

Stabilization of soft soil subgrades by disking, aerating/drying, and re-compaction may be feasible during traditionally drier times of the year. During wet seasons, partial undercutting and replacing of wet soils with structural fill, drying with soil additives such as lime, or use of geosynthetics may be needed to create a stable subgrade before placing controlled fills.

If building pads and pavement subgrades will be exposed through typical seasonal wet or freezing weather conditions prior to concrete or asphalt placement, consideration could be made to chemically stabilizing the subgrades during earthwork procedures to enhance subgrade resilience and reduce undercuts and stone placement that may be needed where subgrades soften due to the inclement weather and repeated construction traffic. The use of soil additives, such as lime and fly-ash, or installation of geosynthetics, should be reviewed by our office prior to use in the field. We expect fewer problems with soft subgrades if work is performed during traditionally drier times of the year (late spring, summer, and early fall). Traditionally wetter seasons (i.e., late fall, winter, and early spring) will contribute to more problems associated with soft, very moist subgrades. Non-organic portions of existing fill can be reused for structural fill with proper moisture control.

New Fill Placement

Structural fill can be placed to design grade once the subgrades are brought to firm and stable conditions. Non-organic site soils (existing fill and natural) can be used as structural fill provided proper moisture control is maintained. Imported fill materials should be reviewed by our office prior to placement. Depending on the time of year of earthwork, the fill may require drying to achieve proper compaction. The contractor should place and compact controlled fills in accordance with the information presented in the *Site Preparation and Earthwork* section of this report.

FOUNDATIONS

Once the site has been properly prepared, it is our opinion the buildings can be supported on conventional shallow foundations that bear on stable, natural non-organic soils or new,

controlled fill placed directly over stable, natural non-organic soils. An allowable bearing pressure of 3,000 pounds per square foot would be appropriate for foundation design.

Regardless of calculated sizes, we recommend minimum sizes of 16 inches wide for wall footings and 30 inches square for column pads to prevent a “punch” effect. Exterior footings should extend to local frost bearing depth (32 inches) or to stable bearing (as stated above), whichever is deeper. Interior footings in heated areas may be placed as shallow as feasible, if bearing on acceptable soils. Continuous wall footings should be designed to include longitudinal reinforcing steel to help control differential settlement.

Typical to local practice, if soft or unstable soils are encountered at footing design subgrade, undercut to stable soils. Soft, unstable footing subgrades should be reviewed by the soils engineer prior to undercut. Undercut areas can be backfilled to footing design subgrade using a controlled density fill (CDF), or footings can be constructed at the bottom of the undercut.

SLABS

Conventional concrete slabs-on-grade are feasible for the proposed building(s). As noted earlier, if fill is left in place, follow the recommendations made earlier in the report; proof-roll and stabilize as needed. The risk of settlement will need to be accepted by the owner as previously discussed. Immediately prior to slab construction and prior to placement of stone, proof-roll the slab areas. Stabilize any soft areas identified by the proof-roll.

GCI recommends placing a minimum of 4 inches of granular fill (such as ODOT Item 304 or AASHTO #57 stone) under the slabs to serve as a capillary cut-off and to provide a uniform, firm sub-base. GCI recommends a minimum of 6 inches of granular fill (either

ODOT 304 aggregate or AASHTO #57 stone) be placed beneath heavily-loaded floor slabs. Placement of a vapor retarder is recommended in areas where moisture could cause problems with floor finishes (interior of the building). Design slabs as “floating slabs” with no connection to the structure to avoid cracking related to differential settlement.

RETAINING AND BELOW-GRADE WALLS

Walls restrained at both top and bottom (conventional basement walls and elevator pits) should be designed to resist *at-rest* lateral soil pressures. Grade-break retaining walls allowed to move freely at the top of the wall should be designed using active-case lateral earth pressures. The design loading depends on the type of backfill material used and boundary support conditions. Surcharge loads also should be considered in design of below grade walls. The following table provides recommended equivalent fluid pressures for two types of soils and loading conditions.

Soil Type	Equivalent Active Fluid Pressure (pcf)	Equivalent At-Rest Fluid Pressure (pcf)
Lean Clay (site soils)	55	70
Sand and Gravel (properly compacted)	35	55

We do not recommend using cohesive soils as wall backfill due to their poor drainage characteristics and potential for lateral wall loads resulting from surface frost. We recommend that granular material (less than 15% passing the No. 200 sieve) be used for all wall backfill. The stone should be placed in a wedge defined by a line extending up from the footing at a 35° angle from the vertical to allow use of the lower values above. We recommend that footing drains and underslab drains leading to a permanent sump pump or otherwise drained to daylight be installed to minimize the build-up of hydrostatic forces

behind the below-grade walls. Optionally, the walls can be designed to resist hydrostatic pressures. GCI also recommends damp-proofing of below-grade walls.

SEISMIC FACTOR

Our borings encountered deposits of medium stiff to very stiff clay-based soils. In accordance with the Ohio Building Code – Site class definitions, we estimate the site as a Site Class D – stiff soil profile.

EXCAVATIONS

The existing fills and natural soils can be excavated with conventional track hoe equipment. Excavation into granular layers will require layback or trench box construction techniques to prevent sidewall collapse. **Excavations should comply with current OSHA regulations.**

GROUNDWATER

We encountered groundwater seepage in one boring at 7 feet below grade. Based on our observations, we do not anticipate groundwater will have a significant impact on foundation and shallow utility excavations. Regardless, if groundwater seepage is encountered, dewater excavations to allow work to be performed under dry conditions. We expect that groundwater flows can be handled with portable sump pumps and working mats of crushed stone. If increased groundwater is encountered, more advanced dewatering may be required. Contact GCI for additional recommendations if excessive water flows are encountered.

PAVEMENTS

Provided the site is properly prepared, conventional aggregate base and flexible asphalt wearing course pavements can be used. Prior to pavement construction, the subgrade should be carefully proof-rolled, and stabilized as necessary. We recommend that any organic soils are removed from below the pavement areas. A specific pavement design is beyond the scope of work of this report; GCI can provide one if requested. A site-specific pavement design would require additional laboratory testing and pavement use criteria. We assume that traffic will consist primarily of automobiles in the parking lot and drive lanes. We expect that any loading dock and access roadways will be used by occasional large trucks.

Properly compacted, we feel that the site soils would have a CBR value of at least 3. Based on our experience with similar projects and soils, and assuming properly prepared subgrades, we feel a minimum light-duty pavement section consisting of 3 inches of asphalt over 8 inches of aggregate base for the parking spaces would be appropriate for the anticipated project. We suggest a pavement section consisting of a minimum of 4 inches of asphalt over 10 inches of aggregate base for heavily-trafficked areas (e.g., drive lanes, entrance area). We also suggest a minimum of 8 inches of air-entrained Portland cement concrete the dumpster pad, dumpster pad approach area, and loading dock areas. Pavements should be designed by the site civil engineer.

Providing adequate subbase drainage is important to future pavement performance. Finger drains connecting to weep-holes in inlets, proper grading of pavement subgrades and surfaces to shed run-off, and underdrains in pavement swales are suggested subbase drainage methods and should be designed by the site civil engineer. Pavement areas should be thoroughly proof-rolled and steel-wheel rolled to a smooth surface prior to

placement of base aggregate. Subgrade preparation during wet seasons may require the use of engineering fabrics or geogrids.

SITE PREPARATION AND EARTHWORK

We provide below general guidelines for site preparation and earthwork operations.

1. When demolishing the existing building(s), remove floor slabs and foundations.
2. Remove abandoned utilities from the proposed development area, plus 5 feet laterally. Resultant excavations from utility trenches or other removed objects should be properly backfilled as discussed in this report. Abandoned utility lines outside the construction limits should be properly capped to prevent loss of soil into the abandoned utility.
3. Remove asphalt, trees, vegetation, topsoil, rootmat systems, and other unsuitable materials from the proposed development area, plus a minimum of 5 feet beyond. Remove existing fill to 10 feet beyond the building limits if the remove and replace approach described above in this report is selected.
4. Thoroughly and carefully proof-roll the exposed soil subgrades with a fully-loaded, tandem-axle dump truck (or equivalent) to identify potential soft subgrade areas. Undercut soft areas or otherwise stabilize soft spots identified during the proof-roll prior to placing controlled fill to design grade.
5. Place controlled fills to design grade within proposed building and pavement areas, as required. Non-organic natural soils or non-organic removed fills are suitable for reuse in new controlled fills. **Off-site borrow materials should be reviewed by our office prior to use.**
6. Place controlled fills in maximum 8-inch thick loose lifts and compact each lift to a minimum of 98% of the maximum Standard Proctor dry density (ASTM D-698). The moisture in the fill soils should be controlled to within $\pm 3\%$ of the optimum Standard Proctor moisture content. **Depending on the time of year of earthwork, moisture adjustment of the existing fill and site soils may be required to achieve proper compaction.** Cohesive soils will compact best with a sheepsfoot roller and granular soils with a vibratory roller.
7. Construct foundations and start building construction after the building pad is completed. Refer to the *Foundations* section of this report for specific foundation design parameters.
8. Slab-on-grade and pavement areas should be proof rolled prior to slab and pavement construction. Slab-on-grade and pavement areas should be steel-wheel rolled to a smooth surface prior to placement of base aggregate. Subgrade preparation during wet seasons may require the use of engineering fabric or geo-grid.

9. It is recommended that GCI be retained to observe proof-rolling operations, cut and fill operations, and footing excavations.
10. If work is performed during the winter (e.g., when freezing temperatures occur), special protective measures will be required during filling and footing construction procedures. Contact GCI for additional cold weather recommendations, as needed.

ADDITIONAL BORINGS

This study consisted of a limited number of borings to assist the client with due diligence aspects of the project. Once a final development plan is available, we recommend additional development specific borings be performed.

CONSTRUCTION MATERIALS ENGINEERING AND TESTING

GCI provides construction materials engineering and testing services. For project continuity throughout construction, we recommend that GCI be retained to observe, test, and document:

- earthwork procedures (stripping, fill placement, compaction, utility trench backfill, etc.),
- foundation subgrade observation,
- concrete placement and compressive strength testing (footings, slabs, etc.),
- structural steel (welds, bolts, etc.), and
- masonry wall construction observation and grout testing (if applicable).

The purpose of this work is to assess that the intent of our recommendations is being followed and to make timely changes to our recommendations (as needed) in the event site conditions vary from those encountered in our borings. Please contact our field department to initiate these services.

FINAL

We recommend that GCI review final site layout and grading plans and to evaluate the need for additional, final phase borings. Recommendations contained in this report may be changed based on review of final site plans and additional final phase borings. If any changes in the nature, design or locations of the construction are planned, conclusions and recommendations should not be considered valid unless verified in writing by GCI.

The recommendations contained in this report are the opinion of GCI based on the subsurface conditions found in the borings and preliminary development information. It should be noted that the nature and extent of variations between borings might not become evident until construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations of this report. This report has been prepared for design purposes only and should not be considered sufficient to prepare an accurate bid document.

If you have any questions or need for any additional information, please contact our office. It has been a pleasure to be of service to you on this project, and we hope to continue our services through construction.



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APPENDIX – Multi-Family Property Due Diligence – Columbus, Ohio

**General Notes for Soil Sampling and Classifications
Site Location Map and Boring Location Plan
Summary of Encountered Subsurface Conditions
Test Boring Logs (B-1 to B-8)**



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GENERAL NOTES FOR SOIL SAMPLING AND CLASSIFICATIONS

BORINGS, SAMPLING AND GROUNDWATER OBSERVATIONS:

Drilling and sampling were conducted in accordance with procedures generally recognized and accepted as standard methods of exploration of subsurface conditions. The borings were drilled using a truck-mounted drill rig using auger boring methods with standard penetration testing performed in each boring at intervals ranging from 1.5 to 5.0 feet. The stratification lines on the logs represent the approximate boundary between soil types at that specific location and the transition may be gradual.

Water levels were measured at drill locations under conditions stated on the logs. This data has been reviewed and interpretations made in the text of the report. Fluctuations in the level of the groundwater may occur due to other factors than those present at the time the measurements were made.

The Standard Penetration Test (ASTM-D-1586) is performed by driving a 2.0 inch O.D. split barrel sampler a distance of 18 inches utilizing a 140 pound hammer free falling 30 inches. The number of blows required to drive the sampler each 6 inches of penetration are recorded. The summation of the blows required to drive the sampler for the final 12 inches of penetration is termed the Standard Penetration Resistance (N). Soil density/consistency in terms of the N-value is as follows:

COHESIONLESS DENSITY		COHESIVE CONSISTENCY	
0-10	Loose	0-4	Soft
10-30	Medium Dense	4-8	Medium Stiff
30-50	Dense	8-15	Stiff
50 +	Very Dense	15-30	Very Stiff
		30 +	Hard

SOIL MOISTURE TERMS

Soil Samples obtained during the drilling process are visually characterized for moisture content as follows:

MOISTURE CONTENT	DESCRIPTION
Damp	Soil moisture is much drier than the Atterberg plastic limit (where soils are cohesive) and generally more than 3% below Standard Proctor "optimum" moisture conditions. Soils of this moisture generally require added moisture to achieve proper compaction.
Moist	Soil moisture is near the Atterberg plastic limit (cohesive soils) and generally within $\pm 3\%$ of the Standard Proctor "optimum" moisture content. Little to no moisture conditioning is anticipated to be required to achieve proper compaction and stable subgrades.
Very Moist	Soil moisture conditions are above the Atterberg plastic limit (cohesive soils) and generally greater than 3% above Standard Proctor "optimum" moisture conditions. Drying of the soils to near "optimum" conditions is anticipated to achieve proper compaction and stable subgrades.
Wet	Soils are saturated. Significant drying of soils is anticipated to achieve proper compaction and stable subgrades.

SOIL CLASSIFICATION PROCEDURE:

Soil samples obtained during the drilling process are preserved in plastic bags and visually classified in the laboratory. Select soil samples may be subjected to laboratory testing to determine natural moisture content, gradation, Atterberg limits and unit weight. Soil classifications on logs may be adjusted based on results of laboratory testing.

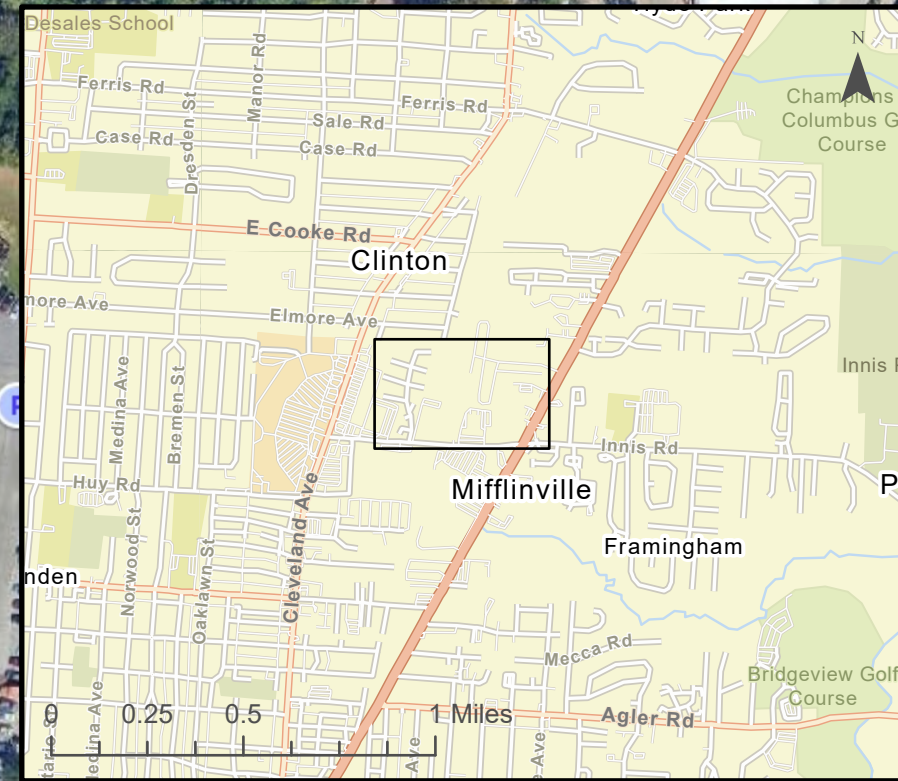
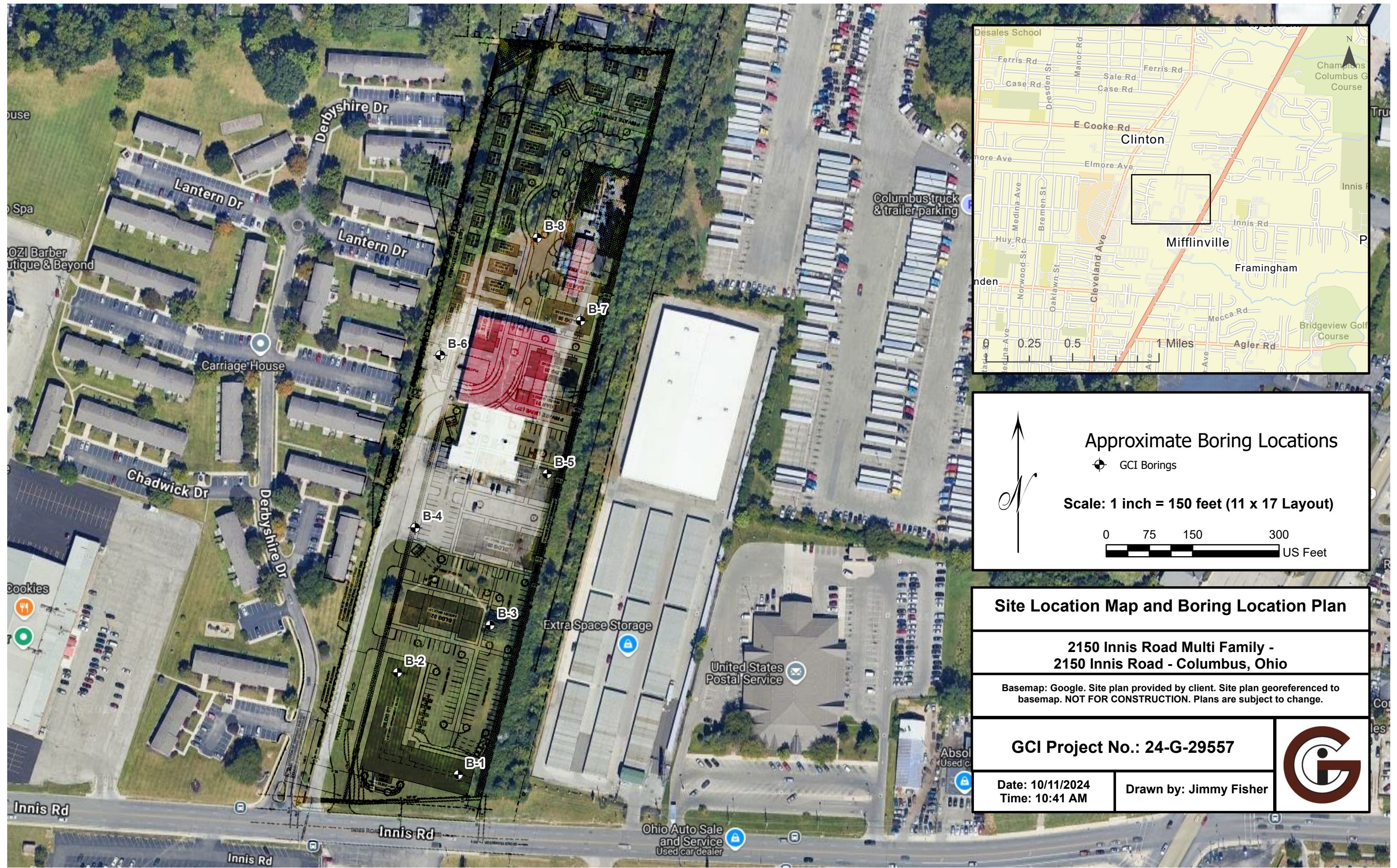
Soils are classified in accordance with the ASTM version of the Unified Soil Classification System. ASTM D-2487 "Classification of Soils for Engineering Purposes (Unified Soil Classification System) describes a system for classifying soils based on laboratory testing. ASTM D-2488 "Description and Identification of Soil (Visual-Manual Procedure) describes a system for classifying soils based on visual examination and manual tests.

Soil classifications are based on the following tables (see reverse side):

GENERAL NOTES FOR SOIL SAMPLING AND CLASSIFICATIONS

PARTICLE SIZE DEFINITION			CONSTITUENT MODIFIERS	
Boulders:		>12"	Trace	Less than 5%
Cobbles:		3" to 12"	Few	5-10%
Gravel:	Coarse:	3/4" to 3"	Little	15-25%
	Fine:	No. 4 (3/16") to 3/4"	Some	30-45%
Sand:	Coarse	No. 10 (2.0mm) to No. 4 (4.75mm)	Mostly	50-100%
	Medium	No. 40 (0.425mm) to No. 10 (2.0mm)		
	Fine	No. 200 (0.074mm) to No. 40 (0.425mm)		
Silt & Clay		<0.074mm; classification based on overall plasticity; in general clay particles <0.005mm.		

ASTM/UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART		
COARSE-GRAINED SOILS (more than 50% of materials is larger than No. 200 sieve size)		
GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size	<i>Clean Gravel (less than 5% fines)</i>	
	GW	Well-graded gravel, gravel-sand mixtures, little or no fines
	GP	Poorly-graded gravels, gravel sand mixtures, little or no fines
	<i>Gravels with fines (more than 12% fines)</i>	
	GM	Silty gravels, gravel-sand-silt mixtures
SANDS More than 50% of coarse fraction smaller than No. 4 sieve size	GC	Clayey gravels, gravel-sand-clay mixtures
	<i>Clean Sands (Less than 5% fines)</i>	
	SW	Well-graded sands, gravelly sands, little or no fines
	SP	Poorly-graded sands, gravelly sands, little or no fines
	<i>Sands with fines (More than 12% fines)</i>	
	SM	Silty sands, sand-silt mixtures
	SC	Clayey sands, sand-clay mixtures
Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows: Less than 5 percentGW, GP, SW, SP Greater than 12 percentGM, GC, SM, SC 5 to 12 percentBorderline cases requiring dual symbols: SP-SM, GP-GM, etc.		
FINE-GRAINED SOILS (50% or more of material is smaller than No. 200 sieve size)		
SILTS AND CLAYS Liquid Limit less than 50%	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
	CL	Inorganic clays or low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
	CL-ML	Inorganic silty clay of slight plasticity, P.I. between 4 and 7
	OL	Organic silts and organic silty clays of low plasticity
SILTS AND CLAYS Liquid Limit 50% or greater	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
	CH	Inorganic clays of high plasticity, fat clays
	OH	Organic clays or medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS	PT	Peat and other highly organic soils



Approximate Boring Locations

● GCI Borings

Scale: 1 inch = 150 feet (11 x 17 Layout)

0 75 150 300 US Feet

Site Location Map and Boring Location Plan	
2150 Innis Road Multi Family - 2150 Innis Road - Columbus, Ohio	
Basemap: Google. Site plan provided by client. Site plan georeferenced to basemap. NOT FOR CONSTRUCTION. Plans are subject to change.	
GCI Project No.: 24-G-29557	
Date: 10/11/2024 Time: 10:41 AM	Drawn by: Jimmy Fisher



Summary of Encountered Subsurface Conditions

Multi-Family Development
2150 Innis Road - Columbus, OH
GCI Job Number: 24-G-29557

Borehole	Surface Layer	Topsoil Thickness (ft.)	Pavement Thickness (inches)		Bottom of Fill Cover (feet)	Groundwater: Level Encountered (ft)	Groundwater: Level at Completion (ft)	Depth to Mottled Lean Clay (ft)	Depth to Brown Till (ft)	Depth to Gray Till (ft)	Bottom of Boring Depth (ft)
			Asphalt	Stone		Depth	Depth				
B- 1	Topsoil	0.8	--	--	--	--	--	0.8	3.0	11.0	20.0
B- 2	Topsoil	0.6	--	--	--	--	--	0.6	3.0	11.0	20.0
B- 3	Topsoil	0.6	--	--	--	--	--	0.6	3.0	11.0	20.0
B- 4	Asphalt	--	3	4	4.0	--	--	--	4.0	8.0	20.0
B- 5	Asphalt	--	2	4	--	--	--	0.5	3.0	9.0	20.0
B- 6	Stone	--	--	6	--	--	--	0.5	3.0	8.0	20.0
B- 7	Topsoil	0.3	--	--	4.0	--	--	--	4.0	7.0	** 17.0
B- 8	Fill	--	--	--	4.0	7	14	--	4.0	11.0	20.0

** - Auger Refusal on Apparent Boulder



PROJECT NAME Multi-Family Development - 2150 Innis Road - Columbus, OH BORING NO. B- 1
 CLIENT Nationwide Children's Hospital PROJ. NO. 24-G-29557 SURF. ELEV. _____
 DATE DRILLED 10/25/2024

*** The stratification lines represent the approximate boundary between soil types and the transition may be gradual.**



TEST BORING LOG

PROJECT NAME **Multi-Family Development - 2150 Innis Road - Columbus, OH** BORING NO. **B- 2**
 CLIENT **Nationwide Children's Hospital** PROJ. NO. **24-G-29557** SURF. ELEV. **10/25/2024**

GROUND WATER OBSERVATION							Proportions Used		140 lb Wt. x 30" fall on 2" O.D. Sampler			
None FEET BELOW SURFACE AT COMPLETION							Trace	Less than 5%	Cohesionless Density		Cohesive Consistency	
_____ FEET BELOW SURFACE AT 24 HOURS							Few	5 to 10%	0 - 10	Loose	0 - 4	Soft
_____ FEET BELOW SURFACE AT _____ HOURS							Little	15 to 25%	10 - 30	Medium Dense	4 - 8	Medium Stiff
							Some	30 to 45%	30 - 50	Dense	8 - 15	Stiff
							Mostly	50 to 100%	50 +	Very Dense	15 - 30	Very Stiff
											30 +	Hard
LOCATION OF BORING See Boring Location Plan												
DEPTH	Pocket Penetrometer (tsf)	Sample Depths From To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Depth*	SOIL IDENTIFICATION Remarks include color, type of soil, etc. Rock-color, type, condition, hardness			
				0-6	6-12	12-18						
5	4.5	0.0-1.5	SS	3	5	4	Moist	0.6	Topsoil			
									Brown Mottled Gray Lean Clay (CL) - stained, moderately plastic, trace sand			
	4.5	2.0-3.5	SS	4	4	4	Moist	3.0	Brown Lean Clay with Sand (CL) - moderately plastic, little fine to coarse sand, trace gravel (glacial till); random silty sand and gravel layers noted			
	4.5	4.0-5.5	SS	3	3	3	Moist					
10	4.5	8.5-10.0	SS	4	4	5	Moist	11.0	Gray Sandy Lean Clay with Gravel (CL) - low plasticity, little to some fine to coarse sand, little gravel (glacial till); random silty sand and gravel layers noted			
15	4.5	13.5-15.0	SS	5	7	9	Moist					
	4.5	18.5-20.0	SS	5	6	6	Moist	20.0	BOTTOM OF BORING: 20'			

* The stratification lines represent the approximate boundary between soil types and the transition may be gradual.



PROJECT NAME Multi-Family Development - 2150 Innis Road - Columbus, OH BORING NO. B- 3
 CLIENT Nationwide Children's Hospital PROJ. NO. 24-G-29557 SURF. ELEV. _____
 DATE DRILLED 10/25/2024

*** The stratification lines represent the approximate boundary between soil types and the transition may be gradual.**



TEST BORING LOG

PROJECT NAME **Multi-Family Development - 2150 Innis Road - Columbus, OH** BORING NO. **B- 4**
 CLIENT **Nationwide Children's Hospital** PROJ. NO. **24-G-29557** SURF. ELEV. **10/25/2024**

GROUND WATER OBSERVATION							Proportions Used		140 lb Wt. x 30" fall on 2" O.D. Sampler			
<u>None</u> FEET BELOW SURFACE AT COMPLETION							Trace	Less than 5%	Cohesionless Density		Cohesive Consistency	
_____ FEET BELOW SURFACE AT 24 HOURS							Few	5 to 10%	0 - 10	Loose	0 - 4	Soft
_____ FEET BELOW SURFACE AT _____ HOURS							Little	15 to 25%	10 - 30	Medium Dense	4 - 8	Medium Stiff
							Some	30 to 45%	30 - 50	Dense	8 - 15	Stiff
							Mostly	50 to 100%	50 +	Very Dense	15 - 30	Very Stiff
											30 +	Hard
LOCATION OF BORING							See Boring Location Plan					
DEPTH	Pocket Penetrometer (tsf)	Sample Depths From To	Type of Sample	Blows per 6" on Sampler From To			Moisture Density or Consist.	Strata Change Depth*	SOIL IDENTIFICATION			
				0-6	6-12	12-18			Remarks include color, type of soil, etc. Rock-color, type, condition, hardness			
5							Moist	0.3		3" Asphalt overlying 4" Aggregate Base		
	4.5	1.0-3.0	SS	4	4	5		0.6		Possible Fill consisting of a mixture of lean clay, silt, sand, and gravel; trace topsoil		
				6			Moist					
	4	3.0-5.0	SS	7	8	8		4.0		Brown Lean Clay with Sand (CL) - moderately plastic, little fine to coarse sand, trace gravel (glacial till); random silty sand and gravel layers noted		
				6			Moist					
								8.0		Gray Sandy Lean Clay with Gravel (CL) - low plasticity, little to some fine to coarse sand, little gravel (glacial till); random silty sand and gravel layers noted		
	4	8.5-10.0	SS	3	4	4	Moist					
							Moist					
	4.5	13.5-15.0	SS	3	3	4						
15							Moist					
							Moist					
							Moist					
							Moist					
	4.5	18.5-20.0	SS	4	5	7						
							Moist					
							20.0		BOTTOM OF BORING: 20'			

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TEST BORING LOG

PROJECT NAME **Multi-Family Development - 2150 Innis Road - Columbus, OH** BORING NO. **B- 5**
 CLIENT **Nationwide Children's Hospital** PROJ. NO. **24-G-29557** SURF. ELEV. **10/25/2024**

GROUND WATER OBSERVATION							Proportions Used		140 lb Wt. x 30" fall on 2" O.D. Sampler			
None FEET BELOW SURFACE AT COMPLETION							Trace	Less than 5%	Cohesionless Density		Cohesive Consistency	
_____ FEET BELOW SURFACE AT 24 HOURS							Few	5 to 10%	0 - 10	Loose	0 - 4	Soft
_____ FEET BELOW SURFACE AT _____ HOURS							Little	15 to 25%	10 - 30	Medium Dense	4 - 8	Medium Stiff
							Some	30 to 45%	30 - 50	Dense	8 - 15	Stiff
							Mostly	50 to 100%	50 +	Very Dense	15 - 30	Very Stiff
											30 +	Hard
LOCATION OF BORING							See Boring Location Plan					
DEPTH	Pocket Penetrometer (tsf)	Sample Depths From To	Type of Sample	Blows per 6" on Sampler From To			Moisture Density or Consist.	Strata Change Depth*	SOIL IDENTIFICATION			
				0-6	6-12	12-18			Remarks include color, type of soil, etc. Rock-color, type, condition, hardness			
								0.2	2" Asphalt overlying 4" Aggregate Base			
	--	1.0-3.0	SS	6	6	7	Moist	0.5	Brown Mottled Gray Lean Clay (CL) - stained, moderately plastic, trace sand			
				7								
								3.0	Brown Lean Clay with Sand (CL) - moderately plastic, little fine to coarse sand, trace gravel (glacial till); random silty sand and gravel layers noted			
5	4.5	3.0-5.0	SS	4	5	3	Moist					
				5								
	4	8.5-10.0	SS	8	8	9	Moist	9.0	Gray Sandy Lean Clay with Gravel (CL) - low plasticity, little to some fine to coarse sand, little gravel (glacial till); random silty sand and gravel layers noted			
10												
	4.5	13.5-15.0	SS	7	11	12	Moist					
15												
	4.5	18.5-20.0	SS	6	7	7	Moist					
								20.0	BOTTOM OF BORING: 20'			

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TEST BORING LOG

PROJECT NAME **Multi-Family Development - 2150 Innis Road - Columbus, OH** BORING NO. **B- 6**
 CLIENT **Nationwide Children's Hospital** PROJ. NO. **24-G-29557** SURF. ELEV. **10/25/2024**

GROUND WATER OBSERVATION							Proportions Used		140 lb Wt. x 30" fall on 2" O.D. Sampler			
None FEET BELOW SURFACE AT COMPLETION							Trace	Less than 5%	Cohesionless Density		Cohesive Consistency	
_____ FEET BELOW SURFACE AT 24 HOURS							Few	5 to 10%	0 - 10	Loose	0 - 4	Soft
_____ FEET BELOW SURFACE AT _____ HOURS							Little	15 to 25%	10 - 30	Medium Dense	4 - 8	Medium Stiff
							Some	30 to 45%	30 - 50	Dense	8 - 15	Stiff
							Mostly	50 to 100%	50 +	Very Dense	15 - 30	Very Stiff
											30 +	Hard
LOCATION OF BORING See Boring Location Plan												
DEPTH	Pocket Penetrometer (tsf)	Sample Depths From To	Type of Sample	Blows per 6" on Sampler From To			Moisture Density or Consist.	Strata Change Depth*	SOIL IDENTIFICATION			
				0-6	6-12	12-18			Remarks include color, type of soil, etc. Rock-color, type, condition, hardness			
								0.5	6" Stone Cover			
	4.5	1.0-3.0	SS	3	4	4	Moist		Brown Mottled Gray Lean Clay (CL) - stained, moderately plastic, trace sand			
				4								
								3.0	Brown Lean Clay with Sand (CL) - moderately plastic, little fine to coarse sand, trace gravel (glacial till); random silty sand and gravel layers noted			
	4.5	3.0-5.0	SS	4	5	5	Moist					
				4								
5												
								8.0	Gray Sandy Lean Clay with Gravel (CL) - low plasticity, little to some fine to coarse sand, little gravel (glacial till); random silty sand and gravel layers noted			
	4	8.5-10.0	SS	5	5	6	Moist					
10												
	4	13.5-15.0	SS	8	5	6	Moist					
15												
	4.5	18.5-20.0	SS	5	5	5	Moist					
								20.0	BOTTOM OF BORING: 20'			

* The stratification lines represent the approximate boundary between soil types and the transition may be gradual.



TEST BORING LOG

PROJECT NAME **Multi-Family Development - 2150 Innis Road - Columbus, OH**

BORING NO. B- 7

CLIENT Nationwide Children's Hospital

PROJ.

SURF. ELEV. _____

NO. 24-G-29557

DATE DRILLED 10/25/2024[illegible]

*** The stratification lines represent the approximate boundary between soil types and the transition may be gradual.**



TEST BORING LOG

PROJECT NAME **Multi-Family Development - 2150 Innis Road - Columbus, OH** BORING NO. **B- 8**
 CLIENT **Nationwide Children's Hospital** PROJ. NO. **24-G-29557** SURF. ELEV. **10/25/2024**

GROUND WATER OBSERVATION							Proportions Used		140 lb Wt. x 30" fall on 2" O.D. Sampler			
<u>14.0</u> FEET BELOW SURFACE AT COMPLETION							Trace	Less than 5%	Cohesionless Density		Cohesive Consistency	
_____ FEET BELOW SURFACE AT 24 HOURS							Few	5 to 10%	0 - 10	Loose	0 - 4	Soft
_____ FEET BELOW SURFACE AT _____ HOURS							Little	15 to 25%	10 - 30	Medium Dense	4 - 8	Medium Stiff
							Some	30 to 45%	30 - 50	Dense	8 - 15	Stiff
							Mostly	50 to 100%	50 +	Very Dense	15 - 30	Very Stiff
											30 +	Hard
LOCATION OF BORING							See Boring Location Plan					
DEPTH	Pocket Penetrometer (tsf)	Sample Depths From To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Depth*	SOIL IDENTIFICATION			
				0-6	6-12	12-18			Remarks include color, type of soil, etc. Rock-color, type, condition, hardness			
5	4	0.0-1.5	SS	7	10	13	Moist	4.0		Possible Fill consisting of a mixture of lean clay, silt, sand, and gravel; trace topsoil		
	4	2.0-3.5	SS	4	5	4	Moist					
	4.5	4.0-5.5	SS	4	4	4	Moist	11.0		Brown Lean Clay with Sand (CL) - moderately plastic, little fine to coarse sand, trace gravel (glacial till); random silty sand and gravel layers noted		
10												
15												
20												
			</									

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