GEOTECHNICAL CONSULTANTS INC.

GCI PROJECT No. 21-G-26128

Subsurface Exploration and Geotechnical Engineering Report

Multi-Family Site

Coshocton Road & Upper Gilchrist Road
Mount Vernon, Ohio

Prepared for:
Rockford Homes

January 24, 2022

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January 24, 2022

Mr. Justin Lowe
Land Development Manager
Rockford Homes
999 Polaris Parkway
Columbus, Ohio 43240

Reference: Subsurface Exploration and Geotechnical Engineering Report
Multi-Family Site
Coshocton Road and Upper Gilchrist Road, Mount Vernon, Ohio
GCI Project No. 21-G-26128

Dear Mr. Lowe:

As authorized, Geotechnical Consultants, Inc. (GCI) performed a subsurface exploration and prepared a geotechnical engineering report for the above referenced project. In summary, the borings encountered a surface cover of topsoil overlying natural clay soils, including glacial till. Sandstone and shale bedrock were encountered in seven of our eight borings at depths of 2.6 to 6 feet. Groundwater seepage was not encountered in our borings.

The primary geotechnical issues with regards to site development will be surface stripping, subgrade stabilization, and foundation subgrade preparation. It is anticipated that deep excavations for utility trenches or ponds will encounter intact bedrock, which may present challenges. Provided these considerations are properly addressed, it is GCI's opinion that this site is suitable for support of the proposed development using conventional shallow foundations and slabs-on-grade for the new buildings and flexible pavements for parking and driveway areas.

After you have reviewed the report, feel free to contact us with any questions you may have. We appreciate the opportunity to provide our services for this project and hope to continue providing our services through construction.

Respectfully submitted,
Geotechnical Consultants, Inc.

Jeffrey M. Holko, P.E.
Senior Project Manger

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INTRODUCTION

As requested and authorized by Mr. Justin Lowe on behalf of Rockford Homes, Geotechnical Consultants, Inc. (GCI) performed a subsurface exploration and prepared this geotechnical engineering report for the proposed multi-family residential development in Mount Vernon, Ohio. We were provided with a site plan prepared by Faris Planning & Design, dated November 16, 2021, showing the layout of proposed buildings, pavement areas, a retention basin, and green spaces.

Our subsurface study consisted of eight (8) standard penetration test borings drilled in proposed development areas. GCI field-located the borings using the referenced plan and existing site landmarks; locations should be considered approximate. Ground elevations at the boring locations were not determined within our scope of services. We have attached two boring location plans and test boring logs in the Appendix.

The intent of this study was to evaluate subsurface conditions and offer geotechnical recommendations relative to site preparation, foundations, floor slabs, and pavements for the proposed development. This report is issued prior to 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 Rockford Homes and their consultants for specific application to the proposed development in Mount Vernon, Ohio, in accordance with generally accepted soil and foundation engineering practices. No warranty, expressed or implied, is made.

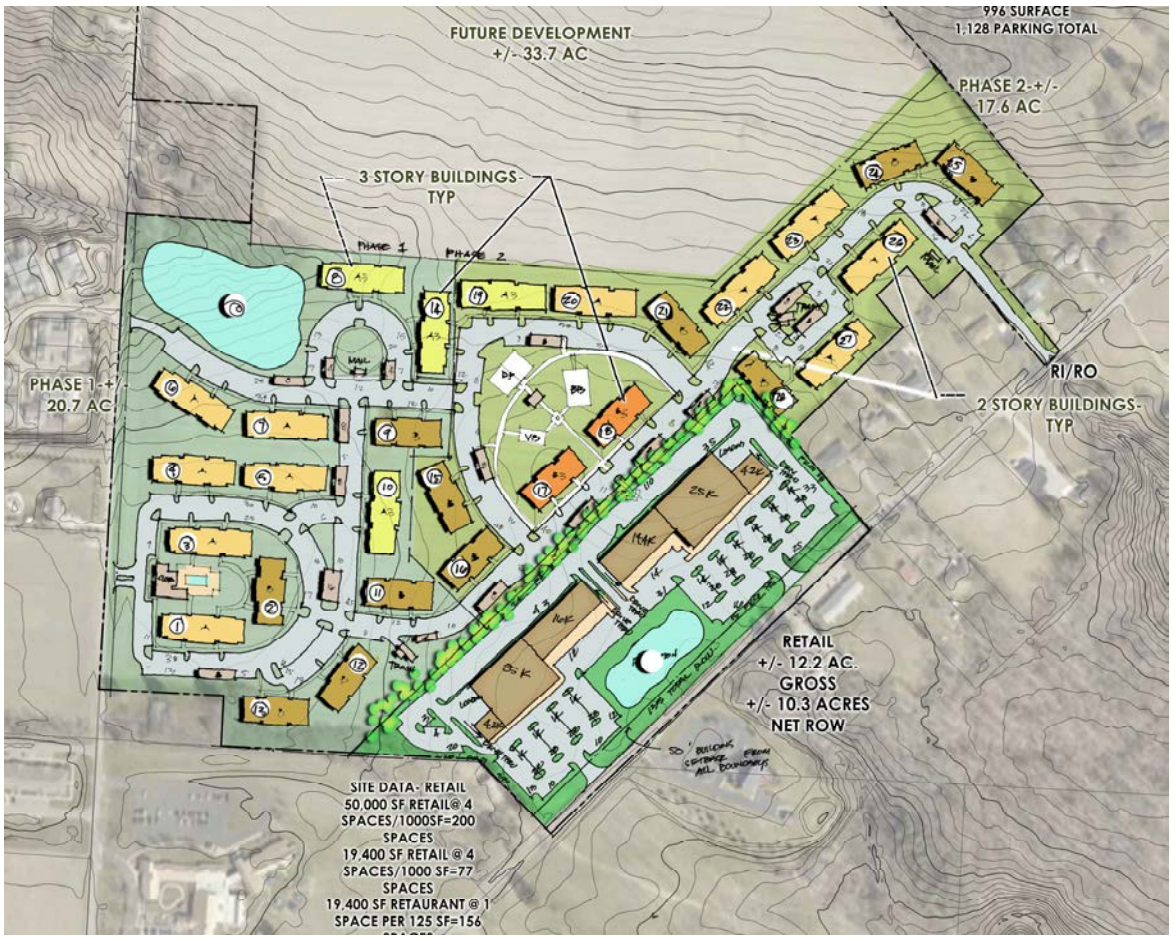
SITE AND PROJECT DESCRIPTIONS

The project site is a ± 38.3-acre undeveloped parcel located between Coshocton Road (U.S. Route 36) and Upper Gilchrist Road on the far eastern end of Mount Vernon, Ohio. The site is currently an agricultural field. There are multiple residential lots due east of the site (along Coshocton Road). The northern end of the site abuts existing farmland, Upper Gilchrist Road forms the western boundary of the site, and the southern / southeastern end of the site is bordered by a tree line and agricultural land. The site is flat with elevations in the range of ± 1200 – 1180 feet per publicly available topographic information. The site slopes down gently from the northeast corner to the southwest. A general site location map is included in the Appendix. An aerial photo of the site is shown below.

Aerial Photo (Obtained from Google Earth, dated March 2019)

We understand the project will consist of a multi-family residential development. The residential structures are displayed on the site plan as two- and three-stories in height. We presume the structures will contain slabs-on-grade and either wood or light gage framing. We have assumed the structures will not contain below grade levels. The site

plan shows Phase 1 on the western portion of the overall site and containing fourteen (14) residential buildings, a clubhouse with pool, garages, a retention basin, pavement areas, and green spaces. Phase 2 is on the eastern portion of the overall site and contains fourteen (14) residential buildings, pavement areas, and green spaces. The site plan also shows a retail section of the site, located southeast of Phases 1 and 2, along Coshocton Road; our borings were not drilled in the proposed retail area. See the proposed site plan below.



Site plan prepared by Faris Planning & Design, dated 11/16/21

SUBSURFACE CONDITIONS

GCI mobilized a track-mounted rotary drill rig (CME 45C with automatic sampling hammer) to the site on January 20, 2022. We drilled eight (8) standard penetration test borings within proposed development areas to a depth range of 12.5' – 20'. Boring logs, two (2) boring location plans, and a summary table of the encountered subsurface conditions are attached in the Appendix. We summarize the subsurface findings in the following sections. Refer to the individual boring logs and summary table for more detailed subsurface information at specific boring locations.

Surface Cover

A layer of topsoil, with thicknesses ranging from 0.3' – 0.5', was encountered at the surface of our borings.

Natural Soils

Below the topsoil, we encountered natural soil visually classified as moderate plasticity brown lean clay and lean clay with sand (classified as CL under the Unified Soil Classification System). Standard penetration testing N-values indicated material of a stiff to very stiff cohesive consistency. This upper clay layer extended to a depth range of 1.5' – 6' below existing grade.

The upper clay layer transitioned to a layer of moderate plasticity sandy lean clay (CL) in borings B-2 to B-7. Sandstone fragments were noted in this sandy lean clay layer. N-values indicated material of a stiff to hard cohesive consistency. This layer extended to a depth range of 2.5' – 6.5' below existing grades.

A deposit of brown glacial till, which transitioned to gray glacial till, was encountered at a depth of 6.5’ in boring B-4. Boring B-4 terminated at a depth of 20’ in the gray till. The glacial till was visually classified as a low plasticity sandy lean clay (CL). N-values indicated material of a stiff to very stiff cohesive consistency.

Between the depths of 1.5’ and 5.5’, boring B-1 encountered a residual soil visually classified as brown clayey sand (SC). Weathered and intact fragments of the parent sandstone were found in this layer. N-values indicated material of a medium dense cohesionless density.

Bedrock

Borings B-1 to B-3 and B-5 to B-7 encountered sandstone bedrock at a depth range of 2.5’ – 6’ below existing grades. In general, the sandstone samples obtained from our split-spoon sampler contained fine sand with intact fragments. The sandstone was highly weathered in its upper regions, becoming less weathered with depth. Standard penetration testing in the lower regions of the sandstone encountered hard driving (penetrations of less than 6 inches over 50 hammer blows), indicating a moderately weathered and intact material. Borings B-1 to B-3 and B-5 to B-7 terminated in the sandstone at a depth range of 13’ – 18.5’, typically with auger refusal.

Shale bedrock was encountered at a depth of 6’ in boring B-8. The shale was completely weathered and similar to a lean clay in the 8.5’ – 10’ depth sample. Our drillers noted difficult drilling at a depth of about 12.5’, which continued to the boring termination at a depth of 15.5’. Standard penetration testing at the 13.5’ depth contained a penetration of 0.5” over 50 hammer blows, indicating a moderately weathered and intact material, and the boring was terminated with auger refusal at 15.5’.

Groundwater

Groundwater seepage was not encountered during drilling. The upper level split-spoon samples (0' – 1.5' depth and 2' – 3.5' depth) were observed to be moist and very moist. The glacial till was noted as moist. The bedrock samples were noted as damp. 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 proposed construction with proper site preparation. The following paragraphs discuss the impact of the subsurface conditions on site development and structure foundations.

Site Preparation

Topsoil, rootmat, and other unsuitable materials (including clay tiles from prior agricultural use) should be removed in their entirety from proposed construction areas, plus 5 feet laterally. After initial stripping operations, we anticipate that the exposed surface will consist of natural clayey soils. The earthwork contractor should proof-roll the exposed subgrade 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.

Subgrade Stabilization

The stabilization of soft 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 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 GCI prior to use in the field. Fewer problems with soft subgrades are expected if work is performed during traditionally drier times of the year (i.e., 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. Careful routing of construction traffic is advised to help minimize instabilities of near surface soils during wet seasons.

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 can be used as structural fill, provided proper moisture control is maintained. GCI does not recommend using excavated bedrock for backfill. 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.

Shale Considerations

Boring B-8 encountered shale bedrock at a depth of 6' below existing grade. Shale can have post-construction implications for the project because of its expansive properties. We are not aware of future site grades and what impact shale may have on the development. The expansive properties of shale could damage slabs, pavements, or swimming pools. If the project team anticipates that shale will be encountered during construction based on site grades and our borings, we recommend that GCI be contacted to provide additional recommendations. Deeper utility trenches may encounter shale; as such, we have provided shale-specific recommendations in the *Excavations* 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 bedrock, or new, controlled fill placed directly over stable, natural non-organic soils or bedrock. 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") 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, particularly where bearing conditions transition from weathered bedrock to soil.

Typical to local practice, if soft or unstable materials are encountered at footing design subgrade, undercut to stable materials. 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.

FLOOR SLABS

Conventional concrete slabs-on-grade are feasible for the proposed structures. GCI recommends placing a minimum of 4 inches of granular fill (such as ODOT Item 304 or AASHTO No. 57 stone) under lightly loaded floor slabs to serve as a capillary cut-off and to provide a uniform, firm sub-base. The under-slab gravel thickness should be increased to at least 6 inches below more heavily-loaded slabs. Place a vapor retarder below the slab in areas where moisture could cause problems with floor finishes.

SWIMMING POOL

Walls restrained at both top and bottom (elevator pit walls and swimming pool walls) should be designed to resist an at-rest lateral soil pressure. The design loading depends on the type of backfill material used. The following table provides recommended equivalent at-rest fluid pressures for two types of soils.

Soil Type	Equivalent At-Rest Fluid Pressure (pcf)
Lean Clay (site soils)	75
Sand and Gravel (properly compacted)	55

**These values assume a backfill compacted with some effort and containing a unit weight on the order of 125 – 130 pcf; surcharge loads are not included in the values.*

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 wall backfill. The stone should be placed in a wedge, defined by a line extending up from the bottom of the pool or footing at a 35° angle from the vertical, to allow use of the 55 pcf value.

We recommend footing drains and below slab drains leading to a sump to prevent build-up of hydrostatic pressures. GCI recommends placing check valves in the pool base to help relieve hydrostatic pressures that may develop outside the pool. Maintenance periods when the pool water level is lowered significantly are of particular concern. Pool design should also consider lateral loads from surcharge conditions.

SEISMIC FACTOR

Our borings encountered mostly clayey soils with stiff to very stiff cohesive consistencies overlying sandstone and shale bedrock. In accordance with the Ohio Building Code – Site class definitions, we estimate the site as a Site Class C – very dense soil and soft rock profile.

EXCAVATIONS

The natural site soils can be excavated with conventional track hoe equipment. Deep utility excavations may require layback or trench box use to prevent sidewall collapse. Excavations should comply with current OSHA regulations.

We anticipate deeper utility excavations encountering sandstone and shale bedrock. The upper, highly weathered regions of the bedrock should be capable of being excavated (with some difficulty) with conventional track-hoe equipment. The deeper, less weathered rock could present excavation challenges; the contractor should be aware that special equipment, such as rock tooth buckets or pneumatic equipment may be required.

We recommend that utility excavations that extend into shale bedrock be coated with asphalt-based waterproofing material to prevent saturation and potential swelling of the shale.

GROUNDWATER

Groundwater seepage was not encountered during drilling. As such, we are of the opinion that groundwater should not have a significant impact on foundation and shallow utility trench excavations. If water is encountered in site excavations, the excavations should be dewatered to allow footing construction and utility trench backfilling in “dry” conditions. We expect groundwater seepage flows in shallow excavations can be handled with portable sump pumps. Contact GCI for additional recommendations if excessive groundwater conditions are encountered.

RETENTION BASIN

A retention basin is shown on the northwest corner of the site. Boring B-1 was drilled within the proposed bounds of the basin. Boring B-1 encountered lean clay to a depth of 1.5'. Below 1.5', a residual clayey sand was noted to a depth of 5.5', which transitioned to sandstone bedrock. If a static water level is required (i.e., "wet" pond), a minimum 24 inch thick compacted, clay-based fill should be placed as a liner. The natural upper lean clay (CL) layer can be reused as a liner. We would not recommend using the sandy lean clay material as a liner due to it containing a substantial amount of sandy material that could hinder water retention.

The basin liner should be properly placed and compacted to a minimum of 98% Standard Proctor dry density, as described in the *Site Preparation and Earthwork* section of this report. If groundwater is encountered during construction, the area will need to be properly dewatered to allow for clay liner construction in "dry" conditions. Dewatering should continue until the pond is filled.

Note that sandstone excavation could be difficult as the material becomes less weathered with depth; the contractor should plan accordingly.

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 provide recommendations for minimum pavement sections below, but 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.

Properly compacted and/or stabilized, we feel that the site soils would have a CBR value of at least 3 (no actual testing has been performed for this subsurface exploration; this is based on our observation of the on-site soils and experience with similar project sites). We assume that traffic will consist of primarily automobiles and occasional school buses and large trucks. Based on our experience with similar projects and soils, and assuming properly prepared subgrades, we recommend a minimum light-duty pavement section consisting of 3 inches of asphalt over 8 inches of aggregate base. We suggest a heavy-duty pavement section consisting of a minimum of 4 inches of asphalt over 10 inches of aggregate base for heavily-trafficked areas. We recommend a minimum of 8 inches of air-entrained, Portland cement concrete for dumpster pad(s).

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. Installing a medium-duty geogrid (Tensar TX 140, or equivalent) below the base stone will increase the structural number of the pavement section and improve the pavement performance.

SITE PREPARATION AND EARTHWORK

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

1. Topsoil, rootmat, and other unsuitable materials should be stripped from the proposed development areas, plus a minimum of 5 feet beyond.

2. Thoroughly and carefully proof-roll the exposed 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.

3. Place controlled fills to design grade within proposed building and pavement areas, as required. Non-organic site soils are suitable for use in new controlled fills. **Off-site borrow materials should be reviewed by our office prior to use.**

4. 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 ±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.

5. Construct foundations and start building construction after the building pads are completed. Refer to the *Foundations* section of this report for specific foundation design parameters.

6. It is recommended that GCI be retained to observe proof-rolling operations, cut and fill operations, and footing excavations.

7. 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.

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.),
- concrete placement and compressive strength testing (footings, slabs, etc.), and
- pavement subbase and asphalt testing.

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.

Recommendations contained in this report may be changed based on review of final site plans. 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 available 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.

GEOTECHNICAL CONSULTANTS INC.

APPENDIX – Multi-Family Site – Mount Vernon, Ohio

General Notes for Soil Sampling and Classifications
General Site Location Map (DeLorme Street Atlas USA – 2014)
Boring Location Plans (2)
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 ±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.

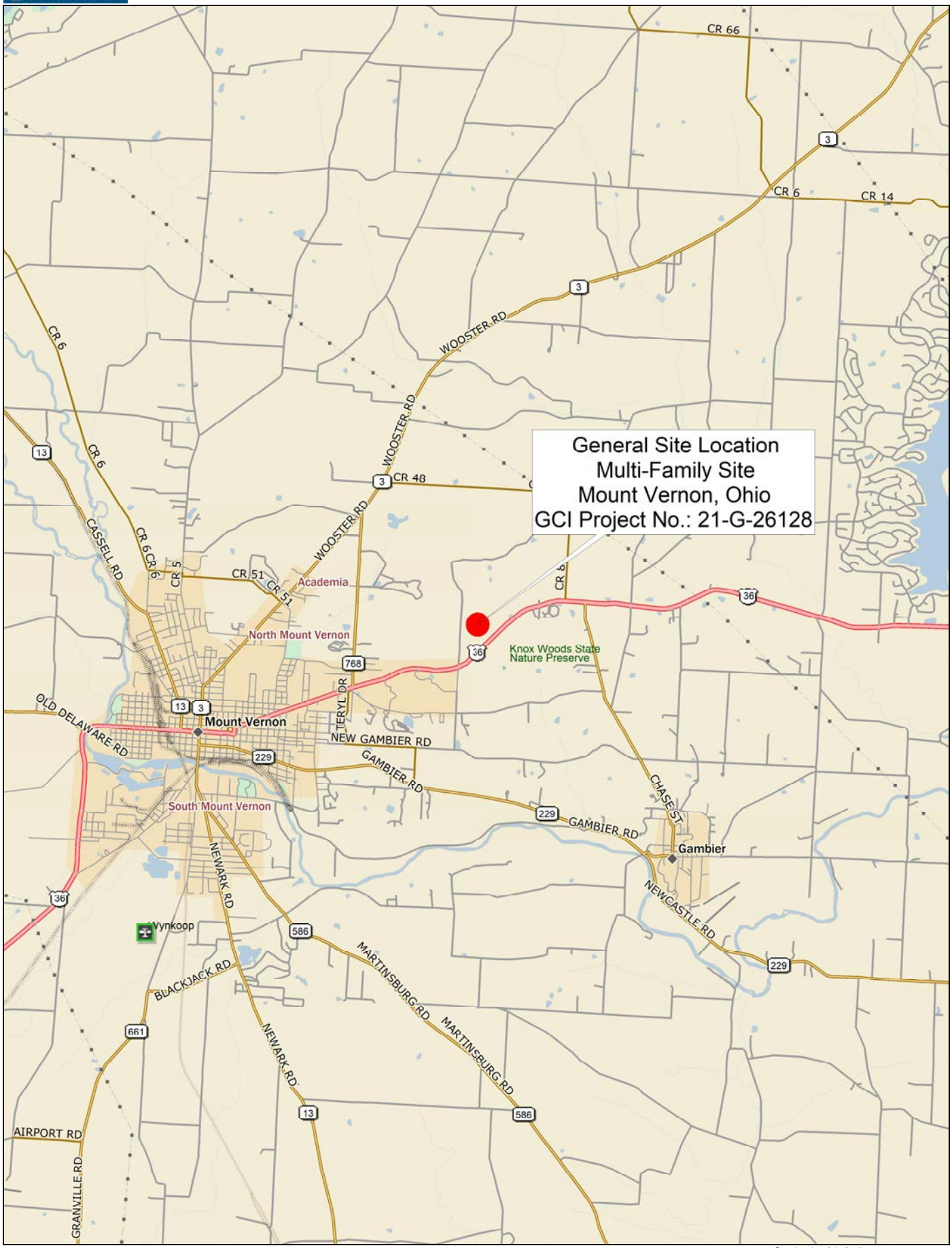
Soil classifications are based on the following tables (see reverse side):

GENERAL NOTES FOR SOIL SAMPLING AND CLASSIFICATIONS

PARTICLE SIZE DEFINITION		
Boulders:		>12"
Cobbles:		3" to 12"
Gravel:	Coarse:	3/4" to 3"
	Fine:	No. 4 (3/16") to 3/4"
Sand:	Coarse	No. 10 (2.0mm) to No. 4 (4.75mm)
	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.

CONSTITUENT MODIFIERS	
Trace	Less than 5%
Few	5-10%
Little	15-25%
Some	30-45%
Mostly	50-100%

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	*Clean Gravel (less than 5% fines)*	
	GW	Well-graded gravel, gravel-sand mixtures, little or no fines
	GP	Poorly-graded gravels, gravel sand mixtures, little or no fines
	Gravels with fines (more than 12% fines)	
	GM	Silty gravels, gravel-sand-silt mixtures
	GC	Clayey gravels, gravel-sand-clay mixtures
SANDS More than 50% of coarse fraction smaller than No. 4 sieve size	*Clean Sands (Less than 5% fines)*	
	SW	Well-graded sands, gravelly sands, little or no fines
	SP	Poorly-graded sands, gravelly sands, little or no fines
	Sands with fines (More than 12% fines)	
	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 percent ……GW, GP, SW, SP Greater than 12 percent ……GM, GC, SM, SC 5 to 12 percent ……Borderline 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



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MN (7.9°W)

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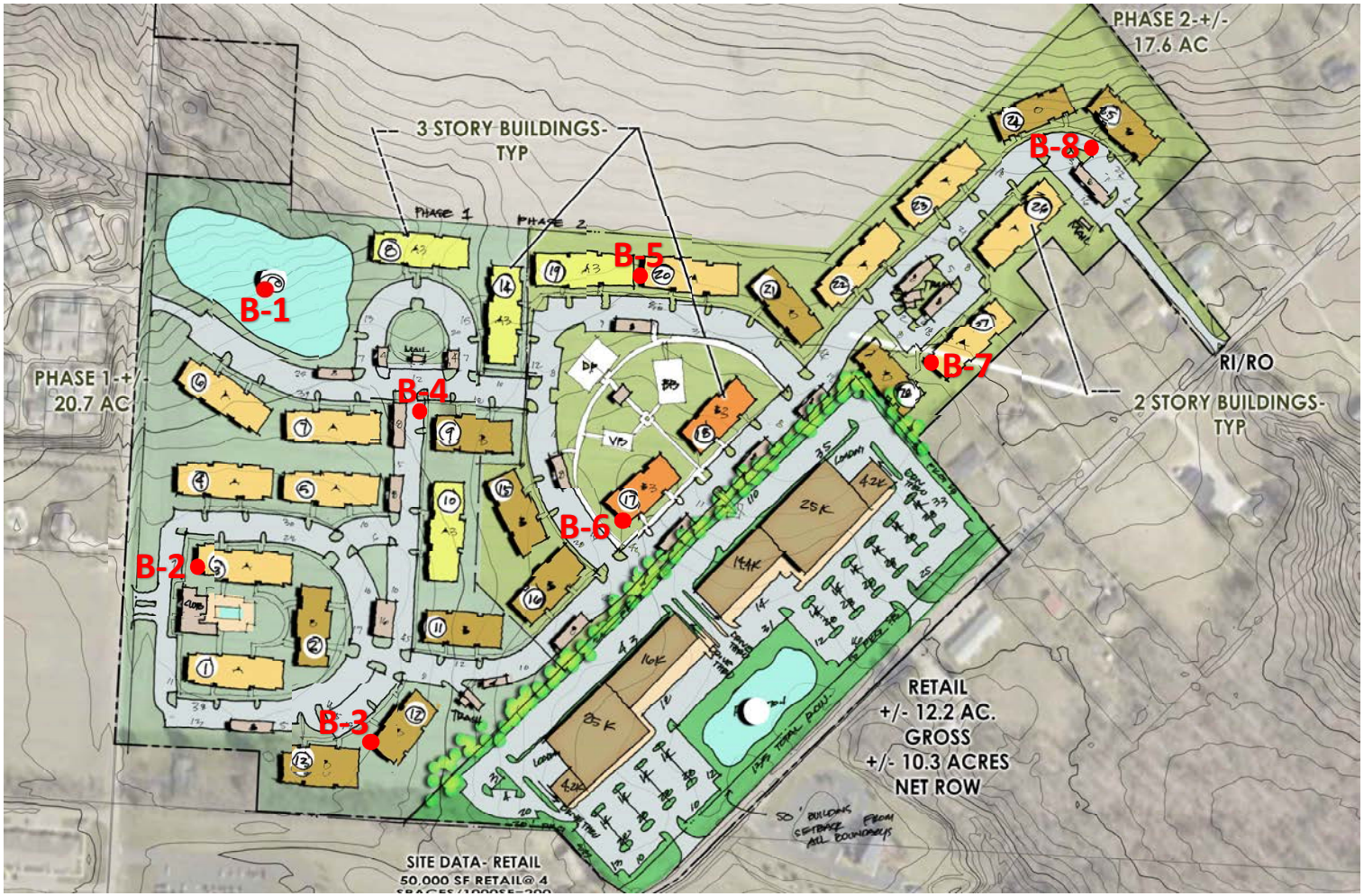
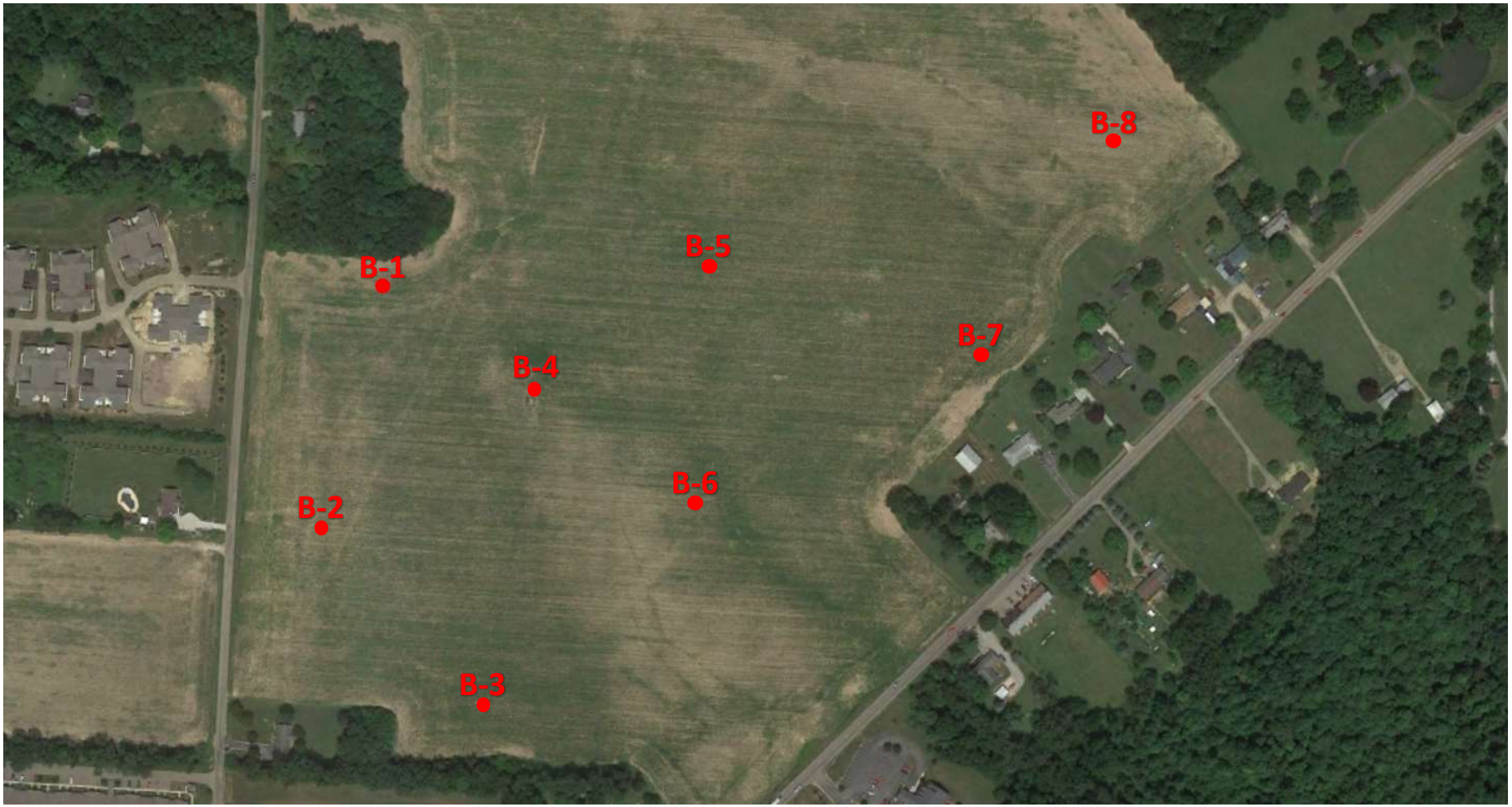


● Boring Location

NORTH

BORING LOCATION PLAN - Site Plan	
Mulit-Family Site	
Coshocton Road & Upper Gilchrist Road, Mount Vernon, Ohio	
Plan prepared by Faris Planning & Design, dated 11/16/21	
Project No.: 21-G-26128	
Date: 01/24/2022 Drawn By: Jeffrey Holko	
Scale: Not to Scale	



● Boring Location

NORTH

BORING LOCATION PLAN - Aerial	
Mulit-Family Site	
Coshocton Road & Upper Gilchrist Road, Mount Vernon, Ohio	
Aerial obtained from Google Earth, dated March 2019	
Project No.: 21-G-26128	
Date: 01/24/2022 Drawn By: Jeffrey Holko	
Scale: Not to Scale	

Summary of Encountered Subsurface Conditions

Multi-Family Site
Coshocton Road & Upper Gilchrist Road, Mount Vernon, Ohio
GCI Project Number: 21-G-26128

Boring	Topsoil Thickness (ft)	Depth to Top of Lean Clay (ft)	Depth to Top of Sandy Lean Clay (ft)	Depth to Top of Clayey Sand - Residual (ft)	Depth to Top of Brown Till (ft)	Depth to Top of Gray Till (ft)	Depth to Top of Sandstone (ft)	Depth to Top of Shale (ft)	Bottom of Boring Depth (ft)	
B-1	0.3	0.3	-	1.5	-	-	5.5	-	16	AR
B-2	0.5	0.5	2	-	-		6	-	16.5	AR
B-3	0.5	0.5	1.7	-	-	-	6	-	13	AR
B-4	0.3	0.3	2.2	-	6.5	8.5	-	-	20	
B-5	0.3	0.3	1.8	-	-	-	2.5	-	18.5	
B-6	0.4	0.4	1.9	-	-	-	5	-	13	AR
B-7	0.3	0.3	1.5	-	-	-	2.5	-	12.5	AR
B-8	0.3	0.3	-	-	-	-	-	6	15.5	AR

AR = auger refusal in rock

TEST BORING LOG

PROJECT NAME **Multi-Family Site - Coshocton Rd & Upper Gilchrist Rd, Mt Vernon, OH** BORING NO. **B-1**

PROJ. SURF. ELEV.

CLIENT **Rockford Homes** NO. **21-G-26128** DATE DRILLED **1/20/2022**

GROUND WATER OBSERVATION

None FEET BELOW SURFACE AT COMPLETION

_____ FEET BELOW SURFACE AT 24 HOURS

_____ FEET BELOW SURFACE AT ____ HOURS

Proportions Used

Trace	Less than 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density

0 - 10	Loose
10 - 30	Medium Dense
30 - 50	Dense
50 +	Very Dense

Cohesive Consistency

0 - 4	Soft
4 - 8	Medium Stiff
8 - 15	Stiff
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 0-6	6-12	12-18	Moisture Density or Consist.	Strata Change Depth*	SOIL IDENTIFICATION Remarks include color, type of soil, etc. Rock-color, type, condition, hardness
	1.5	0.0-1.5	SS	6	6	7	Moist	0.3	Topsoil
									Brown Lean Clay (CL) - moderate plasticity, few f-m sand
								2.0	
		2.0-3.5	SS	8	8	10	Moist		Light Brown Clayey Sand (SC) - residual soil - mostly f sand, some clay; with sandstone fragments; with zones of sandy clay
		4.0-5.5	SS	8	10	12	Damp		
5								5.5	
									Light Brown Sandstone - highly to moderately weathered
		8.5-9.7	SS	19	21	50/2"	Damp		sampled as mostly fine sand with some clay/silt fines; with intact fragments
10									
		13.5-13.6	SS	50/1"					no sample recovery
15								16.0	
									AUGER REFUSAL & BOTTOM OF BORING: 16'

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

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TEST BORING LOG

PROJECT NAME **Multi-Family Site - Coshocton Rd & Upper Gilchrist Rd, Mt Vernon, OH** BORING NO. **B-2**

PROJ. SURF. ELEV.

CLIENT **Rockford Homes** NO. **21-G-26128** DATE DRILLED **1/20/2022**

GROUND WATER OBSERVATION

None FEET BELOW SURFACE AT COMPLETION

_____ FEET BELOW SURFACE AT 24 HOURS

_____ FEET BELOW SURFACE AT ____ HOURS

Proportions Used

Trace	Less than 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density

0 - 10	Loose
10 - 30	Medium Dense
30 - 50	Dense
50 +	Very Dense

Cohesive Consistency

0 - 4	Soft
4 - 8	Medium Stiff
8 - 15	Stiff
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 0-6	6-12	12-18	Moisture Density or Consist.	Strata Change Depth*	SOIL IDENTIFICATION Remarks include color, type of soil, etc. Rock-color, type, condition, hardness
	1.5	0.0-1.5	SS	5	5	6	Very Moist	0.5	Topsoil
								2.0	Brown Lean Clay with Sand (CL) - moderate plasticity, little f-c sand, trace gravel
	2.25-4.5+	2.0-3.5	SS	6	7	7	Very Moist to Moist		Brown Sandy Lean Clay (CL) - moderate plasticity, some f-c sand
	4.5+	4.0-5.5	SS	6	8	10	Moist		with sandstone fragments
5								6.0	Brown Sandstone - highly to moderately weathered
		8.5-8.8	SS	50/4"			Damp		sampled as fine sand and intact fragments
10									
		13.5-13.6	SS	50/1"					no sample recovery
15								16.5	AUGER REFUSAL & BOTTOM OF BORING: 16.5'

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

TEST BORING LOG

PROJECT NAME **Multi-Family Site - Coshocton Rd & Upper Gilchrist Rd, Mt Vernon, OH** BORING NO. **B-3**

PROJ. SURF. ELEV.

CLIENT **Rockford Homes** NO. **21-G-26128** DATE DRILLED **1/20/2022**

GROUND WATER OBSERVATION

None FEET BELOW SURFACE AT COMPLETION

_____ FEET BELOW SURFACE AT 24 HOURS

_____ FEET BELOW SURFACE AT ____ HOURS

Proportions Used

Trace	Less than 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density

0 - 10	Loose
10 - 30	Medium Dense
30 - 50	Dense
50 +	Very Dense

Cohesive Consistency

0 - 4	Soft
4 - 8	Medium Stiff
8 - 15	Stiff
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 0-6	6-12	12-18	Moisture Density or Consist.	Strata Change Depth*	SOIL IDENTIFICATION Remarks include color, type of soil, etc. Rock-color, type, condition, hardness
	1.25	0.0-1.5	SS	6	7	9	Very Moist	0.5	Topsoil
								1.7	Brown Lean Clay (CL) - moderate plasticity, few f-m sand
	4.25	2.0-3.5	SS	15	17	19	Moist		Brown Sandy Lean Clay (CL) - moderate plasticity, some f-m sand; with sandstone fragments
	4.5+	4.0-5.5	SS	14	15	19	Moist		
5								6.0	
									Brown Sandstone - highly to moderately weathered
		8.5-9.3	SS	15	50/4"		Damp		sampled as fine sand and intact fragments
10									
								13.0	
									AUGER REFUSAL & BOTTOM OF BORING: 13'
15									

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

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TEST BORING LOG

PROJECT NAME **Multi-Family Site - Coshocton Rd & Upper Gilchrist Rd, Mt Vernon, OH** BORING NO. **B-4**

PROJ. SURF. ELEV.

CLIENT **Rockford Homes** NO. **21-G-26128** DATE DRILLED **1/20/2022**

GROUND WATER OBSERVATION

None FEET BELOW SURFACE AT COMPLETION

_____ FEET BELOW SURFACE AT 24 HOURS

_____ FEET BELOW SURFACE AT ____ HOURS

Proportions Used

Trace	Less than 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density

0 - 10	Loose
10 - 30	Medium Dense
30 - 50	Dense
50 +	Very Dense

Cohesive Consistency

0 - 4	Soft
4 - 8	Medium Stiff
8 - 15	Stiff
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 0-6	6-12	12-18	Moisture Density or Consist.	Strata Change Depth*	SOIL IDENTIFICATION Remarks include color, type of soil, etc. Rock-color, type, condition, hardness
	0.75	0.0-1.5	SS	5	5	4	Very Moist	0.3	Topsoil
									Brown Lean Clay (CL) - moderate plasticity, few f-m sand
								2.2	
	3.5	2.0-3.5	SS	4	5	6	Moist		Brown Sandy Lean Clay (CL) - moderate plasticity, some f-c sand, trace gravel
	4.0	4.0-5.5	SS	4	5	6	Moist		
5								6.5	
									Brown Sandy Lean Clay (CL) - glacial till
								8.5	
	4.5+	8.5-10.0	SS	5	7	8	Moist		Gray Sandy Lean Clay (CL) - glacial till - low plasticity, some f-c sand, few gravel
10									
	4.5+	13.5-15.0	SS	9	10	12	Moist		
15									
	4.5+	18.5-20.0	SS	7	9	10	Moist		
								20.0	BOTTOM OF BORING: 20'

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

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TEST BORING LOG

PROJECT NAME **Multi-Family Site - Coshocton Rd & Upper Gilchrist Rd, Mt Vernon, OH** BORING NO. **B-5**

PROJ. SURF. ELEV.

CLIENT **Rockford Homes** NO. **21-G-26128** DATE DRILLED **1/20/2022**

GROUND WATER OBSERVATION

None FEET BELOW SURFACE AT COMPLETION

_____ FEET BELOW SURFACE AT 24 HOURS

_____ FEET BELOW SURFACE AT ____ HOURS

Proportions Used

Trace	Less than 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density

0 - 10	Loose
10 - 30	Medium Dense
30 - 50	Dense
50 +	Very Dense

Cohesive Consistency

0 - 4	Soft
4 - 8	Medium Stiff
8 - 15	Stiff
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 0-6	6-12	12-18	Moisture Density or Consist.	Strata Change Depth*	SOIL IDENTIFICATION Remarks include color, type of soil, etc. Rock-color, type, condition, hardness
	1.75	0.0-1.5	SS	6	7	9	Very Moist	0.3	Topsoil
									Brown Lean Clay (CL) - moderate plasticity, few f-m sand
								1.8	
	2.5	2.0-3.3	SS	18	30	50/3"	Moist to Damp	2.5	Brown Sandy Lean Clay (CL)
									Brown Sandstone - highly to moderately weathered
									sampled as fine sand and intact fragments
		4.0-4.2	SS	50/2"					no sample recovery
5									
		8.5-8.7	SS	50/2"					no sample recovery
10									auger cuttings from 6' - 10' contained mostly fine sand with some clay/silt fines and intact fragments
		13.5-13.5	SS	50/0.5"					no sample recovery
15									
		18.5-8.5	SS	50/0"				18.5	
									BOTTOM OF BORING: 18.5'

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

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TEST BORING LOG

PROJECT NAME **Multi-Family Site - Coshocton Rd & Upper Gilchrist Rd, Mt Vernon, OH** BORING NO. **B-6**

PROJ. SURF. ELEV.

CLIENT **Rockford Homes** NO. **21-G-26128** DATE DRILLED **1/20/2022**

GROUND WATER OBSERVATION

None FEET BELOW SURFACE AT COMPLETION

_____ FEET BELOW SURFACE AT 24 HOURS

_____ FEET BELOW SURFACE AT ____ HOURS

Proportions Used

Trace	Less than 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density

0 - 10	Loose
10 - 30	Medium Dense
30 - 50	Dense
50 +	Very Dense

Cohesive Consistency

0 - 4	Soft
4 - 8	Medium Stiff
8 - 15	Stiff
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 0-6	6-12	12-18	Moisture Density or Consist.	Strata Change Depth*	SOIL IDENTIFICATION Remarks include color, type of soil, etc. Rock-color, type, condition, hardness
	1.5	0.0-1.5	SS	5	5	6	Very Moist	0.4	Topsoil
									Brown Lean Clay (CL) - moderate plasticity, few f-m sand
								1.9	
	2.5	2.0-3.5	SS	5	6	6	Very Moist to Moist		Brown Sandy Lean Clay / Clayey Sand (CL / SC) - moderate plasticity, fine to coarse sand; with rock fragments
	4.5+	4.0-5.5	SS	4	4	19	Moist	5.0	
5									Brown Sandstone - highly to moderately weathered
		8.5-8.7	SS	50/2"			Moist		
10								13.0	
									AUGER REFUSAL & BOTTOM OF BORING: 13'
15									

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

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TEST BORING LOG

PROJECT NAME **Multi-Family Site - Coshocton Rd & Upper Gilchrist Rd, Mt Vernon, OH** BORING NO. **B-7**

PROJ. SURF. ELEV.

CLIENT **Rockford Homes** NO. **21-G-26128** DATE DRILLED **1/20/2022**

GROUND WATER OBSERVATION

None FEET BELOW SURFACE AT COMPLETION

_____ FEET BELOW SURFACE AT 24 HOURS

_____ FEET BELOW SURFACE AT ____ HOURS

Proportions Used

Trace	Less than 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density

0 - 10	Loose
10 - 30	Medium Dense
30 - 50	Dense
50 +	Very Dense

Cohesive Consistency

0 - 4	Soft
4 - 8	Medium Stiff
8 - 15	Stiff
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 0-6	6-12	12-18	Moisture Density or Consist.	Strata Change Depth*	SOIL IDENTIFICATION Remarks include color, type of soil, etc. Rock-color, type, condition, hardness
	0.5	0.0-1.5	SS	6	8	8	Very Moist	0.3	Topsoil
								1.5	Brown Lean Clay (CL) - moderate plasticity, few f-m sand
									Brown Sandy Lean Clay (CL)
		2.0-2.8	SS	19	50/3"		Moist	2.5	Brown Sandstone - highly to moderately weathered
									sampled as fine sand and intact fragments
		4.0-4.2	SS	50/2"			Damp		
5									
		8.5-8.7	SS	50/2"			Damp		
10								12.5	AUGER REFUSAL & BOTTOM OF BORING: 12.5'
15									

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

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TEST BORING LOG

PROJECT NAME **Multi-Family Site - Coshocton Rd & Upper Gilchrist Rd, Mt Vernon, OH** BORING NO. **B-8**

PROJ. SURF. ELEV.

CLIENT **Rockford Homes** NO. **21-G-26128** DATE DRILLED **1/20/2022**

GROUND WATER OBSERVATION

None FEET BELOW SURFACE AT COMPLETION

_____ FEET BELOW SURFACE AT 24 HOURS

_____ FEET BELOW SURFACE AT ____ HOURS

Proportions Used

Trace	Less than 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density

0 - 10	Loose
10 - 30	Medium Dense
30 - 50	Dense
50 +	Very Dense

Cohesive Consistency

0 - 4	Soft
4 - 8	Medium Stiff
8 - 15	Stiff
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 0-6	6-12	12-18	Moisture Density or Consist.	Strata Change Depth*	SOIL IDENTIFICATION Remarks include color, type of soil, etc. Rock-color, type, condition, hardness
	2.75	0.0-1.5	SS	5	5	5	Moist	0.3	Topsoil
									Brown Lean Clay (CL) - moderate plasticity, few f-m sand, mottled
	4.5+	2.0-3.5	SS	6	8	8	Moist		Light Brown Lean Clay with Sand (CL) - moderate plasticity, little f-c sand; with rock fragments
	4.5+	4.0-5.5	SS	6	11	10	Moist		
5								6.0	
									Light Brown to Light Gray Shale - completely weathered; similar to a lean clay
		8.5-10.0	SS	8	8	10	Moist		
10									
									highly to moderately weathered
		13.5-13.5	SS	50/0.5"					no sample recovery
									hard drilling from 12.5' - 15.5'
15								15.5	
									AUGER REFUSAL & BOTTOM OF BORING: 15.5'

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

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