WERTZ

GEOTECHNICAL ENGINEERING

GEOTECHNICAL EXPLORATION REPORT

FOR THE

CANTERBURY CROSSING
RAVENNA STREET
CITY OF HUDSON, OHIO
WGE #20231265

PREPARED FOR

PRESTIGE BUILDERS GROUP
778 MCCAULEY ROAD, SUITE 140
STOW, OH 44224

BY

WERTZ GEOTECHNICAL ENGINEERING, INC.
400 COLLIER DRIVE
DOYLESTOWN, OHIO 44230

DRILLING | MATERIAL TESTING | ENGINEERING

January 4, 2023

Prestige Builder Group
778 McCauley Road, Suite 140
Stow, OH 44224

ATTN: **Chris Brown**

RE: **Canterbury Crossing, Ravenna Street, City of Hudson, Ohio; WGE #20231265**

Mr. Brown:

Wertz Geotechnical Engineering (WGE) has completed the requested subsurface investigation for the proposed Canterbury Crossing project in City of Hudson, Ohio. The purpose of this investigation is to define the subsurface conditions at the project site and to make general recommendations relative to site preparation, earthwork, pavement, construction, and other pertinent geotechnical aspects of the project. These professional services have been performed, the findings obtained, and the recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices.

If you have any questions or concerns regarding the information presented in this submittal, or have need of additional services, please contact our office at (330) 991-0041.

Sincerely,

Leroy Wertz, P.E.
Senior Geotechnical Engineer

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PROJECT DESCRIPTION

SITE DESCRIPTION

The project site is located northwest of the intersection of Stow Road and Ravenna Street in the City of Hudson, Ohio. The site is currently farmland with areas of brush and trees. An existing pond is present in the southeast region of the northern section of the site. Historic imagery indicates a structure was razed in the southwestern region of the northern section of the site, prior to 2014. Historical imagery also indicated that a pond may have previously existed in the southern section of the site.

A site plan dated July 14, 2023 was provided. The project includes the development of the site with 34 sublots with single-family homes, three stormwater management basins, roadways, and supporting utilities. Six sublots with direct access to Ravenna Street, and one stormwater management will be located south of Ravenna Street. The remaining 28 sublots, two stormwater management basins, and a new roadway with two access points to Ravenna Road will be located north of Ravenna Street. The homes are assumed to be two-story with full basements and attached slab-on-grade garages.

For the geotechnical analysis, the maximum foundation loadings are assumed to not exceed 15 kips for columns and 3 kips per foot for walls. The planned foundation systems will be shallow spread footings set below the frost penetration depth and built according to the Ohio Building Code.

The terrain within the northern area is mild and generally slopes towards the southwest. Grades range from approximately 1106 feet to 1128 feet MSL. The terrain within the southern section is a relatively flat, low-lying area with grades of approximately 1104 feet to 1106 feet MSL. Finished floor elevations were provided on the site plan.

If our project understanding or any of our project assumptions are incorrect, we should be contacted in order to determine if our recommendations remain valid.

DESCRIPTION OF REGIONAL GEOLOGICAL SETTING

The project site in Hudson, Summit County, Ohio is situated in the Killbuck-Glaciated Pittsburgh Plateau Physiographic Region of Ohio, which is defined by ridges and flat uplands covered with thin drift and dissected by steep valleys, where valley segments alternate between broad drift-filled and narrow rock-walled reaches. The site area is on end moraines (Ohio Department of Natural Resources Division of Geological Survey, 1998).

According to the USDA Web Soil Survey, the site area is mapped by the local soil and water conservation district as the Bogart loam, a material consisting of outwash, deposited on outwash terraces. Also present in the site area is the Mahoning silt loam, a material consisting of till, deposited on till plains on uplands. The Trumbull silt loam, a material consisting of till, deposited on till plains on depressions (USDA, 2020). A USDA Web Soil Survey site map is presented in Figure 2.

According to publicly available mine data from ODNR, no active or inactive surface or underground sand and gravel, limestone, or coal mining activities are present within the site footprint or surrounding areas.

According to 24k Ohio Division of Geological Survey (ODNR-DGS) Bedrock Geology Maps, bedrock in the area primarily consists of the Allegheny and Pottsville Groups, undivided, of which major lithologies consist of shale and siltstone. The minor lithologies consist of limestone and sandstone (Ohio Department of Natural Resources Division of Geological Survey, 1991). Bedrock is reported by ODNR-DGS at approximately 1000 feet to 1040 feet MSL in elevation. Bedrock is estimated to be encountered approximately 75 to 125 feet below existing site grades. A Geologic Map is presented in Figure 3.

FIELD INVESTIGATION & LABORATORY TESTING

Six (6) soil borings were advanced at the project site on December 20th, 2023, utilizing the CME-550 all-terrain, rotary drilling rig, with 3.25" hollow stem augers, operated by WGE drilling staff. The boring locations were field marked by WGE personnel at the approximate locations shown on the attached Figure 1 Boring Location Plan.

In addition, eight (8) test pits were excavated on December 22nd, 2023, utilizing a mini-hydraulic excavator with a two-foot bucket with earth teeth. A WGE Engineer observed the excavations and recorded the encountered subsurface conditions to depths up to 11 feet. Test pit locations are shown on the Geotechnical Test Location Map.

Standard penetration testing and sampling was performed at the depth intervals shown on the attached Soil Boring Logs utilizing a 140-lb automatic hammer falling 30 inches to drive a 2-inch outer-diameter split spoon sampler over three, six-inch intervals. Collected samples were examined and visually identified by our personnel in the field based on the visual-manual procedure (ASTM D-2488). Representative samples were retained and transported to our office, for further examination and the assignment of laboratory testing.

Moisture content testing was performed per ASTM D-2216. Thirty (30) moisture content tests were conducted on the retained samples. The moisture content test results are included on the Boring Logs in Attachment A.

Static groundwater level observations and hole depth soundings were made upon completion of each boring. This was followed by backfilling the holes. Groundwater level observations, made during the drilling of each boring, are indicated on the attached Soil Boring Logs. It should be noted that groundwater levels and zones of saturation should be expected to fluctuate seasonally based on variation in amounts of rainfall, evapotranspiration, runoff from impervious areas, and several other factors.

SUBSURFACE CONDITIONS

Soil boring data collected at the site generally indicates the presence of native clay, silt, and sandy soils. These findings can be described for engineering purposes as the following:

- Topsoil was encountered in every test pit and soil boring with thicknesses of 6 to 18 inches.

- Natural (non-fill) clay, clayey silt, silty clay, silt, sand, and gravel soils were encountered. The clayey soils were damp to moist with a soft to very stiff consistency. The silt soils were moist and loose to medium dense. The sandy soils were in a damp to wet and very loose to medium dense condition. The gravel soils were moist to wet and loose to medium dense.

- Soft and very loose soils are notable for having low bearing capacity. These occurrences are summarized below:

Boring	Depth	Encountered Soil	Note
B-4	3 – 8 feet	Very loose SAND	Groundwater below ±6 feet.
B-5	0 – 3 feet 3 – 5.5 feet	Soft CLAY Very loose SAND	-
B-6	3 – 5.5 feet	Soft CLAY	Groundwater below ±10 feet
TP-6	4.5 – 7+ feet	Very loose SAND	Groundwater below ±4.5 feet. Heaving sands present.

- Groundwater was encountered in Borings B-4 and B-6 at depths of approximately 6 feet and 10 feet below existing grades, respectively. Upon completion of drilling water was observed in the bore holes at depths of 3 feet and 4 feet in Borings B-4 and B-6, respectively. Groundwater was encountered in Test Pit TP-6 at a depth of approximately 4.5 feet below the surface, within heaving sands. Major groundwater seepage was encountered in Test Pit TP-1 at a depth of approximately 8 feet below the surface, within the gravel layer. Minor groundwater seepage was present in Test Pits TP-2, TP-3, TP-4, TP-5, TP-7, and TP-8 at depths of 3 to 8 feet below the surface.

- A significant cave-in was present in Test Pit TP-6. Moderate cave-ins were present in TP-1 and TP-5 from depths of 8 to 11 feet and 0 to 5 feet below the surface, respectfully.

GEOTECHNICAL RECOMMENDATIONS

We offer the following for your consideration based on our analysis of the soil conditions encountered at the locations indicated; and the assumption that conditions between and away from the soil borings are similar to those that are known:

GENERAL CONSIDERATIONS

Special care must be taken in developing the site due to various subsurface conditions. In most areas, the subsoils are suitable to support standard foundations. Layers of soft clays and very loose sands were encountered during our evaluation which are unsuitable to support structural loads and utilities. Soft or very loose soils that are present at footing subgrade will need to be undercut to the underlying natural, stable soils and backfilled with compacted stone.

Unsuitable soils should be expected throughout the development and careful evaluation of the subgrades for the individual structures should be performed during sitework and foundation excavations. The bearing pressure of the foundation subgrades should be field verified by a geotechnical engineer prior to concrete placement.

Excavations into the wet sand/gravel soils will be difficult. If basements are to be constructed, basement floor elevations should be set at least 1 foot above the known groundwater table. Groundwater was present approximately 3 to 10 feet below the surface. If groundwater is present in basement excavations, the geotechnical engineer should be contacted for a site-specific recommendation.

Where unstable trench or basement slab subgrades occur due to uncontrolled groundwater during excavation, the subgrade should be undercut to suitable bearing soils and backfilled with stone, as detailed below. Dewatering for the sewers should be anticipated.

Recommendations are provided in the Earthwork General Guidelines section below for the quality, compaction, testing and inspection of engineered fill. Care should be taken to evaluate foundation, slab, and pavement subgrades prior to stone or concrete placement. All subgrades should be observed by a qualified soils technician under the supervision of a geotechnical engineer, and field density tests should be made to ensure compaction to specification. It is recommended that site work be performed during the drier summer and fall months.

GROUNDWATER AND EXCAVATIONS

Groundwater was encountered in two of the six soil borings and all of the test pits during our subsurface investigation. Excavations within the wet sands will be difficult. Well points may be required for excavations within the sands. The need for dewatering measures depends on the size and depth of the excavation.

Excavations should either be sloped back or shored in accordance with Occupational Safety & Health Administration (OSHA) regulations and any other applicable local codes. Parameters for design of temporary shoring are included in those regulations. Due to the presence of loose

sands on the site, with respect to temporary excavation side slopes, the site soils should be classified as Type "C" per OSHA. Therefore, temporary excavations should be cut back to a temporary slope no steeper than a 1.5:1 (horizontal: vertical).

The soils encountered during this exploration can likely be excavated with a medium-sized hydraulic excavator with a standard bucket with earth teeth.

EARTHWORK GUIDELINES

- Prior to construction, all topsoil, vegetation, or other deleterious material should be completely stripped and grubbed from within the footprint of the proposed building and pavement areas and areas to be cut or to receive engineered fill, prior to construction.

- All surfaces cut to subgrade elevation, or subgrades to receive fill, should be proof rolled under the direction of an on-site geotechnical engineer or their direct assigns. Any areas of soft or yielding (pumping/rutting) soils, or obviously contaminated zones, should be undercut to underlying, stable soils and replaced with stable, compacted engineered fill, or stabilized in place as directed by the engineer.

- The engineered fill should be clean, inert soil which should be approved by the geotechnical engineer. The engineered fill should have a dry density greater than 100 pcf, liquid limit less than 50% and an organic content less than 1%.

- Engineered fill material should be placed on the approved subgrade in controlled lifts. Each lift should be compacted to a stable condition at a minimum of 98% maximum dry density per ASTM D-698, with a moisture content between 2.0% below to 2.0% over optimum moisture. All filling operations should be observed by a qualified soils technician under the supervision of a geotechnical engineer. Field density tests should be made to ensure compaction to specification.

- All surfaces should be sealed and sloped after each day or prior to inclement weather to promote positive drainage of water offsite.

- Construction traffic should be kept off any wet subgrades. If site work is performed during times of drier weather, the need for additional repairs and stabilization to the subgrade may be substantially reduced. Therefore, it is recommended that sitework be performed during these times.

BUILDING BEARING CAPACITY AND FOUNDATIONS

Various conditions are present throughout the development. It is WGE's opinion that the encountered loose and better sands and silts, and medium stiff clay soils are capable of supporting the light-weight structures (less than 3 kips/foot for walls, 15 kips for columns) with a conventional spread and strip footing shallow foundation system.

It is also WGE's opinion that the encountered very loose sand soils and soft clay soils are not capable of supporting the proposed structures with a conventional spread and strip footing shallow foundation system. Pockets of very loose and soft soils were present in two of the eight test pits and three of the 6 soil borings. The very loose and soft soils will need to be undercut and backfilled with compacted stone as directed by our engineer.

Standard shallow foundations for the homes should be designed for an allowable bearing capacity of 2,000 psf. Estimated total and differential settlements for footings designed in accordance with the recommendations provided in this report are approximately 1 inch and ½ inches, respectively, provided that the recommendations under *Earthwork Guidelines* and those provided below are followed:

- The foundation subgrades, for an allowable design bearing pressure of 2,000 psf, should consist of natural medium stiff or better clay soil, loose or better sand and silt soils, or approved engineered fill. The foundation subgrade should be evaluated and approved by a geotechnical engineer, or their representative, prior to concrete placement. Any deleterious foundation subgrade soils be undercut and backfilled with lean concrete or compacted stone as directed by our field engineer.

- The foundation subgrade should be evaluated and approved by a geotechnical engineer, or his representative, prior to concrete placement.

- Foundation subgrades should be concreted in a dry and frost-free condition as soon after exposure as possible.

- The ground surface surrounding the building should be graded to direct surface drainage of water away from all exterior foundation walls and members.

- All exterior footings should be located below the depth of potential frost penetration (42 inches).

FLOOR SLAB AND PAVEMENT SUPPORT

Concrete floor slabs would be adequately supported on stable, approved site soils prepared according to *Earthwork Guidelines* and on stable engineered fill placed and compacted to the above-provided specifications. Any areas of soft or yielding (pumping/rutting) soils, or obviously contaminated zones, should be undercut to underlying, stable soils and replaced with stable, compacted engineered fill, or stabilized in place as directed by the engineer. The appropriate type and depth of stabilization should be determined in the field during earthwork operations by the Geotechnical Engineer or their designated representative. Soft and very loose soils are present and additional cost for stabilization should be anticipated.

Floor slab subgrades should be evaluated prior to stone placement by our personnel. All interior floor slabs should have a minimum of 4 inches of free draining granular base (ODOT #57 limestone or an approved equivalent) with a suitable vapor barrier. All exterior concrete slabs should have a minimum of 4 inches of #304 crushed limestone base.

Asphalt and/or concrete pavement would be suitable for the pavement areas. The pavement subgrade should be proof rolled to identify areas which may be unsuitable for bearing pavement loadings. Any soft or yielding (pumping/rutting) areas should be undercut to a stable subgrade and backfilled with approved compacted engineered fill or stone in accordance with the *Earthwork Guidelines* or stabilized in place as directed by the geotechnical engineer. Pockets of very loose and soft soils at pavement subgrade should be anticipated.

The pavement base for roadways should consist of a minimum of 6 inches of #304 crushed limestone for non-cement stabilized subgrade. The pavement section should be designed for a CBR value of 5 (MR=6,000 psi) for untreated (quick lime/cement) subgrades. A pavement design specific to the anticipated traffic loads and subgrade stabilization conditions can be completed upon request.

BASEMENT WALLS

Basement walls should be designed to resist the lateral earth pressure from grade differences. The basement walls should be designed according to Ohio Residential Building Code Section R 404.1.2 for clay (CL) soils.

Pockets of wet sand and gravel were encountered throughout the development. The basement floor elevation should be set above the known groundwater elevation. Stormwater should be directed away from the homes and standard waterproofing measures should be anticipated. Our project engineer should be notified for further recommendations if groundwater seepage is present during basement excavations.

UTILITY INSTALLATION

Utilities will likely be installed with open trench construction. In general, soils at and immediately below the sewer elevation, are suitable for support of the proposed sewers and manhole structures with typical bedding.

Heavy groundwater should be expected for deep excavations in areas of the site. Additional costs for dewatering the excavations should be expected.

Groundwater, not controlled during excavation, may cause the bearing subgrade to lose strength due to the upward movement of groundwater (heave). Any unstable soils created or encountered during excavation would need to be undercut to suitable bearing soils. The undercuts should be backfilled with compacted crushed stone to planned invert elevation to provide a stable bearing subgrade for the sewer. The undercut crushed stone should be wrapped with a silt fabric to prevent the piping of silt into the stone backfill. The lower portion of the undercut backfill stone should consist of ODOT #1/#2 crushed limestone with the remaining stone being ODOT #57.

The excavated soil from the sewer is not suitable to be used as structural backfill within roadways. Backfill within roadways should consist of ODOT Structural Backfill Types 1 and 2. The backfill should be compacted to 98 percent of the maximum dry density per ODOT Supplement 1015. Sewer trenches outside of the roadway can be backfilled with properly

compacted onsite soils. The onsite soils should be free of fat clays, organics, and other debris and be compacted to a minimum of 95 percent.

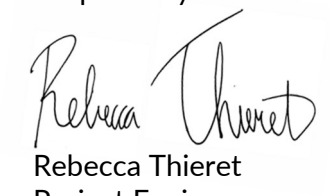
STANDARD OF CARE AND LIMITATIONS

Our recommendations for this project were developed utilizing the project information provided to WGE and the soil information obtained from the test borings that were made at the project site. The test borings only depict the soil and rock conditions at the specified locations and time at which they were made. The soil conditions at other locations on the site may differ from those occurring at the boring locations. Additionally, the conclusions and recommendations have been based upon the available soil information and the design details furnished to us. We should be immediately notified if, during construction, any conditions different from those found in this investigation are evident or our project assumptions or understanding are incorrect. We will advise you of any modifications to our conclusions and recommendations deemed necessary, after observing the exposed conditions and/or changes to the project scope. The scope of our services does not include any environmental assessment or investigation for the presence or absence of hazardous or toxic materials in the soil, groundwater, or surface water within or beyond the site studied.

Our professional services have been performed, our findings obtained, and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. Wertz Geotechnical Engineering, Inc. is not responsible for the conclusions, opinions, or recommendation made by others based upon the data included herein.

We hope you will find this report satisfactory. Please contact our office if we can be of further service or you have questions regarding this submittal.

Respectfully submitted,

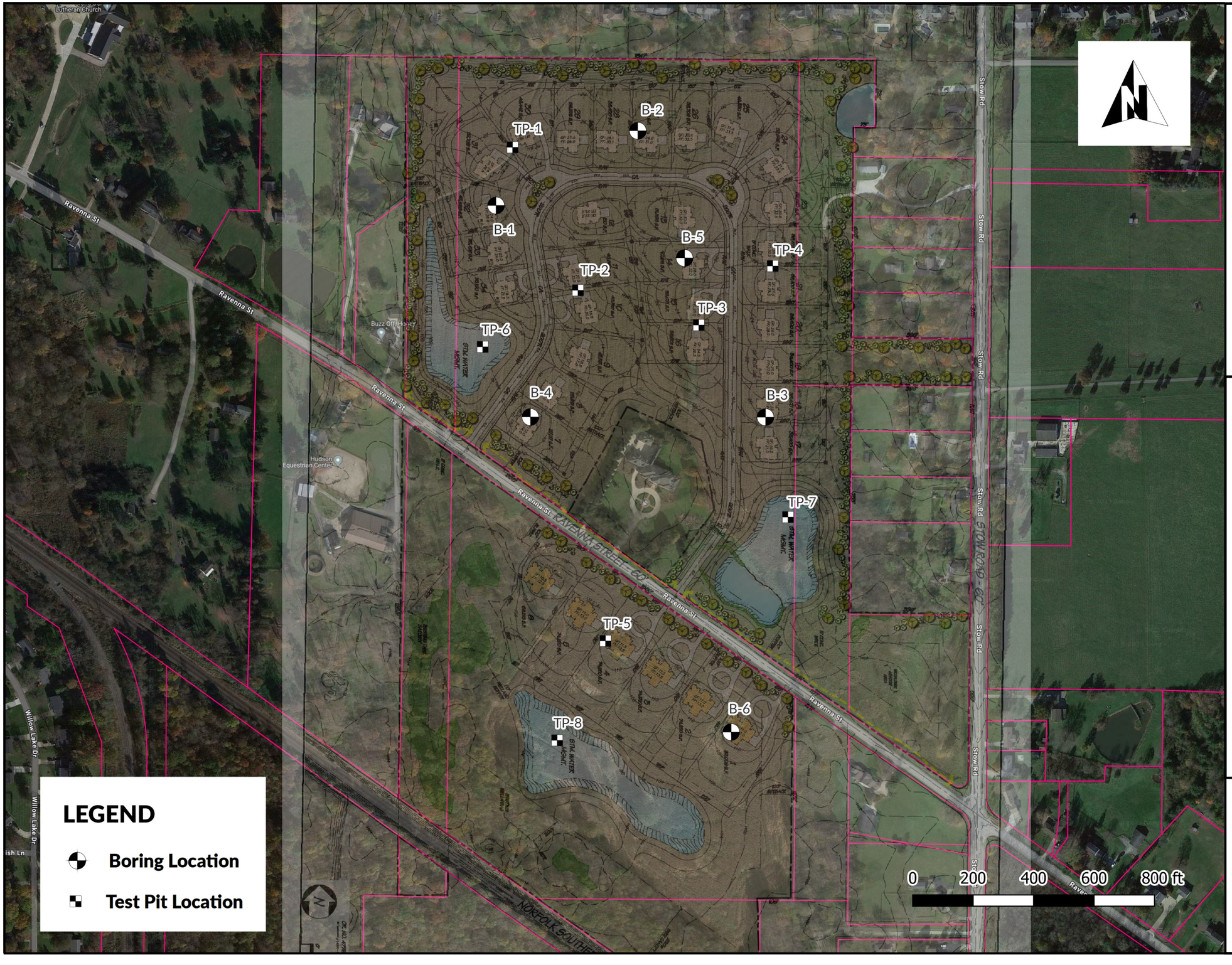


Rebecca Thieret
Project Engineer

Leroy Wertz, P.E.
Senior Geotechnical Engineer

FIGURE 1

Geotechnical Boring Location Map



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GEOTECHNICAL TEST LOCATION MAP

CLIENT
PRESTIGE BUILDER GROUP
778 MCCAULEY ROAD, SUITE 140, STOW, OH 44224

SITE
RAVENNA STREET, CITY OF HUDSON, OHIO

PROJECT NAME
CANTERBURY CROSSING

LAYOUT BY **RT**	DATE: 12/19/2023
DRAWN BY **RT**	FIGURE NO. **1**
CHECKED BY **LW**	

FIGURE 2

USDA Web Soil Survey Map

Map Scale: 1:5,120 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

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

Special Point Features

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

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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

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

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

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

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

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

Soil Survey Area: Summit County, Ohio
Survey Area Data: Version 20, Sep 11, 2023

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

Date(s) aerial images were photographed: Sep 12, 2020—Sep 21, 2020

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BgB	Bogart loam, 2 to 6 percent slopes	19.6	31.5%
MgA	Mahoning silt loam, 0 to 2 percent slopes	12.5	20.2%
MgB	Mahoning silt loam, 2 to 6 percent slopes	18.4	29.6%
Tr	Trumbull silt loam, 0 to 2 percent slopes	11.6	18.6%
Totals for Area of Interest		**62.1**	**100.0%**

FIGURE 3

ODNR Bedrock Geology Map

CANTUBURY CROSSING PROJECT GEOLOGIC MAP

Bedrock Topography of Ohio 24K (ODNR-DGS) -Bedrock Topography 24K - Contours

Bedrock Topography Contour (50-ft Interval), data from ODNR-DGS)

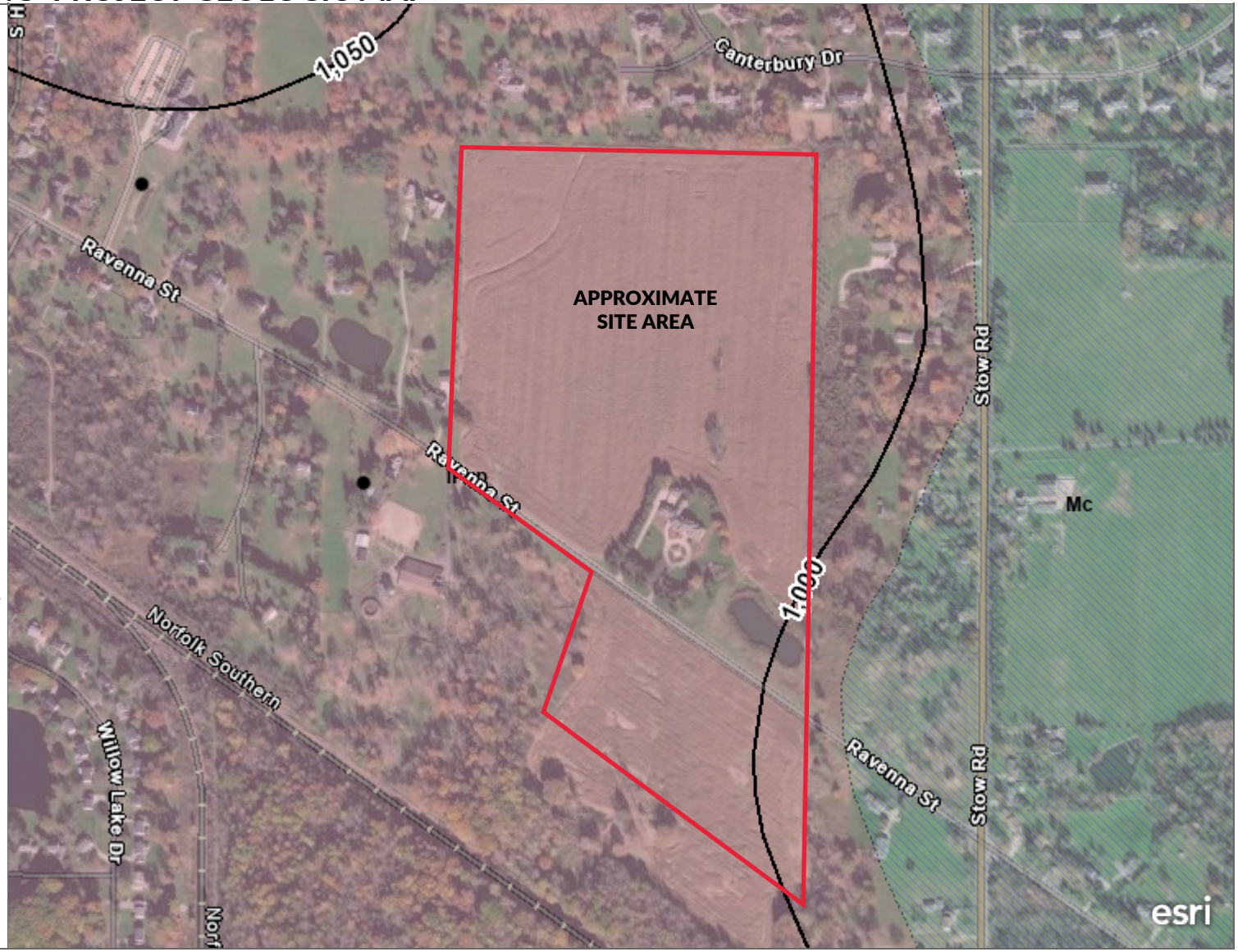
Oil-and-gas well

Water well, data from Ohio Division of Water

-Bedrock Geology 24K
-Data Bedrock Geology of Ohio 24K (ODNR-DGS)

IPap -Allegheny and Pottsville Groups, Undivided Major: Shale, Siltstone Minor: Limestone, Sandstone

Bedrock Contours are interpolated by ODNR-DGS based on data from local water wells and oil and gas wells.



Bedrock is estimated to be encountered approximately 75 to 125 feet below surface grades.

600ft

ATTACHMENT A

Geotechnical Boring Logs

WERTZ GEOTECHNICAL ENGINEERING, INC.
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(330) 991-0041
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PROJECT:	Canterbury Crossing	**PROJECT NO.:** 20231265	**DRILL RIG:**	CME 550	**BORING ID:**	B-1	**Page 1 of 1**
LOCATION:	Hudson, Ohio		**METHOD:**	Hollow Stem	**DATE STARTED:**	12/20/2023	
LOGGED BY:	DM		**AUGER SIZE:**	3.25 inches	**DATE COMPLETED:**	12/20/2023	
DRILL CREW:	BK & CG		**HAMMER:**	Auto SPT	**ELEVATION:**	1116 feet MSL	
GROUNDWATER ENCOUNTER DEPTH	None	**GROUNDWATER AT COMPLETION:** None	**TOTAL DEPTH:**	15'	**CAVE DEPTH:**	10'	

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE DEPTH	BLOW COUNTS (BLOWS/0.5FOOT)	RECOVERY (INCHES)	POCKET PEN (TSF)	GRAPHIC LOG	LITHOLOGY
1		AS	--	--	--		12" TOPSOIL.
2	1	1.0-2.5	1-1-4	18	2		Moist, medium stiff, brown, fine to coarse sandy CLAY, minor silt and gravel. Wn%: 15.1
3							
4	2	3.5-5.0	3-7-10	18	5+		Damp, very stiff, brown, CLAY, minor silt and fine to coarse sand and gravel. Wn%: 16.0
5							
6							
7	3	6.0-7.5	5-9-11	18	5+		Damp, very stiff, brown, CLAY, minor silt and fine to coarse sand and gravel. Wn%: 16.0
8							
9	4	8.5-10.0	5-4-5	15			Moist, loose, brown, SILT, minor clay and fine to coarse sand and gravel. Wn%: 17.9
10							
11							
12							
13							
14	5	13.5-15.0	2-9-15	9	1.5		Moist, very stiff, brown, CLAY, some silt, minor fine to coarse sand and gravel. Wn%: 16.6
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							
32							
33							
34							
35							

Note: *Ground surface elevations at boring locations estimated using data provided by Google Earth Pro.*

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PROJECT:	Canterbury Crossing	**PROJECT NO.:** 20231265	**DRILL RIG:**	CME 550	**BORING ID:**	B-2	**Page 1 of 1**
LOCATION:	Hudson, Ohio		**METHOD:**	Hollow Stem	**DATE STARTED:**	12/20/2023	
LOGGED BY:	DM		**AUGER SIZE:**	3.25 inches	**DATE COMPLETED:**	12/20/2023	
DRILL CREW:	BK & CG		**HAMMER:**	Auto SPT	**ELEVATION:**	1126 feet MSL	
GROUNDWATER ENCOUNTER DEPTH	None	**GROUNDWATER AT COMPLETION:** None	**TOTAL DEPTH:**	15'	**CAVE DEPTH:**	9'	

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE DEPTH	BLOW COUNTS (BLOWS/0.5FOOT)	RECOVERY (INCHES)	POCKET PEN (TSF)	GRAPHIC LOG	LITHOLOGY
1		AS	--	--	--		12" TOPSOIL.
2	1	1.0-2.5	2-4-5	18	2.25		Moist, stiff, brown, CLAY, some fine to coarse sand, minor silt and gravel. Wn%: 20.0
3							
4	2	3.5-5.0	3-5-6	16	2.75		Moist, stiff, brown, CLAY, minor silt and fine to coarse sand and gravel. Wn%: 21.0
5							
6							
7	3	6.0-7.5	5-6-9	18	5+		Damp, stiff, brown, CLAY, minor silt and fine to coarse sand and gravel. Wn%: 16.6
8							
9	4	8.5-10.0	5-8-10	18	5+		Damp, very stiff, brown, CLAY, minor silt and fine to coarse sand and gravel. Wn%: 17.3
10							
11							
12							
13							
14	5	13.5-15.0	3-10-15	13	2.5		Moist, very stiff, brown, CLAY, minor silt and fine to coarse sand and gravel. Wn%: 16.7
15							***Note:*** *Ground surface elevations at boring locations estimated using data provided by Google Earth Pro.*
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PROJECT:	Canterbury Crossing	**PROJECT NO.:** 20231265	**DRILL RIG:**	CME 550	**BORING ID:**	B-3	**Page 1 of 1**
LOCATION:	Hudson, Ohio		**METHOD:**	Hollow Stem	**DATE STARTED:**	12/20/2023	
LOGGED BY:	DM		**AUGER SIZE:**	3.25 inches	**DATE COMPLETED:**	12/20/2023	
DRILL CREW:	BK & CG		**HAMMER:**	Auto SPT	**ELEVATION:**	1118 feet MSL	
GROUNDWATER ENCOUNTER DEPTH	None	**GROUNDWATER AT COMPLETION:** None	**TOTAL DEPTH:**	15'	**CAVE DEPTH:**	2.5'	

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE DEPTH	BLOW COUNTS (BLOWS/0.5FOOT)	RECOVERY (INCHES)	POCKET PEN (TSF)	GRAPHIC LOG	LITHOLOGY
1		AS	--	--	--		7" TOPSOIL.
2	1	1.0-2.5	4-5-6	16			Damp, stiff, brown, clayey SILT, minor fine to coarse sand, trace gravel. Wn%: 16.7
3							
4	2	3.5-5.0	2-3-3	15	1		Moist, medium stiff, brown, fine to coarse sandy CLAY, minor silt and gravel. Wn%: 14.9
5							
6							
7	3	6.0-7.5	3-6-8	16	3.5		Moist, stiff, brown, CLAY, some silt, minor fine to coarse sand. NOTE: Silt seam. Wn%: 17.9
8							
9	4	8.5-10.0	2-6-10	17	5+		Damp to moist, stiff, gray, CLAY, minor silt and fine to coarse sand and gravel. Wn%: 15.4
10							
11							
12							
13							
14	5	13.5-15.0	3-8-13	18			Damp, medium dense, brown, fine to medium SAND. Wn%: 4.5
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Note: *Ground surface elevations at boring locations estimated using data provided by Google Earth Pro.*

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PROJECT:	Canterbury Crossing	**PROJECT NO.:** 20231265	**DRILL RIG:**	CME 550	**BORING ID:**	B-4	
LOCATION:	Hudson, Ohio		**METHOD:**	Hollow Stem	**DATE STARTED:**	12/20/2023	
LOGGED BY:	DM		**AUGER SIZE:**	3.25 inches	**DATE COMPLETED:**	12/20/2023	
DRILL CREW:	BK & CG		**HAMMER:**	Auto SPT	**ELEVATION:**	1110 feet MSL	
GROUNDWATER ENCOUNTER DEPTH	6'	**GROUNDWATER AT COMPLETION:** 3'	**TOTAL DEPTH:**	15'	**CAVE DEPTH:**	3.5'	

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE DEPTH	BLOW COUNTS (BLOWS/0.5FOOT)	RECOVERY (INCHES)	POCKET PEN (TSF)	GRAPHIC LOG	LITHOLOGY
1		AS	--	--	--		11" TOPSOIL.
2	1	1.0-2.5	2-3-4	18			Moist, loose, brown, clayey fine SAND, minor silt. Wn%: 16.0
4	2	3.5-5.0	1-1-1	5			Moist, very loose, brown, clayey fine SAND, minor silt. Wn%: 21.8
7	3	6.0-7.5	0-1-1	11			Wet, very loose, brown, silty fine SAND, trace clay. NOTE: Water in sample. Wn%: 24.5
9	4	8.5-10.0	3-2-3	12			Wet, loose, brown, fine SAND, trace silt. NOTE: Water in sample. Wn%: 17.1
14	5	13.5-15.0	4-11-14	7			Moist, very stiff, brown, CLAY, minor sandstone fragments. NOTE: Water in sample. Wn%: 19.0
15							***Note:*** *Ground surface elevations at boring locations estimated using data provided by Google Earth Pro.*

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PROJECT:	Canterbury Crossing	**PROJECT NO.:** 20231265	**DRILL RIG:**	CME 550	**BORING ID:**	B-5	
LOCATION:	Hudson, Ohio		**METHOD:**	Hollow Stem	**DATE STARTED:**	12/20/2023	
LOGGED BY:	DM		**AUGER SIZE:**	3.25 inches	**DATE COMPLETED:**	12/20/2023	
DRILL CREW:	BK & CG		**HAMMER:**	Auto SPT	**ELEVATION:**	1125 feet MSL	
GROUNDWATER ENCOUNTER DEPTH	None	**GROUNDWATER AT COMPLETION:** None	**TOTAL DEPTH:**	15'	**CAVE DEPTH:**	'	

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE DEPTH	BLOW COUNTS (BLOWS/0.5FOOT)	RECOVERY (INCHES)	POCKET PEN (TSF)	GRAPHIC LOG	LITHOLOGY
1		AS	--	--	--		7" TOPSOIL.
2	1	1.0-2.5	2-1-2	12	0.75		Moist, soft, brown, fine to coarse sandy CLAY, minor silt and gravel. Wn%: 16.1
3							
4	2	3.5-5.0	1-2-1	14			Moist, very loose, brown, clayey fine to coarse SAND, minor silt and gravel. Wn%: 14.5
5							
6							
7	3	6.0-7.5	3-10-9	18	4		Damp, very stiff, brown, CLAY, minor silt and fine to coarse sand and gravel. Wn%: 15.5
8							
9	4	8.5-10.0	6-9-12	4	1.25		Moist, very stiff, brown, CLAY, some fine to coarse sand, minor silt and gravel. Wn%: 16.5
10							
11							
12							
13							
14	5	13.5-15.0	2-3-6	18	3.25		Moist, stiff, brown, CLAY, some silt and fine to coarse sand and gravel. Wn%: 15.5
15							***Note:*** *Ground surface elevations at boring locations estimated using data provided by Google Earth Pro.*
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PROJECT:	Canterbury Crossing	**PROJECT NO.:** 20231265	**DRILL RIG:**	CME 550	**BORING ID:**	B-6	
LOCATION:	Hudson, Ohio		**METHOD:**	Hollow Stem	**DATE STARTED:**	12/20/2023	
LOGGED BY:	DM		**AUGER SIZE:**	3.25 inches	**DATE COMPLETED:**	12/20/2023	
DRILL CREW:	BK & CG		**HAMMER:**	Auto SPT	**ELEVATION:**	1105 feet MSL	
GROUNDWATER ENCOUNTER DEPTH	10'	**GROUNDWATER AT COMPLETION:** 4'	**TOTAL DEPTH:**	15'	**CAVE DEPTH:**	5'	

DEPTH (FEET)	SAMPLE NUMBER	SAMPLE DEPTH	BLOW COUNTS (BLOWS/0.5FOOT)	RECOVERY (INCHES)	POCKET PEN (TSF)	GRAPHIC LOG	LITHOLOGY
1		AS	--	--	--		6" TOPSOIL.
2	1	1.0-2.5	2-2-4	14	1.25		Moist, medium stiff, brown and gray, CLAY, minor silt, trace sand and organics. Wn%: 28.3
3							
4	2	3.5-5.0	1-1-3	18	0.25		Moist, soft, brown, fine to coarse sandy CLAY, minor silt. Wn%: 25.1
5							
6							
7	3	6.0-7.5	1-8-9	6			Moist, medium dense, gray, fine to coarse SAND, some clay, minor silt. NOTE: Poor recovery, possible plug. Wn%: 23.4
8							
9	4	8.5-10.0	2-9-8	15			Wet, medium dense, gray, fine to coarse SAND, minor clay and silt and gravel. Wn%: 12.7
10							
11							
12							
13							
14	5	13.5-15.0	4-5-10	17	2.75		Moist, stiff, gray, CLAY, minor silt and fine to coarse sand and gravel. Wn%: 15.1
15							***Note:*** *Ground surface elevations at boring locations estimated using data provided by Google Earth Pro.*
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ATTACHMENT B

Test Pit Logs

CANTERBURY CROSSING TEST PIT LOGS

Performed on December 22, 2023 with a Mini-Sized Hydraulic Excavator with Earth Teeth and monitored by WGE Geologist R.J.

TP-1

0”-15”	Silty TOPSOIL.
15”-3’	Damp, stiff, brown and gray, very silty CLAY, minor cobbles and gravel.
3’-8’	Damp, very stiff, brown, silty CLAY, minor cobbles and gravel.
8’-11’	Wet, loose, brown GRAVEL, some sand and cobbles.
Notes:	Major groundwater seepage at 8’; moderate cave-in at 8-11’; 3-8’ clay layer was very hard digging.

TP-2

0”-18”	Sandy TOPSOIL.
18”-4’	Damp, medium dense SAND, some gravel.
4’-10.5’	Damp, stiff, brown, very silty CLAY, some gravel, minor cobbles.
Notes:	Minor groundwater seepage at 4’; sturdy walls, no cave-ins.

TP-3

0”-12”	Very sandy TOPSOIL.
12”-8’	Damp, loose, brown SAND, some gravel.
8’-10.5’	Damp, medium stiff, gray, silty CLAY, minor cobbles.
Notes:	Groundwater seepage at 8’; sturdy walls, no cave-ins.

TP-4

0’-12”	Silty TOPSOIL.
12”-3’	Damp, medium stiff, brown and gray, very silty CLAY.
3’-4’	Wet, loose, brown GRAVEL, some sand.
4’-9’	Damp, stiff, brown, silty CLAY, some cobbles.
9’-10.5’	Damp, very stiff, gray, silty CLAY, minor cobbles.

Notes: Groundwater seepage at 3-4’; sturdy walls, no cave-ins; 9-10.5’ clay layer was very hard digging.

TP-5

0”-15”	TOPSOIL.
15”-3.5’	Moist, medium stiff, brown and gray, silty CLAY, trace gravel.
3.5’-5’	Wet, loose, brown GRAVEL, some sand.
5’-11’	Damp, very stiff, gray silty CLAY, minor cobbles.

Notes: Groundwater seepage at 3.5’; Moderate sidewall collapse from 0’-5’.

TP-6

0”-15”	Silty TOPSOIL.
15”-4.5’	Moist, medium dense, brown and gray SILT, trace sand and clay.
4.5’-7’	Wet, very loose, gray SAND, some gravel. Note: Heaving sands.

Notes: Groundwater encountered at 4.5’, significant cave-in; visibly heaving sands and groundwater.

TP-7

0”-12”	Sandy TOPSOIL.
12”-3.5’	Damp, brown and gray, very silty CLAY.
3.5’-4.5’	Wet, medium dense, brown SAND, some gravel.
4.5’-10.5’	Damp, very stiff, gray, very silty CLAY, some gravel, minor cobbles.

Notes: Groundwater seepage at 3.5’, sturdy walls; no cave-ins; very hard digging in clay layer 4.5-10.5’.

TP-8

0”-12”	Moist TOPSOIL.
12”-3’	Moist, soft, gray and brown CLAY.
3’-4.5’	Damp, soft, gray and brown, silty CLAY.
4.5’-6’	Moist to wet, medium dense, brown GRAVEL, some sand.
6’-11’	Damp, very stiff, gray silty CLAY, minor cobbles.

Notes: Minor groundwater seepage at 6’, sturdy walls; no cave-ins; very hard digging in clay layer 6-11’.

ATTACHMENT C

Test Pit Photos

Image 1: TP-1

Image 2: TP-1 Spoils

Image 3: TP-2

Image 4: TP-2 Spoils

Image 5: TP-3

Image 6: TP-3 Spoils

Image 7: TP-4

Image 8: TP-4 Spoils

Image 9: TP-5

Image 10: TP-5 Spoils

Image 11: TP-6

Image 12: TP-6 Spoils

Image 13: TP-7

Image 14: TP-7 Spoils

Image 15: TP-8

Image 16: TP-8 Spoils