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GEOTECHNICAL CONSULTANTS INC.

GCI PROJECT #20-G-23929-A

Subsurface Exploration and Geotechnical Engineering Report

Portage County Rest Area Replacement
ODOT Rest Area 04-35
Interstate 76 – Eastbound, Mile Marker 45.0
Edinburg, Ohio

Prepared for:
ms consultants, Inc.

June 1, 2020

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June 1, 2020

Mr. Jim Seiple, AIA, NCARB
ms consultants, Inc.
333 East Federal Street
Youngstown, Ohio 44503

Reference: Subsurface Exploration and Geotechnical Engineering Report
Portage County Rest Area Replacement (ODOT Rest Area 04-35)
Interstate 76-Eastbound – Mile Marker 45.0
Edinburg, Ohio
GCI Project No. 20-G-23929-A

Dear Mr. Seiple:

Geotechnical Consultants, Inc. (GCI) has performed a subsurface exploration and prepared a geotechnical engineering report for the above referenced project. In summary, three (3) of the borings encountered existing fill soils that will require modification. Beneath the fill and below the natural topsoil in the other borings, we encountered natural glacial drift and residual soils. Shale-based bedrock underlain by brown sandstone was encountered at depths ranging between 8.5 and 12.0 feet below existing grades. Groundwater seepage was not encountered in the borings.

Geotechnical issues that will impact site development are the existing construction and demolition, existing fill soil modification, site stripping, site and subgrade preparation, and controlled fill placement and compaction. Provided these considerations are properly addressed during construction, it is GCI's opinion that the site geotechnical conditions are suitable for the proposed new construction utilizing conventional shallow foundation systems, typical slabs-on-grade design, and rigid or flexible pavements. The attached report addresses these and other issues and provides more detailed recommendations.

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.

Tim Petrilla, E.I.
Project Manager

Joseph D. Stafford, P.E.
In-House Reviewer

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INTRODUCTION

As requested and authorized by Mr. Jim Seiple of ms consultants, Inc. (MS), Geotechnical Consultants, Inc. (GCI) has performed a subsurface exploration and prepared this geotechnical engineering report for the proposed Portage County Rest Area Replacement (ODOT Rest Area 04-35) located on Interstate 76-Eastbound at mile marker 45.0 in Edinburg, Ohio. Prior to drilling, MS provided us with a site plan showing the proposed new building and pavement area, the requested boring locations, and an existing site survey.

Our study consisted of five (5) standard penetration test borings for the proposed new building and parking area expansion. GCI field located the borings, at the requested locations, using the provided site plan and existing site landmarks; locations should be considered approximate. Ground surface elevations indicated on the boring logs were interpolated using the provided topographic/survey information. We attach a sketch showing the approximate boring locations and copies of the boring logs in the appendix.

The intent of this study was to evaluate subsurface conditions and offer geotechnical recommendations relative to earthwork, foundations, slabs, and pavements for the proposed rest area replacement. We issue this report 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.

We prepared this report for the exclusive use of ms consultants, Inc. and their consultants for specific application to the above referenced project in Edinburg, Ohio in accordance with generally accepted soil and foundation engineering practices. We make no warranty,

expressed or implied.

SITE LOCATION AND PROJECT DESCRIPTION

The existing Portage County Rest Area (ODOT Rest Area 04-35) is located on the south side of Interstate 76 - Eastbound at mile marker 45.0 in Edinburg, Ohio. The general site location is shown on the *Site Location Map* (DeLorme Street Mapping) included in the Appendix.

Presently, the site is occupied by the Portage County Rest Area (ODOT Rest Area 04-35). The existing rest room building is located in a grass area on the south center portion of the site. An auxiliary vending machine building is located east of the rest room building. Both existing buildings will be demolished (removed) as part of the replacement. An automobile parking area is located north of the building area, with a truck parking area north of the automobile parking area. The site has several concrete sidewalk/walking paths, an existing pavilion, and several picnic tables. These items may be removed as part of the replacement. The aerial photograph below shows existing buildings, adjacent site features, and the boring locations.

Aerial photograph from the Google Earth©, June 2019

Topographically, the site generally slopes downward from the west to the east, from about elevation 1118 feet to about 1100 feet in the southeast corner. Surface elevations at the building boring locations (B-3 through B-5) ranged between 1115 and 1118 feet. Southeast of the existing rest room building, generally east of the proposed building location, there is an existing swale feature. Based on the proposed site plan, a portion of this swale area will need to be filled. GCI understands that to the extent possible, existing parking area grades will not change significantly. Based on this and the ground surface elevations at the boring locations, we anticipate that the new rest room building finish floor elevation will be at or near ±1118 feet.

The project consists of demolishing the existing rest room and vending machine buildings and replacing them with a new prototypical ODOT rest room design (single building). Additionally, a new automobile parking area will be constructed to the south of its existing location (north of the proposed new building), and a new truck parking area will be constructed to the north of the new automobile parking area. The proposed new truck parking area will generally encompass the existing truck parking area and the existing automobile parking area. The project will include a new dumpster enclosure and sidewalks. A new emergency/maintenance drive will be located on the east side of the new building. Based on the proposed site plan, it appears that modification of the upper portions of existing rest area entrance/exit ramps, proximate to the new parking areas, will be required.

SUBSURFACE CONDITIONS

GCI mobilized a track-mounted, rotary drill rig (CME-45 with automatic sampling hammer) to the site on May 22, 2020. We drilled five (5) standard penetration test borings (B-1 to

B-5) at the requested locations. The borings extended to depths ranging between 17.0 and 18.5 feet below existing grades. We have attached boring logs, a copy of the *Boring Location Plan*, and a summary table of encountered subsurface conditions in the appendix. We summarize the subsurface findings below. Refer to the individual boring logs for more detailed subsurface information at specific boring locations.

Surface Cover & Existing Fill Soils

Topsoil (both fill and natural) was encountered at each boring location. The topsoil thickness ranged between 5 and 6 inches at each boring location. Due to the project site's size and setting, wooded perimeter and some randomly located trees, we anticipate that topsoil thickness will vary. It has been our experience that topsoil is thicker in low-lying, wooded areas, and along tree lines.

Borings B-1, B-2, and B-3 encountered existing fills soils below surface topsoil fill cover. In general, these fill soils were comprised of brown, gray, dark gray, and black sandy silt, silty sand, and silty clay and containing varying amounts of gravel and rock fragments. Traces of organics and vegetation were present within the fill layer at all sample depths. Standard Penetration testing generally indicated existing fill soils to be loose to medium dense in cohesionless density. We generally describe the retrieved soil samples from the existing fill layer as very moist.

Natural Soils

Below the existing fill (B-1 through B-3) and the natural topsoil surface cover (B-4 and B-5), the borings encountered natural glacial drift transitioning to residual soils (soils formed in-place from the weathering of parent bedrock, in this case sandstone and shale). The

glacial drift and residual soils generally consisted of grayish brown sandy silt (ML)*, brown sandy silt (ML)*, brown silt with sand (ML)*, brown lean clay (CL)*, and brown lean clay with sand (CL)*. These glacial drift and residual soils extended to depths ranging between 8.5 and 12.0 feet below existing grades. Standard Penetration testing indicated the silt-based soils to generally be medium dense in cohesionless density and the clay-based soils to be stiff to very stiff in cohesive consistency. We generally describe the retrieved soil samples from the glacial drift and residual soil layer as moist.

*Unified Soil Classification System (USCS) soil classification

Bedrock

Below the residual soils in borings B-1 through B-4, we encountered a shale-based bedrock formation comprised of brown highly weathered shale (with thin seams of fire clay and traces of lignite), black shale and lignite, and brown and black weathered shale with lignite. This shale-based formation with varying amounts of coal and lignite extended to depths ranging between 13.5 and 15.0 feet below existing grades.

Below the shale-based formation (B-1 to B-4) and below the residual soils in B-5, the borings encountered brown sandstone. Borings B-4 and B-5 terminated upon encountering auger (drilling refusal) at a depth of 18.0 and 17.0 feet below existing grades, respectively. The remaining borings terminated upon split-spoon driving refusal[1] in the brown sandstone formation at a depth of 18.5 feet below existing grades.

1. Split-spoon driving refusal is defined as greater than 50 hammer blows required to advance the sampler 6 inches.

Groundwater

Groundwater seepage was not encountered in any of the borings during the drilling process. At the completion of the drilling process, the borings were reported as dry.

Note that soil moisture conditions and groundwater observations fluctuate due to changes in precipitation, climate, stabilization time and other factors that may differ from the time the measurements were made.

LABORATORY TESTING

Natural moisture content, Atterberg Limits, and grain size analysis testing were performed on select samples obtained from the borings. The purpose of the laboratory testing was to provide information to refine our soil classifications and to evaluate the characteristics of the subsurface strata. Results of the lab testing are incorporated in the soil descriptions above and in the attached boring logs. The results of the laboratory testing are included in the appendix and summarized in the following .

Boring Number	Sample Depth (ft.)	Moisture Content (%)	Grain Size Distribution			Atterberg Limits		
			% Gravel	% Sand	% Silt & Clay	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index
B-1	2.0 - 3.5	32.4	-	-	-	-	-	-
B-1	4.0 - 5.5	18.6	-	-	-	-	-	-
B-1	8.5 - 10.0	15.3	-	-	-	-	-	-
B-1	13.5 - 15.0	22.5	-	-	-	-	-	-
B-2	2.0 -3.5	17.7	-	-	-	-	-	-
B-2	4.0 -5.5	23.2	-	-	-	-	-	-
B-2	8.5 - 10.0	13.0	6	31	63	-	-	-
B-3	2.0 - 3.5	29.1	-	-	-	-	-	-
B-3	4.0 - 5.5	13.3	-	-	-	-	-	-
B-3	8.5 - 10.0	16.3	-	-	-	-	-	-
B-4	2.0 - 3.5	15.6	-	-	-	-	-	-
B-4	4.0 - 5.5	16.0	-	-	-	-	-	-
B-4	8.5 - 10.0	20.8	-	-	-	-	-	-
B-5	2.0 - 3.5	17.9	6	16	78	32	21	11
B-5	4.0 - 5.5	14.1	-	-	-	-	-	-
B-5	8.5 – 10.0	9.2	-	-	-	-	-	-

ANALYSES AND CONCLUSIONS

GEOTECHNICAL EVALUATION

Borings B-1, B-2, and B-3 encountered existing fills soils. In general, these fill soils were comprised of brown, gray, dark gray, and black sandy silt, silty sand, and silty clay and contained varying amounts of gravel and rock fragments with traces of organics and vegetation. Based on the location of the existing fill, the fill was likely placed during the original construction of the rest area and associated entrance/exit ramps. We suspect the fill was obtained from the large pond to the east of the project site. Based on the elevated moisture condition of the fill samples obtained from our borings, we do not consider the fill suitable for support of the proposed building (B-3) or the proposed parking areas (B-1 and B-2) without remediation/modification.

Provided the existing fill soils are remediated/modified, as outlined in the following sections, and the site is properly prepared, it is GCI's opinion that the site geotechnical conditions are suitable for the proposed new construction. Conventional shallow foundation systems and typical concrete slabs-on-grade can be supported directly on the stable, non-organic natural site soils or on new controlled fill, placed directly over stable non-organic natural site soils.

The primary geotechnical issues that will impact site development are:

- Demolition of existing site features.
- site stripping, preparation,
- fill remediation/modification,
- subgrade stability, and
- new fill placement and compaction.

We discuss these issues and other considerations in more detail in the following paragraphs.

Demolition of Existing Buildings & Site Features

The new building will be constructed to the southeast of the existing rest room building and southwest of the existing vending machine building. Based on the provided site plan showing proposed and existing site features, there does not appear to be an overlap of existing and proposed building footprints. However, the proposed automobile parking area, new sidewalks, and the emergency/maintenance drive will be constructed within the existing building footprints. Existing buildings, sidewalks, pavements, utilities, and other site features that will interfere with the proposed construction will need to be demolished (removed).

Following removal of these items, controlled fill (backfill) can be placed over suitable subgrades (see below) to achieve proposed grades, once the stability of the underlying subgrades has been verified. See the *Subgrade Stability* and *Fill Placement and Compaction* sections of this report for additional information. **GCI should be retained to observe subgrade stability prior to placement of controlled fill.**

Site Stripping & Preparation

The borings encountered a topsoil (natural and fill) surface cover. Topsoil thicknesses ranged between 5 and 6 inches at the boring locations. We anticipate that topsoil depths will vary across the site. Topsoil is not suitable for supporting building foundations, slabs, or pavements and should be completely removed from below these areas prior to construction. We recommend that topsoil and vegetation be removed (stripped) a minimum of 10 feet laterally beyond proposed construction areas.

The contractor should take the necessary precautions during site clearing, grubbing and stripping work to remove only surface vegetation and organic surface cover materials.

Provided stained natural soils are firm and stable, and relatively free of organic content, they can remain in place for building and pavement support. Topsoil and/or near surface organic soils can be stockpiled for later use in landscaping mounds, redistribution in non-structural areas, or to backfill on-site borrow pits.

Fill Remediation/Modification

Building boring B-3 (near the northwest corner of proposed building) encountered existing fill to the 4.0 feet depth. Due to the boring's location, encountered fill depth, and site walk-over observations, we suspect that B-3 is near the lateral grading limits of the original construction (i.e. existing fill doesn't extend significantly further to the south). Based on this and the relatively shallow fill depth, we recommend removing all existing fill from within the footprint of the proposed building, plus 10 feet laterally. Existing fill soils that are generally free of organic content and other deleterious materials can be reused as controlled fill. Following removal of existing fill and provided the subgrade is firm and stable, controlled fill can be placed to grade, as outlined in *Fill Placement and Compaction Section* of this report.

Borings B-1 and B-2, performed in proposed pavement areas, encountered 5.0 and 8.0 feet of existing fill, respectively. Based on the information obtained from borings B-1 and B-2 and the results of laboratory testing, GCI does not consider the existing fill suitable for pavement support, without modification. We recommend that the existing fill beneath the pavement area extension and new drive lanes be removed (undercut) to a depth of 3 feet below proposed subgrade elevation. Removed (undercut) existing fill soils that are generally free of organic content and other deleterious materials and are at an acceptable moisture content can be reused as controlled fill. Note: Based on our laboratory testing,

we anticipate that some existing fill will be too wet for immediate reuse as controlled fill.

Following undercutting in pavement areas, we recommend that the exposed subgrade (existing fill soil) be thoroughly re-compacted using an appropriately sized soil compactor (i.e. largest compactor feasible). Following removal of existing fill and provided the subgrade is firm and stable (verified through proofrolling), controlled fill can be placed to grade, as outlined in *Fill Placement and Compaction Section* of this report.

If existing fills soils are encountered following stripping procedures in proposed sidewalk areas and at the emergency/maintenance drive area, we suggest that they be evaluated on a case-by-case basis. Provided existing fills are firm and stable, following stripping procedures, it is our opinion that they can remain in-place for sidewalk and emergency/maintenance drive support. As a minimum, we recommend that existing fill soils permitted to remain in-place at these locations be thoroughly re-compacted prior to placement of additional controlled fill soils or sub-base aggregate.

Subgrade Stability

We recommend that the site contractor proof-roll the soil subgrades (natural or existing fill) using a fully-loaded, tandem-axle dump truck (or equivalent) following topsoil stripping, cutting to grade, or existing fill removal, and prior to controlled fill placement or construction of slabs/pavements. Thorough proofrolling will be critical in areas where new pavements meet existing pavements or existing light duty pavement areas will be modified to a heavy duty pavement section (i.e. automobile versus truck parking areas). It has been our experience that these transition areas can be prone to reflective distress (cracking) due to variations in subgrade stability.

The purpose of the proof-roll is 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 placing controlled fill to finished subgrade elevation. Controlled fill should be placed as outlined in the *Fill Placement and Compaction* section of this report.

The upper level site soils were generally moist at the time of this study. Note that the upper-level site soils may be above optimum moisture content depending upon weather at the time of construction and could require some type of subgrade stabilization. The upper level clay and silt-based soils are prone to becoming unstable, particularly when wet. We expect fewer problems with soft and/or wet subgrades if earthwork operations are performed during traditionally drier times of the year (i.e. late spring, summer, and early fall).

Stabilization of soft or wet 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. The use of soil additives such as lime and flyash or installation of geosynthetics should be reviewed by our office prior to use in the field.

Fill Placement and Compaction

At the time of this writing a proposed grading plan was not yet available. Based on existing site grades and our general understanding of the project, we anticipate that cuts

and fills up to ±4 feet will generally be required for the project, with localized deeper fills possible in demolition areas or to the east of the proposed building (existing swale location). Non-organic site soils (natural or fill) can be used as controlled fill for the building pad, pavement areas, and utility trench backfill. GCI should review off-site borrow materials prior to their use.

New fill materials within construction areas should be placed in a controlled manner. Controlled fill in building/sidewalk areas should be placed in maximum 8-inch thick loose lifts and compacted to 98% of the maximum Standard Proctor (ASTM D-698) dry density, within ±2% of the optimum moisture content. Controlled fill in pavement areas (parking and main drive areas) should be placed in maximum 8-inch thick loose lifts and compacted to 100% of the maximum Standard Proctor (ASTM D-698) dry density, within ±2% of the optimum moisture content. Slab, pavement, and sidewalk/drive subgrades should be compacted to a flat, smooth, stable surface with a smooth drum compactor prior to placement of aggregate base materials. Moisture adjustment of the fill materials may be required, particularly if earthwork is performed in the early spring, late fall, or winter seasons.

Note: The compaction recommendations above are not in-lieu of ODOT design specifications. It our opinion based on the boring information, our understanding of the project, and our experience on projects of similar nature. We recommend that if ODOT design specifications are more stringent, ODOT design specifications should be followed.

FOUNDATIONS

Once the site is properly prepared, the stable non-organic site soils or new controlled fill placed directly over stable, non-organic subgrades would be suitable for support of the anticipated structure using a conventional shallow spread footing and continuous wall

foundation system. We recommend designing the foundations for a net allowable bearing capacity not to exceed 2,500 pounds per square foot (PSF).

Regardless of the calculated values, we recommend minimum dimensions of 18 inches wide for wall footings and 36 inches square for isolated column pads to eliminate a potential punching effect. Exterior footings should be placed with a minimum exterior soil cover of 42 inches, extended to local frost code depth, or to stable soils, whichever is deepest. Interior footings in heated areas may be placed as shallow as feasible if bearing in acceptable soils.

If soft or unstable areas are encountered within footing excavations, undercut to stable soils. Undercut areas can be backfilled to bottom of footing elevation using a controlled density fill (CDF). Alternatively, the foundations can be constructed on firm, stable natural soils at the bottom of the undercut. **GCI should be retained to observe soft or unstable bearing soils prior to undercuts.**

FLOOR SLABS

A conventional concrete slab-on-grade is suitable for the proposed building, provided the subgrade is thoroughly proof-rolled and any soft, yielding areas are brought to a stable condition prior to slab construction or placement of aggregate base.

GCI anticipates that the floor slab will generally be lightly loaded and that a concrete slab thickness of 4 inches will be sufficient. GCI recommends placing a minimum of 4 inches of granular fill (such as ODOT Item 304-limestone) under the floor slabs to serve as a capillary cut-off and to provide a uniform, firm sub-base. If required for design, a subgrade

modulus (k) of 130 pounds per cubic inch (pci) can be used to design slabs constructed on 4 inches of aggregate base placed on a firm and stable subgrade. Placement of a vapor barrier below the slabs is recommended in areas where moisture could cause problems with floor finishes.

Note: This recommendation is not in-lieu of ODOT minimum or typical design standards. It our opinion based on the boring information, our understanding of the project, and our experience on projects of similar nature. We recommend that if ODOT design standards are more stringent, ODOT design standards should be followed.

SEISMIC FACTOR

Three (3) of the borings encountered surface fill extending to depths ranging between 4.0 and 8.0 feet below existing grades. Below the fill and beneath the topsoil in the other (2) borings, the borings generally encountered loose to medium dense and medium stiff glacial drift and residual soils. Shale-based bedrock transitioning to sandstone was encountered at depths ranging between 8.5 and 12.0 feet below existing grades. Based on the borings and in accordance with the Ohio Building Code, we *estimate* the site as a Site Class C – *Very Stiff Soil and Soft Rock*. We do not consider liquefaction to be an issue for this project.

CUT AND FILL SLOPES

At the time of this writing a proposed grading plan was not yet available. Based on existing site grades and our general understanding of the project, we anticipate a combination of localized cuts and fills, generally on the order of ±4 feet (or less) will be needed to construct a level building pad and desired grades in proposed pavement and drive areas. Final grading of slopes, either created or existing (modified), should be no steeper than 2H:1V. If slopes steeper than 2H:1V are required, they should be properly reinforced with geo-grid. For ease of mowing and maintenance, we recommend that final grading of slopes not exceed 3H:1V.

EXCAVATIONS & GROUNDWATER

The site soils (natural and existing fill) can be excavated with conventional track-hoe equipment. We encountered shale-based bedrock transitioning to sandstone bedrock at depths ranging between 8.5 and 12.0 feet below existing grades. Depending on finalized site grading, rock may impact deeper utilities. We anticipate that deeper excavations that extend into the upper portions of the rock formation (upper ±2 feet) can be excavated using conventional track-hoe equipment, albeit with some difficulty. Below this depth (±12 feet), excavations into the intact sandstone formation may be difficult without the use of pneumatic equipment. **All site excavations should comply with current OSHA regulations.**

Groundwater seepage was not encountered in any of the borings during the drilling process. At the completion of the drilling process, the borings were reported as dry. Based on this, it is GCI's opinion that groundwater will not significantly impact construction.

If water is encountered in shallow site excavations (perched in the existing fill layer or near the fill/natural soil interface), the excavations should be dewatered to allow footing construction and utility trench backfilling in dry conditions. We expect groundwater seepage flows and surface runoff in shallow excavations can be handled with portable sump pumps and working mats of crushed stone, as needed. Contact GCI for additional recommendations if excessive groundwater conditions are encountered.

PAVEMENTS

As part of the project, the existing truck parking area will be extended to the south and a new automobile parking area will be constructed south of that. Additionally, a new

automobile entrance/exit (to/from the proposed parking area) will be constructed. Presently, existing parking area and entrance ramps are asphalt. Provided the site is properly prepared, conventional aggregate base under flexible (asphalt) or rigid (concrete) pavements can be used.

Prior to pavement construction, the subgrade should be carefully proofrolled, and stabilized as necessary. As previously stated, thorough proofrolling will be critical to long term pavement performance in areas where new pavements meet existing pavements or existing light duty pavement areas will be modified to a heavy duty pavement section (i.e. automobile versus truck parking areas). Properly compacted, we feel that the site soils would have a CBR value of at least 3. A specific pavement design is beyond the scope of work for this report; GCI can provide one if requested. A site-specific pavement design would require additional laboratory testing and pavement use criteria. We provide general design guidelines for both rigid and flexible pavements below, along with other pavement considerations.

Rigid Pavements

Based on the soils encountered in the borings, our experience with projects of similar size and nature, and assuming properly prepared subgrades, we feel that a minimum design thickness of 7 inches of air-entrained concrete (4,000 psi minimum 28-day compressive strength) overlying 8 inches of aggregate base (ODOT Item 304) is adequate for light-duty (automobile) parking areas. For heavy-duty (truck) areas and new travel lanes, we recommend a minimum pavement section consisting of 10 inches of air-entrained concrete (4,000 psi minimum 28-day compressive strength) overlying 8 inches of aggregate base (ODOT Item 304 crushed limestone). If required for design, a subgrade

modulus (k) of 150 pounds per cubic inch (pci) can be used to design rigid pavements constructed on 10 inches of aggregate based placed on a firm and stable subgrade.

Flexible (Asphalt) Pavements

Based on the soils encountered in the borings, our experience with projects of similar size and nature, and assuming properly prepared subgrades, we feel that a minimum design thickness of 5 inches of asphalt overlying 8 inches of aggregate base (ODOT Item 304) is adequate for light-duty (automobile) parking areas. For heavy-duty (truck) areas and new travel lanes, we recommend a minimum pavement section consisting of 8 inches of asphalt overlying 10 inches of aggregate base (ODOT Item 304 crushed limestone).

Installing a medium-duty geogrid (Tensar BX 1200, TX 160, or equivalent) below the base aggregate course in areas subjected to stopping and turning traffic or concentrated traffic flow will increase the structural number of the pavement section and improve the pavement performance.

Sub-base Drainage

Providing adequate subbase drainage is important to future pavement performance. Finger drains connecting to weep-holes at inlet structures, underdrains at pavement transitions (i.e. rigid to flexible), proper grading of pavement subgrades and surfaces to shed run-off, and under drains in pavement swales are suggested subbase drainage methods and should be designed by the site civil engineer. Prior to pavement construction, the subgrade should be carefully proof-rolled, stabilized (as necessary), and flat wheel rolled to a smooth draining surface.

Emergency/Maintenance Drive

A new emergency/maintenance drive will be constructed on the east side of the new building, extending from the new automobile parking area. Due to the anticipated limited vehicle usage of the access drive we suggest a minimum pavement thickness of 6 inches of air-entrained concrete (4,000 psi minimum 28-day compressive strength) overlying 6 inches of aggregate base (ODOT Item 304-limestone). If required for design, a subgrade modulus (k) of 140 pounds per cubic inch (pci) can be used to design rigid pavements constructed on 6 inches of aggregate base placed on a firm and stable subgrade.

Note: The pavement recommendations above are not in-lieu of ODOT minimum or typical design standards. It our opinion based on the boring information, our understanding of the project, and our experience on projects of similar nature. We recommend that if ODOT design standards are more stringent, ODOT design standards should be followed.

SITE PREPARATION AND EARTHWORK

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

1. Demolish existing buildings, removing any below grade structural elements and utilities that would interfere with the proposed construction. Remove surface vegetation, topsoil, pavements, sidewalks, etc. from within the proposed construction areas, plus 5 feet laterally. Topsoil can be stockpiled for redistribution in proposed green space areas, reuse in landscaping mounds, or to backfill on-site borrow pits, otherwise haul the topsoil off-site.

2. Existing fill soils in the proposed new building area should be removed from within the proposed building footprint, plus 10 feet laterally. Non-organic existing fill soils obtained from the removal process are suitable for reuse in controlled fills, provided their moisture content is at an acceptable condition. Refer to the *Fill Placement & Compaction Section* of this report for additional information.

3. Existing fill soils in proposed new parking and main drive areas should be modified, partial remove and replace. For this we recommend undercutting (removing) existing fills soils to a depth of 3 feet below proposed subgrade. Non-organic existing fill soils, obtained from the undercut process are suitable for reuse in controlled fills, provided their moisture content is at an acceptable condition. Refer to the *Fill Placement & Compaction Section* of this report for additional information.

4. 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 or aggregate base material.

5. Place controlled fills to design grade within proposed construction areas, as required. Non-organic site soils (natural or existing fill) are suitable for reuse in controlled fills, provided they are at an acceptable moisture content. **Off-site borrow materials should be reviewed by our office prior to use.**

6. Place controlled fill in building/sidewalk areas in maximum 8-inch thick loose lifts and compacted to 98% of the maximum Standard Proctor (ASTM D-698) dry density, within ±2% of the optimum moisture content. Controlled fill in pavement areas (parking and main drive areas) should be placed in maximum 8-inch thick loose lifts and compacted to 100% of the maximum Standard Proctor (ASTM D-698) dry density, within ±2% of the optimum moisture content. Depending on the time of year of earthwork, moisture adjustment of the site soils may be required to achieve proper compaction. Cohesive soils will compact best with a sheepsfoot roller. Granular soils compact best with a vibratory smooth-drum compactor.

7. Construct foundations and start building construction after the building pad is filled to grade. Refer to the *Foundations* section of this report for specific foundation design parameters.

8. The building pad and pavement area subgrades should be steel-wheel rolled to a smooth surface prior to placement of the under-slab/pavement aggregate base course.

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

10. Precautions should be taken when performing earthwork operations during winter weather or when freezing temperatures may occur. Contact GCI for additional recommendations on cold-weather earthwork operations, if applicable.

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, undercutting, controlled fill placement, compaction, foundation bearing capacity verification, utility trench backfill, etc.),
- slab preparation (proof-rolling, excavations, undercuts, etc.),
- masonry (grout and mortar testing, reinforcing steel inspection),
- concrete placement and compressive strength testing (footings, slabs, pavements, etc.), and
- structural steel (welds, bolts, etc.).

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

General Notes for Soil Sampling and Classifications
General Site Location Map (DeLorme Street Atlas USA – 2016)
Site Survey (provided by client)
Boring Location Plan with Proposed Construction (provided by client)
Test Boring Logs (B-1 to B-5)
Summary of Encountered Subsurface Conditions
Laboratory Test Data Sheet (1 page)

GEOTECHNICAL CONSULTANTS INC.

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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.

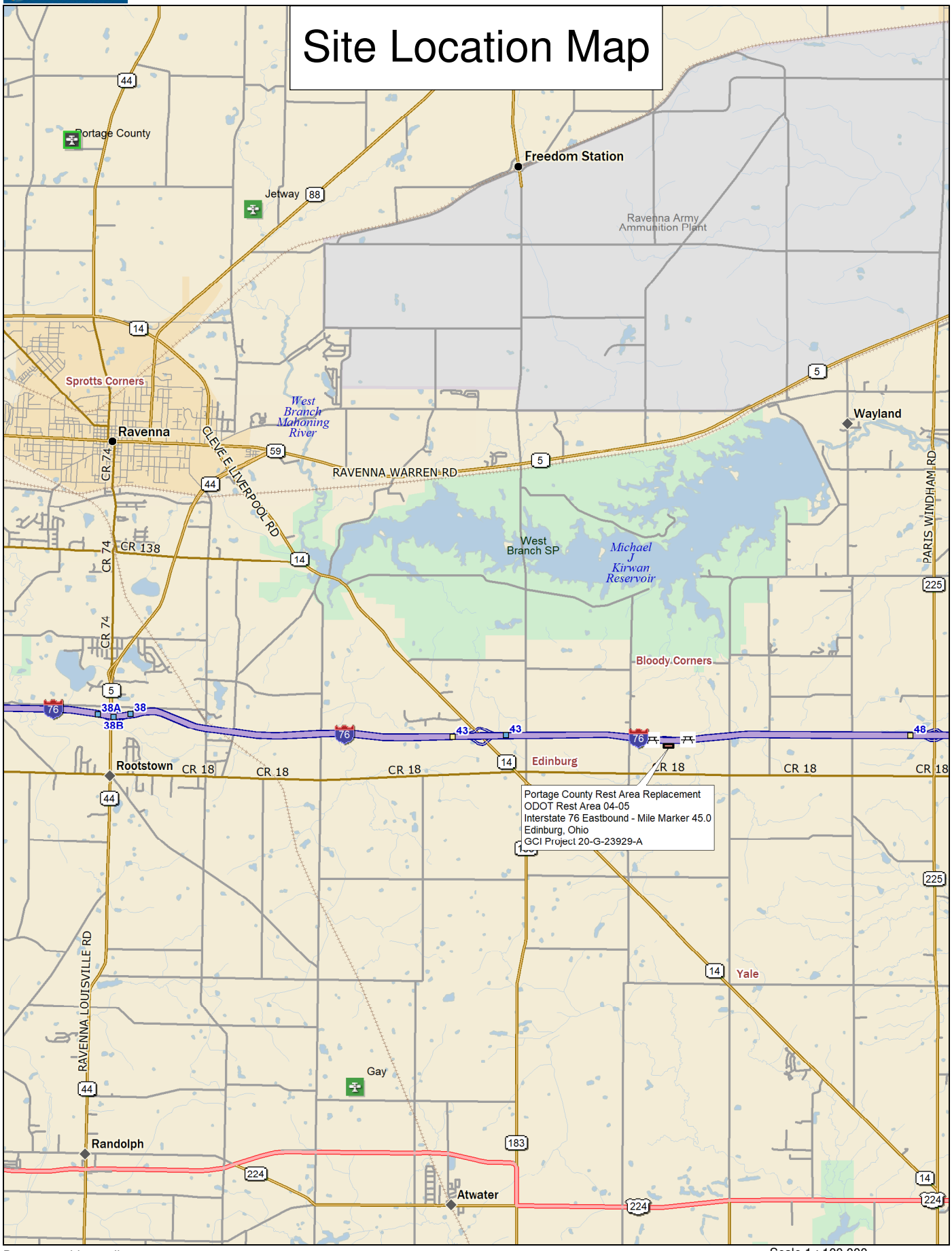
Soil classifications are based on the following tables (see reverse side):

GENERAL NOTES FOR SOIL SAMPLING AND CLASSIFICATIONS

PARTICLE SIZE DEFINITION			CONSTITUENT MODIFIERS	
Boulders:		>12"		
Cobbles:		3" to 12"	Trace	Less than 5%
Gravel:	Coarse:	3/4" to 3"	Few	5-10%
	Fine:	No. 4 (3/16") to 3/4"	Little	15-25%
Sand:	Coarse	No. 10 (2.0mm) to No. 4 (4.75mm)	Some	30-45%
	Medium	No. 40 (0.425mm) to No. 10 (2.0mm)	Mostly	50-100%
	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	*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

Site Location Map



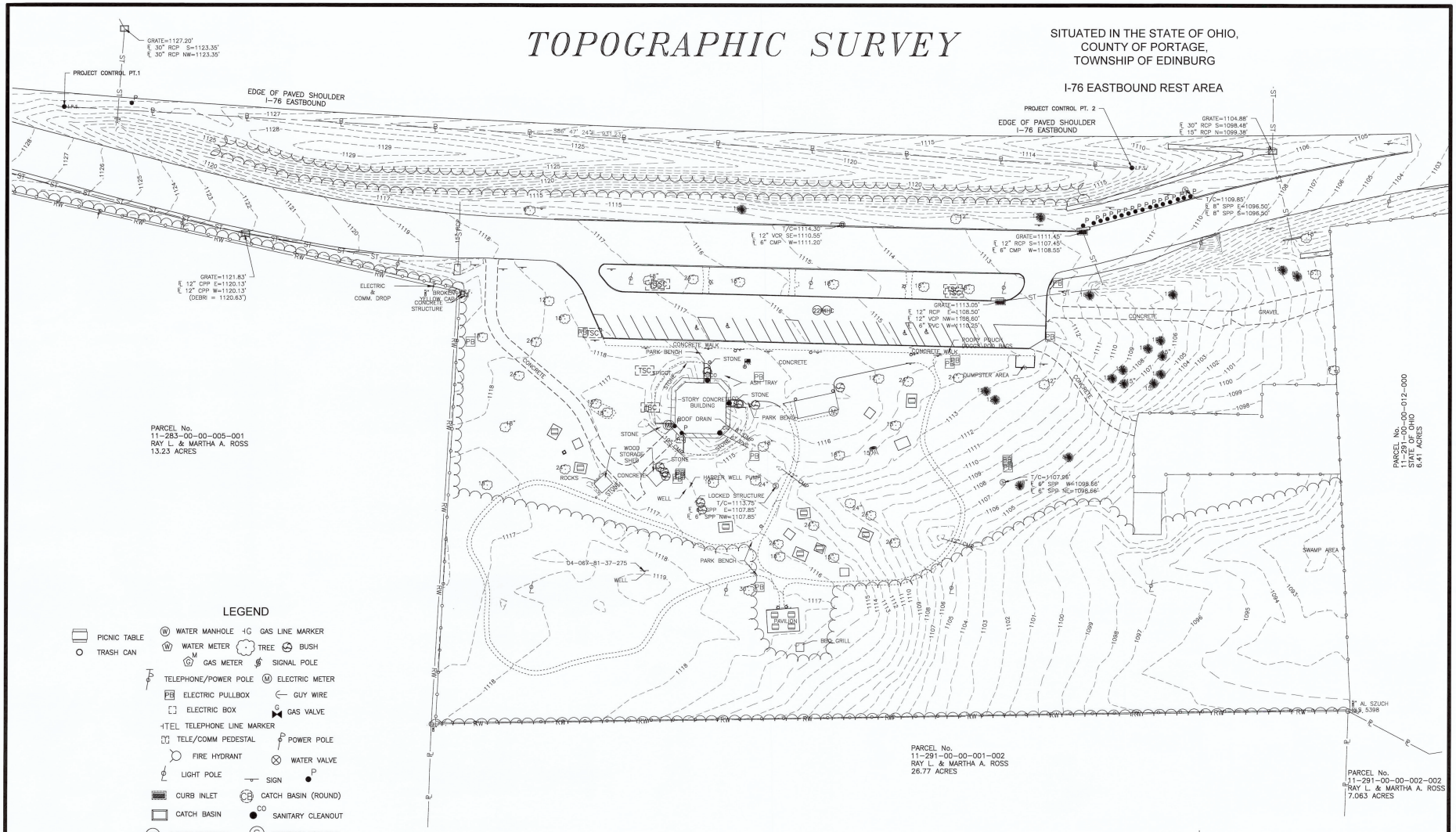
TN
MN (8.9°W)

Scale 1 : 100,000
1" = 1.58 mi
Data Zoom 11-0

TOPOGRAPHIC SURVEY

SITUATED IN THE STATE OF OHIO,
COUNTY OF PORTAGE,
TOWNSHIP OF EDINBURG

I-76 EASTBOUND REST AREA



LEGEND

- PICNIC TABLE
- TRASH CAN
- WATER MANHOLE
- WATER METER
- GAS METER
- TELEPHONE/POWER POLE
- ELECTRIC PULLBOX
- ELECTRIC BOX
- TELE/COMM PEDESTAL
- FIRE HYDRANT
- LIGHT POLE
- CURB INLET
- CATCH BASIN
- STORM MANHOLE
- GAS LINE MARKER
- TREE
- BUSH
- SIGNAL POLE
- ELECTRIC METER
- GUY WIRE
- GAS VALVE
- TELEPHONE LINE MARKER
- POWER POLE
- WATER VALVE
- SIGN
- CATCH BASIN (ROUND)
- SANITARY CLEANOUT
- SANITARY MANHOLE
- I.P.F. IRON PIN FD.
- P.F. IRON PIPE FD.

- EDGE OF PAVEMENT
- STORM SEWER
- SANITARY SEWER
- WATERLINE
- SURVEY BASE LINE

VERTICAL DATUM

ELEVATIONS ARE ESTABLISHED BY A VRS/GNSS SURVEY WITH THE OHIO DEPARTMENT OF TRANSPORTATION REFERENCE STATION COLB. THE VERTICAL COMPONENT OF THE VRS NETWORK IS BASED ON NAVD 88 AS DETERMINED BY THE NGS (NATIONAL GEODETIC SURVEY).

OHGA (SOURCE) = 1,097.04'

PROJECT CONTROL

CONTROL PT. #1		CONTROL PT. #2	
NORTH:	527,045.250	NORTH:	526,993.104
EAST:	2,350,112.457	EAST:	2,351,042.228
ELEV.:	1,128.21	ELEV.:	1,114.45

⅝" x 30" REBAR SET WITH A RED "MS CONS. INC. TRAVERSE" CAP

UTILITY STATEMENT:

THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES AS SHOWN HEREON. THE UNDERGROUND UTILITIES SHOWN HEREON HAVE BEEN APPROXIMATELY PLATTED BASED ON LOCATIONS FROM AN ACTUAL FIELD SURVEY, AND/OR INFORMATION OBTAINED FROM RECORD PLANS AND MAPS. THE SURVEYOR MAKES NO GUARANTEE THAT THE UNDERGROUND UTILITIES SHOWN HEREON COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN HEREON ARE IN THE EXACT LOCATION INDICATED, ALTHOUGH DOES STATE THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE.

BASIS OF BEARING

'NORTH' FOR THIS SURVEY IS BASED ON THE SURVEY BASE LINE BETWEEN CONTROL PTS. 1 & 2, AS BEING SOUTH 87° 47' 24" EAST AS ESTABLISHED BY A VRS/GPS SURVEY ON MARCH 23, 2020 AND IS TIED TO THE OHIO STATE PLANE COORDINATE SYSTEM, NORTH ZONE AND THE NORTH AMERICAN DATUM OF 1983 (2011).

GRAPHIC SCALE
0 20 40 80
1 inch = 40 feet

PREPARED BY:

THE FOREGOING TOPOGRAPHIC SURVEY WAS PREPARED BY ms consultants, inc. UNDER THE DIRECTION AND SUPERVISION OF CHAD S. SNOW FROM AN ACTUAL FIELD SURVEY PERFORMED IN APRIL 10, 2020.

04/30/20

CHAD S. SNOW
REGISTERED PROFESSIONAL SURVEYOR NO. 8559

FIELD SURVEY BY: MDK
CHECKED BY APPROVED BY: CSS
ISSUE DATE: 04/30/2020

REVISION

#	DATE	DESCRIPTION

ms consultants, inc.
engineers, architects, planners
2221 Schrock Road
Columbus, Ohio 43229-1547
p 614 895 7100
f 614 895 7570
www.msconsultants.com

CLIENT

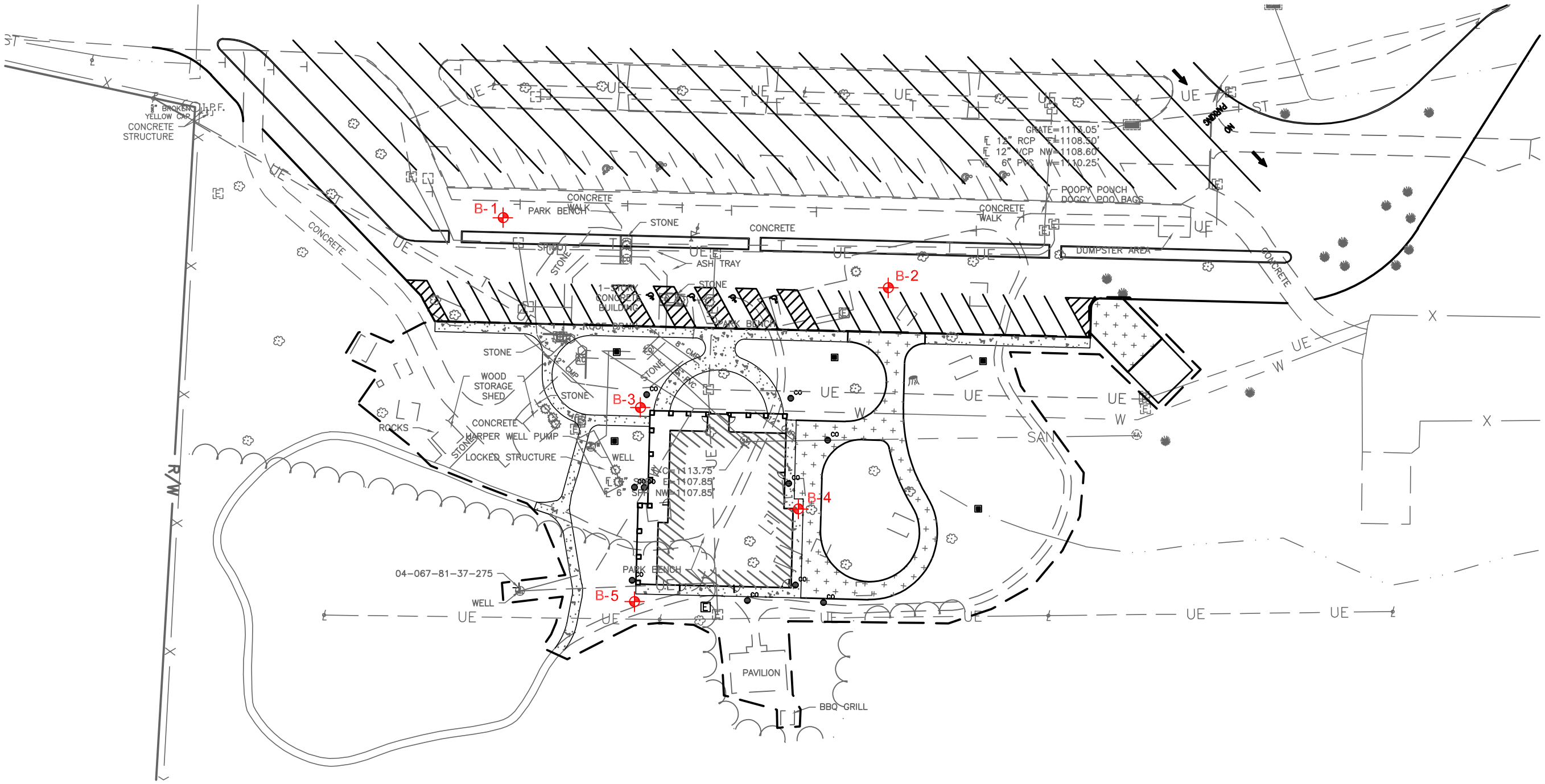
PROJECT
ODOT REST AREA
I-76
Edinburg, Ohio 44272
Portage County

CHAD STEWART 8559 REGISTERED PROFESSIONAL SURVEYOR

PROJECT NO. 64-12A14-02

SHEET TITLE: TOPOGRAPHIC SURVEY

SHEET: C300



LEGEND

FEATURE	DESCRIPTION
⊕	PROPOSED BORING

BORING INFORMATION

NAME	NORTHING	EASTING
B-1	526829.7551	2350610.6310
B-2	526794.3011	2350805.1369
B-3	526733.8863	2350679.9748
B-4	526682.6379	2350759.7378
B-5	526635.8605	2350677.0604

0 15 30 45 60
SCALE: 1"=30'

OHIO UTILITIES PROTECTION SERVICE
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811 OR 1-800-362-2764

DRAWN BY

CHECKED BY
APPROVED BY

ISSUE DATE

REVISION

#	DATE	DESCRIPTION
	5/1/20	DD SUBMISSION

2221 Schrock Road
Columbus, Ohio 43229-1547
p 614.898.7100
f 614.898.7570
www.msconsultants.com

CLIENT

PROJECT
REST AREA BUILDING REPLACEMENT
I-76
Edinburg, Ohio 44272
Portage County

NOT FOR CONSTRUCTION

PROJECT NO.

SHEET TITLE
BORING PLAN - EB

SHEET
BP-2

TEST BORING LOG

PROJECT NAME **I76 EB - Portage - ODOT Rest Area Replacement - Edinburg, Ohio** BORING NO. **B-1**

PROJ. SURF. ELEV. **1118±**

CLIENT **ms consultants, inc.** NO. **20-G-29929-A** DATE DRILLED **5/22/2020**

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	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
	0.0-1.5	SS	2	3	2	Very Moist	0.5	6" Topsoil
								FILL: Brown and Black Sandy Silt and Silty Clay, Few Gravel and Rock Fragments, Trace of Vegetation and Organic Material
	2.0-3.5	SS	3	4	5	Very Moist		
	4.0-5.5	SS	4	4	5	Moist		
5							5.0	
								Grayish Brown Silt with Sand (ML) - little medium to fine sand, trace of gravel, slight plasticity
							7.0	
								Brown Lean Clay with Sand (CL) - little medium to fine sand, few gravel, low plasticity
	8.5-10.0	SS	10	12	16	Moist		
10								
							12.0	
								Brown Highly Weathered Shale with Thin Seams of Gray Fire Clay, Trace of Lignite
	13.5-14.6	SS	21	26	50/1	Moist		
							14.5	
15								Brown Sandstone
							18.5	
	18.5	SS	50/0			Damp		
								Bottom of Boring at 18.5 feet

*** 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 **I76 EB - Portage - ODOT Rest Area Replacement - Edinburg, Ohio** BORING NO. **B-2**

PROJ. SURF. ELEV. **1117±**

CLIENT **ms consultants, inc.** NO. **20-G-29929-A** DATE DRILLED **5/22/2020**

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	Sample Depths From To	Type of Sample	Blows per 6" on Sampler 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
	0.0-1.5	SS	4	7	6	Moist	0.5	6" Topsoil
								FILL: Brown and Dark Gray Sandy Silt, Silty Sand, Rock Fragments, Trace of Vegetation
	2.0-3.5	SS	6	6	7	Moist		
	4.0-5.5	SS	5	7	9	Very Moist		
5							8.0	
	8.5-10.0	SS	8	9	15	Moist		Brown Sandy Silt (ML) - some coarse to fine sand, few gravel, slight plasticity
10							12.0	
								Black Lignite and Coal
	13.5-13.6	SS	50/1			Moist		
15							15.0	
								Brown Sandstone
							18.5	
	18.5	SS	50/0			Damp		
								Bottom of Boring at 18.5 feet

*** 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 **I76 EB - Portage - ODOT Rest Area Replacement - Edinburg, Ohio** BORING NO. **B-3**

PROJ. SURF. ELEV. **1115±**

CLIENT **ms consultants, inc.** NO. **20-G-29929-A** DATE DRILLED **5/22/2020**

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	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
	0.0-1.5	SS	5	5	5	Very Moist	0.5	6" Topsoil
								FILL: Brown and Gray Sandy Silt and Silty Clay, Few Gravel and Rock Fragments, Trace of Vegetation and Organic Material
	2.0-3.5	SS	7	9	12	Very Moist		
							4.0	
	4.0-5.5	SS	8	8	8	Moist		Brown Sandy Silt (ML) - some coarse to fine sand, few gravel, slight plasticity
5							7.0	
								Brown Lean Clay with Sand (CL) - little medium to fine sand, few gravel, low plasticity
	8.5-10.0	SS	8	12	15	Moist		
10							12.0	
								Brown and Black Weathered Shale with Lignite
	13.5-13.8	SS	50/3			Moist	14.0	
								Brown Sandstone
15								
							18.5	
	18.5	SS	50/0			Damp		
								Bottom of Boring at 18.5 feet

*** 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 **I76 EB - Portage - ODOT Rest Area Replacement - Edinburg, Ohio** BORING NO. **B-4**

PROJ. SURF. ELEV. **1115±**

CLIENT **ms consultants, inc.** NO. **20-G-29929-A** DATE DRILLED **5/22/2020**

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	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
	0.0-1.5	SS	4	5	7	Moist	0.4	5" Topsoil
								Grayish Brown Sandy Silt (ML) - some medium to fine sand, trace of gravel, slight plasticity
	2.0-3.5	SS	7	9	12	Moist		
							4.0	
	4.0-5.5	SS	8	12	15	Moist		Brown Sandy Silt (ML) - some coarse to fine sand, few gravel, slight plasticity
5								
							8.5	
	8.5-9.0	SS	55			Moist		Brown and Black Weathered Shlae with Lignite
10								
							13.5	
	13.5	SS	50/0			Moist		Brown Sandstone
15								
							18.0	
						Damp		Auger Refusal at Bottom of Boring at 18.0 feet

*** 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 **I76 EB - Portage - ODOT Rest Area Replacement - Edinburg, Ohio** BORING NO. **B-5**

PROJ. SURF. ELEV. **1118±**

CLIENT **ms consultants, inc.** NO. **20-G-29929-A** DATE DRILLED **5/22/2020**

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	Sample Depths From To	Type of Sample	Blows per 6" on Sampler 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
	0.0-1.5	SS	3	4	6	Moist	0.5	6" Topsoil
							2.0	Grayish Brown Silt (ML) - few fine sand, slight plasticity
	2.0-3.5	SS	4	5	6	Moist		Brown Lean Clay with Sand (CL) - little medium to fine sand, few gravel, low plasticity
	4.0-5.5	SS	6	7	10	Moist		
5							8.5	
	8.5-8.6	SS	50/1			Moist		Brown Weathered to Intact Sandstone
10								
	13.5	SS	50/0			Damp		
15							17.0	
								Auger Refusal at Bottom of Boring at 17.0 feet

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

720 Greencrest Drive • Westerville, Ohio 43081 • 614-895-1400

Summary of Encountered Subsurface Conditions

Portage County Rest Area Replacement

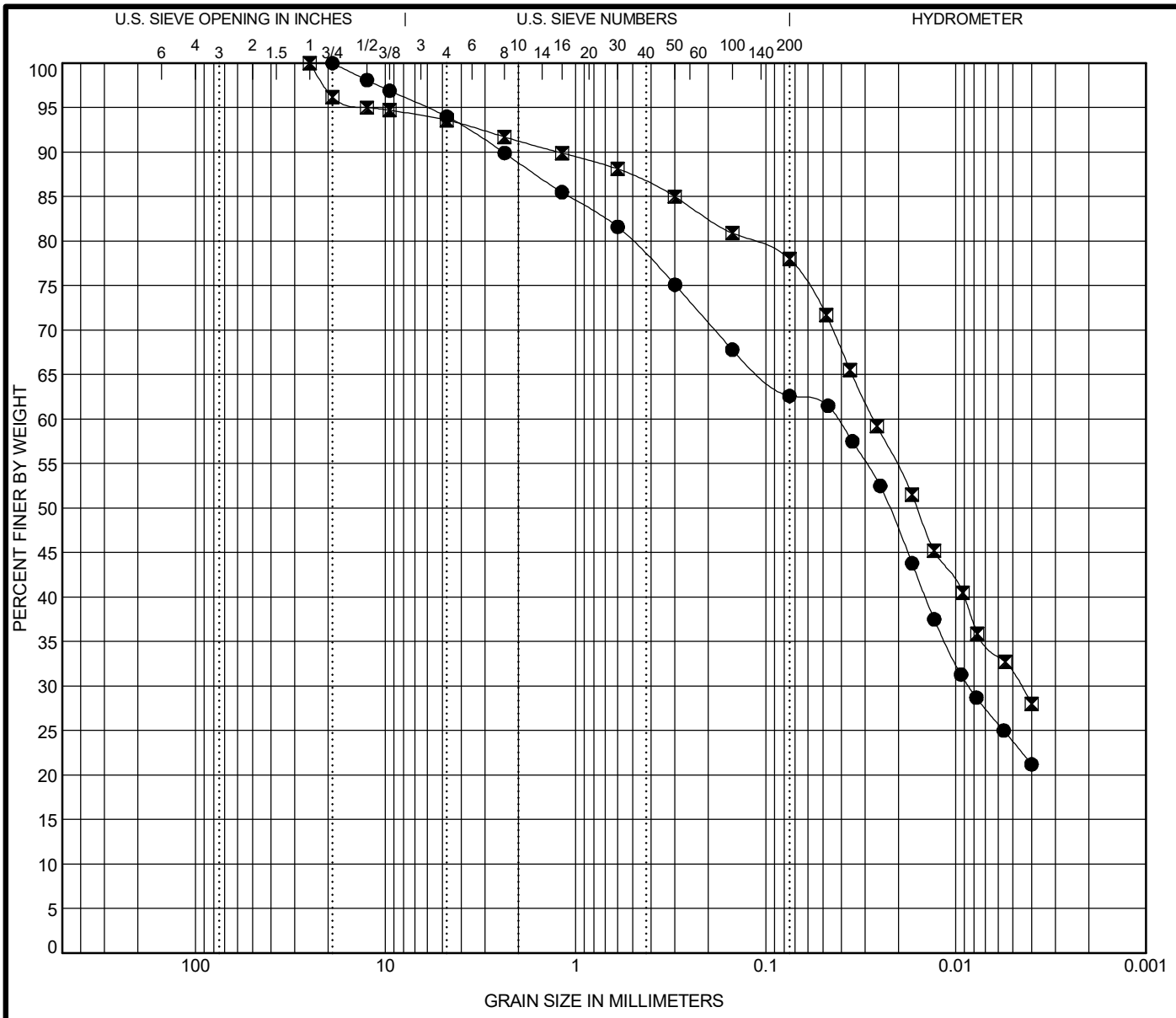
ODOT Rest Area 04-35
Interstate 76-Eastbound - Mile Marker 45.0
Edinburg, Ohio

GCI Project Number: 20-G-23929-A

Boring Number	Boring Depth (ft.)	Surface Elevation (ft.)[1]	Surface Cover	Topsoil Thickness (in.)	Fill Soils		Stable Natural Soils		Bedrock	
					Thickness (ft.)	Elevation (ft.)	Depth (ft.)	Elevation (ft.)	Depth (ft.)	Elevation (ft.)
B-1	18.5	1118	Topsoil/Fill	6	5.0	1113.0	6.0	1112.0	12.0	1106.0
B-2	18.5	1117	Topsoil/Fill	6	8.0	1109.0	8.5	1108.5	12.0	1105.0
B-3	18.5	1115	Topsoil/Fill	6	4.0	1111.0	4.5	1110.5	12.0	1103.0
B-4	18.0[2]	1115	Topsoil	5	na	na	1.0	1114.0	8.5	1106.5
B-5	17.0[2]	1118	Topsoil	6	na	na	1.0	1117.0	8.5	1109.5

1. Surface elevations interpolated using the topographic/survey information provided by the client. Elevations should be considered approximate.
2. Auger Refusal

GEOTECHNICAL CONSULTANTS INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-2	8.5	SANDY SILT(ML)	NP	NP	NP		
⊠	B-5	2.0	LEAN CLAY with SAND(CL)	32	21	11		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-2	8.5	19	0.042	0.009		6.0	31.4	62.6	
⊠	B-5	2.0	25	0.027	0.005		6.4	15.6	78.0	

Geotechnical Consultants, Inc.
8433 South Avenue - Building 1, Suite 1
Boardman, Ohio 44514
Telephone: 330-965-1400
Fax: 330-965-1410

GRAIN SIZE DISTRIBUTION

Project: I76 EB - Portage - ODOT Rest Area Replacement

Location: Edinburg, Ohio

Number: 20-G-29929-A

US GRAIN SIZE 20G23929A.GPJ US LAB.GDT 6/1/20