

JR Smith Park

**East Cherry Street
Sunbury, Ohio 43074**

Geotechnical Subsurface Investigation

**City of Sunbury
20 South Morning Street,
Sunbury, Ohio 43074**

December 16, 2024

CT Project No. 24000707

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City of Sunbury
20 South Morning Street
Sunbury, Ohio 43074

Re: Geotechnical Subsurface Investigation
JR Smith Park
East Cherry Street
Sunbury, Ohio 43074

Dear:

Following is the report of the geotechnical subsurface investigation performed by CT Consultants, Inc. (CT) for the referenced project conducted for the City of Sunbury.

This report contains the results of our study, our engineering interpretation of the results with respect to the project characteristics, and our recommendations for the design and construction of foundations, floor slabs, and pavements.

Should you have any questions regarding this report or require additional information, please contact our office.

Respectfully,

CT Consultants, Inc.



Negoslav Tosanovic, P.E.
Geotechnical Project Manager



Curtis E. Roupe, P.E.
Vice President

GEOTECHNICAL SUBSURFACE INVESTIGATION
JR SMITH PARK
EAST CHERRY STREET, SUNBURY, OHIO

FOR

CITY OF SUNBURY
20 SOUTH MORNING STREET
SUNBURY, OHIO 43074

SUBMITTED

DECEMBER 16, 2024
CT PROJECT NO. 24000707

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1.0 INTRODUCTION

This geotechnical subsurface investigation report has been prepared for the proposed improvements at the subject property. The site is on the east side of Sunbury, at the southeast corner of East Cherry Street and South Morning Street (SR 37), as shown on the attached Site Location Map (Plate 1.0).

This report summarizes our understanding of the proposed construction, describes the investigative and testing procedures, presents the findings, discusses our evaluations and conclusions, and provides our design and construction recommendations for foundations, slabs, and pavements.

The purpose of this investigation was to evaluate the subsurface conditions and laboratory data related to the design and construction of foundations, building slabs, and pavements. To accomplish this, 5 test borings, laboratory soil testing, and a geotechnical engineering evaluation of the test results were performed.

This report includes:

- > A description of the subsurface soil and groundwater conditions encountered in the borings.
- > Design recommendations for foundations, floor slabs, and pavements related to the proposed development.
- > Recommendations concerning soil- and groundwater-related construction procedures such as site preparation, earthwork, foundation and pavement construction, and related field testing.

This investigation did not include an environmental assessment of the subsurface materials at this site.

2.0 INVESTIGATIVE PROCEDURES

This subsurface investigation included five (5) test borings designated as B-1 through B-5 drilled by CT Consultants' subcontractor, A. Drilling, Inc. on September 13, 2024, to depths ranging from 10 to 20 feet below existing grades. The test borings were located in the field based on a Park Master Plan drawing used for the boring layout plan, dated October 23, 2023. The approximate locations of the borings, percolation tests, and existing site features are shown on the Test Boring Location Plan (Plate 2.0). Additionally, the test boring locations are summarized in the following table.

Table 2.0 Test Boring Locations		
Boring Number	General Location	Proposed Development
B-1	West side of the site; south of the existing building located on the east side of the S. Morning Street	New Smaller Parking Lot
B-2	The western third of the site	Pavilion and Restroom Building
B-3	The western third of the site	A 2,000 square feet Splash Pad
B-4	The central area of the site	Larger New Parking Lot
B-5	The northeast corner of the site	Exit/Entry Access Drive

The test borings were performed in general accordance with geotechnical investigative procedures outlined in ASTM Standard D 6151. The test borings performed during this investigation were drilled with an ATV-mounted drill rig utilizing 3-inch diameter solid stem augers. Borings were terminated at planned depths of 10 to 20 feet below the current grade.

During auger advancement, soil samples were generally collected at 2½-foot intervals to a depth of 10 feet, and at 5-foot intervals thereafter. Split-spoon (SS) samples were obtained by the Standard Penetration Test (SPT) Method (ASTM D 1586), which consists of driving a 2-inch outside diameter split-barrel sampler into the soil with a 140-pound weight falling freely through a distance of 30 inches. The sampler was driven in three successive 6-inch increments with the number of blows per increment being recorded. The sum of the number of blows required to advance the sampler in the second and third 6-inch increments is termed the Standard Penetration Resistance (N-value) and is presented on the Logs of Test Borings attached to this report. The samples were sealed in jars and transported to our laboratory for further classification and testing.

Soil conditions encountered in the test borings are presented in the Logs of Test Borings, along with information related to sample data, SPT results, water conditions observed in the borings, and laboratory test data. It should be noted that these logs have been

prepared based on laboratory classification and testing, as well as field logs of the encountered soils.

All of the recovered samples of the subsoils were visually or manually classified in accordance with the Unified Soil Classification System (USCS) (ASTM D 2487 and D 2488) and tested in our laboratory for moisture content (ASTM D 2216). Unconfined compressive strength estimates were obtained for the intact cohesive samples using a calibrated hand penetrometer. A particle size analysis (ASTM D 6913 and D 7928) and an Atterberg Limits test (ASTM D 4318) were performed on samples SS-2 (Boring B-2) and SS-1 (Boring B-4), to determine soil classification and soil index properties, as well as for pavement subgrade evaluations. Organic content by Loss on Ignition (LOI) was performed on the SS-2 sample from Boring B-2. The test results are presented in Appendices A through D, attached to this report.

Experience indicates that the actual subsoil conditions at a site could vary from those generalized on the basis of test borings made at specific locations, especially at previously developed sites. Therefore, it is essential that a geotechnical engineer be retained to provide soil engineering services during the site preparation and excavation phases of the proposed project. This is to observe compliance with the design concepts, specifications, and recommendations and to allow design changes in the event subsurface conditions differ from those anticipated prior to the start of construction.

3.0 PROPOSED CONSTRUCTION

We understand that the project consists of improving an area located at the southeast corner of East Cherry Street and South Morning Street in Sunbury, Ohio. The subject improvement area has a frontage of 620 feet along East Cherry Street with irregularly shaped southern limits reaching about 350 feet south of the road. Per a Google Earth image from May 9, 2023, the site is grass-covered and used as a multipurpose sports field with football and baseball fields. There are a couple of existing buildings along the western property limit and a bleacher structure on the north side of the site along East Cherry Street. There is a paved loop drive along the circumference of the site that connects the entrance on the northeast corner of the site and the existing paved parking lot on the western portion of the site next to the existing building. Topographically, the area of planned improvement is relatively flat and level at elevation 965.

The site is generally located on the city's east side, approximately 0.5 miles southeast of the intersection of US Route 36 (N. State Street) and State Route 37 (South Morning Street) in Sunbury, Ohio.

Conceptually, the improvement is designed to have a larger parking lot for 44 cars at the central site area and will be connected by a 16-foot access drive to the entry/exit access point at the northeast corner and the new smaller parking at the west side of the site. The new drive is along the site's north side, turns 90 degrees south, and goes along the western property limit. Within the loop drive in the western half of the site, a new Pavilion and Restroom building approximately 35 x 50 feet in plan dimension will be constructed along with a 2,000 square feet Splash Pad. Building details have not been provided, we assume the building will be a single-story wood frame structure with possible masonry walls or brick veneer with wood trusses, while the Splash Pad will be an at-grade concrete structure. The existing paved drive along the southern property line will be revitalized into a 10-foot bike path. It will connect two access points to the site located at the northeast site's corner and at the west side of the site, south of the smaller parking lot along S. Morning Street.

Structural loads were not available at the time of preparing this report but are assumed to be relatively light in magnitude. Maximum column loads are assumed to be 75 kips, and maximum wall loads are assumed to be 3,000 pounds per lineal foot (plf). It is anticipated that final site elevations will approximate existing site elevations.

4.0 GENERAL SITE AND SUBSURFACE CONDITIONS

4.1 General Site Conditions

At the time of our investigation, the site was used as a multi-purpose sports field with football and baseball fields. There are a couple of existing buildings along the west property limit that will remain at the site. The small existing parking lot on the west side of the site, to the south of the southern building, as well as the existing paved drive along the southern property line will be rehabilitated. Topographically, the terrain is relatively flat and level at elevation 965.

The surface materials encountered in Borings B-1, B-4, and B-5 consisted of asphalt 3, 5, and 5 inches thick, respectively; Borings B-2 and B-3 encountered topsoil at the surface with respective thicknesses of 5 and 4 inches.

Below the asphalt, in Boring B-1, granular existing fill was encountered extending to depth of 3.5 feet below the surface. Non-soil materials within the fill included crushed stone in trace quantities. The existing granular fill materials consisted of poorly graded sand with traces of crushed stone and silt. An SPT N-value was 6 blows per foot(bpf) was recorded, indicating loose compactness. The moisture content was 6 percent.

4.2 General Soil Conditions

Based on the results of our field and laboratory tests, the subsoils encountered underlying the surface materials and existing fill materials consisted of predominantly cohesive soils underlain by granular material over weathered shale.

Stratum I: Underlying the granular existing fill materials soil and surficial materials, cohesive naturally deposited soils were encountered in all borings extending to a depth ranging between 6 and 10 feet below the surface. The cohesive soil encountered in this stratum were sandy lean clay (CL) or lean clay (CL) with varying amounts of sand and gravel. SPT N-values ranged from 3 to 24 bpf, indicating soft to a very stiff consistency, and moisture contents ranged from 16 to 30 percent. Boring B-1 was terminated in this stratum.

Stratum II: A granular soil stratum consisting of clayey sand (SC) with a trace of gravel was encountered in borings B-2, B-3, B-4, and B-5 underlying the Stratum I soils and extending to depths ranging between 8.5 to 13.5 feet below the surface. Recorded SPT N-values were between 11 and 26 bpf, indicating medium-dense compactness. Moisture contents ranged between 10 and 11 percent. Boring B-4 was terminated in this stratum.

Stratum III: Underlying the granular soil in Stratum II, weathered shale was encountered in Borings B-2, B-3, and B-5 extending to the termination depths between 10 and 20 feet below the surface. Recorded SPT N-values were between 33 and 78 bpf; SSR (Split Spoon Refusal) was recorded in the last sample SS-6 at a depth of 18.8 feet in Boring B-3.

Moisture content ranged between 8 and 15 percent. Borings B-2, B-3, and B-5 were terminated in this stratum.

Additional descriptions of the stratigraphy encountered in the borings are presented on the Logs of Test Borings.

4.3 Groundwater Conditions

Groundwater was initially encountered during drilling in 2 of the deeper borings, B-2 and B-3 at respective depths of 12 and 9 feet below existing grades; groundwater was not detected in Borings B-1, B-4, and B-5. Groundwater was observed upon completion of drilling in the same 2 borings at depths ranging from 8.4 and 7.8 feet; groundwater was not encountered upon the termination of borings B-1, B-4, and B-5. It should be noted that each of the borings were drilled and backfilled within the same day. As such, stabilized water levels may not have occurred over this limited time period. Instrumentation was not installed to observe long-term groundwater levels.

Based on the soil characteristics and groundwater conditions encountered in the borings, it is our opinion that the “normal” groundwater level at the site may generally be encountered at depths of approximately 8 feet or greater below the existing ground surface. However, it should be noted that groundwater elevations can fluctuate with seasonal and climatic influences.

5.0 DESIGN RECOMMENDATIONS

The following conclusions and recommendations are based on our understanding of the proposed construction and on the data obtained during the field investigation. If the project information or location as outlined is incorrect or should change significantly, a review of these recommendations should be made by CT. These recommendations are contingent upon the satisfactory completion of the recommended site and subgrade preparation and fill placement operations described in Section 6.0, "Construction Recommendations."

5.1 Shallow Foundations

Based on the field and laboratory test results, exterior foundation excavations should bear below a frost depth of 42 inches. These excavations are anticipated to encounter naturally deposited cohesive soils consisting of predominantly stiff to very stiff sandy lean clay or lean clay (N-value of 9 to 24). The naturally deposited cohesive soils are considered generally suitable for supporting the proposed foundations. However, a 3½ feet-thick granular existing fill was encountered in boring B-1; as such, there is a slight potential that existing fill soils may be encountered at the planned bearing elevation. Due to their unknown placement history, these soils are not considered suitable for foundation bearing. While not likely, if the existing fill materials are encountered at the foundation subgrade elevation, they must be over-excavated and replaced with the new engineered fill, as described below.

Where existing fill materials are encountered, or if other unsuitable foundation materials are encountered, over-excavation should extend through these materials to suitable bearing soils. The base of the over-excavation should be widened one foot for every foot of depth below the planned bearing depth, with the over-excavation centered along the footing. The over-excavated areas should be backfilled with dense-graded aggregate, placed in controlled lifts, and compacted to not less than 100 percent of the maximum dry density as determined by ASTM D 698 (Standard Proctor). Alternatively, the over-excavated areas could be backfilled with lean concrete having a minimum compressive strength of 1,500 pounds per square inch (psi) or other flowable controlled-density fill having a minimum compressive strength of 300 psi. If foundations will be placed at the base of the over-excavation or the lean concrete fill option will be utilized, widening the footing over-excavation will not be required. If the controlled-density fill option is utilized, the footing over-excavation shall be widened as discussed above.

Following the satisfactory completion of the site preparation and footing excavation inspections outlined in Section 6.0 of this report, the proposed structure may be supported on a conventional shallow spread foundation system consisting of wall (strip) and/or column (square) footings. Shallow foundations may be designed utilizing a net allowable bearing pressure of 2,000 pounds per square foot (psf) for strip and square footings. In using a net allowable soil pressure, the weight of the footings, backfill over the footings or

floor slabs need not be included in the structural loads for dimensioning footings. The bearing materials should be field verified as being native cohesive soils with a minimum unconfined compressive strength of 2,000 psf, or properly placed and compacted new engineered fill.

Due to the encountered existing fill materials at the site, we strongly recommend that the bearing surface at the bottom of all footing excavations be inspected during construction by a CT geotechnical engineer or qualified representative. Inspection should be performed to verify that the exposed soil conditions at the bearing elevations are consistent with the subsurface conditions encountered in the test borings. Additionally, the presence of our engineer will help facilitate the timely remediation of unsuitable soil conditions. If the results of hand penetrometer, DCP, or other strength tests indicate the exposed soil conditions are not suitable for the design bearing pressure, it may be necessary to modify the bearing soils in-place, increase the footing size to accommodate the lower bearing strengths, or over-excavate and backfill with engineered fill or flowable fill.

All exterior footings and footings in unheated areas should be constructed at a minimum frost penetration depth of 42 inches below finished exterior grades. Interior footings may bear at a convenient depth below the floor slab, provided they are supported on compacted native soils as described above, or properly placed and compacted new engineered fill. Wall (strip) footings should be at least 18 inches wide, and column (square) footings should be at least 30 inches square, regardless of sizing, based on design loads and the allowable bearing pressure.

Utilizing the above allowable bearing pressures and proper foundation inspection techniques, the total settlement associated with the structure should not exceed 1 inch, and differential settlement should not exceed $\frac{3}{4}$ inch.

For the slab-on-grade new Splash Pad structure native cohesive soils should be capable of support. As for the foundations, existing fill or otherwise unsuitable soil may be encountered in this area during the construction of the pad. If existing fill soils are encountered, we recommend removing them full depth from below the structure footprint and replacing them with engineered fill, as was discussed above. The excavation to remove the existing fill material must extend horizontally for at least the depth of the undercut in all directions perpendicular to the pad circumference.

5.2 Subgrades

5.2.1 Existing Subgrade

The subgrades that would result upon the satisfactory completion of the site preparation, as described in Section 6.0 of this report, are considered generally suitable for support of the proposed floor slabs, at-grade structures/pads, and pavements. Based on field and

laboratory data developed during this investigation, the subgrade soils consist of granular existing fill materials and native cohesive soils. Laboratory analysis performed for a representative sample from Borings B-2 (SS-2), and B-4 (SS-1) as well as visual descriptions of the upper soil profile, indicate that the subgrade soils will generally consist cohesive soils that may be generally classified as Group A-6b in accordance with the Ohio Department of Transportation (ODOT) system of soil classification. The cohesive soils are considered fair to poor as subgrade materials because they have relatively low permeabilities and a high percentage of silt and clay particles, which makes them susceptible to moisture, frost penetration, and frost heave.

At the time of this investigation, moisture contents in the upper 2½ feet of the subgrade cohesive soils generally ranged from approximately 20 to 27 percent; the moisture content of the existing granular fill was 6 percent (Boring B-1). These moisture contents are estimated to vary from near to significantly above the expected optimum moisture contents for these soils. Some remedial action should be anticipated to adjust the moisture contents of the existing materials and achieve proper compaction of the subgrade, particularly during wet seasonal periods.

5.2.2 Modified Subgrade

Although not anticipated to be prevalent, if soils are dry of optimum, water should be uniformly mixed into the subgrade. More likely to be present at this site are soils that are wet of optimum. Where soils wet of optimum are encountered, lowering the moisture content by scarification and aeration (discing and exposure to sun and wind) may be required. However, this may not be feasible if construction occurs during wet seasonal conditions. Very moist to wet soils will “pump” under the operation of heavy equipment, resulting in deep rutting and perhaps rendering the operation of grading and paving equipment difficult or impossible.

Therefore, other methods of subgrade modification may be required in areas of high moisture content. Modification may be achieved by undercutting and replacement with granular subbase (possibly in combination with a geotextile separation layer or geogrid reinforcement), mixing stone into the subgrade, or treating the subgrade with cement. The method of subgrade modification should be determined at the time of construction (See Section 6.1, “Construction Recommendations - Site and Subgrade Preparation”).

5.3 Floor Slabs

As discussed previously, while existing fill soils were only encountered in boring B-1,, at the small parking lot area, there is potential for its presence elsewhere on the site. It should be noted that the conditions of the existing fill material encountered in the boring B-1 are generally suitable for support of building floor slabs, provided they are properly prepared as described in Section 6.1 of this report. However, as in any case of existing fills of unknown origin, there is potential for variable and less favorable conditions between

boring locations that increase the risk for settlement of the floor slab. If this risk is unacceptable, partial or full-depth removal of the existing fill materials, if encountered, would be required.

It is recommended that all floor slabs be “floating”, that is, fully ground supported and not structurally connected to walls or foundations. This is to reduce the possibility of cracking and displacement of the floor slabs because of differential movements between the slab and the foundation. Such movements could be detrimental to slabs that are rigidly connected to the foundations. There may be certain areas where it will be difficult or impractical to make the slab floating. In such areas, it may be necessary to increase the slab thickness and reinforcement to prevent the foundation from cracking the slab and settling independently.

For properly prepared Group A-6b or better subgrade soils, a modulus of subgrade reaction (k) of 150 pounds per cubic inch (pci) may be used for floor slab design. It is recommended that the floor slab be supported on a minimum 6-inch layer of relatively clean granular material such as sand and gravel or crushed stone. This is to help distribute concentrated loads and provide more uniform subgrade support beneath the slab.

5.4 Flexible (Asphalt) Pavement

Based on the results of the gradation analyses as well as the visual classification of the recovered samples, we recommend a subgrade CBR value of 6 percent for Group A-6b or better soils. This CBR value is based on subgrade compacted to at least 100 percent of the maximum dry density as determined by ASTM D 698 (Standard Proctor) or verified as stable through proof rolling.

It should be noted that we are not privy to the design traffic loads or intended design life. During final design, the subgrade support recommendations indicated herein (and in the final investigation report) should be reviewed by the site engineer in conjunction with the design traffic criteria to determine the required pavement sections. In any case, we recommend the light-duty pavement cross-section consisting of at least 3 inches of asphalt underlain by 6 inches of aggregate base for even the lightest-duty pavements based on our experience regarding environmental exposure and reasonable serviceability. For the same reason, we recommend the heavy-duty pavement cross-section (at a minimum, for any bus drive lanes) consist of at least 4 inches of asphalt underlain by 8 inches of aggregate base.

All paving operations should conform to Ohio Department of Transportation (ODOT) specifications. The pavement and subgrade preparation procedures outlined in this report should result in a reasonably workable and satisfactory pavement. It should be recognized, however, that all flexible pavements need repairs or overlays from time to time as a result of progressive yielding under repeated traffic loads for a prolonged period of time, as well as exposure to weather conditions.

5.5 Rigid (Concrete) Pavement

For properly prepared Group A-6b or better subgrade soils, a modulus of subgrade reaction (k) of 150 pounds per cubic inch (pci) may be used for rigid pavement design. A concrete pavement section is recommended in the areas of repetitive turning, site exit and entrance aprons, and trash enclosure areas (including where the truck parks while servicing the container). These sections should consist of a minimum of 6 inches of reinforced, air-entrained concrete with a minimum compressive strength of 3,500 psi underlain by a minimum of 6 inches of a dense-graded granular base. The pavement section should be supported on a subgrade compacted to not less than 100 percent of the maximum dry density as determined by ASTM D 698 (Standard Proctor) or verified as stable through proof rolling. All paving operations should conform to the State of Ohio Department of Transportation (ODOT) specifications.

5.6 Pavement Drainage

Based on the poorly drained nature of the cohesive and silty granular subgrade soils, it is anticipated that surface water infiltration may collect in the aggregate base course. Without adequate drainage, water will remain in the base for extended periods of time, creating localized wet, soft pockets. The presence of these pockets will increase the likelihood that pavement distress (cracking, potholes, etc.) will develop. Drainage features may include grading the subgrade surface to slope downward to the outside edge of pavements and/or providing longitudinal edge drains connected to storm sewers or other outlets. A system of "finger drains" could also be installed near catch basins within the pavement areas to collect surface water, thus reducing the possibility of freeze-thaw effects on the pavement.

5.7 Groundwater Control and Drainage

As stated previously, groundwater was encountered during drilling in the two deeper borings at depths of 9 to 12 feet and observed upon completion of drilling at depths of 7.8 to 8.4 feet below existing grades in the same borings.

Based on the limited data available, such as the soil characteristics and the groundwater conditions encountered in the borings, it is our opinion that the "normal" groundwater level may be encountered at depths of 8 feet or lower below existing grades. It is our experience that adequate control of groundwater seepage or surface water run-off into shallow excavations should be achievable by minor dewatering systems, such as pumping from prepared sumps. If deeper excavations are required that extend below the groundwater table, installation of well points may be required in addition to pumping from preparation sumps. In the event excessive seepage is encountered during construction, CT may be notified to evaluate whether other dewatering methods are required.

5.8 Excavations and Slopes

The sides of temporary excavations for building foundations, underground utility installation, and other construction should be adequately sloped to provide stable sides and safe working conditions. Otherwise, the excavation must be properly braced against lateral movements. In any case, applicable Occupational Safety and Health Administration (OSHA) standards must be followed. It is the responsibility of the installation contractor to develop appropriate installation methods and specify pertinent equipment prior to commencement of work, and to obtain the services of a geotechnical engineer to design or approve sloped or benched excavations and/or lateral bracing systems as required by OSHA criteria.

Where existing buildings, structures, roadways, or underground utilities are located within a distance from the excavation equal to approximately twice the depth of the excavation, an adequate system of sheet piling, lateral bracing, or an alternate construction procedure may be required to prevent lateral movements that may cause settlement of structures or embankment failures. Any retaining system proposed by the contractor should be reviewed by a CT geotechnical engineer prior to approval for installation and use.

The soils encountered in the test borings are classified as the following OSHA Type soils:

- > OSHA Type A soils (cohesive soils with unconfined compressive strengths of 3,000 pounds per square foot (psf) or greater),
- > OSHA Type B soils (cohesive soils with unconfined compressive strengths greater than 1,000 psf but less than 3,000 psf), and
- > OSHA Type C soils (fill materials, granular soils, and cohesive soils with unconfined compressive strengths of 1,000 psf or less).

For temporary excavations in Type A, B, and C soils, side slopes should be constructed no steeper than $\frac{3}{4}$ horizontal to 1 vertical ($\frac{3}{4}$ H:1V), 1H:1V, and 1½H:1V, respectively. For situations where an excavation encounters a lower strength soil underlying a higher strength soil, the slope of the entire excavation is governed by the lower strength soil. In all cases, flatter slopes may be required if lower strength soils or adverse seepage conditions are encountered during construction.

For permanent excavation slopes, we recommend that grades be no steeper than 3H:1V without a more extensive geotechnical evaluation of the proposed construction plans and site conditions.

6.0 CONSTRUCTION RECOMMENDATIONS

6.1 Site and Subgrade Preparation

Prior to proceeding with construction operations, all pavements, root systems, vegetation, and other deleterious non-soil materials should be removed. Suitable topsoil may be stockpiled for later use in landscaped areas. Typically, soils with more than 5 percent organics are not recommended as subgrade soils in structure and pavement areas, but dark colored soils having the appearance of topsoil with only trace “root hairs” of 5 percent or less may not necessarily require stripping. For these “transitional” soils, the actual moisture content and subgrade stability under proof-rolling operations is more critical than the color in determination of the amount of stripping or subgrade undercut. The actual amount of required stripping should be determined in the field by a geotechnical engineer or qualified representative.

Due to the existing development at the site, the proof rolling and preparation of this site will require careful inspection. If visible or detected during the proof roll testing or later during the excavation for footer construction, all existing rigid elements, such as footer and wall pieces, pipes, manholes, larger floor slab segments, etc., must be completely removed from within the building area and from within the top two feet below the subgrade in the pavement areas to avoid stress concentration and pinching points through the pavement. Voids remaining after footing removal and utility trench abandonment, and other exposed excavations should be backfilled with engineered fill, placed in controlled lifts, and tested for suitable compaction in accordance with the criteria in Section 6.2 of this report. If such excavations are randomly filled or graded without compaction control, excessive differential settlement could occur.

Upon completion of stripping and clearing, the areas intended to support floor slabs, pavements and new fill should be carefully inspected by a geotechnical engineer. The engineer should observe proof-rolling of the cohesive subgrades utilizing a 20- to 30-ton loaded truck or other pneumatic-tired vehicle of similar size and weight. The truck should make a minimum of two passes in each of two perpendicular directions covering the proposed development area, with additional passes as necessary to achieve required compaction and/or subgrade stabilization. The purpose of proof rolling the cohesive subgrades is to locate any weak, soft, or excessively wet soils that may be present at the time of construction.

Any unsuitable materials observed during the inspection and proof-rolling operations should be undercut and replaced with compacted fill or stabilized in place utilizing conventional remedial measures such as discing, aeration, and recompaction. Once the site has been proof-rolled, inspected, and stabilized, the proof-rolled or inspected subgrades should not be exposed to wet conditions. It should be recognized that during periods of wet weather, the clayey soils that will be exposed at design subgrades will tend

to pond water for short periods of time, with the potential to deteriorate the prepared subgrade.

The results of the inspection and proof-rolling operations will be partially dependent on construction operations, the moisture content of the soil, and the weather conditions prevalent at the time. If pumping or rutting is encountered and difficulty is experienced in the operation of construction equipment, CT should be notified in order to determine which method of subgrade modification may be best suited for the conditions encountered. Should such conditions be experienced, we may recommend that a small test area be used to determine the necessary depth of undercutting and stone replacement or other remedial action necessary to achieve a stable subgrade condition.

6.2 Fill

Material for engineered fill or backfill required to achieve design grades may consist of any non-organic soils having a maximum dry density as determined by the Standard Proctor (ASTM D 698) of 90 pounds per cubic foot (pcf) or greater. To maintain the recommended subgrade support values (CBR value and k-value) presented in this report, new engineered fill within 36 inches of subgrade elevation should consist of ODOT A-6b or better soils. On-site soils may be used as engineered fill materials provided that they are free of organic matter, debris, excessive moisture, and rock or stone fragments larger than 3 inches in diameter. Depending on seasonal conditions, the on-site soils may be wet of optimum and may require scarification and aeration to achieve satisfactory compaction. If the construction schedule does not allow for scarification and aeration activities, it may be more practical or economical to utilize imported granular fill.

Fill should be placed in uniform layers no more than 8 inches thick (loose measure) and adequately keyed into stripped and scarified soils. All fill within the building areas and pavement subgrades should be compacted to not less than 100 percent of the maximum dry density as determined by ASTM D 698 (Standard Proctor).

The upper soil profile at the site mostly consists of cohesive soils. Additionally, subgrades may consist of new engineered fill utilized to achieve design grades. The contractor should be prepared to use a sheepsfoot roller to provide effective compaction of the cohesive materials. For granular soils and granular engineered fill, a vibratory, smooth-drum roller would provide effective compaction of these materials. In narrow utility or footing excavations, the on-site cohesive soils may be difficult to compact; therefore, a clean granular material may be required in these areas.

Scarified subgrade soils and all fill material should be within 3 percent of the optimum moisture content to facilitate compaction. Furthermore, fill material should not be frozen or placed on a frozen base. It is recommended that all earthwork and site preparation activities be conducted under adequate specifications and properly monitored in the field by a qualified geotechnical testing firm.

6.3 Foundation Excavations

As mentioned in Section 5.1, foundation excavations should have a detailed inspection performed for each foundation. A geotechnical engineer or qualified representative should perform these inspections to verify that the exposed materials are similar to those encountered in the borings and that engineered fill has been properly placed and compacted such that it is capable of supporting the design bearing pressure.

We recommend that the foundation excavations be concreted as soon as practical after they are excavated and that water not be allowed to pond in any excavation. If it is necessary to leave the bearing surface open for any extended period of time, we recommend that a thin mat of lean concrete be placed over the bottom of the excavation to reduce damage to the surface from weather or construction. Foundation concrete should not be placed on frozen or saturated subgrade.

Additional foundation subgrade inspection and preparation recommendations are provided in Section 5.1.

7.0 QUALIFICATION OF RECOMMENDATIONS

Our evaluation of foundation and pavement design and construction conditions, as well as underground utility installation conditions, has been based on our understanding of the site, as well as the data obtained during our field investigation. The general subsurface conditions were based on interpretation of the subsurface data obtained in widely-spaced borings. Regardless of the thoroughness of a subsurface investigation, there is the possibility that conditions between borings will differ from those at the boring locations, that conditions are not as anticipated by the designers, or that the construction process has altered the soil conditions. This is especially true for previously developed sites such as this site. The presence of glass may also be likely at this site.

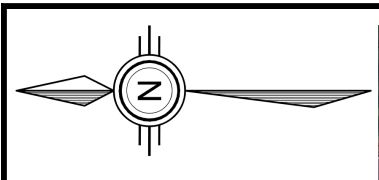
The nature and extent of variations between the borings may not become evident until the course of construction. If such variations are encountered, it will be necessary to reevaluate the recommendations of this report after on-site observations of the conditions.

Therefore, experienced geotechnical engineers should observe earthwork and foundation construction to confirm that the conditions anticipated in design are noted. Otherwise, CT assumes no responsibility for construction compliance with the design concepts, specifications, or recommendations.

Our professional services have been performed, our findings derived, and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. This warranty is in lieu of all other warranties either expressed or implied. CT is not responsible for the conclusions, opinions, or recommendations of others based on this data.

PLATES

PLATE 1.0	SITE LOCATION MAP
PLATE 2.0	TEST BORING LOCAITON PLAN



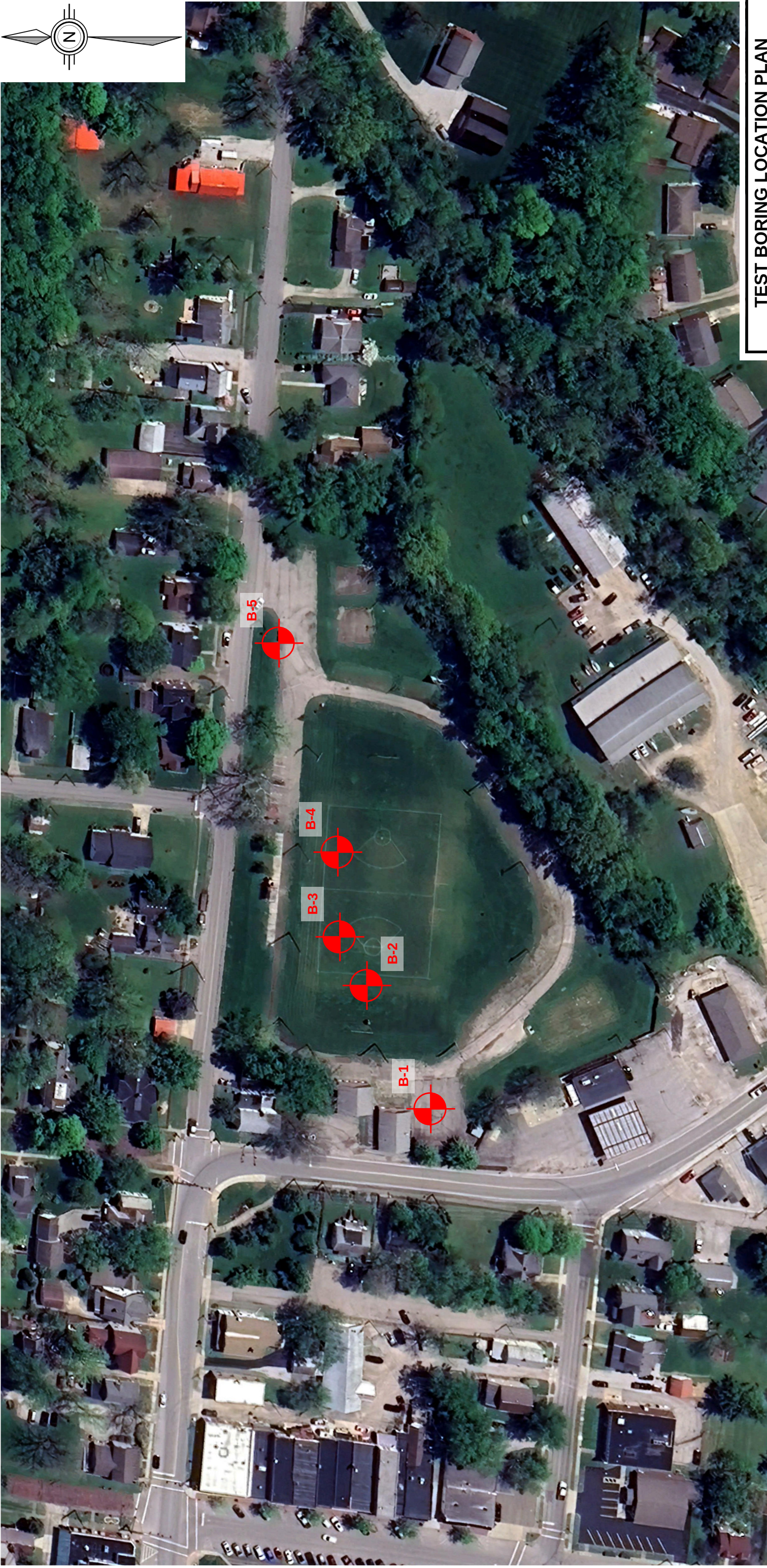
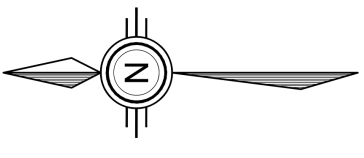
Approximate
Site Location

SITE LOCATION MAP	
JR SMITH PARKS SUNBURY, OHIO	
PREPARED FOR	
VILLAGE OF SUNBURY SUNBURY, OHIO	
DRAWN: MSI / 10/09/2024	
REVISED: NT/12-13-24	
PROJECT No: 24000707	
PLATE 1.0	

SCALE IN FEET



0' 700 1,400'



LEGEND:



B-1

APPROXIMATE TEST BORING
LOCATION

BASE PLAN "SITE AERIAL PLAN" DATED 05/09/2023 OBTAINED FROM GOOGLE EARTH.

TEST BORING LOCATION PLAN

JR SMITH PARKS
SUNBURY, OHIO

PREPARED FOR

VILLAGE OF SUNBURY
SUNBURY, OHIO

DRAWN: MSI / 10/09/2024

REVISED: NT/12-13-24

PROJECT No: 24000707



A Verdantas Company

PLATE 2.0

SCALE IN FEET



0' 140' 280'

APPENDIX A

LOGS OF TEST BORINGS



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BORING NUMBER B-1

PAGE 1 OF 1

CLIENT	Village of Sunbury	PROJECT NAME	JR Smith Park
PROJECT NUMBER	24000707	PROJECT LOCATION	Sunbury, OH
DRILLING CONTRACTOR	A Drilling Company Tim Matt	RIG NO.	CME 550x ATV
DRILLING METHOD	3 in. SSA	GROUND ELEVATION	966 ft
DATE STARTED	9/13/24	COMPLETED	9/13/24
LOGGED BY	KKC	CHECKED BY	IEH
NOTES	Lat: 40.242206° Long: -82.856721° (Approx.)		
GROUND WATER LEVELS:		AT TIME OF DRILLING	
		None	
		AT END OF DRILLING	
		None	
		0hrs AFTER DRILLING	
		Backfilled w/Cuttings and Bentonite Chips	

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UNCONF. COMP. STR. (tsf)	DRY UNIT WT. (pcf)	PL 20 MC 40 LL 80 ▲ SPT N VALUE ▲
	0								20 40 60 80
965			ASPHALT - 3 Inches						
			FILL - Moist Loose Brown POORLY GRADED SAND w/Trace Crushed Stone and Silt	SS 1	28	4-3-3 (6)	NP		6
			Moist Stiff to very Stiff Brown LEAN CLAY w/Sand, Trace Gravel, and Iron Oxide Stain Seam (CL)	SS 2	50	3-4-5 (9)	3.75		16
960			Moist Soft to medium Stiff Brown LEAN CLAY w/Sand and Trace Gravel (CL)	SS 3	39	1-1-3 (4)	3.00		18
			Moist Medium Stiff to Stiff Gray/Brown LEAN CLAY w/Sand, Trace Gravel, and Iron Oxide Stain Seam (CL)	SS 4	89	2-3-5 (8)	3.50		26
	10		Bottom of hole at 10.0 feet.						



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BORING NUMBER B-2

PAGE 1 OF 1

CLIENT	Village of Sunbury	PROJECT NAME	JR Smith Park
PROJECT NUMBER	24000707	PROJECT LOCATION	Sunbury, OH
DRILLING CONTRACTOR	A Drilling Company Tim Matt	RIG NO.	CME 550x ATV
DRILLING METHOD	3 in. SSA	GROUND ELEVATION	965 ft
DATE STARTED	9/13/24	COMPLETED	9/13/24
LOGGED BY	KKC	CHECKED BY	IEH
NOTES	Lat.: 40.242385° Long: -82.856233° (Approx.)		
		GROUND WATER LEVELS:	
		▽ AT TIME OF DRILLING	12.0 ft / Elev 953.0 ft
		▼ AT END OF DRILLING	8.4 ft / Elev 956.6 ft
		0hrs AFTER DRILLING	Backfilled w/Cuttings and Bentonite Chips

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UNCONF. COMP. STR. (tsf)	DRY UNIT WT. (pcf)	PL 20 MC 40 LL 80 ▲ SPT N VALUE ▲
965	0		TOPSOIL - 5 Inches						
			Moist Very Stiff Brown SANDY LEAN CLAY w/Trace Gravel, Organics, and Iron Oxide Stain Seam (CL)	SS 1	28	6-14-10 (24)	4.00		23
			Moist Stiff Gray/Brown LEAN CLAY w/Sand, Trace Gravel, and Organics (CL) Organic Content (LOI) = 3.82 %	SS 2	83	6-5-4 (9)	1.29	90	30
960	5		Moist Very Stiff Brown SANDY LEAN CLAY w/Trace Gravel (CL)	SS 3	33	0-4-12 (16)	2.50		18
			Moist Medium Dense Brown CLAYEY SAND w/Gravel (SC)	SS 4	17	10-8-12 (20)	NP		10
955	10		Gray Severely WEATHERED SHALE	SS 5	72	15-24-35 (59)	NP		15
950	15			SS 6	50	27-20-34 (54)	NP		13
945	20		Bottom of hole at 20.0 feet.						

TTL GEOTECH STANDARD 24000707.GPJ GINT US LAB.GDT 12/11/24



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BORING NUMBER B-3

PAGE 1 OF 1

CLIENT	Village of Sunbury	PROJECT NAME	JR Smith Park
PROJECT NUMBER	24000707	PROJECT LOCATION	Sunbury, OH
DRILLING CONTRACTOR	A Drilling Company Tim Matt	RIG NO.	CME 550x ATV
DRILLING METHOD	3 in. SSA	GROUND ELEVATION	965 ft
DATE STARTED	9/13/24	COMPLETED	9/13/24
LOGGED BY	KKC	CHECKED BY	IEH
NOTES	Lat: 40.242452° Long: -82.856085° (Approx.)		
GROUND WATER LEVELS:		▽ AT TIME OF DRILLING 9.0 ft / Elev 956.0 ft	
		▼ AT END OF DRILLING 7.8 ft / Elev 957.2 ft	
		0hrs AFTER DRILLING Backfilled w/Cuttings and Bentonite Chips	

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UNCONF. COMP. STR. (tsf)	DRY UNIT WT. (pcf)	PL 20 MC 40 LL 80 ▲ SPT N VALUE ▲
965	0		TOPSOIL - 4 Inches						
			Moist Medium Stiff Brown LEAN CLAY w/Sand and Trace Gravel (CL)	SS 1	44	2-3-4 (7)	0.50		20
			@3.5': Medium Stiff to Stiff Brown/Gray	SS 2	28	2-2-3 (5)	3.50		30
960	5		Moist Stiff to Very Stiff Gray/Brown SANDY LEAN CLAY w/Trace Gravel (CL)	SS 3	39	2-4-10 (14)	2.75		19
			Moist Medium Dense Brown/Gray CLAYEY SAND w/Gravel (SC)	SS 4	72	7-12-14 (26)	NP		10
955	10		Gray Severely WEATHERED SHALE	SS 5	83	23-34-44 (78)	NP		11
950	15		Bottom of hole at 18.8 feet.	SS 6	100	50/4"	NP		14
									>>

TTL_GEOTECH_STANDARD 24000707.GPJ GINT US LAB.GDT 10/9/24



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BORING NUMBER B-4

PAGE 1 OF 1

CLIENT	Village of Sunbury	PROJECT NAME	JR Smith Park
PROJECT NUMBER	24000707	PROJECT LOCATION	Sunbury, OH
DRILLING CONTRACTOR	A Drilling Company Tim Matt	RIG NO.	CME 550x ATV
DRILLING METHOD	3 in. SSA	GROUND ELEVATION	965 ft
DATE STARTED	9/13/24	COMPLETED	9/13/24
LOGGED BY	KKC	CHECKED BY	IEH
NOTES	Lat: 40.242480° Long: -82.855751° (Approx.)		
GROUND WATER LEVELS:		AT TIME OF DRILLING	
		None	
		AT END OF DRILLING	
		None	
		0hrs AFTER DRILLING	
		Backfilled w/Cuttings and Bentonite Chips	

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UNCONF. COMP. STR. (tsf)	DRY UNIT WT. (pcf)	PL 20 MC 40 LL 80 ▲ SPT N VALUE ▲
965	0		ASPHALT - 5 Inches						
			Moist Medium Stiff Brown/Gray LEAN CLAY w/Sand and Trace Gravel (CL)	SS 1	44	7-3-3 (6)	0.83	97	27
			@3.5': Medium Stiff to Stiff	SS 2	67	1-2-3 (5)	3.00		24
960	5		Moist Stiff to Very Stiff Brown/Gray SANDY LEAN CLAY w/Trace Gravel (CL)	SS 3	39	6-4-8 (12)	2.50		14
			Moist Medium Dense Gray/Brown CLAYEY SAND w/Gravel (SC)	SS 4	50	5-6-5 (11)	NP		11
955	10		Bottom of hole at 10.0 feet.						



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BORING NUMBER B-5

PAGE 1 OF 1

CLIENT	Village of Sunbury	PROJECT NAME	JR Smith Park		
PROJECT NUMBER	24000707	PROJECT LOCATION	Sunbury, OH		
DRILLING CONTRACTOR	A Drilling Company Tim Matt	RIG NO.	CME 550x ATV	GROUND ELEVATION	969 ft
DRILLING METHOD	3 in. SSA	GROUND WATER LEVELS:			
DATE STARTED	9/13/24	COMPLETED	9/13/24	AT TIME OF DRILLING	None
LOGGED BY	KKC	CHECKED BY	IEH	AT END OF DRILLING	None
NOTES	Lat: 40.242691° Long: -82.854935° (Approx.)			0hrs AFTER DRILLING	Backfilled w/Cuttings and Bentonite Chips

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UNCONF. COMP. STR. (tsf)	DRY UNIT WT. (pcf)	PL 20 MC 40 LL 80 ▲ SPT N VALUE ▲
	0		ASPHALT - 5 Inches						
			0.4'						
			Moist Medium Stiff to Very Stiff Brown/Gray LEAN CLAY w/Sand and Trace Gravel (CL)	SS 1	33	2-3-4 (7)	3.00		22
965			3.5'						
	5		Moist Soft Brown LEAN CLAY w/Sand and Trace Gravel (CL)	SS 2	33	2-1-2 (3)	0.25		20
			6.0'						
			Moist Medium Dense Brown CLAYEY SAND w/Gravel (SC)	SS 3	28	6-8-9 (17)	NP		10
			8.5'						
960			Severely WEATHERED ROCK	SS 4	28	20-9-24 (33)	NP		8
	10		10.0'						
			Bottom of hole at 10.0 feet.						

APPENDIX B

LEGEND KEY

LEGEND KEY

Unified Soil Classification System Soil Symbols

	GW - WELL GRADED GRAVEL Includes Gravel-Sand mixtures, little or no fines.		GP - POORLY GRADED GRAVEL Includes Gravel-Sand mixtures, little or no fines.		GM - SILTY GRAVEL Includes Gravel-Sand-Silt mixtures.		GC - CLAYEY GRAVEL Includes Gravel-Sand-Clay mixtures.
	SW - WELL GRADED SAND Includes Gravelly Sands, little or no fines.		SP - POORLY GRADED SAND Includes Gravelly Sands, little or no fines.		SM - SILTY SAND Includes Sand-Silt mixtures.		SC - CLAYEY SAND Includes Sand-Clay mixtures.
	ML - SILT Includes Silt with Sand and Sandy Silt.		CL - LEAN CLAY Includes Sandy Lean Clay and Lean Clay with Sand and Gravel.		MH - ELASTIC SILT Includes Sandy Elastic Silt and Elastic Silt with Sand.		CH - FAT CLAY Includes Sandy Fat Clay and Fat Clay with Sand.
	CL-ML - SILTY CLAY Includes Clayey Silt of low plasticity.		OL - ORGANIC SILT and ORGANIC CLAY of low plasticity.		OH - ORGANIC SILT and ORGANIC CLAY of medium to high plasticity.		Pt - PEAT Includes humus, swamp and other soils with high organic content.
	FILL MATERIAL - Includes controlled and non-controlled soil and non-soil materials.		TOPSOIL		ASPHALT - Bituminous Asphalt		CONCRETE - Includes broken concrete rubble.

Sample Symbols

	SS - Split Spoon		ST - Shelby Tube		RC - Rock Core		GS - Geoprobe Sleeve
			AU - Auger Cuttings		GB - Grab		

Notes:

1. Exploratory borings were drilled on September 13, 2024, using solid stem augers.
2. These logs are subject to the limitations, conclusions, and recommendations in the report and should not be interpreted separate from the report.
3. The borings were located in the field by CT in accordance with a boring plan.
4. Latitude, Longitude, and ground surface elevation for all borings were surveyed by CT via a hand-held GPS device. The accuracy from the handheld GPS device was generally found to be approximately 2 to 6 inches horizontal, and approximately 4 to 12 inches vertical.
5. Unconfined Compressive Strength:
NP = No Penetration

APPENDIX C

TABULATION OF LABORATORY TEST DATA



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Toledo Ohio 43604
Telephone: (419)324-2222

SUMMARY OF LABORATORY RESULTS

PAGE 1 OF 1

CLIENT Village of Sunbury

PROJECT NAME JR Smith Park

PROJECT NUMBER 24000707

PROJECT LOCATION Sunbury, OH

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	Classification	Water Content (%)	Dry Density (pcf)	Saturation (%)	Void Ratio
B-1	1.0							6.2			
B-1	3.5							15.6			
B-1	6.0							17.7			
B-1	8.5							25.7			
B-2	1.0							22.5			
B-2	3.5	49	25	24	9.5	78	CL	29.5	89.8		
B-2	6.0							18.4			
B-2	8.5							10.2			
B-2	13.5							14.9			
B-2	18.5							12.7			
B-3	1.0							19.8			
B-3	3.5							30.4			
B-3	6.0							19.5			
B-3	8.5							10.2			
B-3	13.5							10.9			
B-3	18.5							13.9			
B-4	1.0	39	23	16	19	77	CL	26.8	97.5		
B-4	3.5							24.0			
B-4	6.0							13.9			
B-4	8.5							10.8			
B-5	1.0							21.7			
B-5	3.5							19.8			
B-5	6.0							9.6			
B-5	8.5							7.7			

24000707 JR Smith Park, Sunbury, Ohio

[illegible]

APPENDIX D

LABORATORY TEST RESULTS



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Telephone: (419)324-2222

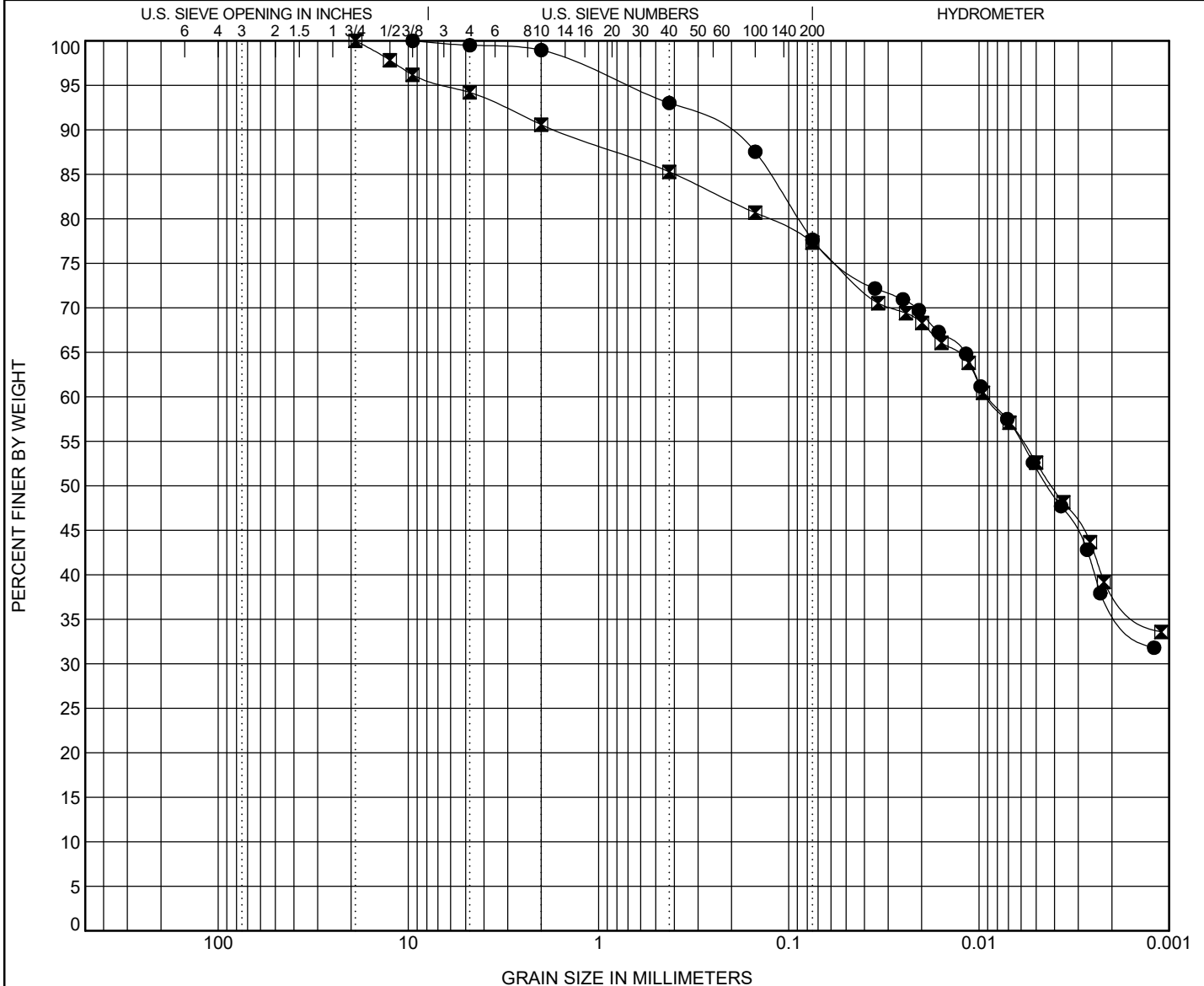
GRAIN SIZE DISTRIBUTION

CLIENT Village of Sunbury

PROJECT NAME JR Smith Park

PROJECT NUMBER 24000707

PROJECT LOCATION Sunbury, OH



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification			USCS Classification			LL	PL	PI	Cc	Cu
●	B-2	3.5	LEAN CLAY with SAND (CL)			49	25	24		
■	B-4	1.0	LEAN CLAY with SAND (CL)			39	23	16		
Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-2	3.5	9.5	0.009			0.5	21.9	25.6	52.0
■	B-4	1.0	19	0.009			5.8	16.9	24.7	52.6

GRAIN SIZE 24000707.GPJ GINT US LAB.GDT 9/26/24

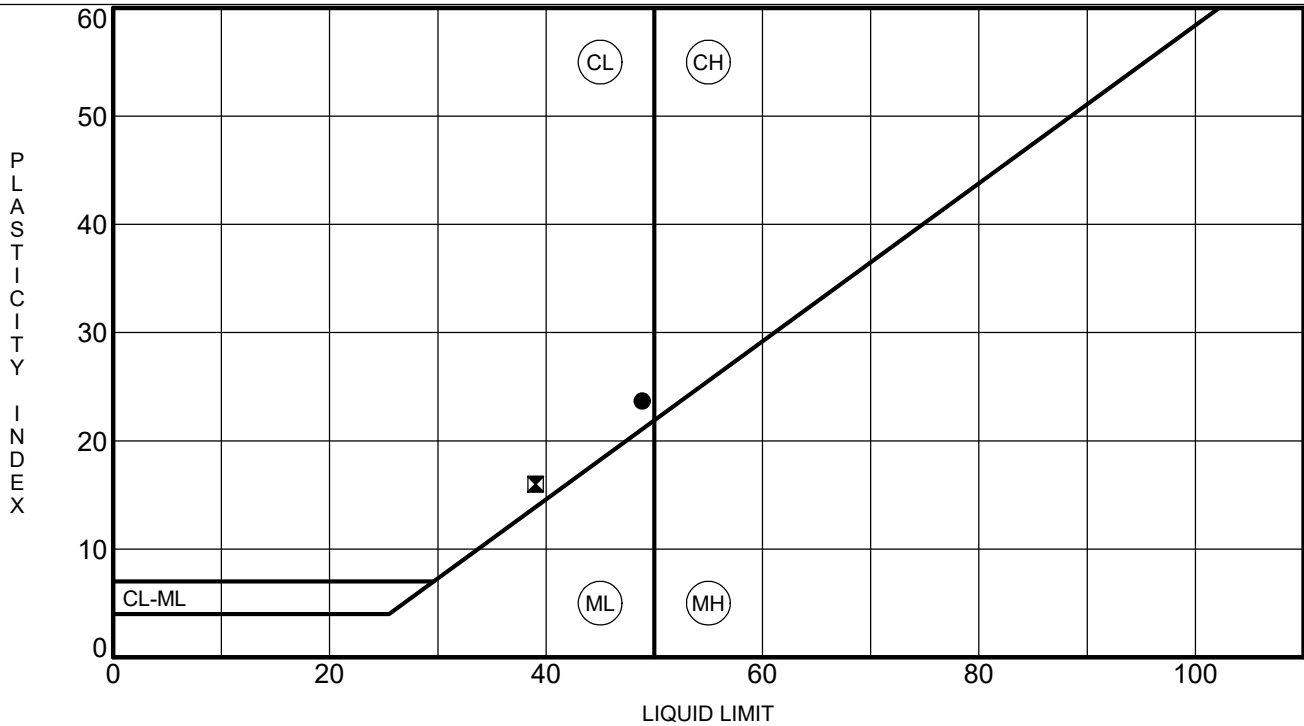
ATTERBERG LIMITS' RESULTS

CLIENT Village of Sunbury

PROJECT NAME JR Smith Park

PROJECT NUMBER 24000707

PROJECT LOCATION Sunbury, OH

[illegible]



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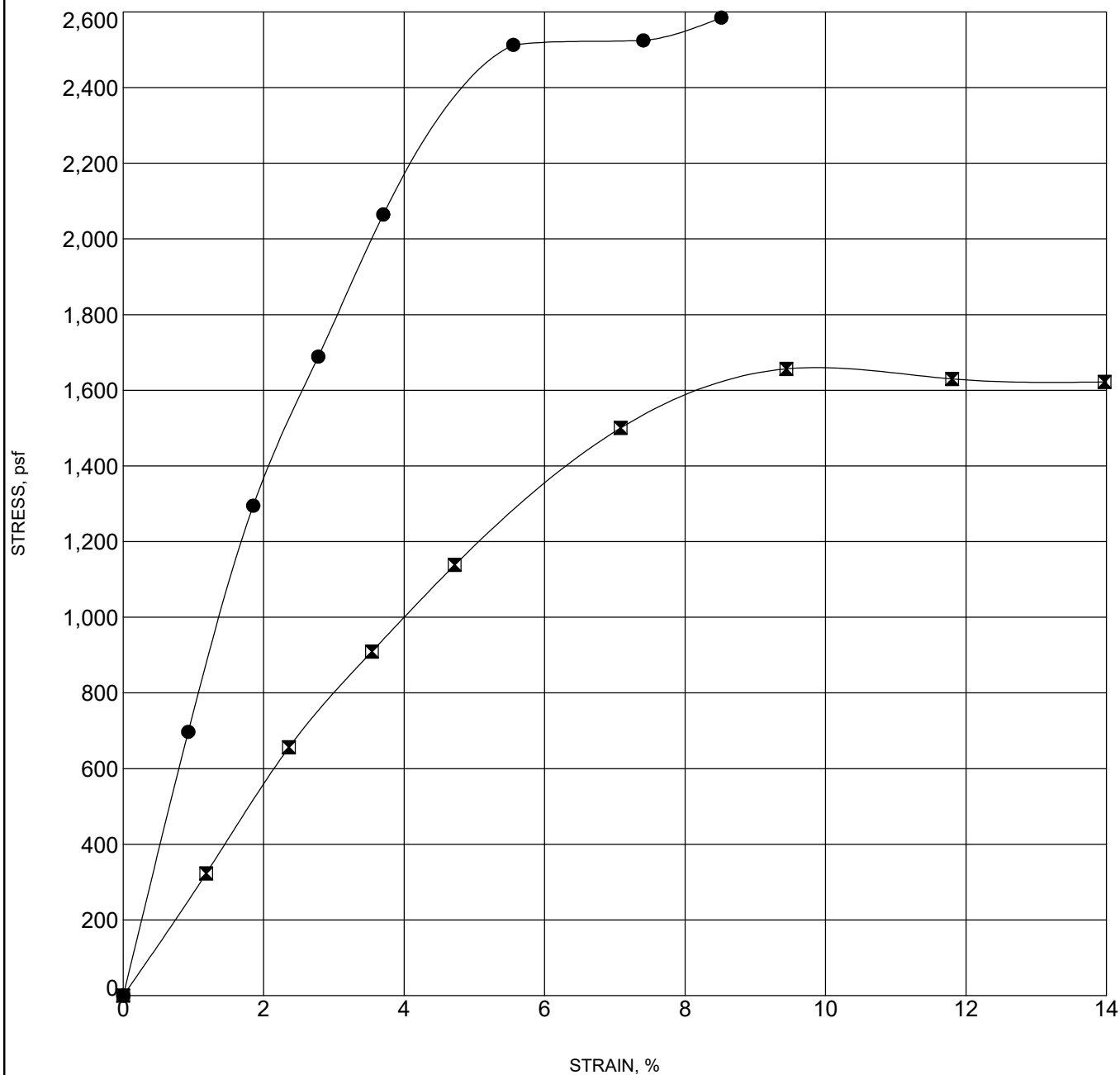
UNCONFINED COMPRESSION TEST

CLIENT Village of Sunbury

PROJECT NAME JR Smith Park

PROJECT NUMBER 24000707

PROJECT LOCATION Sunbury, OH



Specimen Identification			Classification	γ_d	MC%
●	B-2	3.5	LEAN CLAY with SAND (CL)	90	30
⊠	B-4	1.0	LEAN CLAY with SAND (CL)	97	27