CGC, Inc.

Construction • Geotechnical
Consulting Engineering/Testing

July 6, 2022
C22051-7

Mr. Jon Evans
City of Madison Department of Public Works
Engineering Division – Facilities and Sustainability
City-County Building, Room 115
210 Martin Luther King, Jr. Blvd.
Madison, Wisconsin 53703

Re: Preliminary Geotechnical Exploration Report
Proposed Permanent Homeless Shelter
1902 Bartillon Drive
Madison, Wisconsin

Dear Mr. Evans:

Construction • Geotechnical Consultants, Inc. (CGC) has completed the preliminary subsurface exploration program for the above-referenced project. The purpose of this program was to obtain an initial understanding of the subsurface conditions within the proposed construction areas and to provide preliminary geotechnical recommendations regarding site preparation, foundation, floor slab and pavement design/construction. A determination of the site class for seismic design is also included, along with a preliminary discussion of the on-site stormwater infiltration potential. We are sending you an electronic copy of this report, and we can provide a paper copy upon request.

PROJECT AND SITE DESCRIPTION

We understand that a permanent, purpose-built homeless shelter is planned at 1902 Bartillon Drive in Madison, Wisconsin. The site used to contain a bar/restaurant with beach volleyball courts and an associated paved parking lot. The former building has since been demolished above-grade, with the concrete floor slabs and footings remaining in-place. Based on a provided ALTA survey (Burse; 1-ft contour lines), existing site grades gently slope from about east down towards the west, with ground surface elevations ranging between approximately EL 867 and 863 ft.

The exact building location on the site, structural grades, etc. have not been determined yet, but we understand that the new shelter will likely include one and two-story portions and no basement. Finished first floor elevation is anticipated to be established at or slightly above current site grades. Structural loads are generally expected to be fairly light.

SUBSURFACE CONDITIONS

Subsurface conditions for this preliminary study were explored by drilling 15 Standard Penetration Test (SPT) soil borings to planned depths of 15 ft below existing site grades in an approximate grid-pattern at locations selected by City personnel and marked in the field by CGC. The borings were

2921 Perry Street, Madison WI 53713
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drilled by Soil Essentials (under subcontract to CGC) on June 16 and 17, 2022 using a track-mounted Geoprobe 7822DT rotary drill rig equipped with hollow stem augers and an automatic SPT hammer. The specific procedures used for drilling and sampling are described in Appendix A, and the boring locations are shown in plan on the Soil Boring Location Exhibit presented in Appendix B. Ground surface elevations at the boring locations were surveyed and provided to us by Burse after completion of the borings.

The subsurface profiles at the boring locations varied to some degree, but the following strata were typically encountered (in descending order):

- Approximately 2 ft of surficial ***sand fill*** in the area of the volleyball eourts (see Borings 3, 6 and 9); or
- About 1 in. of ***concrete floor slab*** on top of about 3 in. of ***base course*** in the area of the former building (see Boring 12); or
- Roughly 2 in. of ***asphalt pavement*** on top of about 3 to 4 in. of ***base course*** within the existing parking lot (see the remaining borings); underlain by
- About 1 to 5 ft of existing ***fill***, consisting largely of loose to dense sand soils, at the majority of the boring locations; over
- Approximately 2 to 5 ft of ***probable buried topsoil*** (slightly organic to organic silt and clay) in the southeastern Borings 11, 12, 14 and 15; and/or
- Roughly 2 to 6 ft of medium stiff to stiff ***lean to silty clay*** strata; underlain by
- Predominantly medium dense ***sand*** deposits with fairly low amounts of silt and gravel, interspersed with occasional seams/layers of silt and clay, to the maximum depths explored.

Natural moisture contents of representative clay samples were determined in our laboratory to range from about 19.1% to 39.1%. Based on natural moisture contents, pocket penetrometer readings (q_p-values; an estimate of the unconfined compressive strength of cohesive soils) and SPT blow counts (N-values), the cohesive soils should generally be considered *slightly to moderately compressible*. Samples taken from the apparent buried topsoil layers were further analyzed in our laboratory with regard to their organic contents by means of loss-on-ignition (LOI), which ranged from about 2.6% to 5.5%. For reference, soils with organic contents greater than 4% are typically considered *organic*.

Groundwater was encountered in the borings during and upon the completion of drilling at depths between about 9 and 13 ft below current site grades, corresponding to approximately EL 852 to 857 ft. Groundwater levels are expected to fluctuate with seasonal variations in precipitation, infiltration, evapotranspiration, the level in nearby waterbodies and other factors.

A more detailed description of the encountered soil and groundwater conditions is included on the individual soil boring logs, attached in Appendix B, which also contain the laboratory test results, and on the WDSPS *Soil and Site Evaluation – Storm* forms, which are contained in Appendix E.

DISCUSSION AND RECOMMENDATIONS

Subject to the limitations discussed below and based on the subsurface exploration, it is our *preliminary* opinion that the site is generally suitable for the planned development and that the proposed homeless shelter can be supported by a conventional shallow spread footing foundation system, *with the understanding that undercutting of unsuitable existing fill, buried topsoil and/or marginal native soils may be required below the bottom of some footings.* Our recommendations for site preparation, foundation, floor slab and pavement design/construction, along with our assessment of the site elass for seismic design and a preliminary discussion of the on-site stormwater infiltration potential, are presented in the following subsections. Additional information regarding the conclusions and recommendations presented in this report is discussed in Appendix C.

Since the exact building location, as well as structural details, such as building elevations and foundation loads, were not available to us at the time of this report, the recommendations contained herein, particularly concerning the building foundations, should be considered <u>preliminary</u>. Once available, the building information should be provided to CGC, and we should be allowed to review the recommendations contained herein and adjust them, as needed.

1. <u>Site Preparation</u>

To prepare the site for eonstruction, we reeommend that remnants of the former building (i.e., floor slab, footings and utilities) and existing asphalt pavement be completely removed from the proposed building area. In new site and pavement areas where fill is required surrounding the proposed shelter, existing pavement and structures can potentially remain in-place provided they are broken up (i.e., pulverized/rubblized) prior to fill placement to promote drainage and they do not interfere with new utility construction. We further recommend that topsoil and vegetation be stripped at least 10 ft beyond the proposed construction areas, including areas requiring fill beyond the building footprint and pavement limits. Topsoil can be stockpiled on-site and later re-used in landscaped areas.

Note that where below-grade components associated with the former building (i.e., footings, buried utilities) are removed below proposed building grades, the subgrade soils should be carefully evaluated for their foundation and floor slab support suitability prior to placing fill in order to establish new building grades. Where unsuitable soils are encountered, they should be undercut and replaced with well-compacted granular backfill, as discussed in the following paragraph.

After building demolition, pavement removal and topsoil stripping, where required, subgrades are generally anticipated to consist of granular fill; however, slightly organie to organic silt and clay soils (probable buried topsoil) may also be encountered following building demolition and pavement removal in the southeast. Portions of these soils may require undercutting and replacement depending on organic content and their strength at the time of construction. In areas remaining at-grade or where site grades need to be raised, we recommend that cohesive and fine-grained subgrades (i.e., clay and silt) be statically recompacted (i.e., without vibration) and subsequently proof-rolled with a piece of heavy rubbcr-tire construetion equipment, such as a loaded tri-axle dump truck, to check for soft/yielding areas. If soft/yielding areas are observed, these soils should be undercut and replaced with granular backfill compacted to at least 95% compaction based on modified Proctor methods (ASTM D1557) in accordance with our Recommended Compacted Fill Specifications presented in Appendix D. Alternatively, 3-in. dense graded base (DGB) that is placed in loose 10-in. lifts and compacted until deflection ceases can also be used to restore grades in undercut areas. Granular subgrades should be thoroughly recompacted with a vibratory smooth-drum roller, and zones that remain loosc after recompaction should be undercut and replaced or stabilized as described above. Areas subsequently receiving fill should be checked for their pavement, floor slab and footing support suitability prior to fill placement, as applicable. *Based on the widespread presence of existing fill and buried topsoil layers near existing site grades, we recommend that the project budget include a generous contingency for subgrade improvement in planned pavement and floor slab areas.*

Following the development of a firm and stable subgrade, fill plaeement to establish site, pavement and building grades can proeeed, where required. To the extent possible, we recommend using granular soils (i.e., sands/gravels) as structural fill within the building envelope and upper 2± ft in pavement areas because these soils are relatively easy to place and compact in most weather conditions compared to clay/silt soils. Clay and silt soils exeavated on-site are generally not recommended as structural fill because moisture conditioning by discing and drying (aeration) will likely be required to achieve desired compaction levels, whieh is highly weather-dependent (i.e., dry, warm and windy conditions) and could delay construction progress. In our opinion, clay/silt soils are best used as fill in landscaping or potentially as lower lifts in pavement areas provided the moisture contents ean be suffieiently lowered from the natural states to facilitate compaction efforts. We reeommend that structural fill be compacted to at least 95% based on modified Proctor methods (ASTM D1557) following Appendix D guidelines. Periodic field density tests should be taken by CGC staff within the fill to document the adequacy of compaction efforts.

2. Building Foundations

In the absence of detailed building information, we assume that the finished first floor elevation of the one to two-story homeless shelter (without a basement) will be established near or slightly above eurrent site grades. Footings are generally anticipated to extend on the order of 2 to 5 ft below finished first floor grade, and footings are therefore expected to largely bear within loose to dense existing, mostly granular fill or medium stiff to stiff native clay soils. *The existing fill soils, where encountered at footing grades, should be carefully evaluated for their suitability to support the building foundations, and unsuitable fill should be undercut and replaced below the bottom of footings. Organic soils/buried topsoil, such as encountered below the existing fill or pavement section in the southeast, should also be undercut and replaced below the bottom of footings.* In addition, medium stiff native clays may require undercutting and replacement if encountered at or slightly below footing grades.

Provided that unsuitable soils are undercut below the bottom of footings, where present, followed by thorough reeompaction of the undercut base and placement of well-compacted granular backfill, we reeommend the following parameters be used for *preliminary* foundation design:

- Maximum net allowable bearing pressure: 2,000 psf

- Minimum foundation widths:
  - Continuous wall footings: 18 in.
  - Column pad footings: 30 in.

- Minimum footing depths below finish site grades:
  - Exterior/perimeter footings: 4 ft
  - Interior footings: no minimum requirement

Recognizing that subsurface conditions will vary across the building footprint, footing subgrades should be checked by a CGC field representative to doeument that the subgrade soils are suitable for footing support or otherwise advise on eorrective measures, such as undercutting. We reeommend using a smooth-edged backhoe bucket for footing and undercut excavations. Where required, the base of undercut excavations should be widened beyond the footing edges at least 0.5 ft in each direction for eaeh foot of undercut depth for stress distribution purposes. Granular soils exposed at footing grade or at the bottom of undereut excavations should be thoroughly recompacted with a large vibratory plate eompactor or an excavator-mounted hoe-pack prior to backfilling and formwork/concrete placement to densify soils loosened during the excavation process. Soils potentially susceptible to disturbance from vibratory compaction (e.g., cohesive/fine-grained soils or sands with elevated moisture content) should be hand-trimmed. OSHA slope guidelines should be followed if workers need to enter footing excavations.

As previously discussed, we recommend that unsuitable existing fill and buried topsoil layers be undercut and replaced below the bottom of footings. Undercutting will also be required where native clay soils with q_p-values of less than 1.0 tsf are present at and slightly below the bottom of footings designed for an allowable bearing pressure of 2,000 psf. Similarly, loose sand or silt soils that cannot be recompacted satisfactorily should also be undercut if encountered at or slightly below footing grades. In order to re-establish footing grade in undercut areas, we recommend using granular backfill compacted to at least 95% compaction based on modified Proctor methods (ASTM D1557), in accordance with the Recommended Compacted Fill Specifications presented in Appendix D. Alternatively, 3-in. DGB that is placed in loose 10-in. lifts and compacted until deflection ceases can also be used to restore grades in undercut areas.

Provided the *preliminary* foundation design/construction recommendations discussed above are followed, we estimate that total and differential settlements should be on the order of 1.0 and 0.5 in., respectively.

As previously noted, the recommendations contained herein are based on assumptions regarding proposed building grades, and should therefore be considered *<u>preliminary</u>*. *Once building details become available, this information should be provided to us for review, and we should be allowed to adjust our recommendations if warranted.*

3. <u>Seismic Site Class</u>

In our opinion, the average soil properties in the upper 100 ft of the site (based on N-values projected to range between 15 and 50 blows/ft, on average, in the sand deposits underlying the site) may be characterized as a stiff soil profile. This characterization would place the site in Site Class D for seismic design aceording to the International Building Code and ASCE 7.

4. <u>Floor Slab</u>

We antieipate that floor slab subgrades will largely consist of existing, mostly granular fill, slightly organic to organic silt and elay soils (buried topsoil in the southeast), or of newly-placed structural fill above current site grades where site grades need to be raised. Prior to slab construction, granular subgrade soils should be thoroughly recompacted with a vibratory smooth-drum roller to densify soils that may become disturbed or loosened during construction activities. Cohesive and fine-grained subgrades will require statie recompaction and subsequent proof-rolling. Contrary to foundation subgrades, it is our opinion that the buried topsoil can generally remain in-place below floor slab areas, provided organic contents are fairly low and these soils perform satisfactorily during proof-rolling. Areas of disturbed soil, soft/yielding zones observed during proof-rolling, or soils that remain loose after recompaction should be undercut and replaced with compacted 3-in. DGB or granular fill. *Due to the wide-spread presence of existing fill and buried topsoil near existing site grades, some undercutting or stabilization of floor slab subgrades should generally be expected, and we recommend that the project budget include a generous contingency for floor slab subgrade improvement.*

To act as a capillary break below the slab, we recommend including a minimum 4 to 6-in. thick layer of well-graded sand/gravel with less than 5% by weight passing the No. 200 U.S. standard sieve. Note, however, that some structural engineers require a layer of dense graded base, such as 1¼-in. DGB, rather than sand/gravel below the floor slabs to increase the subgrade modulus immediately below the slab. To further reduce the potential for moisture migration through the slab, a plastic vapor barrier can also be utilized. Fill and base layer material below the floor slab should be placed as described in the Site Preparation section of this report. Slabs constructed on a minimum 6-in. thick DGB layer may be designed utilizing a subgrade modulus of 150 pci, and a subgrade modulus of 100 pci should be used for the design of slabs that are constructed on a sand/gravel layer. The design subgrade moduli are based on a firm or adequately stabilized, recompacted subgrade such that non-yielding conditions are developed. The slab should be structurally separated from the footings with a compressible filler and have construction joints and reinforcement for crack control.

5. Pavement Design

Wc anticipate that pavement design will be controlled by the shallow fill and buried topsoil layers, and subgrades should be prepared as described in the Site Preparation section of this report, with recompaction/proof-rolling completed prior to base course and asphalt placement. *Due to the encountered surficial subsurface conditions, we recommend that the budget include a generous contingency for subgrade undercutting/stabilization, which may involve the placement of about 12 in. of additional coarse aggregate (e.g., 3-in. DGB), potentially over biaxial geogrid (e.g., Tensar BX Type 1 or equivalent).* The areas requiring undercutting/stabilization and the depth of undercutting should be determined in the field by proof-rolling prior to installing the base course layer, and the need for undercutting/stabilization will likely depend on the weather conditions during construction. The need for undercutting below the pavement section will likely be redueed where site grades are raised at least 2 ft above existing grade with high-quality granular fill. As stated, slightly organic soils may potentially remain in-place below pavement areas provided they are firm when proof-rolled and the owner is willing to accept the potential risk of premature distress and/or increased maintenance costs. If the risk is not acceptable or the slightly organic soils are not firm, they should be undercut/stabilized as described.

We anticipate that asphalt pavement on this site will primarily be exposed to automobile traffie with less than one 18-kip equivalent single axle load (ESAL) per day. In view of this, we have assumed Traffic Class I following Wisconsin Asphalt Pavement Association (WAPA) recommendations for smaller parking areas and driveways that are mainly used by light passenger vehicles. However, main sections of the driveways are likely to experience heavier traffic loads (e.g., due to garbage trucks). For pavement areas where trucks will routinely travel, as well as parking lots with 50 or more stalls, we have assumed a traffic load of up to 5 ESALs per day and Traffic Class II according to WAPA. The pavement sections summarized in Table 1 below were selected assuming a Soil Support Value "SSV" of about 4.0 for a firm or adequately stabilized fill/silt/clay subgrade and a design life of 20 years.

TABLE 1 – Recommended Pavement Sections

Material	Thicknesses (in.)		WDOT Specification [1]
	Traffic Class I (Light Duty)	Traffic Class II (Medium Duty)	
Bituminous Upper Layer [2,3]	1.75	1.75	Section 460, Table 460-1
Bituminous Lower Layer [2,3]	1.75	2.25	Section 460, Table 460-1
Dense Graded Base Course [2,4]	8.0	10.0	Sections 301 and 305
Total Thickness	**11.5**	**14.0**	

Notes:

1) Wisconsin DOT *Standard Specifications for Highway and Structure Construction*, latest edition, including supplemental specifications, and *Wisconsin Asphalt Pavement Association 2020 Asphalt Pavement Design Guide*.

2) Compaction requirements:
   - Bituminous concrete: Refer to Section 460-3.
   - Base course: Refer to Section 301.3.4.2, Standard Compaction

3) Mixture Type LT (or E-0.3) bituminous; refer to Section 460, Table 460-2 of the *Standard Specifications*.

4) The upper 4 in. should consist of 1¼-in. DGB; the bottom part of the layer can consist of 3-in. DGB.

The medium-duty pavement section may be considered across the entire area for constructability reasons. The recommended pavement sections assume that regular maintenance (crack sealing, etc.) will occur, as needed. Note that if traffic volumes are greater than those assumed, CGC should be allowed to review the recommended pavement sections and adjust them accordingly. Alternative pavement designs may prove acceptable and should be reviewed by CGC. If there is a delay between subgrade preparation and placing the base course, the subgrade should be recompacted.

Where concrete pavement may be used, such as in pavement areas subjected to concentrated wheel loads (e.g., dumpster pads), we recommend that the concrete be at least 6 in. thick and contain adequate reinforcement for crack control. Concrete slabs underlain by a minimum 6-in. thick dense graded base layer over a firm or stabilized subgrade can be designed utilizing a subgrade modulus of 150 pci.

6. Preliminary Stormwater Infiltration Discussion

We understand that stormwater management features may be required in conjunction with the planned redevelopment of the site. In light of this, the soil borings of the preliminary study discussed in this report were evaluated for their stormwater infiltration potential. The subsurface profiles varied to some degree across the site, but were generally dominated by lower-permeability layers of *clay loam*, *silty clay loam*, *sandy clay loam* and *silt loam* to depths between approximately 5 and 9 ft below current site grades. Groundwater was observed at depths between about 9 and 13 ft below existing site grades during and upon the completion of drilling. It must be noted, however, that the majority of the shallow lower-permeability soils exhibit low-chroma/high-value (i.e., gley or gray) dominant color and/or redoximorphic features (redox or mottling), which typically indicate the level of past saturation from *seasonally elevated groundwater* (or potentially periodically infiltrating surface water/precipitation) at shallower depths. Based on the observed groundwater levels and the prevalence of shallow lower-permeability soils, indicating signs of potential seasonally higher groundwater levels, it is our opinion that the site is not suitable for infiltrating significant quantities of stormwater and may qualify as exempt/excluded per NR151.

Infiltration Potential: The following is a summary of the estimated infiltration rates for the soils encountered in Borings B-1 through B-15, per Table 2 of the WDNR Conservation Practice Standard 1002, *Site Evaluation for Storm Water Infiltration. Where lower-permeability soil (e.g., silt loam, silty clay loam, etc.) seams/layers exist within otherwise more permeable soils (e.g., granular, coarse-grained soils), the infiltration rate of the lower-permeability seams/layers will control the vertical infiltration rate, unless the lower-permeability seams are removed or the layer (with scattered seams) is excavated and blended.* The estimated infiltration rates are as follows:

- Clay loam (CL) 0.03 in./hr.
- Silty clay loam (SiCL) 0.04 in./hr.
- Sandy clay loam (SCL) 0.11 in./hr.
- Silt loam (SiL) 0.13 in./hr.
- Fine sandy loam (FSL) 0.50 in./hr.
- Gravelly sandy loam (GRSL) 0.50 in./hr.
- Fine sand (FS) 0.50 in./hr.
- Gravelly loamy sand (GRLS) 1.63 in./hr.
- Sand (S) 3.60 in./hr.

Note that the infiltration rates should be considered approximate since they are merely based on soil texture and do not account for in-place soil density and other factors, which will affect the infiltration rate. *Infiltration rates in fill should be considered very approximate due to the potential for seams/layers of dissimilar material or variable composition.* We recommend that, at the time of construction, the soils at and several feet below the bottom of stormwater management systems be checked by a certified soil tester *in conjunction with the basin designer* to document that the soils are appropriate for the design infiltration rate or recommend remedial measures, if necessary. The Wisconsin Department of Safety & Professional Services *Soil and Site Evaluation – Storm* forms for Borings B-1 through B-15 are contained in Appendix E.

It must be cautioned that the results of the soil borings have limitations with regard to the evaluation of the on-site stormwater infiltration potential, as actual soil horizon transitions may vary from those shown on the boring logs and infiltration forms. The reviewing agency may require test pits to be excavated at a later date prior to finalizing the stormwater design. *The results of the test pits may require revisions to the stormwater management design if the design has been based solely on the soil borings.*

Groundwater: As previously discussed, groundwater was encountered at depths between approximately 9 and 13 ft below current site grades during our field exploration, but color indicators in the near-surface lower-permeability soils suggest the level of past saturation at shallower depths, which may be due to *seasonally high groundwater* levels. Groundwater levels/seasonal high levels and groundwater mounding effects must be carefully considered during the design (i.e., establishing design bottom elevation) since it is a limiting factor for infiltration and may preclude the ability to infiltrate. Adequate separation distance from groundwater must be maintained per WDNR requirements.

Bedrock: Bedrock was not encountered in the borings performed for this study. The depth and consistency of bedrock should be expected to vary across the site.

During construction, appropriate erosion control should be provided to prevent eroded soil from contaminating the stormwater management areas. Where appropriate, the stormwater system design should include pretreatment to remove fine-grained soils (silt/clay) and clogging materials (oils/greases) from stormwater prior to entering the infiltration areas. Additionally, a regular maintenance plan should be developed to remove silt/clay soils and clogging materials that may accumulate in the bottom of the stormwater management areas over time. Failure to adequately control fine-grained soils and clogging materials from entering the infiltration areas or failure to regularly remove fine-grained soils and clogging materials that accumulate at the base of the stormwater infiltration systems will likely cause the stormwater management systems to fail. Additionally, it is important that the soils in the bottom of the infiltration systems do not become compacted during construction or measures are taken to mitigate soils that are compacted during construction. Refer to WDNR *Conservation Practice Standards 1002, 1003 and 1004*, as well as *NR151* for additional information.

CONSTRUCTION CONSIDERATIONS

Due to variations in weather, construction methods and other factors, specific construction problems are difficult to predict. Soil related difficulties which could be encountered on the site are discussed below:

- Due to the potentially sensitive nature of some of the on-site soils, we recommend that final site grading activities be completed during dry weather, if possible. Construction traffic should be avoided on prepared subgrades to minimize potential disturbance.

- Contingencies in the project budget for subgrade stabilization with coarse aggregate in pavement and floor slab areas should be increased if the project sehedule requires that work proceed during adverse weather conditions.

- Earthwork construction during the late fall through early spring could be complicated as a result of wet weather and/or freezing temperatures. During cold weather, exposed subgrades should be protected from freezing before and after footing construction. Fill should never be placed while frozen or on frozen ground.

- Exeavations extending greater than 4 ft in depth below the existing ground surface should be sloped or braced in accordance with current OSHA standards. Where adequate sloping is not possible, temporary shoring (earth retention) will be required, which should be designed by an appropriately qualified profcssional engineer.

- Based on the observations made during our field exploration, we do not anticipate groundwater to be encountered during footing or (relatively shallow) undercut excavations. However, groundwater may potentially be encountered during deeper undercuts or deep utility trench excavations (if any), which should be appropriately controlled with means and methods being the responsibility of the contractor. Water accumulating at the bottom of excavations as a result of precipitation or seepage should be quickly removed in a similar manner.

RECOMMENDED CONSTRUCTION MONITORING

The quality of the foundation, floor slab and pavement subgrades will be largely determined by the level of care exercised during site development. To check that earthwork and foundation construction proceed in accordance with our recommendations, the following operations should be monitored by CGC:

- Topsoil stripping and subgrade proof-rolling/compaction;
- Fill/backfill placement and compaction;
- Foundation excavation/subgrade preparation; and
- Concrete placement.

* * * * *

It has been a pleasure to serve you on this project. If you have any questions or need additional consultation, please contact us.

Sincerely,

CGC, Inc.

Tim F. Gassenheimer, PE, CST
Senior Staff Engineer

Ryan J. Portman /TFG

Ryan J. Portman, PE, CST
Consulting Professional/Field Supervisor

Encl: Appendix A - Field Exploration
Appendix B - Soil Boring Location Exhibit
Logs of Test Borings (15)
Log of Test Boring-General Notes
Unified Soil Classification System
Appendix C - Document Qualifications
Appendix D - Recommended Compacted Fill Specifications
Appendix E - WDSPS *Soil and Site Evaluation – Storm* Forms

APPENDIX A

FIELD EXPLORATION REPORT

APPENDIX A

FIELD EXPLORATION

Subsurfaee conditions for this study were explored by drilling 15 Standard Penetration Test (SPT) soil borings to depths of 15 ft below current site grades, which were sampled at 2.5-ft intervals to a depth of 10 ft and at 5-ft intervals thereafter. The samples were obtained in general accordance with specifications for standard penetration testing, ASTM D1586, and the speeifie procedures used for drilling and sampling are described below.

1. Boring Procedures between Samples

   The boring is extended downward, between samples, by a hollow-stem auger.

2. Standard Penetration Test and Split-Barrel Sampling of Soils
   (ASTM Designation: D 1586)

   This method consists of driving a 2-inch outside diameter split-barrel sampler using a 140-pound weight falling freely through a distance of 30 inches. The sampler is first seated 6 inches into the material to be sampled and then driven 12 inches. The number of blows required to drive the sampler the final 12 inehes is recorded on the log of borings and is known as the Standard Penetration Resistance.

During the field exploration, the driller visually elassified the soil and prepared a field log. *Field screening of the soil samples for possible environmental contaminants was not conducted by the driller as these services were not part of CGC's work scope.* Water level observations were made in each boring during and after drilling and are shown at the bottom of each boring log. Upon completion of drilling, the borings were backfilled with bentonite to satisfy WDNR regulations and the soil samples were delivered to our laboratory for visual classification and limited geotechnical laboratory testing. The soils were visually classified by a geotechnical engineer/certified soil tester using dual classification per the Unified Soil Classification System (USCS) and the United States Department of Agriculture (USDA) classification system.

The final boring logs prepared by the engineer, including laboratory test results, along with a Soil Boring Location Exhibit and a description of the Unified Soil Classification System are presented in Appendix B. The WDSPS *Soil and Site Evaluation – Storm* forms are attached in Appendix E.

APPENDIX B

SOIL BORING LOCATION EXHIBIT
LOGS OF TEST BORINGS (15)
LOG OF TEST BORING – GENERAL NOTES
UNIFIED SOIL CLASSIFICATION SYSTEM

Notes

1. Borings were drilled by Soil Essentials on June 16 and 17, 2022.
2. Boring locations are approximate.
3. Base map was obtained via DCiMap.

Job No.: C22051-7	CGC, Inc.	**SOIL BORING LOCATION EXHIBIT**
Date: June 2022		**Proposed Permanent Homeless Shelter** **1902 Bartillon Drive** **Madison, Wisconsin**

LOG OF TEST BORING

CGC Inc.

Project: Proposed Permanent Homeless Shelter
1902 Bartillon Drive
Location: Madison, Wisconsin

Boring No. 1
Surface Elevation (ft) 864.22
Job No. C22051-7
Sheet 1 of 1

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N	Depth (ft)		qu (qa) (tsf)	W	LL	PL	LI
						2± in. Asphalt Pavement / 3± in. Base Course					
1		15	M	31		FILL: Dense, Grayish Brown Fine to Coarse Sand, Some Silt and Gravel					
2		18	M	5		Stiff, Gray/Brown (Mottled) Sandy Lean CLAY, Trace Gravel (CL)	(1.0-1.25)	20.1			
					5						
3		18	M	5		Medium Stiff, Light Gray/Yellowish Brown (Lightly Mottled) Lean CLAY, Trace Sand (CL)	(0.75-1.0)				
4		15	W	12		Medium Dense, Grayish Brown to Brown Fine SAND, Trace to Little Silt (SP/SP-SM)					
					10 ∇						
5		17	W	17							
					15	End of Boring at 15 ft Borehole Backfilled with Bentonite Chips; Surface Patched with Asphalt Cold Patch					

WATER LEVEL OBSERVATIONS

While Drilling ∇ 10.0' Upon Completion of Drilling ______
Time After Drilling ______ ______ ______ ______
Depth to Water ______ ______ ______ ______
Depth to Cave in ______ ______ ______ ______

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

GENERAL NOTES

Start 6/16/22 End 6/16/22
Driller SE Chief Tim Rig Geoprobe
Logger Tim Editor TFG 7822DT
Drill Method 2.25" HSA; Autohammer

LOG OF TEST BORING

CGC Inc.

Project: **Proposed Permanent Homeless Shelter**
1902 Bartillon Drive
Location: **Madison, Wisconsin**

Boring No. **2**
Surface Elevation (ft) **865.04**
Job No. **C22051-7**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	qu (qa) (tsf)	W	LL	PL	LI
					0	2± in. Asphalt Pavement / 3± in. Base Course					
						FILL: Loose, Brownish Gray Fine to Coarse Sand, Some Silt and Gravel					
1		10	M	8							
						Stiff to Very Stiff, Light Gray/Brown (Lightly Mottled) Lean CLAY, Trace Sand (CL)					
2		16	M	4			(1.75-2.25)	26.8			
					5	Stiff to Very Stiff, Light Gray/Yellowish Brown (Mottled) Lean to Silty CLAY, Little Sand (CL/CL-ML)					
3		14	M	7			(1.75-2.25)				
						Medium Dense, Grayish Brown to Brown Fine SAND, Trace to Little Silt (SP/SP-SM)					
4		16	M/W	12							
					10						
						Very Stiff, Light Gray/Yellowish Brown (Lightly Mottled) Lean CLAY, Trace Sand (CL)					
5		14	W	15			(2.75-3.0)	39.1			
					15	End of Boring at 15 ft Borehole Backfilled with Bentonite Chips; Surface Patched with Asphalt Cold Patch					

WATER LEVEL OBSERVATIONS

While Drilling	∇ 11.0'	Upon Completion of Drilling			
Time After Drilling					
Depth to Water					11.1' ▼
Depth to Cave in					11.1'

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

GENERAL NOTES

Start **6/16/22** End **6/16/22**
Driller **SE** Chief **Tim** Rig **Geoprobe 7822DT**
Logger **Tim** Editor **TFG**
Drill Method **2.25" HSA; Autohammer**

LOG OF TEST BORING

CGC Inc.

Project: **Proposed Permanent Homeless Shelter**
1902 Bartillon Drive
Location: **Madison, Wisconsin**

Boring No. **3**
Surface Elevation (ft) **865.42**
Job No. **C22051-7**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	qu (qa) (tsf)	W	LL	PL	LI
						2± ft Sand FILL					
1		14	M	7							
						FILL: Loose, Grayish Brown Fine to Coarse Sand, Some Gravel, Trace to Little Silt					
2		12	M	9							
					5						
						Very Stiff, Light Gray/Yellowish Brown (Mottled) Lean CLAY, Little Sand (CL)					
3		18	M	7			(2.0-2.75)	20.0			
						Medium Dense, Grayish Brown to Brown Fine SAND, Trace to Little Silt (SP/SP-SM)					
4		16	M/W	14							
					10 ▼						
					▽						
5		14	W	15							
					15	End of Boring at 15 ft Borehole Backfilled with Bentonite Chips					

WATER LEVEL OBSERVATIONS

While Drilling	▽ 13.0'	Upon Completion of Drilling		
Time After Drilling				
Depth to Water				10.1' ▼
Depth to Cave in				10.1'

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

GENERAL NOTES

Start **6/16/22** End **6/16/22**
Driller **SE** Chief **Tim** Rig **Geoprobe 7822DT**
Logger **Tim** Editor **TFG**
Drill Method **2.25" HSA; Autohammer**

LOG OF TEST BORING

CGC Inc.

Project: **Proposed Permanent Homeless Shelter**
1902 Bartillon Drive
Location: **Madison, Wisconsin**

Boring No. **4**
Surface Elevation (ft) **864.01**
Job No. **C22051-7**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N	Depth (ft)		qu (qa) (tsf)	W	LL	PL	LI
						2± in. Asphalt Pavement / 4± in. Base Course					
						FILL: Loose, Light Brown Fine Sand, Some Silt, Trace to Little Gravel					
1		13	M	8							
						Stiff, Light Gray/Brown (Mottled) Lean CLAY, Trace Sand (CL)					
2		18	M	4			(1.5-1.75)	26.8			
					5	Medium Dense, Grayish Brown to Brown Fine SAND, Trace to Little Silt, Scattered Silt Seams (SP/SP-SM)					
3		18	M	11							
4		16	M/W	16							
					10						
					▼						
						Medium Dense, Gray Fine to Coarse SAND, Some Gravel, Trace to Little Silt (SP/SP-SM)					
5		14	W	15							
					15	End of Boring at 15 ft Borehole Backfilled with Bentonite Chips; Surface Patched with Asphalt Cold Patch					

WATER LEVEL OBSERVATIONS

While Drilling	∇ 11.0'	Upon Completion of Drilling			
Time After Drilling					
Depth to Water				11.0'	▼
Depth to Cave in				11.0'	

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

GENERAL NOTES

Start **6/16/22** End **6/16/22**
Driller **SE** Chief **Tim** Rig **Geoprobe 7822DT**
Logger **Tim** Editor **TFG**
Drill Method **2.25" HSA; Autohammer**

CGC Inc.

LOG OF TEST BORING

Project: Proposed Permanent Homeless Shelter, 1902 Bartillon Drive
Location: Madison, Wisconsin

Boring No. 5
Surface Elevation (ft) 864.96
Job No. C22051-7
Sheet 1 of 1

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	qu (qa) (tsf)	W	LL	PL	LI
						2± in. Asphalt Pavement / 3± in. Base Course					
						FILL: Loose to Medium Dense, Light Brown Fine Sand, Some Silt, Trace to Little Gravel					
1		18	M	10							
						Stiff, Bluish Gray/Brown (Lightly Mottled) Lean CLAY, Trace Sand and Organics (CL)					
2		17	M	5			(1.75-2.0)	29.8			
					5						
						Stiff to Very Stiff, Light Gray/Yellowish Brown (Mottled) Lean to Silty CLAY, Little Sand (CL/CL-ML)					
3		18	M	9			(1.5-2.25)	19.1			
						Medium Dense, Grayish Brown to Brown Fine SAND, Trace to Little Silt (SP/SP-SM)					
4		14	M/W	18							
					10						
5		14	W	15							
					15	End of Boring at 15 ft Borehole Backfilled with Bentonite Chips; Surface Patched with Asphalt Cold Patch					

WATER LEVEL OBSERVATIONS

While Drilling ▽ 11.0' Upon Completion of Drilling ______
Time After Drilling
Depth to Water 10.9' ▼
Depth to Cave in 10.9'

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

GENERAL NOTES

Start 6/16/22 End 6/16/22
Driller SE Chief Tim Rig Geoprobe 7822DT
Logger Tim Editor TFG
Drill Method 2.25" HSA; Autohammer

LOG OF TEST BORING

CGC Inc.

Project: Proposed Permanent Homeless Shelter
1902 Bartillon Drive
Location: Madison, Wisconsin

Boring No. 6
Surface Elevation (ft) 865.41
Job No. C22051-7
Sheet 1 of 1

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

No.	Type	Rec (in.)	Moist	N	Depth (ft)	Visual Classification and Remarks	qu (qa) (tsf)	W	LL	PL	LI
						2± ft Sand FILL					
1		18	M	10							
						FILL: Loose to Medium Dense, Grayish Brown Fine to Coarse Sand, Some Gravel, Trace to Little Silt, Scattered Lean Clay Seams					
2		16	M	4		Stiff, Gray/Brown (Mottled) Lean CLAY, Trace Sand (CL)	(1.25-1.75)				
					5						
3		18	M	10		Very Stiff, Light Gray/Brown (Mottled) Lean CLAY, Trace Sand (CL)	(2.0-2.75)	20.9			
						Medium Dense, Grayish Brown to Brown Fine SAND, Trace to Little Silt (SP/SP-SM)					
4		14	M/W	20	▼						
					▽ 10						
5		13	W	17							
					15	End of Boring at 15 ft Borehole Backfilled with Bentonite Chips					

WATER LEVEL OBSERVATIONS

While Drilling	▽ 10.0'	Upon Completion of Drilling			
Time After Drilling					
Depth to Water				9.1' ▼	
Depth to Cave in				9.1'	

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

GENERAL NOTES

Start 6/16/22 End 6/16/22
Driller SE Chief Tim Rig Geoprobe
Logger Tim Editor TFG 7822DT
Drill Method 2.25" HSA; Autohammer

LOG OF TEST BORING

CGC Inc.

Project: **Proposed Permanent Homeless Shelter**
1902 Bartillon Drive
Location: **Madison, Wisconsin**

Boring No. **7**
Surface Elevation (ft) **863.75**
Job No. **C22051-7**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	qu (qa) (tsf)	W	LL	PL	LI
						2± in. Asphalt Pavement / 4± in. Base Course					
1		14	M	7		FILL: Loose, Light Brown Fine Sand, Some Silt, Trace to Little Gravel					
2		14	M	4		Medium Stiff to Stiff, Light Gray/Yellowish Brown (Lightly Mottled) Lean CLAY, Trace Sand (CL)	(0.75-1.5)				
					5						
3		18	M	7		Stiff, Light Gray/Brown (Mottled) Lean CLAY, Trace to Little Sand (CL)	(1.0-1.5)	19.4			
4		14	W	17		Medium Dense, Light Brown Fine SAND, Trace to Little Silt, Scattered Silt Seams (SP/SP-SM)					
					10						
5		14	W	19							
					15	End of Boring at 15 ft Borehole Backfilled with Bentonite Chips; Surface Patched with Asphalt Cold Patch					

WATER LEVEL OBSERVATIONS

While Drilling	▽ 10.0'	Upon Completion of Drilling			
Time After Drilling					
Depth to Water				10.1' ▼	
Depth to Cave in				10.1'	

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

GENERAL NOTES

Start **6/17/22** End **6/17/22**
Driller **SE** Chief **Tim** Rig **Geoprobe 7822DT**
Logger **Tim** Editor **TFG**
Drill Method **2.25" HSA; Autohammer**

LOG OF TEST BORING

CGC Inc.

Project: **Proposed Permanent Homeless Shelter**
1902 Bartillon Drive
Location: **Madison, Wisconsin**

Boring No. **8**
Surface Elevation (ft) **864.52**
Job No. **C22051-7**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	qu (qa) (tsf)	W	LL	PL	LI
						2± in. Asphalt Pavement / 3± in. Base Course					
						FILL: Loose, Light Brown Fine Sand, Some Silt, Trace to Little Gravel					
1		14	M	5							
						Very Stiff, Bluish Gray/Brown (Lightly Mottled) Lean CLAY, Trace Sand (CL)					
2		16	M	5			(2.0-2.5)	27.4			
					5						
						Stiff, Bluish Gray/Brown (Mottled) Lean CLAY, Trace to Little Sand (CL)					
3		16	M	9			(1.5-1.75)	19.5			
						Medium Dense, Gray to Tan Fine SAND, Trace to Little Silt (SP/SP-SM)					
4		14	M/W	15							
					10						
5		18	W	16							
					15	End of Boring at 15 ft					
						Borehole Backfilled with Bentonite Chips; Surface Patched with Asphalt Cold Patch					

WATER LEVEL OBSERVATIONS

While Drilling	∇ 11.0'	Upon Completion of Drilling			
Time After Drilling					
Depth to Water				11.2'	▼
Depth to Cave in				11.2'	

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

GENERAL NOTES

Start **6/17/22** End **6/17/22**
Driller **SE** Chief **Tim** Rig **Geoprobe 7822DT**
Logger **Tim** Editor **TFG**
Drill Method **2.25" HSA; Autohammer**

LOG OF TEST BORING

CGC Inc.

Project: Proposed Permanent Homeless Shelter, 1902 Bartillon Drive
Location: Madison, Wisconsin

Boring No. 9
Surface Elevation (ft) 865.42
Job No. C22051-7
Sheet 1 of 1

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N	Depth (ft)		qu (qa) (tsf)	W	LL	PL	LI
						2± ft Sand FILL					
1		18	M	8							
						FILL: Loose, Light Brown Fine Sand, Some Silt, Trace to Little Gravel, Scattered Lean Clay Seams					
2		18	M	4		Stiff, Light Gray/Brown (Mottled) Lean CLAY, Trace Sand (CL)	(1.5-1.75)				
					5						
3		18	M	7			(1.0-1.25)				
						Medium Dense, Grayish Brown to Brown Fine SAND, Trace to Little Silt (SP/SP-SM)					
4		13	M/W	16							
					10						
5		14	W	18							
					15	End of Boring at 15 ft Borehole Backfilled with Bentonite Chips					

WATER LEVEL OBSERVATIONS

While Drilling	∇ 10.0'	Upon Completion of Drilling			
Time After Drilling					
Depth to Water				10.2' ▼	
Depth to Cave in				10.2'	

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

GENERAL NOTES

Start 6/16/22 End 6/16/22
Driller SE Chief Tim Rig Geoprobe
Logger Tim Editor TFG 7822DT
Drill Method 2.25" HSA; Autohammer

CGC Inc.

LOG OF TEST BORING

Project: Proposed Permanent Homeless Shelter
1902 Bartillon Drive
Location: Madison, Wisconsin

Boring No. 10
Surface Elevation (ft) 863.75
Job No. C22051-7
Sheet 1 of 1

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE No.	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	qu (qa) (tsf)	W	LL	PL	LI
				0	2± in. Asphalt Pavement / 3± in. Base Course					
					FILL: Loose, Light Brown Fine Sand, Some Silt, Trace to Little Gravel					
1	16	M	8							
				3	Stiff, Bluish Gray/Brown (Lightly Mottled) Lean CLAY, Trace Sand and Organics (CL)					
2	16	M	4			(1.75-2.0)	28.0			
				5.5	Medium Stiff, Light Gray/Brown (Mottled) Lean CLAY, Trace Sand (CL)					
3	18	M	6			(0.75-1.0)				
4	14	M/W	15							
				9	Medium Dense, Light Brown to Brownish Gray Fine SAND, Trace to Little Silt (SP/SP-SM)					
				10						
5	14	W	16							
				15	End of Boring at 15 ft					
					Borehole Backfilled with Bentonite Chips; Surface Patched with Asphalt Cold Patch					

WATER LEVEL OBSERVATIONS

While Drilling ▽ 11.0' Upon Completion of Drilling ______
Time After Drilling
Depth to Water 10.9' ▼
Depth to Cave in 10.9'

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

GENERAL NOTES

Start 6/17/22 End 6/17/22
Driller SE Chief Tim Rig Geoprobe 7822DT
Logger Tim Editor TFG
Drill Method 2.25" HSA; Autohammer

LOG OF TEST BORING

CGC Inc.

Project	Proposed Permanent Homeless Shelter
	1902 Bartillon Drive
Location	Madison, Wisconsin
Boring No.	11
Surface Elevation (ft)	864.67
Job No.	C22051-7
Sheet	1 of 1

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N	Depth (ft)		qu (qa) (tsf)	W	LL	PL	LI
						2± in. Asphalt Pavement / 4± in. Base Course					
						FILL: Loose, Light Brown Fine Sand, Some Silt, Trace to Little Gravel					
1		14	M	5							
						Stiff, Dark Gray Organic CLAY, Trace Sand (OL; Probable Buried Topsoil)					
2		18	M	5			(1.25-1.5)	37.1			5.5
					5						
						Stiff, Bluish Gray/Brown (Mottled) Lean CLAY, Trace to Little Sand (CL)					
3		18	M	8			(1.5-2.0)	23.8			
						Medium Dense, Brownish Gray to Light Brown Fine SAND, Trace to Little Silt (SP/SP-SM)					
4		12	M/W	13							
					10						
5		18	W	16							
					15	End of Boring at 15 ft					
						Borehole Backfilled with Bentonite Chips; Surface Patched with Asphalt Cold Patch					

WATER LEVEL OBSERVATIONS

While Drilling	▽ 11.0'	Upon Completion of Drilling			
Time After Drilling					
Depth to Water				11.0' ▼	
Depth to Cave in				11.0'	

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

GENERAL NOTES

Start	6/17/22	End	6/17/22		
Driller	SE	Chief	Tim	Rig	Geoprobe 7822DT
Logger	Tim	Editor	TFG		
Drill Method	2.25" HSA; Autohammer				

LOG OF TEST BORING

CGC Inc.

Project: Proposed Permanent Homeless Shelter, 1902 Bartillon Drive
Location: Madison, Wisconsin

Boring No. 12
Surface Elevation (ft) 865.28
Job No. C22051-7
Sheet 1 of 1

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	qu (qa) (tsf)	W	LL	PL	LI
						1± in. Concrete Slab / 3± in. Base Course					
						FILL: Very Loose to Loose, Light Brown Fine Sand, Some Silt, Trace to Little Gravel					
1		18	W	4							
						Loose, Dark Gray SILT, Trace Sand and Organics (ML; Probable Buried Topsoil)					
2		17	M	5				27.1			2.9
					5						
						Stiff, Light Gray/Brown (Mottled) Lean CLAY, Trace Sand (CL)					
3		17	M	7			(1.0-1.25)				
						Medium Dense, Grayish Brown to Brown Fine SAND, Trace to Little Silt (SP/SP-SM)					
4		14	M	17							
					10						
5		16	W	15							
					15	End of Boring at 15 ft					
						Borehole Backfilled with Bentonite Chips; Surface Patched with Asphalt Cold Patch					

WATER LEVEL OBSERVATIONS

While Drilling	∇ 10.0'	Upon Completion of Drilling			
Time After Drilling					
Depth to Water				10.2'	▼
Depth to Cave in				10.2'	

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

GENERAL NOTES

Start 6/16/22 End 6/16/22
Driller SE Chief Tim Rig Geoprobe
Logger Tim Editor TFG 7822DT
Drill Method 2.25" HSA; Autohammer

CGC Inc.

LOG OF TEST BORING

Project: **Proposed Permanent Homeless Shelter**
1902 Bartillon Drive
Location: **Madison, Wisconsin**

Boring No. **13**
Surface Elevation (ft) **864.32**
Job No. **C22051-7**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	qu (qa) (tsf)	W	LL	PL	LI
						2± in. Asphalt Pavement / 6± in. Base Course					
1		15	M	34		FILL: Dense, Grayish Brown Fine to Coarse Sand, Some Silt and Gravel					
2		18	M	7		FILL: Loose/Stiff, Gray to Bluish Gray/Brown (Mottled) Mixture of Silt and Lean Clay, Trace Sand	(2.0-2.5)				
					5						
3		14	M	7		Stiff, Light Gray/Brown (Mottled) Lean CLAY, Trace Sand (CL)	(1.25-1.5)	26.6			
4		14	M/W	14		Medium Dense, Grayish Brown to Brown Fine SAND, Trace to Little Silt (SP/SP-SM)					
					10						
5		17	W	14							
					15	End of Boring at 15 ft Borehole Backfilled with Bentonite Chips; Surface Patched with Asphalt Cold Patch					

WATER LEVEL OBSERVATIONS

While Drilling ▽ **10.0'** Upon Completion of Drilling ______
Time After Drilling
Depth to Water **10.1'** ▼
Depth to Cave in **10.1'**

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

GENERAL NOTES

Start **6/17/22** End **6/17/22**
Driller **SE** Chief **Tim** Rig **Geoprobe 7822DT**
Logger **Tim** Editor **TFG**
Drill Method **2.25" HSA; Autohammer**

LOG OF TEST BORING

CGC Inc.

Project: **Proposed Permanent Homeless Shelter**
1902 Bartillon Drive
Location: **Madison, Wisconsin**

Boring No. **14**
Surface Elevation (ft) **864.40**
Job No. **C22051-7**
Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N	Depth (ft)		qu (qa) (tsf)	W	LL	PL	LI
						2± in. Asphalt Pavement / 3± in. Base Course					
1		16	M	5		Loose, Dark Gray SILT, Trace Sand and Organics (ML; Probable Buried Topsoil)		29.5			2.6
2		16	M	5		Loose, Dark Gray SILT, Trace Sand and Organics (ML; Possible Lower Horizon Topsoil)					
					5						
3		18	M	4		Medium Stiff, Bluish Gray/Brown (Mottled) Lean CLAY, Trace to Little Sand (CL)	(0.75-1.0)				
4		13	M/W	11		Medium Dense, Grayish Brown to Brown Fine SAND, Trace to Little Silt, Scattered Silt Seams/Pockets (SP/SP-SM)					
					10						
5		14	W	17							
					15	End of Boring at 15 ft Borehole Backfilled with Bentonite Chips; Surface Patched with Asphalt Cold Patch					

WATER LEVEL OBSERVATIONS

While Drilling	▽ 10.0'	Upon Completion of Drilling		
Time After Drilling				
Depth to Water				10.4' ▼
Depth to Cave in				10.4'

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

GENERAL NOTES

Start **6/17/22** End **6/17/22**
Driller **SE** Chief **Tim** Rig **Geoprobe 7822DT**
Logger **Tim** Editor **TFG**
Drill Method **2.25" HSA; Autohammer**

LOG OF TEST BORING

CGC Inc.

Project: Proposed Permanent Homeless Shelter
1902 Bartillon Drive
Location: Madison, Wisconsin

Boring No. 15
Surface Elevation (ft) 864.83
Job No. C22051-7
Sheet 1 of 1

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N	Depth (ft)		qu (qa) (tsf)	W	LL	PL	LI
					0	2± in. Asphalt Pavement / 3± in. Base Course					
1		17	M	5		Stiff, Dark Gray Silty to Organic CLAY, Trace Sand (CL-ML/OL; Probable Buried Topsoil)	(1.25-1.75)	28.4			4.0
2		14	M	6	5		(1.75-2.0)				
3		14	M	6		Medium Stiff, Light Gray/Brown (Mottled) Lean CLAY, Trace Sand (CL)	(0.75-1.0)	26.8			
4		14	M/W	6	10	Loose, Grayish Brown Fine SAND, Trace to Little Silt (SP/SP-SM)					
						Dense, Light Brown Fine to Coarse SAND, Trace Silt and Gravel, Scattered Lean Clay Seams (SP)					
5		12	W	38	15						
						End of Boring at 15 ft Borehole Backfilled with Bentonite Chips; Surface Patched with Asphalt Cold Patch					

WATER LEVEL OBSERVATIONS

While Drilling	∇ 11.0'	Upon Completion of Drilling			
Time After Drilling					
Depth to Water				11.1' ▼	
Depth to Cave in				11.1'	

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

GENERAL NOTES

Start 6/17/22 End 6/17/22
Driller SE Chief Tim Rig Geoprobe 7822DT
Logger Tim Editor TFG
Drill Method 2.25" HSA; Autohammer

CGC, Inc.

LOG OF TEST BORING

General Notes

DESCRIPTIVE SOIL CLASSIFICATION

Grain Size Terminology

Soil Fraction	Particle Size	U.S. Standard Sieve Size
Boulders	Larger than 12"	Larger than 12"
Cobbles	3" to 12"	3" to 12"
Gravel: Coarse	¾" to 3"	¾" to 3"
Fine	4.76 mm to ¾"	#4 to ¾"
Sand: Coarse	2.00 mm to 4.76 mm	#10 to #4
Medium	0.42 to mm to 2.00 mm	#40 to #10
Fine	0.074 mm to 0.42 mm	#200 to #40
Silt	0.005 mm to 0.074 mm	Smaller than #200
Clay	Smaller than 0.005 mm	Smaller than #200

Plasticity characteristics differentiate between silt and clay.

General Terminology

Physical Characteristics
Color, moisture, grain shape, fineness, etc.
Major Constituents
Clay, silt, sand, gravel
Structure
Laminated, varved, fibrous, stratified, cemented, fissured, etc.
Geologic Origin
Glacial, alluvial, eolian, residual, etc.

Relative Density

Term	"N" Value
Very Loose	0 - 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	Over 50

Relative Proportions Of Cohesionless Soils

Proportional Term	Defining Range by Percentage of Weight
Trace	0% - 5%
Little	5% - 12%
Some	12% - 35%
And	35% - 50%

Consistency

Term	q_u-tons/sq. ft
Very Soft	0.0 to 0.25
Soft	0.25 to 0.50
Medium	0.50 to 1.0
Stiff	1.0 to 2.0
Very Stiff	2.0 to 4.0
Hard	Over 4.0

Organic Content by Combustion Method

Soil Description	Loss on Ignition
Non Organic	Less than 4%
Organic Silt/Clay	4 – 12%
Sedimentary Peat	12% - 50%
Fibrous and Woody Peat	More than 50%

Plasticity

Term	Plastic Index
None to Slight	0 - 4
Slight	5 - 7
Medium	8 - 22
High to Very High	Over 22

The penetration resistance, N, is the summation of the number of blows required to effect two successive 6" penetrations of the 2" split-barrel sampler. The sampler is driven with a 140 lb. weight falling 30" and is seated to a depth of 6" before commencing the standard penetration test.

SYMBOLS

Drilling and Sampling

CS – Continuous Sampling
RC – Rock Coring: Size AW, BW, NW, 2"W
RQD – Rock Quality Designation
RB – Rock Bit/Roller Bit
FT – Fish Tail
DC – Drove Casing
C – Casing: Size 2 ½", NW, 4", HW
CW – Clear Water
DM – Drilling Mud
HSA – Hollow Stem Auger
FA – Flight Auger
HA – Hand Auger
COA – Clean-Out Auger
SS - 2" Dia. Split-Barrel Sample
2ST – 2" Dia. Thin-Walled Tube Sample
3ST – 3" Dia. Thin-Walled Tube Sample
PT – 3" Dia. Piston Tube Sample
AS – Auger Sample
WS – Wash Sample
PTS – Peat Sample
PS – Pitcher Sample
NR – No Recovery
S – Sounding
PMT – Borehole Pressuremeter Test
VS – Vane Shear Test
WPT – Water Pressure Test

Laboratory Tests

q_a – Penetrometer Reading, tons/sq ft
q_a – Unconfined Strength, tons/sq ft
W – Moisture Content, %
LL – Liquid Limit, %
PL – Plastic Limit, %
SL – Shrinkage Limit, %
LI – Loss on Ignition
D – Dry Unit Weight, lbs/cu ft
pH – Measure of Soil Alkalinity or Acidity
FS – Free Swell, %

Water Level Measurement

▽- Water Level at Time Shown
NW – No Water Encountered
WD – While Drilling
BCR – Before Casing Removal
ACR – After Casing Removal
CW – Cave and Wet
CM – Caved and Moist

Note: Water level measurements shown on the boring logs represent conditions at the time indicated and may not reflect static levels, especially in cohesive soils.

CGC, Inc.

Madison - Milwaukee

Unified Soil Classification System

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

COARSE-GRAINED SOILS (more than 50% of material is larger than No. 200 sieve size)		
GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size		Clean Gravels (Less than 5% fines)
	GW	Well-graded gravels, 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 50% or more 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
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 of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
	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 of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS	PT	Peat and other highly organic soils

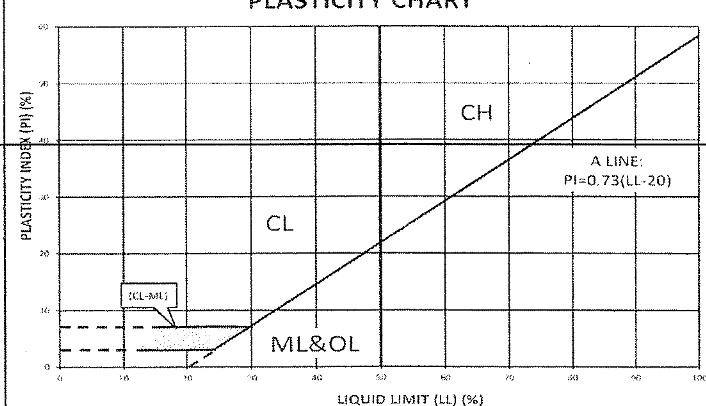
LABORATORY CLASSIFICATION CRITERIA

GW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_C = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
GP	Not meeting all gradation requirements for GW	
GM	Atterberg limts below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
GC	Atterberg limts above "A" line or P.I. greater than 7	
SW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_C = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
SP	Not meeting all gradation requirements for GW	
SM	Atterberg limits below "A" line or P.I. less than 4	Limits plotting in shaded zone with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
SC	Atterberg limits above "A" line with P.I. greater than 7	

Determine percentages of sand and gravel from grain-size curve. 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
More than 12 percent .... GM, GC, SM, SC
5 to 12 percent .... Borderline cases requiring dual symbols

PLASTICITY CHART



APPENDIX C

DOCUMENT QUALIFICATIONS

APPENDIX C
DOCUMENT QUALIFICATIONS

I. GENERAL RECOMMENDATIONS/LIMITATIONS

CGC, Inc. should be provided the opportunity for a general review of the final design and specifications to confirm that earthwork and foundation requirements have been properly interpreted in the design and specifications. CGC should be retained to provide soil engineering services during excavation and subgrade preparation. This will allow us to observe that construction proceeds in compliance with the design concepts, specifications and recommendations, and also will allow design changes to be made in the event that subsurface conditions differ from those anticipated prior to the start of construction. CGC does not assume responsibility for compliance with the recommendations in this report unless we are retained to provide construction testing and observation services.

This report has been prepared in accordance with generally accepted soil and foundation engineering practices and no other warranties are expressed or implied. The opinions and recommendations submitted in this report are based on interpretation of the subsurface information revealed by the test borings indicated on the location plan. The report does not reflect potential variations in subsurface conditions between or beyond these borings. Therefore, variations in soil conditions can be expected between the boring locations and fluctuations of groundwater levels may occur with time. The nature and extent of the variations may not become evident until construction.

II. IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL ENGINEERING REPORT

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes. While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. *No one except you* should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one - not even you* - should apply the report for any purpose or project except the one originally contemplated.

READ THE FULL REPORT

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A GEOTECHNICAL ENGINEERING REPORT IS BASED ON A UNIQUE SET OF PROJECT-SPECIFIC FACTORS

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, *do not rely on a geotechnical engineering report* that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes - even minor ones - and request an assessment of their impact. *CGC cannot accept responsibility or liability for problems that occur because our reports do not consider developments of which we were not informed.*

SUBSURFACE CONDITIONS CAN CHANGE

A geotechnical engineering report is based on conditions that existed at the time the geotechnical engineer performed the study. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

MOST GEOTECHNICAL FINDINGS ARE PROFESSIONAL OPINION

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgement to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ - sometimes significantly - from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A REPORT'S RECOMMENDATIONS ARE NOT FINAL

Do not over-rely on the confirmation-dependent recommendations included in your report. *Those confirmation-dependent recommendations are not final*, because geotechnical engineers develop them principally from judgement and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *CGC cannot assume responsibility or liability for the report's confirmation-dependent recommendations if we do not perform the geotechnical-construction observation required to confirm the recommendations' applicability.*

A GEOTECHNICAL ENGINEERING REPORT IS SUBJECT TO MISINTERPRETATION

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Constructors can also misinterpret a geotechnical engineering report. Confront that risk by having CGC participate in prebid and preconstruction conferences, and by providing geotechnical construction observation.

DO NOT REDRAW THE ENGINEER'S LOGS

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

GIVE CONSTRUCTORS A COMPLETE REPORT AND GUIDANCE

Some owners and design professionals mistakenly believe they can make constructors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give constructors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise constructors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure constructors have sufficient time* to perform additional study. Only then might you be in a position to give constructors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

READ RESPONSIBILITY PROVISIONS CLOSELY

Some clients, design professionals, and constructors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineer's responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

ENVIRONMENTAL CONCERNS ARE NOT COVERED

The equipment, techniques, and personnel used to perform an *environmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

OBTAIN PROFESSIONAL ASSISTANCE TO DEAL WITH MOLD

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

RELY ON YOUR GEOTECHNICAL ENGINEER FOR ADDITIONAL ASSISTANCE

Membership in the Geotechnical Business Council (GBC) of Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk confrontation techniques that can be of genuine benefit for everyone involved with a construction project. Confer with CGC, a member of GBC, for more information.

Modified and reprinted with permission from:

Geotechnical Business Council
of the Geoprofessional Business Association
8811 Colesville Road, Suite G 106
Silver Spring, MD 20910

APPENDIX D

RECOMMENDED COMPACTED FILL SPECIFICATIONS

APPENDIX D

CGC, INC.

RECOMMENDED COMPACTED FILL SPECIFICATIONS

General Fill Materials

Proposed fill shall contain no vegetation, roots, topsoil, peat, ash, wood or any other non-soil material which by decomposition might cause settlement. Also, fill shall never be placed while frozen or on frozen surfaces. Rock, stone or broken concrete greater than 6 in. in the largest dimension shall not be placed within 10 ft of the building area. Fill used greater than 10 ft beyond the building limits shall not contain rock, boulders or concrete pieces greater than a 2 sq ft area and shall not be placed within the final 2 ft of finish subgrade or in designated utility construction areas. Fill containing rock, boulders or concrete pieces should include sufficient finer material to fill voids among the larger fragments.

Special Fill Materials

In certain cases, special fill materials may be required for specific purposes, such as stabilizing subgrades, backfilling undercut excavations or filling behind retaining walls. For reference, WisDOT gradation specifications for various types of granular fill are attached in Table 1.

Placement Method

The approved fill shall be placed, spread and leveled in layers generally not exceeding 10 in. in thickness before compaction. The fill shall be placed at moisture content capable of achieving the desired compaction level. For clay soils or granular soils containing an appreciable amount of cohesive fines, moisture conditioning will likely be required.

It is the Contractor's responsibility to provide all necessary compaction equipment and other grading equipment that may be required to attain the specified compaction. Hand-guided vibratory or tamping compactors will be required whenever fill is placed adjacent to walls, footings, columns or in confined areas.

Compaction Specifications

Maximum dry density and optimum moisture content of the fill soil shall be determined in accordance with modified Proctor methods (ASTM D1557). The recommended field compaction as a percentage of the maximum dry density is shown in Table 2. Note that these compaction guidelines would generally not apply to coarse gravel/stone fill. Instead, a method specification would apply (e.g., compact in thin lifts with a vibratory compactor until no further consolidation is evident).

Testing Procedures

Representative samples of proposed fill shall be submitted to CGC, Inc. for optimum moisture-maximum density determination (ASTM D1557) prior to the start of fill placement. The sample size should be approximately 50 lb.

CGC, Inc. shall be retained to perform field density tests to determine the level of compaction being achieved in the fill. The tests shall generally be conducted on each lift at the beginning of fill placement and at a frequency mutually agreed upon by the project team for the remainder of the project.

Table 1
Gradation of Special Fill Materials

Material	WisDOT Section 311	WisDOT Section 312	WisDOT Section 305			WisDOT Section 209		WisDOT Section 210
	Breaker Run	Select Crushed Material	3-in. Dense Graded Base	1 1/4-in. Dense Graded Base	3/4-in. Dense Graded Base	Grade 1 Granular Backfill	Grade 2 Granular Backfill	Structure Backfill
Sieve Size	Percent Passing by Weight							
6 in.	100							
5 in.		90-100						
3 in.			90-100					100
1 1/2 in.		20-50	60-85					
1 1/4 in.				95-100				
1 in.					100			
3/4 in.			40-65	70-93	95-100			
3/8 in.				42-80	50-90			
No. 4			15-40	25-63	35-70	100 (2)	100 (2)	25-100
No. 10		0-10	10-30	16-48	15-55			
No. 40			5-20	8-28	10-35	75 (2)		
No. 100						15 (2)	30 (2)	
No. 200			2-12	2-12	5-15	8 (2)	15 (2)	15 (2)

Notes:

1. Reference: Wisconsin Department of Transportation *Standard Specifications for Highway and Structure Construction.*
2. Percentage applies to the material passing the No. 4 sieve, not the entire sample.
3. Per WisDOT specifications, both breaker run and select crushed material can include concrete that is 'substantially free of steel, building materials and other deleterious material'.

Table 2
Compaction Guidelines

Area	Percent Compaction (1) Clay/Silt	Percent Compaction (1) Sand/Gravel
Within 10 ft of building lines		
Footing bearing soils	93 - 95	95
Under floors, steps and walks		
- Lightly loaded floor slab	90	90
- Heavily loaded floor slab and thicker fill zones	92	95
Beyond 10 ft of building lines		
Under walks and pavements		
- Less than 2 ft below subgrade	92	95
- Greater than 2 ft below subgrade	90	90
Landscaping	85	90

Notes:

1. Based on Modified Proctor Dry Density (ASTM D 1557)

APPENDIX E

WISCONSIN DEPARTMENT OF SAFETY & PROFESSIONAL SERVICES
SOIL AND SITE EVALUATION – STORM FORM

Division of Industry Services
P.O. Box 2658
Madison, Wisconsin 53701

Attachment 2:

SOIL AND SITE EVALUATION - STORM

In accordance with SPS 382.365, 385, Wis. Adm. Code, and WDNR Standard 1002

Attach a complete site plan on paper not less than 8 ½ x 11 inches in size. Plan must include, but not limited to: vertical and horizontal reference point (BM), direction and percent of slope, scale or dimensions, north arrow, and BM referenced to nearest road	County: Dane Parcel I.D.: 251/0810-283-0504-4
Please print all information Personal information you provide may be used for secondary purposes [Privacy Law, s. 15.04(1)(m)]	Reviewed by: Date:

Property Owner: City of Madison EDD Homeless Shelter	Property Location: Govt. Lot NW ¼ SW ¼ S 28 T 8 N R 10 E
Property Owner's Mail Address: PO Box 2983	Lot # / Block# / Subd. Name or CSM #
City: Madison; State: WI; Zip Code: 53701-2983; Phone Number:	[X] City [ ] Village [ ] Town: Madison; Nearest Road: 1902 Bartillon Dr

Drainage area ______ [ ] sq ft [ ] acres

Test site suitable for (check all that apply): [ ] Site not suitable; [ ] Bioretention; [ ] Subsurface Disperal System; [ ] Reuse; [ ] Irrigation; [ ] Other ______

Hydraulic Application Test Method: [X] Morphological Evaluation [ ] Double Ring Infiltrometer [ ] Other: (specify) ______

Soil Moisture: Date of soil borings: ______
USDA-NRCS WETS Value: [ ] Dry = 1; [ ] Normal = 2; [ ] Wet = 3.

B-1 #OBS. [ ] Pit [X] Boring Ground surface elevation 864.2 ft. Elevation of limiting factor 861.2 ft. (Color/redox) 854.2 ft. (Groundwater)

Horizon	Approx. Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frags.	% Fines (P200)	Hydraulic App Rate Inches/Hr
1	0-5	Pavement Section: 2" Asphalt over 3" Base Course								
2	5-36	10YR 7/2	none	GRSL *(Fill)*	1msbk	mfr		20-30		0.50 (1)
3	36-66	10YR 5/1	c2d 10YR 3/6	SCL	0m	mfi		<10		0.11
4	66-96	5Y 6/1	f1f 5Y 5/4	SiCL	0m	mfi		<5		0.04
5	96-180	10YR 6/3 to 6/6	none	FS	0sg	ml		<10		0.50

Comments: Groundwater was encountered near 10 ft below the ground surface during drilling; gray dominant color and redox in Horizons 3 and 4 indicate the level of past saturation, which may be due to *seasonally high groundwater levels* .
(1) Infiltration rates in *fill* should be considered very approximate due to the potential for seams/layers of dissimilar material or variable composition.

Overall Site Comments: See Comments above and Stormwater Infiltration Potential section in Geotechnical Exploration Report (CGC Project No. C22051-7; dated July 6, 2022).

Name (Please Print): Tim F. Gassenheimer	Signature: [signature]
Credential Number: SP-011900004	
Address: 129 Milky Way, Madison, WI 53718	Date Evaluation Conducted: June 21, 2022
Telephone Number: (608) 288-4100	

B-2 #OBS. [ ] Pit [X] Boring Ground surface elevation 865.0 ft. Elevation of limiting factor 862.0 ft. (Color/redox)
854.0 ft. (Groundwater)

Horizon	Approx. Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frags.	% Fines (P200)	Hydraulic App Rate Inches/Hr
1	0-5	Pavement Section: 2" Asphalt over 3" Base Course								
2	5-36	10YR 4/2	none	GRSL *(Fill)*	0sg	ml		20-30		0.50 [(1)]
3	36-66	GLEY 1 5GY 6/1	c1d 10YR 5/4	SiCL	0m	mfi		<5		0.04
4	66-96	5Y 6/1	c2d 10YR 3/6	CL	0m	mfi		<5		0.03
5	96-156	10YR 6/3 to 6/6	none	FS	0sg	ml		<10		0.50
6	156-180	5Y 6/1	f1f 5Y 5/4	SiCL	0m	mfi		<5		0.04

Comments: Groundwater was encountered near 11 ft below the ground surface during and upon the completion of drilling; gley/gray dominant color and redox in Horizons 3 and 4 indicate the level of past saturation, which may be due to *seasonally high groundwater levels*.
[(1)] Infiltration rates in *fill* should be considered very approximate due to the potential for seams/layers of dissimilar material or variable composition.

B-3 #OBS. [ ] Pit [X] Boring Ground surface elevation 865.4 ft. Elevation of limiting factor 859.9 ft. (Color/redox)
855.4 ft. (Groundwater)

Horizon	Approx. Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frags.	% Fines (P200)	Hydraulic App Rate Inches/Hr
1	0-24	Sand Fill at Volleyball Court (not sampled)								
2	24-66	10YR 7/3	none	GRLS *(Fill)*	0sg	ml		20-30		1.63 [(1)]
3	66-96	5Y 6/1	c2f 10YR 5/4	CL	0m	mvfi		<5		0.03
4	96-180	10YR 6/3 to 6/6	none	FS	0sg	ml		<10		0.50

Comments: Groundwater was encountered near 13 ft during drilling, and near 10 ft below the ground surface upon the completion of drilling; gray dominant color and redox in Horizon 3 indicate the level of past saturation, which may be due to *seasonally high groundwater levels*.
[(1)] Infiltration rates in *fill* should be considered very approximate due to the potential for seams/layers of dissimilar material or variable composition.

Division of Industry Services
P.O. Box 2658
Madison, Wisconsin 53701

Attachment 2:

SOIL AND SITE EVALUATION - STORM

In accordance with SPS 382.365, 385, Wis. Adm. Code, and WDNR Standard 1002

Attach a complete site plan on paper not less than 8 ½ x 11 inches in size. Plan must include, but not limited to: vertical and horizontal reference point (BM), direction and percent of slope, scale or dimensions, north arrow, and BM referenced to nearest road

Please print all information

Personal information you provide may be used for secondary purposes [Privacy Law, s. 15.04(1)(m)]

County: Dane
Parcel I.D.: 251/0810-283-0504-4
Reviewed by:
Date:

Property Owner: City of Madison EDD Homeless Shelter	Property Location: Govt. Lot SE ¼ SW ¼ S 28 T 8 N R 10 E
Property Owner's Mail Address: PO Box 2983	Lot # / Block# / Subd. Name or CSM #
City: Madison; State: WI; Zip Code: 53701-2983; Phone Number:	[X] City [ ] Village [ ] Town: Madison; Nearest Road: 1902 Bartillon Dr

Drainage area ____________ [ ] sq ft [ ] acres

Test site suitable for (check all that apply): [ ] Site not suitable;
[ ] Bioretention; [ ] Subsurface Disperal System;
[ ] Reuse; [ ] Irrigation; [ ] Other ____________

Hydraulic Application Test Method
[X] Morphological Evaluation
[ ] Double Ring Infiltrometer
[ ] Other: (specify) ____________

Soil Moisture
Date of soil borings: ____________
USDA-NRCS WETS Value:
[ ] Dry = 1;
[ ] Normal = 2;
[ ] Wet = 3.

B-4 #OBS. [ ] Pit [X] Boring Ground surface elevation 864.0 ft. Elevation of limiting factor 861.0 ft. (Color/redox)
853.0 ft. (Groundwater)

Horizon	Approx. Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frags.	% Fines (P200)	Hydraulic App Rate Inches/Hr
1	0-6	Pavement Section: 2" Asphalt over 4" Base Course								
2	6-36	10YR 6/4	none	FSL *(Fill)*	1fsbk	mvfr		<10		0.50 [(1)]
3	36-66	GLEY 1 5GY 6/1	c1d 10YR 5/4	SiCL	0m	mfi		<5		0.04
4	66-156	10YR 6/3 to 6/6	none	FS, *SiL Seams*	0sg	ml		<10		0.13-0.50
5	156-180	10YR 5/1	none	GRLS	0sg	ml		20-30		1.63

Comments: Groundwater was encountered near 11 ft below the ground surface during and upon the completion of drilling; gley dominant color and redox in Horizon 3 indicate the level of past saturation, which may be due to *seasonally high groundwater levels* .
(1) Infiltration rates in *fill* should be considered very approximate due to the potential for seams/layers of dissimilar material or variable composition.

Overall Site Comments: See Comments above and Stormwater Infiltration Potential section in Geotechnical Exploration Report (CGC Project No. C22051-7; dated July 6, 2022).

Name (Please Print): Tim F. Gassenheimer	Signature: [signature]
Credential Number: SP-011900004	
Address: 129 Milky Way, Madison, WI 53718	Date Evaluation Conducted: June 21, 2022
Telephone Number: (608) 288-4100	

B-5 #OBS. [ ] Pit [X] Boring Ground surface elevation 865.0 ft. Elevation of limiting factor 862.0 ft. (Color/redox) 854.0 ft. (Groundwater)

Horizon	Approx. Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frags.	% Fines (P200)	Hydraulic App Rate Inches/Hr
1	0-5	Pavement Section: 2" Asphalt over 3" Base Course								
2	5-36	10YR 6/4	none	FSL *(Fill)*	1fsbk	mvfr		<10		0.50 (1)
3	36-66	GLEY 2 5BG 4/1	f1d 10YR 5/3	SiCL	0m	mfi		<5		0.04
4	66-96	5Y 6/1	c2d 5Y 5/4	CL	0m	mfi		<5		0.03
5	96-180	10YR 6/3 to 6/6	none	FS	0sg	ml		<10		0.50

Comments: Groundwater was encountered near 11 ft below the ground surface during and upon the completion of drilling; gley/gray dominant color and redox in Horizons 3 and 4 indicate the level of past saturation, which may be due to *seasonally high groundwater levels* .
(1) Infiltration rates in *fill* should be considered very approximate due to the potential for seams/layers of dissimilar material or variable composition.

B-6 #OBS. [ ] Pit [X] Boring Ground surface elevation 865.4 ft. Elevation of limiting factor 861.9 ft. (Color/redox) 856.4 ft. (Groundwater)

Horizon	Approx. Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frags.	% Fines (P200)	Hydraulic App Rate Inches/Hr
1	0-24	Sand Fill at Volleyball Court (not sampled)								
2	24-42	10YR 7/3	none	GRLS, SiCL Seams *(Fill)*	0sg	ml		20-30		0.04-1.63 (1)
3	42-72	GLEY 1 10Y 5/1	f1d 10YR 3/6	SiCL	0m	mfi		<5		0.04
4	72-96	5Y 6/1	m3p 10YR 4/6	SiCL	0m	mvfi		<5		0.04
5	96-180	10YR 6/3 to 6/6	none	FS	0sg	ml		<10		0.50

Comments: Groundwater was encountered near 10 ft during drilling, and near 9 ft the ground surface upon the completion of drilling; gley/gray dominant color and redox in Horizons 3 and 4 indicate the level of past saturation, which may be due to *seasonally high groundwater levels* .
(1) Infiltration rates in *fill* should be considered very approximate due to the potential for seams/layers of dissimilar material or variable composition.

B-7 #OBS. [ ] Pit [X] Boring Ground surface elevation 863.8 ft. Elevation of limiting factor 860.8 ft. (Color/redox) 853.8 ft. (Groundwater)

Horizon	Approx. Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frags.	% Fines (P200)	Hydraulic App Rate Inches/Hr
1	0-6	Pavement Section: 2" Asphalt over 4" Base Course								
2	6-36	10YR 6/4	none	FSL *(Fill)*	1fsbk	mvfr		<10		0.50 (1)
3	36-66	5Y 6/1	f1f 5Y 10/4	SiCL	0m	mfi		<5		0.04
4	66-96	5Y 6/1	c2p 10YR 4/6	CL	0m	mvfi		<5		0.03
5	96-180	10YR 6/3	none	FS, *SiL Seams*	0sg	ml		<10		0.13-0.50

Comments: Groundwater was encountered near 10 ft below the ground surface during and upon the completion of drilling; gray dominant color and redox in Horizons 3 and 4 indicate the level of past saturation, which may be due to *seasonally high groundwater levels* .
(1) Infiltration rates in *fill* should be considered very approximate due to the potential for seams/layers of dissimilar material or variable composition.

B-8 #OBS. ☐ Pit ☒ Boring Ground surface elevation 864.5 ft. Elevation of limiting factor 861.5 ft. (Color/redox) 853.5 ft. (Groundwater)

Horizon	Approx. Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frags.	% Fines (P200)	Hydraulic App Rate Inches/Hr
1	0-5	Pavement Section: 2" Asphalt over 3" Base Course								
2	5-36	10YR 6/4	none	FSL *(Fill)*	1fsbk	mvfr		<10		0.50 (1)
3	36-66	GLEY 1 10GY 5/1	c1f 10YR 6/3	SiCL	0m	mvfi		<5		0.04
4	66-96	GLEY 1 10GY 5/1	c2d 10YR 5/4	CL	0m	mfi		<5		0.03
5	96-180	10YR 6/1 to 7/3	none	FS	0sg	ml		<10		0.50

Comments: Groundwater was encountered near 11 ft below the ground surface during and upon the completion of drilling; gley dominant color and redox in Horizons 3 and 4 indicate the level of past saturation, which may be due to *seasonally high groundwater levels* .
(1) Infiltration rates in *fill* should be considered very approximate due to the potential for seams/layers of dissimilar material or variable composition.

B-9 #OBS. ☐ Pit ☒ Boring Ground surface elevation 865.4 ft. Elevation of limiting factor 861.9 ft. (Color/redox) 855.4 ft. (Groundwater)

Horizon	Approx. Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frags.	% Fines (P200)	Hydraulic App Rate Inches/Hr
1	0-24	Sand Fill at Volleyball Court (not sampled)								
2	24-42	10YR 6/4	none	FSL, CL Seams *(Fill)*	1fsbk	mvfr		<10		0.03-0.50 (1)
3	42-84	GLEY 1 5GY 6/1	c1d 10YR 5/4	SiCL	0m	mfi		<5		0.04
4	84-180	10YR 6/3 to 6/6	none	FS	0sg	ml		<10		0.50

Comments: Groundwater was encountered near 10 ft below the ground surface during and upon the completion of drilling; gley dominant color and redox in Horizon 3 indicate the level of past saturation, which may be due to *seasonally high groundwater levels* .
(1) Infiltration rates in *fill* should be considered very approximate due to the potential for seams/layers of dissimilar material or variable composition.

B-10 #OBS. ☐ Pit ☒ Boring Ground surface elevation 863.8 ft. Elevation of limiting factor 860.8 ft. (Color/redox) 852.8 ft. (Groundwater)

Horizon	Approx. Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frags.	% Fines (P200)	Hydraulic App Rate Inches/Hr
1	0-5	Pavement Section: 2" Asphalt over 3" Base Course								
2	5-36	10YR 6/4	none	FSL *(Fill)*	1fsbk	mvfr		<10		0.50 (1)
3	36-66	GLEY 2 5BG 4/1	f1d 10YR 5/3	SiCL	0m	mfi		<5		0.04
4	66-108	GLEY 1 5GY 6/1	c1d 10YR 5/4	SiCL	0m	mfi		<5		0.04
5	108-180	10YR 6/4 to 6/2	none	FS	0sg	ml		<10		0.50

Comments: Groundwater was encountered near 11 ft below the ground surface during and upon the completion of drilling; gley dominant color and redox in Horizons 3 and 4 indicate the level of past saturation, which may be due to *seasonally high groundwater levels* .
(1) Infiltration rates in *fill* should be considered very approximate due to the potential for seams/layers of dissimilar material or variable composition.

B-11 #OBS. ☐ Pit ☒ Boring   Ground surface elevation 864.7 ft.   Elevation of limiting factor 859.2 ft. (Color/redox)
853.7 ft. (Groundwater)

Horizon	Approx. Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frags.	% Fines (P200)	Hydraulic App Rate Inches/Hr
1	0-6	Pavement Section: 2" Asphalt over 4" Base Course								
2	6-24	10YR 6/4	none	FSL *(Fill)*	1fsbk	mvfr		<10		0.50 (1)
3	24-66	10YR 3/1	none	SiL	2msbk	mfr		<5		0.13
4	66-96	GLEY 1 5GY 6/1	c1d 10YR 5/4	SiCL	0m	mfi		<5		0.04
5	96-180	10YR 4/2 to 6/4	none	FS	0sg	ml		<10		0.50

Comments: Groundwater was encountered near 11 ft below the ground surface during and upon the completion of drilling; gley dominant color and redox in Horizon 4 indicate the level of past saturation, which may be due to *seasonally high groundwater levels* .
(1) Infiltration rates in *fill* should be considered very approximate due to the potential for seams/layers of dissimilar material or variable composition.

B-12 #OBS. ☐ Pit ☒ Boring   Ground surface elevation 865.3 ft.   Elevation of limiting factor 859.8 ft. (Color/redox)
855.3 ft. (Groundwater)

Horizon	Approx. Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frags.	% Fines (P200)	Hydraulic App Rate Inches/Hr
1	0-4	Floor Slab Section: 1" Concrete Slab over 3" Base Course								
2	4-36	10YR 6/4	none	FSL *(Fill)*	1fsbk	mvfr		<10		0.50 (1)
3	36-66	10YR 3/1	none	SiL	2msbk	mfr		<5		0.13
4	66-96	GLEY 1 10Y 6/1	c2p 10YR 4/6	SiCL	0m	mfi		<5		0.04
5	96-180	10YR 6/3 to 6/6	none	FS	0sg	ml		<10		0.50

Comments: Groundwater was encountered near 10 ft below the ground surface during and upon the completion of drilling; gley dominant color and redox in Horizon 4 indicate the level of past saturation, which may be due to *seasonally high groundwater levels* .
(1) Infiltration rates in *fill* should be considered very approximate due to the potential for seams/layers of dissimilar material or variable composition.

B-13 #OBS. ☐ Pit ☒ Boring   Ground surface elevation 864.3 ft.   Elevation of limiting factor 861.3 ft. (Color/redox)
854.3 ft. (Groundwater)

Horizon	Approx. Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frags.	% Fines (P200)	Hydraulic App Rate Inches/Hr
1	0-8	Pavement Section: 2" Asphalt over 6" Base Course								
2	8-36	10YR 7/2	none	GRSL *(Fill)*	1msbk	mfr		20-30		0.50 (1)
3	36-66	GLEY 2 10BG 4/1 to 5Y 6/1	f1d 10YR 5/4	SiCL+SiL *(Fill)*	variable			var.		0.04-0.13 (1)
4	66-96	GLEY 1 5GY 6/1	c1d 10YR 5/4	SiCL	0m	mfi		<5		0.04
5	96-180	10YR 6/3 to 6/6	none	FS	0sg	ml		<10		0.50

Comments: Groundwater was encountered near 10 ft below the ground surface during and upon the completion of drilling; gley dominant color and redox in Horizons 3 and 4 indicate the level of past saturation, which may be due to *seasonally high groundwater levels* .
(1) Infiltration rates in *fill* should be considered very approximate due to the potential for seams/layers of dissimilar material or variable composition.

B-14 #OBS. ☐ Pit ☒ Boring Ground surface elevation 864.4 ft. Elevation of limiting factor 858.9 ft. (Color/redox)
854.4 ft. (Groundwater)

Horizon	Approx. Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frags.	% Fines (P200)	Hydraulic App Rate Inches/Hr
1	0-5	Pavement Section: 2" Asphalt over 3" Base Course								
2	5-48	10YR 3/1	none	SiL	2msbk	mfr		<5		0.13
3	48-66	10YR 4/1	none	SiL	2cabk	mfr		<5		0.13
4	66-96	GLEY 1 10GY 5/1	c2d 10YR 5/4	CL	0m	mfi		<5		0.03
5	96-180	10YR 6/3 to 6/6	none	FS, *SiL Seams*	0sg	ml		<10		0.13-0.50

Comments: Groundwater was encountered near 10 ft below the ground surface during and upon the completion of drilling; gley dominant color and redox in Horizon 4 indicate the level of past saturation, which may be due to *seasonally high groundwater levels* .

B-15 #OBS. ☐ Pit ☒ Boring Ground surface elevation 864.8 ft. Elevation of limiting factor 859.3 ft. (Color/redox)
853.8 ft. (Groundwater)

Horizon	Approx. Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frags.	% Fines (P200)	Hydraulic App Rate Inches/Hr
1	0-5	Pavement Section: 2" Asphalt over 3" Base Course								
2	5-66	10YR 3/1	none	SiL	2msbk	mfr		<5		0.13
3	66-96	GLEY 1 5GY 6/1	c1d 10YR 5/4	SiCL	0m	mfi		<5		0.04
4	96-144	10YR 4/2	none	FS	0sg	ml		<10		0.50
5	144-180	10YR 6/3	none	S, *SiCL Seams*	0sg	ml		<10		0.04-3.60

Comments: Groundwater was encountered near 11 ft below the ground surface during and upon the completion of drilling; gray dominant color and redox in Horizon 3 indicate the level of past saturation, which may be due to *seasonally high groundwater levels* .