CGC, Inc.

Construction • Geotechnical
Consulting Engineering/Testing

REF DOC 1

September 19, 2023
C23051-10

Mr. Adam Kaniewski
City of Madison Parks Division
330 E. Lakeside Street
Madison, WI 53715

Re: Geotechnical Exploration Report
Country Grove Park
7353 East Pass
Madison, WI

Dear Mr. Kaniewski:

Construction • Geotechnical Consultants, Inc. (CGC) has completed the geotechnical exploration program for the project referenced above. The purpose of this exploration program was to evaluate the subsurface conditions within the proposed construction area and to provide geotechnical recommendations regarding site preparation, foundation, floor slab and asphalt pavement design/construction. Stormwater infiltration potential is also discussed. An electronic copy of this report is provided for your use and paper copies can be provided upon request.

PROJECT AND SITE DESCRIPTIONS

We understand that this project will include the construction of a parking lot, shelter building, courts and stormwater features. Few details are known at this time, but minimal cut/fill is anticipated to establish site grades. The preliminary site layout is depicted on the Soil Boring Location Exhibit included in Appendix A.

SUBSURFACE CONDITIONS

Subsurface conditions on site were explored by drilling seven (7) soil borings near the proposed construction areas. The borings were field located (and numbered) by others under contract to the City. The borings were drilled by OES (under sub contract to CGC) on August 17, 2023 using an ATV track-mounted rig. The approximate soil boring locations are shown in plan on the Soil Boring Location Exhibit presented in Appendix A.

The subsurface profile at the boring locations was generally similar and can be described by the following strata, in descending order:

- About 5 to 9-in. of ***topsoil*** (except B-1 with 3-in. asphalt/6-in. base course); over
- About 2 to 7-ft of fill involving **clay, silt, sand** and **gravel** (absent in B-6 and B-7); over
- About 2.5 to 7.5- ft soft to stiff natural brown lean ***clay*** and/or very/loose to medium

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dense **silt** to depths of about 3 to 10.5 ft (absent at B-1, B-2 and B-5); over

- Natural medium dense to very dense ***sand*** soils, containing generally little to some silt and gravel, plus scattered cobbles/boulders extending to the maximum depths explored of 8 to 15 ft. Note auger refusal occurred in B-5 and B-6 at 8 ft on a presumed boulder/possible bedrock.

Groundwater was not encountered in Borings 1, 5, 6 and 7 during or shortly following drilling; but was encountered in Borings 2, 3 and 4 at depths of 8 to 9.5 ft. Groundwater levels should be expected to fluctuate with seasonal variations in precipitation, infiltration, evapotranspiration and other factors. A more detailed description of the site soil and groundwater conditions is presented on the Soil Boring Logs attached in Appendix A. The WDSPS Soil and Site evaluation-storm form for the four completed stormwater borings is contained in Appendix D, along with particle size distribution reports for representative sand samples.

DISCUSSION AND RECOMMENDATIONS

Subject to the limitations described below and based on the subsurface exploration, it is our opinion that the site is generally suitable for the proposed construction and that the proposed building can be supported by conventional spread footing foundations bearing on natural clays (with some undercutting needed to address softer clays). Isolated undercutting and/or stabilization of existing soils may also be required during construction below court/slab/pavement subgrade levels. Our recommendations for site preparation, foundation, floor slab and asphalt pavement design/construction are presented in the following subsections. Additional information regarding the conclusions and recommendations presented in this report is discussed in Appendix B.

1. Site Preparation

We recommend that the topsoil be stripped/removed at least 10 ft beyond the proposed construction areas, including areas required for cuts and fills beyond the courts, shelter footprint or pavement limits. Variable topsoil thicknesses should be expected beyond the boring locations due to presumed previous grading activities on the site. Stripped topsoil can be stockpiled on-site and re-used as fill in landscaped areas. Existing asphalt pavement near B-1 should also be removed.

After site stripping and cutting to grade (where required), the exposed subgrades are generally expected to consist of existing fill. The exposed subgrades should be proof-rolled with a heavy piece of construction equipment followed by recompaction with a vibratory smooth-drum roller to densify soils loosened during stripping and to check for loose areas. Loosened areas which cannot be recompacted should be undercut and replaced with granular backfill compacted to a least 95% compaction based on modified Proctor methods (ASTM D1557) in accordance with our Recommended Compacted Fill Specifications presented in Appendix C. Granular materials such as 3-in. dense graded base (DGB) that is placed in loose 10-in. lifts and compacted until deflection ceases can be used to restore grades in undercut areas.

Following development of a stable subgrade, fill placement (where required) to establish foundation, floor slab, site and/or pavement grades can then proceed. To the extent possible, we recommend using granular soils 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 soils are generally not recommended as structural fill because moisture conditioning will likely be required to achieve desired compaction levels. Moisture conditioning 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 areas or potentially as lower lifts in pavement areas provided the moisture contents can be sufficiently lowered from the natural states to facilitate compaction efforts. We recommend that structural fill be compacted to at least 95% compaction based on modified Proctor methods following Appendix C guidelines. Periodic field density tests should be taken by CGC staff within the fill to document the adequacy of compactive effort.

2. Foundation Design

Based on Borings 3 and 4, it is our opinion that the proposed shelter can be supported on reinforced concrete spread footing foundations bearing on natural clay but some undercutting will be needed. Provided the recommendations outlined in this report are followed, it is our opinion that foundations can be designed using a ***maximum net allowable soil bearing pressure of 2,500 psf.*** The following additional parameters should be used for foundation design:

- Minimum foundation widths:
  - -- Continuous wall footings: 18 in.
  - -- Column pad footings: 30 in.
- Minimum footing depths:
  - -- Exterior/perimeter footings: 4 ft
  - -- Interior footings: no minimum requirement

CGC should be present during footing excavations to check whether subgrades are satisfactory for the design bearing pressure and to advise on corrective measures, where necessary. We recommend using a smooth-edged backhoe bucket for footing and undercut excavations. Clay soils should be re-compacted with a heavy jumping jack. Undercutting below footing grade will be required where clays exhibiting pocket penetrometer readings of less than 1.25 TSF are observed at or slightly below footing grade. Where undercutting is required, such as the soft clay soils in Boring 3, the base of the undercut excavation should be widened beyond the footing edges at least 0.5 ft in each direction for each foot of undercut depth for stress distribution purposes. Granular backfill (including on-site sands) compacted to at least 95% (ASTM D1557) should be used to re-establish footing grade. As an alternative, 3-in. DGB could be placed/compacted to re-establish footing grade.

Provided the 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.

3. Floor Slab

Floor slab subgrades are generally expected to consist of existing fill. Floor slab subgrades should be prepared as discussed in the Site Preparation section of this report, including recompacting, proof-rolling and undercutting/stabilization, where required, as well as proper placement and compaction of fill soils as outlined in Appendix C.

To act as a capillary break below the slab, and to help retard potential frost heave if the shelter is unheated, we recommend including a minimum 12-in. thick layer of well-graded sand/gravel with less than 5% by weight passing the No. 200 U.S. standard sieve. Fill and base layer material below the floor slab should be placed as described in the Site Preparation section of this report. Subgrade modulus of 100 pci should be used for the design of slabs that are constructed on a sand/gravel layer. The design subgrade modulus is 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.

4. Pavement Design

We anticipate that pavement design will be controlled by the surficial clay fills that were encountered within the borings, and subgrades should be prepared as described in the Site Preparation section of this report, with recompaction/proof-rolling completed prior to base course placement. 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 may depend on the weather conditions during construction.

We anticipate that some asphalt pavement on this site may be exposed to automobile traffic accessing the parking lot and shelter, as well as heavier truck traffic. Because we assume that the truck traffic will use the same entrance drives as the light vehicles, it is our opinion that the occasional truck traffic will control pavement design. In view of this, we have assumed a traffic load of up to 5 ESALs per day and Traffic Class II according to Wisconsin Asphalt Pavement Association (WAPA) recommendations. The pavement section summarized in Table 1 below was selected assuming a Soil Support Value "SSV" of about 4.0 for a firm or adequately stabilized subgrade and a design life of 20 years.

Table 1 – Pavement Design Recommendations

Material	**Thickness (in.)**	**WDOT Specification[1]**
Bituminous Upper Layer[2,3]	1.75	Section 460, Table 460-1
Bituminous Lower Layer[2,3]	2.25	Section 460, Table 460-1
Dense Graded Base Course[2,4]	10.0	Sections 301 and 305, 3 in. and 1¼ in.
Total Thickness	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 pavement design assumes a stable/non-yielding subgrade and a regular program of preventative maintenance. Alternative pavement designs may prove applicable and should be reviewed by CGC. For example, the courts near Borings 5 and 6 may perform in an acceptable manner if only 3.5-in. of asphalt over 8-in. of base course is used in the potentially non-truck traffic areas. If there is a delay between subgrade preparation and placing the base course, the subgrade should be recompacted.

5. Stormwater Infiltration Potential

We understand that stormwater management systems are being considered as part of the planned park improvements. In our opinion, the shallow subsurface conditions encountered in the borings evaluated for stormwater purposes (i.e., Borings 1, 2, 3 and 5) are generally not favorable for infiltrating significant quantities of stormwater due to the presence of lower permeability silty clay loam and silt loam. Undercutting of the lower permeability silty clay loam and silt loam soils is expected to be necessary in order to reach more permeable native granular soils, such as gravelly sandy loam, loamy sand, gravelly loamy sand, very gravelly loamy sand, and/or fine sand.

It is our opinion that limited stormwater infiltration may be possible, assuming the infiltration system extends into sandier soils (or lower permeability soils are undercut and replaced with appropriate sandier soils) and that the minimum separation distance between the bottom of the feature and groundwater (or redox/color, indicating previous groundwater) can be developed. In an effort to improve the infiltration potential, we recommend that after the overlying silty clay loam and silt loam are removed that the granular soils be excavated and blended (or deep-tilled, ripped, etc.) to break up lower permeability seams and loosen the relatively dense, overconsolidated granular soils. *Thicker layers of silt loam (or silty clay loam, etc.) will require excavation and removal.*

The following parameters should be considered for design of infiltration features:

Infiltration Potential: The following infiltration parameters were estimated using Table 2 of the WDNR Conservation Practice Standard 1002, *Site Evaluation for Storm Water Infiltration*. The estimated infiltration rates are as follows:

- Silty clay loam (SICL) — 0.04 in./hr
- Silt loam (SIL) — 0.13 in./hr
- Sandy loam (SL) — 0.5 in./hr
- Gravelly sandy loam (GRSL) — 0.5 in./hr
- Fine sand (FS) — 0.5 in./hr
- Loamy sand (LS) — 1.63 in./hr
- Gravelly loamy sand (GRLS) — 1.63 in./hr

Note that the infiltration rates should be considered very 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. Further, infiltration rates within existing fill deposits may be highly variable. We recommend that the soils at and several feet below the bottom of infiltration basins be checked by geotechnical engineer or certified soil tester *in conjunction with the basin designer* to document that the soils are adequate for the design infiltration rate or recommend remedial measures, if necessary. The Wisconsin Department of Safety and Professional Services Soil Evaluation – Storm form for Borings B-1, -2, -3 and -5 is contained in Appendix D.

Groundwater: Apparent groundwater was encountered in Borings B-2 and B-3 at depths of about 9 and 8± ft, respectively. Groundwater levels should be expected to fluctuate, as previously discussed.

Bedrock: Auger refusal on a presumed boulder or possible bedrock was encountered in Boring B-5 at a depth of about 8± ft below existing grade. Note that the excavation of supplemental test pits is recommended to characterize the refusal materials encountered. The depth to 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 design should include pretreatment to remove fine-grained soils (silt/clay) and clogging materials (oils and greases) from stormwater prior to entering the infiltration areas. Additionally, a regular maintenance plan should be developed to remove fine-grained and clogging materials that may accumulate in the bottom of the stormwater management area over time. Failure to adequately control fine-grained soils and clogging materials from entering the infiltration area or failure to regularly remove fine-grained soils and clogging materials that accumulate at the base of the stormwater infiltration system will likely cause the stormwater management system to fail. Refer to WDNR Conservation Practice Standards 1002, 1003 and 1004, as well as and NR 151 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 that could be encountered on the site are discussed below:

- Due to the potentially sensitive nature 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.

- Earthwork construction during the early spring or late fall could be complicated as a result of wet weather and 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.

- Excavations extending greater than 4 ft in depth below the existing ground surface should be sloped or braced in accordance with current OSHA standards.

- Based on observations made during the field exploration, groundwater infiltration into footing excavations is not expected to be a problem. Water accumulating at the base of excavations as a result of precipitation or seepage should be controlled and quickly removed using pumps operating from filtered sump pits. Dewatering means and methods are the contractor's responsibility.

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 proceeds in accordance with our recommendations, the following operations should be monitored by CGC:

- Topsoil stripping/subgrade proof-rolling within the construction areas;
- 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,

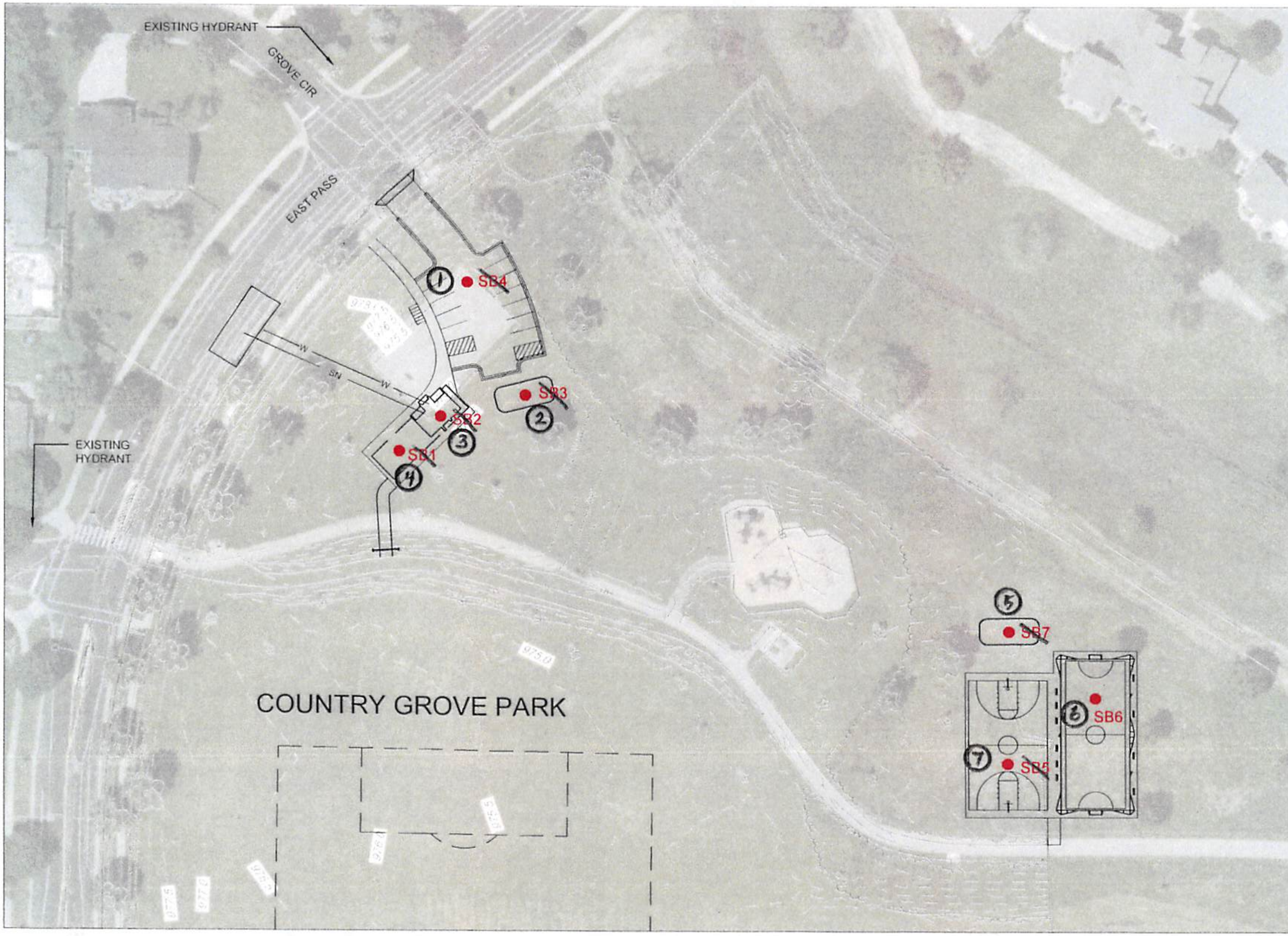
CGC, Inc.

Michael N. Schultz, P.E.
Principal/Consulting Professional

Encl: Appendix A - Soil Boring Location Map
Logs of Test Borings (7)
Log of Test Borings-General Notes
Unified Soil Classification System
Appendix B- Document Qualifications
Appendix C - Recommended Compacted Fill Specifications
Appendix D - WDSPS Spoil & Site Evaluation – Storm Form
Particle Size Distributions (2)

APPENDIX A

SOIL BORING LOCATION MAP
LOGS OF TEST BORINGS (7)
LOG OF TEST BORINGS-GENERAL NOTES
UNIFIED SOIL CLASSIFICATION SYSTEM



Soil Boring Location

Notes

1. Soil borings were performed by OSE on August 17, 2023.
2. Boring locations shown are approximate.
3. Base map provided by City of Madison.

Date: 9/19/23	CGC, Inc.	SOIL BORING LOCATION EXHIBIT Country Grove Park 7573 East Pass., Madison, Wisconsin
Job No. C23051-10		

CGC Inc.

LOG OF TEST BORING

Project: Country Grove Park Improvements

Location: Madison, Wisconsin

Boring No. 1
Surface Elevation (ft) 975.4
Job No. C23051-10
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	LOI
						3 in. Asphalt Pavement/6 in. Base Course					
1		1	M	9		FILL: Loose Brown Silt with Sand, Gravel and Clay *USDA: Variegated Silt Loam (Fill)*					
2		1	M	5	5						
3		13	M	17		Medium Dense to Dense, Brown Fine to Medium SAND, Some Silt and Gravel, Scattered Cobbles and Boulders (SM) *USDA: 10YR 4/4 Gravelly Sandy Loam*					
4		10	M	33	10	*USDA: 10YR 6/4 Gravelly Loamy Sand*					
					15	End of Boring at 10 ft Backfilled with Bentonite Chips and Asphalt Patch					
					20						

WATER LEVEL OBSERVATIONS

While Drilling ∇ NW   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 8/17/23 End 8/17/23
Driller OES Chief Gage Rig 7822
Logger Gage Editor ESF DT
Drill Method 3.25" HSA; Autohammer

CGC Inc.

LOG OF TEST BORING

Project: Country Grove Park Improvements

Location: Madison, Wisconsin

Boring No. 2
Surface Elevation (ft) 973.7
Job No. C23051-10
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	LOI
						8 in. TOPSOIL					
1		13	M	3		FILL: Stiff Dark Brown Clay with Gravel and Scattered Cobbles to 3' *USDA: 10YR 2/2 Silty Clay Loam (Fill)*	(1.25)				
2		12	M	3		Brown and Gray (Mottled) Clay, Trace Sand to 5.5' *USDA: 10YR 6/1 Silty Clay Loam (Fill)* Redox: c2p 10YR 4/6	(1.5)				
					5						
3		6	M	13		Very Stiff Gray and Dark Brown Clay with Gravel and Scattered Cobbles to 8'	(2.25)				
4		4	M/W	39	▽	Dense to Medium Dense, Brown Fine to Medium SAND and GRAVEL, Some Silt, Scattered Cobbles and Boulders (SM/SP-SM; GM/GP-GM) *USDA: 10YR 6/4 Very Gravelly Loamy Sand*					
					10						
5		11	W	16							
6		16	W	34							
					15	End of Boring at 15 ft Backfilled with bentonite chips					
					20						

WATER LEVEL OBSERVATIONS

While Drilling ▽ 9.0' 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 8/17/23 End 8/17/23
Driller OES Chief Gage Rig 7822
Logger Gage Editor ESF DT
Drill Method 3.25" HSA; Autohammer

CGC Inc.

LOG OF TEST BORING

Project: Country Grove Park Improvements

Location: Madison, Wisconsin

Boring No. 3
Surface Elevation (ft) 974.9
Job No. C23051-10
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	LOI
						9 in. TOPSOIL					
1		16	M	7		FILL: Dark Brown Silt with Traces Sand and Clay *USDA: 10YR 3/2 Silt Loam (Fill)*					
2		12	M	2	5	Soft to Very Soft, Brown Lean CLAY (CL - Possible Fill) *USDA: 10YR 4/4 Silty Clay Loam*	(0.25)				
3		13	M/W	4	▽	Very Loose to Medium Dense, Brown Fine to Medium SAND, Some Gravel, Trace to Little Silt (SP/SP-SM - Possible Fill to 8') *USDA: 10YR 6/3 Fine Sand* %P200 (Sample 3): 9.2					
4		11	W	16	10	Medium Dense, Brown Fine to Medium SAND, Some Gravel, Trace to Little Silt, Scattered Cobbles and Boulders (SP/SP-SM) *USDA: 10YR 6/1 Loamy Sand*					
5		8	W	14							
6		17	W	17	15						
					20	End of Boring at 15 ft Backfilled with bentonite chips					

WATER LEVEL OBSERVATIONS

While Drilling ▽ 8.0'   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 8/17/23 End 8/17/23
Driller OES Chief Gage Rig 7822
Logger Gage Editor ESF DT
Drill Method 3.25" HSA; Autohammer

LOG OF TEST BORING

CGC Inc.

Project: Country Grove Park Improvements

Location: Madison, Wisconsin

Boring No. 4
Surface Elevation (ft) 974.8
Job No. C23051-10
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	LOI
					9 in. TOPSOIL					
1	13	M	8		FILL: Stiff Dark Brown Clay with Gravel	(1.5)				
2	12	M	3		Stiff, Brown and Gray (Mottled) Lean CLAY, Trace Sand (CL)	(1.5)				
				5						
3	13	M	4			(1.25)				
4	13	M/W	3		Very Loose, Brown and Gray (Mottled) SILT, Trace Clay and Sand (ML)					
				10						
5	14	W	30		Medium Dense to Dense, Brown Fine to Medium SAND, Some Silt and Gravel, Scattered Cobbles and Boulders (SM)					
6	16	W	23							
				15	End of Boring at 15 ft Backfilled with bentonite chips					
				20						

WATER LEVEL OBSERVATIONS

While Drilling ▽ 9.5' 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 8/17/23 End 8/17/23
Driller OES Chief Gage Rig 7822
Logger Gage Editor ESF DT
Drill Method 3.25" HSA; Autohammer

CGC Inc.

LOG OF TEST BORING

Project: Country Grove Park Improvements

Location: Madison, Wisconsin

Boring No. 5
Surface Elevation (ft) 976.3
Job No. C23051-10
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	LOI
						6 in. TOPSOIL					
1		11	M	16		FILL: Medium Dense Reddish-Brown Silty Sand with Gravel and Clay *USDA: 10YR 4/4; 4/3 Sandy Loam (Fill)*					
2		10	M	37	5	Dense to Very Dense, Brown Fine to Coarse SAND and GRAVEL, Little Silt, Scattered Cobbles and Boulders (SP-SM/GP-GM) *USDA: 10YR 6/3 Very Gravelly Loamy Sand* %P200 (Sample 2): 8.7					
3		11	M	70		Numerous Cobbles Beginning Near 6'					
					10	End of Boring at 8 ft due to auger refusal on presumed boulder/possible bedrock Backfilled with soil cuttings					
					15						
					20						

WATER LEVEL OBSERVATIONS

While Drilling ▽ NW   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 8/17/23 End 8/17/23
Driller OES Chief Gage Rig 7822
Logger Gage Editor ESF DT
Drill Method 3.25" HSA; Autohammer

LOG OF TEST BORING

CGC Inc.

Project: Country Grove Park Improvements
Location: Madison, Wisconsin

Boring No. 6
Surface Elevation (ft) 977.4
Job No. C23051-10
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	LOI
						5 in. TOPSOIL					
1		13	M	10		Loose to Medium Dense, Brown SILT, Trace Sand (ML - Possible Fill)					
2		0	M	94/9"		Dense to Very Dense, Brown Fine to Coarse SAND and GRAVEL, Little Silt, Scattered Cobbles and Boulders (SP-SM/GP-GM)					
					5						
3		9	M	47							
4		0		50		End of Boring at 8 ft due to auger refusal on presumed boulder/possible bedrock Backfilled with bentonite chips					
					10						
					15						
					20						

WATER LEVEL OBSERVATIONS

While Drilling ⊻ NW — 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 8/17/23 End 8/17/23
Driller OES Chief Gage Rig 7822
Logger Gage Editor ESF DT
Drill Method 3.25" HSA; Autohammer

LOG OF TEST BORING

CGC Inc.

Project: Country Grove Park Improvements
Location: Madison, Wisconsin

Boring No. 7
Surface Elevation (ft) 977.6
Job No. C23051-10
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	LOI
					0	6 in. TOPSOIL					
						Loose, Brown SILT, Trace Clay and Sand (ML)					
1		13	M	6							
						Medium Dense to Dense, Brown Fine to Coarse SAND and GRAVEL, Little Silt, Scattered Cobbles and Boulders (SP-SM/GP-GM)					
2		11	M	28							
					5						
3		10	M	57							
4		10	M	55		Reddish-Brown Near 9'					
					10	End of Boring at 10 ft					
						Backfilled with bentonite chips					
					15						
					20						

WATER LEVEL OBSERVATIONS

While Drilling ▽ NW   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 8/17/23 End 8/17/23
Driller OES Chief Gage Rig 7822
Logger Gage Editor ESF DT
Drill Method 3.25" 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

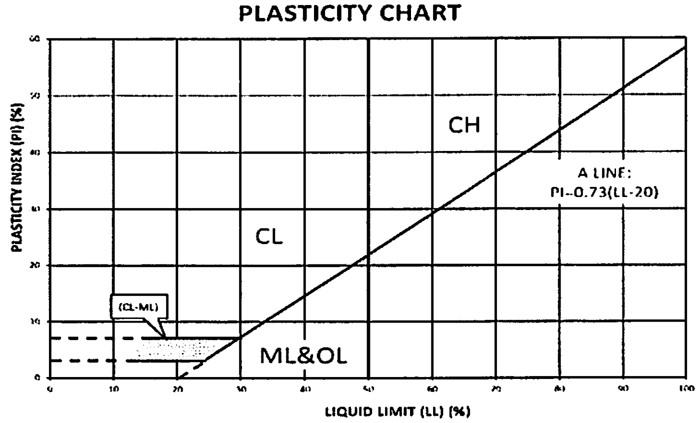
LABORATORY CLASSIFICATION CRITERIA

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 B

DOCUMENT QUALIFICATIONS

APPENDIX B
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.

APPENDIX C

RECOMMENDED COMPACTED FILL SPECIFICATIONS

APPENDIX C

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 D

WDSPS SPOIL & SITE EVALUATION – STORM FORM
PARTICLE SIZE DISTRIBUTIONS (2)

1002-CPS-23

Division of Industry Services
P.O. Box 2658
Madison, Wisconsin 53701
Scott Walker, Governor
Laura Gutierrez, Secretary

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.: *06081105035*
Reviewed by:
Date:

Property Owner: *CITY OF MADISON PARKS*

Property Location: Govt. Lot ¼ ¼ S *11* T *6* N R *8* E

Property Owner's Mail Address: *210 MLK JR BLVD RM 104*

Lot #: *OL4* Block#: Subd. Name or CSM #: *COUNTRY GROVE*

City: *MADISON* State: *WI* Zip Code: *53703-3342* Phone Number:

[X] City [ ] Village [X] Town *MADISON*

Nearest Road: *7353 EAST PASS*

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: 8/17/2023
USDA-NRCS WETS Value:
[ ] Dry = 1;
[ ] Normal = 2;
[ ] Wet = 3.

1 #OBS. [ ] Pit [X] Boring Ground surface elevation 975.4 ft. Elevation of limiting factor < 965.4 ft.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frags.	% Fines	Hydraulic App Rate Inches/Hr
1	0-9	3-in. Asphalt Pavement over 6-in. of Base Course								
2	9-66	Variegated	-	SIL (Fill)	Varies	Varies	gw	10-15		0.13(1)
3	66-96	10YR 4/4	-	GRSL	0sg	ml	gw	15-25		0.5
4	96-120	10YR 6/4	-	GRLS	0sg	ml		25-35		1.63

Comments: No apparent groundwater encountered. (1)Variable infiltration rate within existing fill materials should be anticipated.

2 #OBS. [ ] Pit [X] Boring Ground surface elevation 973.7 ft. Elevation of limiting factor 964.7 ft. (Groundwater)

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frags.	% Fines	Hydraulic App Rate Inches/Hr
1	0-8	Topsoil (No sample obtained)								
2	8-36	10YR 2/2	-	SICL (Fill)	Varies	Varies	gw	10-15		0.04(1)
3	36-90	10YR 6/1	c2p 10YR 4/6	SICL (Fill)	Varies	Varies	gw	0-5		0.04(1)
4	90-180	10YR 6/4	-	VGRLS	0sg	ml		40-50		1.63

Comments: Apparent groundwater near 9 ft. Apparent redox observed in fill materials within Horizon 3, which may have formed at the source location or following placement.

Name (Please Print): Ryan J. Portman
Signature: Ryan Portman
Credential Number: **1201636**
Address: 201 N. Mallard Dr., Sun Prairie, WI 53590
Date Evaluation Conducted: **9/13/2023**
Telephone Number: 608-288-4100

3 #OBS. [ ] Pit [X] Boring Ground surface elevation 974.9 ft. Elevation of limiting factor 966.9 ft.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frags.	% Fines	Hydraulic App Rate Inches/Hr
1	0-9	Topsoil (No sample obtained)								
2	9-36	10YR 3/2	-	SIL (Fill)	Varies	Varies	gw	0-5		0.13[1]
3	36-66	10YR 4/4	-	SICL	1fsbk	mfi	gw	0-5		0.04
4	66-102	10YR 6/3	-	FS	0sg	ml	gw	10-15	9.2	0.5
5	102-180	10YR 6/4	-	LS	0sg	ml		10-15		1.63

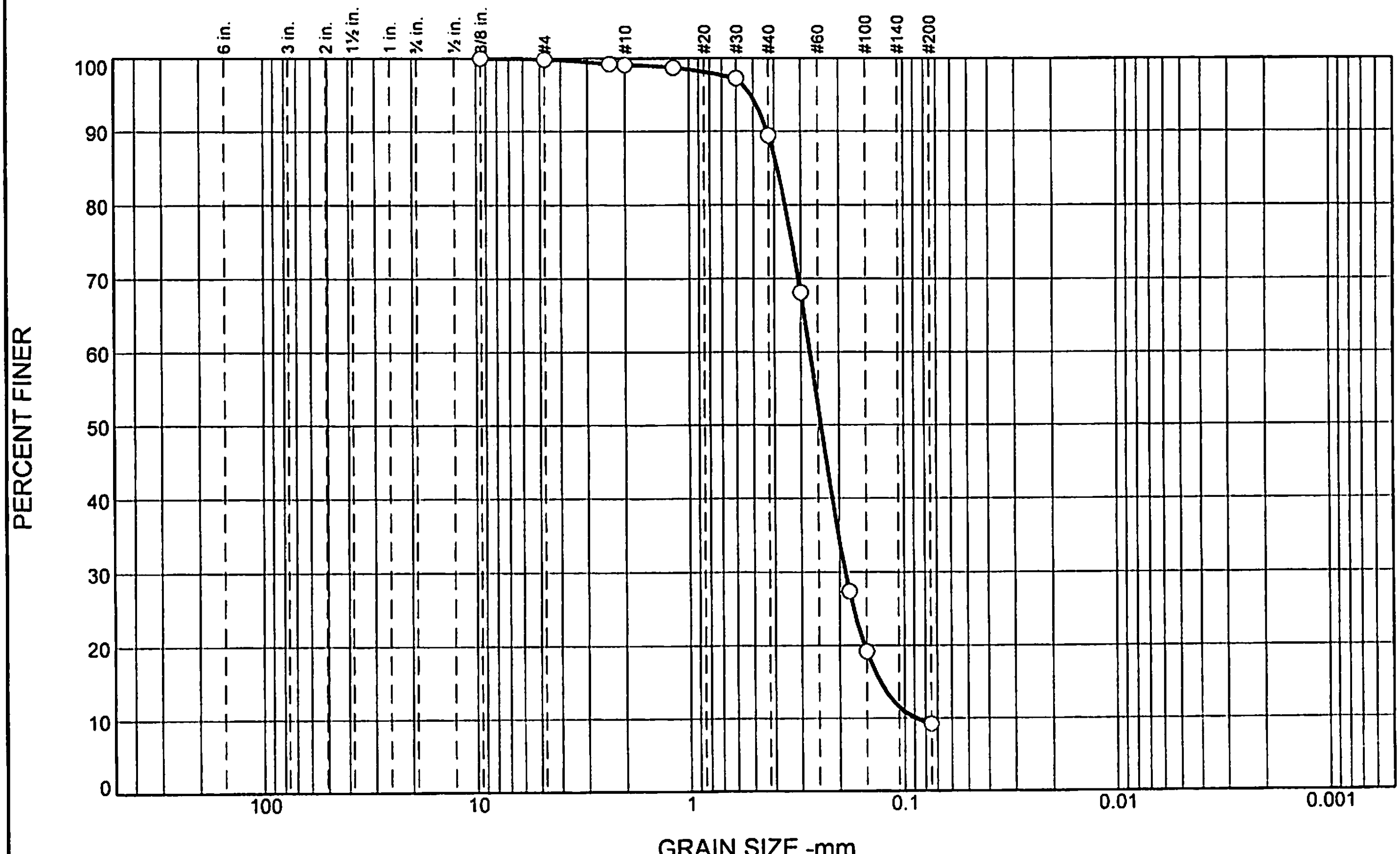
Comments: Apparent groundwater near 8 ft. [1]Variable infiltration rate within existing fill materials should be anticipated.

5 #OBS. [ ] Pit [X] Boring Ground surface elevation 976.3 ft. Elevation of limiting factor 968.3 ft. (Poss. Bedrock)

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frags.	% Fines	Hydraulic App Rate Inches/Hr
1	0-6	Topsoil (No sample obtained)								
2	6-36	10YR 4/4; 4/3	-	SL (Fill)	0sg	ml	gw	10-15		0.50[1]
3	36-96	10YR 6/3	-	VGRLS	0sg	ml		45-55	8.7	1.63

Comments: No apparent groundwater encountered. Auger refusal on presumed boulder/possible bedrock experienced at 8 ft. [1]Variable infiltration rate within existing fill materials should be anticipated.

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.8	9.6	80.3	9.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8	100.0		
#4	99.9		
#8	99.3		
#10	99.1		
#16	98.7		
#30	97.3		
#40	89.5		
#50	68.2		
#80	27.4		
#100	19.2		
#200	9.2		

* (no specification provided)

Material Description

Brown Fine to Medium Sand, Little Silt, Trace Gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.4308 D_{85}= 0.3862 D_{60}= 0.2719
D_{50}= 0.2422 D_{30}= 0.1878 D_{15}= 0.1298
D_{10}= 0.0884 C_u= 3.07 C_c= 1.47

Classification

USCS= SP-SM AASHTO=

Remarks

Sample Number: B3/3 **Depth:** 6'-7.5'

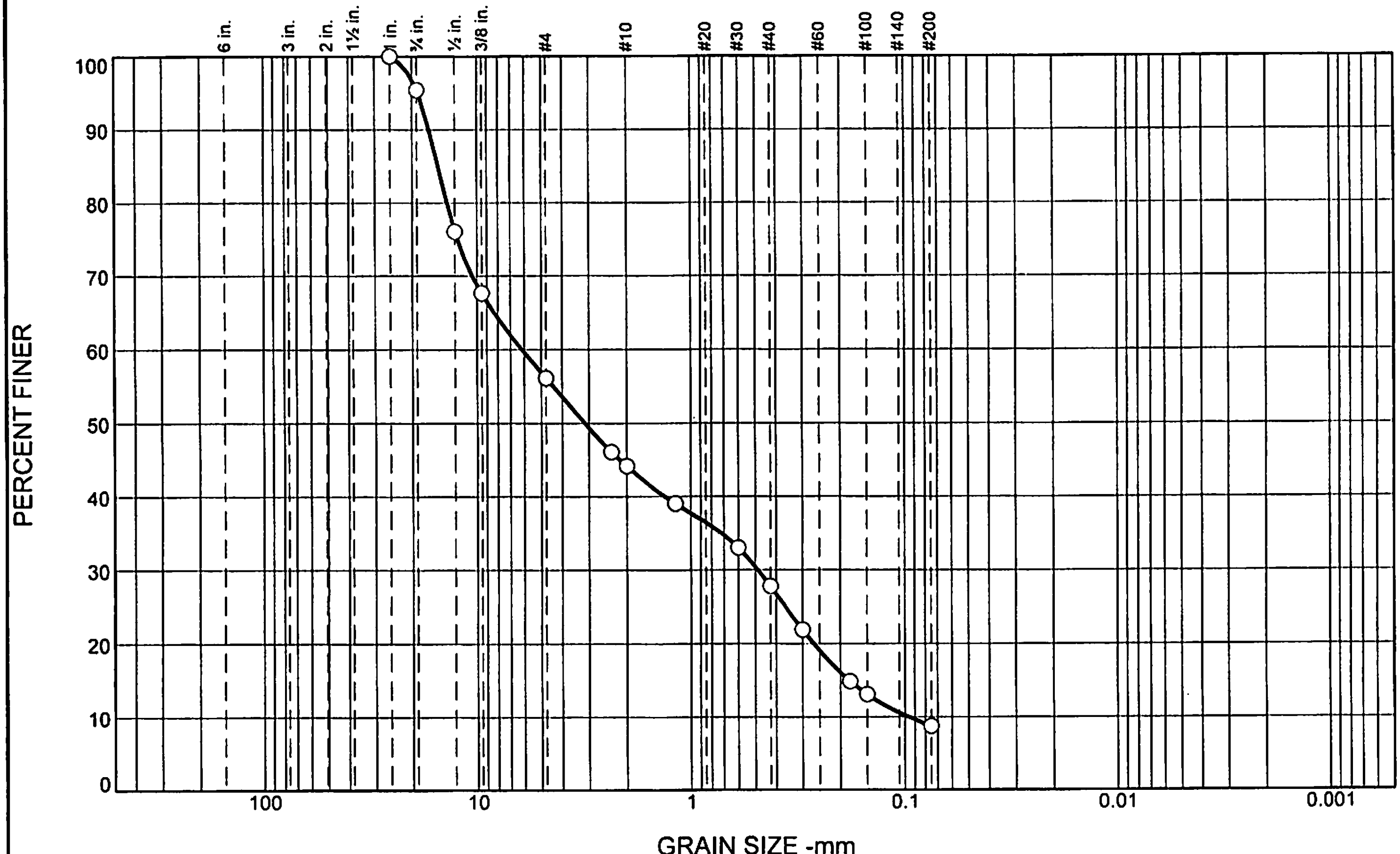
Date: 9/15/23

CGC,Inc.

Client: City of Madison-Parks Division
Project: Country Grove Park
Project No: C23051-10 **Figure**

Tested By: JFS **Checked By:** KJS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	4.6	39.2	12.0	16.4	19.1	8.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
3/4	95.4		
1/2	76.1		
3/8	67.7		
#4	56.2		
#8	46.1		
#10	44.2		
#16	39.1		
#30	33.0		
#40	27.8		
#50	21.9		
#80	14.9		
#100	13.1		
#200	8.7		

* (no specification provided)

Material Description

Brown Gravelly Fine to Coarse Sand, Little Silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 16.7460 D_{85}= 15.2008 D_{60}= 6.1496
D_{50}= 3.1385 D_{30}= 0.4864 D_{15}= 0.1824
D_{10}= 0.0960 C_u= 64.05 C_c= 0.40

Classification

USCS= SP-SM AASHTO=

Remarks

Sample Number: B5/2 **Depth:** 3.5'-5'

Date: 9/15/23

CGC, Inc.

Client: City of Madison-Parks Division
Project: Country Grove Park

Project No: C23051-10 **Figure**

Tested By: JFS **Checked By:** KJS