CGC, Inc.
Construction • Geotechnical
Consulting Engineering/Testing

February 17, 2017
C17051-5

Mr. Randy Wiesner
Facilities Management & Sustainability
City of Madison Engineering Division
210 Martin Luther King Jr. Blvd, Room 115
Madison, WI 53703

Re: Geotechnical Exploration Report
Proposed Equipment Building & Improvements
Olin Transfer Station
101 E. Olin Avenue
Madison, WI

Dear Mr. Wiesner:

Construction • Geotechnical Consultants, Inc. (CGC) has completed the subsurface exploration for the proposed equipment building and improvements at the Olin Transfer Station. The purpose of this exploration program was to evaluate the subsurface conditions in the area of the proposed structure and improvements and to provide geotechnical recommendations for foundation and utility design/construction. Stormwater infiltration potential is also discussed. An electronic copy of this report is provided, and a paper copy can be sent upon request.

PROJECT AND SITE DESCRIPTION

We understand that that an equipment building is proposed in the southwest part of the Olin Transfer Station site. The equipment building will have post-and-pad foundations (i.e., pole barn), with the slab being existing asphalt pavement, so site grades are expected to remain largely unchanged. A new storm sewer will be located north of the building and run to the northwest.

The site is located south of Olin Avenue, with the proposed pole barn in an area that has been used to store different materials, and we understand this site sits on a former landfill. Site grades are fairly flat. Wingra Creek exists northwest of the site.

SUBSURFACE EXPLORATION

The subsurface conditions at this site were explored by drilling eight standard penetration test (SPT) soil borings to planned depths of 7.5 to 15 ft below the ground surface. The borings were located in the field by CGC and City of Madison personnel, with the borings offset, as needed, by the drillers to avoid buried utilities. The boring locations are shown on the attached Soil Boring Location Plan in

Appendix B. Badger State Drilling (under subcontract to CGC) performed the soil borings on February 8, 2017 using a truck-mounted CME-55 rotary drill rig equipped with hollow stem augers and an automatic SPT hammer. Soil samples were obtained in the boring locations following SPT techniques (ASTM D1586), and the boreholes were abandoned upon completion in accordance with WDNR requirements. The specific procedures used for drilling and sampling are described in Appendix A. Ground surface elevations at the boring locations were estimated by CGC using topographic information from Dane County DCiMap, and the elevations should be considered approximate (e.g., +/- 1 ft).

The subsurface profile in the borings was fairly similar and can generally be described by the following strata, in descending order:

- About 5 to 10 in. of ***asphalt pavement*** and 0 to 11 in. of ***base course*** in Borings 1 through 6 and about 6 to 8 in. of ***topsoil fill*** in Borings 7 and 8, over

- 5 to 14+ ft of ***mixed highly variable fill*** consisting of variable amounts of sand, silt and clay, intermixed with organics, wood, glass, ash, cinders, etc.; note that the fill extended to the maximum depth explored in Borings 1, 2 and 4, or was followed by

- Loose ***sedimentary or fibrous peat*** in Borings 3 and 5 or very soft to soft ***lean clay*** with plant fibers in Borings 6, 7 and 8.

Groundwater was generally encountered in the borings at 3.5 to 13.5 ft below existing site grades during or shortly after drilling. Fluctuations in the groundwater table should be expected in response to seasonal variations in precipitation, infiltration, the stage of Wingra Creek and other factors. Detailed descriptions of the soil and groundwater conditions observed in the borings are included in Appendix B.

DISCUSSION AND RECOMMENDATIONS

The variable fill soils over peat and soft clay subsurface conditions on this site are generally considered poor for foundation support, and structures on sites such as this are typically supported on deep foundation systems extending to deeper competent soils or bedrock. However, the pole barn structure that is planned is a lightly-loaded, flexible structure that may perform acceptably on a conventional post and pad foundation, assuming the owner understands and is willing to accept the risk that foundation settlement (including differential settlement) may exceed typically tolerable levels if the foundations are supported on the variable fill overlying peat and soft clays. Raising *grades in the vicinity of the equipment building should also be avoided, as the weight of the new fill could result in additional settlement.*

In order to reduce (but not eliminate) the risk of unacceptable foundation settlement occurring, we recommend undercutting a minimum of 2 ft below the bottom of the post pads and restoring footing grade with compacted clear stone or dense graded aggregate. Additionally, we recommend proportioning the post and pad foundations for a low bearing pressure to reduce the load imposed on the fairly weak and variable soils. Partial undercutting of the fill is also recommended below new utility piping to create more uniform pipe support, but similar to the building, some settlement may occur due to the existing subsurface conditions being prone to long-term settlement without additional load added. Lastly, stormwater infiltration appears to be very limited due to the composition of the soils and shallow groundwater.

With the above limitations in mind, our recommendations for foundation, utility and stormwater infiltration potential design and construction are presented in the following paragraphs. Additional information regarding the conclusions and recommendations presented in this report is discussed in Appendix C.

1. Foundation Recommendations

As mentioned above, the variable fill soils over peat and soft clay subsurface conditions on this site are generally considered poor for foundation support, and structures on sites such as this are typically supported on deep foundation systems extending to deeper competent soils or bedrock. However, the pole barn structure that is planned is a lightly-loaded, flexible structure that may perform acceptably on a conventional post and pad foundation, assuming the owner understands and is willing to accept the risk that foundation settlement (including differential settlement) may exceed typically tolerable levels if the foundations are supported on the variable fill overlying peat and soft clays. **The foundation recommendations assume that the City is willing to accept the risk of settlement exceeding typically tolerable levels.** (Alternative foundation recommendations that would involve less risk can be provided, but deeper borings would be required to develop these recommendations, and penetrating through the landfill with deep foundations would need to be acceptable.)

In our opinion, in order to reduce (but not eliminate) the risk of post-and-pad foundation settlement occurring, we recommend undercutting a minimum of 2 ft of the existing fill soils below foundations. The undercut excavations should be oversized at least 1 ft wider than the planned post pad diameter, and the soils at the bottom of the undercut should be recompacted with a vibratory compactor (e.g., hoe-pack, etc.). Note that if the bottom of the excavation is wet, the soils at the bottom should be stabilized with compacted clear stone prior to backfilling, and if very soft, loose or organic soils are encountered at the bottom of the undercut, the excavation may need to be extended deeper. Grade should then be restored with compacted clear stone or 3-in. dense graded base placed in maximum loose lifts of 12 in. and compacted until deflection ceases. We recommend that foundations be located at least 4 ft below finish grade for frost protection, so due to the recommended overexcavation, the foundation installer will need to have equipment capable of extending at least 2 ft deeper and at least 1 ft larger in diameter than what is typically needed for conventional foundation installation. The excavation spoils will also likely require landfill disposal if hauled off site.

In addition to the 2 ft of undercutting below the post pads, to limit the pressure on the existing soils it is our opinion that the allowable bearing pressure should be limited to 500 psf. Despite the recommended undercutting/replacement below the foundations and use of a low bearing pressure, which are intended to reduce (but not eliminate) the risk of settlement exceeding typically tolerable limits (i.e., 1 in. of total settlement and 0.5 in. of differential settlement), settlement of the structure is difficult to predict due to the variable, non-engineered fill and potential for highly compressible peat and soft clay to underlie the site. Because of these factors, settlement should be expected to exceed typical levels. We recommend discussing the potential for building settlement with the pole barn manufacturer and installer to determine if modifications are needed (or can be made) to allow the structure to function as intended despite higher settlement than normally experienced. The contractor may also have alternative methods for developing a suitable foundation subgrade, which may require further discussion.

2. Utility Design Considerations

We understand that a storm sewer line is proposed north of the new pole barn that will extend to the northwest. We assume the storm sewer invert will be fairly shallow. Based on the variable soil conditions encountered in the borings we recommend including a minimum 1-ft thick stabilization layer of well-graded coarse aggregate (e.g, 3-in. dense graded base or similar) below the bottom of the planned bedding layer to create more uniform pipe support. If very soft, loose or organic soils are encountered along the pipe alignment, additional undercutting will likely be required. Due to the presence of buried highly compressible organic soils and unknown composition and depth of the existing refuse, some settlement of the new storm sewer is possible despite placement of the stabilization layer. The following are our recommendations regarding trench excavation, dewatering, and backfilling:

- Excavation: Open cuts should be sloped and/or braced in accordance with OSHA guidelines. Based on the highly variable nature of the fill soils, we expect that the soils will be classified as OSHA "Type C" soils, and slopes of 1.5H:1V or flatter are expected to be required. Note that flatter side slopes may be required where perched water or groundwater is present that destabilizes the side slopes. The appropriate excavation slope should be determined by a competent person completing the utility construction. Where the base of the excavation extends to wet silty or clayey soils that are difficult to dewater, the stone stabilization layer should consist of crushed clear stone that is compacted into the bottom of the excavation using a backhoe-mounted, vibratory plate compactor (i.e., hoe-pack). If the stone layer exceeds 12 in. it should be enveloped with woven geotextile fabric (e.g., Mirafi 160N or equivalent). If required, temporary bracing for utility excavations should be designed by a registered professional engineer.

Because of the nature of the waste material through which the utilities will be installed, additional precautions will be required, including appropriate personal protective equipment (PPE) and special handling/disposal of spoils and dewatering discharge. Excavation spoils removed from the site should be disposed of in a licensed landfill.

- Dewatering: Groundwater was encountered in the southern borings (Borings 1 through 5) at 7.5 to 13.5 ft during or shortly after the completion of drilling. Groundwater levels may be higher during wetter parts of the year and will fluctuate with the stage of nearby Wingra Creek. For the water levels encountered in the borings and assuming shallow utility excavations, groundwater is generally not expected to be encountered, but groundwater could be encountered in deeper utility excavation or if utility construction occurs during wetter times of the year. For groundwater drawdowns of less than about 1 to 2 ft, dewatering can typically be accomplished with submersible pumps in shallow sump pits. Where groundwater drawdowns exceed 1 to 2 ft, dewatering with well points or deep wells will likely be required. Dewatering means and methods, including appropriate discharge handling and permits, are the responsibility of the utility contractor.

- Rock Removal: Bedrock was not encountered in the borings, but highly variable mixed fill was encountered that may contain cobbles and boulders or other large pieces of debris that may require additional effort to excavate.

- Backfilling - Excavation backfilling may proceed using the following guidelines:

  -- Although silty, clayey and sandy excavation spoils may be used to backfill the utility trenches above the pipe and associated granular bedding material, to the extent possible, we recommend that granular soils be used as backfill below paved areas because sand/gravel soils are relatively easy to place and compact in most weather conditions compared to cohesive soils. Silt and clay soils and soils excavated below the water table will likely require moisture conditioning prior to placement and compaction, which could delay construction progress. Granular soils with cobbles and boulders should not be used in direct contact with utility lines.

-- Backfill material should be placed in accordance with Appendix D guidelines or applicable City of Madison requirements.

-- Compaction recommendations:

  - Within 10 ft of buildings: 95% modified Proctor (ASTM D1557)
  - Depths greater than 3 ft below grade in pavement areas: 90% modified Proctor
  - Final 3 ft in pavement areas: 95% modified Proctor
  - Landscape areas: 85% modified Proctor

3. Stormwater Infiltration Potential

We understand that stormwater management areas are planned in the northern portion of the site near Borings 7 and 8. The soil conditions in these borings generally consisted of topsoil over mixed variable fill soils underlain by low permeability silty clay loam. Groundwater was encountered in both borings about 3.5 ft below existing grade. Based on the presence of shallow groundwater, it is our opinion that this site is not favorable for infiltrating stormwater. The northern part of the site may qualify as "excluded" due to insufficient separation distance between seasonal high groundwater and the bottom of the stormwater infiltration system. Other limitations may also exist due to the presence of the landfill. The Wisconsin Department of Safety and Professional Services Soil Evaluation – Storm form for Borings 7 and 8 is contained in Appendix E.

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:

- 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 in accordance with current OSHA standards.

- Based on observations made during the field exploration, groundwater infiltration into foundation excavations is generally not expected to be an issue unless excavations need to be extended deeper or construction occurs during wetter times of the year. Note however, that utility construction may require dewatering, and dewatering considerations were previously discussed. Additional water accumulating at the base of the excavations as a result of precipitation or seepage should be quickly removed using pumps operating from filtered sump pits.

RECOMMENDED CONSTRUCTION MONITORING

The quality of the foundation and pavement subgrades will largely be 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 a CGC:

- Foundation excavation and subgrade preparation;
- Fill and backfill placement and compaction; and
- Concrete placement.

* * * * *

CLOSING REMARKS

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.

David A. Staab, P.E., LEED AP
Consulting Professional

William W. Wuellner, P.E.
Senior Geotechnical Engineer

Encl: Appendix A - Field Exploration
Appendix B - Soil Boring Location Plan
Logs of Test Borings (8)
Log of Test Boring-General Notes
Unified Soil Classification System
Appendix C - Document Qualifications
Appendix D - Recommended Compacted Fill Specifications
Appendix E - WI Dept. of Safety & Professional Services Soil Evaluation Form (2 Borings)

APPENDIX A

FIELD EXPLORATION

APPENDIX A

FIELD EXPLORATION

A total of eight standard penetration test (SPT) soil borings were drilled to planned depths of 7.5 to 15 ft below the ground surface. The borings were located in the field by CGC and City of Madison personnel, with the borings offset, as needed, by the drillers to avoid buried utilities. The boring locations are shown on the attached Soil Boring Location Plan in Appendix B. Badger State Drilling (under subcontract to CGC) performed the soil borings on February 8, 2017 using a truck-mounted CME-55 rotary drill rig equipped with hollow stem augers and an automatic SPT hammer. Soil samples were obtained in the boring locations following SPT techniques (ASTM D1586), and the boreholes were abandoned upon completion in accordance with WDNR requirements. Ground surface elevations at the boring locations were estimated by CGC using topographic information from Dane County DCiMap, and the elevations should be considered approximate (e.g., +/- 1 ft).

In each boring, soil samples were obtained at 2.5-foot intervals to a depth of 10 feet and at 5 foot intervals thereafter. The soil samples were obtained in general accordance with specifications for standard penetration testing, ASTM D 1586. The specific 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.

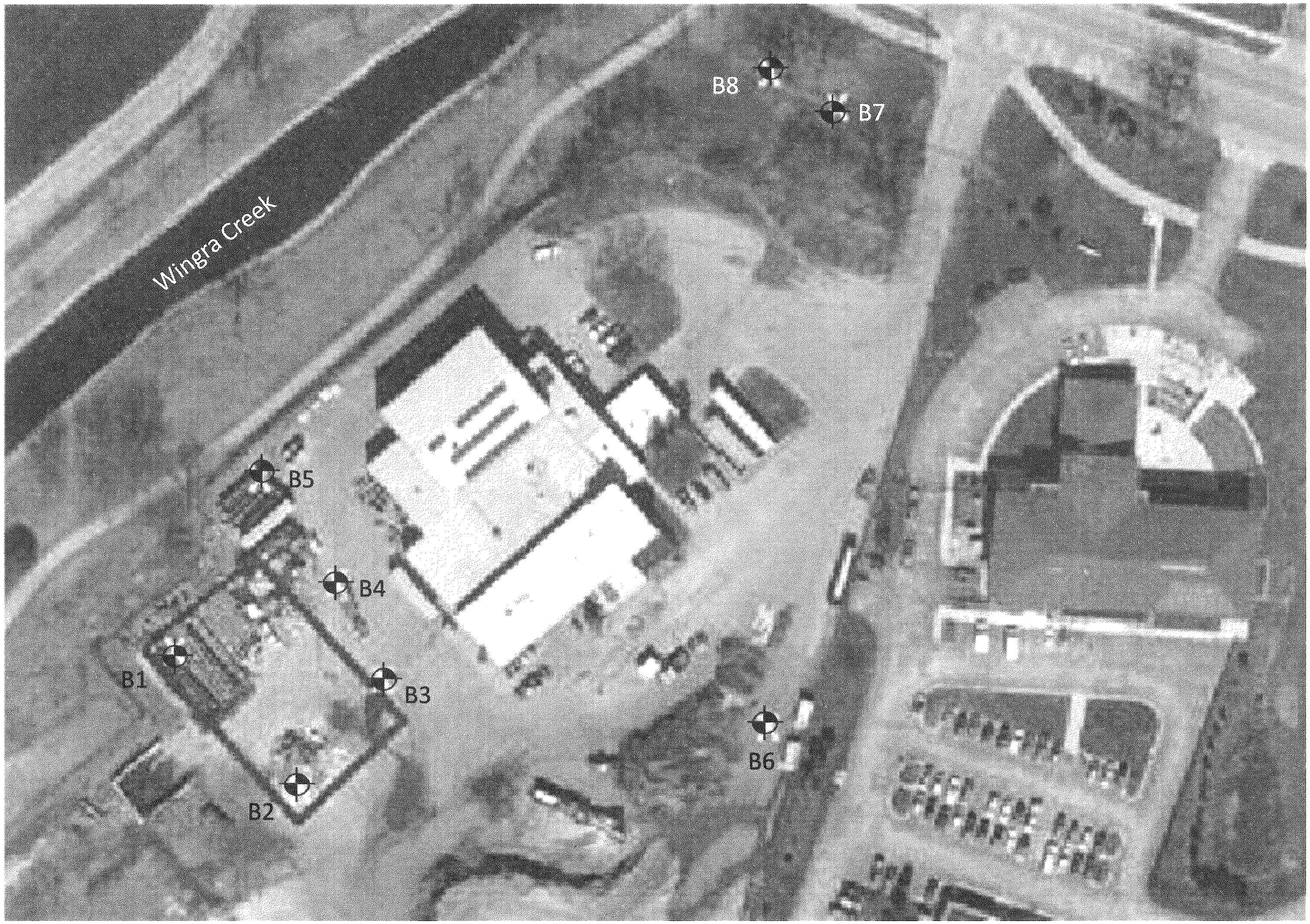
2. Standard Penetration Test and Split-Barrel Sampling of Soils
   (ASTM Designation: D 1586)

   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 inches is recorded on the log of borings and is known as the Standard Penetration Resistance.

During the field exploration, the driller visually classified the soil and prepared a field log. *Field screening of the samples for possible environmental contaminants was not conducted by the drillers, as environmental site assessment activities 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 boreholes were backfilled with bentonite in accordance with WDNR regulations, and the soil samples were delivered to our laboratory for visual classification. The soils were visually classified by a geotechnical engineer using the Unified Soil Classification System. The final logs prepared by the engineer, and a description of the Unified Soil Classification System are presented in Appendix B.

APPENDIX B

SOIL BORING LOCATION EXHIBITS
LOGS OF TEST BORINGS (8)
LOG OF TEST BORING – GENERAL NOTES
UNIFIED SOIL CLASSIFICATION SYSTEM



N

Legend

Denotes Boring Location

Notes

1. Soil borings performed by Badger State Drilling in February 2017
2. Boring locations are approximate.

Scale: Reduced

Date: 2/2017	CGC, Inc.	**Soil Boring Location Plan** **Olin Transfer Site Improvements** **Madison, WI**
Job No. C17051-5		

CGC Inc.

LOG OF TEST BORING

Project: Olin Transfer Site Improvements

Location: Madison, WI

Boring No. 1
Surface Elevation (ft) 859±
Job No. C17051-5
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
						9 in. Asphalt/3 in. Base Course					
1		12	M	12		FILL: Brown Sand with Variable Silt and Gravel Contents, Clayey Layers and Scattered Organics					
2		8	M	5	5	Medium Stiff to Stiff Clayey Layer Noted Near 4 ft	(1.0)	23.1			
3		12	M	19							
4		12	M	27	10	Stiff to Very Stiff Clayey Layer Mixed with Gravel, Topsoil and Peat Noted Near 9 ft	(2.0)				
						FILL: Mixed Dark Gray Sand,Gravel, Organics and Refuse (Including Glass and Woody Materials)					
5		12	W	15	15						
						End of Boring at 15 ft					
					20	Backfilled with Bentonite Chips and Asphalt Patch					

WATER LEVEL OBSERVATIONS

While Drilling ∇ 13.5' 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 2/8/17 End 2/8/17
Driller BSD Chief MC Rig CME-55
Logger FD Editor ESF
Drill Method 2.25" HSA; Automatic Hammer

LOG OF TEST BORING

CGC Inc.

Project: Olin Transfer Site Improvements

Location: Madison, WI

Boring No. 2
Surface Elevation (ft) 857±
Job No. C17051-5
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
						10 in. Asphalt/11 in. Base Course					
1		12	M	29		FILL: Loose to Medium Dense, Brown to Gray SAND with Variable Silt and Gravel Contents					
2		12	M/W	6	5						
3		8	W	17		Refuse Including Glass, Metal and Woody Material Noted Beginning Near 6 ft					
4		1	W	59/9"	10	FILL: (Refuse) Including Glass, Metal and Woody Material Mixed with Variable Soils					
5		2	W	11	15						
					20	End of Boring at 15 ft Backfilled with Bentonite Chips and Asphalt Patch					

WATER LEVEL OBSERVATIONS

While Drilling ▽ 7.5'   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 2/8/17 End 2/8/17
Driller BSD Chief MC Rig CME-55
Logger FD Editor ESF
Drill Method 2.25" HSA; Automatic Hammer

CGC Inc.

LOG OF TEST BORING

Project: Olin Transfer Site Improvements

Location: Madison, WI

Boring No. 3
Surface Elevation (ft) 857±
Job No. C17051-5
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
						8 in. Asphalt/3 in. Base Course					
1		12	M	27		FILL: Medium Dense, Brown Sand with Variable Silt and Gravel Content, Occasional Clay Chunks					
2		2	M	16							
					5	FILL: Very Stiff, Brown Clay with Trace to Little Sand and Gravel					
3		12	M	14			(2.25-2.50)	19.7			
						FILL: Very Loose to Loose, Dark Brown Sand with Silt, Gravel and Refuse Including Metal and Glass					
4		4	M	4							
					10						
						Loose, Dark Brown Fibrous PEAT (PT)					
5		18	W	8	▽			191.7			56.7
					15	End of Boring at 15 ft Backfilled with Bentonite Chips and Asphalt Patch					
					20						

WATER LEVEL OBSERVATIONS

While Drilling ▽ 13.5' 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 2/8/17 End 2/8/17
Driller BSD Chief MC Rig CME-55
Logger FD Editor ESF
Drill Method 2.25" HSA; Automatic Hammer

CGC Inc.

LOG OF TEST BORING

Project: Olin Transfer Site Improvements

Location: Madison, WI

Boring No. 4

Surface Elevation (ft) 858±

Job No. C17051-5

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
						7 in. Asphalt/4 in. Base Course					
1		14	M	22		FILL: Medium Dense, Brown Sand with Little to Some Silt and Gravel					
2		16	M	19		FILL: Medium Dense Brown to Dark Brown Silty Sand with Clay Layers	(2.5)				
					5						
3		12	M	30		FILL: Medium Dense to Dense, Brown Sand With Some Silt and Gravel					
4		10	M	13		FILL: Loose to Medium Dense, Dark Brown Sand with Silt and Gravel Mixed with Stiff Clay and Traces of Glass	(1.75)				
					10						
					∇						
5		10	W	8		Increased Glass/Refuse Content Noted in Sample 5					
					15	End of Boring at 15 ft Backfilled with Bentonite Chips and Asphalt Patch					
					20						

WATER LEVEL OBSERVATIONS

While Drilling ∇ 13.5' 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 2/8/17 End 2/8/17

Driller BSD Chief MC Rig CME-55

Logger FD Editor ESF

Drill Method 2.25" HSA; Automatic Hammer

LOG OF TEST BORING

CGC Inc.

Project	Olin Transfer Site Improvements
Location	Madison, WI
Boring No.	5
Surface Elevation (ft)	858±
Job No.	C17051-5
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
						5 in. Asphalt/0 in. Base Course					
1		12	M	37		FILL: Dense, Reddish-Brown Silty Sand with Gravel and Scattered Cobbles					
2		8	M/W	11		FILL: Medium Dense, Brown Silty Sand with Gravel					
					5						
3		4	M	7		FILL: Loose to Dense, Brown Silty Sand Mixed with Clay, Concrete and Brick Fragments					
4		12	M	32							
					10						
5		14	M	8		Loose, Dark Brown Sedimentary PEAT (PT)					
					15	End of Boring at 15 ft Backfilled with Bentonite Chips					
					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 2/8/17 End 2/8/17
Driller BSD Chief MC Rig CME-55
Logger FD Editor ESF
Drill Method 2.25" HSA; Automatic Hammer

LOG OF TEST BORING

CGC Inc.

Project: Olin Transfer Site Improvements
Location: Madison, WI

Boring No. 6
Surface Elevation (ft) 854±
Job No. C17051-5
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
						6 in. Asphalt/4 in. Base Course					
1		6	M	63/9"		FILL: Medium Dense, Brown and Very Dark Brown Sand with Silt, Gravel, Clay and Scattered Cobbles (Pushed Stone at 1.5 ft)					
2		12	M	42		FILL: Soft to Stiff, Brown Clay Mixed with Silty Sand and Gravel, Scattered Cobbles	(1.25)				
3		6	M/W	6	5		(0.5)				
4		6	W	62/7"		Encountered Buried Woody Material Resulting in Spoon Refusal at 9 ft Possible Petroleum Odor Noted Near 9 ft					
					10	Very Soft, Gray Lean CLAY, Occasional Plant Fibers (CL)					
5		18	M/W	4			(<0.25)				
					15	End of Boring at 15 ft					
					20						

WATER LEVEL OBSERVATIONS

While Drilling ▽ 8.5' 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 2/8/17 End 2/8/17
Driller BSD Chief MC Rig CME-55
Logger FD Editor ESF
Drill Method 2.25" HSA; Automatic Hammer

CGC Inc.

LOG OF TEST BORING

Project: Olin Transfer Site Improvements

Location: Madison, WI

Boring No. 7
Surface Elevation (ft) 850±
Job No. C17051-5
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
						6 in. TOPSOIL FILL (OL)					
1	▮	14	M	4		FILL: Medium Dense, Dark Gray-Brown Sand Mixed with Fine Gravel and Scattered Cinders USDA: 10YR 3/2 Sandy Loam with Cinders					
2	▮	4	W	4	∇	FILL: Loose to Very Loose, Brown Silty Sand with Brick Fragments USDA: 10YR 3/2 Sandy Loam with Brick (FILL)					
					5						
3	▮	8	W	4		Soft, Gray Lean CLAY, Occasional Plant Fibers (CL) USDA: 10G 4/1 Silty Clay Loam	(0.3)				
						End of Boring at 7.5 ft Backfilled wtih Bentonite Chips					
					10						
					15						
					20						

WATER LEVEL OBSERVATIONS

While Drilling ∇ 3.5' 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 2/8/17 End 2/8/17
Driller BSD Chief MC Rig CME-55
Logger DB Editor ESF
Drill Method 2.25" HSA; Automatic Hammer

CGC Inc.

LOG OF TEST BORING

Project Olin Transfer Site Improvements

Location Madison, WI

Boring No. 8
Surface Elevation (ft) 850±
Job No. C17051-5
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
						8 in. TOPSOIL FILL (OL)					
1		0	M	4		FILL: Loose to Very Loose, Brown Sand with Silt and Gravel Mixed with Ash and Occasional Cinders and Wood USDA: 10YR 3/2 Gravelly Sandy Loam with Refuse					
2		4	W	4	∇						
					5						
3		16	W	2		Very Soft, Gray Lean CLAY, Occasional Plant Fibers (CL) USDA: 10G 4/1 Silty Clay Loam	(0.25)	42.4			3.4
						End of Boring at 7.5 ft Backfilled with Bentonite Chips					
					10						
					15						
					20						

WATER LEVEL OBSERVATIONS

While Drilling ∇ 3.5' 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 2/8/17 End 2/8/17
Driller BSD Chief MC Rig CME-55
Logger FD Editor ESF
Drill Method 2.25" HSA; Automatic Hammer

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

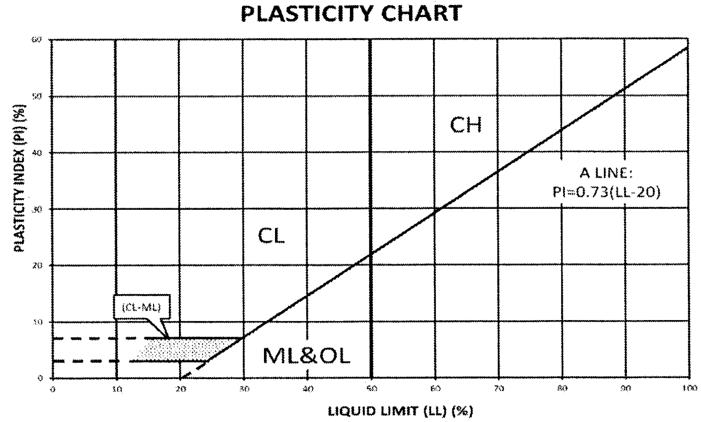
LABORATORY CLASSIFICATION CRITERIA

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.

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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

WI DEPT. OF SAFETY & PROFESSIONAL SERVICES SOIL EVALUATION FORM (2 BORINGS)

Wisconsin Department of Safety & Professional Services
Division of Safety and Buildings

SOIL EVALUATION - STORM

in accordance with Comm 82.365 & 85, Wis. Adm. Code

County: Dane

Parcel I.D.: 070926419049

Review by: | Date:

Attach complete site plan on paper not less than 8 1/2 x 11 inches in size. Plan must include, but not limited to: vertical and horizontal reference point (BM), direction and percent 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)).

Property Owner City of Madison	**Property Location** Govt. Lot 1/4 1/4 S 26 T 07 N R 09 E
Property Owner's Mailing Address 210 Martin Luther King, Jr Blvd, Rm 115	**Lot #** **Block #** 2 **Subd. Name or CSM#** CSM 10594
City Madison **State** WI **Zip Code** 53703 **Phone Number**	[X] City [ ] Village [ ] Town Madison **Nearest Road** 1802 Quann-Olin Pkwy

Drainage area________ [ ] sq. ft. [ ] acres

Optional:
Test Site Suitable for (check all that apply)

[ ] Irrigation [ ] Bioretention trench [ ] Trench(es)
[ ] Rain Garden [ ] Grassed Swale [ ] Reuse
[ ] Infiltration trench [ ] SDS (>15' wide) [ ] Other ______

Hydraulic Application Test Method

[X] Morphological Evaluation
[ ] Double-Ring Infiltrometer
[ ] Other (Specify)______

Obs. # 7 [X] Boring [ ] Pit **Ground Surface Elev.** 850 ft **Depth to limiting factor** 42 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
1	0 - 6		Topsoil Fill - No Sample Recovered						
2	6 - 66	10 YR 3/2	None	SL w/ Misc. Debris (Fill)	Variable	Variable	as	<5	0.5
3	66 - 90	10 G 4/1	None	SiCL	0m	mvfr		<5	0.04

Groundwater encountered near 42 in. in boring.

Obs. # 8 [X] Boring [ ] Pit **Ground Surface Elev.** 850 ft **Depth to limiting factor** 42 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
1	0 - 8		Topsoil Fill - No Sample Recovered						
2	8 - 66	10 YR 3/2	None	SL w/ Misc. Debris (Fill)	Variable	Variable	as	<5	0.5
3	66 - 90	10 G 4/1	None	SiCL	0m	mvfr		<5	0.04

Groundwater encountered near 42 in. in boring.

CST/PSS Name (Please Print)	Signature	CST/PSS Number
DAVID A STAAB		1042602
Address	**Date Evaluation Conducted**	**Telephone Number**
641 PIPER DRIVE, MADISON, WI	2/15/2017	608/279-4530