

**Preliminary Geotechnical Investigation
Proposed Zablocki VA Community Living Center
Gen. Mitchell Boulevard and West National Avenue
Milwaukee, Wisconsin**

For

**Chequamegon Bay Engineering
1109 North Mayfair Road, Suite 208
Wauwatosa, WI 53226**

Job Number 0556-10-001

November 29, 2010

Prepared By:



GEOTECHNICAL ENGINEERING - MATERIALS TESTING

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Geotechnical Investigations
Testing & Inspection of
Soil, Rock, Aggregates,
Concrete, Asphalt,
Mortar and Grout

November 29, 2010

Mr. David J. Cleary, P.E.
Senior Project Manager
Chequamegon Bay Engineering
1109 North Mayfair Road, Suite 208
Wauwatosa, WI 53226

Re: Preliminary Geotechnical Investigation
Zablocki VA Community Living Center
Gen. Mitchell Blvd. and West National Ave.
Milwaukee, Wisconsin
(0556-10-001)

Dear Mr. Cleary:

In accordance with your request and authorization, we have completed a preliminary geotechnical investigation for the above referenced project. Submitted herewith is a report presenting a summary of our findings and recommendations to assist in project design and construction.

Included in the report are project characteristics such as the type of building planned, estimated structural loads and proposed final grades. The project characteristics were important in developing our opinions and recommendations, and therefore any significant changes should be immediately brought to our attention.

We have appreciated the opportunity to be of service to you on this project. If there are any questions, or if we can be of any further assistance, please contact our office.

Sincerely,

WISCONSIN TESTING LABORATORIES, LLC

Jeffrey G. Smith, P.E.
Principal Engineer

Copies (2) Client

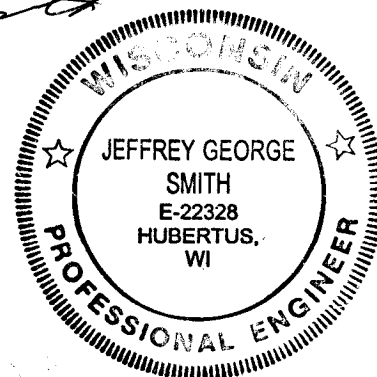


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**Preliminary Geotechnical Investigation
Proposed Zablocki VA Community Living Center
Gen. Mitchell Boulevard and West National Avenue
Milwaukee, Wisconsin**

1. INTRODUCTION

The purpose of this investigation was to generally estimate the subsurface conditions at the site of the proposed project, from which a preliminary evaluation could be made relative to foundation design, subgrade preparation and storm water infiltration. A report pertaining specifically to storm water infiltration will be submitted separately. The opinions and recommendations presented in this report were developed on the basis of the information obtained from a series of soil test borings and a supplemental laboratory testing program. All significant variations in the subsurface conditions revealed by the field and laboratory investigations are reflected in our opinions and recommendations. Further variations in the subsurface conditions between the widely spaced boring locations are likely, however, and additional subsurface exploration is recommended prior to final design.

Comments relative to potential construction problems and recommendations dealing with earthwork and inspection during construction are also included. Inspection is considered necessary for verifying the subsurface conditions and for ensuring that the soils-related construction phases are properly carried out.

2. SITE AND PROJECT CHARACTERISTICS

The project site is located on the east side of Gen. Mitchell Boulevard, which borders the east side of the main parking lots that serve the Department of Veteran Affairs Medical Center in Milwaukee, Wisconsin. The site extends north from West National Avenue for a distance of about 1,400 ft. The property boundaries are irregularly shaped and a drainage channel partially forms the eastern boundary. The majority of the site has a grassy surface and widely scattered trees, some of which are very large. A gravel parking lot has recently been constructed in the northern reaches of the site.

The existing ground surface within 50 to 100 ft. of Gen. Mitchell Boulevard is steeply sloping and appears to be a man-made embankment. A steep slope adjacent to the south side of the drainage

channel also appears to be a man-made embankment. The balance of the site is gently to moderately sloping and the site drainage is generally to the north, toward the drainage channel. The existing surface elevations range from about El. 120 at the south end of the site to about El. 80 in the extreme northeast corner.

As presently conceived, the Community Living Center site development would include the construction of four 8,000 sq.ft. buildings. Each building would include a partial (approximately 1,000 sq.ft.) basement with walk-out exterior access. The basement walls would be cast-in-place concrete. The balance of the building would have stepped concrete frost walls. The building structure will be single-story, wood-framed with steel main columns and center-span members.

The project will likely include construction of new pavement drives and one or two storm water basins. The proposed design elevations for the storm water basins, buildings and pavement areas are not available at this time. However, it is anticipated that the pavement elevations will vary greatly along existing side slopes associated with General Mitchell Boulevard, as the drive will transition to a much lower exiting grade within the southeast property corner.

3. SUBSURFACE CONDITIONS ENCOUNTERED

The following is a summary of the subsurface stratigraphy encountered by a series of test borings made recently at the project site. The boring locations and numbers are indicated on the topographic map included in the appendix to this report. Further details regarding the subsurface materials and conditions encountered can be obtained from the boring logs included in the appendix. Also included, at the rear of the boring logs, are insert sheets describing our field sampling procedures and our soil classification system.

3.1 Topsoil and Fill

The borings encountered a surface topsoil layer ranging in thickness from 2 in. to about 3 ft. Much of the topsoil is obviously fill. Inorganic fill consisting mainly of silty clay and sandy silty clay was encountered to depths of 2.5 ft. to 5.5 ft. at Borings 3, 5, 8, and 9, and to 10.5 ft. at Boring 4. It appears likely that the higher portion of the site north of a line roughly connecting Borings 3 and 6 resulted from fill placement. The inorganic fill soils were estimated to range in condition from medium stiff to very stiff.

3.2 Soft Cohesive Soils

Relatively soft soils were encountered in the lower portion of the site, where Borings 5, 6 and 7 were made. The soft soils are within the top 2 ft. of the natural soil profile at Borings 5 and 6. Boring 7 encountered 6.5 ft. of soft soil below 3 ft. of fill. Estimated unconfined compressive strengths of only 0.7 to 0.9 tons/sq.ft. were obtained on samples of these soils.

3.3 Stratified Clay, Silt and Sand

The soils described above are underlain by stratified deposits of silty clay, very silty clay, clayey silt, fine sandy silt, silty fine sand, fine to medium sand, and silty fine to coarse sand with gravel. The standard penetration test results (N values) and calibrated penetrometer readings obtained in these soils generally indicate medium stiff to very stiff and firm to medium dense conditions. Samples of the more clayey soils exhibited moisture contents ranging from 9.2 to 27.5 percent and estimated unconfined compressive strengths of 1.0 to 4.5+ tons/sq.ft. The borings were terminated in these deposits at 10 to 20 ft. below existing grade.

3.3 Groundwater

Groundwater seepage was encountered at widely varying elevations. The highest occurrence of groundwater seepage was 3.5 ft. below existing grade, or about El. 113.2, at Boring 1. Mottled soil

colorations are common at this site, and such colorations are indicative of seasonal high groundwater. The borings were abandoned per DNR regulations shortly after completion of drilling.

4. OPINIONS AND RECOMMENDATIONS

The following opinions and recommendations were developed on the basis of the previously described project characteristics and the subsurface conditions encountered in the test borings. If the actual project characteristics will vary significantly from these, we should be notified immediately, so that a determination can be made as to any necessary changes in our opinions and recommendations. As mentioned previously, additional subsurface exploration is recommended prior to final design.

4.1 Foundation Concept and Design

Our findings indicate that the proposed buildings can be supported on conventional footings. However, in order to avoid having to overexcavate through the soft soils that were encountered in the lower portion of the site and the deep fill that exists north of Borings 3 and 6, it is recommended that the buildings be located as close to the south and southeast sides of the property as possible, including the locations of Borings 1, 2 and 3.

It appears that the footings can be designed for a net allowable bearing pressure of 2,000 lbs./sq. ft. When designing footings for net pressure, the weight of the footing and backfill over the footing need not be included in the design load. Exterior footings and footings remote from the heated spaces should be located to bear at depths of at least 4.5 ft. and 5.5 ft. below final exterior grade for frost protection, respectively, in our opinion. Where the suitable natural-occurring foundation soils occur below the normal bearing elevations, these elevations can be reestablished with lean (1,000 psi) concrete backfill.

It is estimated that the resulting foundation settlements will be quite limited and will not exceed 1 in. Differential movements are not likely to exceed 50 percent of the total estimated settlement. An estimated bearing capacity safety factor of about 3.0 is included in the recommended allowable bearing pressure.

4.2 Basement Considerations

The groundwater conditions at this site appear to be rather complex, probably due to the stratified nature of the site soils. However, based on the soil colorations, it appears that seasonal high groundwater occurs at very shallow depths, generally following the natural surface contours. It is therefore recommended that basement floors be located as high as practicable, preferably no more than 3 ft. below the natural ground surface.

Design lateral soil loads for the on-site soils and for imported granular materials are listed in the following table. The active condition applies only if the wall is expected to deflect a minimum of 0.001 times the retained soil height. With granular backfill, the backfill zone must extend at least 30 degrees from vertical from the base of the wall. Open-graded gravel or crushed stone is strongly recommended under floor slabs and exterior pavement, since obtaining the compaction necessary to prevent settlement is relatively easy with this type of material. Granular backfill placed against exterior walls should be capped with a layer of clayey soil, and the ground surface should be sloped away from the building.

<i>Backfill Material</i>	<i>Unified Soil Classification</i>	<i>Design Lateral Soil Load PSF per Foot of Depth</i>	
		<i>Active</i>	<i>At-Rest</i>
Silty Clay (site soils)	CL	60	100
Clean Granular Material (pit source)	GW, GP, SW, SP	30	50

A permanent subdrainage system should be installed at the bases of the basement walls. The drain tile lines should be surrounded by at least 6 in. of pea gravel, followed by at least 6 in. of standard concrete (torpedo) sand, in our opinion. If desired, a suitable filtration geotextile can be substituted for the pea gravel. The purpose of these filtration materials is to minimize the migration of fine soil particles into the subdrainage system. If at all possible, the basement subdrainage systems should be gravity drained to the lower area of the site.

4.3 Subgrade Preparation

Prior to placement of fill, all surface topsoil, as well as any frozen, wet or soft surface material should be removed. If the pavement elevations are within or just above the soft soils that were encountered in the lower portion of the site, the soft soils will need to be at least partially removed. To check for soft soils, the subgrade should then be proofrolled with a partially loaded dump truck.

It is recommended that the slab-on-grade floors be supported on a 4 to 6 in. layer of sand and gravel or crushed stone having less than 10 percent passing the No. 200 sieve. The purpose of this is to help distribute concentrated loads and to facilitate drainage beneath the slabs.

4.4 Seismic Site Class

For seismic design purposes, the Wisconsin Administrative Code requires that a Site Class be assigned based on the subsurface conditions within 100 ft. of the ground surface. Based on our findings and general knowledge of the geologic conditions in the locality of this project, we believe that the appropriate Site Class for this site is "D".

4.5 Construction Considerations

Much of the naturally occurring soil at this site is relatively high in moisture content. Therefore, it is anticipated that the site soils will need to be aerated extensively under warm and dry weather condi-

tions, to lower the moisture contents to a level that is conducive to compaction. The stratified nature of the naturally occurring soils will also make compaction control difficult. The moisture contents of the existing inorganic fill soils are relatively low, and therefore the existing fill may actually be preferable for use as engineered fill.

All fill and backfill that will support footings, floor slabs and pavements should be compacted to a dry density of at least 95 percent of the standard Proctor maximum dry density (ASTM D-698), or equivalent. The compaction should be accomplished by placing the fill in lifts not exceeding 8 in. loose thickness and mechanically compacting each lift to at least the specified minimum dry density.

A soils technician, under the direction of a registered engineer, should perform field density tests on each lift as necessary to ensure that adequate compaction is achieved.

All foundation excavations should be inspected by a representative of this company or by another qualified geotechnical firm. The purpose of this is to further ensure that the excavations expose suitable natural-occurring soil and that any detrimental variations in the foundation soils are detected and properly adjusted for.

Soils exposed in the bases of the foundation excavations should be protected against any detrimental change in condition, such as from disturbance, rain and freezing. Surface run-off water should be drained away from the excavations and not be allowed to pond. If possible, all footing concrete should be placed the same day the excavation is made. If this is not possible, the footing excavations should be adequately protected until the concrete has been satisfactorily placed.

Provided the recommendations pertaining to basement elevations are followed, no severe dewatering problems are anticipated in the footing excavations. Any groundwater seepage that occurs due to perched conditions can be handled by simple dewatering methods, such as by pumping from sumps.

FIELD AND LABORATORY INVESTIGATIONS

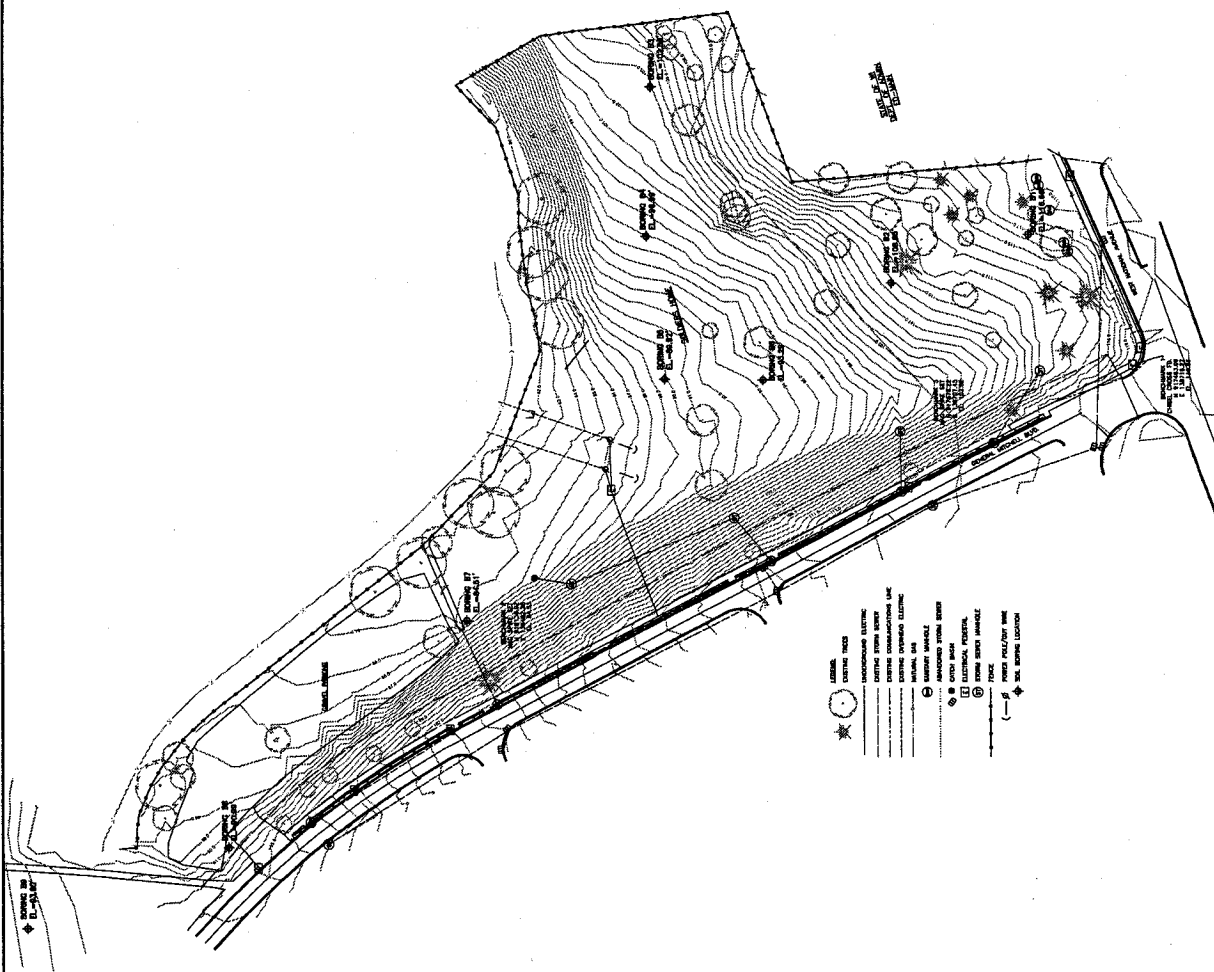
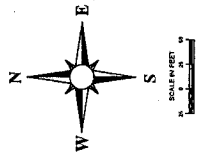
To generally estimate the subsurface conditions in the area of the proposed facility, nine (9) soil test borings, as authorized by the client, were made at the locations shown on the topographic map included in the appendix. The borings were extended to a depth of 10 to 20 ft. below the existing ground surface.

Boring logs showing descriptions of all strata encountered, along with the sampling and field test data, are also included in the appendix. Split-spoon samples were taken at 2.5- and 5-ft. intervals by the standard penetration test procedure (ASTM D-1586). Representative portions of all samples were enclosed in labeled containers and returned to our laboratory for inspection by a geotechnical engineer and selective testing.

The laboratory testing program consisted of natural moisture determinations, calibrated penetrometer tests and one set of Atterberg limits tests. All of the laboratory test results are included on the boring logs.

Representative portions of all soil samples obtained on this project will be stored in our laboratory for a period of 30 days, and will then be discarded. If other arrangements are desired, the client should notify our office within this holding period.

APPENDIX



NO.	DATE	REVISIONS
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		



Dept. of Veterans Affairs
Medical Center
5000 W. National Avenue
Milwaukee, WI



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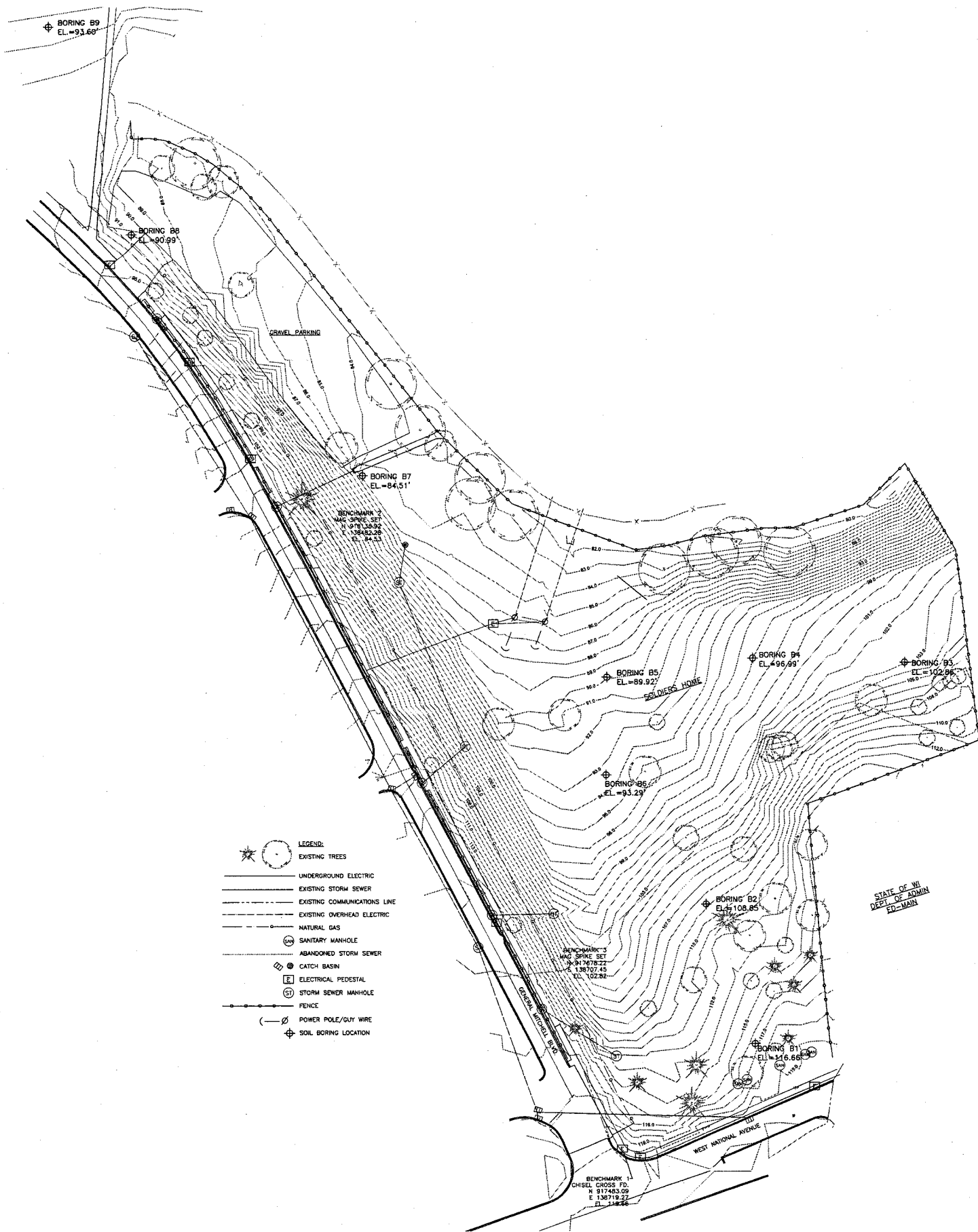
SOIL BORING LOCATIONS

Approved Project Director
Date: 26 OCT 2010
Checked By: JPG
Drawn By: NLB

SOIL BORING LOCATIONS

Project Title: SOIL BORING LOCATIONS
Drawing Number: 11-2-10
Project Number: 895-CSH-314
Drawing Number: 11-2-10

Office of Facilities Management
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LOG OF BORING

WISCONSIN TESTING LABORATORIES

PROJECT: Zablocki VA Community Living Center CLIENT: Chequamegon Bay Engineering LOCATION: General Mitchell Boulevard and West National Avenue Milwaukee, Wisconsin	JOB NO.: 0556-10-001 BORING NO.: 1 GROUND ELEVATION: 116.66 BORING LOCATION: See Diagram
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BORING STARTED 10/29/2010 BORING COMPLETED 10/29/2010 TOTAL BORING DEPTH 20'	Groundwater: During Drilling 3'-6" Completion of Drilling 17' 24 Hours After Completion
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Notes and Laboratory Test Results					Sample No	Recovery	Blow Count	Depth Feet	Sample	Material Classification	Elevation
M _c %	D _d pcf	O _c %	Q _u tsf	Q _p tsf							
					1	18"	7	7		DARK BROWN CLAYEY TOPSOIL moist. (8")	116.0
19.0				>4.5			7	7		VERY STIFF BROWN SILTY CLAY moist, trace fine to coarse sand, trace fine to coarse gravel, trace roots. (CL)	114.2
					2	18"	9	10	5	MEDIUM DENSE TO FIRM LIGHT OLIVE BROWN SLIGHTLY MOTTLED CLAYEY SILT very moist to wet, few seams of fine to medium sand. (ML)	
22.4				2.5			9	9			
					3	18"	6	6			
17.2				2.0			6	6			
					4	18"	6	6	10	STIFF TO VERY STIFF YELLOWISH BROWN VERY SILTY CLAY moist, little fine sand, some seams and layers of wet fine to medium sand. (CL & SP)	108.7
15.5				3.0			6	7			
					5	18"	3	5			
				3.0			5	6			
					6	18"	8	7	15		
				3.5			8	8			
					7	18"	3	3		MEDIUM STIFF GRAYISH BROWN TO GRAY SILTY CLAY moist, trace fine to medium sand. (CL)	99.7
24.4				1.5			3	3			
				1.0			4	4	20		
										END OF BORING	96.7
									25		

LOGGED BY J.P. METHOD OF DRILLING 2-1/4 in. I.D. hollow stem auger casing with carbide toothed finger bit used for entire depth of boring	CHECKED BY Soils Engineer MACHINE MODEL Truck-mounted CME 45 SPT HAMMER TYPE Safety hammer, rope and cathead	CLASSIFICATION SYSTEM WTL <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> SPLIT-SPOON </div> <div style="text-align: center;"> TUBE </div> <div style="text-align: center;"> <div style="border: 1px solid black; padding: 2px; width: 20px; height: 20px; text-align: center; line-height: 20px;">A</div> AUGER </div> <div style="text-align: center;"> <div style="border: 1px solid black; padding: 2px; width: 20px; height: 20px; text-align: center; line-height: 20px;">W</div> WASH </div> </div>
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LOG OF BORING

WISCONSIN TESTING LABORATORIES

PROJECT: Zablocki VA Community Living Center CLIENT: Chequamegon Bay Engineering LOCATION: General Mitchell Boulevard and West National Avenue Milwaukee, Wisconsin	JOB NO.: 0556-10-001 BORING NO.: 2 GROUND ELEVATION: 108.85 BORING LOCATION: See Diagram
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BORING STARTED 10/29/2010 BORING COMPLETED 10/29/2010 TOTAL BORING DEPTH 20'	Groundwater: During Drilling 6' Completion of Drilling 15'-6" 24 Hours After Completion
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Notes and Laboratory Test Results					Sample No	Recovery	Blow Count	Depth Feet	Sample	Material Classification	Elevation
M _c %	D _d pcf	O _c %	Q _u tsf	Q _p tsf							
9.2				>4.5	1	12"	4			DARK BROWN CLAYEY TOPSOIL moist. (18")	107.4
							7			MEDIUM DENSE BROWN CLAYEY SILT moist, some roots. (Possible Fill)	105.9
							8				
11.4				3.5	2	18"	6			VERY STIFF YELLOWISH BROWN SILTY CLAY moist, little fine sand, some seams of clayey silt. (CL)	
							8				
							9				
24.0	LL=41, PL=23			2.5	3	18"	6			STIFF AND VERY STIFF BROWN AND YELLOWISH BROWN MOTTLED SILTY CLAY TO VERY SILTY CLAY moist, little fine sand, some seams and layers of wet silty fine sand. (CL & SM)	103.4
							7				
							9				
20.7				1.7	4	18"	4				
							4				
							5				
22.0				2.2	5	18"	7				
							7				
							7				
				3.0	6	18"	6			VERY STIFF CLAYEY SILT very moist, some seams and layers of wet silty fine sand. (ML & SM)	95.9
							6				
							8				
				1.2	7	18"	6			STIFF GRAYISH BROWN AND GRAY SILTY CLAY moist, trace fine to medium sand, few silt seams. (CL)	91.9
							4				
							6				
20										END OF BORING	88.9
25											

LOGGED BY J.P. METHOD OF DRILLING 2-1/4 in. I.D. hollow stem auger casing with carbide toothed finger bit used for entire depth of boring	CHECKED BY Soils Engineer SPT HAMMER TYPE Safety hammer, rope and cathead	CLASSIFICATION SYSTEM WTL <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> SPLIT-SPOON </div> <div style="text-align: center;"> TUBE </div> <div style="text-align: center;"> <div style="border: 1px solid black; padding: 2px; width: 20px; height: 20px; text-align: center; line-height: 20px;">A</div> AUGER </div> <div style="text-align: center;"> <div style="border: 1px solid black; padding: 2px; width: 20px; height: 20px; text-align: center; line-height: 20px;">W</div> WASH </div> </div>
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WISCONSIN TESTING LABORATORIES

PROJECT: Zablocki VA Community Living Center		JOB NO.: 0556-10-001									
CLIENT: Chequamegon Bay Engineering		BORING NO.: 3									
LOCATION: General Mitchell Boulevard and West National Avenue Milwaukee, Wisconsin		GROUND ELEVATION: 102.86									
		BORING LOCATION: See Diagram									
BORING STARTED 11/1/2010		Groundwater: During Drilling 6'									
BORING COMPLETED 11/1/2010		Completion of Drilling 18'									
TOTAL BORING DEPTH 20'		24 Hours After Completion									
Notes and Laboratory Test Results											
M_c %	D_d pcf	O_c %	Q_u tsf	Q_p tsf	Sample No	Recovery	Blow Count	Depth Feet	Sample	Material Classification	Elevation
8.7					1	18"	6 5 4			FILL OF BLACK CLAYEY TOPSOIL moist. (8")	102.2
										FILL OF STIFF BROWN SANDY CLAY AND FIRM BROWN VERY SILTY FINE SAND moist.	
12.5				2.5	2	18"	2 4 3			MEDIUM STIFF TO STIFF BROWN SILTY CLAY moist, little fine sand. (CL)	99.9
								5		FIRM BROWN SLIGHTLY MOTTLED VERY SILTY FINE SAND very moist, few silt seams. (SM)	97.9
					3	18"	4 5 5				
29.1				1.5	4	18"	3 5 5			STIFF BROWN TO GRAYISH BROWN SILTY CLAY moist, trace fine sand. (CL)	94.9
								10			
					5	18"	9 9 9			MEDIUM DENSE BROWN CLAYEY SILT very moist. (ML)	92.4
										MEDIUM DENSE BROWN SILTY FINE SAND wet. (SM)	91.4
					6	18"	5 6 6			FIRM GRAYISH BROWN SILTY FINE SAND wet. (SM)	89.9
								15			
					7	18"	5 6 7				
								20		END OF BORING	82.9
								25			
LOGGED BY J.P. CHECKED BY Soils Engineer CLASSIFICATION SYSTEM WTL											
METHOD OF DRILLING 2-1/4 in. I.D. hollow stem auger casing with carbide toothed finger bit used for entire depth of boring											
MACHINE MODEL Truck-mounted CME 45											
SPT HAMMER TYPE Safety hammer, rope and cathead											
<div><div><div></div><div>SPLIT-SPOON</div></div><div><div></div><div>TUBE</div></div><div><div>A</div><div>AUGER</div></div><div><div>W</div><div>WASH</div></div></div>											

LOG OF BORING

WISCONSIN TESTING LABORATORIES

PROJECT: Zablocki VA Community Living Center CLIENT: Chequamegon Bay Engineering LOCATION: General Mitchell Boulevard and West National Avenue Milwaukee, Wisconsin	JOB NO.: 0556-10-001 BORING NO.: 4 GROUND ELEVATION: 96.99 BORING LOCATION: See Diagram
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BORING STARTED 11/1/2010 BORING COMPLETED 11/1/2010 TOTAL BORING DEPTH 20'	Groundwater: During Drilling 13' Completion of Drilling 9'-6" 24 Hours After Completion
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Notes and Laboratory Test Results					Sample No	Recovery	Blow Count	Depth Feet	Sample	Material Classification	Elevation
M _c %	D _d pcf	O _c %	Q _u tsf	Q _p tsf							
					1	18"	12	10	10	FILL OF DARK BROWN CLAYEY TOPSOIL moist. (2")	96.8
					2	18"	4	3	4	FILL OF VERY STIFF BROWN SANDY SILTY CLAY moist, little to some fine to coarse gravel.	94.0
11.0				1.3	3	18"	3	4	6	FILL OF MEDIUM STIFF BROWN AND GRAY SILTY CLAY moist, trace to some fine to coarse sand, little fine to coarse gravel.	89.0
13.9				1.0	4	18"	7	8	9	FILL OF VERY STIFF BROWN SANDY SILTY CLAY moist, little to some fine to coarse gravel.	86.5
10.2					5	18"	7	10	11	VERY STIFF BROWN CLAYEY SILT moist, trace fine sand. (ML)	84.0
14.8				3.5	6	18"	4	5	6	FIRM TO MEDIUM DENSE YELLOWISH BROWN FINE SAND wet, trace to little silt. (SP-SM)	77.0
					7	18"	6	8	9	END OF BORING	
								25			

LOGGED BY J.P. METHOD OF DRILLING 2-1/4 in. I.D. hollow stem auger casing with carbide toothed finger bit used for entire depth of boring	CHECKED BY Soils Engineer SPT HAMMER TYPE Safety hammer, rope and cathead	CLASSIFICATION SYSTEM WTL <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> SPLIT-SPOON </div> <div style="text-align: center;"> TUBE </div> <div style="text-align: center;"> <div style="border: 1px solid black; padding: 2px; width: 20px; height: 20px; text-align: center; line-height: 20px;">A</div> AUGER </div> <div style="text-align: center;"> <div style="border: 1px solid black; padding: 2px; width: 20px; height: 20px; text-align: center; line-height: 20px;">W</div> WASH </div> </div>
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LOG OF BORING

WISCONSIN TESTING LABORATORIES

PROJECT: <u>Zablocki VA Community Living Center</u> CLIENT: <u>Chequamegon Bay Engineering</u> LOCATION: <u>General Mitchell Boulevard and West National Avenue</u> <u>Milwaukee, Wisconsin</u>	JOB NO.: <u>0556-10-001</u> BORING NO.: <u>5</u> GROUND ELEVATION: <u>89.92</u> BORING LOCATION: <u>See Diagram</u>
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BORING STARTED <u>10/29/2010</u> BORING COMPLETED <u>10/29/2010</u> TOTAL BORING DEPTH <u>20'</u>	Groundwater: During Drilling <u>8'</u> Completion of Drilling <u>7'</u> 24 Hours After Completion
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Notes and Laboratory Test Results					Sample No	Recovery	Blow Count	Depth Feet	Sample	Material Classification	Elevation
M _c %	D _d pcf	O _c %	Q _u tsf	Q _p tsf							
					1	18"	7 6 4			FILL OF BLACK CLAYEY TOPSOIL moist. (12")	88.9
12.6										FILL OF STIFF BROWN SANDY SILTY CLAY moist, some fine to coarse gravel.	87.4
					2	18"	2 2 2			BLACK CLAYEY TOPSOIL moist. (OL)	86.4
18.5				0.8				5		SOFT TO MEDIUM STIFF YELLOWISH BROWN AND GRAY MOTTLED VERY SILTY CLAY moist, little fine to coarse sand, trace fine to coarse gravel, few silt seams. (CL)	
16.7				2.0	3	18"	3 4 5				
					4	18"	4 5 7	10		FIRM LIGHT OLIVE BROWN SILTY FINE SAND wet, few seams of very silty clay. (SM)	81.9
					5	18"	6 6 7			FIRM BROWN TO GRAYISH BROWN FINE TO MEDIUM SAND wet, trace to little silt. (SP-SM)	79.4
					6	18"	5 6 7	15			
					7	18"	5 6 5				
					8	18"	4 5 5	20		FIRM GRAY SILTY FINE SAND wet, few seams of clayey silt. (SM)	71.9
										END OF BORING	69.9
								25			

LOGGED BY <u>J.P.</u> METHOD OF DRILLING <u>2-1/4 in. I.D. hollow stem auger casing with carbide toothed finger bit used for entire depth of boring</u>	CHECKED BY <u>Soils Engineer</u> MACHINE MODEL <u>Truck-mounted CME 45</u> SPT HAMMER TYPE <u>Safety hammer, rope and cathead</u>	CLASSIFICATION SYSTEM <u>WTL</u> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> SPLIT-SPOON </div> <div style="text-align: center;"> TUBE </div> <div style="text-align: center;"> <div style="border: 1px solid black; padding: 2px; width: 20px; height: 20px; text-align: center; line-height: 20px;">A</div> AUGER </div> <div style="text-align: center;"> <div style="border: 1px solid black; padding: 2px; width: 20px; height: 20px; text-align: center; line-height: 20px;">W</div> WASH </div> </div>
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LOG OF BORING

WISCONSIN TESTING LABORATORIES





PROJECT: Zablocki VA Community Living Center CLIENT: Chequamegon Bay Engineering LOCATION: General Mitchell Boulevard and West National Avenue Milwaukee, Wisconsin	JOB NO.: 0556-10-001 BORING NO.: 6 GROUND ELEVATION: 93.29 BORING LOCATION: See Diagram
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BORING STARTED <u>10/29/2010</u> BORING COMPLETED <u>10/29/2010</u> TOTAL BORING DEPTH <u>10'</u>	Groundwater: During Drilling <u>6'</u> Completion of Drilling <u>6'-6"</u> 24 Hours After Completion
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Notes and Laboratory Test Results					Sample No	Recovery	Blow Count	Depth Feet	Sample	Material Classification	Elevation
M _c %	D _d pcf	O _c %	Q _u tsf	Q _p tsf							
					1	18"	4 4 4			FILL OF MEDIUM STIFF BLACK CLAYEY TOPSOIL moist, few layers of brown silty clay.	
17.9				0.7	2	18"	2 3 4			SOFT TO MEDIUM STIFF YELLOWISH BROWN AND GREENISH GRAY MOTTLED SILTY CLAY moist, trace fine to coarse sand. (CL)	90.3 88.8
16.5				1.5	3	12"	3 4 6			MEDIUM STIFF BROWN AND YELLOWISH BROWN MOTTLED VERY SILTY CLAY moist, little fine sand, few seams of silty fine sand. (CL)	
15.4				1.2	4	18"	4 6 7			STIFF BROWN CLAYEY SILT wet, trace fine sand. (ML)	85.3
17.1										END OF BORING	83.3
								15			
								20			
								25			

LOGGED BY <u>J.P.</u>	CHECKED BY <u>Soils Engineer</u>	CLASSIFICATION SYSTEM <u>WTL</u>
METHOD OF DRILLING <u>2-1/4 in. I.D. hollow stem auger casing with carbide toothed finger bit used for entire depth of boring</u>		
MACHINE MODEL <u>Truck-mounted CME 45</u>	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> SPLIT-SPOON </div> <div style="text-align: center;"> TUBE </div> <div style="text-align: center;"> <div style="border: 1px solid black; padding: 2px; width: 20px; height: 20px; text-align: center; line-height: 20px;">A</div> AUGER </div> <div style="text-align: center;"> <div style="border: 1px solid black; padding: 2px; width: 20px; height: 20px; text-align: center; line-height: 20px;">W</div> WASH </div> </div>	
SPT HAMMER TYPE <u>Safety hammer, rope and cathead</u>		

WISCONSIN TESTING LABORATORIES

PROJECT: Zablocki VA Community Living Center CLIENT: Chequamegon Bay Engineering LOCATION: General Mitchell Boulevard and West National Avenue Milwaukee, Wisconsin										JOB NO.: 0556-10-001 BORING NO.: 7 GROUND ELEVATION: 84.51 BORING LOCATION: See Diagram	
BORING STARTED 10/29/2010 BORING COMPLETED 10/29/2010 TOTAL BORING DEPTH 10'					Groundwater: During Drilling None Completion of Drilling None 24 Hours After Completion						
Notes and Laboratory Test Results											
M _c %	D _d pcf	O _c %	Q _u tsf	Q _p tsf	Sample No	Recovery	Blow Count	Depth Feet	Sample	Material Classification	Elevation
					1	8"	4 6 6			FILL OF STIFF BLACK CLAYEY TOPSOIL moist, trace fine to coarse gravel.	
21.0				0.9	2	18"	2 2 3	5		SOFT TO MEDIUM STIFF BROWN MOTTLED SILTY CLAY moist, trace fine to medium sand. (CL)	81.5
32.6				0.7	3	18"	2 1 2			SOFT GREENISH GRAY AND YELLOWISH BROWN MOTTLED SILTY CLAY moist. (CL)	79.0
										SOFT DARK GRAYISH BROWN CLAYEY SILT moist. (ML)	76.5
25.9 17.2				0.5	4	18"	1 1 6	10		FIRM DARK BROWN AND DARK GRAY FINE SANDY SILT very moist. (ML)	75.0 74.5
										END OF BORING	
LOGGED BY J.P. CHECKED BY Soils Engineer CLASSIFICATION SYSTEM WTL METHOD OF DRILLING 2-1/4 in. I.D. hollow stem auger casing with carbide toothed finger bit used for entire depth of boring MACHINE MODEL Truck-mounted CME 45 SPT HAMMER TYPE Safety hammer, rope and cathead											
										 SPLIT-SPOON  TUBE  AUGER  WASH	

LOG OF BORING

WISCONSIN TESTING LABORATORIES

PROJECT: Zablocki VA Community Living Center		JOB NO.: 0556-10-001	
CLIENT: Chequamegon Bay Engineering		BORING NO.: 8	
LOCATION: General Mitchell Boulevard and West National Avenue Milwaukee, Wisconsin		GROUND ELEVATION: 90.99	
		BORING LOCATION: See Diagram	

BORING STARTED 11/1/2010 BORING COMPLETED 11/1/2010 TOTAL BORING DEPTH 10'	Groundwater: During Drilling 8'-6" Completion of Drilling 8'-6" 24 Hours After Completion
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Notes and Laboratory Test Results					Sample No	Recovery	Blow Count	Depth Feet	Sample	Material Classification	Elevation
M _c %	D _d pcf	O _c %	Q _u tsf	Q _p tsf							
21.9		8.1			1	12"	9 4 4		CRUSHED ASPHALT (2-1/2")	90.8	
					FILL OF CRUSHED CONCRETE moist.					89.1	
6.5					2	18"	9 9 11		FILL OF MEDIUM STIFF DARK BROWN CLAYEY TOPSOIL moist.	88.0	
					FILL OF VERY STIFF BROWN SANDY SILTY CLAY moist, little to some fine to coarse gravel.					85.5	
27.5				2.5	3	18"	4 5 6		STIFF GREENISH GRAY AND YELLOWISH BROWN MOTTLED SILTY CLAY moist, trace fine sand. (CL)	83.0	
					MEDIUM DENSE YELLOWISH BROWN SILTY FINE TO COARSE SAND AND FINE TO LARGE GRAVEL very moist to wet. (SM/GM)					81.0	
END OF BORING											

LOGGED BY J.P.	CHECKED BY Soils Engineer	CLASSIFICATION SYSTEM WTL	
METHOD OF DRILLING 2-1/4 in. I.D. hollow stem auger casing with carbide toothed finger bit used for entire depth of boring			
MACHINE MODEL Truck-mounted CME 45			
SPT HAMMER TYPE Safety hammer, rope and cathead			

SPLIT-SPOON

TUBE

A

 AUGER

W

 WASH

LOG OF BORING

WISCONSIN TESTING LABORATORIES

PROJECT: Zablocki VA Community Living Center										JOB NO.: 0556-10-001	
CLIENT: Chequamegon Bay Engineering										BORING NO.: 9	
LOCATION: General Mitchell Boulevard and West National Avenue Milwaukee, Wisconsin										GROUND ELEVATION: 93.60	
										BORING LOCATION: See Diagram	
BORING STARTED 11/1/2010					Groundwater: During Drilling None						
BORING COMPLETED 11/1/2010					Completion of Drilling None						
TOTAL BORING DEPTH 10'					24 Hours After Completion						
Notes and Laboratory Test Results											
M _c %	D _d pcf	O _c %	Q _u tsf	Q _p tsf	Sample No	Recovery	Blow Count	Depth Feet	Sample	Material Classification	Elevation
13.3				>4.5	1	15"	4 6 5			FILL OF BLACK CLAYEY TOPSOIL moist. (10")	92.8
										FILL OF VERY STIFF BROWN AND DARK BROWN SILTY CLAY moist, trace fine to coarse sand, trace fine to coarse gravel.	90.6
17.1				3.5	2	18"	6 8 10	5		VERY STIFF YELLOWISH BROWN AND BROWN MOTTLED SILTY CLAY moist, trace fine to coarse sand, trace fine to coarse gravel, few silt seams. (CL)	
20.1				3.0	3	18"	6 7 9				
					4	18"	10 11 13	10		MEDIUM DENSE YELLOWISH BROWN SILTY FINE TO COARSE SAND AND FINE TO COARSE GRAVEL moist. (SM/GM)	85.6
										END OF BORING	83.6
								15			
								20			
								25			
LOGGED BY J.P.					CHECKED BY Soils Engineer					CLASSIFICATION SYSTEM WTL	
METHOD OF DRILLING 2-1/4 in. I.D. hollow stem auger casing with carbide toothed finger bit used for entire depth of boring											
MACHINE MODEL Truck-mounted CME 45											
SPT HAMMER TYPE Safety hammer, rope and cathead											
					<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> SPLIT-SPOON </div> <div style="text-align: center;"> TUBE </div> <div style="text-align: center;"> A </div> <div style="text-align: center;"> W </div> </div>						

WISCONSIN TESTING LABORATORIES

FIELD EXPLORATION STANDARD SAMPLING PROCEDURES

Soil sampling was performed in general accordance with ASTM method D-1586. Using this method, a 140 lb. weight (hammer) free-falling a distance of 30 in. is used to drive a 2 in. O.D. by 1-3/8 in. I.D. split-barrel sampler into the soil. The sampler is first driven 6 in. into the soil for seating purposes. The sampler is then driven an additional 12 in., and the number of blows required to drive the sampler the final 12 in. is known as the penetration resistance or "N" value. The number of hammer blows used in making the test is reported on the drill logs for all three 6 in. increments of penetration (example: 7/8/9 where $8 + 9 = 17$ is the standard penetration resistance or "N" value). "N" values are used to indicate relative densities of cohesionless (sand and gravel soils) and to a lesser degree the consistencies of cohesive soils.

All soil samples recovered from the test borings were preliminarily classified in the field by the drill crew. Representative portions of the samples were enclosed in glass jars, labeled and returned to the laboratory for further examination and final classification by a geotechnical engineer.

Please note that the boring logs show the subsurface conditions at the dates, locations and depths indicated, and it is not warranted that they are representative of subsurface conditions at other locations and times, and to greater depths than penetrated by the borings. It should also be noted that water level determinations made in clean, cohesionless soil are generally quite reliable, whereas water level determinations made in cohesive soils may not indicate true static water levels even after several days or weeks observation.

WISCONSIN TESTING LABORATORIES

Field Classification System for Soil Exploration

Non Cohesive Soils

(Silt, Sand, Gravel and Combinations)

<u>Relative Density</u>	<u>Blows Per Ft.</u>
Very Loose	5 or less
Loose	6 to 10
Firm	11 to 15
Medium Dense	16 to 30
Dense	31 to 50
Very Dense	51 or more

Relative Proportions

<u>Descriptive Term</u>	<u>Percent</u>
Trace	1 to 10
Little	11 to 20
Some	21 to 35
And	36 to 50

Cohesive Soils

(Clay, Silt and Combinations)

<u>Consistency</u>	<u>Blows Per Foot</u>
Very Soft	3 or less
Soft	4 to 5
Medium Stiff	6 to 10
Stiff	11 to 15
Very Stiff	16 to 30
Hard	31 or more

Laboratory Test Symbols

M_c: Natural Moisture Content
D_d: Natural Dry Density
O_c: Organic Content
Q_u: RIMAC Unconfined Compressive Strength
Q_p: Calibrated Penetrometer

Particle Size Identification

Boulders - 8 inch diameter or more
Cobbles - 3 to 8 inch diameter
Gravel - Coarse - Large 1 to 3 inch
- Medium - 1/2 to 1 inch
- Fine - 4.76mm to 1/2 inch
Sand - Coarse - 2.0mm to 4.76mm
(dia. of pencil lead)
- Medium - 0.42mm to 2.0mm
(dia. of broom straw)
- Fine - 0.074mm to 0.42mm
(dia. of human hair)
Silt - 0.002mm to 0.074mm
(Cannot see particles)

<u>Plasticity</u>	<u>Plasticity</u>
Degree of	
<u>Plasticity</u>	<u>Index</u>
None to Slight	0 to 4
Slight	5 to 7
Medium	8 to 22
High to Very High	Over 22

Classification on logs are made by visual inspection in the absence of classification tests.

Standard Penetration Test - A 2.0 in. O.D. by 1-3/8 in. I.D. sampler (split-spoon) is driven a distance of 1.5 ft. with a 140 lb. hammer free falling a distance of 30.0 in. The number of hammer blows required for each 6.0 in. of penetration are recorded on the boring log (Example - 6/8/9). The Standard Penetration Resistance (N value) can be obtained by adding the last two figures (i.e. N = 8+9 = 17).

Strata Changes - In the column "Material Classification" on the boring log, the horizontal lines represent strata changes. A solid line (—) represents an actually observed change, a dashed line (----) represents an estimated change.

Groundwater Observations were made at the times indicated. Porosity of soil strata, weather conditions, site topography, etc., may cause the water levels to vary from those indicated on the logs.

Interbedded Strata Descriptions

Very thin seams	- Paper thin to 1/8 in. thick
Thin seams	- 1/8 in. to 1 in. thick
Medium seams	- 1 in. to 6 in. thick
Large seams	- 6 in. to 12 in. thick