

Potential Brown County Borrow Source List

Location	Type of Material	Contact Name	Contact Number	Representing	Estimated Quantity (CY)	Soil Borings Available**
3 Miles SE of Wrightstown on CTH IL	Red Clay	Chad Doverspike	920-621-4393 920-492-4955	Brown County Solid Waste Dept.	500,000 - 600,000	No
City of Green Bay	Reprocessed block and brick	Quasan Shaw	920-448-3396	GB Economic Development	Unknown	No
Fox River on Hurlbut Street	Waste Lime	Steve Moss	920-965-4218	Great Lakes Calcium	15,000	No
Hurlbut Street	Dredged material	Dean Haen	920- 492-4953	Brown County Port	800,000 +	Yes
State Street	Sand from PCB dredging	Richard Feeney	920-445-0732	Tetra Tech	25,000 - 100,000	No
W2354 CTH G	N/A	Tom Ostrowski	920-595-0101	Private	1.5-2.0 Million	No
Village Green Golf Course - Stockpile	Silt	Geoff Farr	920-434-4060	Village of Howard	20,000	No
Woodman's - Excavate Pond	Silt	Geoff Farr	920-434-4060	Village of Howard	30,000	No
Village Center - Excavate Pond	Silt	Geoff Farr	920-434-4060	Village of Howard	25,000	No
Community Church - Excavate Storm Ponds	Silt	Geoff Farr	920-434-4060	Village of Howard	15,000	No

** See documentation below

CORRESPONDENCE/MEMORANDUM _____ State of Wisconsin

DATE: June 16, 2010

TO: Ken Hanzel, P.E.
Northeast Region Soils and Materials Engineer

FROM: Jeffrey D Horsfall, P.E.
Geotechnical Engineer

SUBJECT: **Site Investigation Memorandum**
Project I.D. 1133-03-03
Bayport Dredge Pile
USH 41
Brown County

General

The Northeast Region requested that the Foundation and Pavement Unit evaluate the Bayport dredge pile for use as a borrow source for the USH 41 project. The dredge pile was generated by first dredging material from the Fox River and placing the material into holding ponds, next the material was excavated from the holding ponds and placed on the dredge pile with dump trucks and spread around the pile with the dozer.

The approximate size of the dredge pile is 900 feet long by 700 feet wide by 55 feet high and has side slopes of approximately 6H:1V (9.5 degrees).

Subsurface Investigation

The Foundation and Pavement Unit performed 12 boring on the dredge pile in May 2010. Samples were collected every five feet with a method conforming to AASHTO T-206, Standard Penetration Test. The purpose of the boring was to define subsurface soil conditions at this site and collect samples. Three auger borings were performed to gather samples for standard Proctor tests and remolded unconfined compression tests. In addition, the Region Soils Engineer had collected samples for standard Proctor tests. Soil textures in the boring logs were field identified by the drillers. Attachment 1 presents the driller's boring logs at this site. Attachment 2 presents the results of the laboratory tests.

Typically, the following describes the subsurface conditions in the borings:

15.0 feet to 50.0 feet black loose to firm silt, trace clay, some organics, overlying Brown, hard, clay, some silt

Soils Laboratory Results

The soils laboratory test results were separated into index testing (moisture content, loss of ignition, Atterberg Limits and grain size distribution) and physical property testing (standard Proctor test and remolded unconfined compression test). The purpose of the index testing was to determine the uniformity and organic nature of the dredge pile, while

the purpose of the physical property testing was to determine the ability of the material to be incorporated into the roadway.

The SPT samples were combined into larger samples for the index testing. Three auger borings were performed to collect sufficient sample to perform standard Proctor tests and remolded unconfined compression tests. Three additional standard Proctor tests were performed in the Region from surface bag samples. Table 1 presents the results of the laboratory tests.

Generally, the results of the index tests indicated that the dredge pile material was mostly silt and clay particles with high moisture contents and relatively high organic contents. The material had a Unified Soil Classification of OL and OH. One sample (B-3, S5 and S6) had unique tests results with a Unified Soil Classification of 'ML' and was not used in the development of the ranges and averages presented below.

The dredge material was relatively consistent both laterally and with depth. The following describes some of the index properties:

- The moisture content ranged from 50.6% to 81.5% with an average of 69.2 %.
- The percent silt size particles ranged from 56.0% to 77.0% with an average of 69.0%. Figure 1 presents the percent silt versus the sample elevation. The figure indicates a slight trend for higher percent silt with the lower sample elevation.
- The loss of ignition test provide an indication of the organic content of the material with values greater than 5% could be considered to be perishable. The loss of ignition ranged from 7.1% to 11.7% with an average of 9.8%. Figure 2 presents the loss of ignition versus the sample elevation. The figure shows no indication of loss of ignition with sample elevation.

The results of the standard Proctor test indicated a range of maximum dry density of 77.7 pcf to 106.0 pcf and a range of optimum moisture content of 17.6% to 34.2%. Samples were remolded for the unconfined compression tests at a dry density of approximately 95% of the maximum dry density and at the optimum moisture content. The results of the unconfined compression tests ranged from 1,480 psf to 2,272 psf. This indicates a medium to stiff material. The moisture content of a soil has a great influence on the compressive strength. Generally, the higher the moisture contents the lower compressive strengths.

Recommendation

The following presents the recommendation for use of the Bayport dredge pile.

1. The dredge pile material should not be used within the core of the embankment because of the high loss of ignition of the material and the high moisture content. The standard specifications Section 207 Embankment prohibit the use of 'perishable material' within the core of the embankment. Material with an average loss of ignition of 9.8% would be considered organic and perishable. In

Table 1: Results of Soils Laboratory Testing

Sample	Descrip	Elevation	Class	LL	PL	PI	%M	%loss	Sand/Gra	Silt	Clay	DDmax	%Mopt	Qu	DD	%M
1	B-1, S1,S2	600.5	OL	NA	NP	NA	66.4	10.4	10	73	17	NA	NA	NA	NA	NA
2	B-2, S2,S3,S4	593.0	OL	NA	NP	NA	79.2	10.4	18	71	11	NA	NA	NA	NA	NA
3	B-3, S1,S2,S3	607.0	OL	NA	NP	NA	69.9	10.3	16	74	10	NA	NA	NA	NA	NA
4	B-3, S5,S6	589.5	ML	NA	NP	NA	26.0	4.2	38	51	11	NA	NA	NA	NA	NA
5	B-4, S3,S4	609.5	OL	NA	NP	NA	75.7	11.3	17	75	8	NA	NA	NA	NA	NA
6	B-4, S6,S7	594.5	OL	NA	NP	NA	71.7	11.4	21	71	8	NA	NA	NA	NA	NA
7	B-5, S3,S4	616.5	OL	NA	NP	NA	75.5	9.5	20	72	8	NA	NA	NA	NA	NA
8	B-5, S8,S9	591.5	OL	NA	NP	NA	50.6	7.4	18	74	8	NA	NA	NA	NA	NA
9	B-6 S1,S2	616.5	OL	NA	NP	NA	63.6	7.1	30	61	9	NA	NA	NA	NA	NA
10	B-6, S4,S5	601.5	OL	NA	NP	NA	65.6	9.0	17	72	11	NA	NA	NA	NA	NA
11	B-7, S4,S5	597.5	OL	NA	NP	NA	70.2	11.0	14	77	9	NA	NA	NA	NA	NA
12	B-8, S1,S2	625.5	OL	NA	NP	NA	72.2	10.2	32	61	7	NA	NA	NA	NA	NA
13	B-8, S8,S9	590.5	OL	NA	NP	NA	69.0	9.9	13	75	12	NA	NA	NA	NA	NA
14	B-9, S2,S3	598.5	OL	NA	NP	NA	64.1	9.8	15	67	18	NA	NA	NA	NA	NA
15	B-10, S1,S2,S3,S4	597.5	OL	NA	NP	NA	70.4	9.4	16	68	16	NA	NA	NA	NA	NA
16	B-11, S2,S3	605.5	OL	NA	NP	NA	70.9	9.0	25	65	10	NA	NA	NA	NA	NA
17	B-11, S5,S6	590.5	OL	NA	NP	NA	59.2	9.9	22	67	11	NA	NA	NA	NA	NA
18	B-12, S1,S2	595.5	OL	NA	NP	NA	81.5	11.7	14	74	12	NA	NA	NA	NA	NA
19	B-5, Bag 5	632.5	OH	65	36	29	NA	8.5	19	61	20	81.6	31.8	1480	73.4	31.8
20	B-7, Bag7	612.5	OH	55	33	22	NA	9.2	28	56	16	81.3	26.5	2272	73.2	26.5
21	B-9, Bag 9	608.5	OH	70	38	32	NA	11.1	16	65	19	77.7	34.2	2110	69.9	34.2
22	Black Soil	NA	NA	NA	NA	NA	35.1	NA	NA	NA	NA	82.4	31.0	NA	NA	NA
23	Brown Soil	NA	NA	NA	NA	NA	23.8	NA	NA	NA	NA	106	17.6	NA	NA	NA
24	Brown/Black Dredge	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	96.8	20.0	NA	NA	NA

Note:

Class: Unified Soil Classification

LL,PL,PI: Liquid Limit, Plastic Limit, Plasticity Index (%)

%M: moisture content (%)

%loss: Loss of ignition (%)

Sand/Gra: percent sand and gravel (%)

Silt: percent silt (%)

Clay: percent clay (%)

DDmax: Standard Proctor maximum dry density (pcf)

%Mopt: Standard Proctor optimum moisture content (%)

Qu: Unconfined compression strength (psf)

DD: Qu dry density (pcf)

%M: Qu moisture content (%)

NP: non plastic

NA: Not Applicable

Figure 1: Dredge Pile - Percent Silt

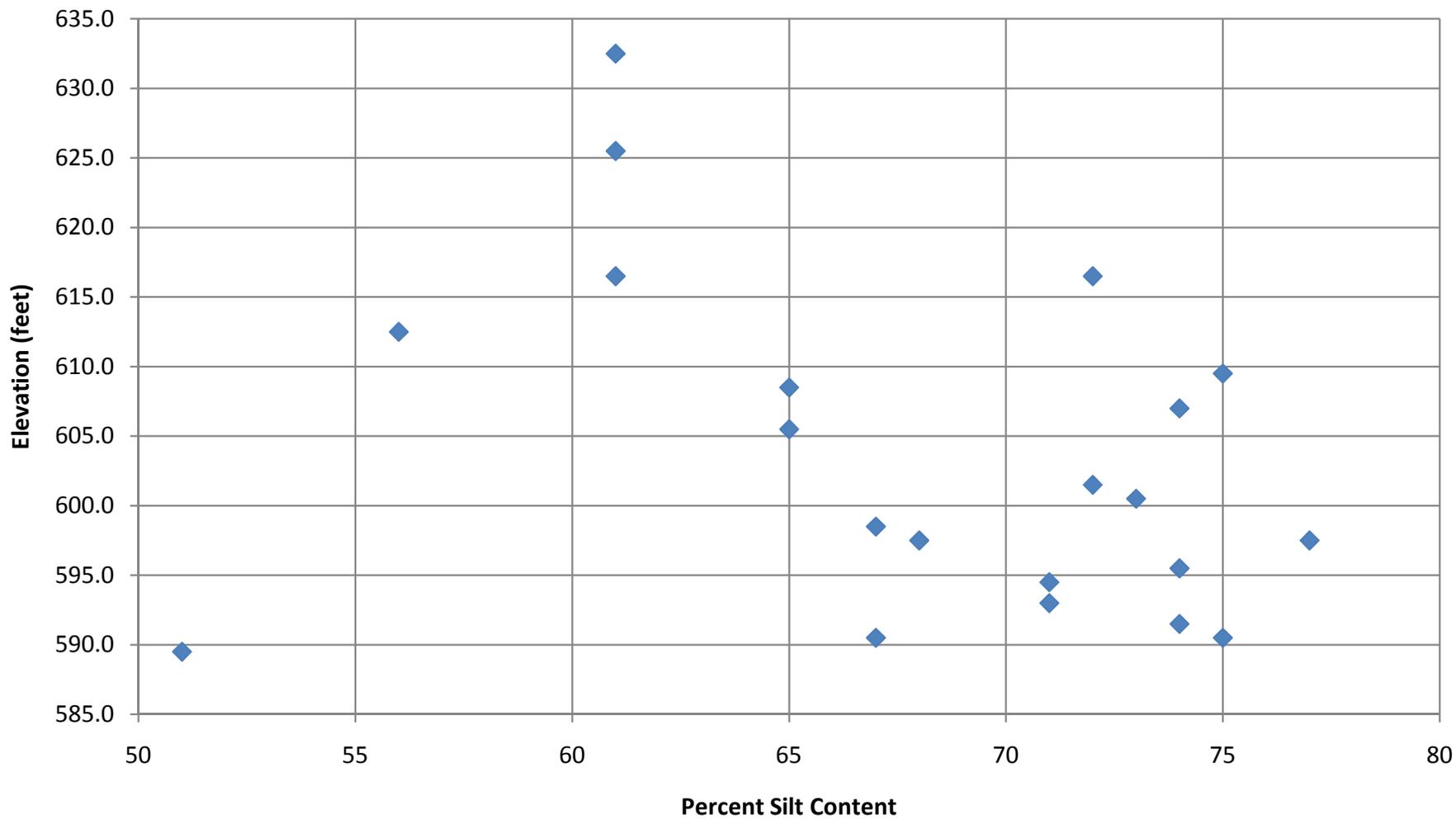
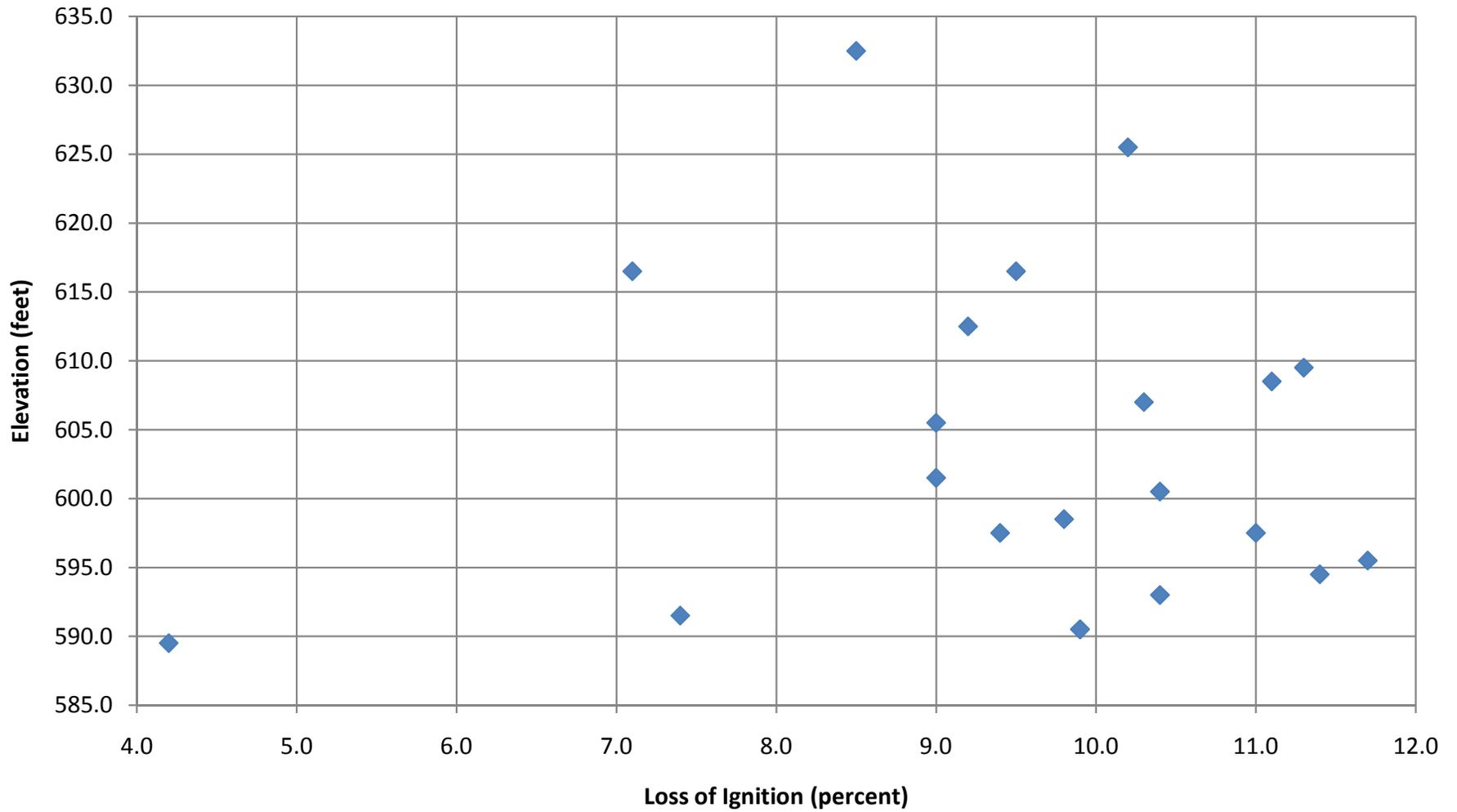


Figure 2: Dredge Pile - Loss of Ignition



addition, the range from the existing moisture content to the standard Proctor optimum moisture content is nearly 40 percent, which indicates the contractor would require a significant effort to dry the material.

2. The dredge pile material could be used outside of the 1H:1V up to a height of 10 feet, however, the cost to the contractor to adequately dry the dredge material may preclude its economical benefit.
3. A bulking additive could be used to reduce the moisture content and allow for the use of the mixture within the core of the embankment, however, this would require an increase in construction observation to insure the proper mixture of the material.

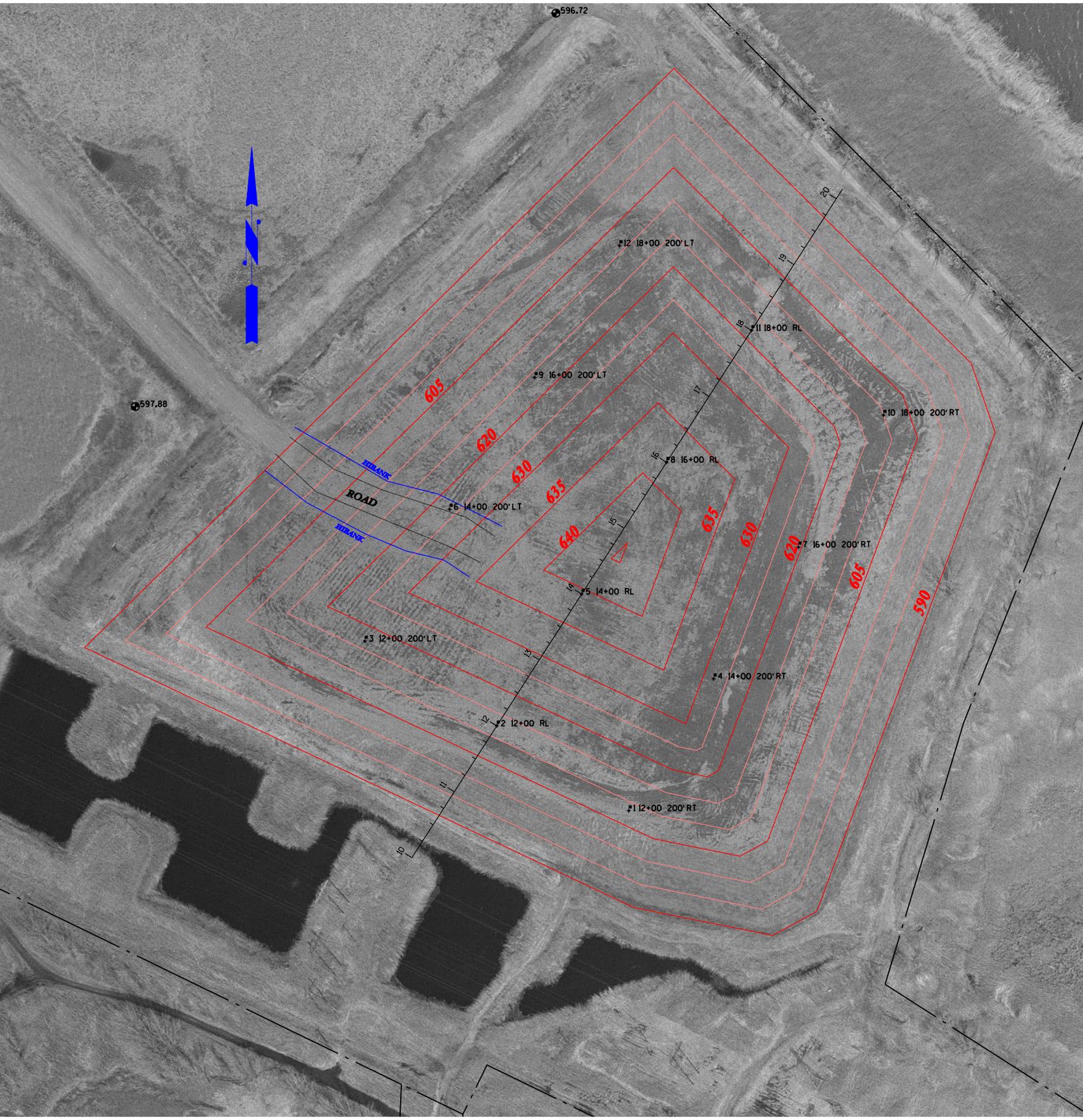
Please call if you have any questions.

Attachments

cc: Northeast Region (via e-mail)
Central Office Files
Geotechnical File (original)

Site Investigation Memorandum
Dredge Pile, USH 41
Attachment 1

Attachment 1
Boring Location Figure and
Driller's Soil Boring Logs



FIELD BORING LOG

Boring No. 1 Structure Dredge Pile County Brown Sheet 1 of 1
 Project 1133-03-03 Road Dredge Pile
 Station 12+00 Offset 200' PT RL Surface Elevation 608

GROUND WATER OBSERVATIONS

Streambed Elev. _____ Time After Drilling _____
 Water Elev. _____
 Top of Well Elev. _____ Depth to Water _____

MOISTURE
 D = Damp HS = Hollowstem
 M = Moist WA = Wash Ahead
 W = Wet RB = Rockbit

DRILLING METHOD
 ST = Shelby Tube A = Auger E = Easy
 SS = Split spoon C = Coring M = Medium
 DM = Drilling Mud W = Wash H = Hard

Start 5-6 Unit 3
 Finish 5-6-10 Chief MD

Sample No.	Moisture	Blows on Sampler		Sample and Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Drilling Method	Probe Blows
		0/6	6/12							
	DM								HS	
						5				
		1	2							
		2	2		4	loose No Recor			SS	
						10				
14M		1	2							
		2	3		4	loose SELF R to clay			SS	
						15				
2a		1	2							
2b		3	3		5	loose			SS	
						17' EOB #1				
						20				
						25				
						30				
						35				
						40				

Checked by _____ Final 17' Boring No. 1

FIELD BORING LOG

Wisconsin Department of Transportation

Boring No. 3 Structure Dredge Pile County Brown Sheet 1 of 1
 Project 1133-03-03 Road Dredge Pile
 Station 12+00 Offset 200' Lt Rl Surface Elevation 617

GROUND WATER OBSERVATIONS

Streambed Elev. _____ Time After Drilling _____
 Water Elev. _____
 Top of Well Elev. _____ Depth to Water _____

MOISTURE
 D = Damp HS = Hollowstem
 M = Moist WA = Wash Ahead
 W = Wet RB = Rockbit

DRILLING METHOD
 ST = Shelby Tube A = Auger E = Easy
 SS = Split spoon C = Coring M = Medium
 DM = Drilling Mud W = Wash H = Hard

Start 5-6 Unit 3
 Finish 5-6-10 Chief TR

Sample No.	Moisture	Blows on Sampler		Sample and Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Drilling Method	Probe Blows
		0/6	6/12							
	M					Silt Br tr Clay			HS	
1a		0 0			5	V loose	5		SS	
		1 2								
2a		0 0			10	V loose	10		SS	
2b		2 3		4		Tr Water				
3a		0 0			15		15		SS	
		2 2		2						
4a		0 1			20		20		SS	
4b		2 3								
5a		3 4			25	Silt br tr Clay	25		SS	
5b		5 3		9	100% Tr Gravel Small Clay lumps					
	MW									
6a		4 5			30	(Small sand gravel layer)	30		SS	
6b		7 5		12	32' EOB #3					
					35		35			
					40		40			

FIELD BORING LOG

Wisconsin Department of Transportation

Boring No. 4 Structure Dredge Pile County Brown Sheet 1 of 1
 Project 1133-03-03 Road Dredge Pile
 Station 14700 Offset 200 ft RT RL Surface Elevation 627

GROUND WATER OBSERVATIONS

Streambed Elev. _____ Time After Drilling _____
 Water Elev. _____
 Top of Well Elev. _____ Depth to Water _____

MOISTURE
 D = Damp HS = Hollowstem
 M = Moist WA = Wash Ahead
 W = Wet RB = Rockbit

DRILLING METHOD
 ST = Shelby Tube A = Auger E = Easy
 SS = Splitspoon C = Coring M = Medium
 DM = Drilling Mud W = Wash H = Hard

Start 5-5 Unit 3
 Finish 5-8-10 Chief M

Sample No.	Moisture	Blows on Sampler		Sample and Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Drilling Method	Probe Blows
		0/6	6/12							
	DM								MS	
19		2 3			5	Silt to clay Br Tr Organic tr wood	5		SS	
		4 4			7	loose				
24	MW	0 0			10	Very loose Silt to clay	10		SS	
		2 2			2					
29	M	2 2			15	Very loose	15		SS	
		3 3			5					
34	MW	0 0			20	Very loose	20		SS	
		2 3			2					
39	W	0 1			25	Layer wet wood	25		SS	
	SM	3 2		4	Very loose Silt to clay Br (water filling in hole)					
44	M	1 2			30	Very loose	30		SS	
		2 2			4					
49	MV	1 2			35	Silt to clay little wood	35		SS	
		3 3			5					
54	MW	2 3			40	(small clay layer 2.5')	40		SS	
		4 4			7					

Checked by _____ Final 42' Boring No. 4

FIELD BORING LOG

Wisconsin Department of Transportation

Boring No. 5 Structure Dredge Pile County Brown Sheet 1 of 2
 Project 1733-03-03 Road Dredge Pile
 Station 14100 Offset AL Surface Elevation 6.39

GROUND WATER OBSERVATIONS

Streambed Elev. _____ Time After Drilling _____
 Water Elev. _____
 Top of Well Elev. _____ Depth to Water _____

MOISTURE
 D = Damp HS = Hollowstem ST = Shelby Tube A = Auger E = Easy Start 5-4 Unit 3
 M = Moist WA = Wash Ahead SS = Split spoon C = Coring M = Medium Finish 5-4-10 Chief PL
 W = Wet RB = Rockbit DM = Drilling Mud W = Wash H = Hard

Sample No.	Moisture	Blows on Sampler		Sample and Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Drilling Method	Probe Blows
		0/6	6/12							
	DM					Silt Dr				
		00	00		5	5				
		00	00			V loose No Recor				
1	M	00	00		10	10 Silt Br				
2		12				V loose				
1	A	00	00		15	15 Trace of Wood				
2	B	00	00			V loose Trace of Ice				
1	A	00	00		20	20				
2	B	22	22			V loose Silt bottle organics Tr Ice				
1	W	00	00		25	25				
2		23	23			V loose Silt bottle clay				
1	M	13	13		30	30				
2		43	43			loose (Small Clay lens) 4 ft				
1		01	01		35	35				
2		23	23			V loose Silt Br Tr Clay Tr organics				
1		12	12		40	40				
2		44	44							

Recorded by _____ Final 52' Boring No. 5

FIELD BORING LOG

Wisconsin Department of Transportation

Boring No. 5 Structure Dredge Pile County Brown Sheet 22 of 22
 Project 1133-03-02 Road Dredge Pile
 Station 14+00 Offset RL Surface Elevation 639

GROUND WATER OBSERVATIONS

Streambed Elev. _____ Time After Drilling _____
 Water Elev. _____
 Top of Well Elev. _____ Depth to Water _____

MOISTURE
 J = Damp HS = Hollowstem ST = Shelby Tube A = Auger E = Easy
 V = Moist WA = Wash Ahead SS = Splitpoon C = Coring M = Medium
 N = Wet RB = Rockbit DM = Drilling Mud W = Wash H = Hard

Start 5-4 Unit 3
 Finish 8-4-10 Chief M

Sample No.	Moisture	Blows on Sampler		Sample and Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Drilling Method	Probe Blows
		0/8	8/12							
	M									
						<i>Silt some clay</i>				
						<i>1' bed wood</i>				
<u>24</u>		<u>1</u>	<u>3</u>	<u> </u>	<u>5</u>	<u>45</u>	<u>5</u>	<u>20</u>	<u>SS</u>	
<u>25</u>		<u>4</u>	<u>5</u>	<u> </u>	<u>7</u>	<u>loose</u>			<u>SS</u>	
<u>26</u>		<u>3</u>	<u>4</u>	<u> </u>	<u>10</u>	<u>50</u>	<u>10</u>	<u>20</u>		
<u>27</u>		<u>4</u>	<u>6</u>	<u> </u>	<u>10</u>	<u>loose silt w/ sand to grain</u>	<u>10</u>	<u>10</u>	<u>SS</u>	
						<i>52' EOB #5</i>				
						<u>15</u>	<u>35</u>	<u>15</u>		
						<u>20</u>	<u>60</u>	<u>20</u>		
						<u>25</u>	<u>65</u>	<u>25</u>		
						<u>30</u>	<u>70</u>	<u>30</u>		
						<u>35</u>	<u>75</u>	<u>35</u>		
						<u>40</u>	<u>80</u>	<u>40</u>		

Checked by _____ Final 52' Boring No. 5

FIELD BORING LOG

Boring No. #6 Structure Dredge Pile County Brown Sheet 1 of 1
 Project 1133-03-03 Road Dredge Pile
 Station 14+00 Offset 200' LT RL Surface Elevation 624

GROUND WATER OBSERVATIONS

Streambed Elev. _____ Time After Drilling _____
 Water Elev. _____
 Top of Well Elev. _____ Depth to Water _____

MOISTURE
 D = Damp HS = Hollowstem ST = Shelby Tube A = Auger E = Easy
 M = Moist WA = Wash Ahead SS = Split Spoon C = Coring M = Medium
 W = Wet RB = Rockbit DM = Drilling Mud W = Wash H = Hard

Start 5-3 Unit 3
 Finish 5-4-10 Chief TW

Sample No.	Moisture	Blows on Sampler		Sample and Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Drilling Method	Probe Blows
		0/6	6/12							
	D								HS	
	W									
5A		0	0		0	5 <u>loose silt little clay to gravel</u> Br	5		SS	
32A	M	8	0			10 <u>loose silt to clay</u> Br	10		SS	
23A	M	4	5			15 <u>Firm</u>	15		SS	
23B		6	5		11					
4A	M	2	2			20 <u>loose silt to sand clay gravel</u> Br	20		SS	
1A		3	9		5					
2A		2	2		5	25 <u>loose silt</u> Br	25		SS	
2B		3	4		5					
4A	M	1	6		5	30 <u>silt to sand & gravel</u>	30		SS	
2B	D	9	60		14	30 <u>Firm silt to organic</u>	30		SS	
1A	M	2	2		5	35 <u>silt little clay to organic</u>	35		SS	
1B		3	6		5	35 <u>loose silt to organic to clay</u>	35		SS	
						40 <u>37' EOB</u>	40			

Checked by _____ Final 38' Boring No. B46

FIELD BORING LOG

Boring No. 7 Structure Dredge Pile County Brown Sheet 1 of 1
 Project 33-03-03 Road Dredge Pile
 Station 16+00 Offset 200' RT R₂ Surface Elevation 620

GROUND WATER OBSERVATIONS

Streambed Elev. _____ Time After Drilling _____
 Water Elev. _____
 Top of Well Elev. _____ Depth to Water _____

MOISTURE
 D = Damp HS = Hollowstem
 M = Moist WA = Wash Ahead
 W = Wet RB = Rockbit

DRILLING METHOD
 ST = Shelby Tube A = Auger E = Easy
 SS = Split spoon C = Coring M = Medium
 DM = Drilling Mud W = Wash H = Hard

Start 5-5 Unit 3
 Finish 5-5-10 Chief [Signature]

Sample No.	Moisture	Blows on Sampler		Sample and Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Drilling Method	Probe Blows
		0/6	8/12							
	M								HS	
						<i>Silt Br Tr Clay Tr Organics</i>				
1a		0 0		1	5	V loose	0.5		SS	
		1 3								
2a		0 0		0	10	V loose	0.3		SS	
		0 2								
3a MW		0 0		2	15	V loose	0.3		SS	
		2 3								
4a MW		2 2		5	20	V loose	0.5		SS	
4b		3 4								
5a MW		2 4		7	25	loose	1.0		SS	
5b		3 4								
6a MW		2 3		7	30	loose	1.5		SS	
6b		4 5								
						<i>32' EOB</i>				
					35					
					40					

Checked by _____ Final 32' Boring No. 7

FIELD BORING LOG

Boring No. B-B Structure Dredge Pile County Brown Sheet 1 of 2
 Project 1133-03-03 Road Dredge Pile
 Station 16100 Offset RL Surface Elevation 538

GROUND WATER OBSERVATIONS

Streambed Elev. _____ Time After Drilling _____
 Water Elev. _____
 Top of Well Elev. _____ Depth to Water _____

MOISTURE
 D = Damp HS = Hollowstem ST = Shelby Tube A = Auger E = Easy
 M = Moist WA = Wash Ahead SS = Spiltspoon C = Coring M = Medium
 N = Wet RB = Rockbit DM = Drilling Mud W = Wash H = Hard

Start 5-4 Unit 3
 Finish Chief [Signature]

Sample No.	Moisture	Blows on Sampler		Sample and Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Drilling Method	Probe Blows
		0/6	6/12							
	M								HS	
		0 0				5				
		0 0		0		v loose			SS	
1A		0 0				10				
		0 3		0		v loose silt Br seashell	0.2		SS	
2A	M	0 0				15				
2B		0 2		0		v loose Silt Br tr clay In Gravel	0.5		SS	
3A		5 3				20				
3B		1 7		4		v loose tr IL	4.5 1.0		SS	
4A		1 1				25				
4B		1 1		2		v loose silt Br some lse little wood	1.6		SS	
5A		0 0				30				
5B		0 2		6		v loose silt Br silt Dark Br Some Organic	1.0 0.2		SS	
6A		0 0				35				
6B		1 2		1		v loose silt Br	1.2		SS	
7A		1 2				40				
7B		3 4		5		v loose silt Br tr wood	3.0		SS	

Checked by _____ Final 52 Boring No. B-B

FIELD BORING LOG

Boring No. A-B Structure Dredge Pile County Brown Sheet 2 of 2
 Project 1133-02-03 Road Dredge Pile
 Station 16+00 Offset RL Surface Elevation _____

GROUND WATER OBSERVATIONS

Streambed Elev. _____ Time After Drilling _____
 Water Elev. _____
 Top of Well Elev. _____ Depth to Water _____

MOISTURE
 D = Damp HS = Hollowstem ST = Shelby Tube A = Auger E = Easy
 V = Moist WA = Wash Ahead SS = Split spoon C = Coring M = Medium
 N = Wet RB = Rockbit DM = Drilling Mud W = Wash H = Hard

Start 5-4 Unit 3
 Finish 5-510 Chief ML

Sample No.	Moisture	Blows on Sampler		Sample and Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Drilling Method	Probe Blows
		0/5	6/12							
<u>7A</u>	<u>0</u>	<u>3</u>	<u>3</u>	<u>6</u>	<u>6</u>	<u>5 45</u> <u>Silt Br</u>	<u>5</u>		<u>SS</u>	
<u>7B</u>	<u>3</u>	<u>5</u>	<u>5</u>	<u>6</u>	<u>6</u>	<u>Loose</u>			<u>SS</u>	
<u>7A</u>	<u>0</u>	<u>2</u>	<u>2</u>	<u>5</u>	<u>5</u>	<u>10 50</u>	<u>10</u>		<u>SS</u>	
<u>7B</u>	<u>3</u>	<u>3</u>	<u>3</u>	<u>5</u>	<u>5</u>	<u>Loose</u>			<u>SS</u>	
						<u>52' LOG</u>				
						<u>15 55</u>	<u>15</u>			
						<u>20 60</u>	<u>20</u>			
						<u>25 65</u>	<u>25</u>			
						<u>30 70</u>	<u>30</u>			
						<u>35 75</u>	<u>35</u>			
						<u>40 80</u>	<u>40</u>			

Checked by _____ Final 52 Boring No. 8

FIELD BORING LOG

Boring No. 9 Structure Dredge Pile County Brown Sheet 11
 Project 1133-03-03 Road Dredge Pile
 Station 16+00 Offset 2100' Lt R/L Surface Elevation 616.

GROUND WATER OBSERVATIONS

Streambed Elev. _____ Time After Drilling _____
 Water Elev. _____
 Top of Well Elev. _____ Depth to Water _____

MOISTURE
 D = Damp HS = Hollowstem ST = Shelby Tube A = Auger E = Easy
 M = Moist WA = Wash Ahead SS = Split spoon C = Coring M = Medium
 N = Wet RB = Rockbit DM = Drilling Mud W = Wash H = Hard

Start 24 Unit 3
 Finish 5-4-10 Chief 721

Sample No.	Moisture	Blows on Sampler		Sample and Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Drilling Method	Probe Blows
		0/6	6/12							
	M					Silt Br tr Tr Gravel			HS	
		0 0			5		5			
		3 3		3		V loose No Recor			SS	
A		1 2			10		10			
B		2 3		4		V loose Silt Br some wood	1.2		SS	
A		0 0			15		15			
B		0 0		0		Silt Br tr clay V loose Tr Organics Small layer Br clay in tip	0.2 0.5		SS	
A		3 4			20		20			
B		6 6		10		loose Silt tr clay	2.8		SS	
A		1 2			25		25			
B		4 3		6		loose Silt tr clay tr gravel	2.0		SS	
						27' EOB # 9				
					30		30			
					35		35			
					40		40			

Checked by _____ Final 27' Boring No. 9

FIELD BORING LOG

Wisconsin Department of Transportation

Boring No. 10 Structure Dredge Pile County Brown Sheet 1 of 1
 Project 1133-03-03 Road Dredge Pile
 Station 1B+00 Offset 200' At RL Surface Elevation 610

GROUND WATER OBSERVATIONS

Streambed Elev. _____ Time After Drilling _____
 Water Elev. _____
 Top of Well Elev. _____ Depth to Water _____

MOISTURE

D = Damp HS = Hollowstem
 M = Moist WA = Wash Ahead
 W = Wet RB = Rockbit

DRILLING METHOD

ST = Shelby Tube A = Auger E = Easy
 SS = Split spoon C = Coring M = Medium
 DM = Drilling Mud W = Wash H = Hard

Start 55 Unit 3
 Finish 55-10 Chief PR

Sample No.	Moisture	Blows on Sampler		Sample and Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Unclassified Strength	Boulders	Drilling Method	Probe Blows
		0/6	6/12							
	M								AS	
1A		1 2			5	Silt Br Tr Clay	5		SS	
		2 3		4	Very loose		1.5			
2A		1 2			10	small clay layer Red	10		SS	
		2 3		4	Very loose		1.2			
3A		0 1			15	Very loose Tr Organic	15		SS	
		1 2		2			1.7			
4A		1 3			20	Loose	20		AS	
		3 3		6			1.5			
22' EOB #10										
					25		25			
					30		30			
					35		35			
					40		40			

Checked by _____ Final 221 Boring No. 10

FIELD BORING LOG

Wisconsin Department of Transportation

Boring No. 12 Structure Overhead Pile County Brown Sheet 1 of 1
 Project 1133-03-03 Road Overhead Pile
 Station 1B+00 Offset 200' L+R Surface Elevation 608

GROUND WATER OBSERVATIONS

Streambed Elev. _____ Time After Drilling _____
 Water Elev. _____
 Top of Well Elev. _____ Depth to Water _____

MOISTURE
 D = Damp HS = Hollowstem ST = Shelby Tube A = Auger E = Easy
 M = Moist WA = Wash Ahead SS = Split spoon C = Coring M = Medium
 W = Wet RB = Reckbit DM = Drilling Mud W = Wash H = Hard

Start 5-4 Unit 3
 Finish 5-4-10 Chief TM

Sample No.	Moisture	Blows on Sampler		Sample and Recovery	Total Blows	VISUAL FIELD CLASSIFICATION AND REMARKS	Unconfined Strength	Boulders	Drilling Method	Probe Blows
		0/6	6/12							
DM						Silt Br			HS	
		0 0				5 V loose NO Recov	5		SS	
		2 2		2						
AM		0 0				10 Silt To clay	10		SS	
B		1 2		1		V loose				
DM		3 4				15	15		SS	
B		5 5		9		Loose	22		SS	
17' EOB #12										
AM		3 4				20 Silt some clay	20		SS	
B		4 4				Loos little wood	23		SS	
22' EOB #12										
						25	25			
						30	30			
						35	35			
						40	40			

Checked by _____ Final TM Boring No. 12

Site Investigation Memorandum
Dredge Pile, USH 41
Attachment 2

Attachment 2

Results of Laboratory Testing

TEST NUMBER
230-8-10

MO.-DAY-YR.	PROJECT ID	TEST CODE	QUANTITY
5 10 10	1133-03-03	190 2	66 jars / 3 bags

County	Brown	Project Name
Contractor		
Material	Soil	
Source	Dredge pile USH 41	
Tests Requested By	Geotechnical	
Submitted by:	Jeff Horsfall	Date 6/2/10

BORING NUMBER	1	2	3	3	4	4
SAMPLE NUMBER	1a2a2b	2a3a4a4b	1a2a2b3a	5a5b6a6b	3a3b4a	6a6b7a7b
DEPTH, FT.						

MECHANICAL ANALYSIS (AASHTO T-88)						
Boulders (Ret. 3")						
Gravel (Pass 3" - Ret. #10)	1	2	2	5	1	1
Coarse Sand (Pass #10 - Ret. #40)	1	1	1	10	3	2
Fine Sand (Pass #40 - Ret. #200)	8	15	13	23	13	18
Silt (Pass #200 - Ret. 0.002mm)	73	71	74	51	75	71
Clay (Pass 0.002mm)	17	11	10	11	8	8
LIQUID LIMIT (AASHTO T-89)						
PLASTICITY INDEX (AASHTO T-90)						
UNIFIED CLASSIFICATION (ASTM D 2487)	OL	OL	OL	ML	OL	OL
AASHTO CLASSIFICATION (AASHTO M-145)	A-8 (0)	A-8 (0)	A-8 (0)	A-4 (0)	A-8 (0)	A-8 (0)
LOSS ON IGNITION, % (AASHTO T-267)	10.4	10.4	10.3	4.22	11.3	11.4
MOISTURE, % (AASHTO T-265)	66.4	79.2	69.9	26.0	75.7	71.7
COMPACTION TEST						
AASHTO T-99, METHOD						
OPTIMUM MOISTURE, %						
MAXIMUM DENSITY, PCF						
CORRECTION FOR COARSE PARTICLES IN THE SOIL COMPACTION TEST (AASHTO T-224)						
OPTIMUM MOISTURE, %						
MAXIMUM DENSITY, PCF						
UNCONFINED COMPRESSION TEST (AASHTO T-208)						
MOISTURE CONTENT, %						
UNIT WEIGHT, PCF						
PENETRATION RESISTANCE, TSF						
UNCONFINED COMPRESSION, TSF						
CONSOLIDATION TEST (AASHTO T-216)						
MOISTURE BEFORE, %						
MOISTURE AFTER, %						
COMPRESSION INDEX						
DIRECT SHEAR TEST (AASHTO T-236)						
MOISTURE CONTENT, %						
ANGLE OF INTERNAL FRICTION, DEGREES						
COHESION, PSF						

Remarks

DISTRIBUTION: Geotechnical Unit
District

By RSD

TEST NUMBER 230-8-10

MO.-DAY-YR.	PROJECT ID	TEST CODE	QUANTITY
5 10 10	1133-03-03	190 2	66 jars / 3 bags

County	Brown	Project Name	
Contractor			
Material	Soil		
Source	Dredge pile USH 41		
Tests Requested By	Geotechnical		
Submitted by:	Jeff Horsfall	Date	6/2/10

BORING NUMBER	5	5	6	6	7	8
SAMPLE NUMBER	3a3b4a4b	8a8b9a9b	1a2a	4a4b5a5b	4a4b5a5b	1a2a2b
DEPTH, FT.						

MECHANICAL ANALYSIS (AASHTO T-88)						
Boulders (Ret. 3")						
Gravel (Pass 3" - Ret. #10)	3		5	1	1	2
Coarse Sand (Pass #10 - Ret. #40)	2	3	2	2	1	1
Fine Sand (Pass #40 - Ret. #200)	15	15	23	14	12	29
Silt (Pass #200 - Ret. 0.002mm)	72	74	61	72	77	61
Clay (Pass 0.002mm)	8	8	9	11	9	7
LIQUID LIMIT (AASHTO T-89)						
PLASTICITY INDEX (AASHTO T-90)						
UNIFIED CLASSIFICATION (ASTM D 2487)	OL	OL	OL	OL	OL	OL
AASHTO CLASSIFICATION (AASHTO M-145)	A-8 (0)					
LOSS ON IGNITION, % (AASHTO T-267)	9.5	7.4	7.1	9.0	11.1	10.2
MOISTURE, % (AASHTO T-265)	75.5	50.6	63.6	65.6	70.2	72.2
COMPACTION TEST						
AASHTO T-99, METHOD						
OPTIMUM MOISTURE, %						
MAXIMUM DENSITY, PCF						
CORRECTION FOR COARSE PARTICLES IN THE SOIL COMPACTION TEST (AASHTO T-224)						
OPTIMUM MOISTURE, %						
MAXIMUM DENSITY, PCF						
UNCONFINED COMPRESSION TEST (AASHTO T-208)						
MOISTURE CONTENT, %						
UNIT WEIGHT, PCF						
PENETRATION RESISTANCE, TSF						
UNCONFINED COMPRESSION, TSF						
CONSOLIDATION TEST (AASHTO T-216)						
MOISTURE BEFORE, %						
MOISTURE AFTER, %						
COMPRESSION INDEX						
DIRECT SHEAR TEST (AASHTO T-236)						
MOISTURE CONTENT, %						
ANGLE OF INTERNAL FRICTION, DEGREES						
COHESION, PSF						

Remarks

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TEST NUMBER 230-8-10

MO.-DAY-YR.	PROJECT ID	TEST CODE	QUANTITY
5 10 10	1133-03-03	190 2	66 jars / 3 bags

County	Brown	Project Name
Contractor		
Material	Soil	
Source	Dredge pile USH 41	
Tests Requested By	Geotechnical	
Submitted by:	Jeff Horsfall	Date 6/2/10

BORING NUMBER	8	9	10	11	11	12
SAMPLE NUMBER	8a8b9a9b	2a2b3a3b	1a2a3a4a	2a2b3a3b	5a6a6b	1a1b2a2b
DEPTH, FT.						

MECHANICAL ANALYSIS (AASHTO T-88)						
Boulders (Ret. 3")	8	9	10	11	11	12
Gravel (Pass 3" - Ret. #10)	2	1	1	2	2	1
Coarse Sand (Pass #10 - Ret. #40)	1	1	1	1	2	1
Fine Sand (Pass #40 - Ret. #200)	10	13	14	22	18	12
Silt (Pass #200 - Ret. 0.002mm)	75	67	68	65	67	74
Clay (Pass 0.002mm)	12	18	16	10	11	12
LIQUID LIMIT (AASHTO T-89)						
PLASTICITY INDEX (AASHTO T-90)						
UNIFIED CLASSIFICATION (ASTM D 2487)	OL	OL	OL	OL	OL	OL
AASHTO CLASSIFICATION (AASHTO M-145)	A-8 (0)					
LOSS ON IGNITION, % (AASHTO T-267)	9.9	9.8	9.4	9.0	9.9	11.7
MOISTURE, % (AASHTO T-265)	69.0	64.1	70.4	70.9	59.2	81.5
COMPACTION TEST						
AASHTO T-99, METHOD						
OPTIMUM MOISTURE, %						
MAXIMUM DENSITY, PCF						
CORRECTION FOR COARSE PARTICLES IN THE SOIL COMPACTION TEST (AASHTO T-224)						
OPTIMUM MOISTURE, %						
MAXIMUM DENSITY, PCF						
UNCONFINED COMPRESSION TEST (AASHTO T-208)						
MOISTURE CONTENT, %						
UNIT WEIGHT, PCF						
PENETRATION RESISTANCE, TSF						
UNCONFINED COMPRESSION, TSF						
CONSOLIDATION TEST (AASHTO T-216)						
MOISTURE BEFORE, %						
MOISTURE AFTER, %						
COMPRESSION INDEX						
DIRECT SHEAR TEST (AASHTO T-236)						
MOISTURE CONTENT, %						
ANGLE OF INTERNAL FRICTION, DEGREES						
COHESION, PSF						

Remarks

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By RSD

TEST NUMBER 230-8-10

	MO.-DAY-YR.	PROJECT ID	TEST CODE	QUANTITY
	5 10 10	1133-03-03	190 2	66 jars / 3 bags

County Brown	Project Name
Contractor	
Material Soil	
Source Dredge pile USH 41	
Tests Requested By Geotechnical	
Submitted by: Jeff Horsfall	Date 6/2/10

BORING NUMBER	Bag 5	Bag 7	Bag 9
SAMPLE NUMBER			
DEPTH, FT.			

MECHANICAL ANALYSIS (AASHTO T-88)			
Boulders (Ret. 3")			
Gravel (Pass 3" - Ret. #10)			
Coarse Sand (Pass #10 - Ret. #40)	2	2	1
Fine Sand (Pass #40 - Ret. #200)	17	26	15
Silt (Pass #200 - Ret. 0.002mm)	61	56	65
Clay (Pass 0.002mm)	20	16	19
LIQUID LIMIT (AASHTO T-89)	65	55	70
PLASTICITY INDEX (AASHTO T-90)	29	22	32
UNIFIED CLASSIFICATION (ASTM D 2487)	OH	OH	OH
AASHTO CLASSIFICATION (AASHTO M-145)	A-7-5 (27)	A-7-5 (17)	A-7-5 (32)
LOSS ON IGNITION, % (AASHTO T-267)	8.5	9.2	11.1
MOISTURE, % (AASHTO T-265)			
COMPACTION TEST			
AASHTO T-99, METHOD	A	A	A
OPTIMUM MOISTURE, %	31.8	26.5	34.2
MAXIMUM DENSITY, PCF	81.6	81.3	77.7
CORRECTION FOR COARSE PARTICLES IN THE SOIL COMPACTION TEST (AASHTO T-224)			
OPTIMUM MOISTURE, %			
MAXIMUM DENSITY, PCF			
UNCONFINED COMPRESSION TEST (AASHTO T-208)			
MOISTURE CONTENT, %	31.8	26.5	34.2
UNIT WEIGHT, PCF	96.8	92.6	93.8
PENETRATION RESISTANCE, TSF			
UNCONFINED COMPRESSION, PSF	1480	2272	2110
CONSOLIDATION TEST (AASHTO T-216)			
MOISTURE BEFORE, %			
MOISTURE AFTER, %			
COMPRESSION INDEX			
DIRECT SHEAR TEST (AASHTO T-236)			
MOISTURE CONTENT, %			
ANGLE OF INTERNAL FRICTION, DEGREES			
COHESION, PSF			

Remarks
 Unconfined Compression samples were re-molded at 90% density of T-99.

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