

1500 Abbott Road, Suite 210 East Lansing, MI 48823 Telephone: (517) 337-0111 Fax: (517) 337-0417

BORING NO. PROJECT

LOCATION

MW-106D SHEET 2 OF 5 GSWA: Spring Hill Camp Phase III

Osceola Township, MI

4065-005

COORDINATES N 229,936.2 E 19,442,633.1

DATUM USGS

PROJECT NO. 4065-0 LOGGED BY GF/PO

S	AMPLE	INFC	RMATI	ON			_		ч
Depth feet	Lab Sample	Sampl Type	e Blow Counts	Rec- overy %	DESCRIPTION	USCS	Strata	REMARKS	Elevatio Feet
-			30-27	100	sphericity and ~70-80% quartz. Coarse fraction is sub-rounded with low sphericity and ~10% quartz.	SW	a, da tata.		
- - 45			<sup>7-9</sup> 12-15	100	Light brown, fine to medium SAND, trace to some coarse Sand, trace fine Gravel, trace Silt, loose, well graded, massive, DRY. Fine to medium Sand is well rounded with moderate sphericity and ~70-80% quartz. Coarse fraction is sub-rounded with low sphericity and ~10% quartz.	sw			1141.25
- 50			8-9 10-15	100	Light brown, fine SAND, trace medium Sand, trace fine Gravel, trace Silt, loose, well graded, massive, DRY. Fine sand is well rounded with moderate sphericity and ~70-80% quartz. Coarse fraction is sub-rounded with low sphericity and ~10% quartz.	SW			1136.25
- - 55 <del>-</del> -			3-5 7-7	100	Light brown, medium SAND, trace to some fine Sand, trace Silt, trace coarse Sand, loose, well graded, DRY. Fine to medium sand is well rounded with moderate sphericity and ~70-80% quartz. Coarse fraction is sub-rounded with low sphericity, ~10% quartz, and occurs as occasional 1" thick seams.	sw		Elevation of change in lithology indicated by drillers.	1131.25
-		_	2-3		Light brown, fine SAND and, SILT, trace medium Sand,	SM		Elevation of change in lithology indicated by	1125.75
60			3-2	100	Brown, fine to medium SAND, trace to some coarse Sand, trace Silt, well to poorly graded, WET. Fine to medium sand is well rounded with moderate sphericity and ~70-80% quartz. Coarse fraction is sub-rounded with low sphericity and ~10% quartz.	SW-SP	<u>-  ,   -  , -</u> 	-drillers. Wet at ~58'	1123.75
65		( SS:	2-2 2-3	100	Brown, fine SAND and, SILT, trace medium Sand, WET.	SM		When augers pulled to replace basket-collapsed to 58'-olocation of change	1118.75
- 70		( SSS	6 1-1 1-1	100	Brown, fine to medium SAND, trace to some coarse Sand, trace Silt, loose, well to poorly graded, massive, WET. Fine to medium sand is well rounded with moderate sphericity and ~70-80% quartz. Coarse fraction is sub-rounded with low sphericity and ~10% quartz.	SW-SP	''''''''	In lithology indicated / by drillers Elevation of change in lithology indicated by drillers	41 <u>15</u> .75
- - 75			5 1-1 1-1	75	organic matter, trace coarse Sand, loose, massive, WET. Fine sand is well rounded with moderate sphericity and ~70-80% quartz.	SM			1111.75
- - 80			3 1-1 3 1-1	100	Brown SILT and fine SAND, trace medium Sand, loose, massive, WET. Fine sand is sub-angular with moderate sphericity and ~60-70% quartz.	SM			1106.25
			1-1	100	Brown, fine to medium SAND, trace coarse Sand, trace Silt, loose, poorly graded, massive, WET. Fine to medium sand is sub-angular to with moderate sphericity and ~60-70%	 SP			<u>1101.2</u> 5
- 50			1-1	100	quartz. Brown Silty, CLAY, trace fine Sand, soft, moderate plasticity, MOIST. Brown to red, fine to medium SAND, trace coarse Sand, trace Silt, loose, poorly graded, massive, WET. Fine to	<u>CL-ML</u>		Elevation of change in thology indicated by / drillers Elevation of change in	<u>1097.95</u> 1097.25
-90 		( SS	3 1-2 2-3	100	medium sand is sub-angular with low sphericity and ~60-70% quartz.	SP	स.स.चा	lithology indicated by drillers.	1001-25
-			1	I		I SM		Elevation of change in	1091.2



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BORING NO. PROJECT LOCATION MW-106D SHEET 3 OF 5 GSWA: Spring Hill Camp Phase III

Osceola Township, MI

COORDINATES N 229,936.2 E 19,442,633.1

DATUM USGS

PROJECT NO.	4065-005
LOGGED BY	GF/PO

s	SAMPLE INFORMATION				ON							с С
Depth feet	Lab Sample	Sam Typ	ple e	Blow Counts	Rec- overy %	DESCRIPTION	USCS		Strata		REMARKS	Elevatic Feet
- 95 - -			SS	2-3 4-4	100	Brown to gray, fine SAND and, SILT, trace medium Sand, loose, massive, WET. <i>(continued)</i>	SM				lithology indicated by drillers.	
- - 100 <del>-</del> -			SS	1-2 3-5	100	Brown, fine to coarse SAND, trace to some fine Gravel, trace Silt, trace coarse Sand, loose, well graded, WET. Fine to coarse sand is rounded with moderate sphericity and ~60-70% quartz. Coarse sand occurs in lenses.	sw		· · · · · · · · · · · · · · · · · · ·			1086.25
- - 105 <del>-</del>			SS	2-1 2-4	100	Brown, fine to coarse SAND, trace to some fine Gravel, trace Silt, trace coarse Sand, loose, well graded, WET. Fine to coarse sand is sub-rounded with moderate sphericity and ~50-60% quartz. Coarse Sand occurs as occasional lenses	sw		· · · · · · · · · · · · · · · · · · ·			1081.25
-				2-1		Brown, fine to coarse SAND, trace fine Gravel, trace Silt, occasional lenses of coarse Sand, loose, well graded. Fine to Coarse Sand is sub-rounded with moderate sphericity	sw		*** *** ***			1076.25
- 110		S: 	55	2-4	50	And ~50-60% quartz. Coarse sand occurs as occasional lenses. Brown, Silty, CLAY, trace to some fine Sand, medium stiff, moderately plastic. MOIST.	CL-ML				Elevation of change in lithology indicated by drillers/ Last Sample of	1073.75 1071.75
- - 115 -			SS	3-3 4-5	100	Brown, medium to coarse SAND, trace to some fine to medium Gravel, trace to some fine Sand, trace Silt, poorly graded, massive, WET. Fine to coarse sand is sub-angular and ~50% quartz. Coarse component is 10% quartz.	SP	S. S. S. S. S. S.			11/2/00.	
- - 120—		í s	SS	4-14 27-35	75	Light brown, medium to coarse SAND, trace fine Gravel, trace fine Sand, poorly graded, wet. Fine to medium sand is well rounded with high sphericity and ~80-90% quartz. Coarse fraction is well rounded with low to moderate	SP	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1			Larry Jordan takes over logging from 119' on. Last sample of	1066.25
-		~				sphericity and composed almost entirely of rock fragments. Light brown, fine to medium SAND, trace coarse Sand, race Silt, poorly graded, wet. All material is well rounded with high sphericity and ~90% quartz.	SP	0	D 0	- (	11/3/00. Drillers Augered to 124'. New driller (Dennis):water level at	1061.2
- 125 — -		( S	SS	8-38 87-50 for 3"	100	Brown, fine to very coarse SAND and fine to medium GRAVEL, trace coarse Sand and fine Gravel, well graded, and WET. Fine to medium sand is well rounded, highly spherical, and 70-80% quartz. Coarse component is	SW-GW		ر > م	0	0755 11/3/00 is 68.4';begin at 124' on 11/6/00. Elevation of change in	1057.25
- - 130—			ss	5-14 44-40	100	Seams of less than 0.1 feet. Brown, medium SAND, trace to some fine and coarse Sand, trace very coarse Sand, poorly graded, massive, WET. Fine to medium sand is well rounded, highly	SP				lithology indicated by drillers.	
-				53-30		spherical, and 60-70% quartz. Coarse component is rounded with low sphericity, and 10-20% quartz. Brown, fine to very coarse SAND, trace Silt, poorly graded, WET. Fine to medium sand is well rounded, highly spherical, and 70-80% quartz. Coarse component is	SP		· · · · · · · · · · · · · · · · · · ·			1051.25
135 <del>-</del> - -			S	95	100	angular, spherical, and 70 00/0 quart2. Course component is Brown SILT and fine SAND, trace medium Sand, non-plastic, massive, WET. Fine to medium sand is well rounded, spherical, and 50-70% quartz. Brown, fine to coarse SAND and fine GRAVEL trace Silt	SM	0		Î l		1048.25 1046.25
- 140 			SS	4-3 4-8	25	well graded, massive, WET. Fine to medium sand is well rounded, highly spherical, and 70-80% quartz.	SW-GW		) , 0	)。 (		
- - 145		í As	SS	7-14	100	Brown, fine to medium SAND, trace Silt, poorly graded, massive, WET. Sand is well rounded, highly spherical, and 80-90% guartz.	SP				Elevation of change in lithology indicated by drillers (layers of fine	1041.25 1039.25
-		<b>a</b>	-	20-23		trace Clay, WET. Occasional oblique partings laminated at	SM				anu coarse material). /	



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MW-106D SHEET 4 OF 5 GSWA: Spring Hill Camp Phase III

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Osceola Township, MI 4065-005

COORDINATES N 229,936.2 E 19,442,633.1

DATUM USGS

LOGGED BY **GF/PO** 

S	AMPLE	INFO	RMATI	ON					Б
Depth feet	Lab Sample	Sample Type	Blow Counts	Rec- overy %	DESCRIPTION	USCS	Strata	REMARKS	Elevatic Feet
- - 150 -		SSS	3-4 13-21		40 degrees. Brown, fine to medium SAND, trace Gravel, poorly graded. Sand is well rounded and highly spherical, and ~70-80% quartz.	<u>SM</u>			1036.25
-					Brown, fine to very coarse SAND and fine GRAVEL, trace Silt, well graded, WET.	SW-GW		Elevation of change in lithology indicated by	1031.25
155 <del>-</del> - -		sss			Brown SILT and CLAY, trace fine to coarse Sand, trace very coarse Sand, stiff, low plasticity, MOIST. Upper contact at oblique(40 degree) angle.	CL-ML		drillers. Elevation of change in lithology indicated by drillers.	1029.25
- - 160		C SSS	0-1 4-7	75	Grayish brown, fine to coarse SAND, little to some Clay, trace fine Gravel, very loose, massive, WET. Fine to coarse sands are rounded, spherical, 80-90% quartz. Fine gravel is sub-rounded, sub-spherical, and 60-70% quartz.	sc	- <u>+</u> ] =       		1025.75
- 165		SSS	3-7 13-19	66	Brown, fine to coarse SAND, little Clay, medium dense, poorly graded, massive, WET. Fine to medium sands are well rounded, spherical, and 80-90% quartz. Coarse sand is rounded, sub-spherical, and 60-70% quartz.	SP			1021.25
-					Light brown, fine to coarse SAND, trace Silt and Gravel, very dense, poorly graded, massive, WET. Fine to medium	SP		Color change from light brown to light gray	1016.25
170 - -		SSS	4-17 40-44	66	sands are well rounded, highly spherical, and 80-90% quartz. Coarse sand is well rounded, sub-spherical, and 70-80% quartz. Brown to light gray, fine to coarse SAND, trace Silt and Gravel, very dense, poorly graded, massive, wet. Fine to medium cands are well rounded, highly spherical, and	SP		and brown at 170'. Fine sands are likely	1013.75 1011.25
- 175 - -		SSS	3-8 26-35	17	80-90% quartz. Coarse sand is well rounded, subspherical, and 70-80% quartz. Multicolored to brown, very coarse SAND, trace fine Sand and Gravel, very dense, poorly graded, massive, WET. Coarse sand is rounded to sub-rounded, low sphericity, and 60 70% quartz. Eise condition woll rounded highly.	SP		hit large gravels and thus low recovery. 179-181' first sample	1006.25
- 180 -		C SSS	3-8 26-35	50	spherical, and 80-90% quartz. Light brown, fine to medium SAND, trace Silt, medium dense, poorly graded, massive, WET. Sand is well rounded with high sphericity and 80-90% quartz.	SP		attemp, no recovery. Likely due to Gravel.	
- - 185		SSS	2-3 10-13	50	Light brown, fine to medium SAND, trace Silt, medium dense, poorly graded, massive, WET. Sand is well rounded and highly spherical, and ~80-90% quartz.	SP			1001.25
-					Light brown, fine to medium SAND, trace Silt, medium dense, poorly graded, massive, WET. Sand is well				996.25
190 - -		SSS S	0-3 7-12	50		SP			
- - 195		SSS	3-4 14-16		Light brown, fine to medium SAND, trace Silt, medium dense, poorly graded, massive, WET. Sand is well rounded and highly spherical, and ~80-90% quartz.	SP			991.25
-			3-6			SP		199-201' first sampling attempt, no recovery.	986.25



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Osceola Township, MI

COORDINATES N 229,936.2 E 19,442,633.1

PROJECT NO. DATUM **USGS** 

LOGGED BY	GF/PO

4065-005

s	SAMPLE INFORMATION			ON			-		Б
Depth feet	Lab Sample	Sampl Type	e Blow Counts	Rec- overy %	DESCRIPTION	USCS	Strata	REMARKS	Elevatio Feet
			5 10-17	50	Light brown, fine to medium SAND, trace Silt, medium dense, poorly graded, massive, WET. Sand is well rounded and highly spherical, and ~80-90% quartz. <i>(continued)</i>	SP			
- 205 -		SSS	3-5 9-10		-		n na hainn Na San San		
- - 210		SS	18-52 97	25	Light brown,fine to medium SAND, trace Silt, dense, poorly graded, massive, WET. Fine sand is rounded to sub-rounded with high sphericity and 85-95% quartz. Medium sand is angular, sub-spherical, and 80-90%	SP			976.25
-					Light brown, fine to coarse SAND, trace Silt, dense, well graded, massive, WET. Fine sand is sub-angular to well				971.25
215 - -		i sse	3 		rounded with high sphericity and 85-95% quartz. Medium and coarse sand is angular with low sphericity and 75-85% quartz. Silt occurs as one ~1/4" very soft gray clast.	sw			
- - 220 <del>-</del> -		SS:	25-57 110	42	Light gray to brown, fine to medium SAND, some Silt, dense, massive, WET. Sand is well rounded with high sphericity and 85-95% quartz. Silt occurs in ~3" thick lenses dispersed throughout the sample.	SM			966.25
-			6.01		Light brown, fine to medium SAND, trace to little Silt, dense, poorly graded, massive, WET. Sand is well rounded with bigh sphericity and 85-95% quartz				961.25
225 - -		SSS S	44-65			SP			
- - 230 -		SS:	13-68 100 for 3"		Light brown, fine to coarse SAND, trace Silt, dense, poorly graded, massive, WET. Fine to medium sand is well rounded with high sphericity and 80-90% quartz. Coarse sand is angular, sub-spherical, and 60-70% quartz.	SP			956.25
- - 235		®GRA	в		Light brown, fine to medium SAND, trace Silt, dense, poorly graded, massive, WET. Fine sand is well rounded with high sphericity and 80-90% quartz. Medium sand is angular with low sphericity and 60-70% quartz.	SP	· · · ·	Sampled with sand bailer.	951.25
-			21-72		Light brown, fine to medium SAND, trace Silt and fine Gravel, very dense, well graded, masssive, WET. Fine to	sw			946.25
240		SS	100 for	42	80-90% quartz. Gravel is angular to sub-rounded and 50-60% quartz.			End of boring - 241'.	942.75

<b>N</b> co		CO KN		<b>M</b> 0.0 E	1500 A East La Telepho Fax: (5 <b>19,440,4</b>	bbott Road, Suite 210 ansing, MI 48823 one: (517) 337-0111 517) 337-0417 4 <b>69.3</b>	BORING NO. PROJECT LOCATION PROJECT NO.	MW-10 GSWA Osceo 4065-0	7D : Sprir la Tow 05	SHEET ng Hill Camp Phas nship, MI	1 OF 6 se III
SUR	FACE ELE	VATIC	N 118	80.68	DATU	USGS	LOGGED BY	Phil O	denkir	k	
DRII Ste DRII 4 1 DRII 11/	LLING COM earns LLING MET /4" HSA LLING STA /2/00 SAND CLAY	NTRAC		MENT <b>1050</b> D <b>/00</b> <b>/</b> SILT CLAYEY	Ý SAND	LOCATION DESCRIPTION: See attached Site Diagr	am for location.				
۰ <i>۲</i>	GRAVEL			SILTY S	AND				-	-	
S Depth feet	SAMPLE Lab Sample	INFO Sample Type	RMATI Blow Counts	ON Rec- overy %		DESCRIPTION		USCS	Strata	REMARKS	Elevation Feet
-	-				Dark bro massive	own, SAND, little Clay, trace Silt e, and MOIST.	, slightly plastic,	SP-SC			1180.68
5-		SSS	1-1	75	Light bro	own, fine to medium SAND, trac	e Silt, poorly	SP			1176.18
-	-		1-1		graded, spherica Brown, f MOIST. Coarse	massive, and MOIST. Sand is v al, and 90% quartz. fine to coarse SAND, little Clay, Fine sand is well rounded, and sand is angular, and 70-80% qu	well rounded, massive, and 80-90% quartz. artz.	sc			1175.48
10 - -	-	C SSS	50/6"	75	Light bro massive rounded	own, fine to coarse SAND, trace a, and MOIST. Fine to medium s I. Coarse sand is angular.	Silt, poorly graded, sand is well	SP			1170.68
15-	-	IT SSS	7-7 14-15	83	Light bro somewh	own, fine to coarse SAND, poorl nat stratified, and MOIST. Sand i	y graded, is rounded.	SP			1166.68
20-	-	(() SSS	7-8 12-16	67	Brown, f massive rounded sub-rou	fine to coarse SAND, trace Silt, v e, and MOIST. Fine to medium s I, spherical, and 70-80% quartz. nded, sub-spherical, and 50-60%	well graded, sands are well Coarse sand is ⁄6 quartz.	SW			1162.68
- 25	-	(() SSS	8-16 25-28	67	Light bro graded, rounded	own, fine to medium SAND, trac massive, and MOIST. Fine to n I and spherical with ~70-80% qu	e Silt, poorly nedium sand is well artz.	SP			1158.18
.			7-8					SP			1151.68



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BORING NO. PROJECT LOCATION

PROJECT NO.

MW-107D SHEET 2 OF 6 **GSWA: Spring Hill Camp Phase III** 

Osceola Township, MI

COORDINATES N 230,060.0 E 19,440,469.3

DATUM **USGS** 

4065-005 Phil Odenkirk LOGGED BY

AMPLE	INFOF	RMATI	ON			_		u
Lab Sample	Sample Type	Blow Counts	Rec- overy %	DESCRIPTION	USCS	Strata	REMARKS	Elevatio Feet
	SSS	20-21	67	Light brown, fine to medium SAND, trace Silt, poorly graded, massive, and MOIST. Sand is well rounded, spherical, and 80-90% quartz. <i>(continued)</i>	SP			
	SSS	7-12 17-20	67	Light brown, fine to medium SAND, trace Silt, trace fine Gravel, poorly graded, and MOIST. Sands are well rounded, spherical, and 80-90% quartz. Gravel occurs as a 3" seam of fine Gravel at 35' bgl. Gravel is sub-rounded, 50-60% quartz.	SP			1146.68
				Light brown, fine to coarse SAND, some fine to medium Gravel, trace Silt, well graded, massive, and MOIST. Fine to medium sand is sub-rounded, highly spherical, and				1143.18
	SSS	7-12 18-21	67	80-90% quartz, Gravel is angular, and 50-60% quartz.	SW			
		7.01		Light brown, fine to medium SAND, trace Silt, poorly graded, massive, and MOIST. Sand is sub-rounded, spherical, and 80-90% quartz.				1138.18
	SSS	31-38	75		SP			
				Light brown, fine to medium SAND, trace Silt, poorly graded, massive, and MOIST. Sand is well rounded, spherical, and 80-90% quartz.	SP			1133.18
	sss (	7-16 22-24	67	Brown, fine to coarse SAND, some fine to medium Gravel, trace Silt, well graded, massive and MOIST. Sands are sub-rounded, spherical, and 80-90% quartz. Gravel is angular and 50-60% quartz.	SW			1130.68
	ass a	4-8	67	Brown, fine to coarse SAND, some fine to medium Gravel, trace Silt, well graded, massive, and MOIST. Sand is	SW		-	¥126.68
		10-13		sub-rounded with low sphericity and 80-90% quartz. Light brown, fine to coarse SAND, trace Gravel, trace Silt, poorly graded, massive, and WET. Fine to medium sand is sub-rounded, sub-spherical, and 60-80% quartz. Coarse sand is angular and 50-60% quartz. 1-1.25" Gravel is			Water encountered at 55.5' bgl during drilling.	1125.18
	( SSS	7-12 10-14	67	chert.	SP			
				Light brown, fine to coarse SAND, trace Silt, poorly graded, massive, and WET. Sand is sub-angular to sub-rounded, sub-spherical and 60, 70% quarts				1118.18
	( C SSS	2-3 7-8	63	Sub-sphencal, and ou-70% qualiz.	SP			
		40.55		Light brown, fine to coarse SAND, some medium Gravel, trace Silt, well graded, massive, and WET. Sand is sub-angular to sub-rounded, sub-spherical, and 60-70%	sw			1113.18
	AMPLE	AMPLE       INFOR         Lab       Sample         Sample       Type         Image: System of the system	AMPLE INFORMATION         Lab Sample       Sample Type       Blow Counts         Image: SSS       20-21         Image: SSS       20-21         Image: SSS       20-21         Image: SSS       20-21         Image: SSS       7-12         Image: SSS       7-12         Image: SSS       7-21         Image: SSS       7-16         Image: SSS       10-13         Image: SSS       10-13         Image: SSS       2-3         Image: SSS       2-3	AMPLE INFORMATIONLab Sample $\overrightarrow{Sample}$ Counts $\overrightarrow{Rec-}overy(2000000000000000000000000000000000000$	AMPLE INFORMATION       DESCRIPTION         Lab       Sample       Blow       Rec- overy       DESCRIPTION         Image: Sample State S	AMPLE INFORMATION         DESCRIPTION         USCS           Lab         Sample         Blow         Rec- overy         DESCRIPTION         USCS           Sample         SSS         20-21         67         Light brown, fine to medium SAND, trace Silt, poorly graded, massive, and MOIST. Sand is well rounded, spherical, and 80-90% quartz. (continued)         SP           Image: SSS         7.12         67         Light brown, fine to medium SAND, trace Silt, trace fine Gravel, poorly graded, and MOIST. Sands are well orunded, spherical, and 80-90% quartz. Gravel occurs as a 3's eam of fine Gravel at 35' bgl. Gravel is sub-rounded, 50-60% quartz.         SP           Image: SSS         7.12         67         Hight brown, fine to coarse SAND, some fine to medium Gravel, trace Silt, well graded, massive, and MOIST. Sand is sub-rounded, spherical, and 80-90% quartz.         SW           Image: SSS         7.12         67         Light brown, fine to medium SAND, trace Silt, poorly graded, massive, and MOIST. Sand is well rounded, spherical, and 80-90% quartz.         SW           Image: SSS         7.12         67         Frace Silt, well graded, massive and MOIST. Sand is well rounded, spherical, and 80-90% quartz.         SW           Image: SSS         7.12         67         Frace Silt, well graded, massive, and MOIST. Sand is well rounded, spherical, and 80-90% quartz.         SW           Image: SSS         7.12         67         Frace Silt, well graded, massive, and MOIST	AMPLE INFORMATION         DESCRIPTION         USCS         gg           Lab         Sample         Blow         Rec- overy         DESCRIPTION         USCS         gg           1         SSS         20-21         67         Light brown, fine to medium SAND, trace Silt, poorly graded, massive, and MOIST. Sand is well rounded, spherical, and 80-90% quartz. (continued)         SP           1         SSS         7.12         67         Light brown, fine to medium SAND, trace Silt, poorly graded, massive, and MOIST. Sands are well rounded, spherical, and 80-90% quartz. Gravel occurs as a 3' seam of the Gravel as 5UG. Gravel is sub-rounded, 50-60% quartz.         SP           1         SSS         7.12         67         Light brown, fine to coarse SAND, some fine to medium Gravel, trace Silt, well graded, massive, and MOIST. Sand is sub-rounded, spherical, and 80-90% quartz.         SW           1         SSS         7.21         67         Light brown, fine to medium SAND, trace Silt, poorly graded, massive, and MOIST. Sand is sub-rounded, spherical, and 80-90% quartz.         SW           1         SSS         7.12         67         Light brown, fine to medium SAND, trace Silt, poorly graded, massive, and MOIST. Sand is well rounded, spherical, and 80-90% quartz.         SW           1         SSS         7.12         67         Brown, fine to coarse SAND, some fine to medium Gravel, trace Silt, well graded, massive, and MOIST. Sand is well rounded, spherical, and 80-90% quart	AMPLE INFORMATION     Description     USCS     Pg       Lab     Sample     Biow Type     Rec. Proc.     Description     USCS     Pg       Sample     Sype     Counts     Pg     USCS     Pg       Sample     Sype     Counts     Pg     USCS     Pg       Sample     Sype     Upth brown, fine to medium SAND, trace Silt, poorly graded, massive, and MOIST. Sands are well counded, spherical, and 80-90% quartz. (continued)     SP     SP       Sample     SSS     7-12     67     Light brown, fine to medium SAND, trace Silt, trace fine Grave, poorly graded, massive, and MOIST. Sands are well so "seare of fine Grave is 30 bg. Grave is sub-rounded, 59-60% quartz.     SP       Sample     SSS     7-12     67     Exploration fine to medium SAND, trace Silt, poorly graded, massive, and MOIST. Sands are well so "seare of fine Grave is 30 bg. Grave is sub-rounded, spi- spherical, and 80-90% quartz.     SW       Light brown, fine to medium SAND, trace Silt, poorly graded, massive, and MOIST. Sands are well so pherical, and 80-90% quartz.     SP       Light brown, fine to medium SAND, trace Silt, poorly graded, massive, and MOIST. Sands are spherical, and 80-90% quartz.     SP       Light brown, fine to coarse SAND, some fine to medium Gravel, trace Silt, well graded, massive, and MOIST. Sands are suparameter and 50-90% quartz.     SW       SP     SSS     7-12     67     Free Silt, well graded, massive, and MOIST. Sands are suparameter and 50-90% qu



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MW-107D SHEET 3 OF 6 GSWA: Spring Hill Camp Phase III

Osceola Township, MI 4065-005

COORDINATES N 230,060.0 E 19,440,469.3

DATUM **USGS** 

BY	Phil	Odenkirk

s	AMPLE	INFO	RMATI	ON					ч
Depth feet	Lab Sample	Sample Type	Blow Counts	Rec- overy %	DESCRIPTION	USCS	Strats	REMARKS	Elevati Feet
-			18-20	58	quartz. Light brown, fine to coarse SAND, trace Silt, trace fine to medium Gravel, well graded, and WET. Sands are	sw			1108.18
75		tttt SSS	8-9 23-30	33	rounded, sub-spherical, and approximately 50% quartz.	SW			
- - 80		SSS	8-16 21-27	75	Light brown, fine to medium SAND, trace Silt, poorly graded, massive, and WET. Sand is rounded, spherical, and 70-80% quartz.	SP			1103.18
-					Light brown, fine to medium SAND, trace Silt, trace fine Gravel, poorly graded, and WET. Sand is rounded, highly spherical, and 75-85% guartz. Fine Gravel occurs as 3"		n ay dan day		1098.18
85		SSS (	3-8 21-22	83	lens at 85.6' bgl, and is sub-rounded and 60-70% quartz.	SP			
- - 90 -			5-11 20-25	75	Brown, fine to coarse SAND, some fine to medium Gravel, well graded, massive, and WET. Sand is angular to rounded, sub-spherical, and 70-80% quartz. Gravel is rounded, sub-spherical, and 70-80% quartz.	SW			1093.18
-			10.25		Multicolored, fine to coarse SAND, some fine to medium Gravel, trace Silt, well graded, massive, and WET. Sand is angular to rounded, sub-spherical, and 70-80% quartz. Gravel is rounded, sub-spherical, and 70-80% quartz	SW			1088.18
95		C SSS	27-30	42	Multicolored, fine GRAVEL, little medium Gravel, poorly graded, massive, and WET. Gravel is well rounded with low sphericity and 60-70% quartz.	GP			1085.18
-			20-25	67	Light brown, fine to medium GRAVEL, trace to some fine to coarse Sand, trace Silt, well graded, and WET. Sand and Gravel is sub- to well rounded with low to high sphericity. Sand is ~50% quartz and ~50% rock fragments. Gravel is	GW SP			1083.18 1081.18
-			31-35	07	sharp at 99.5'. Light brown, fine to medium SAND, trace coarse Sand, poorly graded, and WET. Sand is well rounded with moderate to high sphericity and ~95% quartz.	GW			1080.78 1078.18
- 105		( SSS	10-25 27-29	75	coarse Sand, trace Silt, well graded, and WE1. Sand and gravel are sub- to well rounded with low to high sphericity. Sand is ~50% quartz and ~50% rock fragments. Gravel is entirely rock fragments. Light brown, fine to medium SAND, little to some fine to coarse Sand, poorly graded, occasional 1-2" thick lenses of	SP			
_			10-15		fine to coarse Gravel, poorly graded, and WET. Sand is well rounded with moderate sphericity and is composed of ~80-90% quartz and 10-20% rock fragments. Light brown, fine to medium SAND, trace fines, massive, poorly graded, and WET. Sand is rounded with low	SP			1073.18



1500 Abbott Road, Suite 210 East Lansing, MI 48823 Telephone: (517) 337-0111 Fax: (517) 337-0417

BORING NO. PROJECT LOCATION

PROJECT NO.

MW-107D SHEET 4 OF 6

GSWA: Spring Hill Camp Phase III

Osceola Township, MI

COORDINATES N 230,060.0 E 19,440,469.3

DATUM USGS

LOGGED BY Phil Odenkirk

4065-005

s	AMPLE	INFO	RMATI	ON			~		u
Depth feet	Lab Sample	Sample Type	Blow Counts	Rec- overy %	DESCRIPTION	USCS	Strate	REMARKS	Elevati Feet
-			16-16	50	sphericity and 70-80% quartz Multicolored, fine to medium GRAVEL, trace Sand, well graded. Gravel is rounded.	GW			1070.18
- - 115— -		(() SSS	3-8 13-13	63	Light brown, fine to medium SAND, trace coarse Sand and fine Gravel, trace Silt, well graded, massive, and WET. Fine to medium sand is well rounded with medium to high sphericity and 80-90% quartz. Coarse sand and gravel is sub-angular to sub-rounded with low to medium sphericity and 70% rock fragments.	sw	4		1068.18
-			11-36		Light brown, fine to medium SAND, trace coarse Sand and Silt, poorly graded, and WET. Fine to medium sand is well rounded with medium to high sphericity and 85-95% quartz. Coarse sand is sub-angular to rounded with low to medium				1063.18
120 <del>-</del> -		SSS	50 for 3"	50	sphericity and is primarily rock fragments.	SP			
- - 125 — -		( SSS	15-21 50/6"	67	Light brown, fine SAND, little Silt, massive, and WET. Sand is well rounded with high sphericity and 80-90% quartz. Top 8" grades into fine Sand and Silt with occasional Clay seams (<1 cm thick) at bottom 8".	SM			1058.18
- - 130— -		( SSS	19-50/6' 	75	Light brown, fine to medium SAND, trace coarse Sand and Gravel, trace Silt, poorly graded, and WET. Fine to medium Sand is well rounded with high sphericity and 80-90% quartz. Coarse sand and gravel is sub-rounded with low to medium sphericity and is composed of rock fragments, quartz, and occasional 1" diameter Clay clasts.	SP			1053.18
- - 135			4-11	67	Light brown, fine to medium SAND, trace Silt, poorly graded, and WET. Sand is well rounded with high sphericity and 80-90% quartz.	SP			1048.18
-			18-19	01	Light brown, fine to medium SAND, trace coarse Sand and fine Gravel trace Silt poorly graded massive and WET				1043.18
- 140 — -		( sss	16-50/6' 	67	Sand and gravel are well rounded with high sphericity and 80-90% quartz.	SP			
-			15-16		Light brown, fine to medium SAND, trace Silt and coarse Sand, poorly graded, massive, and WET. Sand is well rounded with high sphericity and 80-90% quartz.			1240:Drillers stop drilling for weekend.	1038.18
145 <del>-</del> -		T SSS	19-21	67	Light brown fing to modium CAND trace second Oracle	SP			1022.40
-			10-14		poorly graded, massive, and WET. Sand is well rounded with high sphericity and 80-90% quartz.	SP		(11/6/00).	1033.18



1500 Abbott Road, Suite 210 East Lansing, MI 48823 Telephone: (517) 337-0111 Fax: (517) 337-0417

DATUM **USGS** 

BORING NO. PROJECT LOCATION MW-107D SHEET 5 OF 6 GSWA: Spring Hill Camp Phase III

Osceola Township, MI

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COORDINATES N 230,060.0 E 19,440,469.3

PROJECT NO. LOGGED BY

Э.	4065-005
	Phil Odenkirk

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S	AMPLE	INFO	RMATI	ON			_		Б
Depth feet	Lab Sample	Sample Type	Blow Counts	Rec- overy %	DESCRIPTION	USCS	Strata	REMARKS	Elevatio Feet
-			16-21	100	Light brown, fine to medium SAND, trace coarse Sand, poorly graded, massive, and WET. Sand is well rounded with high sphericity and 80-90% quartz. <i>(continued)</i>	SP			
- 155 -		I SSS	3-7 10-14	100					
-					Light brown, fine to medium SAND, trace coarse Sand, poorly graded, and WET. Fine to medium sand is well rounded with high sphericity and >90% quartz. Coarse				1023.18
160 <del>-</del> -		SSS (	4-4 8-11	50	and ~90% rock fragments.	SP			
- - 165			10-25	100	Light brown, medium to coarse SAND, trace fine Sand and fine Gravel, poorly graded, massive, and WET. Sand is well rounded with high sphericity and 70-80% quartz. Gravel is sub- to well rounded with medium sphericity and 2000 rook for another sphericity.	SP		5' heave in augers. 164-166' sample, pushed through 12" heave.	1018.18
-				100	<ul> <li>ABU% FOCK fragments.</li> <li>Light brown, fine GRAVEL and medium to coarse SAND, well graded, and WET. Sand is well rounded with high sphericity and 60-70% quartz. Gravel is sub- to well</li> </ul>	GW			1014.98
- - 170		( SSS	6-12 	75	I rounded with medium to high sphericity and >90% rock	SP		5' heave in augers. 169-171' sample, pushed through 12" heave.	1013.18
-					Light brown, fine to medium SAND, trace coarse Sand, poorly graded, and WET. Fine to medium sand is well rounded with high sphericity and ~70-80% quartz. Coarse			5' heave in augers. 174-176' sample, pushed through 12"	1008.18
175		SSS (	12-28	10	Fraction is angular to sub-angular with low sphericity and ~90% rock fragments.	SP		neave.	
-			16-50/6		Light brown, fine to medium SAND, trace coarse Sand, poorly graded, and WET. Majority of fine to medium sand is well rounded and highly spherical. Fraction of fine and medium sand has low sphericity. High sphericity material is	SP			1003.18
180 - -		C SSS		75	~90% quartz; low sphericity material is >80% rock fragments. Coarse sand is sub- to well rounded with medium sphericity. Gravel has low to medium sphericity. Sand is predominantly quartz. Gravel is ~90% rock	<u>SP/GP</u> SP	<u>9 9 9 9 9 9</u>		- <u>1000.68</u> 1000.38
- - 185			11-50/6'	100	Light brown, medium to coarse SAND and GRAVEL. Sand is highly spherical and predominantly quartz. Gravel has low to medium sphericity and ~90% quartz. All material is well rounded.	SP		Bailed 5' heave.	998.18
-					Light brown, fine SAND, little medium Sand, poorly graded, and WET. Sand is well rounded, highly spherical, and ~90% quartz. Light brown, fine to medium SAND, trace coarse Sand and				000.40
-			11-50/6'		fine Gravel, poorly graded, massive, and WET. Fine to medium sand is well rounded, highly spherical, and ~80% quartz. Coarse sand is ~80% rock fragments. Gravel is angular to sub-rounded with low sphericity and >90% rock	SP			993.18



BORING NO. PROJECT

LOCATION

MW-107D SHEET 6 OF 6

**GSWA: Spring Hill Camp Phase III** 

Osceola Township, MI

### COORDINATES N 230,060.0 E 19,440,469.3

SURFACE ELEVATION 1180.68

DATUM USGS

PROJECT NO. 4065-005 **Phil Odenkirk** LOGGED BY

		_								
S	SAMPLE INFORMATION									uo
Depth feet	Lab Sample	Sa T	ample Type	Blow Counts	Rec- overy %	DESCRIPTION	USCS	Strate	REMARKS	Elevati Feet
			SSS		50	fragments. Overall spoon coarsens downward. Light brown, fine to medium SAND, trace coarse Sand and fine Gravel, poorly graded, and WET. Fine to medium sand is well rounded, highly spherical, and 80-90% quartz. Coarse fraction is sub-angular to sub-rounded with medium sphericity and ~90% rock fragments. At 190' bgl, 2" lens of fine to medium Gravel. ( <i>continued</i> )	SP		5' heave in augers. 189-191' sample, pushed through 12"	988.18
195 - -		ננננת	SSS	16-21 	35	Light brown, fine to medium SAND, trace coarse Sand, poorly graded, massive, and WET. Fine to medium sand is sub-rounded, highly spherical, and ~90-95% quartz. Coarse sand is sub-angular with low sphericity and ~80% rock fragments.	SP		heave.	
- - 200 -		וווו	SSS	6-14 30	50	Light brown, fine to medium SAND, trace coarse Sand, poorly graded, massive, and WET. Fine to medium sand is well rounded, highly spherical, and ~80-90% quartz. Coarse sand is ~90% rock fragments. Gravel is sub-angular to sub-rounded with low sphericity.	SP		5' heave	983.18
-				16-50/5'		Light brown, fine to medium SAND, trace coarse Sand, poorly graded, massive, and WET. Fine to medium Sand is well rounded, highly spherical, and ~80-90% quartz. Coarse sand is ~90% rock fragments, sub-angular to			5' heave	978.18
205 - -		נות	555		75	sub-rounded with medium sphericity. ~2" thick lense of fine GRAVEL and fine to coarse SAND at 205.5'. Light brown, fine to medium SAND, little to some coarse	SP			973.18
- 210		ιιι	SSS	12-16 	75	Fine to medium sand is sub- to well rounded and highly spherical, with ~70-80% quartz. Coarse fraction is angular to sub-rounded with low sphericity and >90% rock fragments.	SP		End of boring - 211'.	969.68

		CORN RN ES N 2		<b>M</b> 0.5 E	1500 Abbott Road, Suite 210       BORING NO.         East Lansing, MI 48823       PROJECT         Telephone: (517) 337-0111       LOCATION         Fax: (517) 337-0417       PROJECT NO.			MW-107I SHEET 1 OF GSWA: Spring Hill Camp Phase III Osceola Township, MI 4065-005						
SUR	FACE EL	EVATIO	N 11	80.75	DATU	M USGS	LOGGED BY	Phil O	denkir	k				
DRII Ste DRII 4 1 DRII 11	LING CO earns LING ME //4" HSA LING ST/ /16/00	NTRAC THOD A ARTED	EQUIF CME ENDE 11/1	PMENT E 1050 D 6/00		LOCATION DESCRIPTION: See attached Site Diag	am for location.							
· · ·	SAND CLAY GRAVEL	3167		SILT CLAYE SILTY S	Y SAND SAND									
S Depth feet	SAMPLE Lab Sample	INFO Sample	RMATI Blow Counts	ON Rec- overy	-	DESCRIPTION		uscs	Strata	REMARKS	Elevation Feet			
				%	Dark bro massive	own, SAND, little Clay, trace Sil e, and MOIST.	t, slightly plastic,	SP-SC			1180.75			
5-	-	SSS	1-1 1-1	75	Light br graded, spherica Brown, MOIST.	own, fine to medium SAND, trac massive, and MOIST. Sand is al, and 90% quartz. fine to coarse SAND, little Clay, . Fine sand is well rounded, and	e Silt, poorly well rounded, massive, and 1 80-90% quartz.	SP SC			<u>1176.25</u> 1175.55			
10-	-	SSS	10-25 50/6"	75	Light br massive rounded	own, fine to coarse SAND, trace e, and MOIST. Fine to medium d. Coarse sand is angular.	artz. Silt, poorly graded, sand is well	SP			1170.75			
15-		SSS	7-7 14-15	83	Light br somewh	own, fine to coarse SAND, poor hat stratified, and MOIST. Sand	ly graded, is rounded.	SP			1166.75			
20-		SSS	7-8 12-16	67	Brown, massive rounded sub-rou	tine to coarse SAND, trace Silt, e, and MOIST. Fine to medium d, spherical, and 70-80% quartz inded, sub-spherical, and 50-60	well graded, sands are well Coarse sand is % quartz.	sw			1162.75			
25-	-	SSS	8-16 25-28	67	graded, rounded	own, fine to medium SAND, frac massive, and MOIST. Fine to i d and spherical with ~70-80% qu	e Silt, poorly nedium sand is well Jartz.	SP			1158.25			
30-	- - -	SSS	7-8 20-21	67	Light br graded, spherica	own, fine to medium SAND, trac massive, and MOIST. Sand is al, and 80-90% quartz.	e Silt, poorly well rounded,	SP			1151.75			
35-	- - -	( SSS	7-12 17-20	67	Light br Gravel, rounded a 3" sea 50-60%	own, fine to medium SAND, trac poorly graded, and MOIST. Sa d, spherical, and 80-90% quartz am of fine Gravel at 35' bgl. Gra o quartz.	e Silt, trace fine nds are well . Gravel occurs as ivel is sub-rounded,	SP			1146.75			
	1		7-12		Light br Gravel,	own, fine to coarse SAND, som trace Silt, well graded, massive	e fine to medium , and MOIST. Fine	SW			1143.25			



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BORING NO. PROJECT

LOCATION

MW-107I SHEET 2 OF 3 **GSWA: Spring Hill Camp Phase III** 

**Osceola Township, MI** 

4065-005

### COORDINATES N 230,060.5 E 19,440,458.6

SURFACE ELEVATION 1180.75

DATUM **USGS** 

PROJECT NO. **Phil Odenkirk** LOGGED BY

s	AMPLE	INFO	RMATI	ON					uo
Depth feet	Lab Sample	Sample Type	Blow Counts	Rec- overy %	DESCRIPTION	USCS	Strata	REMARKS	Elevatio Feet
-		SSS	18-21	67	to medium sand is sub-rounded, highly spherical, and 80-90% quartz, Gravel is angular, and 50-60% quartz. Light brown, fine to coarse SAND, some fine to medium Gravel, trace Silt, well graded, massive, and MOIST. Fine to medium sand is sub-rounded, highly spherical, and	SW			1138.25
45		SSS	7-21 31-38	75	80-90% quartz, Gravel is angular, and 50-60% quartz. (continued) Light brown, fine to medium SAND, trace Silt, poorly graded, massive, and MOIST. Sand is sub-rounded, spherical, and 80-90% quartz.	SP			1133 25
_			7 16		Light brown, fine to medium SAND, trace Silt, poorly graded, massive, and MOIST. Sand is well rounded,	SP			1100.20
50 - -		SSS	22-24	67	spherical, and 80-90% quartz. Brown, fine to coarse SAND, some fine to medium Gravel, trace Silt, well graded, massive and MOIST. Sands are sub-rounded, spherical, and 80-90% quartz. Gravel is angular and 50-60% quartz.	sw			1130.75
- 55		Ass	4-8	67	Brown, fine to coarse SAND, some fine to medium Gravel,	sw			1126.75
-			10-13		sub-rounded with low sphericity and 80-90% quartz. Light brown, fine to coarse SAND, trace Gravel, trace Silt, poorly graded, massive, and WET. Fine to medium sand is sub-rounded, sub-spherical, and 60-80% quartz. Coarse	SD.		Water encountered at 55.5' bgl during drilling.	1125.25
60		sss	7-12 10-14	67	angular with low sphericity, and composed of white to gray chert.				
-					Light brown, fine to coarse SAND, trace Silt, poorly graded,				1118.25
65		sss	2-3 7-8	63	sub-spherical, and 60-70% quartz.	SP			
-					Light brown, fine to coarse SAND, some medium Gravel,				1113.25
- 70 -		SSS	12-23 18-20	58	sub-angular to sub-rounded, sub-spherical, and 60-70% quartz. Gravel is sub-angular to sub-rounded, and 20-30% quartz.	sw			
-					Light brown, fine to coarse SAND, trace Silt, trace fine to medium Gravel well graded and WET. Sands are				1108.25
75		SSS	8-9 23-30	33	sub-rounded, sub-spherical, and 70-80% quartz. Gravel is rounded, sub-spherical, and approximately 50% quartz.	sw			
-					Light brown, fine to medium SAND, trace Silt, poorly				1103.25
- 80 -		SSS	8-16 21-27	75	and 70-80% quartz.	SP			
-					Light brown, fine to medium SAND, trace Silt, trace fine				1098.25
- 85		- sss	3-8 21-22	83	Gravel, poorly graded, and WET. Sand is rounded, highly spherical, and 75-85% quartz. Fine Gravel occurs as 3" lens at 85.6' bgl, and is sub-rounded and 60-70% quartz.	SP			
-					Brown, fine to coarse SAND, some fine to medium Gravel,				1093.25
- 90		r sss	5-11 20-25	75	well graded, massive, and WET. Sand is angular to rounded, sub-spherical, and 70-80% quartz. Gravel is rounded, sub-spherical, and 70-80% quartz.	sw			
						sw			1088.25



BORING NO. PROJECT

LOCATION

MW-107I SHEET 3 OF 3 **GSWA: Spring Hill Camp Phase III** 

Osceola Township, MI

4065-005

#### COORDINATES N 230,060.5 E 19,440,458.6

SURFACE ELEVATION 1180.75

DATUM **USGS** 

PROJECT NO. Phil Odenkirk LOGGED BY

S	AMPLE	١N	NFOF	RMATI	ON					u
Depth feet	Lab Sample	Sa	ample Гуре	Blow Counts	Rec- overy %	DESCRIPTION	USCS	Strata	REMARKS	Elevatic Feet
95			SSS	10-25 27-30	42	Multicolored, fine to coarse SAND, some fine to medium Gravel, trace Silt, well graded, massive, and WET. Sand is angular to rounded, sub-spherical, and 70-80% quartz.	SW GP			1085.25
- - 100-		וננ	SSS	20-25	67	Multicolored, fine GRAVEL, little medium Gravel, poorly graded, massive, and WET. Gravel is well rounded with low sphericity and 60-70% quartz.	GW SP			1083.25 1081.25
-		, ų		31-35		coarse Sand, trace Silt, well graded, and WET. Sand and Gravel is sub- to well rounded with low to high sphericity. Sand is ~50% quartz and ~50% rock fragments. Gravel is entirely rock fragments. Contact between SP and GW is	GW 			1080.85 1078.25
- 105 <del>-</del> -		וווו	SSS	10-25 27-29	75	Sharp at 99.5'. Light brown, fine to medium SAND, trace coarse Sand, poorly graded, and WET. Sand is well rounded with moderate to high sphericity and ~95% quartz. Light brown, fine to medium GRAVEL, trace to some fine to	SP			
- - 110		וווו	SSS	10-15 16-16	50	coarse Sand, trace Silt, well graded, and WET. Sand and gravel are sub- to well rounded with low to high sphericity. Sand is ~50% quartz and ~50% rock fragments. Gravel is	SP	<del>مر (</del>		1073.25
-		۱ ا				Light brown, fine to medium SAND, little to some fine to coarse Sand, poorly graded, occasional 1-2" thick lenses of fine to coarse Gravel, poorly graded, and WET. Sand is well rounded with moderate sphericity and is composed of	GW  SW			1068.25
115			SSS	3-8 13-13	63	-80-90% quartz and 10-20% rock fragments. Light brown, fine to medium SAND, trace fines, massive, poorly graded, and WET. Sand is rounded with low sphericity and 70-80% quartz Multicolored, fine to medium GRAVEL, trace Sand, well graded. Gravel is rounded. Light brown, fine to medium SAND, trace coarse Sand and fine Gravel, trace Silt, well graded, massive, and WET. Fine to medium sand is well rounded with medium to high sphericity and 80-90% quartz. Coarse sand and gravel is sub-angular to sub-rounded with low to medium sphericity and 70% rock fragments.	SW		End of boring - 116' bgl	1064.75

		CO RN ES N 2		<b>M</b> 5.6 E	1500 Abbott Road, Suite 210       BORING N         East Lansing, MI 48823       PROJECT         Telephone: (517) 337-0111       LOCATION         Fax: (517) 337-0417       PROJECT         E 19,439,573.3       PROJECT			MW-108I SHEET 1 OF 4 GSWA: Spring Hill Camp Phase III Osceola Township, MI 0. 4065-005				
SUR	FACE ELE	Ενατιο	N <b>11</b> :	32.99	DATUN	M USGS	LOGGED BY	Phil Oc	denkirl	k		
DRIL Ste DRIL 4 1 DRIL 11/	LING COL Parns LING ME <sup>*</sup> /4" HSA LING STA /9/00 SAND	NTRAC THOD ARTED STR/		2MENT 5 <b>95</b> 5 <b>4/00</b> SILT		LOCATION DESCRIPTION: See attached Site Diagr	am for location.					
E	CLAY			CLAYE	SAND							
<u>مر</u> ۰-	GRAVEL			SILTY S	AND							
s	SAMPLE	INFO	RMATI	ON					-		u	
Depth feet	Lab Sample	Sample Type	Blow Counts	Rec- overy %		DESCRIPTION		USCS	Strats	REMARKS	Elevatio Feet	
- - - 5		sss	3-4 7-9	75	Light bro massive layer 4-4	own SILT, some Clay, little fine 5 e, and MOIST. Sand is well rour 4.25' bgl.	Sand, low plasticity, ided. Organic rich	ML			1132.99	
- - 10 - -		( SSS	5-8 9-9	67	Light bro Sand, lo highly sp disperse Light bro	own SILT, some fine Sand, trace ow plasticity, MOIST. Sand is we pherical. Sand is concentrated i ed throughout rest of sample. own SILT, some very fine Sand,	e Clay, trace coarse ell rounded and n 3" lense and also trace Clay, trace	ML		8' bgl: Rig rythmically bouncing on fine gravels.	1125.49 1120.49	
- 15- -		SSS	7-9 12-14		coarse S rounded	Sand, very stiff, massive, and M <sup>i</sup> I and highly spherical.	OIST. Sand is well	ML				
-		~	1-7		Brown C plastic, s	CLAY, trace Silt, trace very fine S stiff, massive, and MOIST.	Sand, moderately	CL			1115.49	
20-			11-24		Light bro well rour	own, fine to medium SAND, poo nded, highly spherical, clean Sa	rly graded. Sand is nd.	SP			1112.39	
-					Medium	GRAVEL.		GP			1110.49	
25-		Sss	5-7 7-9		Light bro	own CLAY, trace Silt, trace Grav	el, trace Sand, low	CL			1108.74	
		~	7.5		Fine to r	medium SAND, poorly graded.	Sand is well	SP			1107.24	
-					Light bro	own SILT.					1105.49	
30		SSS	4-6 12-18	83	Grey, Cl Gray CL	LAY, low plasticity, massive.	nd, moderately	CL		Silt grades into Clay in 29-31' split spoon sample.	1102.99 1100.49	
35-		SSS	8-15 18-25	50	rounded	I, sub-spherical, and matrix supp	ported.	CL				
-			1-3		Light bro trace Sil to mediu	own, fine to medium SAND, frac lt, loose, poorly graded, massive um sand is well rounded, spheric	e coarse Sand, e, and MOIST. Fine cal, and 80-90%	SP			1095.49	



BORING NO. PROJECT

LOCATION

**MW-108I** SHEET 2 OF 4 **GSWA: Spring Hill Camp Phase III** 

Osceola Township, MI

#### COORDINATES N 228,525.6 E 19,439,573.3

SURFACE ELEVATION 1132.99

DATUM **USGS** 

PROJECT NO. **Phil Odenkirk** LOGGED BY

4065-005

1040.49

SAMPLE INFORMATION				ON					<u>د</u>
Depth feet	Lab Sample	Sample Type	Blow Counts	Rec- overy %	DESCRIPTION	USCS	Strata	REMARKS	Elevatio Feet
			7-10	50	quartz. Coarse sand occurs as 2" seam @39', is well rounded, highly spherical, and 60-70% quartz.	SP	a, da tatu.		
45-	-	( SSS	1-2 8-19	33	Brown, fine to coarse SAND, trace fine Gravel, trace Silt, loose, well graded, massive, and MOIST. Sand is well rounded, spherical, and 80-90% quartz. Gravel occurs in 2" seam and is well rounded, spherical, and 60-70% quartz.	sw			1090.49
50-		( sss	1-2 5-8	42	Brown, fine to coarse SAND, little fine Gravel, trace Silt, loose, well graded, massive, and MOIST. Sand is well rounded, spherical, and 80-90% quartz. Gravel is well rounded, spherical, and 60-70% quartz.	sw			1085.49
55 -	-	- eee	2-2		Brown, SAND, trace Gravel, trace Silt, loose, well graded, massive, and MOIST. Sand is well rounded, spherical, 80-90% quartz. Gravel is well rounded, spherical, and	sw			1080.49
	-		3-4		60-70% quartz. Gray CLAY, little fine Sand, moderately plastic, massive, and MOIST to WET.	CL		Wet at 55' bgl.	1077.99
60-	-	SSS	2-2	58	Gray-brown CLAY, some fine to coarse Sand, trace fine Gravel, firm, moderately plastic, massive and WET. Fine to medium sand is well rounded, spherical, 80-90% quartz, coarse sand is well rounded, spherical, 60-70% quartz, all	CL		2	1075.49 ¥
	-		3-4		Gray CLAY, little fine to medium Sand, trace coarse Sand,				1070.49
65 - - -	-	( SSS	5-9 11-14	58	very stiff, medium plastic, massive, and WET. Fine to medium sand is well rounded, spherical, and 80-90% quartz. Coarse sand is sub-spherical, rounded, and 60-70% quartz.	CL			
70-	-	SSS	6-10 12-14	100	Brown, fine to medium SAND, trace Clay, medium dense, poorly graded, massive, and WET. Sand is well rounded, spherical, and 80-90% quartz. Brown CLAY and SAND, trace fine Gravel, WET.	SP			1062.99 1060.49
75	-	( SSS	5-9 11-15	83		CL/SP			
80-	-	( SSS	3-5 9-11	100	Light brown, fine to coarse SAND, little Clay, medium dense, well graded, massive, and WET. Fine sand is well rounded, highly spherical, and 80-90% quartz. Medium to coarse sand is angular with low sphericity, and 60-70%	SW			1052.99 1050.49
85 -		( SSS	5-6 8-13	75	guarrz. Brown, fine to coarse SAND, trace Silt, trace Clay clasts, medium dense, WET. Fine sand is well rounded, highly spherical, and ~80-90% quartz. Medium to coarse sand is sub-rounded to angular, sub-spherical, and 60-70% quartz. Clay clasts are ~1/8" diameter.	sw			1045.49
90 - - 90	-	( SSS	2-3 4-4	33	trace Clay clasts, loose, poorly graded, massive, WET. Fine to medium sand is well rounded, spherical, 80-90% quartz. Coarse sand is angular to sub-angular with low sphericity and 60-70% quartz. Clay clasts are 0.5-1" diameter.	SP			
1 .	4		I			I SP			1040.49



BORING NO. PROJECT

LOCATION

MW-108I SHEET 3 OF 4 **GSWA: Spring Hill Camp Phase III** 

Osceola Township, MI

## COORDINATES N 228,525.6 E 19,439,573.3

SURFACE ELEVATION 1132.99 

DATUM **USGS** 

4065-005 PROJECT NO. Phil Odenkirk LOGGED BY

Т

s	AMPLE	INF	DRMAT	ION			_		u
Depth feet	Lab Sample	Samp Typ	e Blow Counts	Rec- overy %	DESCRIPTION	USCS	Strata	REMARKS	Elevatio Feet
95		ss	S 5-9 13-23	63	Light brown, fine to medium SAND, trace Silt, medium dense, poorly graded, massive, and WET. Fine sand is well rounded, highly spherical, and 80-90% quartz. Medium sand is angular with low sphericity and 60-70% quartz. <i>(continued)</i> Brown, fine to coarse SAND, trace fine Gravel, trace Clay,	SP			1035.49
- - 100 - -		í ss	S 1-2 4-5	42	loose, well graded, bedded, and WET. Clay occurs as 1" seam @ 99.3' bgl and is moderately plastic. Fine sand is well rounded, highly spherical, and 70-80% quartz. Medium to coarse sand and gravel is sub-angular with low sphericity, and 60-70% quartz. Brown, fine to coarse SAND, trace fine Gravel, trace Silt,	SW			1030.49
- 105 <del>-</del> -		( ss	S		well graded, and WET. Fine sand is well rounded, highly spherical, and 80-90% quartz. Coarse sand and fine gravel are sub-rounded with low sphericity and 60-70% quartz. Coarse sand and gravel are concentrated in 3-4" thick lenses ~3-4" apart, with mostly fine to medium sand between the coarse layers.	SW			1025.49
- 110- - -		( ss	S 3-6 8-19	67	Light brown, fine to coarse SAND, trace fine Gravel, trace Clay, medium dense, well graded, massive, and WET. Clay occurs as brown, moderately plastic 2" thick lenses @ 111'. Fine sand is well rounded, highly spherical, and 80-90% quartz. Coarse sand and gravel are rounded with low sphericity, and 60-70% quartz.	SW			1020.49
- 115 - -		( ss	S 3-5 9-15	63	Silt, medium dense, poorly graded, massive, and WET. Sand is well rounded, spherical, and 80-90% quartz.	SP	ng dan dang Tanggan Ng dan dang		
- - 120 - -		i ss	S 2-3 6-9	83	Light brown, fine to medium SAND, trace Gravel, trace Clay, loose, poorly graded, massive, and WET. Sand is well rounded, spherical, and 80-90% quartz. Clay occurs as 2.5" lense @ 120.2' with 1.75" diameter Gravel directly above Clay. Gravel is well rounded, highly spherical, and quartz.	SP			1015.49
- - 125 -		( ss	S 2-3 5-7		graded, massive, and WET. Sand is well rounded, spherical, 80-90% quartz, Clay occurs as 2-1.5" lenses @ 125.6' bgl.	SP			1010.49
- - 130		í ss	s 3-6 7-11	63	Brown, fine to coarse SAND, little Clay, trace fine Gravel, loose, well graded, massive, and WET. Sand is well rounded, spherical, 80-90% quartz. Clay is in 2" lenses.	sw			1005.49
- - 135		( ss	S 2-4 5-7	63	Brown, fine to medium SAND, trace Silt, trace coarse Sand, loose, poorly graded, massive, and WET. Sand is sub-rounded to rounded, moderately spherical, and 80-90% quartz.	SP	·		1000.49
-			0 2-3		Gray CLAY, little fine Sand, moderately plastic, massive. Trace coarse Sand in a 3" lens.				995.49
140 - -			5-7	42	Gray CLAY, little fine Sand, trace coarse Sand, moderately	CL			990.49
- 145 -		r SS	S 0-0 0-0	75	80-90% quartz.	CL			



1500 Abbott Road, Suite 210 East Lansing, MI 48823 Telephone: (517) 337-0111 Fax: (517) 337-0417 BORING NO. PROJECT LOCATION PROJECT NO. MW-108I SHEET 4 OF 4 GSWA: Spring Hill Camp Phase III

Osceola Township, MI

4065-005

COORDINATES N 228,525.6 E 19,439,573.3

DATUM USGS

LOGGED BY Phil Odenkirk

s	SAMPLE INFORMATION			RMATIO	ЛС					с С
Depth feet	Lab Sample	Sa T	mple ype	Blow Counts	Rec- overy %	DESCRIPTION	USCS	Strata	REMARKS	Elevatio Feet
						Gray CLAY, little fine Sand, firm, moderately plastic, massive, and WET. Sand is well rounded, spherical, and	CL			985.49
150-		H	SSS	1-3 3-4	50	80-90%. quartz.	CL			
-				0-0		Gray CLAY, little fine Sand, very soft, moderately plastic, massive. Sand is well rounded, spherical, and 80-90% guartz.			11/13/2000 17:00 - Stop drilling for day.	980.49
155			555	0-0	50	·				
- - 160			SSS	0-0 3-4	75	Gray CLAY, little fine Sand, soft, low plasticity, and MOIST to WET, interbedded with SAND and CLAY. Sand is well rounded, spherical, and 80-90% quartz.	CL-SP			975.49
-				54		Gray CLAY, little fine Sand, soft, low plasticity, MOIST to			Driller feels	970.49
- 165 <del>-</del> -			SSS	0-0 2-2	33	WET, interbedded with SAND and CLAY. Sand is well rounded, spherical, and 80-90% quartz.	CL-SP		interbedded sands and clays.	
-						Gray CLAY, little fine to medium Sand, stiff, low plasticity, MOIST to WET, interbedded with SAND and CLAY. Sand		 		965.49
170-		ננו	SSS	2-5 8-11	33	is well rounded with medium sphericity and 80-90% quartz.	CL-SP			
-				6-12		Gray CLAY, little fine Sand, very stiff, moderately plastic, MOIST to WET. Vertical somewhat "clean" Sand seams 1-2" in length. Sand is well rounded, spherical, and			Driller feels sample drive like hard clay.	960.49
175			555	14-21	50	80-90% quartz.	UL			
- - 180			SSS	7-18		Gray CLAY, little Sand, very stiff, moderately plastic, MOIST. Sand is well rounded, spherical, and 80-90% quartz.	CL			955.49
-				22 20					End of Boring - 181' bgs.	951.99

		RN ES N2	229,68	<b>B.</b> 3 E 18.77	1500 Abbott Road, Suite 210       BORING NO.         East Lansing, MI 48823       PROJECT         Telephone: (517) 337-0111       LOCATION         Fax: (517) 337-0417       PROJECT NO.         DATUM       USGS			MW-109D SHEET 1 OF 5 GSWA: Spring Hill Camp Phase III Osceola Township, MI 4065-005 Larry Jordan					
DRIL Ste DRIL 4 1 DRIL 11/	LING CO earns LING ME /4" HSA LING ST/ 7/00	NTRAC THOD A ARTED STRA	EQUIP CME ENDEI 11/8	MENT 5 <b>1050</b> 0 700		LOCATION DESCRIPTION: See attached Site Diagra	um for location.						
· · · · · ·	SAND CLAY GRAVEL			SILT CLAYEN SILTY S	Y SAND			_					
S Depth feet	AMPLE Lab Sample	INFO Sample Type	RMATI Blow Counts	ON Rec- overy %		DESCRIPTION		USCS	Strata	REMARKS	Elevation Feet		
-					Dark bro Matter,	own SILT and fine to coarse SA trace Clay, non-plastic, and WET	ND, little Organic <sup>r</sup> .	ML			1118.77		
5		SSS (	3-4 5-2	75	Orange coarses medium ~80% q	to brown, fine to medium SAND Sand, poorly graded, massive, an a sand is well rounded with high s uartz. Coarse fraction is angular ts. @5.3 feet there is a 3" lens	, little Silt, trace nd WET. Fine to sphericity, and and ~80% rock of fine to medium	SP			1114.47		
- 10		SSS	4-5 8-2	10	Gravel. Brown, well gra	fine to medium GRAVEL, and fin ded, and WET.	e to coarse SAND,	GW					
- - 15 -		SSS	8-6 2-2	70	Gray SI slightly layers. horizont	LT, and fine to medium SAND, li plastic, laminated, and WET. Oc Occasional laminations are at ~3 tal. Spoon coarsens downward o	ttle to some Clay, ccasional Clay 30 degrees with overall.	ML		Very hard drilling at 12.5' bgl	1106.27		
		SSS	2/24"	100	Brown S coarse S and WE primarily	SILT, and fine to medium SAND, Sand, trace fine Gravel, slightly p T. Gravel and coarse sand are y rock fragments.	some Clay, trace blastic, massive, well rounded and	ML			1101.27		
- - - 25-		_ sss	2-2 2-3	100	Brown S fine Gra rounded	SILT, and CLAY, some fine to co avel, moderately plastic, and WE d with low sphericity.	arse SAND, trace T. Gravel is well	ML-CL			1096.27		
-					Brown S trace co	SILT, and fine to medium Sand, t parse Sand, trace fine Gravel, slig e, and WET.	race to little Clay, ghtly plastic,	ML			1091.27		
30		í SSS E	2/24"	100	Light bro poorly g well rou Sand is rock frac	own, fine to medium SAND, trace graded, massive, and WET. Fine inded with high sphericity and >8 well rounded with low to high sp gments.	e coarse Sand, to medium Sand is 0% quartz. Coarse hericity and >80%	SP			1086.27		
35-		SSS	2-6 6-6	25	Light bro massive high sph Light bro graded,	own, fine to medium SAND, pool e, and WET. All components are hericity and >85% quartz. own, fine to coarse SAND, some and WET. Sands are well round	rly graded, well rounded with Gravel, well ded with high	SW			1083.77 1081.27		
-			1-1		well rou	inded and >90% rock fragments.	is sub-aliguiar to	SP					



BORING NO. PROJECT

LOCATION

MW-109D SHEET 2 OF 5 **GSWA: Spring Hill Camp Phase III** 

Osceola Township, MI

COORDINATES N 229,688.3 E 19,439,059.6

PROJECT NO. 4065-005 LOGGED BY

Larry Jordan

SUR	FACE ELI	EVATIO	N <b>11</b> ′	18.77	DATUM <b>USGS</b>	LOGGED BY	Larry J	lordan		
s	AMPLE	INFO	RMATI	ON				m.		uo
Depth feet	Lab Sample	Sample Type	e Blow Counts	Rec- overy %	DESCRIP	TION	USCS	Strate	REMARKS	Elevati Feet
-		SSS	5-5	100	Light brown, fine to medium SAN poorly graded, massive, and WE sub- to well rounded with high sp (continued) Brown, fine to medium SAND, sc	D, trace coarse Sand, T. Fine to medium Sand is hericity and >80% quartz.	SM		At 40.5' bgl, grades into Sand, some Silt.	1078.2 1076.2
45 - -		SSS SSS	5-5 7-10	70	moderately plastic, and WET. Light brown, fine to medium SAN trace fine Gravel, Silt content incl from 44-45 feet bgs, well graded, WET. @45 feet there is a 0.4 fer Below the lens Clay and Silt cont	ID, trace coarse Sand, reases from trace to little , graded bedding, and et thick lens of Silty-Clay.	SМ			1071.2
- 50		SSS	4-7 8-9	70	Sand is well rounded with high sp <u>quartz.</u> Light brown, fine to coarse SANE graded, massive, and WET. Fine rounded with high sphericity and	bhericity and 70-80% , trace fine Gravel, poorly e to medium Sand is well >80% quartz. Coarse	SP			1066.2
- 55 <del>-</del> -		SSS		90	<ul> <li>sand is sub- to well rounded and</li> <li>Light brown, fine to medium SAN coarse Sand, trace fine Gravel, w</li> <li>WET. Fine to medium sand is su with high sphericity and ~70-90%</li> <li>angular to well rounded and prim</li> </ul>	primarily rock fragments. ID, trace to little Silt, trace vell graded, massive, and ub-angular to sub-rounded o quartz. Coarse fraction is arrily rock fragments	SP	n de series Nationaliste Nationaliste		1000.2
- - 60		SSS	2-12 6-6	100	Light brown, fine to medium SAN Gravel, poorly graded, massive, i sand is sub- to well rounded with ~80-90% quartz. Coarse fractior sub-rounded with high sphericity	D, little coarse Sand, trace and WET. Fine to medium high sphericity and h is sub-angular to and ~70-80% rock	SP			1061.2
- - 65—		SSS	4-4 6-9	50	Light brown, fine to medium SAN fine Gravel, well graded, graded to medium sand is well rounded ~80% quartz. Coarse fraction is rounded with low to high spherici	nward. ID, little coarse Sand, little bedding, and WET. Fine with high sphericity and sub-angular to well ty and >80% rock	sw			1056.2
- - 70-		SSS	3-3 4-6	100	Light brown, fine to medium SAN trace fine Gravel, poorly graded, to medium sand is sub-rounded >90% quartz. Coarse fraction is rounded with moderate to high sp fragments	D, trace coarse Sand, massive, and WET. Fine with high sphericity and sub-angular to well phericity and 70-90% rock	SP			1051.2
- - 75-		SSS	4-5 16-17	30	Gray SILT, some fine Sand, trace occasional 1mm thick fine to mee WET.	e medium to coarse Sand, Jium Sand laminations,	н — — - МL			1046.2
-					Gray, fine to medium SAND, little trace fine Gravel, poorly graded,	coarse Sand, little Silt, massive, and WET. Fine				1041.2
80 <del>-</del> -		sss -	4-7 8-8	100	to medium Sand is sub-angular to sphericity and ~70-90% quartz. ( gravel is sub-angular to sub-roum sphericity and ~80% rock fragme	o well rounded with high Coarse sand and fine ided with moderate ents.	SP			1036.2
- 85— -		SSS	2-2 2-4		were were were were were were were were	y graded, massive, and rimarily sub-angular to well s. Coarser fraction is quartz. Gravel is primarily a 3" thick Gravel lense.	SP			1000.2
- - 90-		sss	1-1 12-14	30	Gray SILT, little fine to medium S slight to moderate plasticity, mas content increases with depth.	and, trace to some Clay, sive, and MOIST. Clay	ML			1031.2
-							ML			1026.2



SAMPLE INFORMATION

feet Sample Type Counts

Sample Blow

Depth

Lab

1500 Abbott Road, Suite 210 East Lansing, MI 48823 Telephone: (517) 337-0111 Fax: (517) 337-0417

BORING NO. PROJECT LOCATION MW-109D SHEET 3 OF 5 GSWA: Spring Hill Camp Phase III

Osceola Township, MI

#### COORDINATES N 229,688.3 E 19,439,059.6

Rec-

overy

%

SURFACE ELEVATION 1118.77 DATUM USGS

PROJECT NO.	4065-005
	Larry Jor

USGS	LOGGED BY	Larry J	ordan	I	
DESCRIPTION		USCS	Strata	REMARKS	Elevation Feet
T, little fine to medium Sand, trac and MOIST. Fine to medium sa	ce coarse Sand, and is				

95 -		SSS	1-5 7-12	100	Gray SILT, little fine to medium Sand, trace coarse Sand, massive, and MOIST. Fine to medium sand is sub-rounded with low sphericity. Coarse sand is	ML			
-	-				sub-rounded and >80% rock fragments. <i>(continued)</i> Grav SII T, some fine to coarse Sand, little Clay, trace				1021.27
-		-	6-7		Gravel, slightly plastic, massive, and MOIST.				1021.21
100-	/	SSS	9-10	100		ML			
-					Gray SILT, some fine to coarse Sand, trace to little Clay,				1016.27
105-		sss	7-8 13-13			ML			
-					Grav fine to medium SAND some Silt little Clav trace		$\lfloor  \rfloor $		1011 27
-			4-4		coarse Sand, trace Gravel, well graded, slightly plastic, massive, and WET. Sand is sub-angular to sub-rounded,		[		1011.27
110	, , ,	1000	7-16		highly spherical, and ~60-80% quartz.	SC	[		
-					Gray, fine to medium SAND, some Silt, little Clay, trace				1006.27
- 115		sss	2-2		slightly plastic, and WET. Sand is sub-angular to sub-rounded and predominantly guartz. Occasional 1"	SC			
-	4	1	5-5		thick Gravel lenses. Gravel is angular to sub-rounded.		<u> </u>		
-					Light gray, fine to medium SAND, little Clay, little Silt, trace coarse Sand, trace Gravel, massive, poorly graded, and				1001.27
120-	, , ,	sss	1/24"		WET. Fine to medium sand is sub-angular to sub-rounded with low to high sphericity and ~70-80% quartz. Coarse sand is angular to sub-rounded, has low sphericity, and is primarily tack fragments	SP			
-					Light brown, fine SAND, trace medium Sand, poorly araded massive and WET. Sand is well rounded with high				996.27
- 125 -		SSS	1/24"		sphericity and ~80% quartz.	SP			
-					Light brown, fine to medium SAND, trace coarse Sand,				991.27
- 130-		sss	1-1 1-1		trace Gravel, poorly graded, massive, and WET. Sand is sub- to well rounded with high sphericity and ~80-90% quartz.	SP			
-	2								
-					Brown, fine SAND, some Silt, little Clay, trace medium to coarse Sand, poorly graded, massive, and WET.				986.27
135-	, , ,	sss	1/24"		Occasional sand layers.	SP			
-					Brown fine SAND some Clay little Silt poorly graded			Did not drive sample	981 27
- 140-		sss	WH/24"		massive, and WET. Occasional <1" thick Sand and Gravel lenses.	SP		as it dropped 2' under weight of rods.	001.27
-		1							
-								Did not sample, due to problems with heave.	976.27
145 -						SP			
		1							



1500 Abbott Road, Suite 210 East Lansing, MI 48823 Telephone: (517) 337-0111 Fax: (517) 337-0417

DATUM **USGS** 

BORING NO. PROJECT LOCATION MW-109D SHEET 4 OF 5 GSWA: Spring Hill Camp Phase III

Osceola Township, MI

4065-005

COORDINATES N 229,688.3 E 19,439,059.6

PROJECT NO. 4065-005 LOGGED BY Larry Jordan

S	AMPLE	INFO	RMATI	NC					uo
Depth feet	Lab Sample	Sample Type	Blow Counts	Rec- overy %	DESCRIPTION	USCS	Strata	REMARKS	Elevati Feet
_					Brown, fine SAND, some Clay, little Silt, massive, and WET. Occasional Sand seams.	SP			971.27
150-		SSS	2/24"			SP			
_			2-2		Gray to brown, very fine to fine SAND, some Clay, trace coarse Sand, trace fine Gravel, and WET. Sand is well rounded with medium to high sphericity. Some thin (~1/8"				966.27
155 <del>-</del> - -			2-2		thick), soft gray Clay layers, and moderately plastic.	SP			
- - 160		ass 7	6-6		Light brown SILT and very fine Sand, trace fine Sand, trace Clay, trace coarse Sand, trace fine Gravel, massive, stiff, and MOIST. Gravel is matrix supported.				961.27
-			50/5"		Gravish brown SILT some very fine Sand Jaminated and				956 27
- 165		sss	31-50/4'	55	MOIST.	ML			930.27
-					Brown to gray CLAY, trace Silt, hard, and MOIST.	CL			953.07
- - 170-		sss	6-6 18-29	75	Brown to gray SILT and very fine Sand, WET, interbedded with two to four inch layers of brown to gray CLAY and Silt, very stiff, and MOIST.	ML-CL			951.27
-					Gray to brown SILT, some Clay, little very fine Sand, hard, massive, and WET. Sand is well rounded with high				946.27
- 175 -		SSS	6-17 29-39	75	sphericity. Silty material is interbedded with more Clayey layers.	ML-CL			
-			25-25		Gray to brown, very fine SAND, some Silt, trace Clay, poorly graded, massive, and WET. Clay occurs as a 1" inch seam, three inches from the bottom of the spoon.				941.27
180 - -			50/5"	85		SM			
- - 185		sss	19-50/4'	75	Gray to brown, very fine to fine SAND, little to some Silt, some Clay clasts, massive, and WET. Sand is rounded with high sphericity. Clay clasts are ~1/8" to 1/2" in diameter.	SM			936.27
-					Gray to brown CLAY, trace to some Silt, hard, laminated, and MOIST.	 CL			931.27
190 - -		a sss	15-30 50/4"	75	Gray to brown, very fine to fine SAND, little Silt, poorly graded, and WET. Sand is well rounded with high sphericity.	SM			928.77
-					Gray to brown CLAY, trace coarse Sand, hard, and MOIST.	†	₽!!!L_`_     		926.27
195 -		sss S	19-22 50/6"			CL			
-			6-17		Gray to brown CLAY, trace fine to coarse Sand, hard, and MOIST.	CL			921.27



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BORING NO. PROJECT LOCATION PROJECT NO. 4065-005

MW-109D SHEET 5 OF 5 **GSWA: Spring Hill Camp Phase III** 

Osceola Township, MI

COORDINATES	N 229,688.3	E 19,439,059.6
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SUR	FACE ELI	EVATIO	N <b>11</b> ′	18.77	DATUM	USGS	5	LOGGED BY	Larry .	Jordan	l	
S	SAMPLE	INFO	RMATI	ON								uo
Depth feet	Lab Sample	Sample Type	Blow Counts	Rec- overy			DESCRIPTION		USCS	Strata	REMARKS	Elevatio Feet
		ISSS	25-31	92					CL	- <u></u> -		
											End of boring - 201' bgs.	917.77

<b>N</b>		RN RN ES N2		<b>9</b> .8 E	1500 A East La Teleph Fax: (5 <b>19,440,9</b>	bbott Road, Suite 210 ansing, MI 48823 one: (517) 337-0111 517) 337-0417 962.8	BORING NO. PROJECT LOCATION PROJECT NO.	MW-11 GSWA Osceo 4065-0	0D : Sprir la Tow 05	SHEET ng Hill Camp Phas nship, MI	1 of 4 se III
SUR	FACE ELI	EVATIO	N <b>11</b>	67.08	DATU		LOGGED BY	Larry J	lordan		
DRII Ste DRII 4 1 DRII 11/	LING CO earns LING ME /4" HSA LING STA /13/00	NTRAC <sup>®</sup> THOD A ARTED	EQUIF CME ENDEI 11/1	PMENT E 1050 D 4/00		LOCATION DESCRIPTION: See attached Site Diagr	am for location.				
[]	SAND	STRA		r SILT							
	GRAVEL			SILTTO							
S	SAMPLE	INFO	RMATI	ON					a a		uo
Depth feet	Lab Sample	Sample Type	Blow Counts	Rec- overy %		DESCRIPTION		USCS	Strat	REMARKS	Elevati Feet
<u> </u>	-				Light bro	own fine to medium SAND, trace raded, interbedded, and MOIST	e coarse Sand, Sand is well		ng dan dag A		1167.08
-					rounded	with high sphericity, >70% quantum density and the sphericity of the second secon	rtz and is ium SAND, some		ng dan dang K		
-					Silt, little	e Clay, well graded, massive, slig	ghtly plastic, and	SP	n ar an		
5-	]	SSS	2-2 2-2	75							
	-										
-					Light bro Gravel,	own CLAY and Silt, trace fine to moderately plastic, laminated, a	coarse Sand, trace nd WET. Clay				1159.58
10-	-	⊂ sss	3-4 6-7	75	layers a	Iternate with Clayey Silt layers.		CL			
-		~	0.1								
-	-				Light bro	own, fine to medium SAND and	SILT, little Clay,	-+	111		1154.58
15-		Sss	8-12	5	Silgritiy	plastic, and WET.		SM			
-		4	13-13					-			
-					Light bro	own CLAY and SILT, trace fine t	o coarse Sand,				1149.58
-		2000	5-7	400	trace Gr Clay is i	ravel, moderately plastic, lamina nterbedded with Clayey Silt.	ated, and WET.				
20-		ر ۵۵۵ ج	9-14	100				CL			
-					light br	own CLAX and SILT trace fine	to coarso Sand				1111 59
					trace Gr	ravel, plastic, laminated, and WE	T. Clay and	CL			1144.00
25-		⊂ SSS		100	Light bro	own fine to coarse SAND, some	Gravel, well				1142.08
-					graded,	and MOIST.		SW			
-								300			
30-		⊂ sss	6-9 18-18	90	Light br	own, fine SAND, trace coarse Sa	and, trace Silt,		,		1137.08
		~			poorly g	raded, massive, and MOIST.	.,	SP			
.					Light bro	own, fine SAND, little Silt, trace	medium to coarse		4422437421		1134.58
35-		Sss	14-22	90	Sand, II Sand is	sub-angular to sub-rounded, hig	hly spherical,	SP			
.	-	2	31-30		≥10% q	uaitz, anu is ianninateu with MM	scale only partings.				
	1				Light bro	own, fine to medium SAND, trac	e coarse Sand,				1129.58
			19-21		trace to Sand is	little Silt, poorly graded, laminat	ed, and MOIST. phericity and >80%	SP			



BORING NO. PROJECT

LOCATION

MW-110D SHEET 2 OF 4 **GSWA: Spring Hill Camp Phase III** 

Osceola Township, MI

4065-005

# COORDINATES N 227,779.8 E 19,440,962.8

SURFACE ELEVATION 1167.08 DATUM **USGS**  PROJECT NO. LOGGED BY

Larry Jordan

s	SAMPLE INFORMATION		ON			, T		uo	
Depth feet	Lab Sample	Sample Type	Blow Counts	Rec- overy %	DESCRIPTION	USCS	Strata	REMARKS	Elevati Feet
-			26-28	100	quartz. Interbedded with 2" thick layers with trace to little Silt.	SP	a da serana. A da serana		
- 45		( SSS	7-14 21-29	100	Light brown, fine to medium SAND, trace coarse Sand, trace to little Silt, poorly graded, interbedded, and MOIST. Sand is sub- to well rounded with high sphericity and ~80-90% quartz. Silt content varies from trace to little from layer to layer. Some layers show iron staining.	SP			1124.58
- - 50		( SSS	7-15 25-21	100	Light brown, fine to medium SAND, trace coarse Sand, trace to little Silt, poorly graded, interbedded, and MOIST. Sand is sub- to well rounded with high sphericity and 80-90% quartz. Silt content varies from layer to layer. Some laminations are at an angle with horizontal	SP			1119.58
- - - 55		sss	5-16 28-29	100	(cross-bedding). Light brown, very fine SAND, trace to little Silt, trace medium Sand, cross bedded, poorly graded, and MOIST. Sand is well rounded with high sphericity.	SP			1114.58
			8-12		Light brown, fine to medium SAND, poorly graded, cross bedded, and MOIST. Sand is sub- to well rounded with high sphericity and >80% quartz.	SD			1109.58
- 60		_ 555	23-40		Light brown, fine to medium SAND, poorly graded,	54		Water between 61 and	¥ 1104.58
- 65 -		SSS	9-10 11-18		massive, and WET. Sand is sub- to well founded with medium to high sphericity and >80% quartz.	SP		64.	
- - 70		( SSS	5-6 10-16		Light brown, fine to medium SAND, trace coarse Sand, trace Gravel, poorly graded, massive, and WET. Fine to medium sand is well rounded with high sphericity and >80% quartz. Coarse fraction is well rounded with medium sphericity and is primarily rock fragments.	SP			1099.58
- - 75		( SSS	6-7 7-9	100	Light brown, fine to coarse SAND, little to some Gravel, well graded, and WET. Sand is well rounded with high sphericity and >50% quartz. Gravel is angular to sub-rounded with low to medium sphericity and is 90% rock fragments. Occassional Gravel lenses.	SW		Bailed heave.	1094.58
-					Light brown, fine to medium SAND, trace coarse Sand, poorly graded, massive, and WET. Sand is well rounded		1 4 4 4 4 4 1 4 4 4 4 1 4 4 4 4 1 4 4 4 4	Bailed heave.	1089.58
80		SSS S	5-5 10-10	100	with high sphericity and >80% quartz.	SP			
- - 85		SSS	7-19 22-32	100	Light brown, fine to medium SAND, some Silt, trace coarse Sand, trace Gravel, trace Clay, well graded, interbedded, and WET. Fine to medium sand is sub- to well rounded with high sphericity and >70% quartz. Coarse fraction is sub-angular to sub-rounded. More Gravelly lens at 84.5'	SM		Bailed heave.	1084.58
-		~	8-11		(4" thick). Light brown, fine to medium SAND, trace to little Gravel, trace coarse Sand, well graded, massive, and WET. Fine to medium sand is well rounded with high sphericity and			Bailed heave.	1079.58
90			22-25	75	>80% quartz. Coarse fraction is sub-angular to well rounded with low sphericity and >80% rock fragments. Gravel lens at 89.8'.	SW SW	· · · · · · · · · · · · · · · · · · ·	Bailed heave.	1074.58



BORING NO. PROJECT LOCATION MW-110D SHEET 3 OF 4 GSWA: Spring Hill Camp Phase III

Osceola Township, MI

## COORDINATES N 227,779.8 E 19,440,962.8

SURFACE ELEVATION **1167.08** DATUM

DATUM USGS

PROJECT NO. 4065-005 LOGGED BY Larry Jordan

S	AMPLE	IN	FOF	RMATI	ON					ç
Depth feet	Lab Sample	Sar Ty	mple ⁄pe	Blow Counts	Rec- overy %	DESCRIPTION	USCS	Strata	REMARKS	Elevatio Feet
95			SSS	2-4 7-10	40	Light brown, fine to coarse SAND, trace fine Gravel, well graded, massive, and WET. Fine to medium sand is well rounded with high sphericity and >80% quartz. Coarse fraction is sub-angular to sub-rounded with low to moderate sphericity and >90% rock fragments. <i>(continued)</i> Light brown, fine to medium SAND, trace coarse Sand, trace fine Orange and WET.	SW		Bailed heave. Stop	1069.58
- 100 <del>-</del> -			SSS	4-4 10-17	75	interbedded with fine to medium GRAVEL and medium to coarse Sand. Fine to medium Sand is well rounded with high sphericity and >80% quartz. Coarse fraction is sub-angular to sub-rounded with low to moderate sphericity and >90% rock fragments. Gravel lenses are ~2" thick.	SP		11/13/00 15:40. Began drilling	1064.58
- 105 -			SSS	5-20 50/6"		Brown, coarse SAND, some fine to medium Sand, trace Gravel, poorly graded, graded bedding, and WET. Fine to medium Sand is well rounded with high sphericity and >70% quartz. Coarse fraction is sub-angular to sub-rounded with low to high sphericity and >80% rock fragments.	SP		11/14/00, 07:42. Drilled hole prior to pounding spoon.	
- - 110 -			SSS	14-26 50/4"		Light brown, fine to medium SAND, little coarse Sand, trace fine to medium Gravel, well graded, massive, and WET. Fine to medium sand is sub- to well rounded with moderate to high sphericity and >80% quartz. Coarse fraction is sub-angular to well-rounded with low to moderate sphericity and >90% rock fragments	SW		Bailed well.	1059.58
- - 115 -			SSS	10-18 50/6"		Light brown, fine to medium SAND, trace coarse Sand, trace fine Gravel, poorly graded, massive, and WET. Fine to medium Sand is well-rounded, with moderate to high sphericity and >80% quartz. Coarse fraction is sub-angular to sub-rounded with moderate sphericity and >70% rock fragments.	SP			1054.58
- - 120 -			SSS	21-25 28-50/6'	75	Gray to brown, fine to medium SAND, little Silt, little coarse Sand, little Gravel, well graded, massive, and WET. Fine to medium sand is sub- to well rounded with high sphericity and >80% quartz. Coarse fraction is angular to well-rounded with low to moderate sphericity and predominantly rock fragments.				1049.58
- - 125 — -			SSS	18-22 50/4"	50	Gray to brown, fine to medium SAND, little Silt, little coarse Sand, well graded, interbedded, and WET; interbedded with gray CLAY and SILT, moderately plastic, and WET. Sample is varved with Sandy layers varying from 1-3 cm and Clay from 0.5 to 1.5 cm in thickness.	SM			1044.58
- 130			SSS	15-26 50/6"		Gray to brown, fine to medium SAND, some Silt, little coarse Sand to Gravel, well graded, massive, and WET. Fine to medium sand is sub-angular to well rounded with moderate to high sphericity and >80% quartz. Coarse fraction is sub-angular to well-rounded with low to moderate sphericity and >80% rock fragments.	SM			1039.58
- - 135 <del>-</del> -			SSS	6-17 50/4"		rounded with moderate to high solution of the well of	SM			1034.58
- - 140 -			SSS	7-16 50/6"	75	1cm thick Clay layers. Gray to brown, fine to medium SAND, some Silt, trace coarse Sand, trace fine Gravel, well graded, laminated, and WET. Occasional mm-scale Clay layers. Fine to medium sand is sub-angular to sub-rounded with moderate to high sphericity and >70% quartz. Coarse fraction is sub-angular to sub-angular to be both schemes in the sub-angular	SM			1029.58
- 145-			SSS	3-6 6-9	50	primarily rock fragments. Light brown, fine to medium SAND, trace coarse Sand, poorly graded, massive, and WET. Fine to medium sand is well-rounded with high sphericity and >80% quartz. Coarse	SP			1024.58



BORING NO. PROJECT

LOCATION

MW-110D SHEET 4 OF 4 **GSWA: Spring Hill Camp Phase III** 

**Osceola Township, MI** 

4065-005

## COORDINATES N 227,779.8 E 19,440,962.8

SURFACE ELEVATION 1167.08

DATUM **USGS** 

PROJECT NO. Larry Jordan LOGGED BY

S	AMPLE	IN	IFOF	RMATI	ON			-		u
Depth feet	Lab Sample	Sa T	mple ype	Blow Counts	Rec- overy %	DESCRIPTION	USCS	Strata	REMARKS	Elevatic Feet
- - 150 - - -			SSS	2-3 6-11	50	fraction is sub-angular to sub-rounded with moderate to high sphericity and >70% rock fragments. Light brown, fine to medium SAND, trace coarse Sand, trace fine to medium Gravel, poorly graded, and WET. Occasional Gravel size Silty Clay clasts. Also occasional cm-scale Clay layers toward 151'. Fine to medium sand is well-rounded with high sphericity and >90% quartz. Coarse fraction is sub-angular to well-rounded with low to moderate sphericity and >70% rock fragments	SP SP			1019.58 1014.58
- 155 -			SSS	2-3 6-10	50	Light brown, fine to medium SAND, trace coarse Sand, poorly graded, massive, and WET. Sand is well-rounded with high sphericity and >80% quartz.	SP			
- - 160 -		ιτι	SSS	4-4 5-10	90	Light brown, fine to medium SAND, trace coarse Sand, poorly graded, massive, and WET. Fine to medium sand is well-rounded with high sphericity and >80% quartz. Coarse fraction is sub-angular to sub-rounded with moderate sphericity and >70% rock fragments.	SP		Split spoon caught down hole. Drillers pump water down hole. Bailed augers.	1009.58
- - 165			SSS	18-21 50/5"	10	Light brown, fine SAND, trace medium Sand, poorly graded, massive, and WET. Sand is well-rounded with low to moderate sphericity and >80% quartz.	SP		Bailed augers.	1004.58
-				2-9		Light brown, fine to medium SAND, poorly graded, massive, and WET. Sand is sub- to well rounded with high sphericity and >80% guartz				999.58
170 - -		ווע	SSS	25/6"	25	Light brown, fine to medium SAND, trace coarse Sand,	SP		Sampled heave from	994.58
- 175 -			SSS	8-27/6"	0	poorly graded, massive, and WET. Sand is well-rounded with high sphericity and >80% quartz. Coarse fraction is primarily rock fragments.	SP		bailer.	
- - 180 -		ιτι	SSS	7-18 50/6"	75	Light brown, fine to medium SAND, trace coarse Sand, poorly graded, massive, and WET. Fine to medium Sand is well-rounded with high sphericity and >80% quartz. Coarse fraction is sub-angular and primarily rock fragments.	SP		No recovery on first spoon. Bailed and respooned.	989.58
- - 185 -		ιιι	SSS	8-23 38-44	90	Gray to brown, fine to medium SAND, some Silt, little coarse Sand, trace Gravel, trace Clay, non-plastic, massive, and WET. Sand is sub-angular to sub-rounded with high sphericity. Fine to medium Sand is >80% quartz. Coarse fraction is >80% rock fragments. Gravel is sub-angular to sub-rounded and 100% rock fragments				984.58
- - 190			SSS	25-41 50/4"	100	Gray SILT, some fine to coarse Sand, little Clay, little Gravel, slight to moderate plasticity, and MOIST (Till).	— — — - МL			979.58
-				30/4					End of Boring - 191' bgs.	976.08

COORDINATES N 231,929.8 E					1500 Abbott Road, Suite 210       BORING NO.         East Lansing, MI 48823       PROJECT         Telephone:       (517) 337-0111         Fax:       (517) 337-0417         LOCATION       PROJECT NO.			MW-114ISHEET1OF4GSWA: Spring Hill Camp Phase IIIOsceola Township, MI4065-005					
SUR	FACE ELE	VATIO	N <b>11</b> 9	98.32	DATUN	M USGS	LOGGED BY	Larry J	lordan	Ì			
DRIL DRIL 4 1 DRIL 11/	LLING CON earns LLING MET /4" HSA LLING STA /21/00 SAND CLAY	TRAC <sup>T</sup> HOD RTED STRA		MENT 1050 2/00 SILT CLAYEY	/ SAND	LOCATION DESCRIPTION: See attached Site Diagr	am for location.	-					
<u>مر</u>	GRAVEL			SILTY S	AND								
S Depth feet	SAMPLE Lab Sample	INFOI Sample Type	RMATI Blow Counts	ON Rec- overy %		DESCRIPTION		USCS	Strata	REMARKS	Elevation Feet		
5					Orange Sand, tr medium to high s Orange Sand, tr medium to high s	to brown, fine to medium SANE race Gravel, poorly graded, MOI n sand is sub-angular to sub-rou sphericity and 70% quartz. to brown, fine to medium SANE race Gravel, poorly graded, MOI n sand is sub-angular to sub-rou sphericity and 70% quartz.	0, trace coarse ST. Fine to nded with moderate 0, trace coarse ST. Fine to nded with moderate	SP		Drillers augered to 29 feet before sampling. Drillers noted gravel from 0-1' bgs. 0-10' lithological description based on cutting. 10-20' lithological description based on cuttings.	1198.32		
20 - - - 25 - -					Orange Sand, tr medium to high s	e to brown, fine to medium SANE race Gravel, poorly graded, MOI n sand is sub-angular to sub-rou sphericity and 70% quartz.	0, trace coarse ST. Fine to nded with moderate	SP		20-29' lithological description based on cuttings.	1178.32		
30 - -		SSS	4-4 6-8	50	Light bro poorly g is sub-a sphericit	rown, fine to medium SAND, trac graded, massive, and MOIST. F angular to sub-rounded with moc ity and 60-80% quartz.	e coarse Sand, ine to medium sand lerate to high	SP	· · ·		1169.32		
35 -		SSS	28-11 13-13	50	Gravel, Sub-ang sphericit fraction	well graded, massive, and MOI gular to well rounded with moder ity. Fine to medium sand is >70 is primarily rock fragments.	ST. All material is ate to high % quartz. Coarse	sw			00.02		
-			9-9		Light bro Gravel, are sub-	rown, fine to medium SAND, little well graded, bedded, and MOIS -angular to well rounded with mo	e coarse Sand, trace ST. All components oderate to high	sw			1160.82		



1500 Abbott Road, Suite 210 East Lansing, MI 48823 Telephone: (517) 337-0111 Fax: (517) 337-0417

BORING NO. PROJECT

LOCATION PROJECT NO. MW-114I SHEET 2 OF 4 GSWA: Spring Hill Camp Phase III

Osceola Township, MI

COORDINATES N 231,929.8 E 19,442,648.2

DATUM **USGS** 

PROJECT NO. 4065-005 LOGGED BY Larry Jordan

S	AMPLE	INFO	RMATI	ON			ł		ц
Depth feet	Lab Sample	Sample Type	e Blow Counts	Rec- overy %	DESCRIPTION	USCS	Strats	REMARKS	Elevati Feet
-			10-13	75	sphericity. Fine to medium sand is >70% quartz. Coarse fraction is primarily rock fragments. 1" thick Silt seam at 40.0'. 3" Gravel lens at 40.2'. Light brown, fine SAND, trace medium Sand, poorly graded, massive, and MOIST. Fine to medium sand is	SW	n, dan dar Ar dan dar		1155.82
45		( SSS	4-7 10-16	75	quartz.	SP			1150.82
- 50		SSS	7-8 9-9	75	graded, bedded, and MOIST. Fine to medium sand is sub-rounded with moderate to high sphericity and >80% quartz. 1" thick Silty Sand lens at 49.8 feet bgs.	SP			
- - 55		( SSS	3-7 8-10	75	Light brown, fine SAND, trace medium Sand, poorly graded, massive, and MOIST. Fine to medium sand is sub-rounded with moderate to high sphericity and >80% quartz.	SP			1145.82
- - 60		C SSS	5-9 14-16	90	Light brown, fine SAND, trace medium Sand, poorly graded, massive, and MOIST. Fine to medium sand is sub-rounded with moderate to high sphericity and >80% quartz.	SP			1140.82
- - 65 -		C SSS	5-10 13-16	50	Light brown, fine SAND, trace medium Sand, poorly graded, massive, and MOIST. Fine to medium sand is sub-rounded with moderate to high sphericity and >80% quartz.	SP		Wet at 66' bgl during drilling.	1135.82 7
- - 70 -		SSS	4-6 9-10	100	Brown, fine to medium SAND, little coarse SAND, poorly graded, massive, and WET. Fine to medium sand is sub-rounded with medium to high sphericity and 80% quartz. Coarse sand is angular to sub-rounded with low sphericity and is primarily rock fragments.	SP			1130.82
- 75 - -					Brown, fine to medium SAND, little coarse SAND, poorly graded, massive, and WET. Fine to medium sand is sub-rounded with medium to high sphericity and 80% quartz. Coarse sand is angular to sub-rounded with low sphericity and is primarily rock fragments.				1123.32
80 - -		sss	2-6 9-10	25		SP			
- 85 - -					Brown, fine to medium SAND, little coarse SAND, poorly graded, massive, and WET. Fine to medium sand is sub-rounded with medium to high sphericity and 80% quartz. Coarse sand is angular to sub-rounded with low sphericity and is primarily rock fragments.	0.5		Bailed heave before sampling from 80-181' bgl.	1113.32
90		SSS SSS	10-12 16-28			52			



1500 Abbott Road, Suite 210 East Lansing, MI 48823 Telephone: (517) 337-0111 Fax: (517) 337-0417

DATUM **USGS** 

BORING NO. PROJECT LOCATION MW-114I SHEET 3 OF 4 GSWA: Spring Hill Camp Phase III

Osceola Township, MI

COORDINATES N 231,929.8 E 19,442,648.2

LOGGED BY	Larry Jordan
LOGGED BI	Larry Joruan

4065-005

S	SAMPLE INFORMATION						ŋ		ion t
Depth feet	Lab Sample	Samp Type	e Blow Counts	Rec- overy %	DESCRIPTION	USCS	Strat	REMARKS	Elevati Feet
95					Brown, fine to medium SAND, trace coarse SAND, trace fine Gravel, poorly graded, massive, and WET. Fine to medium sand is sub-rounded with medium to high sphericity and 80% quartz. Coarse sand is angular to sub-rounded with low sphericity and is primarily rock	SP			1103.32
100		SS	6-7 <sup>2-3</sup>		fragments.	SP			
105 <del></del> - -		~	1.2		Brown, fine to medium SAND, little coarse SAND, trace fine Gravel, poorly graded, laminated, and WET.	SP			1093.32
110-		∏ss:	5-8	100	Silty fine SAND	SM			1088.32
- - - 115-					Brown, fine to medium SAND, little coarse Sand, poorly graded, graded bedding, WET. Fine to medium sand is sub- to well rounded with moderate to high sphericity and >80% quartz. Coarse fraction is angular to sub-rounded with low to moderate sphericity and is primarily rock fragments.	SP	al da sera Al da sera Al da sera	Stopped drilling for the	1088.12
-			5-7		Brown, fine to medium SAND, some coarse Sand, trace Gravel, well graded, massive, and wet. Fine to medium sand is sub-rounded with moderate to low sphericity, and is >80% quartz. Coarse fraction is angular to sub-rounded with low to moderate sphericity and is primarily rock	0.47		day.	1003.32
120			10-14	100	fragments.	SW			
125					Light brown, fine to medium SAND, some coarse SAND, little fine Gravel, poorly graded, graded bedding, and WET. Fine to medium sand is well rounded with high sphericity and >70% quartz. Coarse fraction is sub-angular to sub-rounded with low to high sphericity and ~70-90% rock				1073.32
130		SS:	8-10 10-16	75	tragments.	SP			
135 - - -					Light brown, fine to medium SAND, little to some coarse Sand, trace fine Gravel, poorly graded, bedded, and wet. Fine to medium sand is well rounded with high sphericity and >70% quartz. Coarse fraction is sub-angular to sub-rounded with low to high sphericity and ~70-90% rock				1063.32
140 - -		SS:	7-12 13-15	75	fragments. 4" thick lens of coarser material showing graded bedding at 139.8 feet bgs.	SP			
145-						SP			1053.32

		ES N 2	<b>DL</b> <b>ILE</b> 231,929	<b>0.8</b> E 98.32	1500 Abbott Road, Suite 210 East Lansing, MI 48823 Telephone: (517) 337-0111 Fax: (517) 337-0417 <b>19,442,648.2</b> DATUM <b>USGS</b>	BORING NO. PROJECT LOCATION PROJECT NO. LOGGED BY	MW-11 GSWA Osceo 4065-0 Larry	<b>/W-114I</b> SHEET 4 OF 4 SSWA: Spring Hill Camp Phase III Osceola Township, MI 1065-005 Larry Jordan				
SAMPLE INFORMATION					DESCRIPTION			ata	DEMARKO	ation		
Depth feet	Lab Sample	Sample Type	Blow Counts	overy %	DESCRIPTION		0303	Str	REMARKS	Elevi Fe		
- - 150 - -		SSS	8-10 14-16	75	Light brown, fine to medium SAND, little Sand, trace fine Gravel, poorly graded, Fine to medium sand is well rounded w and 70% quartz. Coarse fraction is sub sub-rounded with low to high sphericity fragments. (continued)	e to some coarse massive, and WET. ith high sphericity -angular to and ~70-90% rock	SP					
155 <del>-</del> - -								ng dan dag Ta				
- - 160		SSS	16-50/6'	25	Light brown, fine to medium SAND, little with SILT, some Clay, slight to moderat WET.	e Silt, interbedded te plasticity, and	SM		Drillers noted change in lithology at 158'	1040.32		
-					graded, massive, and WET. Silt clasts	are gravel sized.		n an An Start Ang	in lithology at 161'	1037.32		
165 <del>-</del> - -							SP	ng Karabag Tanggan Ng Karabag				
- 170 -		SSS	16-24 50/6"	10								
- - 175					Brown, fine to medium SAND, trace Sil	clasts, poorly are gravel sized.		n de la constant a de la constant		1023.32		
- - 180		- SSS	4-27	25	g. 2200,		SP					
_			30/3*						End of boring - 181' bgl	1017.32		

COOR SURFA DRILLII DRILLII Hanc DRILLII 6/27/	ALL PIR RDINATE ACE ELE NG CON COL NG MET d Auge NG STA 700	STRA	226,960 226,960 108 FOR EQUIP Hand ENDEL 6/27/ TA KEY	<b>M</b> <b>38.04</b> <b>MENT</b> <b>d Auge</b> <b>700</b> <b>r</b> SILT	1500 A East La Teleph Fax: (5 <b>19,440,8</b> DATUM	bbott Road, Suite 210 ansing, MI 48823 one: (517) 337-0111 517) 337-0417 <b>373.6</b> M <b>USGS</b> LOCATION DESCRIPTION: See attached Site Diagr	e 210 BORING NO. Seep 1 SHEET 1 PROJECT GSWA: Spring Hill Camp Phase LOCATION Osceola Township, MI PROJECT NO. 4065-005 LOGGED BY Jeff Groncki				
CLAY CLAYEY					Y SAND						
SA Depth feet S	MPLE Lab Sample	INFO Sample Type	RMATI Blow Counts	ON Rec- overy %		DESCRIPTION		USCS	Strata	REMARKS	Elevation Feet
5		<sup>®</sup> GRAE			PEAT Medium Gravel,	to fine SAND, with some coarse trace medium to coarse Gravel.	e Sand and fine	SP		End of boring - 5' bgl	1088.04 1087.04