STALLION HAMMOCK SCRUB PRESERVE GEOTECHNICAL STUDY FOR PIT DEWATERING

Prepared for:



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BCI Project No. 13272.2

February 2011

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1.0 PURPOSE

A limited geotechnical site investigation and seepage analysis was completed at the Stallion Hammock Scrub project site in Hillsborough County, Florida. The purpose of the study was to estimate the seepage rate into a series of five mine pits during construction dewatering. The locations of the pits are provided on **Figure 1**.

2.0 SITE INVESTIGATION AND LABORATORY TESTING

Site reconnaissance was performed on January 7, 2011 in preparation for a geotechnical site investigation. Two Standard Penetration Test (SPT) borings were performed on January 11, 2011 by Independent Drilling Inc. at pre-determined locations using standard drilling and sampling procedures (ASTM D1586). Boring SPT-1 was advanced to a depth of 40 feet below ground surface (BGS) and boring SPT-2 to a depth of 35 feet BGS. During drilling, soil samples from the split-spoons were visually inspected and collected in sealed containers. The collected samples were then transported to our United States Army Corps of Engineers (USACE) certified geotechnical laboratory for further classification and testing. Boring locations are indicated on **Figure 1** and complete gINT boring logs included as **Appendix A**.

Laboratory tests were performed on selected soil samples to determine their index properties. A total of twelve moisture content tests (ASTM 2216), twelve finer than No. 200 sieve tests (ASTM 1140) and five particle size analysis tests (ASTM 422) were performed. Detailed laboratory test results are included as **Appendix B** and are summarized on the SPT boring logs in **Appendix A**.

3.0 SUBSURFACE STRATIGRAPHY

As part of our investigation, topographic maps, bathymetric maps of the existing mined pits, and historic aerials were reviewed for the project site. Based on the results of the field exploration, laboratory testing, knowledge of standard phosphate mining practice, and our experience with similar projects, boring SPT-1 appears to be located in a previously mined area, which was backfilled with near-surface soil that was removed from the ore body during mining operations and deposited in the adjacent mining pit, typically with a dragline. This material, commonly termed "cast overburden," extends from existing ground surface to a depth of approximately 23.5 feet BGS. The cast overburden typically exhibits low fines content, low SPT N-values and a mottled appearance. The cast overburden locally appears to consist of variably silty sand (Unified Soil Classification System (USCS) = SP-SM to SM). Below 23.5 feet BGS, un-mined sequences of sandy clay (USCS = CH) with phosphate were encountered inter-bedded with clayey sands (USCS = SC) to a depth of approximately 31 feet BGS. From 31 feet BGS, clay with a trace of phosphate was encountered with hard drilling conditions and high SPT N-values down to the boring termination depth of 40 feet BGS.

Boring SPT-2 was performed at a location that was likely unmined based on the results of our laboratory analyses, the SPT N-values, and visual soil classification. In boring SPT-2, variably silty to clayey sand (USCS = SP-SM, SM, SC) was encountered from ground surface to

approximately 13.5 feet BGS. From 13.5 feet BGS to approximately 18.5 feet BGS clayey sand (USCS = SC) was encountered, below which sequences of sandy clay (USCS = CH) with phosphate were encountered inter-bedded with clayey sands (USCS = SC) to 28.5 feet BGS. From approximately 28.5 feet to the boring termination depth of 35 feet BGS bluish clay (USCS = CH) was encountered.

4.0 CROSS SECTION DEVELOPMENT

Two typical cross sections were developed using each of the boring logs and laboratory data, one across the previously mined area with cast overburden, and the other across the unmined land area. Hydraulic conductivities for each stratum were determined using a correlation presented by Ridgeway, 1982^1 , and our professional judgment and experience with similar soils occurring in the project area. This correlation is based on the estimated dry density, finer than No. 200 sieve fraction, D_{10} effective grain size and the specific gravity of the soil. A complete summary of the hydraulic conductivities used in our seepage analyses are shown in **Table 1**.

TABLE 1 Summary of Saturated Hydraulic Conductivities

Material	Hydraulic conductivity (k, ft/sec)
Sand (SP to SP-SM)	3.3E-05
Clayey sand (SC)	1.6E-05
Cast overburden (SP, SP-SM)	3.3E-05
Matrix Clay (SC to CH)	1.6E-06
Bed Clay Complex (CH, Limestone and SP)	3.3E-08

In addition to saturated conductivity, additional soil characteristics such as hydraulic conductivity functions, volumetric water functions, porosity, and soil retentivity were assumed based on typical text book values coupled with guidance in the Seep/W user's manual.

4.1 Cast Overburden Cross Section

The cast overburden cross section was assumed to apply to all areas between two adjacent mine pits. Two analyses were performed for this cross section, one with 150 feet between adjacent mine pits and one with 300 feet between adjacent mine pits. In each case the model extended to the center of a typical mine pit at the site, approximately 75 feet. The upstream pit was modeled 15 feet deep with water at 5 feet below ground surface, and the dewatered pit was modeled as 20 feet deep with 4 feet of water remaining in the pit. **Figure 1** details the locations where this cross section was applied.

¹ Ridgeway, Hallas H., (1982) "Pavement Subsurface Drainage Systems", Transportation Research Board, Washington, D.C.

4.2 **Unmined Land Cross Section**

The unmined cross section was applied in cases where no mine pits were adjacent to the dewatered pits, predominately along the northern edge of the subject area. This cross section extended 1,500 feet upstream with a hydrostatic boundary condition on the upstream vertical face with water at 5 feet below ground surface. The subject pit was modeled as 20 feet deep with 4 feet of water remaining in the pit. **Figure 1** details the locations where this cross section was applied.

4.3 **Analysis Methodology**

Seepage analyses were performed on the cross sections presented above under steady state and transient state seepage conditions. The seepage analyses were performed using the SEEP/W computer program of the GeoStudio software suite. SEEP/W is a two-dimensional finite element program that performs seepage analyses for hydrogeologic models and determines seepage paths, seepage flow rates, phreatic surfaces, pore water pressures, and exit gradients for steady state and transient seepage problems.

4.4 **Results and Conclusions**

Tabulated analysis results are provided in **Appendix C** for transient state seepage analysis time steps at two days, ten days, forty days, and sixty days along with steady state seepage analysis results. Each table presents a summary of the length along each pit's perimeter divided based on cross section geometry and total seepage associated with dewatering. Values are tabulated for seepage flow rates for individual pit dewatering and the total seepage rate that may be expected if all of the pits are dewatered simultaneously.

Figure 2 presents the total estimated seepage flow for dewatering of all five pits up to sixty days after drawing down the water level within the pits. The results of the transient state seepage analyses indicate that seepage flow during the initial days of dewatering may be as much as seven times greater than the steady state seepage flow. The difference in seepage flow rates between the transient state and steady state seepage conditions in the two design sections is the result of drainage of water out of voids within the soil structure near the surface of the pit slope. This effect generally became less pronounced after about sixty days of dewatering.

Our modeling assumes that soil formations are homogenous and continuous; however the potential exists for field conditions to vary from the conditions encountered in the geotechnical investigation. Due to the variable nature of the cast overburden and the potential for occasional high permeability sand seams to occur in the vicinity of the pit slope within the unmined sections, actual seepage into the pits may vary from our analysis estimations. As a result, we recommend that the dewatering system be designed for at least 50% greater seepage flow rates than indicated in our analyses. This increase in flow rates is on Figure 2. Also, if individual pits are dewatered and backfilled independently then the seepage flow rate into the remaining pits may decrease.

FIGURES

FIGURE 1 Site Location Plan with Applied Cross Sections

FIGURE 2 Summary of Total Seepage for Transient State Seepage Analysis

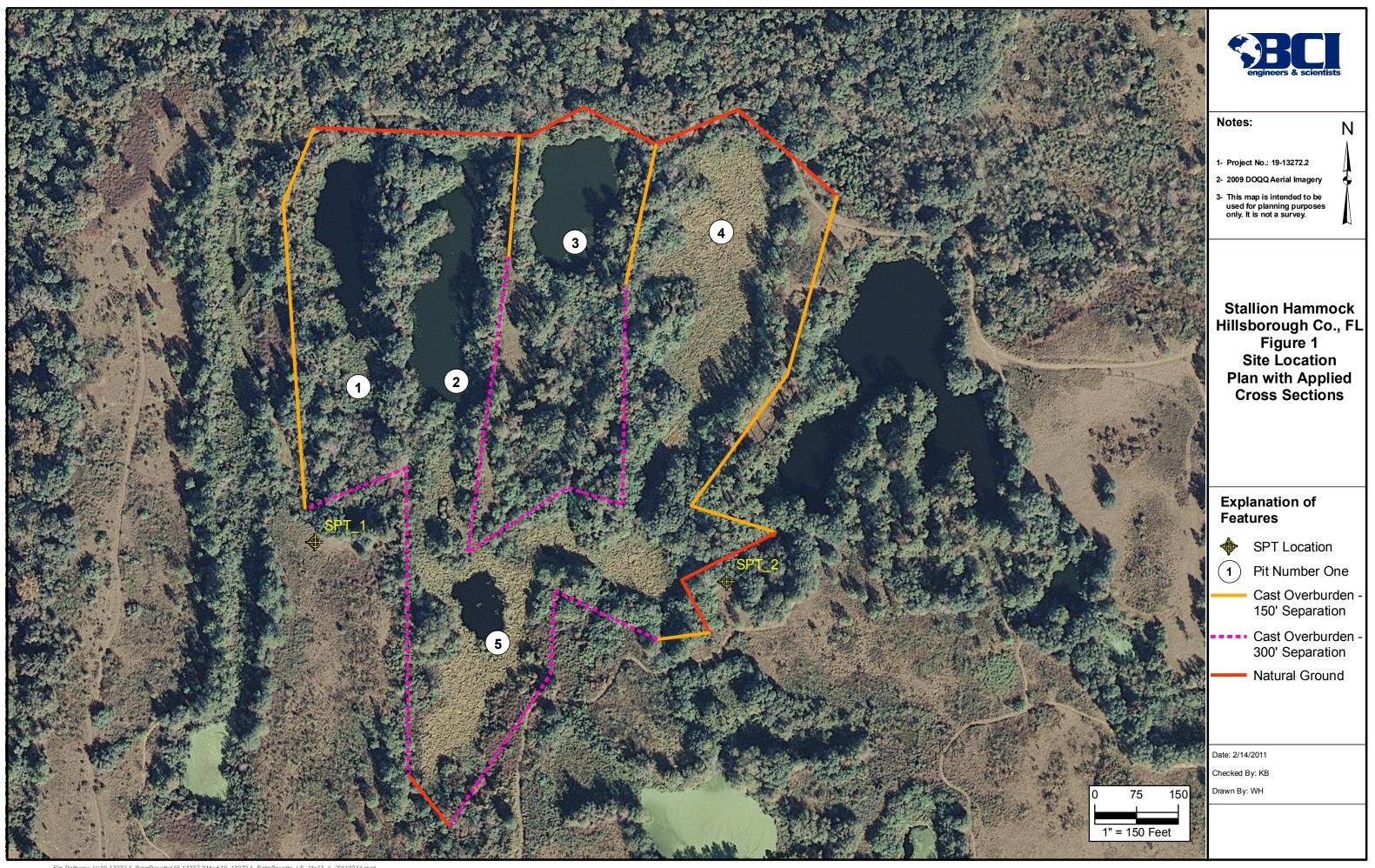
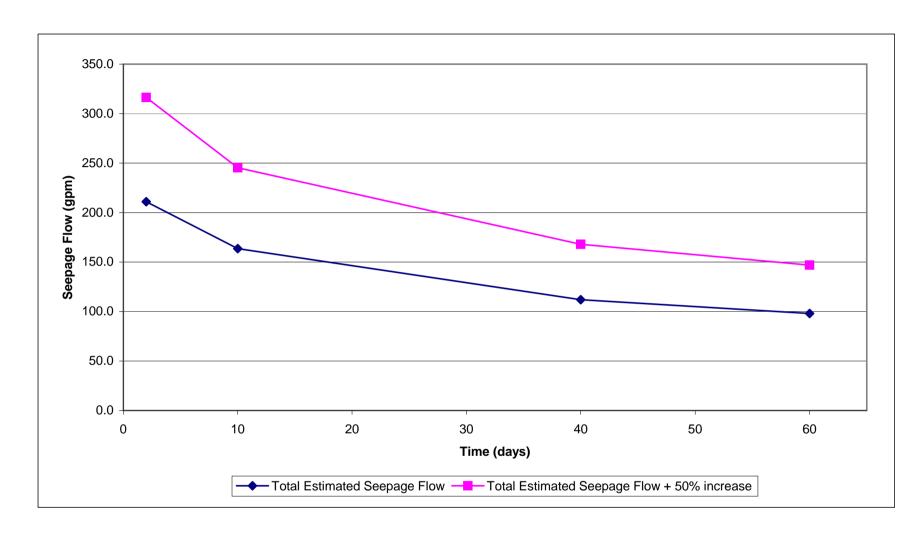




Figure 2
Summary of Total Seepage for Transient State Seepage Analysis



APPENDIX A

gINT Boring Logs

SBCI

BORING NUMBER SPT-01

PAGE 1 OF 2

						DDO IFOT NAME. Obelling I have seen	
			al Associates			PROJECT LOCATION Hillsborough County	_
		IBER <u>1327</u>		DI ETF	:D 4/	PROJECT LOCATION Hillsborough County 1/11/11	
- 1						DI) GROUND WATER LEVELS:	
- 1		HOD Mud		iirig, iri	וט. (וטו	AT TIME OF DRILLING	
				CKED	BY K	Keith Beriswill AT END OF DRILLING	
			Iling practices wer			AFTER DRILLING	
			3				
O DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG		
- ,-	SS 1	4-8-5-6 (13)	MC = 11% Fines = 12%	SP- SM		(SP-SM) Brown to dark brown slightly silty SAND with trace of brown clayey SAND	-2.0
LAS	SS 2	2-4-5-3 (9)				(SP-SM) Brown to dark brown mottled slightly silty SAND	
AMMOCK.C	SS 3	4-4-3-3 (7)	MC = 7% Fines = 8%				
ALLION H	SS 4	5-4-4-4 (8)		SP-			
IGATION/ST	SS 5	4-4-4-3 (8)		SM			
GENERAL BH / TP / WELL - GINT STD US LAB GDT - 2/8/11 12:07 - TX1913272.2-STALLION HAMMOCK/GEOTECH/SITE INVESTIGATION/STALLION HAMMOCK/GPJ CONTROL OF THE STD US LAB GDT - 2/8/11 12:07 - TX1913272.2-STALLION HAMMOCK/GEOTECH/SITE INVESTIGATION/STALLION HAMMOCK/GPJ CONTROL OF THE STD US LAB GDT - 2/8/11 12:07 - TX1913272.2-STALLION HAMMOCK/GEOTECH/SITE INVESTIGATION/STALLION HAMMOCK/GPJ CONTROL OF THE STD US LAB GDT - 2/8/11 12:07 - TX1913272.2-STALLION HAMMOCK/GEOTECH/SITE INVESTIGATION/STALLION HAMMOCK/GPJ CONTROL OF THE STD US LAB GDT - 2/8/11 12:07 - TX1913272.2-STALLION HAMMOCK/GEOTECH/SITE INVESTIGATION/STALLION HAMMOCK/GPJ CONTROL OF THE STD US LAB GDT - 2/8/11 12:07 - TX1913272.2-STALLION HAMMOCK/GEOTECH/SITE INVESTIGATION/STALLION HAMMOCK/GPJ CONTROL OF THE STD US LAB GDT - 2/8/11 12:07 - TX1913272.2-STALLION HAMMOCK/GEOTECH/SITE INVESTIGATION HAMMOCK/GPJ CONTROL OF THE STD US LAB GDT - 2/8/11 12:07 - TX1913272.2-STALLION HAMMOCK/GEOTECH/SITE INVESTIGATION HAMMOCK/GPJ CONTROL OF THE STD US LAB GDT - 2/8/11 12:07 - TX1913272.2-STALLION HAMMOCK/GEOTECH/SITE INVESTIGATION HAMMOCK/GPJ CONTROL OF THE STD US LAB GDT - 2/8/11 12:07 - TX1913272.2-STALLION HAMMOCK/GEOTECH/SITE INVESTIGATION HAMMOCK/GPJ CONTROL OF THE STD US LAB GDT - 2/8/11 12:07 - TX1913272.2-STALLION HAMMOCK/GEOTECH/SITE INVESTIGATION HAMMOCK/GEOTEC	SS 6	1-1-1 (2)	MC = 22% Fines = 6%	SP- SM	_	13.5 (SP-SM) Brown to dark brown slightly silty SAND (wet) POOR RECOVERY	-13.5
TALLION H	ss	1-1-0	MC = 35%			18.5 (SM) Brown Silty SAND with cemented SAND	-18.5
7 - T:\\1913272.2-8	7	(1)	Fines = 17%	SM			
25	SS 8	3-4-7 (11)				23.5 (CH) Light brown to gray CLAY with phosphate	-23.5
D US LAB.GDT				СН			00 =
30	SS 9	1-2-3 (5)	MC = 63% Fines = 32%	sc		28.5 (SC) Light brown to gray clayey SAND with phosphate	-28.5
ERAL BH / TP / WE	- - - - - - - -	9-14-17		СН		(CH) Light brown to gray CLAY with trace of fine phosphate HARD DRILLING (31.0 to 33.5 feet depth)	-31.0
35 35	10	(31)					
						(Continued Next Page)	



BORING NUMBER SPT-01

PAGE 2 OF 2

CLIEN	95 95 96 97 98 98 98 98 98 98 98			PROJECT NAME Stallion Hammock			
PROJ	ECT NUM	MBER 132	72.2			PROJECT LOCATION Hillsborough County	
(f) (2) 25	0	>	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
 40	SS 11	16-21-38 (59)		СН		(CH) Light brown to gray CLAY with trace of fine phosphate (continued) 40.0	-40.0
						Bottom of borehole at 40.0 feet.	

GENERAL BH / TP / WELL - GINT STD US LAB GDT - 2/8/11 12:07 - T/1913272.2-STALLION HAMMOCKIGEOTECHISITE INVESTIGATION/STALLION HAMMOCK GPJ

BORING NUMBER SPT-02

PAGE 1 OF 1

6					
1	4		-		
	270	inee	١,	sci	:te

CLIENT Scheda	a Ecological Associates		PROJECT NAME Stallion Hammock PROJECT LOCATION Hillsborough County			
PROJECT NUMB	BER 13272.2					
DATE STARTED	COMF	PLETED 1/11/11	GROUND ELEVATION _0 ft HOLE SIZE _3" inches			
DRILLING CONT	RACTOR Independent Drill	ling, Inc. (IDI)	GROUND WATER LEVELS:			
DRILLING METH	OD Mud Rotary		AT TIME OF DRILLING			
LOGGED BY To	ony Skipper CHEC	CKED BY Keith Beris	swill AT END OF DRILLING			
	rd SPT drilling practices were		AFTER DRILLING			
O DEPTH (ft) SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	U.S.C.S. GRAPHIC LOG	MATERIAL DESCRIPTION			
SS 1	3-3-4-3 (7) MC = 8% Fines = 7%		(SP-SM) Light brown to brown slightly silty SAND mottled with light brown clayey SAND			
V ss I	3-5-5-4	3.0	-3.0			
2	(10)	SC //4.0	(SC) Light brown to yellow clayey SAND (dry)			
5 SS 3	3-4-5-4 MC = 8% (9) Fines = 6%	SP- SM	(SP-SM) Light brown mottled silty SAND with orangish brown silty SAND -6.0			
SS 4	3-4-5-4 (9)	SM	(SM) Reddish brown silty SAND with hardpan			
SS 5	3-2-3-2 (5)	8.0	(SP-SM) Light brown to brown slightly silty SAND			
10 / \		SP-				
SS	2-2-2 MC = 49%	13.5	-13.5 (SP-SC) Orangish brown to green clayey SAND			
15 6	Fines = 32%	SP- SC				
- SS 7	5-4-7 (11) MC = 76% Fines = 60%	18.5	(CH) Yellow brown sandy CLAY with slight trace of phosphate			
		21.0	-21.0			
SS 25 8	10-33-46 (79) MC = 53% Fines = 34%		(SC) Yellowish brown clayey SAND with traces of desiccated CLAY and phosphate			
30 9 9	MC = 81% Fines = 60%	28.5	-28.5 (CH) Light gray sandy CLAY with trace of phosphate			
SS 10	9-10-25 (35) MC = 106% Fines = 54%	33.5 CH 35.0	-33.5 (CH) Green to blue CLAY with trace of phosphate -35.0			
00 /	, 7	30.0	Bottom of horehole at 35.0 feet			

APPENDIX B

Laboratory Test Results



Location: Balm Scrub Mountian Biking Park

2050 S. Edgewood Drive Suite 111 Lakeland, FL 33803

Phone: (863) 667-2345 Fax: (863) 667-2662

MOISTURE CONTENT and WET SIEVE ANALYSIS

ASTM C117, D1140, D2216, D2487, D4643

CLIENT:	Scheda Ecological	Assigned Date:	January 13, 2011
Address:	Un Named Road off Balm Boyette Road	Project #: _	13272*2
		Requested By:	KAB
_	Balm-Picnic, FL	Tested By:	MG/nab
_		Checked By:	M. Chomtid
Project:	Stallion Hammock	· -	

% Solids, Moisture Content Wet Sieve Test									
	Weight of	Weight of				Weight of	Weight of	% Finer	
Sample No.	Container +	Container +	Weight of	Solids	Moisture	Container +	Container + Dry	Than #200	
and Depth	Wet Soil	Dry Soil	Container	Content	Content	Dry Soil	Washed Soil	Sieve	
	(grams)	(grams)		(%)	(%)	(grams)	(grams)	(%)	
SPT-1 SAMPLE - 1	501.37	453.59	6.58	90.3	10.7	453.59	401.77	11.6	
SPT-1 SAMPLE - 3	503.80	471.32	6.58	93.5	7.0	471.32	436.27	7.5	
SPT-1 SAMPLE - 6	158.82	131.78	6.55	82.2	21.6	131.78	124.08	6.1	
SPT-1 SAMPLE - 7	174.14	130.54	6.60	74.0	35.2	130.54	109.71	16.8	
SPT-1 SAMPLE - 9	133.78	84.80	6.55	61.5	62.6	84.80	59.66	32.1	
SPT-2 SAMPLE - 1	511.91	473.74	6.59	92.4	8.2	473.74	440.63	7.1	
SPT-2 SAMPLE - 3	548.07	507.96	6.55	92.6	8.0	507.96	479.90	5.6	
SPT-2 SAMPLE - 6	124.64	85.61	6.50	67.0	49.3	85.61	60.33	32.0	
SPT-2 SAMPLE - 7	307.26	177.50	6.49	56.9	75.9	177.50	75.71	59.5	
SPT-2 SAMPLE - 8	171.72	114.32	6.55	65.2	53.3	114.32	77.23	34.4	
SPT-2 SAMPLE - 9	105.59	61.21	6.60	55.2	81.3	61.21	28.62	59.7	
SPT-2 SAMPLE - 10	117.85	60.52	6.59	48.5	106.3	60.52	31.19	54.4	

Notes:			



Remarks:

2050 S. Edgewood Drive Suite 111 Lakeland, FL 33803 Phone: (863) 667-2345 Fax: (863) 667-2662

CLIENT: Scheda Ecological

Address: Un Named Road off Balm Boyette Road

Balm-Picnic, FL

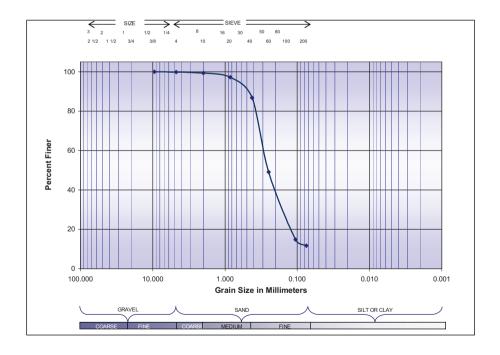
Project: Stallion Hammock
Location: Balm Scrub Mountian Biking Park

Sample ID: SPT-1 SAMPLE - 1

Visual Description: Light Gray Sand
USCS Classification:

	Grain Size Distribution Data									
Sieve Number	Sieve Opening (mm)	Sieve Weight (grams)	Sieve Weight + Soil (grams)	Soil Weight Retained (grams)	Accumulative Retained (grams)	Accumulative Percent Retained (%)	Percent Finer			
3/8"	9.500	489.8	489.80	0.00	0.00	0.0	100.0			
# 4	4.750	693.9	694.50	0.60	0.60	0.1	99.9			
# 10	2.000	470.1	472.70	2.60	3.20	0.7	99.3			
# 20	0.850	630.1	639.20	9.10	12.30	2.8	97.2			
# 40	0.425	378.2	425.20	47.00	59.30	13.3	86.7			
# 60	0.250	520.5	688.80	168.30	227.60	50.9	49.1			
# 140	0.106	503.9	657.40	153.50	381.10	85.3	14.7			
# 200	0.075	341.1	354.40	13.30	394.40	88.2	11.8			
PAN	-	500.8	553.40	52.60	447.00	100.0	0.0			

Assigned Date:	January 17, 2011	
Project #:	13272*2	
Requested By:	KAB	
Tested By:	MG/nab	
Checked By:	M. Chomtid	
_		
Dry Soil + Container:	453.59	
Container Weight.:	6.58	grams
Dry Soil:	447.01	grams
Dry Wash + Cont.:		grams
Dry Washed Soil:		grams





2050 S. Edgewood Drive Suite 111 Lakeland, FL 33803 Phone: (863) 667-2345 Fax: (863) 667-2662

CLIENT: Scheda Ecological

Address: Un Named Road off Balm Boyette Road

Balm-Picnic, FL

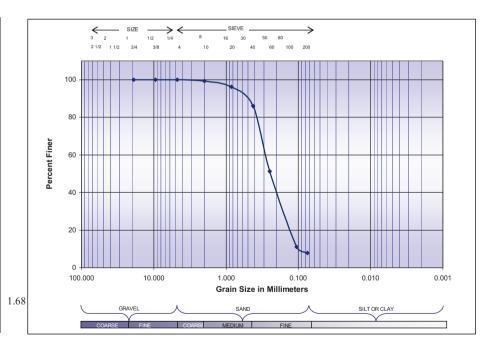
Project: Stallion Hammock
Location: Balm Scrub Mountian Biking Park

Sample ID: SPT-1 SAMPLE - 3
Visual Description: Light Brown Sand
USCS Classification:

Remarks:

	Grain Size Distribution Data									
Sieve Number	Sieve Opening (mm)	Sieve Weight (grams)	Sieve Weight + Soil (grams)	Soil Weight Retained (grams)	Accumulative Retained (grams)	Accumulative Percent Retained (%)	Percent Finer (%)			
3/4"	19.000	823.2	823.20	0.00	0.00	0.0	100.0			
3/8"	9.500	489.8	489.80	0.00	0.00	0.0	100.0			
# 4	4.750	693.9	694.40	0.50	0.50	0.1	99.9			
# 10	2.000	470.1	473.30	3.20	3.70	0.8	99.2			
# 20	0.850	630.1	643.80	13.70	17.40	3.7	96.3			
# 40	0.425	378.2	425.90	47.70	65.10	14.0	86.0			
# 60	0.25	520.5	681.90	161.40	226.50	48.7	51.3			
# 140	0.106	503.9	690.50	186.60	413.10	88.9	11.1			
# 200	0.075	341.1	356.40	15.30	428.40	92.2	7.8			
Pan		500.8	537.12	36.32	464.72	100.0	0.0			

Assigned Date:	January 17, 2011	
Project #:	13272*2	
Requested By:	KAB	
Tested By:	MG/nab	
Checked By:	M. Chomtid	
Dry Soil + Container:	471.32	_
Container Weight.:	6.58	grams
Dry Soil:	464.74	grams
Dry Wash + Cont.:		grams
Dry Washed Soil:		grams





2050 S. Edgewood Drive Suite 111 Lakeland, FL 33803

Phone: (863) 667-2345 Fax: (863) 667-2662

CLIENT: Scheda Ecological

Address: Un Named Road off Balm Boyette Road

Balm-Picnic, FL

Project: Stallion Hammock
Location: Balm Scrub Mountian Biking Park

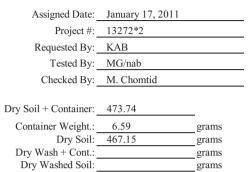
Sample ID: SPT-2 SAMPLE - 1

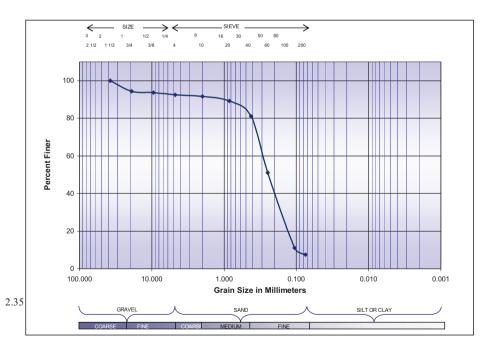
Visual Description: Light Brown Sand w/ Rock and Fibers

USCS Classification:

Remarks:

			Grain Size	e Distributi	ion Data		
Sieve	Sieve	Sieve	Sieve	Soil	Accumulative	Accumulative	Percent
Number	Opening	Weight	Weight +	Weight	Retained	Percent	Finer
		,	Soil	Retained		Retained	(0.1)
	(mm)	(grams)	(grams)	(grams)	(grams)	(%)	(%)
1 1/2"	37.500	710.3	710.30	0.00	0.00	0.0	100.0
3/4"	19.000	823.2	850.00	26.80	26.80	5.7	94.3
3/8"	9.500	489.8	493.00	3.20	30.00	6.4	93.6
# 4	4.750	693.9	699.00	5.10	35.10	7.5	92.5
# 10	2.000	470.1	474.20	4.10	39.20	8.4	91.6
# 20	0.850	630.1	641.60	11.50	50.70	10.9	89.1
# 40	0.425	378.2	415.80	37.60	88.30	18.9	81.1
# 60	0.25	520.5	660.90	140.40	228.70	49.0	51.0
# 140	0.106	503.9	691.00	187.10	415.80	89.0	11.0
# 200	0.075	341.1	357.30	16.20	432.00	92.5	7.5
Pan		500.8	535.95	35.15	467.15	100.0	0.0







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Phone: (863) 667-2345 Fax: (863) 667-2662

CLIENT: Scheda Ecological

Address: Un Named Road off Balm Boyette Road

Balm-Picnic, FL

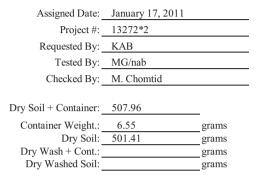
Project: Stallion Hammock
Location: Balm Scrub Mountian Biking Park

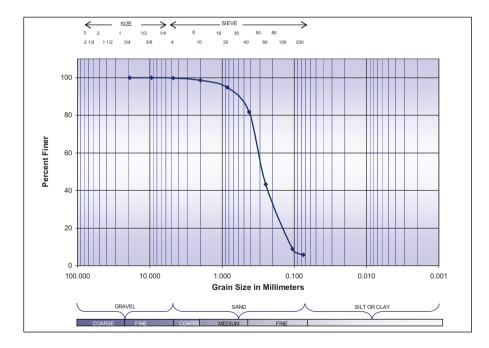
Sample ID: SPT-2 SAMPLE - 3

Visual Description: Brown Sand
USCS Classification:

Remarks:

	Grain Size Distribution Data						
Sieve Number	Sieve Opening (mm)	Sieve Weight (grams)	Sieve Weight + Soil (grams)	Soil Weight Retained (grams)	Accumulative Retained (grams)	Accumulative Percent Retained (%)	Percent Finer
3/4"	19.000	823.2	823.20	0.00	0.00	0.0	100.0
3/8"	9.500	489.8	489.80	0.00	0.00	0.0	100.0
# 4	4.750	693.9	694.70	0.80	0.80	0.2	99.8
# 10	2.000	470.1	476.30	6.20	7.00	1.4	98.6
# 20	0.850	630.1	649.10	19.00	26.00	5.2	94.8
# 40	0.425	378.2	443.90	65.70	91.70	18.3	81.7
# 60	0.25	520.5	713.30	192.80	284.50	56.7	43.3
# 140	0.106	503.9	676.70	172.80	457.30	91.2	8.8
# 200	0.075	341.1	355.80	14.70	472.00	94.1	5.9
Pan		500.8	530.20	29.40	501.40	100.0	0.0





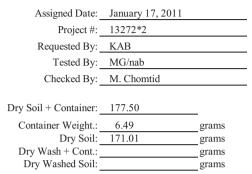


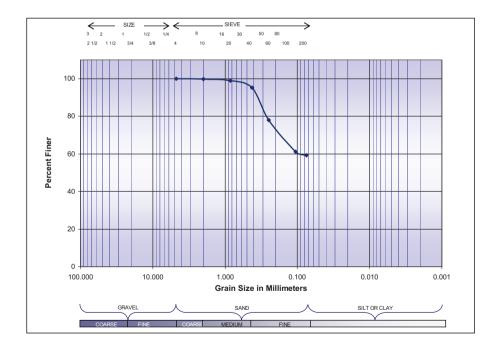
2050 S. Edgewood Drive Suite 111 Lakeland, FL 33803 Phone: (863) 667-2345

Phone: (863) 667-2345 Fax: (863) 667-2662

CLIENT:	Scheda Ecological
Address:	Un Named Road off Balm Boyette Road
	Balm-Picnic, FL
Project:	Stallion Hammock
Location:	Balm Scrub Mountian Biking Park
Sample ID:	SPT-2 SAMPLE - 7
Visual Description:	Light Brown Sand w/ Small Stone and Limestone
USCS Classification:	
Remarks:	

			Grain Size	e Distributi	ion Data		
Sieve Number	Sieve Opening	Sieve Weight	Sieve Weight +	Soil Weight	Accumulative Retained	Accumulative Percent	Percent Finer
	(mm)	(grams)	Soil (grams)	Retained (grams)	(grams)	Retained (%)	(%)
# 4	4.750	693.9	693.90	0.00	0.00	0.0	100.0
# 10	2.000	470.1	470.40	0.30	0.30	0.2	99.8
# 20	0.850	630.1	631.50	1.40	1.70	1.0	99.0
# 40	0.425	378.2	384.60	6.40	8.10	4.7	95.3
# 60	0.250	520.5	549.90	29.40	37.50	21.9	78.1
# 140	0.106	503.9	533.00	29.10	66.60	38.9	61.1
# 200	0.075	341.1	344.30	3.20	69.80	40.8	59.2
Pan		500.8	602.00	101.20	171.00	100.0	0.0





APPENDIX C

Seepage Analyses Summary Tables





Summary of Transient State Seepage Analysis Results for 2nd Day

Pit Number	Cross Section	Geometry	Unit Seepage Flow Rate	Section Length	Total Seepage Flow Rate	
	Stratigraphy		(ft ³ /s/ft)	(ft)	(cfs)	(gpm)
	Cast	Adjacent mine cut 150 ft away	7.49E-05	900	0.07	30.3
1&2	Overburden	Adjacent mine cut 300 ft away	7.49E-05	500	0.04	16.8
102	Un-mined Land	No adjacent mine cut	4.63E-05	390	0.02	8.1
		F	Pit 1 & 2 subtotal	1790	0.12	55.2
	Cast	Adjacent mine cut 150 ft away	7.49E-05	475	0.04	16.0
3	Overburden	Adjacent mine cut 300 ft away	7.49E-05	200	0.01	6.7
3	Un-mined Land	No adjacent mine cut	4.63E-05	260	0.01	5.4
			Pit 3 subtotal	935	0.06	28.1
	Cast	Adjacent mine cut 150 ft away	7.49E-05	1110	0.08	37.3
4	Overburden	Adjacent mine cut 300 ft away	7.49E-05	900	0.07	30.3
4	Un-mined Land	No adjacent mine cut	4.63E-05	625	0.03	13.0
			Pit 4 subtotal	2635	0.18	80.6
	Cast	Adjacent mine cut 150 ft away	7.49E-05	0	0.00	0.0
_	Overburden	Adjacent mine cut 300 ft away	7.49E-05	1325	0.10	44.5
5	Un-mined Land	No adjacent mine cut	4.63E-05	125	0.01	2.6
			Pit 5 subtotal	1450	0.11	47.1
	Total	Dewatering Quantity		6810	0.47	210.9





Summary of Transient State Seepage Analysis Results for 10th Day

Pit Number	Cross Section	Geometry	Unit Seepage Flow Rate	Section Length	Total Seepage Flow Rate	
	Stratigraphy		(ft ³ /s/ft)	(ft)	(cfs)	(gpm)
	Cast	Adjacent mine cut 150 ft away	5.81E-05	900	0.05	23.5
1&2	Overburden	Adjacent mine cut 300 ft away	5.81E-05	500	0.03	13.0
102	Un-mined Land	No adjacent mine cut	3.59E-05	390	0.01	6.3
		F	Pit 1 & 2 subtotal	1790	0.10	42.8
	Cast	Adjacent mine cut 150 ft away	5.81E-05	475	0.03	12.4
3	Overburden	Adjacent mine cut 300 ft away	5.81E-05	200	0.01	5.2
3	Un-mined Land	No adjacent mine cut	3.59E-05	260	0.01	4.2
			Pit 3 subtotal	935	0.05	21.8
	Cast	Adjacent mine cut 150 ft away	5.81E-05	1110	0.06	28.9
4	Overburden	Adjacent mine cut 300 ft away	5.81E-05	900	0.05	23.5
4	Un-mined Land	No adjacent mine cut	3.59E-05	625	0.02	10.1
			Pit 4 subtotal	2635	0.14	62.5
	Cast	Adjacent mine cut 150 ft away	5.81E-05	0	0.00	0.0
F	Overburden	Adjacent mine cut 300 ft away	5.81E-05	1325	0.08	34.5
5	Un-mined Land	No adjacent mine cut	3.59E-05	125	0.00	2.0
			Pit 5 subtotal	1450	0.08	36.5
	Total	Dewatering Quantity		6810	0.36	163.6





Summary of Transient State Seepage Analysis Results for 40th Day

Pit Number	Cross Section	Geometry	Unit Seepage Flow Rate	Section Length	Total Seepage Flow Rate	
	Stratigraphy		(ft ³ /s/ft)	(ft)	(cfs)	(gpm)
	Cast	Adjacent mine cut 150 ft away	3.96E-05	900	0.04	16.0
1&2	Overburden	Adjacent mine cut 300 ft away	3.96E-05	500	0.02	8.9
102	Un-mined Land	No adjacent mine cut	2.53E-05	390	0.01	4.4
		F	Pit 1 & 2 subtotal	1790	0.07	29.3
	Cast	Adjacent mine cut 150 ft away	3.96E-05	475	0.02	8.4
3	Overburden	Adjacent mine cut 300 ft away	3.96E-05	200	0.01	3.6
3	Un-mined Land	No adjacent mine cut	2.53E-05	260	0.01	2.9
			Pit 3 subtotal	935	0.03	14.9
	Cast	Adjacent mine cut 150 ft away	3.96E-05	1110	0.04	19.7
4	Overburden	Adjacent mine cut 300 ft away	3.96E-05	900	0.04	16.0
4	Un-mined Land	No adjacent mine cut	2.53E-05	625	0.02	7.1
			Pit 4 subtotal	2635	0.10	42.8
	Cast	Adjacent mine cut 150 ft away	3.96E-05	0	0.00	0.0
_	Overburden	Adjacent mine cut 300 ft away	3.96E-05	1325	0.05	23.5
5	Un-mined Land	No adjacent mine cut	2.53E-05	125	0.00	1.4
			Pit 5 subtotal	1450	0.06	24.9
	Total	Dewatering Quantity		6810	0.25	111.9





Summary of Transient State Seepage Analysis Results for 60th Day

Pit Number	Cross Section	Geometry	Unit Seepage Flow Rate	Section Length	Total Seepage Flow Rate	
	Stratigraphy		(ft ³ /s/ft)	(ft)	(cfs)	(gpm)
	Cast	Adjacent mine cut 150 ft away	3.46E-05	900	0.03	14.0
1&2	Overburden	Adjacent mine cut 300 ft away	3.45E-05	500	0.02	7.8
10.2	Un-mined Land	No adjacent mine cut	2.23E-05	390	0.01	3.9
		F	Pit 1 & 2 subtotal	1790	0.06	25.6
	Cast	Adjacent mine cut 150 ft away	3.46E-05	475	0.02	7.4
3	Overburden	Adjacent mine cut 300 ft away	3.45E-05	200	0.01	3.1
3	Un-mined Land	No adjacent mine cut	2.23E-05	260	0.01	2.6
			Pit 3 subtotal	935	0.03	13.1
	Cast	Adjacent mine cut 150 ft away	3.46E-05	1110	0.04	17.3
4	Overburden	Adjacent mine cut 300 ft away	3.45E-05	900	0.03	14.0
4	Un-mined Land	No adjacent mine cut	2.23E-05	625	0.01	6.3
			Pit 4 subtotal	2635	0.08	37.5
	Cast	Adjacent mine cut 150 ft away	3.46E-05	0	0.00	0.0
F	Overburden	Adjacent mine cut 300 ft away	3.45E-05	1325	0.05	20.5
5	Un-mined Land	No adjacent mine cut	2.23E-05	125	0.00	1.3
			Pit 5 subtotal	1450	0.05	21.8
	Total	Dewatering Quantity		6810	0.22	98.0





Summary of Steady State Seepage Analysis Results

Pit Number	Cross Section	Geometry	Unit Seepage Flow Rate	Section Length	Total Seepage Flow Rate		
	Stratigraphy		(ft ³ /s/ft)	(ft)	(cfs)	(gpm)	
	Cast	Adjacent mine cut 150 ft away	1.78E-05	900	0.02	7.2	
1&2	Overburden	Adjacent mine cut 300 ft away	1.03E-05	500	0.01	2.3	
10.2	Un-mined Land	No adjacent mine cut	1.35E-06	390	0.00	0.2	
		F	Pit 1 & 2 subtotal	1790	0.02	9.7	
	Cast	Adjacent mine cut 150 ft away	1.78E-05	475	0.01	3.8	
3	Overburden	Adjacent mine cut 300 ft away	1.03E-05	200	0.00	0.9	
3	Un-mined Land	No adjacent mine cut	1.35E-06	260	0.00	0.2	
			Pit 3 subtotal	935	0.01	4.9	
	Cast	Adjacent mine cut 150 ft away	1.78E-05	1110	0.02	8.8	
4	Overburden	Adjacent mine cut 300 ft away	1.03E-05	900	0.01	4.2	
4	Un-mined Land	No adjacent mine cut	1.35E-06	625	0.00	0.4	
			Pit 4 subtotal	2635	0.03	13.4	
	Cast	Adjacent mine cut 150 ft away	1.78E-05	0	0.00	0.0	
5	Overburden	Adjacent mine cut 300 ft away	1.03E-05	1325	0.01	6.1	
S	Un-mined Land	No adjacent mine cut	1.35E-06	125	0.00	0.1	
			Pit 5 subtotal	1450	0.01	6.2	
	Total	Dewatering Quantity		6810	0.08	34.2	