



NORDIC
INDUSTRIES, INC.

MAGNUS
Pacific

DATE: **March 23, 2015**
TO: SBFCA C/O Parsons Brinkerhoff
 Mr. Mark Martin
 2329 Gateway Oaks Drive, Suite 200
 Sacramento, CA 95833-4231
mamartin@pbworld.com
cc James Lorenzen
lorenzen@pbworld.com
Pages: **203**

TRANSMITTAL # **80.0**
FROM: Nordic / Magnus Pacific JV
 Jared Williams
 Project Manager
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 1437 Furneaux Road
 Olivehurst, CA 95961
 TEL: 530-742-7124
 FAX: 530-742-3707

We are sending you:

- | | | |
|---|---|--|
| <input type="checkbox"/> Specifications | <input checked="" type="checkbox"/> Submittal | <input type="checkbox"/> Change Order |
| <input type="checkbox"/> Plans | <input type="checkbox"/> RFI | <input type="checkbox"/> Field Instruction |
| <input type="checkbox"/> Drawings | <input type="checkbox"/> Letter | <input type="checkbox"/> Other: See Below |

Specification Section: **General Specifications - Section 02 32 00**

Resubmittal of:

Item No.	Date	Copies	Pages	Description
80.0	3/23/15	1	203	Area D Verification Borelogs

Remarks:

I certify that the above submitted items had been reviewed in detail and are correct and in strict conformance with contract drawings and specifications except as otherwise stated.

Jared Williams

Copy to: File

LOG OF BORING C001_1988+00

PROJECT NO: 14-165.1	BEGIN DATE: 6/16/2014	DRILLING CONTRACTOR: GeoEx Subsurface, Driller: Rian H.
PROJECT: SBFCA-B&D Verif. Borings	COMPLETION DATE: 6/17/2014	DRILLING METHOD: Solid-Stem Auger & Rotary Wash
LOCATION: E. of Gridley	SURFACE ELEVATION: 112(ft)	DRILL RIG: CME 75
CLIENT: Magnus	SURFACE CONDITION: Gravel	HAMMER TYPE: Auto: 140lb, 30"
LOGGED BY: JJW	WATER DEPTH: N/A	SAMPLER TYPE & SIZE: SPT (1.4")
DEPTH OF BORING: 48(ft)	READING TAKEN: N/A	BOREHOLE DIAMETER: 6"
	HAMMER EFFICIENCY:	BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY(%)	LABORATORY					REMARKS						
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE							
110	1							SILTY SAND (SM); brown; dry; medium to fine SAND; about 35 to 40% low plasticity fines.						Driller augered to 14.5' below crest of levee. Driller set casing (5" ID) to 15' below crest of levee							
108	2																				
	3																				
	4																				
	5																				
106	6																				
	7																				
104	8																				
	9																				
102	10																				
	11																				
100	12																				
	13																				
98	14																				
	15																				
96	16																				
	17																				
94	18																				
	19																				
92	20																				
	21																				
90	22																				
	23																				
88	24																				



Crawford & Associates, Inc.
 4030 S Land Park Drive, Ste. C
 Sacramento, CA 95822
 (916) 455 4225

PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C001_1988+00
 ENTRY BY: JJW
 CHECKED BY: SHEET 1 of 2

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS				
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE					
86	26																		
	27																		
84	28																		
	29																		
82	30																		
	31																		
80	32																		Gravel layer encountered
	33																		
78	34																		
	35																		
76	36																		Switched from Punch Core drill rods to NWJ drill rods. Also changed to a new bit
	37																		
74	38																		
	39																		
72	40																		Coarse sand in cuttings. Matrix most likely very dense coarse gravels to cobbles intermixed with coarse sand
	41																		
70	42																		
	43																		
68	44																		
	45																		
66	46																		
	47																		
64	48																		Bottom of borehole at 48.0 ft bgs
	49																		Bit too damaged to continue. Changed to a dragbit in attempt to break through coarse gravel/cobble layer.
	49																		Draft Log
62	50																		Hole abandoned due to potential carbide teeth in bottom of hole.
	51																		
60	52																		
	53																		
58	54																		
	55																		

LOG OF BORING C001R_1988+05

PROJECT NO: 14-165.1	BEGIN DATE: 6/18/2014	DRILLING CONTRACTOR: GeoEx Subsurface, Driller: Rian H./Tom
PROJECT: SBFCA-B&D Verif. Borings	COMPLETION DATE: 6/23/2014	DRILLING METHOD: Solid-Stem Auger & Rotary Wash
LOCATION: E. of Gridley	SURFACE ELEVATION: 112(ft)	DRILL RIG: CME 75
CLIENT: Magnus	SURFACE CONDITION: Gravel	HAMMER TYPE: Auto: 140lb, 30"
LOGGED BY: JJW	WATER DEPTH: N/A	SAMPLER TYPE & SIZE: SPT (1.4")
DEPTH OF BORING: 111.8(ft)	READING TAKEN: N/A	BOREHOLE DIAMETER: 6"
	HAMMER EFFICIENCY:	BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY(%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
110	1						SILTY SAND (SM); brown; dry; medium to fine SAND; about 35% low plasticity fines.							Augered to 14.5' below levee crown Cased (5") to 15' below levee crown	
	2														
	3														
	4														
	5														
	6														
	7														
	8														
	9														
	10														
	11														
	12														
	13														
	14														
	15														
	16													Downhole air hammer used in attempt to break through gravels. Switched from Solid Stem Augers to Air Rotary	
	17														
	18														
	19														
	20														
	21														
	22														
	23														
	24														



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C001R_1988+05
 ENTRY BY: JJW
 CHECKED BY:

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
86	26						Poorly graded SAND (SP); light brown; dry; medium to fine SAND; about 5% nonplastic fines.								
	27														
84	28														
	29														
82	30														
	31														
80	32														
	33														
78	34														Drill chatter, suggests gravel layer
	35														
76	36														
	37														
74	38														
	39														
72	40														
	41														
70	42														
	43														
68	44														
	45														
66	46														
	47														
64	48														Loss of about 100 gallons
	49														
62	50														
	51														
60	52														Loss of about 125 additional gallons
	53														
58	54														
	55														



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C001R_1988+05
 ENTRY BY: JJW
 CHECKED BY: SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS						
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)		% PASSING 200 SIEVE					
56	56																			
57	57																			
54	58		1	43	64		SILTY CLAY (CL-ML); yellowish brown; moist; about 5% fine SAND; medium plasticity fines.	11												
59	59			35																
52	60		2	12	30		Poorly graded SAND with SILT (SP-SM); brown; moist to wet; medium to fine SAND; about 10% nonplastic fines.	100												
61	61		3	2	22			44												
50	62			10																
63	63		4	10	44			100												
64	64			18																
48	64			26																
65	65		5	8	38		Lean CLAY (CL); yellowish brown; moist; about 5% fine SAND; medium to high plasticity fines; oxidation. Reddish brown; about 10% fine SAND.	100												
46	66			15																
67	67		6	20	52			100												
68	68			26																
44	68			26																
69	69		7	16	54		CLAYEY SILT with SAND (ML/CL); reddish brown; moist; about 25% fine SAND; low plasticity fines.	100												
42	70			23																
71	71		8	13	37			100												
40	72			16			About 20% fine SAND; nonplastic to low plasticity fines.													
73	73		9	11	45			100												
38	74			16																
75	75		10	13	43			100												
36	76			18																
77	77		11	10	28		About 25 to 30% fine SAND.	88												
34	78			12																
79	79		12	15	41		SILTY SAND (SM); brown; moist; medium to fine SAND; about 30% nonplastic fines.	100												
32	80			18																
81	81		13	12	32			100												
30	82			15			About 35% nonplastic fines.													
83	83		14	13	35			100												
28	84			15			About 25% nonplastic fines.													
85	85		15	7	93/8			100												
				43			SILTY SAND (SM) (continued).													
				50/2"																



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PROJECT NUMBER: 14-165.1
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 BORING: C001R_1988+05
 ENTRY BY: JJW
 CHECKED BY: SHEET 3 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
26	86														Drill chatter, suggests gravel layer
	87														Loss of about 100 additional gallons
24	88														
	89														
22	90														
	91														
20	92														
	93														
18	94														No drill chatter, suggests end of gravel layer
	95		16	28	64			0							
16	96			36											
	97			28											No recovery, most likely due to rock at sampler tip. Overdrill by a foot in attempt to push away gravel
	98														
14	98		17	20	58		SILTY SAND (SM); blackish brown; moist to wet; medium to fine SAND; about 20% nonplastic fines.	100							
	99			24			Lean CLAY (CL); bluish gray; moist; about 5 to 10% fine SAND; medium plasticity fines.								
	100			34											
12	100		18	30	104			100							
	101			48											
	101			56											
10	102		19	20	82			75							
	103			32											
	103			50											
8	104		20	24	50/4			100							6/20/14: End of drilling for day
	105			50/4"											6/23/14: Resumed drilling beyond 104'. Driller switched from Rian H. to Tom S.
6	106		21	40	50/3		Blocky structure.	100							
	107			50/3"											
	107		22	22	82/10			100							
	108			32											
4	108			50/4"			Poorly graded SAND with SILT (SP-SM); dark gray; wet; fine SAND; about 10% nonplastic fines.								
	109						Lean CLAY (CL); dark gray; wet; about 5 to 10% fine SAND; medium plasticity fines; blocky structure.	100							
	109		23	33	93/11										
	110			43			SILTY SAND (SM); dark gray; wet; fine SAND; about 15 to 20% nonplastic fines.								
2	110			50/5"											
	111						Lean CLAY (CL); dark gray; wet; about 5 to 10% fine SAND; medium plasticity fines; blocky.	100							
	111		24	30	50/3										
	112			50/3"			Bottom of borehole at 111.8 ft bgs								
0	112														
	113						Draft Log								
	114														
-2	114														
	115														
	116														



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C001R_1988+05
 ENTRY BY: JJW
 CHECKED BY: SHEET 4 of 4

LOG OF BORING C002_1989+00

PROJECT NO: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 LOCATION: E. of Gridley
 CLIENT: Magnus/Nordic JV
 LOGGED BY: JJW
 DEPTH OF BORING: 111.3(ft)

BEGIN DATE: 6/23/2014
 COMPLETION DATE: 6/26/2014
 SURFACE ELEVATION: 111.6(ft)
 SURFACE CONDITION: Gravel
 WATER DEPTH: N/A
 READING TAKEN: N/A HAMMER
 EFFICIENCY:

DRILLING CONTRACTOR: GeoEx Subsurface, Driller: Tom S.
 DRILLING METHOD: Solid-Stem Auger & Rotary Wash
 DRILL RIG: CME 75
 HAMMER TYPE: Auto: 140lb, 30"
 SAMPLER TYPE & SIZE: SPT (1.4")
 BOREHOLE DIAMETER: 6"
 BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY(%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
110	1														Driller augered to 25' below crest of levee. Driller set casing (5" ID) to 25' below crest of levee
108	2														
106	3														
104	4														
102	5														
100	6														
98	7														
96	8														
94	9														
92	10														
90	11														
88	12														



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C002_1989+00
 ENTRY BY: JJW
 CHECKED BY: SHEET 1 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
86	26														Switch from Solid stem auger to rotary wash
	27														
84	28														
	29														
82	30														
	31														
80	32														Drill chatter, suggest gravel layer
	33														
78	34														
	35														
76	36														
	37														
74	38														
	39														
72	40														
	41														
70	42														
	43														
68	44														
	45														
66	46														
	47														
64	48														
	49														
62	50														Loss of about 50 gallons
	51														
60	52														
	53														
58	54														
	55														



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C002_1989+00
ENTRY BY: JJW
CHECKED BY: SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS			
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)		% PASSING 200 SIEVE		
56	56																
57	57		1	27	61			25									
54	58			30		3.0	SILTY CLAY with SAND (CL-ML); yellowish brown; moist; about 15 to 20% fine SAND; low to medium plasticity fines.									No drill chatter, suggest end of gravel layer	
59	59		2	17	49		SILTY SAND (SM); yellowish brown; moist; medium to fine SAND; about 30% nonplastic to low plasticity fines.	100									
52	60			26													
61	61		3	14	28												
50	62			14			Poorly graded SAND with SILT (SP-SM); dark brown; moist to wet; medium to fine SAND; about 10% nonplastic fines.									Driller replaced bit	
63	63		4	28			CLAYEY SAND (SC); brown; moist; medium to fine SAND; about 35% low plasticity fines.	25									
48	64		5	16	57		Lean CLAY with SAND (CL); brown; moist; about 15% fine SAND; medium plasticity fines; slightly blocky.	100									
65	65			21		>4.5											
46	66		6	20	59		SANDY lean CLAY (CL); brown; moist; about 35% fine SAND; low to medium plasticity fines; oxidation.	100									
67	67			26													
68	68		7	8	40												
44	68			12													
69	69		8	30	81		2" lense of Lean Clay with Sand.	100									
42	70			35			SILTY, CLAYEY SAND (SC-SM); brown; moist; medium to fine SAND; about 40% low plasticity fines.	100									
71	71		9	14	62												
40	72			23													
73	73		10	15	73/11		About 5% coarse to fine GRAVEL.	100									
38	74		11	23	REF		About 35% low plasticity fines.	0									
75	74			50/5"			SANDY SILT (ML); brown; moist; about 45% fine SAND; low plasticity fines.									Drill chatter, suggest gravel layer	
75	75			50/3"			About 15 to 20% coarse to fine GRAVEL.										
36	76																
77	77																
34	78																
79	79																
32	80																
81	81																
30	82																
83	83																
28	84																
85	85																



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C002_1989+00
 ENTRY BY: JJW
 CHECKED BY: SHEET 3 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS		
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE			
26	86																
	87																
24	88																
	89																
22	90																Loss of about 75 additional gallons
	91																
20	92																
	93																
18	94																No drill chatter, suggest end of gravel layer
	95																
16	96	12		40	72		SANDY SILTY CLAY (CL-ML); brown; moist; about 35% fine SAND; low to medium plasticity fines.	550									
	97	13		24	49	1.25											
14	98			24			SILTY SAND (SM); brown; moist; fine SAND; about 40% nonplastic to low plasticity fines.	4									
	99	14		16	41												
12	100			17													
	101	15		16	42		Poorly graded SAND with SILT (SP-SM); dark gray to black; wet; medium to fine SAND; about 5 to 10% nonplastic fines.	71									
10	102			26	50/5												
	103	16		50/5"			Lean CLAY (CL); bluish gray; moist; about 5% fine SAND; medium plasticity fines; blocky.	100									
8	104	17		29	90/11												
	105			40													
6	106			50/5"													Drill cuttings suggest material is consistent between 104.5' and 105.5' below ground surface
	107	18		31	50/5												
4	108			50/4"													
	109	19		31	50/4												
2	110			50/3"													
	111	20		39	50/3		SILT with SAND (ML); dark bluish gray; moist; about 15% fine SAND; low plasticity fines; slightly blocky.	100									
	112	21		16	90/9		Lean CLAY (CL); bluish gray; moist; about 5 to 10% fine SAND; medium plasticity fines; blocky.	80									
	113			40													
	114			50/3"													
0	115	Bottom of borehole at 111.3 ft bgs															
	116	Draft Log															

LOG OF BORING C003_1990+00

PROJECT NO: 14-165.1	BEGIN DATE: 6/26/2014	DRILLING CONTRACTOR: GeoEx Subsurface, Driller: Rian H.
PROJECT: SBFCA-B&D Verif. Borings	COMPLETION DATE: 7/2/2014	DRILLING METHOD: Solid-Stem Auger & Rotary Wash
LOCATION: E. of Gridley	SURFACE ELEVATION: 112(ft)	DRILL RIG: CME 75
CLIENT: Magnus	SURFACE CONDITION: Gravel	HAMMER TYPE: Auto: 140lb, 30"
LOGGED BY: JJW	WATER DEPTH: N/A	SAMPLER TYPE & SIZE: MCAL (2.0"); SPT (1.4")
DEPTH OF BORING: 112.5(ft)	READING TAKEN: N/A	BOREHOLE DIAMETER: 6"
	HAMMER EFFICIENCY:	BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY(%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
110	1														Augered to 25' below levee crown Cased (5") to 19' below levee crown
	2														
	3														
108	4														
	5														
106	6														
	7														
104	8														
	9														
102	10														
	11														
100	12														
	13														
98	14														
	15														
96	16														
	17														
94	18														
	19														
92	20														
	21														
90	22														
	23														
88	24														



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C003_1990+00
 ENTRY BY: JJW
 CHECKED BY: SHEET 1 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS				
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE					
86	26																		
	27																		
84	28																		
	29																		
82	30																		
	31																		
80	32																		
	33																		
78	34																		
	35																		Drill chatter, suggests gravel layer
76	36																		
	37																		Loss of about 75 gallons
74	38																		
	39																		
72	40																		
	41																		
70	42																		
	43																		
68	44																		
	45																		
66	46																		
	47																		
64	48																		
	49																		
62	50																		
	51																		
60	52																		
	53																		
58	54																		
	55																		



Crawford & Associates, Inc.
4030 S Land Park Drive, Ste. C
Sacramento, CA 95822
(916) 455 4225

PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C003_1990+00
ENTRY BY: JJW
CHECKED BY: SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS		
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE			
26	86																
	87																
24	88																
	89																
22	90																
	91																
20	92																
	93																
18	94																
	95																
16	96		13	21 28 40	68				42								
	97					1.0	Lean CLAY (CL); medium stiff to stiff; light brown; moist; about 10% fine SAND; medium plasticity fines.										
14	98		14	19 19 50/5.5"	69/12		SANDY SILT (ML); brown; moist; about 45% fine SAND; low plasticity fines.	100									
	99																
12	100		15	29 27 39	66	2.0	Lean CLAY (CL); stiff to very stiff; bluish gray; moist; about 5% fine SAND; medium plasticity fines.	67									
	101																
10	102		16	3 18 36	54			50									
	103																
8	104		17	27 43 50/3"	93/9	>4.5	Hard; slightly blocky.	100									
	105																
6	106		18	20 33 50/5"	83/11		About 5% coarse GRAVEL; blocky.	35									
	107																
4	108		19	23 43 97	140		SILTY, CLAYEY SAND (SC-SM); very dense; dark gray; moist; medium to fine SAND; about 30% low plasticity fines.	100									
	109																
2	110		20	26 57 100	157		2" lense of Sandy Silty Clay.	100									
	111																
0	112		21	41 190			SILTY CLAY (CL-ML); hard; bluish gray; wet; about 5% fine SAND; low to medium plasticity fines. Blocky, almost claystone like.	75									
	113																
	114		22	10 26 55	81		SANDY SILT (ML); bluish gray; wet; about 40% fine SAND; low plasticity fines.	100									
	115																
-4	116						Bottom of borehole at 112.5 ft bgs										
							Draft Log										

No drill chatter, suggests end of gravel layer.
Used up about 425 gallons of water from approx. 84' to 94' bgs



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C003_1990+00
ENTRY BY: JJW
CHECKED BY: SHEET 4 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)			GRAPHIC LOG	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)		% PASSING 200 SIEVE
86	26														
	27														
84	28														
	29														
82	30														
	31														
80	32														
	33														Drill chatter, suggest gravel layer
78	34														
	35														
76	36														
	37														
74	38														
	39														
72	40														
	41														
70	42														
	43														
68	44														
	45														
66	46														
	47														
64	48														
	49														
62	50														
	51														
60	52														
	53														
58	54														
	55														Used approximately 500 gallons of water

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS		
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE			
56	56																
	57																
54	58																
	59																
52	60																
	61																
50	62																No drill chatter, suggest end of gravel layer
	63																Mud cuttings contain sandy material
48	64																Drill chatter, suggest gravel layer
	65																
46	66																No drill chatter, suggest end of gravel layer
	67																
44	68																
	69																
42	70																
	71																
40	72																
	73																
38	74																
	75																
36	76																Drill chatter, suggest gravel layer
	77																
34	78																
	79																
32	80																
	81																
30	82																
	83																
28	84																
	85																



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C004_1991+00
 ENTRY BY: JJW
 CHECKED BY: SHEET 3 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS		
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE			
26	86																
	87																
24	88																
	89																
22	90																
	91																
20	92																
	93																
18	94																
	95																
16	96																
	97																
14	98																
	99																
	100	1	22	78			SILTY CLAY (CL-ML); bluish gray; moist; about 10% fine SAND; low to medium plasticity fines.	21									
12	101		31				Slightly blocky.										
	102	2	21	73			SILTY SAND (SM); dark gray; wet; medium to fine SAND; about 30% nonplastic to low plasticity fines; interbedded lenses of 1/4" to 1/2" lenses of lean Clay.	96									
10	103		31				Lean CLAY (CL); bluish gray; moist; about 10% fine SAND; low to medium plasticity fines.										
	104		42														
8	105	3	50/4" REF92/9					90									
	106		50/3"														
6	107	4	21	115			Lean CLAY with SAND (CL); bluish gray; moist; about 20% fine SAND; low to medium plasticity fines; blocky.	100									
	108		42														
4	109	5	28	104			SANDY lean CLAY (CL); dark bluish gray; moist; about 30% medium to fine SAND; low to medium plasticity fines; blocky.	100									
	110		34														
2	111	6	39	139			About 40% medium to fine SAND.	100									
	112		47				SILTY SAND (SM); dark bluish gray; moist to wet; medium to fine SAND; about 25% nonplastic to low plasticity fines.										
0	113	7	92	270			SANDY SILT (ML); dark gray; moist to wet; fine SAND; about 40% low plasticity fines.	100									
	114		178														
	115						Bottom of borehole at 112.5 ft bgs										
	116						Draft Log										

Used approximately 300 additional gallons of water
No drill chatter, suggest end of gravel layer

Driller drove sampler 10" from 104', then overdrilled from 104' to 105', then continued driving sampler from 105' to 105'-9"

ELEVATION (ft)	DEPTH (ft)	FIELD					RECOVERY (%)	LABORATORY					REMARKS					
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)		GRAPHIC LOG	DESCRIPTION	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)	% PASSING 200 SIEVE			
86	26																	
	27																	
84	28																	
	29																	
82	30																	
	31																	
80	32																	
	33																	
78	34																	
	35																	
76	36																	
	37																	
74	38																	
	39																	
72	40																	
	41																	
70	42																	
	43																	
68	44																	
	45																	
66	46																	
	47																	
64	48																	
	49																	
62	50																	
	51																	
60	52																	
	53																	
58	54																	
	55																	

Drill chatter, suggests gravel layer



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C005_1992+00
 ENTRY BY: JJW
 CHECKED BY: SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
56															
57															
54	58														
	59														
52	60														
	61														
50	62														
	63														
48	64														
	65														
46	66														
	67														
	68	1	30	28			Lean CLAY with SAND (CL); brown; moist; about 5% fine GRAVEL; about 15% fine SAND; medium plasticity fines.	100							
44	69	2	27	47	106		SANDY lean CLAY (CL); brown; moist; about 30 to 35% fine SAND; medium plasticity fines.	86							
	70			59											
42	71						CLAYEY SAND (SC); very dense; brown; moist; medium to fine SAND; about 20% low to medium plasticity fines.								
	72	3	44	100/4"	100/4		Poorly graded SAND with CLAY (SP-SC); very dense; dark gray; moist; about 5% fine GRAVEL; medium to fine SAND; about 10% low to medium plasticity fines.	100							
40	73														
	74														Drill chatter, suggests gravel layer
38	75														
	76														
36	77														
	78														
34	79														
	80														
32	81														
	82														
30	83														
	84														
28	85														

No drill chatter, suggests end of gravel layer.
Used ~425 gallons of water from 0' to 66' bgs.

Drill chatter, suggests gravel layer



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C005_1992+00
ENTRY BY: JJW
CHECKED BY: SHEET 3 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE		
26	86															
	87															
24	88															
	89															
22	90															
	91															
20	92															
	93															
18	94															
	95															
16	96															
	97															No drill chatter, suggests end of gravel layer.
14	98	4		35	98		SANDY SILTY CLAY (CL-ML); bluish gray; moist; about 40% fine SAND; low to medium plasticity fines; blocky.	95								Driller switched from 3.5" percussion bit to 4.5" punch core bit. Redrilled from 22' to 97'
	99			45												
	100			53			Elastic SILT (MH); bluish gray; moist; about 50% fine SAND; about 50% low plasticity fines.									
12	101															
	102	5		28	107		Lean CLAY (CL); bluish gray; moist; about 10% fine SAND; medium plasticity fines.	67								
10	103			44			SILTY SAND (SM); very dense; dark bluish gray; moist to wet; medium to fine SAND; about 20% nonplastic to low plasticity fines.									
	104			63			Lean CLAY with SAND (CL); bluish gray; moist; about 15% fine SAND; medium plasticity fines.	100								
8	105	6		90			SILTY, CLAYEY SAND (SC-SM); dark bluish gray; moist; fine SAND; about 30 to 40% nonplastic to low plasticity fines.									
	106			137		2.0	1" lense of blocky Silt.									
6	107	7		24	109		Lean CLAY with SAND (CL); stiff to very stiff; bluish gray; moist; about 20% fine SAND; medium plasticity fines.	83								
	108			39			About 10% fine SAND; blocky.									
4	109	8		26	84			100								
	110			34			SANDY lean CLAY (CL); bluish gray; moist; about 40 to 45% fine SAND; low to medium plasticity fines.									
2	111			50			SILTY SAND (SM); very dense; dark bluish gray; moist to wet; medium to fine SAND; about 20% nonplastic to low plasticity fines.	86								
	112	9		80	192		About 20 to 25% nonplastic to low plasticity fines.									
	113			112			SILTY CLAY with SAND (CL-ML); dark bluish gray; moist; about 15% fine SAND; low to medium plasticity fines; slightly blocky.									
	114						Bottom of borehole at 113.0 ft bgs									
	115						Draft Log									
-2	116															

ELEVATION (ft)	DEPTH (ft)	FIELD					DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS					
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)			GRAPHIC LOG	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)		% PASSING 200 SIEVE				
86	26																		
	27																		
84	28																		
	29																		
82	30																		
	31																		
80	32																		Drill chatter, suggests gravel layer
	33																		
78	34																		
	35																		
76	36																		
	37																		
74	38																		
	39																		
72	40																		
	41																		
70	42																		
	43																		
68	44																		
	45																		
66	46																		
	47																		
64	48																		
	49																		
62	50																		
	51																		
60	52																		
	53																		
58	54																		
	55																		



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C006_1993+00
ENTRY BY: JJW
CHECKED BY: SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)		GRAPHIC LOG	DESCRIPTION	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)
56	56													
57	57													
54	58													
59	59													
52	60													
61	61													
50	62													
63	63													
48	64													
65	65													
46	66													
67	67													
44	68													
69	69													
42	70													
71	71													
40	72													
73	73													
38	74													
75	75													
36	76													
77	77													
34	78													
79	79													
32	80													
81	81													
30	82													
83	83													
28	84													
85	85													



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PROJECT NUMBER: 14-165.1
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BORING: C006_1993+00
ENTRY BY: JJW
CHECKED BY: SHEET 3 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE		
26	86															
	87															
24	88															
	89															
22	90															
	91															
20	92															
	93															
18	94															
	95															
16	96															
	97	X	1	33	80/4		SILTY CLAY (CL-ML); bluish gray; moist; about 10% fine SAND; low to medium plasticity fines.	60								No drill chatter, suggests end of gravel layer.
14	98															Used ~550 gallons of water from 0' to 97' bgs.
	99															Driller switched from 3.5" percussion bit to 4.5" punch core bit. Needs to redrill from 22' to 97'
12	100	X	2	16	89	>4.5	Lean CLAY (CL); hard; bluish gray; moist; about 10% fine SAND; medium plasticity fines; blocky structure.	100								Driller noticed an object was partially blocking spt sampler.
	101	X		37												Driller drove an N rod with a carbide tooth welded to the tip in attempt to move object to side.
	101	X		52												
10	102	X	3	33	128	>4.5	Lean CLAY with SAND (CL); hard; bluish gray; moist; about 15 to 20% fine SAND; medium plasticity fines.	100								
	103	X		54												
	103	X		74												
8	104															
	105	X	4	46	123/10		Blocky structure.	100								
	105	X		48			SANDY lean CLAY (CL); very stiff; bluish gray; moist; about 30% fine SAND; medium plasticity fines.									
6	106	X		75/4"	3.0											Driller pounded sampler from 104.5' to 105.5', then overdrilled to 105.5', then pounded sampler from 105.5' to 106'-3"
	107	X	5	21	113			100								
	107	X		41												
4	108	X		72												
	109	X	6	21	133		SILTY, CLAYEY SAND (SC-SM); very dense; dark bluish gray; moist to wet; medium to fine SAND; about 20 to 25% nonplastic to low plasticity fines.	100								
	109	X		33												
2	110	X		100			2" lense of lean CLAY.									
	111	X	7	39			Poorly graded SAND with SILT (SP-SM); very dense; dark gray; wet; medium to fine SAND; about 10% nonplastic fines.	100								
	111	X		95												
0	112						SILT with SAND (ML); dark bluish gray; moist; about 20% fine SAND; low plasticity fines.									
	112						Bottom of borehole at 112.0 ft bgs									
	113															
	114						Draft Log									
-2	114															
	115															
-4	116															



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C006_1993+00
 ENTRY BY: JJW
 CHECKED BY: SHEET 4 of 4

LOG OF BORING C007_1994+00

PROJECT NO: 14-165.1	BEGIN DATE: 7/10/2014	DRILLING CONTRACTOR: GeoEx Subsurface, Driller: Rian H.
PROJECT: SBFCA-B&D Verif. Borings	COMPLETION DATE: 7/11/2014	DRILLING METHOD: Solid-Stem Auger & Rotary Wash
LOCATION: E. of Gridley	SURFACE ELEVATION: 112(ft)	DRILL RIG: CME 75
CLIENT: Magnus	SURFACE CONDITION: Gravel	HAMMER TYPE: Auto: 140lb, 30"
LOGGED BY: JJW	WATER DEPTH: N/A	SAMPLER TYPE & SIZE: SPT (1.4")
DEPTH OF BORING: 112(ft)	READING TAKEN: N/A	BOREHOLE DIAMETER: 6"
	HAMMER EFFICIENCY:	BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY(%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE		
112	1															Augered to 22' below levee crown Cased (5") to 23.5' below levee crown
110	2															
	3															
108	4															
	5															
106	6															
	7															
104	8															
	9															
102	10															
	11															
100	12															
	13															
98	14															
	15															
96	16															
	17															
94	18															
	19															
92	20															
	21															
90	22															
	23															
88	24															Switched from Solid Stem Auger to Rotary Wash

ELEVATION (ft)	DEPTH (ft)	FIELD					RECOVERY (%)	LABORATORY					REMARKS					
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)		GRAPHIC LOG	DESCRIPTION	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)	% PASSING 200 SIEVE			
86	26																	
	27																	
84	28																	
	29																	
82	30																	
	31																	
80	32																	Drill chatter, suggests gravel layer
	33																	
78	34																	
	35																	
76	36																	
	37																	
74	38																	
	39																	
72	40																	
	41																	
70	42																	
	43																	
68	44																	
	45																	
66	46																	
	47																	
64	48																	
	49																	
62	50																	
	51																	
60	52																	
	53																	
58	54																	
	55																	



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C007_1994+00
ENTRY BY: JJW
CHECKED BY: SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)		GRAPHIC LOG	DESCRIPTION	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)
56	56													
57	57													
54	58													
59	59													
52	60													
61	61													
50	62													
63	63													
48	64													
65	65													
46	66													
67	67													
44	68													
69	69													
42	70													
71	71													
40	72													
73	73													
38	74													
75	75													
36	76													
77	77													
34	78													
79	79													
32	80													
81	81													
30	82													
83	83													
28	84													
85	85													



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PROJECT NUMBER: 14-165.1
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BORING: C007_1994+00
ENTRY BY: JJW
CHECKED BY: SHEET 3 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS		
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE			
26	86																
	87																
24	88																
	89																
22	90																
	91																
20	92																
	93																
18	94																
	95																
16	96																
	97																
14	98																
	99																
12	100																
	101																No drill chatter, suggests end of gravel layer.
10	102	1	63	88			Lean CLAY (CL); bluish gray; moist; about 5 to 10% fine SAND; medium plasticity fines.	0									Used ~1400 gallons of water from 0' to 97' bgs. Driller switched from 3.5" percussion bit to 4.5" punch core bit. Needs to redrill from 22' to 99'
	103																
8	104	2	29	62			Lean CLAY with SAND (CL); bluish gray; moist; about 15% fine SAND; medium plasticity fines.	100									
	105	3	100	68	188/11		SANDY lean CLAY (CL); bluish gray; moist; about 35 to 40% medium to fine SAND; medium plasticity fines. About 30% medium to fine SAND.	100									
6	106		120/5"				About 35% medium to fine SAND.										
	107	4	70	46	100/3		Lean CLAY (CL); bluish gray; moist; about 10% fine SAND; medium plasticity fines.	100									
4	108		50	67	157		SANDY lean CLAY (CL); bluish gray; moist; about 35 to 40% medium to fine SAND; medium plasticity fines.										
	109	5	50	67	90			58									
2	110																
	111	6	155	100			SILTY SAND (SM); very dense; dark gray; moist to wet; medium to fine SAND; about 15% nonplastic fines.	100									
0	112						SANDY lean CLAY (CL); dark bluish gray; moist to wet; about 45% medium to fine SAND; low to medium plasticity fines.										
	113						Bottom of borehole at 112.0 ft bgs										
	114						Draft Log										
	115																
	116																

No drill chatter, suggests end of gravel layer.
Used ~1400 gallons of water from 0' to 97' bgs.
Driller switched from 3.5" percussion bit to 4.5" punch core bit. Needs to redrill from 22' to 99'

Driller noticed an object was partially blocking spt sampler. Driller drove an N rod with a carbide tooth welded to the tip from 102' to 104' bgs in attempt to move object to side. Bluish gray lean CLAY stuck to outside of NWJ rod

Driller pounded sampler from 105' to 106', then overdrilled to 106', then pounded sampler from 106' to 107'

Driller pounded sampler from 107' to 108'-3", then overdrilled to 108'-3", then pounded sampler from 108'-3" to 109'

From ~99' to 112' bgs, driller used an additional ~400 gallons of water (7/11/14)

LOG OF BORING C008_1995+00

PROJECT NO: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 LOCATION: E. of Gridley
 CLIENT: Magnus
 LOGGED BY: JJW
 DEPTH OF BORING: 113.5(ft)

BEGIN DATE: 7/11/2014
 COMPLETION DATE: 7/14/2014
 SURFACE ELEVATION: 112(ft)
 WATER DEPTH: N/A
 READING TAKEN: N/A
 HAMMER EFFICIENCY:

DRILLING CONTRACTOR: GeoEx Subsurface, Driller: Rian H.
 DRILLING METHOD: Solid-Stem Auger & Rotary Wash
 DRILL RIG: CME 75
 HAMMER TYPE: Auto: 140lb, 30"
 SAMPLER TYPE & SIZE: NX Core (ID 2.0")
 BOREHOLE DIAMETER: 6"
 BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY(%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
110	1														Driller augered to 22' below crest of levee. Driller set casing (5" ID) to 23' below crest of levee
108	2														
106	3														
104	4														
102	5														
100	6														
98	7														
96	8														
94	9														
92	10														
90	11														
88	12														Switch from Solid stem auger to rotary wash



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C008_1995+00
 ENTRY BY: JJW
 CHECKED BY: SHEET 1 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS					
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)			GRAPHIC LOG	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)		% PASSING 200 SIEVE				
86	26																		
	27																		
84	28																		
	29																		
82	30																		
	31																		
80	32																		
	33																		
78	34																		
	35																		
76	36																		
	37																		
74	38																		
	39																		
72	40																		
	41																		
70	42																		
	43																		
68	44																		
	45																		
66	46																		
	47																		
64	48																		
	49																		
62	50																		
	51																		
60	52																		
	53																		
58	54																		
	55																		

Drill chatter, suggest gravel layer



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C008_1995+00
ENTRY BY: JJW
CHECKED BY:

ELEVATION (ft)	DEPTH (ft)	FIELD					RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)		GRAPHIC LOG	DESCRIPTION	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)
56	56													
57	57													
54	58													
59	59													
52	60													
61	61													
50	62													
63	63													
48	64													
65	65													
46	66													
67	67													
44	68													
69	69													
42	70													
71	71													
40	72													
73	73													
38	74													
75	75													
36	76													
77	77													
34	78													
79	79													
32	80													
81	81													
30	82													
83	83													
28	84													
85	85													



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C008_1995+00
ENTRY BY: JJW
CHECKED BY: SHEET 3 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS		
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE			
26	86																
	87																
24	88																
	89																
22	90																
	91																
20	92																
	93																
18	94																
	95																
16	96																
	97																
14	98																
	99																
12	100	1						50									No drill chatter, suggest end of gravel layer
	101	2						86									
10	102																
	103					>4.5	Hard; blocky.										
8	104	3						80									
	105					>4.5											
6	106						CLAYEY SILT (ML/CL); dark bluish gray; moist; about 10% fine SAND; low plasticity fines.										
	107					>4.5	SILTY CLAY (CL-ML); hard; dark bluish gray; moist; about 10% fine SAND; low to medium plasticity fines.										
4	108																
2	109	4					Poorly graded SAND with SILT (SP-SM); gray; wet; medium to fine SAND; about 5 to 10% nonplastic fines; strong cementation.	70									
	110						Lean CLAY (CL); hard; bluish gray; moist to wet; about 5% fine SAND; medium plasticity fines; blocky.										
0	111					>4.5											
	112					4.0	CLAYEY SILT (ML/CL); very stiff to hard; bluish gray; moist to wet; about 10% fine SAND; low plasticity fines; slightly blocky.										
	113						SILT (ML); dark bluish gray; wet; about 10% fine SAND; nonplastic fines.										
-2	114						Bottom of borehole at 113.5 ft bgs										Used approximately 800 to 900 gallons of water from 0' to 113.5' bgs
	115						Draft Log										
-4	116																

LOG OF BORING C009_1996+00

PROJECT NO: 14-165.1	BEGIN DATE: 7/16/2014	DRILLING CONTRACTOR: GeoEx Subsurface, Driller: Rian H.
PROJECT: SBFCA-B&D Verif. Borings	COMPLETION DATE: 7/17/2014	DRILLING METHOD: Solid-Stem Auger & Rotary Wash
LOCATION: E. of Gridley	SURFACE ELEVATION: 112(ft)	DRILL RIG: CME 75
CLIENT: Magnus	SURFACE CONDITION: Gravel	HAMMER TYPE: Auto: 140lb, 30"
LOGGED BY: SML	WATER DEPTH: N/A	SAMPLER TYPE & SIZE: HQ Core; SPT (1.4" ID)
DEPTH OF BORING: 113(ft)	READING TAKEN: N/A	BOREHOLE DIAMETER: 6"
	HAMMER EFFICIENCY:	BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
110	1														Driller augered to 22' below crest of levee. Driller set casing (5" ID) to 23.5' below levee crest
108	2														
106	3														
104	4														
102	5														
100	6														
98	7														
96	8														
94	9														
92	10														
90	11														
88	12														Switch from Solid Stem Auger to Rotary Wash



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C009_1996+00
ENTRY BY: SML
CHECKED BY: SHEET 1 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					RECOVERY (%)	LABORATORY					REMARKS					
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)		GRAPHIC LOG	DESCRIPTION	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)	% PASSING 200 SIEVE			
86	26																	
	27																	
84	28																	
	29																	
82	30																	
	31																	
80	32																	Drill chatter, suggest gravel layer
	33																	
78	34																	
	35																	
76	36																	
	37																	
74	38																	
	39																	
72	40																	
	41																	
70	42																	
	43																	
68	44																	
	45																	
66	46																	
	47																	
64	48																	
	49																	
62	50																	
	51																	
60	52																	
	53																	
58	54																	
	55																	



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C009_1996+00
 ENTRY BY: SML
 CHECKED BY: SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE		
56																
57																
54	58															
	59															
52	60															
	61															
50	62															
	63															
48	64															
	65															
46	66															
	67															
44	68	0	19	60			SANDY CLAYEY SILT (ML/CL); brown; moist; about 30% fine SAND; low plasticity fines.	100								No drill chatter, suggest end of gravel layer
	69		24													
			36													
42	70	1	33	76			SANDY lean CLAY (CL/ML); brown; moist; about 30% fine SAND; low plasticity fines; bottom 2 inches enderated.	100								
	71		37													
	72		39													
40	73															
	74	2	9					100								
38	75	3	16	87/8			CLAYEY SAND (SC); brown; moist; fine SAND; about 45% medium plasticity fines; 2 Inch clay lenses.	80								
	76		37				Well-graded GRAVEL with CLAY and SAND (GW-GC); black; moist; coarse to fine GRAVEL; about 25% coarse to fine SAND; about 10% low to medium plasticity fines.									Drill chatter
36	77		50/2"													
	78															
34	79															
	80															
32	81															
	82															
30	83															
	84															
28	85															



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C009_1996+00
 ENTRY BY: SML
 CHECKED BY: SHEET 3 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE		
26	86															
	87															
24	88															
	89															
22	90															
	91															
20	92															
	93															
18	94															
	95															
16	96															
	97															
14	98															No drill chatter, suggest end of gravel layer
	99	4					Fat CLAY (CH); greenish blue; moist; about 5% fine SAND; high plasticity fines.	79								
12	100															
	101	5					Lean CLAY (CL); greenish blue; moist; about 10% fine SAND; medium plasticity fines.	6								
10	102															
	103															
8	104															
	105	6						25								
6	106	7					Blocky texture. 1" to 3.5" inch enderated lean clay lenses.	67								
	107															
4	108															
	109															
2	110	8						85								
	111															
0	112															
	113						CLAYEY SAND (SC); greenish blue; moist; medium to fine SAND; about 45% medium plasticity fines.									
							Bottom of borehole at 113.0 ft bgs									Potential carbide teeth in bottom of hole.
-2	114															
	115						Draft Log									
-4	116															



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C009_1996+00
 ENTRY BY: SML
 CHECKED BY: SHEET 4 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					RECOVERY (%)	LABORATORY					REMARKS					
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)		GRAPHIC LOG	DESCRIPTION	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)	% PASSING 200 SIEVE			
86	26																	
	27																	
84	28																	
	29																	
82	30																	
	31																	
80	32																	
	33																	
78	34																	
	35																	
76	36																	
	37																	
74	38																	
	39																	
72	40																	
	41																	
70	42																	
	43																	
68	44																	
	45																	
66	46																	
	47																	
64	48																	
	49																	
62	50																	
	51																	
60	52																	
	53																	
58	54																	
	55																	

Drill chatter, suggests gravel layer



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B & D Verif. Boring
 BORING: C010_1997+00
 ENTRY BY: SML
 CHECKED BY: SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE		
26	86															
	87															
24	88															
	89															
22	90															
	91															
20	92															
	93															
18	94															
	95															
16	96															
	97															
14	98	X	1	33			Lean CLAY with SAND (CL); grey; moist; about 15 to 20% fine SAND; medium plasticity fines.	67								No drill chatter, suggests end of gravel layer.
	99	X	2	23	101		Lean CLAY (CL); hard; grey; moist; about 10% fine SAND; medium plasticity fines; blocky structure.	72								
12	100	X		44												
	101	X	3	21	70	>4.5	No blocky structure.	88								
10	102	X		26												
	103	X		44												
8	104	X	4	33	74			88								
	105	X		34			SANDY lean CLAY (CL); brown; moist; about 30% fine SAND; low to medium plasticity fines.									
6	106	X	5	54	96			75								
	107	X		46			Lean CLAY with SAND (CL); grey; moist; about 15% fine SAND; low to medium plasticity fines; blocky structure.									
4	108	X		50												
	109	X	6	24	81		SILTY SAND (SM); grey brown; moist; fine SAND; about 20% fines.	75								
2	110	X		37			SILTY CLAY (CL-ML); blackish green; moist; about 10% fine SAND; low plasticity fines; blocky structure.									
	111	X		44												
0	112	X	7	14	83			83								
	113			36			Bottom of borehole at 112.5 ft bgs									
	114			47			Draft Log									
	115															
-4	116															



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B & D Verif. Boring
 BORING: C010_1997+00
 ENTRY BY: SML
 CHECKED BY: SHEET 4 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					RECOVERY (%)	LABORATORY					REMARKS					
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)		GRAPHIC LOG	DESCRIPTION	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)	% PASSING 200 SIEVE			
86	26																	
	27																	
84	28																	
	29																	
82	30																	
	31																	
80	32																	
	33																	
78	34																	
	35																	
76	36																	
	37																	Drill chatter, suggests gravel layer
74	38																	
	39																	
72	40																	
	41																	
70	42																	
	43																	
68	44																	
	45																	
66	46																	
	47																	
64	48																	
	49																	
62	50																	
	51																	
60	52																	
	53																	
58	54																	
	55																	Very heavy drill chatter from 54' to 56' bgs



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C011_1998+00
 ENTRY BY: SML
 CHECKED BY: SHEET 2 of 3

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE		
56	56															
	57															
54	58															
	59															
52	60															
	61															
50	62															
	63															
48	64															
	65															
46	66															
	67															
44	68															
	69						Bottom of borehole at 68 ft bgs									Drill bit broke, drillers abandoned hole.
	70						Draft Log									
42	71															
	72															
40	73															
	74															
38	75															
	76															
36	77															
	78															
34	79															
	80															
32	81															
	82															
30	83															
	84															
28	85															

LOG OF BORING C011R_1998+00

PROJECT NO: 14-165.1	BEGIN DATE: 10/13/2014	DRILLING CONTRACTOR: GeoEx Subsurface, Driller: Tom S.
PROJECT: SBFCA-B&D Verif. Borings	COMPLETION DATE: 10/13/2014	DRILLING METHOD: Solid-Stem Auger & Rotary Wash
LOCATION: E. of Gridley	SURFACE ELEVATION: 112.2(ft)	DRILL RIG: CME 75
CLIENT: Magnus/Nordic JV	SURFACE CONDITION: Gravel	HAMMER TYPE: Auto: 140lb, 30"
LOGGED BY: SML	WATER DEPTH: N/A	SAMPLER TYPE & SIZE: SPT (1.4" ID)
DEPTH OF BORING: 112.5(ft)	READING TAKEN: N/A	BOREHOLE DIAMETER: 6"
	HAMMER EFFICIENCY: N/A	BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY(%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
110	1														Augered to 18.5' below levee crown Cased (5") to 18.5' below levee crown
108	2														
106	3														
104	4														
102	5														
100	6														
98	7														
96	8														
94	9														
92	10														
90	11														
88	12														
	13														
	14														
	15														
	16														
	17														
	18														
	19														
	20														
	21														
	22														
	23														
	24														

switched from Solid Stem Auger to Rotary Wash



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C011R_1998+00
ENTRY BY: SML
CHECKED BY: SHEET 1 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					RECOVERY (%)	LABORATORY					REMARKS					
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)		GRAPHIC LOG	DESCRIPTION	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)	% PASSING 200 SIEVE			
86	26																	
	27																	
84	28																	
	29																	
82	30																	
	31																	
80	32																	
	33																	
78	34																	
	35																	
76	36																	Drill chatter, suggests gravel layer
	37																	
74	38																	
	39																	
72	40																	
	41																	
70	42																	
	43																	
68	44																	
	45																	
66	46																	
	47																	
64	48																	
	49																	
62	50																	
	51																	
60	52																	
	53																	
58	54																	
	55																	



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C011R_1998+00
ENTRY BY: SML
CHECKED BY: SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)		GRAPHIC LOG	DESCRIPTION	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)
56	56													
57	57													
54	58													
59	59													
52	60													
61	61													
50	62													
63	63													
48	64													
65	65													
46	66													
67	67													
44	68													
69	69													
42	70													
71	71													
40	72													
73	73													
38	74													
75	75													
36	76													
77	77													
34	78													
79	79													
32	80													
81	81													
30	82													
83	83													
28	84													
85	85													



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C011R_1998+00
ENTRY BY: SML
CHECKED BY: SHEET 3 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS		
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE			
26	86																
	87																
24	88																
	89																
22	90																
	91																
20	92																
	93																
18	94																
	95																
16	96																
	97																
14	98		1														No drill chatter, suggests end of gravel layer
	99																No sampling from 97' to 98'
12	100		2	17	101/11	2.2			96								
	101			26													
	101			75/5					100								
10	102		3	19	42	2.25											
	102			19					100								
	103			23													
8	104		4	10	58	4.25											
	105			18					100								
	105			40													
6	106																
	107		5	50													
	107			38					100								
4	108		6	Core													
	108			21	102				100								
	109			32					100								
	109			70													
2	110																
	111		8	76													
	111								100								
0	112		9	25	98												
	112			32					89								
	112			66													
	113	Bottom of borehole at 112.5 ft bgs															
	114	Draft Log															
-2	114																
	115																
-4	116																



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C011R_1998+00
 ENTRY BY: SML
 CHECKED BY: SHEET 4 of 4

LOG OF BORING C012_1999+00

PROJECT NO: 14-165.1	BEGIN DATE: 10/16/2014	DRILLING CONTRACTOR: GeoEx Subsurface, Driller: Tom S.
PROJECT: SBFCA-B&D Verif. Borings	COMPLETION DATE: 10/16/2014	DRILLING METHOD: Solid-Stem Auger & Rotary Wash
LOCATION: E. of Gridley	SURFACE ELEVATION: 112.5(ft)	DRILL RIG: CME 75
CLIENT: Magnus/Nordic JV	SURFACE CONDITION: Gravel	HAMMER TYPE: Auto: 140lb, 30"
LOGGED BY: PM	WATER DEPTH: N/A	SAMPLER TYPE & SIZE: SPT (1.4" ID)
DEPTH OF BORING: 68(ft)	READING TAKEN: N/A	BOREHOLE DIAMETER: 6"
	HAMMER EFFICIENCY: N/A	BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY(%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
111	1														Augered to 18' below levee crown Cased (5") to 18.5' below levee crown
	2														
	3														
109	4														
	5														
107	6														
	7														
105	8														
	9														
103	10														
	11														
101	12														
	13														
99	14		1	7	15		SANDY SILT (ML); dark brown; moist; about 50% fine SAND; about 50% nonplastic fines.	100							
	15			6											
	16			9											
97	17		2	3	6			100							
	18			3											
95	19			3			SILTY SAND (SM); brown; moist; fine SAND; about 40% nonplastic fines.	96						switched from Solid Stem Auger to Rotary Wash	
	20		3	4	9										
	21			5											
93	22		4	3	7			100							
	23			4											
91	24														
89			5		5		SILT with SAND (ML); dark brown; moist; about 20%	92							



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C012_1999+00
ENTRY BY: JJW
CHECKED BY: SHEET 1 of 3

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE		
87	26		5	2 2 3	5			fine SAND; low plasticity fines.	92							
	27		6	2 2 3	5				100							
85	28															
	29		7	2 3 5	8				92							
83	30							SILTY SAND (SM); dark brown; moist; fine SAND; about 35% nonplastic fines.								
	31															
81	32		8	7 6 7	13			Poorly graded SAND (SP); gray; moist; coarse to fine SAND; about 5% nonplastic fines.	96							
	33															
79	34		9	2 2 3	5			SILTY SAND (SM); gray; moist; coarse to fine SAND; about 20% nonplastic fines.	79							
	35															
77	36		10	12 24 34	58			Poorly graded SAND (SP); gray; moist; coarse to fine SAND; about 5% nonplastic fines.	100							Drill chatter, suggests gravel layer
	37							Poorly graded GRAVEL (GP); brown; wet; coarse to fine GRAVEL; about 10% coarse to fine SAND; about 5% nonplastic fines.								
75	38															
	39															
73	40															
	41															
71	42															
	43															
69	44															
	45															
67	46															
	47															
65	48															
	49															
63	50															
	51															
61	52															
	53															
59	54															
	55															



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C012_1999+00
 ENTRY BY: JJW
 CHECKED BY: SHEET 2 of 3

ELEVATION (ft)	DEPTH (ft)	FIELD					DESCRIPTION	RECOVERY (%)	LABORATORY				REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)			GRAPHIC LOG	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)
57	56													
	57													
55	58													
	59													
53	60													
	61													
51	62													
	63													
49	64													
	65													
47	66													
	67													
45	68						Bottom of borehole at 68.0 ft bgs						Driller could no longer advance. Pulled up rods and noticed NWJ rod snapped about 4' above bit. Abandoned borehole	
	69						Draft Log							
43	70													
	71													
41	72													
	73													
39	74													
	75													
37	76													
	77													
35	78													
	79													
33	80													
	81													
31	82													
	83													
29	84													
	85													

ELEVATION (ft)	DEPTH (ft)	FIELD					RECOVERY (%)	LABORATORY					REMARKS					
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)		GRAPHIC LOG	DESCRIPTION	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)	% PASSING 200 SIEVE			
87	26																	
	27																	
85	28																	
	29																	
83	30																	
	31																	
81	32																	
	33																	
79	34																	
	35																	
77	36																	Drill chatter, suggests gravel layer
	37																	
75	38																	
	39																	
73	40																	
	41																	
71	42																	
	43																	
69	44																	
	45																	
67	46																	
	47																	
65	48																	
	49																	
63	50																	
	51																	
61	52																	
	53																	
59	54																	
	55																	



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C012B_1999+06
 ENTRY BY: JJW
 CHECKED BY: SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)		GRAPHIC LOG	DESCRIPTION	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)
57	56													
	57													
55	58													
	59													
53	60													
	61													
51	62													
	63													
49	64													
	65													
47	66													
	67													
45	68													
	69													
43	70													
	71													
41	72													
	73													
39	74													
	75													
37	76													
	77													
35	78													
	79													
33	80													
	81													
31	82													
	83													
29	84													
	85													

ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS			
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)		% PASSING 200 SIEVE		
27	86																
	87																
25	88																
	89																
23	90																
	91																
21	92																
	93																
19	94																
	95																
17	96																
	97																
15	98	X	1	18	61		Lean CLAY (CL); very stiff; brownish gray; moist; about 5% fine SAND; medium plasticity fines; slightly blocky structure.	100									
	99	X		28		3.75											
	100	X		33													
13	101	X	2	25		>4.5	Hard.	100									
	102	X		65													
11	103	X	3	15			SILTY CLAY (CL-ML); brownish gray; moist; about 5% fine SAND; low to medium plasticity fines.	100									
	104	X		36			Blocky structure.	100									
9	105	X	4	24				100									
	106	X		50													
7	107	X	5	25	50/1		Slightly blocky structure.	100									
	108	X		50/1"													
5	109	X	6	17	82		SILTY SAND (SM); brownish gray; moist; fine SAND; about 30% low plasticity fines; strong cementation.	100									
	110	X		32													
3	111	X	7	20	47		Poorly graded SAND (SP); brownish gray; moist; medium to fine SAND; about 5% nonplastic fines; trace weak cementation.	100									
	112	X		22													
1	113	X	8	7	49			79									
	114	X		14													
-1	115	X		35													
-2	116						Bottom of borehole at 112.5 ft bgs										
							Draft Log										

No drill chatter, suggests end of gravel layer
No sampling from 97' to 98'



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C012B_1999+06
ENTRY BY: JJW
CHECKED BY: SHEET 4 of 4

LOG OF BORING C013_2000+00

PROJECT NO: 14-165.1	BEGIN DATE: 10/20/2014	DRILLING CONTRACTOR: GeoEx Subsurface, Driller: Tom S.
PROJECT: SBFCA-B&D Verif. Borings	COMPLETION DATE: 10/20/2014	DRILLING METHOD: Solid-Stem Auger & Rotary Wash
LOCATION: E. of Gridley	SURFACE ELEVATION: 112.5(ft)	DRILL RIG: CME 75
CLIENT: Magnus/Nordic JV	SURFACE CONDITION: Gravel	HAMMER TYPE: Auto: 140lb, 30"
LOGGED BY: SML	WATER DEPTH: N/A	SAMPLER TYPE & SIZE: SPT (1.4" ID)
DEPTH OF BORING: 112.5(ft)	READING TAKEN: N/A	BOREHOLE DIAMETER: 6"
	HAMMER EFFICIENCY: N/A	BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY(%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
111	1														Augered to 18.5' below levee crown Cased (5") to 18.5' below levee crown
	2														
	3														
109	4														
	5														
107	6														
	7														
105	8														
	9														
103	10														
	11														
101	12														
	13														
99	14														
	15														
97	16														
	17														
95	18														
	19														
93	20														switched from Solid Stem Auger to Rotary Wash
	21														
91	22														
	23														
89	24														



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C013_2000+00
 ENTRY BY: JJW
 CHECKED BY: SHEET 1 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					RECOVERY (%)	LABORATORY					REMARKS					
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)		GRAPHIC LOG	DESCRIPTION	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)	% PASSING 200 SIEVE			
87	26																	
	27																	
85	28																	
	29																	
83	30																	
	31																	
81	32																	
	33																	
79	34																	
	35																	
77	36																	
	37																	Drill chatter, suggests gravel layer
75	38																	
	39																	
73	40																	
	41																	
71	42																	
	43																	
69	44																	
	45																	
67	46																	
	47																	
65	48																	
	49																	
63	50																	
	51																	
61	52																	
	53																	
59	54																	
	55																	No drill chatter, suggests end of gravel layer



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C013_2000+00
ENTRY BY: JJW
CHECKED BY: SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS				
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)			GRAPHIC LOG	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)		% PASSING 200 SIEVE			
57	56																	
	57																	Drill chatter, suggests gravel layer
55	58																	
	59																	
53	60																	
	61																	
51	62																	
	63																	
49	64																	
	65																	
47	66																	
	67																	
45	68																	
	69																	
43	70																	
	71																	
41	72																	
	73																	
39	74																	
	75																	
37	76																	
	77																	
35	78																	
	79																	
33	80																	
	81																	
31	82																	
	83																	
29	84																	
	85																	

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE		
27	86															
	87															
25	88															
	89															
23	90															
	91															
21	92															
	93															
19	94															
	95															
17	96															
	97															
15	98															
	99															No drill chatter, suggests end of gravel layer No sampling from 98.5' to 99'
13	100	1	15	28	83		Lean CLAY with SAND (CL); grayish blue; moist; about 15 to 20% medium to fine SAND; low to medium plasticity, high dry strength fines; trace induration.	0								
	101	2	56/6	REF				0								Lean Clay with Sand stuck to outside of sampler
11	102															
	103															
9	104	3	14	17	38	4.5	CLAYEY SAND (SC); dense; grayish blue; moist; about 70% medium to fine SAND; low plasticity fines; weakly cemented.	100								
	105															
7	106	4	20	20	42	4.5	Lean CLAY with SAND (CL); hard; grayish blue; moist; about 20% fine SAND; about 80% low plasticity fines; moderate induration.	100								
	107						SILTY SAND (SM); dense; grayish blue; moist; about 30% nonplastic fines; weakly cemented.									
5	108						SILT with SAND (ML); dense; dark gray; moist; about 20% fine SAND; low plasticity fines; moderate induration.									
	109	5	11	21	43		SANDY SILT (ML); dark gray; moist; about 50% low plasticity fines; poor induration.	100								
3	110						SILTY SAND (SM); dense; dark gray; moist; fine SAND; about 35% low plasticity fines; weakly cemented.									
	111	6	12	31	61		SILTY CLAY (CL-ML); dark gray; moist; about 10% fine SAND; low plasticity fines.	97								
1	112															
	113						Bottom of borehole at 112.5 ft bgs									
	114						Draft Log									
-2	115															
	116															



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C013_2000+00
 ENTRY BY: JJW
 CHECKED BY: SHEET 4 of 4

LOG OF BORING C013B_2000+05

PROJECT NO: 14-165.1	BEGIN DATE: 10/20/2014	DRILLING CONTRACTOR: GeoEx Subsurface, Driller: Tom S.
PROJECT: SBFCA-B&D Verif. Borings	COMPLETION DATE: 10/20/2014	DRILLING METHOD: Solid-Stem Auger & Rotary Wash
LOCATION: E. of Gridley	SURFACE ELEVATION: 112.5(ft)	DRILL RIG: CME 75
CLIENT: Magnus/Nordic JV	SURFACE CONDITION: Gravel	HAMMER TYPE: Auto: 140lb, 30"
LOGGED BY: SML	WATER DEPTH: N/A	SAMPLER TYPE & SIZE: SPT (1.4" ID)
DEPTH OF BORING: 38(ft)	READING TAKEN: N/A	BOREHOLE DIAMETER: 6"
	HAMMER EFFICIENCY: N/A	BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY(%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
111	1														Augered to 18.5' below levee crown Cased (5") to 18.5' below levee crown
	2														
	3														
109	4														
	5														
107	6														
	7														
105	8														
	9														
103	10														
	11														
101	12														
	13														
99	14		7	12	18		SILTY SAND (SM); medium dense; brown; moist; about 60% fine SAND; nonplastic fines; trace organics.	100							
	15			9	9										
97	16						SANDY SILT (ML); soft; brown; moist; about 45% fine SAND; nonplastic fines.	92							
	17		8	3	7										
	18			3											
95	19			4	6									switched from Solid Stem Auger to Rotary Wash	
	20			3											
	21			3											
93	22			3											
	23			3											
91	24						About 50% SAND.	100							
89															



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C013B_2000+05
 ENTRY BY: JJW
 CHECKED BY: SHEET 1 of 2

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
87	26	X	11	2 3 3	6		SILTY SAND (SM); loose; brown; moist; about 75% fine SAND; nonplastic fines.	100							
85	27	X	12	3 3 4	7		About 85% fine SAND.	100							
83	29	X	13	4 3 4	7		Poorly graded SAND (SP); loose; brown; moist; about 95% fine SAND.	100							
81	31	X	14	3 3 4	7		SILTY SAND (SM); yellowish brown; moist; about 70% fine SAND; nonplastic fines.	100							
79	32	X	14	3 3 4	7		Poorly graded SAND with SILT (SP-SM); loose; brown; moist to wet; about 90% fine SAND; nonplastic fines.	100							
77	34	X	15	2 3 6	9		Wet.	83							
75	36	X	16	12 14 27	41		SILTY SAND (SM); dense; brown; moist to wet; about 85% fine SAND; nonplastic fines.	100							
	37	X					Poorly graded GRAVEL with SAND (GP); very dense; grayish brown; moist to wet; about 80% coarse to fine GRAVEL; about 15% coarse to fine SAND; nonplastic fines.								
	38						Bottom of borehole at 38.0 ft bgs								
	39						Draft Log								
	40						URS requested to sample material in upper 40' after C013 was drilled								
	41						C013B moved 5' to station 2000+05								
	42														
	43														
	44														
	45														
	46														
	47														
	48														
	49														
	50														
	51														
	52														
	53														
	54														
	55														

LOG OF BORING C014_2001+00

PROJECT NO: 14-165.1	BEGIN DATE: 10/22/2014	DRILLING CONTRACTOR: GeoEx Subsurface, Driller: Tom S.
PROJECT: SBFCA-B&D Verif. Borings	COMPLETION DATE: 10/22/2014	DRILLING METHOD: Solid-Stem Auger & Rotary Wash
LOCATION: E. of Gridley	SURFACE ELEVATION: 112.5(ft)	DRILL RIG: CME 75
CLIENT: Magnus/Nordic JV	SURFACE CONDITION: Gravel	HAMMER TYPE: Auto: 140lb, 30"
LOGGED BY: RRH	WATER DEPTH: N/A	SAMPLER TYPE & SIZE: SPT (1.4" ID)
DEPTH OF BORING: 54(ft)	READING TAKEN: N/A	BOREHOLE DIAMETER: 6"
	HAMMER EFFICIENCY: N/A	BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY(%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
111	1														Augered to 18.5' below levee crown Cased (5") to 18.5' below levee crown
	2														
	3														
109	4														
	5														
107	6														
	7														
105	8														
	9														
103	10														
	11														
101	12														
	13														
99	14		1	4	8		SILTY SAND (SM); medium dense; brown; moist; about 45% fine SAND; nonplastic fines; Trace organics.	83							
	15			4											
97	16			4											
	17		2	5	7				79						
	18			3											
95	19			4										switched from Solid Stem Auger to Rotary Wash	
	20		3	3	6			79							
93	21			3											
	22		4	3	6			100							
91	23			3											
	24			3											
89			5		7			100							



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C014_2001+00
 ENTRY BY: JJW
 CHECKED BY: SHEET 1 of 2

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE		
87	26	X	5	push 3 4	7			SILTY SAND (SM) (continued).	100							
85	27	X	6	3 3 3	6			SILT with SAND (ML); loose; brown; moist; about 25% fine SAND; low plasticity fines.	88							
83	28	X						SILTY SAND (SM); loose; brown; moist; about 55% fine SAND; nonplastic fines; trace organics/ roots.								
81	29	X	7	4 3 3	6			SANDY SILT (ML); loose; brown; moist; about 40% fine SAND; low plasticity fines; trace organics.	100							
79	30	X						SILTY SAND (SM); loose; brown; moist; about 60% fine SAND; nonplastic fines; trace organics.								
77	31	X						SANDY SILT (ML); loose; brown; moist; about 40% fine SAND; low plasticity fines.								
75	32	X	8	2 2 4	6			SILTY SAND (SM); loose; brown; moist; about 60% fine SAND; nonplastic fines.	96							
73	33	X						SANDY SILT (ML); loose; brown; moist; about 40% fine SAND; low plasticity fines.	100							
71	34	X	9	2 3 4	7			SILTY SAND (SM); loose; brown; moist; about 80% fine SAND; nonplastic fines.								
69	35	X						Poorly graded SAND with SILT (SP-SM); loose; gray; moist to wet; about 90% fine SAND; nonplastic fines.	100							
67	36	X	10	4 7 24	31			Poorly graded GRAVEL with SAND (GP); very dense; dark gray; wet; about 80% coarse to fine GRAVEL; about 15% SAND.								
65	37															
63	38															
61	39															
59	40															
	41															
	42															
	43															
	44															
	45															
	46															
	47															
	48															
	49															
	50															
	51															
	52															
	53															
	54															
	55															
Bottom of borehole at 54.0 ft bgs														Drill bit broke, drillers abandoned hole.		
Draft Log																



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C014_2001+00
 ENTRY BY: JJW
 CHECKED BY: SHEET 2 of 2

LOG OF BORING C014B_2001+04

PROJECT NO: 14-165.1	BEGIN DATE: 10/22/2014	DRILLING CONTRACTOR: GeoEx Subsurface, Driller: Tom S.
PROJECT: SBFCA-B&D Verif. Borings	COMPLETION DATE: 10/22/2014	DRILLING METHOD: Solid-Stem Auger & Rotary Wash
LOCATION: E. of Gridley	SURFACE ELEVATION: 112.5(ft)	DRILL RIG: CME 75
CLIENT: Magnus/Nordic JV	SURFACE CONDITION: Gravel	HAMMER TYPE: Auto: 140lb, 30"
LOGGED BY: RRRH	WATER DEPTH: N/A	SAMPLER TYPE & SIZE: SPT (1.4" ID)
DEPTH OF BORING: 112.65(ft)	READING TAKEN: N/A	BOREHOLE DIAMETER: 6"
	HAMMER EFFICIENCY: N/A	BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY(%)	LABORATORY					REMARKS		
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE			
111	1																Augered to 18.5' below levee crown Cased (5") to 18.5' below levee crown
	2																
	3																
109	4																
	5																
107	6																
	7																
105	8																
	9																
103	10																
	11																
101	12																
	13																
99	14																
	15																
97	16																
	17																
95	18																
	19																
93	20																
	21																
91	22																
	23																
89	24																

switched from Solid Stem Auger to Rotary Wash



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C014B_2001+04
ENTRY BY: JJW
CHECKED BY: SHEET 1 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS			
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE				
87	26																	
	27																	
85	28																	
	29																	
83	30																	
	31																	
81	32																	
	33																	
79	34																	
	35																	
77	36																	
	37																	
75	38																	Drill chatter, suggests gravel layer
	39																	
73	40																	
	41																	
71	42																	
	43																	
69	44																	
	45																	
67	46																	
	47																	
65	48																	
	49																	
63	50																	
	51																	
61	52																	
	53																	
59	54																	
	55																	



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C014B_2001+04
 ENTRY BY: JJW
 CHECKED BY: SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE		
57	56															
	57															
55	58														No drill chatter, suggests end of gravel layer	
	59															
53	60														Drill chatter, suggests gravel layer	
	61															
51	62															
	63															
49	64															
	65															
47	66															
	67															
45	68															
	69															
43	70															
	71															
41	72															
	73															
39	74															
	75															
37	76															
	77															
35	78															
	79															
33	80															
	81															
31	82															
	83															
29	84															
	85															



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C014B_2001+04
 ENTRY BY: JJW
 CHECKED BY: SHEET 3 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS		
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE			
27	86																
	87																
25	88																
	89																
23	90																
	91																
21	92																
	93																
19	94																
	95																
17	96																
	97																
15	98																
	99																
13	100	X	11	6 20 50/6	70/12	4.5		Lean CLAY (CL); hard; gray-blue; moist; about 5% fine SAND; medium plasticity fines; blocky structure.	100								
	101							SANDY SILTY CLAY (CL-ML); hard; gray-blue; moist; about 45% medium to fine SAND; low to medium plasticity fines.	100								
11	102	X	12	16 24 38	62			SANDY SILTY CLAY (CL-ML); hard; gray-blue; moist; about 45% medium to fine SAND; low to medium plasticity fines.	100								
	103																
9	104	X	13	12 15 27	42			SILTY SAND (SM); dense; dark gray; moist to wet; medium to fine SAND; about 15% nonplastic fines.	100								
	105																
7	106	X						SILTY CLAY (CL-ML); hard; gray-blue; moist; about 5% fine SAND; medium plasticity fines.									
	107	X	14	13 25 100/5	125/11			CLAYEY SILT (ML/CL); very dense; gray-blue; moist; about 5% fine SAND; low plasticity fines.	100								
5	108																
	109	X	15	11 22 32	54			Poorly graded SAND with SILT (SP-SM); very dense; dark brown; moist; fine SAND; about 10% nonplastic fines; interbedded with 2" to 4" lenses of weakly cemented Poorly Graded Sand and poorly indurated lean Clay.	100								
3	110	X															
	111	X	16	16 18 41	59			SILTY SAND (SM); very dense; dark brown; moist; fine SAND; about 20% nonplastic fines; moderately cemented.	100								
1	112																
	113																
-2	114							SANDY CLAYEY SILT (ML/CL); very dense; dark blue-gray; moist; about 30% fine SAND; low plasticity fines; moderately indurated.									
	115							Bottom of borehole at 112.7 ft bgs									
-4	116							Draft Log									

No drill chatter, suggests end of gravel layer
No sampling from 98' to 99'

LOG OF BORING C015_2002+00

PROJECT NO: 14-165.1	BEGIN DATE: 11/6/2014	DRILLING CONTRACTOR: GeoEx Subsurface, Driller: Tom S.
PROJECT: SBFCA-B&D Verif. Borings	COMPLETION DATE: 11/7/2014	DRILLING METHOD: Solid-Stem Auger & Rotary Wash
LOCATION: E. of Gridley	SURFACE ELEVATION: 113.72(ft)	DRILL RIG: CME 75
CLIENT: Magnus/Nordic JV	SURFACE CONDITION: Gravel	HAMMER TYPE: Auto: 140lb, 30"
LOGGED BY: RRH	WATER DEPTH: N/A	SAMPLER TYPE & SIZE: SPT (1.4" ID)
DEPTH OF BORING: 113.3(ft)	READING TAKEN: N/A	BOREHOLE DIAMETER: 6"
	HAMMER EFFICIENCY: N/A	BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY(%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
112	1														Augered to 18.5' below levee crown Cased (5") to 18.5' below levee crown
	2														
	3														
110	4														
	5														
108	6														
	7														
106	8														
	9														
104	10														
	11														
102	12														
	13														
100	14		1	4	8		SANDY SILT (ML/SM); loose; brown; moist; about 45 to 50% fine SAND; nonplastic to low plasticity fines.	75							
	15			3											
	16			5											
98	16		2	4	8		Trace organics.	88							
	17			4											
	18			4											
96	18														
	19		3	4	7			67						switched from Solid Stem Auger to Rotary Wash	
	20			3											
94	20			4											
	21		4	0	7			54							
	22			3											
92	22			4											
	23														
90	24		5	3	6		SILTY SAND (SM); loose; grayish brown; moist to wet; fine SAND; about 45 to 50% nonplastic fines.	88							
				3											
				3											



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C015_2002+00
ENTRY BY: JJW
CHECKED BY: SHEET 1 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)		% PASSING 200 SIEVE
88	26	X	5	3	6		SILTY SAND (SM) (continued).	88							
	27	X	6	3	7			67							
	28	X	7	2	4										
86	29	X		2			CLAYEY SAND (SC); very loose to loose; grayish brown; moist; fine SAND; about 45% low plasticity fines.	100							
	30	X		2											
	31	X	8	4	6		SILTY SAND (SM); loose; grayish brown; moist; fine SAND; about 30% nonplastic to low plasticity fines.	67							
	32	X		3											
	33	X		3											
80	34	X	9	2	5		About 40% low plasticity fines.	100							
	35	X		2			6-inch lense of Clayey Sand.								
	36	X	10	1	6		Fine SAND; about 30% nonplastic fines; trace organics.	88							
	37	X		5			About 15% fines.								
76	38	X					About 30% fines.								
	39	X	11	2	10			79							
74	40	X		3											
	41	X		7											
	42	X	12	2	9		Poorly graded SAND (SP); loose; gray; wet; medium to fine SAND; about 5% nonplastic fines.	54							
	43	X		3											
	44	X		6											
70	45	X	13	13	38		Poorly graded GRAVEL (GP); dense; grayish brown; moist to wet; coarse to fine GRAVEL; about 30% coarse to fine SAND; about 5% nonplastic fines.	67						Drill chatter	
68	46			20											
	47			18											
	48														
66	49														
	50														
64	51														
	52														
62	53														
	54														
60	55														

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS				
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE					
58	56																		
	57																		
56	58																		
	59																		
54	60																		No drill chatter, suggests end of gravel layer
	61																		
52	62																		
	63																		Drill chatter, suggests gravel layer
50	64																		
	65																		
48	66																		
	67																		
46	68																		
	69																		
44	70																		
	71																		
42	72																		
	73																		
40	74																		
	75																		
38	76																		
	77																		
36	78																		
	79																		
34	80																		
	81																		
32	82																		
	83																		
30	84																		
	85																		

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS			
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE				
28	86																	
	87																	
26	88																	
	89																	
24	90																	
	91																	
22	92																	
	93																	
20	94																	
	95																	
18	96																	
	97																	
16	98		14	15	80		Lean to fat CLAY (CL/CH); hard; gray; moist; about 5% fine SAND; medium to high plasticity fines; slightly blocky structure.	58										
	99			33														
14	100					4.0												
	101		15	16	46		SILTY SAND (SM); dense; grayish brown; moist; fine SAND; about 30% nonplastic fines; weak to moderate cementation.	92										
	102			21														
12	103						SILTY CLAY (CL-ML); grayish brown; moist; about 5% fine SAND; low to medium plasticity fines; slightly blocky structure. Blocky structure.											
	104		16	17	90			100										
10	105			15	27			100										
	106		17	18	113			100										
8	107						SILTY SAND (SM); very dense; dark gray; moist to wet; coarse to fine SAND; about 20% nonplastic fines.	83										
	108		19	36	42													
6	109						Poorly graded SAND with SILT (SP-SM); very dense; grayish brown; wet; coarse to medium SAND; about 10% nonplastic fines.	100										
	110		20	12	110/8													
	111						CLAYEY SILT (ML/CL); gray; moist; about 5% fine SAND; low to medium plasticity fines; slightly blocky structure.	100										
4	112		21	10	100/7													
	113						Poorly graded SAND (SP); very dense; dark gray; moist; fine SAND; about 5% nonplastic fines.	100										
2	114		22	14	49/9													
	115																	
0	116						Bottom of borehole at 113.3 ft bgs											
							Draft Log											

No drill chatter, suggests end of gravel layer

ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)		% PASSING 200 SIEVE
88	26		5		4		SANDY SILT (ML) <i>(continued)</i> .	67							
	27		6	2 3 2	5		SILTY SAND (SM); loose; brown; moist; fine SAND; about 35% nonplastic fines.	63							
86	28		7					100							
	29		8	3 2 1	3		About 40% fines.	72							
84	30		9	2 3 2	5		Nonplastic to low plasticity fines.	100							
82	32		10	5 4 5	9		6-inch lense of Sandy Silt.	75							
	33		11	4 4 5	9		6-inch lense of Sandy Silt.	100							
80	34		12	3 2 2	4		Poorly graded SAND (SP); loose to medium dense; brown; moist; about 5% fine GRAVEL; coarse to fine SAND; about 5% nonplastic fines.	88							
78	36		13	30 25/2"	25/2		Poorly graded SAND (SP); loose; gray; moist to wet; medium to fine SAND; about 5% nonplastic fines.	100							
76	38						Poorly graded GRAVEL (GP); very dense; gray-blue; wet; coarse to fine GRAVEL; about 15% coarse to fine SAND; about 5% nonplastic fines.								Drill chatter
74	40														
72	42														
	43														
70	44														
	45														
68	46														
	47														
66	48														
	49														
64	50														
	51														
62	52														
	53														
60	54														
	55														



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C016_2017+00
 ENTRY BY: JJW
 CHECKED BY: SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)		GRAPHIC LOG	DESCRIPTION	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)
58	56													
	57													
56	58													
	59													
54	60													
	61													
52	62													
	63													
50	64													
	65													
48	66													
	67													
46	68													
	69													
44	70													
	71													
42	72													
	73													
40	74													
	75													
38	76													
	77													
36	78													
	79													
34	80													
	81													
32	82													
	83													
30	84													
	85													



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C016_2017+00
 ENTRY BY: JJW
 CHECKED BY: SHEET 3 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS		
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE			
28	86																
	87																
26	88																
	89																
24	90																
	91																
22	92																
	93																
20	94																No drill chatter, suggests end of gravel layer
	95		14	14	41		CLAYEY SAND (SC); dense; gray; moist to wet; medium to fine SAND; about 20% low to medium plasticity fines.	88									
18	96			21			Poorly graded SAND (SP); dense; dark gray; wet; medium to fine SAND; about 5% nonplastic fines.										
	97			20													
16	98		15	19	48			100									
	99			17			SILTY CLAY (CL-ML); gray; moist; about 10% fine SAND; low to medium plasticity fines; blocky structure.										
	100			31													
14	100		16	15	54		Slightly blocky. 3-inch lense of Poorly Graded Sand. Blocky structure.	100									
	101			21													
	101			33													
12	102		17	20	30		SANDY elastic SILT (MH); gray; moist; about 45% fine SAND; low plasticity fines.	100									
	103			17													
	103			13			SILTY SAND (SM); dense; dark gray; wet; fine SAND; about 15 to 20% low to medium plasticity fines.										
10	104						Bottom of borehole at 104.0 ft bgs										
	105						Draft Log										
8	106																
	107																
6	108																
	109																
4	110																
	111																
2	112																
	113																
0	114																
	115																
-2	116																

LOG OF BORING C017S_2018+00

PROJECT NO: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 LOCATION: E. of Gridley
 CLIENT: Magnus/Nordic JV
 LOGGED BY: NRA
 DEPTH OF BORING: 105(ft)

BEGIN DATE: 2/13/2015
 COMPLETION DATE: 2/16/2015
 SURFACE ELEVATION: 113.72(ft)
 SURFACE CONDITION: Gravel
 WATER DEPTH: 33.5
 READING TAKEN: 2/13/15
 HAMMER EFFICIENCY: N/A

DRILLING CONTRACTOR: National, Driller Name: Josh
 DRILLING METHOD: Sonic
 DRILL RIG: Geoprobe 8140LC
 HAMMER TYPE: N/A
 SAMPLER TYPE & SIZE: Sonic Bag
 BOREHOLE DIAMETER: 4
 BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY(%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
112	1							SILTY SAND (SM); brown; moist; about 60% fine SAND; about 40% nonplastic fines; Levee Fill.							
110	2														
108	3														
106	4														
104	5														
102	6														
100	7														
98	8														
96	9														
94	10														
92	11														
90	12														
	13						SILTY SAND (SM); dark brown; dry to moist; about 55% fine SAND; about 45% nonplastic fines.								
	14														
	15														
	16														
	17						Fine SAND; about 50 to 60% nonplastic to low plasticity fines; Clay interbeds of ~3/4".								
	18														
	19														
	20														
	21														
	22														
	23														
	24						SANDY SILT (ML); dark brown; dry to moist; about								



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ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY				REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)
88	26						40% fine SAND; about 60% nonplastic to low plasticity fines.							
	27						SILTY SAND (SM); brown; dry to moist; about 55% fine SAND; about 45% low plasticity fines.							
86	28													
	29													
84	30													
	31													
82	32													
	33													
80	34						Greenish gray with greenish bronze mottling; wet; about 70% SAND; about 30% fines.							
	35													
78	36													
	37													
76	38						Black; wet; about 75% SAND; about 25% fines; Rotting tree rootlets present, no other organics or organic odor.							
	39													
74	40						Poorly graded GRAVEL (GP); greenish gray; wet; about 90% coarse to fine GRAVEL; about 10% coarse to fine SAND.							
	41													
72	42													
	43													
70	44													
	45													
68	46						Approximate 12" interbeds of SP, gray, wet, 5% F-gravel, 90% F-C sand, 5% fines.							
	47													
66	48													
	49													
64	50													
	51													
62	52						CLAYEY GRAVEL with SAND (GC); brownish green; wet; about 50% coarse to fine GRAVEL; about 35% coarse to medium SAND; about 15% low plasticity fines.							
	53													
60	54													
	55													
							CLAYEY GRAVEL with SAND (GC) (continued).							



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ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	
58	56						Poorly graded GRAVEL with SAND (GP); brownish greenish gray; wet; about 80% coarse to fine GRAVEL; about 15% coarse to fine SAND; about 5% low plasticity fines.							
57	58													
56	59													
54	60													
	61					CLAYEY GRAVEL with SAND (GC); brownish greenish gray; wet; about 60% coarse to fine GRAVEL; about 15% coarse to fine SAND; about 25% low to medium plasticity fines.								
52	62													
	63													
50	64													
	65					Poorly graded GRAVEL with CLAY and SAND (GP-GC); olive gray, moist; about 70% coarse to fine GRAVEL; about 20% coarse to fine SAND; about 10% low plasticity fines.								
48	66													
	67													
46	68													
	69					Poorly graded GRAVEL with SAND (GP); dark gray; moist; about 80% coarse to fine GRAVEL; about 15% coarse to fine SAND; about 5% low plasticity fines.								
44	70													
	71													
42	72													
	73					Poorly graded GRAVEL with SAND (GP) (continued).								
40	74													
	75													
38	76													
	77					Poorly graded GRAVEL with SAND (GP) (continued).								
36	78													
	79													
34	80													
	81					Poorly graded GRAVEL with SAND (GP) (continued).								
32	82													
	83													
30	84													
	85					Poorly graded GRAVEL with SAND (GP) (continued).								



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ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY				REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	
28	86												
	87												
26	88												
	89												
24	90						CLAYEY SAND with GRAVEL (SC); gray; moist; about 40% coarse to fine GRAVEL; about 45% coarse to fine SAND; about 15% low plasticity fines.						
	91												
22	92												
	93												
20	94						SANDY elastic SILT (MH); dark gray; moist; about 35% medium to fine SAND; about 65% low to medium plasticity fines.						
	95						Elastic SILT with SAND (MH); dark gray; moist; about 25% fine SAND; about 75% low to medium plasticity fines.						
18	96						SILTY CLAY to CLAYEY SILT with SAND (CL/ML); gray; moist; about 25% fine SAND; about 75% low to medium plasticity fines; partial blocky structure.						
	97												
16	98												
	99						Poorly graded SAND with SILT (SP-SM); dark gray; moist to wet; about 90% coarse to fine SAND; about 10% nonplastic fines.						
14	100						SANDY SILT (ML); dark gray; moist to wet; about 35% medium to fine SAND; about 65% nonplastic to low plasticity fines; weak blocky structure.						
	101												
12	102						SILTY SAND (SM); dark gray; moist to wet; about 70% medium to fine SAND; about 30% nonplastic fines.						
	103												
10	104						SANDY SILT (ML); dark gray; moist; about 45% fine SAND; about 55% nonplastic to low plasticity fines.						
	105						Bottom of borehole at 105.0 ft bgs						
8	106						Draft Log						
	107												
6	108												
	109												
4	110												
	111												
2	112												
	113												
0	114												
	115												
-2	116												



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LOG OF BORING C018S_2019+00

PROJECT NO: 14-165.1	BEGIN DATE: 2/17/2015	DRILLING CONTRACTOR: National, Driller Name: Josh
PROJECT: SBFCA-B&D Verif. Borings	COMPLETION DATE: 2/17/2015	DRILLING METHOD: Sonic
LOCATION: E. of Gridley	SURFACE ELEVATION: 113.91(ft)	DRILL RIG: Geoprobe 8140LC
CLIENT: Magnus/Nordic JV	SURFACE CONDITION: Gravel	HAMMER TYPE: N/A
LOGGED BY: NRA	WATER DEPTH: 32.5	SAMPLER TYPE & SIZE: Sonic Bag
DEPTH OF BORING: 105(ft)	READING TAKEN: 2/17/15	BOREHOLE DIAMETER: 4
	HAMMER EFFICIENCY: N/A	BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY(%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE		
112	1							SILTY SAND (SM); brown; dry to moist; about 55% fine SAND; about 45% nonplastic fines; Levee Fill.								
110	2															
108	3															
106	4															
104	5															
102	6															
100	7															
98	8															
96	9															
94	10															
92	11															
90	12															
	13							SANDY SILT (ML); brown; dry to moist; about 40% fine SAND; about 60% nonplastic to low plasticity fines.								
	14															
	15															
	16															
	17															
	18															
	19															
	20															
	21															
	22															
	23															
	24															



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 BORING: C018_2019+00
 ENTRY BY: NRA
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ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE		
88	26							SILTY SAND (SM) <i>(continued)</i> .								
86	27							SANDY SILT (ML); brown; dry to moist; about 40% fine SAND; about 60% nonplastic to low plasticity fines.								
84	28							SILTY SAND (SM); gray/green with green/bronze mottling; moist to wet; about 80% medium to fine SAND; about 20% nonplastic fines.								
82	29															
80	30															No soil recovered from 32' to 41.5'
78	31															
76	32															
74	33															
72	34															
70	35															
68	36															
66	37															
64	38															
62	39															
60	40															
	41															
	42							Poorly graded GRAVEL with SAND (GP); green/gray; wet; about 75% coarse to fine GRAVEL; about 25% coarse to fine SAND.								
	43															
	44															
	45															No soil recovered from 45' to 49'
	46															
	47															
	48															
	49															
	50							Poorly graded GRAVEL with CLAY and SAND (GP-GC); olive green/gray; moist to wet; about 65% coarse to fine GRAVEL; about 25% coarse to fine SAND; about 10% low to medium plasticity fines.								
	51															
	52							Moist; about 60% GRAVEL; about 15% fines.								
	53															
	54															
	55							Poorly graded GRAVEL with CLAY and SAND								



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 ENTRY BY: NRA
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ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)		% PASSING 200 SIEVE
58	56						(GP-GC) (continued).								
	57														
56	58						About 20% SAND; about 20% fines.								
	59														
54	60						Poorly graded GRAVEL with SAND (GP); green/brown with dark red oxidation; moist; about 70% coarse to fine GRAVEL; about 25% coarse to fine SAND; about 5% fines; Localized oxidation in the sand/fines matrix.								
	61														
52	62						Poorly graded GRAVEL with CLAY and SAND (GP-GC); gray; moist to wet; about 50% coarse to fine GRAVEL; about 40% coarse to fine SAND; about 10% low to medium plasticity fines.								
	63														
50	64														
	65														
48	66														
	67														
46	68														
	69														
44	70														
	71														
42	72														
	73														
40	74														
	75														
38	76														
	77														
36	78														
	79														
34	80														
	81														
32	82														
	83														
30	84														
	85														
							Poorly graded GRAVEL with CLAY and SAND (GP-GC) (continued).								Soil disturbed and washed from 85' to 89'



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ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS					
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE						
28	86																			
	87																			
26	88																			
	89																			
24	90																			
	91																			
22	92																			
	93																			
20	94																			
	95																			
18	96																			
	97																			
16	98																			
	99																			
14	100																			
	101																			
12	102																			
	103																			
10	104																			
	105																			
8	106																			
	107																			
6	108																			
	109																			
4	110																			
	111																			
2	112																			
	113																			
0	114																			
	115																			
-2	116																			

CLAYEY SAND with GRAVEL (SC); gray; moist to wet; about 40% coarse to fine GRAVEL; about 45% coarse to fine SAND; about 15% medium plasticity fines.

Poorly graded GRAVEL with CLAY and SAND (GP-GC); gray; wet; about 60% coarse to fine GRAVEL; about 30% coarse to fine SAND; about 10% medium plasticity fines.

SANDY lean CLAY (CL); dark gray; moist to wet; about 35% fine SAND; about 65% low to medium plasticity fines; Localized weak to moderate cementation.

CLAYEY SAND (SC); dark gray; moist to wet; about 85% medium to fine SAND; about 15% low to medium plasticity fines.

Lean CLAY with SAND (CL); green/gray; moist; about 15% fine SAND; about 85% medium plasticity fines; Localized weak to moderate cementation.

Bottom of borehole at 105.0 ft bgs

Draft Log



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 BORING: C018_2019+00
 ENTRY BY: NRA
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LOG OF BORING C019S

PROJECT NO: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 LOCATION: E. of Gridley
 CLIENT: Magnus
 LOGGED BY: SML
 DEPTH OF BORING: 104(ft)

BEGIN DATE: 12/16/2014
 COMPLETION DATE: 12/16/2014
 SURFACE ELEVATION: (ft)
 WATER CONDITION: Sandy Silt
 WATER DEPTH: N/A
 READING TAKEN: N/A
 HAMMER EFFICIENCY:

DRILLING CONTRACTOR: National
 DRILLING METHOD: Rotary Percussion
 DRILL RIG: Sonic
 HAMMER TYPE: N/A
 SAMPLER TYPE & SIZE: Sonic
 BOREHOLE DIAMETER: 6"
 BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)		% PASSING 200 SIEVE
1			1				SANDY SILT (ML); brown; dry to moist; about 45% fine SAND; about 55% nonplastic to low plasticity fines.	100							Levee fill
2															
3															
4															
5			2				About 50% SAND; about 50% fines.	100							
6															
7															
8															
9															
10			3					100							Encountered 4 inch wood/bark piece
11															
12															
13			4					100							Bottom of levee
14															
15															
16															
17															
18			5				Trace Organics.	100							
19															
20															
21			6				SILTY SAND (SM); brown; moist; about 65% fine SAND; about 35% nonplastic fines.	100							
22															
23															
24			7					100							
			8				SANDY SILT (ML); brown; moist; about 4% fine	100							



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 ENTRY BY: SML
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ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)		% PASSING 200 SIEVE
26			9				GRAVEL; about 30 to 35% coarse to fine SAND; about 70 to 65% low plasticity fines.	100							
27			10					100							
28															
29			11				Poorly graded SAND with SILT (SP-SM); brown; moist; about 90% fine SAND; about 10% low plasticity fines.	100							
30															
31															
32															
33			12				SILTY SAND (SM); dark gray; moist to wet; interbedded.	100							
34			13				Poorly graded SAND with SILT (SP-SM); brown; wet; about 90% medium to fine SAND; about 10% low plasticity fines; 1/2 inch layer of silty sand.	100							
35															
36															
37															
38			14				Poorly graded SAND (SP); gray; wet; about 95% medium to fine SAND; about 5% fines.	100							
39			15				Poorly graded GRAVEL with SAND (GP); dark gray; wet; about 70% coarse to fine GRAVEL; about 25% coarse to fine SAND; about 5% fines.	100							
40															
41															
42															
43			16				Poorly graded GRAVEL with SILT and SAND (GP-GM); dark gray; wet; about 50% coarse to fine GRAVEL; about 40% coarse to fine SAND; about 10% fines; Trace Cobble.	100							
44															
45															
46															
47			17				Poorly graded GRAVEL with SAND and COBBLES (GP); dark gray; wet; about 20% COBBLES; about 80% coarse to fine GRAVEL; about 15% coarse to fine SAND; about 5% fines.	100							
48															
49															
50															
51			18				Poorly graded GRAVEL with CLAY, SAND, and COBBLES (GP-GC); light brown; wet; about 15% COBBLES; about 75% coarse to fine GRAVEL; about 15% coarse to fine SAND; about 10% low to medium plasticity fines.	100							
52															
53															
54															
55			19					100							



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ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)		% PASSING 200 SIEVE
56			19					100							
57															
58															
59															
60															
61															
62			20				SILTY SAND with GRAVEL and COBBLES (SM); brown; moist; about 15% COBBLES; about 25% coarse to fine GRAVEL; about 60% coarse to fine SAND; about 15% nonplastic fines.	100							
63			21				Poorly graded GRAVEL with SILT and SAND (GP-GM); brown; moist; about 50% coarse to fine GRAVEL; about 40% coarse to fine SAND; about 10% low plasticity fines.	100							
64															
65							Cobbles end.								
66															
67															
68			22					100							
69															
70			23				CLAYEY GRAVEL with SAND (GC); brown; moist; about 60% coarse to fine GRAVEL; about 25% coarse to fine SAND; about 15% low to medium plasticity fines.	100							
71															
72							Gray.								
73															
74			24				Poorly graded GRAVEL with SAND (GP); gray; moist; about 70% coarse to fine GRAVEL; about 20% coarse to fine SAND; about 5% nonplastic fines.	100							
75															
76															
77															
78															
79															
80															
81															
82															
83			25					100							
84			26					100							
85															



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BORING: C019S
ENTRY BY: SML
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ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY				REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)
86			27				SANDY elastic SILT (MH); gray; moist; about 50% fine SAND; about 50% low to medium plasticity, low to medium dry strength fines; weak to moderate cementation.	100						
87														
88														
89			28					100						
90														
91														
92														
93			29				SILTY CLAY with SAND (CL-ML); gray; moist; about 25% fine SAND; about 75% low to medium plasticity fines; strong cementation.	100						
94														
95			30				Poorly graded SAND (SP); gray; moist; about 95% medium to fine SAND; about 5% fines.	100						
96														
97			31				Lean CLAY (CL); gray; moist; about 5% fine SAND; about 95% medium plasticity fines.	100						
98														
99														
100			32				Poorly graded SAND (SP); dark gray; moist to wet; about 95% medium to fine SAND; about 5% fines.	100						
101														
102														
103			33				Poorly graded SAND with SILT (SP-SM); gray; moist; about 90% fine SAND; about 10% nonplastic fines.	100						
104							Bottom of borehole at 104.0 ft bgs							
105							Draft Log							
106														
107														
108														
109														
110														
111														
112														
113														
114														
115														
116														



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 BORING: C019S
 ENTRY BY: SML
 CHECKED BY: SHEET 4 of 4

LOG OF BORING C020S_2021+00

PROJECT NO: 14-165.1	BEGIN DATE: 2/18/2015	DRILLING CONTRACTOR: National, Driller Name: Josh
PROJECT: SBFCA-B&D Verif. Borings	COMPLETION DATE: 2/19/2015	DRILLING METHOD: Sonic
LOCATION: E. of Gridley	SURFACE ELEVATION: 113.87(ft)	DRILL RIG: Geoprobe 8140LC
CLIENT: Magnus/Nordic JV	SURFACE CONDITION: Gravel	HAMMER TYPE: N/A
LOGGED BY: NRA	WATER DEPTH: 34	SAMPLER TYPE & SIZE: Sonic Bag
DEPTH OF BORING: 105(ft)	READING TAKEN: 2/18/15	BOREHOLE DIAMETER: 4"
	HAMMER EFFICIENCY: N/A	BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
112	1							<p>SILTY SAND (SM); brown; dry to moist; about 70% medium to fine SAND; about 30% nonplastic fines; Levee Fill.</p> <p>SANDY SILT (ML); brown; dry to moist; about 45% fine SAND; about 55% nonplastic fines; Levee Fill.</p> <p>SILTY SAND (SM); loose; brown; dry to moist; about 75% fine SAND; about 25% nonplastic fines.</p>	<p>Run #1: 10ft to 15ft bgs Recovery: 93%</p> <p>Run #2: 15ft to 25ft bgs Recovery: 10%</p>	<p>Drillers did not bag upper 10ft of material</p>					
110	2														
108	3														
106	4														
104	5														
102	6														
100	7														
98	8														
96	9														
94	10														
92	11														
90	12														
	13														
	14														
	15														
	16														
	17														
	18														
	19														
	20														
	21														
	22														
	23														
	24														



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 (916) 455 4225

PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C020S_2021+00
 ENTRY BY: NRA
 CHECKED BY: SHEET 1 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY				REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	
88	26						SILTY SAND (SM) (continued).						Run #3: 25ft to 30ft Recovery: 100%
	27						Poorly graded SAND (SP); light brown; dry; about 95% fine SAND; about 5% fines.						
86	28						SANDY SILT (ML); brown; moist to wet; about 45% fine SAND; about 55% nonplastic to low plasticity fines.						
	29												
84	30												Run #4: 30ft to 35ft Recovery: 100%
	31												
82	32						SILTY SAND (SM); greenish brown with bronze mottling; moist to wet; about 65% fine SAND; about 35% nonplastic fines.						
	33												
80	34						Poorly graded SAND with SILT (SP-SM); greenish brown with bronze mottling; moist to wet; about 90% coarse to fine SAND; about 10% nonplastic fines.						
	35												Run #5: 35ft to 45ft Recovery: 80%
78	36												
	37												
76	38						Poorly graded SAND (SP); greenish gray; wet; about 100% coarse to fine SAND; trace fines.						
	39												
74	40						Poorly graded GRAVEL with SAND (GP); greenish gray; wet; about 75% coarse to fine GRAVEL; about 20% coarse to fine SAND; about 5% fines.						
	41												
72	42						Poorly graded SAND (SP); greenish gray; wet; about 10% fine GRAVEL; about 90% coarse to fine SAND; trace fines.						
	43												
70	44						Poorly graded GRAVEL with SAND (GP); greenish gray; wet; about 60% fine GRAVEL; about 35% coarse to fine SAND; about 5% fines.						
	45												
68	46						Poorly graded SAND (SP); gray; wet; about 10% fine GRAVEL; about 90% coarse to fine SAND; trace fines.						
	47												
66	48												
	49												
64	50						Poorly graded GRAVEL with SAND (GP); greenish gray; wet; about 85% coarse to fine GRAVEL; about 15% coarse to fine SAND; trace fines.						
	51												Run #7: 50ft to 55ft Recovery: 80%
62	52												
	53												
60	54												
	55						Poorly graded GRAVEL with SAND (GP) (continued).						Run #8: 55ft to 65ft



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BORING: C020S_2021+00
ENTRY BY: NRA
CHECKED BY: SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	
58	56						CLAYEY SAND with GRAVEL (SC); olive greenish gray; moist to wet; about 40% coarse to fine GRAVEL; about 40% coarse to fine SAND; about 20% medium plasticity fines.							Recovery: 100%
57	58													
56	59													
54	60													
52	61													
50	62													
48	63						Poorly graded GRAVEL with CLAY and SAND (GP-GC); greenish gray with dark red mottling; moist to wet; about 50% coarse to fine GRAVEL; about 40% coarse to fine SAND; about 10% medium plasticity fines.							Run #9: 65ft to 70ft Recovery: 100%
46	64													
44	65													
42	66													
40	67													
38	68													
36	69													
34	70						CLAYEY GRAVEL with SAND (GC); greenish gray; moist; about 50% coarse to fine GRAVEL; about 35% coarse to fine SAND; about 15% low to medium plasticity fines.							Run #10: 70ft to 80ft Recovery: 80%
32	71													
30	72													
	73													
	74													
	75													
	76						CLAYEY GRAVEL with SAND (GC); greenish gray; moist; about 50% coarse to fine GRAVEL; about 35% coarse to fine SAND; about 15% low to medium plasticity fines; strong cementation.							
	77													
	78													
	79													
	80						Poorly graded SAND with CLAY and GRAVEL (SP-SC); dark gray; moist to wet; about 45% coarse to fine GRAVEL; about 45% coarse to fine SAND; about 10% medium plasticity fines.							Run #11: 80ft to 90ft Recovery: 92%
	81													
	82													
	83						Poorly graded SAND with SILT and GRAVEL (SP-SM); dark gray; moist to wet; about 35% coarse to fine GRAVEL; about 55% coarse to fine SAND; about 10% nonplastic fines.							
	84													
	85						Poorly graded SAND with SILT and GRAVEL (SP-SM) (continued).							



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C020S_2021+00
ENTRY BY: NRA
CHECKED BY: SHEET 3 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS		
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)		% PASSING 200 SIEVE	
28	86						Poorly graded SAND with CLAY and GRAVEL (SP-SC); dark gray; moist to wet; about 45% coarse to fine GRAVEL; about 45% coarse SAND; about 10% low to medium plasticity fines.									
	87															
26	88						Poorly graded SAND with SILT and GRAVEL (SP-SM); dark gray; moist to wet; about 35% coarse to fine GRAVEL; about 55% coarse to fine SAND; about 10% nonplastic fines.									
	89															
24	90						CLAYEY SAND with GRAVEL (SC); dark gray; moist to wet; about 35% coarse to fine GRAVEL; about 50% coarse to fine SAND; about 15% low to medium plasticity fines.									
	91															
22	92															
	93															
20	94															
	95															
18	96						Lean CLAY with SAND (CL); dark gray; moist; about 25% fine SAND; about 75% medium plasticity fines; blocky; indurated, slight organic odor.									
	97															
16	98															
	99															
14	100															
	101															
12	102						Poorly graded SAND (SP); dark gray; moist to wet; about 95% coarse to fine SAND; about 5% fines; weak cementation.									
	103															
10	104															
	105															
							Bottom of borehole at 105.0 ft bgs									
8	106						Draft Log									
	107															
6	108															
	109															
4	110															
	111															
2	112															
	113															
0	114															
	115															
-2	116															

Run #12: 90ft to 100ft
Recovery: 100%

Run #13: 100ft to 105ft
Recovery: 100%



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PROJECT: SBFCA-B&D Verif. Borings
BORING: C020S_2021+00
ENTRY BY: NRA
CHECKED BY: SHEET 4 of 4

LOG OF BORING C021S_2022+00

PROJECT NO: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 LOCATION: E. of Gridley
 CLIENT: Magnus/Nordic JV
 LOGGED BY: NRA
 DEPTH OF BORING: 105(ft)

BEGIN DATE: 2/20/2015
 COMPLETION DATE: 2/20/2015
 SURFACE ELEVATION: 113.98(ft)
 SURFACE CONDITION: Gravel
 WATER DEPTH: 32.5
 READING TAKEN: 2/20/15
 HAMMER EFFICIENCY: N/A

DRILLING CONTRACTOR: National, Driller Name: Josh
 DRILLING METHOD: Sonic
 DRILL RIG: Geoprobe 8140LC
 HAMMER TYPE: N/A
 SAMPLER TYPE & SIZE: Sonic Bag
 BOREHOLE DIAMETER: 4"
 BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY(%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
112	1							SILTY SAND (SM); light brown; dry to moist; about 65% fine SAND; about 35% nonplastic fines; Levee Fill.						Drillers did not bag upper 13ft of material Run #1: 13ft to 15ft bgs Recovery: 75% Run #2: 15ft to 20ft bgs Recovery: 100% Run #3: 20ft to 25ft Recovery: 100%	
	2														
	3														
110	4														
	5														
108	6														
	7														
106	8														
	9														
104	10														
	11														
102	12														
	13								SANDY SILT (ML); brown; dry to moist; about 30% fine SAND; about 70% nonplastic fines.						
100	14														
	15						SILTY SAND (SM); brown; dry to moist; about 75% fine SAND; about 25% nonplastic fines.								
98	16														
	17														
96	18														
	19														
94	20						Dark brown; moist; about 70% SAND; about 30% fines.								
	21														
92	22														
	23						Light brown; dry to moist; about 80 to 85% medium to fine SAND; about 15 to 20% fines.								
90	24														



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PROJECT NUMBER: 14-165.1
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 BORING: C021S_2022+00
 ENTRY BY: NRA
 CHECKED BY: SHEET 1 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY				REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	
88	26						SILTY SAND (SM) (continued).						Run #4: 25ft to 30ft Recovery: 33%
86	28												
84	30												Run #5: 30ft to 35ft Recovery: 77%
82	32						Greenish brown with brownish bronze mottling; wet; about 85% fine SAND; about 15% fines.						
80	34												
78	36						Poorly graded SAND (SP); greenish gray; wet; about 100% coarse to fine SAND; trace fines; tree roots present, 1" organic lense at 36', no other organics odor.						Run #6: 35ft to 40ft Recovery: 80%
76	38						Poorly graded SAND with GRAVEL (SP); greenish gray; wet; about 15% coarse to fine GRAVEL, max. 1.25 in. dia.; about 85% coarse to fine SAND; trace fines.						
74	40												Run #7: 40ft to 45ft Recovery: 82%
72	42						Poorly graded GRAVEL with SAND (GP); greenish gray; wet; about 80 to 90% coarse to fine GRAVEL, max. 2 in. dia.; about 10 to 20% coarse to fine SAND; trace fines.						
70	44												
68	46						Poorly graded GRAVEL with CLAY and SAND (GP-GC); grayish green; moist to wet; about 75% coarse to fine GRAVEL, max. 3 in. dia.; about 15% coarse to fine SAND; about 10% medium plasticity fines.						Run #8: 45ft to 50ft Recovery: 100%
66	48												
64	50												Run #9: 50ft to 55ft Recovery: 87%
62	52												
60	54												
	55						CLAYEY GRAVEL with SAND (GC); gray; moist to wet.						Run #10: 55ft to 60ft



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PROJECT NUMBER: 14-165.1
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BORING: C021S_2022+00
ENTRY BY: NRA
CHECKED BY: SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	
58	56						about 50% coarse to fine GRAVEL; about 35% coarse to fine SAND; about 15% medium plasticity fines.							Recovery: 100%
54	60						CLAYEY SAND with GRAVEL (SC); greenish gray; moist to wet; about 25% coarse to fine GRAVEL; about 50% coarse to fine SAND; about 25% medium plasticity fines.							Run #11: 60ft to 65ft Recovery: 83%
52	62						Poorly graded GRAVEL with CLAY and SAND (GP-GC); greenish gray; moist to wet; about 65% coarse to fine GRAVEL; about 25% coarse to fine SAND; about 10% medium plasticity fines.							
48	66						Poorly graded SAND with SILT and GRAVEL (SP-SM); dark reddish brown; moist to wet; about 30% fine GRAVEL; about 60% coarse to fine SAND; about 10% nonplastic fines.							Run #12: 65ft to 70ft Recovery: 85%
44	70						CLAYEY GRAVEL with SAND (GC); greenish gray brown; moist to wet; about 50% fine GRAVEL, max. 0.75 in. dia.; about 35% coarse to fine SAND; about 15% low plasticity fines.							Run #13: 70ft to 75ft Recovery: 73%
42	72						Dark gray; about 60% coarse to fine GRAVEL; about 25% SAND; about 15% low to medium plasticity fines.							
40	74						Poorly graded GRAVEL with SAND (GP); dark gray; wet; about 70% coarse to fine GRAVEL; about 30% coarse to fine SAND; trace fines.							Run #14: 75ft to 80ft Recovery: 73%
38	76						About 80% GRAVEL; about 15% SAND; about 5% low plasticity fines.							
36	78													
34	80													Run #15: 80ft to 85ft Recovery: 82%
32	82													
30	84						About 70% GRAVEL; about 25% SAND; about 5% fines.							
	85						SILTY SAND (SM); gray; wet; about 70% coarse to fine SAND; about 30% nonplastic to low plasticity fines.							Run #16: 85ft to 90ft Recovery: 92%



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C021S_2022+00
 ENTRY BY: NRA
 CHECKED BY: SHEET 3 of 4

LOG OF BORING C022S_2023+00

PROJECT NO: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 LOCATION: E. of Gridley
 CLIENT: Magnus/Nordic JV
 LOGGED BY: RRH
 DEPTH OF BORING: 105 (ft)

BEGIN DATE: 2/23/2015
 COMPLETION DATE: 2/23/2015
 SURFACE ELEVATION: 113.41 (ft)
 WATER DEPTH: N/A
 READING TAKEN: N/A
 HAMMER EFFICIENCY: N/A

DRILLING CONTRACTOR: National
 DRILLING METHOD: Sonic
 DRILL RIG: 400LS
 HAMMER TYPE: N/A
 SAMPLER TYPE & SIZE: Sonic Bag
 BOREHOLE DIAMETER: 4"
 BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
111	1														As directed by Magnus/Nordic JV, CAI personnel was not present with drillrig during drilling C022S. CAI logger Ryan H. logged bulk samples on 3/2/2015
	2														
	3														
109	4														
	5														
107	6														
	7														
105	8														
	9														
103	10														
	11														
101	12														
	13														
99	14														
	15														
97	16														
	17														
95	18														
	19														
93	20														
	21														
91	22														
	23														
89	24														



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PROJECT NUMBER: 14-165.1
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 BORING: C022S_2023+00
 ENTRY BY: RRH
 CHECKED BY: SHEET 1 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)		GRAPHIC LOG	DESCRIPTION	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)
87	26													
	27													
85	28													
	29													
83	30													
	31													
81	32													
	33													
79	34													
	35													
77	36													
	37													
75	38													
	39													
73	40													
	41													
71	42													
	43													
69	44													
	45													
67	46													
	47													
65	48													
	49													
63	50													
	51													
61	52													
	53													
59	54													
	55													



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PROJECT NUMBER: 14-165.1
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 BORING: C022S_2023+00
 ENTRY BY: RRH
 CHECKED BY: SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS			
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE				
57	56																	
	57																	
55	58																	
	59																	
53	60																	
	61																	
51	62																	
	63																	
49	64																	
	65																	
47	66							Poorly graded GRAVEL with CLAY and SAND (GP-GC); gray; moist; about 70% coarse to fine GRAVEL; about 20% coarse to fine SAND; low plasticity fines.										
	67																	
45	68							Poorly graded GRAVEL with SILT and SAND (GP-GM); gray; moist; about 50 to 60% coarse to fine GRAVEL; about 30 to 40% coarse to fine SAND; nonplastic fines.										
	69																	
43	70																	
	71																	
41	72																	
	73																	
39	74																	
	75																	
37	76																	
	77																	
35	78																	
	79																	
33	80																	
	81																	
31	82							SILTY SAND (SM); gray; moist; about 5% fine GRAVEL; about 60% fine SAND; nonplastic fines.										
	83																	
29	84																	
	85							Lean CLAY with SAND (CL); gray; moist; about 15 to 20% fine SAND; low to medium plasticity fines.										



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PROJECT NUMBER: 14-165.1
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 BORING: C022S_2023+00
 ENTRY BY: RRH
 CHECKED BY: SHEET 3 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS				
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE					
27	86																		
	87																		
25	88																		
	89																		
23	90																		
	91																		
21	92																		
	93																		
19	94																		
	95																		
17	96																		
	97																		
15	98																		
	99																		
13	100																		
	101																		
11	102																		
	103																		
9	104																		
	105																		
Bottom of borehole at 105.0 ft bgs																			
7	106																		
Draft Log																			
	107																		
5	108																		
	109																		
3	110																		
	111																		
1	112																		
	113																		
-1	114																		
	115																		
-3	116																		



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C022S_2023+00
ENTRY BY: RRH
CHECKED BY: SHEET 4 of 4

LOG OF BORING C023S_2024+00

PROJECT NO: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 LOCATION: E. of Gridley
 CLIENT: Magnus/Nordic JV
 LOGGED BY: RRH
 DEPTH OF BORING: 105 (ft)

BEGIN DATE: 2/24/2015
 COMPLETION DATE: 2/24/2015
 SURFACE ELEVATION: 113.02(ft)
 WATER CONDITION: Gravel
 WATER DEPTH: N/A
 READING TAKEN: N/A
 HAMMER EFFICIENCY: N/A

DRILLING CONTRACTOR: National
 DRILLING METHOD: Sonic
 DRILL RIG: 400LS
 HAMMER TYPE: N/A
 SAMPLER TYPE & SIZE: Sonic Bag
 BOREHOLE DIAMETER: 4"
 BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
111	1														As directed by Magnus/Nordic JV, CAI personnel was not present with drillrig during drilling C023S. CAI logger Ryan H. logged bulk samples on 3/2/2015
	2														
	3														
109	4														
	5														
107	6														
	7														
105	8														
	9														
103	10														
	11														
101	12														
	13														
99	14														
	15														
97	16														
	17														
95	18														
	19														
93	20														
	21														
91	22														
	23														
89	24														



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C023S_2024+00
 ENTRY BY: RRH
 CHECKED BY:

ELEVATION (ft)	DEPTH (ft)	FIELD					DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)			GRAPHIC LOG	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	
87	26													
	27													
85	28													
	29													
83	30													
	31													
81	32													
	33													
79	34													
	35													
77	36													
	37													
75	38													
	39													
73	40													
	41													
71	42													
	43													
69	44													
	45													
67	46													
	47													
65	48													
	49													
63	50													
	51													
61	52													
	53													
59	54													
	55													



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C023S_2024+00
ENTRY BY: RRH
CHECKED BY: SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS					
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE						
57	56																			
	57																			
55	58																			
	59																			
53	60																			
	61																			
51	62																			
	63																			
49	64																			
	65																			
47	66							CLAYEY GRAVEL with SAND (GC); grayish brown; moist; about 50 to 60% coarse to fine GRAVEL; about 25 to 30% coarse to fine SAND; low plasticity fines.												
	67																			
45	68																			
	69																			
43	70							Poorly graded GRAVEL (GP); dark gray; wet; about 80 to 85% coarse to fine GRAVEL; about 10 to 15% coarse to fine SAND; nonplastic fines.												
	71																			
41	72																			
	73																			
39	74																			
	75																			
37	76							CLAYEY SAND (SC); gray; moist; trace fine GRAVEL; about 60% coarse to fine SAND; low plasticity fines.												
	77																			
35	78							SANDY lean CLAY (CL); gray; moist; about 40 to 45% medium to fine SAND; low plasticity fines; blocky structure.												
	79																			
33	80																			
	81																			
31	82																			
	83																			
29	84																			
	85							SANDY lean CLAY (CL) (continued).												



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C023S_2024+00
 ENTRY BY: RRH
 CHECKED BY: SHEET 3 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
27	86						Lean CLAY with SAND (CL); grayish brown; dry to moist; about 20% fine SAND; low plasticity fines; blocky structure.								
	87														
25	88						SANDY SILT (ML); gray; moist; about 40% fine SAND; nonplastic to low plasticity fines; blocky structure.								
	89														
23	90						SANDY lean CLAY (CL); gray; moist; about 30% fine SAND; low plasticity fines; blocky structure.								
	91														
21	92						Poorly graded SAND (SP); dark gray; moist; about 95% medium to fine SAND; nonplastic fines.								
	93														
19	94						SANDY lean CLAY (CL); gray; moist; about 30% fine SAND; low plasticity fines; blocky structure.								
	95														
17	96						SANDY lean CLAY (CL); gray; moist; about 30% fine SAND; low plasticity fines; blocky structure.								
	97														
15	98						SANDY lean CLAY (CL); gray; moist; about 30% fine SAND; low plasticity fines; blocky structure.								
	99														
13	100						SILTY SAND (SM); gray; moist; about 70% fine SAND; nonplastic fines.								
	101														
11	102						SANDY SILT (ML); gray; moist; about 35 to 45% fine SAND; nonplastic fines.								
	103														
9	104						SANDY SILT (ML); gray; moist; about 35 to 45% fine SAND; nonplastic fines.								
	105														
								Bottom of borehole at 105.0 ft bgs							
7	106							Draft Log							
	107														
5	108														
	109														
3	110														
	111														
1	112														
	113														
-1	114														
	115														
-3	116														

LOG OF BORING C024S

PROJECT NO: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 LOCATION: E. of Gridley
 CLIENT: Magnus
 LOGGED BY: SML/JJW
 DEPTH OF BORING: 105(ft)

BEGIN DATE: 12/18/2014
 COMPLETION DATE: 12/18/2014
 SURFACE ELEVATION: (ft)
 SURFACE CONDITION: Sandy Silt
 WATER DEPTH: N/A
 READING TAKEN: N/A
 HAMMER EFFICIENCY:

DRILLING CONTRACTOR: National
 DRILLING METHOD: Rotary Percussion
 DRILL RIG: Sonic
 HAMMER TYPE: N/A
 SAMPLER TYPE & SIZE: Sonic
 BOREHOLE DIAMETER: 6"
 BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)		% PASSING 200 SIEVE
1			1				SILTY SAND (SM); brown; moist; about 55% fine SAND; about 45% nonplastic to low plasticity fines.	100							Levee Fill Bottom of levee Trace roots, 2 Inch charcoal
2								100							
3			2												
4															
5															
6															
7															
8															
9			3				SANDY SILT (ML); brown; dry to moist; about 50% fine SAND; about 50% nonplastic to low plasticity fines.	100							
10															
11															
12															
13			4				SILTY SAND (SM); brown; dry to moist; about 70% fine SAND; about 30% nonplastic to low plasticity fines.	100							
14															
15															
16			5					100							
17															
18															
19			6				SANDY SILT (ML); brown; moist; about 45% fine SAND; about 55% nonplastic fines.	100							
20															
21															
22			7				SILT with SAND (ML); brown; moist; about 25% fine SAND; about 75% low plasticity fines.	100							
23															
24			8				SILTY SAND (SM); brown; moist; about 70% fine SAND; about 30% low plasticity fines.	100							



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C024S
 ENTRY BY: SML
 CHECKED BY: SHEET 1 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)		% PASSING 200 SIEVE
26			9				Poorly graded SAND (SP); yellow Brown; moist; about 98% fine SAND; about 2% fines; No Recovery from 30-35 ft.	100							
27															
28															
29															
30															
31			10					0							
32															
33															
34															
35								100							
36															
37															
38							Light gray.								
39			11					100							
40															
41			12				Poorly graded GRAVEL with SAND (GP); olive gray; moist; about 80% coarse to fine GRAVEL; about 20% coarse to fine SAND.	100							Gravel up to 3" in diameter
42															
43															
44							SILTY SAND (SM); brown; moist; about 55% fine SAND; about 45% nonplastic to low plasticity fines.	0							
45			13					100							
46															
47			14					100							
48															
49			15				SANDY SILT (ML); dark gray; moist; about 50% fine SAND; about 50% nonplastic fines.	100							Some Cobles encountered
50							Poorly graded GRAVEL with SAND (GP); light olive gray; wet; about 80% coarse to fine GRAVEL; about 15% coarse to medium SAND; about 5% fines.								
51															
52															
53															
54															
55															



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C024S
ENTRY BY: SML
CHECKED BY: SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)		% PASSING 200 SIEVE
56			15					100							
57			16					100							
58															
59															
60			17				SILTY SAND (SM); gray; wet; about 80% medium to fine SAND; about 20% nonplastic to low plasticity fines.	100							
61															
62			18				Poorly graded GRAVEL with SAND (GP); dark olive gray; wet; about 80% coarse to fine GRAVEL; about 15% coarse to medium SAND; about 5% low plasticity fines.	100							
63															
64															
65															
66															
67															
68															
69			19				About 25% coarse to medium SAND.	100							
70															
71															
72															
73			20					100							
74															
75															some cobble encountered
76			21				SILT with SAND (ML); gray; moist; about 15% fine SAND; about 85% low plasticity fines.	100							
77															
78															
79															
80			22				SANDY CLAYEY SILT (ML/CL); olive gray; moist; about 35% fine SAND; about 65% low plasticity fines.	100							
81			23				CLAYEY SAND (SC); dark blue; moist to wet; about 60% medium to fine SAND; about 40% low plasticity fines.	100							
82															
83			24				Lean CLAY with SAND (CL); olive gray; moist; about 15% medium to fine SAND; about 85% low to medium plasticity fines.	100							
84															
85															



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C024S
 ENTRY BY: SML
 CHECKED BY: SHEET 3 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY				REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)
86			24					100						
87			25				SANDY SILT (ML/SM); bluish gray; wet; about 50% fine SAND; about 50% low plasticity fines.	100						
88														
89														
90			26				SILTY SAND (SM); dark blue; moist; about 70% fine SAND; about 30% nonplastic to low plasticity fines.	100						
91														
92														
93														
94			27				Lean CLAY (CL); dark bluish gray; wet; about 5 to 10% fine SAND; about 90% medium plasticity fines.	100						
95														
96														
97														
98														
99			28				SANDY SILT (ML); dark gray; wet; about 45% fine SAND; about 55% nonplastic to low plasticity fines.	100						
100														
101														
102														
103														
104			29				SILTY CLAY (CL-ML); dark bluish gray; wet; about 10% fine SAND; about 90% low to medium plasticity fines.	100						
105							Bottom of borehole at 105.0 ft bgs							
106							Draft Log							
107														
108														
109														
110														
111														
112														
113														
114														
115														
116														



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C024S
 ENTRY BY: SML
 CHECKED BY: SHEET 4 of 4

LOG OF BORING C025S_2026+00

PROJECT NO: 14-165.1	BEGIN DATE: 11/18/2014	DRILLING CONTRACTOR: GeoEx Subsurface, Driller: Tom S.
PROJECT: SBFCA-B&D Verif. Borings	COMPLETION DATE: 11/20/2014	DRILLING METHOD: Solid-Stem Auger & Rotary Wash
LOCATION: E. of Gridley	SURFACE ELEVATION: 113.81(ft)	DRILL RIG: CME 75
CLIENT: Magnus/Nordic JV	SURFACE CONDITION: Gravel	HAMMER TYPE: Auto: 140lb, 30"
LOGGED BY: RRRH	WATER DEPTH: N/A	SAMPLER TYPE & SIZE: SPT (1.4" ID)
DEPTH OF BORING: 103.8(ft)	READING TAKEN: N/A	BOREHOLE DIAMETER: 6"
	HAMMER EFFICIENCY: N/A	BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY(%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
112	1														Driller augered to 18' below crest of levee. Driller set casing (5" ID) to 18.5' below levee crest
110	2														
108	3														
106	4														
104	5														
102	6														
100	7														
98	8														
96	9														
94	10														
92	11														
90	12														
	13														
	14														
	15														
	16														
	17														
	18														Switch from Solid Stem Auger to Rotary Wash
	19														
	20														
	21														
	22														
	23														
	24														



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C025S_2026+00
ENTRY BY: JJW
CHECKED BY: SHEET 1 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE		
58	56															
	57															
56	58															
	59															
54	60															
	61															
52	62															
	63															
50	64															
	65															
48	66															
	67															
46	68															
	69															
44	70															
	71															
42	72															
	73															
40	74															
	75															
38	76															
	77															
36	78															
	79															
34	80															No drill chatter, suggest end of gravel layer
	81	X	1	37	54/2			0								Lean Clay stuck to outside of sampler
32	82			54/2"												
	83	X	2	34			Lean CLAY (CL); bluish gray; moist; about 5% fine	50								
30	84	X	3	18	50		SAND; medium plasticity fines.	0								
	85	X		25												
				25												



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C025S_2026+00
 ENTRY BY: JJW
 CHECKED BY: SHEET 3 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS		
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE			
28	86	X	4	22					83								
	87		5	100/6"	REF												Rock in tip of sample #4. Driller next used A-rod with welded carbide tooth in center in attempt to push away remaining gravel (GAD-5)
26	88	X	6	31	79/8		Elastic SILT (MH); brownish gray; moist; about 30% fine SAND; low to medium plasticity fines; slightly blocky structure.	100									
	89			45													
				34/2"													
24	90	X	7	39			SILTY CLAY with SAND (CL-ML); brownish gray; moist; about 15% fine SAND; medium plasticity fines; blocky structure.	100									
	91	X	8	15	53		Gray; moist; about 20% SAND; low plasticity fines; slightly blocky structure.	100									
	92	X		18													
	93	X		35													
	93						Nonplastic fines.										
20	94	X	9	12	43		SANDY SILT (ML); bluish gray; moist; about 30% fine SAND; nonplastic fines; slightly blocky structure.	100									
	95	X		22													
	95	X		21													
18	96	X	10	11	31		Gray; about 40% fine SAND; nonplastic to low plasticity fines; slightly blocky structure.	100									
	97	X		14													
	97	X		17													
16	98	X					SANDY elastic SILT (MH); gray; moist; about 30% fine SAND; low plasticity fines; blocky structure.										
	99	X	11	19													
	99	X		75													
14	100	X	12	20			SANDY SILT (ML); gray; moist; about 30% fine SAND; nonplastic to low plasticity fines; blocky structure.	100									
	101	X		55													
12	102	X	13	11	26		Poorly graded SAND (SP); dark gray; wet; fine SAND; about 5% nonplastic fines.	100									
	103	X		11													
	103	X		15													
10	104						Bottom of borehole at 103.8 ft bgs										
	105						Draft Log										
8	106																
	107																
6	108																
	109																
4	110																
	111																
2	112																
	113																
0	114																
	115																
-2	116																



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C025S_2026+00
ENTRY BY: JJW
CHECKED BY: SHEET 4 of 4

LOG OF BORING C026S_2027+00

PROJECT NO: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 LOCATION: E. of Gridley
 CLIENT: Magnus/Nordic JV
 LOGGED BY: RRH
 DEPTH OF BORING: 105 (ft)

BEGIN DATE: 2/24/2015
 COMPLETION DATE: 2/25/2015
 SURFACE ELEVATION: 113.78 (ft)
 WATER DEPTH: N/A
 READING TAKEN: N/A
 HAMMER EFFICIENCY: N/A

DRILLING CONTRACTOR: National
 DRILLING METHOD: Sonic
 DRILL RIG: 400LS
 HAMMER TYPE: N/A
 SAMPLER TYPE & SIZE: Sonic Bag
 BOREHOLE DIAMETER: 4"
 BACKFILL METHOD: Cement grout

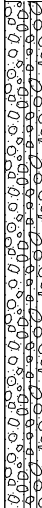


ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
112	1														As directed by Magnus/Nordic JV, CAI personnel was not present with drillrig during drilling C026S. CAI logger Ryan H. logged bulk samples on 3/2/2015
111	2														
110	3														
109	4														
108	5														
107	6														
106	7														
105	8														
104	9														
103	10														
102	11														
101	12														
100	13														
99	14														
98	15														
97	16														
96	17														
95	18														
94	19														
93	20														
92	21														
91	22														
90	23														
	24														



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C026S_2027+00
 ENTRY BY: RRH
 CHECKED BY: SHEET 1 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					RECOVERY (%)	LABORATORY					REMARKS		
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)		GRAPHIC LOG	DESCRIPTION	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)	% PASSING 200 SIEVE
88	26														
	27														
86	28														
	29														
84	30														
	31														
82	32														
	33														
80	34														
	35														
78	36														
	37														
76	38														
	39														
74	40														
	41														
72	42														
	43														
70	44														
	45														
68	46														
	47														
66	48														
	49														
64	50														
	51														
62	52														
	53														
60	54														
	55														

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS				
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE					
58	56																		
	57																		
56	58																		
	59																		
54	60																		
	61																		
52	62																		
	63																		
50	64																		
	65																		
48	66							Poorly graded GRAVEL with SILT and SAND (GP-GM); gray; moist; about 60 to 70% coarse to fine GRAVEL; about 20 to 30% coarse to fine SAND; nonplastic fines.											
	67																		
46	68																		
	69																		
44	70																		
	71																		
42	72																		
	73																		
40	74																		
	75																		
38	76							SILTY SAND with GRAVEL (SM); gray; wet; about 35% fine GRAVEL; about 45% coarse to fine SAND; nonplastic to low plasticity fines.											
	77																		
36	78																		
	79																		
34	80																		
	81																		
32	82																		
	83																		
30	84																		
	85							CLAYEY SILT with SAND (ML/CL); gray; moist; about 20% fine SAND; low plasticity fines; blocky structure.											



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C026S_2027+00
 ENTRY BY: RRH
 CHECKED BY: SHEET 3 of 4

LOG OF BORING C027S_2028+00

PROJECT NO: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 LOCATION: E. of Gridley
 CLIENT: Magnus/Nordic JV
 LOGGED BY: RRH
 DEPTH OF BORING: 105 (ft)

BEGIN DATE: 2/25/2015
 COMPLETION DATE: 2/25/2015
 SURFACE ELEVATION: 113.93(ft)
 WATER DEPTH: N/A
 READING TAKEN: N/A
 HAMMER EFFICIENCY: N/A

DRILLING CONTRACTOR: National
 DRILLING METHOD: Sonic
 DRILL RIG: 400LS
 HAMMER TYPE: N/A
 SAMPLER TYPE & SIZE: Sonic Bag
 BOREHOLE DIAMETER: 4"
 BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
112	1														As directed by Magnus/Nordic JV, CAI personnel was not present with drillrig during drilling C027S. CAI logger Ryan H. logged bulk samples on 3/2/2015
111	2														
110	3														
109	4														
108	5														
107	6														
106	7														
105	8														
104	9														
103	10														
102	11														
101	12														
100	13														
99	14														
98	15														
97	16														
96	17														
95	18														
94	19														
93	20														
92	21														
91	22														
90	23														
	24														



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















PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C027S_2028+00
 ENTRY BY: RRH
 CHECKED BY: SHEET 1 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)		GRAPHIC LOG	DESCRIPTION	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)
88	26													
	27													
86	28													
	29													
84	30													
	31													
82	32													
	33													
80	34													
	35													
78	36													
	37													
76	38													
	39													
74	40													
	41													
72	42													
	43													
70	44													
	45													
68	46													
	47													
66	48													
	49													
64	50													
	51													
62	52													
	53													
60	54													
	55													



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C027S_2028+00
ENTRY BY: RRH
CHECKED BY: SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS					
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE						
58	56																			
	57																			
56	58																			
	59																			
54	60																			
	61																			
52	62																			
	63																			
50	64																			
	65																			
48	66							SILTY GRAVEL with SAND (GM); gray; moist to wet; about 60 to 70% coarse to fine GRAVEL; about 15 to 25% coarse to fine SAND; nonplastic fines.												
	67																			
46	68																			
	69																			
44	70																			
	71																			
42	72																			
	73																			
40	74																			
	75																			
38	76																			
	77																			
36	78																			
	79																			
34	80																			
	81																			
32	82																			
	83																			
30	84																			
	85							SILTY SAND (SM); gray; moist; about 65 to 70% fine SAND; nonplastic fines.												

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS			
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE				
28	86																	
	87																	
26	88																	
	89																	
24	90																	
	91																	
22	92																	
	93																	
20	94																	
	95																	
18	96																	
	97																	
16	98																	
	99																	
14	100																	
	101																	
12	102																	
	103																	
10	104																	
	105																	
Bottom of borehole at 105.0 ft bgs																		
8	106																	
Draft Log																		
	107																	
6	108																	
	109																	
4	110																	
	111																	
2	112																	
	113																	
0	114																	
	115																	
-2	116																	



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C027S_2028+00
ENTRY BY: RRH
CHECKED BY: SHEET 4 of 4

LOG OF BORING C028S_2029+00

PROJECT NO: 14-165.1	BEGIN DATE: 2/23/2015	DRILLING CONTRACTOR: National, Driller Name: Josh
PROJECT: SBFCA-B&D Verif. Borings	COMPLETION DATE: 2/24/2015	DRILLING METHOD: Sonic
LOCATION: E. of Gridley	SURFACE ELEVATION: 113.71(ft)	DRILL RIG: Geoprobe 8140LC
CLIENT: Magnus/Nordic JV	SURFACE CONDITION: Gravel	HAMMER TYPE: N/A
LOGGED BY: NRA	WATER DEPTH: 33	SAMPLER TYPE & SIZE: Sonic Bag
DEPTH OF BORING: 104(ft)	READING TAKEN: 2/23/15	BOREHOLE DIAMETER: 6"
	HAMMER EFFICIENCY: N/A	BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
112	1						SANDY SILT (ML/SM); light brown; dry to moist; about 45% fine SAND; about 55% nonplastic fines; Levee Fill.							Drillers did not bag upper 10ft of material Run #1: 10ft to 15ft bgs Recovery: 43%	
	2														
	3														
110	4														
	5														
108	6														
	7														
106	8														
	9														
104	10														
	11														
102	12														
	13						SILTY SAND (SM); brown; moist; about 60% fine SAND; about 40% nonplastic fines.						Run #2: 15ft to 20ft bgs Recovery: 83%		
100	14														
	15														
98	16														
	17														
96	18														
	19						Did not log, no recovery from 18.5' to 25'.						Run #3: 20ft to 25ft Recovery: 0%		
94	20														
	21														
92	22														
	23														
90	24														



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C028S_2029+00
 ENTRY BY: NRA
 CHECKED BY: SHEET 1 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY				REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	
88	26						SILT with SAND (ML); dark brown; moist; about 25% fine SAND; about 75% nonplastic fines; small rootlets in the sample; Two 3" lenses of Silty Sand.						Run #4: 25ft to 30ft Recovery: 90%
86	28												
84	30												Run #5: 30ft to 35ft Recovery: 73%
82	32												
80	34						Poorly graded SAND (SP); greenish gray; moist to wet; about 100% medium to fine SAND; trace fines.						Run #6: 35ft to 40ft Recovery: 40%
78	36												
76	38						Greenish brown; wet.						
74	40						About 5% fine GRAVEL; about 95% SAND.						Run #7: 40ft to 45ft Recovery: 90%
72	42						Poorly graded GRAVEL with SAND (GP); greenish brown; wet; about 65% coarse to fine GRAVEL; about 35% coarse to fine SAND; trace fines.						
70	44						Poorly graded GRAVEL (GP); greenish gray; wet; about 85% coarse to fine GRAVEL, max. 2.75 in. dia.; about 10% coarse to fine SAND; about 5% fines.						
68	46						No recovery from 45' to 53.5'.						Run #8: 45ft to 50ft Recovery: 0%
66	48												
64	50												Run #9: 50ft to 55ft Recovery: 27%
62	52												
60	54						Poorly graded GRAVEL (GP); greenish gray; wet; about 85% coarse to fine GRAVEL, max. 2.75 in. dia.; about 10% coarse to fine SAND; about 5% fines.						
	55						Poorly graded GRAVEL (GP) (continued).						Run #10: 55ft to 60ft



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C028S_2029+00
ENTRY BY: NRA
CHECKED BY: SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	
58	56													Recovery: 87%
57	58						4" lense of Poorly Graded Sand.							
56	60						Poorly graded GRAVEL with SAND (GP); grayish green; wet; about 60% coarse to fine GRAVEL; about 35% coarse to fine SAND; about 5% low to medium plasticity fines.							Run #11: 60ft to 65ft Recovery: 100%
54	65													Run #12: 65ft to 70ft Recovery: 100%
52	70						SILTY GRAVEL with SAND (GM); greenish gray; moist to wet; about 60% coarse to fine GRAVEL; about 25% coarse to fine SAND; about 15% low to medium plasticity fines; fines are MH.							Run #13: 70ft to 75ft Recovery: 80%
50	75													Run #14: 75ft to 80ft Recovery: 100%
48	80						CLAYEY SAND with GRAVEL (SC); dark gray/black; moist to wet; about 30% coarse to fine GRAVEL, max. 1.25 in. dia.; about 50% coarse to fine SAND; about 20% low to medium plasticity fines.							Run #15: 80ft to 85ft Recovery: 100%
46	82						SANDY lean CLAY (CL/SC); dark gray; moist to wet; about 50% fine SAND; about 50% medium plasticity fines; poorly indurated.							
44	85						No recovery from 85' to 87'.							Run #16: 85ft to 90ft Recovery: 60%



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C028S_2029+00
ENTRY BY: NRA
CHECKED BY: SHEET 3 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS				
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE					
28	86																		
	87																		
26	88																		
	89																		
24	90																		
	91																		
22	92																		
	93																		
20	94																		
	95																		
18	96																		
	97																		
16	98																		
	99																		
14	100																		
	101																		
12	102																		
	103																		
10	104																		
	105																		
8	106																		
	107																		
6	108																		
	109																		
4	110																		
	111																		
2	112																		
	113																		
0	114																		
	115																		
-2	116																		

Bottom of borehole at 104.0 ft bgs

Draft Log

Run #17: 90ft to 95ft
Recovery: 90%

Run #18: 95ft to 100ft
Recovery: 100%

Run #19: 100ft to 104ft
Recovery: 0%



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C028S_2029+00
ENTRY BY: NRA
CHECKED BY: SHEET 4 of 4

LOG OF BORING C029S_2030+00

PROJECT NO: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 LOCATION: E. of Gridley
 CLIENT: Magnus/Nordic JV
 LOGGED BY: RRH
 DEPTH OF BORING: 105 (ft)

BEGIN DATE: 2/25/2015
 COMPLETION DATE: 2/26/2015
 SURFACE ELEVATION: 113.65(ft)
 WATER DEPTH: N/A
 READING TAKEN: N/A
 HAMMER EFFICIENCY: N/A

DRILLING CONTRACTOR: National
 DRILLING METHOD: Sonic
 DRILL RIG: 400LS
 HAMMER TYPE: N/A
 SAMPLER TYPE & SIZE: Sonic Bag
 BOREHOLE DIAMETER: 4"
 BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
112	1														As directed by Magnus/Nordic JV, CAI personnel was not present with drillrig during drilling C029S. CAI logger Ryan H. logged bulk samples on 3/3/2015
111	2														
110	3														
109	4														
108	5														
107	6														
106	7														
105	8														
104	9														
103	10														
102	11														
101	12														
100	13														
99	14														
98	15														
97	16														
96	17														
95	18														
94	19														
93	20														
92	21														
91	22														
90	23														
	24														



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C029S_2030+00
 ENTRY BY: RRH
 CHECKED BY: SHEET 1 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					RECOVERY (%)	LABORATORY					REMARKS		
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)		GRAPHIC LOG	DESCRIPTION	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)	% PASSING 200 SIEVE
88	26														
	27														
86	28														
	29														
84	30														
	31														
82	32														
	33														
80	34														
	35														
78	36														
	37														
76	38														
	39														
74	40														
	41														
72	42														
	43														
70	44														
	45														
68	46														
	47														
66	48														
	49														
64	50														
	51														
62	52														
	53														
60	54														
	55														



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C029S_2030+00
 ENTRY BY: RRH
 CHECKED BY: SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS				
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE					
58	56																		
	57																		
56	58																		
	59																		
54	60																		
	61																		
52	62																		
	63																		
50	64																		
	65																		
48	66							CLAYEY GRAVEL with SAND (GC); brown; moist; about 50 to 60% coarse to fine GRAVEL; about 25 to 35% coarse to fine SAND; low plasticity fines; blocky structure in fines.											
	67																		
46	68																		
	69																		
44	70							Poorly graded GRAVEL with SAND (GP); brown; moist; about 50 to 60% coarse to fine GRAVEL; about 35 to 45% coarse to fine SAND; nonplastic fines.											
	71																		
42	72																		
	73																		
40	74																		
	75																		
38	76							SANDY SILT (ML); grayish brown; moist; about 5% fine GRAVEL; about 40% fine SAND; nonplastic fines; blocky structure.											
	77																		
36	78							CLAYEY SAND (SC); gray; moist; trace fine GRAVEL; about 55% fine SAND; low plasticity fines.											
	79																		
34	80																		
	81							About 75% fine SAND.											
32	82																		
	83							SANDY lean CLAY (CL); gray; moist; about 40% fine SAND; low plasticity fines; blocky structure.											
30	84																		
	85							SILTY SAND (SM); gray; moist; about 85% fine SAND; nonplastic to low plasticity fines.											



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C029S_2030+00
 ENTRY BY: RRH
 CHECKED BY: SHEET 3 of 4

LOG OF BORING C030S_2031+00

PROJECT NO: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 LOCATION: E. of Gridley
 CLIENT: Magnus/Nordic JV
 LOGGED BY: RRH
 DEPTH OF BORING: 105 (ft)

BEGIN DATE: 2/26/2015
 COMPLETION DATE: 2/26/2015
 SURFACE ELEVATION: 113.81 (ft)
 WATER DEPTH: N/A
 READING TAKEN: N/A
 HAMMER EFFICIENCY: N/A

DRILLING CONTRACTOR: National
 DRILLING METHOD: Sonic
 DRILL RIG: 400LS
 HAMMER TYPE: N/A
 SAMPLER TYPE & SIZE: Sonic Bag
 BOREHOLE DIAMETER: 4"
 BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
112	1														As directed by Magnus/Nordic JV, CAI personnel was not present with drillrig during drilling C030S. CAI logger Ryan H. logged bulk samples on 3/3/2015
111	2														
110	3														
109	4														
108	5														
107	6														
106	7														
105	8														
104	9														
103	10														
102	11														
101	12														
100	13														
99	14														
98	15														
97	16														
96	17														
95	18														
94	19														
93	20														
92	21														
91	22														
90	23														
	24														



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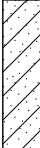

PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C030S_2031+00
 ENTRY BY: RRH
 CHECKED BY: SHEET 1 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					RECOVERY (%)	LABORATORY					REMARKS		
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)		GRAPHIC LOG	DESCRIPTION	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)	% PASSING 200 SIEVE
88	26														
	27														
86	28														
	29														
84	30														
	31														
82	32														
	33														
80	34														
	35														
78	36														
	37														
76	38														
	39														
74	40														
	41														
72	42														
	43														
70	44														
	45														
68	46														
	47														
66	48														
	49														
64	50														
	51														
62	52														
	53														
60	54														
	55														



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C030S_2031+00
 ENTRY BY: RRH
 CHECKED BY: SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS						
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE							
58	56																				
	57																				
56	58																				
	59																				
54	60																				
	61																				
52	62																				
	63																				
50	64																				
	65																				
48	66							Poorly graded GRAVEL with SILT and SAND (GP-GM); brown; moist; about 65 to 75% coarse to fine GRAVEL; about 15 to 25% coarse to fine SAND; nonplastic to low plasticity fines.													
	67																				
46	68																				
	69																				
44	70																				
	71																				
42	72																				
	73																				
40	74																				
	75																				
38	76																				
	77																				
36	78							Lean CLAY with SAND (CL); gray; dry to moist; about 15 to 20% fine SAND; low to medium plasticity fines; blocky structure.													
	79																				
34	80							6 inch lense of Silty Sand.													
	81							SANDY SILT (ML); gray; moist; about 40% fine SAND; nonplastic to low plasticity fines; blocky structure.													
32	82																				
	83																				
30	84																				
	85																				
								Lean CLAY with SAND (CL); gray; dry to moist; about 15 to 20% fine SAND; low to medium plasticity fines;													



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 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C030S_2031+00
 ENTRY BY: RRH
 CHECKED BY: SHEET 3 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE		
28	86															
	87															
26	88															
	89															
24	90							CLAYEY SAND (SC/SM); gray; moist; about 55 to 65% fine SAND; nonplastic to low plasticity fines; weakly, partially cemented.								
	91															
22	92															
	93															
20	94															
	95															
18	96															
	97															
16	98															
	99															
14	100															
	101						Lean CLAY with SAND (CL); gray; moist; about 20% fine SAND; low to medium plasticity fines; blocky structure.									
12	102															
	103															
10	104															
	105						Bottom of borehole at 105.0 ft bgs									
8	106						Draft Log									
	107															
6	108															
	109															
4	110															
	111															
2	112															
	113															
0	114															
	115															
-2	116															



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 ENTRY BY: RRH
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LOG OF BORING C031S_2032+00

PROJECT NO: 14-165.1	BEGIN DATE: 2/24/2015	DRILLING CONTRACTOR: National, Driller Name: Josh
PROJECT: SBFCA-B&D Verif. Borings	COMPLETION DATE: 2/24/2015	DRILLING METHOD: Sonic
LOCATION: E. of Gridley	SURFACE ELEVATION: 114.06(ft)	DRILL RIG: Geoprobe 8140LC
CLIENT: Magnus/Nordic JV	SURFACE CONDITION: Gravel	HAMMER TYPE: N/A
LOGGED BY: NRA	WATER DEPTH: 33	SAMPLER TYPE & SIZE: Sonic Bag
DEPTH OF BORING: 105(ft)	READING TAKEN: 2/24/15	BOREHOLE DIAMETER: 6"
	HAMMER EFFICIENCY: N/A	BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
112	1							SILTY SAND (SM/ML); light brown; dry to moist; about 55% fine SAND; about 45% nonplastic fines; Levee Fill.							Drillers did not bag upper 10ft of material
108	6														Run #1: 10ft to 15ft bgs Recovery: 83%
100	14							SILTY SAND (SM); brown; moist; about 65% fine SAND; about 35% nonplastic fines.							Run #2: 15ft to 20ft bgs Recovery: 67%
94	20							SILT with SAND (ML); dark brown; moist; about 25% fine SAND; about 75% nonplastic fines.							Run #3: 20ft to 25ft Recovery: 73%
90	24							Poorly graded SAND (SP); light brown; dry to moist; about 100% fine SAND; trace fines. SILTY SAND (SM); light brown; moist; about 85% medium to fine SAND; about 15% nonplastic fines.							



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ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
88	26							No recovery from 25' to 30'.							Run #4: 25ft to 30ft Recovery: 0%
86	28														
84	30							SILTY SAND (SM); brown; moist to wet; about 75% medium to fine SAND; about 25% nonplastic fines.							Run #5: 30ft to 35ft Recovery: 60%
82	32														
80	33							Dark brown to black; wet; about 85% SAND; about 15% fines; rootlets present, no organic odor.							
78	34														
76	35							SANDY SILT (ML); dark brown to black; moist to wet; about 45% fine SAND; about 55% nonplastic fines; rootlets and rotting trees present, slight organic odor.							Run #6: 35ft to 40ft Recovery: 100%
74	36							Poorly graded SAND (SP); dark gray to black; wet; about 100% medium to fine SAND; trace fines.							
72	37							SILTY SAND (SM); dark brown; moist to wet; about 55% fine SAND; about 45% nonplastic fines; rootlets present, no organic odor.							
70	38							Poorly graded SAND (SP); dark gray to black; wet; about 95% medium to fine SAND; about 5% fines; rootlets present, no organic odor.							
68	39							Insufficient recovery to log from 40' and 45'.							Run #7: 40ft to 45ft Recovery: 20%
66	40														
64	41														
62	42														
60	43														
	44														
	45							Poorly graded SAND (SP); greenish gray; wet; trace fine GRAVEL; about 100% coarse to medium SAND; trace fines.							Run #8: 45ft to 50ft Recovery: 67%
	46														
	47														
	48							Poorly graded GRAVEL with SAND (GP); greenish gray; wet; about 65% coarse to fine GRAVEL; about 35% coarse to medium SAND; trace fines.							
	49														
	50														
	51														
	52							Poorly graded SAND (SP); olive brown; wet; trace fine GRAVEL; about 95% coarse to fine SAND; about 5% fines.							Run #9: 50ft to 55ft Recovery: 83%
	53														
	54														
	55							Poorly graded SAND (SP) (continued).							Run #10: 55ft to 60ft



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ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY				REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	
58	56						SILTY CLAY with SAND (CL-ML); olive green; moist; about 20% fine SAND; about 80% medium plasticity fines; blocky structure.						Recovery: 87%
	57												
56	58						5 inch lense of Poorly Graded Sand.						
	59												
54	60												Run #11: 60ft to 65ft Recovery: 100%
	61												
52	62												
	63												
50	64						SILTY SAND (SM/SC); olive brown; moist to wet; about 85% coarse to fine SAND; about 15% low plasticity fines.						Run #12: 65ft to 70ft Recovery: 100%
	65												
48	66												
	67												
46	68						Poorly graded GRAVEL with SAND (GP); grayish olive brown; moist; about 60% coarse to fine GRAVEL; about 35% coarse to fine SAND; about 5% fines.						Run #13: 70ft to 75ft Recovery: 70%
	69												
44	70												
	71												
42	72												
	73												
40	74												
	75												
38	76												Run #14: 75ft to 80ft Recovery: 100%
	77												
36	78												
	79												
34	80						Lean CLAY with SAND (CL); olive brown; moist; about 25% fine SAND; about 75% medium plasticity fines; blocky structure.						Run #15: 80ft to 85ft Recovery: 100%
	81												
32	82						SANDY SILT (ML/SM); olive gray; moist; about 50% fine SAND; about 50% nonplastic fines.						
	83												
30	84						SILTY SAND (SM); dark gray to black; wet; about 85% coarse to fine SAND; about 15% nonplastic fines.						Run #16: 85ft to 90ft Recovery: 60%
	85						SILTY SAND (SM) (continued).						



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 BORING: C031S_2032+00
 ENTRY BY: NRA
 CHECKED BY: SHEET 3 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE		
28	86							Poorly graded SAND (SP); dark gray to black; wet; about 95% coarse to fine SAND; about 5% fines; weak cementation.								
	87															
26	88															
	89															
24	90							Fat CLAY (CH); olive gray; moist; about 5% fine SAND; about 95% high plasticity fines; blocky structure.								Run #17: 90ft to 95ft Recovery: 100%
	91															
22	92							Lean to fat CLAY (CL/CH); olive gray to blue gray; dry to moist; about 5% fine SAND; about 95% medium to high plasticity fines; blocky structure.								
	93															
20	94															
	95							SILTY SAND (SM); dark gray; moist to wet; about 75% fine SAND; about 25% nonplastic fines; weak cementation.								Run #18: 95ft to 100ft Recovery: 90%
18	96															
	97							Lean to fat CLAY (CL/CH); bluish gray; moist; about 10% fine SAND; about 90% medium to high plasticity fines; blocky structure.								
16	98															
	99							SILTY SAND (SM/ML); dark gray; moist to wet; about 55% fine SAND; about 45% nonplastic fines; weak cementation.								
14	100															
	101							SANDY SILT (ML); dark gray; moist to wet; about 40% fine SAND; about 60% nonplastic fines; blocky structure, stratified with 1.5 inch lenses of Silty Sand.								Run #19: 100ft to 105ft Recovery: 100%
12	102															
	103							SILTY SAND (SM); gray; moist; about 65% medium to fine SAND; about 35% nonplastic fines; moderate cementation.								
10	104															
	105							Lean to fat CLAY (CL/CH); bluish gray; moist; about 10% fine SAND; about 90% medium to high plasticity fines; blocky structure.								
								Bottom of borehole at 105.0 ft bgs								
8	106							Draft Log								
	107															
6	108															
	109															
4	110															
	111															
2	112															
	113															
0	114															
	115															
-2	116															



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LOG OF BORING C032S_2033+00

PROJECT NO: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 LOCATION: E. of Gridley
 CLIENT: Magnus/Nordic JV
 LOGGED BY: RRH
 DEPTH OF BORING: 105 (ft)

BEGIN DATE: 2/26/2015
 COMPLETION DATE: 2/27/2015
 SURFACE ELEVATION: 114.25 (ft)
 WATER DEPTH: N/A
 READING TAKEN: N/A
 HAMMER EFFICIENCY: N/A

DRILLING CONTRACTOR: National
 DRILLING METHOD: Sonic
 DRILL RIG: 400LS
 HAMMER TYPE: N/A
 SAMPLER TYPE & SIZE: Sonic Bag
 BOREHOLE DIAMETER: 4"
 BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
112	1														As directed by Magnus/Nordic JV, CAI personnel was not present with drillrig during drilling C032S. CAI logger Ryan H. logged bulk samples on 3/3/2015
111	2														
110	3														
109	4														
108	5														
107	6														
106	7														
105	8														
104	9														
103	10														
102	11														
101	12														
100	13														
99	14														
98	15														
97	16														
96	17														
95	18														
94	19														
93	20														
92	21														
91	22														
90	23														
	24														



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





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 BORING: C032S_2033+00
 ENTRY BY: RRH
 CHECKED BY: SHEET 1 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)		GRAPHIC LOG	DESCRIPTION	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)
88	26													
	27													
86	28													
	29													
84	30													
	31													
82	32													
	33													
80	34													
	35													
78	36													
	37													
76	38													
	39													
74	40													
	41													
72	42													
	43													
70	44													
	45													
68	46													
	47													
66	48													
	49													
64	50													
	51													
62	52													
	53													
60	54													
	55													



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ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS					
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE						
58	56																			
	57																			
56	58																			
	59																			
54	60																			
	61																			
52	62																			
	63																			
50	64																			
	65																			
48	66							Poorly graded SAND with CLAY (SP-SC); brown; moist; about 90% medium to fine SAND; low plasticity fines.												
	67																			
46	68							Poorly graded GRAVEL with CLAY and SAND (GP-GC); brown; moist; about 50% fine GRAVEL; about 40% coarse to fine SAND; low plasticity fines; stratified with 6 inch layers of Clayey Sand.												
	69																			
44	70																			
	71																			
42	72																			
	73																			
40	74																			
	75																			
38	76							CLAYEY SAND (SC); gray; moist; about 60% fine SAND; low plasticity fines.												
	77																			
36	78																			
	79																			
34	80							SILTY SAND (SM); gray; moist; about 80% fine SAND; nonplastic fines.												
	81																			
32	82							About 60% SAND.												
	83																			
30	84							SILTY SAND with GRAVEL (SM); gray; moist; about 25% fine GRAVEL; about 60% fine SAND; nonplastic fines.												
	85							Lean CLAY with SAND (CL); gray; moist; trace fine												



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ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
28	86						GRAVEL; about 15% fine SAND; low to medium plasticity fines; blocky structure.								
	87														
26	88						Medium plasticity fines.								
	89														
24	90						CLAYEY SAND (SC); gray; moist; about 60% fine SAND; low plasticity fines.								
	91														
22	92						About 70% SAND; blocky structure.								
	93														
20	94						SANDY SILT (ML); gray; moist; about 45% fine SAND; nonplastic fines; blocky structure.								
	95														
18	96						SANDY lean CLAY (CL); gray; moist; about 40% fine SAND; low plasticity fines; blocky structure.								
	97														
16	98						Bottom of borehole at 105.0 ft bgs								
	99														
14	100						Draft Log								
	101														
12	102														
	103														
10	104														
	105														
8	106														
	107														
6	108														
	109														
4	110														
	111														
2	112														
	113														
0	114														
	115														
-2	116														



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PROJECT NUMBER: 14-165.1
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 BORING: C032S_2033+00
 ENTRY BY: RRH
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LOG OF BORING C033S_2034+00

PROJECT NO: 14-165.1	BEGIN DATE: 2/26/2015	DRILLING CONTRACTOR: National, Driller Name: Josh
PROJECT: SBFCA-B&D Verif. Borings	COMPLETION DATE: 2/27/2015	DRILLING METHOD: Sonic
LOCATION: E. of Gridley	SURFACE ELEVATION: 114.08(ft)	DRILL RIG: Geoprobe 8140LC
CLIENT: Magnus/Nordic JV	SURFACE CONDITION: Gravel	HAMMER TYPE: N/A
LOGGED BY: NRA	WATER DEPTH: 33	SAMPLER TYPE & SIZE: Sonic Bag
DEPTH OF BORING: 105(ft)	READING TAKEN: 2/26/15	BOREHOLE DIAMETER: 6"
	HAMMER EFFICIENCY: N/A	BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY(%)	LABORATORY					REMARKS							
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE								
112	1							SANDY SILT (ML); dark brown; moist; about 45% fine SAND; about 55% nonplastic fines; Levee Fill.						Run #1: 0ft to 5ft bgs Recovery: 40%								
	2																					
	3																					
110	4																					
	5																					
108	6																					
	7																					
106	8																					
	9							SILTY SAND (SM); light brown; dry to moist; about 75% medium to fine SAND; about 25% nonplastic fines; Levee Fill.						Run #2: 5ft to 10ft bgs Recovery: 30%								
104	10																					
	11																					
102	12																					
	13							SILTY SAND (SM); dark brown; moist; about 60% medium to fine SAND; about 40% nonplastic fines.							Run #3: 10ft to 15ft bgs Recovery: 80%							
100	14																					
	15																					
98	16																					
	17																					
96	18																					
	19							Light brown; dry to moist; about 70% SAND; about 30% fines; weak cementation.							Run #4: 15ft to 20ft bgs Recovery: 90%							
94	20																					
	21																					
92	22																					
	23																					
90	24																					



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ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
88	26							(continued).							Run #6: 25ft to 30ft Recovery: 50%
86	28							SILTY SAND (SM); light brown; dry to moist; about 70% medium to fine SAND; about 30% nonplastic fines; weak cementation.							
84	30							No recovery from 30' to 37.5'.							Run #7: 30ft to 35ft Recovery: 0%
82	32														
80	34														
78	36														Run #8: 35ft to 40ft Recovery: 50%
76	38							SILTY SAND (SM); brown; wet; about 65% medium to fine SAND; about 35% nonplastic fines.							
74	40							SILTY SAND (SM); black; wet; about 75% medium to fine SAND; about 25% nonplastic fines; 5% organics, slight organic odor.							Run #9: 40ft to 45ft Recovery: 90%
72	42							Poorly graded SAND (SP); dark gray; wet; about 95% medium to fine SAND; about 5% fines; mica present.							
70	44							SILTY SAND (SM); black; wet; about 75% medium to fine SAND; about 25% nonplastic fines; 5% organics, slight organic odor.							Run #10: 45ft to 50ft Recovery: 100%
68	46							CLAYEY SAND with GRAVEL (SC); tannish green; moist; about 40% coarse to fine GRAVEL; about 40% coarse to fine SAND; about 20% medium plasticity fines.							
66	48							SILTY CLAY with SAND (CL-ML); olive tan; moist; about 15% fine SAND; about 85% low to medium plasticity fines.							
64	50														Run #11: 50ft to 55ft Recovery: 100%
62	52							Lean CLAY (CL); olive tan; moist; about 5% fine SAND; about 95% medium plasticity fines.							
60	54														
	55							No recovery from 55' to 58'.							Run #12: 55ft to 60ft



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C033S_2034+00
ENTRY BY: NRA
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ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
58	56														Recovery: 40%
57	58						Lean CLAY (CL); dark olive tan; moist; about 10% fine SAND; about 90% medium plasticity fines.								
56	60						No recovery from 60' to 65'.								Run #13: 60ft to 65ft Recovery: 0%
54	65						SILTY CLAY with SAND (CL-ML); dark olive tan; moist; about 20% fine SAND; about 80% low to medium plasticity fines.								Run #14: 65ft to 70ft Recovery: 100%
52	70						Two 2-inch interbeds of white ash.								
50	72						SILTY SAND with GRAVEL (SM); olive brown; moist to wet; about 40% coarse to fine GRAVEL, max. 2 in. dia.; about 40% coarse to fine SAND; about 20% nonplastic to low plasticity fines.								Run #15: 70ft to 75ft Recovery: 100%
48	75														Run #16: 75ft to 80ft Recovery: 90%
46	80														Run #17: 80ft to 85ft Recovery: 100%
44	82						Lean CLAY with SAND (CL); olive green; moist; about 5% coarse to fine GRAVEL; about 20% medium to fine SAND; about 75% medium plasticity fines; gravels may have been stroked into sample during drilling.								
42	85						SANDY SILT (ML); dark bluish gray; moist; about 40% fine SAND; about 60% nonplastic fines; weak cementation.								Run #18: 85ft to 90ft Recovery: 100%



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C033S_2034+00
ENTRY BY: NRA
CHECKED BY: SHEET 3 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS					
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE						
28	86																			
	87																			
26	88																			
	89																			
24	90																			
	91																			
22	92																			Run #19: 90ft to 95ft Recovery: 100%
	93																			
20	94																			
	95																			
18	96																			
	97																			
16	98																			
	99																			
14	100																			
	101																			
12	102																			
	103																			
10	104																			
	105																			
																				Bottom of borehole at 105.0 ft bgs
8	106																			Draft Log
	107																			
6	108																			
	109																			
4	110																			
	111																			
2	112																			
	113																			
0	114																			
	115																			
-2	116																			



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C033S_2034+00
ENTRY BY: NRA
CHECKED BY: SHEET 4 of 4

LOG OF BORING C034S_2035+00

PROJECT NO: 14-165.1	BEGIN DATE: 2/26/2015	DRILLING CONTRACTOR: National, Driller Name: Josh
PROJECT: SBFCA-B&D Verif. Borings	COMPLETION DATE: 2/26/2015	DRILLING METHOD: Sonic
LOCATION: E. of Gridley	SURFACE ELEVATION: 114.13(ft)	DRILL RIG: Geoprobe 8140LC
CLIENT: Magnus/Nordic JV	SURFACE CONDITION: Gravel	HAMMER TYPE: N/A
LOGGED BY: NRA	WATER DEPTH: 33	SAMPLER TYPE & SIZE: Sonic Bag
DEPTH OF BORING: 105(ft)	READING TAKEN: 2/26/15	BOREHOLE DIAMETER: 6"
	HAMMER EFFICIENCY: N/A	BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS					
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE						
112	1							SANDY SILT (ML); brown; moist; about 40% fine SAND; about 60% nonplastic fines; Levee Fill.					Run #1: 0ft to 5ft bgs Recovery: 10%							
	2																			
	3																			
110	4																			
	5																			
108	6																			
	7																			
106	8																			
	9																			
104	10																			
	11																			
102	12																			
	13																			
100	14						SILTY SAND (SM); light brown; dry to moist; about 60% fine SAND; about 40% nonplastic fines.													
	15						No recovery from 15' to 22'.													
98	16																			
	17																			
96	18																			
	19																			
94	20																			
	21																			
92	22																			
	23																			
90	24						SANDY SILT (ML); dark brown; moist; about 45% fine SAND; about 55% nonplastic fines.													



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 BORING: C034S_2035+00
 ENTRY BY: NRA
 CHECKED BY: SHEET 1 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY				REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	
88	26						SANDY SILT (ML) (continued).						Run #6: 25ft to 30ft Recovery: 20%
86	28												
84	30												
82	31						Poorly graded SAND (SP); light brown; dry; about 95% medium to fine SAND; about 5% fines; weak cementation.						Run #7: 30ft to 35ft Recovery: 60%
82	32						SILTY SAND (SM); brown; dry to moist; about 85% medium to fine SAND; about 15% nonplastic fines.						
80	33						No recovery from 33' to 35.5'.						
78	36						SILTY SAND (SM); brown; wet; about 65% medium to fine SAND; about 35% nonplastic fines.						Run #8: 35ft to 40ft Recovery: 80%
74	40						SILTY SAND (SM); black; wet; about 75% medium to fine SAND; about 25% nonplastic fines; approximately 5% organic material, slight organic odor.						Run #9: 40ft to 45ft Recovery: 80%
70	44						Poorly graded SAND (SP); dark gray; wet; about 95% coarse to fine SAND; about 5% fines.						Run #10: 45ft to 50ft Recovery: 93%
66	48						Lean CLAY with SAND (CL); hard; olive tan; moist; about 15% fine SAND; about 85% medium plasticity fines; magnesium oxide present.						Run #11: 50ft to 55ft Recovery: 100%
60	55						CLAYEY SILT with SAND (ML/CL); very stiff; olive tan;						Run #12: 55ft to 60ft



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BORING: C034S_2035+00
ENTRY BY: NRA
CHECKED BY: SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
58	56							moist; about 25% fine SAND; about 75% low plasticity fines.							Recovery: 100%
	57														
	58														
	59														
	60							No recovery from 60' to 64'.							Run #13: 60ft to 65ft Recovery: 20%
	61														
	62														
	63														
	64							SILTY CLAY (CL-ML); olive tan; moist; about 10% fine SAND; about 90% low to medium plasticity fines.							Run #14: 65ft to 70ft Recovery: 40%
	65														
	66														
	67							Poorly graded SAND with GRAVEL (SP); olive brown; wet; about 40% coarse to fine GRAVEL, max. 1.5 in. dia.; about 55% coarse to fine SAND; about 5% nonplastic to low plasticity fines.							
	68														
	69														
	70														Run #15: 70ft to 75ft Recovery: 90%
	71														
	72														
	73														
	74														
	75														
	76							Poorly graded GRAVEL with SILT and SAND (GP-GM); brownish gray; moist to wet; about 55% coarse to fine GRAVEL; about 35% coarse to fine SAND; about 10% nonplastic to low plasticity fines.							Run #16: 75ft to 80ft Recovery: 93%
	77														
	78														
	79														
	80														
	81														
	82							SANDY lean CLAY (CL); very stiff to hard; dark bluish gray; moist; about 35% coarse to fine SAND; about 65% medium plasticity fines; blocky structure.							
	83														
	84														
	85							SANDY lean CLAY (CL) (continued).							Run #18: 85ft to 90ft Recovery: 100%






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 BORING: C034S_2035+00
 ENTRY BY: NRA
 CHECKED BY: SHEET 3 of 4

LOG OF BORING C035S_2036+00

PROJECT NO: 14-165.1	BEGIN DATE: 2/25/2015	DRILLING CONTRACTOR: National, Driller Name: Josh
PROJECT: SBFCA-B&D Verif. Borings	COMPLETION DATE: 2/25/2015	DRILLING METHOD: Sonic
LOCATION: E. of Gridley	SURFACE ELEVATION: 114.5(ft)	DRILL RIG: Geoprobe 8140LC
CLIENT: Magnus/Nordic JV	SURFACE CONDITION: Gravel	HAMMER TYPE: N/A
LOGGED BY: NRA	WATER DEPTH: 33	SAMPLER TYPE & SIZE: Sonic Bag
DEPTH OF BORING: 105(ft)	READING TAKEN: 2/25/15	BOREHOLE DIAMETER: 6"
	HAMMER EFFICIENCY: N/A	BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY(%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
113	1							No recovery from 0' to 5'.							Drillers did not bag upper 15ft of material
109	5							SILTY SAND (SM); brown; dry to moist; about 55% fine SAND; about 45% nonplastic fines; Levee Fill.							
101	13							SANDY CLAYEY SILT (ML/CL); brown; dry to moist; about 40% fine SAND; about 60% low plasticity fines.							
99	15							No recovery from 15' to 20'.							Run #1: 15ft to 20ft bgs Recovery: 0%
95	20							SANDY CLAYEY SILT (ML/CL); brown; dry to moist; about 30% fine SAND; about 70% low plasticity fines.							Run #2: 20ft to 25ft Recovery: 90%
91	24														



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C035S_2036+00
 ENTRY BY: NRA
 CHECKED BY: SHEET 1 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
89	26							No recovery from 25' to 29'.							Run #3: 25ft to 30ft Recovery: 20%
85	30							SANDY CLAYEY SILT (ML/CL); brown; dry to moist; about 30% fine SAND; about 70% low plasticity fines.							Run #4: 30ft to 35ft Recovery: 83%
83	32							Poorly graded SAND (SP); light brown; dry to moist; about 95% medium to fine SAND; about 5% fines; micaceous.							
81	34							SILTY SAND (SM); greenish gray; wet; about 85% medium to fine SAND; about 15% nonplastic fines; micaceous.							Run #5: 35ft to 40ft Recovery: 60%
75	40							SILTY SAND (SM); dark gray to black; wet; about 80% medium to fine SAND; about 20% nonplastic fines; rootlets and rotting trees present, slight organic odor, approximately 5% organics.							Run #6: 40ft to 45ft Recovery: 90%
73	42							Poorly graded SAND (SP); dark gray to black; wet; about 95% medium to fine SAND; about 5% fines; rootlets and rotting trees present, slight organic odor, approximately 5% organics.							
71	44							SILTY SAND (SM); dark gray to black; wet; about 80% medium to fine SAND; about 20% nonplastic fines; rootlets and rotting trees present, slight organic odor, approximately 5% organics.							
69	45							Poorly graded GRAVEL (GP); greenish gray; wet; about 90% coarse to fine GRAVEL, max. 3 in. dia.; about 10% coarse to fine SAND; trace fines.							Run #7: 45ft to 50ft Recovery: 100%
67	47							Lean CLAY (CL); tannish olive green; moist; about 5% fine SAND; about 95% medium plasticity fines; blocky structure.							
63	53							CLAYEY SILT (ML/CL); reddish olive green; moist; about 10% fine SAND; about 90% nonplastic to low plasticity fines; blocky structure.							Run #8: 50ft to 55ft Recovery: 100%
61	55							No recovery from 55' to 63'.							Run #9: 55ft to 60ft



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ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
59	56														Recovery: 0%
	57														
57	58														
	59														
55	60														Run #10: 60ft to 65ft Recovery: 40%
	61														
53	62														
	63														
51	64						Lean CLAY (CL); tannish olive green; moist; about 5% fine SAND; about 95% medium plasticity fines; blocky structure.								
	65						Poorly graded SAND (SP); greenish brown; wet; about 95% coarse to fine SAND; about 5% fines.								Run #11: 65ft to 70ft Recovery: 100%
49	66														
	67														
47	68														
	69														
45	70						CLAYEY SAND with GRAVEL (SC); olive brown; moist; about 25% coarse to fine GRAVEL, max. 1.75 in. dia.; about 55% coarse to fine SAND; about 20% low to medium plasticity fines.								Run #12: 70ft to 75ft Recovery: 93%
	71														
43	72						Poorly graded GRAVEL with CLAY and SAND (GP-GC); olive brown; moist to wet; about 50% coarse to fine GRAVEL, max. 2 in. dia.; about 40% coarse to fine SAND; about 10% low to medium plasticity fines.								
	73														
41	74														
	75														
39	76														Run #13: 75ft to 80ft Recovery: 93%
	77														
37	78														
	79						Poorly graded GRAVEL with SILT and SAND (GP-GM); olive gray; moist to wet; about 60% coarse to fine GRAVEL, max. 2.25 in. dia.; about 30% coarse to fine SAND; about 10% nonplastic fines.								
35	80														
	81						Lean CLAY with SAND (CL); bluish gray; moist; about 15% medium to fine SAND; about 85% medium to high plasticity fines; slightly blocky structure.								Run #14: 80ft to 85ft Recovery: 90%
33	82														
	83														
31	84														
	85						SILTY SAND (SM); bluish dark gray; moist to wet; about 85% medium to fine SAND; about 15% nonplastic fines.								Run #15: 85ft to 90ft Recovery: 40%



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PROJECT NUMBER: 14-165.1
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BORING: C035S_2036+00
ENTRY BY: NRA
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ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE		
29	86							No recovery from 85' to 88'.								
	87															
27	88							SILTY SAND (SM); bluish dark gray; moist to wet; about 85% medium to fine SAND; about 15% nonplastic fines.								
	89							SANDY elastic SILT (MH); dark bluish gray; moist to wet; about 40% fine SAND; about 60% low plasticity fines; blocky structure.								Run #16: 90ft to 95ft Recovery: 100%
25	90															
	91															
23	92															
	93							1/16-inch white ash interbeds.								
21	94															
	95															Run #17: 95ft to 100ft Recovery: 80%
19	96															
	97															
17	98							SILTY SAND (SM); dark gray to black; wet; about 80% medium to fine SAND; about 20% nonplastic fines; weak to moderate cementation.								
	99															
15	100															
	101							Moist to wet; about 5% fine GRAVEL; about 70% SAND; about 25% fines.								Run #18: 100ft to 105ft Recovery: 60%
13	102															
	103															
11	104							Poorly graded SAND with SILT (SP-SM); dark gray to black; wet; trace fine GRAVEL; about 90% coarse to fine SAND; about 10% nonplastic fines; weak cementation.								
	105															
9	106							SILTY SAND (SM); dark gray to black; moist to wet; about 80% coarse to fine SAND; about 20% nonplastic fines; weak cementation.								
	107							Bottom of borehole at 105.0 ft bgs								
	108							Draft Log								
7	109															
	110															
5	111															
	112															
3	113															
	114															
1	115															
	116															



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 BORING: C035S_2036+00
 ENTRY BY: NRA
 CHECKED BY: SHEET 4 of 4

LOG OF BORING C036S_2137+00

PROJECT NO: 14-165.1	BEGIN DATE: 12/16/2014	DRILLING CONTRACTOR: National, Driller Name: C.J.
PROJECT: SBFCA-B&D Verif. Borings	COMPLETION DATE: 12/16/2014	DRILLING METHOD: Sonic
LOCATION: N. of Gridley	SURFACE ELEVATION: 123(ft)	DRILL RIG: 400LS
CLIENT: Magnus/Nordic JV	SURFACE CONDITION: Gravel	HAMMER TYPE: N/A
LOGGED BY: RRH	WATER DEPTH: N/A	SAMPLER TYPE & SIZE: Sonic Bag
DEPTH OF BORING: 113(ft)	READING TAKEN: N/A	BOREHOLE DIAMETER: 6"
	HAMMER EFFICIENCY: N/A	BACKFILL METHOD: Cement grout



ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY(%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
121	1														
119	2														
117	3														
115	4														
113	5														
111	6														
109	7														
107	8														
105	9														
103	10														
101	11														
99	12														
	13														
	14														
	15														
	16														
	17														
	18														
	19														
	20														
	21														
	22														
	23														
	24														



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 BORING: C036S_2137+00
 ENTRY BY: RRH
 CHECKED BY: SHEET 1 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)		GRAPHIC LOG	DESCRIPTION	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)
97	26													
	27													
95	28													
	29													
93	30													
	31													
91	32													
	33													
89	34													
	35													
87	36													
	37													
85	38													
	39													
83	40													
	41													
81	42													
	43													
79	44													
	45													
77	46													
	47													
75	48													
	49													
73	50													
	51													
71	52													
	53													
69	54													
	55													

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS				
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE					
67	56																		
	57																		
65	58																		
	59																		
63	60																		
	61																		
61	62																		
	63																		
59	64																		
	65																		
57	66																		
	67																		
55	68																		
	69																		
53	70																		
	71																		
51	72																		
	73																		
49	74																		
	75																		
47	76																		
	77																		
45	78																		
	79																		
43	80																		
	81																		
41	82																		
	83																		
39	84							CLAYEY GRAVEL with SAND (GC); light brown; moist; about 65% coarse to fine GRAVEL; about 20% coarse to medium SAND; low plasticity fines.											
	85							CLAYEY SAND (SC); light brown; moist; about 65% fine SAND; low plasticity fines; poorly to moderately											



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BORING: C036S_2137+00
ENTRY BY: RRH
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ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
37	86						Indurated.								
	87						Poorly graded SAND (SP); brown; wet; about 95% medium to fine SAND; nonplastic fines.								
35	88						Poorly graded SAND with SILT (SP-SM); brown; wet; about 90% medium to fine SAND; nonplastic fines.								
	89														
33	90						CLAYEY SAND with GRAVEL (SC); brown; moist; about 15% fine GRAVEL; about 65% coarse to fine SAND; nonplastic to low plasticity fines; moderate cementation.								
	91						Poorly graded SAND with SILT (SP-SM); dark brown; moist; about 90% fine SAND; nonplastic fines.								
31	92						CLAYEY SAND (SC); dark gray; moist; about 75% coarse to fine SAND; low plasticity fines.								
	93						Poorly graded SAND with CLAY (SP-SC); dark gray; moist; about 90% medium to fine SAND; low plasticity fines.								
29	94						CLAYEY SAND (SC); dark gray; moist; about 80% medium to fine SAND; low plasticity fines.								
	95						Lean CLAY (CL); dark gray; moist; about 5% fine SAND; low to medium plasticity fines; blocky structure.								
27	96														
	97														
25	98						SILTY SAND (SM); dark gray; moist; about 75% medium to fine SAND; nonplastic fines.								
	99						Poorly graded SAND with SILT (SP-SM); dark gray; moist; about 90% medium to fine SAND; nonplastic fines.								
23	100						CLAYEY GRAVEL (GC); gray; moist; about 60% coarse to fine GRAVEL; about 5% fine SAND; low plasticity fines; well indurated.								
	101						GRAVELLY lean CLAY (CL); yellowish brown; moist; about 30% coarse to fine GRAVEL; about 10% fine SAND; medium plasticity fines.								
21	102						SANDY lean CLAY (CL); gray; moist; about 30% coarse to fine SAND; medium plasticity fines.								
	103														
19	104						CLAYEY SAND with GRAVEL (SC); gray; moist; about 15% coarse to fine GRAVEL; about 45% coarse to fine SAND; low to medium plasticity fines.								
	105						CLAYEY SAND (SC); gray; wet; about 80% coarse to fine SAND; low to medium plasticity fines.								
17	106						SANDY lean CLAY (CL); gray; moist; about 25% coarse to fine GRAVEL; about 30% coarse to fine SAND; low plasticity fines; blocky structure.								
	107														
15	108						About 20% coarse to fine GRAVEL; about 55% medium to fine SAND.								
	109														
13	110														
	111														
11	112														
	113						Bottom of borehole at 113.0 ft bgs								
9	114						Draft Log								
	115														
7	116														



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C036S_2137+00
 ENTRY BY: RRH
 CHECKED BY: SHEET 4 of 4

LOG OF BORING C037S_2138+00

PROJECT NO: 14-165.1	BEGIN DATE: 12/16/2014	DRILLING CONTRACTOR: National, Driller Name: C.J.
PROJECT: SBFCA-B&D Verif. Borings	COMPLETION DATE: 12/16/2014	DRILLING METHOD: Sonic
LOCATION: N. of Gridley	SURFACE ELEVATION: 123(ft)	DRILL RIG: 400LS
CLIENT: Magnus/Nordic JV	SURFACE CONDITION: Gravel	HAMMER TYPE: N/A
LOGGED BY: RRH	WATER DEPTH: N/A	SAMPLER TYPE & SIZE: Sonic Bag
DEPTH OF BORING: 114(ft)	READING TAKEN: N/A	BOREHOLE DIAMETER: 6"
	HAMMER EFFICIENCY: N/A	BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY(%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
121	1														
119	2														
117	3														
115	4														
113	5														
111	6														
109	7														
107	8														
105	9														
103	10														
101	11														
99	12														
	13														
	14														
	15														
	16														
	17														
	18														
	19														
	20														
	21														
	22														
	23														
	24														



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C037S_2138+00
 ENTRY BY: RRH
 CHECKED BY: SHEET 1 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)		GRAPHIC LOG	DESCRIPTION	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)
97	26													
	27													
95	28													
	29													
93	30													
	31													
91	32													
	33													
89	34													
	35													
87	36													
	37													
85	38													
	39													
83	40													
	41													
81	42													
	43													
79	44													
	45													
77	46													
	47													
75	48													
	49													
73	50													
	51													
71	52													
	53													
69	54													
	55													



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C037S_2138+00
 ENTRY BY: RRH
 CHECKED BY: SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS				
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE					
67	56																		
	57																		
65	58																		
	59																		
63	60																		
	61																		
61	62																		
	63																		
59	64																		
	65																		
57	66																		
	67																		
55	68																		
	69																		
53	70																		
	71																		
51	72																		
	73																		
49	74																		
	75																		
47	76																		
	77																		
45	78																		
	79																		
43	80																		
	81																		
41	82																		
	83																		
39	84																		
	85																		

Well-graded GRAVEL with SAND (GW); brown; wet;
about 85% fine GRAVEL; about 15% coarse to medium
SAND; trace nonplastic fines.

Poorly graded GRAVEL with SAND (GP); brown; wet;

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
37	86						about 85% fine GRAVEL; about 15% coarse to medium SAND; trace nonplastic fines.								
	87						Coarse to fine GRAVEL.								
35	88						Poorly graded SAND with SILT (SP-SM); brown; wet; about 90% coarse to fine SAND; nonplastic fines.								
	89														
33	90						Trace coarse gravel.								
	91														
31	92						Poorly graded SAND with GRAVEL (SP); brown; wet; about 20% fine GRAVEL; about 75% coarse to fine SAND; nonplastic fines.								
	93														
29	94						CLAYEY SILT with SAND (ML/CL); black; moist; about 15% fine SAND; low plasticity fines.								
	95														
27	96						SILTY SAND (SM); brown; moist; about 75% fine SAND; nonplastic to low plasticity fines.								
	97														
25	98						Lean CLAY with SAND (CL); brown; moist; about 25% fine SAND; low plasticity fines.								
	99														
23	100						Lean CLAY (CL); brown; moist; trace fine GRAVEL; about 10% fine SAND; low to medium plasticity fines; slightly blocky structure.								
	101						Gray.								
21	102						GRAVELLY lean CLAY (CL); gray; moist; about 35% coarse to fine GRAVEL; about 5 to 10% fine SAND; low to medium plasticity fines.								
	103														
19	104						Medium plasticity fines.								
	105														
17	106						CLAYEY GRAVEL (GC); gray; wet; about 65% coarse to fine GRAVEL; about 10% fine SAND; low plasticity fines.								
	107														
15	108						CLAYEY SAND with GRAVEL (SC); gray; wet; about 25% fine GRAVEL; about 50% medium to fine SAND; low plasticity fines.								
	109														
13	110						SILTY SAND (SM); grayish brown; wet; about 75% medium to fine SAND; nonplastic fines.								
	111														
11	112						Bottom of borehole at 114.0 ft bgs								
	113														
9	114						Draft Log								
	115														
7	116														



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C037S_2138+00
ENTRY BY: RRH
CHECKED BY: SHEET 4 of 4

LOG OF BORING C038S

PROJECT NO: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 LOCATION: N. of Gridley
 CLIENT: Magnus
 LOGGED BY: JJW/SML
 DEPTH OF BORING: 113 (ft)

BEGIN DATE: 12/15/2014
 COMPLETION DATE: 12/15/2014
 SURFACE ELEVATION: (ft)
 SURFACE CONDITION: Sandy Silt
 WATER DEPTH: N/A
 READING TAKEN: N/A
 HAMMER EFFICIENCY:

DRILLING CONTRACTOR: National
 DRILLING METHOD: Rotary Percussion
 DRILL RIG: Sonic
 HAMMER TYPE: N/A
 SAMPLER TYPE & SIZE: Sonic - Bulk
 BOREHOLE DIAMETER: 6"
 BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
1	1		1					100							
2	2							SILTY SAND with GRAVEL (SM); brown; dry to moist; about 20% coarse to fine GRAVEL; medium to fine SAND; about 30% nonplastic to low plasticity fines.							
3	3		2					SANDY SILT (ML); brown; dry to moist; about 35% medium to fine SAND; nonplastic to low plasticity fines.	100						
4	4														
5	5		3					SILTY SAND with GRAVEL (SM); brown; dry to moist; about 20% coarse to fine GRAVEL; medium to fine SAND; about 30% nonplastic to low plasticity fines.	100						
6	6														
7	7		4					SANDY SILT (ML); brown; dry to moist; about 35% medium to fine SAND; nonplastic to low plasticity fines.	100						
8	8														
9	9														
10	10														
11	11														
12	12		5				SILT with SAND (ML); dark brown; moist; about 25% fine SAND; low plasticity fines.	100							
13	13														
14	14														
15	15														
16	16		6				About 30% coarse to fine GRAVEL; about 20% fine SAND; nonplastic to low plasticity fines. No gravel.	100							
17	17														
18	18														
19	19														
20	20														
21	21		7				SILTY SAND (SM); dark brown; dry to moist; medium to fine SAND; about 20% nonplastic fines.	100							
22	22														
23	23		8				SANDY SILT (ML); brown; moist; about 40% fine SAND; nonplastic to low plasticity fines.	100							
24	24		9				About 50% fine SAND; about 50% nonplastic to low plasticity fines.	100							



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C038S
 ENTRY BY: JJW
 CHECKED BY: SHEET 1 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY				REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)
26			10				Poorly graded SAND (SP); yellowish brown; dry; medium to fine SAND; about 5% nonplastic fines.	100						
27			11				Poorly graded GRAVEL with SAND and COBBLES (GP); light yellowish brown; dry; about 5% COBBLES; coarse to fine GRAVEL; about 35% coarse to medium SAND; about 5% nonplastic fines.	100						
29			12				Dark brown; wet; about 10% COBBLES; about 30% coarse to medium SAND.	69						
30														
31														
32														
33														
34														
35														
36														
37														
38														
39														
40														
41														
42														
43														
44														
45			13					75						
46														
47														
48														
49														
50														
51														
52														
53														
54														
55			14				About 25% COBBLES; about 25% coarse to medium	100						



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C038S
ENTRY BY: JJW
CHECKED BY: SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)		% PASSING 200 SIEVE
56			14				SAND.	100							
57															
58															
59			15				About 35% coarse to medium SAND; no cobbles.	100							
60															
61															
62															
63															
64															
65			16				About 20% coarse to medium SAND; trace chunks of oxidized decomposed gravel.	100							
66															
67															
68															
69			17				Poorly graded SAND with SILT and GRAVEL (SP-SM); dark brown; wet; about 40% coarse to fine GRAVEL; coarse to medium SAND; about 10% nonplastic fines.	100							
70															
71															
72															
73															
74															
75			18				Lean CLAY (CL); yellowish brown; moist to wet; about 10% fine SAND; medium plasticity fines; weak to moderate cementation.	100							
76															
77															
78			19				SILTY, CLAYEY SAND (SC-SM); dark brown; wet; fine SAND; about 40% low plasticity fines; moderate cementation.	100							
79			20				SANDY SILT (ML); brown; wet; about 45% fine SAND; nonplastic to low plasticity fines; weak to moderate cementation.	100							
80															
81			21				CLAYEY SILT with SAND (ML/CL); yellowish brown; moist; about 10 to 15% fine SAND; low to medium plasticity fines; moderate cementation; oxidized speckles.	100							
82															
83			22				SANDY SILT (ML); brown; wet; about 45% fine SAND; nonplastic to low plasticity fines; weak to moderate cementation.	100							
84															
85			23				CLAYEY SILT with SAND (ML/CL); brown; moist; about 20 to 25% fine SAND; low plasticity fines; moderate	100							



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C038S
ENTRY BY: JJW
CHECKED BY: SHEET 3 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)		% PASSING 200 SIEVE
86			23				cementation.	100							
87															
88															
89															
90			24				Lean CLAY (CL); brown; moist; about 5% fine SAND; medium plasticity fines.	100							
91			25				SANDY SILT (ML); brown; moist; about 30% fine SAND; low plasticity fines; moderate cementation.	100							
92							5" lense of Silty Sand.								
93			26				SILTY SAND (SM); dark gray; wet; fine SAND; about 20 to 25% nonplastic fines.	100							
94															
95															
96															
97							Weak cementation.								
98			27				SANDY SILT (ML); dark brown; moist to wet; about 40% medium to fine SAND; nonplastic to low plasticity fines; moderate cementation.	100							
99															
100			28				Weak cementation.	100							
101															
102															
103															
104															
105			29				Lean CLAY (CL); greenish blue; moist; about 5% fine GRAVEL; about 10% fine SAND; medium plasticity fines; weak to moderate cementation.	100							
106			30				GRAVELLY lean CLAY with SAND (CL); greenish blue; moist; about 30% coarse to fine GRAVEL; about 15% medium to fine SAND; medium plasticity fines.	100							
107			31				SANDY lean CLAY (CL); dark bluish gray; moist; about 5% fine GRAVEL; about 40% coarse to fine SAND; medium plasticity fines; weak to moderate cementation.	100							
108															
109															
110			32				CLAYEY GRAVEL with SAND (GC); dark bluish gray; moist; coarse to fine GRAVEL; about 15% coarse to fine SAND; about 35% low to medium plasticity fines.	100							
111															
112			33				SANDY lean CLAY (CL); dark bluish brown; moist; about 30% medium to fine SAND; medium plasticity fines; weak to moderate cementation.	100							
113							Bottom of borehole at 113.0 ft bgs								
114							Draft Log								
115															
116															



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C038S
 ENTRY BY: JJW
 CHECKED BY: SHEET 4 of 4

LOG OF BORING C039S_2140+00

PROJECT NO: 14-165.1	BEGIN DATE: 12/17/2014	DRILLING CONTRACTOR: National, Driller Name: C.J.
PROJECT: SBFCA-B&D Verif. Borings	COMPLETION DATE: 12/17/2014	DRILLING METHOD: Sonic
LOCATION: N. of Gridley	SURFACE ELEVATION: 123(ft)	DRILL RIG: 400LS
CLIENT: Magnus/Nordic JV	SURFACE CONDITION: Pavement	HAMMER TYPE: N/A
LOGGED BY: RRH	WATER DEPTH: N/A	SAMPLER TYPE & SIZE: Sonic Bag
DEPTH OF BORING: 113(ft)	READING TAKEN: N/A	BOREHOLE DIAMETER: 6"
	HAMMER EFFICIENCY: N/A	BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY(%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
121	1														
119	2														
117	3														
115	4														
113	5														
111	6														
109	7														
107	8														
105	9														
103	10														
101	11														
99	12														
	13														
	14														
	15														
	16														
	17														
	18														
	19														
	20														
	21														
	22														
	23														
	24														



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C039S_2140+00
ENTRY BY: RRH
CHECKED BY: SHEET 1 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)		GRAPHIC LOG	DESCRIPTION	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)
97	26													
	27													
95	28													
	29													
93	30													
	31													
91	32													
	33													
89	34													
	35													
87	36													
	37													
85	38													
	39													
83	40													
	41													
81	42													
	43													
79	44													
	45													
77	46													
	47													
75	48													
	49													
73	50													
	51													
71	52													
	53													
69	54													
	55													



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C039S_2140+00
 ENTRY BY: RRH
 CHECKED BY: SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS				
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE					
67	56																		
	57																		
65	58																		
	59																		
63	60																		
	61																		
61	62																		
	63																		
59	64																		
	65																		
57	66																		
	67																		
55	68																		
	69																		
53	70																		
	71																		
51	72																		
	73																		
49	74																		
	75																		
47	76																		
	77																		
45	78																		
	79																		
43	80																		
	81																		
41	82																		
	83																		
39	84						Lean CLAY with SAND (CL); light brown; moist; about 15% fine SAND; about 85% medium plasticity fines; slightly blocky structure.												
	85						Brown; slightly blocky to blocky structure. Lean CLAY with SAND (CL) (continued).												

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS					
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE						
37	86																			
	87																			
35	88																			
	89																			
33	90																			
	91																			
31	92																			
	93																			
29	94																			
	95																			
27	96																			
	97																			
25	98																			
	99																			
23	100																			
	101																			
21	102																			
	103																			
19	104																			
	105																			
17	106																			
	107																			
15	108																			
	109																			
13	110																			
	111																			
11	112																			
	113																			
9	114																			
	115																			
7	116																			

LOG OF BORING C040S_2141+00

PROJECT NO: 14-165.1	BEGIN DATE: 12/18/2014	DRILLING CONTRACTOR: National, Driller Name: C.J.
PROJECT: SBFCA-B&D Verif. Borings	COMPLETION DATE: 12/18/2014	DRILLING METHOD: Sonic
LOCATION: N. of Gridley	SURFACE ELEVATION: 123(ft)	DRILL RIG: 400LS
CLIENT: Magnus/Nordic JV	SURFACE CONDITION: Pavement	HAMMER TYPE: N/A
LOGGED BY: RHL/JJW	WATER DEPTH: N/A	SAMPLER TYPE & SIZE: Sonic Bag
DEPTH OF BORING: 113(ft)	READING TAKEN: N/A	BOREHOLE DIAMETER: 6"
	HAMMER EFFICIENCY: N/A	BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY(%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
121	1														
119	2														
117	3														
115	4														
113	5														
111	6														
109	7														
107	8														
105	9														
103	10														
101	11														
99	12														



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C040S_2141+00
ENTRY BY: JJW
CHECKED BY: SHEET 1 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)		GRAPHIC LOG	DESCRIPTION	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)
97	26													
	27													
95	28													
	29													
93	30													
	31													
91	32													
	33													
89	34													
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87	36													
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85	38													
	39													
83	40													
	41													
81	42													
	43													
79	44													
	45													
77	46													
	47													
75	48													
	49													
73	50													
	51													
71	52													
	53													
69	54													
	55													



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C040S_2141+00
ENTRY BY: JJW
CHECKED BY: SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS					
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE						
67	56																			
	57																			
65	58																			
	59																			
63	60																			
	61																			
61	62																			
	63																			
59	64																			
	65																			
57	66																			
	67																			
55	68																			
	69																			
53	70																			
	71																			
51	72																			
	73																			
49	74																			
	75																			
47	76																			
	77																			
45	78																			
	79																			
43	80																			
	81																			
41	82																			
	83																			
39	84						Lean CLAY with SAND (CL); brown; moist; about 15 to 30% fine SAND; low to medium plasticity fines; poorly indurated.													
	85						Lean CLAY with SAND (CL) (continued).													



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C040S_2141+00
ENTRY BY: JJW
CHECKED BY: SHEET 3 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS				
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE					
37	86																		
	87							Light brown.											
35	88							Brown.											
	89																		
33	90							SANDY SILT (ML); light brown; moist; about 30 to 45% fine SAND; low plasticity fines; poorly indurated.											
	91																		
31	92							SILTY SAND (SM); brown; moist to wet; fine SAND; about 30% nonplastic to low plasticity fines; Few weakly cemented chunks. Gradually grades to 15% at approximately 95.5'.											
	93																		
29	94																		
	95																		
27	96							Poorly graded SAND with SILT (SP-SM); brown; moist to wet; medium to fine SAND; about 10% nonplastic fines.											
	97																		
25	98							SILTY SAND (SM); brown; moist to wet; fine SAND; about 20 to 30% nonplastic to low plasticity fines.											
	99																		
23	100							Poorly graded SAND (SP); dark gray; moist to wet; coarse to fine SAND; about 5% nonplastic fines.											
	101																		
21	102																		
	103																		
19	104							SILTY CLAY with SAND (CL-ML); layered reddish & yellowish brown; moist; about 15 to 30% fine SAND; low to medium plasticity fines; weak cementation; slightly blocky structure.											
	105																		
17	106																		
	107							Brown; moist; blocky structure.											
15	108																		
	109																		
13	110																		
	111							Dark brown.											
11	112																		
	113							Bottom of borehole at 113.0 ft bgs											
9	114							Draft Log											
	115																		
7	116																		

LOG OF BORING C041S_2142+00

PROJECT NO: 14-165.1	BEGIN DATE: 12/18/2014	DRILLING CONTRACTOR: National, Driller Name: C.J.
PROJECT: SBFCA-B&D Verif. Borings	COMPLETION DATE: 12/18/2014	DRILLING METHOD: Sonic
LOCATION: N. of Gridley	SURFACE ELEVATION: 123(ft)	DRILL RIG: 400LS
CLIENT: Magnus/Nordic JV	SURFACE CONDITION: Pavement	HAMMER TYPE: N/A
LOGGED BY: RRH	WATER DEPTH: N/A	SAMPLER TYPE & SIZE: Sonic Bag
DEPTH OF BORING: 113(ft)	READING TAKEN: N/A	BOREHOLE DIAMETER: 6"
	HAMMER EFFICIENCY: N/A	BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY(%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
	1														
121	2														
	3														
119	4														
	5														
117	6														
	7														
115	8														
	9														
113	10														
	11														
111	12														
	13														
109	14														
	15														
107	16														
	17														
105	18														
	19														
103	20														
	21														
101	22														
	23														
99	24														



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C041S_2142+00
 ENTRY BY: RRH
 CHECKED BY: SHEET 1 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					RECOVERY (%)	LABORATORY					REMARKS		
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)		GRAPHIC LOG	DESCRIPTION	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)	% PASSING 200 SIEVE
97	26														
	27														
95	28														
	29														
93	30														
	31														
91	32														
	33														
89	34														
	35														
87	36														
	37														
85	38														
	39														
83	40														
	41														
81	42														
	43														
79	44														
	45														
77	46														
	47														
75	48														
	49														
73	50														
	51														
71	52														
	53														
69	54														
	55														



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C041S_2142+00
ENTRY BY: RRH
CHECKED BY: SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS					
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE						
67	56																			
	57																			
65	58																			
	59																			
63	60																			
	61																			
61	62																			
	63																			
59	64																			
	65																			
57	66																			
	67																			
55	68																			
	69																			
53	70																			
	71																			
51	72																			
	73																			
49	74																			
	75																			
47	76																			
	77																			
45	78																			
	79																			
43	80																			
	81																			
41	82																			
	83																			
39	84							Lean CLAY with SAND (CL); reddish brown; moist; about 15% fine SAND; low plasticity fines.												
	85							Poorly graded SAND with CLAY (SP-SC); yellowish brown; moist; about 90% medium to fine SAND; low												



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C041S_2142+00
 ENTRY BY: RRH
 CHECKED BY: SHEET 3 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE		
37	86							plasticity fines.								
	87															
35	88															
	89															
33	90							Poorly graded SAND (SP); dark brown; moist; about 95% medium to fine SAND; low plasticity fines.								
	91															
31	92							Poorly graded SAND with CLAY (SP-SC); yellowish brown; moist; about 90% medium to fine SAND; low plasticity fines.								
	93															
29	94							CLAYEY SAND (SC); yellowish brown; moist; about 70% coarse to fine SAND; low plasticity fines.								
	95							Poorly graded SAND (SP); dark yellowish brown; moist; about 95% fine SAND; low plasticity fines.								
27	96							CLAYEY SAND with GRAVEL (SC); brown; moist; about 15% fine GRAVEL; about 60% medium to fine SAND; low plasticity fines.								
	97															
25	98							SANDY lean CLAY with GRAVEL (CL); brown; moist; about 15% fine GRAVEL; about 40% medium to fine SAND; low plasticity fines.								
	99															
23	100							CLAYEY GRAVEL (GC); grayish brown; moist; about 60% coarse to fine GRAVEL; about 5% fine SAND; low to medium plasticity fines. Dark yellowish brown.								
	101															
21	102							Dark olive brown.								
	103															
19	104															
	105							Lean CLAY (CL); dark gray; moist; trace fine GRAVEL; about 10% fine SAND; low to medium plasticity fines.								
17	106															
	107															
15	108							Wet.								
	109															
13	110							Well-graded GRAVEL (GW); brown; wet; about 70% coarse to fine GRAVEL; about 25% coarse to fine SAND; nonplastic fines.								
	111															
11	112															
	113							Bottom of borehole at 113.0 ft bgs								
9	114							Draft Log								
	115															
7	116															



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C041S_2142+00
 ENTRY BY: RRH
 CHECKED BY: SHEET 4 of 4

LOG OF BORING C042S_2143+00

PROJECT NO: 14-165.1	BEGIN DATE: 12/19/2014	DRILLING CONTRACTOR: National, Driller Name: C.J.
PROJECT: SBFCA-B&D Verif. Borings	COMPLETION DATE: 12/19/2014	DRILLING METHOD: Sonic
LOCATION: N. of Gridley	SURFACE ELEVATION: 123(ft)	DRILL RIG: 400LS
CLIENT: Magnus/Nordic JV	SURFACE CONDITION: Pavement	HAMMER TYPE: N/A
LOGGED BY: RHL/JJW	WATER DEPTH: N/A	SAMPLER TYPE & SIZE: Sonic Bag
DEPTH OF BORING: 113(ft)	READING TAKEN: N/A	BOREHOLE DIAMETER: 6"
	HAMMER EFFICIENCY: N/A	BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY(%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
121	1														
119	2														
117	3														
115	4														
113	5														
111	6														
109	7														
107	8														
105	9														
103	10														
101	11														
99	12														



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C042S_2143+00
 ENTRY BY: JJW
 CHECKED BY: SHEET 1 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)		GRAPHIC LOG	DESCRIPTION	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)
97	26													
	27													
95	28													
	29													
93	30													
	31													
91	32													
	33													
89	34													
	35													
87	36													
	37													
85	38													
	39													
83	40													
	41													
81	42													
	43													
79	44													
	45													
77	46													
	47													
75	48													
	49													
73	50													
	51													
71	52													
	53													
69	54													
	55													



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C042S_2143+00
ENTRY BY: JJW
CHECKED BY: SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS					
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE						
67	56																			
	57																			
65	58																			
	59																			
63	60																			
	61																			
61	62																			
	63																			
59	64																			
	65																			
57	66																			
	67																			
55	68																			
	69																			
53	70																			
	71																			
51	72																			
	73																			
49	74																			
	75																			
47	76																			
	77																			
45	78																			
	79																			
43	80																			
	81																			
41	82																			
	83																			
39	84						Lean CLAY with SAND (CL); reddish brown; moist; about 15 to 25% fine SAND; low to medium plasticity fines; poorly indurated chunks.													
	85						SANDY SILT (ML/SM); brown; moist to wet; about 50% fine SAND; about 50% nonplastic to low plasticity fines.													

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS				
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE					
37	86																		
	87																		
35	88																		
	89																		
33	90																		
	91																		
31	92																		
	93																		
29	94																		
	95																		
27	96																		
	97																		
25	98																		
	99																		
23	100																		
	101																		
21	102																		
	103																		
19	104																		
	105																		
17	106																		
	107																		
15	108																		
	109																		
13	110																		
	111																		
11	112																		
	113																		
9	114																		
	115																		
7	116																		

LOG OF BORING C043S_2144+00

PROJECT NO: 14-165.1	BEGIN DATE: 12/19/2014	DRILLING CONTRACTOR: National, Driller Name: C.J.
PROJECT: SBFCA-B&D Verif. Borings	COMPLETION DATE: 12/19/2014	DRILLING METHOD: Sonic
LOCATION: N. of Gridley	SURFACE ELEVATION: 123(ft)	DRILL RIG: 400LS
CLIENT: Magnus/Nordic JV	SURFACE CONDITION: Pavement	HAMMER TYPE: N/A
LOGGED BY: RHL/JJW	WATER DEPTH: N/A	SAMPLER TYPE & SIZE: Sonic Bag
DEPTH OF BORING: 113(ft)	READING TAKEN: N/A	BOREHOLE DIAMETER: 6"
	HAMMER EFFICIENCY: N/A	BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY(%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
121	1														
119	2														
117	3														
115	4														
113	5														
111	6														
109	7														
107	8														
105	9														
103	10														
101	11														
99	12														



**Crawford
& Associates, Inc.**
Geotechnical Engineering, Design
and Construction Services

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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C043S_2144+00
ENTRY BY: JJW
CHECKED BY: SHEET 1 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)		GRAPHIC LOG	DESCRIPTION	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)
97	26													
	27													
95	28													
	29													
93	30													
	31													
91	32													
	33													
89	34													
	35													
87	36													
	37													
85	38													
	39													
83	40													
	41													
81	42													
	43													
79	44													
	45													
77	46													
	47													
75	48													
	49													
73	50													
	51													
71	52													
	53													
69	54													
	55													



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C043S_2144+00
 ENTRY BY: JJW
 CHECKED BY: SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS			
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE				
67	56																	
	57																	
65	58																	
	59																	
63	60																	
	61																	
61	62																	
	63																	
59	64																	
	65																	
57	66																	
	67																	
55	68																	
	69																	
53	70																	
	71																	
51	72																	
	73																	
49	74																	
	75																	
47	76																	
	77																	
45	78																	
	79																	
43	80																	
	81																	
41	82																	
	83																	
39	84						SANDY SILT (ML); reddish brown; moist; about 35 to 45% fine SAND; low plasticity fines; poorly indurated chunks.											
	85						SILTY SAND (SM); brown; moist; fine SAND; about 15 to 25% nonplastic to low plasticity fines.											

ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY				REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)
37	86													
	87													
35	88													
	89													
33	90													
	91													
31	92						GRAVELLY lean CLAY (CL); grayish brown; moist; about 30 to 40% coarse to fine GRAVEL; about 10 to 15% fine SAND; low to medium plasticity fines; indurated chunks.							
	93													
29	94													
	95													
27	96													
	97													
25	98													
	99													
23	100													
	101													
21	102						Lean CLAY with GRAVEL (CL); grayish brown; moist; about 15 to 25% coarse to fine GRAVEL; about 10 to 15% fine SAND; low to medium plasticity fines; indurated chunks.							
	103													
19	104													
	105													
17	106													
	107													
15	108													
	109													
13	110													
	111													
11	112						SILTY SAND (SM); dark gray; moist; fine SAND; about 35 to 45% nonplastic to low plasticity fines; moderately cemented chunks.							
	113						Bottom of borehole at 113.0 ft bgs							
9	114						Draft Log							
	115													
7	116													



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C043S_2144+00
 ENTRY BY: JJW
 CHECKED BY: SHEET 4 of 4

LOG OF BORING C044S_2145+00

PROJECT NO: 14-165.1	BEGIN DATE: 12/22/2014	DRILLING CONTRACTOR: National, Driller Name: C.J.
PROJECT: SBFCA-B&D Verif. Borings	COMPLETION DATE: 12/22/2014	DRILLING METHOD: Sonic
LOCATION: N. of Gridley	SURFACE ELEVATION: 123(ft)	DRILL RIG: 400LS
CLIENT: Magnus/Nordic JV	SURFACE CONDITION: Pavement	HAMMER TYPE: N/A
LOGGED BY: RRH	WATER DEPTH: N/A	SAMPLER TYPE & SIZE: Sonic Bag
DEPTH OF BORING: 113(ft)	READING TAKEN: N/A	BOREHOLE DIAMETER: 6"
	HAMMER EFFICIENCY: N/A	BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY(%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
121	1														
119	2														
117	3														
115	4														
113	5														
111	6														
109	7														
107	8														
105	9														
103	10														
101	11														
99	12														
	13														
	14														
	15														
	16														
	17														
	18														
	19														
	20														
	21														
	22														
	23														
	24														



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C044S_2145+00
 ENTRY BY: RRH
 CHECKED BY: SHEET 1 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)		GRAPHIC LOG	DESCRIPTION	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)
97	26													
	27													
95	28													
	29													
93	30													
	31													
91	32													
	33													
89	34													
	35													
87	36													
	37													
85	38													
	39													
83	40													
	41													
81	42													
	43													
79	44													
	45													
77	46													
	47													
75	48													
	49													
73	50													
	51													
71	52													
	53													
69	54													
	55													



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C044S_2145+00
 ENTRY BY: RRH
 CHECKED BY: SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS			
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE				
67	56																	
	57																	
65	58																	
	59																	
63	60																	
	61																	
61	62																	
	63																	
59	64																	
	65																	
57	66																	
	67																	
55	68																	
	69																	
53	70																	
	71																	
51	72																	
	73																	
49	74																	
	75																	
47	76																	
	77																	
45	78																	
	79																	
43	80																	
	81																	
41	82																	
	83																	
39	84						SILTY SAND (SM); light brown; moist; about 65% fine SAND; nonplastic fines.											
	85						SILTY SAND (SM) (continued).											



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C044S_2145+00
 ENTRY BY: RRH
 CHECKED BY: SHEET 3 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY				REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)
37	86						Poorly graded SAND with CLAY (SP-SC); yellowish brown; moist; about 90% medium to fine SAND; low plasticity fines.							
	87						Poorly graded GRAVEL with SAND (GP); brown; moist; about 50% fine GRAVEL; about 45% medium to fine SAND; low plasticity fines.							
35	88						SANDY lean CLAY with GRAVEL (CL); brown; wet; about 15% fine GRAVEL; about 30% fine SAND; low plasticity fines.							
	89						Poorly graded SAND with SILT (SP-SM); brown; moist; about 10% fine GRAVEL; about 80% fine SAND; nonplastic fines.							
33	90						CLAYEY GRAVEL (GC); grayish brown; moist; about 50% coarse to fine GRAVEL; about 15% medium to fine SAND; low plasticity fines.							
	91													
31	92													
	93													
29	94													
	95						About 65% coarse to fine GRAVEL; about 10% medium to fine SAND; low plasticity fines.							
27	96													
	97													
25	98						Poorly graded GRAVEL with CLAY (GP-GC); gray; moist; about 65% coarse to fine GRAVEL; about 25% coarse to fine SAND; low to medium plasticity fines.							
	99													
23	100													
	101													
21	102													
	103													
19	104													
	105						CLAYEY GRAVEL (GC); gray; moist; about 50% coarse to fine GRAVEL; about 20% coarse to fine SAND; low plasticity fines.							
17	106													
	107													
15	108													
	109													
13	110						Lean CLAY with GRAVEL (CL); dark gray; moist; about 10% fine GRAVEL; about 10% coarse to fine SAND; low to medium plasticity fines.							
	111													
11	112						SANDY SILT (ML); dark gray; wet; about 40% fine SAND; nonplastic fines.							
	113						Bottom of borehole at 113.0 ft bgs							
9	114						Draft Log							
	115													
7	116													



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C044S_2145+00
 ENTRY BY: RRH
 CHECKED BY: SHEET 4 of 4

LOG OF BORING C045S_2146+00

PROJECT NO: 14-165.1	BEGIN DATE: 12/22/2014	DRILLING CONTRACTOR: National, Driller Name: C.J.
PROJECT: SBFCA-B&D Verif. Borings	COMPLETION DATE: 12/22/2014	DRILLING METHOD: Sonic
LOCATION: N. of Gridley	SURFACE ELEVATION: 123(ft)	DRILL RIG: 400LS
CLIENT: Magnus/Nordic JV	SURFACE CONDITION: Pavement	HAMMER TYPE: N/A
LOGGED BY: RRH	WATER DEPTH: N/A	SAMPLER TYPE & SIZE: Sonic Bag
DEPTH OF BORING: 113(ft)	READING TAKEN: N/A	BOREHOLE DIAMETER: 6"
	HAMMER EFFICIENCY: N/A	BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY(%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
121	1														
119	2														
117	3														
115	4														
113	5														
111	6														
109	7														
107	8														
105	9														
103	10														
101	11														
99	12														
	13														
	14														
	15														
	16														
	17														
	18														
	19														
	20														
	21														
	22														
	23														
	24														



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C045S_2146+00
 ENTRY BY: JJW
 CHECKED BY: SHEET 1 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)		GRAPHIC LOG	DESCRIPTION	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)
97	26													
	27													
95	28													
	29													
93	30													
	31													
91	32													
	33													
89	34													
	35													
87	36													
	37													
85	38													
	39													
83	40													
	41													
81	42													
	43													
79	44													
	45													
77	46													
	47													
75	48													
	49													
73	50													
	51													
71	52													
	53													
69	54													
	55													



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C045S_2146+00
ENTRY BY: JJW
CHECKED BY: SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS				
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE					
67	56																		
	57																		
65	58																		
	59																		
63	60																		
	61																		
61	62																		
	63																		
59	64																		
	65																		
57	66																		
	67																		
55	68																		
	69																		
53	70																		
	71																		
51	72																		
	73																		
49	74																		
	75																		
47	76																		
	77																		
45	78																		
	79																		
43	80																		
	81																		
41	82																		
	83																		
39	84						Lean CLAY with SAND (CL); yellowish brown; moist; about 15 to 25% fine SAND; low to medium plasticity fines.												
	85						Lean CLAY with SAND (CL) (continued).												



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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C045S_2146+00
ENTRY BY: JJW
CHECKED BY: SHEET 3 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
37	86						GRAVELLY lean CLAY with SAND (CL); brown; moist; about 30 to 40% coarse to fine GRAVEL; about 15 to 25% fine SAND; low to medium plasticity fines.								
	87														
35	88						Lean CLAY with GRAVEL (CL); grayish brown; moist; about 20 to 30% fine GRAVEL; about 15 to 25% fine SAND; low to medium plasticity fines.								
	89														
33	90						Well-graded GRAVEL with SAND (GW); grayish brown; wet; coarse to fine GRAVEL; about 15 to 25% medium to fine SAND; about 5% nonplastic fines.								
	91														
31	92						Poorly graded SAND with GRAVEL (SP); gray; moist to wet; about 30% GRAVEL.								
	93														
29	94						Interbedded layers of approximately 1-inch to 1.5-inch of (SP) and (GP).								
	95														
27	96						Lean CLAY with SAND (CL); light gray; moist; about 15% SAND; low to medium plasticity fines; slightly blocky structure.								
	97														
25	98						CLAYEY SAND (SC); dark gray; moist; about 30 to 45% low to medium plasticity fines; blocky structure.								
	99														
23	100						Bottom of borehole at 113.0 ft bgs								
	101														
21	102						Draft Log								
	103														
19	104														
	105														
17	106														
	107														
15	108														
	109														
13	110														
	111														
11	112														
	113														
9	114														
	115														
7	116														



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C045S_2146+00
 ENTRY BY: JJW
 CHECKED BY: SHEET 4 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	
97	26						SANDY SILT (ML) <i>(continued)</i> .							Run #2: 25ft to 35ft bgs Recovery: 33%
95	28						SILTY SAND (SM); light brown; dry to moist; about 55% fine SAND; about 45% low plasticity fines.							
89	34						Poorly graded GRAVEL with SAND (GP); brownish gray; moist; about 70% coarse to fine GRAVEL; about 30% coarse to fine SAND; trace fines.							Run #3: 35ft to 40ft bgs Recovery: 88%
85	38						Poorly graded SAND with SILT (SP-SM); olive grayish brown; moist; trace fine GRAVEL; about 90% coarse to medium SAND; about 10% nonplastic fines.							
83	40						Poorly graded GRAVEL with SAND (GP); olive grayish brown; wet; about 80% coarse to fine GRAVEL; about 15% fine SAND; about 5% nonplastic fines.							Run #4: 40ft to 45ft bgs Recovery: 87%
77	46													Run #5: 45ft to 55ft Recovery: 82%
71	52						CLAYEY GRAVEL with SAND (GC); gray; moist; about 65% coarse to fine GRAVEL; about 15% coarse SAND; about 20% low to medium plasticity fines.							
69	54						CLAYEY GRAVEL with SAND (GC) <i>(continued)</i> .							Run #6: 55ft to 60ft



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PROJECT NUMBER: 14-165.1
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BORING: C046S_2147+00
ENTRY BY: NRA
CHECKED BY: SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY				REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	
67	56												Recovery: 100%
	57												
65	58												
	59												
63	60												Run #7: 60ft to 65ft Recovery: 93%
	61						Poorly graded GRAVEL with CLAY and SAND (GP-GC); greenish brown; moist; about 70% coarse to fine GRAVEL; about 20% coarse SAND; about 10% low to medium plasticity fines.						
61	62												
	63												
59	64						CLAYEY GRAVEL with SAND (GC); greenish brown; moist; about 60% coarse to fine GRAVEL; about 20% coarse to fine SAND; about 20% low to medium plasticity fines.						
	65												
57	66												Run #8: 65ft to 70ft Recovery: 90%
	67												
55	68												
	69												
53	70						SILT with SAND (ML); reddish brown; moist; about 25% fine SAND; about 75% low plasticity fines.						
	71												
51	72												
	73												
49	74												
	75												
47	76												
	77												
45	78						Lean to fat CLAY (CL/CH); dark reddish brown; moist; about 10% fine SAND; about 90% medium to high plasticity fines; blocky structure, likely magnesium oxide present; appears well consolidated.						
	79												
43	80												Run #10: 80ft to 90ft Recovery: 100%
	81												
41	82												
	83												
39	84												
	85						Lean to fat CLAY (CL/CH) (continued).						



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PROJECT NUMBER: 14-165.1
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BORING: C046S_2147+00
ENTRY BY: NRA
CHECKED BY: SHEET 3 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
37	86							SILT (ML); green; moist; about 10% medium to fine SAND; about 90% low plasticity fines; weak cementation; 1 to 2-inch lean clay interbeds.							
35	88														
	89														
33	90							CLAYEY SAND with GRAVEL (SC); dark brownish gray with greenish bronze mottling; moist; about 30% coarse to fine GRAVEL; about 35% coarse to fine SAND; about 35% low to medium plasticity fines.							Run #11: 90ft to 95ft Recovery: 100%
	91														
31	92							SILTY SAND with GRAVEL (SM); mottled green, red, and brown; moist; about 15% fine GRAVEL; about 55% coarse to medium SAND; about 30% nonplastic to low plasticity fines.							
	93														
29	94							SILTY, CLAYEY SAND (SC-SM); moist; about 70% coarse to fine SAND; about 30% low plasticity fines.							
	95														
27	96							CLAYEY SAND with GRAVEL (SC); gray; moist to wet; about 20% coarse to fine GRAVEL; about 55% coarse SAND; about 25% low to medium plasticity fines; weak cementation.							Run #12: 95ft to 100ft Recovery: 87%
	97														
25	98							SILTY SAND (SM); greenish gray; moist to wet; about 85% medium SAND; about 15% nonplastic fines; weak to moderate cementation.							
	99														
23	100							Poorly graded GRAVEL with SILT and SAND (GP-GM); gray; wet; about 70% fine GRAVEL; about 20% coarse SAND; about 10% nonplastic to low plasticity fines.							Run #13: 100ft to 110ft Recovery: 85%
	101														
21	102														
	103														
19	104							CLAYEY GRAVEL with SAND (GC); dark gray; moist to wet; about 55% coarse to fine GRAVEL; about 25% coarse to fine SAND; about 20% low to medium plasticity fines.							
	105														
17	106														
	107														
15	108														
	109														
13	110							SANDY lean CLAY (CL); dark gray; moist; about 40% fine SAND; about 60% medium plasticity fines; slightly blocky structure.							Run #14: 110ft to 113.5ft Recovery: 43 %
	111														
11	112														
	113														
9	114							Bottom of borehole at 113.5 ft bs							
	115							Draft Log							
7	116														



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PROJECT NUMBER: 14-165.1
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 BORING: C046S_2147+00
 ENTRY BY: NRA
 CHECKED BY: SHEET 4 of 4

LOG OF BORING C047S_2148+00

PROJECT NO: 14-165.1	BEGIN DATE: 2/10/2015	DRILLING CONTRACTOR: National, Driller Name: C.J.
PROJECT: SBFCA-B&D Verif. Borings	COMPLETION DATE: 2/11/2015	DRILLING METHOD: Sonic
LOCATION: N. of Gridley	SURFACE ELEVATION: 123(ft)	DRILL RIG: 400LS
CLIENT: Magnus/Nordic JV	SURFACE CONDITION: Pavement	HAMMER TYPE: N/A
LOGGED BY: SML/NRA	WATER DEPTH: N/A	SAMPLER TYPE & SIZE: Sonic Bag
DEPTH OF BORING: 113(ft)	READING TAKEN: N/A	BOREHOLE DIAMETER: 6"
	HAMMER EFFICIENCY: N/A	BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY(%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
121	1							SANDY SILT (ML); brown; moist; about 50% fine SAND; about 50% nonplastic to low plasticity fines; Levee Fill.							
119	4							SILTY SAND (SM); brown; dry to moist; about 55% fine SAND; about 45% nonplastic to low plasticity fines; Levee Fill.							
117	6														
115	8														
113	10														
111	12							SANDY SILT (ML); brown; dry to moist; about 45% fine SAND; about 55% nonplastic to low plasticity fines; Levee Fill.							
109	14							Native soil.							
107	16														
105	18														
103	19							SILTY SAND (SM); brown; moist; about 60% fine SAND; about 40% nonplastic to low plasticity fines.							
101	22														
99	24														



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C047S_2148+00
 ENTRY BY: SML
 CHECKED BY: SHEET 1 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)		% PASSING 200 SIEVE
97	26						SILTY SAND (SM) <i>(continued)</i> .								
	27						SANDY SILT (ML); brown; moist; about 50% fine SAND; about 50% low plasticity fines.								
95	28														
	29														
93	30														
	31														
91	32						SILTY SAND (SM); brown; wet; about 65% fine SAND; about 35% nonplastic to low plasticity fines.								
	33														
89	34														
	35														
87	36														
	37														
85	38						Poorly graded GRAVEL with SAND (GP); dark gray; wet; about 75% coarse to fine GRAVEL; about 20% coarse SAND; about 5% fines.								
	39														
83	40														
	41														
81	42														
	43														
79	44														
	45														
77	46														
	47														
75	48														
	49														
73	50														
	51														
71	52						At 52 feet, 1-foot silty sand lense.								
	53														
69	54														
	55						Poorly graded GRAVEL with SAND (GP) <i>(continued)</i> .								



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PROJECT NUMBER: 14-165.1
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 BORING: C047S_2148+00
 ENTRY BY: SML
 CHECKED BY: SHEET 2 of 4

ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY				REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)
67	56													
	57													
65	58						SILTY GRAVEL with SAND (GM); gray; wet; about 65% coarse to fine GRAVEL; about 20% coarse to fine SAND; about 15% low plasticity fines.							
	59													
63	60													
	61													
61	62													
	63													
59	64						CLAYEY GRAVEL with SAND (GC); brown; wet; about 65% coarse to fine GRAVEL; about 15% coarse to fine SAND; about 20% low to medium plasticity fines.							
	65													
57	66													
	67													
55	68													
	69													
53	70						CLAYEY SILT (ML/CL); brown; moist; about 10% fine SAND; about 90% low plasticity fines.							
	71													
51	72						SILTY SAND (SM); brown; moist; about 65% fine SAND; about 35% low plasticity fines.							
	73													
49	74													
	75													
47	76													
	77													
45	78						SANDY CLAYEY SILT (ML/CL); brown; moist; about 50% fine SAND; about 50% low plasticity fines.							
	79													
43	80													
	81						Lean CLAY (CL); reddish brown; moist; about 10% fine SAND; about 90% medium to high plasticity fines.							
41	82													
	83													
39	84						SILT (ML); grayish brown; moist; about 10 to 15% fine SAND; about 85% low plasticity fines.							
	85						SILT (ML) (continued).							



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PROJECT NUMBER: 14-165.1
 PROJECT: SBFCA-B&D Verif. Borings
 BORING: C047S_2148+00
 ENTRY BY: SML
 CHECKED BY: SHEET 3 of 4

LOG OF BORING C048_1902+77

PROJECT NO: 14-165.1	BEGIN DATE: 11/12/2014	DRILLING CONTRACTOR: GeoEx Subsurface, Driller: Rian H.
PROJECT: SBFCA-B&D Verif. Borings	COMPLETION DATE: 11/12/2014	DRILLING METHOD: Solid-Stem Auger & Rotary Wash
LOCATION: E. of Gridley	SURFACE ELEVATION: 107(ft)	DRILL RIG: CME 75
CLIENT: Magnus/Nordic JV	SURFACE CONDITION: Gravel	HAMMER TYPE: Auto: 140lb, 30"
LOGGED BY: RRRH	WATER DEPTH: N/A	SAMPLER TYPE & SIZE: SPT (1.4" ID)
DEPTH OF BORING: 80.5(ft)	READING TAKEN: N/A	BOREHOLE DIAMETER: 6"
	HAMMER EFFICIENCY: N/A	BACKFILL METHOD: Cement grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY(%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
105	1														Driller augered to 13' below crest of levee. Driller set casing (5" ID) to 13.5' below levee crest
103	2														
101	3														
99	4														
97	5														
95	6														
93	7														
91	8														
89	9														
87	10														
85	11														
83	12														
	13														Switch from Solid Stem Auger to Rotary Wash
	14														
	15														
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Crawford & Associates, Inc.
Geotechnical Engineering, Design and Construction Services

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PROJECT NUMBER: 14-165.1
PROJECT: SBFCA-B&D Verif. Borings
BORING: C048_1902+77
ENTRY BY: JJW
CHECKED BY: SHEET 1 of 3

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS				
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE					
81	26																		
	27																		
79	28																		
	29																		
77	30																		
	31																		
75	32																		
	33																		
73	34																		
	35																		
71	36																		Slight Drill chatter, suggest gravel and sand layer
	37																		
69	38																		
	39																		
67	40																		Drill chatter, suggest gravel layer
	41																		
65	42																		
	43																		
63	44																		
	45																		
61	46																		
	47																		
59	48																		
	49																		
57	50																		
	51																		
55	52																		No drill chatter, suggest end of gravel layer
	53																		
53	54	X	1	7 13 13	26		SANDY lean CLAY (CL); stiff; brown; moist; about 45% medium to fine SAND; low to medium plasticity fines.	100											
	55	X				2	SANDY lean CLAY (CL) (continued).												



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ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
51	56		2	9	22		CLAYEY SAND (SC); medium dense; brown; moist; fine SAND; about 40% low plasticity fines.	100							
	57			13											
49	58						SILTY SAND (SM); medium dense; dark brown; moist; fine SAND; about 40% nonplastic to low plasticity fines.	100							
	59		3	8	21										
	60			8			SANDY CLAYEY SILT (ML/CL); brown; moist; about 35% fine SAND; medium plasticity fines; slightly blocky structure.	100							
47	61		4	6	18										
45	62			7			6-inch lense of Silty Sand.								
	63			11											
	64		5	7	30		Poorly graded SAND (SP); medium dense; brown; moist; about 5% nonplastic fines.	96							
	65			12			SILTY CLAY with SAND (CL-ML); brown; moist; about 15% fine SAND; low plasticity fines.								
	66			18			Poorly graded SAND (SP); medium dense; brown; moist; fine SAND; about 5% nonplastic fines.								
41	66		6	8	36		SANDY SILT (ML); brown; moist; fine SAND; about 40 to 45% low plasticity fines.	100							
	67			12			SANDY SILT (ML); brown; moist; fine SAND; about 40 to 45% low plasticity fines.								
	68			24											
39	68					>4.5	SILTY CLAY with SAND (CL-ML); brown; moist; about 15% fine SAND; medium plasticity fines; blocky structure.								
	69		7	7	13		SANDY SILT (ML); brown; moist; about 40% fine SAND; low plasticity fines.	100							
37	70			6											
	71			7											
	72		8	13	28			100							
35	73			13											
	74			15											
	75		9	12	28		CLAYEY SILT with SAND (ML/CL); brown; moist; about 25% fine SAND; low to medium plasticity fines.	100							
33	76			12											
	77			16											
31	77		10	11	21		SANDY CLAYEY SILT (ML/CL); brown; moist; about 50% fine SAND; about 50% low plasticity fines.	100							
	78			11			6-inch lense of Silty Sand.								
29	79		11	10	27		About 40% SAND; low to medium plasticity fines; blocky structure.	100							
27	80			14											
	81			13											
	82						Bottom of borehole at 80.5 ft bgs								
25	83						Draft Log								
	84														
23	85														



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