



PORTLAND HARBOR RI/FS
**ROUND 3B SEDIMENT
DATA REPORT**

APPENDIX G
GEOTECHNICAL DATA SUMMARY

DRAFT

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Prepared for
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The geotechnical fieldwork consisted of obtaining sediment samples and conducting in-situ field tests of sediment strength. Sediment samples obtained in the field were sent to geotechnical laboratories for further analysis.

Vibracore samples collected in the field were visually analyzed and logged by an experienced field geologist at the processing laboratory. Representative sub-samples from the vibracores were chosen to be further characterized by laboratory testing. To classify the soil, moisture content, grain-size analysis, Atterberg limit, and specific gravity tests were run on 19 samples. The results of these tests and corresponding soil classifications are shown in Table A-1. Seepage-induced consolidation tests were run on four of the samples from the vibracores. The results of these tests are shown in Table A_2.

To measure sediment shear strength, in-situ vane shear tests were performed in eight locations in the river and at varying depths from one to three feet below the mudline. Both peak and residual shear strengths were measured. Co-located sediment surface grab samples were obtained from the location the vane shear tests were run. These samples were submitted for Atterberg limit and grain-size testing to further classify the sediment at the location of the vane shear test, and to determine correction factors for the field vane shear data. Results of these tests are shown in Table A-3 with applied correction factors derived from Atterberg Limits.

The following is a brief description of the aforementioned tests performed.

- **Moisture contents** were determined for all vibracore samples submitted in accordance with ASTM D 2216.
- **Grain-size analyses** were performed on all samples submitted in accordance with ASTM D 421/422. A hydrometer analysis was performed on the fines fraction (finer than the U.S. No. 200 sieve) for all of the samples.
- **Atterberg limit** determinations were performed on all samples. The liquid limit and plastic limit were determined in accordance with ASTM D 4318. Ten samples were classified as non-plastic.
- **Specific gravity tests** were performed on all vibracore samples submitted in accordance with ASTM D 854.
- **Seepage-induced consolidation tests** were run on four reconstituted samples collected from vibracores. This test, which provides load-settlement relationship data for sediments, was conducted in accordance with the process outlined by Znidarcic (“Consolidation Characteristics Determination for Phosphatic Clays, Volume 1: Seepage Induced Consolidation Test Equipment Description and Users Manual.” Znidarcic, et al., Florida Institute of Phosphate Research, Bartow, FL, 1992.).
- **Vane shear tests** were run in eight locations according to ASTM D 2573. A total of 40 tests were done, including both peak and residual strengths.

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Table G-1. Geotechnical Index Properties Obtained from Vibracore Samples

Sample ID	Date Sampled	Time	Top Sample Depth (ft)	Bottom Sample Depth (ft)	Average Sample Depth (ft)	Moisture Content ^a (%)	Atterberg Limits ^b			Grain Size ^c			Atterberg Limits	USCS Description	Specific Gravity ^d
							Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Sand (%)	Gravel/Sand (%)	Silt/Clay (%)			
LW3-E605A	12/17/07	1430	40.5	44.5	42.5	116.70	83.4	56.8	26.6	4.5	4.5	95.5	MH	MH- elastic silt	2.63
LW3-E662A-A	12/18/07	1350	7.0	9.7	8.3	71.05	52.2	41.0	11.2	27.2	27.2	72.8	MH	MH- elastic silt with sand	2.59
LW3-E662A-B	12/18/07	1400	9.7	10.5	10.1	26.60	40.6	31.8	8.8	26.0	89.5	10.5	ML	GP-GM poorly graded gravel with silt and sand	2.69
LW3-E665A	12/18/07	1430	0.0	7.3	3.7	89.08	71.9	48.1	23.8	7.3	7.3	92.7	MH	MH- elastic silt	2.58
LW3-E679A	12/18/07	1500	37.0	41.2	39.1	77.70	68.9	45.4	23.5	10.7	10.7	89.3	MH	MH- elastic silt	2.65
LW3-E690A	12/21/07	1540	22.0	24.0	23.0	84.06	74.0	49.8	24.3	8.0	8.0	92.0	MH	MH- elastic silt	2.48
LW3-E690B	12/21/07	1540	30.0	32.7	31.3	68.23	70.6	46.6	24.0	13.3	13.3	86.8	MH	MH- elastic silt	2.32
LW3-E721A	12/21/07	1400	18.0	22.0	20.0	89.58	77.7	52.7	25.0	7.7	7.7	92.3	MH	MH- elastic silt	2.63
LW3-E721B	12/21/07	1400	22.0	26.0	24.0	78.35	71.3	48.1	23.2	7.7	7.7	92.3	MH	MH- elastic silt	2.55
LW3-E721C	12/21/07	1400	26.0	31.0	28.5	51.93	43.0	35.7	7.3	45.2	45.2	54.7	ML	ML- sandy silt	2.51
LW3-E723A	12/18/07	1530	35.5	36.4	35.9	122.90	84.9	51.2	33.7	14.3	14.3	85.8	MH	MH- elastic silt	2.53
LW3-E723B	12/18/07	1530	36.4	40.4	38.4	107.10	96.2	56.1	40.1	3.2	3.2	96.8	MH	MH- elastic silt	2.50
LW3-E723C	12/18/07	1530	40.4	46.8	43.6	89.87	84.7	49.1	35.5	2.0	2.0	98.1	MH	MH- elastic silt	2.53
LW3-E724A	1/4/08	1415	6.0	10.7	8.3	44.36	NA	NA	NA	63.8	65.5	34.6	Non-Plastic	SM silty sand	2.54
LW3-E724B	1/4/08	1420	10.7	13.0	11.8	28.42	NA	NA	NA	92.4	95.0	5.0	Non-Plastic	SP-SM poorly graded sand with silt	2.63
LW3-E726A	1/4/08	1445	30.0	32.8	31.4	95.00	89.1	57.4	31.7	7.0	7.0	93.0	MH	MH- elastic silt	2.53
LW3-E726B	1/4/08	1450	32.8	40.8	36.8	83.50	86.9	53.4	33.4	2.5	2.5	97.5	MH	MH- elastic silt	2.57
LW3-E733A	1/11/08	1400	43.0	45.1	44.0	36.71	NA	NA	NA	81.5	81.6	18.4	Non-Plastic	SM silty sand	2.61
LW3-E733B	1/11/08	1405	45.1	50.4	47.8	23.20	NA	NA	NA	94.5	97.9	2.1	Non-Plastic	SP- Poorly graded sand	2.69

Notes:

- ^a Moisture Content testing conducted according to ASTM D-2216
- ^b Atterberg Limits testing conducted according to ASTM D-4318
- ^c Grain Size testing conducted according to ASTM D-422
- ^d Specific gravity testing conducted according to ASTM D-854

Table G-2. Results from Seepage Induced Consolidation Testing

Sample ID	Date Sampled	Time	Top Sample Depth (ft)	Bottom Sample Depth (ft)	Average Sample Depth (ft)	Moisture Content ^a (%)	Atterberg Limits ^b			Grain Size ^c			Atterberg Limits	USCS	Specific Gravity ^e	Start of Test		SICT Parameters				
							Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Sand (%)	Gravel/Sand (%)	Silt/Clay (%)				Initial Water Content (%)	Initial Void Ratio (e ₀) [-]	A [-]	B [-]	Z [kPa]	C [m/sec]	D [-]
LW3-E662A-A	12/18/07	1350	7.0	9.7	8.3	65.30	52.2	41.0	11.2	27.2	27.2	72.8	MH	MH- elastic silt with sand	2.59	217.8	3.070	2.53	-0.1580	0.29300	1.71E-09	4.07
LW3-E679A	12/18/07	1500	37.0	41.2	39.1	74.50	68.9	45.4	23.5	10.7	10.7	89.3	MH	MH- elastic silt	2.65	338.5	4.184	2.64	-0.1150	0.01840	1.28E-10	6.31
LW3-E723B	12/18/07	1530	36.4	40.4	38.4	104.70	96.2	56.1	40.1	3.2	3.2	96.8	MH	MH- elastic silt	2.50	552.3	5.581	2.95	-0.0948	0.00118	1.55E-10	2.70
LW3-E726A	1/4/08	1445	30.0	32.8	31.4	95.20	89.1	57.4	31.7	7.0	7.0	93.0	MH	MH- elastic silt	2.53	412.0	5.457	3.08	-0.1150	0.00699	1.10E-10	3.46

Notes:

^a Moisture Content testing conducted according to ASTM D-2216

^b Atterberg Limits testing conducted according to ASTM D-4318

^c Grain Size testing conducted according to ASTM D-422

^d Specific gravity testing conducted according to ASTM D-854

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Table G-3. Shear Strength Results from Vane Shear Test

Sample ID	Date Sampled	Time	Depth Below Mudline			Atterberg Limits ^a			Grain Size ^b			Atterberg Limits	USCS	Test Depth below mudline (ft)	Test Type Peak [P] Residual [R]	Undrained Shear Strength, (s _u) _{corr.} (lb/ft ²)
			Top Sample Depth (ft)	Bottom Sample Depth (ft)	Average Sample Depth (ft)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Sand (%)	Gravel/Sand (%)	Silt/Clay (%)					
V605	12/27/07	900	1.0	2.0	1.5	NA	NA	NA	73.2	92.3	7.7	Non-Plastic	SP-SC poorly graded sand with silty clay & gravel	1	P	501
														1	R	222
														2	P	661
														2	R	227
V662	12/27/07	1110	1.0	3.0	2.0	NA	NA	NA	63.5	63.5	36.5	Non-Plastic	SM silty sand	1	P	184
														1	R	90
														2	P	288
														2	R	76
														3	P	340
														3	R	76
V679	12/27/07	1400	1.0	3.0	2.0	NA	NA	NA	45.5	45.6	54.5	Non-Plastic	ML- sandy silt	1	P	94
														1	R	38
														2	P	123
														2	R	57
														3	P	246
														3	R	94
V690	12/27/07	1430	1.0	3.0	2.0	NA	NA	NA	80.1	80.2	19.8	Non-Plastic	SM silty sand	1	P	161
														1	R	66
														2	P	231
														2	R	76
														3	P	123
														3	R	113
V721	12/27/07	1515	1.0	3.0	2.0	64.9	51.7	13.3	6.0	6.0	94.0	MH	MH- elastic silt	1	P	69
														1	R	40
														2	P	173
														2	R	89
														2.5	P	397
														2.5	R	188
V723	12/28/07	950	1.0	1.0	1.0	NA	NA	NA	94.2	97.9	2.2	Non-Plastic	SP- Poorly graded sand	1	P	236
														1	R	184
V724	12/27/07	1600	1.0	3.0	2.0	NA	NA	NA	84.6	84.6	15.4	Non-Plastic	SM silty sand	1	P	118
														1	R	80
														2	P	260
														2	R	66
														3	P	269
														3	R	109
V726	12/28/07	1050	1.0	1.5	1.3	55.1	40.2	14.8	17.3	17.4	82.6	MH	MH- elastic silt with sand	1	P	784
														1	R	284
														1.5	P	891
														1.5	R	323

Notes:

^a Atterberg Limits testing conducted according to ASTM D-4318

^b Grain Size testing conducted according to ASTM D-422

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