CENWS-OD-TS-DM

MEMORANDUM FOR RECORD 11 February 2004

SUBJECT: **DETERMINATION OF THE SUITABILITY OF SEDIMENT PROPOSED TO BE DREDGED FROM THE BLAIR WATERWAY BRIDGE REACH WIDENING PROJECT FOR OPEN-WATER DISPOSAL AT THE COMMENCEMENT BAY OPEN-WATER DISPOSAL SITE, AS EVALUATED UNDER SECTION 404 OF THE CLEAN WATER ACT.**

1. The following summary reflects the consensus determination of the Agencies that comprise the regional Dredged Material Management Program (DMMP) for the State of Washington. The agencies include the Corps of Engineers, Department of Ecology, Department of Natural Resources, and the Environmental Protection Agency. The agencies are charged with determining the suitability of dredged material for in-water disposal and have evaluated the proposed dredging of 265,000 cubic yards from the Blair Bridge Reach Widening Project located in Blair Waterway, Commencement bay, Washington.

2. The project was ranked moderate for testing purposes. The sampling and analysis plan was approved on August 28, 2003 by the DMMP agencies for an estimated total dredged material footprint volume of 265,000 cubic yards. The sampling design called for analyzing 87,000 cy of the proposed dredging footprint represented by the fill layer down through 12 feet of the native sediment contact layer. A total of 178,000 cy of native sediment below the –12 feet MLLW contact layer were not sampled and are considered suitable for unconfined-open water disposal without testing. Sampling of the proposed dredging footprint (see figures 1-4) was conducted on November 4-5, 2003, and consisted of drilling four borings at pre-selected locations using a hollow-stem auger drilling rig. A 6-inch diameter hollow stem auger and 4-inch diameter split-spoon sampler were used to collect samples in the upper portions of the borings. The sampling intervals were 7, 14, 16 feet. Below that, a smaller diameter auger and 2-inch split-spoon sampler were used. Changing to a smaller diameter augur was necessary to control excessive heave that resulted from using the larger diameter augur in sandy material. The change was made at a depth of seven feet when refusal was encountered using the larger-diameter sampler. Compositing of the core samples was done at Analytical Resources, Inc. (ARI) in Tukwila, Washington. Compositing was accomplished in accordance with the SAP, which called for compositing horizontally by 4-foot intervals. Composites for the four dredged Material Management Units (DMMUs) in the top 8 feet of the 32-foot sampling interval were two-way composites. Samples for the other six DMMUs representing the bottom 24 feet of the sampling interval were four-way composites. Figure 4 shows a schematic of the horizontal and vertical configuration of the ten DMMUs. DMMUs 1-9 were analyzed, while DMMU-10 (representing the 28-32 foot interval) was archived at -20^{0}C. Samples were collected for both chemisty and potential biological testing. A tiered testing approach was used, and all samples for potential biological testing were archived at 4°C pending completion of the chemical analyses.

3. Relevant dates for regulatory tracking purposes are included in Table 1.

Table 1. Regulatory Tracking Information and Dates

Initial SAP submittal date: Revised SAP submittal date:	April 2, 2003 August 11, 2003
Initial SAP review/response letter date: Revised SAP approval letter date:	May 23, 2003 August 28, 2003
Sampling date(s):	November 4-5, 2003
Sediment data characterization report submittal date:	January 23, 2004
DAIS Tracking Number	POTBB-1-A-F-193
Recency Determination Date: Moderate (5 years)	November 2009

4. The Sampling and Analysis Plan approved by the Agencies for testing for the ten DMMUs was followed, and quality assurance/quality control guidelines specified by the PSDDA Users Manual were generally complied with. The data gathered were deemed sufficient and acceptable for decision-making by the DMMP agencies based on best professional judgment.

5. Table 2 provides an analysis summary of the results of the conventional parameters analyzed for the nine composited DMMUs. Chemical analysis of the nine DMMUs indicated that there were no detected and detection limit exceedances of screening level for all chemicals of concern. Table 3 provides a complete dry weight chemical analysis inventory for the nine DMMU's analyzed. Six of the nine DMMUs had low TOC concentrations less than 0.5%. Table 4 provides TOC-normalized results for comparison with SMS guidelines for the three DMMUs with TOC's greater than 0.5%. There were no bioaccumulation trigger (BT) or maximum level (ML) exceedances of COC analyzed. Based on the results for the nine composited DMMUs, the archived sample (BBW-C10SD) was not analyzed. Because there were no SL guideline exceedances, biological testing was not required.

6. The results of the chemical analysis for the nine composited DMMU and the unanalyzed archived DMMU (BBW-C10SD), representing a total of 87,000 cy of material and the 178,000 cy of unanalyzed native sediment indicate that the entire 265,000 cy of material is determined to be suitable for unconfined open-water disposal.

7. This memorandum documents the suitability of sediment to be dredged from the Blair Bridge Reach Widening Dredging Project for disposal at the Commencement Bay non-dispersive open-water disposal site. However, this suitability determination does not constitute final agency approval of the project. A dredging plan for this project must be completed as part of the final project approval process. A final decision will be made after full consideration of agency input, and after an alternatives analysis is done under Section 404(b)(1) of the Clean Water Act.

Concur:

3/10/04 — David R. Kendall
Date — David Kendall, Ph.D., Seattle District Corps of Engineers

3/4/04 — Justine Barton
Date — Justine Barton, Environmental Protection Agency

3/10/04 — Thomas H. Gries
Date — Tom Gries/Loree Randall, Washington Department of Ecology

3/4/2004 — [illegible]
Date — Peter Leon, Washington Department of Natural Resources

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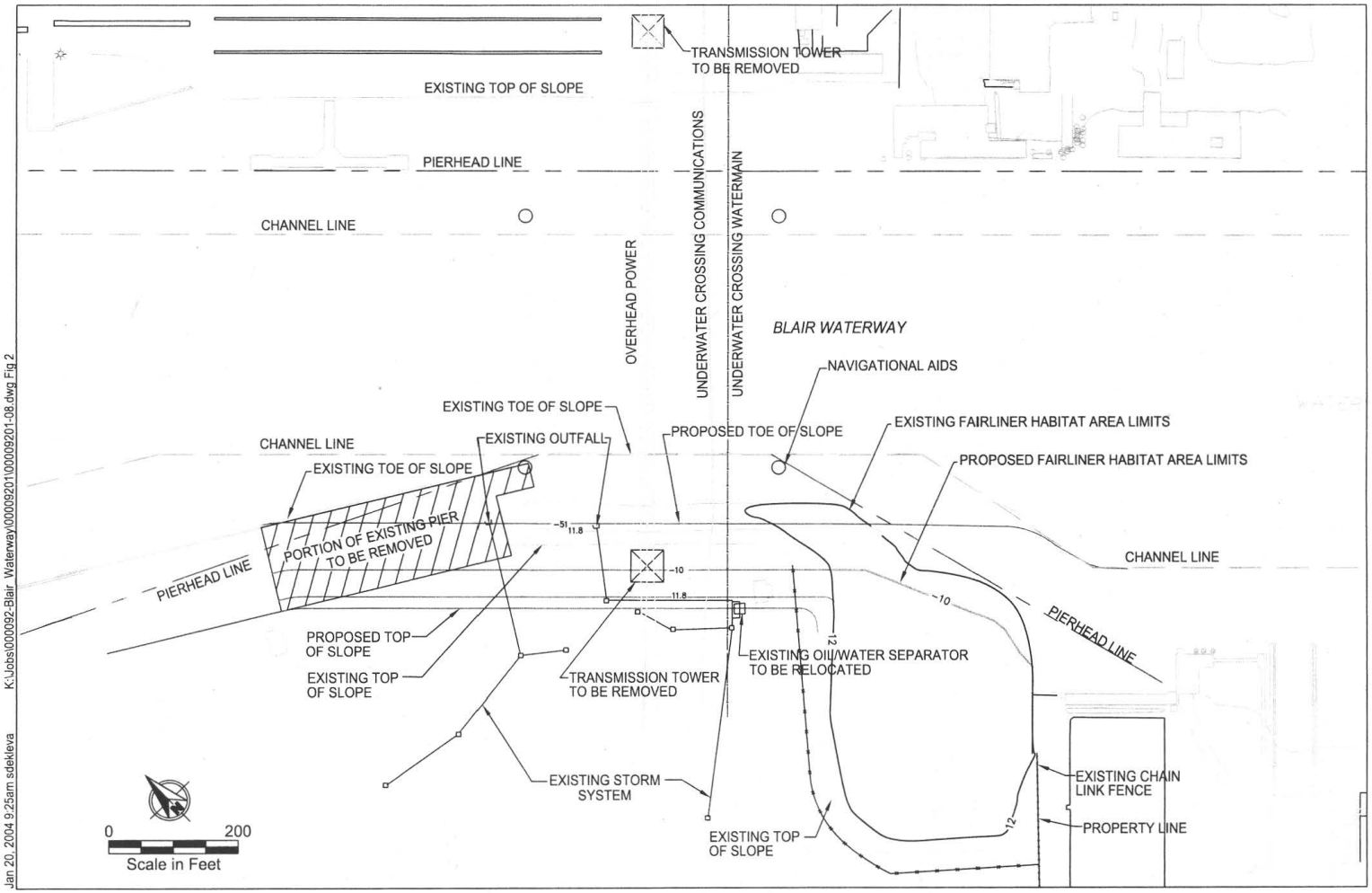
DMMO File

Jan 20, 2004 9:23am sdekleva K:\Jobs\000092-Blair_Waterway\00009201\00009201-04.dwg Blair Wway Fig 1

ANCHOR ENVIRONMENTAL, L.L.C.

Figure 1
Vicinity Map
Blair Bridge Reach Widening Project



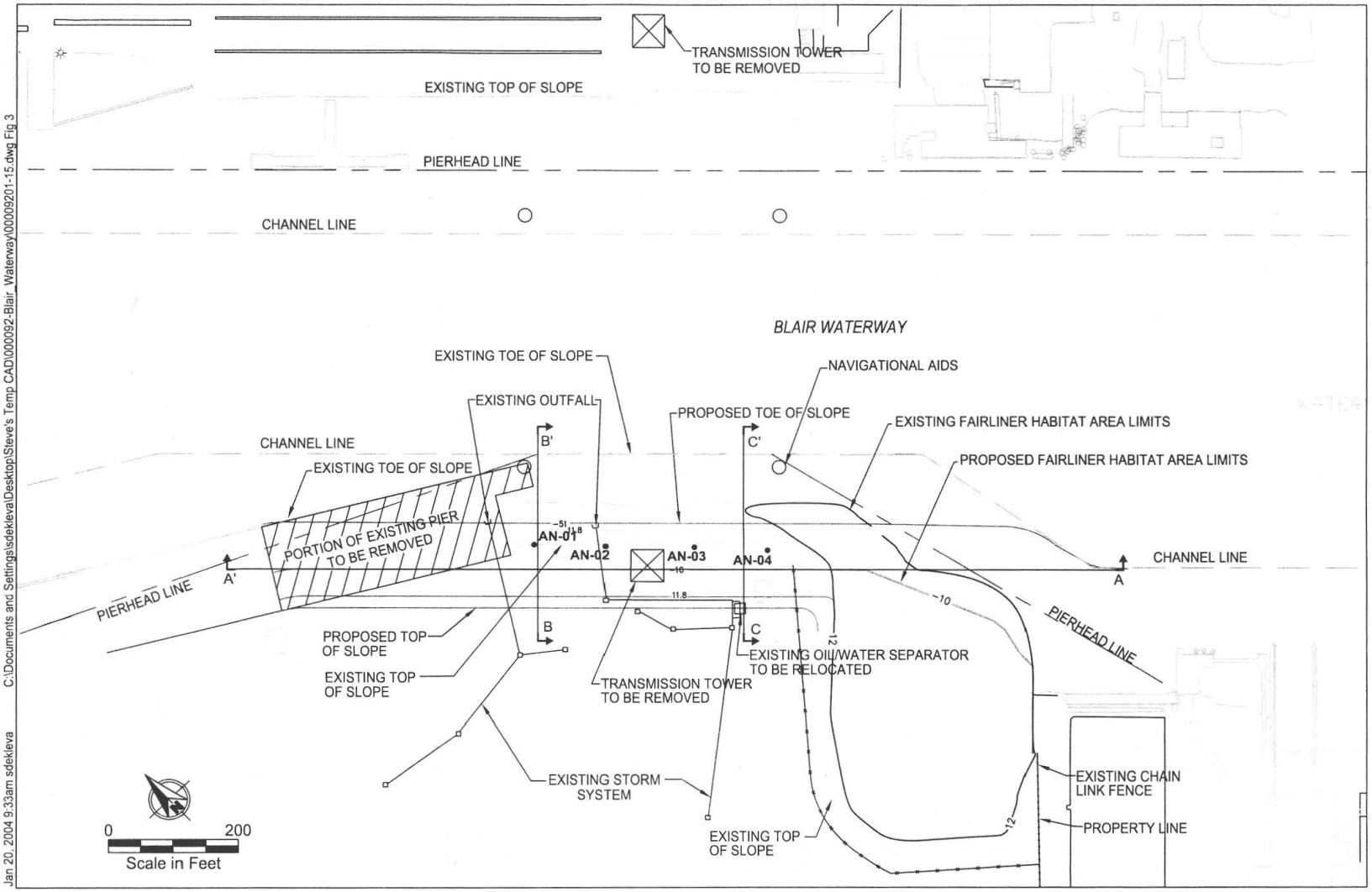
ANCHOR ENVIRONMENTAL L.L.C.

LEGEND:

Existing Contours

Proposed Contours

Figure 2
Plan View
Blair Bridge Reach Widening Project



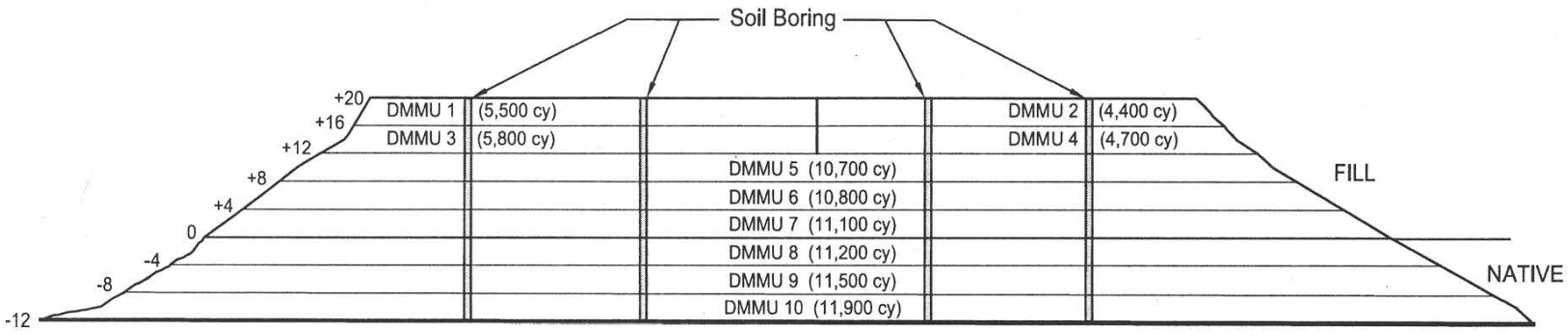
ANCHOR ENVIRONMENTAL, L.L.C.

LEGEND:

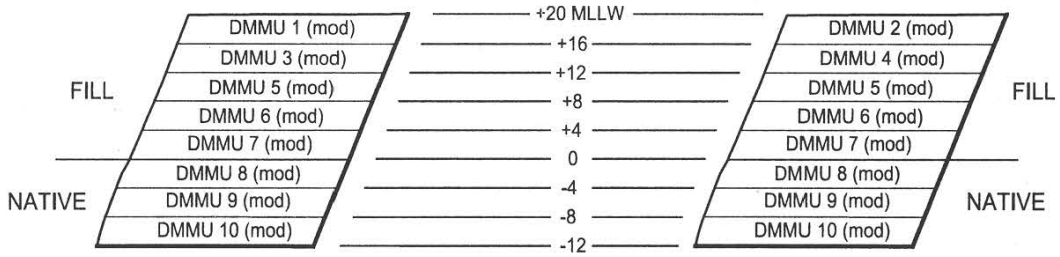
Existing Contours

Proposed Contours

Figure 3
Sampling Locations
Blair Bridge Reach Widening Project



Section A-A' (see Fig 3)



Section B-B' (see Fig 3)

Section C-C' (see Fig 3)

0 120
Horizontal Scale in Feet

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Figure 4
Dredge Material Management Unit Layout
Blair Bridge Reach Widening Project

Table 2. Blair Bridge Reach Widening Project Characterization, PSDDA Evaluation Summary

				Location ID	BBW-C01		BBW-C02		BBW-C03		BBW-C04		BBW-C05		BBW-C06		BBW-C07		BBW-C08		BBW-C09		BBW-C10		
				Sample ID	BBW-C01SD		BBW-C02SD		BBW-C03SD		BBW-C04SD		BBW-C05SD		BBW-C06SD		BBW-C07SD		BBW-C08SD		BBW-C09SD		BBW-C10SD		
				Rank:	M		M		M		M		M		M		M		M		M		M		
PARAMETER	Units	SL	BT	ML	Conc.	VQ	Conc.	VQ	Conc.	VQ	Conc.	VQ	Conc.	VQ	Conc.	VQ	Conc.	VQ	Conc.	VQ	Conc.	VQ	Conc.	VQ	
Conventionals																							Archived		
Total Solids	%				92.0		90.4		90.2		91.7		87.1		78.6		81.7		80.9		81.1		NA		
Total Organic Carbon	%				0.78		1.6		0.49		0.87		0.3		0.27		0.32		0.11		0.21		NA		
Total Volatile Solids	%				1.6		2.4		1.1		2.1		0.99		0.99		0.98		0.71		0.83		NA		
Total Ammonia	mg-N/kg				0.19	u	0.78		0.21	u	0.22		0.21	u	0.21	u	0.63		0.7		0.73		NA		
Total Sulfides	mg/kg				1.1	u	1.1	u	1.3		1.1	u	1.3	u	1.2	u	1.2	u	2.4		1.9		NA		
Grain Size																							Archived		
Gravel	%				21.5		50.2		5.1		33.3		5.7		0.7		3.2		2.2		0.8		NA		
Sand	%				70.6		45.6		85.9		59.5		85.2		90		85.8		92.6		87.8		NA		
Silt	%				5.8		2.7		7.6		5.3		7.2		7.3		7.9		4.2		9.5		NA		
Clay	%				2		1.5		1.5		2		1.8		2		3.1		0.8		1.9		NA		
Fines (percent silt + clay)	%				7.8		4.2		9.1		7.4		9		9.3		11		5		11.4		NA		
Atterberg Limits																							Archived		
Liquid limit					N-P		N-P		N-P		N-P		N-P		N-P		N-P		N-P		N-P		NA		
Plastic limit					N-P		N-P		N-P		N-P		N-P		N-P		N-P		N-P		N-P		NA		
Plasticity index					N-P		N-P		N-P		N-P		N-P		N-P		N-P		N-P		N-P		NA		
Eohaustorius estuarius hits:					NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		
Mytilus galloprovincialis hits:					NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		
Neanthes arenaceodentata hits:					NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		
Bioassay Determination: (P/F)					NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		
BTs exceeded:					no		no		no		no		no		no		no		no		no				
Bioaccumulation conducted:					no		no		no		no		no		no		no		no		no				
Bioaccumulation Determination:																									
ML Rule exceeded:					no		no		no		no		no		no		no		no		no				
PSDDA Determination:					Pass		Pass		Pass		Pass		Pass		Pass		Pass		Pass		Pass		Pass		**Total Vol.**
DMMU Volume:	cy				5,500		4,400		5,800		4,700		10,700		10,800		11,100		11,200		11,500		11,900		87,600
DMMU ID:					**C1**		**C2**		**C3**		**C4**		**C5**		**C6**		**C7**		**C8**		**C9**		**C10**		

~~Table 2~~ Table 3

Summary of Dry-Weight Basis Analytical Results and Comparison with PSDDA ~~and Applicable SMS Evaluation Criteria~~
~~(Including OC-Normalized results for PCBs and alpha-BHC for comparison with respective PSDDA OC-Normalized criteria)~~

Location ID	DMMP Criteria		SMS	BBW-C01	BBW-C02	BBW-C03	BBW-C04	BBW-C05	BBW-C06	BBW-C07	BBW-C08	BBW-C09
Sample ID	Screening	Bio	Sed Qual	BBW-C01SD	BBW-C02SD	BBW-C03SD	BBW-C04SD	BBW-C05SD	BBW-C06SD	BBW-C07SD	BBW-C08SD	BBW-C09SD
Sample Date	Level	Trigger	Std	11/04/2003	11/04/2003	11/04/2003	11/04/2003	11/04/2003	11/04/2003	11/04/2003	11/04/2003	11/04/2003
Conventionals												
Preserved Total Solids (%)	---	---	---	90.1	89.0	86.8	89.8	77.5	80.4	79.7	81.9	78.7
Total Organic Carbon (%)	---	---	---	0.78	1.6	0.49	0.87	0.30	0.27	0.32	0.11	0.21
Total solids (%)	---	---	---	92.0	90.4	90.2	91.7	87.1	78.6	81.7	80.9	81.1
Total Volatile Solids (%)	---	---	---	1.6	2.4	1.1	2.1	0.99	0.99	0.98	0.71	0.83
Ammonia (mg/kg)	---	---	---	0.19 U	0.78	0.21 U	0.22	0.21 U	0.21 U	0.63	0.70	0.73
Sulfide (mg/kg)	---	---	---	1.10 U	1.10 U	1.30	1.10 U	1.30 U	1.20 U	1.20 U	2.40	1.90
Grain Size (%)												
Gravel	---	---	---	21.5	50.2	5.1	33.3	5.7	0.7	3.2	2.2	0.8
Sand	---	---	---	70.6	45.6	85.9	59.5	85.2	90	85.8	92.6	87.8
Silt	---	---	---	5.8	2.7	7.6	5.3	7.2	7.3	7.9	4.2	9.5
Clay	---	---	---	2.0	1.5	1.5	2.0	1.8	2.0	3.1	0.8	1.9
Fines	---	---	---	7.8	4.2	9.1	7.4	9.0	9.3	11	5	11.4
Atterberg Limits												
Liquid limit	---	---	---	N-P	N-P	N-P	N-P	N-P	N-P	N-P	N-P	N-P
Plastic limit	---	---	---	N-P	N-P	N-P	N-P	N-P	N-P	N-P	N-P	N-P
Plasticity index	---	---	---	N-P	N-P	N-P	N-P	N-P	N-P	N-P	N-P	N-P
Metals (mg/kg)												
Antimony	150	---	---	5 U	5 U	5 U	5 U	6 U	6 U	6 U	6 U	6 U
Arsenic	57	507.1	57	5 U	32	5 U	10	6 U	6 U	6 U	6 U	6 U
Cadmium	5.1	11.3	5.1	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.3 U	0.2 U	0.2 U	0.2 U
Chromium	---	267	260	21.7	44.3	15.4	30.3	19.0	19.5	14.7	14.9	13.6
Copper	390	1027	390	29.4	89.4	27.4	26.4	19.6	11.3	15.9	12.8	11.7
Lead	450	975	450	36	37	9	34	9	3 U	5	2 U	2 U
Mercury	0.41	1.5	0.41	0.05 U	0.05	0.08	0.05	0.04 U	0.06 U	0.05 U	0.06 U	0.05 U
Nickel	140	370	---	15	35	10	22	12	12	10	10	9
Selenium	---	3	---	0.2 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Silver	6.1	6.1	6.1	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.4 U	0.4 U	0.3 U	0.4 U
Zinc	410	2783	410	73.7	120	69.6	67.9	34.8	21.5	25.6	22.4	19.1
PCBs (µg/kg)												
Aroclor 1016	---	---	---	19 U	20 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U
Aroclor 1221	---	---	---	38 U	40 U	39 U	38 U	40 U	39 U	39 U	39 U	40 U
Aroclor 1232	---	---	---	19 U	20 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U
Aroclor 1242	---	---	---	19 U	20 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U
Aroclor 1248	---	---	---	19 U	20 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U
Aroclor 1254	---	---	---	19 U	63	20 U	19 U	20 U	19 U	19 U	19 U	20 U
Aroclor 1260	---	---	---	19 U	20 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U
Total PCBs	---	---	130	38 U	63	39 U	38 U	40 U	39 U	39 U	39 U	40 U
Pesticides (µg/kg)												
4,4'-DDD	---	---	---	1.9 U	2.0 U	2.0 U	1.9 U	2.0 U	1.9 U	1.9 U	1.9 U	2.0 U
4,4'-DDE	---	---	---	1.9 U	6.0	2.0 U	1.9 U	2.0 U	1.9 U	1.9 U	1.9 U	2.0 U
4,4'-DDT	---	---	---	5.1	4.8 U	2.0 U	1.9 U	2.0 U	1.9 U	1.9 U	1.9 U	2.0 U
Aldrin	10	---	---	0.96 U	0.99 U	0.99 U	0.96 U	0.99 U	0.97 U	0.96 U	0.97 U	0.99 U
alpha-BHC	---	---	---	0.96 U	0.99 U	0.99 U	0.96 U	0.99 U	0.97 U	0.96 U	0.97 U	0.99 U
gamma-BHC (Lindane)	10	---	---	0.96 U	0.99 U	0.99 U	0.96 U	0.99 U	0.97 U	0.96 U	0.97 U	0.99 U
alpha-Chlordane	---	---	---	0.96 U	0.99 U	0.99 U	0.96 U	0.99 U	0.97 U	0.96 U	0.97 U	0.99 U
gamma-Chlordane	---	---	---	0.96 U	0.99 U	0.99 U	0.96 U	0.99 U	0.97 U	0.96 U	0.97 U	0.99 U
DDT (total)	6.9	50	---	5.1	6	2 U	1.9 U	2 U	1.9 U	1.9 U	1.9 U	2 U

~~Table 2~~ Table 3

Summary of Dry-Weight Basis Analytical Results and Comparison with PSDDA ~~and Applicable SMS Evaluation Criteria~~
~~(Including OC-Normalized results for PCBs and alpha-BHC for comparison with respective PSDDA OC-Normalized criteria)~~

Location ID	DMMP Criteria		SMS	BBW-C01	BBW-C02	BBW-C03	BBW-C04	BBW-C05	BBW-C06	BBW-C07	BBW-C08	BBW-C09
Sample ID	Screening	Bio	Sed Qual	BBW-C01SD	BBW-C02SD	BBW-C03SD	BBW-C04SD	BBW-C05SD	BBW-C06SD	BBW-C07SD	BBW-C08SD	BBW-C09SD
Sample Date	Level	Trigger	Std	11/04/2003	11/04/2003	11/04/2003	11/04/2003	11/04/2003	11/04/2003	11/04/2003	11/04/2003	11/04/2003
Dieldrin	10	---	---	1.9 U	2.0 U	2.0 U	1.9 U	2.0 U	1.9 U	1.9 U	1.9 U	2.0 U
Heptachlor	10	---	---	0.96 U	0.99 U	0.99 U	0.96 U	0.99 U	0.97 U	0.96 U	0.97 U	0.99 U
cis-Nonachlor	---	---	---	1.9 U	2.0 U	2.0 U	1.9 U	2.0 U	1.9 U	1.9 U	1.9 U	2.0 U
trans-Nonachlor	---	---	---	1.9 U	2.0 U	2.0 U	1.9 U	2.0 U	1.9 U	1.9 U	1.9 U	2.0 U
Total chlordane (PSDDA)	10	37	---	1.9 U	2 U	2 U	1.9 U	2 U	1.9 U	1.9 U	1.9 U	2 U
SVOCs (µg/kg)												
LPAHs												
Naphthalene	2100	---	2100	19 U	20 U	20 U	60	20 U	19 U	19 U	19 U	20 U
Acenaphthylene	560	---	560	19 U	20 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U
Acenaphthene	500	---	500	19 U	20 U	20 U	58	20 U	19 U	19 U	19 U	20 U
Fluorene	540	---	540	19 U	20 U	20 U	52	20 U	19 U	19 U	19 U	20 U
Phenanthrene	1500	---	1500	19 U	72	20 U	220	44	19 U	19 U	19 U	20 U
Anthracene	960	---	960	19 U	15 J	20 U	39	20 U	19 U	19 U	19 U	20 U
2-Methylnaphthalene	670	---	670	19 U	20 U	20 U	44	20 U	19 U	19 U	19 U	20 U
Total LPAH	5200	---	5200	19 U	87	20 U	429	44	19 U	19 U	19 U	20 U
HPAHs												
Fluoranthene	1700	4600	1700	23	210	13 J	230	33	19 U	19 U	19 U	20 U
Pyrene	2600	11980	2600	31	280	17 J	340	30	19 U	19 U	19 U	20 U
Benzo(a)anthracene	1300	---	1300	17 J	220	12 J	210	20 U	19 U	19 U	19 U	20 U
Chrysene	1400	---	1400	29	300	19 J	320	20 U	19 U	19 U	19 U	20 U
Benzo(b)fluoranthene	---	---	---	34	510	17 J	430	20 U	19 U	19 U	19 U	20 U
Benzo(k)fluoranthene	---	---	---	27	470	14 J	440	20 U	19 U	19 U	19 U	20 U
Total benzofluoranthenes	3200	---	3200	61	980	31	870	20 U	19 U	19 U	19 U	20 U
Benzo(a)pyrene	1600	---	1600	21	460	20 U	400	20 U	19 U	19 U	19 U	20 U
Indeno(1,2,3-cd)pyrene	600	---	600	19 U	140	20 U	190	20 U	19 U	19 U	19 U	20 U
Dibenzo(a,h)anthracene	230	---	230	19 U	35	20 U	50	20 U	19 U	19 U	19 U	20 U
Benzo(g,h,i)perylene	670	---	720	19 U	80	20 U	120	20 U	19 U	19 U	19 U	20 U
Total HPAH	12000	---	12000	182	2705	92	2730	63	19 U	19 U	19 U	20 U
Chlorinated Hydrocarbons												
1,3-Dichlorobenzene	170	---	---	0.8 U	0.8 U	0.9 U	0.8 U	1.0 U	0.9 U	1.0 U	0.9 U	0.9 U
1,4-Dichlorobenzene	110	---	110	0.8 U	0.8 U	0.9 U	0.8 U	1.0 U	0.9 U	1.0 U	0.9 U	0.9 U
1,2-Dichlorobenzene	35	---	35	0.8 U	0.8 U	0.9 U	0.8 U	1.0 U	0.9 U	1.0 U	0.9 U	0.9 U
1,2,4-Trichlorobenzene	31	---	31	4.2 U	4.0 U	4.3 U	4.2 U	4.8 U	4.7 U	4.9 U	4.7 U	4.7 U
Hexachlorobenzene	22	168	22	0.96 U	0.52 J	0.99 U	0.85 J	0.99 U	0.97 U	0.96 U	0.97 U	0.99 U
Phthalates												
Dimethylphthalate	1400	---	71	19 U	59	20 U	19 U	20 U	19 U	19 U	19 U	20 U
Diethylphthalate	1200	---	48	19 U	20 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U
Di-n-butylphthalate	5100	---	1400	19 U	20 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U
Butylbenzylphthalate	970	---	63	19 U	20 U	20 U	19	20 U	19 U	19 U	19 U	20 U
bis(2-Ethylhexyl)phthalate	8300	---	1300	120	150	150	200	120	150	110	150	120
Di-n-octylphthalate	6200	---	420	19 U	20 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U
Phenols												
Phenol	420	---	420	19 U	20 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U
2-Methylphenol	63	---	63	19 U	20 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U
4-Methylphenol	670	---	670	19 U	20 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U
2,4-Dimethylphenol	29	---	29	19 U	20 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U
Pentachlorophenol	400	504	140	97 U	98 U	98 U	95 U	98 U	96 U	97 U	97 U	98 U

~~Table 2~~ Table 3

Summary of Dry-Weight Basis Analytical Results and Comparison with PSDDA ~~and Applicable SMS Evaluation Criteria~~
~~(Including OC-Normalized results for PCBs and alpha-BHC for comparison with respective PSDDA OC-Normalized criteria)~~

Location ID	DMMP Criteria		SMS	BBW-C01	BBW-C02	BBW-C03	BBW-C04	BBW-C05	BBW-C06	BBW-C07	BBW-C08	BBW-C09
Sample ID	Screening	Bio	Sed Qual	BBW-C01SD	BBW-C02SD	BBW-C03SD	BBW-C04SD	BBW-C05SD	BBW-C06SD	BBW-C07SD	BBW-C08SD	BBW-C09SD
Sample Date	Level	Trigger	SQS	11/04/2003	11/04/2003	11/04/2003	11/04/2003	11/04/2003	11/04/2003	11/04/2003	11/04/2003	11/04/2003
Miscellaneous												
Benzyl alcohol	57	---	57	19 U	20 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U
Benzoic acid	650	---	650	190 U	200 U	200 U	190 U	200 U	190 U	190 U	190 U	200 U
Dibenzofuran	540	---	540	19 U	20 U	20 U	40	20 U	19 U	19 U	19 U	20 U
Hexachloroethane	1400	---	1400	19 U	20 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U
Hexachlorobutadiene	29	---	11	0.96 U	0.99 U	0.99 U	0.96 U	0.99 U	0.97 U	0.96 U	0.97 U	0.99 U
n-Nitrosodiphenylamine	28	---	28	19 U	20 U	20 U	19 U	20 U	19 U	19 U	19 U	20 U
VOC (µg/kg)												
Ethylbenzene	10	---	---	0.8 U	0.8 U	0.9 U	0.8 U	1.0 U	0.9 U	1.0 U	0.9 U	0.9 U
Tetrachloroethene	57	---	---	0.8 U	0.8 U	0.9 U	0.8 U	1.0 U	0.9 U	1.0 U	0.9 U	0.9 U
Trichloroethene	160	---	---	0.8 U	0.8 U	0.9 U	0.8 U	1.0 U	0.9 U	5.2	0.9 U	0.9 U
m,p-Xylenes	---	---	---	0.8 U	0.8 U	0.9 U	0.8 U	1.0 U	0.9 U	1.0 U	0.9 U	0.9 U
o-Xylene	---	---	---	0.8 U	0.8 U	0.9 U	0.8 U	1.0 U	0.9 U	1.0 U	0.9 U	0.9 U
Xylene (total)	40	---	---	0.8 U	0.8 U	0.9 U	0.8 U	1 U	0.9 U	1 U	0.9 U	0.9 U
Organic Carbon Normalized (mg/kg-OC)[1]												
Total PCBs	---	38	---	4.87 U	3.94	7.96 U	4.37 U	13.3 U	14.4 U	12.2 U	35.5 U	19 U
alpha-BHC	---	10	---	0.123 U	0.0619 U	0.202 U	0.11 U	0.33 U	0.359 U	0.3 U	0.882 U	0.471 U

Notes:

1--Note that Total PCBs and alpha-BHC are provided for comparison with PSDDA Organic Carbon Normalized Criteria (mg/kg-OC)

J = The result is an estimated concentration less than method reporting limit (MRL) but greater than method detection limit (MDL).

U = The compound was analyzed for, but not detected at or above the MRL/MDL.

N-P = non-plastic

Table 4
Summary of Organic Carbon-Normalized Analytical Results and Comparison with Applicable SMS Evaluation Criteria

Location ID Sample ID Sample Date	SMS SQS	SMS CSL	BBW-C01 BBW-C01SD 11/04/2003	BBW-C02 BBW-C02SD 11/04/2003	BBW-C04 BBW-C04SD 11/04/2003
PCBs (mg/kg-OC)					
Total PCBs	12	65	4.9 U	3.9	4.4 U
SVOCs (mg/kg-OC)					
LPAHs					
Naphthalene	99	170	2.4 U	1.3 U	6.90
Acenaphthylene	66	66	2.4 U	1.3 U	2.2 U
Acenaphthene	16	57	2.4 U	1.3 U	6.7
Fluorene	23	79	2.4 U	1.3 U	6
Phenanthrene	100	480	2.4 U	4.5	25.3
Anthracene	220	1200	2.4 U	0.9 J	4.5
2-Methylnaphthalene	38	64	2.4 U	1.3 U	5.1
Total LPAH	370	780	2.4 U	5.4	49.3
HPAHs					
Fluoranthene	160	1200	3	13	26.4
Pyrene	1000	1400	4	17.5	39.1
Benzo(a)anthracene	110	270	2.2 J	13.8	24.1
Chrysene	110	460	3.7	18.8	36.8
Total benzofluoranthenes	230	450	7.8	61.3	100
Benzo(a)pyrene	99	210	2.7	28.8	46.0
Indeno(1,2,3-cd)pyrene	34	88	2.4 U	8.8	21.8
Dibenzo(a,h)anthracene	12	33	2.4 U	2.2	5.8
Benzo(g,h,i)perylene	31	78	2.4 U	5	13.8
Total HPAH	960	5300	23.3	169	314
Chlorinated Hydrocarbons					
1,4-Dichlorobenzene	3.1	9	0.1 U	0.1 U	0.1 U
1,2-Dichlorobenzene	2.3	2.3	0.1 U	0.1 U	0.1 U
1,2,4-Trichlorobenzene	0.81	1.8	0.54 U	0.3 U	0.48 U
Hexachlorobenzene	0.38	2.3	0.12 U	0.03 J	0.10 J
Phthalates					
Dimethylphthalate	53	53	2.4 U	3.7	2.2 U
Diethylphthalate	61	110	2.4 U	1.3 U	2.2 U
Di-n-butylphthalate	220	1700	2.4 U	1.3 U	2.2 U
Butylbenzylphthalate	4.9	64	2.4 U	1.3 U	2.2
bis(2-Ethylhexyl)phthalate	47	78	15.4	9.4	23
Di-n-octylphthalate	58	4500	2.4 U	1.3 U	2.2 U
Miscellaneous					
Dibenzofuran	15	58	2.4 U	1.3 U	4.6
Hexachlorobutadiene	3.9	6.2	0.1 U	0.1 U	0.1 U
n-Nitrosodiphenylamine	11	11	2.4 U	1.3 U	2.2 U

Notes:

J = The result is an estimated concentration less than method reporting limit (MRL) but greater than method detection limit (MDL).

U = The compound was analyzed for, but not detected at or above the MRL/MDL.