



THEA FOSS AND WHEELER-OSGOOD WATERWAYS REMEDIATION PROJECT

YEAR 0 BASELINE MONITORING SUPPLEMENTAL BASELINE NATURAL RECOVERY MONITORING PRELIMINARY FINDINGS MEMORANDUM

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Prepared for:

U.S. ENVIRONMENTAL PROTECTION AGENCY

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PRELIMINARY FINDINGS MEMORANDUM SUPPLEMENTAL BASELINE NATURAL RECOVERY MONITORING

INTRODUCTION

This memorandum presents the findings from Year 0, supplemental baseline natural recovery monitoring performed in the Thea Foss and Wheeler-Osgood Waterways. Supplemental baseline natural recovery area monitoring is required as part of Natural Recovery and Enhanced Natural Recovery Performance Monitoring specified in the EPA-approved Operations, Maintenance, and Monitoring Plan (OMMP) for the Thea Foss and Wheeler-Osgood Waterways Remediation Project (City of Tacoma 2006). The OMMP requires that supplemental baseline natural recovery area monitoring be conducted during Year 0 and that long-term natural recovery monitoring be performed during Years 2, 4, 7, and 10, as necessary, to verify that surface sediments in natural recovery areas satisfy performance criteria within the allowed 10-year time frame.

As described in the OMMP, surface sediment samples (0 to 10 cm) were collected from areas designated for natural recovery and enhanced natural recovery in the Thea Foss and Wheeler-Osgood Waterways. The baseline natural recovery area monitoring was performed in accordance with the OMMP. Provided with this memorandum are attachments that contain the field forms and photographs documenting observations during sample collection and the laboratory analytical report and data validation for sample analyses. The following sections summarize natural recovery area monitoring requirements and the results of supplemental baseline natural recovery area sampling and analysis performed.

SUMMARY OF NATURAL RECOVERY PERFORMANCE MONITORING REQUIREMENTS

The OMMP requires that surface sediment (0 to 10 cm) sampling and analysis be conducted in natural recovery and enhanced natural recovery areas to monitor the attenuation of chemical concentrations. The designated natural recovery and enhanced natural recovery areas to be monitored include the northern portions of Remedial Area (RA) 5 and RA 6, RA 7, most of the area north of the 11th Street Bridge to Station 20+00, the head of the Wheeler-Osgood Waterway located between RA 12 and RA 13, an area east of RA 16 and north of RA 15, and an area located east of RA 5 near the mouth of the Wheeler-Osgood Waterway extending from Station 41+50 to 46+50 (Figure 1). Additionally, slopes in the Wheeler-Osgood Waterway comprising RA 10, RA 11, and RA 13 were designated for natural recovery and slope rehabilitation during the Remedial Design phase of the project and will be monitored as part of the OMMP.

The OMMP specifies that natural recovery performance monitoring be conducted during Years 0 (baseline), 2, 4, 7, and 10, as necessary, to verify that surface sediments designated for natural recovery satisfy performance criteria within the allowed 10-year time frame. Year 0, or baseline monitoring, is comprised of a combination of the results of post-construction verification and supplemental surface samples.

Post-construction confirmation surface samples collected within the designated natural recovery areas adjacent to RA 2 and RA 4 and within the northern portions of RA 5, RA 6, and RA 7 are used to characterize natural recovery baseline conditions in these areas. The results of post-

construction confirmation surface samples used as baseline for natural recovery areas were presented in the Remedial Action Construction Report (RACR) for the Thea Foss and Wheeler-Osgood Waterways Remediation Project (City of Tacoma 2006) and will also be presented in the Baseline Year 0 Operations, Maintenance, and Monitoring Report. Supplemental baseline samples were required within designated natural recovery and enhanced natural recovery areas as part of Year 0 monitoring where there was insufficient existing post-construction data to complete the baseline characterization. Table 1 identifies the post-construction confirmation and supplemental samples that establish the baseline for natural recovery and enhanced natural recovery areas. Figure 1 identifies the baseline natural recovery and enhanced natural recovery area sample locations.

The results of Year 0 surface samples collected from natural recovery and enhanced natural recovery areas provide the baseline for evaluating the results of subsequent natural recovery monitoring. The results of subsequent natural recovery sampling and analysis will be compared to the baseline results to evaluate trends in chemical concentrations to identify if natural recovery and enhanced natural recovery areas will satisfy or have satisfied performance criteria within the allowed 10-year time frame.

SUMMARY OF FIELD ACTIVITIES AND OBSERVATIONS

Supplemental baseline natural recovery monitoring consisted of collection and analysis of surface samples (0 to 10 cm) from natural recovery and enhanced natural recovery areas in the Thea Foss and Wheeler-Osgood Waterways. A Van Veen sampler deployed from a boat was used to collect surface samples from the supplemental sampling locations in channel and harbor areas on October 23-24, 2006. Samples of shoreline areas in the Wheeler-Osgood Waterway were collected using a stainless steel spoon and bowl when the sample locations were exposed at a low tide on October 25, 2006. Sample collection forms and photographs documenting activities and observations were prepared during the field events and are presented in Attachment A.

The coordinates for sample locations in channel and harbor areas in the Thea Foss and Wheeler-Osgood Waterways were generated based on the locations identified on figures presented in the OMMP. During sample collection, the sampling vessel was maneuvered to the sample coordinates and a buoy was deployed to mark the sample location. Then the sampling vessel was maneuvered to the position of the buoy and the Van Veen sampler was deployed at the sample location. The actual sample coordinates where the sampler was deployed were collected at each location at the time of sample collection. The actual sample coordinates are provided on the field forms in Attachment A and actual sample locations are shown on Figure 1.

Samples collected from the shoreline of the Wheeler-Osgood Waterway are composites comprised of subsamples collected from three locations in each RA (i.e., RA 10, RA 11, and RA 13). The locations of the shoreline subsamples were established by installing stakes at each sample location prior to sample collection. Shoreline sample locations were established at the approximate mid-point of the slope at three evenly spaced locations within each RA (Figure 1). The approximate mid-point of the slope within each RA and at each sample location was identified from post-construction hydrographic surveys of the shoreline areas and locations identified on figures presented in the OMMP. Stakes were installed at the sample locations during low tides on October 18-19, 2006. Photographs of the shoreline sample location stakes within the Wheeler-Osgood Waterway are presented in Attachment A. The actual sample coordinates were collected at each location at the time of sample collection and are provided on the field forms in Attachment A. The actual sample locations are shown on Figure 1.

A quality control check was performed daily on the Global Positioning System (GPS) unit used to document sample location coordinates. The coordinates of known benchmarks were recorded from the GPS prior to initiation of sampling on each day. The coordinates of the benchmarks recorded by the GPS on the day of sampling were compared to the surveyed coordinates of the benchmarks. The recorded GPS readings were within 10 feet of the known benchmark coordinates as required in the OMMP.

Collection of supplemental baseline samples from channel and harbor areas within the Thea Foss and Wheeler-Osgood Waterways generally progressed from north to south. Samples were collected from sample locations NR-06, NR-07, NR-11, NR-16, NR-17, NR-19, and NR-20 on October 23, 2006, and from sample location NR-25 on October 24, 2006.

Samples collected in the natural recovery area north of the 11th Street Bridge (i.e., NR-06, NR-07, and NR-11) (Figure 1) consisted of a soft, olive to gray colored silt containing shells, worms, and worm tubes. Multiple casts were necessary to acquire sample material that was not over-penetrated by the sampler. No odor or sheen was detected in the samples collected from the area north of the 11th Street Bridge (Attachment A).

The sample collected from the enhanced natural recovery area in RA 7 (i.e., NR-16) consisted of approximately 1 cm of soft, olive to gray colored silt overlying the channel cap material placed during remedial actions in RA 7. No odor or sheen was detected in the sample collected from RA 7.

The sample collected from the natural recovery area located at the mouth of the Wheeler-Osgood Waterway (i.e., NR-17) consisted of olive to dark gray colored sand containing wood fibers and pieces. Worms were also observed in the sample. Additionally, a slight hydrogen sulfide odor and sheen spots were detected in the sample bowl after homogenization of the sample material.

The samples collected from the natural recovery area at the head of the Wheeler-Osgood Waterway, north and east of RA 12 (i.e., NR-19 and NR-20, respectively) consisted of olive to dark gray colored silt containing shells, mussels, barnacles, and worms. No sheen was observed in the samples collected from the head of the Wheeler-Osgood Waterway. A slight creosote odor was detected in the sample material collected from the area east of RA12 when the sample was homogenized in the sample bowl.

The sample collected from the natural recovery area west of RA 16 and north of RA 15 (i.e., NR-25) consisted of olive to dark gray colored silt containing shells and wood fibers and pieces. No sheen was observed in the sample collected from the area west of RA 16. A slight hydrogen sulfide odor was detected in the sample material.

Collection of supplemental baseline samples from shoreline areas in the Wheeler-Osgood Waterway generally progressed from sample locations with higher elevations to sample locations with lower elevations as the samples were collected as the tide receded. Samples were collected from three locations in RA-10 (i.e., SR-10-D1, SR-10-D2, and SR-10-D3), RA-11 (i.e., SR-11-D1, SR-11-D2, and SR-11-D3), and RA-13 (i.e., SR-13-D1, SR-13-D2, and SR-13-D3) and combined to comprise a composite for each RA. The samples were collected from shoreline areas in the Wheeler-Osgood Waterway on October 25, 2006 (Figure 1).

The samples collected from the natural recovery and slope rehabilitation areas on the shorelines of the Wheeler-Osgood Waterway consisted of an olive, dark gray, or brown colored sand with gravel or silt. Samples also contained wood pieces and shells. No odor or sheen was detected in the samples collected from the shorelines in the Wheeler-Osgood Waterway.

The following sections summarize the results and findings from the Year 0 baseline supplemental natural recovery monitoring.

SUMMARY OF ANALYTICAL RESULTS

The samples collected from natural recovery and enhanced natural recovery areas were analyzed by the City of Tacoma laboratory. The supplemental baseline natural recovery area samples were analyzed for conventionals, metals, semi-volatile organic compounds (SVOC), pesticides, and polychlorinated biphenyls (PCBs) in accordance with the OMMP (Table 2). The results of sample analysis are summarized in Table 3. The laboratory analytical report is provided in Attachment B.

Eleven samples from locations in natural recovery and enhanced natural recovery areas were analyzed to complete the baseline characterization of these areas. Additionally, three duplicate samples were collected, one on each day of sample collection activities, and analyzed for quality control. The detected chemical concentrations in the samples are compared to the Sediment Quality Objectives (SQOs) to identify the baseline conditions.

Detected chemical concentrations were less than the SQOs in the samples collected from the northeast and northwest portions of the natural recovery area north of the 11th Street Bridge (i.e., NR-06 and NR-07, respectively) (Table 3 and Figure 1). Only bis(2-ethylhexyl)phthalate (BEHP) was detected at concentrations greater than the SQOs in the remaining sample collected from the natural recovery area north of the 11th Street Bridge (i.e., NR-11). The detected concentration of BEHP was approximately 1.5 times the SQO. The detected concentrations of most chemicals in samples collected north of the 11th Street Bridge were less than one-half the SQO. Benzyl alcohol was qualified as not detected at a concentration that was greater than the SQO in two samples collected north of the 11th Street Bridge because benzyl alcohol was detected in the associated laboratory method blank sample.

Relatively few chemicals were detected in the sample collected from the enhanced natural recovery area located south of the 11th Street Bridge (i.e., NR-16). All of the detected chemicals were at concentrations that were substantially less than the SQOs.

One chemical was detected at a concentration greater than the SQO in the sample collected from the natural recovery area located at the mouth of the Wheeler-Osgood Waterway (i.e., NR-17). Pyrene was detected at approximately 1.25 times the SQO.

Three chemicals were detected at concentrations greater than the SQOs in the sample collected in the natural recovery area located in the head of the Wheeler-Osgood Waterway, north of RA-12 (i.e., NR-19). Benzo(a)anthracene, pyrene, and N-nitrosodiphenylamine were detected at concentrations that were at or below two times the SQOs.

A sample and sample duplicate were submitted for analysis from the natural recovery area located in the head of the Wheeler-Osgood Waterway, east of RA-12. Three chemicals were detected in both the parent sample and sample duplicate at concentrations exceeding the SQOs. BEHP, 1,2-dichlorobenzene, and PCBs were detected in both samples at similar

concentrations, concentrations less than two times the SQOs. Multiple polycyclic aromatic hydrocarbons (PAHs) were detected in the parent sample at concentrations exceeding the SQOs but were not detected in the sample duplicate at similar concentrations. PAH concentrations detected in the duplicate sample were generally less than one-half the SQOs. The similarity in chemical concentrations between the parent sample and sample duplicate, except for the concentrations of PAHs, indicates that the PAHs were likely present in a subcomponent of the sample, a piece of creosote treated wood for example, and not homogenous within the sediment matrix. Additionally, benzyl alcohol was qualified as not detected at a concentration that was greater than the SQO in the parent sample because benzyl alcohol was detected in the associated laboratory method blank sample.

A sample and sample duplicate were also submitted for analysis from the natural recovery area located east of RA-16 and north of RA-15. Mercury, PAHs, butylbenzyl phthalate, and BEHP were detected in both samples at concentrations exceeding the SQOs. The detected concentrations of mercury, PAHs, and butylbenzyl phthalate were at or below twice the SQOs for these chemicals. The detected concentration of BEHP was between two and three times the SQO.

Relatively few chemicals were detected in the samples collected from the slope rehabilitation natural recovery areas located along the shoreline within the Wheeler-Osgood Waterway (i.e., SR-10, SR-11, and SR-13). All of the detected chemical concentrations were substantially less than the SQOs.

The results for Year 0 supplemental natural recovery sample analysis presented above characterize the baseline for the areas sampled. The results of the baseline natural recovery monitoring will be used as the basis for comparison to the results of subsequent natural recovery and enhanced natural recovery performance monitoring.

SUMMARY OF DATA QUALITY

Data validation was performed on the results of analyses on supplemental natural recovery area samples in accordance with the OMMP. The resulting data validation reports are presented in Attachment B. All data are considered valid and acceptable for use. All qualifiers resulting from data validation are presented in the summary of analytical results provided in Table 3.

Some deviations from performance goals were identified as a result of matrix interferences. As outlined in the OMMP, multiple re-analyses were performed on sample extracts in order to meet performance criteria. Additional cleanups were also performed in an effort to increase analytical accuracy. Deviations from performance goals are identified in the data validation reports and generally resulted in the data being qualified as an estimate (i.e., J qualifier).

SUMMARY OF PRELIMINARY FINDINGS

The following summarizes the results and preliminary findings for the Year 0, baseline supplemental natural recovery sampling and analysis performed in the Thea Foss and Wheeler-Osgood Waterways:

- No chemicals were detected at concentrations greater than the SQOs in the samples collected from the northeast and northwest portions of the natural recovery area north of the 11th Street Bridge (i.e., NR-06 and NR-07), from the enhanced natural recovery area

south of the 11th Street Bridge (i.e., NR-16), and from the slope rehabilitation natural recovery areas along the shorelines in the Wheeler-Osgood Waterway (i.e., SR-10, SR-11, and SR-13);

- Detected chemical concentrations that were greater than the SQO were predominantly at or below twice the SQO in samples collected from the remaining five sample locations; and
- The results of analyses of the sample and sample duplicate collected from the head of the Wheeler-Osgood Waterway east of RA-12 were similar except for PAHs that were detected in the parent sample at concentrations exceeding the SQOs but were not detected at concentrations exceeding the SQOs in the duplicate sample. The detected concentrations of PAHs in the parent sample were likely present in a subcomponent of the sample, a piece of creosote treated wood for example, and not homogenous within the sediment matrix.

The results of Year 0 supplemental natural recovery sampling and analysis characterize the baseline for the areas sampled. The results from Year 0 supplemental natural recovery monitoring will be combined with the results from construction verification sampling performed in natural recovery areas and presented in the Baseline Operations, Maintenance, and Monitoring Report to provide a comprehensive baseline for all natural recovery and enhanced natural recovery areas within the Thea Foss and Wheeler-Osgood Waterways. The results of baseline natural recovery monitoring will be used as the basis for comparison to the results of subsequent natural recovery and enhanced natural recovery performance monitoring conducted in accordance with the OMMP.

**Table 1
Post-Construction Verification and Supplemental Baseline
Natural Recovery Samples**

Area	Remedial Action	Post-Construction Verification Samples Used for Baseline	Supplemental Baseline Natural Recovery Samples	Supplemental Baseline Sample Collection Date			
North of 11th Street Bridge	Natural Recovery	RA-02-004	NR-06	October 23, 2006			
		RA-02-006					
		RA-02-007					
		RA-02-008					
				RA-02-009	NR-07	October 23, 2006	
				RA-04-005			
				RA-04-006			
				RA-04-007	NR-11		October 23, 2006
				RA-04-008			
				RA-04-009			
		RA-04-010					
		RA-04-011					
RA-04-012							
Northern Portion of RA5	Natural Recovery	RA-05-002	None	NA			
		RA-05-009					
		RA-05-010					
Northern Portion of RA6	Natural Recovery	RA-06-001	None	NA			
		RA-06-014					
		RA-06-015					
RA 7	Enhanced Natural Recovery	RA-07-001	NR-16	October 23, 2006			
Mouth of the Wheeler-Osgood Waterway	Natural Recovery	None	NR-17	October 23, 2006			
Shoreline of the Wheeler-Osgood Waterway	Slope Rehabilitation / Natural Recovery	None	SR-10	October 25, 2006			
			SR-11	October 25, 2006			
			SR-13	October 25, 2006			
Head of the Wheeler-Osgood Waterway	Natural Recovery	None	NR-19	October 23, 2006			
			NR-20	October 23, 2006			
Harbor Area Adjacent to RA 15 and RA 16	Natural Recovery	None	NR-25	October 24, 2006			

Table 2
Summary of Parameters for Sediment Sample Analysis

Parameters	Analyte	SQO	Analytical Method
Conventionals	Total Organic Carbon in %	NA	EPA Method 9060
	Total Solids in %	NA	PSEP 1997
Metals	Antimony	150 mg/kg	EPA Method 6010B
	Arsenic	57 mg/kg	
	Cadmium	5.1 mg/kg	
	Copper	390 mg/kg	
	Lead	450 mg/kg	
	Nickel	140 mg/kg	
	Silver	6.1 mg/kg	
	Zinc	410 mg/kg	
	Mercury	0.59 mg/kg	EPA Method 7471A
Semi-Volatile Organic Compounds	2-Methylnaphthalene	670 µg/kg	EPA Method 8270C
	Acenaphthene	500 µg/kg	
	Acenaphthylene	1,300 µg/kg	
	Anthracene	960 µg/kg	
	Fluorene	540 µg/kg	
	Naphthalene	2,100 µg/kg	
	Phenanthrene	1,500 µg/kg	
	Total LPAHs	5,200 µg/kg	
	Benzo(a)Anthracene	1,600 µg/kg	
	Benzo(a)Pyrene	1,600 µg/kg	
	Benzo(b)Fluoranthene	NA	
	Benzo(k)Fluoranthene	NA	
	Total Benzofluoranthenes	3,600 µg/kg	
	Benzo(g,h,i)Perylene	720 µg/kg	
	Chrysene	2,800 µg/kg	
	Dibenz(a,h)Anthracene	230 µg/kg	
	Fluoranthene	2,500 µg/kg	
	Indeno(1,2,3-c,d)Pyrene	690 µg/kg	
	Pyrene	3,300 µg/kg	
	Total HPAHs	17,000 µg/kg	
	Dimethylphthalate	160 µg/kg	
	Diethylphthalate	200 µg/kg	
	Di-n-butylphthalate	1,400 µg/kg	
	Butylbenzylphthalate	900 µg/kg	

Parameters	Analyte	SQO	Analytical Method
Semi-Volatile Organic Compounds	Bis(2-Ethylhexyl)Phthalate	1,300 µg/kg	EPA Method 8270C
	Di-n-octylphthalate	6,200 µg/kg	
	Phenol	420 µg/kg	
	2-Methylphenol	63 µg/kg	
	4-Methylphenol	670 µg/kg	
	2,4-Dimethylphenol	29 µg/kg	
	Pentachlorophenol	360 µg/kg	
	Benzyl alcohol	73 µg/kg	
	Benzoic acid	650 µg/kg	
	1,2-Dichlorobenzene	50 µg/kg	
	1,3-Dichlorobenzene	170 µg/kg	
	1,4-Dichlorobenzene	110 µg/kg	
	1,2,4-Trichlorobenzene	51 µg/kg	
	Hexachlorobenzene	22 µg/kg	
	Dibenzofuran	540 µg/kg	
Hexachlorobutadiene	11 µg/kg		
N-Nitrosodiphenylamine	28 µg/kg		
Pesticides	4,4'-DDD	16 µg/kg	EPA Method 8270C
	4,4'-DDE	9 µg/kg	
	4,4'-DDT	34 µg/kg	
PCBs	PCB-1016	NA	EPA Method 8270C
	PCB-1221	NA	
	PCB-1232	NA	
	PCB-1242	NA	
	PCB-1248	NA	
	PCB-1254	NA	
	PCB-1260	NA	
	Total PCBs	300 µg/kg	

Table 3
Summary of Supplemental Baseline Natural Recovery Area Sample Results

Parameter	Station		NR-06		NR-07		NR-11		NR-16		NR-17		NR-19	
	Sample ID		NR-06-Y0-D		NR-07-Y0-D		NR-11-Y0-D		NR-16-Y0-D		NR-17-Y0-D		NR-19-Y0-D	
	Sample Date		10/23/2006	Enrichment										
	Sample Depth		0 to 10 cm	Ratio										
	Units	SQO												
Conventionals														
Total Organic Carbon	mg/kg	NA	21,900	NA	22,600	NA	25,800	NA	21,600	NA	46,600	NA	27,700	NA
Total Solids	%	NA	47.7	NA	46	NA	45.5	NA	83.7	NA	62.8	NA	63.2	NA
Metals														
Antimony	mg/kg	150	6 U	NA	6 U	NA	6 U	NA	0.76 U	NA	0.8 U	NA	6 U	NA
Arsenic	mg/kg	57	10.2	0.18	9.83	0.17	11.4	0.20	3.33	0.06	4.75	0.08	6.23	0.11
Cadmium	mg/kg	5.1	0.926	0.18	0.897	0.18	1.17	0.23	0.238	0.05	0.554	0.11	0.529	0.10
Copper	mg/kg	390	80.4 J	0.21	83 J	0.21	96.8 J	0.25	20.9 J	0.05	62 J	0.16	49.6 J	0.13
Lead	mg/kg	450	55.8	0.12	51.4	0.11	69.2	0.15	7.95	0.02	26.7	0.06	41.5	0.09
Nickel	mg/kg	140	17.6	0.13	15.7	0.11	18.7	0.13	13.3	0.10	9.41	0.07	12.6	0.09
Silver	mg/kg	6.1	0.22 U	NA	0.2 U	NA	0.22 U	NA	0.21 U	NA	0.22 U	NA	0.21 U	NA
Zinc	mg/kg	410	102	0.25	109	0.27	130	0.32	35.3	0.09	65.6	0.16	84	0.20
Mercury	mg/kg	0.59	0.298	0.51	0.317	0.54	0.407	0.69	0.029 U	NA	0.032 U	NA	0.099	0.17
SVOCs														
2-Methylnaphthalene	µg/kg	670	160	0.24	150	0.22	150	0.22	99 U	NA	410	0.61	400	0.60
Acenaphthene	µg/kg	500	100 U	NA	100 U	NA	100 U	NA	99 U	NA	99 U	NA	140	0.28
Acenaphthylene	µg/kg	1,300	100 U	NA	100 U	NA	100 U	NA	99 U	NA	99 U	NA	260	0.20
Anthracene	µg/kg	960	260	0.27	210	0.22	230	0.24	99 U	NA	520	0.54	420	0.44
Fluorene	µg/kg	540	110	0.20	100 U	NA	110	0.20	99 U	NA	300	0.56	100 U	NA
Naphthalene	µg/kg	2,100	290	0.14	260	0.12	270	0.13	99 U	NA	420	0.20	510	0.24
Phenanthrene	µg/kg	1,500	510	0.34	470	0.31	560	0.37	99 U	NA	1,300	0.87	950	0.63
Total LPAH	µg/kg	5,200	1,400	0.27	1,200	0.23	1,400	0.27	350 U	NA	3,000	0.58	2,700	0.52
Benzo(a)anthracene	µg/kg	1,600	500	0.31	450	0.28	550	0.34	99 U	NA	440	0.28	1900	1.19
Benzo(a)pyrene	µg/kg	1,600	520	0.33	510	0.32	620	0.39	99 U	NA	380	0.24	920	0.58
Benzofluoranthenes (total)	µg/kg	3,600	1,100	0.31	1,100	0.31	1,400	0.39	99	0.03	630	0.18	1,600	0.44
Benzo(g,h,i)perylene	µg/kg	720	360	0.50	330	0.46	400	0.56	99 U	NA	200	0.28	430	0.60
Chrysene	µg/kg	2,800	620	0.22	620	0.22	700	0.25	99 U	NA	580	0.21	2,300	0.82
Dibenzo(a,h)anthracene	µg/kg	230	100 U	NA	100 U	NA	100 U	NA	99 U	NA	99 U	NA	130	0.57
Fluoranthene	µg/kg	2,500	810	0.32	770	0.31	900	0.36	99 U	NA	1,000	0.40	2,000	0.80
Indeno(1,2,3-cd)pyrene	µg/kg	690	270	0.39	270	0.39	300	0.43	99 U	NA	160	0.23	360	0.52
Pyrene	µg/kg	3,300	1,800	0.55	1,800	0.55	2,400	0.73	99 U	NA	4,100	1.24	6,800	2.06
Total HPAH	µg/kg	17,000	6,100	0.36	5,800	0.34	7,300	0.43	450 U	NA	7,500	0.44	16,000	0.94
Dimethyl phthalate	µg/kg	160	10	0.06	16	0.10	18	0.11	1.2	0.01	4 U	NA	9.6	0.06
Diethylphthalate	µg/kg	200	100 U	NA	100 U	NA	100 U	NA	99 U	NA	99 U	NA	100 U	NA
Di-n-butyl phthalate	µg/kg	1,400	100 U	NA	100 U	NA	100 U	NA	99 U	NA	99 U	NA	100 U	NA
Butyl benzyl phthalate	µg/kg	900	240	0.27	290	0.32	480	0.53	99 U	NA	99 U	NA	230	0.26
bis(2-ethylhexyl)phthalate	µg/kg	1,300	730	0.56	1,000	0.77	2,000	1.54	230	0.18	330	0.25	720	0.55
Di-n-octyl phthalate	µg/kg	6,200	100 U	NA	100 U	NA	100 U	NA	99 U	NA	99 U	NA	100 U	NA
Phenol	µg/kg	420	100 U	NA	100 U	NA	100 U	NA	99 U	NA	99 U	NA	100 U	NA
2-Methylphenol	µg/kg	63	4 UJ	NA	4 UJ	NA	4 UJ	NA	1 UJ	NA	4 UJ	NA	4 UJ	NA
3- & 4-Methylphenol	µg/kg	670	100 U	NA	100 U	NA	100 U	NA	99 U	NA	99 U	NA	100 UJ	NA
2,4-Dimethylphenol	µg/kg	29	18 J	0.62	18 J	0.62	19 J	0.66	1 UJ	NA	21 J	0.72	4 UJ	NA
Pentachlorophenol	µg/kg	360	4 UJ	NA	76	0.21	4 UJ	NA	1 U	NA	4 U	NA	77 J	0.21
Benzyl alcohol	µg/kg	73	69 UJ	NA	75 U	NA	81 UJ	NA	20 U	NA	42 U	NA	62 UJ	NA
Benzoic acid	µg/kg	650	170 UJ	NA	170 UJ	NA	190 UJ	NA	48 UJ	NA	190 UJ	NA	170 UJ	NA
1,2-Dichlorobenzene	µg/kg	50	4 U	NA	4 U	NA	4 U	NA	1 U	NA	4 U	NA	6	0.12
1,3-Dichlorobenzene	µg/kg	170	4 U	NA	4 U	NA	4 U	NA	1 U	NA	4 U	NA	4 U	NA
1,4-Dichlorobenzene	µg/kg	110	11	0.10	15	0.14	21	0.19	1.2	0.01	6.3	0.06	8.8	0.08
1,2,4-Trichlorobenzene	µg/kg	51	4 U	NA	4 U	NA	4 U	NA	1 U	NA	4 U	NA	4 U	NA
Hexachlorobenzene	µg/kg	22	4 U	NA	4 U	NA	4 U	NA	1 U	NA	4 U	NA	4 U	NA
Dibenzofuran	µg/kg	540	100 U	NA	100 U	NA	100 U	NA	99 U	NA	130	0.24	120	0.22
Hexachlorobutadiene	µg/kg	11	4 U	NA	4 U	NA	4 U	NA	1 U	NA	4 U	NA	4 U	NA
N-Nitrosodiphenylamine	µg/kg	28	17	0.61	13	0.46	12	0.43	2	0.07	18	0.64	30	1.07

Table 3
Summary of Supplemental Baseline Natural Recovery Area Sample Results

Parameter	Station		NR-06		NR-07		NR-11		NR-16		NR-17		NR-19	
	Sample ID		NR-06-Y0-D		NR-07-Y0-D		NR-11-Y0-D		NR-16-Y0-D		NR-17-Y0-D		NR-19-Y0-D	
	Sample Date		10/23/2006	Enrichment										
	Sample Depth		0 to 10 cm	Ratio										
	Units	SQO												
Pesticides														
4,4'-DDD	µg/kg	16	4 U	NA	4 U	NA	4 U	NA	1 U	NA	4 U	NA	4 U	NA
4,4'-DDE	µg/kg	9	4 U	NA	4 U	NA	4 U	NA	1 U	NA	4 U	NA	4 U	NA
4,4'-DDT	µg/kg	34	4 U	NA	4 U	NA	4 U	NA	1 U	NA	4 U	NA	4 U	NA
PCBs														
PCB-1016	µg/kg	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA
PCB-1221	µg/kg	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA
PCB-1232	µg/kg	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA
PCB-1242	µg/kg	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA
PCB-1248	µg/kg	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA
PCB-1254	µg/kg	NA	150 J	NA	140 J	NA	200 J	NA	20 U	NA	20 U	NA	110 J	NA
PCB-1260	µg/kg	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA
PCBs (total)	µg/kg	300	150 J	0.50	140 J	0.47	200 J	0.67	20 U	NA	20 U	NA	110 J	0.37

Notes:

Concentrations highlighted in red exceed the SQO.

NA: Not applicable

Qualifiers:

U - Undetected

J - The analyte was analyzed for and positively identified, but the associated numerical value is an estimate.

UJ - The analyte was analyzed for and not detected but the associated numerical value is an estimate.

Table 3
Summary of Supplemental Baseline Natural Recovery Area Sample Results

Parameter	Station		NR-20				NR-25				SR-10		SR-11				SR-13	
	Sample ID		NR-20-Y0-D		NR-20-Y0-D1		NR-25-Y0-D		NR-25-Y0-D1		SR-10-Y0-D		SR-11-Y0-D		SR-11-Y0-D4		SR-13-Y0-D	
	Sample Date		10/23/2006	Enrichment	10/23/2006	Enrichment	10/24/2006	Enrichment	10/24/2006	Enrichment	10/25/2006	Enrichment	10/25/2006	Enrichment	10/25/2006	Enrichment	10/25/2006	Enrichment
	Sample Depth		0 to 10 cm	Ratio	0 to 10 cm	Ratio	0 to 10 cm	Ratio	0 to 10 cm	Ratio	0 to 10 cm	Ratio	0 to 10 cm	Ratio	0 to 10 cm	Ratio	0 to 10 cm	Ratio
	Units	SQO																
Conventionals																		
Total Organic Carbon	mg/kg	NA	36,900	NA	35,600	NA	90,300	NA	95,100	NA	10,600	NA	3,590	NA	3,820	NA	6,040	NA
Total Solids	%	NA	56.5	NA	57.7	NA	35.8	NA	36.5	NA	79.2	NA	76.4	NA	76.3	NA	78.7	NA
Metals																		
Antimony	mg/kg	150	6 U	NA	6 U	NA	7.45	0.05	6 U	NA	6 U	NA	6 U	NA	0.79 U	NA	0.79 U	NA
Arsenic	mg/kg	57	9.62	0.17	10.6	0.19	31.4	0.55	22.8	0.40	5.81	0.10	4.23	0.07	4.29	0.08	3.93	0.07
Cadmium	mg/kg	5.1	0.952	0.19	0.994	0.19	2.36	0.46	1.96	0.38	0.249	0.05	0.251	0.05	0.251	0.05	0.285	0.06
Copper	mg/kg	390	87 J	0.22	88.8 J	0.23	173 J	0.44	136 J	0.35	31 J	0.08	25.4 J	0.07	18.3 J	0.05	27.8 J	0.07
Lead	mg/kg	450	67.4	0.15	75.7	0.17	130	0.29	108	0.24	52	0.12	18.5	0.04	13.4	0.03	14.9	0.03
Nickel	mg/kg	140	15.6	0.11	17.3	0.12	19.9	0.14	17.3	0.14	13.3	0.10	10.8	0.08	9.91	0.07	16.4	0.12
Silver	mg/kg	6.1	0.22 U	NA	0.22 U	NA	0.22 U	NA	0.22 U	NA	0.21 U	NA	0.21 U	NA	0.22 U	NA	0.22 U	NA
Zinc	mg/kg	410	167	0.41	178	0.43	254	0.62	206	0.50	77.6	0.19	56	0.14	52	0.13	58.1	0.14
Mercury	mg/kg	0.59	0.175	0.30	0.173	0.29	0.602	1.02	0.771	1.31	0.056	0.09	0.016 U	NA	0.014 U	NA	0.052	0.09
SVOCs																		
2-Methylnaphthalene	µg/kg	670	500	0.75	360		320	0.48	310	0.46	99 U	NA	84 U	NA	100 U	NA	96 U	NA
Acenaphthene	µg/kg	500	820	1.64	100 U	NA	280	0.56	250	0.50	99 U	NA	84 U	NA	100 U	NA	96 U	NA
Acenaphthylene	µg/kg	1,300	100 U	NA	100 U	NA	170	0.13	130	0.10	99 U	NA	84 U	NA	100 U	NA	96 U	NA
Anthracene	µg/kg	960	1,700	1.77	250	0.26	720	0.75	640	0.67	140	0.15	84 U	NA	100 U	NA	96 U	NA
Fluorene	µg/kg	540	1,100	2.04	140	0.26	350	0.65	320	0.59	99 U	NA	84 U	NA	100 U	NA	96 U	NA
Naphthalene	µg/kg	2,100	360	0.17	330	0.16	790	0.38	740	0.35	130	0.06	84 U	NA	100 U	NA	96 U	NA
Phenanthrene	µg/kg	1,500	7,800	5.20	640	0.43	1,800	1.20	1,500	1.00	480	0.32	84 U	NA	100 U	NA	96 U	NA
Total LPAH	µg/kg	5,200	12,000	2.31	1,800	0.35	4,500	0.87	3,900	0.75	950	0.18	290 U	NA	350 U	NA	340 U	NA
Benzo(a)anthracene	µg/kg	1,600	2700	1.69	780	0.49	1700	1.06	1700	1.06	390	0.24	84 U	NA	100 U	NA	96 U	NA
Benzo(a)pyrene	µg/kg	1,600	1,500	0.94	540	0.34	1,400	0.88	1,300	0.81	340	0.21	84 U	NA	100 U	NA	96 U	NA
Benzofluoranthenes (total)	µg/kg	3,600	3,400	0.94	1,300	0.36	3,200	0.89	3,400	0.94	650	0.18	100	0.03	140		180	0.05
Benzo(g,h,i)perylene	µg/kg	720	870	1.21	340	0.47	820	1.14	640	0.89	170	0.24	84 U	NA	100 U	NA	96 U	NA
Chrysene	µg/kg	2,800	2,700	0.96	1,100	0.39	2,400	0.86	2,100	0.75	520	0.19	84 U	NA	100 U	NA	130	0.05
Dibenzo(a,h)anthracene	µg/kg	230	200	0.87	100	0.43	180	0.78	140	0.61	99 U	NA	84 U	NA	100 U	NA	96 U	NA
Fluoranthene	µg/kg	2,500	3,900	1.56	850	0.34	2,500	1.00	2,900	1.16	740	0.30	84 U	NA	100 U	NA	150	0.06
Indeno(1,2,3-cd)pyrene	µg/kg	690	670	0.97	260	0.38	650	0.94	520	0.75	140	0.20	84 U	NA	100 U	NA	96 U	NA
Pyrene	µg/kg	3,300	7,600	2.30	2,000	0.61	6,900	2.09	7,100	2.15	1,500	0.45	130	0.04	140	0.04	200	0.06
Total HPAH	µg/kg	17,000	24,000	1.41	7,400	0.44	20,000	1.18	20,000	1.18	4,400	0.26	524	0.03	630	0.04	900	0.05
Dimethyl phthalate	µg/kg	160	27	0.17	47	0.29	87	0.54	46	0.29	4 U	NA	1.5	0.01	1	0.01	10	0.06
Diethylphthalate	µg/kg	200	100 U	NA	100 U	NA	100 U	NA	170	0.85	99 U	NA	84 U	NA	100 U	NA	96 U	NA
Di-n-butyl phthalate	µg/kg	1,400	100 U	NA	100	0.07	100 U	NA	100 U	NA	99 U	NA	84 U	NA	100 U	NA	96 U	NA
Butyl benzyl phthalate	µg/kg	900	520	0.58	480	0.53	1,400	1.56	1,400	1.56	99 U	NA	84 U	NA	100 U	NA	170	0.19
bis(2-ethylhexyl)phthalate	µg/kg	1,300	1,600	1.23	1,600	1.23	3,600	2.77	2,700	2.08	190	0.15	84 U	NA	100 U	NA	380	0.29
Di-n-octyl phthalate	µg/kg	6,200	100 U	NA	100 U	NA	100 U	NA	100 U	NA	99 U	NA	84 U	NA	100 U	NA	96 U	NA
Phenol	µg/kg	420	100 UJ	NA	100 J	0.24	100 U	NA	100 U	NA	99 U	NA	84 U	NA	100 UJ	NA	100 U	NA
2-Methylphenol	µg/kg	63	4 UJ	NA	4 UJ	NA	4 UJ	NA	4 UJ	NA	4 UJ	NA	1 UJ	NA	1 UJ	NA	4 UJ	NA
3- & 4-Methylphenol	µg/kg	670	100 UJ	NA	100 U	NA	100 U	NA	100 U	NA	99 U	NA	84 U	NA	100 UJ	NA	96 U	NA
2,4-Dimethylphenol	µg/kg	29	4 UJ	NA	4 UJ	NA	4 UJ	NA	4 UJ	NA	4 UJ	NA	1 UJ	NA	1 UJ	NA	4 UJ	NA
Pentachlorophenol	µg/kg	360	4 UJ	NA	4 UJ	NA	4 U	NA	4 U	NA	4 U	NA	1 UJ	NA	1 UJ	NA	4 U	NA
Benzyl alcohol	µg/kg	73	79 UJ	NA	71 UJ	NA	4 U	NA	4 U	NA	55 U	NA	27 UJ	NA	33 UJ	NA	51 U	NA
Benzoic acid	µg/kg	650	170 UJ	NA	190 UJ	NA	80 UJ	NA	80 UJ	NA	170 UJ	NA	51 UJ	NA	51 UJ	NA	150 UJ	NA
1,2-Dichlorobenzene	µg/kg	50	91	1.82	85	1.70	7.6	0.15	6.4	0.13	4 U	NA	1 U	NA	1 U	NA	4 U	NA
1,3-Dichlorobenzene	µg/kg	170	6	0.04	4.8	0.03	4 U	NA	4 U	NA	4 U	NA	1 U	NA	1 U	NA	4 U	NA
1,4-Dichlorobenzene	µg/kg	110	63	0.57	44	0.40	28	0.25	28	0.25	4 U	NA	1.3	0.01	1.1	0.01	4 U	NA
1,2,4-Trichlorobenzene	µg/kg	51	6.8	0.13	4.8	0.09	4 U	NA	4 U	NA	4 U	NA	1 U	NA	1 U	NA	4 U	NA
Hexachlorobenzene	µg/kg	22	4 U	NA	4 U	NA	4 U	NA	4 U	NA	4 U	NA	1 U	NA	1 U	NA	4 U	NA
Dibenzofuran	µg/kg	540	270	0.50	100 U	NA	240	0.44	240	0.44	99 U	NA	84 U	NA	100 U	NA	96 U	NA
Hexachlorobutadiene	µg/kg	11	4 U	NA	4 U	NA	4 U	NA	4 U	NA	4 U	NA	1 U	NA	1 U	NA	4 U	NA
N-Nitrosodiphenylamine	µg/kg	28	4 U	NA	4 U	NA	4 U	NA	4 U	NA	14	0.50	3.1	0.11	3.3	0.12	6.8	0.24

Table 3
Summary of Supplemental Baseline Natural Recovery Area Sample Results

Parameter	Station	NR-20				NR-25				SR-10		SR-11				SR-13		
	Sample ID	NR-20-Y0-D		NR-20-Y0-D1		NR-25-Y0-D		NR-25-Y0-D1		SR-10-Y0-D		SR-11-Y0-D		SR-11-Y0-D4		SR-13-Y0-D		
	Sample Date	10/23/2006	Enrichment	10/23/2006	Enrichment	10/24/2006	Enrichment	10/24/2006	Enrichment	10/25/2006	Enrichment	10/25/2006	Enrichment	10/25/2006	Enrichment	10/25/2006	Enrichment	
	Sample Depth	0 to 10 cm	Ratio	0 to 10 cm	Ratio	0 to 10 cm	Ratio	0 to 10 cm	Ratio	0 to 10 cm	Ratio	0 to 10 cm	Ratio	0 to 10 cm	Ratio	0 to 10 cm	Ratio	
	Units	SQO																
Pesticides																		
4,4'-DDD	µg/kg	16	4 U	NA	4 U	NA	4 U	NA	4 U	NA	4 U	NA	1 U	NA	1 U	NA	4 U	NA
4,4'-DDE	µg/kg	9	4 U	NA	4 U	NA	4 U	NA	4 U	NA	4 U	NA	1 U	NA	1 U	NA	4 U	NA
4,4'-DDT	µg/kg	34	4 U	NA	4 U	NA	4 U	NA	4 U	NA	4 U	NA	1 U	NA	1 U	NA	4 U	NA
PCBs																		
PCB-1016	µg/kg	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA
PCB-1221	µg/kg	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA
PCB-1232	µg/kg	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA
PCB-1242	µg/kg	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA
PCB-1248	µg/kg	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA
PCB-1254	µg/kg	NA	350 J	NA	490 J	NA	270 J	NA	290 J	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA
PCB-1260	µg/kg	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA	20 U	NA
PCBs (total)	µg/kg	300	350 J	1.17	490 J	1.63	270 J	0.90	290 J	0.97	20 U	NA	20 U	NA	20 U	NA	20 U	NA

Notes:
Concentrations highlighted in red exceed the SQO.
NA: Not applicable
Qualifiers:
U - Undetected
J - The analyte was analyzed for and positively identified
UJ - The analyte was analyzed for and not detected but

Legend

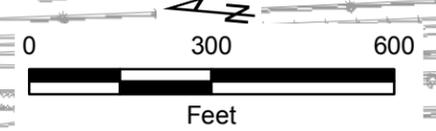
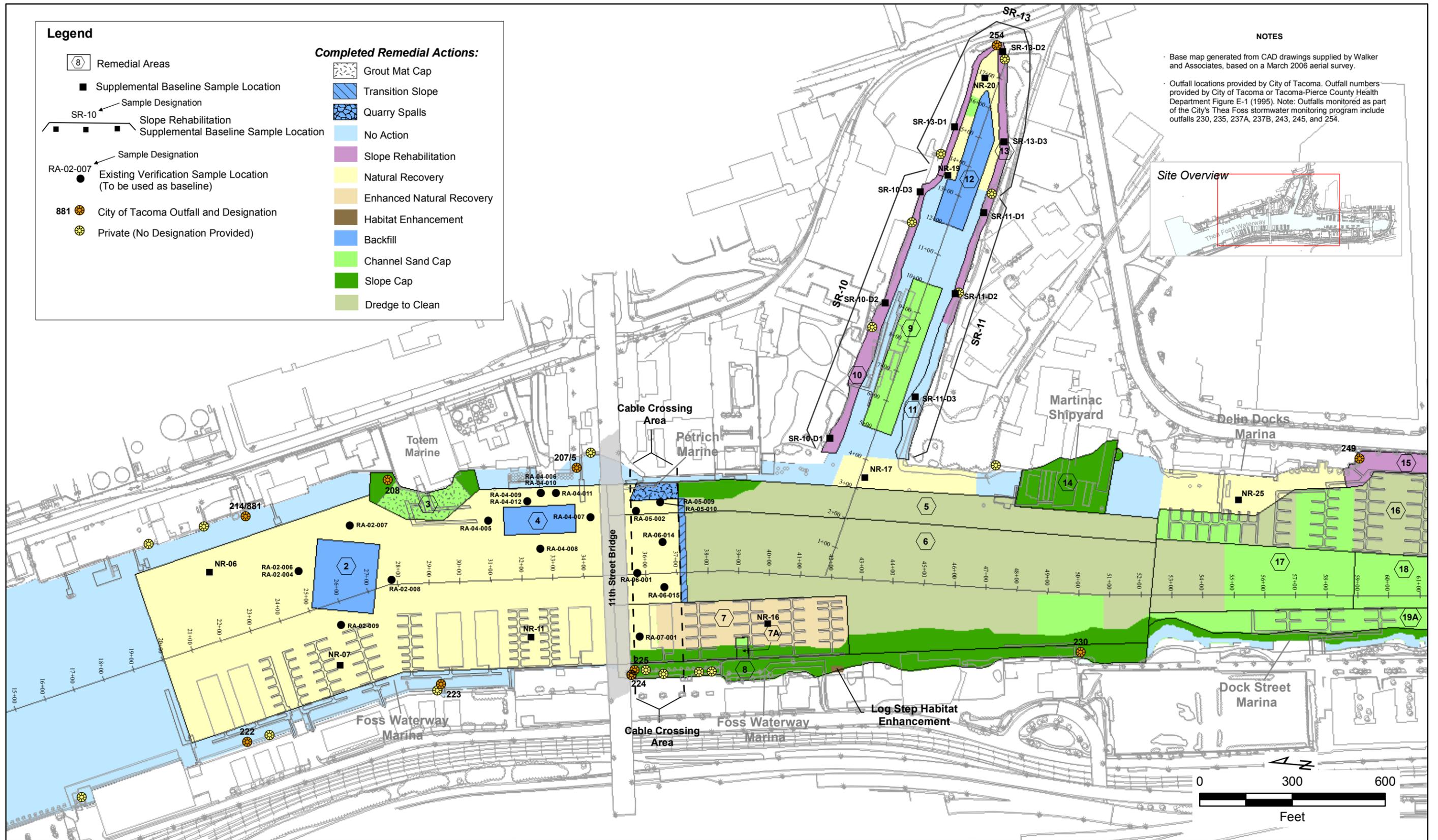
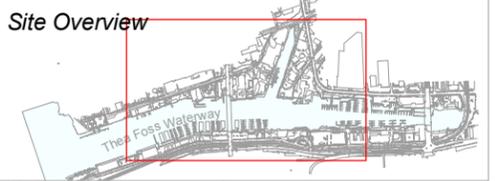
- ⑧ Remedial Areas
- Supplemental Baseline Sample Location
- SR-10 Sample Designation
- SR-10 Supplemental Baseline Sample Location
- RA-02-007 Sample Designation
- Existing Verification Sample Location (To be used as baseline)
- 881 City of Tacoma Outfall and Designation
- Private (No Designation Provided)

Completed Remedial Actions:

- Grout Mat Cap
- Transition Slope
- Quarry Spalls
- No Action
- Slope Rehabilitation
- Natural Recovery
- Enhanced Natural Recovery
- Habitat Enhancement
- Backfill
- Channel Sand Cap
- Slope Cap
- Dredge to Clean

NOTES

- Base map generated from CAD drawings supplied by Walker and Associates, based on a March 2006 aerial survey.
- Outfall locations provided by City of Tacoma. Outfall numbers provided by City of Tacoma or Tacoma-Pierce County Health Department Figure E-1 (1995). Note: Outfalls monitored as part of the City's Thea Foss stormwater monitoring program include outfalls 230, 235, 237A, 237B, 243, 245, and 254.



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**Thea Foss and Wheeler-Osgood Waterways
OMMP**

**Figure 1
Baseline Natural Recovery Sample Locations**

Attachment A

Sample Collection Forms and Photographs

Sample Collection Forms

SURFACE SEDIMENT SAMPLE COLLECTION FORM

Thea Foss and Wheeler-Osgood Waterways OMMP

Date: 10/23/06Weather: overcast, Foggy, No breeze,Field Personnel: Iain Wingard (See below)

- 10:15 Boat is at Fire boat dock.
Crew is comprised of Mike Rhubright, Bill Essemayer, Tom Antonofalsky, and Iain Wingard
Bill and Tom have performed QA benchmark coordinates reading for GPS unit (Trimble GeoXH 2005 Series PN: 60950-00), Coordinates read at Benchmark 214 and measure coordinates were N 704660.95 E 1161060.91
Preparing equipment for sampling including decon of samplers.
- 10:50 Depart Fire Station Dock
- 11:00 Deploy marker buoy for NR-06
- 11:31 Collected sample at NR06 - see sample sheet
- 11:52 Relocate to NR07
Tie off at dock
- 12:05 Collect sample at NR07 - see sample sheet
- 12:29 Relocate to NR11
- 12:42 Collected sample at NR11
- 13:00 Relocate to NR16
- 13:20 Collected sample at NR-16 - see sample sheet.
- 13:39 Relocate to NR17
- 13:50 Collected sample at NR-17 - see sample sheet
- 14:14 Relocating to NR-20
- 14:30 Collected sample at NR20 - see sample sheet
- 14:40 Relocate to NR-19
- 14:55 Collect sample for NR-19 - see sample sheet.
- 15:15 Arrive at Fire Station Dock

SURFACE SEDIMENT SAMPLE COLLECTION FORM

Thea Foss and Wheeler-Osgood Waterways OMMP

Date: 10/23/06

Weather: overcast/Foggy/No Wind/Approx 45°F

Field Personnel: Jain Wingard

Sample Type

1. Performance Surface (0-10 cm) 4. Bioassay
 2. Early Warning Recontamination (0-2 cm) 5. Benthic Recolonization
 3. Performance Subsurface

Sample Designation: NR-06-Y2-D

Sample Method (Van Veen Surface Grab/Slope Composite): Vanveen

Datum (Horizontal/Vertical): NAD 83 Wa State Plane S. / MLLW

Sample Types 1, 2, 3, 4, 5
 *If sample type 4, were reference samples collected? Yes No

Leadline Water Dept 39 ft (A) 11:06 (38ft 11:41)
 Predicted Tide Elevation 6.46 ft (B) 11:30
 Mudline Elevation -32.6 ft (B-A) C-A = 5.9' - 38.5' = X
 Actual Tide Elevation 5.9 ft (C) 11:30 (MLLW)

Run # or Composite Pt	Time	Latitude (Northing)	Longitude (Easting)	Sample Criteria (Surface Grab Only)					Accept Sample Y/N	Comments (Include depth of sample)
				1	2	3	4	5		
Grab #1	11:10	707573.70	1160202.5	X	X	X	X	X	N	overfilled
Grab #2	11:22	11	11						N	overfilled
Grab #3	11:31	707592.43	1160193.89	X	X	X	X	X	Y	17cm recovery

Acceptance criteria: 1 Overlying water is present; 2 Water has low turbidity; 3 Sampler is not over filled; 4 Sample surface is flat; or 5 Desired sample depth is reached.

Sediment Sample Description

Sediment Sample Description (density, moisture, color, minor constituents, major constituents, other obs - *see field ref cards):

Soft, wet, olive, silt, no odor, some shells

Sample containers filled (number and type):

1-6 oz / 1-8 oz sample jars

Laboratory analysis:

Total organic carbon, total solids, metals, semi-volatile organic compounds, pesticides, and PCBs in accordance with the Final OMMP Table B-1-2.

~~Thick Slope Cap Composite Sampling~~ Notes:

Predicted tide elevation:

1-2 cm redox layer - light olive layer on top with underlying dark grey sediment

Remediation area:

below

Number of composite points:

below

SURFACE SEDIMENT SAMPLE COLLECTION FORM

Thea Foss and Wheeler-Osgood Waterways OMMP

Date: 10/23/06

Weather: overcast, no wind, approx 50°F

Field Personnel: Jain Wingard

Sample Type

- 1. Performance Surface (0-10 cm)
- 2. Early Warning Recontamination (0-2 cm)
- 3. Performance Subsurface
- 4. Bioassay
- 5. Benthic Recolonization

Sample Designation: NK-07-Y0-D

Sample Method (Van Veen Surface Grab/Slope Composite): Van Veen

Datum (Horizontal/Vertical): _____

Sample Types 1, 2, 3, 4, 5
*If sample type 4, were reference samples collected? Yes No

Leadline Water Dept 37 A (A) 12:03 (35' 12" 14")
 Predicted Tide Elevation 6.15 A (B) 12:06
 Mudline Elevation -30.4 ft (B-A) CA = 5.6' - 36' X
 Actual Tide Elevation 5.6 ft MLLW @ 12:06

Run # or Composite Pt	Time	Latitude (Northing)	Longitude (Easting)	Sample Criteria (Surface Grab Only)					Accept Sample Y/N	Comments (Include depth of sample)
				1	2	3	4	5		
Grab #1	12:05	707127.5	115994.1	X	X	X	X	X	Y	17cm Recovered

Acceptance criteria: 1 Overlying water is present; 2 Water has low turbidity; 3 Sampler is not over filled; 4 Sample surface is flat; or 5 Desired sample depth is reached.

Sediment Sample Description

Sediment Sample Description (density, moisture, color, minor constituents, major constituents, other obs - *see field ref cards):

Soft, wet, olive, silt, no odor, some tubes (biota/worms)

Sample containers filled (number and type):

1-500 ml / 1-250 ml Jars

Laboratory analysis:

Total organic carbon, total solids, metals, semi-volatile organic compounds, pesticides, and PCBs in accordance with the Final OMMP Table B-1-2.

~~Thick Slope Cap Composite Sampling~~ **Notes:**

Predicted tide elevation:

1cm redox layer - light olive layer

Remediation area:

on top dark gray sediment below

Number of composite points:

Tied stern of boat to North facing finger float

SURFACE SEDIMENT SAMPLE COLLECTION FORM

Thea Foss and Wheeler-Osgood Waterways OMMP

Date: 10/23/06

Weather: Clouds and Sun, slight breeze

Field Personnel: From north, approx 50°F
Iain Wingard

Sample Type

1. Performance Surface (0-10 cm) 4. Bioassay
 2. Early Warning Recontamination (0-2 cm) 5. Benthic Recolonization
 3. Performance Subsurface

Sample Designation: NR-11-40-D

Sample Method (Van Veen Surface Grab/Slope Composite): Vanveen

Datum (Horizontal/Vertical): NAD 83, WA state plane S. / MLLW

Sample Types 1, 2, 3, 4, 5
 *If sample type 4, were reference samples collected? Yes No

Leadline Water Dept 36 ft (A) 12:30 (36' 12:52)
 Predicted Tide Elevation 6.15 (B) 12:42
 Mudline Elevation -30.4 ft (B-A) C-A = 5.6' - 36' = X
 Actual Tide Elevation 5.6 ft MLLW (C) 12:42

Run # or Composite Pt	Time	Latitude (Northing)	Longitude (Easting)	Sample Criteria (Surface Grab Only)					Accept Sample Y/N	Comments (Include depth of sample)
				1	2	3	4	5		
Grab #1	12:33		9W	X	X	X	X	X	N	Overpenetrated
Grab #2	12:42	706525.66	1160083.48	X	X	X	X	X	Y	17 cm recovery

Acceptance criteria: 1 Overlying water is present; 2 Water has low turbidity; 3 Sampler is not over filled; 4 Sample surface is flat; or 5 Desired sample depth is reached.

Sediment Sample Description

Sediment Sample Description (density, moisture, color, minor constituents, major constituents, other obs - *see field ref cards):

Soft, wet, olive, silt, NO odor, Several worms.

Sample containers filled (number and type):

1-500 mL / 1-250 mL jars

Laboratory analysis:

Total organic carbon, total solids, metals, Semi-volatile organic compounds, pesticides, and PCBs in accordance with the Final OMMP Table B-1-2.

Thick Slope Cap Composite Sampling Notes:

Predicted tide elevation:

Approx 1 cm redox layer - light olive

Remediation area:

silt on surface - dark grey silt below

Number of composite points:

Tied off stern to south facing finger float

SURFACE SEDIMENT SAMPLE COLLECTION FORM

Thea Foss and Wheeler-Osgood Waterways OMMP

Date: 10/23/06

Weather: clouds and sun, slight wind

Field Personnel: from north
Tain Wingerd

Sample Type

1. Performance Surface (0-10 cm) 4. Bioassay
 2. Early Warning Recontamination (0-2 cm) 5. Benthic Recolonization
 3. Performance Subsurface

Sample Designation: NR-16-10-D

Sample Method (Van Veen Surface Grab/Slope Composite): Vanveen

Datum (Horizontal/Vertical): NAD 83, State Plane S / MLLW

Sample Types 1, 2, 3, 4, 5

*If sample type 4, were reference samples collected? Yes No

Leadline Water Dept 30A (A) 13:10 (27' 1328)

Predicted Tide Elevation 6.45 ft (B) 13:18

Mudline Elevation -22.7 ft (B-A) G-A = 5.8 - 28.5 = X

Actual Tide Elevation 5.8 ft MLLW(G)

Run # or Composite Pt	Time	Latitude (Northing)	Longitude (Easting)	Sample Criteria (Surface Grab Only)					Accept Sample Y/N	Comments (Include depth of sample)
				1	2	3	4	5		
Grab #1	13:15	705762.25	1160188.97						N	Inadequate recovery
Grab #2	13:20	"	"	X	X	X	X	X	Y	12 cm recovery

Acceptance criteria: 1 Overlying water is present; 2 Water has low turbidity; 3 Sampler is not over filled; 4 Sample surface is flat; or 5 Desired sample depth is reached.

Sediment Sample Description

Sediment Sample Description (density, moisture, color, minor constituents, major constituents, other obs - *see field ref cards):

Loose, wet, olive, sand and gravel with silt, no odor

Sample containers filled (number and type):

1- 500 ml / 1- 250 ml Jars

Laboratory analysis:

Total organic carbon, total solids, metals, semi-volatile organic compounds, pesticides, and PCBs in accordance with the Final OMMP Table B-1-2.

Thick-Slope Cap Composite Sampling Notes:

~~Predicted tide elevation:~~ 1 cm silt over sand cap material.

~~Remediation area:~~ 1/2 cm redox layer - light olive silt

~~Number of composite points:~~ over dark gray silt over cap material

Tied up to end of north facing finger float (i.e., tied stern of boat to north facing finger float)

SURFACE SEDIMENT SAMPLE COLLECTION FORM

Thea Foss and Wheeler-Osgood Waterways OMMP

Date: 10/23/06

Weather: Clouds and Sun, slight NW breeze, approx SS OF

Field Personnel: Lein Wingard

Sample Type

1. Performance Surface (0-10 cm) 4. Bioassay
 2. Early Warning Recontamination (0-2 cm) 5. Benthic Recolonization
 3. Performance Subsurface

Sample Designation: NR-17-Y0-D

Sample Method (Van Veen Surface Grab/Slope Composite): Van Veen

Datum (Horizontal/Vertical): NAD 83 Wa State plane S. / MLLW

Sample Types 1, 2, 3, 4, 5

*If sample type 4, were reference samples collected? Yes No

Leadline Water Dept 16.5 ft (A) 13:46 (13' 14:00)

Predicted Tide Elevation 6.9 ft (B)

Mudline Elevation -8.2 ft (B-A) C-A = 6.3 - 14.5 = x

Actual Tide Elevation 6.3 ft MLLW (C)

Run # or Composite Pt	Time	Latitude (Northing)	Longitude (Easting)	Sample Criteria (Surface Grab Only)					Accept Sample Y/N	Comments (Include depth of sample)
				1	2	3	4	5		
<u>Grab #1</u>	<u>1350</u>	<u>705487.71</u>	<u>1160695.28</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>Y</u>	<u>13cm recovery</u>

Acceptance criteria: 1 Overlying water is present; 2 Water has low turbidity; 3 Sampler is not over filled; 4 Sample surface is flat; or 5 Desired sample depth is reached.

Sediment Sample Description

Sediment Sample Description (density, moisture, color, minor constituents, major constituents, other obs - *see field ref cards):

Medium dense, wet, olive to dark grey, fine to medium sand, H₂S odor (slight), 1-2% wood fibers, sheen spots, some worms

Sample containers filled (number and type):

1- 500 ml / 1- 250 ml Jars

Laboratory analysis:

Total organic carbon, total solids, metals, semi-volatile organic compounds, pesticides, and PCBs in accordance with the Final OMMP Table B-1-2.

Thick Slope Cap Composite Sampling: Notes

~~Predicted tide elevation:~~

~~Remediation area:~~

~~Number of composite points:~~

Dark grey sand with wood fibers, < 1/2 cm redox layer - light olive on surface, dark olive to ^{dark} grey sand below.

SURFACE SEDIMENT SAMPLE COLLECTION FORM

Thea Foss and Wheeler-Osgood Waterways OMMP

Date: 10/23/06

Weather: overcast, slight breeze

Field Personnel: from NW, approx 55°F

Jana Wingard

Sample Type

1. Performance Surface (0-10 cm) 4. Bioassay
 2. Early Warning Recontamination (0-2 cm) 5. Benthic Recolonization
 3. Performance Subsurface

Sample Designation: NR-19-47-D

Sample Method (Van Veen Surface Grab/Slope Composite): Van Veen

Datum (Horizontal/Vertical): NAD 83 WA State plane S / MLLW

Sample Types 1, 2, 3, 4, 5

*If sample type 4, were reference samples collected? Yes No

Leadline Water Dept 7.5 ft (A) 14:50 (8.0 14:55)

Predicted Tide Elevation 8.3 ft (B)

Mudline Elevation 0.0 ft (B-A) GA=7.7'-7.75'=X

Actual Tide Elevation 7.7 ft MLLW (C)

Run # or Composite Pt	Time	Latitude (Northing)	Longitude (Easting)	Sample Criteria (Surface Grab Only)					Accept Sample Y/N	Comments (Include depth of sample)
				1	2	3	4	5		
<u>Grab #1</u>	<u>14:50</u>								<u>N</u>	<u>Wood in Jaws</u>
<u>Grab #2</u>	<u>14:55</u>	<u>705297.11</u>	<u>1161689.20</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>Y</u>	<u>12 cm recovery</u>

Acceptance criteria: 1 Overlying water is present; 2 Water has low turbidity; 3 Sampler is not over filled; 4 Sample surface is flat; or 5 Desired sample depth is reached.

Sediment Sample Description

Sediment Sample Description (density, moisture, color, minor constituents, major constituents, other obs - *see field ref cards):

Soft, wet, olive, sandy silt, no odor, abundant shells, mussels, barnacles, and some worms.

Sample containers filled (number and type):

1-500 ml / 1-250 ml Jars

Laboratory analysis:

Total organic carbon, total solids, metals, semi-volatile organic compounds, pesticides, and PCBs in accordance with the Final OMMP Table B-1-2.

Thick Slope Gap Composite Sampling - Notes:

Predicted tide elevation - Thin (1/2 cm) Redox layer, lighter-olive

Remediation area - on surface, dark olive below

Number of composite points:

SURFACE SEDIMENT SAMPLE COLLECTION FORM

Thea Foss and Wheeler-Osgood Waterways OMMP

Date: 10/23/06

Weather: Sunny with clouds, breeze out of NW, approx 55°F

Field Personnel: Jan Wingard

Sample Type

1. Performance Surface (0-10 cm) 4. Bioassay
 2. Early Warning Recontamination (0-2 cm) 5. Benthic Recolonization
 3. Performance Subsurface

Sample Designation: NR-20-YØ-D

Sample Method (Van Veen Surface Grab/Slope Composite): Vanveen

Datum (Horizontal/Vertical): NAD83, WA State plane S, MLLW

Sample Types 1, 2, 3, 4, 5

*If sample type 4, were reference samples collected? Yes No

Leadline Water Dept 7.0 ft (A) 14:20 (7.5 ft 14:30)

Predicted Tide Elevation 7.75 ft (B) 14:30

Mudline Elevation 0.0 ft (B-A) GA = 7.2' - 7.25' = x

Actual Tide Elevation 7.2 ft MLLW (C)

Run # or Composite Pt	Time	Latitude (Northing)	Longitude (Easting)	Sample Criteria (Surface Grab Only)					Accept Sample Y/N	Comments (Include depth of sample)
				1	2	3	4	5		
Grab #1	14:20								N	Plastic in Jars
Grab #2	14:25								N	Insufficient recovery
Grab #3	14:30	705222.3	1162004	X	X	X	X	X	Y	14 cm recovery

Acceptance criteria: 1 Overlying water is present; 2 Water has low turbidity; 3 Sampler is not over filled; 4 Sample surface is flat; or 5 Desired sample depth is reached.

Sediment Sample Description

Sediment Sample Description (density, moisture, color, minor constituents, major constituents, other obs - *see field ref cards):

Soft, wet, dark olive/dark grey, sandy silt, no odor abundant shells, mussels, worms, barnacles and some wood

Sample containers filled (number and type): pieces (Note: slight creosote odor in sample bowl)

1-500 ml / 1-250 ml Jars - Sample duplicate NR-20-YØ-D1 was collected at this station.

Laboratory analysis: Total organic carbon, total solids, metals, semi-volatile organic compounds, pesticides, and PCBs in accordance with the Final OMMP Table B-1-2.

Thick Slope Gap Composite Sampling

Predicted tide elevation: Thin redox layer of lighter olive sediment

Remediation area: Park grey sediment beneath redox

Number of composite points: layer

SURFACE SEDIMENT SAMPLE COLLECTION FORM

Thea Foss and Wheeler-Osgood Waterways OMMP

Date: 10/24/06

Weather: overcast, wind approx 10 mph from South, Temp approx 45°F

Field Personnel:

- 8:40 Arrive at Fire Station boat dock/float
Sampling crew is Bill Essemeyer, Mike Rhubright,
Tom Chortofalsky and Iain Wingerd
Preparing for sampling.
- 8:53 Depart Dock/Enroute to NR25
- 9:07 Collect Sample from NR-25 see sample sheet
- 9:28 Arrive at Fire boat dock
Bill took readings at Benchmark 214
prior to sampling. The benchmark coordinates
were 704667.46 N 1161058.26 E. The
GPS unit that was used was the same
as used on 10/23/06.

SURFACE SEDIMENT SAMPLE COLLECTION FORM

Thea Foss and Wheeler-Osgood Waterways OMMP

Date: 10/24/06

Weather: overcast, wind approx 10 mph from South, temp approx 45° F

Field Personnel: Jain Wingard

Sample Type

- 1. Performance Surface (0-10 cm)
- 2. Early Warning Recontamination (0-2 cm)
- 3. Performance Subsurface
- 4. Bioassay
- 5. Benthic Recolonization

Sample Designation: NR-25-YØ-D

Sample Method (Van Veen Surface Grab/Slope Composite): Van Veen

Datum (Horizontal/Vertical): NAD 83 Wa State Plane S. / MLLW

Sample Types 1, 2, 3, 4, 5
*If sample type 4, were reference samples collected? Yes No

Leadline Water Dept 12.7 (A) 9:07 (12.0 9:14)
Predicted Tide Elevation 10.61 ft (B) 9:06
Mudline Elevation -1.3 ft (B-A) C-A = 10.7 - 12 = X
Actual Tide Elevation 10.7 ft MLLW(C)

Run # or Composite Pt	Time	Latitude (Northing)	Longitude (Easting)	Sample Criteria (Surface Grab Only)					Accept Sample Y/N	Comments (Include depth of sample)
				1	2	3	4	5		
<u>Grab # 1</u>	<u>9:07</u>	<u>704294.03</u>	<u>1160724.17</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>Y</u>	<u>15 cm recovery</u>

Acceptance criteria: 1 Overlying water is present; 2 Water has low turbidity; 3 Sampler is not over filled; 4 Sample surface is flat; or 5 Desired sample depth is reached.

Sediment Sample Description

Sediment Sample Description (density, moisture, color, minor constituents, major constituents, other obs - *see field ref cards):

3" - dark gray soft, wet, olive, silt with abundant wood pieces and fibers, shells, H₂S odor slight, one fish

Sample containers filled (number and type):

1- 500 ml / 1- 250 ml Jars - A duplicate sample NR-25-YØ-D1 was collected at this station

Laboratory analysis:

Total organic carbon, total solids, metals, semi-volatile organic compounds, pesticides, and PCBs in accordance with the Final OMMP Table B-1-2.

~~Thick Slope Cap Composite Sampling~~ Notes:

~~Predicted tide elevation:~~

olive^{ow} silt with abundant wood, 1 dark gray

~~Remediation area:~~

~~Number of composite points:~~

SURFACE SEDIMENT SAMPLE COLLECTION FORM

Thea Foss and Wheeler-Osgood Waterways OMMP

Date: 10/25/06Weather: Overcast, no wind, approx 50°FField Personnel: Iain Wircard

- 20:00 Arrive onsite with Joe Marsh, Corps (Iw and Joe Marsh)
- 20:15 Bill Essemeyer and Tom Chantofsky City arrive. Have performed QC for GPS, at 214 benchmark. The GPS is estimated to be 16 ft off of benchmark coordinates, Bill/Tom to check 2nd benchmark and depart
- 20:31 Bill/Tom return with GPS benchmark readings which are the following
- | | | | | |
|-----|---|-----------|---|------------|
| 214 | N | 704653.90 | E | 1161063.38 |
| 215 | N | 703685.90 | E | 1160984.77 |
| 216 | N | 703210.59 | E | 1161011.98 |
- The GPS that was used was the Trimble that was used for the Vanueen sampling from the boat (i.e. 10/23 & 10/24/2006)
- Initiate collection of SR samples from RA-10, RA-11, and RA-13. See Sample Collection forms for sample information.
- 23:15 Sample collection completed, Bill Essemeyer takes samples to City lab (Tom accompanies Bill) and departs site. Joe and I depart site.
- 23:25 Arrive at City office beneath 11th Street bridge. Provide Joe with sample location figure and table. Joe departs office,

SURFACE SEDIMENT SAMPLE COLLECTION FORM

Thea Foss and Wheeler-Osgood Waterways OMMP

Date: 10/25/06

Weather: Overcast, slight breeze

Field Personnel: Iain Winward

Sample Type

1. Performance Surface (0-10 cm) 4. Bioassay
 2. Early Warning Recontamination (0-2 cm) 5. Benthic Recolonization
 3. Performance Subsurface

Sample Designation: SR-10-YØ-D

Sample Method (Van Veen Surface Grab/Slope Composite): Grab/Slope Composite

Datum (Horizontal/Vertical): NAD 83 WA State Plane S.

Sample Types 1, 2, 3, 4, 5 Leadline Water Dept _____ (A)

*If sample type 4, were reference samples collected? Yes No Predicted Tide Elevation _____ (B)

Mudline Elevation _____ (B-A)

Actual Tide Elevation _____

Run # or Composite Pt	Time	Latitude (Northing)	Longitude (Easting)	Sample Criteria (Surface Grab Only)					Accept Sample Y/N	Comments (Include depth of sample)
				1	2	3	4	5		
SR-10-D3	2110	705404.41	1161610.57	✓	✓	✓	✓	✓	Y	10 cm
SR-10-D2	2242	705465.75	1161244.96	✓	✓	✓	✓	✓	Y	10 cm
SR-10-D1	2253	705626.27	1160794.67	✓	✓	✓	✓	✓	Y	10 cm

Acceptance criteria: 1 Overlying water is present; 2 Water has low turbidity; 3 Sampler is not over filled; 4 Sample surface is flat; or 5 Desired sample depth is reached.

Sediment Sample Description

Sediment Sample Description (density, moisture, color, minor constituents, major constituents, other obs - *see field ref cards):

D3 - stiff moist, olive, sand and gravel, few wood pieces & shells
 D2 - medium moist, olive sand with gravel, shell fragments
 orange mottling,
 D1 - stiff moist, olive, sand and gravel

Sample containers filled (number and type):

1 - 500 mL / 1 - 250 mL Jars Note: Sample approx 50% gravel

Laboratory analysis:

Total organic carbon, total solids, metals, semi-volatile organic compounds, pesticides, and PCBs in accordance with the Final OMMP Table B-1-2.

Thick Slope Cap Composite Sampling

Predicted tide elevation: _____

Remediation area: SR-10/RA-10

Number of composite points: Three

SURFACE SEDIMENT SAMPLE COLLECTION FORM

Thea Foss and Wheeler-Osgood Waterways OMMP

Date: 10/25/06

Weather: overcast, slight breeze, approx

Field Personnel: 50°F

Iain Wingard

Sample Type

1. Performance Surface (0-10 cm) 4. Bioassay
 2. Early Warning Recontamination (0-2 cm) 5. Benthic Recolonization
 3. Performance Subsurface

Sample Designation: SR-11-Y0-D

Sample Method (Van Veen Surface Grab/Slope Composite): Grab/slope Composite

Datum (Horizontal/Vertical): _____

Sample Types 1, 2, 3, 4, 5 Leadline Water Dept _____ (A)
 *If sample type 4, were reference Predicted Tide Elevation _____ (B)
 samples collected? Yes No Mudline Elevation _____ (B-A)
 Actual Tide Elevation _____

Run # or Composite Pt	Time	Latitude (Northing)	Longitude (Easting)	Sample Criteria (Surface Grab Only)					Accept Sample Y/N	Comments (Include depth of sample)
				1	2	3	4	5		
SR-11-D1	2142	705194.20	1161561.78						Y	10 cm
SR-11-D2	2150	705262.88	1161294.91						Y	10 cm
SR-11-D3	2200	705362.64	1160951.93						Y	10 cm

Acceptance criteria: 1 Overlying water is present; 2 Water has low turbidity; 3 Sampler is not over filled; 4 Sample surface is flat; or 5 Desired sample depth is reached.

Sediment Sample Description

Sediment Sample Description (density, moisture, color, minor constituents, major constituents, other obs - *see field ref cards):
D1- medium, moist, olive, sand with silt and gravel, shell fragments
D2- soft, wet, olive, sand with some gravel, shell fragments
D3- soft, wet, olive, sand with shell fragments

Sample containers filled (number and type):
1- 500 mL / 1- 250 mL Jars - Collected duplicate sample
SR-11-Y0-D4

Laboratory analysis:
Total organic carbon, total solids, metals, semi-volatile organic compounds, pesticides, and PCBs in accordance with the Final OMMP Table B-1-2.

Thick Slope Cap Composite Sampling

Predicted tide elevation: _____
 Remediation area: SR-11 / R1A-11
 Number of composite points: Three

SURFACE SEDIMENT SAMPLE COLLECTION FORM

Thea Foss and Wheeler-Osgood Waterways OMMP

Date: 10/25/06

Weather: overcast, slight breeze,

Field Personnel: approx 56°F
Iain Wingard

Sample Type

1. Performance Surface (0-10 cm) 4. Bioassay
 2. Early Warning Recontamination (0-2 cm) 5. Benthic Recolonization
 3. Performance Subsurface

Sample Designation: SR-13-V0-D

Sample Method (Van Veen Surface Grab/Slope Composite): Grab/Slope Composite

Datum (Horizontal/Vertical): NAD 83 wa state plane S. / MLW

Sample Types 1, 2, 3, 4, 5 Leadline Water Dept _____ (A)
 *If sample type 4, were reference Predicted Tide Elevation _____ (B)
 samples collected? Yes No Mudline Elevation _____ (B-A)
 Actual Tide Elevation _____

Run # or Composite Pt	Time	Latitude (Northing)	Longitude (Easting)	Sample Criteria (Surface Grab Only)					Accept Sample Y/N	Comments (Include depth of sample)
				1	2	3	4	5		
SR-13-D2	20:50	705178.72	1162083.67	—	—	—	—	—	Y	10 cm Sample
SR-13-D1	21:05	705312.25	1161828.79	—	—	—	—	—	Y	10 cm Sample
SR-13-D3	21:35	705149.37	1161794.51	—	—	—	—	—	Y	10 cm Sample

Acceptance criteria: 1 Overlying water is present; 2 Water has low turbidity; 3 Sampler is not over filled; 4 Sample surface is flat; or 5 Desired sample depth is reached.

Sediment Sample Description

Sediment Sample Description (density, moisture, color, minor constituents, major constituents, other obs. - *see field ref cards): D2 - medium, wet, olive & dark gray, sand, some wood pieces, leaves, shells
H2S odor

D1 - medium, wet, brown sand and gravel (Habitat mix)

D3 - medium, moist, brown sand and gravel (Habitat mix)

Sample containers filled (number and type):

1-500 mL / 1-250 mL Jars

Laboratory analysis:

Total organic carbon, total solids, metals, semi-volatile organic compounds, pesticides, and PCBs in accordance with the Final OMMP Table B-1-2.

Thick Slope Cap Composite Sampling

Predicted tide elevation:

Remediation area: RA-13 / SR-13

Number of composite points: Three

Photographs

Channel and Harbor Area Sample Photographs



IMG_0284 2006-10-23 11-33-31



IMG_0285 2006-10-23 11-39-43



IMG_0286 2006-10-23 12-07-26



IMG_0288 2006-10-23 12-13-22



IMG_0289 2006-10-23 12-48-36



IMG_0291 2006-10-23 12-52-30



IMG_0293 2006-10-23 13-24-13



IMG_0294 2006-10-23 13-27-56



IMG_0297 2006-10-23 13-53-05



IMG_0298 2006-10-23 13-59-32



IMG_0304 2006-10-23 14-59-14



IMG_0305 2006-10-23 15-04-49



IMG_0299 2006-10-23 14-31-23



IMG_0301 2006-10-23 14-41-29



IMG_0306 2006-10-24 09-12-25



IMG_0308 2006-10-24 09-20-06

**Wheeler-Osgood Waterway Shoreline
Sample Location Photographs**



IMG_0279 2006-10-19 13-29-45

SR-10-Y0-D1-C



IMG_0280 2006-10-19 13-30-08

SR-10-Y0-D1-C



IMG_0264 2006-10-18 11-29-38

SR-10-Y0-D2-C



IMG_0265 2006-10-18 11-30-12

SR-10-Y0-D2-C



IMG_0274 2006-10-18 17-04-03

SR-10-Y0-D3-C



IMG_0276 2006-10-18 17-05-03

SR-10-Y0-D3-C



IMG_0270 2006-10-18 12-36-40

SR-11-Y0-D1-C



IMG_0271 2006-10-18 12-37-20

SR-11-Y0-D1-C



IMG_0268 2006-10-18 12-07-57

SR-11-Y0-D2-C



IMG_0269 2006-10-18 12-08-13

SR-11-Y0-D2-C



IMG_0266 2006-10-18 11-45-52

SR-11-Y0-D3-C



IMG_0267 2006-10-18 11-46-21

SR-11-Y0-D3-C



IMG_0277 2006-10-19 13-05-59

SR-13-Y0-D1-C



IMG_0278 2006-10-19 13-06-21

SR-13-Y0-D1-C



IMG_0272 2006-10-18 12-59-57

SR-13-Y0-D2-C



IMG_0273 2006-10-18 13-00-28

SR-13-Y0-D2-C



IMG_0281 2006-10-19 14-40-54

SR-13-Y0-D3-C



IMG_0282 2006-10-19 14-41-41

SR-13-Y0-D3-C

**Wheeler-Osgood Waterway Shoreline
Sample Photographs**



Wheeler-Osgood 25 Oct 06 026 2006-10-25 22-49-46

SR-10-D1



Wheeler-Osgood 25 Oct 06 024 2006-10-25 22-37-31

SR-10-D2



Wheeler-Osgood 25 Oct 06 008 2006-10-25 21-03-59

SR-10-D3



IMG_0317 2006-10-25 23-19-02

Composite Sample SR-10-Y0-D



Wheeler-Osgood 25 Oct 06 011 2006-10-25 21-36-32

SR-11-D1



Wheeler-Osgood 25 Oct 06 014 2006-10-25 21-44-30

SR-11-D2



Wheeler-Osgood 25 Oct 06 017 2006-10-25 21-56-59

SR-11-D3



IMG_0312 2006-10-25 22-18-55

Composite Sample SR-11-Y0-D



Wheeler-Osgood 25 Oct 06 006 2006-10-25 20-58-28

SR-13-D1



Wheeler-Osgood 25 Oct 06 003 2006-10-25 20-45-18

SR-13-D2



Wheeler-Osgood 25 Oct 06 010 2006-10-25 21-29-35

SR-13-D3



IMG_0314 2006-10-25 22-28-52

Composite Sample SR-13-Y0-D

Attachment B

Laboratory Analytical and Data Validation Reports

(On Enclosed CD)