



To: Piper Peterson Lee, U.S. Environmental Protection Agency
FROM: Mary Henley, P.E., Project Manager, City of Tacoma
SUBJECT: OMMP Revisions Based on Year 0 Monitoring
DATE: April 24, 2007

This Technical Memorandum has been prepared to outline the changes to the 2006 Operations, Maintenance, and Monitoring Plan (OMMP) needed as a result of activities or findings from the baseline monitoring year. This memorandum should be included with the OMMP and referenced when planning for activities for subsequent monitoring years. Similar memoranda will be prepared each year to document any modifications needed in the future monitoring program.

For completeness and to ensure consideration of all potential modifications, each section of the OMMP is discussed below, regardless of whether there are changes to that portion of the work.

Sediment Remediation Area Performance Monitoring

Cap Area Performance Monitoring

The purpose of cap area performance monitoring is to verify cap integrity and performance. The cap performance monitoring program is designed to detect and evaluate long-term changes in cap thickness, and surface sediment quality to ensure compliance with performance criteria. Cap area performance monitoring includes cap integrity monitoring and cap area chemical performance monitoring.

Cap Integrity Monitoring – Cap integrity monitoring consists of low tide slope cap inspections and hydrographic surveys and is designed to verify the physical integrity of caps constructed as part of the Thea Foss and Wheeler-Osgood Waterways remediation project. Low tide cap inspections of slope caps ensure that the intertidal portions of slope caps are intact and that underlying contaminated materials are contained or identify areas needing maintenance. Hydrographic surveys of capped areas detect and evaluate long-term changes in cap thickness to ensure compliance with performance criteria.

While there was some minor maintenance activities needed on a few slope areas, there were no modifications to the OMMP monitoring program needed for subsequent monitoring years. The next round of cap integrity monitoring will be completed in Year 2 (2008).

Cap Area Chemical Performance Monitoring – Cap area chemical performance monitoring is designed to evaluate the long-term effectiveness of caps constructed as part of the project. Chemical performance monitoring activities consist of the collection and analysis of surface samples from constructed cap areas. Based on baseline monitoring results, there were no modifications to the OMMP monitoring program needed for subsequent monitoring years. The next round of cap integrity monitoring will be completed in Year 2 (2008).

The City is working with the Utilities to follow up on Sediment Quality Objective (SQO) exceedences identified within the Head of the Thea Foss Waterway. Additional sampling and analysis will be performed in 2007 under the Utilities OMMP in response to these exceedences.

Natural Recovery and Enhanced Natural Recovery Monitoring – Natural recovery and enhanced natural recovery monitoring is designed to verify that surface sediments in natural recovery areas are on a track to satisfy performance criteria within the allowed 10-year time frame. Natural recovery and enhanced natural recovery monitoring consists of collection and analysis of surface samples in these areas to evaluate progress toward natural recovery. Based on baseline monitoring results, there were no modifications to the OMMP monitoring program needed for subsequent monitoring years. The next round of natural recovery and enhanced natural recovery monitoring will be completed in Year 2 (2008).

Early Warning Monitoring for Recontamination

Early warning sampling and analysis will be used to evaluate the potential for recontamination in the Thea Foss and Wheeler-Osgood Waterways, and to identify potential sources of recontamination (if suspected) before the remediated sediments become out of compliance with remedial action and long-term monitoring objectives. Early warning monitoring was not required as part of baseline OMMP activities.

No modifications to the OMMP early warning monitoring program have been identified. The first round of early warning monitoring for recontamination is scheduled to occur in Year 2 (2008).

Benthic Recolonization Monitoring

Benthic recolonization monitoring will be performed to track the progress of benthic recolonization in remediated areas. Benthic recolonization monitoring was not required as part of baseline OMMP activities.

No modifications to the OMMP benthic recolonization monitoring program have been identified. The first round of benthic recolonization monitoring is scheduled to occur in Year 2 (2008).

Confined Disposal Facility Monitoring

Confined Disposal Facility (CDF) monitoring is designed to protect water quality in adjacent surface water bodies from the migration of contaminants from dredged material placed within the St. Paul CDF. A post-construction hydrogeological investigation of the site has been completed as described in the Year 0 Baseline Monitoring Annual Operations, Maintenance, and Monitoring Report. Based on the results of the hydrogeological investigation, the baseline monitoring program was established and the first of 8 quarters of CDF monitoring began in

March 2007. Upon completion of the planned 8 quarters of baseline CDF monitoring, the results will be evaluated and the performance monitoring program developed.

Habitat Mitigation Area Monitoring

Habitat mitigation area monitoring is performed to evaluate the effectiveness of the development of biological and physical features at the mitigation and enhancement sites to confirm that they are on a trajectory to provide habitat function necessary to meet the site objectives. Based upon several activities that have occurred or issues that have arisen during the baseline monitoring year, minor modifications to the monitoring program have been identified. Each of these is described in more detail below.

Erosion at the North Beach Habitat Area – After completion of the qualitative site survey in July 2006, some erosion of an area of the St. Paul Beach portion of the North Beach Habitat Area was identified. As described in the Year 0 Baseline Monitoring Annual Operations, Maintenance, and Monitoring Report, several discussions of the issue were conducted, along with a site visit. The following outcomes, as related to modifications to monitoring activities, were identified:

- Take quarterly photographs of the site at the established photo points and other relevant locations as appropriate to track continued movement of the beach at the site. This will be done in conjunction with the quarterly monitoring of the CDF which began in March 2007. A revised Table 1-6 is included herein as Attachment 1 to reflect this addition.
- Develop a modified plan for placement of erosion control-related LWD at the northwest corner of the peninsula. This plan was provided to the agencies for review and was subsequently approved. A copy of the modified habitat plan (Figure E-5) showing location of the additional erosion control-related LWD is included herein as Attachment 2.

Replacement of Plants at the Head of Thea Foss Shoreline Habitat – During the qualitative site inspection at this enhancement area, it was found that there was a low survival rate for the fleshy jaumea and the tufted hairgrass. The City is replacing the tufted hairgrass, but determined through discussions with the agencies that the elevation of the log step was probably too high to support the growth of the jaumea, leading to its failure to thrive. As a result, and with agency approval, the City is planting approximately 200 additional tufted hairgrass and 300 additional distichilis at the site to replace the 300 fleshy jaumea. A sketch of the approved planting plan for these new plants is included herein as Attachment 3.

Additional Work at the Hylebos Creek Mitigation Site – As part of the final approval of the construction of the Hylebos Creek Mitigation Site, several modifications to the site have been, or are being implemented:

- Additional LWD has been placed at the site, and several pieces of LWD are being placed in Hylebos Creek. In addition, some small branches will be placed around the LWD. Figure E-8 in the OMMP reflects the locations of this LWD.
- Approximately 280 additional red alders will be planted in the forested wetland area in Spring 2007.

Additional Planting Nodes at the Middle Waterway Tideflat Habitat – In accordance with the project design, additional planting nodes were required to be installed during the first or second spring following construction to accelerate colonization of the area. These nodes are not subject to the performance standards for this site and are therefore not required to be monitored under the OMMP. Therefore, there is no OMMP modification in response to the planting of additional nodes at the Middle Waterway Tideflat Habitat.

Follow-Up to Agency Comments on the Preliminary Findings Memorandum for Baseline Habitat Monitoring – The agencies provided comments on the memorandum, and through these comments required modifications to subsequent monitoring activities. The following additional tasks will be completed:

- Figures of each mitigation and enhancement site will be included in future Preliminary Findings Memoranda.
- A table showing specific performance criteria for each site, along with an indication as to whether or not the criteria were met, will be included in future Preliminary Findings Memoranda and Annual Reports.
- Stream flow for the Puyallup River and Hylebos Creek will be recorded on the qualitative site survey forms for the Puyallup River Side Channel and the Hylebos Creek Mitigation Site during subsequent qualitative site surveys. The revised forms for these sites have been modified and are included herein as Attachment 4.

Attachment 1 – Table 1-6, Monitoring Schedule, Year 0 Modification

Attachment 2 – Figure E-5, North Beach Habitat, Year 0 Modification

Attachment 3 – Replacement of Plant Species at the Head of Thea Foss Shoreline Habitat

Attachment 4 – From Attachment E-2, Qualitative Ground Survey, Mitigation Sites

Attachment 1

Table 1-6 Monitoring Schedule Year 0 Modification

**Table 1-6
Monitoring Schedule
Year 0 Modification**

Activity	Monitoring Year (Calendar Year)										
	Year 0 (2006)	Year 1 (2007)	Year 2 (2008)	Year 3 (2009)	Year 4 (2010)	Year 5 (2011)	Year 6 (2012)	Year 7 (2013)	Year 8 (2014)	Year 9 (2015)	Year 10 (2016)
1) Sediment Remediation Area Performance Monitoring											
Supplemental Data Collection for Natural Recovery Area Sediment Quality	X										
Sediment Quality (0 to 10 cm) Performance Monitoring of Cap and Natural Recovery Areas			X		X			X			X
Low Tide Slope Cap Inspection for Cap Integrity	X		X		X			X			X
Subtidal Cap Hydrographic Survey for Cap Integrity			X		X			X			X
2) Early Warning Monitoring for Recontamination											
Sediment Quality (0 to 2 cm) Monitoring			X		X			X			X
3) Benthic Recolonization Monitoring											
Sediment Profile Imaging and Archive Sediment Sample (0 to 10 cm) Collection			X		X			X			X
4) Confined Disposal Facility Monitoring											
72-Hour Tidal Study and Slug Tests	X										
Baseline Monitoring ¹		4 Q	4 Q								
Performance Monitoring				TBD							

Activity	Monitoring Year (Calendar Year)										
	Year 0 (2006)	Year 1 (2007)	Year 2 (2008)	Year 3 (2009)	Year 4 (2010)	Year 5 (2011)	Year 6 (2012)	Year 7 (2013)	Year 8 (2014)	Year 9 (2015)	Year 10 (2016)
5) Habitat Mitigation Area Monitoring											
Qualitative Ground Surveys	X	X	X	X	X	X	X	X	X	X	X
Quantitative Vegetation Surveys		X	X		X			X			X
Photo Documentation	X	X	X		X			X			X
Elevation Monitoring ^{2,3}	X	X	X	X		X		X			X
Brackish Marsh Salinity Monitoring	X	X									
Juvenile Salmonid Monitoring		X		X							
Invertebrate Monitoring		X		X							
Water Surface Elevation Monitoring	X			X		X		X			X

Notes:

4 Q Four quarters.

TBD To be determined.

- 1 Includes visual observations of the containment berm and offset berm and the CDF cap. In addition, photographs will be taken at North Beach photo points P-1 through P-5 at each baseline quarterly monitoring event to track the erosion which has occurred at the site.
- 2 The vertical datum used during the construction phase of the project was MLLW. Due to the length of the OMMP monitoring period and the fact that MLLW changes over time, the vertical datum to be used during this phase has been designated as NGVD 29.
- 3 Note that survey transects of the channels at Hylebos Creek will be performed annually while monitoring of elevation stakes at other locations will be performed on the scheduled shown.

Attachment 2

Figure E-5 North Beach Habitat Year 0 Modification



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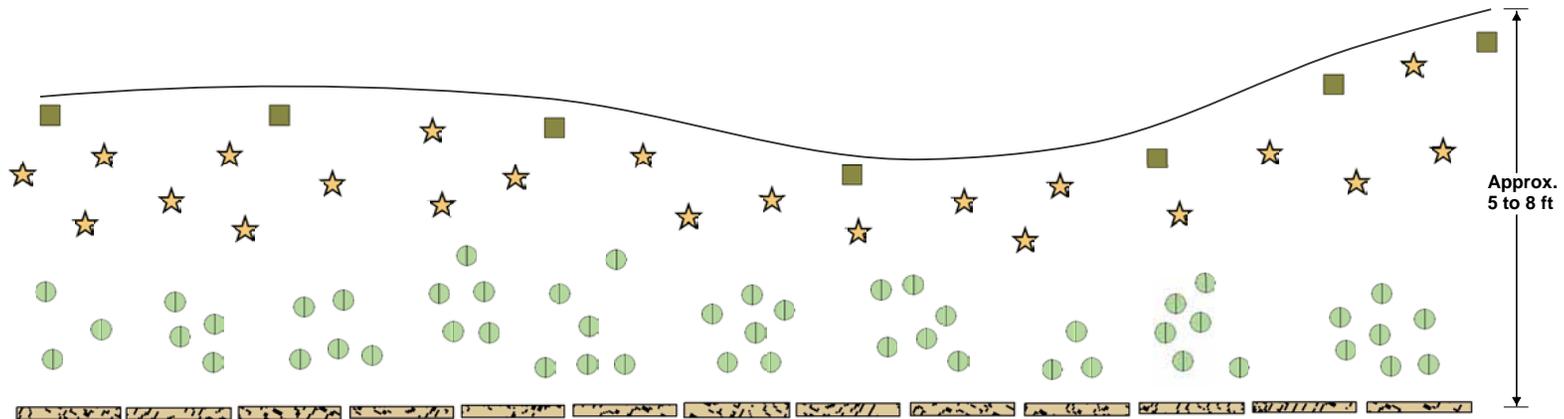


**Thea Foss and Wheeler-Osgood Waterways
OMMP**

**Figure E-5
North Beach Habitat
Year 0 Modification**

Attachment 3

Replacement of Plant Species at Head of Thea Foss Shoreline Habitat



Log Step, EL. +12.4 +/- MLLW

(Typical)
Not to Scale

Notes:

Common Name	Scientific Name	Condition	Spacing on Center (Ft)	Quantity	Notes
Tufted hairgrass	<i>Deschampsia cespitosa</i>	Bare root, or plug (min. 4 - in. above ground stem)	2	200*	Plant in irregular pattern in 1 to 2 rows in back half of planting strip.
Saltgrass	<i>Distichlis spicata</i>	Bare root, or plug (min. 4 - in. above ground stem)	2	300	Plant in groups in the front of the planting strip near log step

* Denotes additional quantity, for a total of 700 at site.

Legend	
	Hooker's Willow (existing)
	Saltgrass
	Tufted Hairgrass
	Log Step



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Thea Foss and Wheeler-Osgood Waterways
OMMP

Replacement of Plant Species at the
Head of Thea Foss Shoreline Habitat

Attachment 4

From Attachment E-2

Qualitative Ground Survey, Mitigation Sites

Qualitative Ground Survey, Mitigation Sites

Date: _____ Year: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10
 Site (circle): North Beach Habitat (NBH), Middle Waterway Tideflat (MWT), Puyallup River Side Channel (PRSC), Hylebos Creek Habitat (HCH)

Staff Present: _____

Weather Conditions: _____

River Discharge* (CFS) (PRSC & Hylebos Creek only): _____

Overall health and vigor of plants: Excellent Fair Poor

Qualitative Observations:

	Riparian Area	Marsh Area	Comments
Erosion			
Sedimentation			
Wildlife			
Vegetation			
Invasive			
Volunteer			
Survival (%)			
Animal Damage			
Disease			
Trash			
Vandalism			
Large Woody Debris			
Wrack or Organic Material			

* For the Hylebos Creek site, use "Riparian" column for forested wetland and "Marsh" column for emergent wetland. Include additional qualitative notes on high slope upland vegetation below

Wildlife Notes (Species observed, other evidence):

Insect Sampling Notes (Hylebos Creek and PRSC only):

Observable Prey Insect (e.g., amphipods, mycids, larvae):

Soil/Sediment Quality: upland aquatic areas

Odor:	
Sheen:	
Color:	
Texture:	

Presence/condition of habitat mix/fine-grained material at surface (North Beach – visual and probe – and PRSC – visual only):

Notes:

*Data from USGS Puyallup River at Puyallup Station (USGS 12101500)

Photo Points (Circle Site):

Year: 0, 1, 2, 4, 7, 10

North Beach	1A – W	1B – NW	2A – E	2B – N
2C – W	3A – E	3B – N	3C – NW	3D – S
4A – s	4B – SW	4C – NW	5A – S	5B – W
5C – N	5D – E	6 – W		
Middle Waterway Tideflat	1A – NW	1B – SW	2A – N	2B – W
2C – S	3A – N	3B – W	4A – S	4B – W
4C – N	4D – E			
Puyallup River Side Channel	1 – W	2A – S	2B – SW	3A – SE
3B – E	4A – NE	4B – SE	5A – N	5B – NE
6 – W				
Hylebos Creek	1A – E	1B – S	2A – SE	2B – SW
2C – W	3A – SW	3B – W	3C – NW	4A – NE
4B – N	4C – NW	5A – S	5B – W	5C – N
5D – E	6A – N	6B – NE	6C – SE	6D – S
7A – NE	7B – N			

Additional Notes/Photos: