Sample Alteration Form

Project Name and Number:

Lower Duwamish Waterway Slip 4 Early Action Area No. A00-06-10C

Material to be Sampled:

Bank sediment.

Measurement Parameter:

Analyses will be tiered as described in the SAP. PCBs, mercury, grain size, total solids, total organic carbon will be analyzed initially. Additional sediment will be archived to allow for full SMS analysis at a future date, if warranted.

Standard Procedure for Field Collection & Laboratory Analysis (cite reference):

Integral. 2004. *Lower Duwamish Waterway Slip 4 Early Action Area Sampling and Analysis Plan for Boundary Definition*. Final report March 4, 2004. Prepared for Seattle City Light and King County, Seattle, WA. Prepared by Integral Consulting, Inc., Olympia, WA.

Reason for Change in Field Procedure or Analysis Variation:

Bank samples will be collected to determine whether the banks are sources of chemicals to sediments in the slip. Collection of bank data prior to preparing the EE/CA will allow banks to be addressed as a potential source in the EE/CA.

Variation from Field or Analytical Procedure:

See attached.

Special Equipment, Materials or Personnel Required:

Additional Equipment: Bruton Compass

Personnel: the field crew will be composed of 3 Integral staff; Susan FitzGerald will be Field Coordinator for this sampling event

Initiators Name: _____ Date _____

Project Officer _____ Date _____

QA Officer: _____ Date _____

Attachment

Variation from Field or Analytical Procedure:

Bank samples will be collected from six locations within Slip 4 (Figure 1). These locations are located along the Slip 4 shoreline in areas where 1) the shoreline is exposed (i.e., isn't covered by either rip rap or the Crowley pier), 2) there are potential upland sources of contaminants, and 3) sediments contain elevated concentrations of PCBs based on either the 2004 or historical data sets. The rationale for specific stations is listed in Table 1.

All bank samples will be surface (0-10 cm) sediment samples collected at a bank elevation of +10 ft MLLW. Bank elevation data around Slip 4 are limited, but the estimated top of bank elevation in Slip 4 is approximately +12 to +16 ft MLLW. Sampling just below the top of the bank will allow evaluation of whether eroding bank soils/sediments may be a source of contaminated material to the sediments (rather than sediment contaminants deposited on the bank during resuspension). If upland sources were present, it is more likely that potential contamination would be present at these higher bank elevations.

Station positioning and recording of actual sampling coordinates for the bank sampling will be accomplished using a handheld DGPS, as described in the Slip 4 SAP. The shoreline elevation will be determined by verifying the real-time Duwamish River stage at the tide staff gauge at the 16th Avenue South bridge (River Mile 3.4). An observer at the gauge will radio tidal stage information to the two-person sampling crew located at Slip 4 so that elevation measurement can be corrected for tidal stage. The target sample elevation of +10 ft MLLW will be measured from the waterline using a graduated staff and level (i.e., Bruton compass). The elevation error using this method is approximately ± 0.5 foot. Samples that cannot be collected due to physical obstruction (e.g., the bulkhead in the vicinity of Station BK05) will be collected at the next highest elevation for which soil/sediments are available. If possible, sediments may be collected in between the wooden slats of the bulkhead, but samples will not be collected by drilling through or augering behind bulkheads.

Samples will be collected using hand corers, spoons or trowels. Multiple hand cores may be collected at each station to obtain sufficient sample volume. At these locations, the cores comprising a single sample will be located within a 2-m radius (the accuracy of hand-held DGPS positioning). Equipment decontamination and sample collection and processing methods will be the same as for shore-based intertidal sample collection described in Section 3.3.6 of the Slip 4 SAP.

The bank samples will be identified by the use of "BK" as second part of the sample identifier number. Station numbers are shown in Figure 1.

Field quality control samples for this sampling event will be collected at the same frequency as described in the Slip 4 SAP, and are summarized in Table 2.

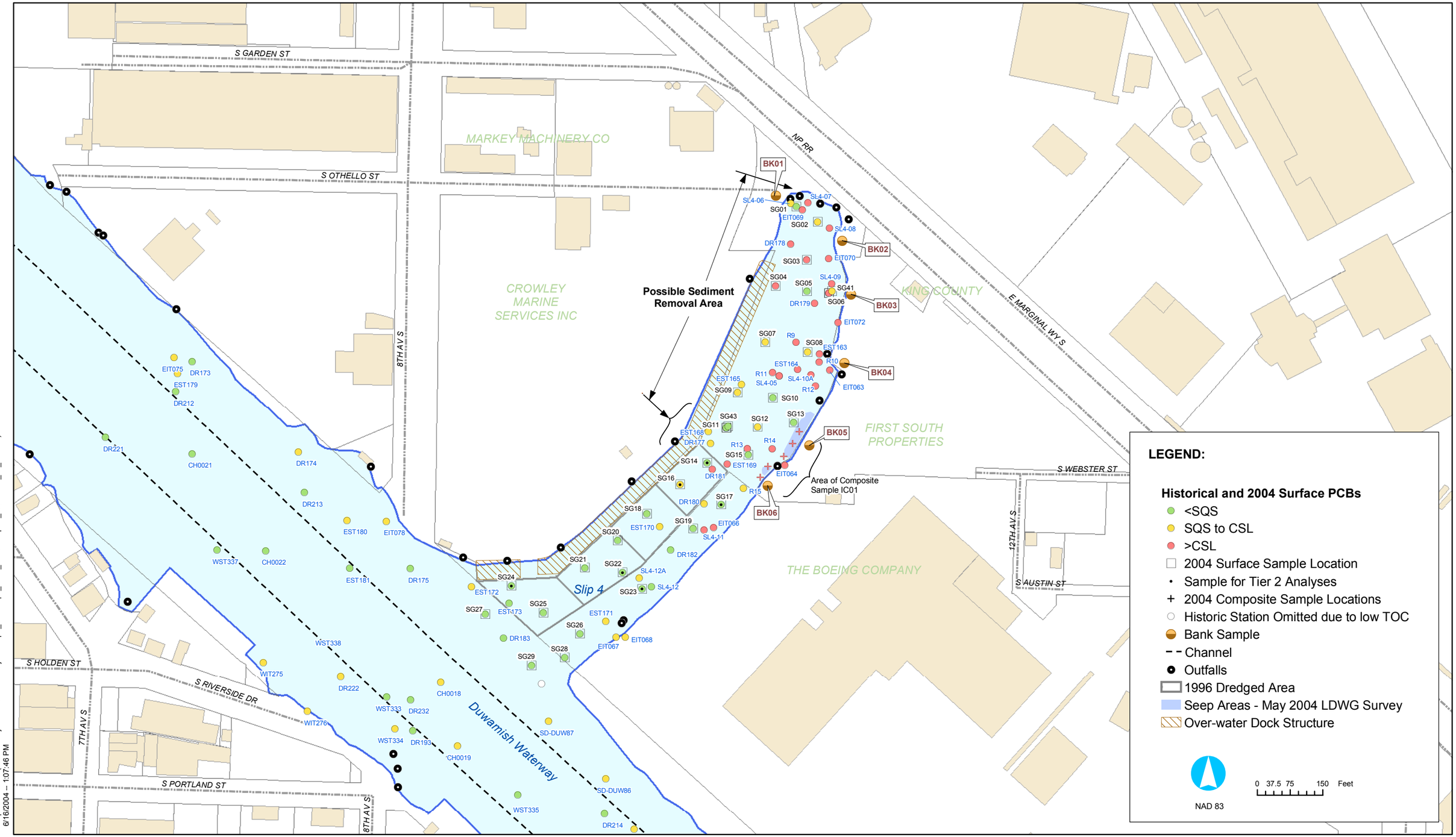
Table 1. Rationale and Target Locations for Bank Sampling Stations.

Station Number	Rationale	Approximate Target Location[1,2]	
		Easting (feet)	Northing (feet)
BK01	Located at head of Slip near former log loading ramp/dock.	1273418	199493
BK02	Located along First South Properties to fill spatial gap between BK01 and BK03.	1273569	199390
BK03	Located along First South Properties adjacent to offshore sediments with elevated PCBs.	1273590	199268
BK04	Located along First South Properties adjacent of offshore sediments with historically elevated PCBs.	1273575	199111
BK05	Located along First South Properties at bank seep and above intertidal composite area with elevated PCBs.	1273494	198921
BK06	Located along First South Properties above intertidal composite area with elevated PCBs.	1273399	198830

[1]Location may be modified in the field, in consultation with EPA, based on field conditions.
[2]North American Datum 1983 (NAD83), with 1991 adjustment.

Table 2. Numbers of Bank Sediment and Field QC Samples.

Analysis	Number of Samples	Sample Splits	Field Replicates	Equipment Rinse Blanks	Total Number of Field Samples
Grain-size	6	1	1	0	8
Total organic carbon	6	1	1	0	8
Total solids	6	1	1	0	8
Mercury	6	1	1	0	8
PCB Aroclors	6	1	1	1	9
Archive	6	1	1	0	8



Map Document: (C:\GIS\Projects\Duwamish\Projects\Slip4_FSP\Slip4_2004_BankSamples_LABELED_v2_rln.mxd)
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integral consulting inc.

Map Feature Sources:
King County GIS, Seattle Public Utilities, USACE, Ecology, Windward Environmental, David Evans, Inc., and others.
Sediment Chemistry:
Lower Duwamish Project Database and 2004 Slip 4 Survey PDB analysis results.

Figure 1. Location of Proposed Bank Samples