URS

Final Memorandum

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Subject: **Supplemental Phase III Remedial Investigation Work Plan**
Everett Shipyard
1016 14th Street
Everett, Washington

INTRODUCTION

In late 2008 and 2009, URS conducted a remedial investigation (RI) of the Everett Shipyard Site, located at 1016 14th Street in Everett, Washington ("Site"). The work was completed in accordance with Agreed Order No.: DE 5271, the Final Remedial Investigation/Feasibility Study Work Plan (RI/FS Work Plan) dated October 31, 2008 (URS, 2008) and the Supplemental RI Work Plan dated October 31, 2009 (URS, 2009a). The results of the field RI were presented in a Preliminary RI Data Report (URS, 2009b) submitted to the Washington State Department of Ecology (Ecology) on May 26, 2009 and a Preliminary RI Phase II Data Submittal submitted to Ecology on February 5, 2010 (URS, 2010). The Preliminary RI Phase II Data submittal, in combination with Ecology's interpretation of the extent of the Site, resulted in the identification of a data gap related to marine sediments in the area of Outfall C during our meeting on February 23, 2010. Subsequent site visits on April 13, 2010 and April 26, 2010 identified an additional data gap involving sediment materials contained between the upper and lower bulkheads in the area between Outfall A and the sheetpile bulkhead west of the Travel Lift. These data gaps prevent the completion of the feasibility study without making significant assumptions about the extent of sediment impacts.

The purpose of this technical memorandum is to present the scope of work for the supplemental Phase III sediment investigation that is proposed to fill the data gaps identified during the review and discussion of the field RI results and site visits. The scope of work involves a marine sediment investigation as described below.

SCOPE OF WORK

A sampling and analysis plan (SAP) for marine sediment sampling and a site-specific health and safety plan were prepared prior to the 2008-09 remedial investigations. These plans were included as appendixes to the RI/FS Work Plan (see Work Plan Appendixes A, E and F). The methods and procedures described in those plans and the supplemental (Phase II) work plan will be utilized during these additional marine

sediment investigations unless otherwise indicated in the description of the scope of work below. The health and safety plan will be updated to address the bulkhead sampling discussed below.

OUTFALL C AREA

Additional marine sediment sampling will be conducted to address a data gap identified in the vicinity of Outfall C at the south end of the site. The proposed sediment sampling locations are shown on Figure 1 and the location coordinates are shown in Table 1. A total of eleven shallow grab samples will be collected. Samples SG-36 and SG-37 will be collected at previously sampled locations SG-32 and SG-33, respectively, for purposes of running bioassays. Two acute bioassays and one chronic bioassay will be performed in accordance with WAC 173-204-315 (Ecology, 1995), the detailed guidance in the Sediment Sampling and Analysis Plan Appendix (Ecology 2008), and the detailed procedures outlined in the Recommended Guidelines for Conducting Laboratory Bioassays on Puget Sound Sediments (PSEP 1995). The proposed test species are summarized in Table 2. In addition to the sediment from these locations submitted for bioassays, additional sediment will be wet-screened on-site to guide reference sample collection in accordance with Recommended Guidelines for Sampling Marine Sediment, Water Column, and Tissue in Puget Sound (PSWQA, 1997) and aliquots will be submitted for the sediment conventionals analysis.

Samples SG-38 through SG-46 will be analyzed for the conventional variables and frozen at -18 degrees C for archival. If the samples from SG-36 and SG-37 both pass the bioassay tests, no further analysis will be performed on these archived samples. Passing bioassay tests at both SG-36 and SG-37 would overturn the prior chemical exceedances observed in historical samples SG-32 and SG-33 and would constitute a bounding of the contamination and bioassay failure previously observed at location SG-13/31. If one of the Phase III samples passes the bioassay, this result will overturn the associated exceedance and constitute a partial bounding of the findings at SG-13/31.

If sample SG-36 or SG-37 fails the bioassays, additional chemical analysis for semivolatile organic compounds (SVOCs) will be performed on the archived samples within SVOC holding times in a tiered fashion. If sample SG-36 fails the bioassays, samples SG-38 and SG-39 will be analyzed for SVOCs. If sample SG-37 fails the bioassays, samples SG-39 and SG-40 will be analyzed for SVOCs. If exceedances of the SMS for SVOCs are observed in samples SG-38, SG-39, or SG-40, the archived sample from the adjacent location in the next outer "tier" of samples (e.g., SG-41 for SG-38, etc.) will be thawed and analyzed for SVOCs. Similarly, if exceedances of the SMS are observed in a sample in the second tier, the corresponding archived sample from the outermost tier will be thawed and analyzed for SVOCs. The results will be used to better-bound the area of contamination around Outfall C.

Based on the results of field wet-screening of sediments from locations SG-36 and SG-37, reference sediment with similar fines content will be collected from one or more established reference locations in Holmes Harbor on Whidbey Island and submitted for bioassays and sediment conventionals analysis. It is assumed that two samples will be collected, designated SG-47 and SG-48.

The proposed analytical work is summarized by location in Table 3 and the sample quantities are shown in Table 4. Analytical results will be submitted electronically to Ecology's EIM database and successful entry confirmed for Ecology's review.

BULKHEAD AREA

Sediment sampling will also be performed in six locations between the lower and upper bulkhead in the north portion of the site (Figure 1 and Table 1). This sampling will be performed utilizing access to be constructed in the vicinity of Outfall A, allowing sampling personnel to perform the sampling using manual methods.

At each of locations BC-1 through BC-6, a 0 to 10 cm surface sample will be collected and analyzed for the full SMS suite of 47 analytes, bulk and porewater organotins, and the sediment conventionals. At each of the six bulkhead locations, a subsurface sample will also be collected, if feasible with the available sampling equipment. The subsurface samples will be collected using either hand auger methods previously approved for this project by Ecology (Ecology, 2008b) or alternate manual coring methods, with a goal of obtaining a sample composited over a horizon of approximately 2 to 3 feet below the surface. If it is not possible to collect a sample from the 2 to 3 foot horizon, an attempt will be made to collect a sample from the 1 to 2 foot horizon. The depth of the material used to make up the subsurface sample will be recorded, together with observations on the characteristics of the material exposed during sample collection. The subsurface samples will be analyzed for bulk organotins, mercury, and the sediment conventionals due to short holding times, and then frozen for archival. If exceedances of the SMS criteria are reported for any of the surface bulkhead samples, the associated subsurface sample will be thawed and analyzed for the remainder of the SMS suite.

Table 3 summarizes the proposed analytical work. Sample quantities are shown in Table 4. Analytical results will be submitted to Ecology's EIM database and successful entry confirmed.

SCHEDULE

The sampling is tentatively scheduled to be performed during the week of May 17, 2010. It is anticipated that the data from the Phase III sampling, including the bioassay results and the non-contingent analytical results, will be incorporated in the second draft RI/FS report, which is due to Ecology on July 26, 2010, if at all possible. If the data are not available by that time, then the results will be provided in a separate submittal to Ecology. Results of the bioassays and initial chemical analyses may lead to the need to undertake contingent analyses. The results of these contingent analyses may not be validated in time for inclusion in the second draft of the RI/FS report and in this case would be transmitted in a separate submittal to Ecology.

REFERENCES

Washington State Department of Ecology (Ecology). 2008a. *Sediment Sampling and Analysis Plan Appendix*. Publication No. 03-09-043. February.

_____. 2008b. Email to URS regarding sampling procedural adjustment at SB-24 and SB-25. December 22.

_____. 1995. Sediment Management Standards. *Chapter 173-204, Washington Administrative Code*. Publication No. 96-252. December.

Puget Sound Estuary Program (PSEP). 1995. *Recommended Guidelines for Conducting Laboratory Bioassays on Puget Sound Sediments*. Interim Final Report, Puget Sound Estuary Program, US Environmental Protection Agency, Region 10, Seattle, Washington. July.

Puget Sound Water Quality Authority (PSWQA). 1997 *Recommended Guidelines for Sampling Marine Sediment, Water Column, and Tissue in Puget Sound*. Prepared for U.S. Environmental Protection Agency. April 1997.

URS Corporation (URS). 2010. Preliminary RI Phase II Data Submittal, *Everett Shipyard,* 1016 14th Street, Everett, Washington. February 5.

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_____. 2009b. *Preliminary Remedial Investigation Data Report, Everett Shipyard,* 1016 14th Street, Everett, Washington. May 26.

_____. 2008. *Final Remedial Investigation Feasibility Study Work Plan, Everett Shipyard,* 1016 14th Street, Everett, Washington. October 31.

Attachments:

Figure 1 – Proposed Phase III Sediment Sample Locations

Table 1 – Sediment Station Coordinates
Table 2 – Bioassay Organisms
Table 3 – Summary of Proposed Sediment Analyses
Table 4 – Environmental and Quality Control Sample Quantities for Marine Sediment Analyses

Table 1
Sediment Station Coordinates

Station Number	Latitude (Decimal Degrees//Degrees, Minutes, Seconds)	Longitude (Decimal Degrees//Degrees, Minutes, Seconds)	Estimated Water Depth (feet)	Proposed Sample Depth Below Sediment Surface
SG-36 (former SG-32)	47.99765278// 47°59'51.55"	-122.21588333//-122°12'57.18"	12	0 to 10 cm
SG-37 (former SG-33)	47.99761111// 47°59'51.40"	-122.21599167//-122°12'57.57"	12	0 to 10 cm
SG-38	47.99775833//47°59'51.93"	-122.2159389//-122°12'57.38"	12	0 to 10 cm
SG-39	47.99772222// 47°59'51.80"	-122.2160472//-122°12'57.77"	14	0 to 10 cm
SG-40	47.99760833// 47°59'51.39"	-122.2161306//-122°12'58.01"	14	0 to 10 cm
SG-41	47.99783056//47°59'52.19"	-122.2159806//-122°12'57.53"	14	0 to 10 cm
SG-42	47.99777611// 47°59'52.03"	-122.2161944//-122°12'58.30"	14	0 to 10 cm
SG-43	47.99760833// 47°59'51.39"	-122.2163111//-122°12'58.72"	14	0 to 10 cm
SG-44	47.99790278//47°59'52.45"	-122.2160194//-122°12'57.67"	12	0 to 10 cm
SG-45	47.99786944//47°59'52.33"	122.2162917//-122°12'58.65"	12	0 to 10 cm
SG-46	47.99761111//47°59'51.40"	-122.2164639//-122°12'59.27"	14	0 to 10 cm
SG-47	TBD (Holmes Harbor)	TBD (Holmes Harbor)	TBD (Holmes Harbor)	0 to 10 cm
SG-48	TBD (Holmes Harbor)	TBD (Holmes Harbor)	TBD (Holmes Harbor)	0 to 10 cm
BC-1-1	47.99889167//47°59'56.01"	-122.2157917//-122°12'56.85"	0	0 to 10 cm
BC-1-2	47.99889167//47°59'56.01"	-122.2157917//-122°12'56.85"	0	2 to 3 feet
BC-2-1	47.999025//47°59'56.49"	-122.2157944//-122°12'56.86"	0	0 to 10 cm
BC-2-2	47.999025//47°59'56.49"	-122.2157944//-122°12'56.86"	0	2 to 3 feet
BC-3-1	47.99913889//47°59'56.90"	-122.2158//-122°12'56.88"	0	0 to 10 cm
BC-3-2	47.99913889//47°59'56.90"	-122.2158//-122°12'56.88"	0	2 to 3 feet
BC-4-1	47.99914722//47°59'56.93"	-122.2159333//-122°12'57.36"	0	0 to 10 cm
BC-4-2	47.99914722//47°59'56.93"	-122.2159333//-122°12'57.36"	0	2 to 3 feet
BC-5-1	47.99913611//47°59'56.89"	-122.2160944//-122°12'57.94"	0	0 to 10 cm
BC-5-2	47.99913611//47°59'56.89"	-122.2160944//-122°12'57.94"	0	2 to 3 feet
BC-6-1	47.99914167//47°59'56.91"	-122.2162222//-122°12'58.40"	0	0 to 10 cm
BC-6-2	47.99914167//47°59'56.91"	-122.2162222//-122°12'58.40"	0	2 to 3 feet

Table 2
Bioassay Organisms

Bioassay	**Test Organism**
Acute amphipod	*Eohaustorius estuarius*
Acute larval	*Mytilus sp.*
Chronic	*Neanthes sp.*

Table 3
Summary of Proposed Initial Sediment Analyses

Location	Bioassays	SMS	Mercury	Organotins (bulk)	Organotins (porewater)	Conventional Variables	Sample Archived
SG-36	✓	---	---	---	---	✓	---
SG-37	✓	---	---	---	---	✓	---
SG-38	---	---	---	---	---	✓	✓
SG-39	---	---	---	---	---	✓	✓
SG-40	---	---	---	---	---	✓	✓
SG-41	---	---	---	---	---	✓	✓
SG-42	---	---	---	---	---	✓	✓
SG-43	---	---	---	---	---	✓	✓
SG-44	---	---	---	---	---	✓	✓
SG-45	---	---	---	---	---	✓	✓
SG-46	---	---	---	---	---	✓	✓
SG-47	✓	---	---	---	---	✓	---
SG-48	✓	---	---	---	---	✓	---
BC-1-1 (surface)	---	✓	---	✓	✓	✓	---
BC-1-2 (subsurface)	---	---	✓	✓	---	✓	✓
BC-2-1	---	✓	---	✓	✓	✓	---
BC-2-2	---	---	✓	✓	---	✓	✓
BC-3-1	---	✓	---	✓	✓	✓	---
BC-3-2	---	---	✓	✓	---	✓	✓
BC-4-1	---	✓	---	✓	✓	✓	---
BC-4-2	---	---	✓	✓	---	✓	✓
BC-5-1	---	✓	---	✓	✓	✓	---
BC-5-2	---	---	✓	✓	---	✓	✓
BC-6-1	---	✓	---	✓	✓	✓	---
BC-6-2	---	---	✓	✓	---	✓	✓

Notes:

SMS – 47 Sediment Management Standards analytes
✓ – Analysis to be performed
--- – Analysis not performed

Table 4
Environmental and Quality Control Sample Quantities for Marine Sediment Analyses

Analyses	Analytical Method	Environmental Samples	Field Duplicates	Matrix QC*	Field Blanks**	Total Samples
Total Metals	EPA SW846 6010B/7471A	6	1	1/1+1	1	11
Mercury	EPA SW846 7471A	12	1	1/1+1	1	17
VOCs	EPA SW846 8260B	6	1	1/1+1	1	11
SVOCs	EPA SW846 8270D/8270-SIM	6	1	1/1+1	1	11
Pesticides	EPA SW846 8081A	6	1	1/1+1	1	11
PCBs	EPA SW846 8082	6	1	1/1+1	1	11
Grain Size	PSEP Method (1986a)	25	2	0	0	27
TOC	EPA SW846 9060	25	2	0	0	27
Ammonia	Plumb, 1981-modified	25	2	0	0	27
Total sulfides	EPA SW846 9030B	25	2	0	0	27
Total Solids	PSEP Method (1986a)	25	2	0	0	27
Total Volatile Solids (TVS)	EPA 160.4 2540 B, E	25	2	0	0	27
Tributyltin (bulk)	Method PSEP/Krone 1988	12	1	1/1+1	1	17
Tributyltin (porewater)	Method PSEP/Krone 1988	6	1	1/1+1	1	11

* Matrix QC – MS/MSD and/or laboratory duplicate analyses.
** Field blanks include equipment rinsate and trip blanks (VOC analysis only)

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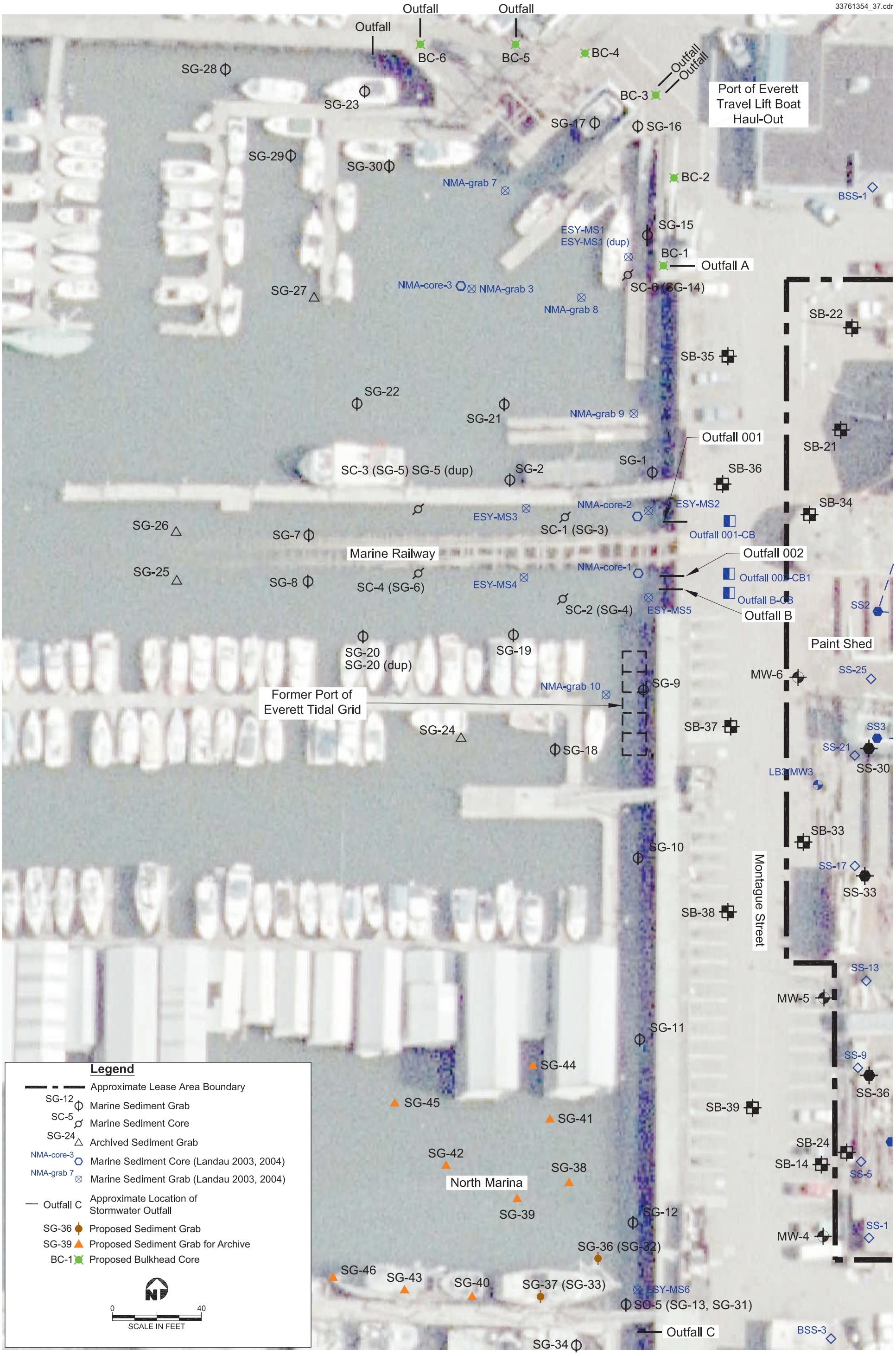

Figure 1

Proposed Supplemental Phase III Sampling Locations

Job No. 33761354

URS

Everett Shipyard
Everett, Washington
SUPPLEMENTAL RI WORK PLAN