PORTLAND HARBOR RI/FS

ROUND 2B FIELD SAMPLING PLAN ADDENDUM FOR ANALYSIS OF ARCHIVED SEDIMENT SAMPLES

DRAFT

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Prepared for

The Lower Willamette Group

Prepared by

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LIST OF ACRONYMS

AOPCs	Areas of Potential Concern
CAS	Columbia Analytical Services
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COIs	chemicals of interest
EPA	U.S. Environmental Protection Agency
FSP	field sampling plan
LWG	Lower Willamette Group
PAHs	polycyclic aromatic hydrocarbons
PCBs	polychlorinated biphenyls
QA	quality assurance
QAPP	quality assurance project plan
RI/FS	remedial investigation and feasibility study
RM	river mile
SOP	standard operating procedure
SVOCs	semivolatile organic compounds
TOC	total organic carbon
VOCs	volatile organic compounds

1.0 INTRODUCTION

Round 2B subsurface sediment core sampling was performed by the Lower Willamette Group (LWG) for the Portland Harbor remedial investigation and feasibility study (RI/FS) in the fall of 2005. This sampling effort was conducted in accordance with the Round 2B Field Sampling Plan Addendum (Integral 2005b), which followed the subsurface sediment sampling approach detailed in the Round 2 Field Sampling Plan (Round 2 Sediment FSP; Integral et al. 2004a).

Like the Round 2A subsurface sampling program, while most core segments were analyzed initially, a subset of core segments was frozen and archived during core processing for possible future chemical analysis based on the initial Round 2B chemistry results. This Round 2B FSP Addendum describes the process used to select archived Round 2B subsurface samples for analysis and proposes a list of archived 2B samples for analysis of specific target analyte groups. Following approval of the selected samples by the U.S. Environmental Protection Agency (EPA), these samples will be analyzed for the target chemicals, and the results will be incorporated into the Draft Portland Harbor Remedial Investigation report.

This Round 2B FSP Addendum also identifies a subset of the Round 2B samples for analysis of polychlorinated biphenyl (PCB) congeners to supplement the paired PCB Aroclor/congener data set generated in Round 2A. The criteria use to select samples for congener analysis is also described here.

The Round 2B Subsurface Sediment Data Report (Integral 2006), the Round 2B Subsurface Field Sampling Report (Integral 2005d), and the Round 2A Sediment Site Characterization Summary Report (Integral 2005c) were submitted previously to EPA.

2.0 SAMPLE SELECTION APPROACH

This section details the approach used to select archived Round 2B subsurface samples for further analyses. The objectives of this archived sample selection and analysis effort are to 1) further define the nature and extent of contaminants in the areas sampled, and 2) generate additional PCB congener sediment data for evaluation of its correlation with PCB Aroclor data and for use in PCB nature and extent and source evaluations.

Archived Round 2B sample selection for nature and extent data gaps was based on a review of the spatial trends in the sediment chemistry data from the initial Round 2B analyses combined with the Round 2A surface and subsurface data (including the Round 2A archived sample data). The sample selection process is similar to the one used in the Round 2A FSP Addendum (Integral 2005a) and is described in Section 2.1.

A subset of samples analyzed initially for PCB Aroclors in Round 2 were selected for PCB congener analysis based on their spatial distribution relative to existing congener data. This sample selection process is described in Section 2.2.

2.1 ROUND 2B ARCHIVED CORE SAMPLE SELECTION

During Round 2B core processing, 45 surface and subsurface core segments were archived without full analysis[1] (Integral 2005d). Because the core processing plan (Integral et al. 2004a) defaulted to the analysis of the top two core segments below the surface segment (i.e., core segments B and C), the archived subsurface segments were most often the deeper subsurface segments D, E, F, etc. Also, most 2B core stations were collocated with Round 2A surface grab samples (0-30 cm), so the top 30 cm of the 2B cores, the A segment, was typically archived. Consequently, in addition to the 25 subsurface core segments, there were also 20 surface segment A samples archived (Integral 2005d).

All archived core segment samples were homogenized in the field laboratory and placed in sample jars in the same manner that all analyzed samples were handled; the archived samples have been stored frozen since their collection.

2.1.2 Chemicals Selected for Archived Sample Screening

The archived sample selection process was based on the spatial distribution of 10 screening chemicals. These 10 chemicals are listed in Table 2-1 and include cadmium, copper, chromium, lead, nickel, zinc, total PCBs, total DDTs, bis(2-ethylhexyl) phthalate, and total polycyclic aromatic hydrocarbons (PAHs). This list represents a compilation of the chemicals of interest (COIs) identified by EPA

[1] Many analyses with short holding times (e.g., VOCs, TPH-G), were conducted initially on these archived core segments in accordance with the Round 2B FSP.

in its December 2005 Round 3A Data Gaps Memorandum (EPA 2005) for the seven preliminary areas of potential concern (AOPCs) in which a Round 2B core is located. These preliminary AOPCs and the associated COIs are compiled in Table 2-2. Two additional COIs, mercury and TBT, listed in Table 2-2, are not included as screening chemicals because their holding time of six months has been exceeded in the archived samples.

The surface and subsurface concentrations of the 10 screening chemicals are mapped in combination with the Round 2A surface and subsurface data in Maps 1-10. Each of these chemicals can be analyzed in a frozen archived sample up to 1 year after sampling. When possible, the summed parameter for a compound group (e.g., total PAHs) were used as the screening "chemical" rather than the individual chemicals (e.g., naphthalene) to capture broad trends in contaminant nature and extent.

2.1.2 Sample Selection Process

The selection process for Round 2B archived samples followed the process used in Round 2A. This process and the associated selection criteria are described below. The surface and subsurface distribution of each screening chemical in the vicinity of each Round 2B core location was visually examined (Maps 1 through 10) for spatial trends in concentrations. The following general decision guidelines were used to select archived samples for analysis:

1. When the deepest core segment or segments at a location was archived and the concentrations clearly increase with depth above the archived segment(s), then the deepest segment(s) was typically selected for analysis. Exceptions to this guideline occurred when 1) analyzing the deepest section would add only approximately 1 foot [2] to the measured vertical extent, or 2) the highest concentrations at depth were still well within levels that appeared to represent widespread concentrations [3] in the study area. When there were field replicate samples, the archived sample from the core with the highest concentrations was selected for analysis.
2. If there was no concentration gradient or a decreasing concentration gradient with depth, then the deeper segments were generally not selected for analysis. Exceptions to this guideline occurred when the concentration

[2] The 1-foot limit was used for purposes of determining chemical nature and extent. This is a conservative limit for FS purposes where the vertical resolution of remedial removal technologies is likely to be approximately 2 feet.

[3] For highly bioaccumulative compounds, such as PCBs and pesticides, any detected concentration was generally regarded as an "elevated" level, whereas for the metals and PAHs, there are relatively low detected concentrations that appear to represent widespread ("nonelevated") concentrations that occur throughout the study area.

in the deepest analyzed segment appeared to represent a localized elevated level.

3. If the archived core segment or segments falls within the middle of the core, (i.e., there were measured values above and below), these vertical data gaps were generally not targeted for analysis. An exception to this guideline occurred when a large (i.e., several feet or more) vertical gap occurred between a steep concentration gradient; in these cases, the intervening sample(s) were considered for selection depending on the specific analyte concentrations analyte and decision guidelines No. 1 and 2.
4. If the surface core segment (A) was archived and the Round 2A surface grab sample for that station was offset (by 50 feet or more) from the core sample location and elevated concentrations were evident in the B core segment, then the A sample was considered for analysis to supplement the surface sediment quality data for that area.

2.2 ARCHIVED SAMPLE SELECTION FOR PCB CONGENER ANALYSIS

A subset of Round 2B sediment samples were selected for PCB congener analysis to supplement the existing (Round 1 and 2) Aroclor/congener data set and support the RI/FS PCB nature and extent and source evaluation assessments. Samples for PCB congener analysis were identified based on the following approach:

1. Maps of Round 2 paired PCB Aroclor/Congener data were generated and areas with strong spatial gradients (both horizontal and vertical) in congener composition were visually identified.
2. The Round 2B station locations were superimposed on these existing Aroclor/congener data maps. In areas where strong gradients in congener composition were evident proximal to Round 2B core locations, archived Round 2B surface and subsurface core segments were considered for congener analysis to supplement the spatial coverage of the paired Aroclor/congener data set. The Round 2B station locations were superimposed on these existing Aroclor/congener data maps. In areas where strong gradients in congener composition were evident proximal to Round 2B core locations, archived Round 2B surface and subsurface cores segments were considered for congener analysis to supplement the spatial coverage of the paired Aroclor/congener data set.
3. If a Round 2B core segment that had not been analyzed for PCB Aroclors (e.g., an archived surface, A, segment) was selected for congener analysis based on the above approach, then PCB Aroclors will also be analyzed in the same archived composite sample to insure that paired Aroclor/congener data is generated for each sample.

3.0 SELECTED SAMPLES

The archived samples selected for analyses based on the application of the selection criteria listed above are described below.

3.1 ROUND 2B ARCHIVED CORE SAMPLES SELECTED

The selection criteria listed in Section 2.2.2 were used to visually examine the nature and extent maps for the ten screening chemicals. Based on this examination, no Round 2B archived samples were selected for analysis on the basis of the cadmium, chromium, lead, nickel, or bis(2-ethylhexyl) phthalate distributions. One or more archived samples was selected for analysis based on the distribution of copper, zinc, total PCBs, total PAHs, and total DDTs. The individual samples selected and the associated screening chemicals are compiled in Table 3-1. The primary decision guideline(s) used to select each sample is also indicated (color-coded) in Table 3-1.

Maps 1 through 10 show the specific core segments selected for analysis on an analyte-by-analyte basis. Note that panels "a" (RM 2-3) and "g" (Swan Island Lagoon) in each map set do not have any 2B core locations but they are included here for completeness (they do include the Round 2A archived sample data not previously mapped in Integral 2005c). Also, there are no selected samples indicated on the cadmium, chromium, lead, nickel, and bis(2-ethylhexyl) phthalate maps as no selections were triggered by the distribution of these analytes.

Overall, 16 of the 45 Round 2B core segments are identified for analysis of one or more compounds. The number of samples triggered per chemical is shown at the bottom of Table 3-1 and is summarized in Table 3-2.

3.2 PCB CONGENER SAMPLES SELECTED

The process described in Section 2.2 was used to select samples for congener analysis based on the pattern and distribution of the Round 1 and Round 2 congener data relative to the Round 2B sediment core locations.

Map 11 shows pie charts of distribution of congener homologs at each sampled location. While most samples with congener data are surface samples, 30 Round 2A subsurface core segments were also analyzed for congeners, and these data are also included on Map 11. Sample depth intervals are shown in the pie center along with the total Aroclor value for that sample. Round 2B core samples location are also included on Map 11.

Five Round 2B samples were selected for PCB congener analysis based on an examination of the spatial distribution of the congener patterns in Map 11. The

selected samples and the associated rationale are listed in Table 3-3. If a selected sample did not already have Aroclor data associated with it (e.g., some A segments), then PCB Aroclors will also be analyzed from the same archived sample (Table 3-3).

4.0 ARCHIVED SAMPLE ANALYSES

Table 4-1 lists the selected archived core samples and the chemical analyses proposed for each sample. The approach used for selecting the suite of chemical analyses to be performed and reported for a given sample based on the triggering chemical(s) is as follows:

- If a sample is selected based on any metal, then all metals will be analyzed and reported.
- If a sample is selected based on total PCBs, then all Aroclors will be analyzed and reported.
- If a sample is selected based on total DDTs, then the full project organochlorine pesticides list will be analyzed and reported.
- If a sample is selected based on bis(2-ethylhexyl) phthalate, then the full semivolatile organic compounds (SVOCs) list, minus PAHs, will be analyzed and reported. No Round 2B archived samples were selected based on bis(2-ethylhexyl) phthalate.
- If a sample is selected based on total PAHs, then the full PAH list will be analyzed and reported.

In addition to these chemical analyses, conventional analyses consisting of grain size, total organic carbon (TOC), and total solids will be performed on all archived samples selected for analysis. These data are needed to support the RI/FS data evaluation.

All analyses will be conducted in accordance with the approved project quality assurance project plan (QAPP) and any relevant QAPP addenda (Integral and Windward 2004, Integral 2004). Table 4-1 lists the analytical methods and project laboratories to be used for the archived sample analyses.

4.1 SAMPLE HOLDING TIMES

The first Round 2B cores were collected on October 18, 2005. With the exception of grain size, all proposed archive analyses, including TOC and total solids, have a 1-year holding time for a frozen sample. The grain-size holding time for a refrigerated sample is 6 months. With the exception of grain size, the analyses identified in this Round 2B FSP Addendum need to be initiated by October 18, 2006, to meet the required holding-time limitation. While the grain-size analyses on the refrigerated samples will be conducted well beyond the 6-month hold time, these data are important to obtain for data evaluation purposes for the RI/FS, and the holding time exceedance qualifier will not negate the usefulness of this sample texture information.

4.2 LABORATORY ANALYSIS

All laboratory methods will follow EPA-approved project analytical protocols. Laboratory methodology details are provided in the Round 2 QAPP (Integral and Windward 2004) and in *Corrective Action Plan: SVOC Analyses in Sediment Core Samples* (Integral 2004, pers. comm.). Analytes, analytical concentration goals, project-specific reporting limits, and analytical methods for sediments are included in these documents. Laboratory quality assurance (QA) will be implemented as described in the Round 2 QAPP and according to the laboratories' respective QA programs, plans, and standard operating procedures (SOPs). Additional information on analytical methods and laboratory QA program plans for each laboratory is provided in the QAPP (Integral and Windward 2004).

5.0 PROJECT ORGANIZATION

The project team described in the Round 2 Sediment FSP will coordinate the analyses of the archived samples. Key task personnel are identified in the following table.

Title	Personnel
CERCLA Project Coordinator	Keith Pine (Integral)
Sampling and Analysis Coordinator	Gene Revelas (Integral)
Chemistry QA Manager	Maja Tritt (Integral)
Sample Transfer Coordinator	Manon Tanner (Integral)
Data Manager	Tom Schulz (Integral)

Additional information on project organization, coordination, and communication between EPA, the LWG, and the consultant team is provided in the RI/FS Programmatic Work Plan (Integral et al. 2004b) and the Round 2 Sediment FSP (Integral et al. 2004a).

5.1 LABORATORY SERVICES

Laboratory services used for the archived sample analyses will follow the Round 2 QAPP (Integral and Windward 2004) and the *Corrective Action Plan: SVOC Analyses in Sediment Core Samples* (Integral 2004, pers. comm.), with the exception that Columbia Analytical Services (CAS) will perform organochlorine pesticide and PCB Aroclor analyses.

Laboratory qualifications were provided in the Round 2 QAPP (Integral and Windward 2004) and Integral (2004, pers. comm.). CAS' SOPs for pesticides and PCBs have been provided to EPA under separate cover.

5.2 SCHEDULE

Laboratory analyses of the archived samples will begin as soon as possible following EPA approval of the selected samples and target analytes identified in this FSP addendum. It is anticipated that archived sample analyses will be initiated in October 2006.

LWG-validated analytical laboratory data for the archived Round 2B samples will be provided to EPA in an electronic format within 90 days of EPA approval of this FSP addendum. Every effort will be made to comply with this data reporting schedule; however, additional time may be needed to generate final, validated data if technical difficulties are encountered at the laboratory or during data validation.

6.0 REPORTING

Results of the archived sediment sampling effort will be incorporated into the Draft Portland Harbor Remedial Investigation report. If available, the validated data for the archived Round 2B samples may be used to inform the development of the Round 3B sediment nature and extent field sampling plan.

7.0 REFERENCES

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Plumb, R.H. Jr. 1981. Procedures for Handling and Chemical Analysis of Sediment and Water Samples. Technical Report EPA/CE-81-1. U.S. Army Corps of Engineers, Vicksburg, MS.

PSEP. 1986. Puget Sound Estuary Program: Recommended Protocols for Measuring Conventional Sediment Variables in Puget Sound. Final Report. Prepared for U.S. Environmental Protection Agency, Region 10, Office of Puget Sound, Seattle, WA, and the U.S Army Corps of Engineers, Seattle District, Seattle, WA. Tetra Tech, Inc., Bellevue, WA.

Table 2-1. Chemicals Used to Screen Archived Samples.

Metals
Cadmium
Chromium
Copper
Lead
Nickel
Zinc
PCBs/Pesticides
Total PCBs
Total DDTs
SVOCs
Bis(2-ethylhexyl) phthalate
Total PAHs

Table 2-2. COIs Identified in EPA (2005, see Figure 3a-d) for Preliminary Areas of Potential Concern.

RM	AOPC	PCBs	DDT et al.	PAH	Phthalates	Cd	Cu	Cr	Pb	Hg	Ni	Zn	TBT
3-4	Schnitzer-Burgard	x		x	x		x	x	x		x	x	x
6-7	US Moorings			x				x				x	x
	RPAC/Arkema		x	x					x	x	x		
	Willamette Cove	x	x	x			x	x		x	x	x	x
7-8	Willbridge	x				x							
8-9	Gunderson/Shell (one 2B station)	x	x	x	x		x		x			x	x
9-10	Fireboat/GE	x			x							x	

Table 3-1. Archived Round 2B Subsurface Samples Selected for Analysis.

Core ID	Rationale	Cadmium	Chromium	Copper	Lead	Nickel	Zinc	Total PCBs (Aroclors)	Total DDT	Total PAHs	Bis(2-ethylhexyl) phthalate
LW2-C083-D	1							C083-D			
LW2-C089-F	1			C089-F							
LW2-C096-A	4									C096-A	
LW2-C099-D	1 and 2							C099-D	C099-D	C099-D	
LW2-C103-C	3							C103-C	C103-C		
LW2-C109-D	3						C109-D	C109-D	C109-D	C109-D	
LW2-167-F	1									C167-F	
LW2-C187-A	4								C187-A	C187-A	
LW2-C321-D2	3									C321-D2	
LW2-C360-D2	3							C360-D2	C360-D2		
LW2-C360-F2	1						C360-F2	C360-F2	C360-F2		
LW2-523-D	2									C523-D	
LW2-C527D	3								C527D		
LW2-C528-D	3							C528-D	C528-D	C528-D	
LW2-C531-D	3							C531-D	C531-D	C531-D	
LW2-C532-D	3							C532-D			
Total Samples	16			1			2	9	9	9	0

Selection Rationale (see text for additional information)

1. Concentrations increase with depth and/or elevated above the archived segment.
2. Concentrations decrease with depth but deepest analyzed segment appears to be locally elevated.
3. Vertical gap (several foot interval) between steep concentration gradient.
4. Core and surface grab locations substantially offset, and elevated concentrations evident in B core segment (analyze A segment).

Table 3-2. Summary of Sample Identified for Analysis.

Total Core Segments Identifed for Analysis	**16**
Chemical Group	**No. of Samples Identifed for Analysis**
Metals	3
PCBs Aroclors	9
Organochlorine Pesticides	9
SVOCs without PAHs	0
PAHs	9

Table 3-3. Round 2B Core Sedments Selected for Congener Analysis.

Sample ID	Location	Rationale	Analyses
LW2-C099-A	RM 3.8, east bank, Schnitzer Terminal riverside	Immediate upstream and downstream sample congener patterns different	PCB Congeners PCB Aroclors
LW2-C106-A	RM 3.8, east bank, Schnitzer Terminal riverside	Immediate upstream and downstream sample congener patterns different	PCB Congeners
LW2-C187-A	RM 5.3, west bank, just offshore Exxon/Mobil and ST Services property boundary	Upstream and downstream sample congener patterns different	PCB Congeners PCB Aroclors
LW2-C187-B	RM 5.3, west bank, just offshore Exxon/Mobil and ST Services property boundary	Sample congener patterns vary with depth in downstream core sample	PCB Congeners
LW2-C532-D	RM 7.8, west bank, upstream end of Willbridge Terminal	Sample congener patterns vary with depth in adjacent nearshore core sample	PCB Congeners PCB Aroclors[1]

[1] This sample selected for Arcolor analysis in Table 3-1 and Map 7.

Table 4-1. Laboratory Methods of Analysis for Sediment Samples.

Analytes	Laboratory	Sample Preparation		Quantitative Analysis	
		Protocol	Procedure	Protocol	Procedure
Conventional Analyses	CAS Kelso				
Total solids		NA	--	PSEP 1986	Balance
Grain size		NA	--	PSEP 1986	Sieves and pipette method
Total organic carbon		Plumb 1981	Acid pretreatment	Plumb 1981	Combustion; coulometric titration
Metals	CAS Kelso				
Antimony, arsenic, cadmium, lead, silver		EPA 3050	Strong acid digestion	EPA 6020	ICP/MS
Aluminum, chromium, copper, nickel, zinc		EPA 3050	Strong acid digestion	EPA 6010B	ICP/OES
Selenium		EPA 3050	Strong acid digestion	EPA 7742	AAS
Organochlorine Pesticides and Selected SVOCs	CAS Kelso	EPA 3541	Soxhlet extraction	EPA 8081A	GC/ECD
		EPA 3620B	Florisil® cleanup		
		EPA 3660B	Sulfur cleanup		
Semivolatile Organic Compounds[a]	CAS Kelso				
Polycyclic aromatic hydrocarbons		EPA 3541	Automated Soxhlet extraction	EPA 8270C	GC/MS - SIM
		EPA 3640A	Gel permeation chromatography		
		EPA 3630C	Silica gel cleanup		
PCB Aroclors	CAS Kelso	EPA 3541	Soxhlet extraction	EPA 8082	GC/ECD
		EPA 3665A	Sulfuric acid cleanup		
		EPA 3620B	Florisil® cleanup		
		EPA 3660B	Sulfur cleanup		

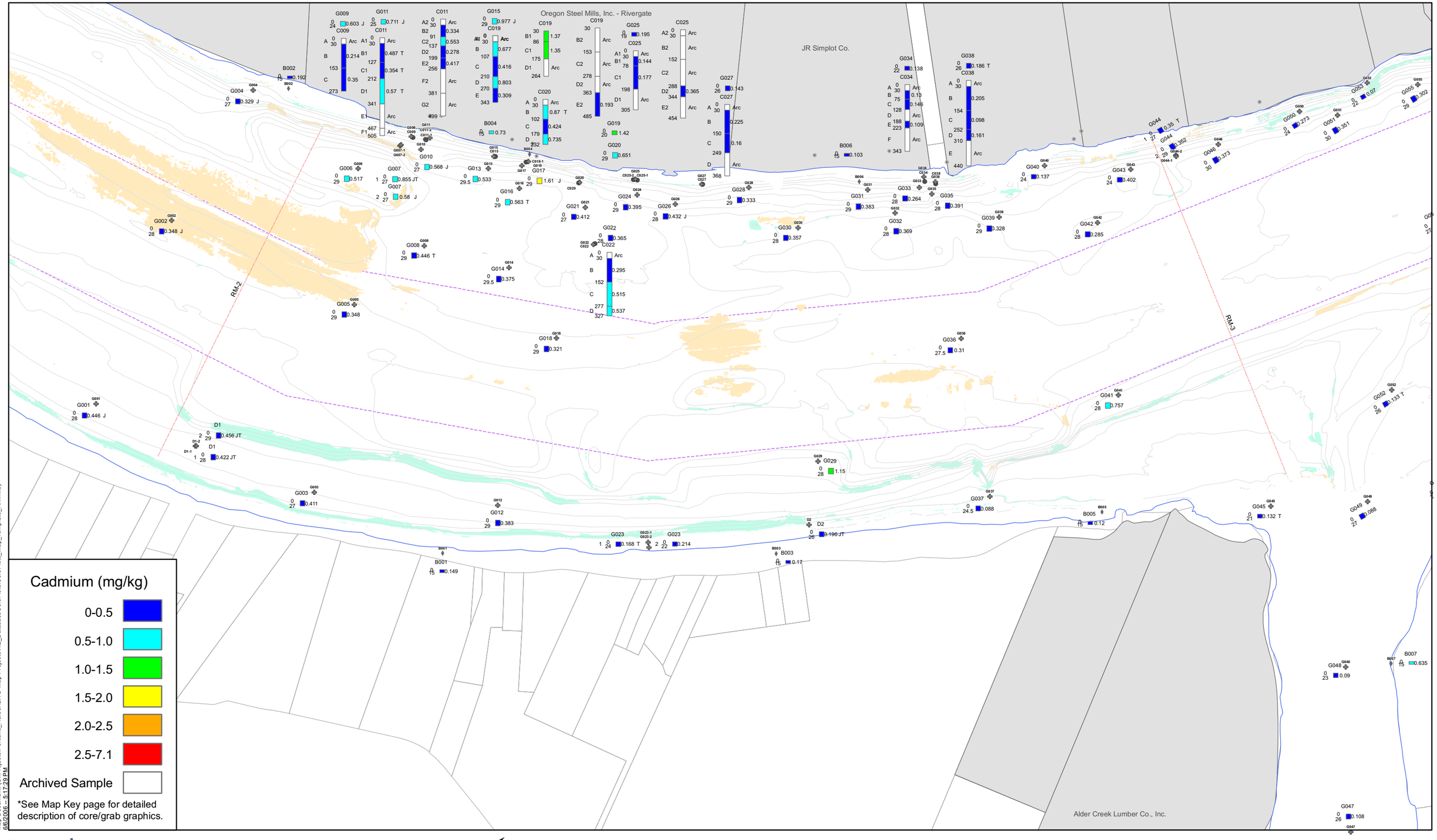
Table 4-1. Laboratory Methods of Analysis for Sediment Samples.

Analytes	Laboratory	Sample Preparation		Quantitative Analysis	
		Protocol	Procedure	Protocol	Procedure
PCB Congeners	Alta	EPA 1668A	Soxhlet extraction	EPA 1668A	HRGC/HRMS

Notes:

[a]Samples will be screened using GC/FID to determine levels of analytes and interferences, and, if necessary, to adjust sample quantities used for extraction.

AAS - Atomic absorption spectrometry
CAS - Columbia Analytical Services
EPA - U.S. Environmental Protection Agency
GC/ECD - gas chromatography/electron capture detection
GC/FID - gas chromatography/flame ionization detection
GC/MS - gas chromatography/mass spectrometry
HRGC/HRMS - high resolution gas chromatography/high resolution mass spectrometry
ICP/OES - inductively coupled plasma/optical emission spectrometry
ICP/MS - inductively coupled plasma - mass spectrometry
NA - not applicable
PAH - polycyclic aromatic hydrocarbon
PCB - polychlorinated biphenyl
PSEP - Puget Sound Estuary Program
SIM - selected ion monitoring
SVOC - semivolatile organic compound



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LWG Lower Willamette Group

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS .
Channel & River miles: Developed from US Army Corps of Engineers information.
Bathymetric Information: Multibeam bathymetric surveys conducted by David Evans and Associates, Inc. (DEA) 2001 to 2004.
River Edge: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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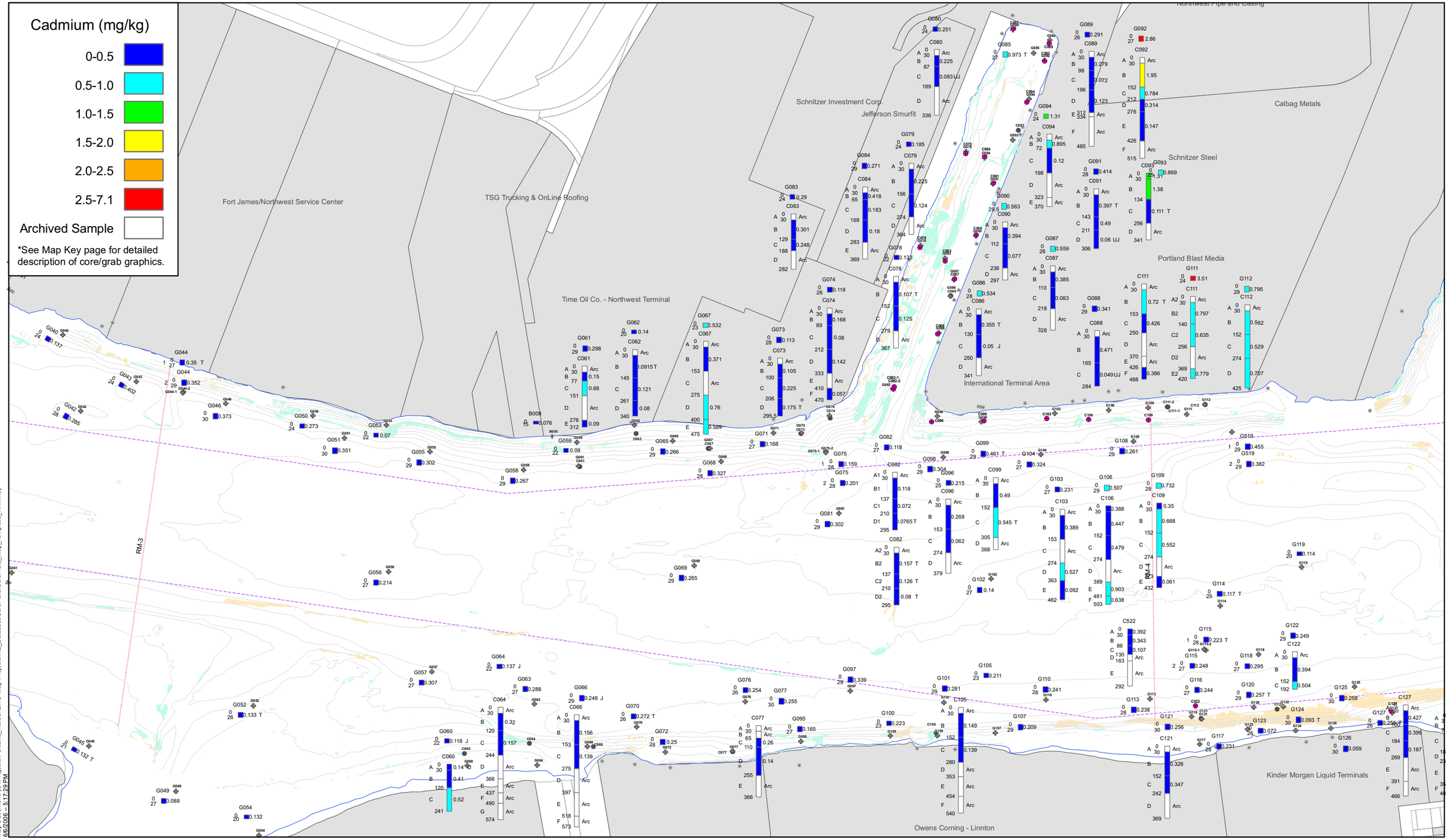
Map 1-a
Portland Harbor RI/FS
Round 2B Archive FSP
Cadmium (mg/kg)
Concentrations in Sediments
River Mile 2-3



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LWG Lower Willamette Group

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS .
Channel & River miles: Developed from US Army Corps of Engineers information.
Bathymetric Information: Multibeam bathymetric surveys conducted by David Evans and Associates, Inc. (DEA) 2001 to 2004.
River Edge: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

DRAFT
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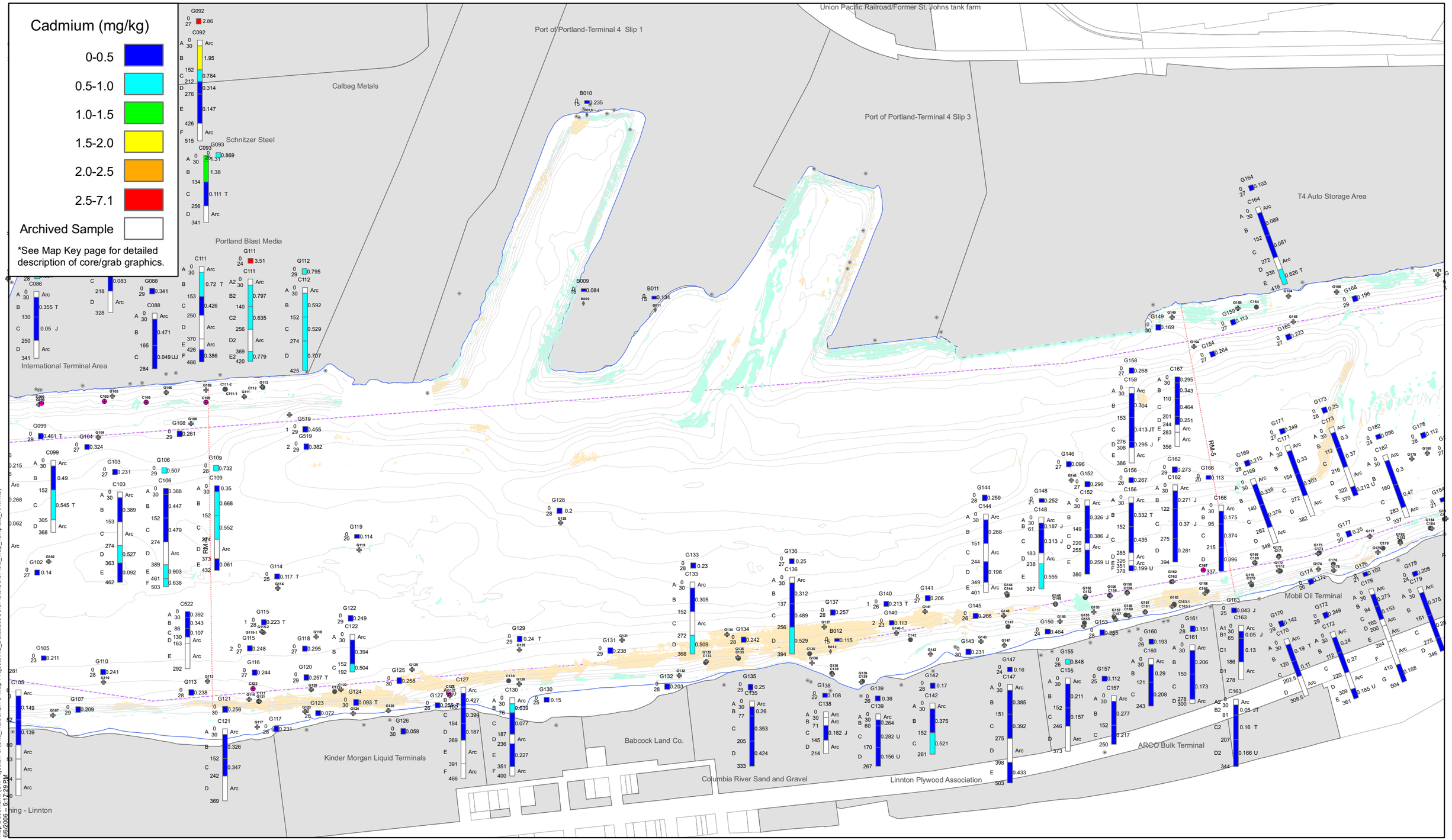
Map 1-b
Portland Harbor RI/FS
Round 2B Archive FSP
Cadmium (mg/kg)
Concentrations in Sediments
River Mile 3-4



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LWG LOWER WILLAMETTE GROUP

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N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 1-c
Portland Harbor RI/FS
Round 2B Archive FSP
Cadmium (mg/kg)
Concentrations in Sediments
River Mile 4-5

Cadmium (mg/kg)

- 0-0.5
- 0.5-1.0
- 1.0-1.5
- 1.5-2.0
- 2.0-2.5
- 2.5-7.1
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

T4 Auto Storage Area

MarCom, Inc.

City of Portland BES Water Pollution Control Lab

Crawford Street Co

Mobil Oil Terminal

ARCO Bulk Terminal

Foss Maritime / Brix Maritime

Transloaders Intl.

Marine Finance Corporation

Hendren Tow Boats

USACE- Portland Moorings

Koppers Industries, Inc

RM-5

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LWG Lower Willamette Group

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Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 1-d
Portland Harbor RI/FS
Round 2B Archive FSP
Cadmium (mg/kg)
Concentrations in Sediments
River Mile 5-6

Cadmium (mg/kg)

- 0-0.5
- 0.5-1.0
- 1.0-1.5
- 1.5-2.0
- 2.0-2.5
- 2.5-7.1
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

McCormick & Baxter Superfund Site

Willamette Cove - Central Parcel

Willamette Cove - West Parcel

Crawford Street Corp.

City of Portland BES Water Pollution Control Lab

RM-7

Arkema

Wacker Siltronics Corp.

Gould Industrie

Bayer (Rhone-Poulenc)

e Corporation

Hendren Tow Boats

USACE- Portland Moorings

Koppers Industries, Inc.

GASCO

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LWG Lower Willamette Group

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Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 1-e
Portland Harbor RI/FS
Round 2B Archive FSP
Cadmium (mg/kg)
Concentrations in Sediments
River Mile 6-7

Cadmium (mg/kg)

- 0-0.5
- 0.5-1.0
- 1.0-1.5
- 1.5-2.0
- 2.0-2.5
- 2.5-7.1
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

McCormick & Baxter Superfund Site

Triangle Park LLC

Arkema

GS Roofing Products

Kinder Morgan

Willbridge Bulk Fuel Area

Chevron U.S.A., Inc.

ConocoPhillips Company

McCall Oil & Great Western Chemical

Front Ave. LLP/Glacier NW

Cascade General Ship

Tube Forgings/Frc

Schnitzer Doane Lake

RM-8

RM-7

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N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 1- f
Portland Harbor RI/FS
Round 2B Archive FSP
Cadmium (mg/kg)
Concentrations in Sediments
River Mile 7-8

Cadmium (mg/kg)

- 0-0.5
- 0.5-1.0
- 1.0-1.5
- 1.5-2.0
- 2.0-2.5
- 2.5-7.1
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

U.S.C.G. Marine Safety

Fred Divine Diving & Salvage Co.

Cascade General

Cascade General Ship Repair Yard

RM-8

RM-9

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N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

- 2004 5-foot Contours (NAVD88)
- Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 1-g
Portland Harbor RI/FS
Round 2B Archive FSP
Cadmium (mg/kg)
Concentrations in Sediments
River Mile 8-9 (East)

Cadmium (mg/kg)

- 0-0.5
- 0.5-1.0
- 1.0-1.5
- 1.5-2.0
- 2.0-2.5
- 2.5-7.1
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

Cascade General

Cascade General Ship Repair Yard

McCall Oil & Great Western Chemical

Front Ave. LLP/Glacier NW

Tube Forgings/Front Ave. LLP

CMI Northwest/Front Ave. LLP

Shaver Transportation Co.

Lakeside Industries

Texaco Portland Bulk Dock

Equilon Enterprises, LLC

Texaco Equilon Pipeline

Gunderson, Inc.

Gresham Transfer (lessee)

Kleen Blast

Burlington N. Santa Fe/Portland Terminal Railroad Co.

RM-8

RM-9

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LWG Lower Willamette Group

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Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 1-h
Portland Harbor RI/FS
Round 2B Archive FSP
Cadmium (mg/kg)
Concentrations in Sediments
River Mile 8-9 (West)

Cadmium (mg/kg)

- 0-0.5
- 0.5-1.0
- 1.0-1.5
- 1.5-2.0
- 2.0-2.5
- 2.5-7.1
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

Gunderson, Inc.

Port of Portland-Terminal 2

RM-9

RM-10

Dock

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LWG Lower Willamette Group

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Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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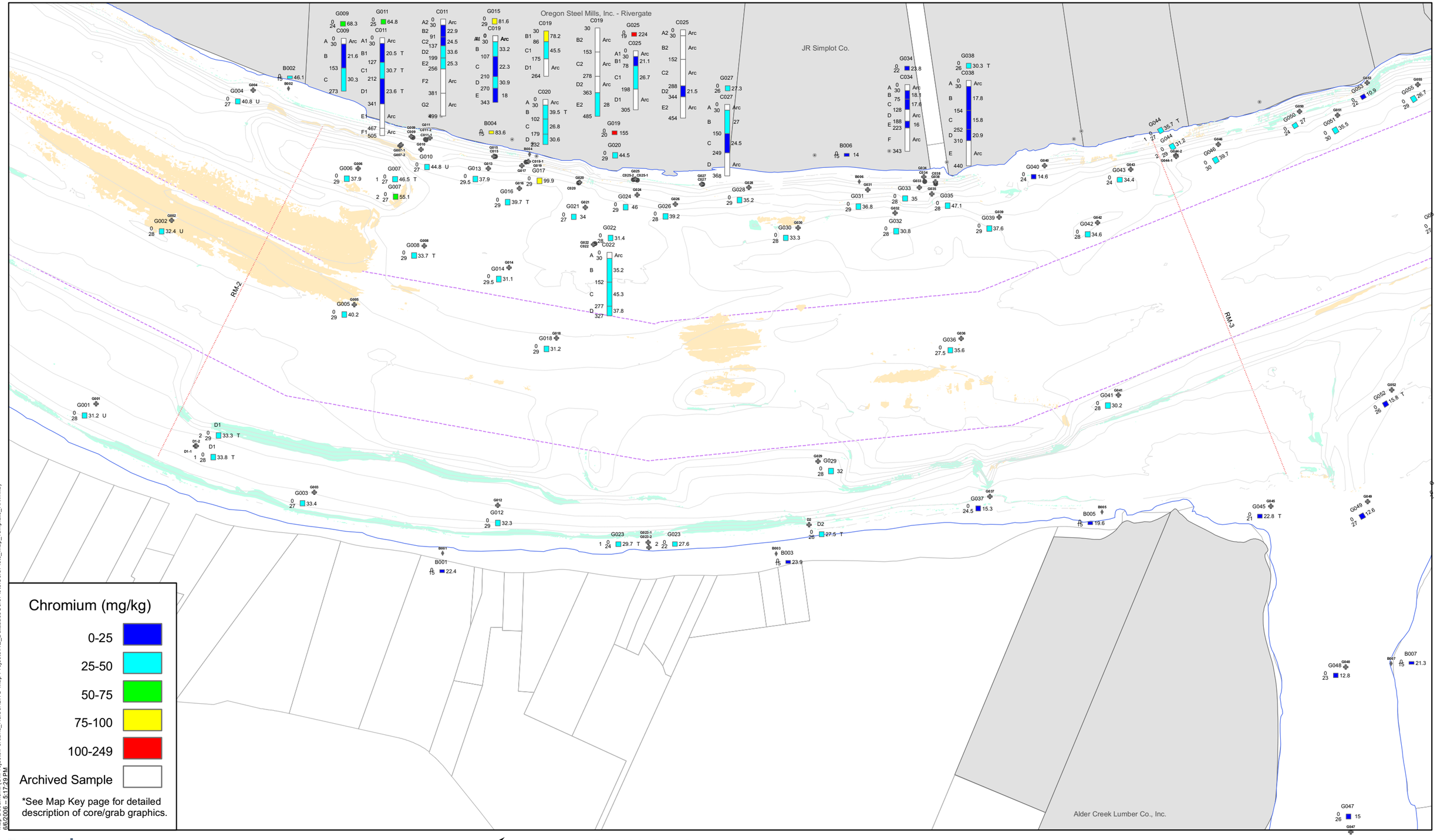
Map 1- i
Portland Harbor RI/FS
Round 2B Archive FSP
Cadmium (mg/kg)
Concentrations in Sediments
River Mile 9-10



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N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 2-a
Portland Harbor RI/FS
Round 2B Archive FSP
Chromium (mg/kg)
Concentrations in Sediments
River Mile 2-3

Chromium (mg/kg)

- 0-25
- 25-50
- 50-75
- 75-100
- 100-249
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

Fort James/Northwest Service Center

TSG Trucking & OnLine Roofing

Time Oil Co. - Northwest Terminal

Schnitzer Investment Corp.

Jefferson Smurfit

Northwest Pipe and Casing

Calbag Metals

Schnitzer Steel

Portland Blast Media

International Terminal Area

Kinder Morgan Liquid Terminals

Owens Corning - Linnton

RM-3

RM-4

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N

0 125 250 500 Feet

Round 2 Sediment Samples

- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)

Navigation Channel

Bathymetric Change

- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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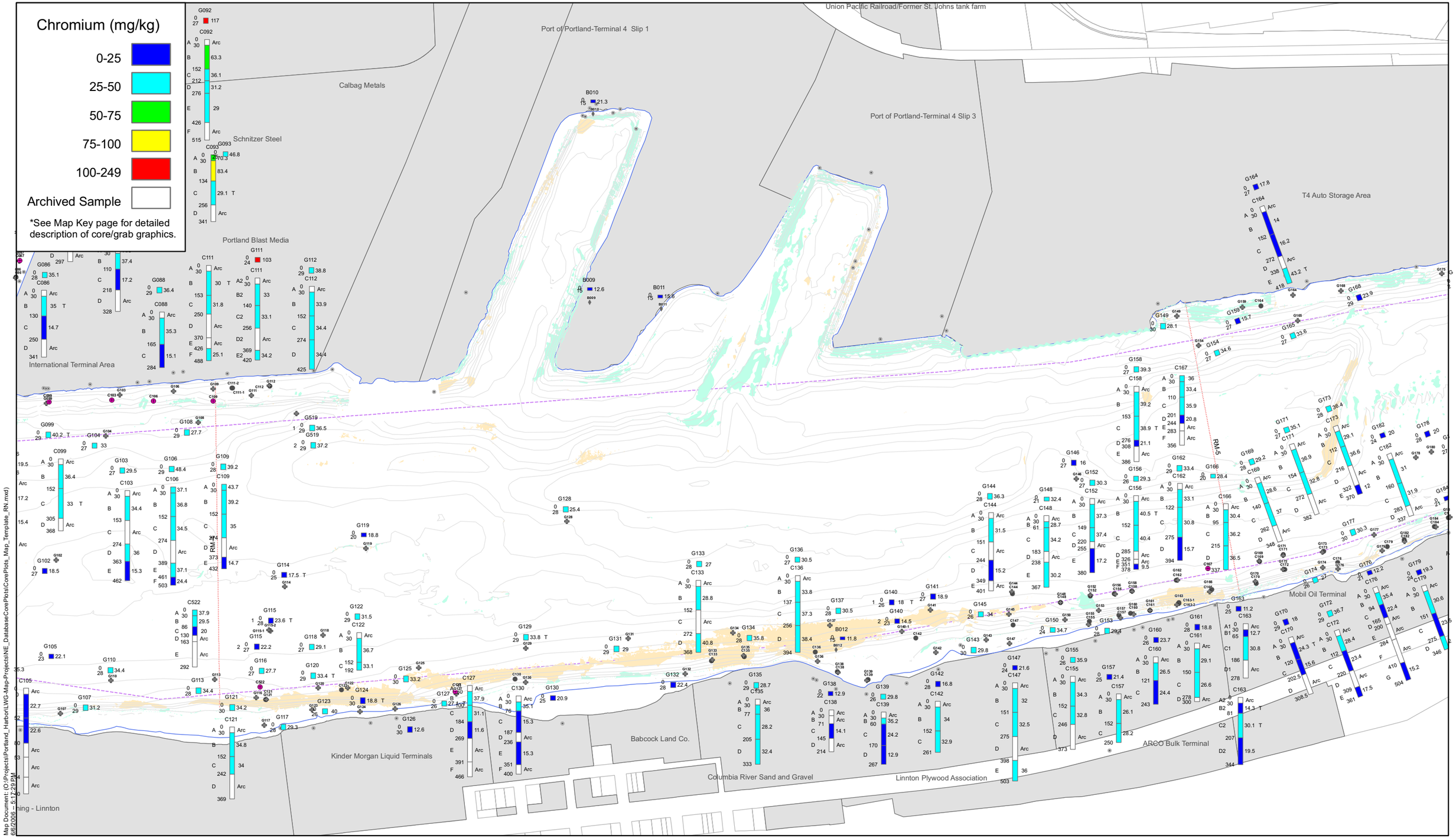
Map 2-b
Portland Harbor RI/FS
Round 2B Archive FSP
Chromium (mg/kg)
Concentrations in Sediments
River Mile 3-4



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LWG LOWER WILLAMETTE GROUP

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N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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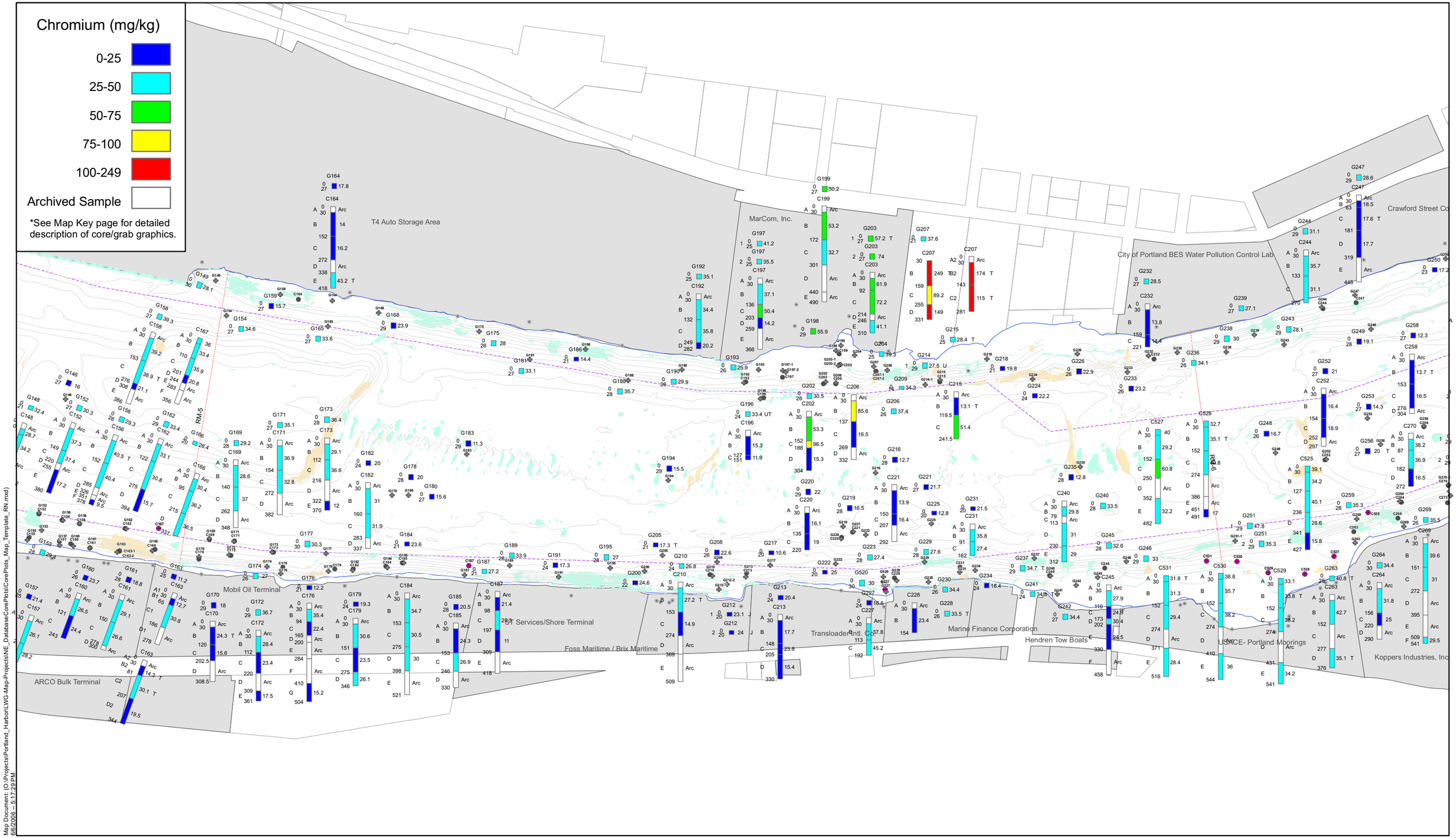
Map 2-c
Portland Harbor RI/FS
Round 2B Archive FSP
Chromium (mg/kg)
Concentrations in Sediments
River Mile 4-5



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LWG Lower Willamette Group

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N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 2-d
Portland Harbor RI/FS
Round 2B Archive FSP
Chromium (mg/kg)
Concentrations in Sediments
River Mile 5-6

Chromium (mg/kg)

- 0-25
- 25-50
- 50-75
- 75-100
- 100-249
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

McCormick & Baxter Superfund Site

Willamette Cove - Central Parcel

Willamette Cove - West Parcel

Crawford Street Corp.

City of Portland BES Water Pollution Control Lab

RM-7

Wacker Siltronics Corp.

Arkema

Gould Industrie

Bayer (Rhone-Poulenc)

GASCO

Koppers Industries, Inc.

USACE- Portland Moorings

Hendren Tow Boats

e Corporation

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0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 2-e
Portland Harbor RI/FS
Round 2B Archive FSP
Chromium (mg/kg)
Concentrations in Sediments
River Mile 6-7

Chromium (mg/kg)

- 0-25
- 25-50
- 50-75
- 75-100
- 100-249
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

McCormick & Baxter Superfund Site

Triangle Park LLC

Arkema

Willbridge Bulk Fuel Area

Kinder Morgan

Chevron U.S.A., Inc.

ConocoPhillips Company

GS Roofing Products

McCall Oil & Great Western Chemical

Front Ave. LLP/Glacier NW

Cascade General Ship

Tube Forgings/Fro

Schnitzer Doane Lake

RM-8

RM-7

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N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 2- f
Portland Harbor RI/FS
Round 2B Archive FSP
Chromium (mg/kg)
Concentrations in Sediments
River Mile 7-8

Chromium (mg/kg)

- 0-25
- 25-50
- 50-75
- 75-100
- 100-249
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

U.S.C.G. Marine Safety

Fred Divine Diving & Salvage Co.

Cascade General

Cascade General Ship Repair Yard

RM-8

RM-9

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Bathymetric Information: Multibeam bathymetric surveys conducted by David Evans and Associates, Inc. (DEA) 2001 to 2004.
River Edge: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

- 2004 5-foot Contours (NAVD88)
- Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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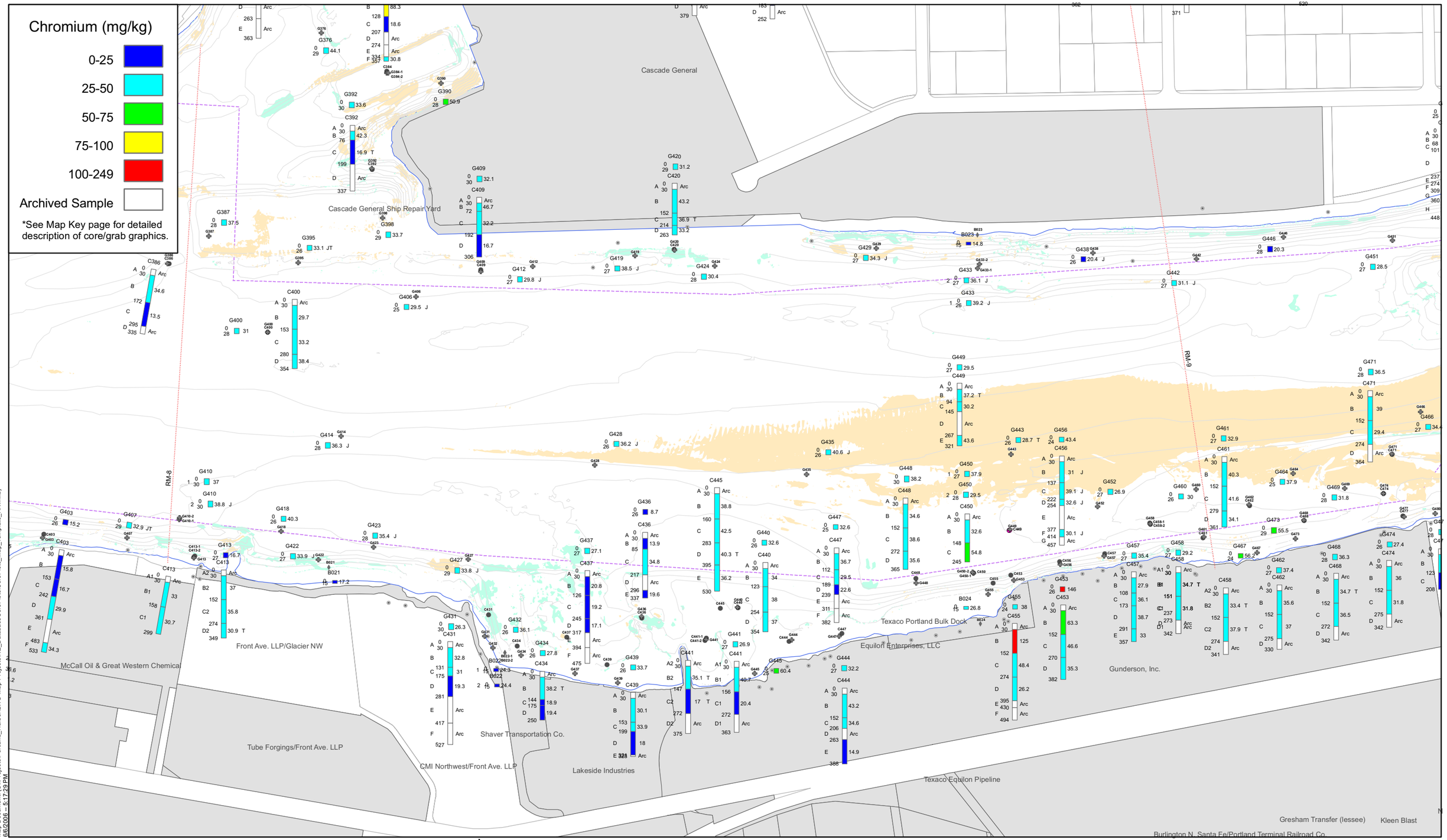
Map 2-g
Portland Harbor RI/FS
Round 2B Archive FSP
Chromium (mg/kg)
Concentrations in Sediments
River Mile 8-9 (East)



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LWG Lower Willamette Group

FEATURE SOURCES:
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0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 2-h
Portland Harbor RI/FS
Round 2B Archive FSP
Chromium (mg/kg)
Concentrations in Sediments
River Mile 8-9 (West)

Chromium (mg/kg)

- 0-25
- 25-50
- 50-75
- 75-100
- 100-249
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

Gunderson, Inc.

Port of Portland-Terminal 2

RM-9

RM-10

Dock

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LWG Lower Willamette Group

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Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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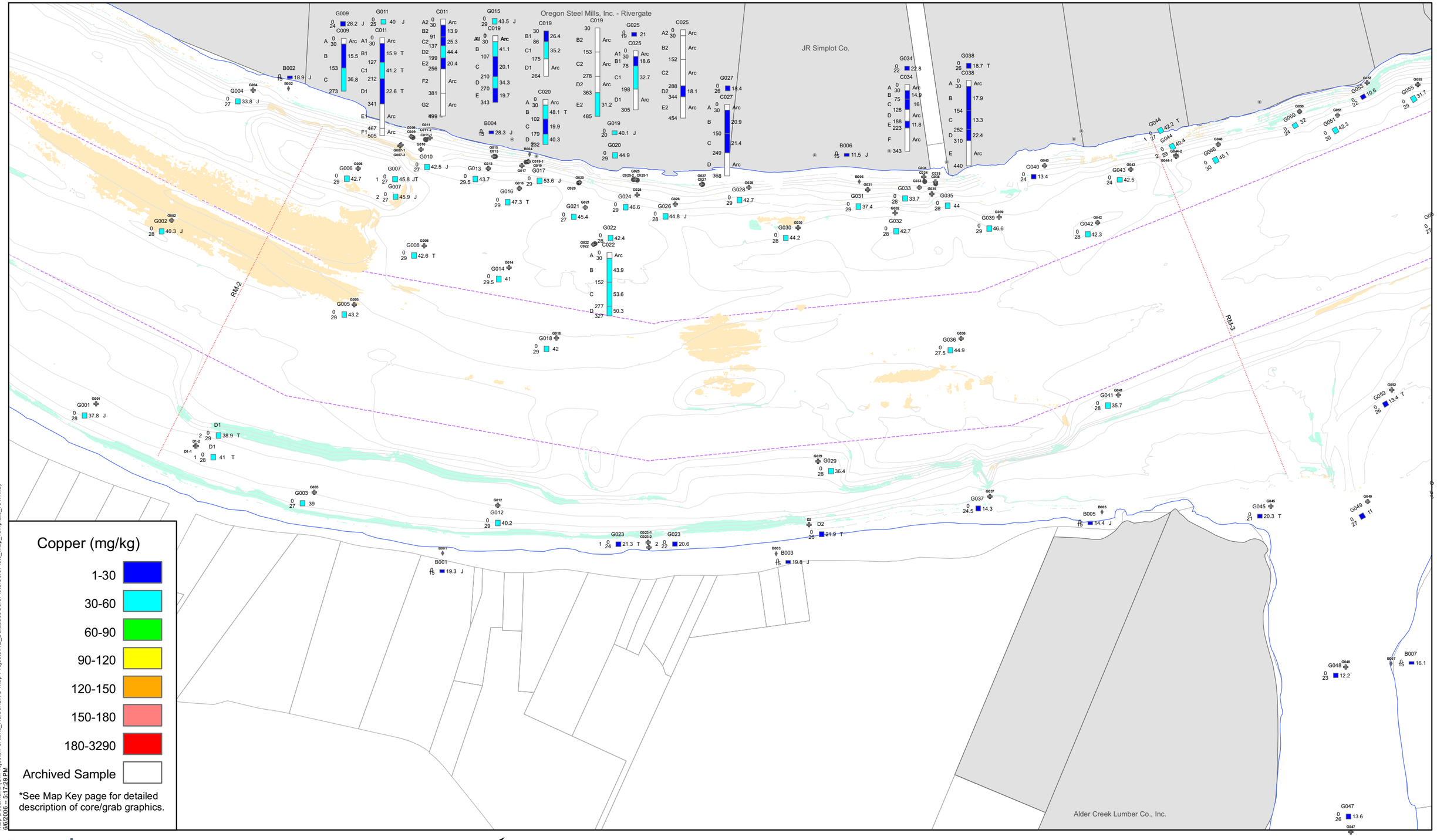
Map 2- i
Portland Harbor RI/FS
Round 2B Archive FSP
Chromium (mg/kg)
Concentrations in Sediments
River Mile 9-10



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N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 3-a
Portland Harbor RI/FS
Round 2B Archive FSP
Copper (mg/kg)
Concentrations in Sediments
River Mile 2-3

Copper (mg/kg)

- 1-30
- 30-60
- 60-90
- 90-120
- 120-150
- 150-180
- 180-3290
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

Fort James/Northwest Service Center

TSG Trucking & OnLine Roofing

Schnitzer Investment Corp.

Jefferson Smurfit

Time Oil Co. - Northwest Terminal

Northwest Pipe and Casing

Calbag Metals

Schnitzer Steel

Portland Blast Media

International Terminal Area

Kinder Morgan Liquid Terminals

Owens Corning - Linnton

RM 3

RM 4

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LWG Lower Willamette Group

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Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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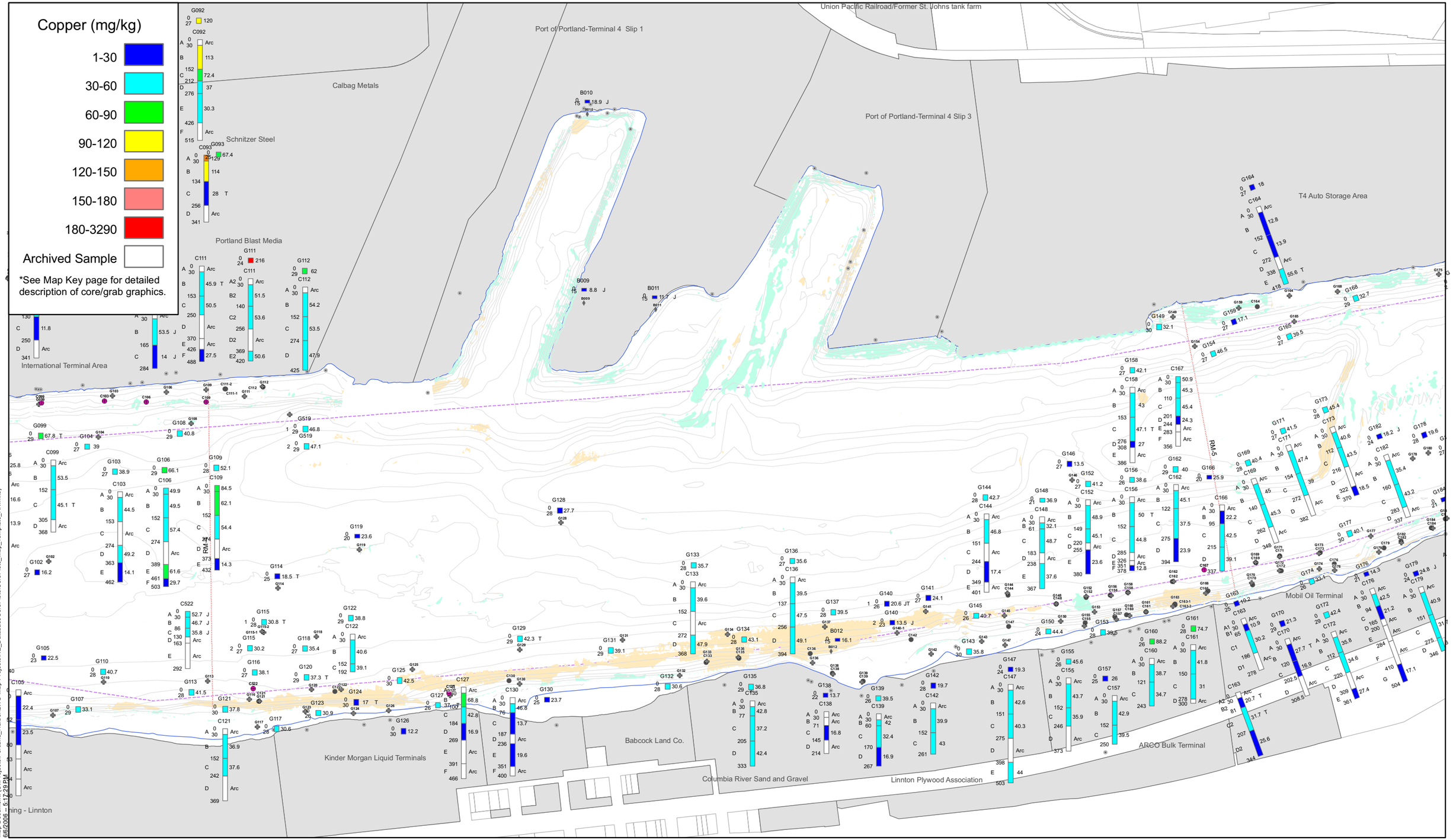
Map 3-b
Portland Harbor RI/FS
Round 2B Archive FSP
Copper (mg/kg)
Concentrations in Sediments
River Mile 3-4



integral consulting inc

LWG Lower Willamette Group

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N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 3-c
Portland Harbor RI/FS
Round 2B Archive FSP
Copper (mg/kg)
Concentrations in Sediments
River Mile 3-4

Copper (mg/kg)

- 1-30
- 30-60
- 60-90
- 90-120
- 120-150
- 150-180
- 180-3290
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

T4 Auto Storage Area

MarCom, Inc.

City of Portland BES Water Pollution Control Lab

Crawford Street Co

Mobil Oil Terminal

ARCO Bulk Terminal

GT Services/Shore Terminal

Foss Maritime / Brix Maritime

Transloaders Intl. Co

Marine Finance Corporation

Hendren Tow Boats

USACE- Portland Moorings

Koppers Industries, Inc

RM-5

RM-5.5

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Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 3-d
Portland Harbor RI/FS
Round 2B Archive FSP
Copper (mg/kg)
Concentrations in Sediments
River Mile 5-6

Copper (mg/kg)

- 1-30
- 30-60
- 60-90
- 90-120
- 120-150
- 150-180
- 180-3290
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

McCormick & Baxter Superfund Site

Willamette Cove - Central Parcel

Willamette Cove - West Parcel

Crawford Street Corp.

City of Portland BES Water Pollution Control Lab

Wacker Siltronics Corp.

Arkema

Gould Industrie

Bayer (Rhone-Poulenc)

e Corporation

Hendren Tow Boats

USACE- Portland Moorings

Koppers Industries, Inc.

GASCO

RM-7

RM-6

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0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 3-e
Portland Harbor RI/FS
Round 2B Archive FSP
Copper (mg/kg)
Concentrations in Sediments
River Mile 6-7

Copper (mg/kg)

- 1-30
- 30-60
- 60-90
- 90-120
- 120-150
- 150-180
- 180-3290
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

McCormick & Baxter Superfund Site

Triangle Park LLC

Arkema

Willbridge Bulk Fuel Area

Kinder Morgan

Chevron U.S.A., Inc.

ConocoPhillips Company

GS Roofing Products

McCall Oil & Great Western Chemical

Front Ave. LLP/Glacier NW

Cascade General Ship

Tube Forgings/Frc

RM-8

Schnitzer Doane Lake

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Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples

- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)

Navigation Channel

Bathymetric Change

- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 3- f
Portland Harbor RI/FS
Round 2B Archive FSP
Copper (mg/kg)
Concentrations in Sediments
River Mile 7-8

Copper (mg/kg)

- 1-30
- 30-60
- 60-90
- 90-120
- 120-150
- 150-180
- 180-3290
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

U.S.C.G. Marine Safety

Fred Divine Diving & Salvage Co.

Cascade General

Cascade General Ship Repair Yard

RM-8

RM-9

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N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 3-g
Portland Harbor RI/FS
Round 2B Archive FSP
Copper (mg/kg)
Concentrations in Sediments
River Mile 8-9 (East)

Copper (mg/kg)

- 1-30
- 30-60
- 60-90
- 90-120
- 120-150
- 150-180
- 180-3290
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

Cascade General

Cascade General Ship Repair Yard

McCall Oil & Great Western Chemical

Front Ave. LLP/Glacier NW

Tube Forgings/Front Ave. LLP

CMI Northwest/Front Ave. LLP

Shaver Transportation Co.

Lakeside Industries

Texaco Portland Bulk Dock

Equilon Enterprises, LLC

Gunderson, Inc.

Texaco Equilon Pipeline

Gresham Transfer (lessee)

Kleen Blast

Burlington N. Santa Fe/Portland Terminal Railroad Co.

RM-8

RM-9

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Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 3-h
Portland Harbor RI/FS
Round 2B Archive FSP
Copper (mg/kg)
Concentrations in Sediments
River Mile 8-9 (West)

Copper (mg/kg)

- 1-30
- 30-60
- 60-90
- 90-120
- 120-150
- 150-180
- 180-3290
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

Gunderson, Inc.

Port of Portland-Terminal 2

Dock

RM-9

RM-10

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N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)

Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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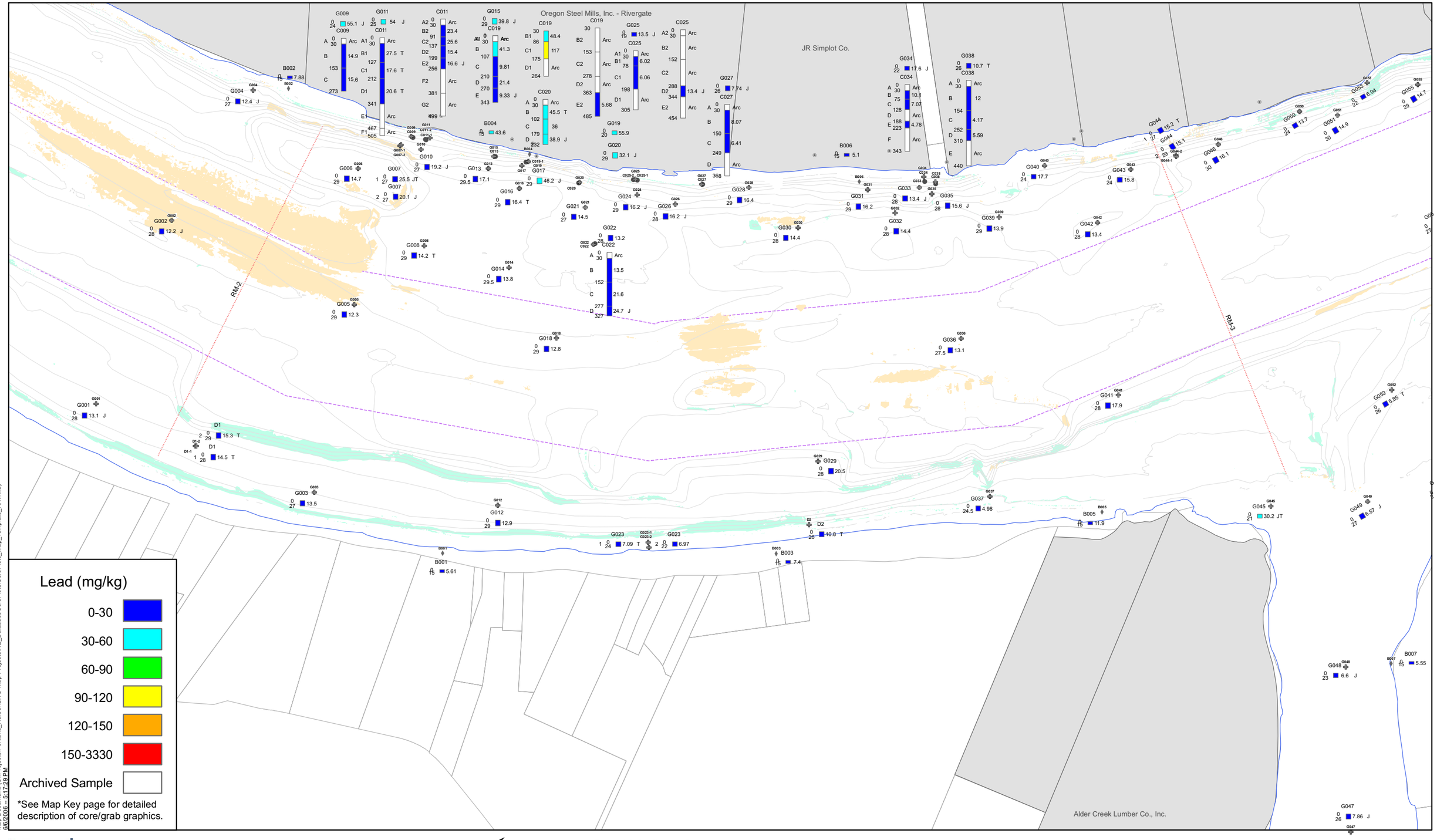
Map 3- i
Portland Harbor RI/FS
Round 2B Archive FSP
Copper (mg/kg)
Concentrations in Sediments
River Mile 9-10



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N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

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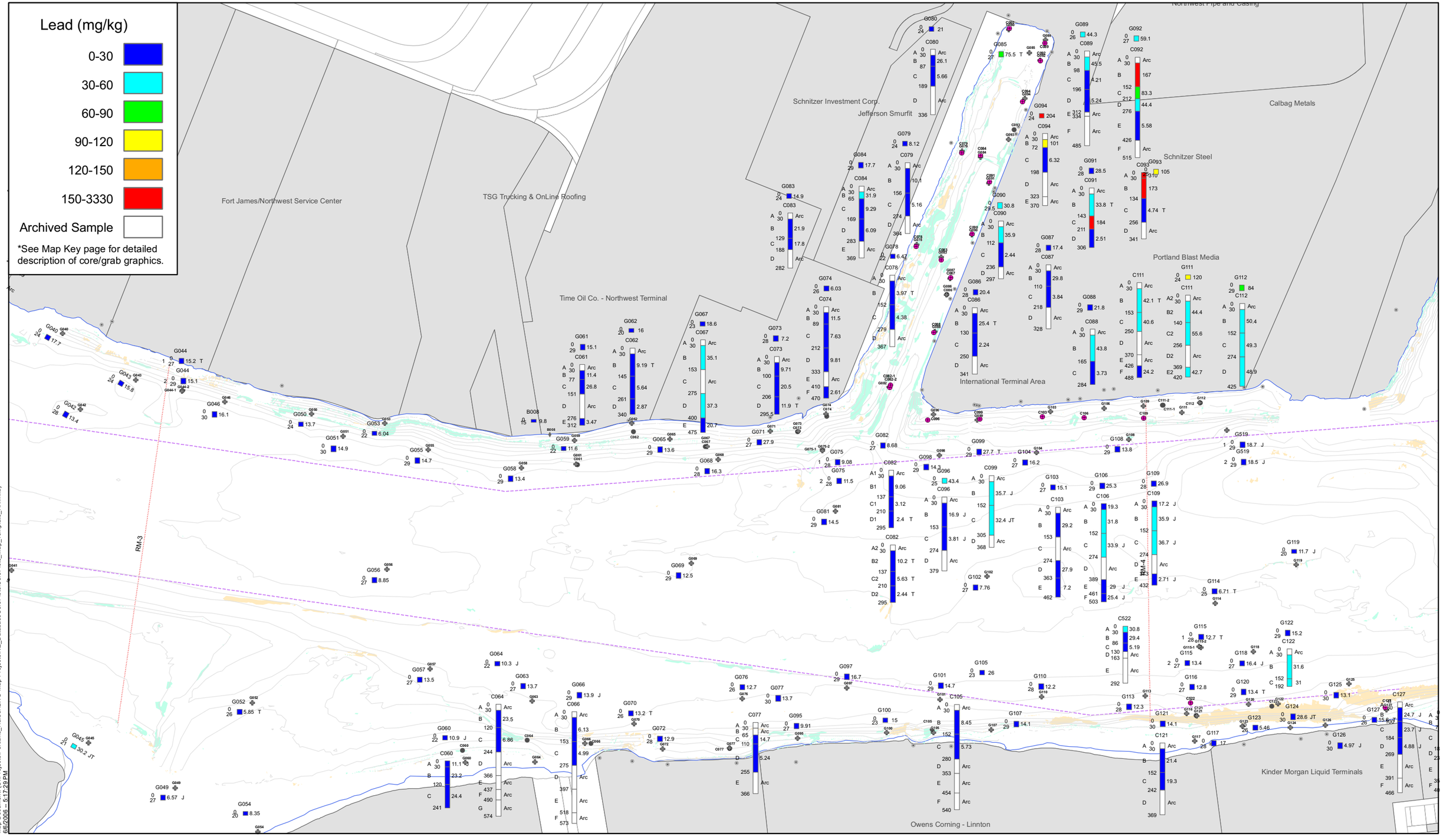
Map 4-a
Portland Harbor RI/FS
Round 2B Archive FSP
Lead (mg/kg)
Concentrations in Sediments
River Mile 2-3



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N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
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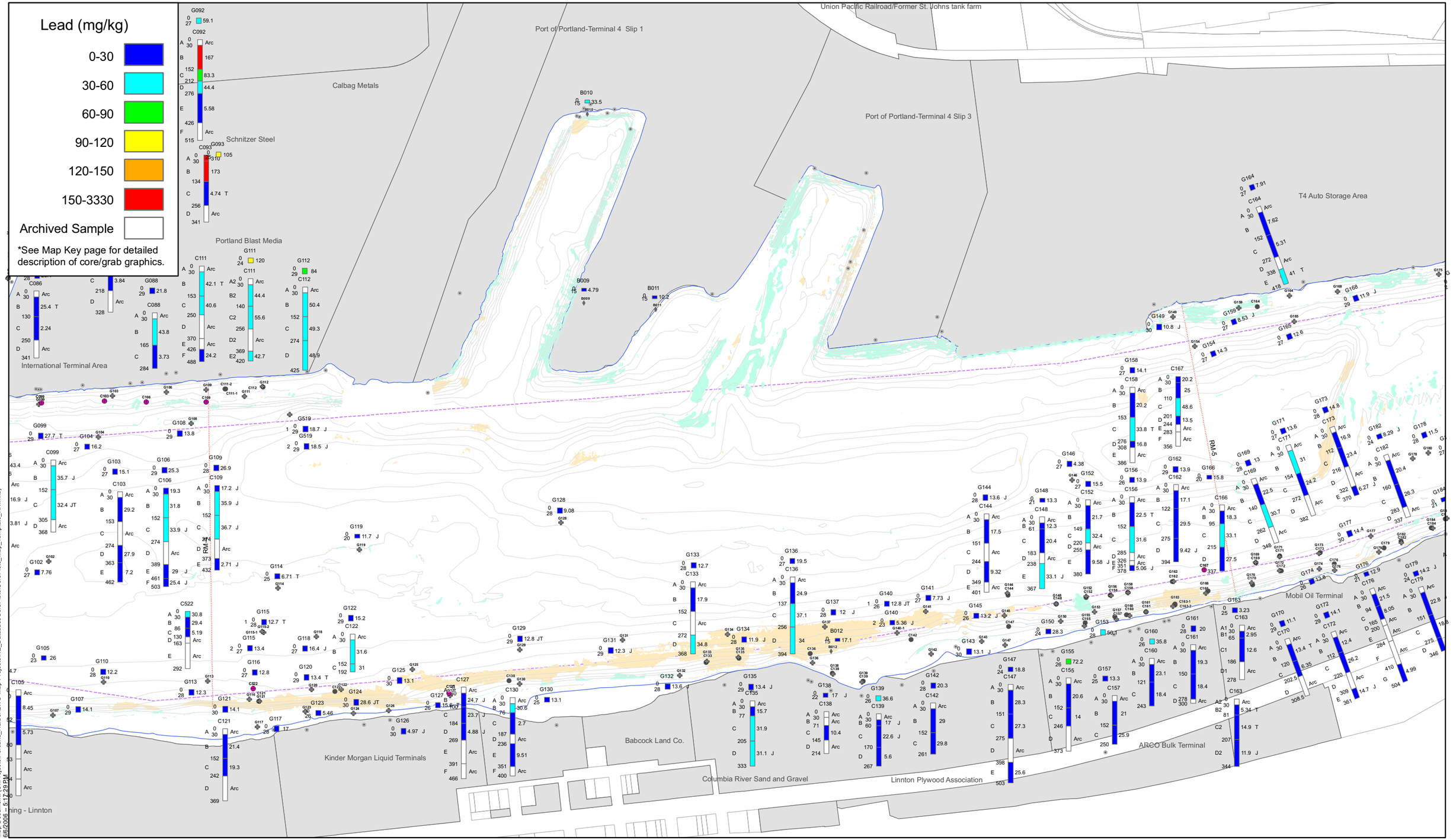
Map 4-b
Portland Harbor RI/FS
Round 2B Archive FSP
Lead (mg/kg)
Concentrations in Sediments
River Mile 3-4



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0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
-22 to -1.1 Shoaling
-1.1 to 1
1.1 to 34 Deepening

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Map 4-c
Portland Harbor RI/FS
Round 2B Archive FSP
Lead (mg/kg)
Concentrations in Sediments
River Mile 4-5

Lead (mg/kg)

- 0-30
- 30-60
- 60-90
- 90-120
- 120-150
- 150-3330
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

T4 Auto Storage Area

MarCom, Inc.

City of Portland BES Water Pollution Control Lab

Crawford Street Co

Mobil Oil Terminal

ARCO Bulk Terminal

Foss Maritime / Brix Maritime

Transloaders Intl. Co

Marine Finance Corporation

Hendren Tow Boats

USACE- Portland Moorings

Koppers Industries, Inc

RM-5

RM-6

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LWG Lower Willamette Group

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS .
Channel & River miles: Developed from US Army Corps of Engineers information.
Bathymetric Information: Multibeam bathymetric surveys conducted by David Evans and Associates, Inc. (DEA) 2001 to 2004.
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Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 4-d
Portland Harbor RI/FS
Round 2B Archive FSP
Lead (mg/kg)
Concentrations in Sediments
River Mile 5-6

Lead (mg/kg)

- 0-30
- 30-60
- 60-90
- 90-120
- 120-150
- 150-3330
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

McCormick & Baxter Superfund Site

Willamette Cove - Central Parcel

Willamette Cove - West Parcel

Crawford Street Corp.

City of Portland BES Water Pollution Control Lab

RM-7

RM-6

Wacker Siltronics Corp.

Arkema

Gould Industrie

Bayer (Rhone-Poulenc)

e Corporation

Hendren Tow Boats

USACE- Portland Moorings

Koppers Industries, Inc.

GASCO

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LWG Lower Willamette Group

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0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 4-e
Portland Harbor RI/FS
Round 2B Archive FSP
Lead (mg/kg)
Concentrations in Sediments
River Mile 6-7

Lead (mg/kg)

- 0-30
- 30-60
- 60-90
- 90-120
- 120-150
- 150-3330
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

McCormick & Baxter Superfund Site

Triangle Park LLC

Arkema

GS Roofing Products

Kinder Morgan

Chevron U.S.A., Inc.

ConocoPhillips Company

Willbridge Bulk Fuel Area

McCall Oil & Great Western Chemical

Front Ave. LLP/Glacier NW

Cascade General Ship

Tube Forgings/Frc

Schnitzer Doane Lake

RM-8

RM-7

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LWG Lower Willamette Group

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Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 4- f
Portland Harbor RI/FS
Round 2B Archive FSP
Lead (mg/kg)
Concentrations in Sediments
River Mile 7-8

Lead (mg/kg)

- 0-30
- 30-60
- 60-90
- 90-120
- 120-150
- 150-3330
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

U.S.C.G. Marine Safety

Fred Divine Diving & Salvage Co.

Cascade General

Cascade General Ship Repair Yard

RM-8

RM-9

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N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 4-g
Portland Harbor RI/FS
Round 2B Archive FSP
Lead (mg/kg)
Concentrations in Sediments
River Mile 8-9 (East)

Lead (mg/kg)

- 0-30
- 30-60
- 60-90
- 90-120
- 120-150
- 150-3330
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

Cascade General

Cascade General Ship Repair Yard

Front Ave. LLP/Glacier NW

McCall Oil & Great Western Chemical

Tube Forgings/Front Ave. LLP

CMI Northwest/Front Ave. LLP

Shaver Transportation Co.

Lakeside Industries

Texaco Portland Bulk Dock

Equilon Enterprises, LLC

Gunderson, Inc.

Texaco Equilon Pipeline

Gresham Transfer (lessee)

Kleen Blast

Burlington N. Santa Fe/Portland Terminal Railroad Co.

RM-8

RM-9

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Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 4-h
Portland Harbor RI/FS
Round 2B Archive FSP
Lead (mg/kg)
Concentrations in Sediments
River Mile 8-9 (West)

Lead (mg/kg)

- 0-30
- 30-60
- 60-90
- 90-120
- 120-150
- 150-3330
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

Gunderson, Inc.

Port of Portland-Terminal 2

Dock

RM-9

RM-10

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LWG Lower Willamette Group

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N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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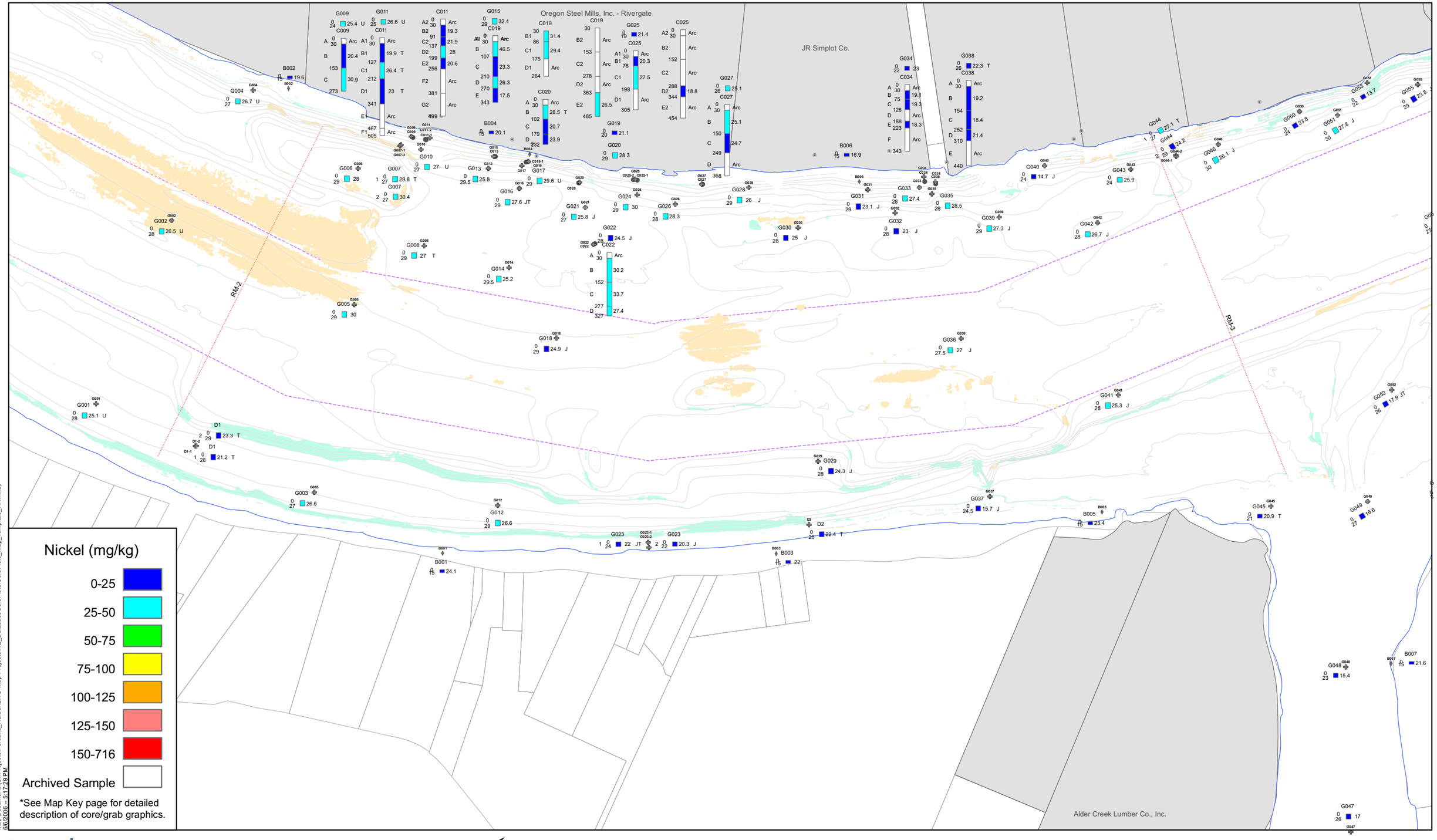
Map 4- i
Portland Harbor RI/FS
Round 2B Archive FSP
Lead (mg/kg)
Concentrations in Sediments
River Mile 9-10



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N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 5-a
Portland Harbor RI/FS
Round 2B Archive FSP
Nickel (mg/kg)
Concentrations in Sediments
River Mile 2-3

Nickel (mg/kg)

- 0-25
- 25-50
- 50-75
- 75-100
- 100-125
- 125-150
- 150-716
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

Fort James/Northwest Service Center

TSG Trucking & OnLine Roofing

Time Oil Co. - Northwest Terminal

Schnitzer Investment Corp.

Jefferson Smurfit

Northwest Pipe and Casing

Calbag Metals

Schnitzer Steel

Portland Blast Media

International Terminal Area

Kinder Morgan Liquid Terminals

Owens Corning - Linnton

RM 3

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N

0 125 250 500 Feet

Round 2 Sediment Samples

- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)

Navigation Channel

Bathymetric Change

- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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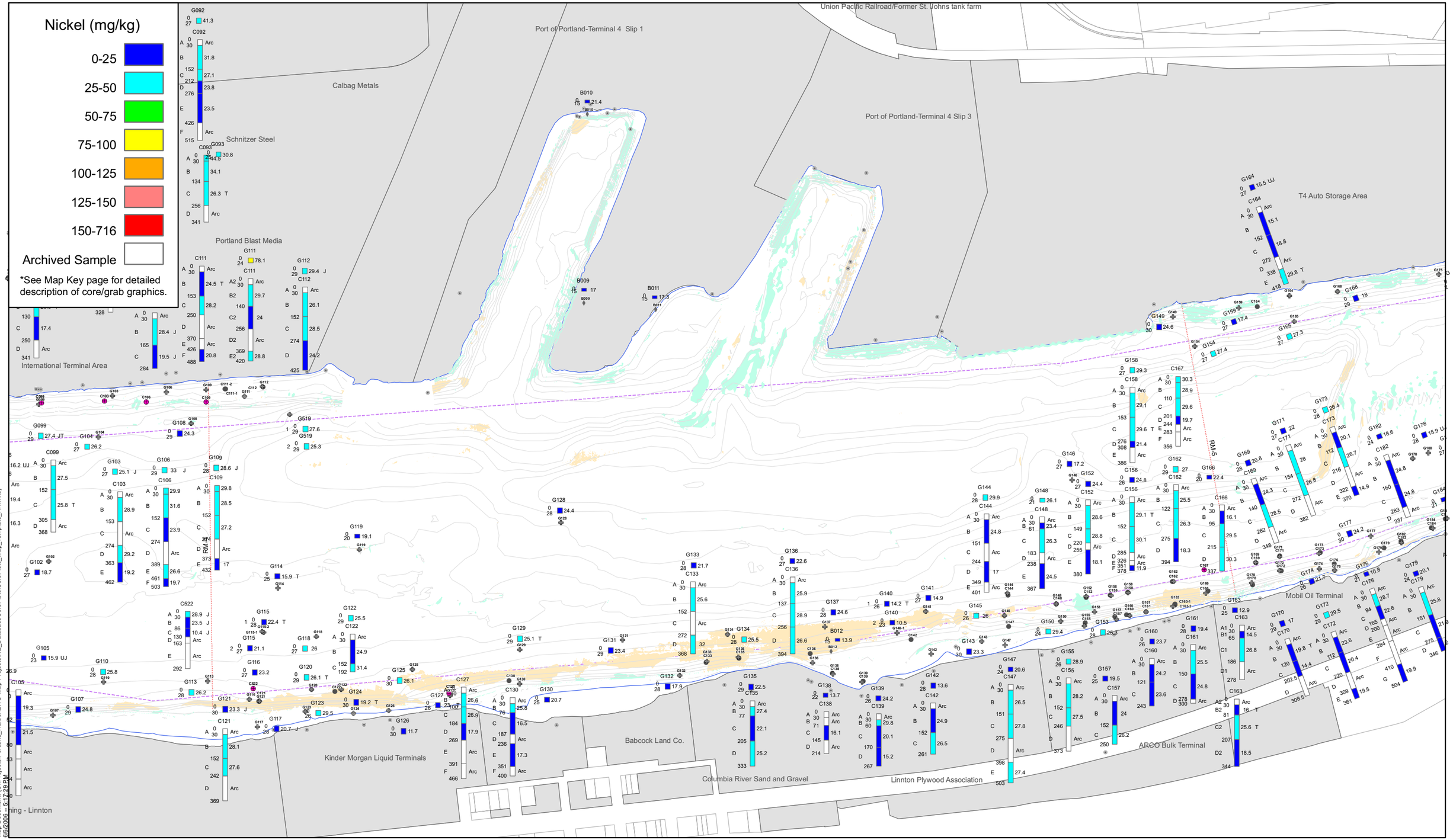
Map 5-b
Portland Harbor RI/FS
Round 2B Archive FSP
Nickel (mg/kg)
Concentrations in Sediments
River Mile 3-4



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LWG Lower Willamette Group

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N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 5-c
Portland Harbor RI/FS
Round 2B Archive FSP
Nickel (mg/kg)
Concentrations in Sediments
River Mile 4-5

Nickel (mg/kg)

- 0-25
- 25-50
- 50-75
- 75-100
- 100-125
- 125-150
- 150-716
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

T4 Auto Storage Area

MarCom, Inc.

City of Portland BES Water Pollution Control Lab

Crawford Street Co

Mobil Oil Terminal

ARCO Bulk Terminal

251 Services/Shore Terminal

Foss Maritime / Brix Maritime

Transloaders Intl. Co

Marine Finance Corporation

Hendren Tow Boats

USACE- Portland Moorings

Koppers Industries, Inc

RM-5

RM-6

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LWG Lower Willamette Group

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Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 5-d
Portland Harbor RI/FS
Round 2B Archive FSP
Nickel (mg/kg)
Concentrations in Sediments
River Mile 5-6

Nickel (mg/kg)

- 0-25
- 25-50
- 50-75
- 75-100
- 100-125
- 125-150
- 150-716
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

McCormick & Baxter Superfund Site

Willamette Cove - Central Parcel

Willamette Cove - West Parcel

Crawford Street Corp.

City of Portland BES Water Pollution Control Lab

Wacker Siltronics Corp.

Arkema

Gould Industrie

Bayer (Rhone-Poulenc)

Koppers Industries, Inc.

USACE- Portland Moorings

Hendren Tow Boats

e Corporation

GASCO

RM-7

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0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)

Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 5-e
Portland Harbor RI/FS
Round 2B Archive FSP
Nickel (mg/kg)
Concentrations in Sediments
River Mile 6-7

Nickel (mg/kg)

- 0-25
- 25-50
- 50-75
- 75-100
- 100-125
- 125-150
- 150-716
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

McCormick & Baxter Superfund Site

Triangle Park LLC

Arkema

Willbridge Bulk Fuel Area

Kinder Morgan

Chevron U.S.A., Inc.

ConocoPhillips Company

GS Roofing Products

McCall Oil & Great Western Chemical

Front Ave. LLP/Glacier NW

Cascade General Ship

Tube Forgings/Frc

Schnitzer Doane Lake

RM-8

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N

0 125 250 500 Feet

Round 2 Sediment Samples

- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)

Navigation Channel

Bathymetric Change

-22 to -1.1 Shoaling

-1.1 to 1

1.1 to 34 Deepening

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Map 5- f
Portland Harbor RI/FS
Round 2B Archive FSP
Nickel (mg/kg)
Concentrations in Sediments
River Mile 7-8

Nickel (mg/kg)

- 0-25
- 25-50
- 50-75
- 75-100
- 100-125
- 125-150
- 150-716
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

U.S.C.G. Marine Safety

Fred Divine Diving & Salvage Co.

Cascade General

Cascade General Ship Repair Yard

RM-8

RM-9

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N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

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- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 5-g
Portland Harbor RI/FS
Round 2B Archive FSP
Nickel (mg/kg)
Concentrations in Sediments
River Mile 7-8

Nickel (mg/kg)

- 0-25
- 25-50
- 50-75
- 75-100
- 100-125
- 125-150
- 150-716
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

Cascade General

Cascade General Ship Repair Yard

Front Ave. LLP/Glacier NW

McCall Oil & Great Western Chemical

Tube Forgings/Front Ave. LLP

CMI Northwest/Front Ave. LLP

Shaver Transportation Co.

Lakeside Industries

Texaco Portland Bulk Dock

Equilon Enterprises, LLC

Texaco Equilon Pipeline

Gunderson, Inc.

Gresham Transfer (lessee)

Kleen Blast

Burlington N. Santa Fe/Portland Terminal Railroad Co.

RM-8

RM-9

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N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
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Map 5-h
Portland Harbor RI/FS
Round 2B Archive FSP
Nickel (mg/kg)
Concentrations in Sediments
River Mile 8-9 (West)

Nickel (mg/kg)

- 0-25
- 25-50
- 50-75
- 75-100
- 100-125
- 125-150
- 150-716
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

Gunderson, Inc.

Port of Portland-Terminal 2

RM-9

RM-10

Dock

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N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)

Navigation Channel

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- -22 to -1.1 Shoaling
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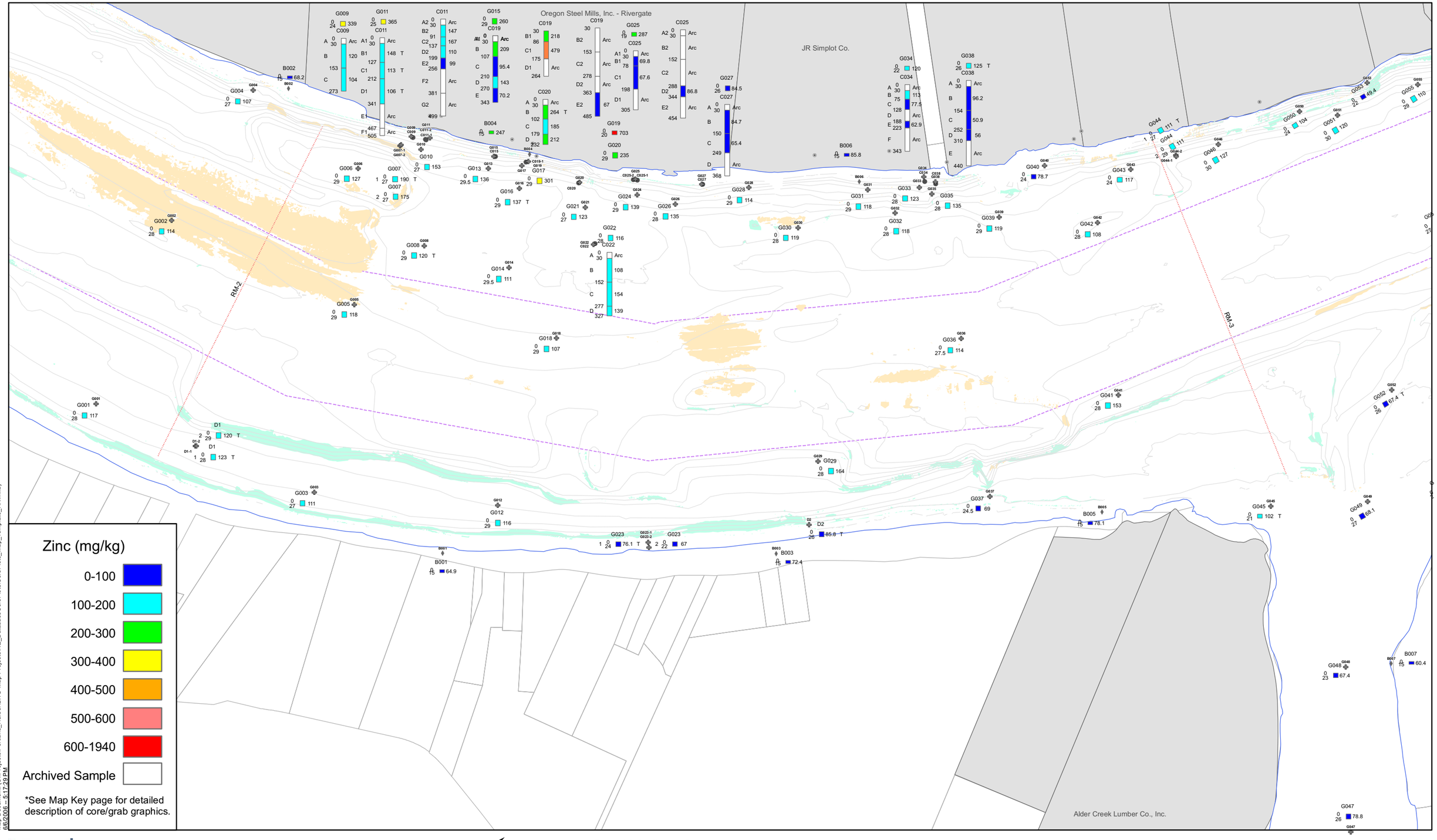
Map 5- i
Portland Harbor RI/FS
Round 2B Archive FSP
Nickel (mg/kg)
Concentrations in Sediments
River Mile 9-10



Map Document: (O:\Projects\Portland_Harbor\LWG-Map-Projects\NE_DatabaseCorePlots\CorePlots_Map_Template_RN.mxd)
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LWG Lower Willamette Group

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS .
Channel & River miles: Developed from US Army Corps of Engineers information.
Bathymetric Information: Multibeam bathymetric surveys conducted by David Evans and Associates, Inc. (DEA) 2001 to 2004.
River Edge: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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This document is currently under review by US EPA and its federal, state, and tribal partners, and is subject to change in whole or in part.

Map 6-a
Portland Harbor RI/FS
Round 2B Archive FSP
Zinc (mg/kg)
Concentrations in Sediments
River Mile 2-3

Zinc (mg/kg)

- 0-100
- 100-200
- 200-300
- 300-400
- 400-500
- 500-600
- 600-1940
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

Fort James/Northwest Service Center

TSG Trucking & OnLine Roofing

Time Oil Co. - Northwest Terminal

Schnitzer Investment Corp.

Jefferson Smurfit

Northwest Pipe and Casing

Calbag Metals

Schnitzer Steel

Portland Blast Media

International Terminal Area

Kinder Morgan Liquid Terminals

Owens Corning - Linnton

RM-3

RM-4

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LWG Lower Willamette Group

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River Edge: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 6-b
Portland Harbor RI/FS
Round 2B Archive FSP
Zinc (mg/kg)
Concentrations in Sediments
River Mile 3-4

Zinc (mg/kg)

- 0-100
- 100-200
- 200-300
- 300-400
- 400-500
- 500-600
- 600-1940
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

Union Pacific Railroad/Former St. Johns tank farm

Port of Portland-Terminal 4 Slip 1

Port of Portland-Terminal 4 Slip 3

Calbag Metals

Schnitzer Steel

Portland Blast Media

T4 Auto Storage Area

International Terminal Area

Kinder Morgan Liquid Terminals

Babcock Land Co.

Columbia River Sand and Gravel

Linnton Plywood Association

ARCO Bulk Terminal

Mobil Oil Terminal

ning - Linnton

RM-5

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LWG Lower Willamette Group

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS .
Channel & River miles: Developed from US Army Corps of Engineers information.
Bathymetric Information: Multibeam bathymetric surveys conducted by David Evans and Associates, Inc. (DEA) 2001 to 2004.
River Edge: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 6-c
Portland Harbor RI/FS
Round 2B Archive FSP
Zinc (mg/kg)
Concentrations in Sediments
River Mile 4-5

Zinc (mg/kg)

- 0-100
- 100-200
- 200-300
- 300-400
- 400-500
- 500-600
- 600-1940
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

T4 Auto Storage Area

MarCom, Inc.

City of Portland BES Water Pollution Control Lab

Crawford Street Co

Mobil Oil Terminal

ARCO Bulk Terminal

Foss Maritime / Brix Maritime

51 Services/Shore Terminal

Transloaders Intl. Co

Marine Finance Corporation

Hendren Tow Boats

USACE- Portland Moorings

Koppers Industries, Inc

RM-5

RM-6

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LWG Lower Willamette Group

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Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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DO NOT QUOTE OR CITE
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Map 6-d
Portland Harbor RI/FS
Round 2B Archive FSP
Zinc (mg/kg)
Concentrations in Sediments
River Mile 5-6

Zinc (mg/kg)

- 0-100
- 100-200
- 200-300
- 300-400
- 400-500
- 500-600
- 600-1940
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

McCormick & Baxter Superfund Site

Willamette Cove - Central Parcel

Willamette Cove - West Parcel

Crawford Street Corp.

City of Portland BES Water Pollution Control Lab

Wacker Siltronics Corp.

Arkema

Gould Industrie

Bayer (Rhone-Poulenc)

Koppers Industries, Inc.

USACE- Portland Moorings

Hendren Tow Boats

e Corporation

GASCO

RM-7

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LWG Lower Willamette Group

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS.
Channel & River miles: Developed from US Army Corps of Engineers information.
Bathymetric Information: Multibeam bathymetric surveys conducted by David Evans and Associates, Inc. (DEA) 2001 to 2004.
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Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)

Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 6-e
Portland Harbor RI/FS
Round 2B Archive FSP
Zinc (mg/kg)
Concentrations in Sediments
River Mile 6-7

Zinc (mg/kg)

- 0-100
- 100-200
- 200-300
- 300-400
- 400-500
- 500-600
- 600-1940
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

McCormick & Baxter Superfund Site

Triangle Park LLC

Cascade General Ship

Willbridge Bulk Fuel Area

Front Ave. LLP/Glacier NW

Arkema

McCall Oil & Great Western Chemical

Kinder Morgan

Chevron U.S.A., Inc.

ConocoPhillips Company

GS Roofing Products

Tube Forgings/Frc

Schnitzer Doane Lake

RM-8

RM-7

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LWG Lower Willamette Group

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS .
Channel & River miles: Developed from US Army Corps of Engineers information.
Bathymetric Information: Multibeam bathymetric surveys conducted by David Evans and Associates, Inc. (DEA) 2001 to 2004.
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Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 6- f
Portland Harbor RI/FS
Round 2B Archive FSP
Zinc (mg/kg)
Concentrations in Sediments
River Mile 7-8

Zinc (mg/kg)

- 0-100
- 100-200
- 200-300
- 300-400
- 400-500
- 500-600
- 600-1940
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

U.S.C.G. Marine Safety

Fred Divine Diving & Salvage Co.

Cascade General

Cascade General Ship Repair Yard

RM-8

RM-9

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LWG Lower Willamette Group

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS .
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Bathymetric Information: Multibeam bathymetric surveys conducted by David Evans and Associates, Inc. (DEA) 2001 to 2004.
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Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 6-g
Portland Harbor RI/FS
Round 2B Archive FSP
Zinc (mg/kg)
Concentrations in Sediments
River Mile 8-9 (East)

Zinc (mg/kg)

- 0-100
- 100-200
- 200-300
- 300-400
- 400-500
- 500-600
- 600-1940
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

Cascade General

Cascade General Ship Repair Yard

McCall Oil & Great Western Chemical

Front Ave. LLP/Glacier NW

Tube Forgings/Front Ave. LLP

CMI Northwest/Front Ave. LLP

Shaver Transportation Co.

Lakeside Industries

Texaco Portland Bulk Dock

Equilon Enterprises, LLC

Gunderson, Inc.

Texaco Equilon Pipeline

Gresham Transfer (lessee)

Kleen Blast

Burlington N. Santa Fe/Portland Terminal Railroad Co.

RM-8

RM-9

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LWG Lower Willamette Group

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS .
Channel & River miles: Developed from US Army Corps of Engineers information.
Bathymetric Information: Multibeam bathymetric surveys conducted by David Evans and Associates, Inc. (DEA) 2001 to 2004.
River Edge: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 6-h
Portland Harbor RI/FS
Round 2B Archive FSP
Zinc (mg/kg)
Concentrations in Sediments
River Mile 8-9 (West)

Zinc (mg/kg)

- 0-100
- 100-200
- 200-300
- 300-400
- 400-500
- 500-600
- 600-1940
- Archived Sample

*See Map Key page for detailed description of core/grab graphics.

RM-9

RM-10

Port of Portland-Terminal 2

Gunderson, Inc.

Dock

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LWG Lower Willamette Group

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS .
Channel & River miles: Developed from US Army Corps of Engineers information.
Bathymetric Information: Multibeam bathymetric surveys conducted by David Evans and Associates, Inc. (DEA) 2001 to 2004.
River Edge: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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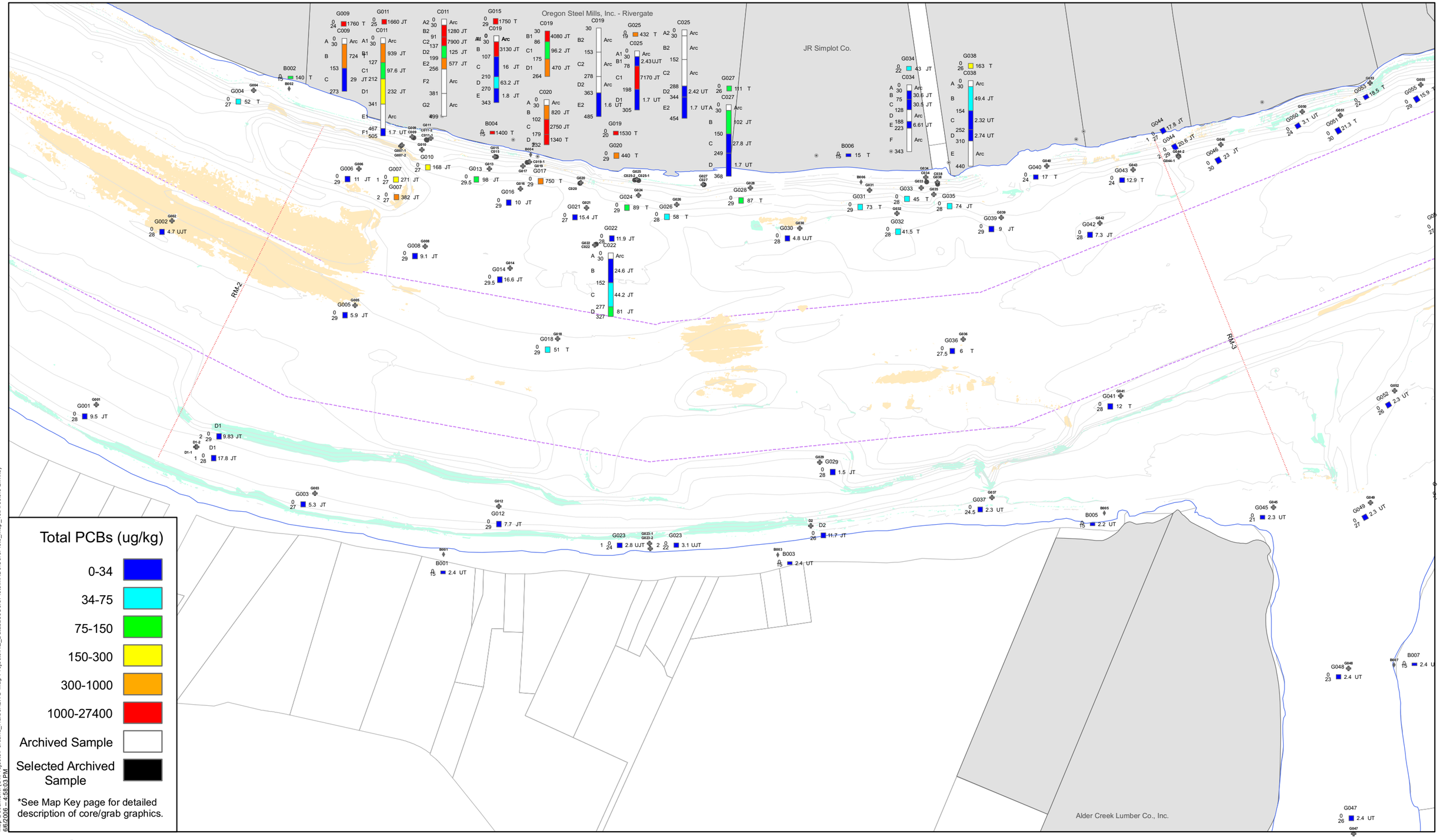
Map 6- i
Portland Harbor RI/FS
Round 2B Archive FSP
Zinc (mg/kg)
Concentrations in Sediments
River Mile 9-10



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LWG Lower Willamette Group

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS .
Channel & River miles: Developed from US Army Corps of Engineers information.
Bathymetric Information: Multibeam bathymetric surveys conducted by David Evans and Associates, Inc. (DEA) 2001 to 2004.
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Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change (ft)
- -22 to -1.1 Shoaling
- -1 to1
- 1.1 top 37 Deepening

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Map 7-a
Portland Harbor RI/FS
Round 2B Archive FSP
Total PCBs (Aroclors) (ug/kg)
Concentrations in Sediments
River Mile 2-3

Total PCBs (ug/kg)

- 0-34
- 34-75
- 75-150
- 150-300
- 300-1000
- 1000-27400
- Archived Sample
- Selected Archived Sample

*See Map Key page for detailed description of core/grab graphics.

Fort James/Northwest Service Center

TSG Trucking & OnLine Roofing

Time Oil Co. - Northwest Terminal

Schnitzer Investment Corp.

Jefferson Smurfit

Northwest Pipe and Casing

Calbag Metals

Schnitzer Steel

Portland Blast Media

International Terminal Area

Kinder Morgan Liquid Terminals

Owens Corning - Linnton

RM-3

RM-4

Map Document: (O:\Projects\Portland_Harbor\LWG-Map-Projects\NE_DatabaseCorePlots\MXDs\CorePlots_Map_TotAroclors-2.mxd)
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FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS .
Channel & River miles: Developed from US Army Corps of Engineers information.
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River Edge: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)

Navigation Channel

Bathymetric Change (ft)
- -22 to -1.1 Shoaling
- -1 to1
- 1.1 top 37 Deepening

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Map 7-b
Portland Harbor RI/FS
Round 2B Archive FSP
Total PCBs (Aroclors) (ug/kg)
Concentrations in Sediments
River Mile 3-4

Total PCBs (ug/kg)

- 0-34
- 34-75
- 75-150
- 150-300
- 300-1000
- 1000-27400
- Archived Sample
- Selected Archived Sample

*See Map Key page for detailed description of core/grab graphics.

Union Pacific Railroad/Former St. Johns tank farm

Port of Portland-Terminal 4 Slip 1

Port of Portland-Terminal 4 Slip 3

Calbag Metals

Schnitzer Steel

Portland Blast Media

T4 Auto Storage Area

International Terminal Area

Kinder Morgan Liquid Terminals

Babcock Land Co.

Columbia River Sand and Gravel

Linnton Plywood Association

ARCO Bulk Terminal

Mobil Oil Terminal

ning - Linnton

RM-5

Map Document: (O:\Projects\Portland_Harbor\LWG-Map-Projects\NE_DatabaseCorePlots\MXDs\CorePlots_Map_TotAroclors-2.mxd)
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FEATURE SOURCES:
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Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change (ft)
- -22 to -1.1 Shoaling
- -1 to1
- 1.1 top 37 Deepening

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Map 7-c
Portland Harbor RI/FS
Round 2B Archive FSP
Total PCBs (Aroclors) (ug/kg)
Concentrations in Sediments
River Mile 4-5

Total PCBs (ug/kg)

- 0-34
- 34-75
- 75-150
- 150-300
- 300-1000
- 1000-27400
- Archived Sample
- Selected Archived Sample

*See Map Key page for detailed description of core/grab graphics.

T4 Auto Storage Area

MarCom, Inc.

City of Portland BES Water Pollution Control Lab

Crawford Street Co

Mobil Oil Terminal

ST Services/Shore Terminal

Transloader Intl. Co.

Foss Maritime / Brix Maritime

Marine Finance Corporation

Hendren Tow Boats

USACE- Portland Moorings

Koppers Industries, Inc

ARCO Bulk Terminal

RM-5

RM-6

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LWG Lower Willamette Group

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS .
Channel & River miles: Developed from US Army Corps of Engineers information.
Bathymetric Information: Multibeam bathymetric surveys conducted by David Evans and Associates, Inc. (DEA) 2001 to 2004.
River Edge: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change (ft)
- -22 to -1.1 Shoaling
- -1 to1
- 1.1 top 37 Deepening

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Map 7-d
Portland Harbor RI/FS
Round 2B Archive FSP
Total PCBs (Aroclors) (ug/kg)
Concentrations in Sediments
River Mile 5-6

Total PCBs (ug/kg)

- 0-34
- 34-75
- 75-150
- 150-300
- 300-1000
- 1000-27400
- Archived Sample
- Selected Archived Sample

*See Map Key page for detailed description of core/grab graphics.

McCormick & Baxter Superfund Site

Willamette Cove - Central Parcel

Willamette Cove - West Parcel

Crawford Street Corp.

City of Portland BES Water Pollution Control Lab

RM-6

RM-7

Wacker Siltronics Corp.

Arkema

Gould Industrie

Bayer (Rhone-Poulenc)

Koppers Industries, Inc.

GASCO

USACE- Portland Moorings

Hendren Tow Boats

e Corporation

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LWG Lower Willamette Group

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Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change (ft)
- -22 to -1.1 Shoaling
- -1 to1
- 1.1 top 37 Deepening

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Map 7-e
Portland Harbor RI/FS
Round 2B Archive FSP
Total PCBs (Aroclors) (ug/kg)
Concentrations in Sediments
River Mile 6-7

Total PCBs (ug/kg)

- 0-34
- 34-75
- 75-150
- 150-300
- 300-1000
- 1000-27400
- Archived Sample
- Selected Archived Sample

*See Map Key page for detailed description of core/grab graphics.

McCormick & Baxter Superfund Site

Triangle Park LLC

Arkema

Willbridge Bulk Fuel Area

Kinder Morgan

Chevron U.S.A., Inc.

ConocoPhillips Company

GS Roofing Products

McCall Oil & Great Western Chemical

Front Ave. LLP/Glacier NW

Cascade General Ship

Tube Forgings/Fro

Schnitzer Doane Lake

RM 7

RM 8

integral consulting inc

LWG Lower Willamette Group

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS .
Channel & River miles: Developed from US Army Corps of Engineers information.
Bathymetric Information: Multibeam bathymetric surveys conducted by David Evans and Associates, Inc. (DEA) 2001 to 2004.
River Edge: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change (ft)
- -22 to -1.1 Shoaling
- -1 to1
- 1.1 top 37 Deepening

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Map 7- f
Portland Harbor RI/FS
Round 2B Archive FSP
Total PCBs (Aroclors) (ug/kg)
Concentrations in Sediments
River Mile 7-8

Map Document: (O:\Projects\Portland_Harbor\LWG-Map-Projects\NE_DatabaseCorePlots\MXDs\CorePlots_Map_TotAroclors-2.mxd)
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Total PCBs (ug/kg)

- 0-34
- 34-75
- 75-150
- 150-300
- 300-1000
- 1000-27400
- Archived Sample
- Selected Archived Sample

*See Map Key page for detailed description of core/grab graphics.

U.S.C.G. Marine Safety

Fred Divine Diving & Salvage Co.

Cascade General

Cascade General Ship Repair Yard

RM-8

RM-9

Map Document: (O:\Projects\Portland_Harbor\LWG-Map-Projects\NE_DatabaseCorePlots\MXDs\CorePlots_Map_TotArochrs-2.mxd)
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LWG Lower Willamette Group

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Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change (ft)
- -22 to -1.1 Shoaling
- -1 to1
- 1.1 top 37 Deepening

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Map 7-g
Portland Harbor RI/FS
Round 2B Archive FSP
Total PCBs (Aroclors) (ug/kg)
Concentrations in Sediments
River Mile 8-9 (East)

Total PCBs (ug/kg)

- 0-34
- 34-75
- 75-150
- 150-300
- 300-1000
- 1000-27400
- Archived Sample
- Selected Archived Sample

*See Map Key page for detailed description of core/grab graphics.

Cascade General

Cascade General Ship Repair Yard

Front Ave. LLP/Glacier NW

McCall Oil & Great Western Chemical

Tube Forgings/Front Ave. LLP

CMI Northwest/Front Ave. LLP

Shaver Transportation Co.

Lakeside Industries

Texaco Portland Bulk Dock

Equilon Enterprises, LLC

Texaco Equilon Pipeline

Gunderson, Inc.

Gresham Transfer (lessee)

Kleen Blast

Burlington N. Santa Fe/Portland Terminal Railroad Co.

RM-8

RM-9

Map Document: (O:\Projects\Portland_Harbor\LWG-Map-Projects\NE_DatabaseCorePlots\MXDs\CorePlots_Map_TotAroclors-2.mxd)
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LWG Lower Willamette Group

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Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change (ft)
- -22 to -1.1 Shoaling
- -1 to1
- 1.1 top 37 Deepening

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Map 7-h
Portland Harbor RI/FS
Round 2B Archive FSP
Total PCBs (Aroclors) (ug/kg)
Concentrations in Sediments
River Mile 8-9 (West)

Total PCBs (ug/kg)

- 0-34
- 34-75
- 75-150
- 150-300
- 300-1000
- 1000-27400
- Archived Sample
- Selected Archived Sample

*See Map Key page for detailed description of core/grab graphics.

Gunderson, Inc.

Port of Portland-Terminal 2

RM-9

RM-10

Dock

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LWG Lower Willamette Group

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Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change (ft)
- -22 to -1.1 Shoaling
- -1 to1
- 1.1 top 37 Deepening

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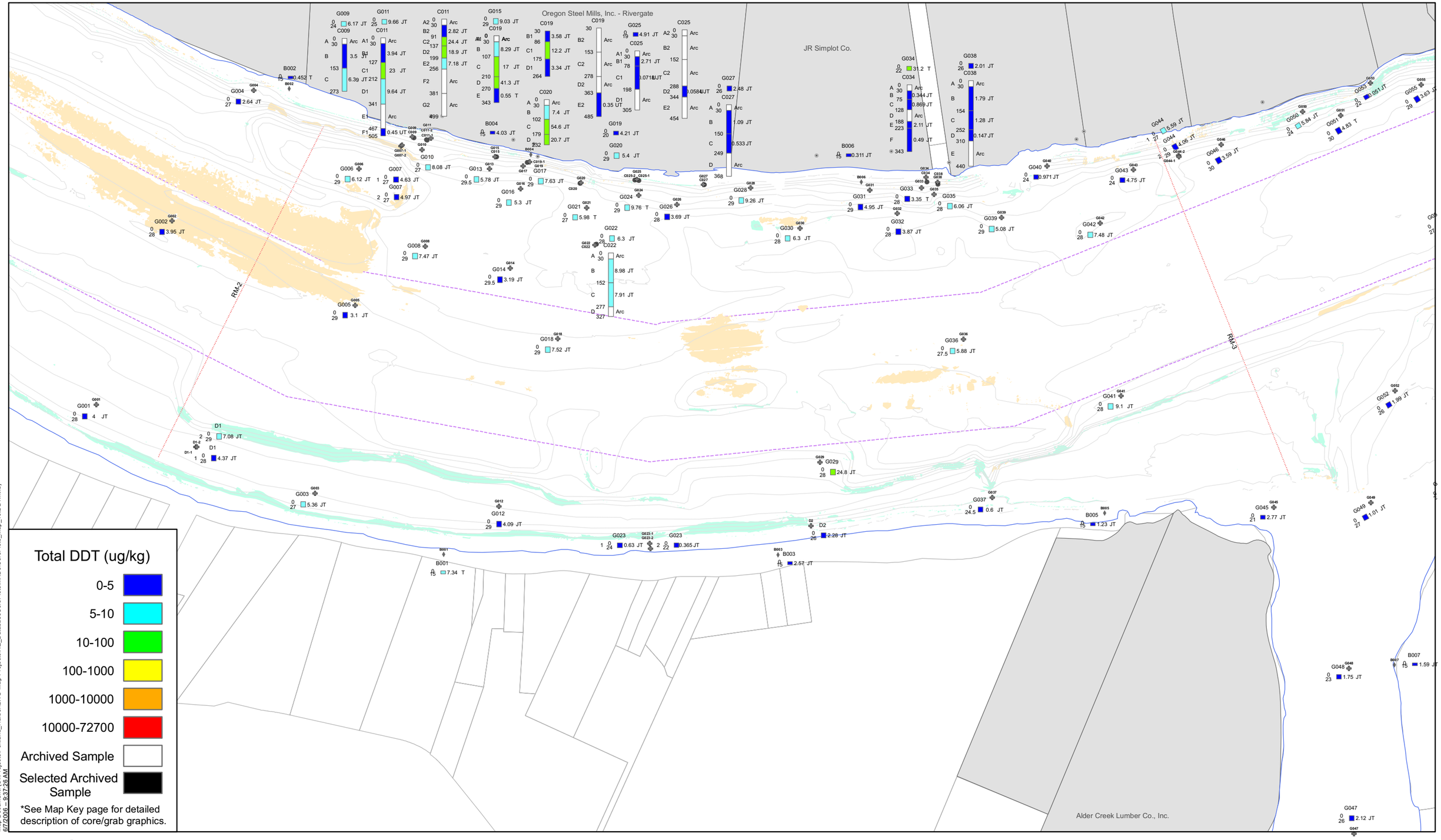
Map 7- i
Portland Harbor RI/FS
Round 2B Archive FSP
Total PCBs (Aroclors) (ug/kg)
Concentrations in Sediments
River Mile 9-10



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LWG Lower Willamette Group

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Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 8-a
Portland Harbor RI/FS
Round 2B Archive FSP
Total DDT (ug/kg)
Concentrations in Sediments
River Mile 2-3

Total DDT (ug/kg)

- 0-5
- 5-10
- 10-100
- 100-1000
- 1000-10000
- 10000-72700
- Archived Sample
- Selected Archived Sample

*See Map Key page for detailed description of core/grab graphics.

Fort James/Northwest Service Center

TSG Trucking & OnLine Roofing

Time Oil Co. - Northwest Terminal

Schnitzer Investment Corp.

Jefferson Smurfit

Northwest Pipe and Casing

Calbag Metals

Schnitzer Steel

Portland Blast Media

International Terminal Area

Kinder Morgan Liquid Terminals

Owens Corning - Linnton

RM 3

RM 3.4

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Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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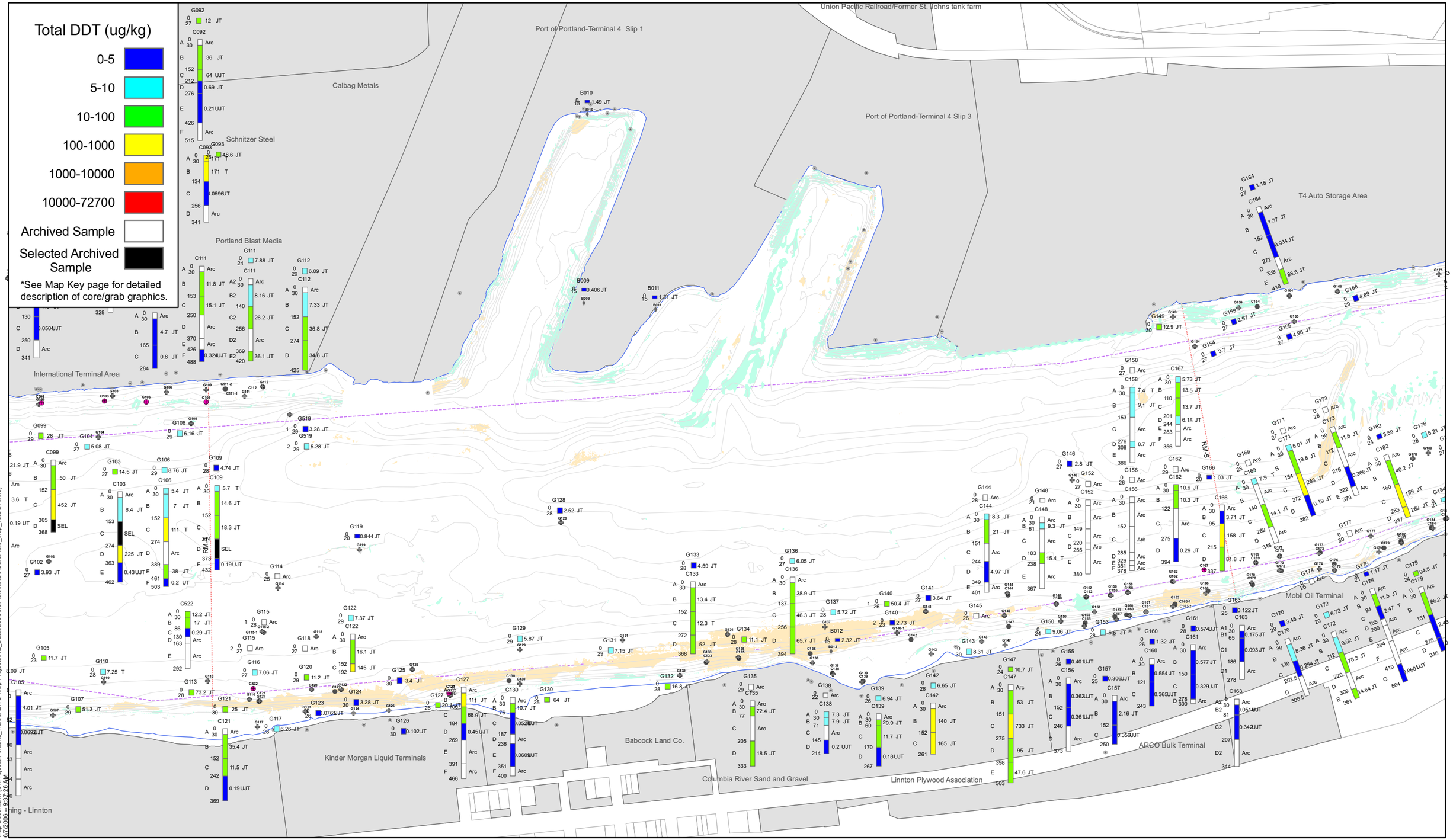
Map 8-b
Portland Harbor RI/FS
Round 2B Archive FSP
Total DDT (ug/kg)
Concentrations in Sediments
River Mile 3-4



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LWG Lower Willamette Group

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Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 8-c
Portland Harbor RI/FS
Round 2B Archive FSP
Total DDT (ug/kg)
Concentrations in Sediments
River Mile 4-5

Total DDT (ug/kg)

- 0-5
- 5-10
- 10-100
- 100-1000
- 1000-10000
- 10000-72700
- Archived Sample
- Selected Archived Sample

*See Map Key page for detailed description of core/grab graphics.

T4 Auto Storage Area

MarCom, Inc.

City of Portland BES Water Pollution Control Lab

Crawford Street Co

Mobil Oil Terminal

ARCO Bulk Terminal

Foss Maritime / Brix Maritime

CT Services/Shore Terminal

Transloaders Intl. Co

Marine Finance Corporation

Hendren Tow Boats

USACE- Portland Moorings

Koppers Industries, Inc

RM-5

RM-6

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Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 8-d
Portland Harbor RI/FS
Round 2B Archive FSP
Total DDT (ug/kg)
Concentrations in Sediments
River Mile 5-6

Total DDT (ug/kg)

- 0-5
- 5-10
- 10-100
- 100-1000
- 1000-10000
- 10000-72700
- Archived Sample
- Selected Archived Sample

*See Map Key page for detailed description of core/grab graphics.

McCormick & Baxter Superfund Site

Willamette Cove - Central Parcel

Willamette Cove - West Parcel

Crawford Street Corp.

City of Portland BES Water Pollution Control Lab

RM-6

RM-7

Wacker Siltronics Corp.

Arkema

Gould Industrie

Bayer (Rhone-Poulenc)

GASCO

Koppers Industries, Inc.

USACE- Portland Moorings

Hendren Tow Boats

e Corporation

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Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)

Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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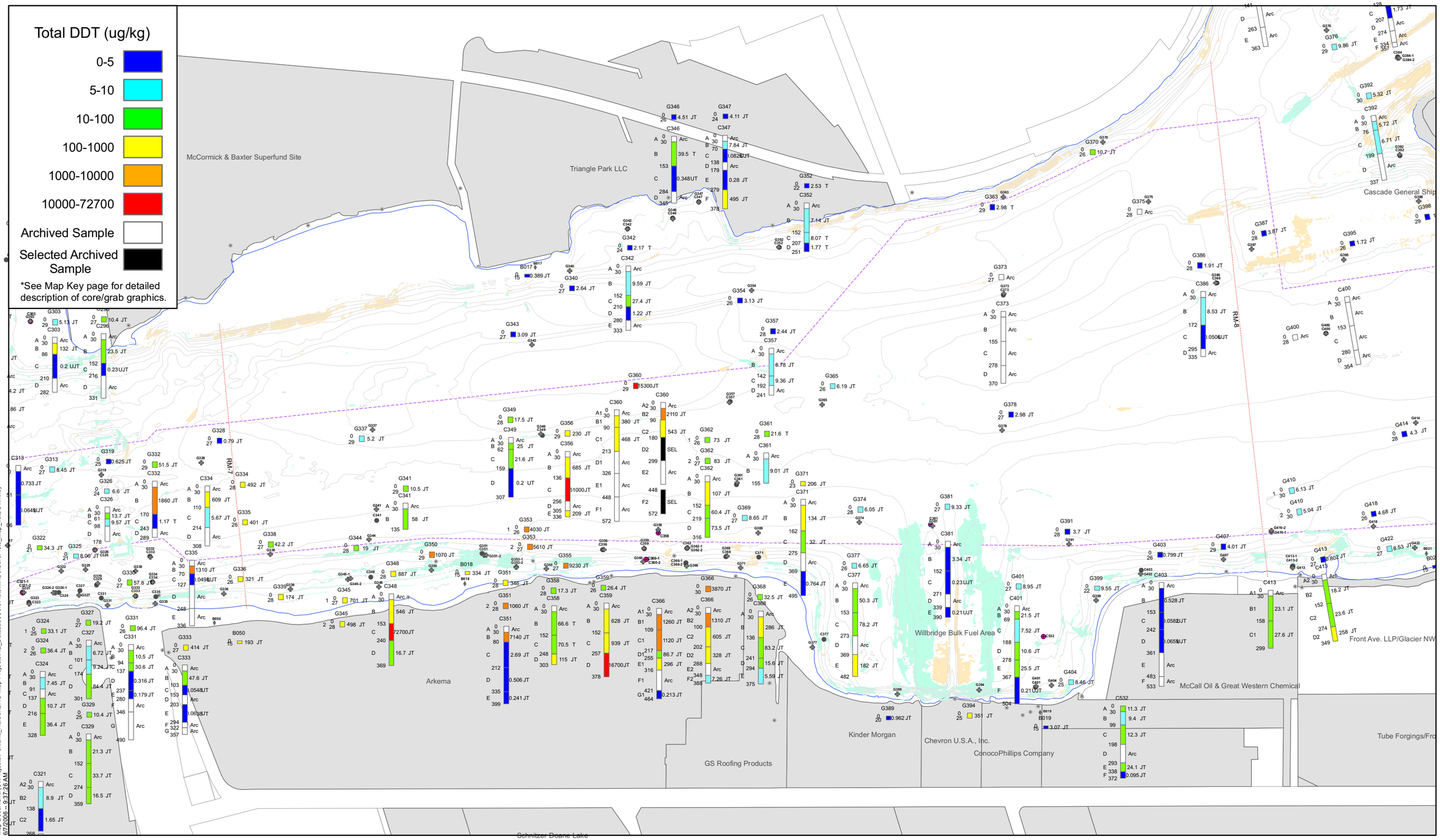
Map 8-e
Portland Harbor RI/FS
Round 2B Archive FSP
Total DDT (ug/kg)
Concentrations in Sediments
River Mile 6-7



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LWG Lower Willamette Group

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Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 8- f
Portland Harbor RI/FS
Round 2B Archive FSP
Total DDT (ug/kg)
Concentrations in Sediments
River Mile 7-8

Total DDT (ug/kg)

- 0-5
- 5-10
- 10-100
- 100-1000
- 1000-10000
- 10000-72700
- Archived Sample
- Selected Archived Sample

*See Map Key page for detailed description of core/grab graphics.

U.S.C.G. Marine Safety

Fred Divine Diving & Salvage Co.

Cascade General

Cascade General Ship Repair Yard

RM-8

RM-9

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N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)

Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 8-g
Portland Harbor RI/FS
Round 2B Archive FSP
Total DDT (ug/kg)
Concentrations in Sediments
River Mile 8-9 (East)

Total DDT (ug/kg)

- 0-5
- 5-10
- 10-100
- 100-1000
- 1000-10000
- 10000-72700
- Archived Sample
- Selected Archived Sample

*See Map Key page for detailed description of core/grab graphics.

Cascade General

Cascade General Ship Repair Yard

Front Ave. LLP/Glacier NW

McCall Oil & Great Western Chemical

Tube Forgings/Front Ave. LLP

Shaver Transportation Co.

CMI Northwest/Front Ave. LLP

Lakeside Industries

Texaco Portland Bulk Dock

Equilon Enterprises, LLC

Texaco Equilon Pipeline

Gunderson, Inc.

Gresham Transfer (lessee)

Kleen Blast

Burlington N. Santa Fe/Portland Terminal Railroad Co.

RM-8

RM-9

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Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 8-h
Portland Harbor RI/FS
Round 2B Archive FSP
Total DDT (ug/kg)
Concentrations in Sediments
River Mile 8-9 (West)

Total DDT (ug/kg)

- 0-5
- 5-10
- 10-100
- 100-1000
- 1000-10000
- 10000-72700
- Archived Sample
- Selected Archived Sample

*See Map Key page for detailed description of core/grab graphics.

Gunderson, Inc.

Port of Portland-Terminal 2

Dock

RM-9

RM-10

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N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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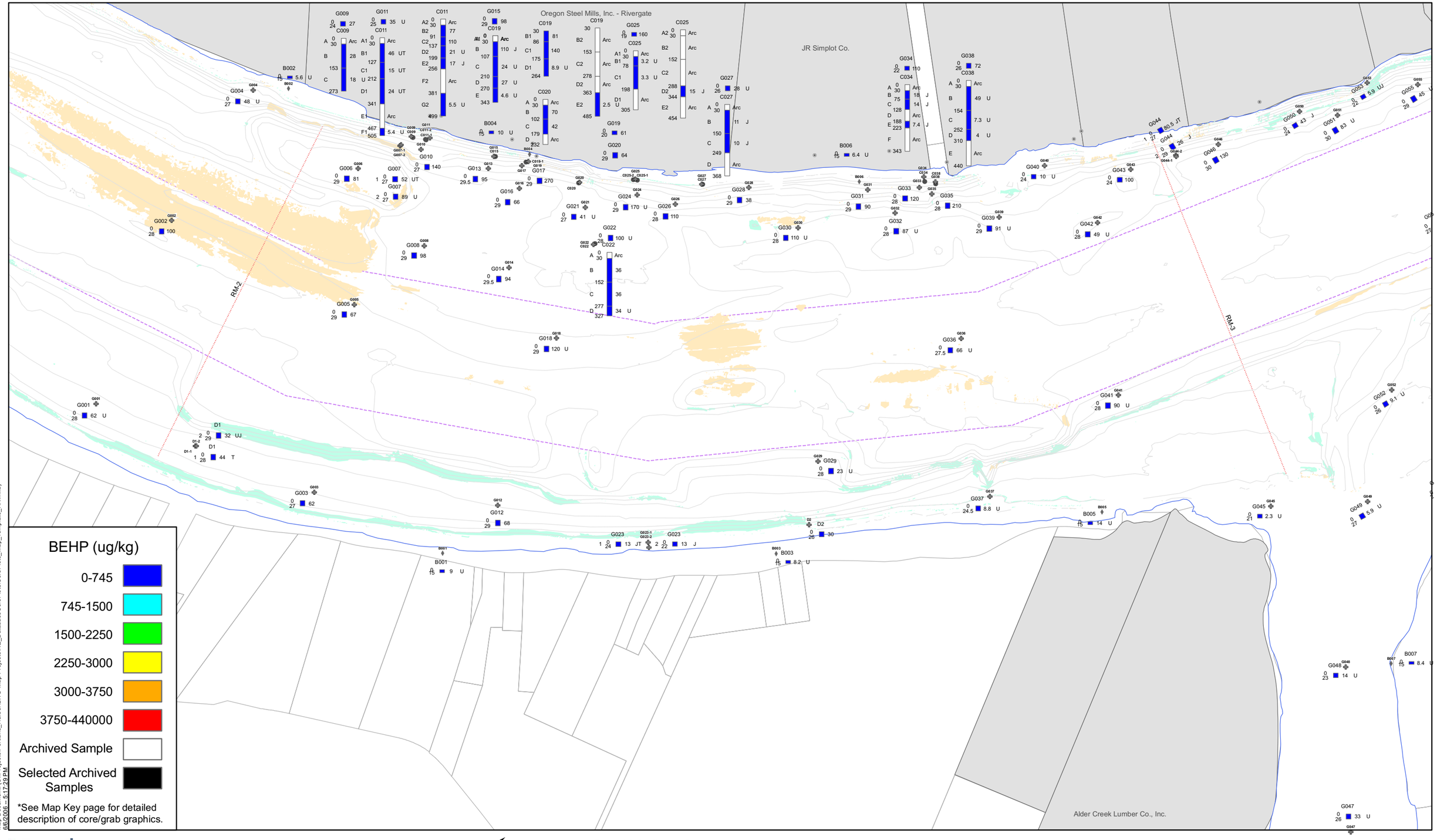
Map 8- i
Portland Harbor RI/FS
Round 2B Archive FSP
Total DDT (ug/kg)
Concentrations in Sediments
River Mile 9-10



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LWG Lower Willamette Group

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N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 9-a
Portland Harbor RI/FS
Round 2B Archive FSP
Bis 2(ethylhexyl) phthalate (ug/kg) Concentrations in Sediments
River Mile 2-3

BEHP (ug/kg)

- 0-745
- 745-1500
- 1500-2250
- 2250-3000
- 3000-3750
- 3750-440000
- Archived Sample
- Selected Archived Samples

*See Map Key page for detailed description of core/grab graphics.

Fort James/Northwest Service Center

TSG Trucking & OnLine Roofing

Time Oil Co. - Northwest Terminal

Schnitzer Investment Corp.

Jefferson Smurfit

Northwest Pipe and Casing

Calbag Metals

Schnitzer Steel

Portland Blast Media

International Terminal Area

Kinder Morgan Liquid Terminals

Owens Corning - Linnton

RM-3

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integral consulting inc

LWG Lower Willamette Group

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River Edge: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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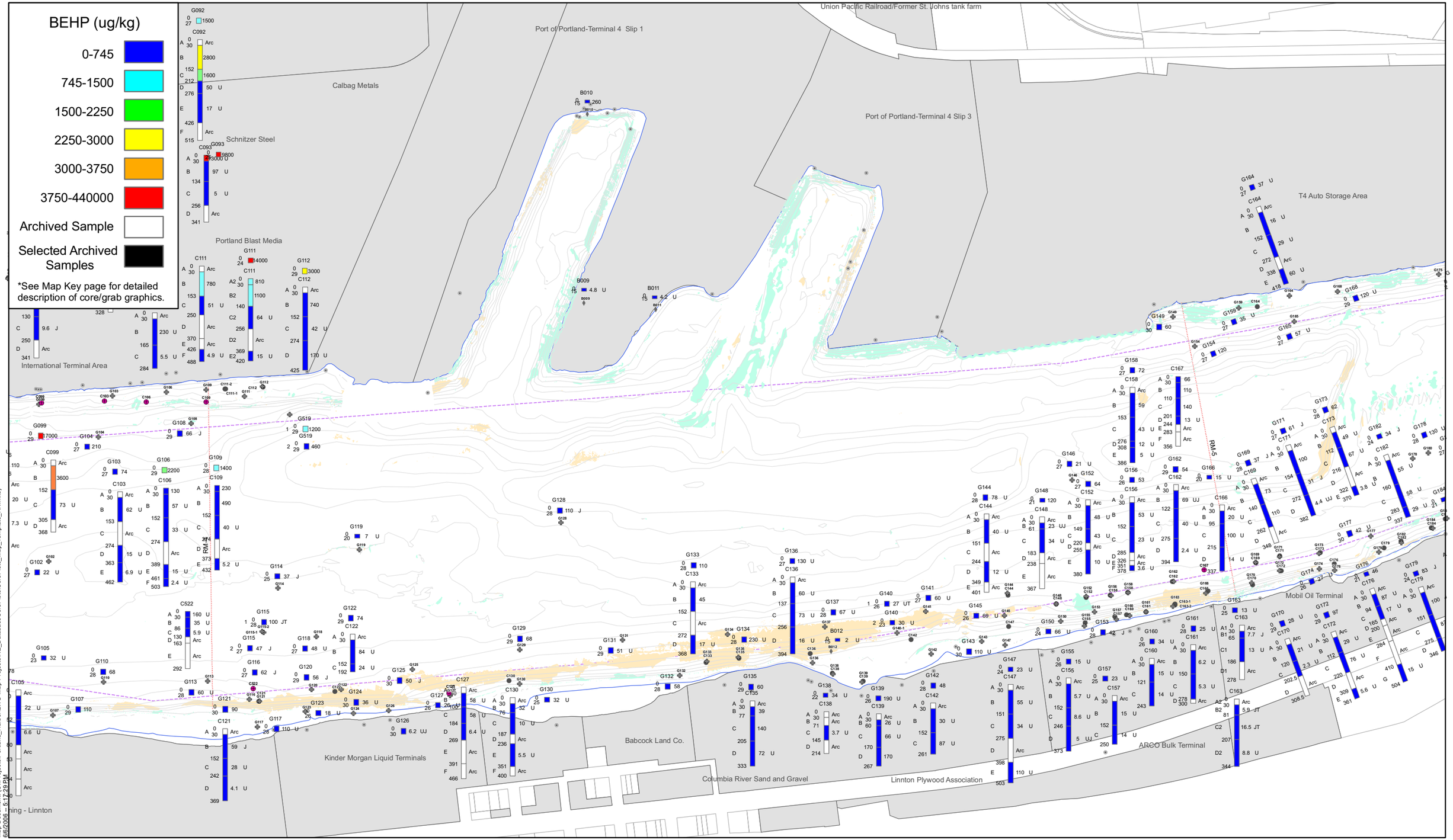
This document is currently under review by US EPA and its federal, state, and tribal partners, and is subject to change in whole or in part.

Map 9-b
Portland Harbor RI/FS
Round 2B Archive FSP
Bis 2(ethylhexyl) phthalate (ug/kg) Concentrations in Sediments
River Mile 3-4



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LWG LOWER WILLAMETTE GROUP

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS .
Channel & River miles: Developed from US Army Corps of Engineers information.
Bathymetric Information: Multibeam bathymetric surveys conducted by David Evans and Associates, Inc. (DEA) 2001 to 2004.
River Edge: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 9-c
Portland Harbor RI/FS
Round 2B Archive FSP
Bis 2(ethylhexyl) phthalate (ug/kg)
Concentrations in Sediments
River Mile 4-5

BEHP (ug/kg)

- 0-745
- 745-1500
- 1500-2250
- 2250-3000
- 3000-3750
- 3750-440000
- Archived Sample
- Selected Archived Samples

*See Map Key page for detailed description of core/grab graphics.

T4 Auto Storage Area

MarCom, Inc.

City of Portland BES Water Pollution Control Lab

Crawford Street Co

Mobil Oil Terminal

ST Services/Shore Terminal

Foss Maritime / Brix Maritime

Transloader Intl. Co

Marine Finance Corporation

Hendren Tow Boats

USACE- Portland Moorings

Koppers Industries, Inc

ARCO Bulk Terminal

RM-5

RM-6

Map Document: (O:\Projects\Portland_Harbor\LWG-Map-Projects\NE_DatabaseCorePlots\CorePlots_Map_Template_RN.mxd)
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LWG Lower Willamette Group

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS .
Channel & River miles: Developed from US Army Corps of Engineers information.
Bathymetric Information: Multibeam bathymetric surveys conducted by David Evans and Associates, Inc. (DEA) 2001 to 2004.
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Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 9-d
Portland Harbor RI/FS
Round 2B Archive FSP
Bis 2(ethylhexyl) phthalate (ug/kg) Concentrations in Sediments
River Mile 5-6

BEHP (ug/kg)

- 0-745
- 745-1500
- 1500-2250
- 2250-3000
- 3000-3750
- 3750-440000
- Archived Sample
- Selected Archived Samples

*See Map Key page for detailed description of core/grab graphics.

McCormick & Baxter Superfund Site

Willamette Cove - Central Parcel

Willamette Cove - West Parcel

Crawford Street Corp.

City of Portland BES Water Pollution Control Lab

RM-7

Wacker Siltronics Corp.

Arkema

Gould Industrie

Bayer (Rhone-Poulenc)

e Corporation

Hendren Tow Boats

USACE- Portland Moorings

Koppers Industries, Inc.

GASCO

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LWG Lower Willamette Group

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS.
Channel & River miles: Developed from US Army Corps of Engineers information.
Bathymetric Information: Multibeam bathymetric surveys conducted by David Evans and Associates, Inc. (DEA) 2001 to 2004.
River Edge: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 9-e
Portland Harbor RI/FS
Round 2B Archive FSP
Bis 2(ethylhexyl) phthalate (ug/kg) Concentrations in Sediments
River Mile 6-7

BEHP (ug/kg)

- 0-745
- 745-1500
- 1500-2250
- 2250-3000
- 3000-3750
- 3750-440000
- Archived Sample
- Selected Archived Samples

*See Map Key page for detailed description of core/grab graphics.

McCormick & Baxter Superfund Site

Triangle Park LLC

Arkema

GS Roofing Products

Kinder Morgan

Willbridge Bulk Fuel Area

Chevron U.S.A., Inc.

ConocoPhillips Company

McCall Oil & Great Western Chemical

Cascade General Ship

Front Ave. LLP/Glacier NW

Tube Forgings/Frc

Schnitzer Doane Lake

RM-8

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LWG Lower Willamette Group

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Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 9- f
Portland Harbor RI/FS
Round 2B Archive FSP
Bis 2(ethylhexyl) phthalate (ug/kg) Concentrations in Sediments
River Mile 7-8

BEHP (ug/kg)

- 0-745
- 745-1500
- 1500-2250
- 2250-3000
- 3000-3750
- 3750-440000
- Archived Sample
- Selected Archived Samples

*See Map Key page for detailed description of core/grab graphics.

U.S.C.G. Marine Safety

Fred Divine Diving & Salvage Co.

Cascade General

Cascade General Ship Repair Yard

RM-8

RM-9

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LWG Lower Willamette Group

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Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 9-g
Portland Harbor RI/FS
Round 2B Archive FSP
Bis 2(ethylhexyl) phthalate (ug/kg) Concentrations in Sediments
River Mile 8-9 (East)

BEHP (ug/kg)

- 0-745
- 745-1500
- 1500-2250
- 2250-3000
- 3000-3750
- 3750-440000
- Archived Sample
- Selected Archived Samples

*See Map Key page for detailed description of core/grab graphics.

Cascade General

Cascade General Ship Repair Yard

Front Ave. LLP/Glacier NW

McCall Oil & Great Western Chemical

Tube Forgings/Front Ave. LLP

CMI Northwest/Front Ave. LLP

Shaver Transportation Co.

Lakeside Industries

Texaco Portland Bulk Dock

Equilon Enterprises, LLC

Texaco Equilon Pipeline

Gunderson, Inc.

Gresham Transfer (lessee)

Kleen Blast

Burlington N. Santa Fe/Portland Terminal Railroad Co.

RM-8

RM-9

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LWG Lower Willamette Group

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS .
Channel & River miles: Developed from US Army Corps of Engineers information.
Bathymetric Information: Multibeam bathymetric surveys conducted by David Evans and Associates, Inc. (DEA) 2001 to 2004.
River Edge: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 9-h
Portland Harbor RI/FS
Round 2B Archive FSP
Bis 2(ethylhexyl) phthalate (ug/kg) Concentrations in Sediments
River Mile 8-9 (West)

BEHP (ug/kg)

- 0-745
- 745-1500
- 1500-2250
- 2250-3000
- 3000-3750
- 3750-440000
- Archived Sample
- Selected Archived Samples

*See Map Key page for detailed description of core/grab graphics.

RM-9

RM-10

Port of Portland-Terminal 2

Dock

Gunderson, Inc.

Map Document: (O:\Projects\Portland_Harbor\LWG-Map-Projects\NE_DatabaseCorePlots\CorePlots_Map_Template_RN.mxd)
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Transportation, Property, or Boundaries: Metro RLIS .
Channel & River miles: Developed from US Army Corps of Engineers information.
Bathymetric Information: Multibeam bathymetric surveys conducted by David Evans and Associates, Inc. (DEA) 2001 to 2004.
River Edge: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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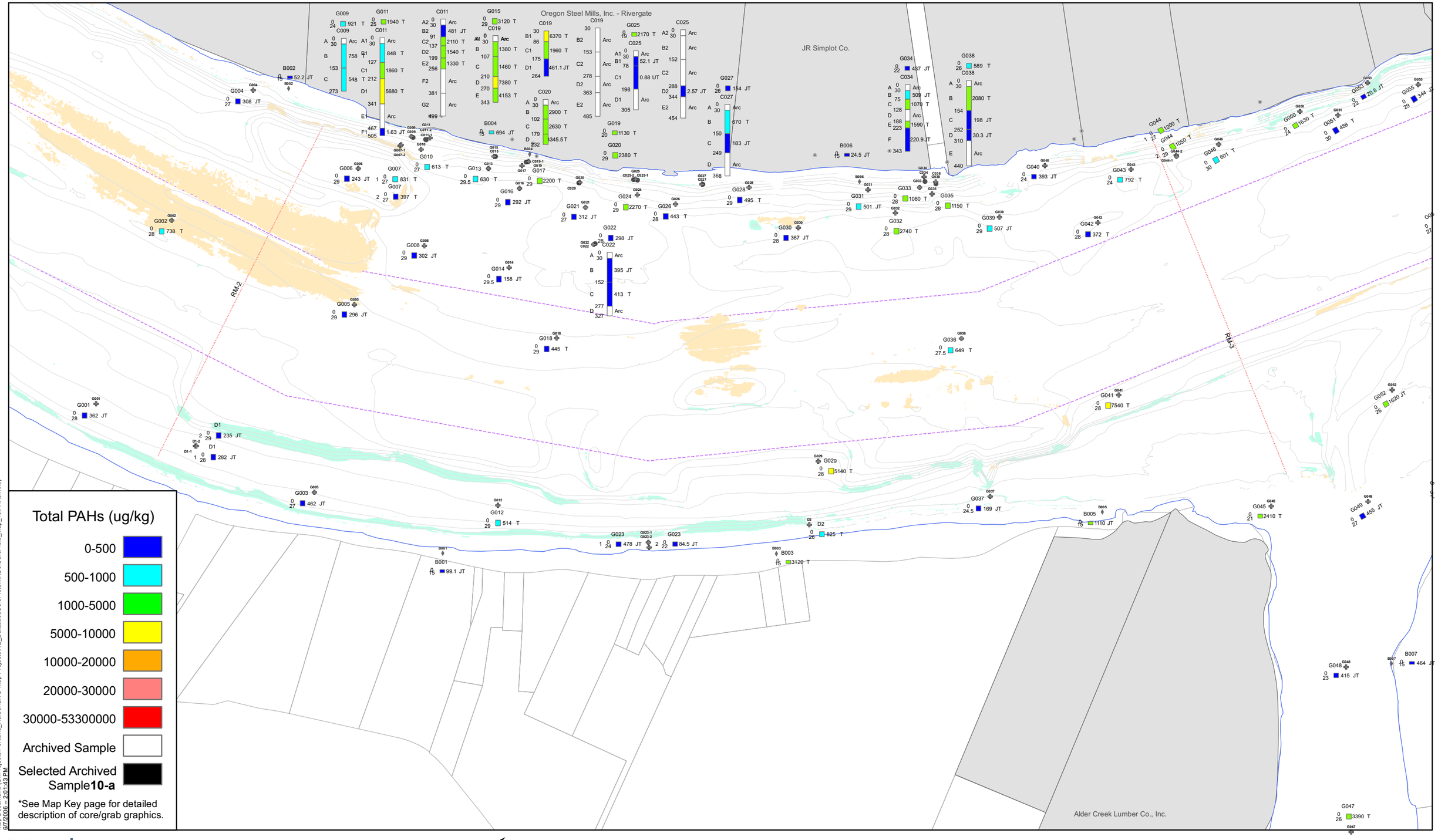
Map 9- i
Portland Harbor RI/FS
Round 2B Archive FSP
Bis 2(ethylhexyl) phthalate (ug/kg) Concentrations in Sediments
River Mile 9-10



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LWG Lower Willamette Group

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Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 10-a
Portland Harbor RI/FS
Round 2B Archive FSP
Total PAHs (ug/kg)
Concentrations in Sediments
River Mile 2-3

Total PAHs (ug/kg)

- 0-500
- 500-1000
- 1000-5000
- 5000-10000
- 10000-20000
- 20000-30000
- 30000-53300000
- Archived Sample
- Selected Archived Sample-**b**

*See Map Key page for detailed description of core/grab graphics.

Fort James/Northwest Service Center
TSG Trucking & OnLine Roofing
Time Oil Co. - Northwest Terminal
Schnitzer Investment Corp.
Jefferson Smurfit
Northwest Pipe and Casing
Calbag Metals
Schnitzer Steel
Portland Blast Media
International Terminal Area
Kinder Morgan Liquid Terminals
Owens Corning - Linnton
RM-3

Map Document: (G:\Projects\Portland_Harbor\LWG-Map-Projects\NE_DatabaseCorePlots\MXDs\CorePlots_Map_TotPAHs.mxd)
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LWG Lower Willamette Group

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS .
Channel & River miles: Developed from US Army Corps of Engineers information.
Bathymetric Information: Multibeam bathymetric surveys conducted by David Evans and Associates, Inc. (DEA) 2001 to 2004.
River Edge: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map 10-b
Portland Harbor RI/FS
Round 2B Archive FSP
Total PAHs (ug/kg)
Concentrations in Sediments
River Mile 3-4

Total PAHs (ug/kg)

- 0-500
- 500-1000
- 1000-5000
- 5000-10000
- 10000-20000
- 20000-30000
- 30000-53300000
- Archived Sample
- Selected Archived Sample-**c**

*See Map Key page for detailed description of core/grab graphics.

Union Pacific Railroad/Former St. Johns tank farm

Port of Portland-Terminal 4 Slip 1

Port of Portland-Terminal 4 Slip 3

Calbag Metals

Schnitzer Steel

Portland Blast Media

International Terminal Area

T4 Auto Storage Area

Mobil Oil Terminal

ARCO Bulk Terminal

Kinder Morgan Liquid Terminals

Babcock Land Co.

Columbia River Sand and Gravel

Linnton Plywood Association

ning - Linnton

RM-4

RM-5

Map Document: (O:\Projects\Portland_Harbor\LWG-Map-Projects\NE_DatabaseCorePlots\MXDs\CorePlots_Map_TotPAHs.mxd)
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LWG Lower Willamette Group

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS .
Channel & River miles: Developed from US Army Corps of Engineers information.
Bathymetric Information: Multibeam bathymetric surveys conducted by David Evans and Associates, Inc. (DEA) 2001 to 2004.
River Edge: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)

Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map10-c
Portland Harbor RI/FS
Round 2B Archive FSP
Total PAHs (ug/kg)
Concentrations in Sediments
River Mile 4-5

Total PAHs (ug/kg)

- 0-500
- 500-1000
- 1000-5000
- 5000-10000
- 10000-20000
- 20000-30000
- 30000-53300000
- Archived Sample
- Selected Archived Sample-

*See Map Key page for detailed description of core/grab graphics.

T4 Auto Storage Area

MarCom, Inc.

City of Portland BES Water Pollution Control Lab

Crawford Street Co

Mobil Oil Terminal

ST Services/Shore Terminal

Foss Maritime / Brix Maritime

Transloader Intl. Co

Marine Finance Corporation

Hendren Tow Boats

USACE- Portland Moorings

Koppers Industries, Inc

ARCO Bulk Terminal

RM-5

Map Document: (O:\Projects\Portland_Harbor\LWG-Map-Projects\NE_DatabaseCorePlots\MXDs\CorePlots_Map_TotPAHs.mxd)
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LWG Lower Willamette Group

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Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map10-d
Portland Harbor RI/FS
Round 2B Archive FSP
Total PAHs (ug/kg)
Concentrations in Sediments
River Mile 4-5

Total PAHs (ug/kg)

- 0-500
- 500-1000
- 1000-5000
- 5000-10000
- 10000-20000
- 20000-30000
- 30000-53300000
- Archived Sample
- Selected Archived Sample-

*See Map Key page for detailed description of core/grab graphics.

McCormick & Baxter Superfund Site

Willamette Cove - Central Parcel

Willamette Cove - West Parcel

Crawford Street Corp.

City of Portland BES Water Pollution Control Lab

Wacker Siltronics Corp.

GASCO

Koppers Industries, Inc.

USACE- Portland Moorings

Hendren Tow Boats

e Corporation

Arkema

Gould Industrie

Bayer (Rhone-Poulenc)

RM-7

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LWG Lower Willamette Group

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Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map10-e
Portland Harbor RI/FS
Round 2B Archive FSP
Total PAHs (ug/kg)
Concentrations in Sediments
River Mile 6-7

Total PAHs (ug/kg)

- 0-500
- 500-1000
- 1000-5000
- 5000-10000
- 10000-20000
- 20000-30000
- 30000-53300000
- Archived Sample
- Selected Archived Sample-

*See Map Key page for detailed description of core/grab graphics.

McCormick & Baxter Superfund Site

Triangle Park LLC

Arkema

Willbridge Bulk Fuel Area

Kinder Morgan

Chevron U.S.A., Inc.

ConocoPhillips Company

GS Roofing Products

McCall Oil & Great Western Chemical

Front Ave. LLP/Glacier NW

Cascade General Ship

Tube Forgings/Frc

Schnitzer Doane Lake

RM 7

RM 8

Map Document: (O:\Projects\Portland_Harbor\LWG-Map-Projects\NE_DatabaseCorePlots\MXDs\CorePlots_Map_TotPAHs.mxd)
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LWG Lower Willamette Group

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Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

0 125 250 500 Feet

Round 2 Sediment Samples

- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)

Navigation Channel

Bathymetric Change

- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map10-f
Portland Harbor RI/FS
Round 2B Archive FSP
Total PAHs (ug/kg)
Concentrations in Sediments
River Mile 7-8

Total PAHs (ug/kg)

- 0-500
- 500-1000
- 1000-5000
- 5000-10000
- 10000-20000
- 20000-30000
- 30000-53300000
- Archived Sample
- Selected Archived Sample-

*See Map Key page for detailed description of core/grab graphics.

U.S.C.G. Marine Safety

Fred Divine Diving & Salvage Co.

Cascade General

Cascade General Ship Repair Yard

RM-8

RM-9

Map Document: (O:\Projects\Portland_Harbor\LWG-Map-Projects\NE_DatabaseCorePlots\MXDs\CorePlots_Map_TotPAHs.mxd)
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LWG Lower Willamette Group

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Bathymetric Information: Multibeam bathymetric surveys conducted by David Evans and Associates, Inc. (DEA) 2001 to 2004.
River Edge: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map10-g
Portland Harbor RI/FS
Round 2B Archive FSP
Total PAHs (ug/kg)
Concentrations in Sediments
River Mile 8-9 (East)

Total PAHs (ug/kg)

- 0-500
- 500-1000
- 1000-5000
- 5000-10000
- 10000-20000
- 20000-30000
- 30000-53300000
- Archived Sample
- Selected Archived Sample

*See Map Key page for detailed description of core/grab graphics.

Cascade General

Cascade General Ship Repair Yard

McCall Oil & Great Western Chemical

Front Ave. LLP/Glacier NW

Tube Forgings/Front Ave. LLP

CMI Northwest/Front Ave. LLP

Shaver Transportation Co.

Lakeside Industries

Texaco Portland Bulk Dock

Equilon Enterprises, LLC

Texaco Equilon Pipeline

Gunderson, Inc.

Gresham Transfer (lessee)

Kleen Blast

Burlington N. Santa Fe/Portland Terminal Railroad Co.

RM-8

RM-9

Map Document: (O:\Projects\Portland_Harbor\LWG-Map-Projects\NE_DatabaseCorePlots\MXDs\CorePlots_Map_TotPAHs.mxd)
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integral consulting inc

LWG Lower Willamette Group

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS .
Channel & River miles: Developed from US Army Corps of Engineers information.
Bathymetric Information: Multibeam bathymetric surveys conducted by David Evans and Associates, Inc. (DEA) 2001 to 2004.
River Edge: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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Map10h
Portland Harbor RI/FS
Round 2B Archive FSP
Total PAHs (ug/kg)
Concentrations in Sediments
River Mile 8-9 (West)

Total PAHs (ug/kg)

- 0-500
- 500-1000
- 1000-5000
- 5000-10000
- 10000-20000
- 20000-30000
- 30000-53300000
- Archived Sample
- Selected Archived Sample

*See Map Key page for detailed description of core/grab graphics.

Gunderson, Inc.

Port of Portland-Terminal 2

RM-9

RM-10

Dock

Map Document: (O:\Projects\Portland_Harbor\LWG-Map-Projects\NE_DatabaseCorePlots\MXDs\CorePlots_Map_TotPAHs.mxd)
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integral consulting inc

LWG Lower Willamette Group

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS .
Channel & River miles: Developed from US Army Corps of Engineers information.
Bathymetric Information: Multibeam bathymetric surveys conducted by David Evans and Associates, Inc. (DEA) 2001 to 2004.
River Edge: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

N

0 125 250 500 Feet

Round 2 Sediment Samples
- Subsurface-Round 2B
- Subsurface-Round 2A
- Surface
- Beach Samples
- Outfalls

2004 5-foot Contours (NAVD88)
Navigation Channel

Bathymetric Change
- -22 to -1.1 Shoaling
- -1.1 to 1
- 1.1 to 34 Deepening

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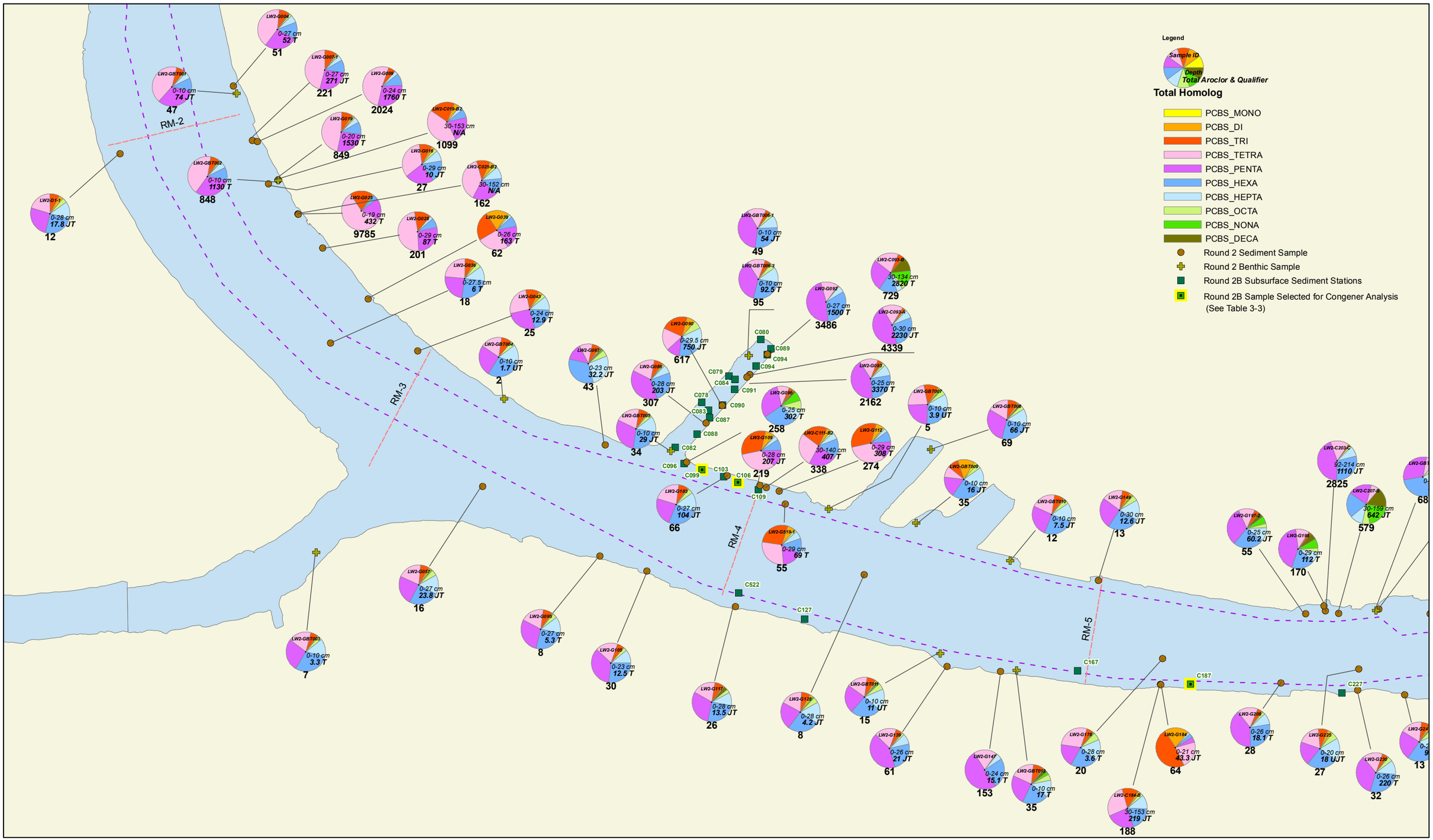
Map10-i
Portland Harbor RI/FS
Round 2B Archive FSP
Total PAHs (ug/kg)
Concentrations in Sediments
River Mile 9-10



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LWG Lower Willamette Group

Legend

Navigation Channel

Rivermile

0 300 600 900 1,200 Feet

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Map 11a

Round 2 Sediment PCB Congener Homolog Distribution, Total Aroclor Concentrations (ug/kg), and Round 2B Sample Locations

Map Document: (O:\Projects\Portland_Harbor\LWG-Map-Projects\Chemistry-6\PCBCongener_R2AllRnd2A_SurfSed_PCB_Congners_10_200607.mxd)
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Legend

Sample ID

Depth

Total Aroclor & Qualifier

Total Homolog

- PCBS_MONO
- PCBS_DI
- PCBS_TRI
- PCBS_TETRA
- PCBS_PENTA
- PCBS_HEXA
- PCBS_HEPTA
- PCBS_OCTA
- PCBS_NONA
- PCBS_DECA
- Round 2 Sediment Sample
- Round 2 Benthic Sample
- Round 2B Subsurface Sediment Stations
- Round 2B Sample Selected for Congener Analysis (See Table 3-3)

RM-5 RM-6 RM-7 RM-8

C167 C187 C227 C312 C321 C523 C525 C530 C531 C528 C529 C527 C533 C296 C303 C358 C360 C381 C532

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Legend

- Navigation Channel
- Rivermile

0 300 600 900 1,200 Feet

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Map 11b
Round 2 Sediment PCB Congener Homolog Distribution, Total Aroclor Concentrations (ug/kg), and Round 2B Sample Locations

Map Document: (O:\Projects\Portland_Harbor\LWG-Map-Projects\Chemistry-6\PCBCongener_R2A\Rnd2A_SurfSed_PCB_Congners_10_200607.mxd)
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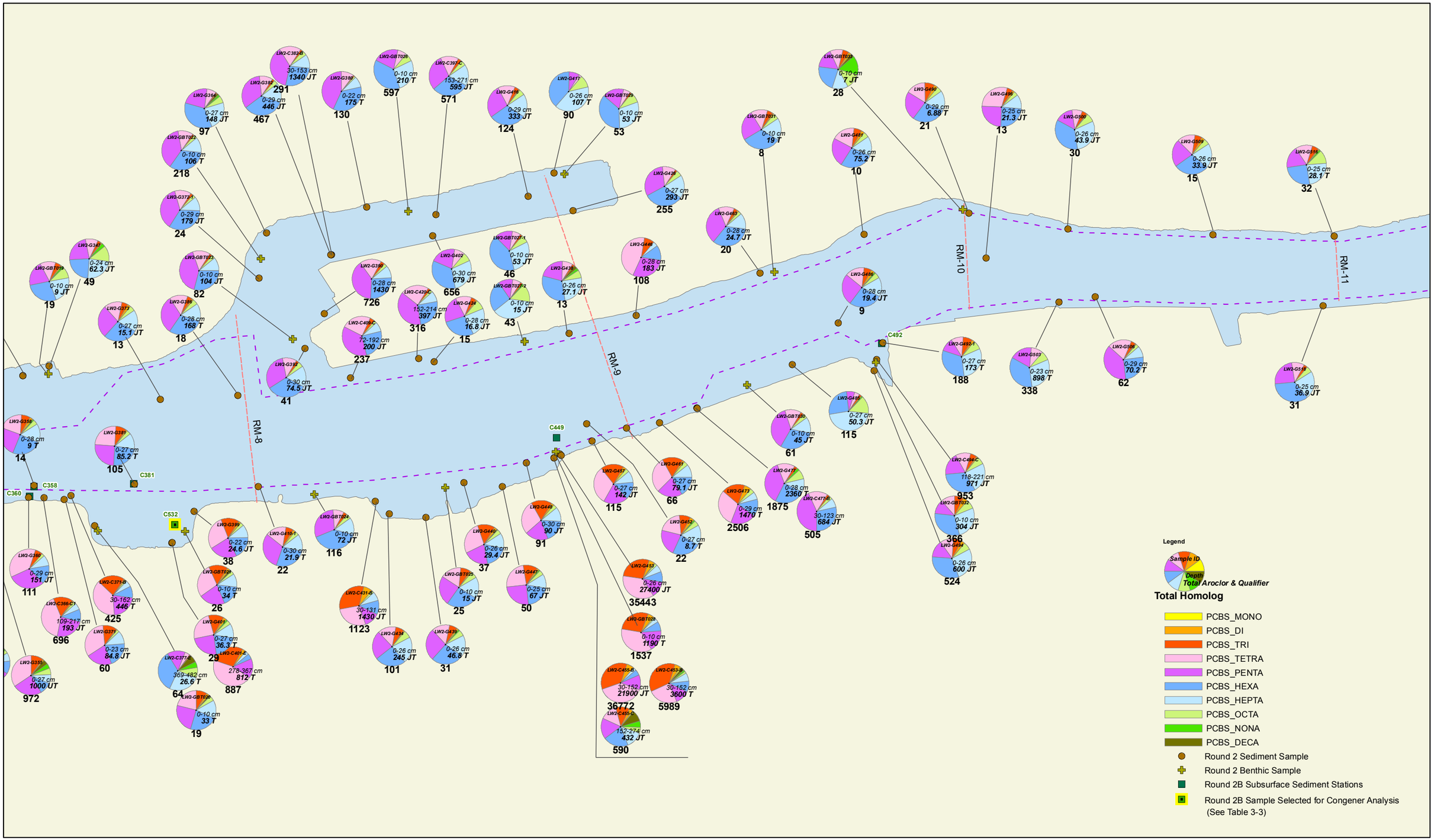

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Legend

Navigation Channel

Rivermile

0 300 600 900 1,200 Feet

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Map 11c
Round 2 Sediment PCB Congener Homolog Distribution, Total Aroclor Concentrations (ug/kg), and Round 2B Sample Locations

Map Document: (O:\Projects\Portland_Harbor\LWG-Map-Projects\Chemistry-6\PCBCongener_R2AllRnd2A_SurfSed_PCB_Congners_10_200607.mxd)
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