



PORTLAND HARBOR RI/FS
ROUND 3B
SIDE-SCAN SONAR
FIELD SAMPLING PLAN

DO NOT QUOTE OR CITE

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.

January 2008

Prepared for:

The Lower Willamette Group

Prepared by:

Anchor Environmental, L.L.C.

TABLE OF CONTENTS

1.0	INTRODUCTION	1
1.1	BACKGROUND	1
1.2	SURVEY SCOPE AND OBJECTIVES	1
2.0	DATA ACQUISITION	3
2.1	SURVEY VESSEL	3
2.2	NAVIGATION	3
2.3	SONAR EQUIPMENT	3
2.4	DATA COLLECTION	3
2.5	SCHEDULE	4
3.0	DATA COMPILATION AND REPORTING	5
4.0	REFERENCES	6

LIST OF FIGURES

- Figure 1-1. Site and Vicinity Map
Figure 2-1. Transect Locations

DO NOT QUOTE OR CITE

LIST OF ACRONYMS

AOPC	Area of Potential Concern
DGPS	differential global positioning system
EPA	U.S. Environmental Protection Agency
FSP	Field Sampling Plan
LWG	Lower Willamette Group
NAD	North American Datum
RI/FS	Remedial Investigation/Feasibility Study
RM	River Mile

DO NOT QUOTE OR CITE

**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.**

1.0 INTRODUCTION

This Side-Scan Sonar Field Sampling Plan (FSP) presents the approach and procedures to implement supplemental side-scan sonar survey activities for the Remedial Investigation/Feasibility Study (RI/FS) of the Portland Harbor Superfund Site (Site; Figure 1-1). The need for such a survey was identified in the *Comprehensive Round 2 Site Characterization Summary and Data Gaps Analysis Report* (Integral 2007). This FSP will augment information obtained in previous investigations and describes procedures to accomplish the following data collection:

- Identify areas of debris and unknown submerged structures along the shorelines on both sides of the river. The survey will include the navigation channel as well as the slope from the river channel bottom to the water line on the day of the survey.

Because any locations of substantial unknown debris or structures can substantially impact removal and/or capping in such areas, collection of this information is potentially critical to determining the effectiveness, feasibility, and costs of remedial alternatives for the FS.

1.1 BACKGROUND

Two rounds of data collection have taken place for the project since 2001 and a third and final data collection round is underway. In February 2007, the *Comprehensive Round 2 Site Characterization Summary and Data Gaps Analysis Report* was completed and describes findings from the first two rounds of data collection and identification of any remaining data gaps (including a side scan sonar survey).

The Round 2 Data Gaps Analysis Report identifies that side-scan sonar is a data gap and states that once final areas of potential concern (AOPCs) have been identified, it will be necessary to conduct a side-scan sonar survey of each of these AOPCs to determine the presence, nature, and extent of any debris in the sediment surface (e.g., submerged logs and structures) of these areas. It may be some time before final AOPCs are identified. Consequently, to keep the project on schedule, we propose in this FSP a side scan sonar survey of the entire Portland Harbor Site. This information will be used directly in the FS evaluation of the feasibility of capping and dredging options, both of which are affected in terms of cost, logistics, and environmental effectiveness by the presence of large amounts of debris or structures.

1.2 SURVEY SCOPE AND OBJECTIVES

Side-scan sonar has the ability to map the river bottom and produce imagery showing submerged debris, submerged structures, and bottom features such as riprap and rock that are otherwise unknown from other site investigations. Additional data processing will allow the generation of mosaic imagery of sediment surface textures (i.e. sands, fines, etc.)

DO NOT QUOTE OR CITE

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.

The objective of the side-scan survey is to map bottom features between river mile (RM) 2 and 11 (Figure 1-1) in the Willamette River to determine the approximate distribution of debris in the river channel and along both banks of the river to support decision making processes related to the FS.

DO NOT QUOTE OR CITE

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.

2.0 DATA ACQUISITION

This section describes the methods used for data acquisition. The survey vessel will move along tracklines parallel to shore to obtain side scan sonar images of the river channel and each shoreline upward to the waterline (Figure 2-1). The survey will focus on the shoreline areas because this is where submerged debris and structures will most likely exist. The river channel is not expected to have submerged structures due to maintenance dredging and any submerged debris is much more likely to be transitory in the main channel. However, the survey will include the river channel as there may be debris in some areas away from the banks.

2.1 SURVEY VESSEL

The surveys will be collected using a shallow draft vessel capable to tow side-scan sonar equipment from the bow at slow speeds. Survey tracks will run parallel to the shoreline as practicable. The typical track beam width is approximately 300 feet, however, beam width may be reduced near shore to improve resolution.

2.2 NAVIGATION

Differential Global Positioning System (DGPS) will be used for vessel positioning. Real-time differential corrections will be obtained from the nearest Coast Guard beacon installation, improving horizontal positional accuracy to less than ± 3 meters. Survey navigation control and data acquisition will be accomplished using HYPACK, or a similar surveying software package. During the survey, the DGPS antenna will be located at the tow point of the side-scan tow cable. Position coordinates will be referenced in International feet to Oregon State Plane, Northern Zone, North American Datum (NAD) 83.

2.3 SONAR EQUIPMENT

Side-scan sonar data will be collected using state-of-the-art side-scan sonar equipment, deployed off the bow of the survey vessel and operated at a frequency necessary to produce a very high resolution image of substrate topography. A shipboard data acquisition and image processing system will be used to acquire, store, and process all side-scan sonar data. The system will also act as an interface between the navigation system and acoustic systems and provide real-time geocoding of all data.

2.4 DATA COLLECTION

Geophysical data collection will consist of side-scan sonar mapping of the river channel and the nearshore river bottom. The side-scan data will be collected at a high frequency to

DO NOT QUOTE OR CITE

achieve the highest resolution riverbed imagery possible. The DGPS data collected will be integrated with the sonar data to facilitate geo-referencing of the sonar data. Data will be typically acquired at the 100-meter (328-foot) range, or less, on either side of tracklines providing a swath of approximately 200 meters (656 feet) for each pass. Survey range along each trackline shall be adjusted to provide coverage of the survey area at a minimum of 160 percent with sufficient trackline overlap to produce imagery at nadir where possible. The side-scan sonar system shall be towed such that it is capable of detecting an object on the river bed that measures 1m at a minimum in the outer range limits. The system will be towed at a speed and range that allows a minimum of 3 to 4 pings per 1 meter of track distance. With a 200 meter swath, areas encompassing the navigation channel, the slope up from the navigation channel, the nearshore bench areas (present in many areas of the river) and both shorelines up to the water line on the day of the survey will be mapped with three to five passes along much of the survey area. In some cases where docks, piers and other obstructions are encountered, an additional pass will be made between the obstruction and the shoreline if space allows. In some cases, piers and shoreline structures will prevent complete imaging of the overlap. The survey is expected to take from 3 to 5 days to complete depending on the additional time required to survey between docks where possible, extra track lines in wider areas of the river, and unexpected circumstances.

2.5 SCHEDULE

Side-scan sonar data is best collected during high water to capture the greatest amount of data possible. Therefore, the survey is proposed for the spring freshet on the Columbia River, typically in late May/early June, when river stage on the Willamette is high and flows are relatively low.

DO NOT QUOTE OR CITE

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.

3.0 DATA COMPILATION AND REPORTING

Data analysis will be conducted using the digital data obtained in the field. Because the data are available almost immediately after the field cruise, the typical project field sampling and data reports will be combined into one data report. Within 90 days of the completion of the field work, Anchor will provide a Data Report to EPA that will include:

- A brief narrative of the field activities that includes the survey dates, identification of the equipment used, methodology, any problems encountered, quality control procedures used, and any field cruise information relevant to interpretation of the data.
- Figures showing the survey transect lines and percent coverage
- Figures showing the synthesized mosaic images of the side-scan sonar data
- Brief text interpretation of images to identify areas of substantial submerged debris or structures
- A CD containing an electronic file of the synthesized mosaic images.

The data report will not discuss the potential implications of any found debris or structures for the FS. Use and interpretation of this information for evaluation of cleanup alternatives will be contained within the project FS.

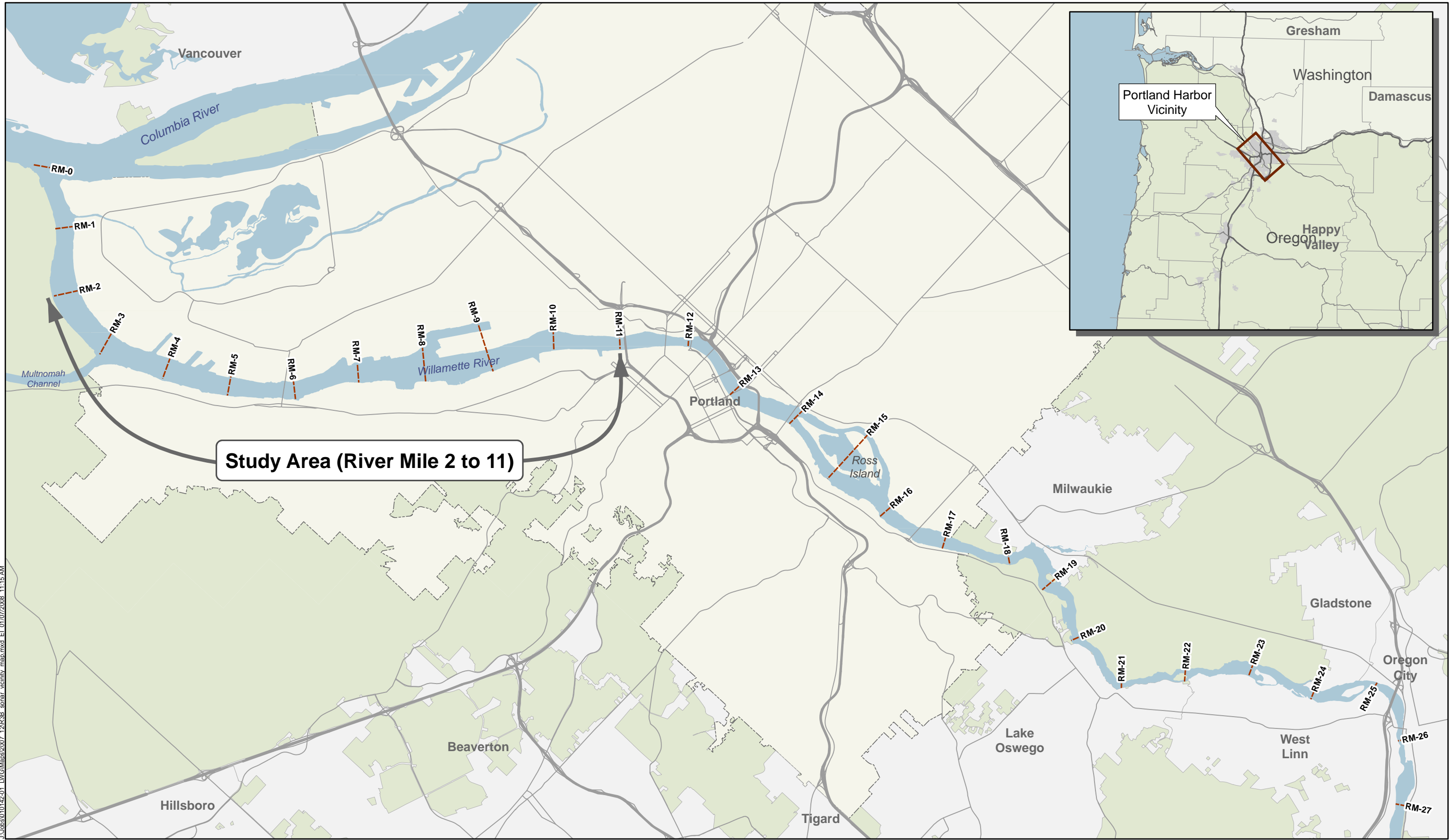
4.0 REFERENCES

Integral. 2007. Portland Harbor RI/FS. Comprehensive Round 2 Site Characterization Summary and Data Gaps analysis Report. Prepared for the Lower Willamette Group, Portland, Oregon. Anchor Environmental LLC, Seattle, Washington. February 21, 2007.

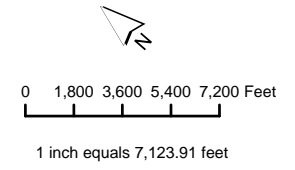
DO NOT QUOTE OR CITE

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.

Figures



Study Area (River Mile 2 to 11)



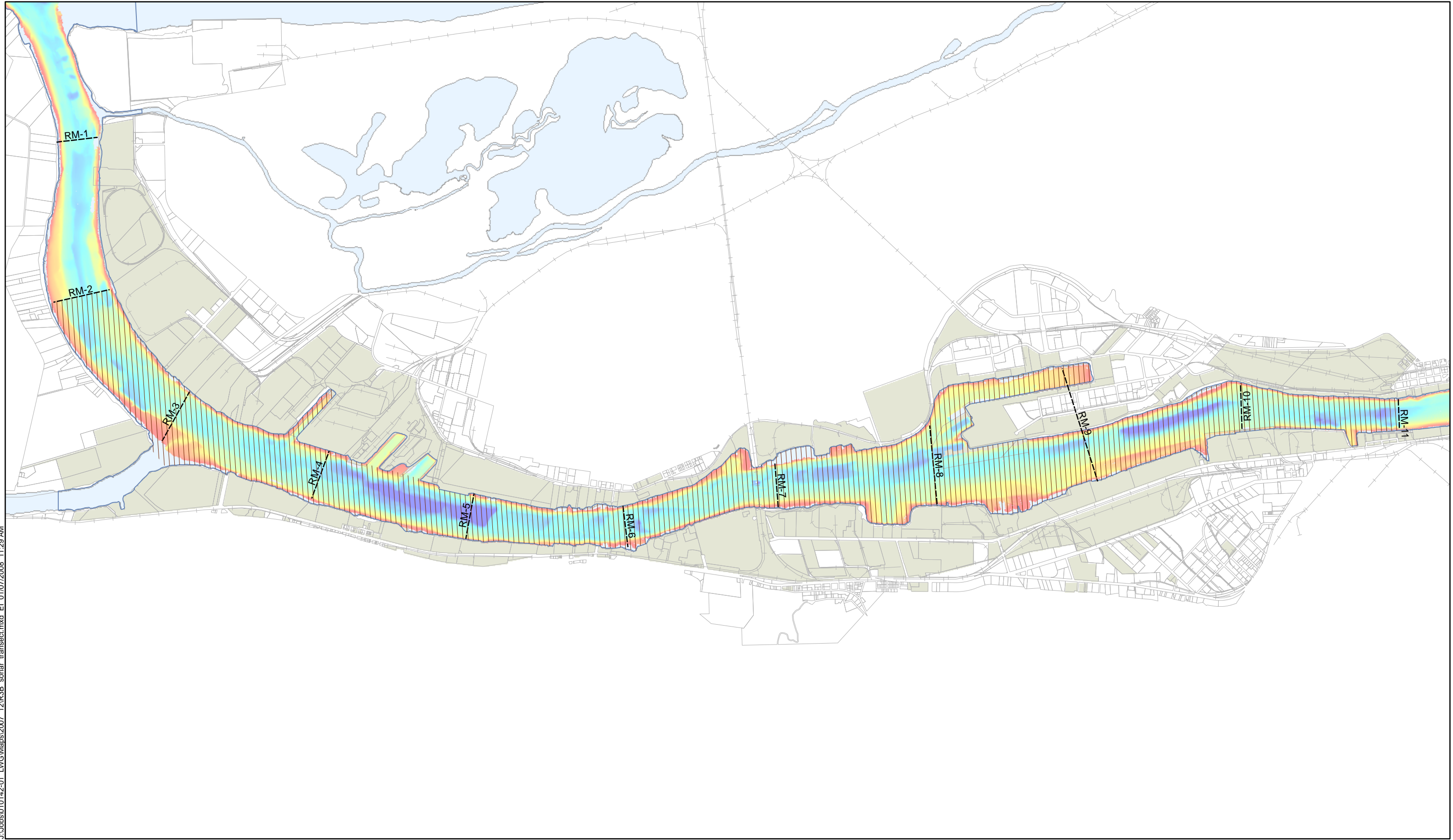
Map Features:
 - River miles (dashed line with dots)
 - Freeways (thick grey line)
 - Major Streets (thin grey line)

CTY FILL
 - <all other values> (light green fill)
 - Unincorporated area (light green fill)

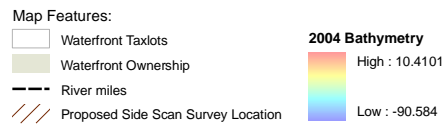
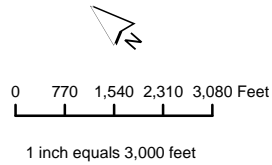
FEATURE SOURCES:
 Transportation, Property, or Boundaries: Metro RLIS
 Streams, Water Bodies: Metro RLIS
 Channel & River miles: US Army Corps of Engineers.
 Bathymetric Information: David Evans and Associates, Inc.

DO NOT QUOTE OR CITE
 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

Figure 1-1
 Portland Harbor RI/FS
 Round 3B Sampling - Side Scan Survey FSP
 Site and Vicinity Map



J:\Jobs\010142-01_LWG\Maps\2007_12\1R3B_sonar_transect.mxd EI: 01/07/2008 11:29 AM



FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS
Streams, Water Bodies: Metro RLIS.
Channel & River miles: US Army Corps of Engineers.
Bathymetric Information: David Evans and Associates, Inc.

DO NOT QUOTE OR CITE

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

Figure 2-1
Portland Harbor RI/FS
Round 3B Sampling - Side Scan Survey FSP
Transect Locations