

Lower Duwamish Waterway Group

Port of Seattle / City of Seattle / King County / The Boeing Company

TECHNICAL MEMORANDUM: SURVEY METHODS FOR IDENTIFYING POTENTIAL HUMAN ACCESS LOCATIONS TO THE LOWER DUWAMISH WATERWAY SHORELINE FINAL

For submittal to

The US Environmental Protection Agency
Region 10
Seattle, WA

The Washington State Department of Ecology
Northwest Regional Office
Bellevue, WA

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Acronyms

CSO	combined sewer overflow
Ecology	Washington Department of Ecology
EPA	US Environmental Protection Agency
FC	field coordinator
GPS	global positioning system
HHRA	human health risk assessment
LDW	Lower Duwamish Waterway
LDWG	Lower Duwamish Waterway Group
MLLW	mean lower low water
NAD	North American datum
PM	project manager
QAPP	Quality Assurance Project Plan
RI	Remedial Investigation
SD	storm drain
TM	task manager
WAAS	wide area augmentation system
Windward	Windward Environmental LLC

1.0 Introduction

The Lower Duwamish Waterway Group (LDWG) is conducting a Remedial Investigation (RI) of the Lower Duwamish Waterway (LDW). The Phase 1 RI report completed in 2003 (Windward 2003a) was based on existing data. The RI report included a human health risk assessment (HHRA) that estimated the potential chemical exposure of people using the LDW to catch and consume seafood and to recreate in intertidal areas. The Phase 2 HHRA will further assess risks to people from these exposure pathways. One of the data needs identified in the data needs memorandum (Windward 2003b) to reduce uncertainties in the Phase 2 HHRA, was information on where shoreline access by people may occur. This memorandum describes the methods for conducting a qualitative reconnaissance survey of potential human access locations along the LDW shoreline. The Phase 2 RI work plan (see Section 3.3.2.1 in that document) discussed this survey in the context of the exposure assessment for the beach play scenario (Windward 2004b). Additional information is needed to better understand locations where people may come into contact with intertidal sediments.

This memorandum contains elements from US Environmental Protection Agency (EPA) guidance for Quality Assurance Project Plans (EPA 2002). However, a formal QAPP is not required because of the qualitative nature of the information to be collected.

This memo is organized into the following sections:

- ◆ Section 2 – project overview
- ◆ Section 3 – data generation
- ◆ Section 4 – documentation and reporting
- ◆ Section 5 – references

2.0 Project Overview

This section describes how the project will be managed and organized. It also provides background information, a project description, and a schedule for conducting the survey.

2.1 PROJECT ORGANIZATION

This section presents the overall project organization for this survey, as well as responsibilities of project team members. LDWG, Allison Hiltner (the EPA Project Manager [PM]), and Rick Huey (the Washington Department of Ecology (Ecology))

PM) will be involved in all aspects of this project, including discussion, review, and approval of this technical memorandum, and interpretation of the results of the investigation.

Tad Deshler will serve as the Windward PM. The Windward PM is responsible for overall project coordination and provides oversight on planning and coordination, production of all project deliverables, and performance of the administrative tasks needed to ensure timely and successful completion of the project. The Windward PM is also responsible for coordinating with LDWG and EPA's and Ecology's PMs on schedule, deliverables, and other administrative details. The Windward PM can be reached as follows:

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Angelita Rodriquez will serve as the Windward Task Manager (TM) and field coordinator (FC). The TM is responsible for project planning and coordination, production of all project deliverables, and performance of the administrative tasks needed to ensure timely and successful completion of the project. The TM is responsible for communicating with the Windward PM on progress of project tasks and any deviations from the methods described in this technical memorandum. The TM will also be responsible for coordinating with the LDWG Public Outreach group to ensure that interested stakeholders are consulted and invited to participate in aspects of this survey. The TM can be reached as follows:

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2.2 PROBLEM DEFINITION/BACKGROUND

The Phase 2 HHRA will evaluate potential chemical exposures for people using the LDW to catch and consume seafood and to recreate in intertidal areas. The exposure assessment for the Phase 2 HHRA will be based on data used in the Phase 1 HHRA and data collected during Phase 2, as described in the data needs memorandum (Windward 2003b) and the Phase 2 RI work plan (Windward 2004b). The intertidal

sediment chemistry data used in the Phase 1 HHRA were collected primarily for reconnaissance purposes, although some focused sediment sampling in intertidal areas also occurred as part of environmental investigations at some early action areas (e.g., Duwamish/Diagonal, Boeing Plant 2, Norfolk CSO/SD). The objectives of the investigations conducted to date that included intertidal sediment sampling did not include characterization of areas that may be frequented by people. Therefore, additional intertidal sediment chemistry data will be collected as part of Phase 2 to characterize potential human exposures during recreational activities.

The Phase 2 RI work plan provides preliminary sampling locations for intertidal sediment based on some potential human use areas, but a complete inventory of such areas has not been compiled. Some public access locations were documented in the Lower Duwamish Community Plan (Green-Duwamish Watershed Alliance 1998), as shown in Figure 1. These locations were never field-verified or described in detail in any of the Phase 1 RI documents. There are additional existing public access points that are not identified in Figure 1, but no attempt was made to update this figure for this memorandum because no comprehensive list of such access points has been created. An updated map will be prepared as part of the survey data report.

The primary objective for this survey is to identify locations where humans are able to access the LDW shoreline. In particular, this survey will focus on identifying locations where people are most likely to come in contact with intertidal sediments. The information derived from this survey will be used to inform the selection of intertidal sediment sampling locations in the surface sediment QAPP.

2.3 PROJECT DESCRIPTION AND SCHEDULE

The focus of this qualitative reconnaissance survey will be on identifying intertidal areas (both public and private) where people may have access to the LDW and on recording information on human use of the LDW observed during the survey. Areas found to have higher abundances of clams, based on results of the intertidal clam survey (Windward 2004a), will be reviewed by the field survey team prior to the survey, so they can be sure to evaluate them for potential human access. The reconnaissance survey will be conducted in two parts; one from a boat in the LDW, the other on foot/bicycle from both sides of the LDW. The two parts of the survey will complement each other in that each potential shoreline access site will be surveyed from both the water and upland sides. Prior to the survey, EPA or LDWG will contact local community groups and tribes (i.e., Muckleshoot, Suquamish, Duwamish) so they can provide input on use frequency and duration at specific public access sites. EPA and LDWG will coordinate on the results of these contacts prior to the survey. The Washington Department of Fish Wildlife enforcement officer for the LDW will also be contacted and asked about potential fishing and clamming locations where people might come in contact with sediments.

Owners of private properties that border the LDW will be contacted to determine:

- ◆ What degree of access by the public, if any, is allowed on their property adjacent to the shoreline?
- ◆ How often do employees come in contact with intertidal sediments, either as part of their work or during breaks?

Although the goal of this survey is to document current shoreline conditions, the physical characteristics of areas where future restoration may occur will receive special focus during this survey. The City of Seattle is currently compiling a map of potential restoration sites within the LDW. This map will be reviewed by the field crew prior to conducting the survey, along with other information gathered during the informal surveys described above.

The survey is scheduled to take place on July 6 – 7 and July 19 – 20, 2004, when negative tides occur each day. The negative tides will maximize the intertidal area that is exposed, and therefore provide an improved view of the intertidal area that may otherwise be partially or fully submerged during most tidal conditions. The upland portion of the survey will occur on July 6 and 7, and the water portion of the survey will occur on July 19 and 20. Because information derived from this survey will be used to select sediment sampling locations, the timing of the survey in mid-summer will allow sufficient time to develop the surface sediment QAPP, which will be submitted to EPA and Ecology by October 1, 2004. The results of the survey will be summarized in the survey report, as described in Section 4.4.

3.0 Data Generation

This section presents the methods and types of data that will be generated from the survey. The data generated during this survey will consist of photographs, field notes, and Global Positioning System (GPS) coordinates. While no physical samples will be collected during this survey, the information derived from this survey will be used in the development of the surface sediment QAPP.

3.1 SURVEY BY LAND

The survey by land will investigate public and non-public access points that are likely to be used by people. Using this approach, sites that are accessible to the public without trespassing can be distinguished from sites that are accessible only to people with authorized access to the shoreline at that location. For example, there may be sites where industrial workers can sit by the LDW during their lunch break, but that are not accessible to the general public because the sites are on private property. Non-public access sites owned by entities other than LDWG members will not be physically surveyed during the survey by land because of the high level of effort associated with negotiating access to the large number of LDW facilities. Sites owned by LDWG

members may be evaluated, if appropriate based on the potential for human use of the shoreline from these sites. Some of the access locations not accessible to the public may be identified during the informal survey of LDW property owners described in Section 2.3. If a non-public access site is found to be of particular concern during the land survey (e.g., vacant land where frequent trespass may be a concern), the location will be noted and efforts to gain access and characterize the site may be made at a later date.

The route followed by the survey team will circumnavigate the LDW study area, using roads, bike paths, or other pathways that are closest to the LDW. Figure 1 shows the approximate route proposed for the shoreline access survey. There are no specific required LDW tidal elevations during the survey by land, although tides will generally be less than + 3 ft mean lower low water (MLLW) during the afternoon hours on July 6 and 7. Because much of the proposed route is not accessible to vehicular traffic, the survey team will walk or use bicycles for the circumnavigation. All roads or paths that diverge from the route but follow more closely to the LDW will be explored and documented, especially all street ends adjacent to the LDW. Particular attention will be paid to the previously identified public access locations shown in Figure 1 and those identified by stakeholders as additional access points. The survey team will carry aerial photographs and a detailed street map to assist them in accessing the LDW from multiple upland locations.

The potential for an access location to be available to the public and the likelihood that the location will be used by the public for recreational activities will be evaluated in the land-based part of the survey. Characteristics used to evaluate these locations will include, but not be limited to:

Site accessibility:

- ◆ Does the location have a functional fence blocking access?
- ◆ Is there a no trespassing sign?
- ◆ Is there an established path to the LDW (either official constructed path or unofficial worn trail through vegetation)?
- ◆ Is the location designated as public through signage?
- ◆ Is the location near residential neighborhoods or businesses?

Shoreline characteristics:

- ◆ Would this be a location that people would likely visit?
- ◆ What is the slope of the intertidal area?
- ◆ What is the composition of the intertidal area (e.g., rip-rap, sand, or mud)?
- ◆ Is the shoreline only accessible at very low tides?

- ◆ Is this a likely location for fishing?
- ◆ Are there other appealing amenities near this location?

Evidence of human use:

- ◆ Were there people present at the time of the survey?
- ◆ Are there residential properties abutting the LDW that have steps leading down to the intertidal area or small hand-launched watercraft on the adjacent shoreline?
- ◆ Were human footprints present in the sediments?
- ◆ Was there localized (not drift) litter present?

Locations that share one or more of the above characteristics will be photographed, documented on a field survey access form (Appendix A), and described in detail in a field notebook (see Section 4.3). Approximate elevations of the intertidal area will be estimated visually using the known tidal elevation¹ to help understand the amount of time that the intertidal area will be exposed above water. This information may be helpful in characterizing exposure duration in the HHRA. Finally, GPS coordinates will be obtained in the field so that the site can be mapped to a scale that allows for appropriate georeferencing.

3.2 SURVEY BY WATER

The survey by water will use the information gathered from the land survey to further investigate public access and non-public access points that are likely to be used by people. The survey will be conducted at a lower tide level (below 3 ft MLLW) in order to view intertidal areas that would not be exposed at higher tides. On the scheduled days of the water survey, the tidal elevation will be below + 3 ft MLLW from approximately 10:00 am to 4:00 pm on July 19, and 10:30 am to 4:30 pm on July 20. This survey will augment the land survey by identifying locations that may be readily accessible by water, but not by land. The July 2003 clam reconnaissance survey and the August 2003 clam sampling survey conducted by LDWG (Windward 2004a) will also be reviewed to identify those intertidal locations that people might use to collect clams.

The water route for the shoreline access survey will follow the general tendency of the LDW. Figure 1 shows the boundary of the LDW; the shoreline access survey will follow the main channel as well as all tributary channels shown in this figure.

The majority of the water survey will be conducted from a small motor boat. The survey team may characterize some public access locations on foot after beaching the boat if sufficient detail can't be observed from the water. If potential public access

¹ Tidal information from the 8th Ave South tide gauge will be used.

locations can't be effectively observed from the motor boat during the first day of the water survey because of the low tide level, smaller vessels such as kayaks may be used during the second day of the water survey to gain access to these intertidal locations.

Each potential public access site will be photographed and characteristics similar to those listed in Section 3.1 will be described in detail in a field notebook (see Section 4.3). Activities of people using the LDW will be recorded during the survey (e.g., the presence of kayakers, individuals along the shore, etc.). The survey will also note the presence of items (e.g., recreational water craft, water toys, chairs, benches) along the shore that are indicative of human use. Approximate elevations at intertidal areas not characterized during the land survey will be estimated, as described in Section 3.1. Finally, GPS coordinates will be obtained in the field so that the site can be mapped to a scale that allows for appropriate georeferencing.

4.0 Documentation and Reporting

Both the land and water surveys will be thoroughly documented using GPS, digital pictures, and written logs as described below. This documentation will be very important in determining where people have the potential to contact intertidal sediments.

4.1 NAVIGATION AND POSITIONING

A handheld WAAS-enabled (Wide Area Augmentation System) GPS receiver unit will be used to obtain coordinates of all access locations as well as to document the survey route. The unit will receive GPS signals from satellites to produce positioning accuracy to within 3 m. Washington State Plane North coordinates (NAD 83) will be used for the horizontal datum. Survey coordinates will be displayed in a figure in the results memorandum (Section 4.4).

4.2 DIGITAL IMAGES

All locations with potential shoreline access to workers or the public, or planned for future restoration efforts, will be photographed. Photographs will be taken with a digital camera and recorded in the field log (Section 4.3). Photographs of both the access route and the shoreline that is potentially accessible to the public will be documented. Photos will be taken at multiple spatial scales. Overview images will be taken from a sufficient distance, if possible, to include the surrounding area at each access point. Close-up images will be taken, as appropriate, to document small-scale features such as substrate type. Photographs will be provided as an appendix to the results memorandum (Section 4.4).

As part of the larger effort to document site conditions in the LDW, digital images, either photographs or video, will be taken in conjunction with the shoreline survey to give a continuous view of the shoreline. Because this documentation will be conducted

at the same time as the shoreline survey, the tide levels should be less than +3 ft MLLW. These images will also be presented in the results memorandum. This documentation may also be useful for subsequent sampling design efforts, particularly surface sediment sampling.

4.3 FIELD LOGS

A complete record of all field activities will be kept in a field logbook maintained by the FC. The field logbook will provide a description of all activities, discussions among field crew associated with field activities, weather conditions, and a record of all deviations from the approved plan. The field logbook will consist of bound, numbered pages. All entries will be made in indelible ink. The field logbook is intended to provide sufficient data and observations to enable participants to reconstruct events that occurred during the survey.

After the survey is completed, the following information will be recorded on the field log sheet:

- ◆ start and end date and time of survey
- ◆ names of survey crew
- ◆ weather conditions
- ◆ estimation of intertidal area elevations
- ◆ tide level
- ◆ description and location with GPS coordinates of shoreline access points
- ◆ evidence of human use
- ◆ description of survey route
- ◆ log of photos taken
- ◆ comments

4.4 REPORT

The methods and results of the qualitative reconnaissance survey will be summarized in a draft technical memorandum that will be submitted to EPA and Ecology on September 1, 2004.

At a minimum, the following will be included in the memorandum:

- ◆ summary of all field activities, including descriptions of any deviations from the approved plan
- ◆ written report of the survey describing survey methods and equipment
- ◆ description and map(s) of the shoreline access locations

- ◆ digital pictures of the shoreline access locations
- ◆ photocopies of field notebooks

Following receipt of comments on the draft memorandum from EPA and Ecology, the necessary changes will be made to the memorandum and it will then be resubmitted to EPA and Ecology for final approval.

5.0 References

- EPA. 2002. Guidance for quality assurance project plans. EPA QA/G-5. Office of Environmental Information, US Environmental Protection Agency, Washington, DC.
- Green-Duwamish Watershed Alliance. 1998. Lower Duwamish Community Plan. Green-Duwamish Watershed Alliance, Seattle, WA.
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- Windward. 2003b. Lower Duwamish Waterway remedial investigation. Task 7: Identification of data needs: technical memorandum. Prepared for Lower Duwamish Waterway Group. Windward Environmental LLC, Seattle, WA.
- Windward. 2004a. Lower Duwamish Waterway remedial investigation. Intertidal clam survey data report. Prepared for Lower Duwamish Waterway Group. Windward Environmental LLC, Seattle, WA.
- Windward. 2004b. Lower Duwamish Waterway remedial investigation. Task 8: Phase 2 RI work plan. Prepared for Lower Duwamish Waterway Group. Windward Environmental LLC, Seattle, WA.



Figure 1. Shoreline survey access route

Attachment A: Field Forms

Form 1. LDW shoreline access survey form

Date:	Observer's name:
Area number:	Time:
Data recorder's name:	Weather:
GPS location: start	GPS location: end
Easting (X):	Easting (X):
Northing (Y):	Northing (Y):
Site accessibility	
Does the location have a functional fence blocking access?	
Is there a no trespassing sign?	
Is there an established path to the LDW?	
Is the location designated as public through signage?	
Is the location near residential neighborhoods or businesses?	
Shoreline characteristics	
Would this be a location that people would likely visit?	
What is the slope of the intertidal area?	
What is the composition of the intertidal area (e.g., rip-rap, sand, or mud)?	
Is the shoreline only accessible at very low tides?	
Is this a likely location for fishing?	
Are there other appealing amenities near this location?	
Evidence of human use	
What type of human activity, if any, was observed?	
Are there residential properties abutting the LDW that have steps leading down to the intertidal area or small hand-launched watercraft on the adjacent shoreline?	
Were human footprints present in the sediments?	
Was there localized (not drift) litter present?	
Photographs	
<u>Photo Number and Description</u>	