Appendix A. Source Control Strategy, Washington Department of Ecology

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DEPARTMENT OF
ECOLOGY
State of Washington

Lower Duwamish Waterway

Source Control Strategy

Draft Final

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Washington State Department of Ecology - www.ecy.wa.gov

- Headquarters, Olympia 360-407-6000
- Northwest Regional Office, Bellevue 425-649-7000
- Southwest Regional Office, Olympia 360-407-6300
- Central Regional Office, Yakima 509-575-2490
- Eastern Regional Office, Spokane 509-329-3400

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Lower Duwamish Waterway

Source Control Strategy

Draft Final

Prepared by:

Rick Thomas, Louise Bardy, Mahbub Alam
Toxics Cleanup Program

Rachel McCrea
Water Quality Program

Northwest Regional Office
Washington State Department of Ecology
Bellevue, Washington 98008-5452

With assistance from:

U.S. Environmental Protection Agency
City of Seattle
King County

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Table of Contents

Page

List of Figures and Tables ii

Acronyms and Abbreviations iii

Acknowledgements v

Executive Summary vii

Lower Duwamish Waterway 1
- Source Control Development 1

Source Control Goals and Priorities 6
- Source Control Goals 6
- Source Control Priorities 6

Defining Sources and Pathways 9
- Pathways 10

Regulatory Framework 14
- Water Quality Regulations 19
- Cleanup Regulations 24
- Additional Source Control Tools 26

Implementation Plans 30

Interagency Coordination and Communication 31
- EPA and Ecology Coordination 31
- Source Control and Cleanup Schedule Coordination 31
- Source Control Work Group 32
- Duwamish Inspection Group 33

Source Control Evaluations 34
- Sediment Recontamination 35
- Source Control Monitoring 36

Published Source Control Reports 37
- Summary of Existing Information and Identification of Data Gaps Reports 37
- Source Control Action Plans 37
- Source Control Status Reports 38

Public Involvement 41

References 44

Appendices

Appendix A: Source Control Action Plans

Appendix B: LDW Source Control Background Information

Appendix C: Ecology Implementation Plan

Appendix D: EPA Implementation Plan

Appendix E: City of Seattle Implementation Plan

Appendix F: King County Implementation Plan

Appendix G: Other Agency Implementation Plans

List of Figures and Tables

Figures

Page

Figure 1. Lower Duwamish Waterway Source Area 4

Figure 2. Source control basins within the Lower Duwamish Waterway Source Area.....5

Figure 3. Pathways from contaminant sources to the Lower Duwamish Waterway 10

Tables

Page

Table 1. Regulatory Authorities Applicable to Source Pathways.....15

Table 2. Source Control Reports.....39

Acronyms and Abbreviations

AOP	Air Operating Permit
BMP	best management practice
CAA	Clean Air Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	contaminant of concern
CSO	combined sewer overflow
CWA	Clean Water Act
EAA	Early Action Area
Ecology	Washington State Department of Ecology
EPA	United States Environmental Protection Agency
ISGP	Industrial Stormwater General Permit
KCIA	King County International Airport
KCIW	King County Industrial Waste
LDW	Lower Duwamish Waterway
LDWG	Lower Duwamish Waterway Group
MHHW	mean higher high water
MOU	Memorandum of Understanding
MS4	municipal separate storm sewer system
MSGP	Multi-Sector General Permit
MTCA	Washington State Model Toxics Control Act
NPDES	National Pollutant Discharge Elimination System
OHSSPR	Oil and Hazardous Substance Spill Prevention and Response
OPA	Oil Pollution Act
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PPP	Public Participation Plan
PSCAA	Puget Sound Clean Air Agency
RCRA	Resource Conservation and Recovery Act
RCW	Revised Code of Washington
RI/FS	Remedial Investigation/Feasibility Study
RM	river mile (as measured from the southern tip of Harbor Island)
ROD	Record of Decision
SCAP	Source Control Action Plan
SCWG	Source Control Work Group; members are also called *source control agencies* or s*ource control partners*
SMC	Seattle Municipal Code
SMS	Washington State Sediment Management Standards

Strategy	Lower Duwamish Waterway Source Control Strategy
SWMP	Stormwater Management Program
SWPPP	Stormwater Pollution Prevention Plan
TSCA	Toxic Substances Control Act
USACE	U.S. Army Corps of Engineers
USC	United States Code
VGP	Vessel General NPDES Permit
WAC	Washington Administrative Code
WSDOT	Washington State Department of Transportation
WWTP	wastewater treatment plant

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Executive Summary

The Lower Duwamish Waterway (LDW) is located in Seattle, Washington, and is approximately 5 miles long. The U.S. Environmental Protection Agency (EPA) added the waterway to the National Priorities List under its Superfund cleanup program on September 13, 2001. Contaminants found in waterway sediments include polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), dioxins/furans, phthalates, mercury, arsenic and other metals, and phthalates. These may pose a threat to people, fish, and wildlife. The LDW Superfund cleanup effort focuses on reducing risks to human health and wildlife from these contaminants.

Source control is an important component of reducing contaminants from identifiable sources within a defined area that end up in the sediments of the LDW. The primary source control goal is to address existing ongoing sources of contaminants to the LDW. The long-term goal is to minimize recontamination of sediments from these contaminants after Superfund cleanup has occurred. As source control actions progress, the Washington State Department of Ecology (Ecology) will report status and make recommendations, when possible, to EPA on whether or not to proceed with any planned sediment cleanup actions.

This document, the ***Lower Duwamish Waterway Source Control Strategy, Revised 2012*** (Strategy), updates and replaces the previous Source Control Strategy published in 2004. It documents a coordinated and committed long-term effort for managing source control in the LDW across the agencies that have authorities to regulate sources of contaminants. The Strategy:

- Defines what is a source and pathway to the river;
- Describes the framework, goals, and priorities of the source control effort;
- Describes the main regulatory mechanisms; and
- Describes, generally, how those mechanisms will be implemented.

The Strategy is largely influenced by the complex regulatory framework that controls sources of contaminants within the larger Duwamish River watershed. Priority work is identified by the regulatory structure of each agency and is influenced by the Superfund remediation schedule.

The Strategy provides a broad framework for organizing the work of federal, state, and local agencies under various legal authorities. Each source control agency has been asked to provide an agency-specific implementation plan that describes how that agency will conduct source control work. Each implementation plan will be unique and should:

1. Describe how each agency will conduct its various programs to address source control work for the LDW source area.
2. Set each agency's priorities for source control on both an annual and long-term basis.

3. Emphasize coordination on two levels:
    a. Intra-departmental coordination within the agency, and
    b. Inter-agency coordination through the Source Control Work Group.

This Strategy will be published for public review and comment at the same time EPA is publishing its draft Proposed Plan for sediment cleanup of the LDW. Comments on the Strategy should be directed to Ecology. Ecology may make revisions to the final Strategy based on those comments and in response to changing circumstances or new information. This Strategy is a living document and will be revised to reflect major changes as the sediment cleanup proceeds.

Lower Duwamish Waterway

The Lower Duwamish Waterway (LDW) is located in Seattle, Washington, and is approximately 5 miles long. It spans from the southern tip of Harbor Island to just south of the turning basin near the Norfolk combined sewer overflow (CSO) (Figure 1). Parts of the waterway also flow through the City of Tukwila and unincorporated King County. Figure 1 also shows the potential source area identified as the combined stormwater and sanitary sewer service area and the separated stormwater drainage basins, encompassing a total area of 20,400 acres or approximately 32 square miles discharging to the LDW.

In 1999, the U.S. Environmental Protection Agency (EPA) completed a study of contaminants in the sediments of the LDW. The study found multiple contaminants that pose threats to people, fish, and wildlife, including: polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), dioxins/furans, phthalates, mercury, arsenic, and other metals.

The study resulted in EPA adding the LDW to the National Priorities List. This is EPA's list of the nation's most contaminated hazardous waste sites that are targeted for investigation and cleanup under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The Washington State Department of Ecology (Ecology) added the LDW to the Washington State Hazardous Sites List on February 26, 2002.

In December 2000, EPA and Ecology jointly entered into a legal agreement called an Administrative Order on Consent with the Lower Duwamish Waterway Group (LDWG). The LDWG is composed of the City of Seattle, King County, the Port of Seattle, and The Boeing Company. Under this agreement, LDWG was required to perform a Remedial Investigation and Feasibility Study (RI/FS) for Lower Duwamish Waterway sediment contamination. The RI/FS (Windward 2010; AECOM 2012) assessed potential risks to human health and the environment and evaluated cleanup alternatives.

Source Control Development

In April 2002, EPA and Ecology signed an interagency Memorandum of Understanding (MOU), dividing federal and state work responsibilities for the LDW (EPA and Ecology 2002). This MOU was revised in 2004 (EPA and Ecology 2004) to reflect ongoing work in the LDW. Under the MOU, EPA is the lead for the sediment investigation work, and Ecology is the lead for coordinating and implementing the source control work.

The MOU between EPA and Ecology will need to be revised again before the Record of Decision (ROD) to reflect changes determined by this Strategy and the Proposed Plan.

As part of the initial source control efforts (2002–2013), Ecology developed Source Control Action Plans (SCAPs) for the 24 sub-basins (or source control areas) that drain to the LDW (Figure 2). The SCAP for each source control area describes available existing information and any data gaps, and identifies potential sources of sediment contaminants and actions needed to control them. It also evaluates whether ongoing sources are present that could recontaminate sediments after cleanup.

The SCAPs describe actions that are planned or currently underway, and sampling and monitoring that will be conducted to identify any additional sources. Based on the SCAPs (and other documents prepared or generated by Ecology, EPA, local governments, and private entities), the summarized findings and recommendations are taken into consideration on a site-specific basis when determining any necessary actions to identify and control sources to the LDW (see Published Source Control Reports).

Status Reports (see Published Source Control Reports) also track items that are not specific to a certain site or not previously identified in a SCAP.

This Strategy is a framework for organizing the work of federal, state, and local source control agencies in the LDW as the Superfund project moves from the RI/FS phase into remedial design and construction activities for sediment cleanup. It identifies the goals and priorities of the LDW source control effort. These goals and priorities are largely influenced by the complex regulatory framework, which controls sources and transport pathways of contaminants within the 24 sub-basins of the LDW watershed. The Strategy also clarifies the regulatory framework that Ecology and other agencies involved with source control use to ensure all identified pathways have regulatory controls in place to minimize the potential for recontamination.

This Strategy identifies the Source Control Work Group (SCWG) that coordinates source control efforts by public agencies (Ecology, EPA, City of Seattle, and King County) as well as their respective roles and responsibilities for source control work in the LDW. To date, the Port of Seattle has participated in the SCWG but does not have an identified role in the SCWG at this time. The Port will continue their source control work according to the various permits and orders that apply to their properties and discharges. The Strategy also describes the documentation, tracking, and reporting of the collective source control efforts and the external communication processes between agencies.

Briefly, some key concepts discussed throughout this Strategy are noted in the text box below.

Key Concepts

What is a *source*? Three things must exist to have a *source*: A *contaminant* release to one or more *media* (air, soil, surface water, or groundwater) with a viable, potential *pathway* to the LDW. All these conditions (contaminant, media, and pathway) must be present to trigger a need for LDW source control.

What is source control? It is the process of finding sources of contaminants, characterizing them, and then taking actions to stop or reduce them before they reach the LDW. Source control includes a variety of actions, from sampling; monitoring; site investigation and cleanup; and structural controls and treatment; to education and agency coordination. All of these actions help reduce contamination in the LDW.

When can sediment cleanups begin? It is unlikely that all sources will be absolutely controlled before sediment cleanup can begin. The Strategy is designed to support the sediment cleanup by putting credible and adaptive long-term control programs in place, and make realistic progress toward attaining human health and ecological beneficial uses in this urban and industrial waterway. Sediment cleanup can begin when the agencies understand sources in an area and have actions in place or planned to sufficiently control them. Source control agencies will likely always have work to do to control existing and new sources.

Figure 1. Lower Duwamish Waterway Source Area

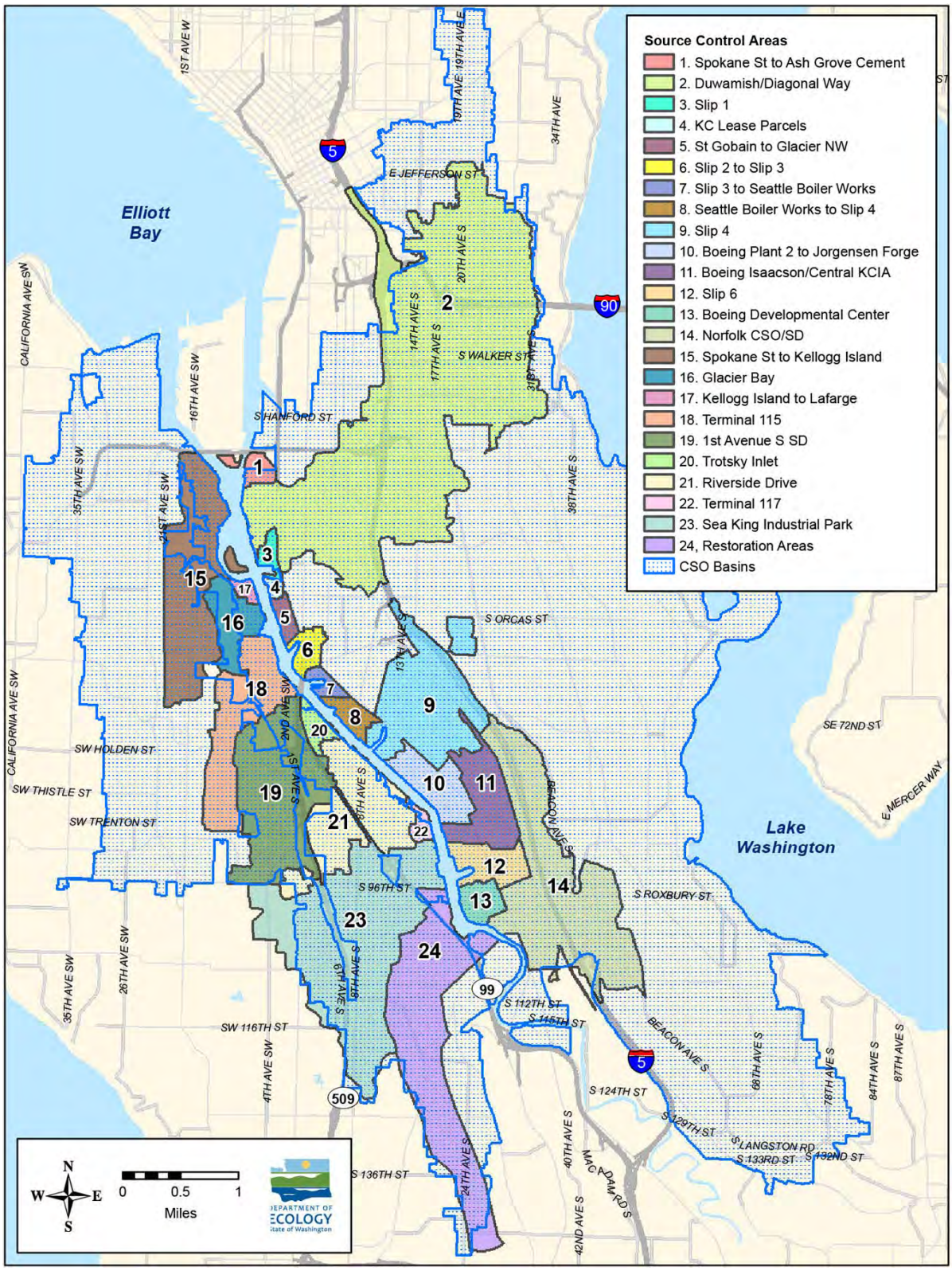

Figure 2. Source control basins within the Lower Duwamish Waterway Source Area

Source Control Goals and Priorities

Source Control Goals

Ecology's primary near-term goal for source control is to address existing sources of contaminants within the LDW. In the long term, after the sediment remedy is in place, Ecology's goal is to minimize the risk of recontaminating sediments above the sediment cleanup standards established in the ROD.[1] A secondary goal is to support habitat restoration opportunities.

These goals will be met by achieving the following objectives:

1. Identify and, to the extent possible, control ongoing sources of chemicals to LDW sediments with the potential to exceed Sediment Management Standards (SMS), Surface Water Quality Standards, or human health risk-based criteria.[2]
2. Apply administrative and legal authorities to accomplish corrective actions in areas contributing to contaminated sediments.
3. Educate businesses, residents, and others who handle hazardous materials on ways to reduce pollution from their activities.
4. Monitor and evaluate source control efforts and revise plans accordingly.
5. Establish milestones and reporting requirements for source control activities.
6. Increase the degree of inter- and intra-agency coordination to address source control issues that cannot be adequately resolved by one agency, department, or program.
7. Evaluate whether controls are at the point where a sediment cleanup can proceed with some assurance that recontamination potential has been (or is being) reduced.

Source Control Priorities

Since 2002, when the LDW source control work started, the agencies identified source control actions that were considered a high priority to complete before the sediment remedy was implemented.

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[1] Per the draft Proposed Plan, the goal is to minimize the potential for chemicals in sediments to exceed numerical criteria established in WAC 173-204 Washington State Sediment Management Standards (SMS), WAC 173-201A Washington State Surface Water Quality Standards, as well as other LDW human health risk-based sediment cleanup standards established by EPA.

[2] The Strategy does not limit the scope of source control to a list of chemicals of concern for the "site" because there are multiple sites where Model Toxics Control Act (MTCA) cleanup actions are occurring due to identified releases to the LDW sediments or surface water that are not considered "contaminants of concern" for the LDW CERCLA action. The Strategy is intended to be flexible enough so that it is applicable to the wide-range of cleanup actions in the LDW and the wide range of chemicals that pose risks to human health or the environment, which may be identified during source control investigations.

Source control priorities are currently determined according to specific facts or issues for a given source and the work outlined in SCAPs and Source Control Status Reports (Status Reports).[3]

The actions identified in the SCAPs are prioritized from high to low for each area.

- **High priority actions:** need to be completed prior to sediment cleanup.
- **Medium priority actions:** can be completed prior to, or concurrent with, sediment cleanup.
- **Low priority actions:** are either ongoing at the time the SCAP is prepared or are actions that can be completed as resources become available because they are likely not critical to preserving the cleanup.

Priority rankings for source control actions identified in the SCAPs are influenced by several questions and lines of evidence:

1. **When is source control needed?** Ideally, source control action is needed before sediment cleanup. The sequencing and timing of sediment remedial action is a critical consideration and this knowledge helps various source control agencies determine when and where to focus their efforts and resources in different sub-basins. EPA and Ecology will discuss sequencing and timing for sediment cleanups and coordinate them with source control, especially at properties adjacent to the waterway.
2. **How contaminated is the source media?** Environmental sample results obtained through source tracing, investigations, inspections/sampling, and property characterizations will indicate how much contamination is present in a particular media (soil, groundwater, surface water, etc.) or how much may be reaching the LDW by any particular pathway (stormwater runoff, air deposition, etc.).
3. **How much impact could the source have?** The impact is determined by the size and type of release, what the contaminated media are, the distance between the release and the LDW, and the contaminant itself. These factors are evaluated in relation to a particular sediment cleanup action. The amount and nature of high priority actions identified in the appropriate SCAP(s) and the length of time to complete the high to medium priority actions is also considered. Several years of lead time may be needed before the source is effectively controlled.

[3] The initial LDW Source Control Strategy (Ecology 2004) divided source control priorities into four tiers based on the EPA schedule for early action areas (highly contaminated areas needing immediate cleanup) and the need to address sources to the entire RI study area. The four-tier approach organized source control priorities very broadly during the early stages of LDW source control efforts. As work progressed and the agencies learned more about sources, the four-tier system became less useful. The four-tier priority approach is not carried forward in this Strategy.

4. **Reassessment of Source Control Priorities in the Future.** Source control is an iterative process. As new information or data become available concerning a specific location or a geographic area, the source control agency(ies) reevaluate what the new information reveals about sources and pathways or how previous actions may have affected sources and pathways. Occasionally, new regulatory requirements (such as permit requirements and regulations or statute changes) will require a reassessment of Ecology's source control priorities.

This Strategy is intended to be the framework for long-term source control for the LDW. This kind of large-scale coordinated effort has not occurred at any other Superfund site in the past. Given this complexity, the Strategy will need to be reviewed and updated every 5 years or as necessary.

Defining Sources and Pathways

To define sources, it is important to understand what a source is and the pathway a source travels to reach the LDW. For the purpose of controlling an LDW source (historical or ongoing), these three elements must be considered:

- **Contaminant:** This is the origin or release of a chemical caused by some action, event, or industrial or business practice.
- **Media:** This is the volume of air, surface water, groundwater, or soil affected by one or more contaminants. Contaminated media need to be controlled to either reduce or completely stop the amount of contaminants reaching the waterway.
- **Pathway:** This is the route to the river that contaminated media travel. Two examples are dust on hard surfaces that washes into stormwater discharges (stormwater pathway), or chemical spills that contaminate soils, which then contaminate groundwater that seeps into the waterway (groundwater pathway).

To achieve source control, actions may be taken to control the contaminant release, the media, or the pathway. Contaminated media can affect sediments through eight types of potential pathways described below. Figure 3 shows a conceptual model of these pathways and how contaminants in the LDW source area reach the LDW sediments. See the text box for examples of what is and what is not considered a source.

Examples of what is and is not a source to the LDW

In the examples below, both facilities have a contaminant and an affected media. However, only one facility has an active pathway to the river. A source must include a contaminant, media and pathway.

Facility A has groundwater (media) contamination from years of historical operations (contaminant release). The groundwater *is a source because it leaks* into a storm drain (pathway) that flows into the waterway.

Facility B has groundwater (media) contamination from years of historical operations (contaminant release). The groundwater *is not a source because it is not leaking* into storm drains or reaching the waterway in a seep or groundwater plume (no pathway exists).

If no data are available, source control evaluations typically include worst-case assumptions about contaminant releases to environmental media (e.g., stormwater solids, soil, groundwater), and the potential for recontamination. Determining how to control a source uses several lines of evidence that includes assessments and cleanup actions conducted nearby, historical and current information regarding industrial activities and businesses, other agency inspections and documentation, and sampling results.

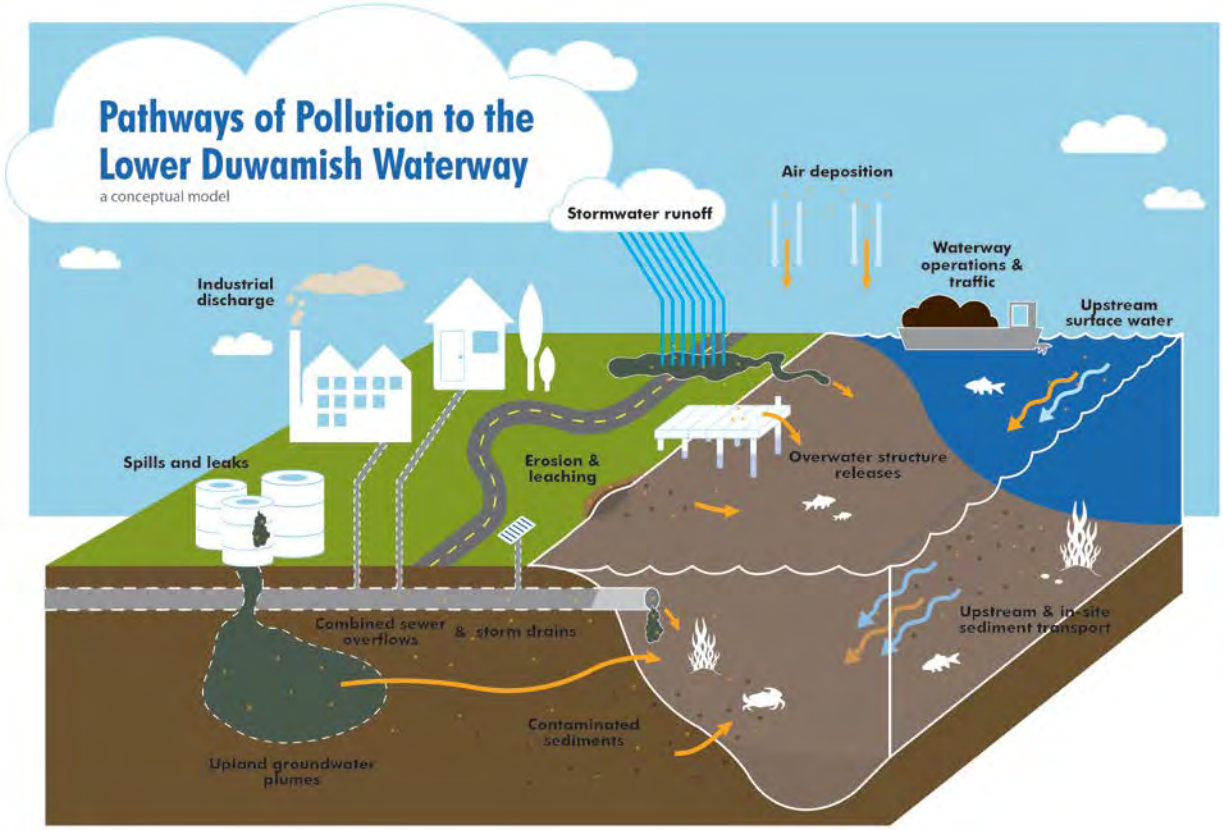

Figure 3. Pathways from contaminant sources to the Lower Duwamish Waterway

Pathways

1. **Direct discharges:** Direct discharges to the LDW are from the following point-sources: public and private storm drain systems, industrial wastewater facilities, and public combined sewer systems that carry municipal and industrial wastewater and stormwater. The direct discharge of pollutants to the waterway from these numerous point-sources may affect sediment quality, depending on the origin and character of the effluent. These discharges are regulated under the Clean Water Act (CWA), National Pollutant Discharge Elimination System (NPDES), and the Washington

Discharge Pathways to the LDW

In the direct discharge pathway, pollutants enter the waterway through three major types of discharges:

* Stormwater
* Combined sewer overflows
* Industrial wastewater

State Water Pollution Control Act [RCW 90.48] and associated state waste discharge program. These discharges, whether or not they exceed permit conditions, may contribute to sediment contamination. Each type of direct discharge is described below:

a. *Stormwater (industrial and municipal):* Stormwater enters the waterway via a combination of storm drains, pipes, ditches, or creeks, and directly from properties adjacent to the waterway. Stormwater pollution is generated when rain contacts pollutants that have accumulated in or on exposed soils and surfaces, and those pollutants become entrained in the stormwater runoff. Pollutants present in soil and on paved surfaces come from urban activities such as lawn and garden maintenance, spills/leaks from vehicles and equipment, vehicular and other air emissions, and a variety of industrial activities (e.g., vehicle and equipment refueling, chemical storage, outdoor manufacturing). Stormwater pollution also comes from illegal discharges or illicit connections to stormwater systems. Contaminated solids that collect in storm drains/pipes and ditches may be carried to the waterway by stormwater. In the LDW source control area, there are more than 100 NPDES permittees for industrial stormwater discharges to municipal storm drains or directly to the waterway. The Cities of Seattle and Tukwila, King County, the Port of Seattle, and the Washington State Department of Transportation (WSDOT) are covered under municipal stormwater permits.

b. *Combined sewer overflows:* Some areas of the LDW are served by combined sewer systems, which carry both stormwater and municipal wastewater (including industrial process wastewater) in a single pipe. Most of the time, the combined wastewater and stormwater are conveyed to a wastewater treatment facility for treatment prior to discharging to surface waters. However, during large storm events, the total volume of untreated wastewater and stormwater can exceed the conveyance capacity of the combined sewer system. When this occurs, the combined sewer system is designed to overflow through relief points, called CSOs, which discharge the untreated wastewater and stormwater to the LDW. CSOs prevent the combined sewer system from backing up into homes and businesses and creating flooding problems in local streets. CSO discharges carry contaminants that affect sediments. The City of Seattle's CSO network is regulated under an NPDES permit. King County's CSOs are regulated under the NPDES permit for the West Point Wastewater Treatment Plant (WWTP).

c. *Industrial wastewater:* Industrial activities located along the LDW may involve processes that generate wastewater that is not permitted to enter the sanitary or combined sewer for treatment at the WWTP. In these situations, the industrial facility must obtain an NPDES and state waste discharge permit that authorizes the discharge of process wastewater under specific conditions. There are currently a handful of

industrial wastewater discharges to the LDW that are regulated under individual industrial wastewater permits.

2. **Surface runoff (sheet flow):** In areas lacking effective stormwater collection systems, contaminants are picked up by stormwater runoff to flow directly from properties adjacent to the LDW or to creeks tributary to the LDW. Current practices at different shoreline properties may contribute to the movement of contaminants to the LDW via runoff. Sheet flow is not considered a point-source discharge.
3. **Groundwater discharges:** Contaminants in soil resulting from spills and releases to adjacent and upland properties may be transported to groundwater and subsequently be released to the LDW. Contaminated groundwater may enter directly into the LDW via seeps or groundwater discharge, or it may infiltrate into storm drains/pipes, ditches, or creeks that discharge to the waterway.
4. **Erosion/leaching:** The banks of the LDW shoreline are susceptible to erosion by wind and surface water, particularly in areas with steep slopes. Contaminants in soils along the banks of the LDW could be released directly to sediments via erosion. Waterway bank soil, contaminated fill, waste piles, landfills, and surface impoundments close to the banks may release contaminants directly to the LDW through erosion into the river or into stormwater or by leaching to groundwater.
5. **Spills, dumping, leaks, and inappropriate management practices:** Near-water and over-water spills, dumping, and leaks may result in contaminant releases directly to the river that may affect both sediments and the water column. Activities on docks, wharves, and piers have the potential to affect sediments from spills of material containing contaminants of concern. Accidental spills during loading/unloading operations or from a mechanical failure may result in transport of contaminants to sediments. Poor housekeeping and management practices for waterside construction, hull maintenance, and waste disposal at marinas and small boatyards may affect sediment quality. Dumping material such as wood waste or debris directly into the waterway may also adversely affect sediments and the water column.
6. **Waterway operations and traffic:** Contaminants from discharges from operating engines and gray, bilge, ballast, or other waters may affect sediments. Discharges of gray, bilge, and ballast water without treatment are prohibited in the national vessel discharge general permit; however, there is a potential for spills in the waterway.
7. **Atmospheric deposition:** Atmospheric deposition refers to contaminants in the air that fall onto surfaces during wet or dry conditions. Atmospheric deposition occurs on the surface of the waterway and everywhere within the source control area. These contaminants can be collected by stormwater conveyance systems and discharged to the LDW as stormwater pollution. Air pollutants may be generated from point or non-point sources. Point sources include industrial facilities, and air pollutants generated from

painting, sandblasting, loading/unloading of raw materials, and other activities, or through industrial smokestacks. Non-point sources include dispersed sources such as vehicle emissions, aircraft exhaust, and off-gassing from common materials such as plastics. Air pollutants may be transported over long distances by wind, and can be deposited to land and water surfaces by precipitation or particle deposition.

8. **Transport of contaminated sediments:** Generally, the issue of sediment transport is currently outside the scope of Ecology's source control work. Sediment transport from the upstream portion of the Green-Duwamish River has been assessed by the RI/FS and Ecology (Ecology and Environment 2009). However, the following two aspects of sediment transport are important to note:

    a. *Upstream sediments and sources:* At this time, it is unclear whether sources and sediments upstream of the LDW should be subject to LDW-specific source control activities. Ecology and King County are assessing sources to the sediments upstream of the LDW in 2012–2015, and efforts are underway to refine pollutant loading estimates from the upstream portion of the Green-Duwamish River. Decisions about expanding source control efforts to the areas upstream of the LDW study area will be made after the assessments are complete.

    b. *In-waterway sediments and cleanups:* Transportation of contaminated sediments within the LDW study area will be addressed as part of the LDW RI/FS work and during individual sediment cleanup construction activities. Transport of sediments from contaminated areas is influenced by a number of variables including hydrodynamics, vessel traffic, dredging, and other waterway activities. During planning for sediment cleanup, recontamination potential from other areas of contaminated sediments will be considered. During sediment cleanup construction activities, best management practices (BMPs) are required to minimize transport of contaminated sediments.

Regulatory Framework

Just as there are multiple pathways for sources to reach the LDW sediments, there are also multiple laws and jurisdictions that regulate these sources. A coordinated and committed, long-term effort will be necessary in order to achieve the source control goals in this large, complex basin.

This Strategy identifies existing regulatory authorities that will form the framework used to address LDW source control needs. Table 1 is a matrix summarizing the major regulatory authorities that apply to the sources (contaminant releases, media, and pathways) that affect the LDW sediments (see Pathways).

Regulatory authorities for source control exist with and are implemented by various public agencies, as described early in this plan. Two such examples are the NPDES permitting program that was delegated to the state by EPA and the wastewater pretreatment program that was delegated to King County from Ecology. Some programs are not delegated, such as the Toxic Substance Control Act (TSCA), which is administered solely by EPA.

Because of the multiple laws and regulations used to control different sources, the local municipalities can find themselves both in the role of regulatory agency through their local regulations and in the role of a regulated entity by Ecology and/or EPA. All the agencies involved with source control work recognize that, due to the need for source-specific actions and the technical difficulties associated with them, source control cannot be done by one agency alone. Therefore, Ecology, EPA, and the SCWG partners must work together and use regulatory tools effectively to minimize recontamination of the LDW sediments.

It is critical that the authorities are clearly understood and coordinated to achieve the most effective source control possible. Since 2002, the members of the SCWG have worked together solving mutual source control problems in a cooperative and voluntary manner. Participation was not required by regulation, order, or decree. Now, however, the LDW Superfund process is entering a new phase and EPA is proposing to issue a ROD for sediment cleanup in 2014. Because the Superfund process is moving from the investigation phase toward design and cleanup, Ecology has determined it is time to clarify the regulatory framework that will be used to continue source control. The framework has two main regulatory categories, which are administered by water quality and cleanup programs. Ecology and EPA intend to coordinate these separate programs to support this Strategy and LDW source control goals.

Other regulations may apply on a case by case basis such as air regulations, TSCA, and the Resource Conservation and Recovery Act (RCRA).

Table 1. Regulatory Authorities Applicable to Source Pathways

Levels of Gov't	Regulatory Authority	Applicable Permits/ Regulations	Pathways							
			Direct Discharges	Surface Runoff	Contaminated Groundwater	Contaminated Soil Erosion/ Leaching	Waterway Operations	Spills, Leaks & Inappropriate Management	Atmospheric Deposition	In-water Transport of Contaminated Sediments
State	State Water Pollution Control Law (RCW 90.48) and federally delegated NPDES program under CWA	Municipal stormwater permits	X	X				X		
		Industrial stormwater permits	X	X				X		
		Municipal wastewater and CSO permits	X	X				X		
		Industrial wastewater	X	X				X		
	State MTCA (RCW 70.105D)	Cleanup regulations	X [a]	X [a]	X	X			X [c]	X
	Hazardous Waste & Toxic Reduction (RCW 70.105)	Control and management of hazardous waste	X [a]	X [a]	X	X			X [c]	X
	State OHSSPR (RCW 90.56)	Surface water spill prevention regulations	X [b]	X [b]			X	X		
Federal	CWA 33 USC §§ et seq.	Point Source general permits (federal, e.g. vessel general permits)	X	X			X	X		
	TSCA 15 USC §§ 2601-2692	Regulates PCBs, asbestos, lead, radon, and other substances and mixtures	X	X	X	X		X		

Levels of Gov't	Regulatory Authority	Applicable Permits/ Regulations	Pathways							
			Direct Discharges	Surface Runoff	Contaminated Groundwater	Contaminated Soil Erosion/ Leaching	Waterway Operations	Spills, Leaks & Inappropriate Management	Atmospheric Deposition	In-water Transport of Contaminated Sediments
	RCRA 42 USC § 6901 et seq.	Sets standards for the treatment, storage, and disposal of hazardous waste in the U.S.	X [a]	X [a]	X	X				
	CWA 33 USC § 404 et seq.	Dredging, filling, work in navigable waters					X	X		
	CERCLA 42 USC § 6901 et seq.	Cleanup regulations/ National Contingency Plan	X [a]	X [a]	X	X			X [c]	
	OPA, 33 USC §§ 2701 et seq.	Surface water spill prevention regulations/ National Contingency Plan	X [b]	X [b]			X	X		
	CAA, 42 USC §§ 7401 et seq.	Air regulations							X	

Levels of Gov't	Regulatory Authority	Applicable Permits/ Regulations	Pathways							
			Direct Discharges	Surface Runoff	Contaminated Groundwater	Contaminated Soil Erosion/ Leaching	Waterway Operations	Spills, Leaks & Inappropriate Management	Atmospheric Deposition	In-water Transport of Contaminated Sediments
Regional & Local	Delegated state CAA (RCW 70.94) and federal CAA	PSCAA permits							X	
	King County Codes: Title 28 Metropolitan services and delegated pretreatment program; Title 9.04, 9.12; Title 16.82	King County industrial waste permits and discharge authorizations; sets requirements for stormwater detention/ treatment, source control, and maintenance	X	X				X		
	Seattle Municipal Codes: Stormwater Code (22.800-22.808) and Side Sewer Code (21.16)	Sets requirements for stormwater detention/ treatment, source control, and maintenance; side sewer construction and permitting	X	X				X		
	Tukwila Code Titles 6, 14, 21, and 22	Permits, licenses, orders, decrees, and notices	X	X				X		

Levels of Gov't	Regulatory Authority	Applicable Permits/ Regulations	Pathways							
			Direct Discharges	Surface Runoff	Contaminated Groundwater	Contaminated Soil Erosion/ Leaching	Waterway Operations	Spills, Leaks & Inappropriate Management	Atmospheric Deposition	In-water Transport of Contaminated Sediments

CAA = Clean Air Act
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
CSO = combined sewer overflow
CWA = Clean Water Act
MTCA = Model Toxics Control Agency
NPDES = National Pollutant Discharge Elimination System
OHSSPR = Oil and Hazardous Substance Spill Prevention and Response
OPA = Oil Pollution Act of 1990
PSCAA = Puget Sound Clean Air Agency
RCRA = Resource Conservation and Recovery Act
RCW = Revised Code of Washington
TSCA = Toxic Substances Control Act
USC = United States Code

a. The character, nature, and extent of chemical contamination, affected media, and pathways at any given place may determine how these regulations apply. Each source may be uniquely regulated.
b. Spill response regulations apply to an immediate threat to human health and to the environment for oil and hazardous substances.
c. Cleanup regulations apply to other media contaminated by air sources.

Water Quality Regulations

Water quality regulations focus on the prevention and systematic reduction of the discharge of contaminants through NPDES and state waste discharge permits. Ecology's Water Quality Program regulates the direct discharge pathways discussed in the previous chapter. EPA has delegated its NPDES permitting responsibilities to Ecology for Washington State. EPA continues to regulate any direct discharge pathways owned or operated by federal facilities in the LDW source control area. Water quality regulations and permits will be an important component of source control for the long term. Each relevant permit is briefly described below.

Municipal Stormwater Permits

Under the federal CWA, certain urban areas are required to have an NPDES permit if they collect stormwater runoff in municipal separate storm sewer systems (MS4s) and discharge it to surface waters. Accordingly, Ecology issues municipal stormwater permits (as joint NPDES and State Waste Discharge Permits) to various municipalities. The Phase I Municipal Stormwater Permit covers the City of Seattle, unincorporated King County, and the Port of Seattle. The Western Washington Phase II Municipal Stormwater General Permit covers the City of Tukwila and numerous other cities located upriver from the LDW. WSDOT has a separate stormwater municipal general permit for discharges from WSDOT's MS4s, which are generally located along state highway rights-of-way across the state.

Each municipal stormwater permittee must implement a Stormwater Management Program (SWMP), which includes programs to control stormwater pollution (refer to text box). The SWMP and the associated minimum performance measures specified in the permits are designed to reduce the discharge of pollutants from the MS4 to the maximum extent practicable, meet state requirements for all known, available, and reasonable methods of prevention, control, and treatment, and protect water quality. However, discharges may occur that cause or contribute to violations of water quality standards. Therefore, in some cases, adaptive management may be necessary. Adaptive management of the SWMPs

Permits

A permit prohibits certain discharges and allows a facility to discharge a specified amount of a pollutant into a waterbody under certain conditions consistent with water quality regulations. In Washington State, NPDES permits are typically issued as both NPDES and State Waste Discharge [RCW 90.48] permits. There are two basic types of NPDES permits: individual and general permits.

Individual Permit
An individual permit is tailored to an individual facility. Once a facility submits the appropriate application(s), Ecology develops their permit based on the type of activity, nature of discharge and receiving water quality. Ecology issues the permit for a specific time period (not to exceed five years) requiring they reapply 180 days prior to the expiration date.

General Permit
General permits are developed for a category of discharger instead of an individual facility. General permits are cost-effective because:

* A large number of facilities can be covered under a single permit, and
* Ecology allocates resources in a more efficient manner to provide more timely permit coverage.

allows permittees to fine-tune their programs to address specific water quality problems. Ecology will evaluate municipal stormwater permittees discharging to the LDW for potential adaptive management requirements to support LDW source control goals. This process has already started with the City of Seattle, which is the largest municipal stormwater permittee in the LDW.

Municipal Stormwater Management Program Components

* Coordination
* Legal Authority
* Source Control, Illicit Discharge Detection and Elimination, and Mapping
* Structural Stormwater Controls
* Municipal Operations and Maintenance
* Construction and Post Construction Runoff Controls
* Public Involvement, Education, and Outreach
* Monitoring

SWMP activities and any appropriate adaptive management provisions will be included in city and county implementation plans. In this way, Ecology may utilize the municipal stormwater permits as a primary regulatory tool to implement controls on municipal stormwater discharges to the LDW. This does not preclude permittees from identifying contributions to municipal stormwater that may need to be addressed separately under other regulations or referred to other source control agencies to address.

Each municipality's implementation plan should describe how they will prioritize and schedule their source control activities, including capital improvement projects, over the long term and will incorporate mechanisms to conduct this prioritization. Ecology encourages municipalities, where possible, to consolidate projects and/or activities to the extent that requirements under other permits, orders, or decrees overlap or coincide with source control priorities for the LDW.

Industrial Stormwater General Permits

Ecology grants coverage under the Industrial Stormwater General Permit (ISGP) to facilities generating stormwater associated with industrial activities that is discharged directly to the LDW or creeks tributary to the LDW or to MS4s. The ISGP requires stormwater monitoring and reporting, and the development and implementation of a Stormwater Pollution Prevention Plan (SWPPP). SWPPPs must include operational, structural and, where necessary, treatment BMPs that identify, reduce, eliminate, and/or prevent the discharge of stormwater pollutants. Any federal facilities discharging stormwater associated with industrial activities in the LDW are subject to requirements of EPA's Multi-Sector General Permit (MSGP). The relevance of the MSGP in LDW source control is minimal and thus it is not discussed further.

Stormwater may become contaminated by industrial activities as a result of contact with materials stored outside; spills and leaks from equipment or materials used onsite; contact with materials during loading, unloading, or transfer from one location to another; and from airborne contaminants.

Facilities covered under the ISGP must manage stormwater in accordance with specific terms and conditions including: the development and implementation of a SWPPP, monitoring, reporting, and ongoing adaptive management based on sampling and inspections. The facility

must implement specific mandatory BMPs consistent with Ecology's Stormwater Management Manual for Western Washington (Ecology 2012). These source control BMPs must be designed and implemented to meet ISGP benchmark values for copper, zinc, turbidity, pH, and oil sheen. Exceedances of benchmark values result in escalating corrective actions. As a result, numerous ISGP permittees are currently designing and installing stormwater treatment technologies.

There are approximately 1,000 commercial properties that discharge stormwater directly or indirectly via the MS4 to the LDW. Approximately 100 of these, including the King County International Airport (KCIA), generate stormwater associated with industrial activity as defined by EPA rules, and thus are subject to the ISGP. The remaining 900 facilities are not required to obtain coverage under the ISGP, and where they discharge to an MS4, are regulated by the local government.

In many cases, full implementation of a SWPPP that meets ISGP requirements will provide sufficient and appropriate stormwater source control to reduce, eliminate, and/or prevent the discharge of stormwater pollutants to waters of the state. However, in the context of LDW source control, sampling results for LDW contaminants of concern (four human health and 39 benthic risk driver chemicals defined in the LDW Feasibility Study [AECOM 2012]) are likely needed to fully understand the range of BMPs necessary to protect the Superfund remedy.

In the near-term, Ecology addresses the industrial stormwater discharges to the LDW in the following manner, on a site-specific basis:

- Ecology conducts regular visits and inspections, and takes formal enforcement action where necessary, to ensure that facilities are complying with their ISGP.
- Ecology is conducting a project to review the SWPPPs for all industrial stormwater permit-holders discharging to the LDW. The project will map all stormwater discharge monitoring locations and review the adequacy of the SWPPPs. Ecology will use the results of this project to evaluate whether additional SWPPP requirements and/or guidance is necessary for LDW dischargers covered under the ISGP.
- Ecology and source control partners collect sampling data to identify facilities where additional LDW contaminants of concern (COCs) are present and may require additional site-specific monitoring as needed to inform the LDW source control effort.

Ecology will also evaluate appropriate administrative approaches to regulating industrial stormwater discharges to meet LDW source control objectives in the long term. Administrative approaches may include individual wastewater permits and LDW-specific general permit conditions. Details associated with these activities will be provided in Ecology's agency-specific Implementation Plan.

Municipal (Sanitary) Wastewater and CSO Permits

In accordance with the CWA and the State Water Pollution Control Act, Ecology issues individual municipal wastewater discharge permits to King County, for its CSO and West Point

WWTP discharges, and to the City of Seattle, for its CSO discharges. The CSO permit provisions include the federal Nine Minimum Controls, which are federal programmatic requirements to reduce the impact of CSOs on the environment.

King County's permit authorizes discharges of treated wastewater into Puget Sound via a deep marine outfall from the West Point WWTP as well as discharges from 42 CSO outfall locations. Near the LDW, King County owns and operates the large-scale interceptor system that is located both inside and outside Seattle city limits, which conveys municipal wastewater from the combined collection system (sanitary sewage, industrial wastewater, and stormwater) and from the separated sanitary sewer system to the WWTP. The County is responsible for sanitary sewer overflows and treated and untreated CSOs that occur from the interceptor system. King County operates four regulator stations, three pump stations, and three weirs in the LDW source control area, resulting in 10 CSO locations to the LDW.

The King County Industrial Waste (KCIW) Program regulates the discharge of pollutants into the separate sanitary and combined sewer systems from various commercial and industrial businesses. Ecology delegated these industrial pre-treatment responsibilities to King County so that the County can adequately manage the WWTP and meet the required WWTP effluent limitations. This program is consistent with the federal general pretreatment regulations in 40 CFR Part 403 and related federal Effluent Guidelines & Limitations [40 CFR Parts 405-471]. These federal regulations, along with Title 28 of the King County Code, give KCIW authority to set limits on pollutants discharged, require BMPs and/or wastewater treatment, issue permits to dischargers, monitor, and enforce.

Under an administrative order, Ecology has required King County to control its remaining uncontrolled CSOs by 2030 to the state standard of on average no more than one untreated discharge event per outfall per year [WAC 173-245-020(22)]. Currently, five of the 10 CSOs are controlled to the state's water quality standard. The West Point WWTP permit requires the County to update its CSO control plan every 5 years. The County's 2012 CSO Control Plan Amendment proposes to complete two projects that will control three CSOs (Hanford #1, Brandon Street, and S Michigan) in the LDW area sooner (by 2022) than previously scheduled to coincide with sediment cleanup actions. The remaining two CSOs in the LDW will be controlled by 2025.

In a separate action, King County is currently negotiating a federal consent decree with EPA, Ecology, the Department of Justice, and the Washington Attorney General's office to control all of its remaining uncontrolled CSOs by 2030.

The City of Seattle has an individual municipal NPDES permit for its CSOs. The City also owns and operates combined sewer collection systems within the Seattle city limits. The City's smaller sewer mains collect domestic sewage, industrial wastewater, and stormwater from Seattle neighborhoods and discharge to the King County interceptor system, which conveys the collected wastewater to the West Point WWTP. The City operates two CSOs in the LDW.

Under its CSO permit, the City is required to submit updates/amendments to its CSO control reduction plan to Ecology for review and approval with each permit renewal application. The City is required to submit its next amendment by May 31, 2015. Similar to King County, the City is negotiating a federal consent decree with EPA, Ecology, the Department of Justice, and the Washington Attorney General's office to control all of its remaining uncontrolled CSOs by 2025.

CWA Section 401 Water Quality Certification

Under federal CWA Section 401, when a project proponent applies for a federal permit or license that results in any discharge to the waters of the United States, the applicant is required to obtain a 401 Water Quality Certification (401 certification) from the state in which the discharge originates. In the state of Washington, Ecology is authorized to issue the 401 certification as an RCW 90.48 administrative order. Issuance of a 401 certification means that Ecology has reasonable assurance that the applicant's project will comply with state water quality standards and other aquatic resources protection requirements under Ecology's authority.

Typical cases where Ecology issues a 401 certification include, but are not limited to, applicants receiving a Section 404 permit from the U.S. Army Corps of Engineers (USACE), a Coast Guard permit, or license from the Federal Energy Regulatory Commission. The 401 certification can cover both the construction and operation of the proposed project. Conditions of the 401 certification become conditions of the federal permit or license.

In the LDW, any dredging projects that need a Section 404 individual permit will also need a 401 certification. One example is the Ecology 401 certification for Boeing Plant 2 RCRA corrective action. Ecology will coordinate within the department to include source control requirements, if any, when it issues a 401 certification in the LDW.

Surface Water Spill Response and Prevention Regulations

Spills of oil and/or hazardous substances are addressed by two regulatory acts:

Oil Pollution Act of 1990

The Oil Pollution Act of 1990 [33 USC §§ 2701 et seq.] provides for prevention, liability, removal, and compensation for the discharge of oil into or upon the navigable waters of the United States, adjoining shorelines, or the Exclusive Economic Zone.

Oil and Hazardous Substance Spill Prevention and Response

Under the state Oil and Hazardous Substance Spill Prevention and Response (OHSSPR) [RCW 90.56], Ecology is designated as Washington's lead agency to oversee prevention, abatement, response, containment, and cleanup efforts with regard to oil or hazardous substance spill to waters of the state. Spill prevention and response is the primary mission of Ecology's Spills Program.

- Ecology would be the designated State On-Scene Coordinator if an oil spill were to occur in the LDW. Parties responsible for oil spills may be asked to reimburse the state for cleanup costs. Additionally, parties responsible for oil spills may also be asked to pay for damages to any state beaches, wildlife, or other natural resources. Spills may also result in penalties and other enforcement actions by the state.

Cleanup Regulations

Cleanup regulations focus primarily on removing contamination from the environment after a release. Three cleanup regulations are primarily used to clean up the LDW and the surrounding source area.

The Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) [42 USC §§ 9601 et seq.], also known as Superfund, provides the basic legal framework for the cleanup and restoration of LDW sediments and is managed by EPA. The LDW Superfund cleanup effort is focused on reducing risks to human health and wildlife.

The Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) of 1976 [42 USC §6901 et seq.] gives EPA the authority to control hazardous waste from “cradle-to-grave.” This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances.

The Federal Hazardous and Solid Waste Amendments are the 1984 amendments to RCRA that focused on waste minimization and phasing out land disposal of hazardous waste, and included provisions for corrective action for releases. Some of the other mandates of this law include increased enforcement authority for EPA, more stringent hazardous waste management standards, and a comprehensive underground storage tank program.

EPA manages two facilities under federal RCRA authority in the LDW source control area. The first is Boeing Plant 2, also known as Early Action Area 4 (EAA-4), where sediment cleanup under RCRA is being coordinated with adjacent bank and sediment cleanups at Jorgensen Forge and Terminal 117 (EAA-5). The second is Rhône-Poulenc, where interim corrective measures for the soils and groundwater are complete and corrective measures for intertidal sediments will be coordinated with the Superfund sediment cleanup.

It is important to note that Ecology implements a federally authorized RCRA program with EPA oversight. Ecology administers RCRA through their Hazardous Waste and Toxics Reduction

Program. A Washington State Model Toxics Control Act (MTCA) order (described below) is considered part of the federally authorized RCRA program only when it is incorporated in a RCRA permit.

The Toxic Substances Control Act

The Toxic Substances Control Act (TSCA) of 1976 [15 USC §2601 et seq.] provides EPA with authority to require reporting, record-keeping and testing requirements, and restrictions relating to chemical substances and/or mixtures. Certain substances are generally excluded from TSCA, including, among others, food, drugs, cosmetics, and pesticides. TSCA addresses the production, importation, use, and disposal of specific chemicals including PCBs, asbestos, radon, and lead-based paint.

With respect to sources in the LDW, there have been a number of TSCA-based cleanups for PCBs over the years. Since LDW source control efforts began, TSCA work has been coordinated with either Ecology's MTCA cleanup program or with EPA's CERCLA cleanup program. The most recent and notable examples include the PCB cleanups at Rainier Commons and at North Boeing Field.

The Model Toxics Control Act

The Model Toxics Control Act (MTCA) [RCW 70.105D (1989) and WAC 173-340 (1992)] is Washington's toxic cleanup law equivalent to the federal Superfund program, and is managed by Ecology. The statewide regulations establish cleanup standards and requirements for managing contaminated sites. Ecology's Toxics Cleanup Program oversees the cleanup of any hazardous substance which has been released into soil, groundwater, surface water, drinking water, ambient air and sediments under this act.

Ecology has identified approximately 20 upland contaminated sites adjacent to the LDW requiring cleanup in order to sufficiently achieve control or eliminate sources through the soil or groundwater pathway, potentially adversely affecting LDW sediments. Thirteen of these sites are adjacent to the LDW and are currently under MTCA Agreed Orders to determine the nature and extent of contamination and propose a course of action to clean up any contamination.

- Ecology will continue to investigate contaminated sites for possible soil and groundwater contamination and prioritize those sites for further cleanup actions where Ecology believes they pose a risk of contaminating LDW sediments or the water column. Once a contaminated site has been identified as posing a risk to the river, Ecology may require a cleanup for all media and contaminants.
- Ecology source control staff will coordinate with cleanup managers to ensure that source control for relevant pathways is integrated into their respective projects.

- Ecology will evaluate additional contaminated sites as they are discovered and/or referred to Ecology by source control partners in order to prioritize the cleanup of contaminated media reaching the LDW through currently unknown site-specific pathways.

The Sediment Management Standards

The Sediment Management Standards (SMS) [WAC 173-204] are Washington's regulations intended to reduce and ultimately eliminate adverse effects on biological resources and significant human health threats from surface sediment contamination. Some requirements of the SMS regulations (Part IV) may be implemented through an administrative action under either the Washington State Water Pollution Control Act [RCW 90.48] or MTCA [RCW 70.105D]. MTCA regulations specifically state that in addition to complying with the requirements of WAC 173-340, sediment cleanup actions must comply with the SMS in WAC 173-204.

Additional Source Control Tools

Ecology's Urban Waters Initiative

The LDW was one of three areas chosen by the 2007 Legislature for Washington State's Urban Waters Initiative. This initiative provides more resources for Ecology and local government efforts to control sources of pollution to the LDW. The initiative's goal is to help prepare for cleanup of the contaminated areas and prevent recontamination after cleanup is complete. This is done using the following steps:

- Identify potential sources of contamination to the LDW water and sediment through comprehensive business inspections.
- Inspect more permitted facilities to ensure compliance with existing permits. Ensure that all businesses that need environmental permits do have them.
- Provide technical assistance to businesses to reduce toxics and prevent pollution.
- Help Ecology decide if more source control measures are needed.
- Strengthen the partnership between Ecology, City of Seattle, and King County.

Waterway Operations, Vessel Discharge Permits

Sources of contamination from dockside operations, dredging and commercial or recreational vessels are regulated with a variety of source control tools such as other types of permits, policies, and procedures. Some of these are under the purview of the federal government such as USACE CWA 404 permits for dredging/filling, Section 10 of the Rivers and Harbors Act permits for construction/demolition related to preserving navigable function of the waterway, or U.S. Coast Guard regulations governing the operations of commercial vessels.

With respect to the LDW, EPA Region 10 and USACE Seattle District coordinate CWA 404 and Section 10 permitting according to a Standard Operating Procedure, which applies to any work proposed within the boundaries of a Superfund site within the District. USACE notifies EPA of any work proposals and will not issue a permit until the project is reviewed and either commented upon or approved by the Superfund Remedial Project Manager. LDW examples of this include maintenance dredging at T-115 and pier/piling removal and replacements at various industrial and commercial docks along the LDW.

Washington State also has regulatory authority over activities that occur in the waterway via Water Quality Certifications (refer to water quality regulations above) and through authorities administered by the Washington State Department of Fish and Wildlife. Two such examples are ballast water discharges and Hydraulic Project Approvals. Ballast water discharge [RCW 77.120] applies to all vessels of three hundred gross tons or more, United States or foreign flagged, carrying, or capable of carrying, ballast water into the waters of the state after operating outside of the waters of the state. Hydraulic Project Approvals provide approvals for construction projects that use, divert, obstruct, or change the natural bed or flow of state waters. The Hydraulic Project Approval is authorized through RCW 77.55, and administered through WAC 220-110.

EPA currently regulates vessel discharges with the national Vessel General NPDES Permit (VGP). The current permit, the 2008 VGP, is in effect until 2013. The VGP applies to discharges incidental to the normal operation of all non-recreational, non-military vessels of 79 feet or greater in length that discharge in waters of the United States. In addition, the ballast water discharge provisions also apply to any non-recreational vessel of less than 79 feet or commercial fishing vessel of any size discharging ballast water. The VGP requires that vessel owners and operators meet certain requirements, including seeking coverage for most vessels, assuring their discharges meet effluent limits and related requirements, a corrective action process for fixing permit violations, and requirements for inspections, monitoring, recordkeeping, and reporting. This national NPDES permit is enforced by the U.S. Coast Guard.

With respect to source control for the LDW, the Ecology/EPA MOU divides responsibilities for source control and sediment cleanup between the agencies at the mean higher high water line (MHHW).[4] When the MOU was negotiated, however, in-water work and vessel operations were not explicitly addressed. As described above, in-water work is coordinated between EPA and USACE for all work proposed in navigable waters (CWA 404 and Section 10 permits). Ecology will rely on EPA to coordinate with the U.S. Coast Guard or other federal agencies as necessary.

Air Regulations

Air pollution control in Washington is based on federal, state, and local laws and regulations. EPA, Ecology, and local clean air agencies all regulate air quality. Ecology implements and

[4] Section III.B of the MOU also states that both agencies recognize there may be site-specific exceptions to the MHHW agreement.

enforces air quality regulations in counties without an air pollution control agency. Ecology also has jurisdiction over primary aluminum plants, pulp mills, vehicles, and vehicle-related sources.

Title V of the federal Clean Air Act requires states to develop and implement an operating permit program in accordance with 40 CFR Part 70 for facilities that are the largest sources of air pollution. These Operating Permits are often referred to as Air Operating Permits (AOPs), Title V Permits, or Part 70 Permits. They combine into one document all operational and procedural requirements, applicable regulations, emission standards, and monitoring, recordkeeping, and reporting requirements. The purpose of the AOP is to make it easier to comply with and enforce air pollution laws. Ecology, the Energy Facility Site Evaluation Council, and any of seven local air quality agencies have received EPA approval to administer Washington's air operating permit program.

Washington's air operating permit regulation is in WAC 173-401. It requires a facility to have an AOP if it has the potential to emit any of the following:

- More than 100 tons per year of any pollutant, such as nitrogen oxides, volatile organic compounds, carbon monoxide, sulfur dioxide, and particulate matter. Lower thresholds may apply in nonattainment areas;
- More than 10 tons per year of any hazardous air pollutant, as listed in subsection 112(b) of the federal Clean Air Act; or
- More than 25 tons per year of a combination of any hazardous air pollutants.

A facility may also be required to have an Operating Permit if it is subject to certain federal air quality requirements, including:

- Title IV Acid Rain Program,
- New Source Performance Standards, or
- National Emission Standard for Hazardous Air Pollutants.

Under the MTCA regulations, Ecology will not establish air cleanup standards where concentrations of hazardous substances in the air originate from an industrial or commercial process or operation, or where hazardous substances in the air originate from an offsite source.

The local agency responsible for regulating air quality of different businesses in the LDW source area is Puget Sound Clean Air Agency (PSCAA). PSCAA's programs, policies, and regulations are designed to maintain air quality standards and protect human health. Refer to PSCAA/Regulation III, which references Acceptable Source Impact Levels as identified in WAC 173-460-150. These Acceptable Source Impact Levels are mainly based

Examples of using MTCA to Control an Air Source

Establishing safe levels for a chemical vapor entering a home or business, as a result of soil or groundwater contamination.

Establishing soil cleanup levels if the surrounding area has been contaminated by air emissions from a smokestack.

on human respiratory health risk, which may not be protective of sediments in terms of atmospheric deposition.

Ecology will establish air cleanup standards when the concentration of hazardous substances in the air originates from other contaminated media or a remedial action at the site, and under the following circumstances:

- Using a site-specific risk assessment to establish non-potable groundwater cleanup levels for volatile organic compounds, or
- Soil cleanup levels addressing dust or vapors, or
- When necessary to establish air emission limits for a remedial action.

Dust emissions at NPDES-permitted facilities that contribute pollutants to stormwater that then discharges to waters of the state may be addressed by provisions of NPDES and state waste discharge permits.

Implementation Plans

As the lead agency for Source Control, Ecology has asked Seattle, King County, and EPA to develop and submit agency-specific implementation plans. The implementation plans should set each agency's priorities for source control for the near-term (next 5 years) and the long-term (extending into the period after the Superfund cleanup is constructed). These implementation plans also emphasize coordination at two levels:

- Inter-departmental coordination within each agency, and
- Inter-agency coordination with the SCWG.

Each agency's plan will be tailored to the different regulatory obligations (e.g., NPDES permits, orders), programmatic approaches (e.g., local business inspections, implementation and enforcement of local codes and rules), and property-specific information (e.g., MTCA cleanups). These plans are under development and should be completed before issuance of the ROD.

Plan for the Port of Seattle

Due to its unique nature as a special purpose government, the Port does not exercise the same kind of land use and environmental regulation over the actions of businesses as the City or County. The Port is subject to the Phase I Municipal Stormwater Permit as a Secondary Permittee. In the context of this Strategy, the Port will be treated as a private land owner, which means that water quality permits for the Port and its tenants and MTCA will likely be the primary means of attaining source control for contamination originating on Port-owned or operated facilities.

Regulatory requirements, permits. and cleanup orders will form the basis for each implementation plan. Once an agency plan is finished, it will be appended to this Strategy and made publically available. Ecology reserves its authority to require partner agencies to act upon all or part of their implementation plans.

Ecology is preparing its own Source Control Implementation Plan. This plan will detail the specific actions required by Ecology to continue addressing the SCAP action item lists, and administering discharge permits, inspections and enforcement, MTCA cleanups, and long-term monitoring.

Implementation Plan Placeholders

Placeholders are included as appendices to this Strategy for illustrative purposes and to support ongoing discussions about each of the agency implementation plans.

EPA's implementation plan will detail actions based on their broad roles in coordinating, implementing, and participating in controlling sources to the LDW as it is a shared responsibility for EPA Region 10's Office of Environmental Cleanup, Office of Air, Waste, and Toxics, Office of Enforcement, and Office of Water.

Interagency Coordination and Communication

Interagency coordination and communication are critical parts of the Strategy. One of the objectives of this strategy, as previously stated, is to "increase the degree of inter- and intra-agency coordination to address source control issues that cannot be adequately resolved by one agency or program." The following sections describe the existing framework, which will continue to be developed. Source control coordination and communication ideas from the agency-specific implementation plans will be used to refine and expand on the existing framework.

EPA and Ecology Coordination

The 2004 MOU between Ecology and EPA (EPA and Ecology 2004) describes how the two agencies will coordinate. With issuance of the ROD and the start of cleanups, the agencies will need to closely coordinate source control and cleanups. The interagency MOU will need revision to describe how this coordination will occur.

In general terms, the coordination should occur at two levels. At the staff level, lines of communication need to continue to allow frequent discussions on a wide range of issues. On a management level, regularly scheduled meetings between Ecology and EPA section/division management should occur. The purpose of these meetings is to discuss issues of mutual concern, such as scheduling, policy and recontamination, and how those concerns influence source control and sediment cleanups. The agencies' designated project managers for source control and cleanup should create a common agenda for these meetings.

Source Control and Cleanup Schedule Coordination

As the lead agency for source control, Ecology has followed the principles contained in EPA's Directive, *Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites* (EPA 2002). Ecology believes a phased approach to remediate contaminated sediments is an appropriate course of action. This is based upon the uncertainties regarding the location and amount of potential sources present within the LDW source area and how long it will take to sufficiently control the currently identified sources as well as continue to identify and control new sources.

The agencies responsible for source control do not have unlimited resources. Knowing when sediment remedial actions are expected to begin is a critical component of determining how the agencies prioritize sources among and within the 24 source control areas. This information is essential to coordinating source control and sediment cleanups.

Arranging the order of where and scheduling when sediment cleanups occur should be based upon the levels of source control that can be achieved and the time it will take to reach those levels of control. Sediment cleanup schedules need to account for the status and scope of source control before proceeding. It is entirely possible that some cleanup actions will be delayed due to the difficulties in controlling all the sources affecting the sediments in the area. It is also possible that cleanups could proceed as scheduled when the remaining source control concerns are not readily addressed in a near-term fashion because the sources are unidentifiable and diffuse.

Ecology and EPA will develop a detailed process to prioritize cleanup areas based upon both agencies' needs and limitations. The agencies are developing this process beginning in early 2013 and will document the process within the revised MOU between the agencies and incorporate the process within the final ROD and Source Control Strategy.

Source Control Work Group

The current SCWG consists of staff from Ecology, EPA, City of Seattle, and King County. To date, the SCWG agencies have invested significant effort and resources toward regulating sources and pathways to the LDW.

Ecology formed the SCWG in January 2002 to coordinate and communicate among these agencies. The purpose of the SCWG is to share data and information; to actively develop, coordinate, and implement source control measures; and to report progress on source control activities.

Other public entities with relevant source control responsibilities include WSDOT, the Port of Seattle, Seattle/King County Department of Public Health, PSCAA, City of Tukwila, and others. These agencies will be invited to participate as appropriate.

SCWG—Many Agencies, Many Roles

At SCWG meetings, agencies think and act as regulators. Each agency has a different level of control over sources depending on where their authorities originate (i.e., federal, state, or local).

Some sources in local jurisdictions need more or stronger control than local codes or regulations can provide, so Ecology and EPA may be able to provide additional regulation and control. SCWG often makes this kind of referral during its meetings.

It's important to note, though, that the local agencies are also regulated by Ecology and EPA in many circumstances, such as NPDES permits.

Annual SCWG Work Plan

The SCWG technical staff dedicates one regular meeting per year, usually the January meeting, for comprehensive work planning. Future work plan meetings will include the project coordinators from each agency (to be defined later in specific implementation plans). The main goal of the annual work plan meeting will be to discuss the resources and staffing needed for the ongoing work of source control such as inspections, sampling, plans for upcoming documents, issues, etc.

Duwamish Inspection Group

The Duwamish Inspection Group currently exists as an informal group of inspectors from King County's Industrial Waste Program, Seattle's Stormwater Program, Ecology's Urban Waters (Hazardous Waste and Water Quality) programs, Ecology's Toxics Cleanup Program, and EPA's Office of Enforcement. This multi-agency group developed an inspection checklist that is specific to the source control issues and COCs that have been identified for the LDW. This Strategy does not propose any changes to the structure of this group as it currently exists (2012). However, as stated in the Proposed Plan for sediment cleanup, EPA and Ecology expect that agency-specific implementation plans will include resources for continued staffing and support of this group and the SCWG.

How Source Control Problems are Referred

Over the years, Ecology has noted that source control problems observed in the field are handled in one of three general ways. Some are handled through the SCWG as described above. The SCWG meets monthly and the problems handled in those meetings tend to be technically complex and because multiple levels or types of source control actions are usually needed to address releases, media, or pathways. For the purposes of this broad source control strategy, the other types of referrals are called *formal* and *informal*. *Formal* referral means an identified problem is transmitted using documentation specific to that problem. Formal referrals are expected to occur when the local government has used its own escalating enforcement authority to resolve the problem but has not been successful, or when the problem falls outside of one entity's authority. For the purposes of this Strategy, an *informal* referral occurs through the established system designed to coordinate routine spill response and environmental complaints. The Ecology system for such informal referrals is called the Environmental Response Tracking System. Refer to http://www.ecy.wa.gov/reportaproblem.html for additional information.

As described, EPA and Ecology recognize that not all discovered sources will fall within the authority of a single agency. Source control is often a joint responsibility.

Source Control Evaluations

Ecology and EPA recognize that understanding the status of source control is vital to initiating sediment cleanup. The key purpose of evaluating source control is to determine whether controls are at the point where a sediment cleanup can proceed with some assurance that recontamination potential has been (or is being) reduced. To serve this purpose, Ecology will provide an evaluation through a memo or letter to EPA, depending on the circumstance.

Ecology's documentation will present an evaluation of environmental data about contaminants, media, and pathways and whether source control activities are minimizing recontamination potential for sediments.

When Does Source Control End?

A comprehensive, long-term monitoring plan for the LDW is critical to evaluate progress and make well-informed decisions.

The goal of source control will be considered successful when post-cleanup monitoring shows that sediments have not been recontaminated.

Some level of source control will continue even when there is no indication of sediment recontamination. However, if sediments have been recontaminated, additional source control actions may be necessary. It is an iterative process.

An evaluation will be based on:

- The adequacy of the information and data gathered,
- Determining if all sources have been reasonably identified,
- Determining if adequate controls are in place for those identified sources,
- Ensuring all identified high priority[5] source control actions have been completed,
- Reviewing long-term sediment monitoring results and trends,
- Reviewing water quality monitoring results and trends, and
- Reviewing source control program effectiveness information.

It is important to understand that source control evaulations are also influenced by the size of the source or area being studied and the fact that some source control activities will continue into the future. Regarding geographic source areas, evaluations may be conducted for individual facilities or discharges, or they may be performed for larger source areas (one of the 24 sub-basins). However, an LDW-wide source control evaluation would depend on so many variables that it would likely offer no certainties. With regard to time frame, source control work will always be needed; therefore, the level of effort may expand and contract as progress is made. Inspections will always need to be conducted, more historical contamination may be discovered, and new sources will likely appear. Depending on the specifics of an evaluation, there are several possible outcomes:

[5] Priorities for source control actions are identified in the Executive Summary tables of each SCAP.

1. Ecology may recommend a sediment cleanup could proceed with reasonable confidence that recontamination potential is as minimal as possible.
2. Ecology may recommend that a sediment cleanup could proceed as long as certain additional controls or oversight are implemented in the near future.
3. Ecology may recommend that sediment cleanup not proceed until additional controls are in place.

Sediment Recontamination

Recontamination is the reappearance of contamination above a regulatory limit following sediment cleanup.

Source control is an ongoing process and continued vigilance is necessary to adequately control the amount of pollution discharged to the LDW from all potential sources.

It is anticipated, even with a comprehensive source control effort, that recontamination will be localized, and will have different contaminant signatures and concentrations than the contamination identified during the LDW RI (Windward 2010), due to the difficulty in identifying and controlling all possible sources and pathways in a highly populated urban environment. Long-term monitoring will continue to occur to inform about any particular location or overall decreasing or increasing trends.

Once recontamination occurs, there is no single course of action to follow. EPA and Ecology will determine the appropriate course of action on a case by case basis. Many factors will determine what actions will be needed including:

- The chemicals causing the recontamination,
- The spatial and temporal extent,
- How much recontamination has occurred (exceedance factors),
- How the recontamination is occurring (such as new sediment deposition),
- The proximity of known sources,
- How well the known sources are controlled,
- Sediment bioassay results, and
- Agency enforcement discretion.

Ideally, monitoring for source control and cleanup purposes will supply adequate warning that recontamination is occurring. Given ample warning, additional measures would be taken to reduce or stabilize concentrations appearing to pose a threat of recontaminating an area after a cleanup action. A range of additional source control measures could include: increased frequency of business inspections, increased source tracing sampling, or installing engineering controls.

Source Control Monitoring

A comprehensive monitoring plan for LDW sediment cleanup areas and LDW source control is necessary. EPA, Ecology, and partner agencies are discussing how to combine, if possible, monitoring requirements of applicable permits, individual cleanup, and the Superfund project (i.e., baseline and post-cleanup monitoring). This will take some time to fully develop and will be further defined later in the cleanup process.

Monitoring is used to evaluate the effectiveness of discrete source control activities and the sufficiency of the larger source control efforts. To assess recontamination trends, Ecology and EPA will use LDW Superfund generated data in conjunction with data from other sources, such as municipal stormwater sediment trap data and cleanup data. Ecology or EPA may require additional post-cleanup sampling of environmental media or other materials in order to evaluate these trends. Monitoring or sampling may include but is not limited to:

- **Monitoring contaminants in sediments.** This refers to direct measurement of contaminant levels in sediments that is critical to assessing overall sediment recontamination. Monitoring will determine whether recontamination is actually occurring and will provide information on recontamination rates and concentrations. Ecology's regulations (MTCA and SMS) and EPA's regulations (CERCLA and RCRA) require post-cleanup monitoring of sediment. One of the goals of this type of monitoring is to determine the occurrence, nature, and rate of recontamination. Therefore, the design of this monitoring program should include considerations for source control trends, such as monitoring of sediments adjacent to outfalls.

  The results of the monitoring will help shape and redefine specific agency priorities for what additional, if any, source control measures need to be implemented at any given location. If additional source control work is necessary, the existing SCAP for that area may be amended or modified.

- **Monitoring sources and pathways.** Monitoring is also necessary to evaluate the effectiveness of source control actions. Generally, this will generate data specific to sources and pathways, including:
  - Data from municipal stormwater source tracing work;
  - Information from environmental investigations (surface water, stormwater, soil, groundwater, air); and
  - Data generated by permits (air, water).

Information gathered will be used to track and identify sources and evaluate whether source contributions have changed as a result of source control actions or other factors.

Published Source Control Reports

As the lead agency for source control, Ecology reports the progress of source control to EPA and the public. Ecology's ability to create comprehensive reports requires that all source control activities be documented by the agencies or parties performing work as described in their implementation plans. These parties will provide Ecology with information that will be incorporated into the reports described below. These Ecology reports are then reviewed by EPA and the SCWG agencies, tribes, and various stakeholders, as appropriate, such as the involved citizen and environmental groups.

Summary of Existing Information and Identification of Data Gaps Reports

Data Gaps Reports represent the collection of environmental information that is known at the time of their publication. The information is collected by various means, primarily from SCWG agencies' records and files, including program files and responses to CERCLA or MTCA inquiries for environmental information. By the time the EPA ROD is finished, Ecology will have completed all the Data Gaps Reports for each of the 24 source control areas (Figure 2).

In general, the Data Gaps Reports describe the drainage basin and physical conditions of each source control area, including the known nature and extent of contamination in soils, banks, groundwater, stormwater, or other surface discharges. Information in these reports includes:

- Current names, addresses, and permit information;
- Historical and current land uses;
- Summary notes about past operations or activities that may be relevant to historical contamination;
- Summary from regulatory programs for investigations or actions taken that are relevant to contaminated media or pathways to sediments;
- Assessment of contaminated media and source pathways for sources adjacent to and upland from the sediments;
- The most recent stormwater source tracing information from the SCWG; and
- Summary of data gaps with recommendations for filling them.

Source Control Action Plans

SCAPs provide detail about how data gaps will be filled, what source control actions are needed, and how these actions will be implemented. Ecology prioritizes source control actions based on

their potential impact to sediment cleanup projects. The SCAPs include the following information:

- Status of contaminated media and pathways.
- Actions necessary to fill data gaps and control sources. This may include collection of additional environmental data, investigation and cleanup, and tracing sources of contamination.
- Target dates for achieving source control actions.

Ecology will continue to periodically review the progress and data associated with source control action items for each SCAP. As new information becomes available, it will be summarized in the LDW Source Control Status Reports described below. Ecology will complete SCAPs for the 24 source control areas (Figure 2 and Appendix A). The SCAP for each source control area is based on information from the Data Gaps Reports described above.

Source Control Status Reports

Ecology publishes periodic Source Control Status Reports about every 1 to 2 years. Each report summarizes any changes since the publication of the previous report. EPA and other SCWG members supply information, review, and provide comments on the Status Reports. In addition to the types of details listed below, these reports show important accomplishments, emerging issues, and challenges that affect source control throughout the LDW.

Status Reports include the following information by source control facility or outfall (as available):

- Summary of business inspections conducted by SCWG members;
- Lists of new sources, completed actions, and updates in each source control area;
- Description of issues affecting source identification, characterization, and source control work;
- Priority of action and the agency or party responsible for it; and
- List of target dates for achieving source control actions as well as the rationale for changes.

Table 2 below summarizes the documentation addressed by this strategy. Final versions of these documents are posted on Ecology's website for the LDW. The web page contains links to EPA's LDW website as well as to appropriate web-pages of other SCWG members. See Appendix A for the list of SCAPs (with dates of publication) for the 24 sub-basins in the LDW.

Other studies and reports are published but are not specifically addressed in the Strategy. Reports and documents associated with these studies will continue to be reviewed by the SCWG and

issued by Ecology. Review and discussion in the SCWG is meant to ensure that these documents address source control needs and issues in the LDW and this practice will continue.

Table 2. Source Control Reports

Document	Description	Frequency	Reviewers
Summary of Existing Information and Data Gaps	Compiles existing information on sources/ pathways in each of 24 source control areas. Summarizes data gaps and source control needs.	Issued once with updates as needed in Source Control Status Report. If necessary, publish Supplemental reports.	Ecology, EPA, Seattle, King County, tribes, stakeholders
Source Control Action Plan	Identifies source control actions, implementing parties/agencies, priorities, and schedules.	Issued once with updates as needed in Source Control Status Report.	Ecology, EPA, Seattle, King County, tribes, stakeholders
Source Control Status Report	Summarizes source control actions with updates reflecting new information in each SCAP area. Tracks and summarizes source control accomplishments and documents issues affecting source control.	Annually and as resources allow	Ecology, EPA, Seattle, King County
Source Control Evaluation	Determines whether source control has reached the point where a sediment cleanup can proceed with some reasonable idea that recontamination potential has been (or is being) reduced.	Letter or memo as needed	Ecology
Other Studies and Reports	Technical and data reports, fact sheets, public notices for permits, etc.	As needed	Ecology, EPA, Seattle, King County, tribes, stakeholders

Source control takes time and often occurs over months and years. Progress on source control will continue to be reported in the Source Control Status Reports.

At some point, the lines of evidence described in the previous Source Control Evaluations section will lead Ecology to determine that a source or source area is controlled so that sediment cleanup may begin. The level of certainty those different lines of evidence provide will be the basis for this determination. Depending on the type of source, the size of a source area, and the nature of the actions implemented, Ecology will provide a memo or letter updating the site since the previous Status Report based upon evaluation of contamination, media and pathway(s), and recontamination potential for sediments.

It will not be possible to make clearly definitive recommendations (i.e., sources are sufficiently controlled) to proceed with a sediment cleanup in every circumstance. Factors that affect source control sufficiency recommendations include:

- The proximity of the sediment cleanup area to stormwater outfalls,
- The size of the stormwater sub-basin,
- The number of known contaminated sites and other contributions in it,
- The potential existence of new sites and contributions (e.g., historical contamination likely to be discovered), and
- The number of businesses operating within a sub-basin at any given time.

There are sediment areas proposed for cleanup that have no stormwater outfalls, no known ongoing sources or evidence of releases from adjacent properties, and no readily identifiable, current sources of the contaminants in the sediments. In these cases, Ecology may only be able to document that there are no readily identifiable sources with recontamination potential for the cleanup area.

Once sediment cleanups occur, sediment and water monitoring in the waterway will be needed to determine how effective source control has actually been, if additional controls are needed, and where further resources might be focused.

Public Involvement

This section outlines how Ecology will involve and inform stakeholders and the LDW community about source control activities and schedules. The stakeholders identified for the sediment cleanup and source control are: local environmental groups like the Duwamish River Cleanup Coalition, Muckleshoot and Suquamish Tribes, SCWG, LDWG, business community, and LDW community residents.

In addition to source control public involvement efforts outlined below, Ecology will continue public involvement efforts related to the sediment cleanup using Ecology's LDW Public Participation Plan (PPP) (updated 2013) as a guide. This PPP was developed with input from key stakeholders and EPA and outlines how Ecology will inform and involve stakeholders in the sediment cleanup process. The PPP and this section of the Strategy will be updated or expanded as source control work evolves and changes throughout the cleanup.

Ecology and its source control partners recognize that areas of the LDW community may experience disproportionate impacts from pollution and cleanup work in the LDW area. Ecology will work with EPA and partner agencies to promote environmental justice during development and implementation of source control policies and activities. The main components of source control public involvement include:

- **Public comment periods** related to legal agreements for source control including MTCA orders and consent decrees, water quality permits and orders, 401 Water Quality Certifications, air permits, RCRA Corrective Actions, and any regulation changes.
    - The timing of the required public involvement will differ between agencies since each agency will use a different mechanism (or combination of more than one mechanism) to solidify their commitment to source control efforts.
    - Source control partners will also hold or undertake public involvement as required by their own agencies.
    - Public comment periods will be combined when possible to streamline the process.
    - Ecology will announce upcoming public comment and notice schedules to LDW stakeholders online and during regular meetings with stakeholders.
- **Regular updates for key stakeholders on source control work including:**
    - Informational meetings when needed or requested
    - Conference calls on a semi-regular basis
    - Public meetings
    - Workshops with stakeholders
    - Presentations at stakeholder meetings and events as needed or requested

  - Updates at neighborhood meetings in South Park and Georgetown as needed or requested

- **Ecology and EPA collaboration:**
  - Ecology and EPA staff will plan and coordinate participation in public meetings and events when possible.
  - Ecology and EPA staff will continue to regularly share updates on source control and cleanup public involvement efforts.
- **Collaboration with partner agencies and other stakeholders including:**
  - Attendance at community events and meetings like the Lower Duwamish River Festival and neighborhood meetings
  - Attendance and presentations at meetings held by source control partners (agencies, Port, and others)
  - Other activities when possible
- **Fact sheets and other educational materials**
  - Ecology will develop fact sheets on source control efforts and mail them to the general LDW community and stakeholders as needed
  - Other educational materials will be developed as needed including brochures, posters, children's activity sheets and games
- **Public meetings and events in the community, as needed.**
- **Distribution of key documents**, such as this Strategy and SCAPs, to interested stakeholders for review and comment when appropriate. Comments from stakeholders will always be reviewed and considered when documents are finalized. Changes will be made to these documents based on comments when appropriate.
- **Participation in EPA's Quarterly Stakeholder meetings** to present information and update on source control efforts when needed.
- **Regular website upgrades and updates:**
  - New source control information, documents, presentations, and reports will be posted on Ecology's website on the main LDW webpage and the source control webpage when they are available. This will include SCAPs, data gaps reports, agreed orders, RI/FS reports, and others.
  - Ecology maintains a Lower Duwamish webpage at: http://www.ecy.wa.gov/programs/tcp/sites_brochure/lower_duwamish/lower_duwamish_hp.html This site includes information about all the cleanup and source control work in the LDW.

- Information about source control efforts has been incorporated into the main LDW webpage at: http://www.ecy.wa.gov/programs/tcp/sites_brochure/lower_duwamish/source_control/sc.html
- Ecology and EPA will share links related to source control on their respective websites where appropriate.

- **Source control document distribution and review:**
  - Ecology will continue to share the SCAPs and other source control reports with interested stakeholders, including the Muckleshoot and Suquamish Tribes, Duwamish River Cleanup Coalition, SCWG, and LDWG, for review and comment.
  - Ecology will consider all comments made by stakeholders when finalizing documents and will incorporate them when appropriate.
  - All final decisions on the Ecology source control documents such as Status Reports and sufficiency evaluations are made by Ecology, with review and comment by EPA.

References

AECOM. 2012. Final Feasibility Study, Lower Duwamish Waterway. 31 Oct 2012. AECOM. Seattle, WA.

Ecology. 2004. Lower Duwamish Waterway Source Control Strategy. Publication No. 04-09-043. Prepared by Washington State Department of Ecology, Northwest Regional Office, Toxics Cleanup Program. January 2004.

Ecology. 2012. Stormwater Management Manual for Western Washington. Prepared by Washington State Department of Ecology, Water Quality Program. August 2012. Publication No. 12-10-030.

Ecology and Environment. 2009. Final Report, Duwamish River Sediment Sampling and Analysis. Lower Duwamish Waterway Risk Assessment Technical Assistance. Prepared by Ecology and Environment, Seattle, WA.

EPA and Ecology. 2002. Lower Duwamish Waterway Site Memorandum of Understanding between the United States Environmental Protection Agency and the Washington State Department of Ecology. April 2002.

EPA and Ecology. 2004. Lower Duwamish Waterway Site Memorandum of Understanding between the United States Environmental Protection Agency and the Washington State Department of Ecology. April 2004.

EPA. 2002. Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites. Office of Solid Waste and Emergency Response. Directive 9285.6-08. U.S. Environmental Protection Agency. February 12, 2002.

Windward. 2003. Lower Duwamish Waterway Remedial Investigation. Task 5: Identification of Candidate Sites for Early Remedial Action. Technical Memorandum: Data Analysis and Candidate Site Identification (FINAL). Prepared by Windward Environmental, Seattle, WA.

Windward. 2010. Lower Duwamish Waterway Remedial Investigation Report (Final). Prepared by Windward Environmental, Seattle, WA.

Appendices

Appendix A. Source Control Action Plans

Source Control Action Plans	Publication Date
EAA-1 (Duwamish/Diagonal Way)	December 2004
EAA-2 (Trotsky Inlet)	June 2007
EAA-3 (Slip 4)	July 2006
EAA-4 (Boeing Plant 2/Jorgensen Forge)	December 2007
EAA-5 (Terminal 117)	July 2005
EAA-6 (Boeing Isaacson/Central KCIA)	March 2009
EAA-7 (Norfolk CSO/SD)	September 2007
RM 0-0.1 East (Spokane Street to Ash Grove Cement)	June 2009
RM 0.9-1.0 East (Slip 1)	May 2009
RM 1.0-1.2 East (King County Lease Parcels)	January 2011
RM 1.2-1.7 East (St. Gobain to Glacier Northwest)	June 2009
RM 1.7-2.0 East (Slip 2 to Slip 3)	June 2008
RM 2.0-2.3 East (Slip 3 to Seattle Boiler Works)	April 2009
RM 2.3-2.8 East (Seattle Boiler Works to Slip 4)	June 2009
RM 3.9-4.3 East (Slip 6)	September 2008
RM 4.3-4.9 East (Boeing Developmental Center)	December 2010
RM 0-1.0 West (Spokane Street to Kellogg Island)	Estimated February 2013
RM 1.0-1.3 West (Kellogg Island to Lafarge Cement)	June 2011
RM 1.3-1.6 West (Glacier Bay)	November 2007
RM 1.6-2.1 West (Terminal 115)	October 2011
RM 2.1 West (1st Avenue S Storm Drain)	Estimated March 2013
RM 2.2-3.4 West (Riverside Drive)	August 2012
RM 3.8-4.2 West (Sea King Industrial Park)	Estimated June 2013
RM 4.2-4.8 West (Restoration Areas)	Estimated June 2013

EAA = Early Action Area

RM = river mile

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Appendix B. LDW Source Control Background Information

The LDW is located in Seattle, Washington, and is approximately 5 miles long. Parts of the waterway also flow through the City of Tukwila and unincorporated King County. The EPA added the LDW to the Superfund list on September 13, 2001. Ecology added the site to the Washington State Hazardous Sites List on February 26, 2002. Contaminants found in waterway sediments include PCBs, PAHs, dioxin/furans, phthalates, mercury, arsenic, and other metals. These contaminants pose threats to people, fish, and wildlife.

In December 2000, EPA and Ecology jointly entered into an order with King County, the Port of Seattle, the City of Seattle, and The Boeing Company. The purpose of the order is to assess risks to human health and the environment, and evaluate cleanup alternatives by performing an RI/FS for the waterway. The EPA is the lead agency for the RI/FS. Ecology is the lead agency for coordinating and implementing source control at the site, in cooperation with the City of Seattle, King County, the Port of Seattle, the City of Tukwila and EPA.

The basis for the original 2004 Source Control Strategy and this Strategy is described in EPA guidance (EPA 2002) and in Washington's SMS [WAC 173-204]. The first principle is to control sources of contaminants early, starting with identifying ongoing sources of the contaminants of concern affecting a cleanup site. EPA's LDW ROD (which outlines and describes the cleanup action) will require that sources of sediment contamination be investigated and controlled as necessary.

Ecology and local partner source control agencies have been implementing an aggressive, comprehensive effort since 2002. This effort has successfully identified and reduced many sources of contamination.

The first Source Control Strategy was developed in 2004. This 2012 Strategy updates and replaces the previous version; the main revisions are listed below:

- Removed the Persistent Bioaccumulative Toxins section,
- Clarified roles between Ecology and EPA,
- Replaced "effectiveness and completeness" with "evaluation,"
- Modified reporting section to reflect current practices,
- Changed language stating "Contamination may pose a threat" to "Contamination <u>does</u> pose a threat,"
- Removed the concept of estimating the number of pounds of pollution removed from the environment, since source control studies have never collected these data,
- Removed Draft Action Plan Table of Contents for Duwamish/Diagonal Way Appendix,

- Removed prioritization of areas by a tier structure, and
- Added a section addressing agency-specific implementation plans.

This Strategy uses existing administrative and legal authorities to control sources of contamination, to perform inspections, and to require other necessary source control actions. The strategy describes how recontamination of waterway sediments will be controlled to the extent practicable.

The Source Control Work Group (Ecology, King County, the City of Seattle, the Port of Seattle, and EPA) will use this Strategy to identify source control issues, implement control of contaminant sources, and monitor source control. The SCWG may be expanded to bring in other entities that play a critical role in source control, as further described in the document. This Strategy is the basis for the series of detailed area-specific SCAPs developed by Ecology. Ecology and EPA prioritized the order of the production of these documents based on the anticipated sediment cleanup projects. The SCAPs document and prioritize source control activities for each source control area.

Remedial Investigation

The RI work was divided into two phases: Phase 1 was completed in 2003 and used existing data to:

- Identify high priority areas for cleanup, known as early action candidate sites,
- Identify initial human health and ecological risks posed by the site,
- Identify gaps in the existing data, and
- Produce a work plan to fill those gaps.

Based on Phase 1 work, seven EAA candidate sites were designated by EPA and Ecology (Windward 2003).

Phase 2 work began in 2004. Phase 2 of the RI consisted of sampling to fill the data gaps, analyzing information about the nature and extent of contamination, evaluating sediment transport processes, and assessing current conditions within the LDW, including risks to people and animals that use the LDW. The RI identified 19 COCs in the baseline Human Health Risk Assessment based on a Tulalip tribal seafood consumption rate for Puget Sound. PCBs, arsenic, carcinogenic PAHs and dioxins and furans are considered the four main risk drivers for human health exposure. The other 15 COCs not selected as risk drivers in the Human Health Risk Assessment were evaluated in the FS for risk reduction based on the remedial alternatives. These chemicals will be considered in the remedial design phase, and included in the post-remedial monitoring program that is part of the 5-year review by EPA.

In addition to the four human health risk drivers, 44 chemicals were identified as COCs for the benthic community and seven COCs for fish or wildlife. Of these, 41 were identified as risk

drivers for the benthic community and one for wildlife. The final RI Report was published in 2010.

Feasibility Study

The LDW draft FS was initiated in 2007 to evaluate sediment remediation alternatives for the site in accordance with the federal CERCLA and MTCA regulations. These regulations establish standards for evaluating remedial alternatives, selecting a remedy, and performing the cleanup. EPA sought public comment on the draft FS in 2010 and 2011, and finalized the FS in 2012. After completion of the FS, a draft Proposed Plan will be prepared and scheduled for release for public comment in early 2013, and a ROD is scheduled for release in 2014.

All of the alternatives described in the FS require source control to help prevent recontamination of the sediments following remediation. There were no target endpoints or goals for source control in the FS, but merely estimates of future conditions for the purpose of developing and comparing the alternatives.

In support of the FS, Ecology conducted an upriver study to understand the distribution of the COCs in surface sediments upstream (south) from river mile 4.9 to river mile 7.0. The data from this study was used to help determine the contaminant loading entering the LDW site from upriver and to determine whether there were any identifiable contaminant sources in the upriver area. Results of this study along with a King County study of the Green River and upper turning basin USACE Dredged Material Management Program core dredge data were used to approximate upstream river input values (including lower and upper bounds) for the Bed Composition Model in the FS.

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Appendix C: Ecology Implementation Plan

To be further developed by Ecology

Ecology is the lead agency for coordination and implementation of LDW source control efforts and will make recommendations to EPA on whether the extent of source control is sufficient for sediment cleanups to proceed. Many programs within Ecology are responsible for implementing and participating in controlling sources to the LDW including Water Quality, Hazardous Waste and Toxics Reduction, and Shorelands and Environmental Assistance. Ecology's Toxics Cleanup Program will coordinate these programs internally. Ecology's responsibilities for source control include the following, as funding and staff are available:

- Continue to lead, manage, and coordinate LDW source control efforts implemented by Ecology programs, other agencies, and private entities working in the LDW source area.
- Apply existing state regulatory authorities to ensure that source control actions in areas contributing to sediment contamination are accomplished, including the following:
    - Manage hazardous waste cleanups through Agreed Orders, Corrective Action Orders, or the Voluntary Cleanup Program.
    - Strengthen programs to reduce discharge of pollutants through stormwater and wastewater pathways in the LDW.
    - Inspect businesses and other entities with discharges to the waterway and in the areas draining to municipal storm drain systems and conduct follow-up to ensure compliance with the required regulations.
- As funding is available, continue to study possible sources to the LDW, including the following:
    - Evaluate the secondary air impacts to stormwater quality from known or suspected air emitters.
    - Evaluate the impact of the upstream sources within the Green-Duwamish River watershed.
- Determine the sufficiency of source control in order to make recommendations to EPA as to whether sediment cleanups should proceed.
- Use other agencies' authorities when necessary to address a source control problem.
- Maintain this source control strategy, including the following:
    - Document source control activities and maintain a public record for source control work.
    - Provide regular updates on source control to the public.

- Chair the Source Control Work Group.
- Continue participation in the Duwamish Inspection Group.
- Review, revise, and enforce, as necessary, implementation plans for the other agencies.
- Adaptively manage the LDW long-term source control strategy in response to changing conditions and new information.

Appendix D: EPA Implementation Plan

To be further developed by EPA

Coordinating, implementing, and participating in controlling sources to the LDW is a shared responsibility for EPA Region 10's Office of Environmental Cleanup, Office of Air, Waste, and Toxics, Office of Enforcement, and Office of Water. EPA's roles in source control efforts are to:

- Ensure that Region 10 program offices with shared responsibility for controlling sources coordinate with the SCWG agencies and are responsive to source control concerns. For example, EPA writes and administers NPDES permits for federal facilities.
- Coordinate source control with EPA-led site investigations and cleanup(s) and, as appropriate, require parties to investigate and control sources.
- Provide support to Ecology to enforce source control requirements as needed.
- Elevate, as necessary, fundamental program issues nationally within the agency to facilitate and strengthen source control work at regional, state, and local levels.
- Coordinate source control activities with other federal agencies that have regulatory authorities in the LDW as opportunities occur, such as USACE, Agency for Toxic Substances and Disease Registry, and U.S. Coast Guard.
- Support Ecology by providing technical assistance on source control issues and documents.
- Perform programmatic and technical reviews on the source control strategy, SCAPs, status reports, proposed source control actions, and source control documents.
- Coordinate source control with EPA-led site sediment investigation and cleanup(s) and, as appropriate, require responsible parties to investigate and control sources.
- Coordinate source control with other EPA-led activities in the waterway area.
- Assist in determining whether source control is sufficient to conduct sediment remedial actions in the LDW.
- Minimize the recontamination potential of sediments at EPA-led actions.
- Assist other public agencies with source control tasks, when necessary.

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Appendix E: City of Seattle Implementation Plan

To be further developed by City of Seattle

The City of Seattle (City) has had an aggressive source control program in the LDW since 2003. This ongoing program includes business inspections to determine that local businesses that drain to city-owned outfalls comply with the pollution prevention requirements of City code, source tracing/sampling to aid in identifying ongoing sources of pollution to the City drainage system, and line cleaning to remove legacy contamination from City storm drains. As of 2012, Seattle has inspected 1,250 businesses, collected over 600 samples, and cleaned 36,000 feet of storm drain lines in the areas contributing to the LDW. The City is currently developing a plan describing source control activities that the City will conduct in the LDW over the next 5 years to support upcoming sediment cleanup operations.

The City is involved in LDW source control efforts because it owns and operates stormwater and wastewater (sanitary sewers and combined sewer) collection systems within the City. The City Stormwater Code (SMC 22.800 – 22.808) gives the City the authority that is specified in the Code to protect people, property, and the environment from damage that can be caused by stormwater runoff. The code includes: requirements for pollution prevention/source control practices (basic BMPs for real property and specific BMPs for certain high-risk activities in areas draining to the City's municipal separate storm sewer system, or MS4); requirements for stormwater flow and quality control for new and redevelopment projects; and a definition of what can and cannot be discharged to the City drainage system.

The City's sanitary and combined sewer system collects domestic sewage, industrial wastewater, and stormwater from Seattle neighborhoods and discharges to the King County interceptor system, which conveys wastewater to the treatment plant at West Point. The City operates two CSOs in the LDW. Under its NPDES CSO permit, the City is responsible for reducing CSOs from its outfalls, as well as maintaining its CSO control systems and monitoring and reporting on its CSO discharges.

The City's role for source control is to:

- Continue participation in the Duwamish Inspection Group and the Source Control Work Group.
- Provide progress reports on source control activities to Ecology and the SCWG and participate in developing those portions of SCAPs and Status Reports addressing sources of pollution discharging to the City's MS4.
- Inspect commercial and industrial businesses and other entities in the areas draining to the City's MS4.

- Require businesses and other entities to take actions to meet the City's code requirements when sources of contaminants are found entering the City's MS4. Take enforcement actions as needed.
- Conduct other source control activities, such as source tracing and construction of stormwater control projects.
- Adaptively manage the City's Stormwater Management Program in the City's MS4 sub-basins that discharge to the LDW or to creeks tributary to the LDW.
- Implement and comply with applicable NPDES and/or State Waste Discharge Permits for city-owned and/or city-operated properties.
- Comply with the requirements of its NPDES CSO permit and Consent Decree with EPA and Ecology for CSOs in the LDW.
- Enforce Seattle Municipal Code as it relates to direct discharges to the LDW and creeks tributary to the LDW.
- Refer special cases to the appropriate regulatory entity when the City discovers a situation that the City does not have authority to address or after the City has made a documented effort of progressive enforcement.
- Ensure that monitoring conducted for the purposes of the sediment remedy is designed to produce data that allow for an evaluation of the effectiveness of the City's source control activities.
- Conduct additional monitoring as necessary to evaluate the effectiveness of the City's source control activities over time.

Appendix F: King County Implementation Plan

To be developed further by King County

King County (County) is involved in LDW source control efforts because it owns and operates stormwater and wastewater (sanitary sewers and combined sewer) collection systems in the LDW source area. Many different divisions within County government have roles in LDW source control activities.

King County owns and operates the sanitary sewer interceptor system, which conveys wastewater to the treatment plant at West Point. The County is responsible for sanitary sewer overflows and treated and untreated CSOs that occur from the interceptor system, and they operate ten CSOs that discharge to the LDW. King County has delegated authority from Ecology to regulate the types and amount of pollutants discharged from industrial users of the sewer system within the King County service area. The County's authority comes from the federal pretreatment regulations in 40 CFR Part 403 and related federal effluent limitations. These federal regulations along with Title 28 of the King County Code gives the KCIW Program authority to set limits on pollutants discharged, require BMPs and/or the installation of pollution treatment equipment, issue permits to dischargers, monitor, and enforce.

King County owns and operates a municipal separate storm sewer system (MS4) in unincorporated County areas that discharge to the LDW. The County also owns and/or operates the storm drainage system at the King County International Airport and other properties along the east side of the LDW. The County's Stormwater Services Group is principally responsible for implementing the County's Stormwater Management Program for its MS4, which includes investigating reported drainage and stormwater quality problems, small capital drainage improvement projects, water quality code compliance, maintenance of stormwater facilities, and updating and administering the County's stormwater regulations, the stormwater pollution prevention manual, and stormwater facility design standards. The County's Department of Transportation oversees source control activities at the King County International Airport.

The King County Hazardous Waste Program and the Environmental Hazards Group of Public Health-Seattle and King County have also participated in source control efforts. The King County Local Hazardous Waste Management Program focuses on helping residents, business owners and operators, and other institutions use fewer and less toxic materials, properly use and store hazardous materials, and properly dispose of hazardous wastes. These two agencies assist in inspecting commercial and industrial businesses and provide technical assistance and environmental education.

King County's role for source control is to:

- Continue participation in the Duwamish Inspection Group and the Source Control Work Group.

- Provide progress reports on source control activities to Ecology and the SCWG and participate in developing those portions of SCAPs and Status Reports addressing sources of pollution discharging to the sanitary sewers, combined areas generating contaminated industrial stormwater (overlapping jurisdiction), storm drainage from County-owned and/or operated properties, and unincorporated areas with County MS4.
- Inspect commercial and industrial businesses and other entities for discharges to the sanitary sewer system throughout the LDW source area, and to the County's MS4 sub-basins that discharge to the LDW or to creeks tributary to the LDW.
- Require businesses and other entities to take actions to meet King County's code requirements when contaminants are discharged to the sanitary sewer throughout the LDW source area, and when sources of contaminants are found entering the County's MS4. Take enforcement actions as needed.
- Conduct other source control activities as appropriate.
- Submit reports to Ecology on the status of source control related activities at EPA-led cleanup sites.
- Implement, and adaptively manage where necessary, the County's Stormwater Management Program in the County's MS4 sub-basins that discharge to the LDW or to creeks tributary to the LDW.
- Implement cleanups under MTCA for county properties in the LDW that present a recontamination risk.
- Implement and comply with applicable NPDES and/or State Waste Discharge Permits for County-owned and/or County-operated properties.
- Comply with the requirements of its NPDES permit that addresses CSOs and the Consent Decree with EPA and Ecology for CSOs in the LDW.
- Enforce King County Code as it relates to direct discharges to the LDW and surface water systems tributary to the LDW.
- Refer special cases to the appropriate regulatory entity when the County discovers a situation that the County does not have authority to address or after the County has made a documented effort of progressive enforcement.
- Ensure that monitoring conducted for the purposes of the sediment remedy is designed to produce data that allow for an evaluation of the effectiveness of the County's source control activities.
- Conduct additional monitoring as necessary to evaluate the effectiveness of the County's source control activities over time.

Appendix G: Other Agency Implementation Plans

Additional implementation plans to be added as necessary.

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