

Municipal Stormwater Source Control Report for Portland Harbor *City of Portland Outfalls Project*

PREPARED BY



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December 2013

Amended February 2014

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CITY OF PORTLAND ENVIRONMENTAL SERVICES



1120 SW Fifth Avenue, Room 1000, Portland, Oregon 97204 ■ Nick Fish, Commissioner ■ Dean Marriott, Director

January 17, 2014

Alex Liverman
Oregon Department of Environmental Quality
Northwest Region
2020 SW 4th Avenue, #400
Portland, OR 97201-4987

Subject: Transmittal of Municipal Stormwater Source Control Report and Notice of Completion – Intergovernmental Agreement for Remedial Investigation and Source Control Measures (DEQ No. LQVC-NWR-03-10)

Dear Ms. Liverman:

Enclosed are two copies of the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report). The Municipal Report describes our citywide stormwater source control programs, how those programs are being implemented in the Portland Harbor, and the City's role in an interagency effort to identify and control contaminant sources to the municipal stormwater conveyance systems located in the harbor. As we have discussed, this Municipal Report is a component of the Oregon Department of Environmental Quality's (DEQ) forthcoming summary report of upland source control in Portland Harbor. It also provides the general context for the *Closure Report for the City of Portland Outfalls Project* included as Appendix A. The Closure Report summarizes the results of the Intergovernmental Agreement (IGA) for Remedial Investigation and Source Control Measures for the City of Portland Outfalls Project.

This letter is also the City's Notice of Completion for Intergovernmental Agreement DEQ No. LQVC-NWR-03-10, between the City of Portland and DEQ dated August 13, 2003. In 2003, the City and DEQ developed the joint objectives for the IGA and a Scope of Work to identify the specific elements of the collaborative work that the City would perform. This work was necessary to minimize the potential for upland site discharges to City outfalls to recontaminate inriver sediment following future sediment remediation in Portland Harbor. In accordance with the terms of the IGA, the City is pleased to notify DEQ that it has completed work under this agreement, and requests a Source Control Decision, written Notice of Completion and final invoice of oversight costs owed under the IGA from DEQ for the Outfalls Project. The IGA provides 60 days for DEQ to issue a letter acknowledging satisfactory completion of activities in accordance with the agreement. If you anticipate needing an extended schedule for review, please inform the City of the proposed date for issuance of the notice. Once the Notice of Completion has been issued and the City has paid the final oversight costs, this IGA will be terminated.

Investigating and controlling contaminant sources to the municipal storm system required a different kind of approach than that typically utilized by DEQ at upland properties, because City regulatory authority alone would not have been sufficient for achieving source control at all identified sources, such as those where onsite investigation or remedial action was warranted. For more than a decade, the City and DEQ have worked together to identify sources of

contamination to the City outfalls located in Portland Harbor and to refer sources to an appropriate City, state, or federal program for the implementation of source controls under those respective authorities. Completing the IGA involved many interim steps, including the following key components:

- Development and approval of the *Programmatic Source Control Remedial Investigation Work Plan for the City of Portland Outfalls Project* to establish an approach for evaluating each outfall basin;
- Determining the potential for each basin to contain sources of contaminants that may have adverse impacts on river sediment, via contaminant discharges to the municipal stormwater conveyance system;
- Conducting source investigations where warranted to identify specific contaminant sources and referring sources to an appropriate program for control;
- Documenting investigation activities and findings in technical reports to DEQ; and
- Consulting with DEQ and the U.S. Environmental Protection Agency on the format and level of content for the Closure Report.

The Closure Report summarizes the City's satisfaction of IGA requirements, and presents Outfall Basin Completion Summaries for each outfall basin, that demonstrate how IGA objectives have been met for each of the 39 City outfalls located in the Portland Harbor Study Area. In partnership with DEQ, the City completed the remedial investigation of City outfall basins in Portland Harbor, verified that all significant current sources have been identified and are in an appropriate program to implement source control measures where needed, and concludes that future discharges from City outfalls are unlikely to represent a significant source of contaminants to the river.

Though the City has completed the specific work required under the IGA, the City's regulatory and non-regulatory stormwater source control programs in the harbor will continue. The City appreciates the productive collaborative relationships with DEQ that this IGA has fostered, and anticipates an ongoing partnership on issues of mutual concern in Portland Harbor.

Sincerely,



Linda Scheffler
Water Resources Program Manager
Superfund Program

cc: Rich Muza / EPA
Kristine Koch / EPA
Keith Johnson / DEQ (w/out attachment)
Kim Cox / City of Portland
Nanci Klinger / Office of the City Attorney

Enc.

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Abbreviations and Acronyms

BDS	Bureau of Development Services
BES	Bureau of Environmental Services
BMP	Best Management Practice
CBWTP	Columbia Boulevard Wastewater Treatment Plant
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
City	City of Portland
Closure Report	Closure Report for City of Portland Outfalls Project
CSO	combined sewer overflow
DEQ	Oregon Department of Environmental Quality
ECSI	Environmental Cleanup Site Information
EPA	U.S. Environmental Protection Agency
IGA	Intergovernmental Agreement
ISA	Initial Study Area
JSCS	Joint Source Control Strategy
LWG	Lower Willamette Group
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
Municipal Report	Municipal Stormwater Source Control Report for Portland Harbor
MS4	Municipal Separate Storm Sewer System
ND	not detected
NEC	No Exposure Certification
NJ	tentatively identified and estimated
NPDES	National Pollutant Discharge Elimination System
ODOT	Oregon Department of Transportation
Outfalls Project	City of Portland Outfalls Project
PBOT	Bureau of Transportation

PCB	polychlorinated biphenyl
PDC	Portland Development Commission
Port	Port of Portland
RI	remedial investigation
RI/FS	remedial investigation / feasibility study
RM	river mile
SCE	source control evaluation
SCM	source control measure
SLV	screening level value
Study Area	Portland Harbor Study Area
SWCM	stormwater control mechanism
SWMM	Stormwater Management Manual
SWMP	Stormwater Management Plan
SWPCP	stormwater pollution control plan
TMDL	total maximum daily load
TSS	total suspended solids
µg/L	micrograms per liter (i.e., parts per billion)
WPCL	Water Pollution Control Laboratory

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SECTION 1. Introduction

The City of Portland (City) developed this *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report) to meet two objectives. The first objective is to support the Oregon Department of Environmental Quality's (DEQ) forthcoming report that will summarize how source control is being achieved in Portland Harbor. This Municipal Report describes the City stormwater source control programs being implemented citywide and in the harbor. The second objective is to provide context for the attached Closure Report for the City of Portland Outfalls Project (Closure Report) documenting the City's completion of an intergovernmental agreement (IGA) with DEQ for remedial investigation and source control in the municipal stormwater conveyance systems in Portland Harbor.

Investigating and controlling sources to the municipal storm system required a different approach than typically has been used for remedial investigation of upland properties. Because some identified sources required onsite remedial investigation or action, City regulatory authority alone would not have been sufficient for achieving source control at all identified sources. Therefore, under the IGA with DEQ and in close coordination with the U.S. Environmental Protection Agency (EPA), the City and its agency partners collaborated on a Portland Harbor source investigation (the City of Portland Outfalls Project [Outfalls Project]) to identify contaminant sources to the 39 City outfalls in Portland Harbor, and to ensure that all identified sources were referred to an appropriate source control program. This report explains the City's general approach to source investigation and control in the municipal stormwater conveyance system and identifies the various City programs that improve stormwater quality in the harbor. Appended to this report is the Closure Report (see Appendix A).

Information presented in the Closure Report represents the culmination of more than a decade of coordinated, targeted work investigating sources to the municipal stormwater conveyance systems in the harbor and identifying mechanisms to ensure their long-term control. During the course of the investigation, the City prepared and submitted more than 50 technical reports to DEQ that document findings of the outfall remedial investigations and the source control referrals. Given the magnitude of the work completed and the availability of previous reports that present the technical details of the Outfalls

Project, the City worked with DEQ and EPA to formulate a format and level of content for this final report. The Closure Report in Appendix A summarizes how the City has met the IGA requirements and includes individual “Outfall Basin Completion Summaries” to demonstrate how IGA objectives have been achieved for each outfall.

As a result of the Outfalls Project, contaminant sources were identified and controlled by the dischargers, existing programs were modified to manage stormwater from sites with legacy contamination, new or revised regulations were created when needed, and interagency collaboration on stormwater quality concerns was improved. The City has completed the Outfalls Project, and the City’s programs that improve stormwater quality in the harbor will continue. Ongoing implementation of stormwater quality initiatives by the City, DEQ, and EPA will be essential to ensuring that each agency’s respective regulatory and programmatic functions continue to reduce contaminant discharges to the Willamette River via the municipal stormwater conveyance system, and minimize the potential risk of sediment recontamination after inriver remediation has been completed.

1.1 Purpose of Document

This Municipal Report presents how the City has completed its targeted Portland Harbor source investigation (the Outfalls Project) under an IGA with DEQ and how the City will continue to work with DEQ and other partners on the long-term implementation of source control programs. This report describes:

- The City’s general approach to source investigation and control in the municipal stormwater conveyance system.
- The City’s various stormwater source control programs and regulations that provide current and future protection of Portland Harbor and water resources citywide.

The Municipal Report is intended to supplement DEQ’s final report to EPA on Portland Harbor upland source control and to provide background information for the Closure Report included as Appendix A.

The purpose of the Closure Report is to support a DEQ Source Control Decision and Notice of Completion for the Outfalls Project. The Closure Report includes:

- A summary of City completion of the IGA Scope of Work.
- The rationale for concluding that source investigation is complete in every City outfall basin within Portland Harbor.

1.2 Report Organization

The remainder of this report is organized as follows:

- *Section 2: Background* — Summarizes the regulatory context and setting for City stormwater source investigation and control in Portland Harbor
- *Section 3: Outfall Basin Source Investigation* — Describes the objectives, approach, and findings of the Outfalls Project
- *Section 4: City Source Control Programs for Stormwater* — Describes the nature of stormwater source controls that are implemented through various City programs and code requirements
- *Section 5: Conclusions* — Summarizes the completion of the Outfalls Project and the City's current and future role in Portland Harbor stormwater source control
- *Section 6: References*
- *Appendix A: Closure Report for the City of Portland Outfalls Project* — Summarizes the satisfaction of IGA requirements and presents how IGA objectives were met for each City outfall basin
- *Appendix B: Portland Harbor Land Use Map Development* — Describes the methodology used for creating the land use map used in the report

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SECTION 2. Background

2.1 Regulatory Overview

2.1.1 Federal and State Roles

A 1997 study initiated by EPA and DEQ (EPA, 1998) identified elevated levels of hazardous substances in shallow, nearshore sediments throughout Portland Harbor. On December 1, 2000, EPA placed the Portland Harbor site (see Figure 2-1) on the National Priorities List under the federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), which established the Superfund program. The roles of the lead agencies involved with the investigation, cleanup, and source control of this site were defined by a Memorandum of Understanding (MOU) entered among DEQ, EPA, other agencies, and Tribes effective February 8, 2001. DEQ is designated as the lead agency for implementing environmental investigation and source control at upland facilities in the harbor under state cleanup authorities. EPA is designated as the lead agency for implementing environmental investigation and cleanup of in-water sediments in the Portland Harbor using CERCLA authorities. In 2001, EPA and members of the Lower Willamette Group (LWG) entered into an Administrative Order on Consent to conduct a remedial investigation/feasibility study (RI/FS) for in-water sediment below the mean high water mark in Portland Harbor (EPA, 2001).

Historically and currently, there are many pathways by which upland contamination may have reached the river, such as overwater spills, bank erosion, stormwater, groundwater, and industrial wastewater discharges. For the upland areas in Portland Harbor, the MOU specified that DEQ and EPA jointly develop a source control strategy that defines the process

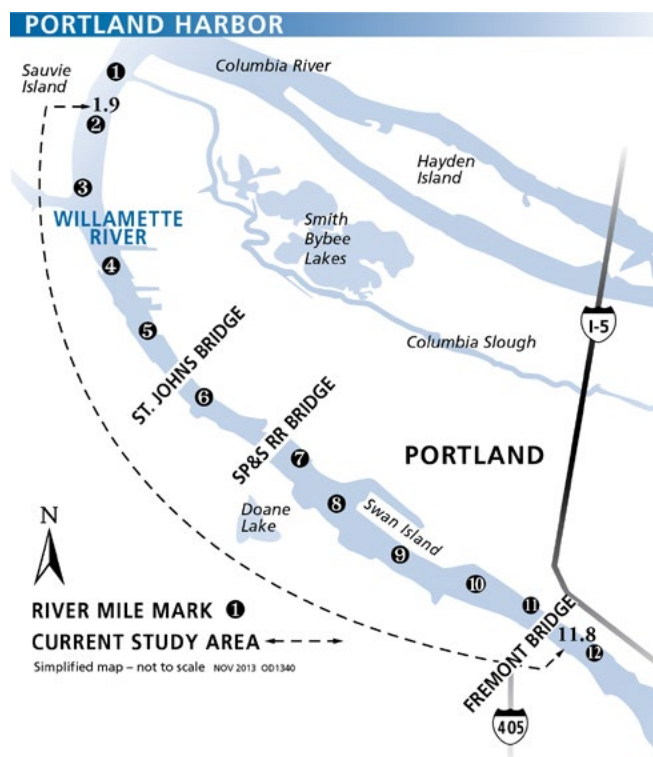


FIGURE 2-1. Portland Harbor Location

for identifying and controlling sources of contamination that could have adverse effects on the river. DEQ and EPA issued the *Portland Harbor Joint Source Control Strategy* (JSCS) in 2005, which established a framework for ensuring that sources and potential migration pathways to the river are evaluated and addressed (DEQ and EPA, 2005). The objective of the JSCS is to complete upland source control in the harbor so that inriver cleanup can proceed without threat of recontamination from upland areas.

Because stormwater has been identified in other Superfund sites as contributing to sediment recontamination after a sediment remediation project has been completed, DEQ is evaluating upland stormwater discharges to determine whether they pose reasonably likely future migration pathways for site contaminants to be transported to the river. DEQ issued its *Guidance for Evaluating the Stormwater Pathway at Upland Sites* (DEQ, 2009) to provide more detailed information to DEQ Cleanup Program project managers and upland sites on investigating and controlling contaminant discharges via the stormwater pathway. The DEQ Cleanup Program enters into agreements with individual owners of sites with known or suspected contamination, to determine whether remedial actions or source controls are warranted at the site.

2.1.2 City Stormwater Source Control

The City is a member of the LWG, and has the challenge of balancing many roles in Portland Harbor. The City Council designated the Bureau of Environmental Services (BES) as its lead agency for Portland Harbor. In this role, BES works within the LWG, with other City bureaus and programs, and with DEQ and EPA to help meet Portland Harbor objectives and to be an ongoing steward of the Willamette River.

The City works in multiple capacities to achieve Portland Harbor stormwater source control objectives, including as a:

- Regulator — working with private property owners to implement stormwater quality and pollution prevention programs under City, state, and federal guidelines.
- Provider of public conveyance services — working to ensure that contaminant discharges to City conveyance systems are identified and dischargers enter into City or state programs to control or eliminate those discharges.
- Property owner — implementing stormwater source controls as needed at City-owned properties in the harbor.

City stormwater source control programs predate the listing of Portland Harbor as a Superfund site. However, Portland Harbor includes unique upland conditions, such as older industrial areas with legacy site contaminants that were not necessarily being identified or adequately controlled by current site owners

and operators. For this reason, the City determined that the following were needed: (1) a specific Portland Harbor source investigation to ensure that all major sources to the City's stormwater conveyance systems in the harbor were identified and referred to appropriate state or City programs for control; and (2) evaluation of City and state stormwater source control programs to identify areas where program modifications were warranted to ensure long-term protection of river sediment and water quality. In partnership with DEQ, the City developed the Outfalls Project to meet these needs (see Section 2.1.3).

It should be noted that while many City programs are implemented citywide and throughout the Portland Harbor drainage area, others are limited only to the drainage area served by City conveyance systems (which represents about 50 percent of the upland area in the harbor). Section 4 describes the municipal stormwater source control programs and program coverage within the harbor.

Within the harbor, there are also properties owned by the City. The City identifies and implements stormwater best management practices as needed to control potential contaminant exposures to stormwater. Some of these sites were contaminated by historical industrial operations before acquisition by the City. Under separate agreements with the DEQ Cleanup Program, the City completes remedial investigations and if needed, remedial actions, to ensure that City properties do not pose adverse risks to human health and the environment and are not likely to cause recontamination of inriver sediment.

Details of investigations and decisions at these sites are not included in this report because they are covered under separate agreements with DEQ.¹

2.1.3 City and DEQ Partnership

Following the completion of the initial Portland Harbor sediment study in 1997, the City began evaluating the sediment data to assess whether City stormwater conveyance systems in the harbor may be providing pathways to the river for contaminants from upland sites. The City entered into a voluntary cleanup agreement with DEQ to conduct a preliminary assessment of the City's stormwater outfalls within the Portland Harbor Study Area (Study Area) (DEQ, 2000). The City and DEQ recognized that the regulatory authorities of both agencies would need to be implemented in order to identify and control contaminant sources to the river. Therefore, the City and the DEQ Cleanup Program began working together to develop a unique cooperative approach to source investigation and control for the Outfalls Project. Section 3 summarizes the specific work (e.g., preliminary assessments and pilot studies) conducted by the City on the Outfalls Project, before the formal IGA with DEQ.

In 2003, the City and DEQ entered into the Outfalls Project IGA to provide the framework for ongoing cooperative work to investigate and control potential

¹ City properties that are in the DEQ Cleanup Program and that discharge to City outfalls in the harbor are identified in the Completion Summaries in Appendix A.

upland sources of contaminants to the City stormwater conveyance system that could adversely affect sediment and surface water quality in Portland Harbor (DEQ, 2003). The IGA established mutual objectives for jointly conducting a remedial investigation and implementing source control measures within the system drainage area. The goals of the IGA were to use respective authorities to:

1. Identify all potentially significant sources of contaminants to the City stormwater conveyance systems in the harbor.
2. Ensure that all identified sources are in a program to implement source controls, where needed, to minimize or prevent the potential for sediment recontamination from those sources.

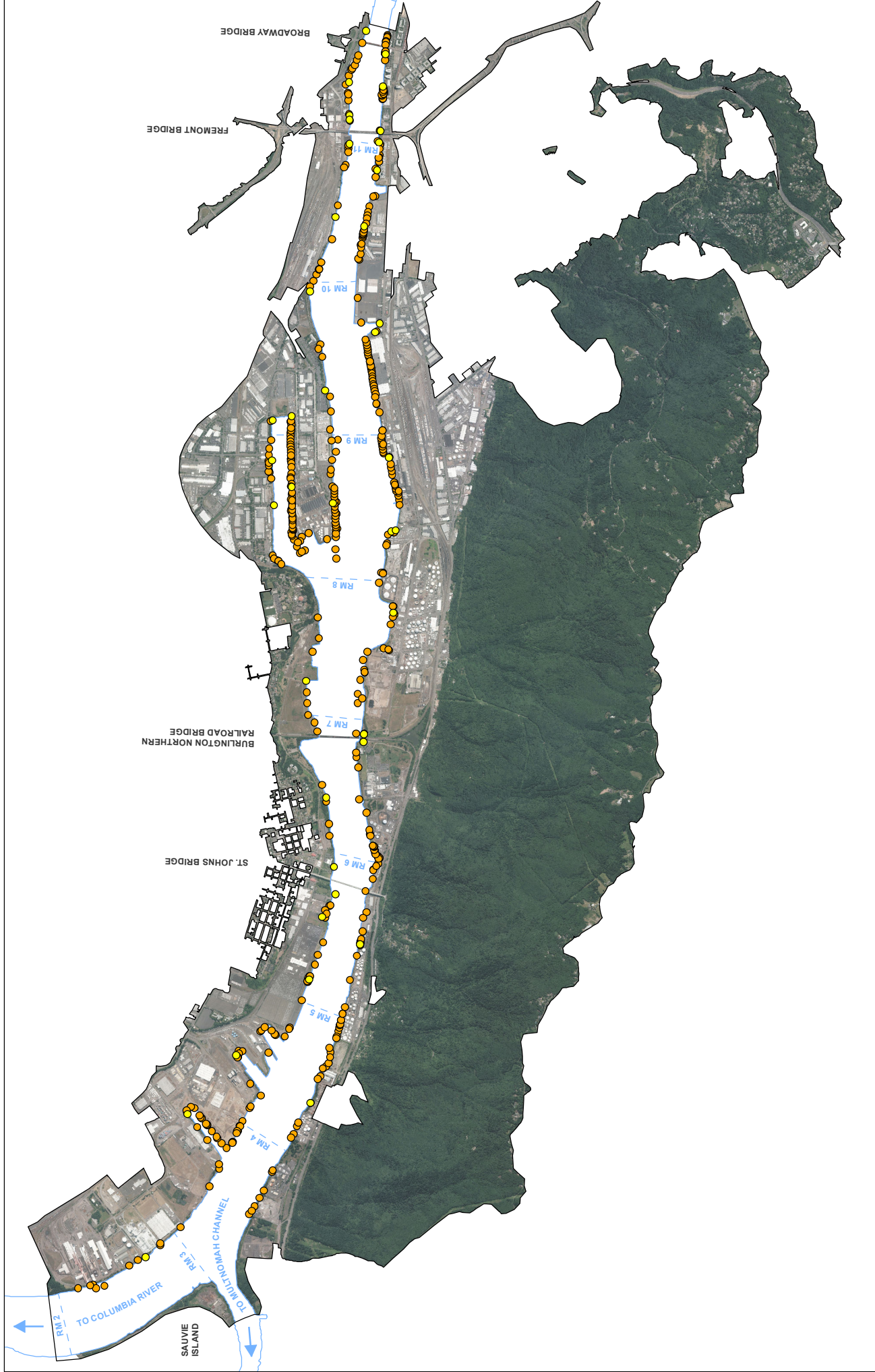
Under the agreement, the City provided technical support to DEQ on site discovery, site information from the BES Industrial Stormwater Program, source investigation findings, and feedback on stormwater pathway evaluations being conducted at DEQ Cleanup Program sites discharging to City storm systems. DEQ used information collected by the City to identify sites for DEQ Cleanup Program consideration and to inform site work plans and data evaluations. The City and DEQ also evaluated existing stormwater source control programs and modified programs to meet long-term Portland Harbor objectives. More information on the City's general approach implemented to meet the IGA objectives is provided in Section 3. Section 4 includes a discussion of the adaptive management process the City is applying in the harbor. The Closure Report is provided in Appendix A.

In addition to the IGA for the outfalls investigation, the City and DEQ entered into a separate IGA in 2004 to provide funding for a new Portland Harbor Stormwater Source Control Coordinator position in the DEQ Cleanup Program (DEQ, 2004). The coordinator is assigned to work on cross-program stormwater issues with the DEQ Water Quality and Hazardous Waste Programs and the City, and to provide programmatic and site-specific regulatory assistance related to stormwater source control in the harbor.

2.2 Setting

2.2.1 Location

The Willamette River drains the entire basin that lies between the Cascade Range and the Coast Range in western Oregon. Portland Harbor is at the downstream end of this large watershed, just upstream from the confluence of the Willamette River with the Columbia River. The Study Area is the stretch of the Willamette located between River Miles (RM) 1.9 and 11.8, or roughly between the southern end of Sauvie Island and the Broadway Bridge (see Figure 2-2). The Willamette River basin upstream of Portland is approximately 11,500 square miles, whereas the current Portland Harbor drainage area is approximately 18 square miles.

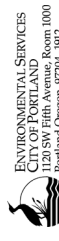


LEGEND

- City Outfall
- Non-City Outfall
- River Mile (RM)
- Portland Harbor Hydroboundary

FIGURE 2-2

Portland Harbor Overview



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Figure 2-2 includes the 2013 hydrologic boundary (i.e., “hydroboundary”), which delineates the land area adjacent to the Study Area that is served by stormwater conveyance systems that discharge to the Willamette River.²

2.2.2 Physical Characteristics

Historically, the Willamette River in the Portland area comprised an extensive and interconnected system of active channels, open slack waters, emergent wetlands, riparian forest, and adjacent upland forests. During the past 150 years, the Portland Harbor reach of the river has been redirected, straightened, filled, and deepened by dredging. Most of the riverbank has been filled, stabilized, and/or engineered for industrial or port operations with riprap, bulkheads, and overwater piers and docks. The river flow varies dramatically with the seasons, with low late summer dry-season levels and high rainy season and spring snow melt levels; during low flow conditions, periodic flow reversals within Portland Harbor also occur as a result of tidal effects. The Willamette River flows into the Columbia River and the Multnomah Channel.³ River stage and velocity within the Study Area are influenced by hydrologic conditions in the Willamette and Columbia rivers, including effects from dam operations on both waterways.

The width and depth of the river affect flow velocities and determine in part where sediment is eroded and deposited. Sediments moving down the river from upstream tend to accumulate in some areas and scour from others. Areas within the main channel tend to be more prone to natural disturbances (e.g., high seasonal flows) than sediments in off-channel areas, such as coves and the Swan Island Lagoon. Hydrodynamic and sediment transport characteristics vary within the Study Area as a function of multiple factors, such as the channel width and depth, degree of tidal influence, off-channel features, and other localized influences, such as propwash from shipping activities. Potential effects of stormwater discharges to the river also will vary depending on the nature of the localized area where stormwater discharge occurs.

2.2.3 Stormwater

The term “outfall” is used in this report to describe a piped point of discharge to the Willamette River from a conveyance system. Outfalls in Portland Harbor convey stormwater, wastewater, and/or combined sewage (i.e., a mix of stormwater and sanitary sewage) to the river from upland properties. There are 39 City outfalls in the Study Area, 36 of which currently discharge stormwater.⁴ More than 400 non-City outfalls also are located within the Study Area. These conveyance systems are operated by other public entities (e.g., the Oregon

² The hydroboundary is subject to change when modifications to existing stormwater conveyance systems or drainage are made and when new systems are constructed during property development.

³ Under certain conditions more than half the river flow is directed into the M. Channel.

⁴ The remaining three outfalls either have no flow at all (i.e., all historical connections to it have been sealed) or only function as a combined sewer overflow discharge point (see Section 2.3.2).

Department of Transportation [ODOT] and the Port of Portland [Port]) and private entities. Some outfalls convey stormwater from multiple parties (i.e., shared systems), while others are dedicated to a single entity. City and non-City outfalls are shown in Figure 2-2. The Outfalls Project addresses only City outfalls, which are described in more detail in Section 2.3.

Given the size of the Willamette River drainage basin relative to the Portland Harbor drainage area, stormwater discharging to Portland Harbor represents a small fraction of the river flow leaving the harbor. At DEQ's request, BES conducted an analysis of the contribution of stormwater flows to the river from the Study Area compared to the total flow in the Willamette River. Based on this analysis, the average annual runoff volume from the harbor is 0.06 percent of the total Willamette River flow; the contribution varies, depending on seasonal conditions and rain patterns, but Portland Harbor stormwater flows are 0.1 percent or less of the river flow at any given time (BES, 2006a).

2.2.4 Historical Development Overview

Understanding the history of industrial development and locations of industrial activities in Portland Harbor provides insight to the current potential sources of contaminants to the river via stormwater discharges. Many historical industrial activities resulted in contaminated soil and/or groundwater that still may be potential sources to the river, even if current land use does not appear to pose risk of contaminant releases.

The Study Area remained largely undeveloped through the late 1800s. Early industrial and commercial development along the river began in scattered areas, such as downtown Portland, St. Johns, Linnton, and Macadam (LWG, 2007). Industrial activities typically were located within narrow strips along the riverfront, while pockets of residential development existed in areas upgradient of the industrial areas, such as in the St. Johns and Linnton neighborhoods. Most of these waterfront industrial sites constructed private conveyance systems that discharged directly to the river.

At the beginning of the 20th century, businesses began to relocate from downtown to the current industrial areas of the harbor, especially the waterfront, as commercial development in the downtown area prevented further industrial expansion. Commercial and industrial land use in Portland Harbor accelerated in the 1920s and again during World War II, which reinvigorated industry following the Great Depression. During the war years, a considerable number of Liberty ships, minesweepers, and T-2 tankers were built at military shipyards located in Portland Harbor. A number of these shipyards also were involved in ship repair. Following the war, some of the shipbuilding facilities closed, but a few remained and were repurposed for scrapping the military's surplus and obsolete vessels. The years following the war also saw an increase in industrial development, which continued to spread throughout the Study Area. In addition to shipbuilding and repair, historical industrial land uses in Portland Harbor included lumber and steel mills, foundries, fuel facilities, rail yards, and

manufacturing facilities (LWG, 2007).

By 1985, most industries were gone from the west downtown area, except for several located on waterfront properties and the Hoyt Street Railyard. On the east side, heavy industrial operations continued along the riverfront downstream of downtown, starting from about the Steel Bridge. Light industrial activities were more widespread on the east side and interspersed with other land uses.

2.2.5 Current Land Use

Land use is an important consideration for stormwater source investigation and control because different land uses generally have different potential pollutant exposures and release mechanisms that may affect stormwater quality. For example, developed industrial areas with outdoor operations likely represent a higher risk of contaminant release to stormwater than commercial and residential areas where chemical products and materials are not handled in large quantities.

Current land use within the Study Area is a mix of heavy and light industrial, commercial, major transportation (i.e., highways and freeways), residential, and open space. Industrial land uses have been a focus of stormwater investigation in the harbor because other studies have shown that contaminant loading from industrial land uses typically is higher for many chemicals than other land uses, such as residential, commercial, and open space (Anchor and Integral, 2007). During the course of the Outfalls Project, the City evaluated current and historical land uses within specific drainage areas to inform where targeted investigations may be needed to identify current contaminant sources.

City zoning regulates general land use patterns for development in the City and can be used as a surrogate for evaluating land use. Figure 2-3 is a map of current land uses within the Study Area (refer to Appendix B for additional information about the map). Figure 2-3 provides a useful depiction of land use patterns, but it is not necessarily accurate for *all* individual properties because actual land use in some areas may not match zoning (e.g., undeveloped properties and non-conforming uses). Table 2-1 summarizes land use acreages within the Study Area and within the portion of the Study Area drained by City outfalls.

The predominant land use/zoning classifications in the Study Area are parks and open space (58 percent of total drainage area) and industrial (31 percent of total drainage – including light and heavy industrial), as shown in Table 2-1. The remaining land use categories combined comprise approximately 11 percent of the Study Area.⁵

⁵ Note that the General Employment zoning is included in the non-industrial percentage because in the harbor, this zoning often is used to allow a transition from industrial to other land uses. For example, the Triangle Park site was zoned industrial, but was changed to General Employment when the University of Portland purchased it for expansion of its campus.

Table 2-1. Land Use Totals within the Portland Harbor Hydroboundary (2013 Conditions)

Acres Per Land Use Classification								
	Heavy Industrial	Light Industrial	General Employment ¹	Major Transportation ²	Commercial	Residential	Parks and Open Space	Total
Total for Each Land Use within Hydroboundary³								
Acres	2,767	636	266	303	66	719	6,535	11,292
% of Total	25%	6%	2%	3%	<1%	6%	58%	100%
Total for Drainage through City Outfalls								
Acres	795	498	137	128	58	488	3,693	5,797
% of Total City Drainage	14%	9%	2%	2%	1%	8%	64%	100%
% of PH Land Use Category	29%	78%	52%	42%	88%	68%	57%	51%
Total for Drainage through Non-City Outfalls								
Acres	1,972	138	129	175	8	231	2,842	5,495
% of PH Land Use Category	71%	22%	48%	58%	12%	32%	43%	49%

PH = Portland Harbor

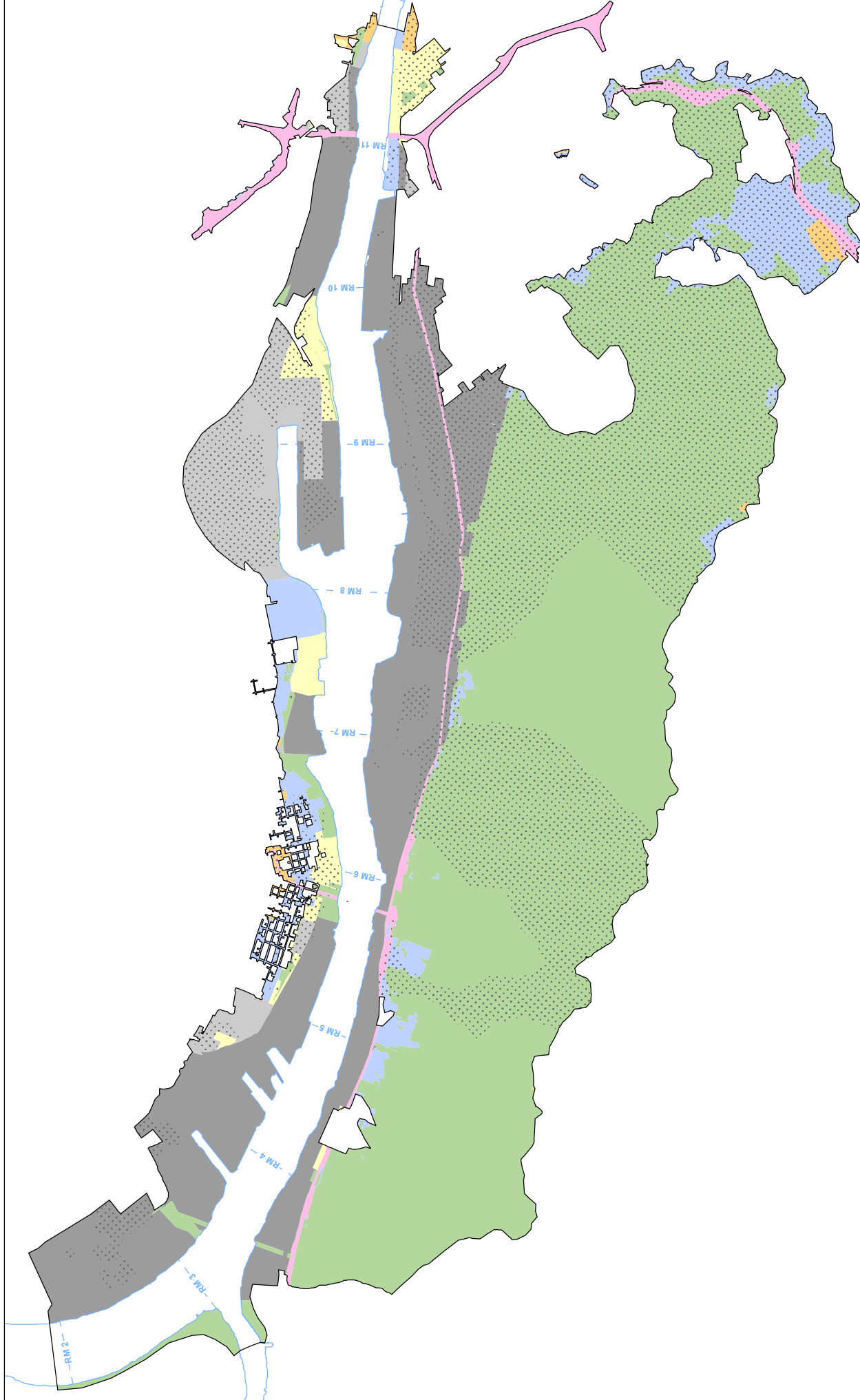
¹ General employment is a Portland zoning category that allows a range of employment opportunities, but emphasizes industrial and industrial-support uses (see Appendix B).

² Acreage for this land use category includes both developed and undeveloped Oregon Department of Transportation (ODOT) drainage areas.

³ Hydroboundary acreage does not include the surface area of the river.

The City's stormwater outfalls drain about 50 percent of the total area within the hydroboundary. Parks and open space comprise approximately 64 percent of the acreage drained by City outfalls. There are a couple of key differences between the hydroboundary land use acreages drained by City outfalls versus areas drained by non-City outfalls:

- The majority of heavy industrial drainage is in the non-City drainage area because much of the heavy industrial development is along the shoreline where properties discharge directly to the river.
- The majority of the light industrial land is in the City drainage areas.
- City stormwater systems serve the majority of commercial, residential, and parks and open space areas within the hydroboundary.



LEGEND

- City Outfall Basin
- River Mile (RM)
- Portland Harbor Hydroboundary

Land Use/Zoning

- Heavy Industrial
- Light Industrial
- General Employment
- Commercial
- Residential
- Parks and Open Space
- Major Transportation

FIGURE 2-3

Portland Harbor Land Use



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2.2.6 Road and Rail Corridors

The Study Area includes state roads, City roads, private roads, and railroad corridors. Some roads are impervious (i.e., improved with pavement) while others are pervious (e.g., gravel or dirt). The term “right-of-way” refers to an area between taxable properties where a right has been granted to establish a public transportation corridor. City roads, state roads, and some rail corridors are located within these rights-of-way. In some cases, there are areas where rights-of-way have been granted and planned, but never exercised (e.g., residential platting in what is now Forest Park included rights-of-way). Most rights-of-way are much wider than the developed roadway or railroad within them. Often rights-of-way include a mix of paved and unpaved surfaces (e.g., paved road surface and unpaved shoulders or areas between the curbs and the adjacent properties). Stormwater discharge from rights-of-way typically is generated from the impervious portions. Stormwater from roadways in some residential areas is routed through green infrastructure that provides treatment (e.g., engineered swales) and in other less developed areas, such as Linnton and Forest Park, road runoff drains to roadside ditches that allow for some stormwater infiltration and a portion of the suspended solids to settle.

Table 2-2 and Figure 2-4 depict the impervious areas within the Study Area, including City and state roads, and buildings and impervious surfaces on individual properties.

Within the Study Area, there is a relatively low prevalence of paved City roads (i.e., 2 percent of the total area). Typically, commercial and residential areas have more roads than do industrial areas because there are more individual tax lots within a given area (i.e., properties are smaller). However, as summarized in Table 2-1, these land uses comprise a small proportion (<7 percent) of the Study Area, and there is a large amount of open space (58 percent) where few paved roads are present. Many of the tax lots in the industrial areas are larger to

Table 2-2. Portland Harbor Impervious Areas

Category	Impervious Acres in Study Area	Percentage of Total Impervious Area	Percentage of Impervious within Study Area ¹	Impervious Acres within City Basins	Percentage of Impervious within City Basins ²
Total Impervious Area	2,717	100	24	1,410	24
City Paved Road	267	10	2	225	4
State Paved Road	189	7	2	82	1
Private Pavement	1,566	58	14	690	12
Buildings	695	25	6	413	7

¹Total upland portion of Study Area is 11,292 acres.

²Total area within City basins is 5,797 acres.

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accommodate industrial activities, so fewer roads are needed to access individual sites. In addition, a number of industrial properties use rail and shipping to move materials and goods, and many properties are served by state roads (e.g., Highway 30).

2.3 City Drainage in the Harbor


2.3.1 Stormwater System

As summarized in Table 2-1, City stormwater outfalls drain approximately half of the Portland Harbor upland area. Thirty-six City outfalls in the Study Area convey stormwater to the river from the municipal system. Three additional City outfalls are present, but no longer discharge stormwater to the river; all connections to Outfall 23 have been sealed; and Outfalls 24 and 46 now function only during infrequent overflows from the City's combined sewer system (see Section 2.3.2). City outfalls are located in each of the nine general geographic regions of the Study Area described in Table 2-3.

To facilitate the remedial investigation of the City outfalls, the City delineated the drainage area for each outfall using conveyance system maps, facility records, and topography. These drainage areas are referred to as "outfall basins." City outfall basins convey drainage from City stormwater lines and connecting stormwater lines constructed by other parties (e.g., ODOT lines and lines constructed on private property). Actual basin drainage areas are subject to change as development and redevelopment occur. In addition, it should be noted that the City used a conservative approach when delineating basins for the

General Location	Study Area Region	Reach (RM)	City OF	Description
<div>West Side</div> <div>↓</div> <div>Downstream</div>	Pearl District Area	10.3 - 11.8	10A, 11, 13, 14, 15	Encompasses area at the north end of downtown where current land use near river is shifting from industrial to residential/commercial.
	Guilds Lake Industrial Area	8.0 - 10.3	16, 17, 18, 19, 19A	This industrial area was mostly created by the filling of Guilds Lake in the 1920s. Area extends roughly from NW Nicolai to NW Kittridge.
	Willbridge/Doane Lake Area	6.0 - 8.0	22, 22B, 22C	This industrial area includes the Willbridge bulk oil and chemical distribution terminals and the former Doane Lake complex that subsequently became the location for chemical, steel, and gas manufacturing; battery and metals recycling; and multiple landfills.
	Linnton Area	3.0 - 6.0	22D, 23*, 24*	Encompasses the historical town of Linnton with a mix of shoreline industrial development and residential/commercial development along Highway 30. Area extends roughly from the St. Johns Bridge to the Multnomah Channel.

Table 2-3. Study Area Regions and City Outfalls

General Location	Study Area Region	Reach (RM)	City OF	Description	
East Side 	Upstream	Albina Area	9.9 - 11.8	42, 43, 44, 44A, 45, 46*, 47	Encompasses the historical town of Albina with a mix of mostly industrial activities adjacent to the river. The area extends roughly from the Broadway Bridge to N. Going, and includes grain, concrete, and asphalt terminals and a rail yard.
		Swan Island/ Mocks Bottom Area	8.1 - 9.9	S-1, S-2, S-5, S-6, M-1, M-2, M-3	Industrial area that serves as a major freight hub. Includes a shipyard, freight couriers, warehouse and distribution operations, and manufacturing.
		St. Johns Area	5.1 – 8.1	48, 49, 50, 52, 52A, 53	Includes the University Park, Cathedral Park, and St. Johns neighborhoods. Development is typically industrial along the shore line and residential above the bluff.
		Port of Portland Terminal 4/ International Slip Area	3.4 - 5.1	52C, 52D	This area is entirely industrial and comprised primarily of a marine terminal, intermodal rail operations, scrap metal recycling, and other heavy industrial uses.
	Downstream	Rivergate Area	1.9 - 3.4	53A	This industrial area extends roughly from N. Time Oil Rd. to the north end of the Study Area. Industrial activities include steel and cement manufacturing and bulk storage facilities.

RM = river mile

OF = outfall

* Indicates outfalls that are present, but do not discharge stormwater (e.g., connections to it are sealed or outfalls only have the potential to discharge during infrequent combined sewer overflow conditions).

source investigation. To ensure that potential source areas were not overlooked, delineations for some basins include areas where stormwater likely infiltrates rather than discharges to the City conveyance system (e.g., gravel portions of rail yards and substations). For these reasons, outfall basin delineations presented in this report are approximate in some locations.

Table 2-4 summarizes the physical characteristics of the 39 City outfalls present within the Study Area, and Figure 2-5 presents the 36 City stormwater drainage basins. Outfalls 23, 24, and 46 do not have stormwater drainage basins affiliated with the outfalls because stormwater from the historical affiliated drainage basins has been diverted to the City's wastewater treatment plant (see Section 2.3.2).

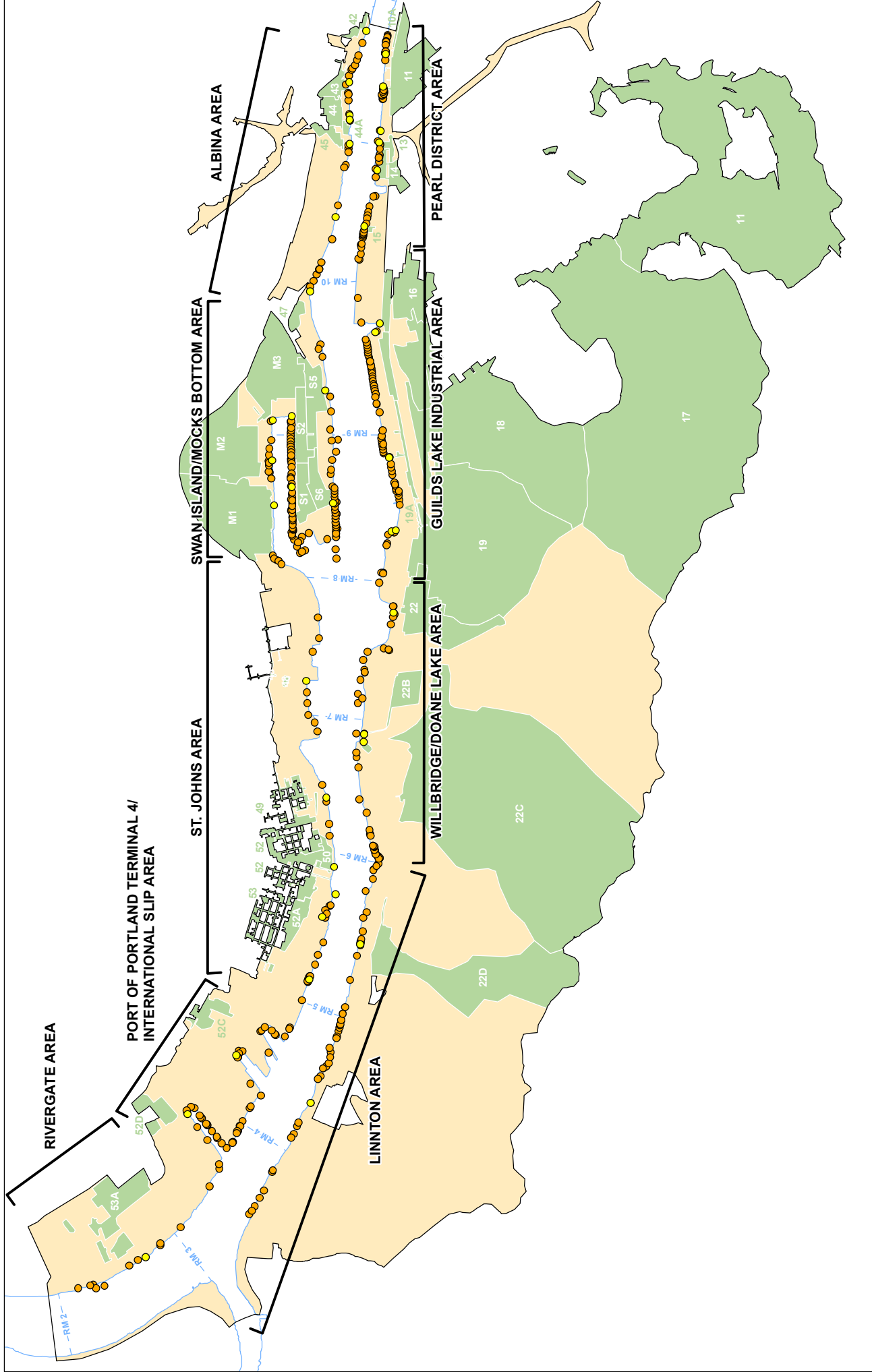
Table 2-4. City Outfall Physical Characteristics

	Outfall ID	River Mile	Outfall Size	Basin Acreage	Basin Land Use (acres)						
					Heavy Industrial	Light Industrial	General Employment	Commercial	Residential	Parks and Open Space	Major Transportation
West Side	OF 10A	11.6	30"	2.9	--	--	0.5	1.2	1.2	--	--
	OF 11	11.4	78"	948.8	--	--	56.4	38.1	344.4	433.5	76.4
	OF 13	11.1	24"	4.9	2.0	--	0.3	--	2.5	--	0.1 ^(a)
	OF 14	10.8	30"	17.9	5.5	4.8	--	--	7.6	--	--
	OF 15	10.4	102"	1.1	1.1	--	--	--	--	--	--
	OF 16	9.7	36"	70.6	66.2	--	--	--	--	--	4.4
	OF 17	9.6	90"	1486.2	76.0	--	--	1.6	36.6	1368.0	4.0
	OF 18	8.8	72"	470.1	191.6	--	--	--	2.7	269.1	6.7
	OF 19	8.4	42"	486.4	146.6	--	--	--	--	330.4	9.4
	OF 19A	8.4	60"	1.7	1.7	--	--	--	--	--	--
	OF 22	7.8	60"	95.2	68.3	--	--	--	--	25.3	1.6
	OF 22B	6.9	48"	29.4	29.4	--	--	--	--	--	--
	OF 22C	6.8	84"	1099.6	52.7	--	--	--	7.0	1030.4	9.5
	OF 22D	5.5	48"	241.9	--	--	--	--	12.3	223.3	6.3
	OF 23	5.2	27"	0	--	--	--	--	--	--	--
	OF 24	4.4	12"	0	--	--	--	--	--	--	--
East Side	OF 42	11.7	10"	6.1	--	--	--	4.0	--	2.1	--
	OF 43	11.4	56"	14.0	2.6	11.4	--	--	--	--	--
	OF 44	11.2	12"	15.9	0.7	15.2	--	--	--	--	--
	OF 44A	11.2	72"	2.3	1.3	--	--	--	--	--	1.0 ^(a)
	OF 45	11.0	27"	9.9	5.6	0.4	--	--	--	--	3.9 ^(a)
	OF 46	10.4	80"	0	--	--	--	--	--	--	--
	OF 47	9.9	48"	9.5	0.5	--	9.0	--	--	--	--
	OF M-1	8.5	60"	162.4	--	162.4	--	--	--	--	--
	OF M-2	8.8	60"	135.4	--	134.0	--	--	--	1.4	--
	OF M-3	9.1	60"	104.0	--	85.4	18.6	--	--	--	--
	OF S-1	8.7	36"	23.3	21.3	2.0	--	--	--	--	--

Table 2-4. City Outfall Physical Characteristics

					Basin Land Use (acres)						
	Outfall ID	River Mile	Outfall Size	Basin Acreage	Heavy Industrial	Light Industrial	General Employment	Commercial	Residential	Parks and Open Space	Major Transportation
East Side	OF S-2	9.1	36"	27.1	2.6	24.5	--	--	--	--	--
	OF S-5	9.3	36"	38.4	1.6	20.5	16.1	--	--	0.1	--
	OF S-6	8.6	36"	22.0	18.9	3.1	--	--	--	--	--
	OF 48	7.2	30"	7.5	0.1	--	0.1	--	6.1	1.2	--
	OF 49	6.4	15"	32.7	--	--	1.4	3.5	25.8	1.5	0.5
	OF 50	5.9	30"	38.6	--	--	13.3	8.2	13.8	1.6	1.7
	OF 52	5.7	30"	24.5	0.01	--	15.5	--	4.7	2.4	1.9
	OF 52A	5.6	36"	26.1	2.1	12.5	4.7	0.4	4.2	2.2	--
	OF 52C	4.4	36"	21.6	--	21.4	0.2	--	--	--	--
	OF 52D	3.9	24"	23.9	23.9	--	--	--	--	--	--
	OF 53	5.2	48"	21.2	--	--	1.1	0.8	19.3	--	--
	OF 53A	2.7	48"	72.6	72.6	--	--	--	--	0.05	--

^(a)Major Transportation acreage in the basin likely is less than this value or none. When land use occurs in multiple vertical dimensions (e.g., State highways elevated over separate land use beneath), the land use map assigns a value to the top layer, but not the underlying land use. This can result in minor inaccuracies in calculated acreages.



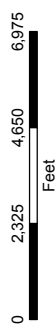
LEGEND

- City Outfall
- Non-City Outfall
- City Outfall Basin
- Non-City Outfall Drainage Areas
- River Mile (RM)
- Portland Harbor Hydroboundary

FIGURE 2-5

City Outfall Drainage in Portland Harbor

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CITY OF PORTLAND
1120 SW Fifth Avenue, Room 1000
Portland, Oregon, 97204-3512



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2.3.2 Combined Sewer Control

In addition to separated stormwater and sanitary sewer conveyance systems, the City's conveyance systems in the harbor include combined sewers, primarily in certain residential and commercial areas, that carry a mix of stormwater and sanitary sewage. Eight outfalls currently have the potential to discharge a combination of stormwater and sanitary sewage during what is called a combined sewer overflow (CSO). CSOs can occur when the capacity of the combined sewer system is exceeded during heavy rain events. When they occur, CSO discharges on average include approximately 80 percent stormwater and 20 percent sanitary wastewater.

In the late 1940s, the City began to construct large interceptor pipes to reduce the amount of combined sewer flow reaching waterways by routing wastewater to the Columbia Boulevard Wastewater Treatment Plant (CBWTP), which started operating in 1952. Additional work involved constructing new separated stormwater and sanitary systems in areas traditionally served by a combined system, primarily in the industrial areas between the river and the residential and commercial developments that typically are located farther from the river.

Starting in the early 1990s under DEQ oversight, the City began implementing a 20-year CSO Abatement Program that included measures to significantly reduce overflows to the Willamette River (BES, 2012a). The objective of the CSO Abatement Program for the Willamette was to reduce the average number of CSO events (i.e., "control" CSO outfalls) to no more than four per winter and one every three summers.

The City initiated the CSO Abatement Program with the Cornerstone Projects, which were designed to reduce the volume of stormwater entering the combined sewer system. In neighborhoods on the east side of the Willamette River, the City worked with residents to redirect stormwater flow from roof drains away from the combined sewer system and into yards where stormwater can infiltrate. On the west side, the City completed the Tanner Creek Stream Diversion Project to reroute underground stream flow from Tanner Creek away from the combined system and directly to the Willamette River. All of the CSO outfalls downstream of RM 9.8 were controlled before the Portland Harbor was listed as a Superfund site; this was about one half of the CSO outfalls in the Study Area.

CSO projects included major infrastructure improvements on the west and east sides of the Study Area. In 2006, the City completed the West Side Big Pipe – a large tunnel that controls CSO outfalls on the west side of the Willamette River by conveying combined sewage to a new pump station on Swan Island and on to the CBWTP. By 2011, a similar tunnel on the east side, the East Side Big Pipe, was also in operation to control CSO outfalls on the east side of the river. The City completed the CSO Abatement Program in 2011.⁶ All CSO outfalls are now controlled.

⁶ A video summarizing the City CSO Abatement Program is available for online viewing at: <http://www.portlandoregon.gov/bes/article/402830>

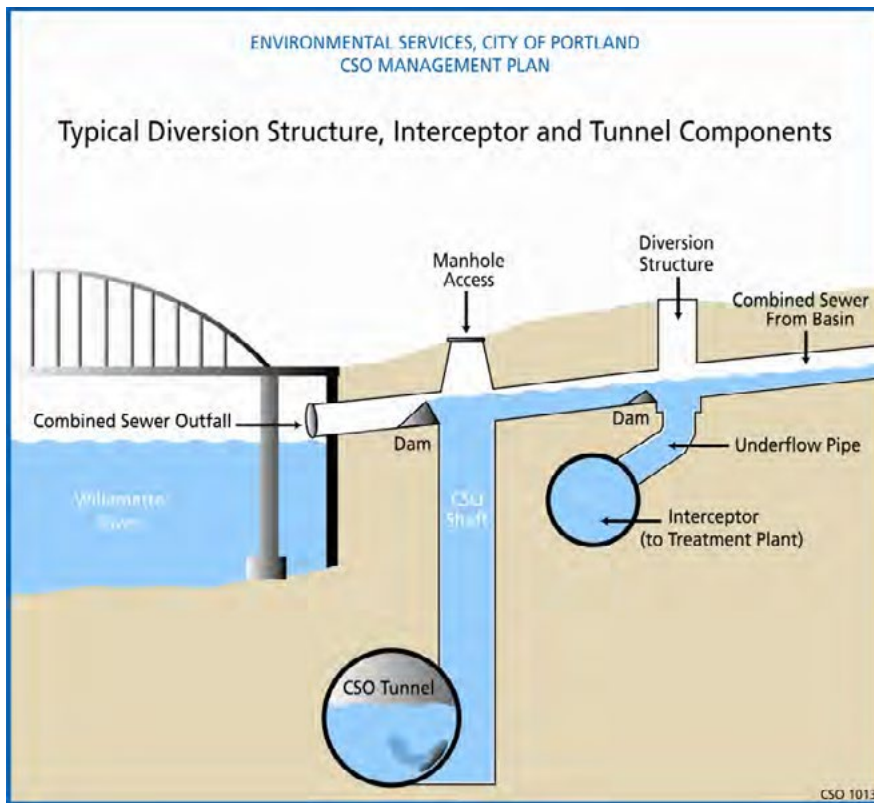


FIGURE 2-6. Typical CSO Outfall Design

Before completion of the new West Side and East Side Big Pipes (i.e., tunnels), CSO outfalls within the harbor were subject to overflows from combined sewer drainage areas affiliated with each outfall. Now the CSO outfalls in the harbor where overflows are most likely to occur (i.e., up to four CSO events per winter) are subject to overflows from the tunnels, which contain combined sewer flow from broader drainage areas. In other words, these CSO outfalls now function as relief points for periodic heavy rainfall events that cause backups in the west side or east side tunnels, and combined sewage from the basin only overflows when the tunnel overflows (see Figure 2-6).

Figure 2-7 provides an overview of the major facilities in the City’s combined sewer system and the CSO outfalls in the harbor (BES, 2011a). Table 2-5 summarizes the City outfalls in the harbor that were controlled under the 20-year CSO Abatement Program.

In addition to the reductions of stormwater discharges to the harbor from CSO events, the CSO Abatement Program resulted in the diversion of approximately 600 acres of formerly separated stormwater drainage, including about 165 industrial acres, from the river to the CBWTP. Current stormwater drainage through City outfalls is depicted in Figure 2-5. Figure 2-8 displays the spatial extent of CSO controls in Portland Harbor, as well as the specific areas where the City diverted separated stormwater to the CBWTP.



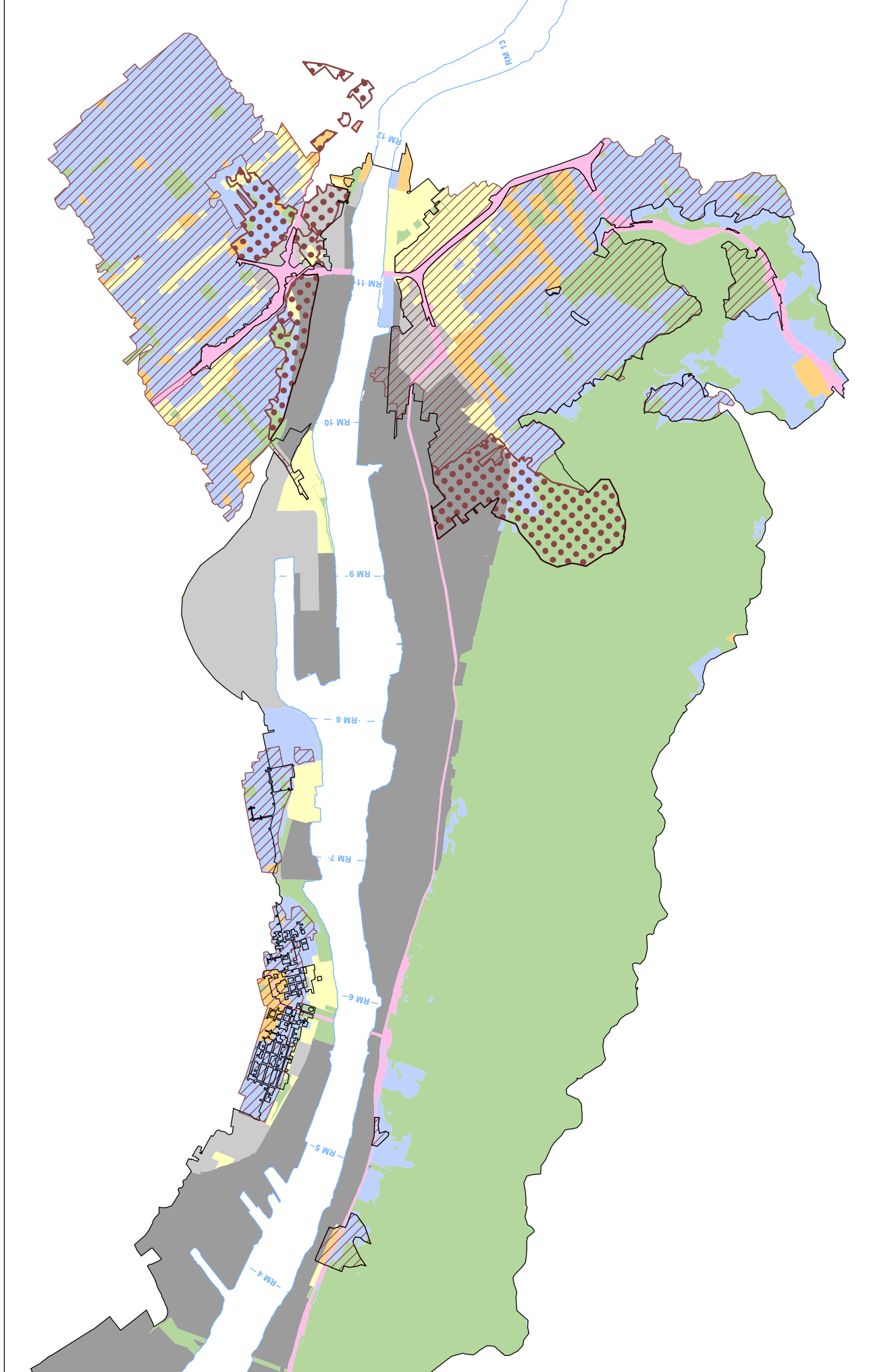
FIGURE 2-7
Overview of Portland's CSO and
Combined Sewer System- December 2011

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Table 2-5.
Portland Harbor Outfalls Controlled as Part of the City's 20-Year CSO Abatement Program

	Outfall ID	River Mile	Control Date	CSO Potential?	Control Method	Control Level
West Side	11	11.4	2006	No	Tanner Creek and West Side Facilities	Sealed
	13	11.1	2006	No	West Side Facilities	Sealed
	15	10.4	2006	Yes	Tanner Creek and West Side Facilities	3-Year Summer, 4-per Winter
	17	9.8	2011	Yes	West Side Facilities; Balch Consolidation Conduit	10-Year Summer/Emergency
	23	5.2	1992	No	System Improvements	Sealed
	24	4.3	2000	Yes	Partial separation and pump station improvements.	3-Year Summer
East Side	43	11.4	2011	Yes	East Side Facilities	3-Year Summer, 4-per Winter
	44A	11.2	2011	No	East Side Facilities	Sealed
	46	10.5	2006	Yes	Cornerstone Projects and East Side Facilities	3-Year Summer, 4-per Winter
	47	9.9	2006	Yes	West Side Facilities	3-Year Summer, 4-per Winter
	48	7.3	1996	No	Cornerstone Projects and System Improvements	Sealed
	49	6.5	1995	No	Cornerstone Projects and System Improvements	Sealed
	50	5.9	1995	No	Cornerstone Projects and System Improvements	Sealed
	52	5.7	1995	Yes	Cornerstone Projects and System Improvements	3-Year Summer
	53	5.2	1995	Yes	Cornerstone Projects and System Improvements	3-Year Summer

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LEGEND

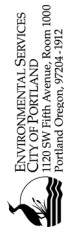
-  Approximate Controlled CSO Area
-  Approximate Diverted Separated Stormwater Area
-  River Mile (RM)
-  Portland Harbor Hydroboundary
-  Heavy Industrial
-  Light Industrial
-  General Employment
-  Commercial
-  Residential
-  Parks and Open Space
-  Major Transportation

NOTE: Land use/zoning data compiled for this map did not include all CSO control areas outside the hydroboundary.

MAP NOTES: Date: December 2013, Data Sources: BES

FIGURE 2-8

CSO Control Area in Portland Harbor - December 2011



0 2,325 4,650 6,975
Feet

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SECTION 3.

Outfall Basin Source Investigation

The City determined that an evaluation of contaminant sources in City basins was needed because of the unusual conditions in Portland Harbor, where historical industrial activities may have resulted in legacy contamination at upland areas with current pathways to the river. The Portland Harbor Remedial Investigation (LWG, 2011) concluded that “historical releases from upland or overwater activities likely contributed to the majority of the observed chemical distribution in sediments within the Study Area.” Some of these historical releases at upland sites may continue to be current sources if there is legacy contamination onsite. Because current site owners and operators may not have anticipated potential adverse impacts to site stormwater from legacy releases, the City developed and completed a Portland Harbor source control program (the Outfalls Project) to ensure that sources to City basins were identified and referred to appropriate programs for control. The Outfalls Project investigation is described in more detail below.

3.1 Pre-IGA Source Investigation Activities

The City began evaluating potential sources to City outfall basins in Portland Harbor in early 2000 in recognition of the sediment contamination observed in the harbor. Steps taken before the development of the Outfalls Project IGA with DEQ included conducting outfall preliminary assessments, development and completion of a Pilot Project, and collection of inriver sediment data near City outfalls. Data collected during early investigation of sources to the stormwater conveyance system informed the development of the IGA and the approach for future investigations in City outfall basins. These activities are described in more detail below.

3.1.1 Preliminary Assessment

In 2000, the City completed a preliminary assessment of outfall basins located within the Portland Harbor Initial Study Area (ISA), a roughly 6-mile stretch from RM 3.5 to RM 9.2.

The objective of the preliminary basin assessments was to compile available background information about each of the approximately 20 City outfalls in the ISA to determine where further source investigation may be warranted. Data included physical information about the outfalls, a comparison of nearby sediment data to DEQ preliminary “baseline” values for individual contaminants (DEQ, 1999), and summaries of upland site information within each basin (e.g., current and historical facility lists, stormwater permit data, spill and hazardous material records, etc.). The City submitted the basin information to DEQ in two reports – one for the east shore outfalls and one for the west shore outfalls (BES, 2000a and 2000b).

3.1.2 Pilot Project

After the completion of the preliminary basin assessments, DEQ and the City developed a collaborative pilot project approach for the outfall basin investigations. The Pilot Project objective was to formulate a process for:

- Evaluating the impacts of upland contaminants discharged to the City stormwater outfalls on Willamette River sediment quality.
- Identifying upland sources of contaminants within the outfall basins.
- Guiding source control efforts.

Outfall Basins 18 and M-1 (see Figure 2-5) were selected for the two-phased Pilot Project (CH2M HILL, 2002). Phase 1 entailed collecting inriver sediment samples in the immediate vicinity of the two outfalls and updating the basin assessments with new or revised information (CH2M HILL, 2003a, 2003b, and 2004a). The purpose of Phase 1 was to determine whether these outfalls were likely conduits for current sources of contaminants to river sediment and to identify which contaminants warranted further investigation in Phase 2. Phase 2 of the Pilot Project was designed to identify current sources of the contaminants identified in Phase 1 and to develop a collaborative approach between the City and DEQ for controlling identified sources. Phase 2 included collection and analysis of inline solids (i.e., sediments accumulated within City storm lines from upland drainage areas), observations of dry-weather flow⁷ in the conveyance systems, and comprehensive facility inspections within Basins 18 and M-1 (CH2M HILL, 2005).

The results of the Pilot Project were used as a model to streamline the collaborative source investigation and control processes in the remaining basins in the harbor.

⁷ “Dry-weather flow” is defined as non-stormwater flows from various sources including, but not limited to, diverted stream flow, groundwater infiltration, approved or permitted discharges (e.g., remediated groundwater, structure dewatering, non-contact cooling water), etc.

3.1.3 Outfall Sediment Sampling

After completing inriver sediment sampling near Outfalls 18 and M-1 under the Pilot Project, the City collected inriver sediment data (see Figure 3-1) from the remaining City stormwater outfalls in the ISA (CH2M HILL, 2004b). The City used these data to prioritize outfall basins for additional source investigation (see Section 3.3).

Figure 3-1. City Outfall Sediment Sampling



City inriver sediment sampling in the vicinity of City outfalls included multiple samples collected upstream, at, and downstream of outfall locations.

3.2 IGA Objectives and General Approach

In 2003, the City and DEQ entered into an IGA that established the framework for collaboration on source investigation and control in City outfall basins (DEQ, 2003). The Outfalls Project IGA constitutes the agreement between DEQ and the City to conduct a collaborative remedial investigation (RI) in City outfall basins and to identify and require implementation of source control measures (SCM) as needed under their respective authorities. The primary joint DEQ and City objectives of the outfalls RI/SCMs were to:

- Identify contaminant sources and pathways for each outfall.
- Determine if source control measures are needed within the basin (i.e., at upland sites or in the City system).
- Confirm that all identified sources are in the appropriate program to implement necessary controls.
- Evaluate the potential for upland sources to the City outfalls to be a significant future contaminant migration pathway to river sediment.
- Evaluate City and state stormwater programs to determine if modifications are needed to ensure long-term protection of sediment quality from upland sources.

The three main components of the City's general approach to the basin RI/SCMs were:

1. Identifying basins where unknown contaminant sources may be present, and collecting analytical data and information from other programs to confirm whether sources were present and to determine actual source locations.

2. Coordinating with the DEQ Cleanup Program on known contaminated sites in City basins to ensure that all potential contaminant pathways from the sites to the basins are evaluated and controlled at the source.

Historically, DEQ did not always require sites in the Cleanup Program to consider stormwater during upland site remedial investigations. In addition to stormwater, contaminant pathways can include contaminated groundwater infiltration into or along City conveyance systems and offsite tracking of contaminated erodible soil to City rights-of-way.

3. Determining appropriate control programs so that all identified sources are controlled and source controls are implemented at the source.
 - Major sources (i.e., those with suspected high concentrations of contaminants migrating offsite and where remedial investigation and/or action may be needed) were referred to the DEQ Cleanup Program.
 - Sources with low to moderate contaminant concentrations were referred to other state or City stormwater quality programs to ensure that sites make necessary operational changes to control pollutant discharges.

As the Study Area expanded from the ISA (RM 3.5 to RM 9.2) to the current Study Area (RM 1.9 to RM 11.8), the BES Portland Harbor Source Control Program broadened its work under the IGA to incorporate the additional outfalls and drainage areas into its source investigation.

The City evaluated the potential for City roads to be a source, but determined that stormwater discharges were not likely to have a significant adverse effect on inriver sediment for the following reasons:

- Vehicular use of roadways is not associated with most of the major risk drivers in the river (e.g., contaminants such as polychlorinated biphenyls [PCB] and pesticides typically are not deposited by cars on roadways).
- Residential areas (e.g., St. Johns) have the highest density of City paved roads, and stormwater treatment already had been added in most of these areas as part of the CSO Abatement Program system improvements⁸ and other City programs (see Section 4).
- Because of the large industrial tax lots within the harbor and the large percentage of parks and open space (see Figure 2), City roads comprise only a small percentage (4 percent) of the total area within City outfall basins (see Table 2-2 and Figure 2-4).
- Other City and state programs are addressing potential contaminant discharges from roadways (e.g., City street and associated stormwater system maintenance activities, DEQ permits that control offsite tracking of contaminants from industrial sites to roadways, etc.).

⁸ The City constructed stormwater treatment facilities in Basins 48, 49, and 50 as part of the CSO Abatement Program. See Appendix A for specific information about these facilities.

Basin investigations also typically did not extend into the combined sewer drainage areas (i.e., the areas outside of the separated storm systems). This is because land use in these areas within the harbor is largely residential and commercial, and additional controls were implemented under the CSO Abatement Program to minimize discharges to the river from the combined system (see Section 2.3.2).

In short, to obtain the best potential for contaminant reduction, the City focused source investigation efforts on the outfall basins and sources within the basins that had the highest concentrations of contaminants. To direct source investigation resources to these areas, the City implemented a general land use approach, along with an evaluation of inriver sediment data and information compiled about potential source areas within the basins, to identify outfall basins where further data collection was warranted (see Section 3.3).

3.3 Outfall Basin Evaluation

The City developed the *Programmatic Source Control Remedial Investigation Work Plan for the City of Portland Outfalls Project* to describe the approach used to determine upland sources of contamination to the municipal stormwater conveyance system (CH2M HILL, 2004b). In accordance with that plan, the City implemented an iterative approach to completing the RI/SCM process for each basin.

An Outfall Basin Completion Summary for each outfall is included in the Closure Report provided in Appendix A. Each summary:

- Provides general background information specific to the basin.
- Synthesizes the source investigation approach implemented in the basin, with references to relevant technical reports.
- Presents a weight-of-evidence evaluation to support the conclusion that additional City source investigation is not needed.
- Identifies the control mechanisms (implemented or planned) for the sources located within the basin that address current and future contaminant discharges to the basin.

Basin evaluation steps completed by the City included (1) prioritizing basins for source investigation, (2) identifying potential sources and pathways within basins to shape investigation activities, (3) collecting data to identify sources, (4) determining the appropriate programs for controlling sources, and (5) verifying that additional source investigation in the basin was not warranted. These steps are described in more detail below.

3.3.1 Prioritization of Basin Source Investigations

The City prioritized basins for initial source investigation to ensure that the outfall basins with the highest likelihood of containing uncontrolled sources were investigated early enough to allow time for implementing source controls (CH2M HILL, 2004b). These areas were identified by evaluating sediment data collected by the City near the outfalls, harbor-wide sediment data compiled by the LWG, and known upland conditions (e.g., land use and potential sources to the basin and river in the vicinity of the outfall). Basins identified for early initial investigation were those where inriver sediment concentrations, land use, and/or upland site information indicated that the basin may be a significant pathway to the river for contaminants from upland areas. The City assigned a lower initial investigation priority to basins where adjacent inriver sediment contamination was not present and where basin land use did not indicate a likelihood of sources with high contaminant concentrations. These priorities determined the order of evaluation. Each City basin was evaluated as part of the Outfalls Project.

Basin source investigations typically included a broader range of contaminants than those identified through sediment data evaluation because the City wanted to verify that other significant sources were not present. In some cases, additional analytical data also were useful in identifying specific contaminant source areas and pathways to the conveyance system. As new data collected in the City conveyance systems (e.g., by LWG) and at upland sites within the basins became available, the City adjusted basin investigation priorities and source tracing contaminants.

In 2010, the City conducted an interim assessment of further source tracing needs. The City developed the *Stormwater Evaluation Report* to present the statistical analysis of basin stormwater data used to determine specific contaminants and basins where additional source tracing was warranted (BES, 2010b). This analysis placed each basin in one of three interim categories:

1. Further source tracing not planned. Applied to basins where basin data, land use, and a review of potential sources indicate that the basin does not contain significant sources.
2. Further source tracing not recommended at this time. Applied to basins where data indicate sources, but sources were believed to have been identified and investigations at suspected sources were underway or planned.
3. Further source tracing may be needed. Applied to basins where data suggest sources, but no sources had been identified.

For basins in the second category, the City continued to review data being collected at upland sources to confirm that sources of contaminants observed in the basin had been identified and to verify that additional City source tracing

in the basin was not needed. For basins in the third category, the City initiated additional source investigations to fill data gaps.

3.3.2 Identification of Potential Sources and Pathways

The second step in the outfall basin evaluations was to identify potential sources and pathways to the City conveyance system for contaminants that had been observed in river sediment. This information then was used to design subsequent source investigations in the basin. The City also evaluated potential sources and pathways to the river from properties in the vicinity of the outfalls to develop a conceptual site model of contaminant sources and pathways for each basin (e.g., in some cases, contaminants observed in river sediment near the outfall appear to be from sources that are not located within the City basin). To identify potential sources within the basins, the City reviewed City and DEQ records to identify specific upland properties that may be discharging pollutants to the basins. Potential sources to each basin included:

- Sites in the DEQ Environmental Cleanup Site Information (ECSI) Database (i.e., sites with known or potential contamination from hazardous substances).
- Sites with National Pollutant Discharge Elimination System (NPDES) stormwater permits issued by the DEQ Water Quality Program to sites with industrial exposures.
- Sites with a history of contaminant releases.
- Sites without an NPDES permit that had been identified by the BES Industrial Stormwater Program to have industrial operations that may result in contaminant exposures to stormwater.

There are several possible pathways for contaminants from upland sites to migrate to City stormwater conveyance systems. Potential contaminant migration pathways to the river via the City system include:

- Stormwater and non-stormwater⁹ discharge via piped connections to the basin.
- Overland runoff of site stormwater to offsite inlets (i.e., catch basins in the right-of-way or on adjacent property) that are connected to the basin.
- Preferential infiltration of contaminated site groundwater into City storm lines or migration along the storm line bedding.
- Offsite tracking of contaminated site erodible soil to areas where it can migrate to basin inlets (see Figure 3-2).

⁹ Non-stormwater discharges include all other permitted (e.g., approved discharges, such as non-contact cooling water) and non-permitted (e.g., spills and illicit discharges) flows.

Figure 3-2. Vehicle Drag-out of Erodible Soil



Offsite migration of contaminants in erodible soil can result from overland stormwater flow and/or drag-out from vehicles and equipment leaving upland sites.

- Air deposition of site contaminants (i.e., fugitive dusts) to offsite impervious surfaces where contaminants can be mobilized by stormwater runoff.

The City used preliminary information on potential sources and pathways to identify potential contaminants and sampling locations for the outfall basins (see Section 3.3.3). To identify potential preferential groundwater pathways to City basins, the City evaluated potential intersections between known groundwater plumes (i.e., mapped areas of contamination) at upland sites and City storm sewer systems in the harbor (GSI, 2006). The City provided this information to DEQ for consideration during evaluations of upland site sources and pathways to the river.

3.3.3 Data Collection

Types of analytical data collected from the City conveyance system and from potential upland sources, to identify specific contaminant sources to the basins, included samples to characterize stormwater, inline solids,¹⁰ erodible soil, and dry-weather flow. The BES Field Operations Program invented a new passive suspended sediment sampling device (see Figure 3-3) to use in smaller pipes where standard sediment traps did not fit and in larger pipes with shallower stormwater flow depths (BES, 2013). The City also used data that were collected from the City conveyance system by other parties, such as the LWG, Port, and DEQ Cleanup Program sites. The Completion Summaries presented in Appendix A include tables of specific investigations in each basin.

For each basin, the City evaluated the basin to determine whether data collection was needed to identify sources (i.e., inriver sediment data or other information indicated the basin was a potential pathway for upland contaminant discharges to the river). If so, the City designed a sampling plan to meet the specific basin investigation objectives. City source investigations focused on the areas where current sources were most likely to be present and on early identification of the major sources (i.e., sources with high concentrations of contaminants in stormwater discharges). Source control implementation at these sources results in large reductions in contaminant loading to the municipal stormwater system.

¹⁰ The term "inline solids" refers to solids samples collected from a conveyance system. Inline solids analyzed by the City for the source investigation included samples of residual sediment accumulated in storm lines and catch basins, as well as suspended solids moving through the system via stormwater and collected in "sediment traps."

The iterative “up-the-pipe” approach used by the City typically entailed collecting data from the downstream end of the conveyance system (i.e., representative of the whole drainage basin before discharge from the outfall) for a broad range of contaminants to determine if another investigation round was needed. The City compared contaminant concentrations to the screening level values provided in the Portland Harbor JSCS, to the ranges of concentrations in samples collected at industrial sites in Portland Harbor (DEQ, 2009), and to data collected at sites within the basin to ascertain whether unknown sources may be present in the basin. If additional investigation was warranted, then the City identified sampling locations farther up-the-pipe in specific branches of the storm system and near suspected sources. Where necessary to expedite potential referral to DEQ, the City sampled discharges to the basin from individual upland sites.

The City also used data collected by sites, for various regulatory requirements, in the basin evaluations. Specifically, site investigations conducted under DEQ Cleanup Program oversight often included a combination of stormwater, inline solids, groundwater, and soil data to characterize potential offsite migration pathways for site contaminants. The City also used the stormwater monitoring data collected by sites with NPDES stormwater permits for the DEQ Water Quality Program. In addition, DEQ collected stormwater solids data from a number of industrial sites in City basins, as part of DEQ site discovery activities in the harbor.

The conveyance system and upland site data, in conjunction with land use and historical information, formed the basis of the City’s conceptual models of contaminant sources and pathways for each basin. The Completion Summaries in Appendix A summarize data collection activities, sources, and pathways in each basin. Three examples of the City’s data collection approach are provided in Table 3-1.

In some basins, the City collected additional data after source controls were implemented at identified sources. These data were used to verify that additional source tracing was not warranted and to determine whether the implemented controls were likely reducing contaminant loading to the City storm system (i.e., effectiveness monitoring). Under DEQ Cleanup Program oversight, sites evaluate the effectiveness of stormwater source controls that are put into place to verify that additional controls are not warranted.

Figure 3-3. Suspended Sediment Sampling



The Screened In-line Flow-Through Sediment Trap (SIFT™) was invented by the City of Portland during the Portland Harbor investigation and is a registered trademark of the City of Portland Bureau of Environmental Services (U.S. Patent pending). City crews deploy the SIFT™ in storm lines for extended periods to trap suspended solids in stormwater.

Table 3-1. Examples of Basin Data Collection Approach

Investigation Rationale	Basin 18	Basin 10A	Basin 52
Initial source investigation priority	High	Low	Low
Inriver sediment contamination near the outfall? ¹	Yes	No	No, but nearby area identified by EPA.
Does current or historical land use suggests sources?	Yes. Although more than half the basin area is parks and open space, current and historical land use in the majority of the developed area is heavy industrial.	No. This small basin is residential and commercial. The only site in the basin with industrial history was redeveloped as residential.	Maybe. Historical industrial uses, but current land use now also includes commercial, residential, parks and open space, and major transportation.
Potential sources identified? ²	Yes	No	Yes
Source investigation 1st Phase: collect data at downstream end of basin to identify source tracing contaminants and need for further investigation.	Yes. Stormwater and inline solids data collected to represent basin discharges.	Not needed	Yes. Stormwater data collected to represent basin discharges.
Source investigation 2nd Phase: collect data up-the-pipe to identify specific sources.	Yes. Data indicated unknown sources of PCBs, pesticides, and copper. Additional investigations: <ul style="list-style-type: none"> • Inline solids in branch lines • Catch basin solids in industrial areas • Erodible soil • Dry-weather flow 	Not needed	Yes. Data indicated unknown source(s) of PCBs and copper. Additional investigations: <ul style="list-style-type: none"> • Inline solids in branch lines • Catch basin solids in industrial areas • Erodible soil
Upland site data?	Yes. DEQ Cleanup Program sites, NPDES permittees, and DEQ site discovery.	No	Yes. DEQ Cleanup Program sites.
Source(s) identified?	Yes	None present	Yes

EPA = U.S. Environmental Protection Agency

DEQ = Oregon Department of Environmental Quality

PCB = polychlorinated biphenyl

NPDES = National Pollutant Discharge Elimination System

ECSI = Environmental Cleanup Site Information

¹ Based on sediment data collected by City or on identification of inriver area of concern by EPA.

² Potential sources include DEQ ECSI sites and NPDES permittees.

The City conducted source investigations in basin drainage areas that were subsequently diverted to the City's combined sewer system (i.e., areas within Basins 17, 43, 44A, 46, and 47). These investigations had a dual purpose. The first was to identify major sources to the river that warranted control before the CSO diversions were completed in 2006 and 2011 (see Table 2-5). The second was to identify any potential sources that were likely to violate applicable City wastewater discharge limits and prohibitions, after the storm systems were diverted to the wastewater treatment plant.

3.3.4 Referral for Source Control

When the City identified a previously unknown contaminant source within a basin, the City and DEQ then determined which City or state program would be the most appropriate for implementing source controls. The general approach used was to refer major sources (i.e., those where contaminant concentrations were much higher than the JSCS screening levels) to the DEQ Cleanup Program. These sources were where data and historical records indicated that contaminant releases may have occurred and remedial actions may be needed to address potential risks to human health and the environment. In some cases, the City's Portland Brownfield Program also could provide investigation funding assistance. Sources with lower contaminant concentrations that were not likely to require remedial investigation or action, and that were more likely to achieve source control through more minor operational changes and controls, were referred to other state or City programs. Examples of other programs include the DEQ Water Quality Program for issuance or enforcement of NPDES stormwater permits (administered by the City), the BES Industrial Stormwater Program for technical assistance or for issuance of stormwater control mechanisms under City Code, and DEQ's Hazardous Waste Technical Assistance Program.

During the course of source identification and referral, the City and DEQ also evaluated their respective programs and authorities to determine whether modifications were needed to address identified sources. Section 4 includes further discussion of this adaptive management approach and descriptions of City source control programs at work in the harbor.

3.3.5 Case Studies

The Outfall Basin Completion Summaries in Appendix A conclude more than 10 years of source investigation and source control coordination work completed by the City in the stormwater basins. To demonstrate how the City implemented the Outfalls Project investigation and source control referral approach, simplified summaries of two of these basins (Basins 44 and 53A) are presented below. In these basins:

- The BES Portland Harbor Program conducted multi-phased source investigations and referred identified potential sources to City and state programs for further investigation and control (BES, 2011b and 2012c).
- Several sites collected data, under DEQ Cleanup Program oversight, to identify onsite source areas to the municipal stormwater system and to implement stormwater source controls.
- The BES Industrial Stormwater Program conducted facility inspections and provided technical assistance to industrial sites within the basins (see Section 4 for a description of this program).

- The City collected additional stormwater data, following the completion of most site source controls, to confirm that further source tracing was not warranted and to evaluate whether contaminant concentrations (e.g., PCBs) in basin stormwater had decreased (BES, 2011b, 2012c, and 2012d). These data, along with data being collected by the DEQ Cleanup Program sites in the basins, indicate that source control implementation resulted in decreased contaminant loading to the municipal storm system.

Detailed descriptions of both basins are included in Appendix A. Figure 3-4 summarizes the source investigations and referrals completed in each basin.

3.4 Basin Findings

During the course of the Portland Harbor basin investigations, the City developed more than 50 reports documenting specific basin investigation findings. A summary of the reports relevant to each basin is provided in each individual Completion Summary included in Appendix A.

General basin source evaluation findings (i.e., the determination of whether sources that warrant control are present) fall into three categories:

1. No significant sources are present in the basin and the basin represents an insignificant or incomplete contaminant pathway to the river.
2. Sources to the basin are present and source identification is complete.
3. Additional source identification is needed or may be needed in the basin.

One basin (Basin 52D) remains in the third category because the basin source investigation is being completed by a private party, under a work plan approved by the DEQ Cleanup Program, and the investigation is still underway. Additional investigation of this basin by the City is not warranted (see Appendix A). The remaining City outfall basins in the harbor are divided equally between the first two categories. Figure 3-5 displays the City basin evaluation findings. Section 4 describes the City stormwater source control programs that are being implemented in Portland Harbor and in City outfall basins.

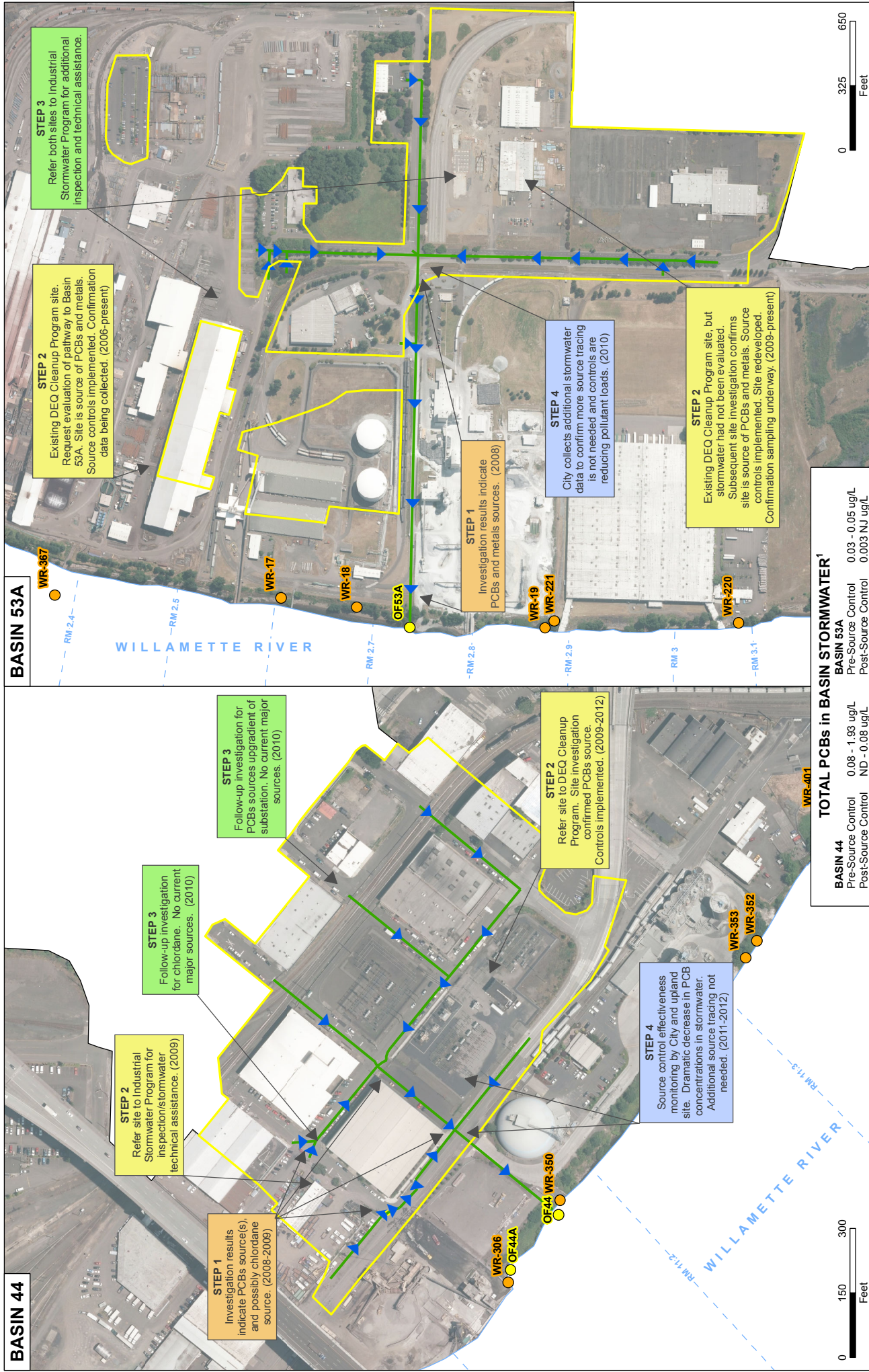
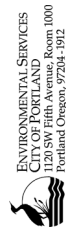
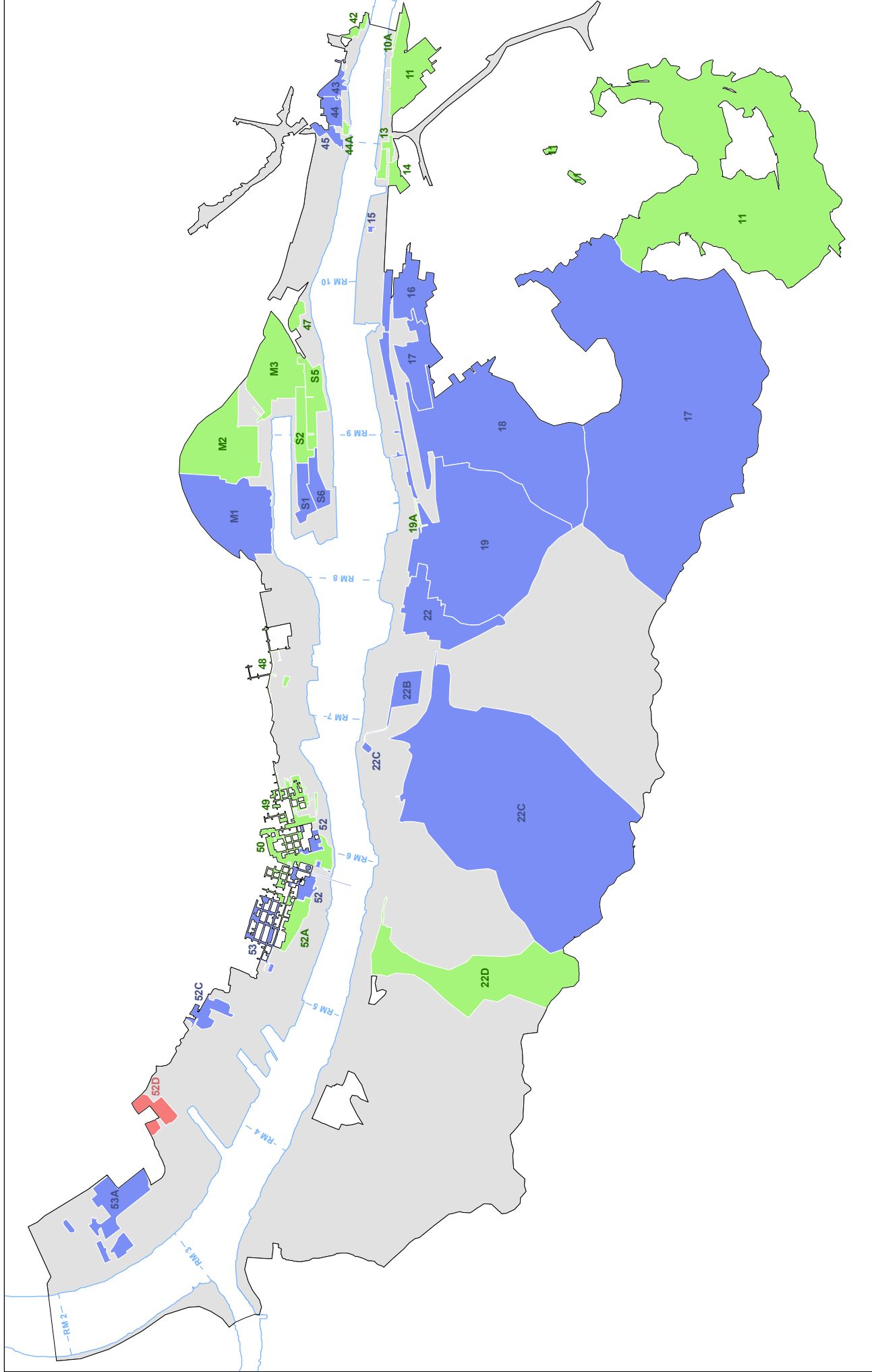


FIGURE 3-4

City Outfall Basin Investigation Case Studies



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LEGEND

Basin Source Evaluation Findings

- No Significant Sources in Basin and Insignificant or Incomplete Pathway
- Sources in the Basin are Present and Source Identification in Basin is Complete*
- Additional Source Identification Needed or May be Needed in Basin

MAP NOTES: Date: December 2013, Data Sources: BES

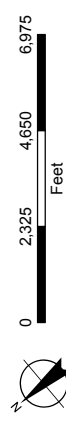
All Other Features

- River Mile (RM)
- Portland Harbor Hydroboundary

NOTE:
*Current significant sources are not present within Basins 52C and 53. Investigations conducted within these basins suggest that contaminants from sources in the vicinity are being tracked offsite to areas drained by these outfalls.

FIGURE 3-5

Outfall Basin Source Evaluation Findings



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SECTION 4.

City Stormwater Source Control Programs

City programs contribute to stormwater quality improvements in the Study Area and stormwater source control takes many forms. Some source controls are designed to keep pollutants out of stormwater, such as removing potential contaminant exposures to rainfall via technical assistance to industries and public education programs. Other “structural” controls remove pollutants from stormwater before the stormwater reaches a receiving water or divert stormwater that may include contaminants away from receiving waters (e.g., to infiltration facilities or offsite disposal). Examples of structural controls include water quality swales, sedimentation ponds or vaults, and green streets.

During development of the IGA, DEQ and the City recognized that program modifications may be needed to meet Portland Harbor upland source control objectives and to minimize the potential for recontamination of river sediment from stormwater discharges. This section provides an overview of City stormwater source control programs in the harbor, and the adaptive management approach the City has been implementing to ensure that City programs evolve to meet future stormwater source control needs.

4.1 Overview of Stormwater Controls

The City historically has prohibited the discharge of contaminants to the City’s conveyance system. Early efforts to control discharges were in the form of discharge prohibitions in City Code. For example, an ordinance adopted in 1943 prohibited discharge of “any flammable liquid” into any public sewer.¹¹ Subsequent code revisions in 1960 prohibited specific discharges that could be hazardous to humans and restricted the discharge of commercial and industrial wastes to public sewers.¹² These provisions formed the basis of what eventually became the City’s pollution prevention programs, which are described in more detail in Section 4.2.

¹¹ *Portland City Code § 14-1432(i) (1943).*

¹² *City Ordinance No. 111595. March 4, 1960*

In 1990, EPA initiated Phase 1 of the NPDES Stormwater Program, which required permit coverage for stormwater discharges from medium and large Municipal Separate Storm Sewer Systems (MS4) located in incorporated places or counties with populations of 100,000 or more. In Oregon, EPA delegates administration and enforcement of NPDES regulations to DEQ. The City collected stormwater data from the municipal stormwater conveyance system starting in 1991 to evaluate issues of concern with specific land uses, and subsequently submitted its Stormwater Management Plan (SWMP) to DEQ in 1993. DEQ issued its first 5-year NPDES MS4 permit to the City and its co-permittees¹³ in 1995. At that time, the Portland City Council passed a resolution that designated BES as the lead for the City's implementation of the stormwater program.

In preparation for the initial MS4 permit, the City implemented a program to monitor and control pollutants in stormwater runoff from industrial facilities. The City adopted City Code Chapter 17.39 in 1994¹⁴ to further regulate discharges to the City's stormwater sewer system, and entered into a Memorandum of Agreement (MOA) with DEQ to administer general NPDES industrial stormwater permits issued by DEQ to industrial sites discharging to the City's storm sewer system (DEQ, 1994). DEQ and the City expanded the MOA in 1999 to include administration of all¹⁵ NPDES stormwater permits issued to individual industrial sites within the City. These agreements with DEQ resulted in closer coordination between the BES MS4 Stormwater Program and the industrial dischargers to the City's stormwater system.

The MS4 Program's 1993 SWMP identified BMPs for new stormwater pollution control techniques in a variety of categories (e.g., Operation and Maintenance, Public Education, and Industrial Controls) and existing management practices that had ongoing stormwater source control benefits (e.g., street sweeping, revegetation programs, etc.). The MS4 Program works within BES and with other City bureaus to achieve BMP goals and meet program objectives. During the early years of the MS4 permit, BES also piloted different types of structural BMPs in the City storm system and on City properties to improve stormwater quality and to inform subsequent revisions to City Code that incorporate stormwater controls into City-wide development standards. Annual reports summarizing the MS4 Program activities from 1995 to the present are available online.¹⁶ This program forms the backbone of the City's stormwater source control in the harbor, and is described in more detail in Section 4.2.

Following the listing of the harbor, the City initiated a targeted investigation of contaminant sources to the municipal stormwater conveyance system in Portland

¹³ Co-permittees for the first permit cycle were Multnomah County, Port, ODOT, Multnomah Drainage District #1, Peninsula Drainage District #1, and Peninsula Drainage District #2. The Port is the only co-permittee on the current MS4 permit.

¹⁴ City Ordinance 167404. February 23, 1994.

¹⁵ DEQ retained oversight on some permits issued to government agencies.

¹⁶ <http://www.portlandoregon.gov/bes/37485>

Harbor and refer those sources to appropriate programs for control (see Section 3). By 2005, DEQ and EPA had developed the Portland Harbor JSCS (DEQ and EPA, 2005) and the DEQ Cleanup Program had begun to routinely incorporate stormwater into upland site investigations and remediation. Key milestones in the joint City and DEQ collaboration on Portland Harbor stormwater source control are displayed in Figure 4-1.

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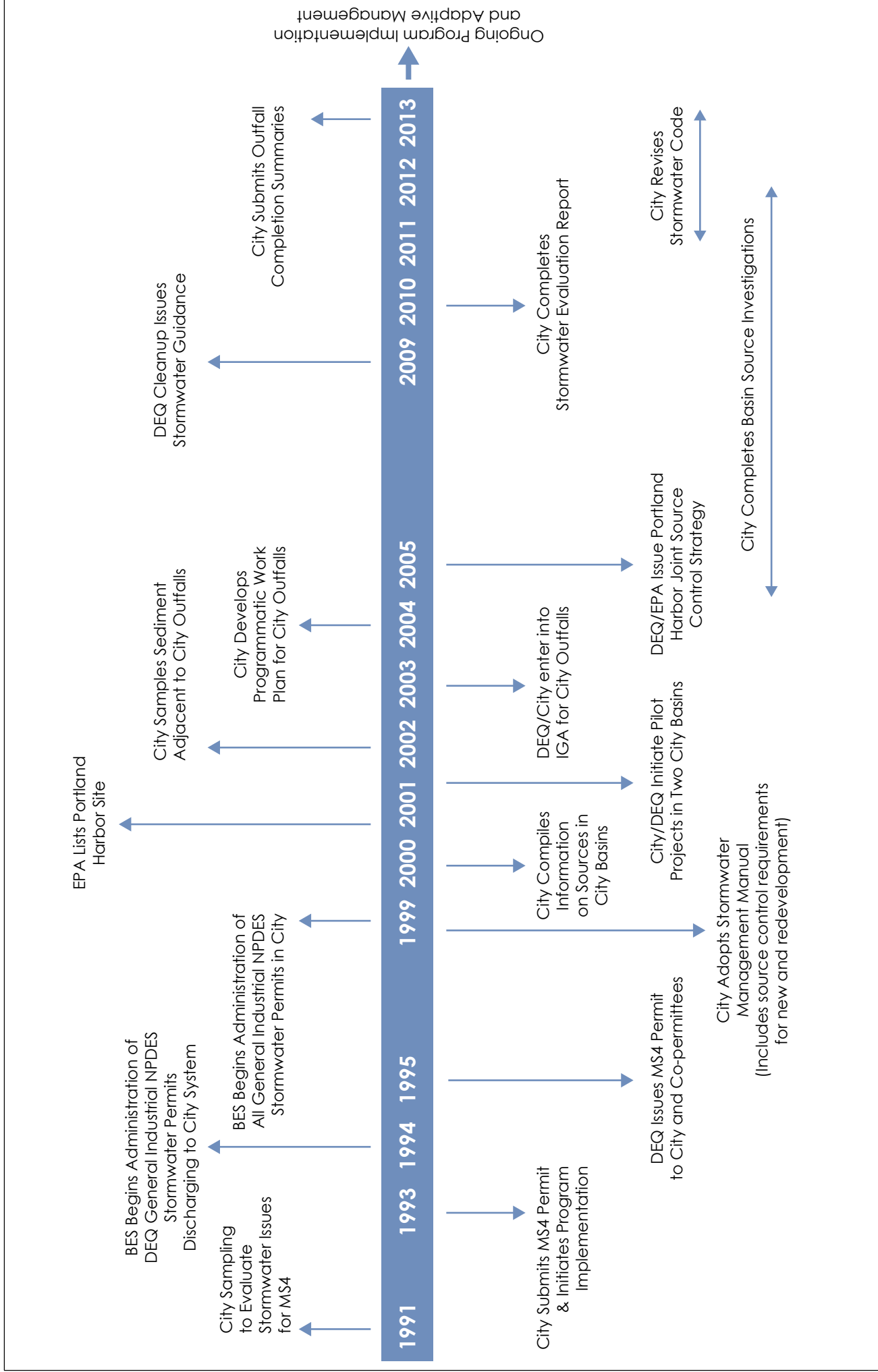


FIGURE 4-1
Stormwater Source Control 1991 to Present

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4.2 Current Stormwater Control Programs

4.2.1 BES MS4 Program

DEQ reissued the MS4 permit to the City in January 2011. In April 2011, the City submitted a revised SWMP to DEQ to describe the BMPs the City planned to implement throughout the permit term, to reduce the discharge of pollutants from the municipal stormwater system to the maximum extent practicable (BES, 2011c). The MS4 Program relies on a number of BES, Portland Bureau of Transportation (PBOT), Portland Bureau of Development Services (BDS), and other partner initiatives to accomplish the stormwater BMP objectives. The eight BMP categories in the SWMP are as follows:

1. Operations and Maintenance (i.e., for streets, sewers, and City facilities)
2. Industrial/Commercial Controls
3. Illicit Discharges Controls
4. New Development Standards
5. Structural Controls
6. Natural Systems
7. Public Involvement
8. Program Management

Brief summaries of some of the City programs that help to meet these objectives are provided below. Detailed descriptions of annual accomplishments in each BMP category are included in annual MS4 reports to DEQ.

4.2.1.1 Operations and Maintenance

The City implements operations and maintenance practices for the City storm sewer system, City rights-of-way, and City facilities to reduce the discharge of pollutants from the MS4.

- For the storm system, the BES Stormwater Operations and Maintenance group works with PBOT to inspect, maintain, and clean system components. This includes pipes, ditches, catch basins, inlets, culverts, public stormwater management facilities, and other infrastructures.
- For City streets, PBOT conducts routine street sweeping (see Figure 4-2) and implements work practices to limit pollutant discharges, such as spill and erosion control during street maintenance activities.

- For City facilities, each bureau manages City assets to minimize potential adverse stormwater effects. Examples include operation and maintenance of the stormwater treatment facilities at the BES Water Pollution Control Laboratory (WPCL), and integrated pest management in City parks to minimize fertilizer and pesticide use.

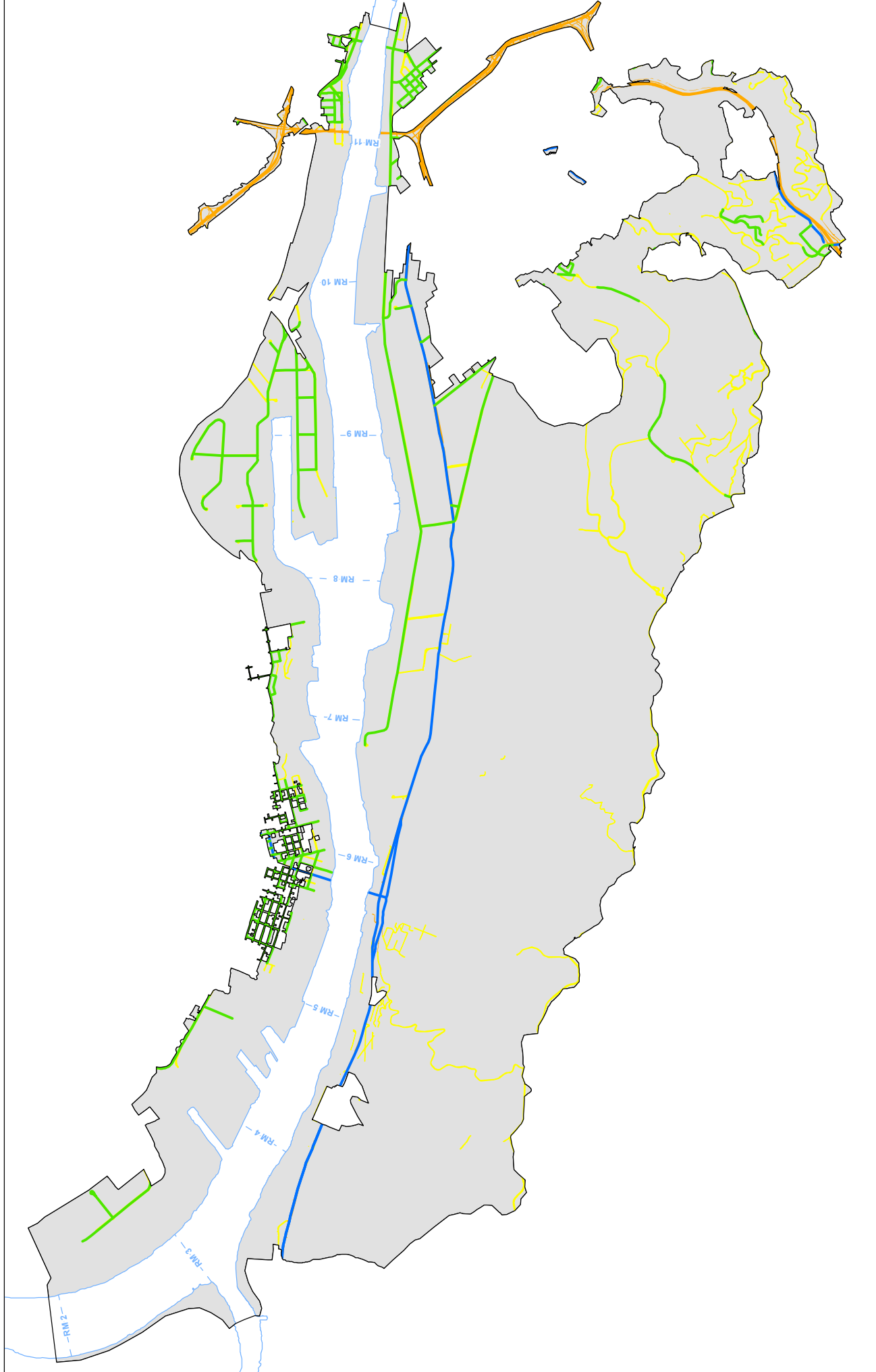
4.2.1.2 Industrial/Commercial Controls

The City regulates industrial and commercial facilities to reduce and control the discharge of pollutants to the MS4. The BES Pollution Prevention Services Group, of which the Industrial Stormwater Program is an integral part, implements several programs that work with individual facilities to address potential pollution concerns. Under an agreement with DEQ, BES administers NPDES industrial stormwater permits (1200-A, 1200-Z, and 1200-COLS)¹⁷ and No Exposure Certifications (NEC) issued to facilities within the City (DEQ, 2010). Under this IGA, BES reviews Stormwater Pollution Control Plans (SWPCP) prepared by facilities to meet permit requirements, reviews monitoring data collected by permittees, conducts facility inspections, provides technical assistance on BMPs needed at the sites to control pollutant discharges in stormwater runoff, and refers non-compliant industries to DEQ for enforcement. BES also identifies facilities that are covered by the NPDES program but warrant issuance of an NEC instead of a permit because of the lack of industrial exposures to stormwater. BES confirms that NEC conditions are met and conducts periodic inspections to verify that facility operations continue to qualify for the NEC.

Another aspect of the BES Industrial Stormwater Program is to inspect unpermitted industrial and commercial facilities to determine whether they are required to obtain an NPDES stormwater permit and to provide technical assistance and outreach to identify pollution prevention measures. BES identifies these facilities through field reconnaissance, environmental surveys conducted by the Industrial Pretreatment Program, and pollution complaints. In some cases, the BES Industrial Stormwater Program will identify sites for which specific stormwater BMPs are needed, but which either do not qualify for NPDES program coverage because of the Standard Industrial Codes under which the facility operates, or need controls in addition to what is required under the permit. Where necessary, BES uses its authorities under City Code Chapter 17.39 to require enforceable stormwater controls, such as SWPCPs or Accidental Spill Prevention Plans. These types of controls under City Code have been referred to by the Industrial Stormwater Program as City Discharge Authorizations or Stormwater Control Mechanisms (SWCM). Under newly adopted Administrative Rules,¹⁸ the City now will issue permits to require these types of stormwater controls. SWCMs, NPDES industrial stormwater permits, and NEC coverage

¹⁷ See <http://www.deq.state.or.us/wq/stormwater/industrial.htm> for more information on NPDES industrial stormwater permits issued by DEQ.

¹⁸ BES updated and finalized Administrative Rules, effective October 1, 2013, that are associated with the issuance and enforcement of City stormwater permits.



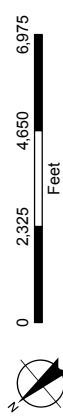
LEGEND

- City Road, Swept by City
- State Road, Swept by City
- City Road, Not Swept
- State Road, Not Swept by City
- River Mile (RM)
- Portland Harbor Hydroboundary

FIGURE 4-2

City Street Sweeping Activities in Portland Harbor

ENVIRONMENTAL SERVICES
CITY OF PORTLAND
1120 SW Fifth Avenue, Room 1000
Portland, Oregon, 97204-5912

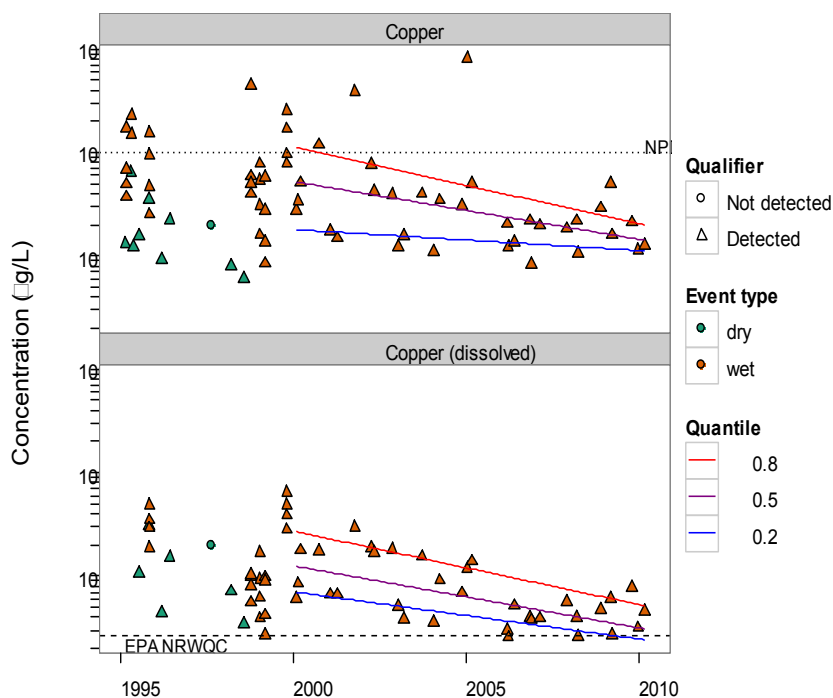


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within the City's outfall basins are displayed in the Completion Summaries provided in Appendix A.

In 2011, the City evaluated long-term stormwater data in Basin 19, where both DEQ and City stormwater source control programs apply to industrial sites, to evaluate program effectiveness (BES, 2011d). Data showed decreasing trends and that City and DEQ programs are working (see Figure 4-3); further reductions are anticipated because the 2012 NPDES industrial permits benchmarks are lower. Conclusions from this basin are applicable to other drainage areas with similar land use and source control program activity.

Figure 4-3. Stormwater Trends



Copper was one of the benchmarks evaluated in the Basin 19 stormwater data set (BES, 2011d). This evaluation indicated a decreasing trend in concentrations following implementation of NPDES stormwater programs in the mid-1990s.

The Industrial Stormwater Program also evaluates non-stormwater discharges allowed under the MS4 permit (e.g., pumped groundwater discharges) to identify and require implementation of any control mechanisms required to protect the City storm system and receiving waters.

The BES Portland Brownfield Program also contributes to control of pollutant discharges from industrial and commercial properties.¹⁹ This program administers EPA grants to provide assistance for property owners, developers, and community members who have concerns with using potentially contaminated land. Funding is available for assisting with environmental assessment and for providing loans to pay for needed cleanup at contaminated sites.

BES also partners with other organizations to promote pollution control at the industrial or commercial source. Examples of this approach include:

- Participation in the Regional Pollution Prevention Outreach Team, a multi-agency group of environmental professionals that promotes comprehensive pollution prevention programs and sponsors the Eco-

¹⁹ Further information about the BES Portland Brownfield Program is located at: <http://www.portlandoregon.gov/bes/article/316740>

Logical Business Program. This program certifies businesses that use environmentally responsible business practices.

- The Bureau of Planning and Sustainability's BEST program (Businesses for an Environmentally Sustainable Tomorrow), which assists industries with green practices that conserve resources and address stormwater and solid waste concerns.

4.2.1.3 Illicit Discharges Controls

The City identifies, investigates, controls, and, to the extent practicable, eliminates illicit discharges to the MS4. Illicit discharges can include illicit connections (i.e., piped connections that allow unacceptable non-stormwater discharges to enter the conveyance system), illegal dumping, and spills. BES implements an Illicit Discharge Elimination Program to identify outfall basins where illicit connections may be present. This program conducts inspections and dry-weather sampling at City outfalls and investigates referrals from other work groups (e.g., Industrial Stormwater) where illicit connections are suspected. City Code²⁰ and administrative rules provide enforcement authority to rectify illicit connections.

BES also implements a Spill Response Program to provide immediate response to spills and pollution complaints that may adversely impact City conveyance systems. The program maintains a 24-hour hotline, investigates spill reports and complaints, and works with other City staff and external agency partners to complete necessary response and enforcement actions.

4.2.1.4 New Development Standards

The City implements new development and redevelopment standards to prevent and mitigate potential pollutant discharges that can result during and after construction. By requiring the incorporation of stormwater management and erosion control provisions into property development plans, the City mitigates potential adverse effects on stormwater from new impervious surfaces, site uses that may generate pollutants of concern, and ground disturbance during construction.

New development and redevelopment projects are required to manage stormwater onsite after project completion (i.e., for the life of the project). The City's Stormwater Management Manual (SWMM) identifies stormwater management principles and techniques that help preserve or mimic the natural hydrologic cycle and achieve water quality goals (BES, 2008).²¹ SWMM requirements apply to all development, whether public or private, and include provisions for reducing the impacts of stormwater runoff (water quantity)

²⁰ City Code Chapter 17.39.050 Notification and Control of Illicit Connections and Discharges; City Code Chapter 17.39.110 Enforcement.

²¹ BES recently updated the SWMM, with anticipated adoption in January 2014. A fact sheet of proposed changes is located at: <http://www.portlandoregon.gov/bes/article/468466>.

and pollution (water quality). Standards included in the SWMM are intended to make site-specific improvements to properties City-wide to protect water resources.

Key stormwater quantity and quality requirements of the SWMM include:

- Infiltration of as much post-development stormwater runoff as practicable.
- Removal of at least 70 percent of total suspended solids (TSS) from 90 percent of the average annual runoff.
- Removal of pollutants of concern for receiving waters that have established total maximum daily loads (TMDL) or are on DEQ's 303(d) list of impaired waters.
- Additional source controls for sites with characteristics and uses that may generate specific pollutants of concern or pollutant levels that cannot be addressed solely with implementation of standard pollution reduction facilities.

BES also conducts a Maintenance Inspection Program to verify that stormwater management facilities constructed to meet SWMM requirements are properly installed, operated, and maintained. This program reviews Operation and Maintenance Plans submitted to meet SWMM requirements and provides technical assistance to site owners and operators as needed.

The Completion Summaries in Appendix A display properties where development or redevelopment has occurred under the SWMM and properties where stormwater management facilities are in operation.

Another tool for reducing construction-related stormwater impacts is the City's Erosion and Sediment Control Manual (BDS et al., 2008). BDS administers and enforces City Code Title 10: Erosion and Sediment Control Regulations for private development. The public works bureaus (BES, PBOT, Water, and Parks and Recreation) manage erosion, sediment, and pollutant control in accordance with Title 10 for their own public works permit projects. Title 10:

- Applies to any ground-disturbing activity, regardless of site size.
- Allows no visible or measurable offsite discharge at any time during construction.
- Requires compliance with the Erosion and Sediment Control Manual.
- Requires the same standards for private construction sites and public works permit projects.

BDS operates a hotline and Web site for receiving erosion-related complaints, and works with BES to investigate and implement an appropriate response.

City public works bureaus also acquire construction-related NPDES stormwater permits (1200-C) from DEQ for each project site larger than 1 acre. Given the number of construction projects undertaken by PBOT and the Bureau of Parks and Recreation, those bureaus hold agency program permits (1200-CA) that cover all development-related activity.

4.2.1.5 Structural Controls

The City structurally modifies components of the storm drainage system to reduce pollutant discharges (i.e., suspended solids) from the MS4 and provides technical assistance, grants, and incentives that result in retrofits and improvements to existing developments that discharge to the MS4. These activities include:

- Implementing retrofits of existing storm drainage systems identified through routine operations and maintenance by City bureaus. Examples include culvert improvements in Forest Park and retrofitting ditches with water quality swales.
- BES Sustainable Stormwater Ecoroof Program.²² This program provides technical assistance and development incentives to promote the use of ecoroofs on public and private property to manage stormwater onsite.
- BES Sustainable Stormwater Green Streets Program.²³ This program identifies opportunities to install green infrastructure (e.g., vegetated swales, planters, rain gardens, etc.) in public rights-of-way to reduce the flow volume and solids loading to the MS4 from street runoff.
- BES Systems Planning. BES is in the process of developing a Stormwater Systems Plan that will be used to identify and prioritize projects for potential funding through the BES capital improvement process. The plan will evaluate various levels of service provided by the stormwater system, such as capacity, condition, and water quality.

4.2.1.6 Natural Systems

The City protects and restores natural areas and vegetation in numerous ways to help preserve the natural resources and functions that prevent pollutants from entering into and discharging from the MS4. Efforts include overall watershed-level planning, regulatory measures, tree-planting incentives, and land acquisition and protection. Examples of relevant program areas include:

- Implementation of the Portland Watershed Management Plan (BES, 2006b). This plan includes the Willamette watershed, and describes the approach the City uses to evaluate watershed conditions and to

²² A video about the Ecoroof Program is located at <http://www.portlandoregon.gov/bes/article/465250>.

²³ A Green Streets fact sheet is located at: <http://www.portlandoregon.gov/bes/article/209685>.

implement projects to improve watershed health. Development of subwatershed improvement strategies is expected to begin in the Portland Harbor area that will recommend specific actions to help protect and improve environmental conditions in localized areas.

- BES Watershed Revegetation Program. This program improves water quality by restoring and maintaining native vegetation and reduces erosion and offsite migration of soil through biofiltration and bioengineering techniques.
- City land use plans and zoning codes that result in natural resource conservation and protection. These include environmental overlay zones that prevent or limit development within protected waterways and upland natural resource areas.
- Working with community partners to plant trees for stormwater management as part of the BES Urban Tree Canopy Program.
- Land acquisition and protection through interbureau partnerships, and partnerships with private property owners and Metro.

4.2.1.7 Public Involvement

The City informs the public about the causes of stormwater pollution, the effects on local waterways, and the need for pollution prevention and stormwater management. Examples of programs that support this BMP are:

- The Clean Rivers Education Program, which provides free water quality and field science training for City schools, teacher workshops, and curriculum resources.
- The Community Stewardship Grants Program, which promotes citizen involvement in watershed stewardship through funding watershed protection projects.
- Participation in the Regional Coalition for Clean Rivers and Streams, which is a group of agencies and municipalities in the metro area dedicated to educating the public about the potential impacts of stormwater runoff.

4.2.2 BES Portland Harbor Source Control Program

Section 3 of this report describes the Outfalls Project, which identified current and potential future contaminant sources to the City stormwater conveyance systems in the harbor and ensured that all identified sources were referred to appropriate EPA, DEQ, or City programs for control. BES created the Portland Harbor Source Control Program to develop and complete this project, under an

IGA with DEQ, because Portland Harbor warranted a more targeted in-depth investigation than other existing City programs could provide. Together, the City and DEQ completed the Outfalls Project. The Closure Report is included in Appendix A.

Under the IGA, City data collection resulted in new DEQ Cleanup Program agreements and implementation of stormwater source controls at more than a dozen sites that discharge to the MS4. In addition, the City and DEQ continue to share information on more than 50 ECSI sites in City outfall basins. There are also several sites within City drainage areas for which EPA is providing remedial investigation oversight. To help DEQ and EPA achieve source control at these sites, the City provides information from City records (e.g., plumbing and building records, spill records, Industrial Stormwater inspections) to inform site investigation activities and data evaluations. DEQ and EPA provide upland site work plans and reports to the City so the City can incorporate findings into basin data evaluations to determine whether additional source tracing is needed. The City and DEQ also collaborate on joint inspections, site discovery, and technical assistance on proposed source controls at sites of mutual interest.

In addition, the BES Portland Harbor Source Control Program provides ongoing technical support within BES and to other City agencies on projects, programs, and policies that have potential source control benefits in the harbor. Examples of this include helping to identify potential areas for green street facilities, reviewing proposed redevelopment plans at private sites in City drainage areas, and contributing to long-term watershed and conveyance system planning.

One of the joint objectives of the IGA was to evaluate City and state stormwater programs to determine if modifications were needed to ensure long-term protection of sediment quality from upland sources (see Section 3.2). The BES Portland Harbor program has been working internally with the MS4, Watershed, CSO, Pollution Prevention, and Engineering programs, as well as externally with other City bureaus (e.g., PBOT, Parks, Water, and Development Services) to make program improvements to meet harbor objectives. Implementing this adaptive management approach is described in more detail in Section 4.4, and represents one of the most critical ongoing roles of the BES Portland Harbor Source Control Program.

4.2.3 BES CSO Abatement Program

As described in Section 2.3.2, the BES CSO Abatement Program resulted in the diversion of approximately 600 acres of separated stormwater from the river to the CBWTP. Diverted areas included approximately 165 acres of industrial-zoned land that may have included potential current or future sources of contaminants to the river. Now that construction has been completed and wet weather infrastructure has been expanded, BES will continue to evaluate long-term system needs to determine where other modifications may be warranted, possibly resulting in additional diverted area.

4.2.4 City Remediation of Contaminated Property

Within the Study Area, there are a number of formerly contaminated industrial properties that were purchased by the City and remediated. In some cases, contaminated properties have been acquired by the Portland Development Commission (PDC) and remediated before resale to bolster economic development in target areas. One area where this occurred was the Pearl District, where PDC acquired and remediated multiple blocks that had legacy contamination from historical industrial activities (see Figure 4-4).²⁴ In other cases, specific bureaus (e.g., BES and Water) acquire contaminated properties, remediate them, and redevelop them with City facilities. An example of this is the WPCL site in St. Johns (see the Basin 50 Completion Summary in Appendix A). BES acquired this site, conducted remedial investigation and soil removal activities, and ultimately redeveloped the site as a full-service environmental laboratory and as a showcase for stormwater BMPs.

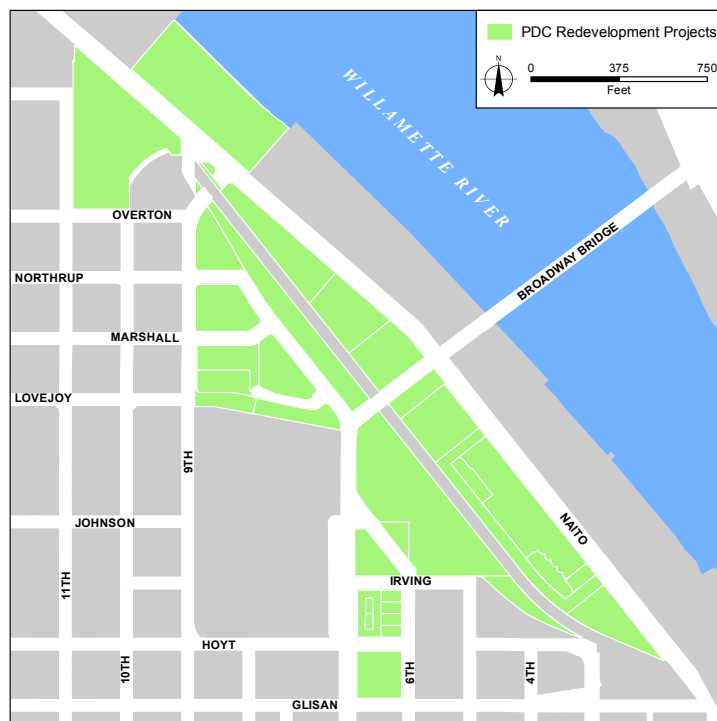


Figure 4-4. PDC Pearl District Redevelopment

4.3 Coverage of Source Control Programs in Portland Harbor

Some City programs that contribute to stormwater source control are implemented throughout the Study Area, while others apply only in areas served by City stormwater conveyance systems (see Figure 2-5). Table 4-2 summarizes the applicability in the harbor of the City programs described above.

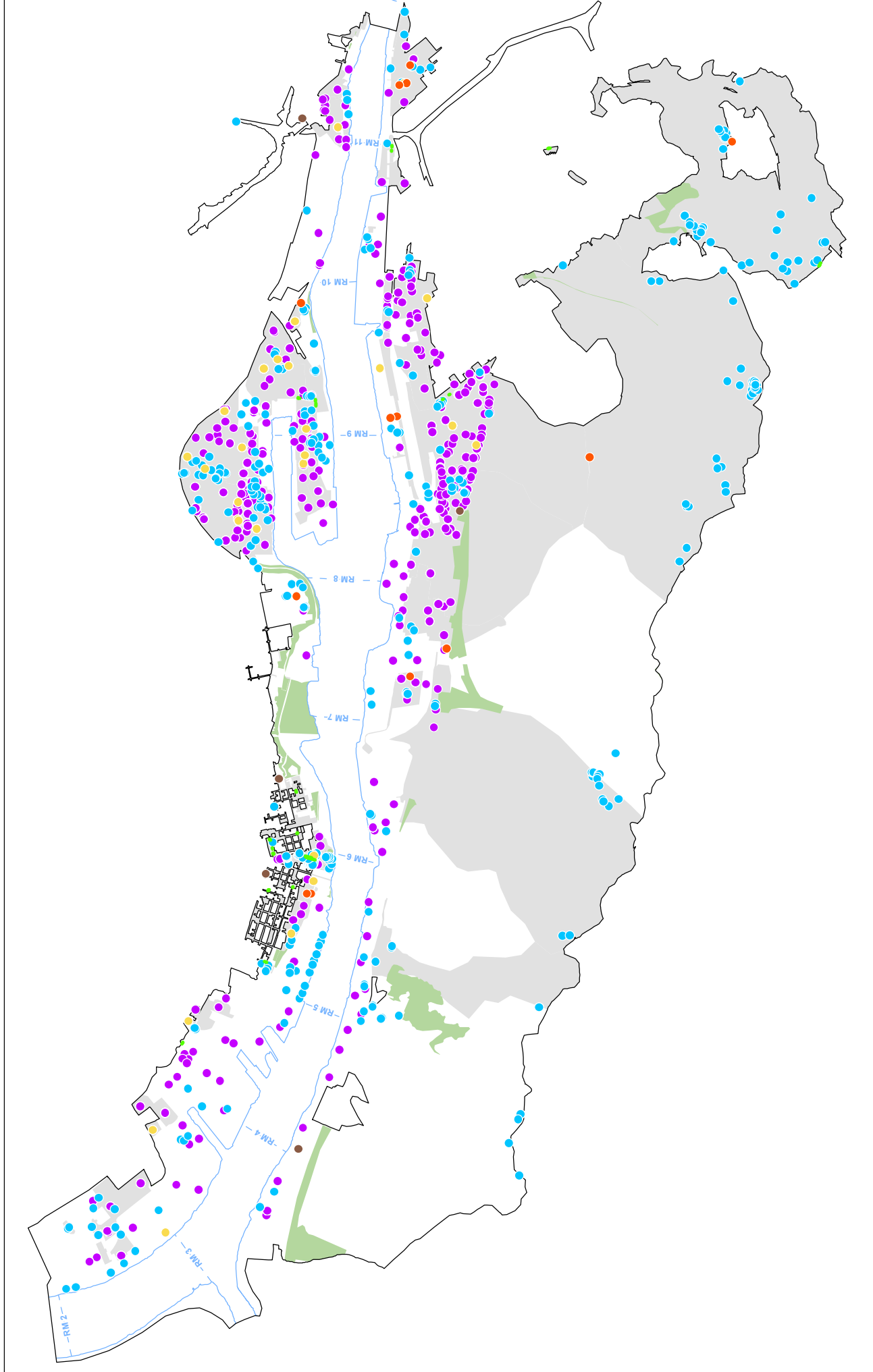
The Completion Summaries in Appendix A display coverage for some of the programs listed above, at the outfall basin scale. To provide a sense of program coverage inside and outside of City outfall basins, Figure 4-5 shows locations of program activities within the Study Area for selected City programs with readily available spatial data.

²⁴ See the Basin 11 Completion Summary in Appendix A for more information.

Table 4-1. City Stormwater Source Control Program Applicability in the Harbor

Program Type	Harborwide	City Drainage Areas Only
Operations and Maintenance	Street cleaning and maintenance BMPs	Storm system inspection and maintenance
Industrial/Commercial Controls	NPDES stormwater permit administration Technical assistance to Ind./Comm. Businesses on stormwater BMPs Portland Brownfield Program	Issuance of SWCMs/City Permits under City Code Chapter 17.39.
Illicit Discharges Controls	Spill Response Program	Illicit Discharge Elimination Program
New Development Standards	SWMM requirements Erosion controls per City Code Title 10	
Structural Controls	Green streets technical assistance Ecoroof incentives	Stormwater system retrofits Stormwater system planning
Natural Systems	Willamette Watershed planning Land Use Plans/Zoning Urban Tree Canopy Program Revegetation Program Land Acquisition/Protection	
Public Involvement	Clean River Education Community Stewardship Grants	
BES Portland Harbor Source Control Program	Technical Coordination between Industrial Stormwater and DEQ Cleanup Programs Development review for harbor sites	Source investigation and source referral in City stormwater outfall basins
BES CSO Abatement Program		Diversion of industrial stormwater drainage areas to the sanitary system

BES = Bureau of Environmental Services, City of Portland
BMP = best management practice
CSO = combined sewer overflow
DEQ = Oregon Department of Environmental Quality
NPDES = National Pollutant Discharge Elimination System
SWCM = Stormwater Control Mechanism
SWMM = Stormwater Management Manual



LEGEND

- Stormwater Treatment Installed under the Stormwater Management Manual
- Ecoroof
- Stormwater Control Mechanism
- Issued under City Code

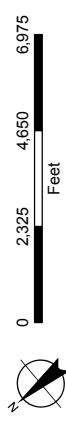
- Industrial Stormwater Program Inspection
- Brownfield Program
- Green Street
- Revegetation Program

- River Mile (RM)
- City Outfall Basin
- Portland Harbor
- Hydroboundary

FIGURE 4-5

Portland Harbor City Stormwater Program Coverage - Selected Programs

ENVIRONMENTAL SERVICES
CITY OF PORTLAND
1120 SW Fifth Avenue, Room 1000
Portland, Oregon, 97204-5512



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4.4 Adaptive Management

Completion of the outfall basin RI/SCM process provided an opportunity to identify areas where City program content or implementation could be improved to better meet Portland Harbor source control objectives, especially in older industrial areas with legacy contamination. Below are examples of how adaptive management has been applied by the City for stormwater source control in Portland Harbor.

- *BES Industrial Stormwater – DEQ Cleanup Program Coordination.* The City recognized that the DEQ Cleanup Program would be evaluating the stormwater pathway at contaminated sites for which the BES Industrial Stormwater Program had valuable technical information and experience. Through the BES Portland Harbor Source Control Program, the City fostered a direct working relationship between the BES Industrial Stormwater Program and DEQ Cleanup Program to support thorough evaluations of site stormwater pathways. Coordination now includes joint facility inspections, reviewing and commenting on stormwater work plans and reports prepared for the DEQ Cleanup Program, data sharing, and provision of technical records.
- *SWMM Revision and Internal/External Coordination.* During the 2004 revision of the development standards in the SWMM, requirements were added to the Source Controls section (Chapter 4) to address sites with known or suspected contamination. As part of this effort, BES worked with BDS to flag all DEQ ECSI tax lots in the City's development permit system to help permit reviewers identify these properties as contaminated sites during the permit review process. In addition, the City implemented a business process to contact the DEQ Cleanup Program when development or redevelopment is proposed on ECSI sites to minimize potential exacerbation of environmental conditions at the site from proposed construction activities.
- *Private Party Access to City Sewers.* The City worked with DEQ to ensure that, where warranted, ECSI sites evaluated the nature and extent of site contaminants in the municipal stormwater conveyance systems that convey site drainage. To facilitate private party access to the City's system when access was necessary to complete investigation and remediation objectives identified by the DEQ Cleanup Program, the City developed and implemented a sewer access authorization process to facilitate private party access to City sewers. Examples of access needs include conducting cleaning in the City conveyance system if offsite migration of contaminated materials had occurred, and conducting video surveys to verify potential complete stormwater and preferential groundwater pathways from sites to City storm lines.
- *City Code Revisions.* The City updated its stormwater code (Chapter 17.39) in 2011 and 2013 to clarify stormwater discharge requirements and

limitations and to enhance the enforcement provisions.²⁵ This process included updating and finalizing Administrative Rules to facilitate issuance and enforcement of City permits, effective October 1, 2013.

- *Spill Response.* The City added direct coordination with DEQ Cleanup Program managers for responding to spills and pollution complaints at DEQ ECSI sites.
- *System Mapping.* The City incorporated field findings related to stormwater conveyance systems to BES mapping staff to update geographic information system layers used by municipal and private parties. The City also worked directly with the Port and ODOT to resolve discrepancies in City system maps.

The City worked with DEQ to evaluate improvements to DEQ Cleanup and Water Quality Programs. For example, the City provided technical assistance to DEQ on the development of an approach for evaluating the stormwater pathway as part of routine Cleanup Program site assessment and investigation. DEQ presented this approach in the JSCS (DEQ and EPA, 2005) and later in more detail in the specific Cleanup Program guidance regarding the stormwater pathway (DEQ, 2009). DEQ is in the process of evaluating the existing NPDES 1200-Z industrial stormwater permit and is considering including Portland Harbor-specific modifications; BES Industrial Stormwater and Portland Harbor staff identified potential candidates for permit coverage and provided mapping and inspection support to DEQ to assist with this evaluation.

The City will continue to evaluate its programs to identify areas where additional improvements should be made. Areas identified for future work include collaborating with DEQ on a process for routine updates of DEQ ECSI tax lots in the City permit tracking system, and working with BES system planners and Willamette watershed managers to develop a process for siting capital improvement projects in areas of the harbor with the highest potential benefit (e.g., to evaluate multiple objectives, such as sediment and water quality, long-term maintenance costs, etc.). The focus will be on basins that discharge to more quiescent areas of the harbor (e.g., Swan Island Lagoon), where a higher level of control may be warranted.

²⁵ *City Ordinance 184898 (September, 2011) and City Ordinance 186192 (August, 2013).*

SECTION 5. Summary and Conclusions

This report summarizes:

- The City's approach in Portland Harbor to source investigation and control in City outfall basins.
- The various City source control programs and regulations that are in place to reduce contaminant loading to the Willamette River via stormwater.
- The rationale for concluding that the basin RI/SCM process is complete in every City outfall basin within the Portland Harbor and that requirements of the Outfalls Project IGA have been satisfied (see Appendix A).

In partnership with DEQ, the City completed the remedial investigation of City outfall basins in Portland Harbor, verified that all significant current sources have been identified and are in an appropriate City, state, or federal program to implement source control measures where needed, and concludes that future discharges from City outfalls are unlikely to represent a significant source of contaminants to the river.

The BES Portland Harbor Program employs an adaptive management approach to modify City programs so they can better meet Portland Harbor stormwater source control objectives. As shown in Figure 5-1,²⁶ long-term stormwater source control in the harbor will continue to rely on a myriad of City, state, and federal programs.

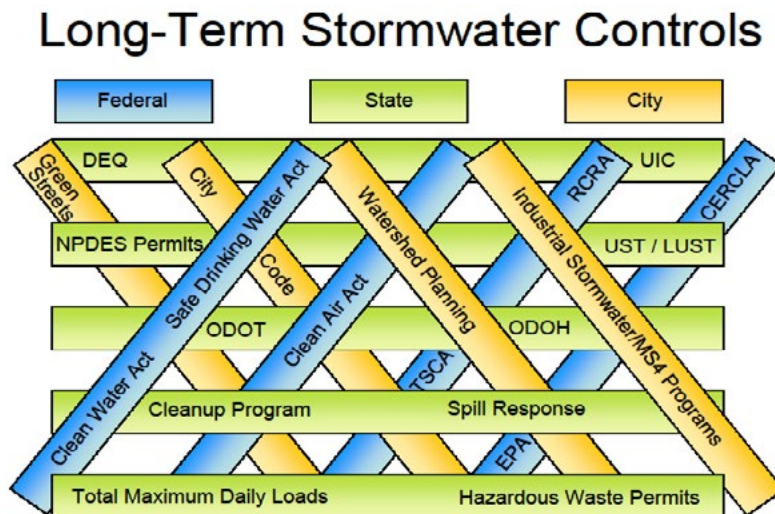


Figure 5-1. Long-Term Stormwater Controls

²⁶ Figure obtained from Dale Norton at the Washington State Department of Ecology, and modified to reflect local conditions.

Ongoing collaboration among agencies will be essential to ensuring that these different regulatory and non-regulatory frameworks continue to reduce overall loading of contaminants to the harbor via the stormwater pathway.

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APPENDIX A

**Closure Report for the City of Portland
Outfalls Project**

*Intergovernmental Agreement – DEQ No. LQVC-NWR-03-10
Environmental Cleanup Site Information (ECSI) Database No. 2425*

Closure Report for the City of Portland Outfalls Project

This Closure Report documents the City of Portland's (City) completion of the Intergovernmental Agreement (IGA) between the City and the Oregon Department of Environmental Quality (DEQ) for the City of Portland Outfalls Project (Outfalls Project; DEQ No. LQVC-NWR-03-10). The City and DEQ developed the joint objectives for the work performed under the IGA, which included using respective regulatory authorities to (1) identify sources to the municipal stormwater conveyance system and require sources to implement controls, (2) modify programs to meet Portland Harbor stormwater source control objectives, and (3) evaluate the potential for City outfalls to contribute to Willamette River sediment contamination (DEQ, 2003).

The tasks for this project were identified in the Scope of Work included as Attachment B of the IGA (DEQ, 2003). The approach for the basin evaluations was developed in the *Programmatic Source Control Remedial Investigation Work Plan*, which was submitted by the City and approved by DEQ (CH2M HILL, 2004b).

Section 3 of the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report) describes the City's general approach to completing the investigation of sources to City outfalls. This approach included early identification of major sources (i.e., those where contaminant concentrations were much higher than DEQ screening levels and remedial investigation and/or action may be warranted). Sources with lower contaminant concentrations (i.e., those that were not likely to require remedial investigation or action and that were more likely to achieve source control through minor operational changes and controls) were referred to other state or City stormwater quality programs. Section 4 of the Municipal Report describes the City programs that help to (1) ensure that contaminant discharges from upland sites are controlled by site owners and operators and (2) improve the quality of stormwater being discharged to the harbor.

Modeling of stormwater impacts to river sediment was included in the draft Portland Harbor Feasibility Study (FS) as part of a recontamination assessment.¹ Using stormwater loading estimates from 2008 upland conditions, the modeling found that at larger spatial scales "stormwater loads did not appear to cause large changes in sediment concentrations or cause substantial recontamination of post active remediation areas" (see Appendix Ha, Section 6, of the FS). Given that modeling may not accurately reflect potential adverse impacts at smaller spatial scales, the City conservatively assumed that additional load reductions were needed, especially for outfalls that discharge either to an area where inriver remediation may occur or to quiescent areas, such as the Swan Island Lagoon.

The City prepared the attached Outfall Basin Completion Summaries to demonstrate how source investigation and control objectives have been met for each of the 39 City outfalls in the Portland Harbor Study Area. To date, the City has delivered more than 50 technical reports to DEQ that document source investigation findings and source control

¹ *Portland Harbor RI/FS Draft Feasibility Study*. Prepared for the Lower Willamette Group by: Anchor QEA, LLC; Windward Environmental, LLC; Kennedy/Jenks Consultants; and Integral Consulting, Inc. March 30, 2012.

recommendations for the Outfalls Project. Given the magnitude of the work completed, and the previous submittals of detailed reports documenting investigation findings during the course of the project, the City worked with DEQ and the U.S. Environmental Protection Agency to develop a streamlined format for this final basin report.

These Completion Summaries do not present all the data collected in each basin; instead, each basin report:

- Provides general background information specific to the basin.
- Synthesizes the source investigation approach implemented in the basin and references relevant technical reports.
- Presents a weight-of-evidence evaluation to support the conclusion that additional City source tracing is not needed.
- Identifies the control mechanisms for the sources located within the basin.

The figures accompanying each Completion Summary display general information about the basin, such as land use and the configuration of the conveyance system, as well as the control mechanisms in place at upland sites within the basin. Information related to source controls at individual sites is subject to change (e.g., as sites in the DEQ Cleanup Program complete source control implementation, stormwater permits are issued and terminated, and properties undergo redevelopment). Data presented in the figures in each Completion Summary represent information available as of September 15, 2013. A key to the symbology and data sources used in the figures is provided in Attachment A-1 for reference.

Information presented in this appendix represents the culmination of more than a decade of coordinated targeted joint work by DEQ and the City to evaluate each of the 39 City outfalls in Portland Harbor. Completion of this work included identifying all significant sources to the municipal stormwater conveyance system and ensuring that all sources have been referred to an appropriate program for the implementation of long-term source controls. Table A-1 summarizes the Scope of Work requirements and how the City has satisfied each requirement.

Under the “Duration and Termination” terms of the IGA, the City is required to submit a written notice of completion to DEQ upon completion of work under the agreement. This Closure Report is intended to satisfy this requirement.

Table A-1. City of Portland Outfalls Project: IGA Requirement Summary

Scope of Work Section ⁽¹⁾	Requirement	IGA Completion
III.	Initial Outfall Characterization	<p>The City submitted two reports characterizing all outfalls in the Initial Study Area:</p> <p><i>Preliminary Evaluation of City Outfalls - Portland Harbor Study Area - Notebook 1: Eastshore Stormwater and CSO Outfalls (July 2000).</i></p> <p><i>Preliminary Evaluation of City Outfalls - Portland Harbor Study Area - Notebook 2: Westshore Stormwater and CSO Outfalls (December 2000)</i></p>
IV.	Outfall Pilot Project	<p>DEQ and the City conducted a pilot project at two City outfalls (OF18 and OFM-1). Work Plans and reports associated with the pilot project are itemized in the OF18 and OFM-1 Completion Summaries.</p>
V.	Remedial Investigation Work Plan	<p>The City submitted a work plan that described the approach for identifying sources to the municipal stormwater system:</p> <p><i>Programmatic Source Control Remedial Investigation Work Plan for the City of Portland Outfalls Project (March 2004).</i></p> <p>DEQ approved the work plan and the City completed the Site Characterization Plan for Outfall Basins described in the work plan (see reports identified in Section VII).</p>
VI.	Evaluation and Implementation of Source Control Measures	<p>DEQ and the City worked closely to identify and evaluate source control measures (SCM) and programs to address contaminant migration to the river. See the Outfall Basin Completion Summaries described under Task VII for source control implementation and Section 4.4 of the <i>Municipal Stormwater Source Control Report</i> for program evaluation. Examples include:</p> <ul style="list-style-type: none"> • Provided technical assistance on stormwater source control to industrial sites under City Code and/or under a separate agreement with the DEQ Water Quality Program to administer the NPDES industrial stormwater permits. • Provided technical assistance to DEQ Cleanup Program managers for stormwater SCMs proposed at upland sites through comments on site work plans and reports, as well as joint site inspections. • Monitored the effectiveness of source control actions at specific outfalls (see Completion Summaries for Outfalls 11, 19, 43, 44, 48, 49, 50, and 53A). Reviewed effectiveness monitoring data collected by upland sites under DEQ oversight. • Evaluated City stormwater source control programs and modified them where needed to ensure long-term protection of river sediment and water quality. • Assisted DEQ in evaluating NPDES general industrial stormwater permit coverage and additional requirements for future permitting.
VII	Reports	<p>The City submitted quarterly reports to DEQ from January 2003 to January 2014.</p> <p>More than 50 Source Investigation reports were submitted to DEQ presenting results of various source investigation efforts by the City. Each Completion Summary identifies the relevant reports for that basin; the Completion Summaries constitute the final Remedial Investigation Reports for each outfall.</p>

Note:

(1) Sections I and II of the IGA Scope of Work identify the schedule and overall objectives.

Attachments:

Attachment A-1: Figure Notes

Attachment A-2: Outfall Basin Completion Summary Reports

APPENDIX A

Attachment A-1: Figure Notes

Figure Notes

The figures provided with each Completion Summary are intended to orient readers to the basin and to present information regarding upland sites and source controls. Data displayed in the figures were obtained from the City of Portland (City), Bureau of Environmental Services (BES), unless otherwise noted. To minimize the need for footnotes in each figure, descriptions of the legend elements are provided below. Note that all elements may not be relevant to all basins.

General



Tax Lot. Data displayed obtained from county tax information. Data available online at www.portlandmaps.com.



River Mile (RM)



Discharges to City Outfall. This shading (used in basin location inset figures) denotes areas within the Portland Harbor hydrologic boundary (hydroboundary) from which stormwater discharges to the river via a City outfall.



Portland Harbor Hydroboundary. This shading (used in basin location inset figures) denotes areas within the Portland Harbor hydroboundary that do not discharge to a City outfall.

Aerial Photos Unless otherwise noted, aerial photos reflect conditions in 2012.

Land Use/Zoning

Land use/zoning information displayed in the figures primarily represents zoning obtained from the City of Portland, Bureau of Planning. With the exception of the Major Transportation category, zoning categories were compressed into the set of land use designations listed below. In areas where there were significant disparities between zoning and land use, refinements were made to more closely reflect actual land use (e.g., areas within Forest Park that are zoned residential). See Appendix B for a description of data sources used to create the land use/zoning map.



Heavy Industrial



Light Industrial



General Employment. This designation is a Portland zoning category that allows a range of employment opportunities, but emphasizes industrial and industrial-support uses.



Commercial



Residential




Parks and Open Space
















Major Transportation. There is no zoning classification for Major Transportation. Shaded areas represent state highways and freeways. Rights-of-way outside of the major transportation category are included in each respective land use.

Conveyance System


-  Basin Boundary. Basin boundary lines delineate the current stormwater drainage area for a given outfall. Delineations were developed by BES for the Portland Harbor Program, based on available property records, conveyance system information, topography, and field observations. Basin boundaries are subject to change as new information becomes available.

Features that constitute the basin conveyance system are displayed by the following symbols.



Data are available online at www.portlandmaps.com

-  Catch Basin
-  Storm Line
-  Culvert
-  Ditch
-  Channel
-  Water Quality Swale
-  Channel Planter
-  Lined Pipe. This symbol represents storm line segments in which cured-in-place pipe (CIPP) lining has been installed to reduce infiltration, improve structural integrity, and/or increase flow capacity.
-  Site Connection. This symbol represents the private line connecting to the City conveyance system. Site connections are not routinely mapped by the City, but in a few basins mapping was completed by the Portland Harbor Program during the course of the source investigation.
-  Sediment Removal Structure. This symbol represents vaults or other structures designed to capture and retain sediment to reduce suspended sediment loading to the outfall.
-  Water Quality Swale System. This symbol is used to indicate the location of water quality swales that cannot be depicted at the scale shown.
-  City Outfall. Outfalls to the Willamette River that are owned and maintained by the City.
-  Non-City Outfall. Outfalls to the Willamette River that are owned and maintained by other public or private entities.











Upland Site Source Controls

-  DEQ ECSI Site. Symbol denotes sites included in the Oregon Department of Environmental Quality's (DEQ) Cleanup Program's Environmental Cleanup Site Information (ECSI) database of sites with known or potential contamination from hazardous substances.
Source: <http://www.deq.state.or.us/lq/ECSI/ecsi.htm>

Status of source control evaluations (SCE) for DEQ ECSI sites (Source: Figure 1b, Milestone Report, Upland Source Control at the Portland Harbor Superfund Site, DEQ, January 2013):

-  SCE Implemented or Pending. Shading (or pattern, used in some cases for clarity of presentation) denotes site tax lots for which the DEQ Cleanup Program has determined that an SCE has been completed or is in progress. Sites coded with this shading are displayed as green, orange, or red in the DEQ map summarizing the status of stormwater source control evaluations in the Portland Harbor Study Area.
-  SCE Not Needed or Low Priority. Shading (or pattern, used in some cases for clarity of presentation) denotes site tax lots for which the DEQ Cleanup Program has determined that an

SCE is not needed or is a low priority for an SCE, or still needs to determine whether an SCE will be required. Sites coded with this shading are displayed as blue or yellow in the DEQ map summarizing the status of stormwater source control evaluations in the Portland Harbor Study Area.

-  NPDES Stormwater Permit. Symbol denotes sites in DEQ's Water Quality Program with current National Pollutant Discharge Elimination System (NPDES) permits. The U.S. Environmental Protection Agency (EPA) delegated permitting authority to DEQ, and the City administers portions of the NPDES program under an Intergovernmental Agreement with DEQ. NPDES permittees displayed include those issued general industrial and individual permits to discharge stormwater to surface water via stormwater conveyance systems.
-  Tax Lots with NPDES Stormwater Permit Coverage. Tax lots associated with the site holding the NPDES permit are denoted with this outline.
-  NPDES No Exposure Certifications. Sites with current NPDES No Exposure Certifications (NEC) are identified with this symbol. Sites that are subject to NPDES regulations because of the nature of industrial operations, but which meet specific criteria relating to exposure of industrial operations to stormwater, can qualify for an NPDES NEC.
-  Tax Lots with NPDES NEC Coverage. Pattern denotes the tax lots associated with the site holding the NEC.
-  >50% of Site Area Redeveloped Under City SWMM. The City's Stormwater Management Manual (SWMM) was adopted in 1999. The requirements defined in the manual apply to all development and redevelopment projects on both private and public property and can include stormwater quantity and quality controls, and/or eliminating industrial activity exposure to stormwater. For sites designated with this pattern, more than 50% of the facility area *within the basin* has been redeveloped or developed in accordance with SWMM requirements. Sources: BES and the City's Bureau of Development Services (BDS).
-  Tax Lots for which a City Discharge Authorization, or Stormwater Control Measure (SWCM), has been issued under City Code authority. Examples include requirements to develop and implement a Stormwater Pollution Control Plan or Accidental Spill Prevention Plan.
-  Site Inspection – BES Industrial Stormwater Program. This symbol indicates that the BES Industrial Stormwater Program has conducted at least one inspection at a site to identify potential industrial exposures to stormwater. Where multiple symbols are displayed on a given tax lot, individual dots reflect inspections of different historical operators at the site and/or different current site operations (i.e., multiple tenants on a given tax lot are inspected independently).
-  Stormwater Treatment Facility. Site stormwater treatment facilities can include vegetated swales and planters, detention ponds, infiltration trenches and basins, oil/water separators, treatment systems, sedimentation manholes, sand filters, drywells, ecoroofs, stormwater harvesting, pervious pavement, and/or other stormwater treatment methods. This symbol indicates the location where a treatment facility has been implemented at a site. As shown in the figure, some sites may have more than one treatment facility. Sources: BES and BDS.
-  Offsite Stormwater Treatment. Symbol indicates sites that redeveloped under the SWMM, but that installed stormwater treatment offsite (i.e., in the shared municipal stormwater conveyance system) rather than onsite, to meet SWMM requirements.
-  Ecoroof. Symbol denotes locations where the BES Sustainable Stormwater Program has a record of an ecoroof being present.

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APPENDIX A

Attachment A-2: Outfall Basin Completion Summaries

Completion Summaries are presented in the following sections by outfall basin:

- *Basin 10A*
- *Basin 11*
- *Basin 13*
- *Basin 14*
- *Basin 15*
- *Basin 16*
- *Basin 17*
- *Basin 18*
- *Basin 19*
- *Basin 19A*
- *Basin 22*
- *Basin 22B*
- *Basin 22C*
- *Basin 22D*
- *Basins 23
and 24*
- *Basin 42*
- *Basin 43*
- *Basin 44*
- *Basin 44A*
- *Basin 45*
- *Basin 46*
- *Basin 47*
- *Basin 48*
- *Basin 49*
- *Basin 50*
- *Basin 52*
- *Basin 52A*
- *Basin 52C*
- *Basin 52D*
- *Basin 53*
- *Basin 53A*
- *Basin M-1*
- *Basin M-2*
- *Basin M-3*
- *Basin S-1*
- *Basin S-2*
- *Basin S-5*
- *Basin S-6*

Completion Summary for City of Portland Outfall Basin 10A

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and several City programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled. This report summarizes the results of this collaborative effort in Outfall Basin 10A.

This Completion Summary includes a weight-of-evidence evaluation to demonstrate that source evaluation is complete and that there are no current (or anticipated future) major sources of contaminants to the Willamette River.

Basin 10A is located on the west side of the river in the Pearl District near downtown Portland. Historically, this outfall drained a small stretch of NW Naito Parkway; in 2008, a new residential development connected to the system.

River sediment in the vicinity of the outfall does not contain elevated concentrations of any contaminants (i.e., the U.S. Environmental Protection Agency [EPA] has not identified the potential need for sediment remediation). One DEQ Cleanup Program site is located within the basin. Following site investigation and remediation, DEQ determined that no further action was needed at this site. The site was redeveloped in 2008, under requirements in the City's Stormwater Management Manual (SWMM), as residential property with stormwater controls. No known or suspected contaminant sources to the Basin 10A stormwater conveyance system have been identified.

The City concludes that that no source investigation is warranted in this basin, and that the existing programmatic source control measures (SCM) in the basin are sufficient for ensuring discharges from Outfall 10A are protective of the river. Therefore, the City has met the remedial investigation (RI)/SCM objectives for Basin 10A.

2 Introduction

This Completion Summary presents a weight-of-evidence evaluation of whether further source investigation is needed in Basin 10A, and the rationale for concluding that current and future discharges from the basin are not likely to be significant sources of contaminants to river sediment. The purpose of this report is to demonstrate that, for Basin 10A, the City has met the joint RI/SCM objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ.

This report is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report), which provides additional background and detail regarding

the City's harborwide stormwater source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Outfall 10A discharges to the west side of the Willamette River near River Mile 11.6, approximately 150 feet downstream of the Broadway Bridge. The drainage area for the Basin 10A conveyance system is approximately 2.9 acres within Portland's Pearl District. Until 2008, the drainage basin included only a small area of NW Front Avenue (now called NW Naito Parkway). The basin expanded in 2008 when stormwater drainage from the newly constructed Waterfront Pearl condominiums was routed to the system. Figure 1 shows the location of the outfall and current drainage basin boundary and provides an overview of the associated stormwater conveyance system.

3.2 Land Use and Potential Upland Sources

Land use adjacent to Basin 10A has transitioned from industrial to mixed residential/commercial as part of the Pearl District redevelopment. A portion of the Waterfront Pearl condominiums comprises approximately 1.2 acres of the basin, and the remainder of the drainage area consists of a paved right-of-way (NW Naito Parkway) within commercial and general employment¹ zones.

No current pollutant sources have been identified in Basin 10A. The current basin includes a portion of one site that completed investigation and remediation activities under the DEQ Cleanup Program, as listed in DEQ's Environmental Cleanup Site Information (ECSI) database. This site, the Waterfront Pearl Condominiums Construction Site (ECSI #4535), was remediated in 2007 and received a No Further Action determination from DEQ (DEQ, 2007). This site did not discharge to the City's stormwater conveyance system until after redevelopment for residential use in 2008. No other ECSI sites are located in the basin.

Because there are no industrial operations in the basin, no sites in the basin currently hold National Pollutant Discharge Elimination System (NPDES) permits to discharge to the Basin 10A conveyance system. The National Railroad Passenger Corporation (Amtrak) previously (1998-2003) held an NPDES 1200-Z permit to discharge to the Basin 10A conveyance system via a historical connection to the basin; this connection from the Amtrak site was rerouted to Basin 11 in about 2003. Note that the City has an NPDES Municipal Separate Stormwater Sewer System (MS4) stormwater permit that covers basin drainage areas.

¹ General employment is a Portland zoning category that allows a range of employment opportunities but emphasizes industrial and industrial-support uses. The zones can allow for the transition to a less industrial overall nature.

3.3 Outfall Setting

Outfall 10A discharges near the upstream end of the Portland Harbor Superfund Site. The outfall is not located within or adjacent to any reach identified by EPA as an area of potential concern (AOPC) for contaminant concentrations in river sediment (EPA, 2010).

4 Basin Screening and Source Investigations

Basin screening consisted of an evaluation of current and past land use, as described in Section 3. Because only one site discharges to the basin and that site has been remediated and redeveloped for residential use, the City concluded that major sources were not present and no source investigations were needed in Basin 10A.

5 Completion of Source Identification

The lines of evidence evaluated to confirm that source evaluation objectives have been met with regard to Basin 10A include (1) inriver sediment concentrations near the outfall, (2) information on potential sources of contaminants, and (3) drainage basin characteristics and land use. Findings from this evaluation are summarized below:

- *Inriver Sediment Concentrations.* River sediment in the vicinity of Outfall 10A does not contain elevated concentrations of any contaminants (i.e., the outfall does not discharge to an AOPC).
- *No Upland Sources:* Basin 10A contains no known or suspected major sources of contaminants to the City stormwater conveyance system (e.g., active DEQ Cleanup Program sites or NPDES-permitted facilities). The only DEQ Cleanup Program site in the basin was not connected to the City's conveyance system until after site investigation and remediation were completed under DEQ oversight. The site is now residential and has stormwater treatment, installed as part of the redevelopment. There are no other upland sites within the basin.
- *Drainage Basin Characteristics and Land Use.* Basin 10A is small (2.9 acres). Drainage is limited to treated stormwater from the condominium development and a portion of NW Naito Parkway that is adjacent to high-density residential developments. These land uses have a low potential for offsite migration of contaminants to Basin 10A.

The weight-of-evidence evaluation summarized above indicates that the Basin 10A source evaluation is complete and no additional source tracing is warranted.

6 Basin Source Controls

Because no known or suspected major sources were identified in Basin 10A, additional coordination between DEQ and the City to identify control mechanisms was not needed in this basin. The Waterfront Pearl Condominiums Construction site, which is the only site in Basin 10A, was investigated and remediated under DEQ oversight and redeveloped under the SWMM. Site stormwater is treated before discharging to Basin 10A. Figure 2 displays the spatial extent of the upland site investigation and other programmatic site source controls in and around the basin (see key to figures provided at beginning of this Appendix). Although no

basin configuration changes are known at this time, any future connections would include stormwater controls as required under the SWMM.

Other municipal programs (e.g., street sweeping) likely provide additional source control benefits in the basin and will help to address minor sources for which specific control measures have not been required. City programs that control current and future contaminant discharges to the conveyance system are described in the Municipal Report.

7 Conclusion

Based on the information summarized above, there are no major pollutant sources in Basin 10A. Therefore, future discharges from Outfall 10A are unlikely to represent a significant source of contaminants to the Willamette River. The City therefore concludes that it has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin 10A.

8 References

DEQ. 2007. DEQ Site Summary Full Report – Details for ECSI Site ID 4535, Waterfront Pearl Condominiums Construction Site. DEQ Environmental Cleanup Site Information (ECSI) Database, updated January 2007; accessed February 19, 2013.

<http://www.deq.state.or.us/lq/ECSI/ecsidetail.asp?seqnbr=4535>

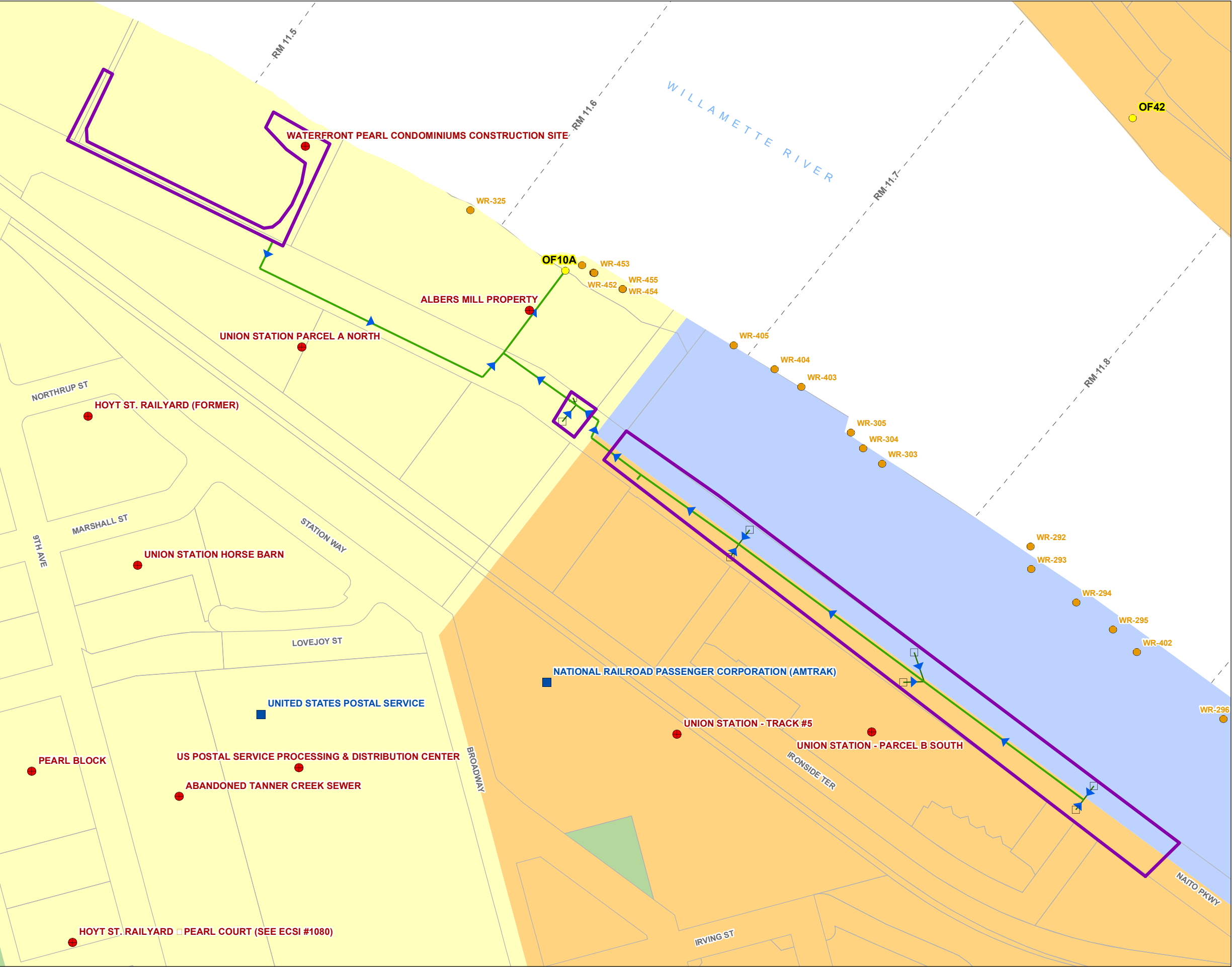
EPA. 2010. Re: Portland Harbor Superfund Site; Administrative Order on Consent for Remedial Investigation and Feasibility Study; Docket No. CERCLA-10-2001-0240. Portland Harbor Feasibility Study Source Tables. Letter from EPA to Mr. Bob Wyatt, Chairman, Lower Willamette Group. November 23, 2010.

List of Figures

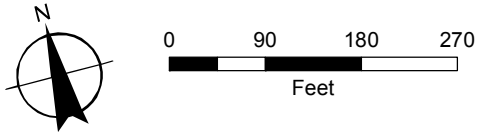
Figure 1: Basin 10A Overview

Figure 2: Basin 10A Upland Site Source Controls

FIGURE 1
Basin 10A
Overview



- Basin 10A
- DEQ ECSI Site
- NPDES Stormwater Permit
- Conveyance System**
 - Storm Line
 - Catch Basin
 - City Outfall
 - Non-City Outfall
- Land Use/Zoning**
 - General Employment
 - Commercial
 - Residential
 - Parks and Open Space
- All Other Data**
 - River Mile (RM)
 - Tax Lot
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO

ENVIRONMENTAL SERVICES
CITY OF PORTLAND
1120 SW Fifth Avenue, Room 1000
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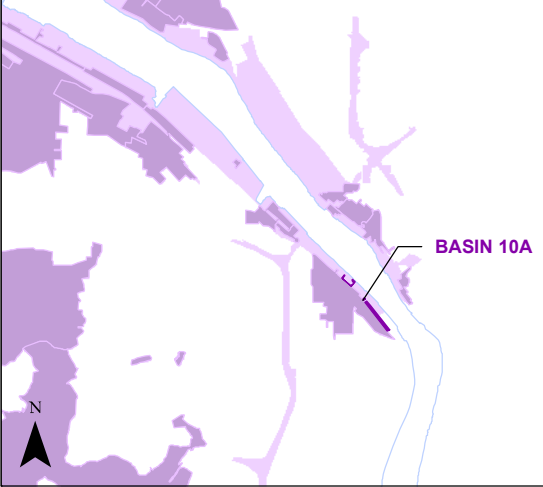
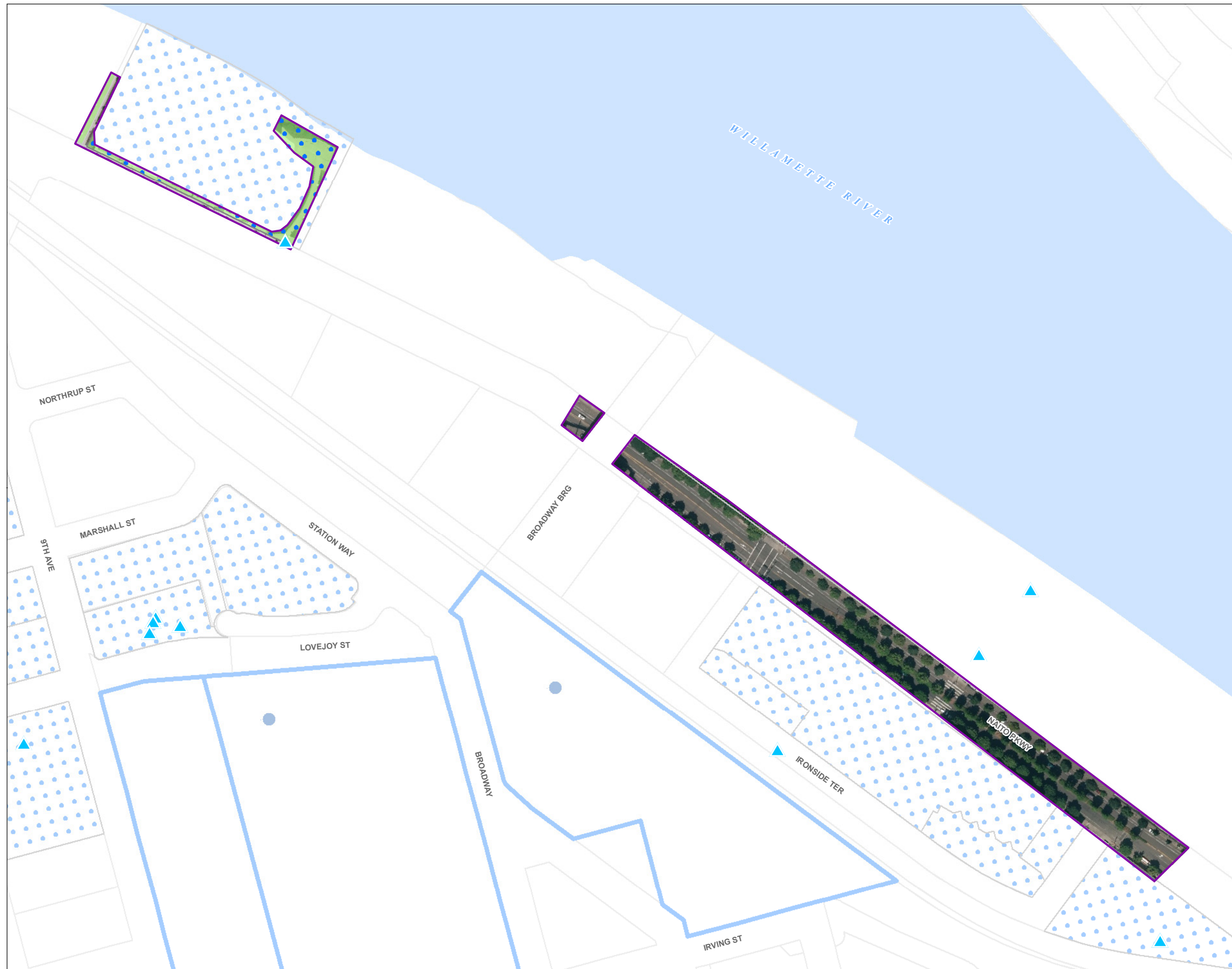
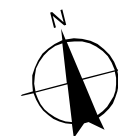


FIGURE 2
Basin 10A
Upland Site Source Controls



- Basin 10A
- Tax Lot
- DEQ Stormwater SCE**
 - SCE implemented or pending
- All Other Features**
 - NPDES Stormwater Discharge Permit
 - >50% of Site Area Redeveloped Under City SWMM
 - Stormwater Treatment Facility
 - Site Inspection - BES Industrial Stormwater Program
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



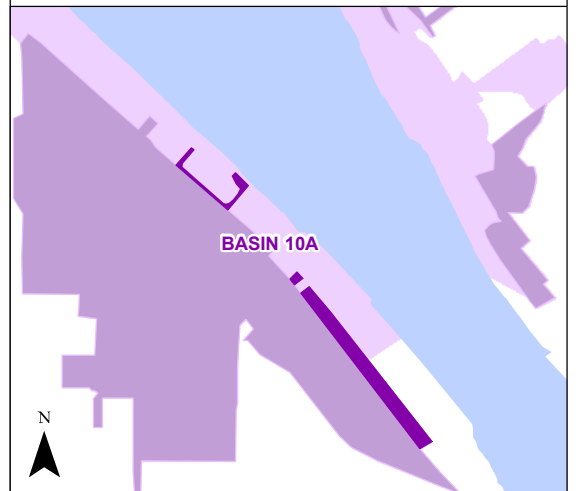
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Feet

MAP NOTES:

Date: December 31, 2013
Data Sources: BES, METRO,
Aerial Photo Taken 2012



ENVIRONMENTAL SERVICES
CITY OF PORTLAND
1120 SW Fifth Avenue, Room 1000
Portland Oregon, 97204-1912



Completion Summary for City of Portland Outfall Basin 11

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and several City programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled. This report summarizes the results of this collaborative effort in Outfall Basin 11.

This Completion Summary includes a weight-of-evidence evaluation to demonstrate that source identification is complete and a summary of source controls (implemented or planned) that will control future contaminant discharges to the Willamette River. River sediment in the vicinity of Outfall 11 does not contain elevated concentrations of any contaminants (i.e., the U.S. Environmental Protection Agency [EPA] has not identified the potential need for sediment remediation), and water quality sampling within the basin indicates contaminant concentrations are very low in discharges from this outfall.

Outfall 11 is located on the west side of the river near River Mile (RM) 11.4, approximately a quarter mile downstream of the Broadway Bridge, within the Pearl District. The associated drainage basin includes an upper subbasin composed of open space, residential, and major transportation (i.e., state highway) land uses in the West Hills, and a lower subbasin of mixed land use (light industrial, general employment, commercial, and residential) located in the heart of the Pearl District. Historically a manufacturing and transportation hub, facilities in this district came into increasing disuse as industrial operations largely shifted to other parts of the City starting in the 1950s. In the early 1980s, the Pearl District became the focus of planning efforts to convert industrial properties into the district's current mixed-use, high-density urban neighborhood. The Hoyt Street Railyard historically covered most of the lower subbasin. Almost all of the former industrial tax lots within Basin 11 entered the DEQ Cleanup Program to address releases associated with historical site operations and many of these properties have since been redeveloped.

Most of this redevelopment occurred after City stormwater management requirements were instituted, which required stormwater quality and quantity controls. Many redeveloped properties in the lower subbasin satisfied some of these requirements by constructing stormwater treatment structures (e.g., sedimentation manholes, etc.) offsite in the City's Basin 11 conveyance system. As a result, the stormwater pathway from these sites has been controlled and much of the stormwater generated in the lower subbasin is subjected to treatment before discharging to the river. In the upper subbasin, a series of water quality swales treat runoff from Oregon Department of Transportation (ODOT) rights-of-way. Basin stormwater controls in the upper subbasin also include stormwater management facilities constructed in areas converted from open space to residential or commercial use. Future

stormwater quality is expected to improve as additional areas redevelop and City and state programs continue to be implemented in the basin.

As a result of deeper elevations of some parts of the Basin 11 conveyance system, the lower portion of the basin also represents a potential preferential groundwater pathway to the river. The DEQ Cleanup Program has been working with sites in the lower basin to evaluate and control this pathway.

The City has identified all potential major sources of contaminants to the basin and necessary source controls are being implemented under DEQ and/or City authority; therefore, the City has met the remedial investigation (RI)/Source Control Measures (SCM) objectives for Basin 11.

2 Introduction

This Completion Summary presents a weight-of-evidence evaluation of whether further source investigation is needed in Basin 11, and the rationale for concluding that current and future discharges from the basin are not likely to be significant sources of contaminants to river sediment. The purpose of this report is to demonstrate that, for Basin 11, the City has met the joint RI/SCM objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ.

This report is included in Appendix A of the *Municipal Programmatic Stormwater Source Control Report for Portland Harbor* (Municipal Report), which provides additional background and detail regarding the City's harborwide source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Outfall 11 (also referred to as the Tanner Creek outfall) discharges to the west side of the Willamette River at approximately RM 11.4. As the population expanded in the late 19th century, Tanner Creek was rerouted underground through a system of pipes to the river. The basin currently drains approximately 949 acres within geographically separate subbasins. The upper subbasin (about 874 acres) is located in the West Hills, and the lower subbasin (about 75 acres) is located close to the river, in the Pearl District. Figure 1 shows the location of the outfall and drainage basin boundary and provides an overview of the associated stormwater conveyance system.

As shown in Figure 2, the conveyance system includes numerous water quality treatment facilities designed to reduce total suspended solids loading to Outfall 11. In the upper subbasin, the system includes four water quality swales constructed along Highway 26 to treat runoff from the ODOT right-of-way: the Meadows Area Swale, the South Swales (two swales), and the Jefferson Swale. These swale systems consist of grassy open channels and associated sedimentation removal structures. The lower subbasin includes numerous sediment removal structures installed during redevelopment of the area from industrial to residential and commercial; because of limited area for installing onsite stormwater treatment, many of the properties installed treatment in the City stormwater conveyance system to help meet

stormwater quantity and quality objectives under the City's Stormwater Management Manual (SWMM). Stormwater treatment also was constructed as part of rebuilding the NW Lovejoy Street ramp and as part of the Portland Streetcar expansion to this area. City programs that result in these types of stormwater improvements are described in the Municipal Report.

3.2 Land Use and Potential Upland Sources

Land use within Basin 11 is varied, and the two major subbasins have distinct land use characteristics (see Figure 2).

- The upper subbasin, in the West Hills, is primarily open space and single-family residences. This subbasin also includes ODOT drainage from Highway 26 and a small commercial area near the western boundary.
- The lower subbasin, in the Pearl District, is highly developed. During the last 10 to 15 years, much of the lower subbasin has transitioned from a historically industrial area to a mixed-use residential/commercial/general employment¹ area. Current land use is dominated by condominiums, office buildings, and parks. The U.S. Postal Service operates a processing and distribution center in this area. Union Station is also in this subbasin. There are several tax lots that have been remediated and are currently vacant until redevelopment occurs.

Sites that were identified as potential sources include the 14 sites in the basin that are in the DEQ Cleanup Program, as listed in DEQ's Environmental Cleanup Site Information (ECSI) database. Table 1 lists these sites and indicates the associated contaminants of interest (COI) and the status of source control evaluations (SCE). As shown in Figure 3, almost every property within the lower subbasin has been or is being evaluated under the DEQ Cleanup Program. There are a few tax lots that have not entered the DEQ Cleanup Program, including Amtrak rail lines, which generally are pervious (gravel) and have little stormwater runoff.

Table 1. DEQ Cleanup Program Sites in Basin 11

DEQ Cleanup Site	Site COIs ⁽¹⁾	Site Pathway Evaluations	
		Stormwater Pathway ⁽²⁾	Preferential Groundwater Pathway ⁽³⁾
Upper Subbasin			
ODOT-US 26: Jefferson Rockfall (ECSI #5752)	TPH, lead, PAHs, VOCs	Need for source control evaluation to be determined ⁽⁴⁾	Not listed ⁽⁴⁾
ODOT – Portland Harbor Source Control Evaluation (ECSI #5437)	Not listed	Source Control Evaluation In Progress ⁽⁴⁾	Not listed ⁽⁴⁾
Sylvan Cleaners (#1897)	VOCs in groundwater	NA	No Further Action issued ⁽⁴⁾
Lower Subbasin			
Abandoned Tanner Creek Sewer (#5328)	Petroleum hydrocarbons, VOCs, PAHs	NA	Site Investigation recommended ⁽⁵⁾

¹ General employment is a Portland zoning category that allows a range of employment opportunities but emphasizes industrial and industrial-support uses. The zones can allow for the transition to a less industrial overall nature.

DEQ Cleanup Site	Site COIs ⁽¹⁾	Site Pathway Evaluations	
		Stormwater Pathway ⁽²⁾	Preferential Groundwater Pathway ⁽³⁾
Centennial Mills (#5136)	TPH in soil and groundwater; lead in soil	Source Control Evaluation In Progress	Source Control Evaluation Completed - Source Control Determination Pending
Hoyt St. Railyard - The Fields (#5443)	PAHs in soil	Investigations and removal actions completed ⁽⁶⁾	Not shown
Hoyt Street Railyard (Former) (#1080)	TPH, PAHs, VOCs, metals, and limited PCBs in soil; TPH and PAHs in groundwater	Source Control Evaluation Not Needed	Source Control Decision Equivalent
Hoyt St. Railyard - Pearl Court (#1624)	TPH and PAHs in soil and groundwater	Source Control Evaluation Not Needed	Source Control Decision Equivalent
Pearl Block (#4960)	Petroleum hydrocarbons and PAHs in soils and groundwater; lead in soils	Source Control Evaluation Not Needed	Source Control Decision Equivalent
Union Station Horse Barn (#2407)	<i>Stormwater:</i> PAHs, TPH, metals ⁽⁵⁾ <i>Groundwater:</i> VOCs, PAHs, TPH ⁽⁵⁾	Source Control Decision / No Further Action Issued	Source Control Decision Equivalent
Union Station Parcel A North (#1962)	<i>Stormwater:</i> PAHs, TPH, metals ⁽⁵⁾	Need for Source Control Evaluation to be Determined / Low Priority	Source Control Decision Equivalent
Union Station - Parcel B South (#1885)	<i>Stormwater:</i> PAHs, TPH, metals ⁽⁵⁾	Source Control Evaluation Not Needed	Source Control Decision Equivalent
Union Station - Track #5 (#1414)	<i>Stormwater:</i> PAHs, TPH ⁽⁵⁾	Source Control Evaluation Not Needed	Source Control Decision Equivalent
US Postal Service Processing & Distribution Center (#2183)	VOCs, PAHs, TPH, metals	Source Control Decision / No Further Action Issued	Source Control Decision Equivalent

Notes:

NA = not applicable; PAHs = polycyclic aromatic hydrocarbons; PCBs = polychlorinated biphenyls; TPH = total petroleum hydrocarbons; VOCs = volatile organic compounds; COIs = contaminants of interest; ODOT = Oregon Department of Transportation; DEQ = Oregon Department of Environmental Quality; ECSI = Environmental Cleanup Site Information.

(1) Unless otherwise noted, site COIs are based on information on DEQ ECSI database (DEQ, 1996, 2004, 2008, 2009, 2010, 2011, 2012a, 2012b, 2012c, 2012d).

(2) Unless otherwise noted, source is DEQ Milestone Report, Figure 1b, "Status of Stormwater Source Control Evaluations, January 2013" (DEQ, 2013).

(3) Source: DEQ Milestone Report, Figure 3, "Groundwater Source Control Evaluation Status, January 2013" (DEQ, 2013).

(4) Site is not tracked in DEQ Milestone Report (DEQ, 2013). Site status listed is based on information on DEQ ECSI database.

(5) Source: Table 4.2-2 in the Portland Harbor RI/FS Draft Final Remedial Investigation Report (Integral et al., 2011).

Industrial sites covered or historically covered by National Pollutant Discharge Elimination System (NPDES) stormwater regulations also were considered as potential sources of pollutants to the City conveyance system. Sites within the basin that currently hold, or historically had, NPDES permits to discharge to the Basin 11 conveyance system are listed in Table 2. Sites with current NPDES permits are shown in Figure 2. Note that the City and ODOT both have NPDES

Municipal Separate Storm Sewer System (MS4) stormwater permits that also cover basin drainage areas.

Table 2. Current⁽¹⁾ and Historical NPDES Permit Coverage in Basin 11

Address	Company	Permit Type	Time Period
800 NW 6 th	National Railroad Passenger Corporation (Amtrak)	Stormwater (1200-Z)	1998 – Present
1105 NW 9 th	Burlington Northern Railroad	Groundwater (1500A)	1995 – 2000
1255 NW 9 th	Pinnacle Building	Groundwater (Individual NPDES)	2006 – 2011
707 NW Front	GSL Properties Inc.	Groundwater (Individual NPDES)	1999 – 2013
1001 NW Lovejoy	Metropolitan Building	Groundwater (Individual NPDES)	2006 – 2009
918 NW Park	U.S. Postal Service	Stormwater (1200-T)	1993 – 1996
		Stormwater (1200-Z)	1998 – Present

Notes:

NPDES = National Pollutant Discharge Elimination System

(1) Current permits are indicated in bold.

3.3 Outfall Setting

Outfall 11 discharges near the upstream end of the Portland Harbor Superfund Site. The outfall is not located within or adjacent to any reach identified by the EPA as an area of potential concern (AOPC) for contaminant concentrations in river sediment.

4 Basin Screening and Source Investigations

Based on the lack of elevated contaminant concentrations in river sediment near the outfall, the fact that almost all of the industrial properties in the basin had completed investigation and remediation under DEQ Cleanup Program oversight, and the extensive redevelopment of the former industrialized portion of the basin, the City did not conduct targeted source investigations in Basin 11. However, the City's Willamette Watershed group conducted a study to evaluate whether basin water quality is suitable for discharge to a potential restoration site for off-channel fish habitat at the confluence of Tanner Creek (i.e., Outfall 11) and the Willamette River (BES, 2011).

The Tanner Creek Water Quality Characterization study included water quality monitoring at several sites, including just upstream of the outfall, between July 2008 and June 2010. Samples were collected during dry-weather conditions as well as during storm events. Results indicated that although dry-weather flows from the basin may be a potential preferential pathway for polycyclic aromatic hydrocarbons (PAH),² overall water quality of discharges from this basin is good. Specifically, none of the pollutants analyzed from dry and wet weather flows was detected at concentrations that would pose serious risks to aquatic life (BES, 2011).

² PAH concentrations in dry-weather flow samples were slightly higher than wet-weather concentrations (BES, 2011).

The City's subsequent evaluation of these data for source tracing did not indicate that major current sources of contaminants were present in Basin 11.

5 Completion of Source Identification

The lines of evidence evaluated to confirm that source evaluation objectives have been met with regard to Basin 11 include (1) inriver sediment concentrations near the outfall, (2) water quality monitoring results for discharges from the outfall, (3) upland site information, and (4) land use in the basin. Findings from this evaluation are summarized below:

- *Inriver Sediment Concentrations:* River sediment in the vicinity of Outfall 11 does not contain elevated concentrations of any contaminants (i.e., the outfall does not discharge to an AOPC).
- *Water Quality:* Results of the Tanner Creek Water Quality Characterization study (BES, 2011) indicate all analyte concentrations are very low (i.e., no significant risk is posed to aquatic life).
- *Upland Investigation Coverage:* Figure 3 displays the spatial extent of upland site investigations and other programmatic controls (see key to figures provided at beginning of this Appendix). As shown in Figure 3, almost all of the former industrial properties in the basin are in the DEQ Cleanup Program and:
 - Have implemented or are implementing SCEs;
 - Have been designated by DEQ as not needing an SCE or as a low priority for an SCE; and/or
 - Are covered under NPDES industrial stormwater regulations.

The only tax lots in the lower subbasin not covered by DEQ Cleanup or Water Quality programs are graveled rail lines that are not expected to generate stormwater runoff.

- *Land Use:* Land use in the former industrial area has shifted to mixed-use residential, commercial, and open space with remediation and redevelopment of the former industrial properties. Most of this redevelopment has occurred after City stormwater requirements were instituted under the City's SWMM, which required both water quality and quantity controls. Future redevelopment activities in this area also will trigger the City's requirements for additional stormwater controls, which should further improve stormwater quality in this basin.

The weight-of-evidence summarized above indicates that the Basin 11 source evaluation is complete and no additional source tracing is warranted.

6 Basin Source Controls

The City and DEQ collaborated under their respective authorities to identify control mechanisms for all major sources identified in the basin. Source control for major and minor sources in Basin 11 includes SCMs completed (or planned) at contaminated sites under DEQ Cleanup Program agreements, specific controls implemented within the City's shared stormwater conveyance system (e.g., water quality swales and sedimentation manholes), and

ongoing City and DEQ programs that are described in the Municipal Report. Source controls implemented in Basin 11 are displayed in Figure 3 and summarized in Table 3.

As shown in Figure 3, a significant number of properties within the upper and lower subbasins has implemented stormwater controls as part of site redevelopment. These controls include: construction of sedimentation structures (e.g., manholes, canister filters, etc.) in the City's stormwater conveyance system; installation of onsite stormwater filters, swales, and flow-through planter boxes; and installation of ecoroofs. In the lower subbasin, most required stormwater controls were installed in the City system (versus on private property) to accommodate high-density residential developments. Many of these redevelopment projects were completed on former DEQ Cleanup Program sites.

Table 3. Basin 11 Source Controls

Site/Area	Source Control Measures (SCM)	Implementation Timeframe ⁽¹⁾
SCMs at DEQ Cleanup Program Sites ⁽²⁾		
<i>Upper Subbasin</i>		
ODOT-US 26: Jefferson Rockfall (ECSI #5752)	To be determined	To be determined
ODOT - Portland Harbor Source Control Evaluation (ECSI #5437)	Water quality swales installed by City (see description below under "City Conveyance System")	2007
Sylvan Cleaners (#1897)	None needed (DEQ determined subsurface contamination at the site poses low risk)	NA
<i>Lower Subbasin</i>		
Abandoned Tanner Creek Sewer (#5328)	To be determined (Site investigation recommended)	To be determined
Centennial Mills (#5136)	To be determined	To be determined
Hoyt St. Railyard - The Fields (#5443)	Contaminated soil was removed and site has been redeveloped.	2009 - 2013
Hoyt St. Railyard (Former) (#1080)	Contaminated soil was removed and site has been capped.	2000 - 2005
Hoyt St. Railyard - Pearl Court (#1624)	Contaminated soil was removed and site has been capped.	2000 - 2005
Pearl Block (#4960)	Contaminated soil was removed and site has been capped.	2000 - 2003
Union Station Horse Barn (#2407)	Contamination "hot spots" in soil were removed. Site is either temporarily capped (Lots 4, 5) pending site development or has been permanently capped by completed development (Lots 1, 2, 3, and 5)	2002 - 2008
Union Station - Parcel A North (#1962)	A portion of the site has been capped and redeveloped.	1998 - 1999

Site/Area	Source Control Measures (SCM)	Implementation Timeframe ⁽¹⁾
Union Station – Parcel B South (#1885)	Contaminated soil was excavated and treated. Site has been capped and redeveloped as residential property.	1997 – 1999
Union Station - Track #5 (#1414)	Contaminated soil was removed from the site.	1996
U.S. Postal Service Processing & Distribution Center (#2183)	Site paving and buildings under current ownership/operation are acting as a cap for contaminated soil.	Ongoing
City Conveyance System		
Storm lines along Highway 26 (upper subbasin)	As part of the Tanner Creek Stream Diversion Project, four water quality swale systems (grassy open channels and associated sedimentation structures) were constructed by the City to treat flows from drainage along Highway 26. The swales are flow-through facilities designed to reduce sediment loading to Basin 11.	2007
Lower subbasin	Numerous stormwater treatment facilities were constructed in the City system during redevelopment of this area from industrial to residential and commercial uses to meet site Stormwater Management Manual requirements. Facilities are designed to reduce sediment loading to the conveyance system (e.g., sedimentation manholes, canister storm filters, and other sedimentation structures).	2000 – 2010
Other (Programmatic Source Controls)		
Numerous commercial and residential properties in the upper and lower subbasins	Stormwater Management Manual Requirements	Ongoing
Pinnacle Building	City Discharge Authorization ⁽³⁾	Ongoing
See site listing in Table 2	NPDES 1200-Z Stormwater Permit Requirements	Ongoing

Notes:

DEQ = Oregon Department of Environmental Quality; ODOT = Oregon Department of Transportation; ECSI = Environmental Cleanup Site Information; NPDES = National Pollutant Discharge Elimination System.

- (1) Because of consolidation in the ECSI database of some sites in this area, some timeframes listed are approximate.
- (2) Descriptions of upland site SCMs are based on information in the DEQ ECSI database (DEQ, 1996, 1998, 2004, 2007, 2008, 2010, 2011, 2012a, 2012b, 2012c, 2012d, 2012e, 2012f).
- (3) Additional site-specific stormwater pollution controls required and implemented under City Code.

All major contaminant sources have been controlled or will be controlled after implementation of SCMs has been completed under the programs identified above.

Other municipal programs (e.g., periodic inspection of and technical assistance to non-NPDES sites, illicit discharge monitoring, street sweeping, etc.) likely provide additional source control benefits in the basin and will help to address minor sources for which specific control measures have not been required. City programs that control current and future contaminant discharges to the conveyance system are described in the Municipal Report.

7 Conclusion

Based on the information summarized above, no current major sources exist in Basin 11, primarily because historical sources have been remediated under the DEQ Cleanup Program and stormwater treatment was installed during redevelopment of these properties. Because necessary SCMs at these sites have been or are being implemented under appropriate DEQ and City regulatory authorities, future discharges from Outfall 11 are unlikely to represent a significant source of contaminants to the river. The City concludes that it has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin 11.

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List of Figures

Figure 1: Basin 11 Drainage Basin Overview

Figure 2: Basin 11 Overview and Conveyance System Source Controls

Figure 3: Basin 11 Upland Site Source Controls

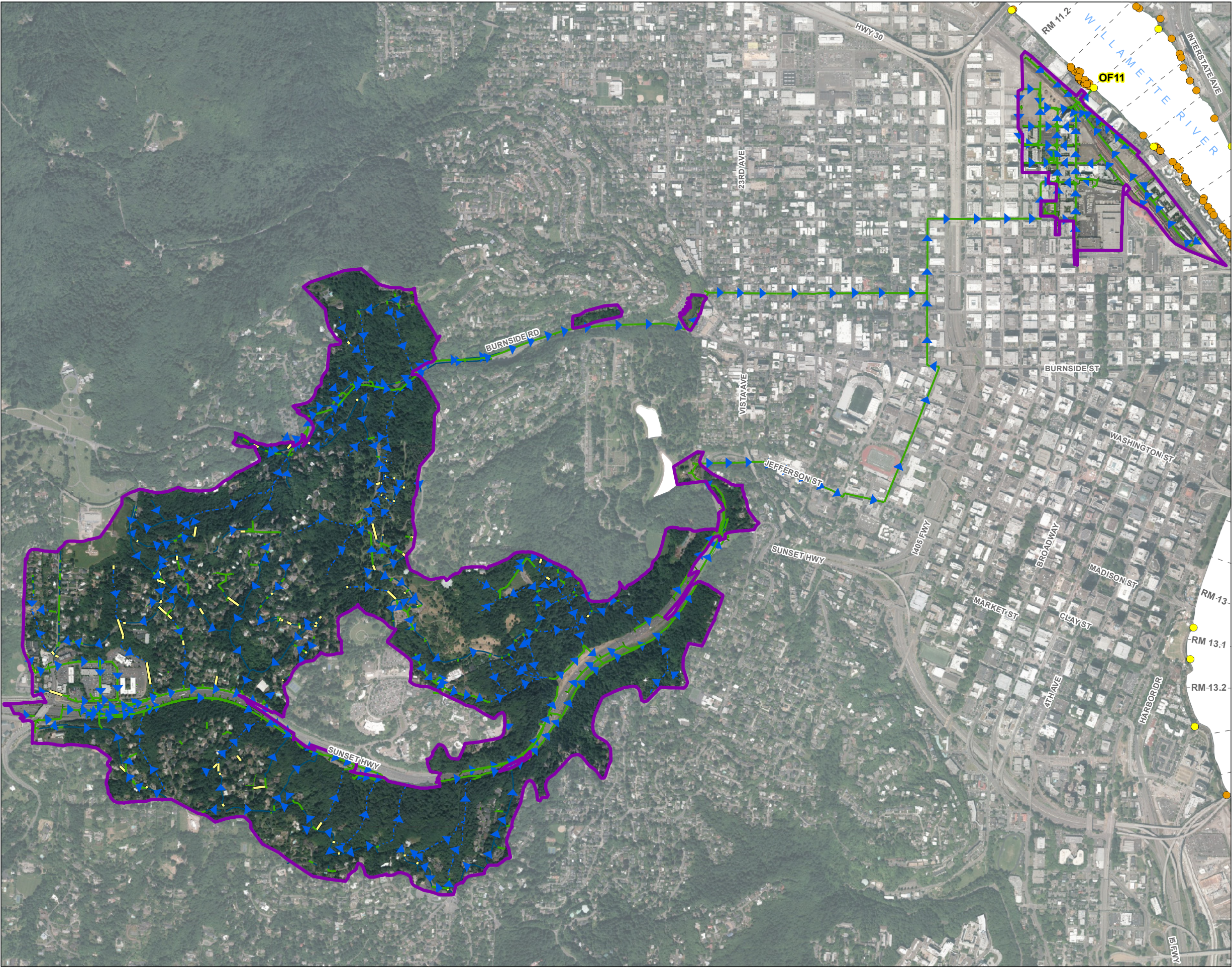
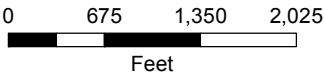
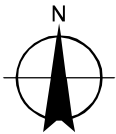


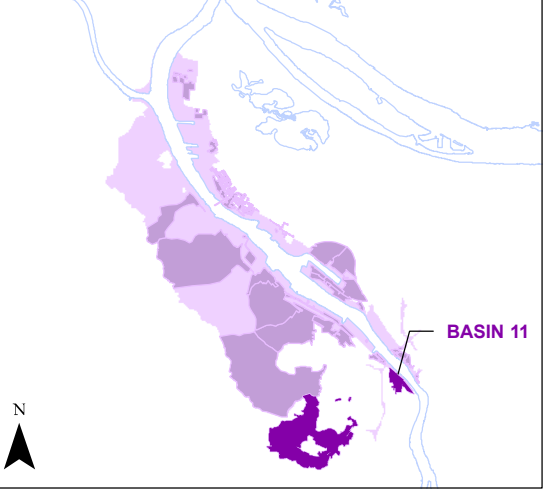
FIGURE 1
Basin 11
Drainage Basin Overview

- Basin 11
- Conveyance System**
 - Storm Line
 - Culvert
 - Ditch
 - Channel
 - City Outfall
 - Non-City Outfall
- All Other Data**
 - River Mile (RM)
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO,
Air Photo Taken 2012

 ENVIRONMENTAL SERVICES
CITY OF PORTLAND
1120 SW Fifth Avenue, Room 1000
Portland Oregon, 97204 -1912



LOWER SUBBASIN

UPPER SUBBASIN

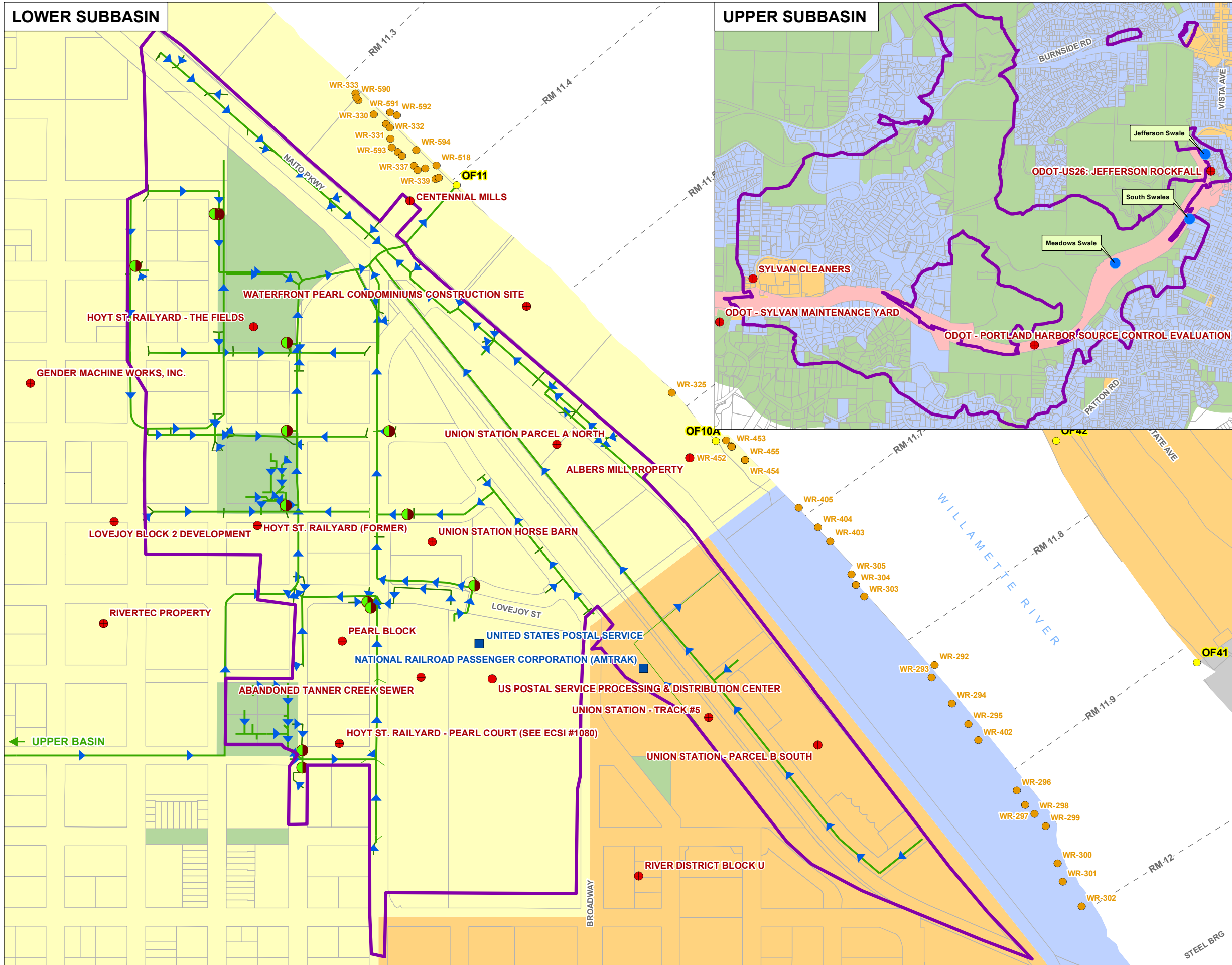
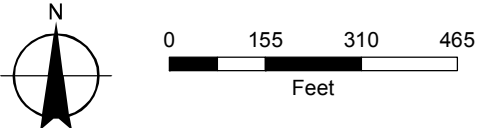


FIGURE 2

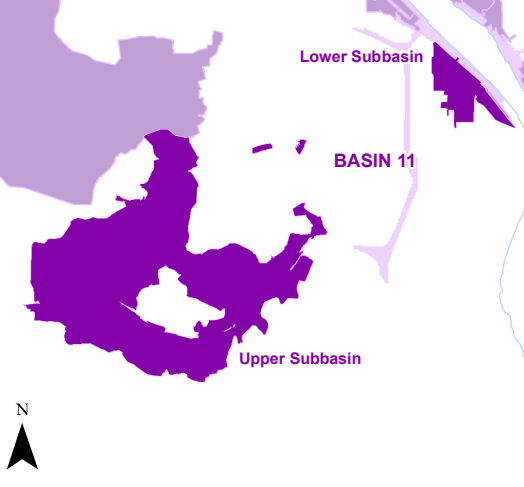
Basin 11
Overview and Conveyance
System Source Controls

- Basin 11
- DEQ ECSI Site
- NPDES Stormwater Permit
- Conveyance System**
 - Storm Line
 - Sediment Removal Structure
 - Water Quality Swale System
 - City Outfall
 - Non-City Outfall
- Land Use/Zoning**
 - Heavy Industrial
 - General Employment
 - Commercial
 - Residential
 - Parks and Open Space
 - Major Transportation
- All Other Data**
 - River Mile (RM)
 - Tax Lot
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO

 ENVIRONMENTAL SERVICES
CITY OF PORTLAND
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Portland Oregon, 97204-1912



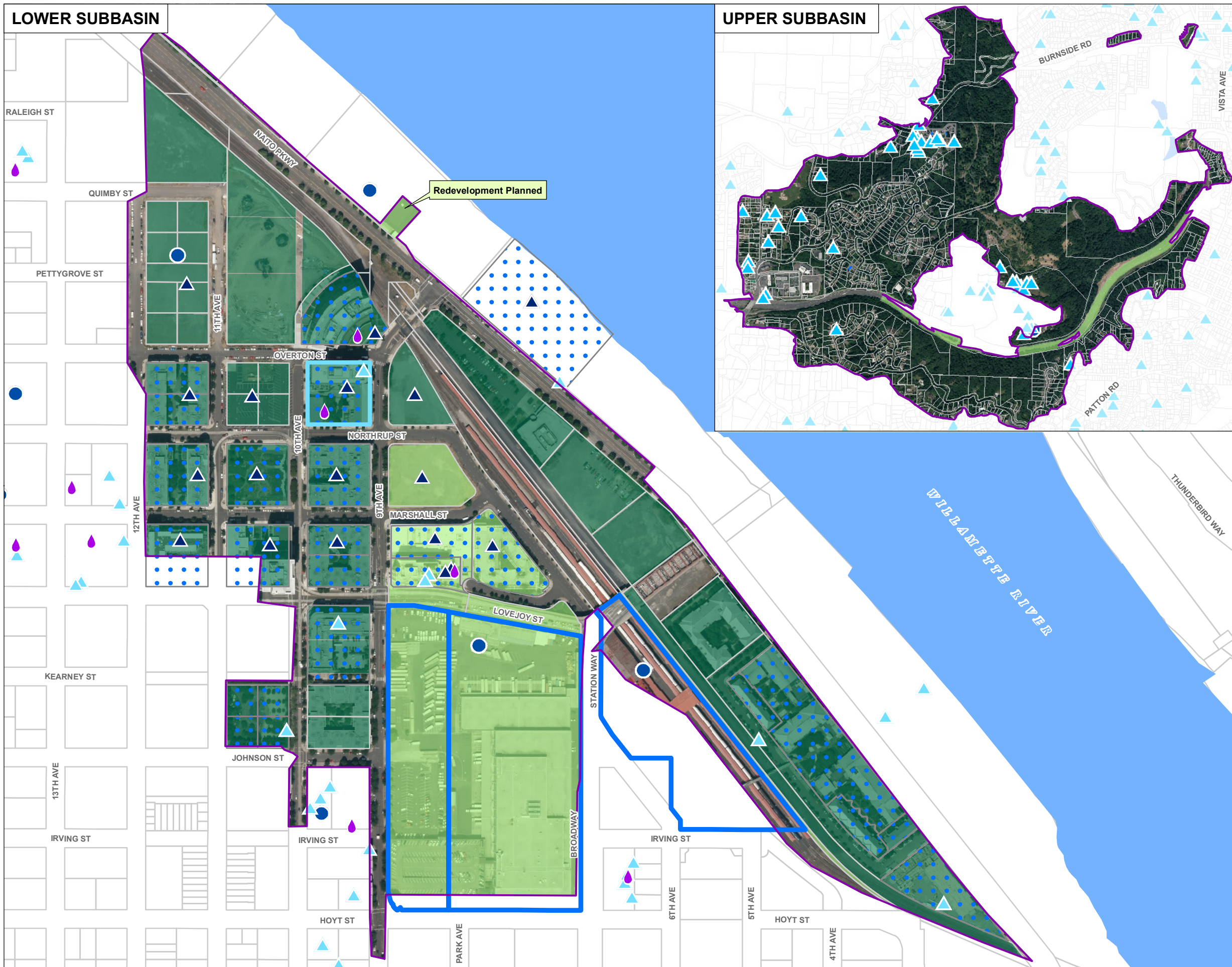
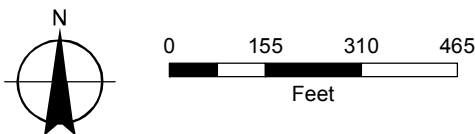


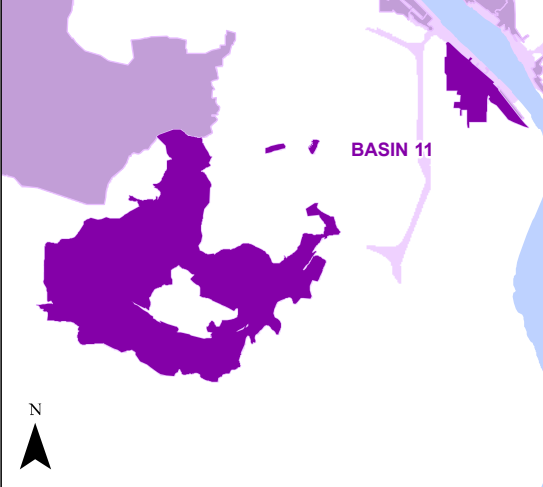
FIGURE 3
Basin 11
Upland Site Source Controls

- Basin 11
- Tax Lot
- DEQ Stormwater SCEs**
 - SCE implemented or pending
 - SCE not needed or low priority
- All Other Features**
 - NPDES Stormwater Discharge Permit
 - City Discharge Authorization
 - >50% of Site Area Redeveloped Under City SWMM
 - Stormwater Treatment Facility
 - Met stormwater treatment requirements with offsite treatment
 - Ecoroof
 - Site Inspection - BES Industrial Stormwater Program
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO, Aerial Photo Taken 2012

ENVIRONMENTAL SERVICES
CITY OF PORTLAND
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Portland Oregon, 97204-1912



Completion Summary for City of Portland Outfall Basin 13

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and several City programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled.

This Completion Summary summarizes the results of this collaborative effort in Outfall Basin 13 and includes a weight-of-evidence evaluation to demonstrate that source evaluation is complete and that there are no current (or anticipated future) major sources of contaminants to the Willamette River.

Basin 13 is located on the west side of the river in the Pearl District near downtown Portland. Historically a manufacturing and transportation hub, facilities in this district came into increasing disuse as industrial activities largely shifted to other parts of the City starting in the 1950s. In the early 1980s, the Pearl District became the focus of planning efforts to convert industrial properties into the district's current mixed-use, high-density urban neighborhood. Basin 13 is small and now consists primarily of City streets and new residential development; the remainder of the basin includes a restaurant, two warehouses, and a truck trailer parking area.

No known or suspected contaminant sources to the Basin 13 stormwater conveyance system have been identified, and river sediment in the vicinity of the outfall does not contain elevated concentrations of any contaminants (i.e., the U.S. Environmental Protection Agency [EPA] has not identified the potential need for sediment remediation). For these reasons, the City concludes that no source investigation is warranted in this basin and that the existing programmatic source control measures (SCM) in the basin are sufficient for ensuring discharges from Outfall 13 are protective of the river. Therefore, the City has met the remedial investigation (RI)/ SCM objectives for Basin 13.

2 Introduction

This Completion Summary presents a weight-of-evidence evaluation of whether further source investigation is needed in Basin 13, and the rationale for concluding that current and future discharges from the basin are not likely to be significant sources of contaminants to river sediment. The purpose of this report is to demonstrate that, for Basin 13, the City has met the joint RI/SCM objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ.

This report is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report), which provides additional background and detail regarding

the City's harborwide source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Outfall 13 discharges to the west side of the Willamette River near River Mile 11, approximately 275 feet downstream of the Fremont Bridge. It was historically a combined sewer outfall (CSO). The combined sewer portion of the system was diverted to the municipal water treatment system in 2006, and Basin 13 is now a stormwater-only basin. The current Basin 13 stormwater conveyance system drains a 4.9-acre area, located within Portland's Pearl District. Figure 1 shows the location of the outfall and drainage basin boundary and provides an overview of the associated stormwater conveyance system. As shown in Figure 1, the basin includes two drainage swales in the right-of-way along the west side of NW Front Avenue. The City's Bureau of Environmental Services (BES) worked with the City's Bureau of Transportation on a pedestrian improvement project to install these swales, which are designed to reduce total suspended solids loading to Outfall 13. City programs that result in these types of stormwater improvements are described in the Municipal Report.

3.2 Land Use and Potential Upland Sources

Basin 13 includes areas zoned for residential (multi-unit), general employment¹ and industrial use (see Figure 1). The majority of the basin consists of NW Front Avenue and NW 15th Street and residential land (occupied by the RiverScape condominiums). The remainder consists of the property at 2047 NW Front Avenue (currently occupied by a restaurant) and a portion of the property at 2030 NW 17th Street, which is occupied by two warehouses and used for parking and storage of truck trailers. The majority of this property is unpaved and covered by gravel.

No current pollutant sources have been identified in Basin 13. Historical land use within and adjacent to the current basin boundary was industrial and included operations associated with the Port of Portland's former Terminal 1 South, which is a DEQ Cleanup Program site (Environmental Cleanup Site Information [ECSI] #2642). The former terminal site was remediated in 2002 and received a No Further Action determination from DEQ (DEQ, 2003). Terminal 1 South did not historically discharge through Outfall 13, but discharged directly to site outfalls. During redevelopment for residential use in 2006 under the City's Stormwater Management Manual (SWMM), a portion of the remediated site was connected to Outfall 13.

Operations at properties in the portion of the basin that is currently zoned for industrial use do not have extensive outdoor activities where industrial stormwater exposures may occur. Accordingly, none of the sites in the basin currently holds, or historically had, National Pollutant Discharge Elimination System (NPDES) permits to discharge to the Basin 13 conveyance system. Note that the City has an NPDES Municipal Separate Stormwater Sewer System (MS4) stormwater permit that covers basin drainage areas.

¹ General employment is a Portland zoning category that allows a range of employment opportunities but emphasizes industrial and industrial-support uses. The zones can allow for the transition to a less industrial overall nature.

3.3 Outfall Setting

Outfall 13 discharges immediately downstream of a river reach identified by EPA as an area of potential concern (AOPC 26) for several contaminants, based on results of river sediment sampling (EPA, 2010). However, Outfall 13 does not discharge to that or any other AOPC.

4 Basin Screening and Source Investigations

Basin screening consisted of an evaluation of current and past land use, as described in Section 3. Based on this evaluation, the City concluded that Basin 13 was unlikely to contain major sources of contaminants to the City conveyance system and no source investigations were needed in Basin 13.

5 Completion of Source Identification

The lines of evidence evaluated to confirm that source evaluation objectives have been met with regard to Basin 13 include (1) inriver sediment concentrations near the outfall, (2) information on potential sources of contaminants, and (3) drainage basin characteristics and land use. Findings from this evaluation are summarized below:

- *Inriver Sediment Concentrations.* River sediment in the vicinity of Outfall 13 does not contain elevated concentrations of any contaminants (i.e., the outfall does not discharge to an AOPC).
- *No Upland Sources:* Basin 13 contains no known or suspected upland sources of contaminants to the City stormwater conveyance system (e.g., no active DEQ Cleanup Program sites or NPDES-permitted facilities). The only DEQ Cleanup Program site in the basin was not connected to the City's conveyance system until after site investigation and remediation were completed under DEQ oversight and the site had been redeveloped for residential use.
- *Drainage Basin Characteristics and Land Use.* Basin 13 is small (4.9 acres) and mostly consists of paved City streets and relatively new residential development. Current uses of the industrial-zoned property in the basin include a restaurant, warehouse, parking, and truck trailer storage. Current and future industrial activities exposed to stormwater at these sites will be addressed by the DEQ Water Quality NPDES program, and non-industrial activities are not a known or suspected major source of contaminants to the City stormwater conveyance system. Water quality swales constructed by the City provide treatment for surface drainage on the west side of NW Front Avenue (see Figure 1).

The weight-of-evidence evaluation summarized above indicates that the Basin 13 source evaluation is complete and no additional source tracing is warranted.

6 Basin Source Controls

Because no known or suspected major sources were identified in Basin 13, additional coordination between DEQ and the City to identify control mechanisms was not needed in this

basin. Terminal 1 South, the only DEQ Cleanup Program site in Basin 13, was investigated and remediated under DEQ oversight. Redevelopment of the portion of this site within Basin 13 changed the land use from heavy industrial to residential, and all of the redevelopment included stormwater controls under the SWMM. Figures 1 and 2 displays the spatial extent of the upland site investigation and other programmatic site source controls in and around the basin (see key to figures provided at beginning of this Appendix). Future anticipated redevelopment in the basin also will be subject to stormwater controls as required under the SWMM.

Conveyance system source controls in Basin 13 consist of treatment swales installed in 2007 along NW Front Ave (see Figure 1) as part of the City's Green Streets program. The swales treat most of the stormwater from the west half of NW Front Avenue. The City conservatively lined the swales based on soil data collected just outside the basin and adjacent to a historical rail line. The data were collected before the Upshur Shaft of the West Side CSO Tunnel was constructed; data showed low concentrations of diesel, polychlorinated biphenyls (PCB) and metals in subsurface soil samples (CH2M HILL and Bridgewater, 2002).

Other municipal programs (e.g., periodic inspection of and technical assistance to non-NPDES sites, illicit discharge monitoring, street sweeping, etc.) likely provide additional source control benefits in the basin and will help to address minor sources for which specific control measures have not been required. City programs that control current and future contaminant discharges to the conveyance system are described in the Municipal Report.

7 Conclusion

Based on the information summarized above, there are no major pollutant sources in Basin 13. Therefore, future discharges from Outfall 13 are unlikely to represent a significant source of contaminants to the river. The City concludes that it has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin 13.

8 References

- CH2M HILL and Bridgewater. 2002. Contaminated Media Management Plan (CMMP) West Side CSO Tunnel, Shafts, & Pipelines, Part I of II. Prepared of the City of Portland Bureau of Environmental Services. September 2002.
- DEQ. 2003. DEQ Site Summary Full Report – Details for ECSI Site ID 2642, Port of Portland - Terminal 1 South. DEQ Environmental Cleanup Site Information Database (ECSI), updated June 9, 2003; accessed September 29, 2011.
<http://www.deq.state.or.us/lq/ECSI/ecsidetailfull.asp?seqnbr=2642>
- EPA. 2010. Re: Portland Harbor Superfund Site; Administrative Order on Consent for Remedial Investigation and Feasibility Study; Docket No. CERCLA-10-2001-0240. Portland Harbor Feasibility Study Source Tables. Letter from EPA to Mr. Bob Wyatt, Chairman, Lower Willamette Group. November 23, 2010.

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Figure 1: Basin 13 Overview and Conveyance System Source Controls

Figure 2: Basin 13 Upland Site Source Controls

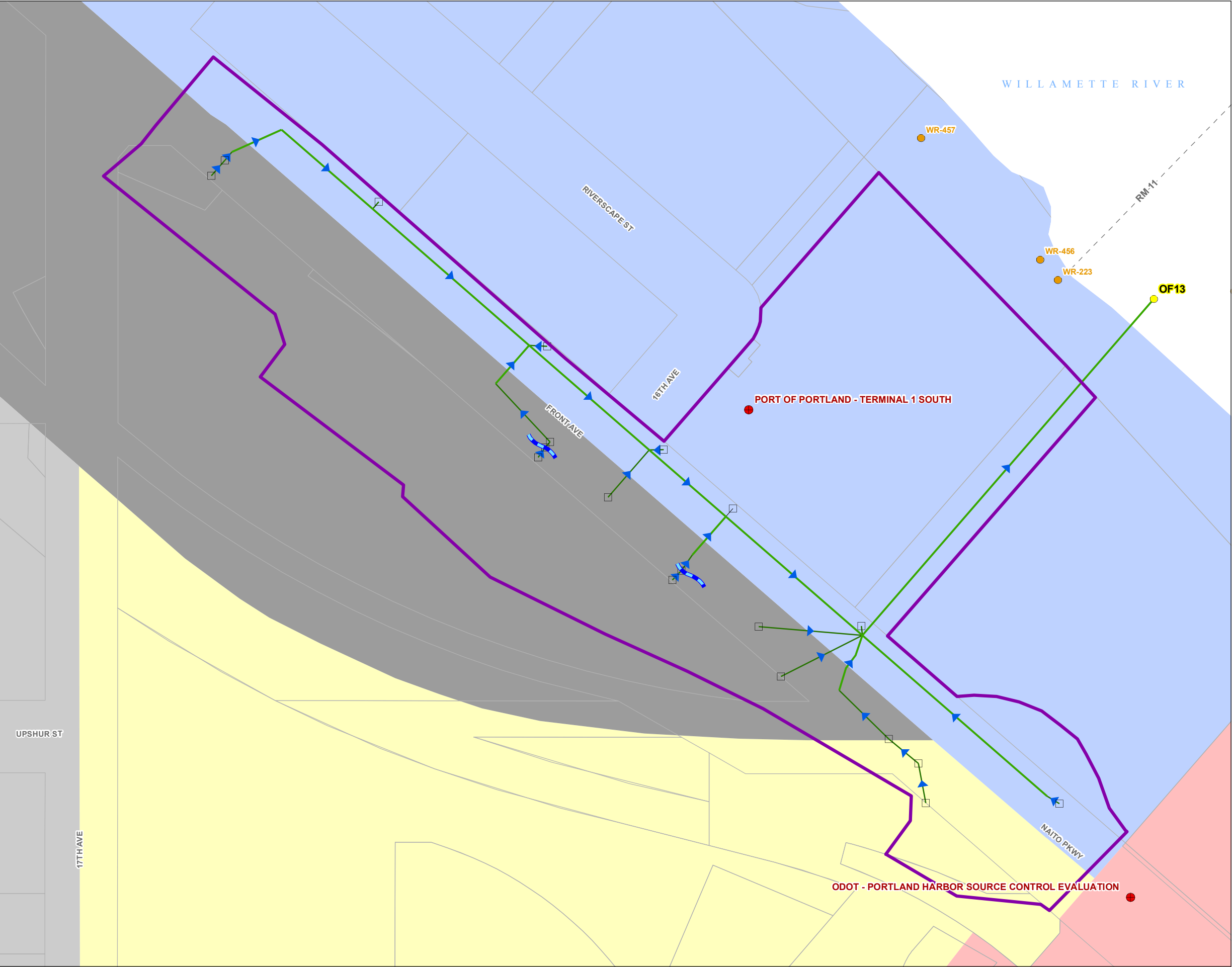
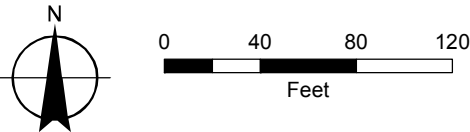


FIGURE 1
Basin 13
Overview and Conveyance
System Source Controls

- Basin 13
- DEQ ECSI Site
- Conveyance System**
 - Storm Line
 - Water Quality Swale
- Catch Basin
- City Outfall
- Non-City Outfall
- Land Use/Zoning**
 - Heavy Industrial
 - Light Industrial
 - General Employment
 - Residential
 - Major Transportation
- All Other Data**
 - River Mile (RM)
 - Tax Lot
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO

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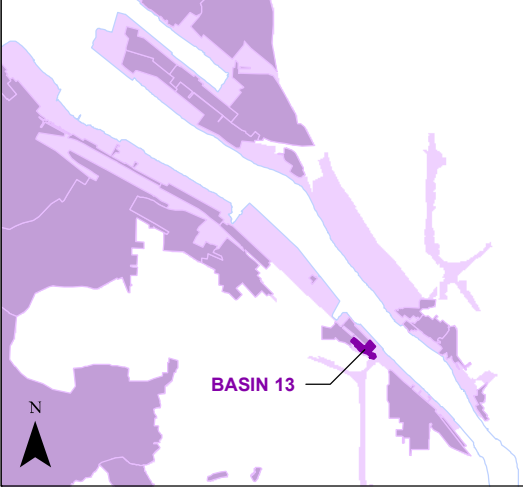
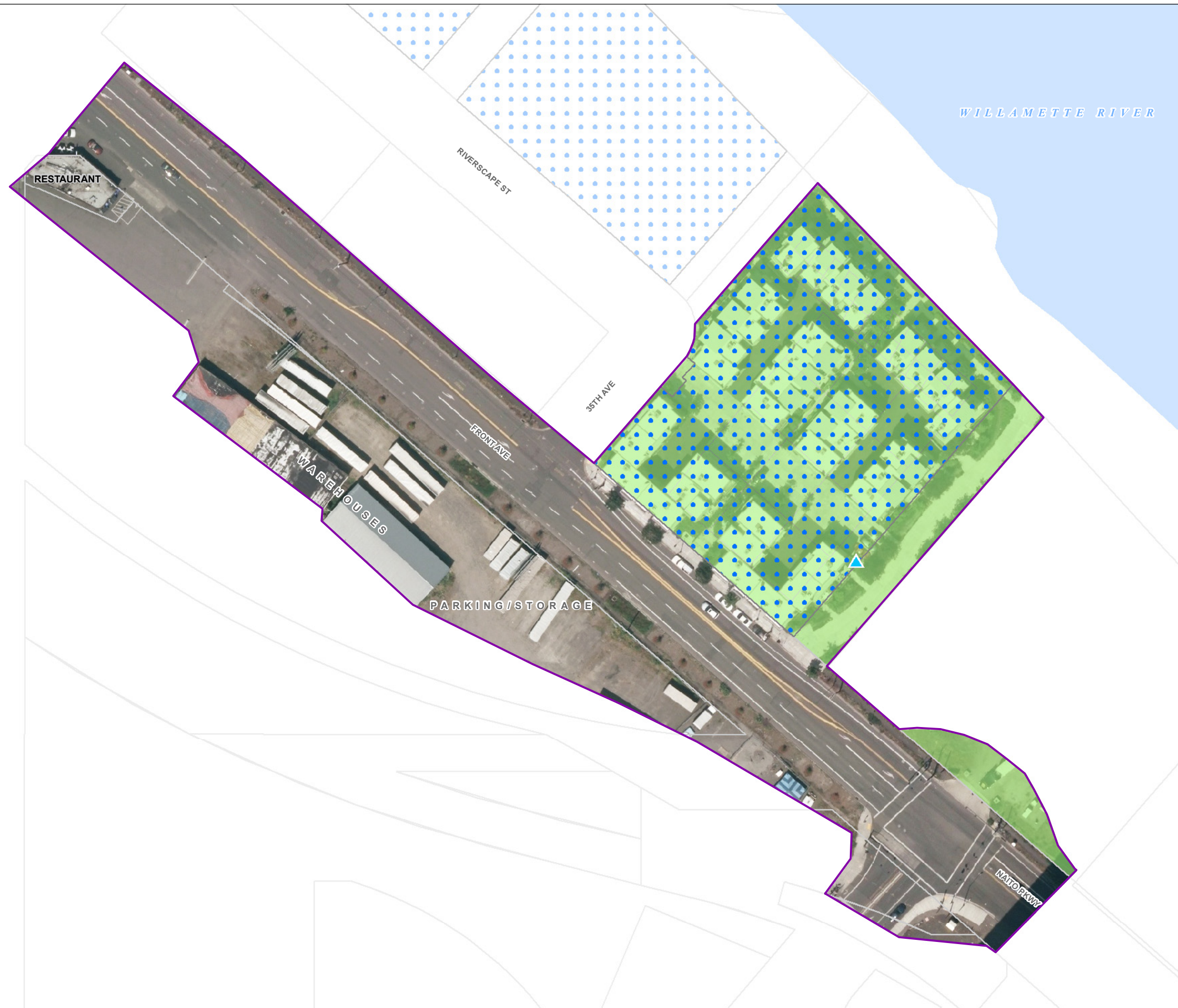
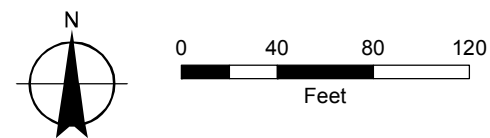


FIGURE 2
Basin 13
Upland Site Source Controls

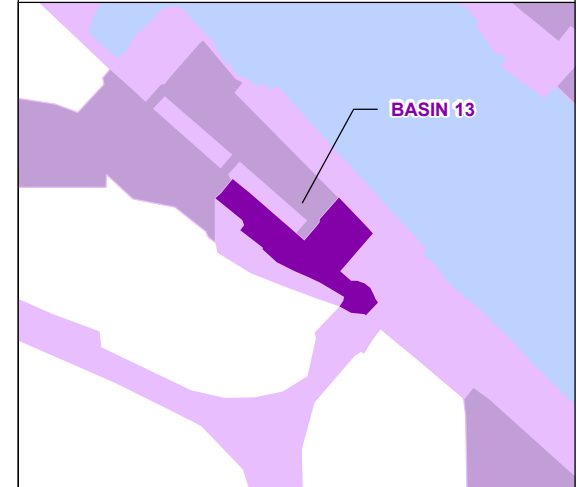


- Basin 13
- Tax Lot
- DEQ Stormwater SCEs**
 - SCE implemented or pending
- All Other Features**
 - >50% of Site Area Redeveloped Under City SWMM
 - Stormwater Treatment Facility
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
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Completion Summary for City of Portland Outfall Basin 14

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and several City programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled. This report summarizes the results of this collaborative effort in Outfall Basin 14.

This Completion Summary includes a weight-of-evidence evaluation to demonstrate that source evaluation is complete and there are no current (or anticipated future) major sources of contaminants to the Willamette River.

Basin 14 is located on the west side of the river just north of the Pearl District near downtown Portland. This area was formerly industrial, but portions have begun to transition to mixed residential and commercial uses, influenced by the redevelopment changes in the Pearl District. The area within Basin 14 now consists of new residential development, warehouses, an office park, a railroad corridor, and paved rights-of-way.

No known or suspected major contaminant sources to the Basin 14 stormwater conveyance system have been identified, and river sediment in the vicinity of the outfall does not contain elevated concentrations of any contaminants (i.e., the U.S. Environmental Protection Agency [EPA] has not identified the potential need for sediment remediation). For these reasons, the City concludes that no source investigation is warranted in this basin and that the existing programmatic source control measures (SCM) in the basin are sufficient for ensuring discharges from Outfall 14 are protective of the river. Therefore, the City has met the remedial investigation (RI)/SCM objectives for Basin 14.

2 Introduction

This Completion Summary presents a weight-of-evidence evaluation of whether further source investigation is needed in Basin 14, and the rationale for concluding that current and future discharges from the basin are not likely to be significant sources of contaminants to river sediment. The purpose of this report is to demonstrate that, for Basin 14, the City has met the joint RI/SCM objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ.

This report is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report), which provides additional background and detail regarding the City's harborwide source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Outfall 14 discharges to the west side of the Willamette River near River Mile 10.8. The Basin 14 stormwater conveyance system drains a 17.9-acre area, located at the north end of the Pearl District. Figure 1 shows the location of the outfall and drainage basin boundary and provides an overview of the associated stormwater conveyance system. As shown in Figure 1, the basin includes a sedimentation manhole on a storm line between NW Riverscape Street and the main line leading to the outfall. This stormwater treatment device and affiliated storm lines were installed by a private party during redevelopment of the former Port of Portland Terminal 1 South property to meet requirements of the City's Stormwater Management Manual (SWMM). The sedimentation manhole reduces total suspended solids loading to Outfall 14 from the condominium properties and associated roadways in the portion of the basin that is on the east side of NW Front Avenue. City programs that result in these types of stormwater improvements are described in the Municipal Report.

3.2 Land Use and Potential Upland Sources

Basin 14 includes areas zoned for heavy industrial, light industrial, and residential (multi-unit) use. Approximately one half of the basin is new residential development and affiliated rights-of-way. Three developed properties, a railroad corridor, and paved rights-of-way comprise the other half of the basin. Although zoning in the non-residential area is industrial, current land use is primarily commercial in nature and includes a moving supply company, document storage facility, and office complex.

No current pollutant sources have been identified in Basin 14. Historical land use within and adjacent to the current basin boundary was industrial and included operations associated with the Port of Portland's former Terminal 1 South, which is a DEQ Cleanup Program site (Environmental Cleanup Site Information [ECSI] # 2642). The former terminal site was remediated in 2002 and received a No Further Action determination from DEQ (DEQ, 2003). Historically, Terminal 1 South did not discharge to the river through Outfall 14, but discharged directly to site outfalls. During redevelopment for residential use in 2006 under the SWMM, a portion of the remediated site was connected to Outfall 14.

No other DEQ Cleanup Program sites are located in Basin 14. Operations at properties in the portion of the basin that is currently zoned for industrial use do not have extensive outdoor activities where industrial stormwater exposures may occur. Accordingly, no sites in the basin currently hold, or historically had, National Pollutant Discharge Elimination System (NPDES) permits to discharge to the Basin 14 conveyance system. Note that the City has an NPDES Municipal Separate Stormwater Sewer System (MS4) stormwater permit that covers basin drainage areas.

3.3 Outfall Setting

Outfall 14 is located about 0.25 mile downstream of the Fremont Bridge. The outfall is not located within or adjacent to any reach identified by the EPA as an area of potential concern (AOPC) for contaminant concentrations in river sediment (EPA, 2010).

4 Basin Screening and Source Investigations

Basin screening consisted of an evaluation of current and past land use, as described in Section 3. Based on this evaluation, the City concluded that Basin 14 was unlikely to contain major sources of contaminants to the City conveyance system and no source investigations were needed in Basin 14.

5 Completion of Source Identification

The lines of evidence evaluated to confirm that source evaluation objectives have been met with regard to Basin 14 include (1) inriver sediment concentrations near the outfall, (2) information on potential sources of contaminants, and (3) drainage basin characteristics and land use. Findings from this evaluation are summarized below:

- *Inriver Sediment Concentrations.* River sediment in the vicinity of Outfall 14 does not contain elevated concentrations of any contaminants (i.e., the outfall does not discharge to an AOPC).
- *No Upland Sources:* Basin 14 contains no known or suspected major sources of contaminants to the City stormwater conveyance system (e.g., no active DEQ Cleanup Program sites or NPDES-permitted facilities). The only DEQ Cleanup Program site in the basin was not connected to the City's conveyance system until after site investigation and remediation was completed under DEQ oversight, and the site had been redeveloped for residential use.
- *Drainage Basin Characteristics and Land Use.* Basin 14 is relatively small (17.9 acres) and mostly consists of condominiums, warehouses, and an office park. Stormwater from the residential development is treated before discharging to the City system. Current uses of the warehouses in the basin include a document storage facility and a moving supply company. Most of the land use at these sites consists of parking areas and warehouse uses with minimal industrial exposures to stormwater. Current and future industrial activities exposed to stormwater at these sites will be addressed by the DEQ Water Quality NPDES program, and non-industrial activities are not a known or suspected major source of contaminants to the City stormwater conveyance system.

The weight-of-evidence evaluation summarized above indicates that the Basin 14 source evaluation is complete and no additional source tracing is warranted.

6 Basin Source Controls

Because no known or suspected major sources of contaminants were identified in Basin 14, additional coordination between DEQ and the City to identify control mechanisms was not needed in this basin. Terminal 1 South, the only DEQ Cleanup Program site in Basin 14, was investigated and remediated under DEQ oversight before any part of it was in Basin 14. Redevelopment of the portion of this site that is now within Basin 14 changed the land use from heavy industrial to residential, and all of the redevelopment included stormwater controls under the SWMM. Figure 2 displays the spatial extent of the Terminal 1 South upland site investigation and other programmatic site source controls in and around the basin (see key to

figures provided at beginning of this Appendix). Future anticipated redevelopment in the basin also will be subject to stormwater controls as required under the SWMM.

In addition, programmatic source controls are ongoing in the basin. One type of programmatic source control is elimination of stormwater exposures to industrial activities. The City Industrial Stormwater Program works with site operators to reduce potential stormwater exposure to site industrial activities, by conducting site visits, providing technical assistance, and monitoring. Sites that are subject to NPDES regulations due to the nature of industrial operations, but which meet specific criteria, can qualify for a No Exposure Certification (NEC). One site in Basin 14 has a stormwater NEC under the NPDES program (see Figures 1 and 2).¹

Other municipal programs (e.g., periodic inspection of and technical assistance to non-NPDES sites, illicit discharge monitoring, street sweeping, etc.) likely provide additional source control benefits in the basin and will help to address minor sources for which specific control measures have not been required. City programs that control current and future contaminant discharges to the conveyance system are described in the Municipal Report.

7 Conclusion

Based on the information summarized above, there are no major pollutant sources in Basin 14. Therefore, future discharges from Outfall 14 are unlikely to represent a significant source of contaminants to the river. The City concludes that it has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin 14.

8 References

- DEQ. 2003. DEQ Site Summary Full Report – Details for ECSI Site ID 2642, Port of Portland - Terminal 1 South. DEQ Environmental Cleanup Site Information Database (ECSI), updated June 9, 2003; accessed September 29, 2011.
<http://www.deq.state.or.us/lq/ECSI/ecsidetailfull.asp?seqnbr=2642>
- EPA. 2010. Re: Portland Harbor Superfund Site; Administrative Order on Consent for Remedial Investigation and Feasibility Study; Docket No. CERCLA-10-2001-0240. Portland Harbor Feasibility Study Source Tables. Letter from EPA to Mr. Bob Wyatt, Chairman, Lower Willamette Group. November 23, 2010.

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Figure 1: Basin 14 Overview and Conveyance System Source Controls

Figure 2: Basin 14 Upland Site Source Controls

¹ Iron Mountain paper storage facility at 2116 NW Front; this site has had an NEC from 2004 to the present.

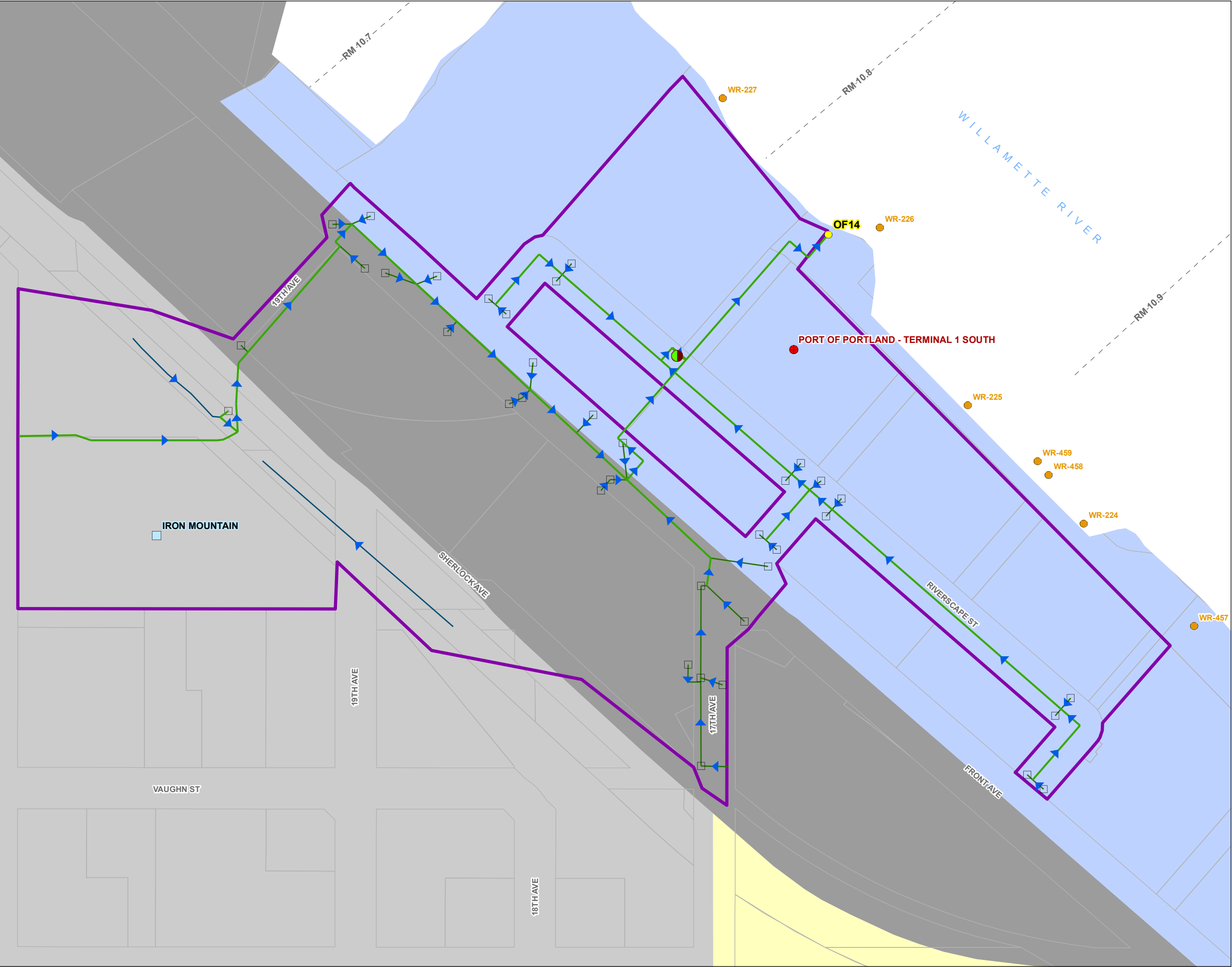
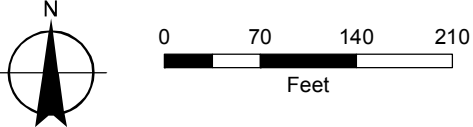


FIGURE 1
Basin 14
Overview and Conveyance
System Source Controls

- Basin 14
- DEQ ECSI Site
- NPDES No Exposure Certification
- Conveyance System**
 - Storm Line
 - Ditch
 - Catch Basin
 - Sediment Removal Structure
 - City Outfall
 - Non-City Outfall
- Land Use/Zoning**
 - Heavy Industrial
 - Light Industrial
 - General Employment
 - Residential
- All Other Data**
 - River Mile (RM)
 - Tax Lot
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: November 31, 2013
Data Sources: BES, METRO

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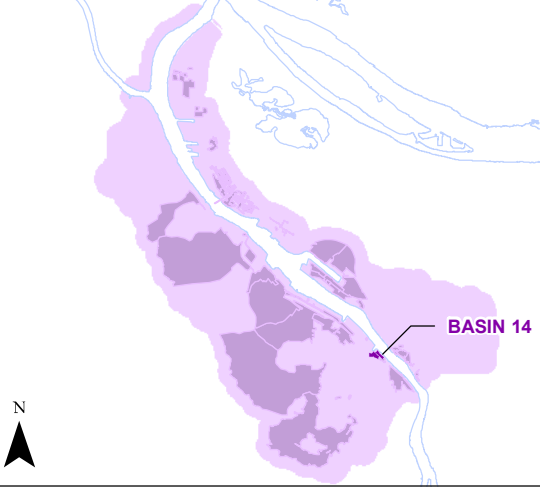
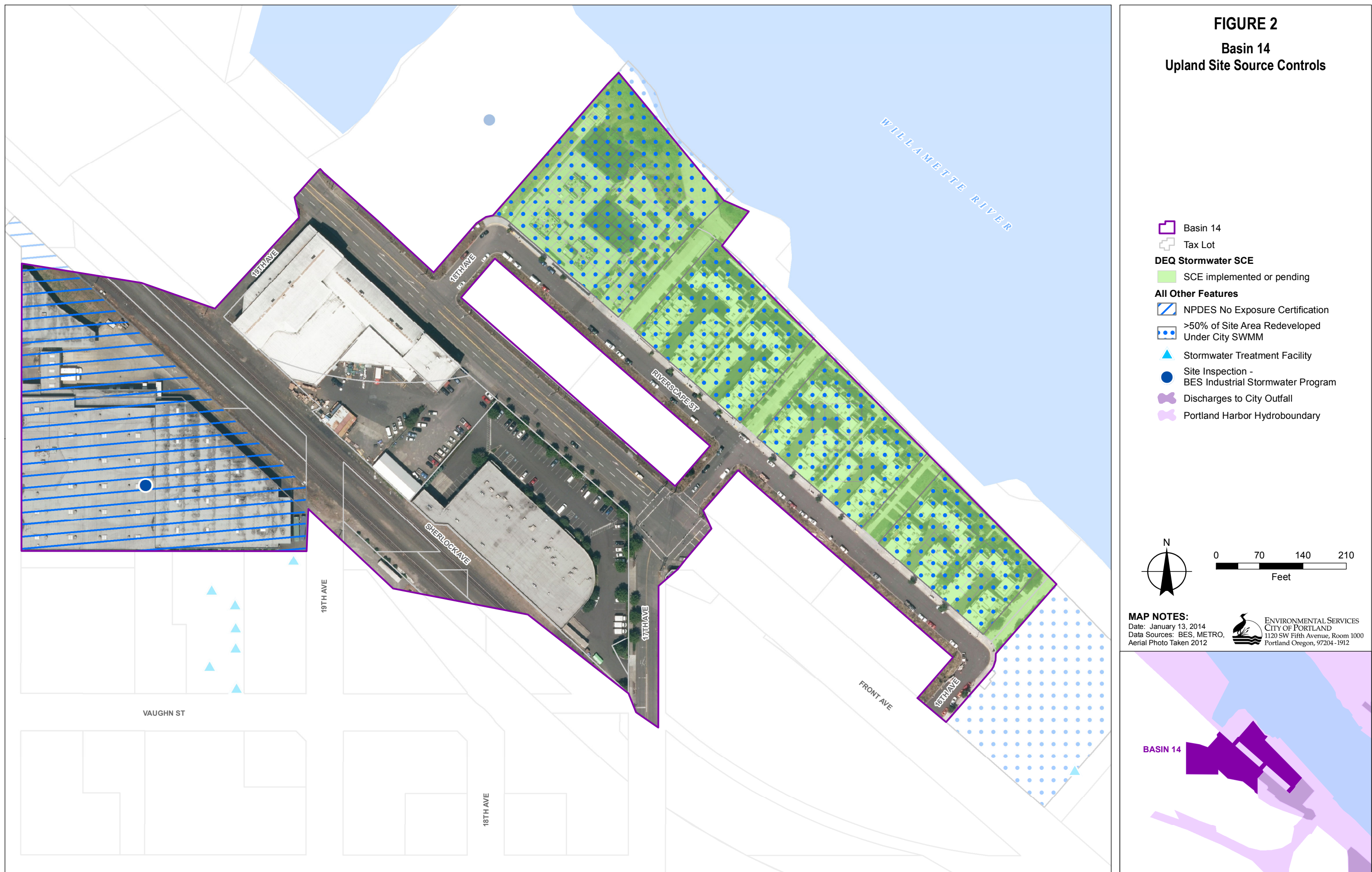


FIGURE 2
Basin 14
Upland Site Source Controls



Completion Summary for City of Portland Outfall Basin 15

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and several City programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled. This report summarizes the results of this collaborative effort in Outfall Basin 15.

The City has completed its source evaluation objectives in Basin 15 and determined that future discharges from the basin are not likely to represent a significant source to the Willamette River. Basin 15 is located on the west side of the river near River Mile (RM) 10.4, between NW Front Avenue and the river. The basin drainage area is entirely a small portion of one industrial site (the former Sulzer Bingham Pumps facility), which is conducting a stormwater pathway evaluation under DEQ Cleanup Program oversight. This evaluation will determine whether source controls are needed to address contaminant discharges from the site to the river via Outfall 15. Because the one potential source area has been identified and is being controlled, the City has met its remedial investigation (RI)/ Source Control Measures (SCM) objectives for Basin 15.

2 Introduction

This Completion Summary presents a weight-of-evidence evaluation of whether further source investigation is needed in Basin 15, and the rationale for concluding that future discharges from the basin are not likely to be significant sources of contaminants to river sediment. The purpose of this report is to demonstrate that, for Basin 15, the City has met the joint RI/SCM objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ.

This report is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report), which provides additional background and detail regarding the City's harborwide source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Outfall 15 discharges to the west side of the Willamette River near RM 10.4, just north of the Pearl District. The outfall currently serves a 1.1-acre stormwater basin. Historically, this outfall drained a larger area that was diverted to the City wastewater treatment plant in 2006 as part of the City's Combined Sewer Overflow Abatement Program. Figure 1 shows the location of the

outfall and current drainage basin boundary and provides an overview of the associated stormwater conveyance system.

3.2 Land Use and Potential Upland Sources

Land use in Basin 15 is heavy industrial, and operations are limited to a portion of a single property, the former Sulzer site. The basin is within a part of the property that was divided in approximately 2007 and sold to Dolan Designs. The Basin 15 portion of the Dolan property is used for offices and truck parking.

The former Sulzer site is a DEQ Cleanup Program site (Environmental Cleanup Site Information [ECSI] #1235) and is conducting a stormwater source control evaluation for the entire former property under DEQ oversight. Contaminants of interest for the site stormwater pathway evaluation include polycyclic aromatic hydrocarbons (PAH), total petroleum hydrocarbons, and metals (Anchor et al., 2012). The source control evaluation includes evaluation of stormwater discharges from the portion of the site draining to Outfall 15. Additionally, the former Sulzer site operated under a National Pollutant Discharge Elimination System (NPDES) 1200-Z industrial stormwater permit before splitting and selling the former eastern portion of their property. Current operations within the basin do not require NPDES industrial stormwater permit coverage.

Groundwater contamination is present at the former Sulzer site. The City evaluated existing site groundwater data and the identified plume does not appear to intersect the Basin 15 outfall pipe (GSI, 2006). DEQ is evaluating potential groundwater pathways at the former Sulzer site as part of the site investigation.

3.3 Outfall Setting

Outfall 15 discharges upstream of a river reach identified by the U.S. Environmental Protection Agency (EPA) as an area of potential concern (AOPC 24) for metals and polychlorinated biphenyls, based on results of river sediment sampling (EPA, 2010). AOPC 24 borders most of the former Sulzer site.

4 Basin Screening and Source Investigations

Basin screening and source investigation was not conducted by the City in the basin because the entire basin area is being addressed under the DEQ Cleanup Program. Sulzer collected stormwater and catch basin solids samples from the portion of the conveyance system draining to Outfall 15 as part of the site's source control evaluation (GeoDesign, 2012) and additional source investigation work is underway (GeoDesign, 2013).

5 Completion of Source Identification

The only site within Basin 15 is the former Sulzer site, which is conducting a stormwater source control evaluation under DEQ Cleanup Program oversight. Therefore, no additional source tracing is warranted.

6 Basin Source Control Measures

Source control measures are being implemented and planned under DEQ oversight at the former Sulzer site (see Figure 1). Measures include stormwater line and catch basin cleanout (2006) and additional line cleanout planned for 2013 (DEQ, 2013). If future industrial activities in the basin drainage area change and result in industrial exposures to stormwater, these activities will be evaluated by the City's Industrial Stormwater Program to determine whether a DEQ Water Quality NPDES industrial stormwater permit is warranted. This program is described in the Municipal Report.

7 Conclusion

Only one site is located within the Basin 15 drainage area, and the need for stormwater source control measures at this site is being evaluated under DEQ authority. Future discharges from Outfall 15 therefore are unlikely to represent a significant source of contaminants to the river. The City concludes that it has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin 15.

8 References

- Anchor et al. 2012. Portland Harbor RI/FS Draft Feasibility Study. Prepared for The Lower Willamette Group by Anchor QEA, LLC, Windward Environmental, LLC, Kennedy/Jenks Consultants, and Integral Consulting, Inc. February 2012.
- DEQ. 2013. Milestone Report, Upland Source Control at the Portland Harbor Superfund Site. Prepared by the Oregon Department of Environmental Quality. January 2013.
- EPA. 2010. Re: Portland Harbor Superfund Site; Administrative Order on Consent for Remedial Investigation and Feasibility Study; Docket No. CERCLA-10-2001-0240. Portland Harbor Feasibility Study Source Tables. Letter from EPA to Mr. Bob Wyatt, Chairman, Lower Willamette Group. November 23, 2010.
- GeoDesign. 2012. Source Control Evaluation, Sulzer Pumps Facility, 2800 NW Front Avenue, Portland, Oregon, DEQ ECSI No. 1235. Prepared for Sulzer Pumps (US) Inc. by GeoDesign, Inc. June 1, 2012.
- GeoDesign. 2013. Revised Work Plan, Additional Source Control Evaluation Activities, Sulzer Pumps Facility, 2800 NW Front Avenue, Portland, Oregon, DEQ ECSI No. 1235. Prepared for Sulzer Pumps (US) Inc. by GeoDesign, Inc. June 7, 2013.
- GSI. 2006. Relationships between Upland Shallow Groundwater Plumes and the City Stormwater and Combined Conveyance System with the Portland Harbor. Technical Memorandum prepared by Groundwater Solutions, Inc., for the City of Portland Bureau of Environmental Services. March 16, 2006.

List of Figures

Figure 1: Basin 15 Overview and Upland Site Source Controls

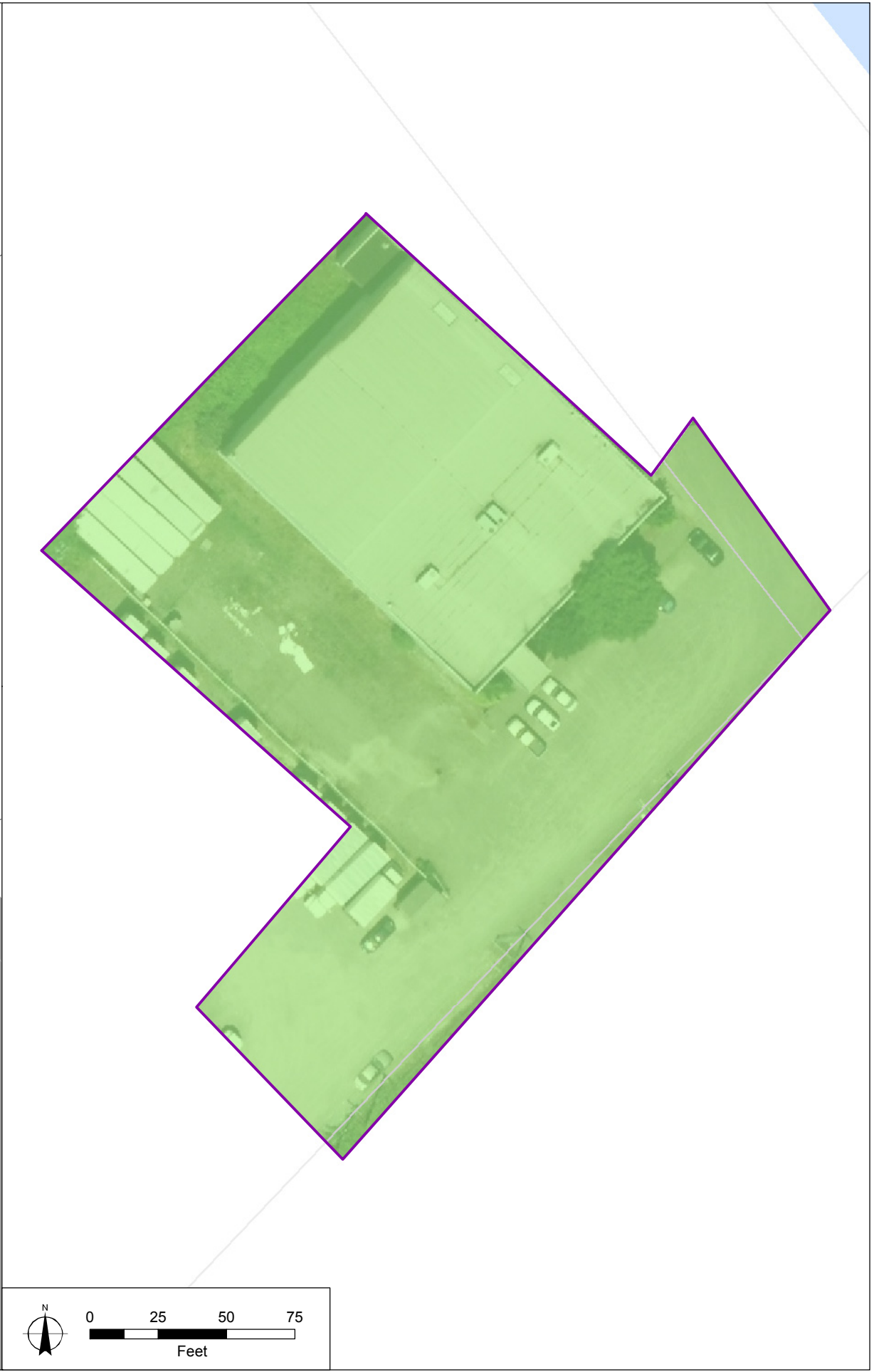
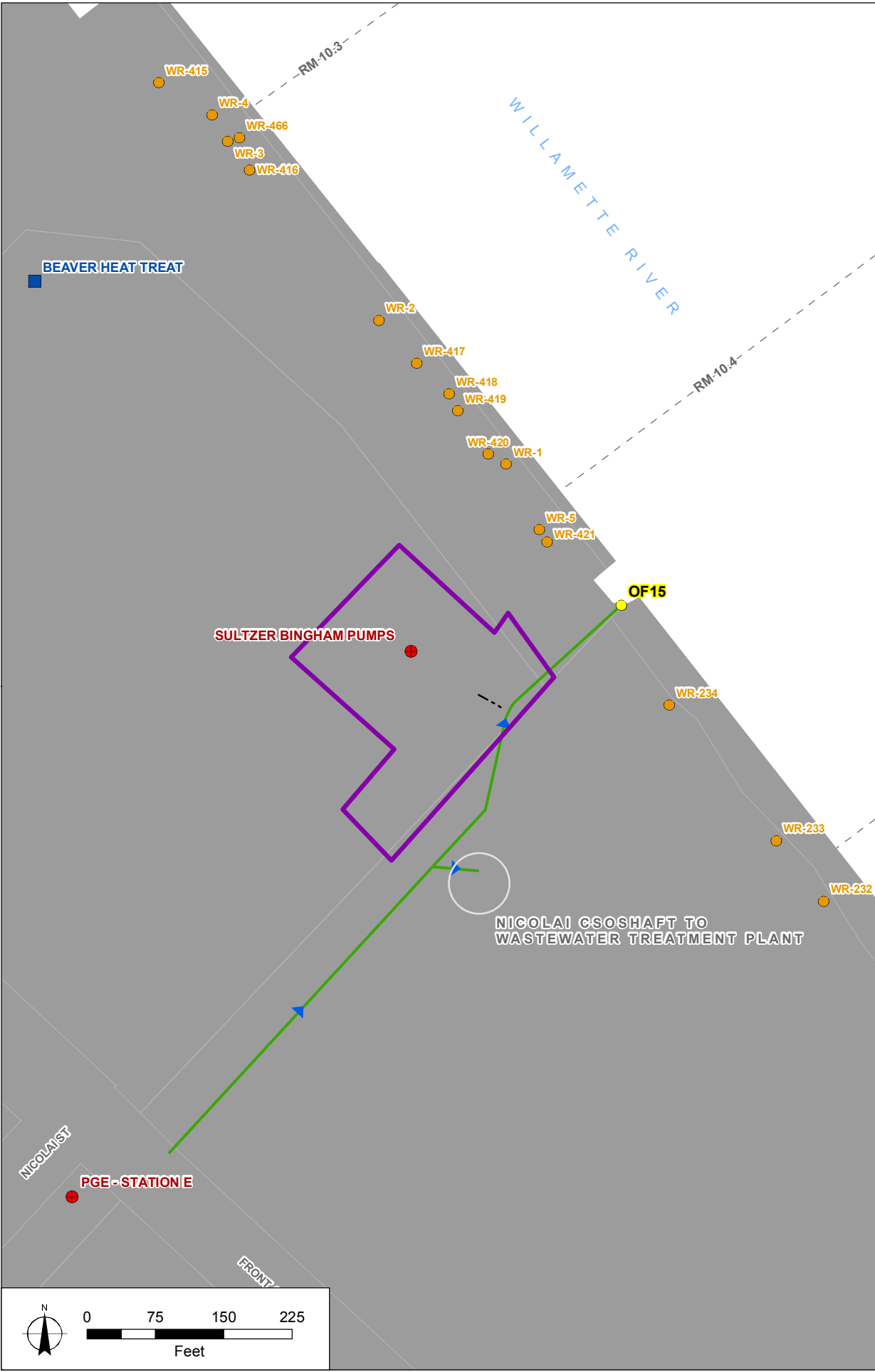
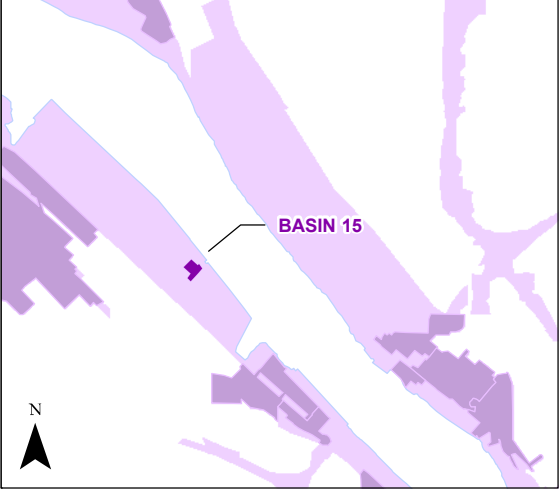


FIGURE 1
Basin 15
Overview and Upland Site Source Controls

- Basin 15
- DEQ ECSI Site
- Conveyance System**
 - Storm Line
 - Site Connection
 - City Outfall
 - Non-City Outfall
- Land Use/Zoning**
 - Heavy Industrial
- DEQ Stormwater SCE**
 - SCEs implemented or pending
- All Other Features**
 - River Mile (RM)
 - Tax Lot
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary

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Completion Summary for City of Portland Outfall Basin 16

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and several City programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled. This report summarizes the results of this collaborative effort in Outfall Basin 16.

This Completion Summary includes a weight-of-evidence evaluation to demonstrate that source identification is complete and a summary of source controls (implemented or planned) that will control future contaminant discharges to the Willamette River.

Basin 16 is located on the west side of the Willamette River in the Guilds Lake industrial area and discharges to Balch Creek Cove. Evaluation of inriver sediment data collected by the Lower Willamette Group (LWG) indicated the presence of sediment contamination in the vicinity of the outfall, so the City identified this basin for source investigation. The entire basin is developed and is occupied by industrial facilities (trucking, warehouse/distribution, automotive service, metals recycling, manufacturing operations, and a storage yard) and commercial properties.

The City conducted a comprehensive phased investigation of the basin, which included collecting and analyzing inline solids, stormwater, and dry-weather flow samples to identify major sources and pathways to the basin. Results of these investigations identified a major source of polychlorinated biphenyls (PCB), semivolatile organic compounds, and metals to the basin. As a result of these investigations, the Calbag Metals site entered the DEQ Cleanup Program and is conducting a stormwater pathway evaluation to identify and implement necessary source control measures (SCM) under DEQ oversight. Source investigation results collected by the City and others within the basin do not indicate the presence of other current major sources of contaminants to the City conveyance system.

Given that the City has identified all major sources of contaminants to the basin and necessary controls are being implemented under DEQ and/or City authority, future discharges from the basin are not likely to represent a significant source to the river. Therefore, the City has met the remedial investigation (RI)/SCM objectives for Basin 16.

2 Introduction

This Completion Summary provides a weight-of-evidence evaluation of whether further source investigation is needed in Basin 16, and the rationale for concluding that future discharges from the basin are not likely to be significant sources of contaminants to river sediment. The purpose of this report is to demonstrate that, for Basin 16, the City has met the joint RI/SCM objectives

of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ. Together, the City and DEQ identified all major sources of contamination to the basin and are using respective authorities to ensure that source controls are implemented where needed.

This report is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report), which provides additional background and detail regarding the City's harborwide source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Outfall 16 discharges to Balch Creek Cove, located on the west side of the Willamette River at approximately River Mile (RM) 9.7. The Basin 16 stormwater conveyance system conveys runoff from an approximate 71-acre stormwater basin. Figure 1 shows the location of the outfall and drainage basin boundary and provides an overview of the associated stormwater conveyance system. Additional detail on the Basin 16 stormwater conveyance system and associated drainage basin is provided in the *Phase I Report and Inline Sampling Results for the City of Portland Basin 16* (GSI, 2008).

3.2 Land Use and Potential Upland Sources

Basin 16 is located within the Guilds Lake industrial area. Although the basin is zoned heavy industrial, actual land use is a mix of heavy industrial (e.g., metals recycling and small manufacturing facilities), light industrial (e.g., trucking and warehousing operations, and a City maintenance storage area), and commercial (e.g., restaurant and bank). Land use also includes major transportation (a section of the Oregon Department of Transportation's [ODOT] Highway 30).

Sites identified as potential sources include the five sites¹ within or partially within the basin that are in the DEQ Cleanup Program, as listed in DEQ's Environmental Cleanup Site Information (ECSI) database. Table 1 lists these sites and indicates the associated contaminants of interest (COI) and the status of stormwater pathway evaluations.

Two of these sites (Guilds Lake and Front Avenue MP) were remediated before City basin investigations. The Guilds Lake site is a City property. Remediation included soil removal, replacing the historical stormwater drainage system (drywells) and constructing a new system connected to Basin 16, and constructing an engineered cap. Work completed at the Front Avenue MP site included underground storage tank decommissioning, soil removal, site storm system cleaning, and catch basin replacement. Stormwater pathway evaluations are underway at the Calbag Metals and ODOT facilities. DEQ has determined that a stormwater pathway evaluation at the remaining ECSI site (Nudelman & Son) is not needed. This site is used for materials salvage and landfilling operations.

¹ Nudelman & Son (#966) does not have a piped connection to Basin 16 but has generated runoff to an adjacent private line that discharges to Basin 16 (BES, 2002).

Table 1. DEQ Cleanup Program Sites in Basin 16

DEQ Cleanup Site	Site COIs ⁽¹⁾	Site Pathway Evaluations	
		Stormwater Pathway ⁽²⁾	Preferential Groundwater Pathway ⁽³⁾
Calbag Metals - Nicolai (ECSI #5059)	TPH, PCBs, metals, phthalates, PAHs	Source Control Evaluation In Progress	Source Control Evaluation in Progress
Front Avenue MP (ECSI #4008)	VOCs, PAHs, TPH, PCBs, metals ⁽⁴⁾	Need for Source Control Evaluation to be Determined / Low Priority	Source Control Decision Equivalent
Guilds Lake (ECSI #404)	TPH, metals in soil and groundwater ⁽⁵⁾	Source Control Evaluation Not Needed	Source Control Decision Equivalent
ODOT - Portland Harbor Source Control Evaluation (ECSI #5437)	Unknown ⁽⁵⁾	Source Control Evaluation In Progress	Not shown
Nudelman & Son, Inc. (ECSI #966) ⁽⁶⁾	Unknown ⁽⁵⁾	Source Control Evaluation Not Needed	Not shown

Notes:

TPH = total petroleum hydrocarbons; PAHs = polycyclic aromatic hydrocarbons; VOCs = volatile organic compounds; COIs = contaminants of interest; ECSI = Environmental Cleanup Site Information; ODOT = Oregon Department of Transportation.

(1) Unless otherwise noted, site COIs are those identified in Appendix Q (Source Control Inventory Tables) of the Portland Harbor RI/FS Draft Feasibility Study (FS) (Anchor et al., 2012).

(2) Source: DEQ Milestone Report, Figure 1b, "Status of Stormwater Source Control Evaluations, January 2013" (DEQ, 2013).

(3) Source: DEQ Milestone Report, Figure 3, "Groundwater Source Control Evaluation Status, January 2013" (DEQ, 2013).

(4) Site is not listed in Appendix Q of the draft FS; source is Table 4.2-2 of the Portland Harbor RI/FS Draft Final Remedial Investigation Report (Integral et al., 2011).

(5) COIs are not listed for this site in Appendix Q of the Draft FS or Table 4.2-2 of the Draft Final RI. COIs listed are based on information on the DEQ ECSI database (DEQ, 2004a, 2009, 2012).

(6) Site does not have piped connection to basin conveyance system, but site activities have generated discharges to an adjacent private system connected to Basin 16.

Industrial sites covered or historically covered by National Pollutant Discharge Elimination System (NPDES) stormwater regulations also were considered as potential sources of pollutants to the City conveyance system. Sites within the basin that currently hold, or historically held, NPDES permits to discharge to the Basin 16 conveyance system are listed in Table 2. Sites with current NPDES permits are shown in Figure 1. Note that the City and ODOT both have NPDES Municipal Separate Storm Sewer System (MS4) stormwater permits that also cover basin drainage areas.

Table 2. Current⁽¹⁾ and Historical NPDES Permit Coverage in Basin 16

Address	Company	Permit Type	Time Period
2211 NW Brewer	ESCO Corporation (Plant #3)	Stormwater (1200-H)	1992 – 1996
		Stormwater (1200-Z)	1997 – Present
3033 NW Yeon	Lincoln & Allen Co.	Stormwater (1200-Z) ⁽²⁾	1999 – 2010
3147 NW Front	McCracken Motor Freight Inc.	Stormwater (1200-Z)	1999 – Present
2495 NW Nicolai	Calbag Metals Co.	Stormwater (1200-R)	1992 – 1996
		Stormwater (1200-Z)	1997 – Present
3182 NW 26th	Peninsula Truck Lines, Inc.	Stormwater (1200-Z)	1998 – Present

Notes:

NPDES = National Pollutant Discharge Elimination System

(1) Current permits are indicated in bold.

(2) Multiple tenants were covered in the permit coverage area.

3.3 Outfall Setting

Outfall 16 discharges to an area of potential concern (AOPC 20) identified by the U.S. Environmental Protection Agency (EPA) based on elevated concentrations of PCBs, metals, and other contaminants in river sediment (EPA, 2010). Outfall 16 is at the southern end of Balch Creek Cove, which also receives discharges from City Outfall 17, outfall WR-258 associated with City Fire Station 6, and outfall WR-235 associated with the Port of Portland Terminal 2. Dock operations (e.g., fire station boathouses) occur within the AOPC in the vicinity of Outfall 16.

4 Basin Screening and Source Investigations

The City initiated source investigations in Basin 16 in 2005, in response to detection of elevated contaminant concentrations in river sediment in Balch Creek Cove. The first phase of the investigation entailed sampling and analyzing inline solids and dry-weather flow from the main branches of the conveyance system to determine if additional investigation was needed at targeted locations within the branches. Although not elevated in river sediment in the cove, arsenic was detected in the dry-weather flow and inline solids samples at locations in the conveyance system coinciding with locations where iron-oxide precipitate was observed in the storm lines; the high arsenic concentrations therefore were attributed to a reducing environment² and not to the likely presence of specific sources (GSI, 2008). A separate evaluation of the potential for City conveyance systems (including Basin 16) to act as preferential pathways for contaminated groundwater did not identify any shallow contaminant plumes potentially intersecting the Basin 16 conveyance system (GSI, 2006), and evaluation of the dry-weather flow investigation results did not indicate that offsite migration of

² Arsenic strongly bonds with iron in reducing groundwater environments. Where groundwater enters the stormwater line and is exposed to air, the solubility of iron (and the strongly bonded arsenic) decreases; as a result, they precipitate out of solution.

contaminants to the basin via the preferential groundwater pathway is a significant source to the basin.

Inline solids were analyzed for a broad range of contaminants (i.e., PCBs, PAHs, phthalates, pesticides, metals, and TPH). Although analytical results did not indicate major sources of any contaminant, the City identified potential COIs, based on inriver and inline detections, to be used in the event that future source tracing was warranted (GSI, 2008).³ In addition, in response to detections of PAHs in the portion of the system in the vicinity of the City maintenance storage yard under the NW 26th Avenue overpass, the City evaluated potential PAH sources, implemented best management practices (BMP) in the storage yard (see Section 6), and confirmed that historical equipment washing by an adjacent facility had been terminated (GSI, 2008).

To verify that additional source tracing was not needed, the City reviewed subsequent data being collected by other parties in the Basin 16 system. In 2007, the LWG installed inline sediment traps and collected stormwater samples from the main branch of the basin to evaluate discharges representative of industrial land use (Anchor and Integral, 2008). Also in 2007, GE Energy – Energy Services (GE) collected inline solids samples at three locations in the basin (AMEC, 2008). Preliminary review of the LWG and GE data indicated potential major sources of PCBs. To identify these sources, the City collected a stormwater grab sample in November 2007 at the connection to the City stormwater line from a potential PCB source, the Calbag Metals facility (BES, 2008), and deployed inline sediment traps in December 2007 and February 2008 at four locations within the upper portions of Basin 16 (BES, 2010a). Results indicated that PCBs and metals are being discharged to the basin from the Calbag site and did not indicate that major sources of PCBs and metals are present in other portions of the basin (BES, 2010a). These findings were referred to DEQ for Cleanup Program consideration and the site has since begun onsite investigations.

The City further evaluated the LWG's 2007 stormwater and sediment trap data from Basin 16 as part of its Portland Harbor stormwater screening effort (BES, 2010b). Based on the evaluation of these data and using a conservative screening approach, only PCBs and copper warranted consideration for potential further source tracing. However, because subsequent investigations already had identified the Calbag site as a major source of these contaminants and had not indicated potential sources in other areas of the basin, no further source tracing was needed (BES, 2010b).

Investigations and evaluations completed by the City and others in the Basin 16 conveyance system are listed in Table 3.

³ PCBs, metals (copper, lead, and zinc), and bis(2-ethylhexyl)phthalate (BEHP) (GSI, 2008).

Table 3. Investigations in the Basin 16 Stormwater Conveyance System

Data Collection Period	Party	Purpose	Documentation
2005	City	Evaluate existing data on groundwater plumes and identify the potential for City conveyance systems (including Basin 16) to act as preferential pathways.	Relationships Between Upland Shallow Groundwater Plumes and the City Stormwater and Combined Conveyance System with the Portland Harbor (GSI, 2006)
2005, 2007	City	Collect dry-weather flow and inline solids samples, evaluate potential presence of major sources within the drainage basin, and identify basin-specific potential contaminants of interest to focus further source investigation activities.	Phase I Report and Inline Sampling Results for the City of Portland Basin 16 (GSI, 2008)
2007	City	Collect a stormwater sample at the discharge point from the Calbag Metals facility to evaluate whether stormwater discharges from this facility are contributing PCBs to the City stormwater conveyance system.	November 2007 PCB Sampling Results – Calbag Metals; 2495 NW Nicolai (BES, 2008)
2007	LWG	Collect stormwater and sediment trap samples from the main branch of the basin to evaluate stormwater discharges representative of industrial land use.	Portland Harbor RI/FS. Round 3A and 3B Stormwater Data Report (Anchor and Integral, 2008)
2007	GE	Evaluate inline solids data to identify contaminant sources to Balch Creek Cove in the vicinity of the GE site.	GE Public Sewer Sediment Assessment Summary Report (AMEC, 2008); Outfall Basin 16 Inline Solids Investigation Technical Memorandum No. OF 16-1 (BES, 2010a)
2007	City	Evaluate stormwater data from City outfalls (including the 2007 LWG stormwater and sediment trap data from Basin 16) to identify additional source tracing needs.	Stormwater Evaluation Report, City of Portland Outfall Project (BES, 2010b)
2007 - 2008	City	Deploy inline sediment traps at four locations in Basin 16 to inform source tracing efforts and assist with the review and evaluation of inline solids data collected in Basin 16 by the LWG and GE in 2007.	Outfall Basin 16 Inline Solids Investigation Technical Memorandum No. OF 16-1 (BES, 2010a)

Notes:

GE = GE Energy – Energy Services; LWG = Lower Willamette Group

Joint investigation by the City and DEQ resulted in the identification of a significant current source of PCBs, PAHs, bis(2-ethylhexyl)phthalate (BEHP), and metals in Basin 16. The City's source investigation work identified the Calbag Metals site for DEQ Cleanup Program consideration.

5 Completion of Source Identification

The lines of evidence evaluated to verify that source tracing is complete and all major sources have been identified include (1) results of source tracing activities conducted in the basin (and upland site information) and (2) land use at remaining upland areas not undergoing DEQ Cleanup Program investigation or redevelopment. Findings from this evaluation are summarized below:

- *Source Tracing Results:* Upland sources of all contaminants determined as potentially warranting source tracing have been identified. Source investigations identified a major source of PCBs, PAHs, BEHP, and metals to the southwestern portion of the basin (GSI, 2008; BES, 2008, 2010a). Basin investigation results do not indicate that there are other major current sources of other contaminants to the Basin 16 conveyance system (BES, 2010b).
- *Upland Investigation Coverage and Land Use:* Figure 2 displays the spatial extent of DEQ Cleanup Program site investigation and other programmatic controls (see key to figures provided at beginning of this Appendix) in the basin. As shown in Figure 2, sites in the basin are being investigated, or likely do not need investigation because of land use and existing controls. Most sites in the basin:
 - Are investigating the stormwater pathway and implementing SCMs under DEQ Cleanup authority;
 - Have been designated by DEQ as not needing a source control evaluation (SCE) or as a low priority for completing an SCE;
 - Are covered under NPDES industrial stormwater regulations; and/or
 - Have been inspected by the City for industrial stormwater exposures and have been provided technical assistance as needed to implement BMPs.

Land use at sites not covered by DEQ Cleanup or Water Quality programs mostly consists of warehouse and distribution facilities, automotive service shops, and commercial businesses with minimal industrial exposures to stormwater. Current and future industrial activities that are exposed to stormwater will be addressed by the DEQ Water Quality NPDES program, and non-industrial activities are not a known or suspected major source of contaminants to the City stormwater conveyance system.

Based on these lines of evidence, the City concludes that Basin 16 source tracing is complete and all major sources have been identified.

6 Basin Source Control Measures

The City and DEQ collaborated under their respective authorities to identify control mechanisms for the major source identified in the basin. Source control for major and minor sources in Basin 16 includes SCMs completed (or planned) at contaminated sites under DEQ Cleanup Program agreements and ongoing City and DEQ programs that are described in the Municipal Report. Source controls implemented in Basin 16 are displayed in Figure 2 and summarized in this section.

One type of programmatic source control is the elimination of stormwater exposures to industrial activities. Sites that hold (or historically held) an NPDES No Exposure Certification (NEC) are listed in Table 4.

Table 4. Sites with No Exposure Certification (NEC) in Basin 16 ⁽¹⁾

Address	Company	NEC Time Period
3342 NW 26 th	Truckways, Inc.	2003 – 2008
	Portland Bindery	2004 – Present
3255 NW Front	Ink Systems, Inc.	2001 – Present
3345 NW Front	S & H Trucking	2008 – Present
2619 NW Industrial	Culver Glass Co., Inc.	2012 – Present
2952 NW Yeon	United Paper Converters, Inc.	2003 – 2013
	P-Dinh	2013 – Present
3019 NW Yeon	Graphic Art Center Publishing	2003 – 2008
3019 NW Yeon	R & A Walker, Inc.	2003 – 2008
3055 NW Yeon	Yeon Mini Storage	2009 – Present
3217 NW Yeon	Paul O Geisey Adcrafters	2003 – 2008
	Adprint Company	2008 – 2011

Notes:

(1) Current NECs are indicated in bold.

The City owns the Guilds Lake site and property underneath the NW 26th Avenue overpass. Portions of the area under the overpass are used by the City's Bureau of Maintenance (BOM) for storage. Based on technical assistance provided by the BES Industrial Stormwater program, BOM cleaned out catch basins in the storage area and installed catch basin filters as a BMP. At the Guilds Lake site, the City completed remedial actions under DEQ oversight (see Table 5 below), and currently leases the site to multiple tenants. Tenants are required to obtain and comply with all relevant environmental regulations, including stormwater controls (see Figure 2).

Additional site-specific, programmatic, and conveyance system source controls completed to date for Basin 16 are summarized in Table 5.

Table 5. Basin 16 Source Controls

Site/Area	Source Control Measures (SCM)	Timeframe/Status
SCMs at DEQ Cleanup Sites		
Calbag Metals Co. (Nicolai) (#5059) ⁽¹⁾	Stormwater covering of material storage areas, and upgrade of stormwater treatment system.	2012
	Additional SCMs to be determined.	To be determined
Front Avenue MP (#4008) ⁽²⁾	Removal of contaminated soil and cleanout of catch basin and associated piping.	2003 – 2004
Guilds Lake (#404) ⁽²⁾	Removal of contaminated soil.	1989
	Construction of a cap, decommissioning of drywells, removal of old stormwater conveyances, site regrading, and construction of new storm lines and inlets.	1994 – 1995
	Implementation of a cap maintenance plan.	Ongoing
Nudelman & Son, Inc. (ECSI #966)	Not applicable ⁽³⁾	Not applicable
ODOT - Portland Harbor Source Control Evaluation (ECSI #5437)	To be determined	To be determined
City Conveyance System		
NW Front Avenue line	The City cleaned out solids from the 8" storm line adjacent to the Front Avenue MP site to remove legacy solids discharged from the site.	2006
Other (Programmatic SCMs) ⁽⁴⁾		
Speedometer Service & Instrument; Dealers Supply Co.	Stormwater Management Manual Requirements	Ongoing
Culver Glass Co Inc.	City Discharge Authorization⁽⁵⁾	Ongoing
See site listing in Table 2	NPDES 1200-Z Stormwater Permit Requirements	Ongoing
See site listing in Table 4	NPDES No Exposure Certifications	Ongoing

Notes:

DEQ = Oregon Department of Environmental Quality; ECSI = Environmental Cleanup Site Information; ODOT = Oregon Department of Transportation; NPDES = National Pollutant Discharge Elimination System.

(1) Based on information in Table 1 in DEQ Milestone Report (DEQ, 2013) and coordination between BES Industrial Stormwater Program, DEQ, and site.

(2) Based on information the DEQ ECSI database (DEQ, 2004a, 2004b).

(3) DEQ has determined that a source control evaluation is not needed or is a low priority at this site (DEQ, 2013).

(4) Programmatic source controls are described in the Municipal Report.

(5) Additional site-specific stormwater pollution controls required and implemented under City Code.

All major contaminant sources have been or will be controlled after implementation of necessary SCMs has been completed under the programs identified above. Other municipal programs (e.g., periodic inspection of and technical assistance to non-NPDES sites, illicit discharge monitoring, street sweeping, etc.) likely provide additional source control benefits in the basin and will help to address minor sources for which specific control measures have not been required. City programs that control current and future contaminant discharges to the conveyance system are described in the Municipal Report.

7 Conclusion

The City completed source tracing in Basin 16, identified a previously unknown major source of contaminants to the City conveyance system, and referred that source to DEQ. The City collected and evaluated basin data to determine that additional major current sources are not present. Because necessary SCMs at all identified sources have been implemented or are being determined under appropriate DEQ and City regulatory authorities, future discharges from Outfall 16 are unlikely to represent a significant source of contaminants to the river. However, because of the sensitive nature of Balch Creek Cove, the City will continue to look for opportunities with existing and future City stormwater programs to reduce suspended solids loading from the basin to the river. The City concludes that it has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin 16.

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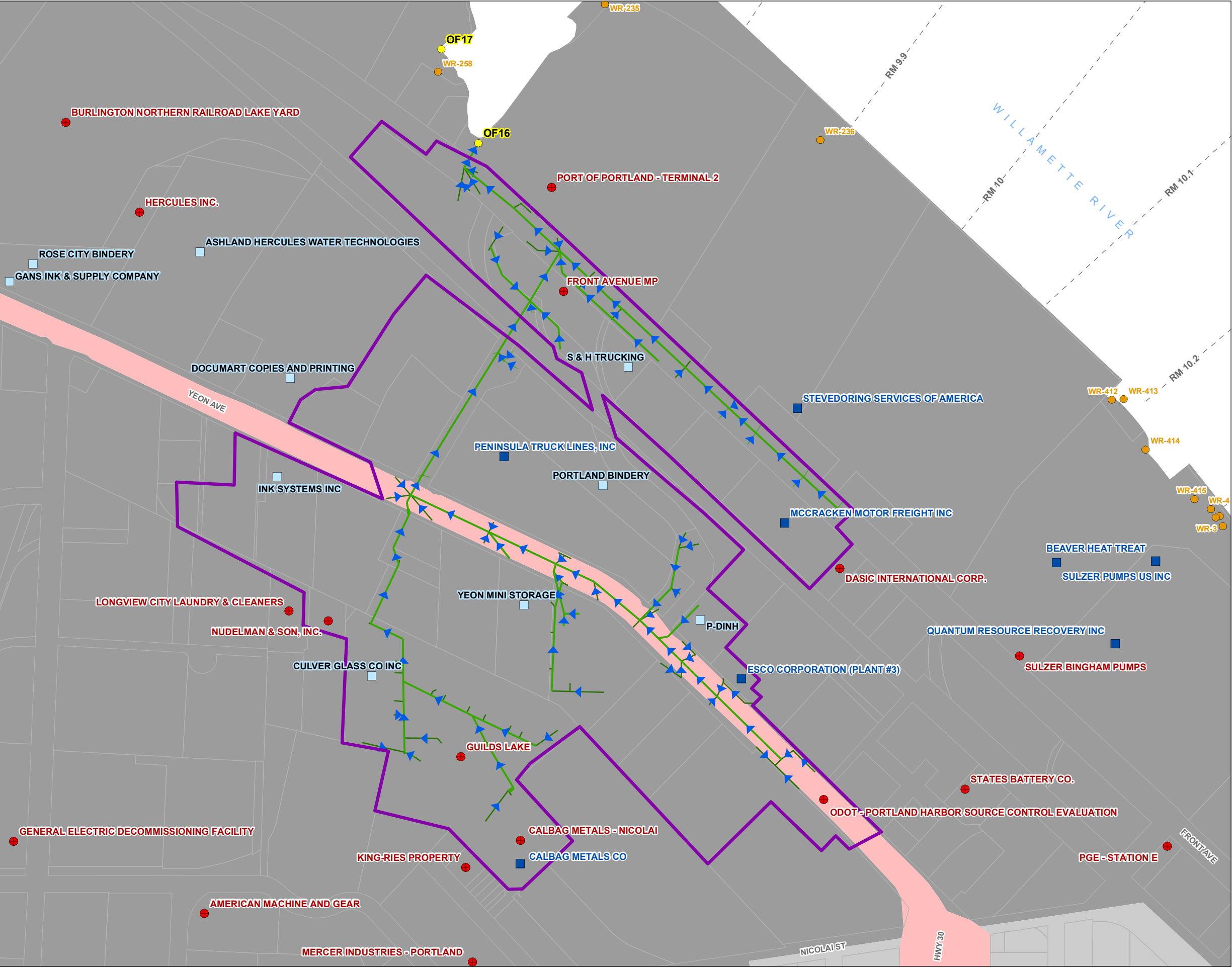
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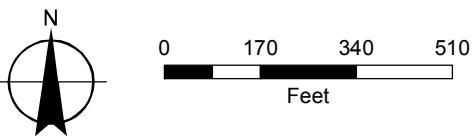
Figure 1: Basin 16 Overview

Figure 2: Basin 16 Upland Site Source Controls

FIGURE 1
Basin 16
Overview



- Basin 16
- DEQ ECSI Site
- NPDES Stormwater Permit
- NPDES No Exposure Certification
- Conveyance System**
 - Storm Line
 - City Outfall
 - Non-City Outfall
- Land Use/Zoning**
 - Heavy Industrial
 - Light Industrial
 - Major Transportation
- All Other Data**
 - River Mile (RM)
 - Tax Lot
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO

ENVIRONMENTAL SERVICES
CITY OF PORTLAND
1120 SW Fifth Avenue, Room 1000
Portland Oregon, 97204 -1912

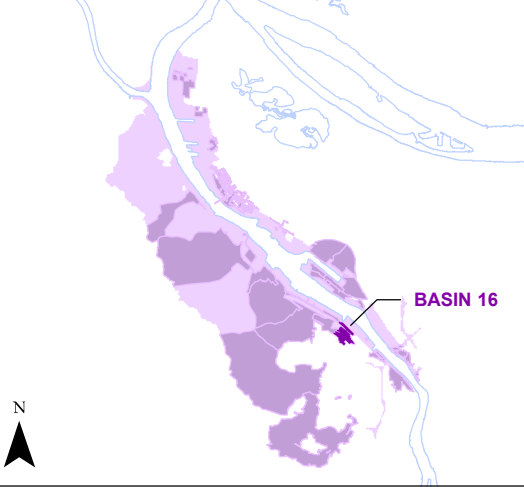
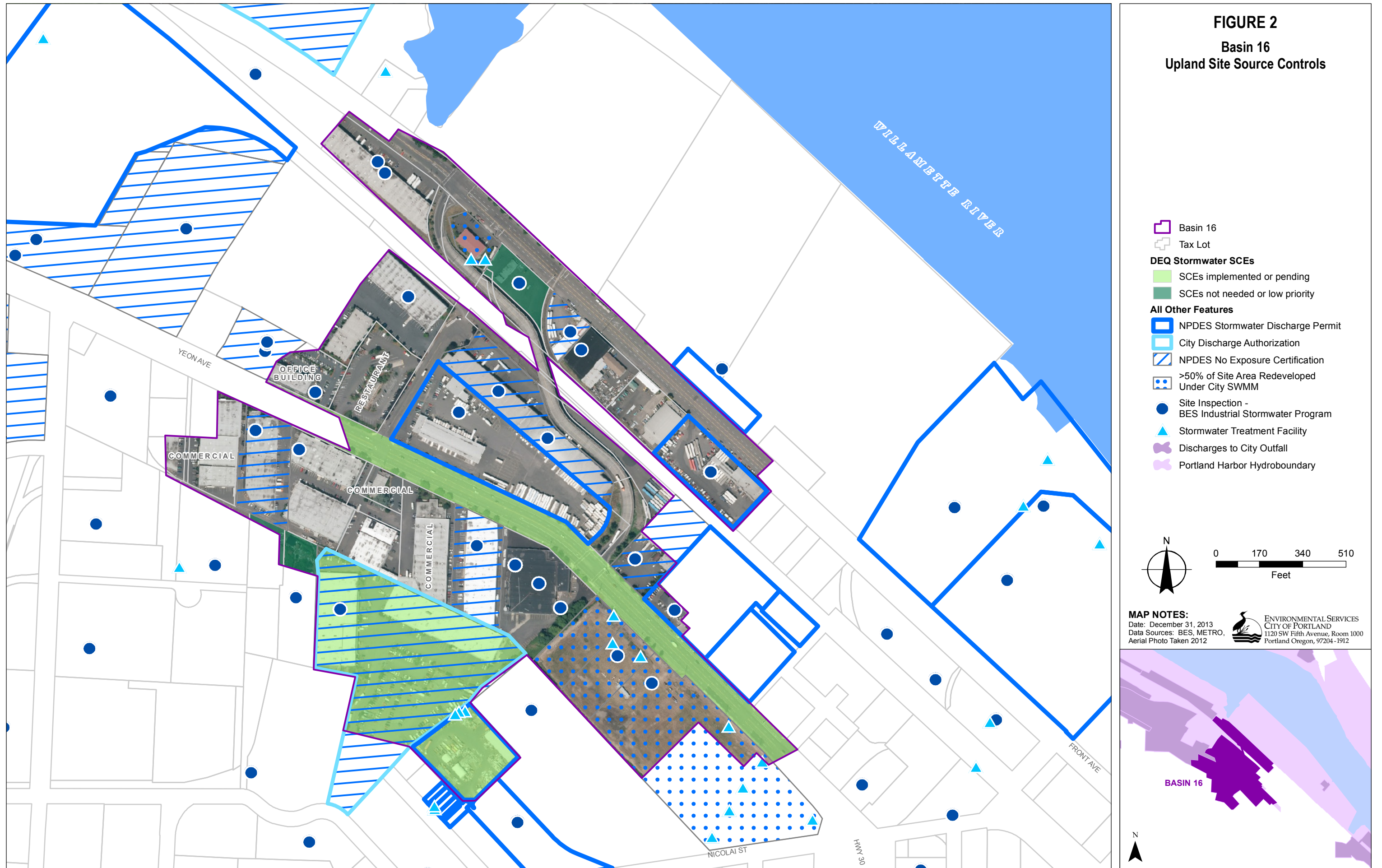


FIGURE 2
Basin 16
Upland Site Source Controls



Completion Summary for City of Portland Outfall Basin 17

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and several City programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled. This report summarizes the results of this collaborative effort in Outfall Basin 17.

This Completion Summary includes a weight-of-evidence evaluation to demonstrate that source identification is complete and a summary of source controls (implemented or planned) that will control future contaminant discharges to the Willamette River.

Outfall 17 is located on the west side of the Willamette River in the Guilds Lake Industrial Area at approximately River Mile (RM) 9.6. Before 2011, the basin consisted of 1,895 acres with approximately 85 percent of the land use as open space and 11 percent of the land use as heavy industrial. In 2011, as part of the City's Combined Sewer Overflow (CSO) Abatement Program, stormwater from most of the industrial area was diverted to the City's wastewater treatment plant (see Figure 1). As a result, the current basin now includes an upper subbasin, which comprises approximately 1,400 acres of primarily open space, with a small component of residential land, in the West Hills, and a lower subbasin consisting of industrial and major transportation land use.

The City collected inriver sediment data in the vicinity of Outfall 17 in 2003 as part of a maintenance dredging project at Fire Bureau Station 6. Evaluation of these data and subsequent data collected by the Lower Willamette Group (LWG) indicated the presence of sediment contamination in the vicinity of the outfall so the City identified Basin 17 for source investigation. Given the low elevation of some parts of the Basin 17 conveyance system, the downgradient portion of the basin also represents a potential preferential groundwater pathway to the river.

By the time the Portland Harbor Study Area expanded upstream and included Basin 17, design was underway for the CSO Abatement Program and the City had determined that the majority of the Basin 17 industrial area would be diverted. Therefore, the City modified the source investigation objective in the portion of Basin 17 slated for diversion. The investigation in the diverted area focused on identifying major sources that could be discharging contaminants at concentrations that violate current City wastewater discharge limitations and prohibitions.

Data collected by the City in the diverted portion of the basin identified the General Electric (GE) Decommissioning Facility as a major source of polychlorinated biphenyls (PCB) and the Galvanizers Co. facility as a major source of zinc. Based on these findings, both sites entered the DEQ Cleanup Program to conduct source control evaluations (SCE) and implement source control measures (SCM). As of 2011, stormwater from these sites discharges to the City's

combined sewer system. SCMs implemented at these sites reduced contaminant discharges to the river (pre-diversion) and now (post-diversion) help to meet City discharge limits and prohibitions for the combined sewer system.

About half of the industrial land use area in the current (undiverted) basin is the Burlington Northern Railroad Lake Yard. Under DEQ Cleanup Program authority, this site has been conducting an SCE and plans to abandon all connections to Basin 17. Most of the remaining areas within the basin lack industrial exposures to stormwater, have been evaluated by DEQ as not needing source control, or are conducting an investigation under a DEQ Cleanup Program agreement. Source evaluation in the remaining portion of the basin did not indicate the presence of other major potential contaminant sources.

Because the City has identified all major sources of contaminants to the basin and necessary controls are being implemented under DEQ and/or City authority, future discharges from the basin are not likely to represent a significant source to the Willamette River and the City has met the remedial investigation (RI)/SCM objectives for Basin 17.

2 Introduction

This Completion Summary presents a weight-of-evidence evaluation of whether further source investigation is needed in Basin 17, and the rationale for concluding that future discharges from the basin are not likely to be significant sources of contaminants to river sediment. The purpose of this report is to demonstrate that, for Basin 17, the City has met the joint RI/SCM objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ. Together the City and DEQ identified major sources of contaminants to the basin and are using respective authorities to ensure that source controls are implemented where needed.

This report is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report), which provides additional background and detail regarding the City's harborwide source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Outfall 17 discharges to Balch Creek Cove on the west side of the Willamette River at approximately RM 9.6. Basin 17 currently consists of an upper subbasin in the West Hills and a lower subbasin in the Guilds Lake Industrial Area. Before the 2011 CSO diversion, the drainage area consisted of 1,895 acres. The delineated drainage area for this outfall is approximately 1,486 acres, most of which is Forest Park. This acreage includes about 39 acres of industrial land that has been disconnected temporarily from the City system (see below). Figures 1 and 2 show the location of the outfall and drainage basin boundary and provide an overview of the associated stormwater conveyance system.

The upper subbasin consists mostly of Forest Park, along with some residential properties and adjacent roadways. The lower subbasin (about 80 acres) includes an industrial area and a small section of the Oregon Department of Transportation's (ODOT) Highway 30. This lower

subbasin delineation includes about 39 acres of the Burlington Northern (BNSF) rail yard that was disconnected from Basin 17 in 2009 through placement of temporary plugs in its connections to the municipal system. After these disconnections are permanent, the lower subbasin will be redelineated. For the purposes of this Completion Summary, the actual drainage of the current lower subbasin is approximately 41 acres, even though the delineated basin shown in the attached figures is approximately 80 acres. The overall basin will be reduced to approximately 1,447 acres after the rail yard connection to the City system is permanently abandoned.

3.2 Land Use and Potential Upland Sources

Land use in the majority of the current basin (92 percent) is open space (see Figure 2). A small amount of residential and commercial land use is present in the upper subbasin. In the lower subbasin, land use is predominantly heavy industrial with some major transportation (i.e., state highway). Industrial operations in the former basin were diverse, including activities such as metal forging and finishing, transformer reconditioning, manufacturing, chemical processing, brewing, and transportation-related activities (e.g., warehousing and trucking). In the current delineated basin industrial area, operations mainly include railroad (e.g., railcar maintenance, washing, fueling, and freight loading) and warehousing.

Sites that were identified as potential sources to the City's sanitary conveyance system (i.e., sites in the industrial area slated for diversion) include six DEQ Cleanup Program sites listed in DEQ's Environmental Cleanup Site Information (ECSI) database. Sites identified as potential upland sources to the current delineated basin include three sites listed in the ECSI database. Table 1 lists these sites and indicates the associated contaminants of interest (COI) and the status of stormwater and preferential groundwater pathway evaluations. All three of the DEQ Cleanup Program sites currently are conducting stormwater pathway evaluations under DEQ oversight or have been identified by DEQ as not needing an SCE.

Table 1. DEQ Cleanup Program Sites in Basin 17

DEQ Cleanup Site	Site COIs ⁽¹⁾	Site Pathway Evaluations	
		Stormwater Pathway ⁽²⁾	Preferential Groundwater Pathway ⁽³⁾
Sites Only in Former Basin (pre-2011 CSO diversion)			
Galvanizers Co. (ECSI #1196)	<i>Stormwater COI:</i> PAHs, TPH, metals, phthalates <i>Groundwater COI:</i> metals, TPH	Source Control Evaluation In Progress	Source Control Evaluation in Progress
General Electric Decommissioning Facility (ECSI #4003)	<i>Stormwater COIs:</i> PAHs, TPH, PCBs, metals <i>Groundwater :</i> PCBs	Source Control Decision /No Further Action Issued	Source Control Decision Completed
Hill Investment Co. (ECSI #1076)	<i>Stormwater COIs:</i> PAHs, PCBs, metals, phthalates ⁽⁴⁾	Need for Source Control Evaluation to be Determined/Low Priority	Not needed ⁽⁵⁾
Mogul Corp. (ECSI #1307)	Not listed ⁽⁶⁾	Need for Source Control Evaluation to be Determined/Low Priority	Source Control Decision Completed ⁽⁷⁾

DEQ Cleanup Site	Site COIs ⁽¹⁾	Site Pathway Evaluations	
		Stormwater Pathway ⁽²⁾	Preferential Groundwater Pathway ⁽³⁾
Paco Pumps (ESCI #146)	PCBs, lubricating oil ⁽⁸⁾	Source Control Decision /No Further Action Issued	Source Control Decision Completed
Wirfs Property (aka Schnitzer Investment – NW 35 th) (ESCI #2424)	<i>Stormwater:</i> VOC, SVOCs, metals <i>Groundwater:</i> VOCs	Source Control Evaluation Needed	Source Control Evaluation in Progress
Sites in Current Basin			
Burlington Northern Railroad Lake Yard (ESCI #100) ⁽⁹⁾ (aka Guilds Lake RR Yard and Portland Terminal Railroad)	<i>Stormwater COIs:</i> VOCs, SVOCs, PAHs, TPH, PCBs, metals, phthalates <i>Groundwater COIs:</i> Not listed	Source Control Evaluation In Progress	Source Control Evaluation in Progress
Hercules Inc. (ESCI #988)	Not listed ⁽⁶⁾	Source Control Evaluation Not Needed	Not shown
ODOT - Portland Harbor Source Control Evaluation (ESCI #5437)	Not listed ⁽⁶⁾	Source Control Evaluation In Progress	Not shown

Notes:

PAHs = polycyclic aromatic hydrocarbons; PCBs = polychlorinated biphenyls; SVOCs = semivolatile organic compounds; TPH = total petroleum hydrocarbons; VOCs = volatile organic compounds; COIs = contaminants of interest; DEQ = Oregon Department of Environmental Quality; ESCI = Environmental Cleanup Site Information

- (1) Unless otherwise noted, site contaminants of interest are those identified in Appendix Q (Source Control Inventory Tables) of the Portland Harbor RI/FS Draft Feasibility Study (FS) (Anchor et al., 2012).
- (2) Source: DEQ Milestone Report, Figure 1b, “Status of Stormwater Source Control Evaluations, January 2013” (DEQ, 2013).
- (3) Source: DEQ Milestone Report, Figure 3, “Groundwater Source Control Evaluation Status, January 2013” (DEQ, 2013), unless otherwise noted.
- (4) Site is listed in Appendix Q of the draft FS as Ashland Chemical (Anchor et al., 2012).
- (5) Figure 3 of the DEQ Milestone Report (DEQ, 2013) categorizes this site as “1999 DEQ Source Control Screening – Low/Medium Priority for Source Control Evaluation.” The Milestone Report defines this category as sites that DEQ examined during its pre-Superfund-listing, site-discovery efforts. At that time, DEQ determined groundwater at these sites did not pose a significant threat to the river and did not recommend a groundwater SCE be completed.
- (6) Site is not listed in Appendix Q of the draft FS or Table 4.2-2 of the Portland Harbor RI/FS Draft Final Remedial Investigation Report (Integral et al, 2011), and site COIs are not listed in ESCI database (DEQ, 2002; DEQ, 2012a; DEQ, 2012b).
- (7) It is not known whether the Groundwater Source Control Evaluation for this site considered the preferential pathway to the City stormwater conveyance system.
- (8) Site is not listed in Appendix Q of the draft FS or Table 4.2-2 of the Portland Harbor RI/FS Draft Final Remedial Investigation Report (Integral et al, 2011). ESCI database (DEQ, 2007) lists PCBs and lubricating oil in soil as site contaminants.
- (9) This site is included in the basin delineation, but temporarily plugged all connections to Basin 17 in 2009. Permanent abandonment is pending.

Industrial sites covered or historically covered by National Pollutant Discharge Elimination System (NPDES) stormwater regulations also were considered as potential sources of pollutants to the City conveyance system. Sites within the basin that currently hold, or historically held, NPDES permits to discharge to the Basin 17 stormwater conveyance system are listed in Table 2. Sites with current NPDES permits are shown in Figure 2. Note that the City and ODOT both have NPDES Municipal Separate Storm Sewer System (MS4) stormwater permits that also cover basin drainage areas (e.g., rights-of-way).

Table 2. Current⁽¹⁾ and Historical NPDES Permit Coverage in Basin 17

Address	Company	Permit Type	Time Period
Sites Only in Former Basin (pre-2011 CSO diversion)			
3601 NW Yeon	Mt. Hood Beverage Co.	Stormwater (1200-Z)	2000 - 2007
	COHO Distributing LLC	Stormwater (1200-Z)	2007 - 2009
3136 NW 35 th	Weyerhaeuser Recycling	Stormwater (1200-P)	1993 - 1996
		Stormwater (1200-Z)	1997 - 1998
3232 NW Industrial	US Food Service	Stormwater (1200-Z)	1998 - 2000
2551 NW 30 th	Paco Pumping Co	Stormwater (1200-Z)	1998 - 2002
2406 NW 35 th	Galvanizers	Stormwater (1200-L)	1992 -1996
		Stormwater (1200-Z)	1997 - 2012
Sites in Current Basin			
3366 NW Yeon	Ashland Hercules Water Technologies	Cooling water (100-J)	1994 - 2001
3500 NW Yeon	Portland Terminal RR Co	Stormwater (1200-Z)	1998 – Present ⁽²⁾

Notes:

(1) Current permits are indicated in bold.

(2) Plans for permanently abandoning the portion of the site that discharges to Basin 17 are underway.

3.3 Outfall Setting

Outfall 17 discharges to an area of potential concern (AOPC 20) identified by the U.S. Environmental Protection Agency (EPA) based on elevated concentrations of PCBs, metals, and other contaminants (EPA, 2010). Outfall 17 is located in the west bank of Balch Creek Cove, which also receives discharges from City Outfall 16, outfall WR-258 associated with City Fire Station 6, and outfall WR-235 associated with the Port of Portland Terminal 2. Overwater activities (e.g., dock operations, material loading and unloading) occur within the AOPC in the vicinity of Outfall 17.

4 Basin Screening and Source Investigations

The City collected inriver sediment data in the vicinity of Outfall 17 in 2003 as part of a maintenance dredging project at Fire Bureau Station 6 (CH2M HILL, 2004). Evaluation of these data and subsequent data collected by the LWG indicated the presence of sediment contamination in the vicinity of the outfall (GSI, 2008), so the City identified this basin for source investigation.

City source investigation activities in the industrial area slated for diversion resulted in the identification of two new DEQ Cleanup Program sites. In 2002, the City detected PCBs and metals in inline solids samples collected for a line cleaning project and identified the GE and Galvanizers sites as likely potential sources of one or more of these contaminants (BES, 2003). As a result of this investigation, DEQ initiated SCEs at GE and Galvanizers. Subsequent data collected at these sites and in the City conveyance system confirmed that GE was a major source of PCBs and Galvanizers was a major source of zinc to the City's conveyance system.

Both sites also investigated the preferential groundwater pathway to Outfall 17. GE detected PCBs at low concentrations in groundwater. Groundwater characterization at and downgradient of the Galvanizers site indicated that zinc had migrated offsite at concentrations that may exceed City discharge limits if groundwater was infiltrating the City system. Because of the elevation of the conveyance system in this area, Galvanizers continues to investigate this pathway (BES, 2009).

GE collected inline solids data from a variety of Basin 17 locations (AMEC, 2008). City evaluation of these data from the basin area slated for diversion indicated a low potential for other sources to be discharging to the system at concentrations that would violate City discharge limits and prohibitions.

GE also collected inline solids from three locations in the current basin that represent the majority of the non-rail yard basin drainage area (i.e., drainage from NW Yeon, NW Front, and associated properties) (AMEC, 2008). Contaminant concentrations were low and did not indicate a need for further source tracing. BNSF is conducting an SCE under DEQ oversight. Stormwater pathway data were not collected for this investigation from the portion of the BNSF site that discharges to Basin 17 because work is underway to permanently abandon all connections to Basin 17. The evaluation of the preferential groundwater pathway from this site is in progress.

Investigations and evaluations completed by the City and others in the Basin 17 conveyance system are listed in Table 3.

Table 3. Investigations in the Basin 17 Stormwater Conveyance System

Data Collection Period	Party	Purpose	Documentation
2002	City	Characterize inline solids planned for removal and disposal during cleaning of a portion of the City conveyance system.	City of Portland/Outfall 17/Contaminated Sediment Source Identification (BES, 2003)
2004	GE	Evaluate offsite inline solids data collected from the vicinity of the site to identify other potential sources of stormwater contaminants.	Source Control Evaluation and Implementation Report. GE Energy - Energy Services Portland Inspection & Repair Service (I&RS) Center, 2727 NW 29 th Avenue. (AMEC, 2006)
2007	City and DEQ	Evaluate inline solids from a catch basin adjacent to the Paco Pumps site (also known as Sulzer Pumps).	Letter to DEQ re: Inline Solids Data Adjacent to Sulzer Pumps Facility at 2551 NW 29 th Avenue (BES, 2007)
2007	GE	Evaluate inline solids data to identify contaminant sources in the vicinity of the GE site.	Public Sewer Sediment Assessment Summary Report (AMEC, 2008)
2002-2008	City	Evaluate Balch Creek water quality	Westside Streams Water Quality and Trend Analyses Status Report. (BES, 2010)

Note:

DEQ = Oregon Department of Environmental Quality

5 Completion of Source Identification

Most of the industrial area formerly within Basin 17 was diverted to the City's wastewater treatment plant in 2011. The lines of evidence evaluated to verify that source tracing is complete and major sources are not present include: (1) investigation results from the basin (and upland site information), (2) planned drainage area reduction, and (3) land use at remaining upland areas not undergoing DEQ Cleanup Program investigation or redevelopment. Findings from this evaluation are summarized below:

- *Source Tracing Results:* Evaluation of inline solids data collected by GE from the current industrialized portion of the basin (AMEC, 2008) did not indicate that major sources were present in the drainage areas represented by these sampling locations. These locations represent drainage from NW Front Avenue and industrial properties along NW Yeon. BNSF did not characterize stormwater discharges to Basin 17 because of temporary abandonment of all connections to the basin and plans for permanent disconnection (see below).
- *Planned Reduction in Basin Drainage Area:* BNSF Railroad Lake Yard (ECSI #100) – the largest industrial site in the basin – has temporarily abandoned all connections to Basin 17 and is in the process of constructing onsite stormwater infiltration facilities under DEQ Cleanup Program oversight. BNSF plans to infiltrate all stormwater from areas previously draining to Outfall 17 and will be required to permanently abandon all connections to the basin as part of this project. This will reduce the basin drainage area by approximately 39 acres and eliminate this site as a potential future source of contaminants to the basin.
- *Upland Investigation Coverage and Land Use:* Approximately 92 percent of the land use in the Basin 17 is open space. For the industrialized portion of the basin, Figure 3 displays the spatial extent of DEQ Cleanup Program site investigations and other programmatic controls (see key to figures provided at beginning of this Appendix). As shown in Figure 3, the majority of this area is being investigated, or likely does not need investigation because of existing controls. With the exception of a few small parcels, sites in the industrial area are:
 - Investigating the stormwater pathway and implementing SCMs under DEQ Cleanup authority;
 - Designated by DEQ as not needing an SCE or as a low priority for completing an SCE;
 - Covered under NPDES stormwater regulations; and/or
 - Monitored for stormwater exposures through periodic inspections under the City's Industrial Stormwater Program.

Land use in remaining industrial areas is primarily warehouse operations, and in the upper subbasin is open space with some residential and commercial areas. Many of the industrial properties in the lower basin have No Exposure Certifications (NEC; see Section 6) and non-industrial activities are not a major known or suspected source of contaminants to the City stormwater conveyance system.

Based on these lines of evidence, the City concludes that Basin 17 source evaluation is complete and no major sources are present in the basin.

6 Basin Source Controls

Source control in Basin 17 includes SCMs completed (or planned) under DEQ Cleanup Program agreements with upland sites and ongoing City and DEQ programs that are described in Municipal Report. Source controls implemented in Basin 17 are displayed in Figure 3 and summarized in this section.

One type of programmatic source control is the elimination of stormwater exposures to industrial activities. Sites that currently hold NPDES NECs are listed in Table 4.

Table 4. Sites with No Exposure Certification (NEC) in Basin 17

Address	Company	NEC Time Period
3436 NW Yeon	Rose City Bindery	2000 - Present
3448 NW Yeon	Gans Ink & Supply Company	2009 - Present
3456 NW Yeon	Sterling Business Forms	2013 - Present
3838 NW Front	Georgia-Pacific NW SERF CTR	2009 - Present
3310 NW Yeon	Documart Copies	2003 - Present
3366 NW Yeon	Ashland Hercules Water Technologies	2006 - Present

Note

NEC = No Exposure Certification

Additional site-specific, programmatic, and conveyance system source controls for Basin 17 are summarized in Table 5. As shown in Figure 3, several properties within the upper subbasin have implemented stormwater source controls to meet stormwater quantity and quality objectives under the City's Stormwater Management Manual during property redevelopment. Types of treatment facilities in the upper subbasin include stormwater filters, infiltration and flow-through planter boxes, ecoroofs, and sedimentation manholes.

Table 5. Basin 17 Source Controls

Site / Area	Source Controls	Implementation Timeframe
Source Control Measures (SCM) at DEQ Cleanup Program Sites ⁽¹⁾		
Burlington Northern Railroad Lake Yard (ECSI #100) (aka Guilds Lake RR Yard and Portland Terminal Railroad)	The eastside stormwater system (discharging to Outfall 17) has been disconnected temporarily to infiltrate site stormwater and is being evaluated for permanent disconnection under a plan approved by DEQ. ⁽¹⁾	Temporary disconnect in 2009. Permanent abandonment timeframe to be determined
Hercules, Inc. (ECSI #988)	Not applicable ⁽²⁾	Not applicable ⁽²⁾
ODOT - Portland Harbor Source Control Evaluation (ECSI #5437)	To be determined	To be determined
Other (Programmatic SCM)		
Burlington Northern Railroad Lake Yard; residential properties in the upper subbasin	Stormwater Management Manual Requirements.	Ongoing
Georgia-Pacific NW Service Center	City Discharge Authorization.⁽³⁾	Ongoing
See listing in Table 2	NPDES 1200-Z Stormwater Permit Requirements.	Ongoing
See listing in Table 4	NPDES No Exposure Certifications	Ongoing

Notes:

ECSI = Environmental Cleanup Site Information; RR = Railroad; NPDES = National Pollutant Discharge Elimination System

(1) Description of upland site SCMs is based on information in reports on file with DEQ.

(2) DEQ has no evidence of a confirmed hazardous substance release (DEQ, 2012a).

(3) Additional site-specific stormwater pollution controls required and implemented under City Code.

Other municipal programs (e.g., periodic inspection of and technical assistance to non-NPDES sites, illicit discharge monitoring, street sweeping, etc.) likely provide additional source control benefits in the basin and will help to address minor sources for which specific control measures have not been required. City programs that control current and future contaminant discharges to the conveyance system are described in the Municipal Report.

7 Conclusion

The City completed a source evaluation in Basin 17. Major contaminant sources are not present in the basin. Therefore, future discharges from Outfall 17 are unlikely to represent a significant source of contaminants to the river. The City concludes that it has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin 17.

8 References

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- GSI. 2008. Phase I Report and Inline Sampling Results for the City of Portland Basin 16. Prepared by GSI Water Solutions, Inc. for the City of Portland Bureau of Environmental Services Portland Harbor Program. June, 2008.
- Integral et al. 2011. Portland Harbor RI/FS, Draft Final Remedial Investigation Report. Prepared for the LWG. Prepared by Integral Consulting Inc., Windward Environmental LLC, Kennedy/Jenks Consultants, and Anchor QEA, LLC. August 29, 2011.

List of Figures

Figure 1: Basin 17 Pre- and Post-Diversion Overview

Figure 2: Basin 17 Current Overview

Figure 3: Basin 17 Upland Site Source Controls

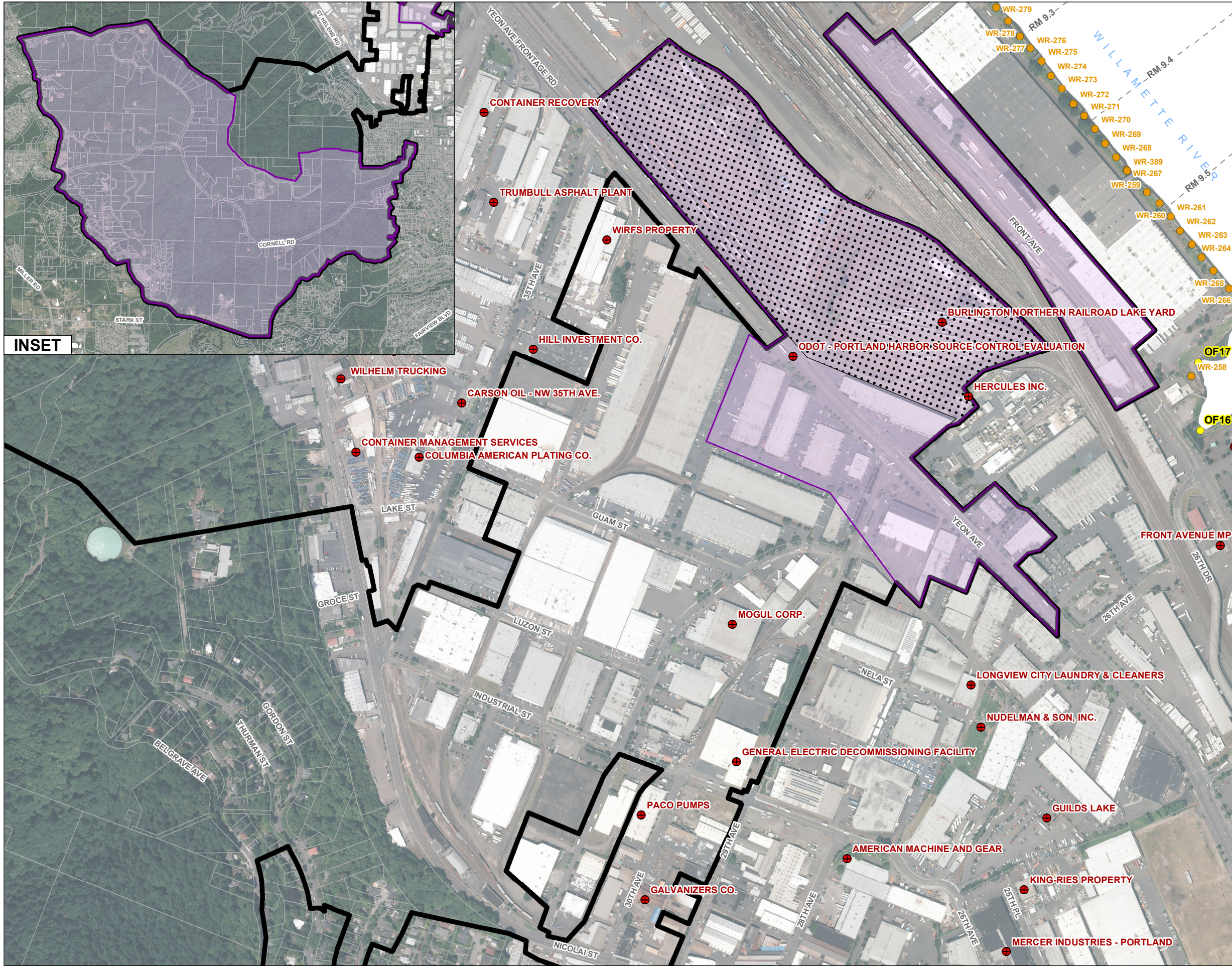
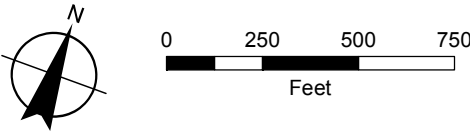


FIGURE 1
Basin 17
Pre- and Post- Diversion Overview

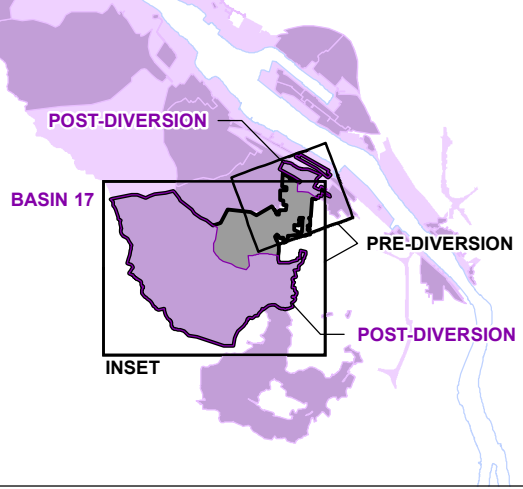
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- Basin 17, Post-Diversion
- Area Does Not Currently Discharge to Basin*
- DEQ ECSI Site
- City Outfall
- Non-City Outfall
- All Other Data
 - River Mile (RM)
 - Tax Lot
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary

NOTE:
*The BNSF Guilds Lake Yard site placed temporary plugs in all connections to Basin 17 in 2009.
Farallon, 2013



MAP NOTES:
Date: January 9, 2014
Data Sources: BES, METRO, Aerial Photo Taken 2012

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1120 SW Fifth Avenue, Room 1000
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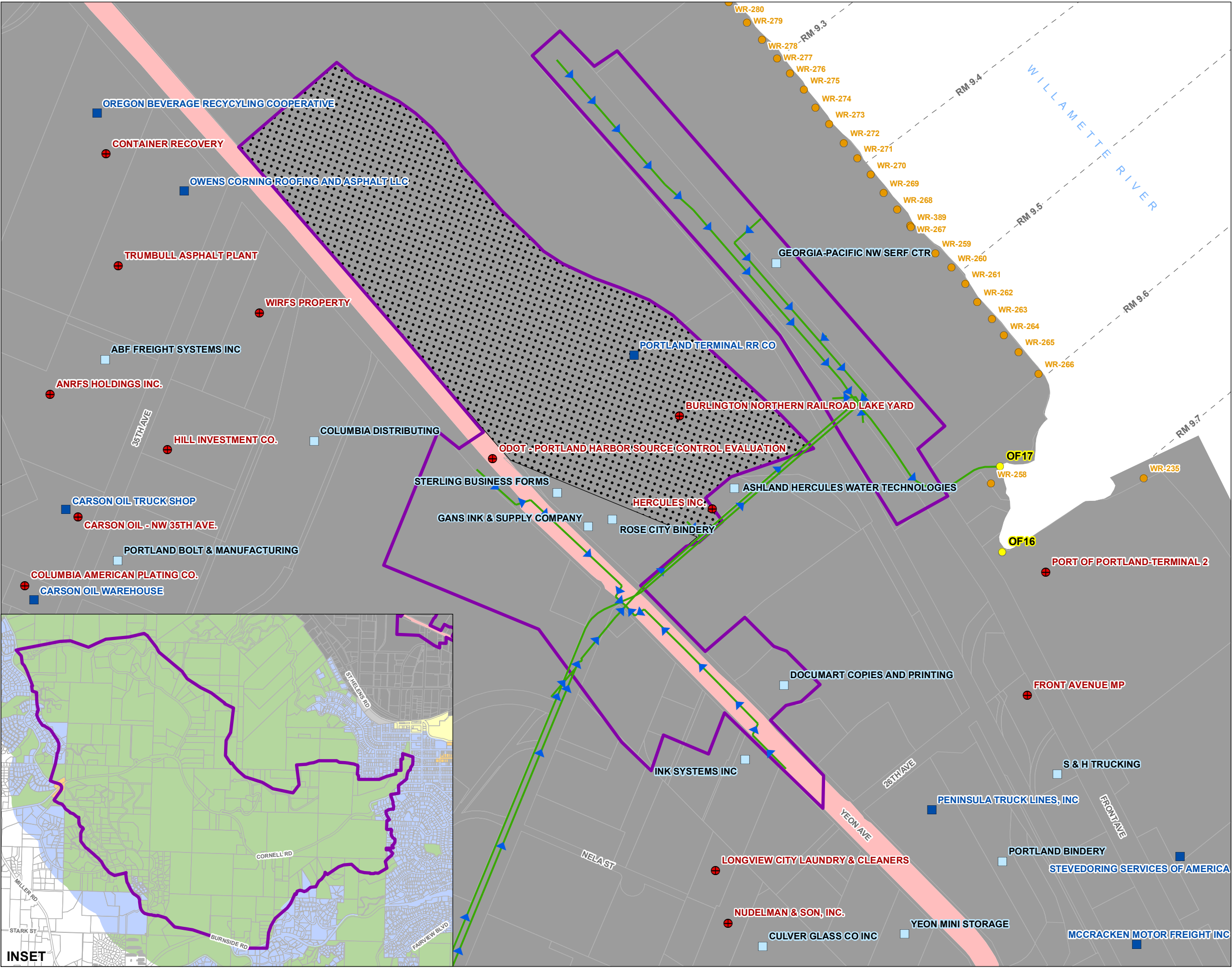
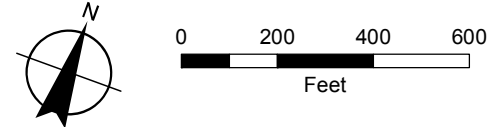


FIGURE 2
Basin 17
Current Overview

- Basin 17
- Area Does Not Currently Discharge to Basin*
- DEQ ECSI Site
- NPDES Stormwater Permit
- NPDES No Exposure Certification
- Conveyance System**
 - Storm Line
 - City Outfall
 - Non-City Outfall
- Land Use/Zoning**
 - Heavy Industrial
 - Light Industrial
 - General Employment
 - Commercial
 - Residential
 - Parks and Open Space
 - Major Transportation
- All Other Data**
 - River Mile (RM)
 - Tax Lot
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary

NOTE:
*The BNSF Guilds Lake Yard site placed temporary plugs in all connections to Basin 17 in 2009.
Farallon, 2013



MAP NOTES:
Date: January 9, 2014
Data Sources: BES, METRO
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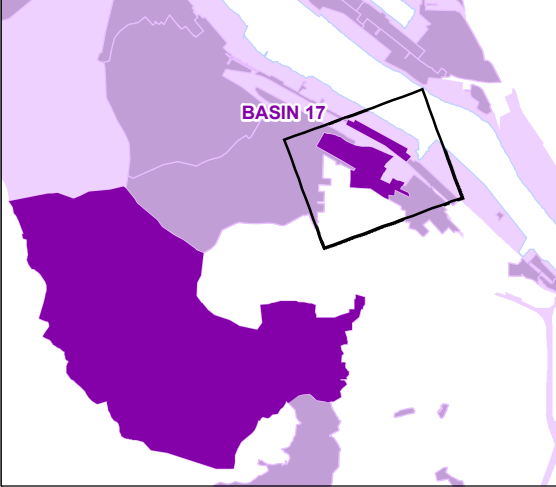
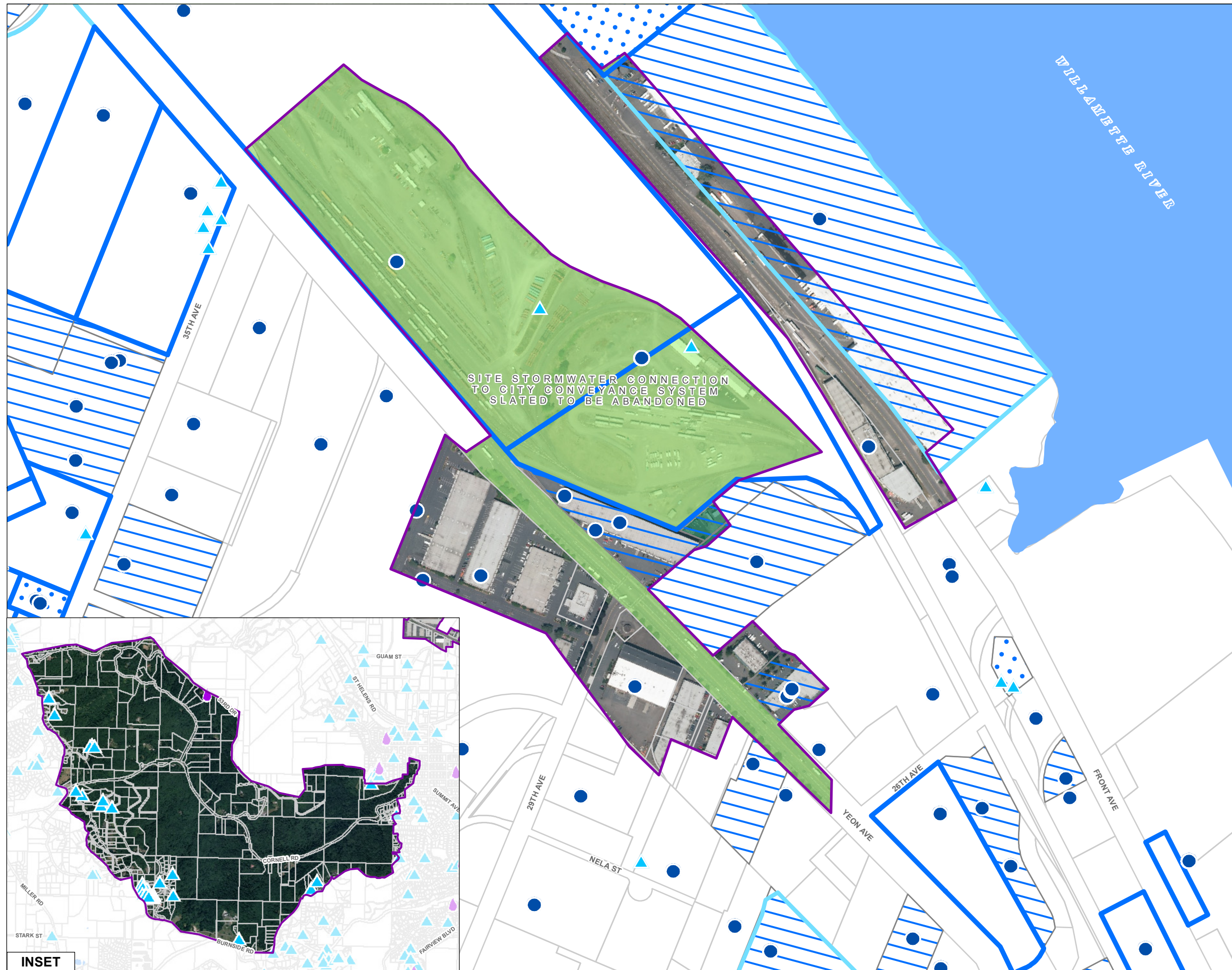


FIGURE 3
Basin 17
Upland Site Source Controls



- Basin 17
- Tax Lot
- DEQ Stormwater SCEs**
 - SCE implemented or pending
 - SCE not needed or low priority
- All Other Features**
 - NPDES Stormwater Discharge Permit
 - City Discharge Authorization
 - NPDES No Exposure Certification
 - >50% of Site Area Redeveloped Under City SWMM
 - Stormwater Treatment Facility
 - Ecoroof
 - Site Inspection - BES Industrial Stormwater Program
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



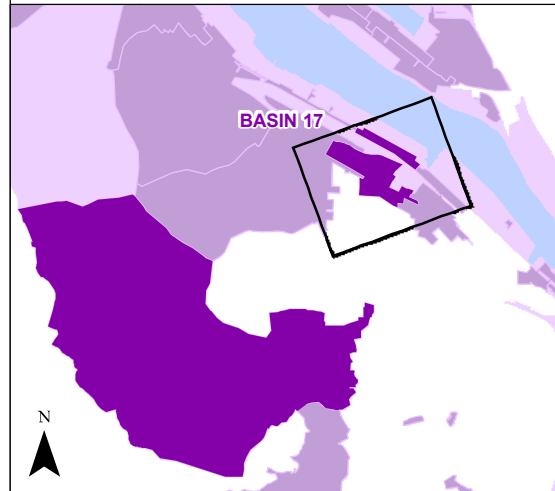
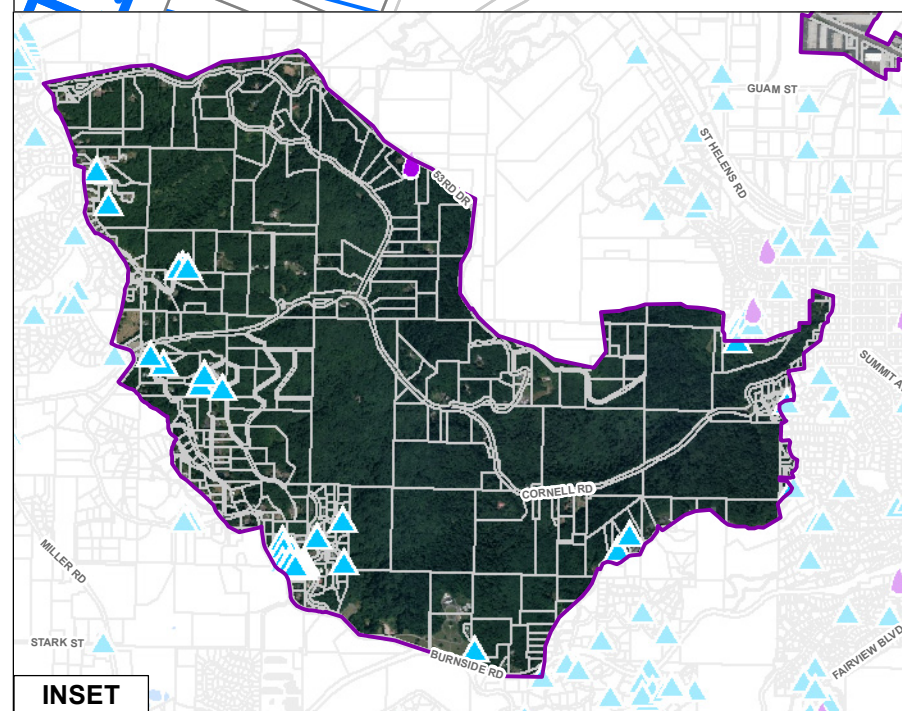
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MAP NOTES:

Date: December 31, 2013
Data Sources: BES, METRO,
Aerial Photo Taken 2012



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Completion Summary for City of Portland Outfall Basin 18

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and several City programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled. This report summarizes the results of this collaborative effort and concludes that it has. This Completion Summary includes a weight-of-evidence evaluation to

This Completion Summary includes a weight-of-evidence evaluation to demonstrate that source identification is complete and a summary of source controls (implemented or planned) that will control future contaminant discharges to the Willamette River.

Basin 18 is located on the west side of the river in the Guilds Lake Industrial Area at approximately River Mile (RM) 8.8. Development in the industrialized portion of the Basin 18 includes a mix of small and large facilities as well as some unpaved operational areas where legacy contamination from historical activities may be present. Forest Park comprises nearly 60 percent of the basin; most of the remainder of the basin is developed for industrial use.

The extensive investigations completed in this basin represent a significant joint effort between the City and DEQ. The City and DEQ selected Basin 18 as an early focus area for the Portland Harbor Outfalls Project and used the basin to pilot different approaches to a conveyance system source investigation. Basin 18 contains many DEQ Cleanup Program sites, as well as a U.S. Environmental Protection Agency (EPA) site, and is one of the more complex basins within the study area. The City focused its source investigation activities on industrial areas in the basin identified as most likely to be major sources to the conveyance system. Based on findings from City investigations, two additional sites joined the Cleanup Program at DEQ's request. Other potential sources were identified and investigated through a coordinated site discovery effort with DEQ.

To facilitate the investigations, the City divided the industrial drainage area into four subbasins and the downstream branch, which primarily comprises the Burlington Northern Santa Fe (BNSF) Railroad Lake Yard (see Figure 1). Source investigation activities included comprehensive facility inspections, sampling (inline solids, stormwater, and dry-weather flow) in specific branches of the system, and coordination with DEQ and EPA on investigation of contaminated sites in the basin. Data collection within the basin confirmed that sources of polychlorinated biphenyls (PCB), pesticides, semivolatile organics (SVOC), and metals are present and that major sources of these contaminants have been identified. Upgradient of the BNSF rail yard, source investigation results indicate that the major sources of contaminants via the stormwater pathway are located in the west-central and east-central subbasins; although sources also are present in the western and eastern subbasins, investigation results did not indicate that major current sources were present in these areas. In the downstream branch, the

whole drainage area is being investigated by three DEQ Cleanup Program sites: the BNSF rail yard, Gunderson, and the Oregon Department of Transportation (ODOT).

In addition to the stormwater pathway, transport of erodible soils (e.g., via overland runoff or vehicle drag-out) appears to be a current pathway for migration of contaminants to the basin and between subbasins. Site investigations also confirmed potential preferential contaminated groundwater pathways to the river via infiltration to Basin 18 conveyances.

Most of the industrial sites within the basin are conducting or have completed investigations under DEQ Cleanup Program or EPA authority, have been remediated, are covered by the DEQ Stormwater Quality Program, and/or have been redeveloped under the City's Stormwater Management Manual. Ongoing source control measure (SCM) implementation at the identified sources, together with the current and future source control programs in the basin, are expected to provide necessary source control for Outfall 18 discharges. Therefore, the City has met the remedial investigation (RI)/SCM objectives for Basin 18.

2 Introduction

This Completion Summary presents a weight-of-evidence evaluation of whether further source investigation is needed in Basin 18, and the rationale for concluding that future discharges from the basin are not likely to be significant sources of contaminants to river sediment. The purpose of this report is to demonstrate that, for Basin 18, the City has met the joint RI/SCM objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ. Together, the City and DEQ identified all major sources of contamination to the basin and are using respective authorities to ensure that source controls are implemented where needed.

This report is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report), which provides additional background and detail regarding the City's harborwide source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Outfall 18 is located in the Guilds Lake Industrial Area and discharges to the west side of the Willamette River at approximately RM 8.8. The drainage area for this system (Basin 18) is approximately 470 acres. Forest Park comprises the majority of the basin area. Remaining drainage is from developed properties (almost entirely heavy industrial), a section of the ODOT facility (Highway 30), and small residential areas. Figure 1 shows the location of the outfall and the entire drainage basin boundary. Figure 2 focuses on the industrial portion of the drainage basin and provides an overview of the associated stormwater conveyance system.

The Basin 18 conveyance system has five main branches; four of the five convey runoff from properties on the south side of NW Yeon Avenue as shown in Figure 1. These four branches are identified as the western, west-central, east-central, and eastern subbasins. The fifth branch

(downstream subbasin) conveys drainage from ODOT, portions of the rail yard and the Gunderson site, and a section of NW Front Avenue.

In 2009, the City Bureau of Environmental Services and Bureau of Transportation partnered with the Owens Corning site at 3750 NW Yeon Avenue to construct stormwater treatment of roof and parking lot drainage. At the same time, the City constructed green street facilities (vegetated swales) along NW 35th Avenue to reduce suspended solids loading to Basin 18. City programs that result in these types of stormwater improvements are described in the Municipal Report.

Additional detail on the Outfall 18 stormwater conveyance system and associated drainage basin is included in the *Phase 1 Data Evaluation Report and Phase 2 Work Planning for City of Portland Outfall 18* (CH2M HILL, 2004a) and the *Outfall Basin 18 Inline Solids Investigation* technical memorandum (BES, 2010a).

3.2 Land Use and Potential Upland Sources

More than half of the basin land use is open space (see Figure 2). Land use in almost the entire remainder of the basin is heavy industrial and major transportation (i.e., state highway). A wide variety of industrial operations take place in the basin, such as railroad servicing (e.g., railcar maintenance, washing, fueling, and freight loading), bulk oil transferring, container reconditioning, manufacturing, metal fabricating, and transportation-related activities (e.g., warehousing and trucking).

Sites that were identified as potential upland sources to the basin include 16 that are in the DEQ Cleanup Program, as listed in DEQ's Environmental Cleanup Site Information (ECSI) database, and one site being investigated under EPA oversight. Table 1 lists these sites and indicates the associated contaminants of interest (COI) and the status of stormwater pathway evaluations. Of these 17 sites, 14 have stormwater source control evaluations (SCE) that are in progress or pending under DEQ or EPA oversight. DEQ determined that SCEs at the remaining sites either are not needed or are a low priority.

Table 1. DEQ Cleanup Program Sites in Basin 18

DEQ Cleanup Site	Site COIs ⁽¹⁾	Site Pathway Evaluations	
		Stormwater Pathway ⁽²⁾	Preferential Groundwater Pathway ⁽³⁾
Western Subbasin			
Christenson Oil – Plant Number 1 (ECSI #2426)	Stormwater: VOCs, PAHs, TPH, metals Groundwater: Not listed	Source Control Evaluation In Progress	Source Control Evaluation in Progress
McWhorter Inc. (ECSI #135)	Stormwater: VOCs, SVOCs, PAHs, TPH, phthalates Groundwater: Not listed	Need for Source Control Evaluation to be Determined/ Low Priority	Source Control Evaluation in Progress
Texaco Portland Terminal (ECSI #169)	Stormwater and groundwater: VOCs, PAHs, TPH, metals	Source Control Evaluation Completed – Source Control Determination Pending	Source Control Evaluation Completed – Source Control Determination Pending

DEQ Cleanup Site	Site COIs ⁽¹⁾	Site Pathway Evaluations	
		Stormwater Pathway ⁽²⁾	Preferential Groundwater Pathway ⁽³⁾
West-Central Subbasin			
Container Management Services (ECSI #4784)	Stormwater: PAHs, TPH, PCBs, metals, phthalates, pesticides	Source Control Evaluation In Progress	Source Control Evaluation in Progress
Van Waters & Rogers – Portland (currently Univar) (ECSI #330)	Stormwater and groundwater: VOCs, TPH, pesticide/herbicides, metals	Source Control Evaluation In Progress (EPA lead)	EPA Source Control Lead
Wilhelm Trucking (ECSI #69)	Stormwater: PCBs, metals	Source Control Evaluation In Progress	Source Control Evaluation Completed – Source Control Determination Pending
East-Central Subbasin			
ANRFS Holdings Inc. (ECSI #1820)	Stormwater: PAHs, PCBs, metals, phthalates	Source Control Evaluation Not Needed	Not shown
Carson Oil - NW 35TH Ave. (ECSI #1405)	Stormwater: VOCs, PAHs, TPH, PCBs, metals, phthalates	Source Control Evaluation In Progress	Source Control Evaluation in Progress ⁽⁴⁾
Columbia American Plating Co. (ECSI #29)	Stormwater: VOCs, SVOCs, PCBs, metals, Other (e.g., cyanide), PAHs, phthalates	Source Control Evaluation Completed – Source Control Determination Pending ⁽⁵⁾	Source Control Evaluation Completed – Source Control Determination Pending
Container Recovery (ECSI #4015)	Stormwater: PAHs, PCBs, metals, phthalates	Source Control Evaluation In Progress ⁽⁶⁾	Source Control Decision Completed
Van Waters & Rogers – Portland (currently Univar) (ECSI #330)	Stormwater and groundwater: VOCs, TPH, pesticide/herbicides, metals	Source Control Evaluation In Progress (EPA lead)	EPA Source Control Lead
Wilhelm Trucking (ECSI #69)	Stormwater: PCBs, metals	Source Control Evaluation In Progress	Source Control Evaluation Completed – Source Control Determination Pending
Eastern Subbasin			
Hill Investment Co. (ECSI #1076)	Stormwater: PAHs, PCBs, metals, phthalates ⁽⁷⁾	Need for Source Control Evaluation to be Determined / Low Priority	Not needed ⁽⁸⁾
Trumbull Asphalt Plant (ECSI #1160)	Stormwater: PAHs, PCBs, metals, phthalates	Source Control Evaluation Needed	Not needed ⁽⁸⁾
Wirfs Property (ECSI #2424)	Stormwater: VOC, SVOCs, metals Groundwater: VOCs	Source Control Evaluation Needed	Source Control Evaluation in Progress

DEQ Cleanup Site	Site COIs ⁽¹⁾	Site Pathway Evaluations	
		Stormwater Pathway ⁽²⁾	Preferential Groundwater Pathway ⁽³⁾
Downstream Branch			
Gunderson Inc. (ECSI #1155)	Stormwater: Metals, PAHs, phthalates, PCBs Groundwater: Not listed	Source Control Evaluation In Progress	Source Control Evaluation in Progress
Burlington Northern Railroad Lake Yard (ECSI #100) (aka Guilds Lake RR Yard and Portland Terminal Railroad)	Stormwater: VOCs, SVOCs, PAHs, TPH, PCBs, metals, phthalates, Other (e.g., sodium cyanide, ethylene glycol, creosote constituents) Groundwater: Not listed	Source Control Evaluation In Progress	Source Control Evaluation in Progress
Texaco Product Pipeline (ECSI #2117)	VOCs, PAHs, TPH	Not Applicable	Source Control Evaluation in Progress ⁽⁹⁾
ODOT - Portland Harbor Source Control Evaluation (ECSI #5437)	Not listed ⁽¹⁰⁾	Source Control Evaluation In Progress	Not Shown

Notes:

PAHs = polycyclic aromatic hydrocarbons; TPH = total petroleum hydrocarbons; VOCs = volatile organic compounds; SVOC = semivolatile organic compounds; COIs = contaminants of interest; EPA = U.S. Environmental Protection Agency; ECSI = Environmental Cleanup Site Information; PCB = polychlorinated biphenyls; ODOT = Oregon Department of Transportation

- (1) Unless otherwise noted, site COIs are those identified in Appendix Q (Source Control Inventory Tables) of the Portland Harbor RI/FS Draft Feasibility Study (FS) (Anchor et al., 2012).
- (2) Source (unless noted otherwise): DEQ Milestone Report, Figure 1b, "Status of Stormwater Source Control Evaluations, January 2013" (DEQ, 2013a).
- (3) Source: DEQ Milestone Report, Figure 3, "Groundwater Source Control Evaluation Status, January 2013" (DEQ, 2013a), unless otherwise noted.
- (4) Stormwater Assessment Workplan, Carson Oil, Inc. (Golder Associates, 2012).
- (5) Based on communication with DEQ (DEQ, 2013b).
- (6) DEQ approved a Stormwater Assessment Workplan for this site (Wohlers, 2013) in June 2013 (DEQ, 2013c).
- (7) Site is listed in Appendix Q of the draft FS as Ashland Chemical (Anchor et al., 2012).
- (8) Figure 3 of the DEQ Milestone Report (DEQ, 2013a), categorizes this site as "1999 DEQ Source Control Screening - Low/Medium Priority for Source Control Evaluation". The Milestone Report defines this category as referring to sites that DEQ examined during its pre-Superfund-listing, site-discovery efforts. At that time, DEQ determined groundwater at these sites did not pose a significant threat to the river and did not recommend a groundwater SCE be completed.
- (9) Site is not shown in Figure 1b of DEQ Milestone Report. Table 1 of Milestone Report indicates SCE for this site is ongoing, and that groundwater is the only applicable pathway (DEQ, 2013a).
- (10) Site is not listed in Appendix Q of the draft FS or Table 4.2-2 of the Portland Harbor RI/FS Draft Final Remedial Investigation Report (Integral et al., 2011), and site COIs are not listed in ECSI database (DEQ, 2012).

Industrial sites covered or historically covered by National Pollutant Discharge Elimination System (NPDES) stormwater regulations also were considered as potential sources of pollutants to the City conveyance system. Sites within the basin that currently hold, or historically held, NPDES permits to discharge to the Basin 18 stormwater conveyance system are listed in Table 2. Sites with current stormwater NPDES permits are shown in Figure 2. Note that the City and ODOT both have NPDES Municipal Separate Storm Sewer System (MS4) stormwater permits that also cover basin drainage areas.

Table 2. Current⁽¹⁾ and Historical NPDES Permit Coverage in Basin 18

Address	Company	Permit Type	Time Period
3003 NW 35 th	Columbia American Plating	Stormwater (1200-Z)	1999 – 2005
	Carson Oil Warehouse	Stormwater (1200-Z)	2011 – Present
3125 NW 35 th	Carson Oil Truck Shop	Stormwater (1200-T)	1993 – 1996
		Stormwater (1200-Z)	1997 – Present
3000 NW St Helens	Container Management Services	Stormwater (1200-Z)	2000 – Present
3250 NW St Helens	Wilhelm Trucking Co.	Stormwater (1200-T)	1996 – 1997
		Stormwater (1200-Z)	1997 – Present
3333 NW 35 th	Bay News Inc./FTL, Inc.	Stormwater (1200-T)	1993 – 1996
		Stormwater (1200-Z)	1997 – 2001
	ABF Freight Systems, Inc. ⁽²⁾	Stormwater (1200-Z)	2001 – 2012
	MRP Services, Inc.	Stormwater (1200-Z)	2003 – 2011
3537 NW St Helens	Special Asphalt Products, Inc.	Stormwater (NPDES Individual Permit 3703-J)	1983 – 1987
		Oily Stormwater (1300-J)	1987 – 1996
		Stormwater (1200-H)	1992 – 1993
3750 NW Yeon	Owens Corning Fiberglass/ Owens Corning Corporation ⁽³⁾	Cooling Water (100J)	1992 – 2003
		Boiler Blowdown (500J)	1991 – 2003
		Groundwater (1500-A)	1995 – 2000
		Oily Stormwater (1300-J)	1988 – 2004
		Stormwater (1200-H)	1992 – 1996
		Stormwater (1200-Z)	1997 – 2007
	Owens Corning Roofing & Asphalt LLC	Stormwater (1200-Z)	2007 – Present
3900 NW Yeon	Container Recovery	Stormwater (1200-Z)	1999 – 2009
	Oregon Beverage Recycling Cooperative	Stormwater (1200-Z)	2009 – Present
3950 NW Yeon	Van Waters and Rogers, Inc./ Vopak USA, Inc./Univar USA ⁽⁴⁾	Groundwater (Individual NPDES) <i>Note: Permit included 1200-Z stormwater requirements.</i>	1998 – 2009
	Univar USA	Groundwater (Individual NPDES)	2009 – Present
3821 NW St Helens	Christenson Oil	Stormwater (1200-H)	1996
		Stormwater (1200-Z)	1997 – Present
3800 NW St Helens	Texaco/Equilon Enterprises, LLC ⁽⁵⁾	Groundwater (1500-A)	1998 – 2005
		Stormwater (1200-T)	1992 – 1995
		Oily Stormwater (1300-J)	1995 – 2007
	Equilon Enterprises, LLC	Stormwater (1200-Z)	2007 – Present

Address	Company	Permit Type	Time Period
4155 NW Yeon	McWhorter Inc./McWhorter Technologies Inc./Eastman Chemical Company ⁽⁶⁾	Cooling Water (100J)	1990 – 2001
		Groundwater (1500-A)	1995 – 2001
		Stormwater (1200-H)	1992 – 1996
		Stormwater (1200-Z)	1997 – 2001
3930 NW Yeon	Burlington Northern Railroad	Stormwater (1200-T)	1996
		Stormwater (1200-Z)	1998 – 2003
	Pacific Rail Services	Stormwater (1200-Z)	2003 – Present
4350 NW Front	Gunderson LLC	Stormwater (1200-L)	1992 – 1996
		Stormwater (1200-Z)	1997 – Present

Notes:

NPDES = National Pollutant Discharge Elimination System

- (1) Current permits are indicated in bold.
- (2) S&T Trucking covered as a tenant under ABF's Stormwater Pollution Control Plan.
- (3) Name changed from Owens Corning Fiberglass to Owens Corning Corporation on 3/3/1998.
- (4) Name changed from Van Waters & Rogers to Vopak USA on 4/2/2001 and to Univar USA on 11/20/2002.
- (5) Name changed from Texaco to Equilon Enterprises on 5/10/2000.
- (6) Name changed from McWhorter, Inc. to McWhorter Technologies, Inc., in 7/1994 and then to Eastman Chemical Company on 1/29/2001.

3.3 Outfall Setting

Outfall 18 discharges to an area of potential concern (AOPC 19) identified by the EPA based on elevated concentrations of PCBs, pesticides, metals, polycyclic aromatic hydrocarbons (PAHs), bis(2-ethylhexyl)phthalate (BEHP), and other contaminants in river sediment (EPA, 2010). In addition to Outfall 18, approximately 36 non-City outfalls discharge to AOPC 19. Overwater activities associated with industrial operations also take place within the AOPC in the vicinity of Outfall 18.

4 Basin Screening and Source Investigations

Source investigations in Basin 18 represent a significant amount of coordination between the City and DEQ. The City's investigations in Basin 18 started shortly after the 2000 listing of Portland Harbor and helped shape DEQ's and the City's joint approach to future source investigation and control activities in other City basins. In 2001, DEQ and the City initiated a pilot project in Basin 18 to develop an effective streamlined process for investigating and evaluating potential sources within the City basins (CH2M HILL, 2002); results of this pilot project (CH2M HILL, 2004a and 2005) served as the basis for development of the 2003 IGA between DEQ and the City. The City conducted research on individual sites under DEQ and EPA cleanup oversight in Basin 18, provided information to the agencies to better address site-specific stormwater pathway evaluations, and assisted DEQ with further site discovery actions in the basin. In addition, as data from the City conveyance system have been collected and evaluated over the years, the City and DEQ have coordinated to identify priorities for further source investigation. Basin 18 source investigations and findings are summarized below.

Phase 1 of the pilot project included sediment sampling adjacent to Outfall 18 in 2002 and compiling information on facilities in the basin to assess the potential for sites to discharge contaminated stormwater to Basin 18. Phase 1 results indicated that several contaminants were present at elevated concentrations in the vicinity of the outfall, and additional investigation of potential sources to the conveyance system was recommended for Phase 2 of the pilot project (CH2M HILL, 2004a). Subsequently, the City identified Basin 18 as a Priority 1 for source tracing based on elevated concentrations of PCBs, metals, pesticides, and phthalates detected in the inriver sediment samples collected by the City in 2002 in the vicinity of Outfall 18 (CH2M HILL, 2004b). Priority 1 designations were assigned to basins where significantly elevated contaminant concentrations had been detected in sediment near the outfall and further investigation efforts were needed to determine if these contaminants were being discharged to the City system.

Phase 2 of the pilot study was conducted in 2003, and it included inspecting more than a dozen facilities within the basin and collecting inline solids samples from the Basin 18 conveyance system to evaluate the feasibility of inline solids sampling as a source investigation tool (CH2M Hill, 2005). The investigation results indicated the presence of contaminant sources within the basin. The City conducted further inline solids sampling in 2004 in the vicinity of Container Management Services and Wilhelm Trucking, as part of emergency stormwater line cleaning activities in the west-central subbasin. Results of this investigation indicated elevated concentrations of PCBs, metals, phthalates, and PAHs in solids in the City and private stormwater lines in the vicinity of these two facilities (BES, 2006).

In 2006, the City evaluated the potential for its conveyance systems (including Basin 18) to act as preferential pathways for contaminated groundwater in identified shallow plumes, using an available groundwater plume dataset developed by the Lower Willamette Group (LWG) (Integral and GSI, 2004). Results indicated the presence of two shallow plumes potentially intersecting portions of the Basin 18 conveyance system: a petroleum plume in the vicinity of the Texaco and McWhorter sites, and a volatile organic compounds (VOC) plume in the vicinity of the Univar (formerly Van Waters & Rogers) site (GSI, 2006). This information helped to identify sites where investigations were needed to evaluate this pathway to the river.

Because the upland sites on the east side of NW Yeon Ave. (i.e., the rail yard and Gunderson) were conducting SCEs under DEQ oversight, the City focused its later investigations on the industrial area between NW Yeon Avenue and Forest Park. In early 2007, the City assisted DEQ with a site discovery effort in this portion of Basin 18, which resulted in DEQ requesting three sites to conduct SCEs.

As part of its Portland Harbor stormwater screening effort, the City evaluated 2007-2008 stormwater and sediment trap sample data collected by the LWG in Basin 18 at a point representing discharge from this area. Based on this analysis, concentrations of total PCBs, pesticides, and copper in Basin 18 stormwater were identified as potentially warranting further source tracing (BES, 2010b). In addition, the City installed sediment traps in the four subbasins upstream of the LWG sampling location to collect data concurrent with the LWG sediment trap investigation to prioritize areas for source identification. Analytical results indicated the presence of sources of PCBs, pesticides, and metals to the east-central subbasin, and sources of PCBs and pesticides to the west-central subbasin (BES, 2010a). Based on these results, the City focused subsequent source tracing on PCBs, pesticides, and metals.

Because the City already had identified Container Management and Wilhelm as likely contaminant sources in the west-central subbasin and these sites were initiating SCEs under DEQ oversight, the City focused the next phase of the investigation on the east-central subbasin (BES, 2012). The City conducted investigations in the east-central subbasin before and after comprehensive cleaning of all main lines in this branch of the system in 2010. Post-cleaning data collected by the City and by Univar as part of its SCE indicate that discharges of PCBs, pesticides, and metals have been reduced, although there are current sources to the subbasin. Results also confirmed an erodible soils pathway from the Container Management site to the east-central subbasin (BES, 2012).

Available information from upland sites confirms the presence of these contaminants at sites within and adjacent to the east-central and west-central subbasins. Likely major current sources to these subbasins include Container Management and Wilhelm Trucking; other sites under investigation by DEQ and EPA also may be discharging these and other contaminants to the basin (see Table 1). The former Columbia American Plating site was a likely source of metals and PCBs to the east-central subbasin before site redevelopment in 2009-2011.

All known and suspected major sources of contaminants to Basin 18, via the stormwater and/or preferential groundwater pathway, are being investigated under DEQ or EPA oversight. Stormwater pathway investigations (and/or preferential groundwater pathway evaluations, where applicable) are currently underway or recently completed at the BNSF, Carson Oil, Christenson Oil, Columbia American Plating, Container Management, Container Recovery, Gunderson, McWhorter, ODOT, Texaco, Univar, and Wilhelm Trucking facilities. In addition, DEQ anticipates completion of SCEs at the Trumbull Asphalt and Wirfs sites.

For additional information, investigations and evaluations completed by the City and others in the Basin 18 conveyance system are listed in Table 3.

Table 3. Investigations in the Basin 18 Stormwater Conveyance System

Data Collection Period	Party	Purpose	Documentation
2000	City	Compile basin background information to identify potential sources.	Preliminary Evaluation of City Outfalls (Westshore) (BES, 2000)
2002	City	Investigate inriver sediment quality in the vicinity of Outfall 18 and develop recommendations for Phase 2 pilot work to be conducted within the basin.	Phase 1 Data Evaluation Report and Phase 2 Work Planning for City of Portland Outfall 18, (CH2M HILL, 2004a)
2003	City	Pilot study to investigate inline solids within the City's conveyance system and evaluate potential contaminant sources.	Data Evaluation Report, Inline Solids in Basin M-1 and 18 (CH2M HILL, 2005)
2004	City	Conduct additional source tracing work through inline solids sampling during line cleaning adjacent to Container Management and Wilhelm Trucking.	Inline Solids Sampling in the Vicinity of Container Management Services and Wilhelm Trucking Co. (BES, 2006)
2005	City	Evaluate existing data on groundwater plumes and identify the potential for City conveyance systems (including Basin 18) to act as preferential pathways.	Relationships Between Upland Shallow Groundwater Plumes and the City Stormwater and Combined Conveyance System with the Portland Harbor (GSI, 2006)

Data Collection Period	Party	Purpose	Documentation
2007	LWG	Collect harborwide stormwater and sediment trap data to develop land use stormwater loading estimates for input to the inriver fate and transport model.	Portland Harbor RI/FS Round 3A and 3B Stormwater Data Report (Anchor and Integral, 2008)
2007 - 2008	City	Evaluate stormwater data from City outfalls to identify additional source tracing needs.	Stormwater Evaluation Report, City of Portland Outfall Project (BES, 2010b)
2007 - 2009	City	Collect inline solids and sediment trap samples at subbasin locations upstream of LWG location, concurrent with the LWG deployment, to assist with data evaluation and source tracing.	Outfall Basin 18 Inline Solids Investigation, TM No. 18-2 (BES, 2010a)
2008 - 2009	Shell Oil/ Texaco	Collect stormwater samples from the City conveyance system as part of the site's stormwater SCE.	Groundwater and Stormwater Source Control Evaluation Report, Shell Portland Bulk Terminal (URS, 2013)
2009	3003 NW 35 th LLC	Sample stormwater solids from City line adjacent to former Columbia American Plating site to evaluate the site's discharges to the conveyance system.	On-Site Stormwater Sewer Cleanout, Former Columbia American Plating Site (O'Gara, 2009)
2009 - 2011	City	Evaluate contaminant sources in the east-central subbasin through inline solids, sediment trap, and erodible soils sampling.	Outfall Basin 18 East-Central Subbasin Source Investigation Report (BES, 2012)
2010 - 2011	Univar	Collect stormwater, sediment trap, and dry-weather flow samples from the City stormwater line upstream and downstream of site connections to evaluate site contributions to the Basin 18 conveyance system via the stormwater and preferential groundwater pathways.	Draft Stormwater Pathway Investigation Report, Univar USA, Inc. (PES, 2012)
2011	Wilhelm	Collect stormwater solids samples from the City stormwater line immediately upstream and downstream from site connections to evaluate the site discharges to the Basin 18 conveyance system.	Storm Water Assessment, Erodible Soil And Storm Water Sediment Sampling Report, Wilhelm Trucking Company (Hahn and Associates, 2012)
2011 - 2012	BNSF	Collect stormwater solids and stormwater samples from the City stormwater line upstream and downstream of site connections as part of the site's stormwater SCE.	Source Control Evaluation Report, Guilds Lake Yard Site, (Farallon, 2013).
2012	Shell Oil/Texaco	Collect dry-weather flow samples from the City conveyance system in NW Yeon Avenue as part of the site's evaluation of the preferential groundwater pathway.	Groundwater and Stormwater Source Control Evaluation Report, Shell Portland Bulk Terminal (URS, 2013)

The City's source investigation work was used by DEQ to focus upland site investigations and to identify sites for DEQ Cleanup Program consideration. Joint investigation by the City and DEQ resulted in the identification of sources of all contaminants selected for source tracing in Basin 18.

5 Completion of Source Identification

The lines of evidence evaluated to verify that source tracing is complete and all major sources have been identified include (1) results of source tracing activities conducted in the basin (and upland site information) and (2) land use at remaining upland areas not undergoing DEQ Cleanup Program investigation or redevelopment. Findings from this evaluation are summarized below.

- *Source Tracing Results:* Upland sources of all contaminants selected for source tracing have been identified. Following a basin-wide assessment, subsequent City source tracing focused on the east-central and west-central subbasins, because all sites discharging to the downstream branch were being investigated by DEQ and data from the western and eastern subbasins did not indicate that major current sources were present. The City selected PCBs, pesticides, and metals for source tracing in these areas. Source investigations and review of upland site data confirmed that four sites in these subbasins (Container Management, Wilhelm Trucking, Univar, and Columbia American Plating) detected one or more of the Basin 18 source tracing contaminants in site soils at concentrations comparable to or higher than those detected in solids from the Basin 18 conveyance system. Sources of other contaminants identified for source tracing, such as PAHs and phthalates, also have been identified (see Table 1). Based on data collected from the City conveyance system and data collected at identified sources, potential major sources to Basin 18 via stormwater, preferential groundwater, and vehicle/equipment drag-out have been identified.
- *Upland Investigation Coverage and Land Use:* Approximately 60 percent of the land use in Basin 18 is open space. For the developed portion of the basin, Figure 3 displays the spatial extent of DEQ Cleanup Program site investigation and other programmatic controls (see key to figures provided at beginning of this Appendix). As shown in Figure 3, the majority of developed area has been or is being investigated, or likely does not need investigation because of land use and existing controls. Most of the sites in the developed area:
 - Are or will be investigating the stormwater and/or preferential groundwater pathway and implementing SCMs under DEQ Cleanup Program or EPA authority;
 - Have completed investigation and remediation activities under DEQ or EPA oversight;
 - Have been designated by DEQ as not needing an SCE or as a low priority for completing an SCE;
 - Are covered under NPDES stormwater regulations; and/or
 - Have been inspected by the City for industrial stormwater exposures and have been provided technical assistance as needed to implement BMPs.

Land use at sites not covered by DEQ/EPA Cleanup or Water Quality Programs consists mostly of a few large warehouse operations with minimal industrial exposures to stormwater and some smaller sites on the west side of NW St. Helens Road. Current and future industrial activities exposed to stormwater will be addressed by the DEQ

Water Quality NPDES Program, and non-industrial activities are not a known or suspected major source of contaminants to the City stormwater conveyance system.

Based on these lines of evidence, the City concludes that the Basin 18 source tracing is complete and all major sources have been identified.

6 Basin Source Controls

The City and DEQ collaborated under their respective authorities to identify control mechanisms for all major sources identified in the basin. Source control for major and minor sources in Basin 18 includes SCMs completed (or planned) at contaminated sites under DEQ Cleanup Program or EPA agreements and ongoing City and DEQ programs that are described in the Municipal Report. Source controls implemented in Basin 18 are displayed in Figures 2 and 3 and summarized in this section.

One type of programmatic source control is the elimination of stormwater exposures to industrial activities. Sites that hold (or historically held) an NPDES No Exposure Certification (NEC) are listed in Table 4.

Table 4. Sites with No Exposure Certification (NEC) in Basin 18 ⁽¹⁾

Address	Company	Time Period
2840 NW 35 th	Journal Graphics	1999 – Present
3441 NW Guam	Portland Bolt & Manufacturing	2003 – Present
3074 NW St Helens	Industrial Craters & Packers	2003 – Present
3133 NW St Helens	Trad Trucking, Inc.	2004 – 2009
	CBL Trucking Company Inc.	2009 – Present
3136 NW 35 th	Weyerhaeuser Recycling	2000 – 2005
3322 NW 35 th	Ashland Chemical Inc.	2000 – 2010
3333 NW 35 th	S&H Trucking	2002 – 2007
	ABF Freight Systems, Inc.	2012 – Present
3509 NW St Helens	Industrial Craters & Packers	2008 – Present
3537 NW St Helens	Special Asphalt Products Inc.	2013 – Present
3641 NW St Helens	Tualatin Valley Transportation Inc.	2013 – Present
3717 NW St Helens	Baxter & Flaming Industries, Inc.	2000 – Present ⁽²⁾
4033 NW Yeon	Alliance Trading LLC	2013 – Present
4155 NW Yeon	Kenan Advantage Group Inc (Reinhard Transp)	2012 - Present

Notes:

(1) Current NECs are indicated in bold.

(2) Records indicate NEC was inactive between November 2005 and June 2006.

Additional site-specific, programmatic, and conveyance system source controls for Basin 18 are summarized in Table 5.

Table 5. Basin 18 Source Controls

Site / Area	Source Controls	Implementation Timeframe
Source Control Measures (SCM) at DEQ Cleanup Sites ⁽¹⁾		
ANRFS Holdings Inc. (ECSI #1820)	Not needed	Not applicable
Burlington Northern Railroad Lake Yard (ECSI #100) (aka Guilds Lake RR Yard and Portland Terminal Railroad)	To be determined.	To be determined
Carson Oil - NW 35TH Ave. (ECSI #1405)	The site cleaned out all onsite catch basins, trench drains, stormwater lines, and the oil/water separator, and pressure washed all paved surfaces.	2012
	Oil-water separator.	Ongoing
Christenson Oil - Plant Number 1 (ECSI #2426)	Product recovery from groundwater - dual phase extraction	Ongoing
	To be determined for stormwater.	To be determined
Columbia American Plating Co. (ECSI #29)	EPA conducted a removal action at the site in 2003-2004 to address the imminent threat site contamination posed to human health and the environment.	2003 - 2004
	The onsite stormwater conveyance system was cleaned and then the site was redeveloped. Improvements made as part of the site redevelopment include demolition of previous buildings, stormwater system replacement, installation of a stormwater treatment system, and site paving.	2009 - 2011
Container Management Services (ECSI #4784)	To be determined.	To be determined
Container Recovery (ECSI #4015)	The site cleaned out all onsite catch basins and accessible stormwater lines.	2008
	Additional SCMs to be determined.	To be determined
Gunderson Inc. (ECSI #1155)	Oil-water separator already in operation. Additional SCMs to be determined.	To be determined.
Hill Investment Co. (ECSI #1076)	Not needed.	Not applicable
McWhorter Inc. (ECSI #135)	Previous site redevelopment included removal of all buildings, tanks, and drainage systems. Additional SCMs to be determined.	To be determined
ODOT - Portland Harbor Source Control Evaluation (ECSI #5437)	To be determined.	To be determined

Site / Area	Source Controls	Implementation Timeframe
Texaco Portland Terminal (ECSI #169)	Replaced wooden flume ("Green Creek") that historically crossed the central portion of property with a buried pipe.	1993
	Removed 36 tons of sandblast grit and lead-based paint chips from surface soil in the East Tank Farm.	1995
	Cleaned out catch basins and storm lines in the East Tank Farm.	2008
	Removed additional soil from East Tank Farm based on surface soil sampling results.	2011
	Operation of an oil/water separator, which treats most of the stormwater discharging from the site.	Ongoing
	Operation of product recovery system to remediate gasoline pipeline release.	1983 - 1990
Texaco Product Pipeline (ECSI #2117)	Operation of air sparging/soil vapor extraction system to remediate pipeline corridor leak near Gunderson.	1993 - 2003
Trumbull Asphalt Plant (ECSI #1160)	Stormwater treatment of front parking lot and some roof drainage. Remainder of site to be determined.	To be determined.
Van Waters & Rogers - Portland (currently Univar) (ECSI #330)	To be determined.	To be determined
Wilhelm Trucking (ECSI #69)	Abandonment of portions of storm system, construction of new storm lines and catch basins, and installation of oil/water separator.	2013
	Additional SCMs to be determined.	To be determined
Wirfs Property (ECSI #2424)	To be determined.	To be determined
City Conveyance System		
West-Central Subbasin	The City cleaned the stormwater line adjacent to Container Management and Wilhelm Trucking.	2001, 2004
Eastern Subbasin (NW 35 th)	The City constructed two water quality swales to reduce total suspended solids loading to Basin 18. The swales treat stormwater discharged from a portion of NW 35 th Avenue.	2009
East-Central Subbasin (upper subbasin, including NW 35 th Avenue)	In response to detections of elevated concentrations of contaminants in the fall 2009 inline solids samples from this subbasin, and in anticipation of additional source investigations, the City cleaned the main lines in the upper subbasin (upstream of Univar).	2010
East-Central Subbasin (lower subbasin)	As part of Univar's stormwater source control evaluation, Univar cleaned the City stormwater line in the lower portion of the east-central subbasin (downstream of the section cleaned by the City).	2010
Other (Programmatic Source Controls)⁽²⁾		
Gunderson, Burlington Northern Railroad Lake Yard, Columbia American Plating/Carson Oil Warehouse	Stormwater Management Manual Requirements	Ongoing

Site / Area	Source Controls	Implementation Timeframe
Univar, Tualatin Valley Transportation Inc.	City Discharge Authorization ⁽³⁾	Ongoing
See site listing in Table 2	NPDES 1200-Z Stormwater Permit Requirements	Ongoing
See site listing in Table 4	NPDES No Exposure Certifications	Ongoing

Notes:

ECSI = Environmental Cleanup Site Information; NPDES = National Pollutant Discharge Elimination System; DEQ = Oregon Department of Environmental Quality; ODOT = Oregon Department of Transportation

- (1) For upland sites, descriptions of SCMs are based on information in DEQ Milestone Report (DEQ, 2013a), DEQ source control decisions, and/or reports on file with DEQ.
- (2) Programmatic source controls are described in the Municipal Report.
- (3) Additional site-specific stormwater pollution controls required and implemented under City Code.

Other municipal programs (e.g., periodic inspection of and technical assistance to non-NPDES sites, illicit discharge monitoring, street sweeping, etc.) likely provide additional source control benefits in the basin and will help to address minor sources for which specific control measures have not been required. City programs that control current and future contaminant discharges to the conveyance system are described in the Municipal Report.

7 Conclusion

The City completed source tracing in Basin 18 and identified the major and potential sources of contaminants to the City conveyance system. Because necessary SCMs at identified sources have been implemented or are being determined under appropriate DEQ, EPA and City regulatory authorities, future discharges from Outfall 18 are unlikely to represent a significant source of contaminants to the river. However, the City will continue to look for opportunities with existing and future City stormwater programs to reduce suspended solids loading from the basin to the river. The City concludes that it has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin 18.

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Figure 1: Basin 18 Drainage Basin Overview

Figure 2: Basin 18 Industrial Area Overview and Conveyance System Source Controls

Figure 3: Basin 18 Upland Site Source Controls

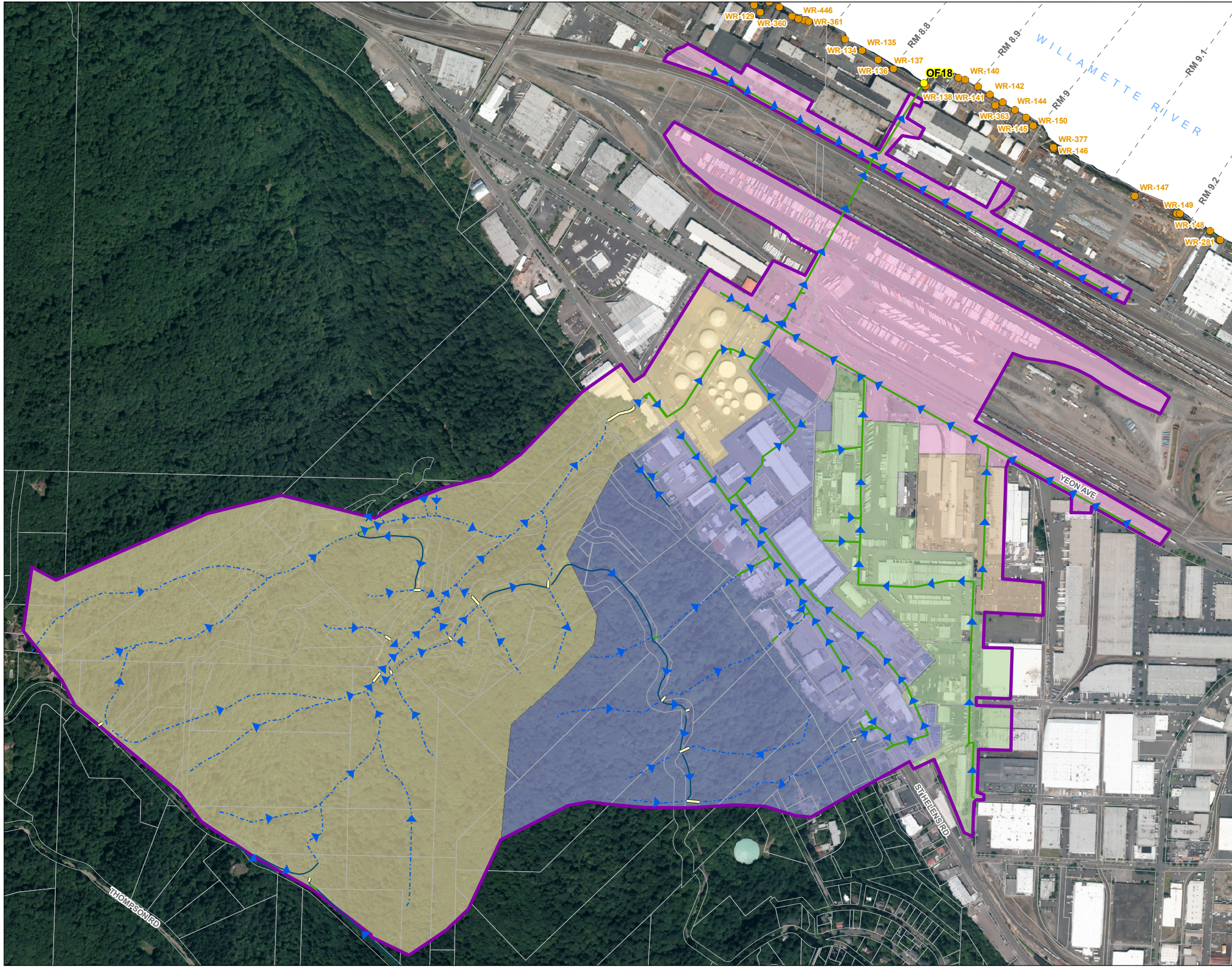
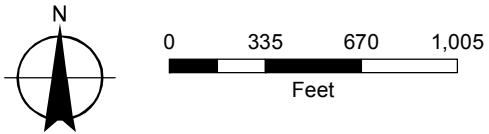


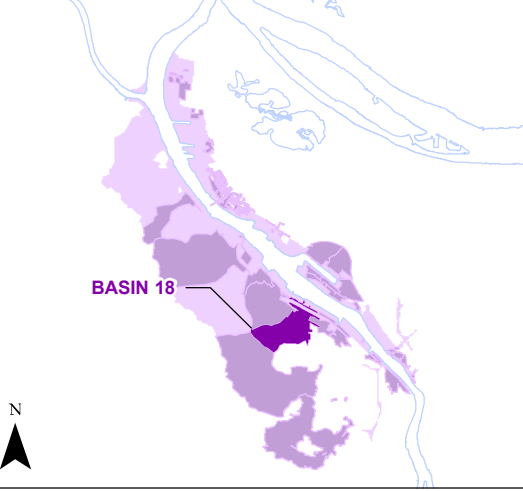
FIGURE 1
Basin 18
Drainage Basin Overview

- Basin 18
- Basin 18 Subbasins**
 - Western Subbasin
 - West-Central Subbasin
 - East-Central Subbasin
 - Eastern Subbasin
 - Downstream Subbasin
- Conveyance System**
 - Storm Line
 - Culvert
 - Ditch
 - Channel
 - City Outfall
 - Non-City Outfall
- All Other Data**
 - River Mile (RM)
 - Tax Lot
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO, Aerial Photo Taken 2012

ENVIRONMENTAL SERVICES
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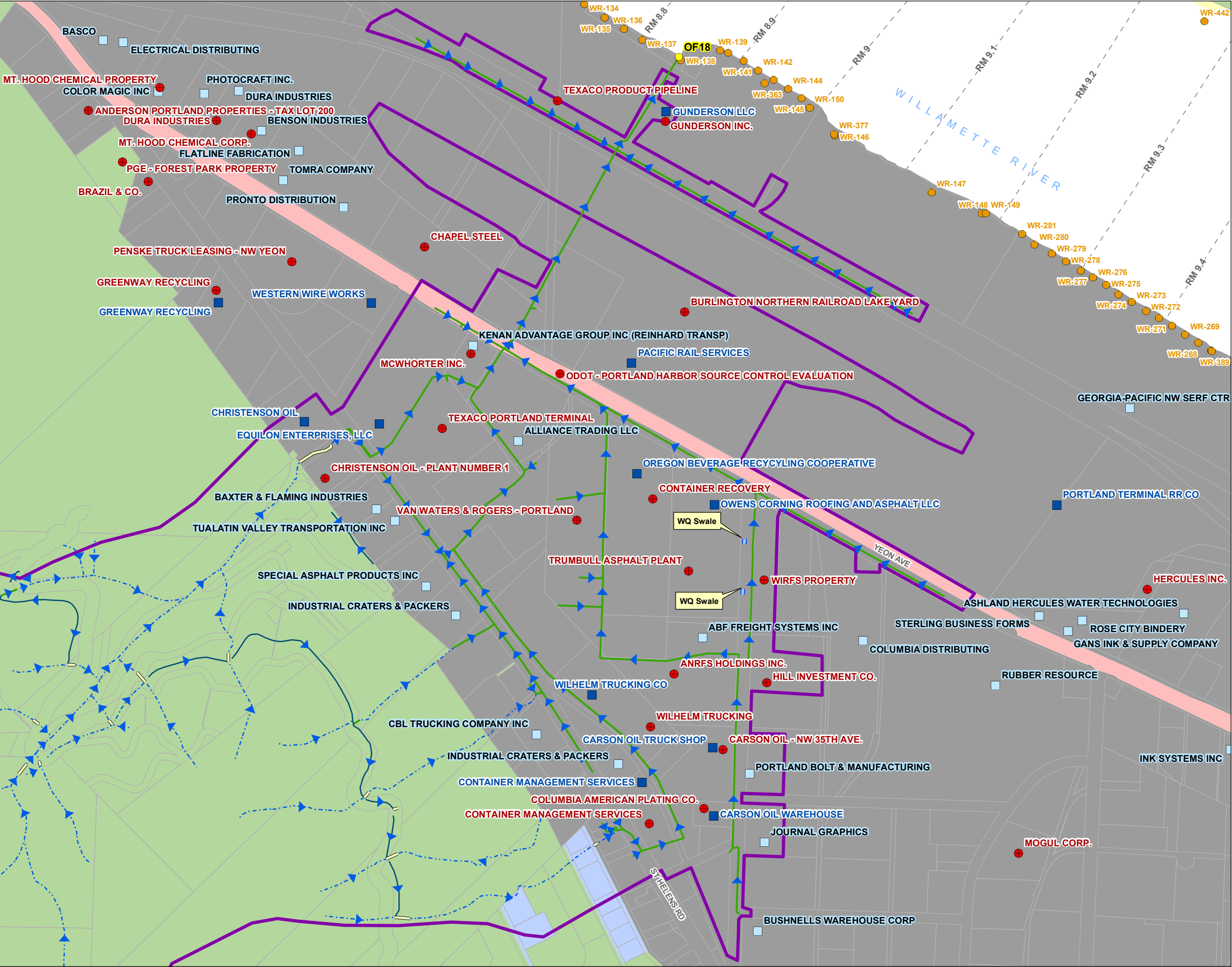
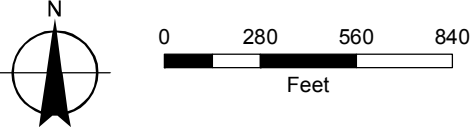


FIGURE 2
Basin 18
Industrial Area Overview and Conveyance
System Source Controls

- Basin 18
- DEQ ECSI Site
- NPDES Stormwater Permit
- NPDES No Exposure Certification
- Conveyance System**
 - Storm Line
 - Culvert
 - Ditch
 - Channel
 - Water Quality (WQ) Swale
 - City Outfall
 - Non-City Outfall
- Land Use/Zoning**
 - Heavy Industrial
 - Residential
 - Parks and Open Space
 - Major Transportation
- All Other Data**
 - River Mile (RM)
 - Tax Lot
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary

NOTE:
Land use in undisplayed portion of basin is all Parks and Open Space.



MAP NOTES:
Date: December 31, 2013
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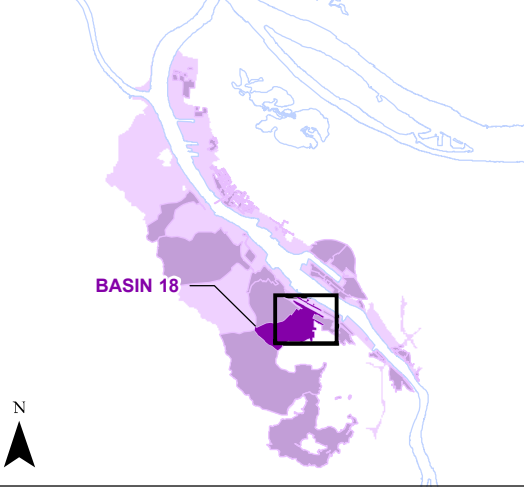
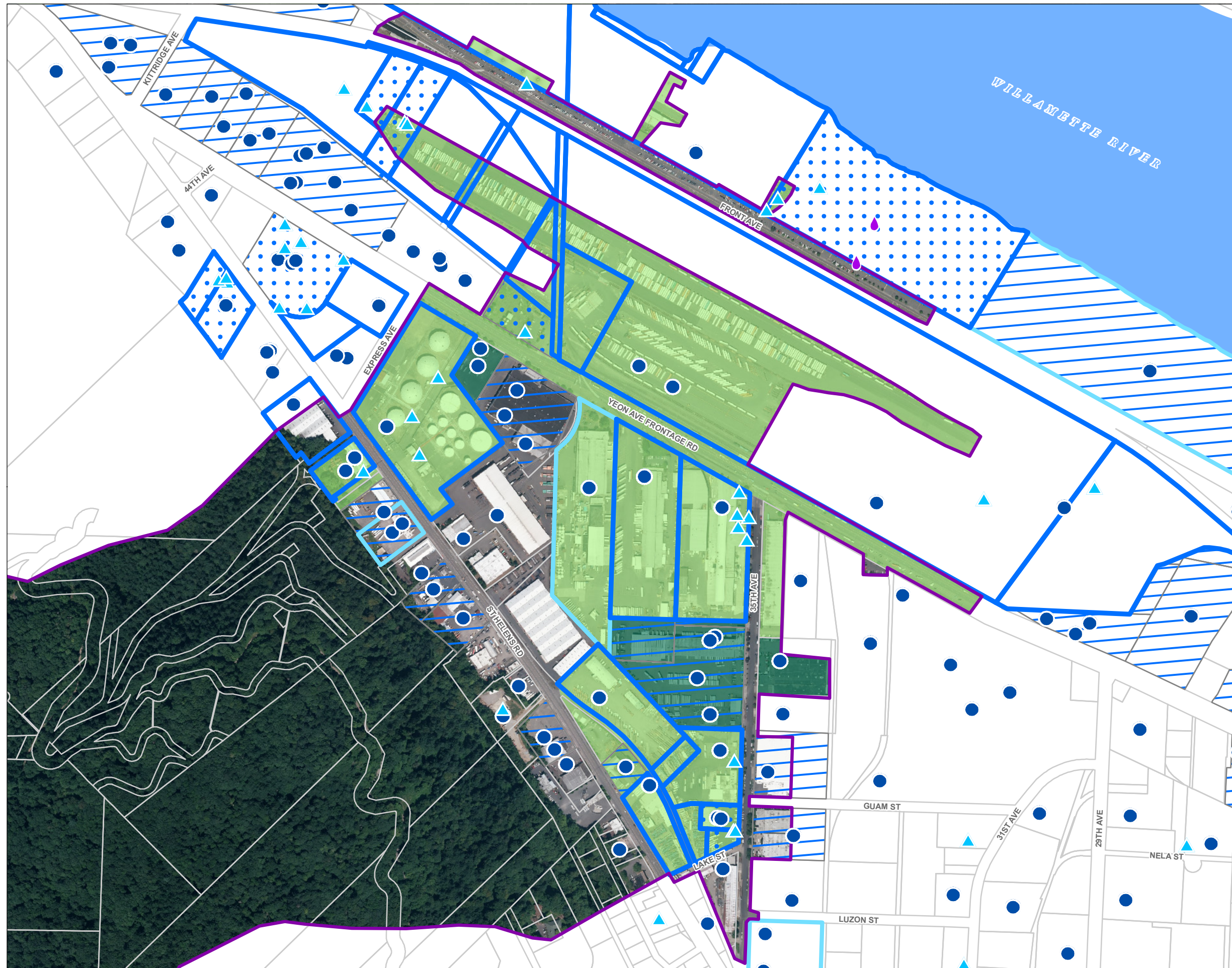
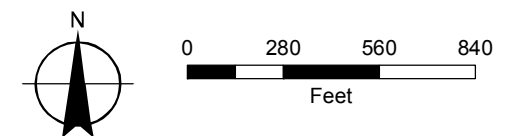


FIGURE 3
Basin 18
Upland Site Source Controls

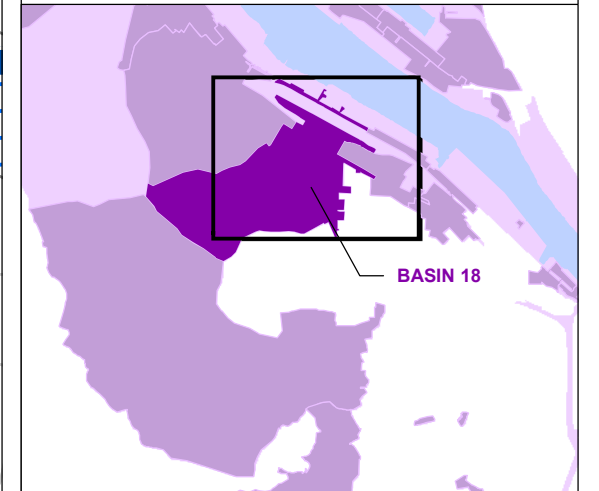


- Basin 18
- Tax Lot
- DEQ Stormwater SCEs**
 - SCE implemented or pending
 - SCE not needed or low priority
- All Other Features**
 - NPDES Stormwater Discharge Permit
 - City Discharge Authorization
 - NPDES No Exposure Certification
 - >50% of Site Area Redeveloped Under City SWMM
 - Stormwater Treatment Facility
 - Ecoroof
 - Site Inspection - BES Industrial Stormwater Program
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
 Date: December 31, 2013
 Data Sources: BES, METRO, Aerial Photo Taken 2012

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Completion Summary for City of Portland Outfall Basin 19

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and a number of City programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled. This report summarizes the results of this collaborative effort in Outfall Basin 19.

This Completion Summary includes a weight-of-evidence evaluation to demonstrate that source identification is complete and a summary of source controls (implemented or planned) that will control future contaminant discharges to the Willamette River.

Basin 19 is located on the west side of the Willamette River in the Guilds Lake Industrial Area. Most of the basin is drainage from Forest Park, with about 30 percent of the basin developed for industrial use. Development in the industrialized portion of Basin 19 includes a variety of industrial operations (e.g., bulk oil transferring, manufacturing, recycling, and transportation-related activities) as well as some commercial businesses. In addition, Oregon Department of Transportation (ODOT) Highway 30 (NW St. Helens Road) and a railroad corridor cross through the basin.

Evaluation of inriver sediment data near the outfall indicated the presence of sediment contamination adjacent to and upstream of the outfall, prompting the City to evaluate whether there may be major sources in the basin. Source evaluations were focused on the developed portion of the basin. The City conducted source tracing within the basin for a broad array of contaminants and subsequently narrowed the source tracing focus to polychlorinated biphenyls (PCB) based on source tracing results and on an evaluation of stormwater and storm solids samples from the downstream end of the basin.

The City identified multiple sources of PCBs and other contaminants within the basin. These sources, and the majority of the industrial sites within the basin, are conducting or have completed investigations under DEQ Cleanup Program authority, are implementing source control measures (SCM) under DEQ oversight, have been remediated, and/or have been redeveloped under the City's Stormwater Management Manual. Analysis of stormwater monitoring data collected from the basin indicates that contaminant concentrations are decreasing. Ongoing SCM implementation at these upland sites, together with current and future source control programs in the basin, are expected to provide necessary source control for Outfall 19 discharges.

Because the City has identified all major sources of contaminants to the basin and necessary controls are being implemented under DEQ and/or City authority, the City has met the remedial investigation (RI)/SCM objectives for Basin 19.

2 Introduction

This Completion Summary presents a weight-of-evidence evaluation of whether further source investigation is needed in Basin 19, and the rationale for concluding that future discharges from the basin are not likely to be significant sources of contaminants to river sediment. The purpose of this report is to demonstrate that, for Basin 19, the City has met the joint RI/SCM objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ. Together the City and DEQ identified all major sources of contamination to the basin and are using respective authorities to ensure that source controls are implemented where needed.

This report is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report), which provides additional background and detail regarding the City's harborwide source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Outfall 19 discharges to the west side of the Willamette River at approximately River Mile 8.4, in the Guilds Lake Industrial Area. The drainage area for this system (Basin 19) is approximately 486 acres. The majority of the conveyance system drains a portion of Forest Park. Remaining drainage is from industrial properties, adjacent roadways, and a section of the ODOT facility (Highway 30). Figure 1 shows the location of the outfall and drainage basin boundary and provides an overview of the associated stormwater conveyance system.

Additional detail on the Outfall 19 stormwater conveyance system and associated drainage basin is included in the *Source Investigation Update Report City of Portland Outfall Basin 19* (BES, 2010a).

3.2 Land Use and Potential Upland Sources

Approximately 70 percent of the land in Basin 19 is open space within Forest Park. The developed portion of the basin is zoned heavy industrial, with a small portion used for major transportation (i.e., state highway). A variety of industrial operations currently takes place in the developed portion of the basin; these operations include bulk oil transferring, pipe fabricating, wire fabricating, recycling, institutional cleaning, construction, transportation-related activities (e.g., warehousing and trucking), industrial coating, printing, and a railroad corridor. Although the developed portion is zoned industrial, current land use on some tax lots is commercial (e.g., office, hotel, grocery, equipment rental, retail).

Sites that were identified as potential upland sources include the 17 sites in the basin that are in the DEQ Cleanup Program, as listed in DEQ's Environmental Cleanup Site Information (ECSI) database. Table 1 lists these sites and indicates the associated contaminants of interest (COI) and the status of stormwater pathway evaluations. Of these 17 sites, 15 have completed site investigation and remediation or have pending stormwater pathway evaluations under DEQ oversight. DEQ determined that a stormwater pathway evaluation at the remaining two sites either was not needed or a low priority.

Table 1. DEQ Cleanup Program Sites in Basin 19

DEQ Cleanup Program Site	Site COIs ⁽¹⁾	Site Stormwater Pathway Evaluations ⁽²⁾
Anderson Brothers Property (ECSI #970)	VOCs, PAHs, TPH, PCBs, metals, pesticides, phthalates	Source Control Decision/No Further Action Issued
Anderson Portland Properties – Tax Lot 200 (ECSI #5529)	PCBs ⁽³⁾	Source Control Evaluation In Progress
Brazil & Co. (ECSI #1026)	PCBs	Source Control Evaluation In Progress
Calbag Metals (ECSI #2454)	PCBs, metals, phthalates	Source Control Evaluation In Progress
Chapel Steel (ECSI #4920)	PAHs, PCBs, metals, phthalates	Source Control Evaluation Not Needed
Dura Industries (ECSI #111)	Metals	Source Control Evaluation Needed
Front LP Properties (ECSI #1239) : Tube Forgings parcel	VOCs, SVOCs, PAHs, TPH, PCBs, metals, phthalates	Source Control Evaluation In Progress
Greenway Recycling (ECSI #4655)	VOCs, TPH, PCBs, metals ⁽⁴⁾	Source Control Decision / No Further Action Issued
Mt. Hood Chemical Corp. (ECSI #81)	VOCs	Source Control Evaluation In Progress
Mt. Hood Chemical Property (ECSI #1328)	Not listed ⁽⁵⁾	Need for Source Control Evaluation to be Determined/ Low Priority
ODOT - Portland Harbor Source Control Evaluation (ECSI #5437)	Not listed ⁽⁵⁾	Source Control Evaluation In Progress
Chevron USA Asphalt Refinery (ECSI #1281)	PAHs, TPH, metals	Source Control Decision/No Further Action Issued
Penske Truck Leasing – NW Yeon (ECSI #5055)	None	Source Control Decision/No Further Action Issued
PGE - Forest Park Property (ECSI #2406)	PCBs ⁽⁴⁾	Source Control Decision/No Further Action Issued
Kittridge Distribution Center (ECSI #2442)	None	Source Control Decision/No Further Action Issued
Unocal - Willbridge Terminal (ECSI #1549/177)	VOCs, TPH, metals	Source Control Evaluation In Progress
Willbridge Yard (BNSF) (ECSI #3395)	Metals	Source Control Evaluation In Progress

Notes:

PAHs = polycyclic aromatic hydrocarbons; SVOCs = semivolatile organic compounds; TPH = total petroleum hydrocarbons; VOCs = volatile organic compounds; COIs = contaminants of interest; ECSI = Environmental Cleanup Site Information; PCBs = polychlorinated biphenyls; BNSF = Burlington Northern Santa Fe

- (1) Unless otherwise noted, site COIs are those identified in Appendix Q (Source Control Inventory Tables) of the Portland Harbor RI/FS Draft Feasibility Study (FS) (Anchor et al., 2012).
- (2) Source: DEQ Milestone Report, Figure 1b, "Status of Stormwater Source Control Evaluations, January 2013" (DEQ, 2013).
- (3) Site joined Cleanup Program in September 2011 and is not listed in Appendix Q of the draft FS. ECSI database (DEQ, 2012) lists PCBs in soil as site contaminants.
- (4) Source: Table 4.2-2 in the Portland Harbor RI/FS Draft Final Remedial Investigation Report (Integral et al., 2011).
- (5) Site is not listed in Appendix Q of the draft FS or Table 4.2-2 of the Draft Final RI, and site COIs are not listed in the ECSI database.

Industrial sites covered or historically covered by National Pollutant Discharge Elimination System (NPDES) stormwater regulations also were considered as potential sources of pollutants to the City conveyance system. Sites within the basin that currently hold, or historically had, NPDES permits to discharge to the Basin 19 conveyance system are listed in Table 2. Sites with current NPDES permits are shown in Figure 1. Note that the City and ODOT both have NPDES Municipal Separate Storm Sewer System (MS4) stormwater permits that cover basin drainage areas.

Table 2. Current⁽¹⁾ and Historical NPDES Permit Coverage in Basin 19

Address	Company	Permit Type	Time Period
4025 NW Express	Western Wire Works	Stormwater (1200-Z)	1998 – Present
3865 NW St Helens	Christenson Oil	Stormwater (1200-Z)	1997 – Present
4000 NW St Helens	Consolidated Sawmill Machinery International Inc.	Stormwater (1200-L)	1995 – 1996
4015 NW St Helens	American Transport Inc.	Stormwater (1200-Z)	2001 – 2002
	Portland Truck and Diesel ⁽²⁾	Stormwater (1200-Z)	2003 – 2004
4135 NW St Helens	Greenway Recycling	Stormwater (1200-Z)	2006 – Present
4285 NW Yeon	ABF Freight Systems Inc.	Stormwater (1200-T & 1200-Z)	1993 – 2001
	FTL Inc. ⁽³⁾	Stormwater (1200-Z)	2001 – 2005
4444 NW Yeon	Mount Hood Chemical	Stormwater (1200-H & 1200-Z))	1992 – 2009
4927 NW Front	Acme Trading & Supply Co. ⁽⁴⁾	Stormwater (1200R & 1200-Z)	1992 – 2003
4959 NW Front	Asset Recovery Inc.	Stormwater (1200-R)	1992 – 1996
5200 NW Front	Tube Forgings of America Inc.	Stormwater (1200-L & 1200-Z)	1992 – Present
5501 NW Front	Chevron Willbridge Asphalt	Cooling Water (100-J)	1985 – 1995
		Stormwater (1200-H & 1200-Z)	1992 – 2005
	Paramount of Oregon	Stormwater (1200-Z)	2005 – 2009
	Paramount Petroleum Corporation	Stormwater (1200-Z)	2009 – Present
5814 NW Doane	BNSF Willbridge Yard	Stormwater (1200-Z)	1999 – 2005
5528 NW Doane	Unocal Terminal	Stormwater (Individual & 1200-Z)	1984 – 1996
	Tosco Corporation	Stormwater (1300-J)	1997 – 2003
	Conoco Phillips	Stormwater (1300-J & 1200-Z)	2004 – 2012
	Phillips 66 Company	Stormwater (1200-Z)	2012 – Present

Notes:

NPDES = National Pollutant Discharge Elimination System; BNSF = Burlington Northern Santa Fe

(1) Current permits are indicated in bold.

(2) Permit also covered Northwest Fleet Products, and Baker Transport as tenants.

(3) S and H Trucking Co. also covered under permit as a tenant.

(4) Calbag Metals assumed operations at the site under Acme's stormwater permit in 1995.

3.3 Outfall Setting

Outfall 19 discharges to an area of potential concern (AOPC 18) identified by the U.S. Environmental Protection Agency (EPA) based on elevated concentrations of PCBs, pesticides, and other contaminants in river sediment (EPA, 2010). In addition to Outfall 19, one other City outfall (Outfall 19A) and nine non-City outfalls discharge to AOPC 18; Outfall 19 is also immediately downstream of AOPC 19 and the affiliated outfalls.

Outfall 19 is located in an embayment where tugboats and barges are docked and several overwater structures are present (see Figure 1). Redeposition of contaminated sediment may occur as propwash disturbs and resuspends material into the water column. This setting makes it difficult to identify specific contaminant pathways to the river based on the nearby inriver sediment data alone.

4 Basin Screening and Source Investigations

The City identified Basin 19 as a Priority 1 for source tracing based on the elevated contaminant concentrations in the vicinity of Outfall 19 (CH2M HILL, 2004). Priority 1 basins are considered the highest priority for identifying sources. The subsequent *Phase I Report for City of Portland Priority 1 Basins* identified PCBs, polycyclic aromatic hydrocarbons (PAH); phthalates, and metals (chromium, copper, lead, nickel, and zinc) for source tracing based on further evaluation of the inriver sediment data (GSI, 2006).

The City conducted comprehensive source investigations throughout the system to trace major upland sources and pathways to the City stormwater conveyance system and to identify the need for SCMs. The City applied a conservative source-tracing approach in the basin and investigated a broad array of contaminants. Results of the majority of City source tracing activities are presented in the *Source Investigation Update Report City of Portland Outfall Basin 19* (BES, 2010a).

In 2010, the City also collected stormwater and stormwater solids data from the downstream end of the basin (i.e., representing all collective discharges to the system) as part of the City's stormwater screening evaluation (BES, 2010b). Based on this evaluation and using a conservative screening approach, PCBs were identified as potentially warranting further source tracing in Basin 19 because concentrations indicated the presence of a source(s) to the basin (BES, 2010b). Other potential COIs previously identified for this basin had low concentrations in the whole-basin stormwater and/or sediment trap samples. Subsequent review of upland site status as part of the stormwater screening evaluation indicated no immediate need for further City source tracing in Basin 19 because stormwater pathway evaluations were underway at several identified sources of PCBs (BES, 2010b) and three additional PCB sources identified by the City were likely to enter into DEQ Cleanup Program agreements for investigation.¹

¹ City source investigations in Basin 19 included targeted investigations of discharges from the following three sites that subsequently entered into Cleanup Program agreements with DEQ to investigate onsite sources of PCBs and other contaminants to Basin 19: Brazil & Co. (ECSI #1026), O'Neill Transfer & Storage Co. (former Calbag Metals – ECSI #2454), and Anderson Portland Properties (ECSI #5529).

The City also identified additional stormwater screening for pesticides as a follow-up step, based on detections in one stormwater sample (BES, 2010b). Additional whole-basin stormwater sampling was conducted and results confirmed that major sources of pesticides were not present in Basin 19 and source tracing was not necessary (BES, 2012).

Investigations and evaluations completed by the City and others in the Basin 19 conveyance system are listed in Table 3.

Table 3. Investigations in the Basin 19 Stormwater Conveyance System

Data Collection Period	Party	Purpose	Documentation
2000	City	Compile basin background information to identify potential sources.	Preliminary Evaluation of City Outfalls (Westshore) (BES, 2000)
2002	City	Evaluate inriver sediment data near City outfalls to prioritize basins for source tracing.	Programmatic Source Control Remedial Investigation Work Plan (CH2M HILL, 2004)
2003	City	Collect solids data from the Basin 19 conveyance system to identify subbasins that may need further source investigation	Source Investigation Update Report, City of Portland Outfall Basin 19 (BES, 2010a)
2005	Calbag Metals	Collect solids data from the Basin 19 conveyance system during cleaning of line segment receiving Calbag discharges, concurrent with data collection from onsite system, as part of the site source control evaluation.	Environmental Assessment Report, Storm Water Discharge System, Former ACME Supply & Trading Facility (Creekside, 2005)
2006	City	Compile existing information to focus source tracing activities based on evaluation of observed contaminants and identified sources.	Phase I Report for City of Portland Priority 1 Basins (GSI, 2006)
2006	City	Fulfill Prospective Purchase Agreement requirement to evaluate Basin 19 for potential offsite migration of contaminants from PGE Forest Park site (ECSI #2406).	Technical Memorandum, PGE - Forest Park Stormwater System Investigation (BES, 2007)
2007	Lower Willamette Group	Collect harborwide stormwater and sediment trap data to develop land use stormwater loading estimates for input to the inriver fate and transport model.	Portland Harbor RI/FS Round 3A and 3B Stormwater Data Report. Prepare for the Lower Willamette Group (Anchor and Integral, 2008)
2007	City	Investigate offsite migration of contaminants in storm system solids from the Calbag Metals site (ECSI #2454).	City Outfall Basin 19 Inline Solids Sampling at the Former Calbag Metals Site (BES, 2008)
2007-2008	City	Investigate offsite migration of contaminants in storm system solids from the Calbag Metals site (ECSI #2454).	City Outfall Basin 19 Inline Solids Sampling at the Former Calbag Metals Site (BES, 2009)
2006-2008	City	Evaluate status of basin source identification and control.	Source Investigation Update Report, City of Portland Outfall Basin 19 (BES, 2010a)
2006-2009	City	Evaluate stormwater data from City	Stormwater Evaluation Report,

Data Collection Period	Party	Purpose	Documentation
		outfalls to identify additional source tracing needs.	City of Portland Outfall Project (BES, 2010b)
1999-2010	City	Evaluate effectiveness of City stormwater management programs within Basin 19 via stormwater trend analyses.	Basin 19 Stormwater Quality Trend Analyses, Effectiveness of City Stormwater Source Control Efforts TM (BES, 2011a)
2010	City	Investigate offsite migration of contaminants from the Anderson Portland Properties site (ECSI #5529).	Basin 19 Source Investigation of Lateral Connection in the Vicinity of NW St. Helens and NW Yeon Avenues (BES, 2011b)
2009-2011	City	Determine whether investigation was needed to identify pesticides sources.	Outfall Basin 19 Stormwater Investigation (BES, 2012)

Notes:

ECSI = Environmental Cleanup Site Information

The City's source investigation work was used by DEQ to focus upland site investigations and to identify sites for DEQ Cleanup Program consideration. Joint investigation by the City and DEQ resulted in the identification of one or more sources of PCBs and other contaminants in Basin 19.

5 Completion of Source Identification

The lines of evidence evaluated to verify that source tracing is complete and all major sources have been identified include (1) source tracing activities conducted in the basin (and upland site information), (2) stormwater data at the end of the outfall, and (3) land use at remaining upland areas not undergoing DEQ Cleanup Program investigation or redevelopment. Findings from this evaluation are summarized below.

- Source Tracing Results:** Upland sources of all contaminants selected for source tracing have been identified. Following a preliminary review of LWG stormwater and sediment trap data collected to represent the basin, the City focused its source tracing efforts on PCBs. Investigation and collaboration with DEQ confirmed that three upland sites discharging to Basin 19 (Anderson Portland Properties, Brazil & Co., and Calbag Metals/O'Neill Transfer) detected PCBs in site soils at considerably higher concentrations than those detected in the Basin 19 conveyance system. PCB sources also may be discharging to two private multiparty lines in the east branch of the basin based on data collected by the City from lateral connections to Basin 19 (BES, 2010a) and stormwater data collected at the Tube Forgings parcel of the Front Avenue LP site confirm that PCBs are being discharged to the storm line along NW Front Avenue (Bridgewater, 2012). Source tracing activities at other upland sites in the basin also identified PCBs onsite, although concentrations do not indicate that these sites are major sources to the basin. All upland sites that identified PCBs in site soil and/or stormwater are being or have been evaluated under the DEQ Cleanup Program and/or have been redeveloped under the City Stormwater Management Manual.

- *Outfall19 Stormwater Data:* The City MS4 program performed long-term stormwater monitoring at Outfall 19 between 1995 and 2011. Although PCBs were not included in the analytical scope until 2006, a trends analysis of City and site-specific data indicates reductions in other contaminant concentrations (i.e., metals) over time (BES, 2011a). The trends analysis report concludes that City stormwater management programs have been effective in reducing pollutant discharges to the Basin 19 conveyance system. Given the hydrophobic nature of PCBs and the tendency for PCBs to bind with the suspended solids fraction in stormwater, implementation of stormwater controls that reduced industrial exposures and solids loading to stormwater also likely reduced loading of PCBs to Basin 19. In addition, evaluation of City and LWG stormwater data from the basin determined that further City source tracing in the basin was not warranted (BES, 2010b and 2012).
- *Upland Investigation Coverage and Land Use:* Approximately 70 percent of the land use in Basin 19 is open space (see Figure 1). Figure 2 displays the spatial extent of upland site investigation and other programmatic controls (see key to figures provided at the beginning of this Appendix). As shown in Figure 2, the majority of developed area has been or is being investigated, or likely does not need investigation because of land use and existing controls. Sites in the developed area are:
 - Investigating the stormwater pathway and implementing SCMs under DEQ Cleanup Program authority;
 - Have completed investigation and remediation activities under DEQ oversight;
 - Have redeveloped under City stormwater code; and/or
 - Are covered under NPDES stormwater regulations.

Land use at sites not covered by DEQ Cleanup or Water Quality Programs or not recently redeveloped consists of residential, commercial, or warehouse uses. Industrial activities exposed to stormwater are being addressed by the DEQ Water Quality NPDES Program and non-industrial activities are not a known or suspected major source of contaminants to the City stormwater conveyance system.

Based on these lines of evidence, the City concludes that Basin 19 source tracing is complete and all major sources have been identified.

6 Basin Source Controls

The City and DEQ collaborated under their respective authorities to identify control mechanisms for all major sources identified in the basin. Source control for major and minor sources in Basin 19 includes SCMs completed (or planned) at contaminated sites under DEQ Cleanup Program agreements and ongoing City and DEQ programs that are described in the Municipal Report. Source controls implemented in Basin 19 are displayed in Figure 2 and summarized in this section.

One type of programmatic source control is the elimination of stormwater exposures to industrial activities. Table 4 lists sites that hold (or historically held) an NPDES No Exposure Certification (NEC).

Table 4. Sites with No Exposure Certification (NEC) in Basin 19 ⁽¹⁾

Address	Company	NEC Time Period
4015 NW St Helens	Portland Truck and Diesel ⁽²⁾	2004 – 2009
4309 NW St Helens	Western Fluid Power	2000 – 2005
	Western Integrated Technologies	2005 – 2010
4250 NW Yeon	Pronto Distribution	2013 – Present
4322 NW Yeon	Tomra Company	2013 – Present
4330 NW Yeon	Flatline Fabrication	2013 – Present
4338 NW Yeon	Pacific Courier	2002 – 2012
4444 NW Yeon	Benson Industries, LLC	2012 – Present
4466 NW Yeon	Dura Industries	2001 – Present
4468 NW Yeon	Photocraft Inc.	2004 – Present
4488 NW Yeon	Color Magic Inc.	2000 – Present
4600/4650 NW St Helens	Electrical Distributing⁽³⁾	2003 – Present
4827 NW Front	Fast Fabricators	2008 – Present
4927 NW Front	O'Neill Transfer & Storage	2003 – 2010
	PPV Inc.	2010 – Present
5041 NW Front	Applied Industrial Technology	2007 – Present
5315 NW St Helens	Goby Walnut & Western Hardwoods	2009 – Present

Notes:

(1) Current NECs are indicated in bold.

(2) NEC also covered PTD, Northwest Fleet Products, and Baker Transport as tenants.

(3) Basco is a tenant of Electrical Distributing and is covered under its permit.

Additional site-specific, programmatic, and conveyance system source controls completed to date for Basin 19 are summarized in Table 5.

Table 5. Basin 19 Source Controls

Site/Area	Source Controls	Implementation Timeframe
Source Control Measures (SCM) at DEQ Cleanup Sites ⁽¹⁾		
Anderson Brothers (ECSI #970)	Contaminated soil removal, cleanout of the onsite stormwater lines, new asphalt surfacing, and additional erosion control BMPs.	2007-2008
Anderson Portland Properties (ECSI #5529)	Contaminated soil removal, capping, and revegetation. Erosion control measures to minimize offsite migration during construction and revegetation process.	2011
Brazil & Co. (ECSI #1026)	SCMs to address offsite migration of contaminated erodible soils on site.	To be determined; SCM planning is in progress.
Calbag Metals (ECSI #2454)	Site storm system cleanout, repaving, and installation of catch basin filters.	2005
	Additional SCMs to be determined.	To be determined.

Site/Area	Source Controls	Implementation Timeframe
Chapel Steel (ECSI #4920)	Not needed. (2)	Not applicable.
Dura Industries (ECSI #111)	To be determined.	To be determined.
Front Avenue LP (ECSI #1239): Tube Forgings parcel	Storm system redevelopment and treatment installation pending.	To be determined.
Greenway Recycling (ECSI #4655)	Soil removal and installation of stormwater treatment.	2007
Mt. Hood Chemical Corp. (ECSI #81)	Soil vapor extraction and groundwater remediation. Abandonment of inactive storm system. Catch basin replacement. Storm system cleaning.	2009 – 2011
	Additional SCMs to be determined.	To be determined.
Mt. Hood Chemical Property (ECSI #1328)	Not needed.(2)	Not applicable
ODOT - Portland Harbor Source Control Evaluation (ECSI #5437)	To be determined.	To be determined.
Paramount Petroleum (Chevron Asphalt) (ECSI #1281)	Oil-water separator already in operation. Cleanout of the onsite stormwater lines.	2006-2009
Penske Truck Leasing (ECSI #5055)	Soil removal, capping, and installation of stormwater treatment.	2007-2008
PGE-Forest Park	Soil removal, capping, removal of site storm system, plugging of former connection to Basin 19.	2000
	Erosion control measures in place and redevelopment pending. Prospective Purchaser Agreement in place for future redevelopment of site by City as Forest Park trailhead.	Ongoing
Schnitzer Kittridge Distribution Center (ECSI #2442)	Site redevelopment included removing former buildings and infrastructure and paving the site.	2004-2007
	DEQ Record of Decision includes engineering and institutional controls, such as cap maintenance and site-specific contaminated soil and groundwater management plans.	Ongoing
Willbridge Terminal – Unocal/ Conoco Philips (ECSI #1549/177)	Oil water separator already in operation. Additional SCMs to be determined.	To be determined.
Willbridge Rail Yard (ECSI #395)	To be determined.	To be determined.
City Conveyance System		
NW Kittridge Avenue	Calbag Metals cleaned the lower portion of the NW Kittridge line to address offsite migration of site-related contaminants.	2005
NW St. Helens Road	Following investigation of City storm lines adjacent to the PGE Forest Park site, the City abandoned lines with residual sediment in the vicinity of NW St. Helens and NW Yeon (BES, 2007).	2006

Site/Area	Source Controls	Implementation Timeframe
Other (Programmatic Source Controls)⁽³⁾		
Greenway Recycling, Penske Truck Leasing	Stormwater Management Manual Requirements.	Ongoing
See site listing in Table 2	NPDES 1200-Z Stormwater Permit Requirements.	Ongoing
See site listing in Table 4	NPDES No Exposure Certifications.	Ongoing

Notes:

ECSI = Environmental Cleanup Site Information; BMP = best management practices; NPDES = National Pollutant Discharge Elimination System; DEQ = Oregon Department of Environmental Quality

- (1) For upland sites, description of SCMs are based on information in DEQ Milestone Report (DEQ, 2013), DEQ source control decisions, and/or reports on file with DEQ.
- (2) DEQ has determined that a source control evaluation is not needed or is a low priority at this site (DEQ, 2013).
- (3) Programmatic source controls are described in detail in the Municipal Report.

All major contaminant sources have been controlled or will be controlled after implementation of SCMs has been completed under the programs identified above.

Other municipal programs (e.g., periodic inspection of and technical assistance to non-NPDES sites, illicit discharge monitoring, street sweeping, etc.) likely provide additional source control benefits in the basin and will help to address minor sources for which specific control measures have not been required. City programs that control current and future contaminant discharges to the conveyance system are described in the Municipal Report.

7 Conclusion

The City completed source tracing in Basin 19 and identified the major sources of contaminants to the City conveyance system. Because necessary SCMs at identified sources have been implemented or are being determined under appropriate DEQ and City regulatory authorities, future discharges from Outfall 19 are unlikely to represent a significant source of contaminants to the river. The City concludes that it has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin 19.

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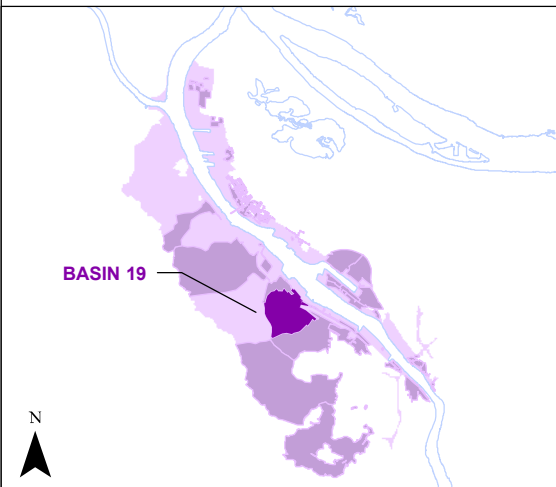
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List of Figures

Figure 1: Basin 19 Overview

Figure 2: Basin 19 Upland Site Source Controls

Basin 19 Overview



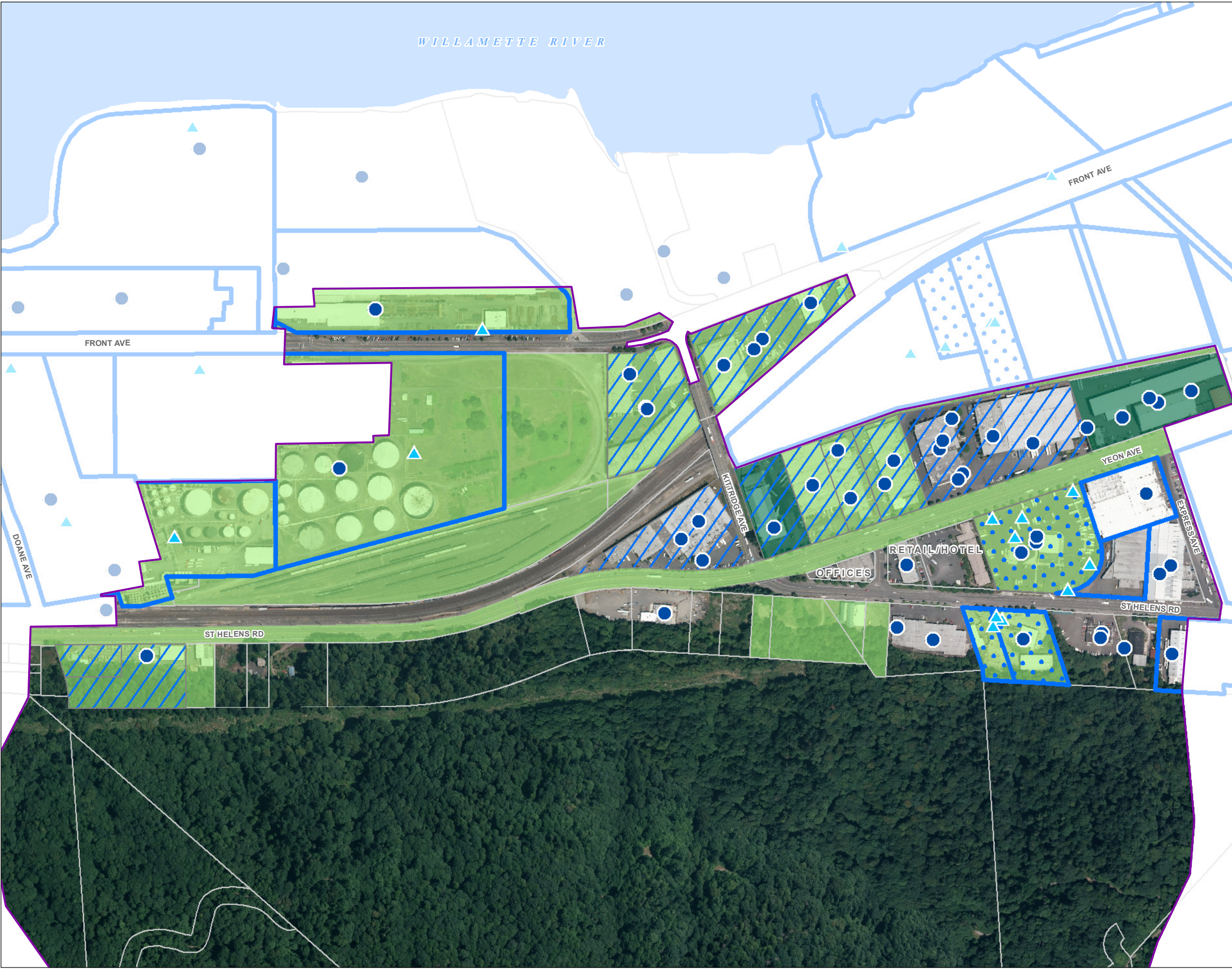


FIGURE 2
Basin 19
Upland Site Source Controls

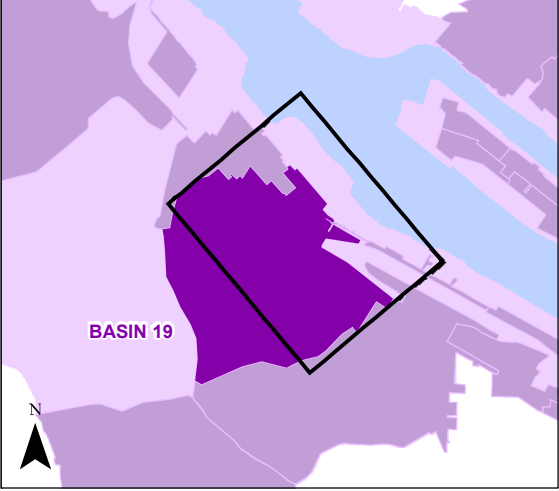
- Basin 19
- Tax Lot
- DEQ Stormwater SCEs**
 - SCE implemented or pending
 - SCE not needed or low priority
- All Other Features**
 - NPDES Stormwater Discharge Permit
 - NPDES No Exposure Certification
 - >50% of Site Area Redeveloped Under City SWMM
 - Stormwater Treatment Facility
 - Site Inspection - BES Industrial Stormwater Program
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary

NOTE:
The DEQ Milestone Report (DEQ, 2013) indicates an SCE is in progress for Tax Lot 300 of the Anderson Portland Properties Site. However, only Tax Lot 200 of this property is in the DEQ Cleanup Program (ECSI #5529). Therefore, SCE status for Tax Lot 300 is not shown in this figure.



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO, Aerial Photo Taken 2012

 ENVIRONMENTAL SERVICES
CITY OF PORTLAND
1120 SW Fifth Avenue, Room 1000
Portland Oregon, 97204-1912



Completion Summary for City of Portland Outfall Basin 19A

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and a number of City programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled. This report summarizes the results of this collaborative effort in Outfall Basin 19A.

Basin 19A is located on the west side of the Willamette River in the Guilds Lake Industrial Area. The basin does not include any upland sites and consists almost entirely of approximately 1.7 acres of paved rights-of-way, surrounded by sites in the DEQ Cleanup Program. Evaluation of inriver sediment data near Outfall 19A (which discharges in close proximity to City Outfall 19) indicated the presence of sediment contamination adjacent to and upstream of the outfall. Given the characteristics of Basin 19A, the City's source investigation focused on evaluating whether contaminated erodible soils at adjacent sites may be a major source to the basin.

The City concludes that major contaminant sources are not present in the basin, no additional City source tracing is warranted, and future discharges from the basin are not likely to represent a significant source of contaminants to the Willamette River. Implementation of source control measures (SCM) under DEQ Cleanup Program oversight at sites adjacent to the basin and ongoing existing programmatic SCMs, such as street sweeping, are sufficient for ensuring that current and future discharges from Outfall 19A are protective of the river. Therefore, the City has met the remedial investigation (RI)/SCM objectives for Basin 19A.

2 Introduction

This Completion Summary presents a weight-of-evidence evaluation of whether further source investigation is needed in Basin 19A, and the rationale for concluding that current and future discharges from the basin are not likely to be significant sources of contaminants to river sediment. The purpose of this report is to demonstrate that, for Basin 19A, the City has met the joint RI/SCM objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ.

This report is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report), which provides additional background and detail regarding the City's harborwide source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Outfall 19A discharges on the west side of the Willamette River near River Mile 8.4. The outfall drains approximately 1.7 acres of NW Front Avenue and NW Kittridge Avenue and driveway aprons to adjacent industrial sites located within the Guilds Lake Industrial Area. Figure 1 shows the location of the outfall and drainage basin boundary and provides an overview of the associated stormwater conveyance system and surrounding sites. The outfall and associated stormwater system were constructed in their current configuration in 1982. According to City records, no industries are, or have been, connected to the system.

Additional detail on the Outfall 19A stormwater conveyance system and associated drainage basin is included in the *Programmatic Source Control Remedial Investigation Work Plan for the City of Portland Outfalls Project* (CH2M HILL, 2004) and *Outfall Basin 19A Stormwater and Solids Investigation, Technical Memorandum No. OF19A-1* (BES, 2011).

3.2 Land Use and Potential Upland Sources

Basin 19A consists almost entirely of paved rights-of-way within an area zoned for industrial use. While no facilities are connected to the basin, six industrial sites listed in DEQ's Environmental Cleanup Site Information (ECSI) database are adjacent to the Basin 19A boundary, including three with driveways that may convey sheet flow to catch basins along NW Front Avenue. These upland facilities were identified as potential sources to the Basin 19A conveyance system (e.g., via vehicle drag-out of contaminated erodible soil or overland runoff). Table 1 lists these sites and indicates the associated contaminants of interest (COI), status in the DEQ Cleanup Program and the status of stormwater pathway evaluations. All six DEQ Cleanup Program sites adjacent to the basin have conducted or currently are conducting stormwater pathway evaluations under DEQ oversight.

Table 1. DEQ Cleanup Program Sites Adjacent to Basin 19A

DEQ Cleanup Site	Site COIs ⁽¹⁾	Site Stormwater Pathway Evaluations ⁽²⁾
Calbag Metals/O'Neill Transfer & Storage Company (ECSI #2454)	Cadmium, lead, mercury, zinc, PCBs, and phthalates	Source Control Evaluation In Progress
Hampton Tree Farms, Inc. (ECSI #5761) ⁽³⁾	VOCs, SVOCs, PAHS, TPH, PCBs, metals, phthalates	Source Control Evaluation In Progress
Gunderson Inc. (ECSI #1155)	Metals, butyltins, PCBs, phthalates, TPH	Source Control Evaluation In Progress
Kittridge Distribution Center (ECSI #2442)	Cadmium, lead, mercury, zinc, PCBs, VOCs, and TPH	Source Control Decision / No Further Action Issued
Lakeside Industries (ECSI #2372)	VOCs, PAHs, TPH, metals	Source Control Evaluation In Progress
Shaver Transportation Company (ECSI #2377)	None	Source Control Decision / No Further Action Issued

Notes:

PAHs = polycyclic aromatic hydrocarbons; PCBs = polychlorinated biphenyls; VOCs = volatile organic compounds; SVOCs = semivolatile organic compounds; TPH = total petroleum hydrocarbons.

(1) COIs identified in Table 4.4-1 of the *Portland Harbor RI/FS Remedial Investigation Report* (Integral Consulting and others, 2011).

(2) Source: Table 1 of the *Milestone Report, Upland Source Control at the Portland Harbor Superfund Site* (DEQ, 2013).

(3) Site was formerly listed under Front LP Properties (ECSI #1239).

As there are no facilities with piped connections to the Basin 19A stormwater conveyance system, there are no sites that hold, or historically held, National Pollutant Discharge Elimination System (NPDES) permits to discharge to the Basin 19A conveyance system. Note that the City has an NPDES Municipal Separate Storm Sewer System (MS4) stormwater permit that also covers the basin drainage area.

3.3 Outfall Setting

Outfall 19A discharges to an area of potential concern (AOPC 18), identified by the U.S. Environmental Protection Agency (EPA) based on elevated concentrations of PCBs, pesticides, and other contaminants in river sediment (EPA, 2010). In addition to Outfall 19A, one other City outfall (Outfall 19) and nine non-City outfalls discharge to AOPC 18; Outfall 19A also is immediately downstream of AOPC 19 and the affiliated outfalls.

Outfall 19A is located in an embayment where tugboats and barges are docked and several overwater structures are present. Redeposition of contaminated sediment may occur as propwash disturbs and resuspends material into the water column. This setting makes it difficult to identify specific contaminant pathways to the river based on the nearby inriver sediment data alone.

4 Basin Screening and Source Investigations

The City identified Basins 19/19A¹ as a Priority 1 for source tracing based on elevated contaminant concentrations in the vicinity of Outfall 19 (CH2M HILL, 2004). Priority 1 basins are considered the highest priority for identifying sources. However, because Basin 19A is small and includes no upland sites, the City recategorized the basin to Priority 4 (i.e., outfall not likely a significant pathway for contaminant migration) and focused subsequent City source investigations for this Priority 1 grouping on Basin 19 (GSI, 2006).

The City collected stormwater data representative of the whole basin during the 2009/2010 storm season to verify that major sources to the system were not present. Based on the evaluation of these data and using a conservative screening approach, no analytes were identified as potentially warranting further source tracing in Basin 19A (BES, 2011). However, concentrations of PCBs and certain metals were somewhat higher than expected, given the small basin size and lack of upland sites within the basin boundary. Therefore, the City also collected inline solids and erodible soils samples from the NW Front Avenue right-of-way adjacent to the Calbag Metals/O'Neill Transfer site to determine whether offsite migration of known site contaminants (PCBs and copper) may have a complete pathway to Basin 19A inlets. Results of the catch basin solids and erodible surface soils sampling indicated that offsite migration (e.g., vehicle drag-out, overland runoff, and/or fugitive dusts) from this site may be a source of contaminants to Basin 19A catch basins. This information was provided to DEQ to incorporate into the site stormwater pathway investigation, and the City determined that no further source tracing was needed.

Investigations and evaluations completed by the City in the Basin 19A conveyance system are listed in Table 2.

Table 2. Investigations in the Basin 19A Stormwater Conveyance System

Data Collection Period	Purpose	Documentation
2000	Compile basin background information to identify potential sources.	Preliminary Evaluation of City Outfalls (Westshore) (BES, 2000)
2002	Evaluate inriver sediment data near City outfalls to prioritize basins for source tracing.	Programmatic Source Control Remedial Investigation Work Plan (CH2M HILL, 2004)
2006	Compile existing information to focus source tracing activities based on evaluation of observed contaminants and identified sources.	Phase I Report for City of Portland Priority 1 Basins (GSI, 2006)
2009 - 2010	Collect and evaluate stormwater samples from the outfall for basin purposes, and collect inline solids and erodible soils samples from the NW Front Avenue right-of-way to evaluate potential offsite migration from the adjacent Calbag site to Basin 19A inlets.	City Outfall Basin 19A Stormwater and Solids Investigation (TM No. OF 19A-1) (BES, 2011)

The City's investigation work did not identify any major sources of contaminants to Basin 19A.

¹ Basins 19 and 19A were grouped together because of their close proximity to one another and because spatial distribution of inriver sediment data and redeposition effects in the cove did not allow for determination of relative source potential (CH2M HILL, 2004).

5 Completion of Source Identification

The lines of evidence evaluated to confirm that source tracing objectives have been met with regard to Basin 19A include (1) basin characteristics, (2) stormwater screening results, and (3) the extent of coverage of adjacent sites under the DEQ Cleanup Program. Findings from this evaluation are summarized below.

- *Basin Characteristics:* Basin 19A is small (1.7 acres), contains no upland sites, and consists almost entirely of paved rights-of-way.
- *Stormwater Screening Results:* Stormwater samples representative of discharges from the whole basin were analyzed for a broad suite of contaminants to screen for the potential presence of major sources. Concentrations do not indicate the presence of major sources in the basin (BES, 2011).
- *Upland Investigation Coverage:* All sites adjacent to Basin 19A (the only identified potential major sources) are either active in the DEQ Cleanup Program or already have been remediated under DEQ oversight (see Figure 1). Investigations are anticipated to evaluate whether offsite migration of contaminants to Basin 19A is occurring (e.g., via overland flow, vehicle drag-out, and/or fugitive dusts).

Based on these lines of evidence, the City concludes that Basin 19A source investigation is complete and there are no major contaminant sources to the basin.

6 Basin Source Controls

The City and DEQ collaborated under their respective authorities to identify control mechanisms for all potential sources to the basin. Source control for minor sources to Basin 19A includes ongoing City and DEQ programs (e.g., street sweeping) that are described in the Municipal Report, and SCMs completed (or being determined) at contaminated sites adjacent to the basin under DEQ Cleanup Program agreements (see Figure 1). After completion, the implementation of additional stormwater source control measures at adjacent active DEQ Cleanup Program sites (see Table 1) likely will further reduce concentrations of PCBs, copper, and other contaminants entering the Basin 19A stormwater conveyance system via erodible soil-related pathways.

Several adjacent industrial sites have NPDES No Exposure Certifications, based on limited industrial exposures to stormwater (see Figure 1). In addition, adjacent sites with NPDES 1200-Z permits will be required to control vehicle drag-out under DEQ's new 1200-Z permit, resulting in additional site source controls in the vicinity of the basin.

7 Conclusions

The City completed a source evaluation of Basin 19A, and no major sources of contaminants to the City conveyance system are present. Therefore, future discharges from Outfall 19A are unlikely to represent a significant source of contaminants to the river. The City concludes that it has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin 19A.

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List of Figures

Figure 1: Basin 19A Overview and Adjacent Upland Site Source Controls

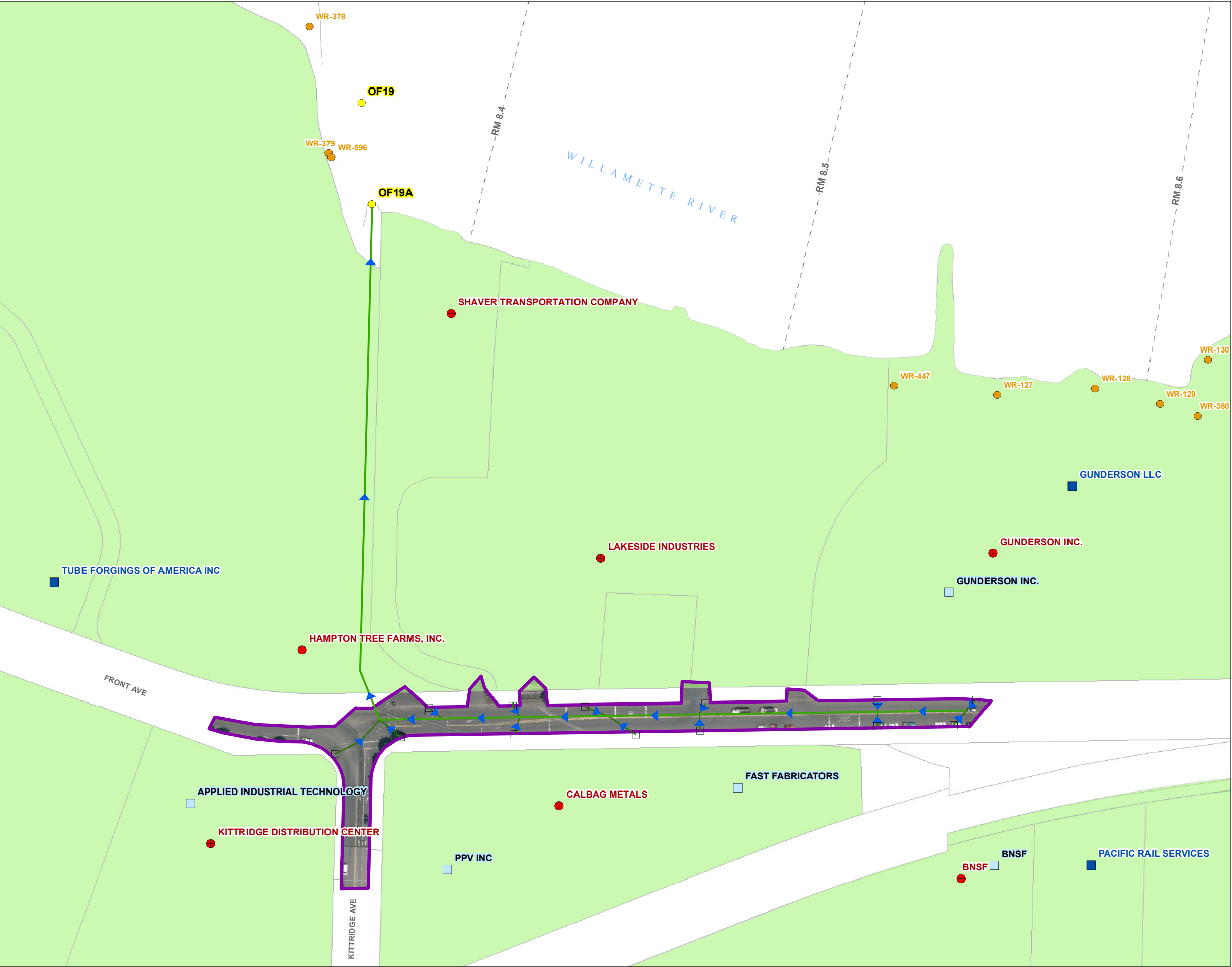
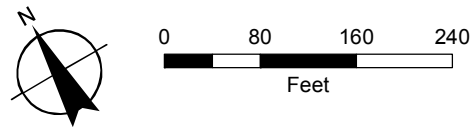


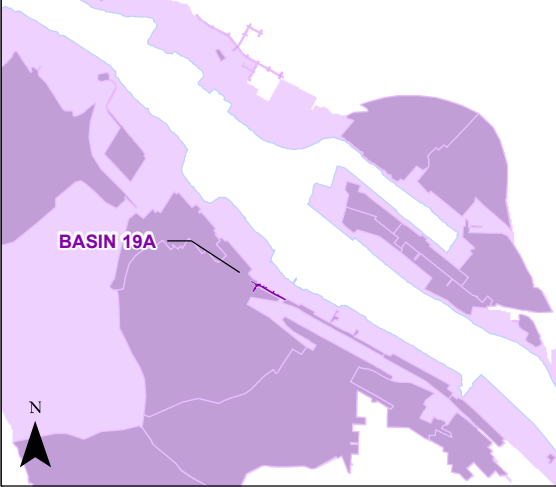
FIGURE 1
Basin 19A
Overview and Adjacent
Upland Site Source Controls

- Basin 19A
- DEQ ECSI Site
- NPDES Stormwater Permit
- NPDES No Exposure Certification
- Conveyance System**
 - Storm Line
 - Catch Basin
 - City Outfall
 - Non-City Outfall
- DEQ Stormwater SCE**
 - SCEs implemented or pending
- All Other Data**
 - River Mile (RM)
 - Tax Lot
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO

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Completion Summary for City of Portland Outfall Basin 22

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and a number of City programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled. This report summarizes the results of this collaborative effort in Outfall Basin 22.

This Completion Summary includes a weight-of-evidence evaluation to demonstrate that source identification is complete and a summary of source controls (implemented or planned) that will control future contaminant discharges to the Willamette River.

Basin 22 is located on the west side of the Willamette River in the Willbridge area, which largely consists of bulk fuel terminals that have been in operation since the early 1900s. The basin includes drainage from Forest Park, a small residential and commercial area, Highway 30, and an industrialized area between Highway 30 and the river. The industrial portion of the basin is almost entirely comprised of DEQ Cleanup Program sites. These sites have completed or are conducting source control evaluations to investigate onsite contaminant sources, determine the significance of site stormwater and groundwater pathways, and implement source control measures (SCM) under DEQ oversight. Based on the historical presence of petroleum plumes in the vicinity of the City stormwater lines, the preferential groundwater pathway is a potentially significant pathway for upland site contaminants to enter the conveyance system. Sites in the basin have implemented numerous SCMs, including lining private and City storm lines to mitigate the infiltration of petroleum-impacted groundwater into the stormwater system. In addition, the Oregon Department of Transportation (ODOT) is conducting a source control evaluation of Highway 30, which runs through the basin.

Based on data collected by the City and other parties, no other major sources of contaminants to the City conveyance system were identified. Because necessary controls are being implemented under DEQ authority, future discharges from the basin are not likely to represent a significant source to the Willamette River and the City has met its remedial investigation (RI)/SCM objectives for Basin 22.

2 Introduction

This Completion Summary presents a weight-of-evidence evaluation of whether further source investigation is needed in Basin 22, and the rationale for concluding that future discharges from the basin are not likely to be significant sources of contaminants to river sediment. The purpose of this report is to demonstrate that, for Basin 22, the City has met the joint RI/SCM objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ.

Together, the City and DEQ identified all major sources of contaminants to the basin and are using their respective authorities to ensure that source controls are implemented where needed.

This report is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report), which provides additional background and detail regarding the City's harborwide source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Outfall 22 discharges to the west side of the Willamette River at approximately River Mile 7.8. The drainage area for this outfall is about 95 acres. Figure 1 shows the location of the outfall and drainage basin boundary and provides an overview of the associated stormwater conveyance system. The Basin 22 system mainly conveys stormwater flow from Forest Park and the Willbridge industrial area. Additional detail on the Outfall 22 stormwater conveyance system and associated drainage basin is included in the *Programmatic Source Control Remedial Investigation Work Plan for the City of Portland Outfalls Project* (CH2M HILL, 2004) and the *Outfall Basin 22 Inline Solids Sampling* Technical Memorandum No. OF22-1 (BES, 2008).

3.2 Land Use and Potential Upland Sources

Land use in the developed portion of the basin is predominantly heavy industrial. The industrial operations east of NW St. Helens Road (State Highway 30) are mainly bulk fuel terminals that have been in operation since the early 1900s and currently handle, store, and distribute a variety of petroleum and chemical products. The products are transferred to other locations via tank cars, trucks, marine vessels, and pipelines. On the west side of the highway, land use is primarily open space (Forest Park). Although the developed properties are zoned industrial west of the highway, actual land use includes a mix of residential, commercial and industrial properties (e.g., a roofing company, video store, a City storage warehouse, and several small commercial/industrial buildings with little to no outside activities). Land use also includes a short section of major transportation (ODOT Highway 30).

Sites that were identified as potential sources to the basin include the six DEQ Cleanup Program sites in Basin 22, as listed in DEQ's Environmental Cleanup Site Information (ECSI) database. Four of these sites are bulk fuel and/or chemical storage facilities (Chevron-Willbridge Distribution Terminal, Chevron USA Asphalt, Unocal - Willbridge Terminal, and McCall Oil). Only small portions of the remaining two sites (ODOT and the Burlington Northern Santa Fe Willbridge Yard) are included in the basin. Table 1 lists these sites and indicates the associated contaminants of interest (COI) and the status of stormwater and preferential groundwater pathway evaluations. All six of the DEQ Cleanup Program sites in the basin have completed site investigation and remediation or currently are conducting source control evaluations under DEQ oversight.

Table 1. DEQ Cleanup Program Sites in Basin 22

DEQ Cleanup Site	Site COIs ⁽¹⁾	Site Pathway Evaluations	
		Stormwater Pathway ⁽²⁾	Preferential Groundwater Pathway ⁽³⁾
Chevron - Willbridge Distribution Terminal (ECSI #25/1549) ⁽⁴⁾	<i>Stormwater:</i> VOCs, PAHs, TPH, metals <i>Groundwater:</i> VOCs, PAHs, TPH, metals ⁽⁵⁾	Source Control Evaluation In Progress	Source Control Evaluation Completed - Source Control Determination Pending
Chevron USA Asphalt Refinery (ECSI #1281)	<i>Stormwater:</i> VOCs, PAHs, TPH, metals <i>Groundwater:</i> VOCs, PAHs, TPH, metals	Source Control Decision /No Further Action Issued	Source Control Decision Completed
McCall Oil (ECSI # 134)	<i>Stormwater:</i> VOCs, SVOCs, PAHs, TPH, PCBs, metals, phthalates <i>Groundwater:</i> VOCs, SVOCs, PAHs, TPH, metals	Source Control Evaluation In Progress	Source Control Evaluation Completed - Source Control Determination Pending
ODOT – Portland Harbor Source Control Evaluation (ECSI #5437)	Not listed ⁽⁶⁾	Source Control Evaluation In Progress	Not Shown
Unocal – Willbridge Terminal (ECSI #177/1549) ⁽⁴⁾ (Phillips 66)	<i>Stormwater:</i> VOCs, PAHs, TPH, metals <i>Groundwater:</i> VOCs, PAHs, TPH, metals ⁽⁵⁾	Source Control Evaluation In Progress	Source Control Evaluation Completed - Source Control Determination Pending
Willbridge Bulk Fuel Area (ECSI #1549) ⁽⁷⁾	<i>Stormwater:</i> VOCs, PAHs, TPH, metals <i>Groundwater:</i> VOCs, PAHs, TPH, metals	Not Applicable ⁽⁷⁾	Not Applicable ⁽⁷⁾
Willbridge Yard (BNSF) (ECSI #3395)	Metals	Source Control Evaluation In Progress	Not shown

Notes:

PAHs = polycyclic aromatic hydrocarbons; PCBs = polychlorinated biphenyls; SVOCs = semivolatile organic compounds; TPH = total petroleum hydrocarbons; VOCs = volatile organic compounds; BNSP = Burlington Northern Santa Fe

(1) Unless otherwise noted, site contaminants of interest are those identified in Appendix Q (Source Control Inventory Tables) of the Portland Harbor RI/FS Draft Feasibility Study (FS) (Anchor et al., 2012).

(2) Source: DEQ Milestone Report, Figure 1b, “Status of Stormwater Source Control Evaluations, January 2013” (DEQ, 2013a).

(3) Source: DEQ Milestone Report, Figure 3, “Groundwater Source Control Evaluation Status, January 2013” (DEQ, 2013a).

(4) Site also is part of the larger Willbridge Bulk Fuel Area site (ECSI #1549).

(5) This site is not listed separately in Appendix Q of the FS (Anchor et al., 2012), but is included in information listed for the Willbridge Bulk Fuel Area (ECSI #1549). COIs for this site are from the listing for ECSI #1549.

(6) Site is not listed in Appendix Q of the draft FS or Table 4.2-2 of the Portland Harbor RI/FS Draft Final Remedial Investigation Report (Integral Consulting et al., 2011), and site COIs are not listed in ECSI database (DEQ, 2012).

(7) The Willbridge Bulk Fuel Area consists of three bulk petroleum facilities, including two within Basin 22 (Chevron - Willbridge Distribution Terminal and Unocal – Willbridge Terminal) and is not shown as a separate facility in Figures 1b and 3 of the DEQ Milestone Report (DEQ, 2013a).

Industrial sites covered or historically covered by National Pollutant Discharge Elimination System (NPDES) stormwater regulations also were considered as potential sources of pollutants to the City conveyance system. Sites within the basin that currently hold, or historically held, NPDES permits to discharge to the Basin 22 conveyance system are listed in Table 2. Sites with

current NPDES permits are shown in Figure 1. Note that the City and ODOT both have NPDES Municipal Separate Storm Sewer System (MS4) stormwater permits that also cover basin drainage areas.

Table 2. Current⁽¹⁾ and Historical NPDES Permit Coverage in Basin 22

Address	Company	Permit Type	Time Period
5501 NW Front	Chevron Willbridge Asphalt	Cooling Water (100J)	1985 – 1995
		Stormwater (1200-H)	1992 – 1996
	Chevron Willbridge Asphalt/ Paramount Petroleum Corporation/ Paramount Petroleum Corporation	Stormwater (1200-Z)	2002 – Present
5814 NW Doane	BNSF Willbridge Yard	Stormwater (1200-Z)	1999 – 2005
5528 NW Doane	Unocal Terminal	Stormwater (Individual)	1984 – 1997
		Stormwater (1200-T)	1992 – 1998
	Tosco Corporation/ConocoPhillips	Stormwater (1300-J)	1997 – 2004
	ConocoPhillips/Phillips 66 Company	Stormwater (1200-Z)	2007 – Present
5531 NW Doane	Chevron USA Willbridge Distribution/Chevron Products Company	Individual NPDES	1991 – 1998
		Oily Stormwater (1300-J)	2000 – 2007
		Stormwater (1200-Z)	2007 – Present
5700 NW Front	Great Western Chemical Co.	Stormwater (1200-H)	1992 – 1996
	Great Western Chemical Co./Quadra Chemical Co./Brenntag Pacific, Inc.	Stormwater (1200-Z)	1997 – Present

Notes:

BNSF = Burlington Northern Santa Fe; NPDES = National Pollutant Discharge Elimination System

(1) Current permits are indicated in bold.

3.3 Outfall Setting

Outfall 22 discharges to Willbridge Cove within a large area of potential concern (AOPC 16) identified by the U.S. Environmental Protection Agency (EPA) based on elevated concentrations of metals, polycyclic aromatic hydrocarbons (PAH), and other contaminants in river sediment (EPA, 2010). In addition to Outfall 22, 11 non-City outfalls discharge to AOPC 16 in the area of Willbridge Cove. There are also three docks in the cove.

4 Basin Screening and Source Investigations

The Willbridge Bulk Fuel Area study area (ECSE #1549), which Outfall 22 partially drains, has known petroleum-contaminated groundwater, including free product¹ floating on the groundwater surface. Individual companies within the study area have been working with

¹ Separate-phase hydrocarbons.

DEQ since the 1970s to address migration of contaminated groundwater. Contaminated groundwater can discharge directly to the river or via the City's conveyance system, through infiltration into storm lines or migration through the conveyance system bedding. All of the basin properties east of Highway 30 are in the DEQ Cleanup Program. Therefore, the City's approach to source investigation in this basin consisted of:

- Evaluating whether there are significant stormwater sources in the basin upgradient of the Willbridge bulk fuel terminals area that need to be controlled.
- Identifying any stormwater-specific issues for the Willbridge bulk fuel terminals area that need to be referred to DEQ.
- Continuing support of DEQ on investigation and control of groundwater impacts to the municipal storm system.

The City evaluated inriver sediment data in the vicinity of Outfall 22 in 2002 and subsequently conducted an inline solids source investigation for three metals (cadmium, copper, and zinc), polychlorinated biphenyls (PCB), PAHs, phthalates, and pesticides to determine if contaminated inline solids were present and whether major stormwater sources were likely in the basin. Although some contaminants exceeded screening levels, the exceedances were relatively small and did not warrant additional source tracing upgradient of the bulk fuel terminal area (BES, 2008). In 2007-2008, the Lower Willamette Group (LWG) collected stormwater and sediment trap data in Basin 22 at a point representing all piped discharges to the basin (Anchor and Integral, 2008), and the City evaluated these data to determine if the results changed the City's conclusions about the need for additional stormwater source tracing (BES, 2010). Based on the results of these data and site investigation results, the City concluded that further City source tracing in Basin 22 was not needed (BES, 2010).

In 2010-2011, the Chevron Willbridge and Unocal-Willbridge Terminal (now Phillips 66) sites jointly collected stormwater upgradient and downgradient of the Terminal to meet DEQ Cleanup Program requirements (ARCADIS, 2012). Results of these evaluations are currently under DEQ review. Based on the City's review of these data (BES, 2012), they do not indicate the presence of major sources upgradient of the Terminal.

The City has continued to coordinate with DEQ on groundwater issues related to the municipal system to ensure that site evaluations encompass all potentially significant pathways.

Investigations and evaluations completed by the City and others in the Basin 22 conveyance system are listed in Table 3.

Table 3. Investigations in the Basin 22 Stormwater Conveyance System

Data Collection Period	Party	Purpose	Documentation
2000	City	Compile basin background information to identify potential sources.	Preliminary Evaluation of City Outfalls (West Shore) (BES, 2000)
2002	City	Evaluate inriver sediment data near City outfalls to prioritize basins for source tracing.	Programmatic Source Control Remedial Investigation Work Plan (CH2M HILL, 2004)

Data Collection Period	Party	Purpose	Documentation
2005	City	Evaluate existing data on groundwater plumes and identify the potential for City conveyance systems (including Basin 22) to act as preferential pathways.	Relationships Between Upland Shallow Groundwater Plumes and the City Stormwater and Combined Conveyance System with the Portland Harbor (GSI, 2006)
2006	City	Collect inline solids samples to evaluate whether contaminated solids were present and indicative of sources within the basin.	Outfall Basin 22 Inline Solids Sampling Technical Memorandum No. OF 22-1 (BES, 2008)
2007-2008	LWG	Collect stormwater and sediment trap samples representative of discharges from the whole basin to evaluate stormwater discharges representative of industrial land use.	Portland Harbor RI/FS. Round 3A and 3B Stormwater Data Report (Anchor and Integral, 2008)
2007-2008	City	Evaluate stormwater data from City outfalls (including the LWG stormwater and sediment trap data from Basin 22) to identify additional source tracing needs.	Stormwater Evaluation Report. City of Portland, Bureau of Environmental Services (BES, 2010)
2007	Chevron Asphalt USA	Chevron Asphalt video surveyed a portion of the City storm line along NW Front Avenue to verify site connections to the conveyance system and observe potential groundwater infiltration.	Source Control Evaluation Report - Former Chevron Willbridge Asphalt Plant (ARCADIS, 2009)
(No basin data collection)	Chevron Willbridge and ConocoPhillips	Evaluate historical groundwater data to assess whether existing source control measures are controlling migration of groundwater contaminants and free product from the Chevron and ConocoPhillips terminals to the river. Evaluation included an assessment of potential groundwater discharges to the City's NW Doane Avenue storm line.	Groundwater Source Control Evaluation Report (ARCADIS, 2011)
2010 - 2011	Chevron Willbridge and ConocoPhillips	Conduct video observations and collect stormwater samples from the City's Basin 22 conveyance system, upgradient and downgradient of the Terminal, to evaluate the stormwater discharge pathway and the potential preferential groundwater pathway from the Chevron and Unocal (ConocoPhillips) sites to the river through the NW Doane Avenue storm line.	NW Doane Avenue Stormwater Evaluation Report (ARCADIS, 2012)

The City's investigation and data evaluation did not identify any current major sources of contaminants in Basin 22 upgradient of the Willbridge terminal sites.

5 Completion of Source Identification

The lines of evidence evaluated to verify that source tracing is complete and all major sources have been identified include (1) results of source tracing activities conducted in the basin (including review of upland site information), (2) the extent of upland investigation coverage, and (3) land use in remaining portions of the basin that are not subject to active investigation. Findings from this evaluation are summarized below.

- *Source Tracing Results (and Upland Site Information):* Evaluation of storm solids and water collected from the system indicates that concentrations are generally below screening levels. The few exceedances are relatively low, indicating no major stormwater sources to the basin. Upland site source control evaluations conducted in the basin have extensively documented the presence of petroleum-contaminated groundwater and free product infiltrating the City conveyance system; sources of elevated contaminant concentrations in basin dry-weather flow have been identified.
- *Upland Investigation Coverage:* Figure 2 displays the spatial extent of DEQ Cleanup Program site investigations and other programmatic controls (see key to figures provided at beginning of this Appendix). As shown in Figure 2, almost all sites within the industrialized portion of Basin 22 are in the DEQ Cleanup Program and:
 - Are investigating the stormwater and preferential groundwater pathways and implementing SCMs under DEQ Cleanup Program authority;
 - Have completed investigation and remediation activities under DEQ oversight; and/or
 - Are covered under NPDES stormwater regulations.
- *Land Use:* Land use at sites not covered by DEQ Cleanup or Water Quality Programs consists primarily of open space (Forest Park), and a mix of residential, commercial, and industrial uses. Most of these properties have little to no outdoor exposure except for the roofing company, which has implemented stormwater controls under City Code. Any current and future industrial activities exposed to stormwater at these sites will be addressed by the DEQ NPDES Program, and non-industrial activities are not a known or suspected major source of contaminants to the City stormwater conveyance system.

Based on these lines of evidence, the City concludes that Basin 22 source tracing is complete and all major sources have been identified.

6 Basin Source Controls

The City and DEQ collaborated under their respective authorities to identify control mechanisms for major sources identified in the basin. Source control for major and minor sources in Basin 22 includes SCMs completed (or planned) at contaminated sites under DEQ Cleanup Program agreements, specific controls implemented within the City's shared stormwater conveyance system (e.g., pipe lining to address contaminated groundwater infiltration and targeted line cleaning), and ongoing City and DEQ programs that are described in the Municipal Report. Source controls implemented in Basin 22 are displayed in Figures 1

and 2. Additional site-specific, programmatic, and conveyance system source controls completed to date for discharges into the municipal storm system are summarized in Table 4.

Table 4. Basin 22 Source Controls

Site / Area	Source Controls	Implementation Timeframe
Source Control Measures (SCM) at DEQ Cleanup Sites ⁽¹⁾		
Chevron USA Asphalt Refinery (ECSI #1281)	Completed targeted catch basin and storm line cleaning.	2007; 2009
	Conducted video surveys to verify that former connections to Basin 22 had been abandoned.	2007
Chevron - Willbridge Distribution Terminal (ECSI #25)	Replaced portions of the site storm system to prevent the infiltration of petroleum-contaminated groundwater.	2003; 2007-2009
	Installed emergency shut-off/control valves to prevent product releases to the basin.	2003; 2008
	Installed storm filters in the new manholes to reduce total suspended solids (TSS) loading.	2007 – 2009
	Chevron Environmental Management Company prepared and is implementing an “Outfall Inspection and Sheen Response Plan” to monitor and respond to oily sheen discharges from the outfall.	2009 -- Present
	Additional SCMs to be determined for stormwater and preferential groundwater pathways.	To be determined
McCall Oil (ECSI # 134)	No SCMs identified for the site area draining to Basin 22.	Not applicable
ODOT - Portland Harbor Source Control Evaluation (ECSI #5437)	To be determined.	To be determined
Unocal - Willbridge Terminal (ECSI #177) (Phillips 66)	Targeted removal of legacy materials in site storm system (catch basin, oil/water separator, and storm line cleanouts).	2008 – 2010
	Repair and lining of onsite manhole connecting storm line to prevent groundwater infiltration.	2010
	Additional SCMs to be determined for stormwater and preferential groundwater pathways.	To be determined
Willbridge Yard (BNSF) (ECSI #3395)	No SCMs identified for the site area draining to Basin 22.	Not applicable
City Conveyance System		
NW Doane Avenue	ConocoPhillips constructed Cure-in-Place Pipe (CIPP) liners in portions of the City system between NW Doane Avenue and the site system to prevent petroleum or hydrocarbon-impacted groundwater infiltration.	2008

Site / Area	Source Controls	Implementation Timeframe
NW Front Avenue	Chevron USA Asphalt cleaned an 8" storm line on NW Front Avenue that historically conveyed only discharges from the site, to remove legacy inline solids.	2009
Outfall pipe	A CIPP liner was installed in the main line between NW Front Avenue and the outfall pipe. The CIPP lining is intended to mitigate petroleum or hydrocarbon-impacted groundwater infiltration.	2010
Other (Programmatic SCM)		
Anderson Roofing, Chevron Willbridge Distribution Terminal	Stormwater Management Manual Requirements	Ongoing
See listing in Table 2	NPDES 1200-Z Stormwater Permit Requirements	Ongoing

Notes:

BNSF = Burlington Northern Santa Fe; ODOT = Oregon Department of Transportation; ECSI = Environmental Cleanup Site Information

- (1) For upland sites, descriptions of SCMs are based on information in DEQ Milestone Report (DEQ, 2013a), DEQ source control decisions (DEQ, 2010, 2013b), and/or reports on file with DEQ (Anchor QEA, 2011; ARCADIS, 2009, 2010, 2011; Santec, 2011).

Additionally, several SCMs have been implemented by Willbridge Terminal facilities to minimize groundwater migration via the bedding of private and municipal storm lines, including installation of recovery wells and cutoff collars. DEQ will determine if additional SCMs are needed to address this pathway.

All major contaminant sources have been controlled or will be controlled after implementation of SCMs has been completed under the programs identified above.

The City and ODOT both have NPDES MS4 stormwater permits that cover basin drainage areas. Other municipal programs (e.g., periodic inspection of and technical assistance to non-NPDES sites, illicit discharge monitoring, street sweeping, etc.) likely provide additional source control benefits in the basin and will help to address minor sources for which specific control measures have not been required. City programs that control current and future contaminant discharges to the conveyance system are described in the Municipal Report.

7 Conclusion

At the time the City initiated the Basin 22 evaluation, most of the developed portion of the basin already had been identified as potential sources by DEQ. Based on subsequent data collected by the City and other parties, no other major sources of contaminants to the City conveyance system were identified. Because necessary SCMs at identified sources have been implemented or are being determined under appropriate DEQ and City regulatory authorities, future discharges from Outfall 22 are unlikely to represent a significant source of contaminants to the river. The City concludes that it has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin 22.

8 References

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List of Figures

Figure 1: Basin 22 Overview and Conveyance System Source Controls

Figure 2: Basin 22 Upland Site Source Controls

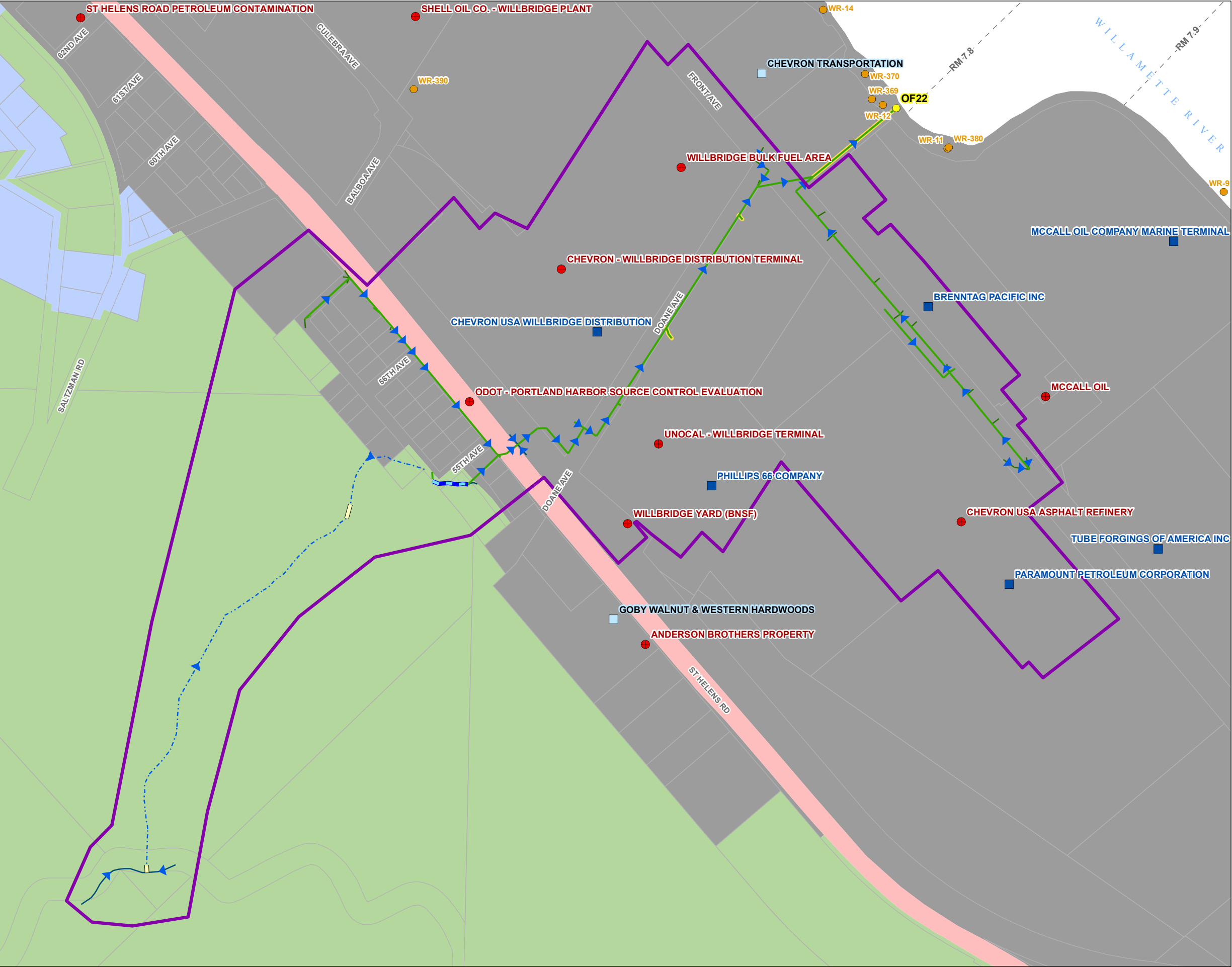


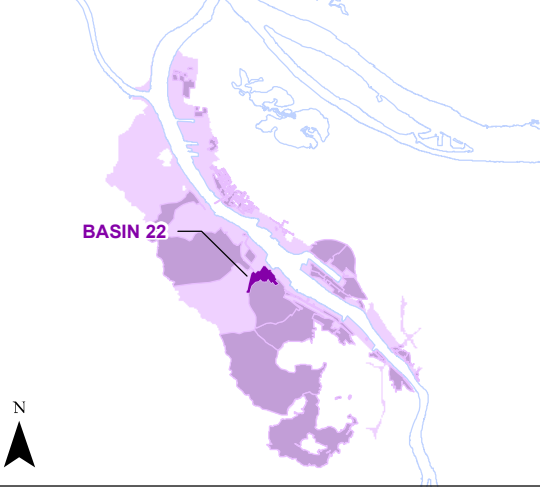
FIGURE 1
Basin 22
Overview and Conveyance
System Source Controls

- Basin 22
- DEQ ECSI Site
- NPDES Stormwater Permit
- NPDES No Exposure Certification
- Conveyance System**
 - Storm Line
 - Culvert
 - Ditch
 - Channel
 - Water Quality Swale
 - Lined Pipe
 - City Outfall
 - Non-City Outfall
- Land Use/Zoning**
 - Heavy Industrial
 - Residential
 - Parks and Open Space
 - Major Transportation
- All Other Data**
 - River Mile (RM)
 - Tax Lot
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO

ENVIRONMENTAL SERVICES
CITY OF PORTLAND
1120 SW Fifth Avenue, Room 1000
Portland Oregon, 97204 -1912



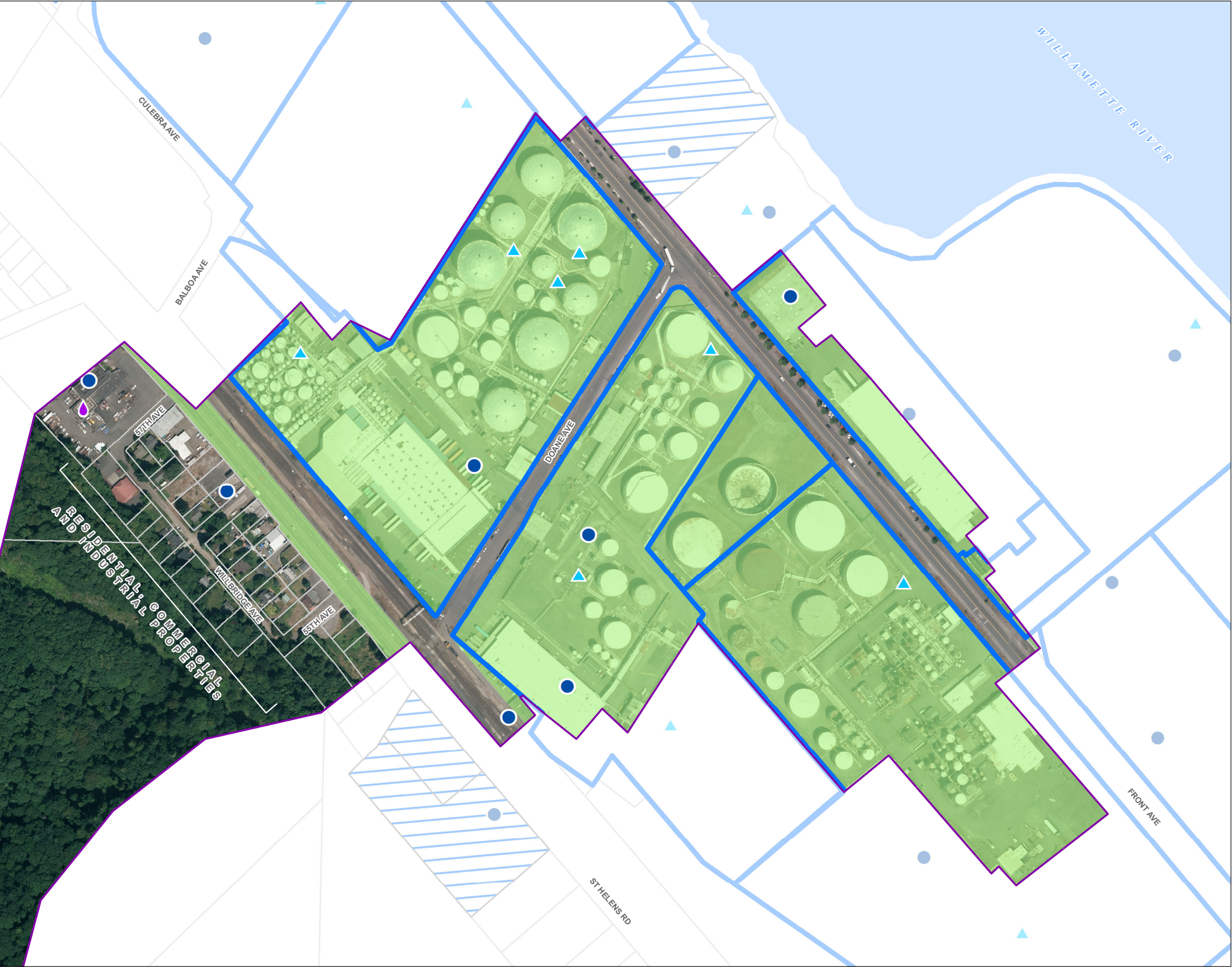
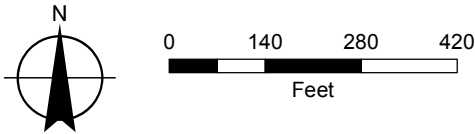


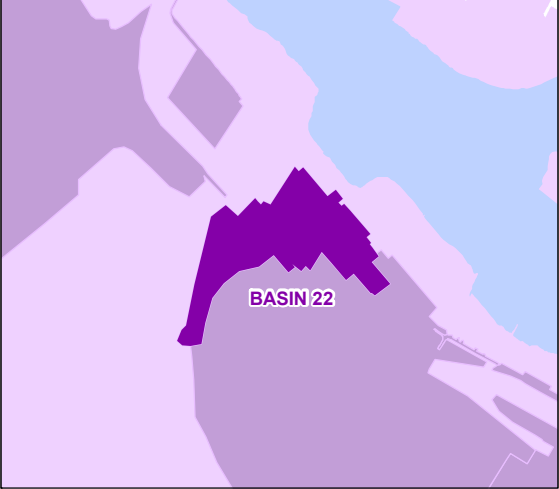
FIGURE 2
Basin 22
Upland Site Source Controls

- Basin 22
- Tax Lot
- DEQ Stormwater SCE**
 - SCEs implemented or pending
- All Other Features**
 - NPDES Stormwater Discharge Permit
 - NPDES No Exposure Certification
 - Stormwater Treatment Facility
 - Ecoroof
 - Site Inspection - BES Industrial Stormwater Program
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: January 9, 2014
Data Sources: BES, METRO, Aerial Photo Taken 2012

 ENVIRONMENTAL SERVICES
CITY OF PORTLAND
1120 SW Fifth Avenue, Room 1000
Portland Oregon, 97204-1912



Completion Summary for City of Portland Outfall Basin 22B

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and several City programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled. This report summarizes the results of this collaborative effort in Outfall Basin 22B.

This Completion Summary includes a weight-of-evidence evaluation to demonstrate that source identification is complete and a summary of source controls (implemented or planned) that will control future contaminant discharges to the Willamette River.

Basin 22B is located on the west side of the river in the Doane Lake industrial area. Land use in this basin is heavy industrial and includes a Metro regional waste transfer station, specialty gas manufacturing operation, and vacant land primarily consisting of the remediated Gould Superfund Site and a shredder residue landfill. Two former herbicide and/or pesticide manufacturing facilities (Rhone-Poulenc and Arkema) are located immediately adjacent to the basin, and a portion of the Arkema site formerly discharged to Basin 22B. The Basin 22B conveyance system is downgradient of a contaminated groundwater plume originating at the Rhone-Poulenc site.

Inriver sediment data show elevated sediment concentrations adjacent to and upstream of the outfall, which prompted the City to evaluate whether there may be major sources in the basin. Source tracing focused on polychlorinated biphenyls (PCB), pesticides, select metals, and phthalates based on elevated concentrations detected in inline solids, storm line cleanout solids, dry-weather flow, erodible soils, stormwater, and sediment trap samples. Investigations verified that contaminants are being discharged to the basin via stormwater and groundwater.

All properties within or historically connected to the basin are DEQ Cleanup Program sites. Of the three sites within the current basin, the Gould site has completed cleanup activities under the federal Superfund program. The remaining two (Metro Central Transfer Station and Schnitzer Investment – Doane Lake/ Air Liquide) are in the DEQ Cleanup Program and are evaluating onsite contaminant sources, pathways, and source control measures (SCM), as appropriate. Additionally, the two DEQ Cleanup Program sites adjacent to the basin (Arkema and Rhone-Poulenc) are implementing or have implemented SCMs to minimize offsite contaminant migration to the City's system; the former by disconnecting from the City's system and the latter by lining the City system to prevent contaminated groundwater from infiltrating the system as a preferential pathway.

Because the City has identified all major sources of contaminants to the basin and necessary controls are being implemented under DEQ authority, the City has met its remedial investigation (RI)/SCM objectives for Basin 22B.

2 Introduction

This Completion Summary presents a weight-of-evidence evaluation of whether further source investigation is needed in Basin 22B, and the rationale for concluding that future discharges from the basin are not likely to be significant sources of contaminants to river sediment. The purpose of this report is to demonstrate that, for Basin 22B, the City has met the joint RI/SCM objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ. Together the City and DEQ identified all major sources of contaminants to the basin and are using their respective authorities to ensure that source controls are implemented where needed.

This report is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report), which provides additional background and detail regarding the City's harborwide source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Outfall 22B discharges to the west side of the Willamette River at approximately River Mile 6.9. The drainage area for this outfall is approximately 29 acres, located within the Doane Lake industrial area. Figure 1 shows the location of the outfall and drainage basin boundary and provides an overview of the associated stormwater conveyance system. Three lateral lines currently connect upland site drainage to the trunk line on NW Front Avenue. Former connections from the Arkema site and historical inlets adjacent to the Schnitzer Investment – Doane Lake/ Air Liquide and Gould sites have been abandoned. The trunk line is downgradient of a contaminated groundwater plume.

Additional detail on the Outfall 22B stormwater conveyance system and associated drainage basin is included in the *Programmatic Source Control Remedial Investigation Work Plan for the City of Portland Outfalls Project* (CH2M HILL, 2004).

3.2 Land Use and Potential Upland Sources

The entire basin and surrounding land are zoned heavy industrial. Current industrial operations in the basin include the Metro regional waste transfer station and the Air Liquide specialty gas manufacturing facility. Approximately 30 percent of the basin has been remediated and has a vegetated cap (Gould site); this site is currently vacant. The western half of the parcel on which the Air Liquide facility is located (owned by Schnitzer Investment) was used historically to stockpile shredder residue (i.e., non-metallic residual from shredding of autos, boats, etc.) from Schnitzer operations offsite. This portion of the Schnitzer site contains landfilled materials, but is otherwise vacant and undeveloped.

Sites that were identified as potential sources include the five DEQ Cleanup Program sites in or adjacent to Basin 22B, as listed in DEQ's Environmental Cleanup Site Information (ECSI) database. Table 1 lists these sites and indicates the associated contaminants of interest (COI) and the status of stormwater and preferential groundwater pathway evaluations. All five DEQ Cleanup Program sites in or adjacent to the basin have completed site investigation and

remediation or are currently conducting stormwater pathway evaluations under DEQ oversight.

Table 1. DEQ Cleanup Program Sites in and Adjacent to Basin 22B

DEQ Cleanup Program Site	Site COIs ⁽¹⁾	Site Stormwater Pathway Evaluations	
		Stormwater Pathway ⁽²⁾	Preferential Groundwater Pathway ⁽³⁾
Within Basin 22B			
Schnitzer Investment - Doane Lake (ECSI #395): Air Liquide parcel ⁽⁴⁾	Site-specific COIs: Calcium hydroxide, VOCs, SVOCs, metals, PCBs; Offsite COIs migrating to site: VOCs, SVOCs, pesticides, metals, PCBs, dioxins/furans	Source Control Evaluation In Progress	1999 DEQ Source Control Screening - Low/Medium Priority for Source Control Evaluation
Schnitzer Investment - Doane Lake (ECSI #395) ⁽⁴⁾	Site-specific COIs: Calcium hydroxide, VOCs, SVOCs, metals, PCBs; Offsite COIs migrating to site: VOCs, SVOCs, pesticides, metals, PCBs, dioxins/furans	Source Control Evaluation In Progress	Source Control Evaluation in Progress
ARKEMA, Inc. (ECSI #398) ⁽⁵⁾	Pesticides, furans, metals	Source Control Evaluation In Progress ⁽⁶⁾	Source Control Evaluation Completed - Source Control Determination Completed/Pending
Gould, Inc./NL Industries Inc. (ECSI #49)	Site-specific COIs: metals; Offsite COIs migrating to site: VOCs, SVOCs, pesticides, metals, PCBs, dioxin/furans	Source Control Evaluation Not Needed ⁽⁷⁾	Source Control Decision Completed
Metro Central Transfer Station (ECSI #1398)	Site-specific COIs: VOCs, SVOCs, pesticides, metals, PCBs, VOCs, SVOCs, pesticides, metals, PCBs; Offsite COIs migrating to site: VOCs, SVOCs, pesticides, metals, dioxin/furans	Source Control Evaluation In Progress	Source Control Evaluation in Progress
Adjacent to Basin 22B			
Rhone-Poulenc - Doane Lake (ECSI #155)	(Groundwater infiltration pathway) Site-specific COIs: VOCs, SVOCs, pesticides, metals, dioxin/furans; Offsite COIs migrating to site: VOCs, SVOCs, pesticides, metals, PCBs, dioxin/furans	Not applicable ⁽⁸⁾	Source Control Evaluation in Progress

Notes:

SVOCs = semivolatile organic compounds; VOCs = volatile organic compounds; COIs = contaminants of interest; PCBs = polychlorinated biphenyls; DEQ = Oregon Department of Environmental Quality; ECSI = Environmental Cleanup Site Information;

(1) Unless otherwise noted, site COIs are those identified in Appendix Q (Source Control Inventory Tables) of the Portland Harbor RI/FS Draft Feasibility Study (FS) (Anchor et al., 2012).

(2) Source: DEQ Milestone Report, Figure 1b, "Status of Stormwater Source Control Evaluations, January 2013" (DEQ, 2013).

(3) Source: DEQ Milestone Report, Figure 3, "Groundwater Source Control Evaluation Status, January 2013" (DEQ, 2013).

(4) Air Liquide leases a portion of the Schnitzer Industries - Doane Lake property, and the two portions of this site are being evaluated independently under DEQ ECSI #395.

(5) The Arkema site no longer discharges to Basin 22B; however, site connections from a small portion of the site to Basin 22B were active during the period of City source investigations in the basin.

(6) Historical pathway; site stormwater connections to Basin 22B have been abandoned.

(7) Site remediation under EPA Superfund program.

(8) Stormwater pathway evaluation not applicable to Basin 22B because site is adjacent to and not within the basin.

Industrial sites covered or historically covered by National Pollutant Discharge Elimination System (NPDES) stormwater regulations also were considered as potential sources of pollutants to the City conveyance system. Sites within the basin that currently hold, or historically held, NPDES permits to discharge to the Basin 22B conveyance system are listed in Table 2. Sites with current NPDES permits are shown in Figure 1. Note that the City has an NPDES Municipal Separate Stormwater Sewer System (MS4) stormwater permit that covers basin drainage areas.

Table 2. Current⁽¹⁾ and Historical NPDES Permit Coverage in Basin 22B

Address	Company	Permit Type	Time Period
6529 NW Front	Air Liquide	Stormwater 1200-H	1993 – 1996
		Stormwater (1200-Z)	1997 – Present
6161 NW 61 st	Metro Central Transfer Station	Stormwater (1200-Z)	1999 – Present
5909 NW 61 st	Gould Battery AKA Canonie	Stormwater (Individual NPDES)	1993 – 1998
6400 NW Front	ATOFINA Chemicals, Inc. ⁽²⁾	Stormwater (Individual NPDES)	1991 – 2008

Notes:

NPDES = National Pollutant Discharge Elimination System

(1) Current permits are indicated in bold.

(2) Site stormwater connections to Basin 22B were abandoned during the course of the City's Basin 22B investigations.

3.3 Outfall Setting

Outfall 22B discharges to a large area of potential concern (AOPC 14) identified by the U.S. Environmental Protection Agency (EPA) based on elevated concentrations of PCBs, pesticides, metals and other contaminants in river sediment (EPA, 2010). In addition to Outfall 22B, 1 other City outfall (Outfall 22C) and 12 other active and inactive non-City outfalls discharge to AOPC 14; 3 of these outfalls (City Outfall 22C and non-City outfalls WR-6 and WR-213) discharge in close proximity to Outfall 22B. Additionally, contaminated sediments in the river have been identified adjacent to and associated with the Arkema site located just upstream of Outfall 22B.

4 Basin Screening and Source Investigations

The City identified Basin 22B as a Priority 1 for source tracing based on evaluation of surface sediment collected in the vicinity of the outfall in 2002 (CH2M HILL, 2004). Priority 1 basins are considered the highest priority for source investigation and identification. The subsequent Phase I report for City Priority 1 basins identified pesticides and metals (arsenic, chromium, copper, lead, nickel, selenium, and zinc) for source tracing based on further evaluation of the inriver sediment data (GSI, 2006a). Although there were elevated contaminant concentrations in the vicinity of Outfall 22B, most of these contaminants were also high upstream of the outfall, except for chromium and zinc.

The City conducted comprehensive source investigation activities throughout the system to identify major contaminant sources and pathways to the City stormwater conveyance system.

City source tracing activities in Basin 22B included inline solids grab and composite cleanout solids sampling (2003/2004), catch basin solids sampling (2005), dry-weather flow observations and sampling (2005), sediment trap sampling (2007/2008), and surface soil sampling (2012). In addition, as part of its Portland Harbor stormwater screening effort, the City evaluated 2007-2008 stormwater and sediment trap sample data collected by the Lower Willamette Group in Basin 22B at a point representing discharge from this area.

The City applied a conservative source-tracing approach in the basin and investigated a broad array of contaminants. Based on the results of this evaluation, the City identified PCBs, pesticides, metals, and phthalates as contaminants that needed investigation and control at upland sites in the basin. Subsequent review of upland site status as part of the stormwater screening evaluation indicated that further City source tracing in Basin 22B was not needed because stormwater pathway evaluations were underway at identified sources of these contaminants (BES, 2010).¹

The City's source investigation work was used by DEQ to encourage basin sites to enter the Cleanup Program and to initiate onsite investigations. The City's investigations occurred within the same timeframe as site source control efforts. These include the stormwater pathway evaluations at the Air Liquide, Metro, and Schnitzer sites; cleaning and lining of the onsite stormwater systems connecting to Basin 22B as part of remedial activities associated with the Rhone-Poulenc site; and disconnection of catch basins discharging from Arkema to Basin 22B. Some of the sites collected data from the City conveyance system in conjunction with their source evaluation and control activities.

Investigations and evaluations completed by the City and others in the Basin 22B conveyance system are listed in Table 3.

Table 3. Investigations in the Basin 22B Stormwater Conveyance System

Data Collection Period	Party	Purpose	Documentation
2000	City	Compile basin background information to identify potential sources.	Preliminary Evaluation of City Outfalls (West Shore) (BES, 2000)
2002	City	Evaluate inriver sediment data near City outfalls to prioritize basins for source tracing.	Programmatic Source Control Remedial Investigation Work Plan (CH2M HILL, 2004)
2003 – 2004	City	Collect and analyze solids samples from the conveyance system for waste characterization purposes in conjunction with line cleaning activities.	Technical Memorandum No. OF 22B-3. City Outfall Basin 22B Inline Solids Evaluation (BES, 2008)
2005	City	Investigate potential offsite contaminant migration from the Gould site via dry-weather flow.	City Outfall Basin 22B Upland Source Control Investigation. Technical Memorandum No. OF22B-1 (BES, 2005a)

¹ Although phthalates are not identified in either the RI Report (Integral et al., 2011) or the FS (Anchor et al., 2012) as a COI for any of these sites, phthalates were detected in surface soil samples collected at and adjacent to the Schnitzer-Doane Lake site in January 2012 (Bridgewater, 2012).

Data Collection Period	Party	Purpose	Documentation
2005	City	Investigate potential offsite contaminant migration to catch basins adjacent to the Arkema site.	Technical Memorandum No. OF22B-2. City Outfall Basin 22B Upland Source Control Investigation (BES, 2005b)
2005	City	Evaluate existing data on groundwater plumes and identify the potential for City conveyance systems (including Basin 22B) to act as preferential pathways.	Relationships Between Upland Shallow Groundwater Plumes and the City Stormwater and Combined Conveyance System with the Portland Harbor (GSI, 2006b)
2003-2006	City	Evaluate and compare inline solids data collected before and during stormwater conveyance system cleanout activities.	Technical Memorandum No. OF 22B-3. City Outfall Basin 22B Inline Solids Evaluation (BES, 2008)
2006	City	Focus source tracing activities based on evaluation of observed contaminants and identified sources.	Phase I Report for City of Portland Priority 1 Basins (GSI, 2006a)
2007	Lower Willamette Group	Collect harborwide stormwater and sediment trap data to develop land use stormwater loading estimates for input to the inriver fate and transport model.	Portland Harbor RI/FS Round 3A and 3B Stormwater Data Report (Anchor and Integral, 2008)
2007-2008	City	Evaluate sediment trap data to investigate potential contaminant sources in the upper part of the basin.	Technical Memorandum No 22B-4. Outfall Basin 22B Inline Solids Investigation (BES, 2009)
2007	City	Evaluate stormwater data from City outfalls to identify additional source tracing needs.	Stormwater Evaluation Report. City of Portland, Bureau of Environmental Services (BES, 2010).
2011	Air Liquide	Evaluate whether the Air Liquide site is a source of contaminants to the Willamette River. Includes the results of stormwater sampling in 2011 at Outfall 22B.	Stormwater Source Control Evaluation Report, Portland Facility (CH2M HILL, 2012)
2012	Schnitzer	Evaluate surface (erodible) soils at the Schnitzer – Doane Lake site and in a vegetated portion of the NW Front Avenue right-of-way adjacent to the site.	Addendum to the Focused Source Control Evaluation Report, Surface Soil Sampling Results (Bridgewater, 2012)
2012	City	Evaluate nature and extent of shallow soil contamination in the vegetated portion of the NW Front Avenue right-of-way in the vicinity of the Schnitzer – Doane Lake site.	Transmittal to DEQ of Shallow Soil Sampling conducted by the City of Portland in July 2012 in Basin 22B Adjacent to Schnitzer Investment-Doane Lake Site (BES, 2012)

Data Collection Period	Party	Purpose	Documentation
2006 - present	StarLink Logistics, Inc. (SLLI)	Evaluate the effectiveness of Interim Remedial Action Measures implemented by SLLI, in Basin 22B conveyance system and upland sites downgradient of former Rhone-Poulenc site, to address preferential groundwater pathway. Includes results of dry-weather flow, inline solids, and stormwater investigations conducted in Basin 22B.	RI/SCE Report, RP – Portland Site (AMEC, 2010)

The City's investigation and data evaluation confirmed that major sources of contaminants are present in Basin 22B.

5 Completion of Source Identification

The lines of evidence evaluated to verify that source tracing is complete and all major sources have been identified include (1) spatial coverage and results of source investigation activities conducted in the basin (including review of upland site information) and (2) stormwater data representative of the basin. Findings from this evaluation are summarized below.

- Upland Investigation Coverage and Results:* Figure 2 displays the spatial extent of upland site investigation and other programmatic controls (see key to figures provided at beginning of this Appendix). As shown in Figure 2, all sites within Basin 22B are either in the DEQ Cleanup Program or have been remediated under EPA oversight. Contaminants detected in the Basin 22B conveyance system (PCBs, pesticides, metals, and phthalates) have been identified at one or more of these sites. All sites with complete stormwater and/or preferential groundwater pathways to Basin 22B are in the process of being controlled under DEQ authority.
- Basin 22B Stormwater Data:* A comparison of basin stormwater data collected in 2007 (Anchor and Integral, 2008) and 2011 (CH2M HILL, 2012) indicates that controlling identified sources has decreased contaminant concentrations in Basin 22B stormwater. As shown in Table 4, concentrations of PCBs and metals² generally decreased between 2007 and 2011 (during which time upland site controls were implemented; see Section 6), and the most recent outfall data are in the lower range of concentrations observed in Portland Harbor industrial areas (DEQ, 2010). As source control implementation is still underway at two of these sites, the City anticipates further reductions in contaminant loading to the Basin 22B system.

² Pesticides were not detected in the 2011 samples; comparisons to 2007 data are not made because the laboratory method reporting limits are elevated.

Table 4. Basin 22B Whole-Basin Stormwater Data ⁽¹⁾

Analyte	2007 Data LWG Investigation (Anchor and Integral, 2008)	2011 Data Air Liquide Investigation (CH2M HILL, 2012)	
	March – November 2007 ⁽²⁾	April 1, 2011	May 11, 2011
Total PCBs	0.1090 µg/L	0.00232 µg/L	0.03 µg/L
Arsenic	3.84 µg/L	1.7 µg/L	1.5 µg/L
Cadmium	1.91 µg/L	0.27 µg/L	0.59 µg/L
Copper	31.42 µg/L	10.7 µg/L	15.5 µg/L

Notes:

PCBs = polychlorinated biphenyls; LWG = Lower Willamette Group; µg/L = microgram per liter

- (1) LWG stormwater data were collected at a manhole upstream of the outfall, but downstream of all stormwater connections to the basin.
- (2) Arsenic, copper, and cadmium values for the 2007 stormwater samples are the calculated arithmetic mean concentrations for four sampling events. The total PCBs value is the arithmetic mean concentration for five sampling events.

Based on these lines of evidence, the City concludes that Basin 22B source tracing is complete and all major sources have been identified.

6 Basin Source Controls

The City and DEQ collaborated under their respective authorities to identify control mechanisms for all major sources identified in the basin. Source control for major and minor sources in Basin 22B includes ongoing City and DEQ programs that are described in the Municipal Report, SCMs completed (or planned) at contaminated sites under DEQ Cleanup Program agreements, and specific controls implemented within the City's shared stormwater conveyance system (e.g., line cleaning and lining). Source controls implemented in Basin 22B are displayed in Figures 1 and 2 and summarized in this section.

Extensive SCMs are being implemented by the sites (including a basinwide measure to address infiltration of contaminated groundwater into the stormwater conveyance system). Additionally, Metro has installed stormwater treatment facilities, including an oil/water separator and ecoroofs, as shown in Figure 2. These SCMs, and the additional site-specific and conveyance system source controls that have been completed to date in Basin 22B, are summarized in Table 5.

Table 5. Basin 22B Source Controls

Site / Area	Source Controls	Implementation Timeframe
Source Control Measures (SCM) at DEQ Cleanup Program Sites ⁽¹⁾		
Rhone-Poulenc Doane Lake (ECSI #155)	As part of its Interim Remedial Action Measure (IRAM) to control infiltration of contaminated groundwater, Rhone-Poulenc/StarLink Logistics, Inc. (SLLI), cleaned and lined the City's entire Basin 22B conveyance system and all stormwater lines at the Air Liquide, Gould, and Metro sites.	2006 - present
Schnitzer Investment – Doane Lake: (ECSI #395): Air Liquide facility	Onsite storm sewer piping cleaned and lined (completed as part of the Rhone-Poulenc IRAM).	2009
	Three historical catch basins and associated lines were abandoned. Gravel was placed on pervious surfaces to minimize mobilization of erodible soils by surface water flows across the site.	2010; 2012
Schnitzer Investment – Doane Lake: landfill area in western portion of site (ECSI #395)	Source control measures planned: onsite erodible contaminated soil will be capped and adjacent offsite contaminated soil will be removed and capped.	Pending
Gould, Inc./NL Industries, Inc. (ECSI #49)	Encapsulation of contaminated media, capping, and revegetation.	2000
	The onsite conveyance system was cleaned and lined (as part of the Rhone-Poulenc IRAM).	2009
Metro Central Transfer Station (ECSI #1398)	The onsite storm sewer piping was cleaned and lined (as part of the Rhone-Poulenc IRAM). Site stormwater passes through an oil/water separator before discharge to Basin 22B.	2009
	Installation of ecoroofs.	2011
	Additional SCMs to be determined.	To be determined
Arkema, Inc. (ECSI #398)	Connections to the City's conveyance system were abandoned or plugged.	2006, 2010
	Other SCMs being implemented include: capping portions of the site; decommissioning existing stormwater conveyance system; rerouting stormwater runoff to a new stormwater conveyance and treatment system; construction of a berm around most of the site to prevent stormwater runoff from leaving the site; and use of erosion control measures during site remediation activities.	Underway
City Conveyance System		
Guilds Lake Pump Station to Outfall 22B	The City cleaned the 48" storm line loop northwest of NW Front Avenue.	2004

Site / Area	Source Controls	Implementation Timeframe
Abandonment of connections to NW Front Avenue line	Historical connection from field inlet at Gould site was abandoned during site remediation.	~2000
	Arkema abandoned lateral connections to catch basins in the drainage swale along NW Front Avenue, adjacent to the Arkema site.	2006
	The City abandoned a connection to a historical catch basin on the south side of NW Front, adjacent to the Air Liquide site.	2007
	Rhone-Poulenc/SLLI abandoned catch basins in the drainage swale along NW Front Avenue, adjacent to the Arkema site.	2010
NW Front Avenue	As part of its IRAM, Rhone-Poulenc cleaned and lined the City’s entire conveyance system (including catch basins and connecting lines): <ul style="list-style-type: none">• Main line cleaned• Lines and laterals cleaned• Anticipated completion of lining project	2006
		2009
		2013
Other (Programmatic SCM)		
See listing in Table 2	NPDES 1200-Z Stormwater Permit Requirements.	Ongoing

Notes:

DEQ = Oregon Department of Environmental Quality; ECSI = Environmental Cleanup Site Information; NPDES = National Pollutant Discharge Elimination System

- (1) For upland sites, descriptions of SCMs are based on information in DEQ Milestone Report (DEQ, 2012), DEQ source control decisions, and/or reports on file with DEQ.

All major contaminant sources have been controlled or will be controlled after implementation of SCMs has been completed under the programs identified above.

Other municipal programs (e.g., illicit discharge monitoring, street sweeping, etc.) likely provide additional source control benefits in the basin and will help to address minor sources for which specific control measures have not been required. City programs that control current and future contaminant discharges to the conveyance system are described in the Municipal Report.

7 Conclusion

The City completed source tracing in Basin 22B and identified the major sources of contaminants to the City conveyance system. Because necessary SCMs at identified sources have been implemented or are being determined under appropriate DEQ and City regulatory authorities, future discharges from Outfall 22B are unlikely to represent a significant source of contaminants to the river. The City concludes that it has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin 22B.

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List of Figures

Figure 1: Basin 22B Overview and Conveyance System Source Controls

Figure 2: Basin 22B Upland Site Source Controls

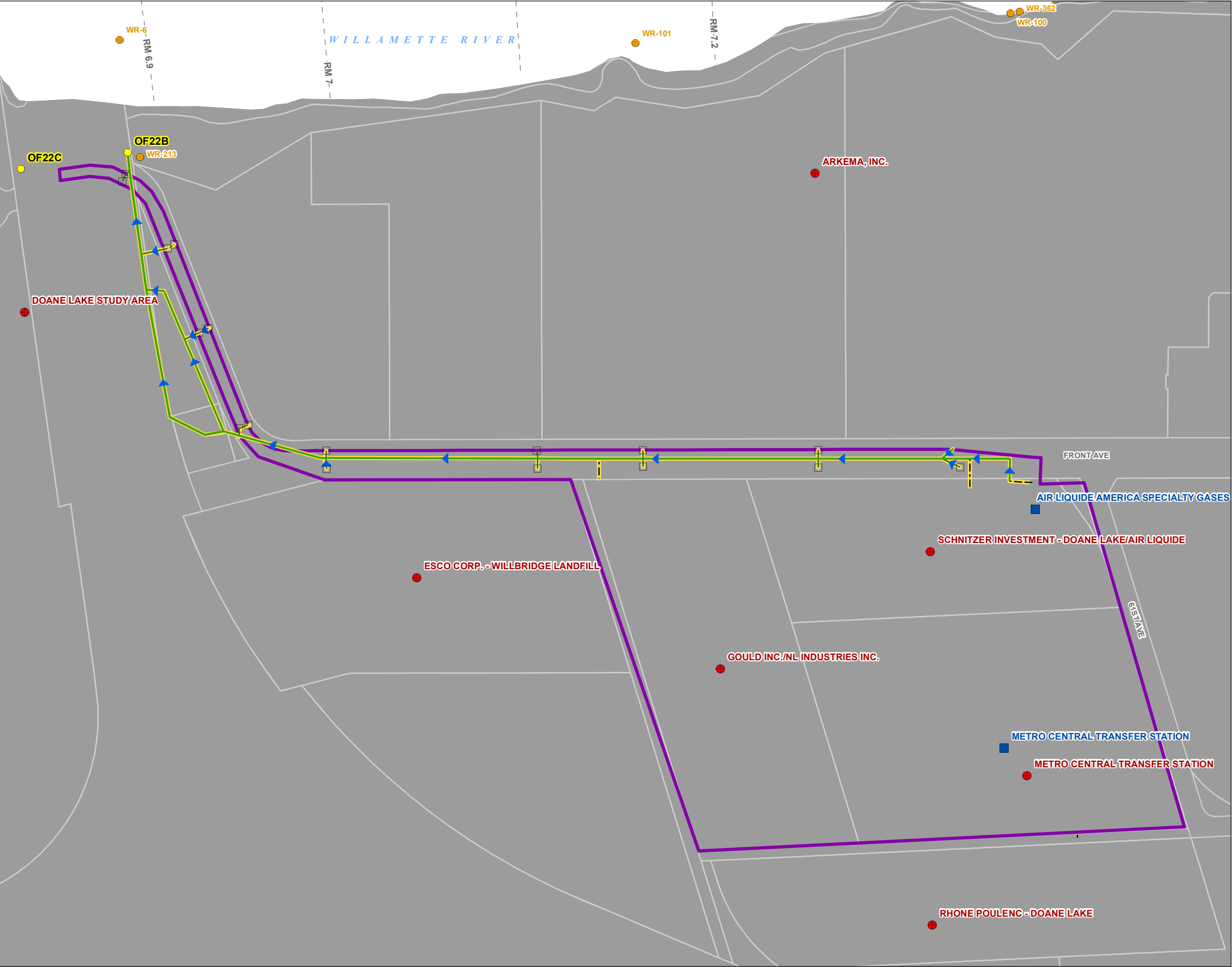
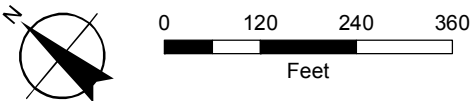


FIGURE 1
Basin 22B
Overview and Conveyance
System Source Controls

- Basin 22B
- DEQ ECSI Site
- NPDES Stormwater Permit
- Conveyance System**
 - Storm Line
 - Site Connection
 - Lined Pipe
 - Catch Basin
 - City Outfall
 - Non-City Outfall
- Land Use/Zoning**
 - Heavy Industrial
- All Other Data**
 - River Mile (RM)
 - Tax Lot
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO

 ENVIRONMENTAL SERVICES
CITY OF PORTLAND
1120 SW Fifth Avenue, Room 1000
Portland Oregon, 97204-1912

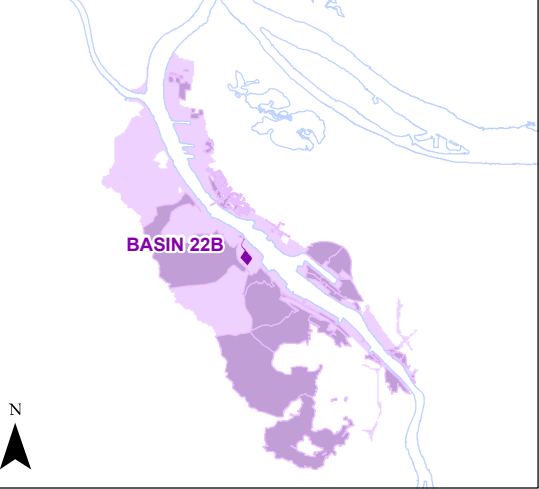
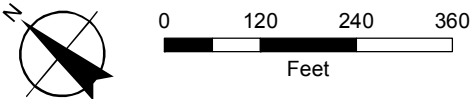




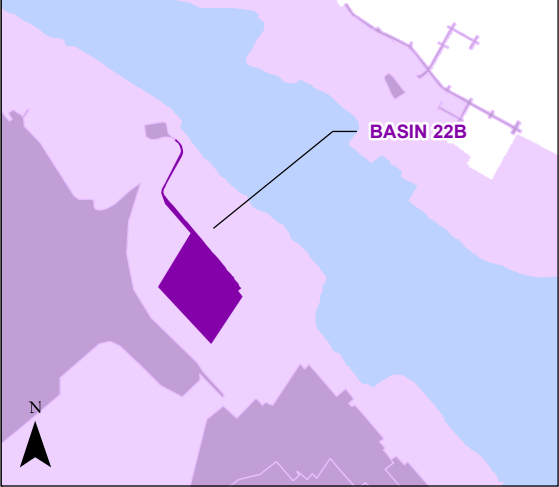
FIGURE 2
Basin 22B
Upland Site Source Controls

- Basin 22B
- Tax Lot
- DEQ Stormwater SCEs**
 - SCE implemented or pending
 - SCE not needed or low priority
- All Other Features**
 - NPDES Stormwater Discharge Permit
 - Stormwater Treatment Facility
 - Ecoroof
 - Site Inspection - BES Industrial Stormwater Program
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO, Aerial Photo Taken 2012

ENVIRONMENTAL SERVICES
CITY OF PORTLAND
1120 SW Fifth Avenue, Room 1000
Portland Oregon, 97204-1912



Completion Summary for City of Portland Outfall Basin 22C

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and several City programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled. This report summarizes the results of this collaborative effort in Outfall Basin 22C.

This Completion Summary includes a weight-of-evidence evaluation to demonstrate that source identification is complete and a summary of source controls (implemented or planned) that will control future contaminant discharges to the Willamette River.

Outfall 22C is located on the west side of the Willamette River in the Doane Lake industrial area, just downstream of the Burlington Northern Santa Fe (BNSF) Railroad Bridge. The vast majority of Basin 22C consists of open space in Forest Park. The basin also includes North Doane Lake (a remnant of former Doane Lake), a few industrial sites (including a small portion of the former GASCO site), a railroad corridor, and a section of Oregon Department of Transportation (ODOT) Highway 30/NW St. Helens Road.

Inriver sediment data collected by the City indicated elevated sediment concentrations adjacent to and upstream of the outfall. The City collected stormwater solids and stormwater samples from the basin to determine whether there were additional sources not already being addressed by the DEQ Cleanup Program. In addition to the City's investigations, stormwater, sediment, and dry-weather flow samples are being collected from the City conveyance system by private parties as part of upland site source control evaluations (SCE). Results of these investigations indicate that sources of polycyclic aromatic hydrocarbons (PAH), dioxins and furans, and manganese are present in the basin, and that sources are being addressed by DEQ.

Several DEQ Cleanup Program sites (NW Natural/GASCO and Rhone-Poulenc) outside of the drainage basin are evaluating migration of site contaminants to areas that drain to Basin 22C. PAH-contaminated groundwater, likely associated with historical operations at the former GASCO facility, is infiltrating the conveyance system and discharging at Outfall 22C. DEQ also is working with the Rhone Poulenc facility to investigate and control contaminant discharges to Outfall 22C via North Doane Lake. Several facilities within the basin (Koppers, Siltronic, and ODOT) also are being evaluated in the DEQ Cleanup Program. City source investigation results did not indicate the presence of major contaminant sources other than those already being evaluated by DEQ.

The City confirmed that the major sources of contaminants to the basin have been identified and necessary controls are being implemented under DEQ and/or City authority. Therefore, the

City has met its remedial investigation (RI)/source control measure (SCM) objectives for Basin 22C.

2 Introduction

This Completion Summary presents a weight-of-evidence evaluation of whether further source investigation is needed in Basin 22C, and the rationale for concluding that future discharges from the basin are not likely to be significant sources of contaminants to river sediment. The purpose of this report is to demonstrate that, for Basin 22C, the City has met the joint RI/SCM objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ. Together the City and DEQ are using respective authorities to ensure that source controls are implemented where needed.

This report is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report), which provides additional background and detail regarding the City's harborwide source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Outfall 22C discharges to the west side of the Willamette River at approximately River Mile 6.8, just downriver from the BNSF Railroad Bridge. Figure 1 shows the location of the outfall and drainage basin boundary and provides an overview of the associated stormwater conveyance system. The drainage area for Basin 22C is approximately 1,100 acres. Many of the conveyance systems that drain to Outfall 22C are not managed by the City and include roadside ditches, culverts, a creek channel, and a lake. Basin 22C has three main branches that discharge into the Northwest Drainage Pond. The largest branch conveys flow from Forest Park and Doane Creek, in the western portion of the basin (western branch). The northern branch conveys stormwater from small portions of Highway 30, the railroad corridor, and the area in the vicinity of the Koppers site. North Doane Lake and the ODOT drainage systems discharging to it comprise the southern drainage area. The Northwest Drainage Pond functions as a natural settling basin for stormwater solids transported through the three branches of the drainage system. Downstream of the pond, discharges to the conveyance system are limited to groundwater infiltration and stormwater runoff from a small parking area at the Siltronic site.

As shown in Figure 1, the conveyance system includes water quality swales in the western branch, near the downstream end of Doane Creek before it crosses beneath Highway 30 and into the Tualatin Hills drainage culvert. These swales are part of a stormwater detention system installed by the City on the former Rivergate Rock Quarry site to treat runoff from approximately 725 acres of Forest Park. The system was designed to reduce sediment loading to the river and includes sedimentation ponds, overflow swales, and trash racks (BES, 1997).

Additional detail on the Outfall 22C stormwater conveyance system and associated drainage basin is included in the *Programmatic Source Control Remedial Investigation Work Plan for the City of Portland Outfalls Project* (CH2M HILL, 2004).

3.2 Land Use and Potential Upland Sources

Land use in approximately 94 percent of the basin is open space in Forest Park; the remainder is heavy industrial, major transportation (ODOT Highway 30), and residential. Land use in the industrial-zoned area includes a small parking lot, railroad corridor, City Police Bureau vehicle impoundment yard (on the former Rivergate Rock Quarry site), Kinder Morgan product facility (formerly Santa Fe Pacific Pipelines site), drop box rental company, electrical substation, auto repair shop, service station, truck/equipment storage, and vacant land.

Sites that were identified as potential sources include DEQ Cleanup Program sites, as identified in DEQ's Environmental Cleanup Site Information (ECSI) database, that are in or partially within Basin 22C. Under the Cleanup Program, the NW Natural Gas Company (GASCO) is investigating properties potentially impacted by historical GASCO operations; several of these properties (Koppers and Siltronic) drain to Basin 22C. In addition, the Siltronic site is also an active independent site in the Cleanup Program to evaluate its current operations. The former Rhone-Poulenc site (now owned by Starlink Logistics, Inc. [SLLI]) is outside of Basin 22C, but is evaluating offsite migration of contaminants to North Doane Lake, which drains to Outfall 22C.

Table 1 lists the sites conducting evaluations within Basin 22C and indicates the associated contaminants of interest (COI) and the status of stormwater and preferential groundwater pathway evaluations. All but one of the sites listed in Table 1 are conducting or have completed stormwater SCEs under DEQ oversight, or DEQ has determined that SCEs are a low priority.

Table 1. DEQ Cleanup Program Sites Within or Partially Within Basin 22C

DEQ Cleanup Program Site	Site COIs ⁽¹⁾	Site Stormwater Pathway Evaluations	
		Stormwater Pathway ⁽²⁾	Preferential Groundwater Pathway ⁽³⁾
GASCO - Koppers Industries, Inc. (ECSI #84) ⁽⁴⁾	<i>Stormwater:</i> VOCs, SVOCs, PAHs, TPH, metals, other (e.g., cyanide) <i>Groundwater:</i> VOCs, SVOCs, PAHs, TPH, metals, other (e.g., cyanide).	Source Control Evaluation In Progress	Source Control Decision Completed
GASCO - Siltronic (ECSI #84)	<i>Stormwater:</i> VOCs, SVOCs, PAHs, TPH, metals, other (e.g., cyanide) ⁽⁵⁾ <i>Groundwater:</i> VOCs, SVOCs, PAHs, TPH, metals, other (e.g., cyanide)	Source Control Evaluation In Progress	Source Control Evaluation In Progress
ODOT - Portland Harbor Source Control Evaluation (ECSI #5437)	Not listed ⁽⁶⁾	Source Control Evaluation In Progress	Not shown
Rhone-Poulenc - Doane Lake/SLLI (ECSI #155) ⁽⁴⁾	<i>Discharge from N. Doane Lake:</i> VOCs, SVOCs, metals, pesticides, dioxin/furans, PCBs. <i>Groundwater:</i> VOC, SVOCs, pesticides, metals, dioxins/furans, PCBs	Source Control Evaluation In Progress	Source Control Evaluation in Progress
Santa Fe Pacific Pipelines - Portland Station (ECSI #2104)	TPH (from gasoline and diesel spills) in soil and groundwater ⁽⁷⁾	Need for Source Control Evaluation to be Determined/Low Priority	1999 DEQ Source Control Screening - Low/Medium Priority for Source Control Evaluation

DEQ Cleanup Program Site	Site COIs ⁽¹⁾	Site Stormwater Pathway Evaluations	
		Stormwater Pathway ⁽²⁾	Preferential Groundwater Pathway ⁽³⁾
Siltronic Corporation (ECSI #183) ⁽⁴⁾ (See also GASCO [ECSI #84])	<i>Stormwater:</i> Metals, VOCs, PAHs, TPH, PCBs, phthalates ⁽⁵⁾ <i>Groundwater:</i> VOCs	Source Control Evaluation In Progress	Source Control Evaluation In Progress
St. Helens Road Petroleum Contamination (ECSI #2630)	TPH and PAHs in soil and groundwater under the road ⁽⁷⁾	Not evaluated ⁽⁸⁾	Not shown
V & K Service (ECSI #2423)	<i>Stormwater:</i> VOCs, TPH	Need for Source Control Evaluation to be Determined/Low Priority	Not shown

Notes:

PAHs = polycyclic aromatic hydrocarbons; PCBs = polychlorinated biphenyls; SVOCs = semivolatile organic compounds; TPH = total petroleum hydrocarbons; VOCs = volatile organic compounds; DEQ = Oregon Department of Environmental Quality; ECSI = Environmental Cleanup Site Information; ODOT = Oregon Department of Transportation; COIs = contaminants of interest

(1) Unless otherwise noted, site COIs are those identified in Appendix Q (Source Control Inventory Tables) of the Portland Harbor RI/FS Draft Feasibility Study (FS) (Anchor et al., 2012).

(2) Source: DEQ Milestone Report, Figure 1b, "Status of Stormwater Source Control Evaluations, January 2013" (DEQ, 2013).

(3) Source: DEQ Milestone Report, Figure 3, "Groundwater Source Control Evaluation Status, January 2013" (DEQ, 2013).

(4) Site is within the larger Doane Lake Study Area site (ECSI #36). Upon completion of the initial study of this area, DEQ determined it would be more efficient to investigate and clean up individual sites in the study area, rather than as a whole (DEQ, 1995). The Koppers site has a distinct ECSI number (#2348); however, the groundwater and stormwater pathways are being evaluated as part of the GASCO (ECSI #84) evaluation.

(5) Specifically for Basin 22C, Siltronic Corporation is evaluating stormwater discharges to the Willamette River. NW Natural/GASCO is evaluating groundwater discharges to the river, Doane Creek and infiltration into the Basin 22C conveyance system.

(6) Site is not listed in Appendix Q of the draft FS or Table 4.2-2 of the Portland Harbor RI/FS Draft Final Remedial Investigation Report (Integral Consulting et al., 2011), and site COIs are not listed in ECSI database (DEQ, 2012).

(7) COIs are not listed for this site in Appendix Q of the Draft FS or Table 4.2-2 of the Draft Final RI (Integral et al., 2011). COIs listed are based on information on DEQ ECSI database (DEQ, 1999, 2000).

(8) Site is not tracked in DEQ Milestone Report (DEQ, 2013). Site status listed is based on information on DEQ ECSI database (DEQ, 2000). Contamination was detected under St. Helens Road and therefore not expected to affect stormwater.

Industrial sites covered or historically covered by National Pollutant Discharge Elimination System (NPDES) stormwater regulations also were considered as potential sources of pollutants to the basin. Table 2 lists sites within the basin that historically held NPDES permits to discharge to the Basin 22C conveyance system. One site has a current NPDES permit to discharge to this basin. Note that the City and ODOT both have NPDES Municipal Separate Storm Sewer System (MS4) stormwater permits that also cover basin drainage areas.

Table 2. Current⁽¹⁾ and Historical NPDES Permit Coverage in Basin 22C

Address	Company	Permit Type	Time Period
6565 NW St. Helens	Santa Fe Pacific Pipeline Co.	Groundwater (1500-A)	1991 – 2005
7540 NW St. Helens	Koppers Industries	Individual NPDES	1992 – 2010

Address	Company	Permit Type	Time Period
7200 NW Front	Siltronic Corporation	Stormwater (1200-L)	1993 - 1996
		Stormwater (1200-Z)	1997 - Present

Notes:

NPDES = National Pollutant Discharge Elimination System

(1) Current permits are indicated in bold.

3.3 Outfall Setting

Outfall 22C discharges to a large area of potential concern (AOPC 14) identified by the U.S. Environmental Protection Agency (EPA) based on elevated concentrations of PCBs, pesticides, metals and other contaminants in river sediment (EPA, 2010). In addition to Outfall 22C, 1 other City outfall (Outfall 22B) and 12 other active and inactive non-City outfalls discharge to AOPC 14.

4 Basin Screening and Source Investigations

The City identified Basin 22C as a Priority 1 for source tracing based on evaluation of surface sediment collected in the vicinity of the outfall in 2002 (CH2M HILL, 2004). Priority 1 basins are considered the highest priority for source investigation and identification. The subsequent Phase I Report for City of Portland Priority 1 Basins identified PAHs, DDT constituents, and arsenic for source tracing in Basin 22C based on further evaluation of the inriver sediment data and consideration of potential sources to the conveyance system (GSI, 2006a). Information reviewed for the Phase I investigation also indicated that likely sources of these contaminants (e.g., GASCO/Siltronic, Koppers, and Rhone-Poulenc/SLLI) already were in the DEQ Cleanup Program and were conducting stormwater SCEs under DEQ oversight. Therefore, the City's source investigation activities in this basin focused on verifying that there were not additional major sources of these or other contaminants.

City source investigation activities in Basin 22C included analyzing solids from the northern branch of the conveyance system (in 2003/2004 and 2006), evaluating sediment data collected from the Northwest Drainage Pond, and analyzing stormwater samples from the western branch of the system and the outfall. The City did not conduct investigations in the southern branch of the system because that portion of the conveyance system is owned and operated by ODOT and that area is being investigated by ODOT and SLLI. In addition, other parties conducted sampling in various parts of the City conveyance system as part of upland site SCEs. Results of the investigations indicate that major sources of PAHs are present in the basin. Offsite migration of contaminated sediment from North Doane Lake is also a potential current source to Outfall 22C.

Significantly elevated total PAHs concentrations were detected in stormwater solids from the northern branch of the City conveyance system in 2003/2004 and 2006 (BES, 2007a). Total PAH concentrations also were elevated in sediments collected from Doane Creek downstream of the Koppers facility (HAI, 2011) and at the outlet of Northwest Drainage Pond (HAI, 2006; AMEC,

2010; BES, 2007b). Former stormwater runoff and/or batch discharges from the Koppers site, as well as spillage of solid pencil pitch (a type of material known to contain high levels of PAHs) into the street, during material transport to the Koppers facility before 2002,¹ were identified as likely sources of the PAHs detected in this portion of the system (BES, 2007a). Most of the stormwater drainage from the Koppers facility has been disconnected from Basin 22C and rerouted to the sanitary sewer system (Anchor and HAI, 2010). A small drainage area remains and DEQ is working with the site to complete formal abandonment of this area.

The former GASCO facility is a major known source of PAHs related to the historical oil-gas manufacturing operations, and groundwater beneath the site is contaminated with PAHs (DEQ, 2001). NW Natural is evaluating impacts to adjacent properties, including those in Basin 22C. Based on data from dry-weather flow sampling conducted in Doane Creek (HAI, 2011) and at the outfall (HAI, 2006; AMEC, 2010), PAHs appear to be entering the Basin 22C conveyance system between the Northwest Drainage Pond and the outfall. Infiltration of groundwater from a GASCO-related PAH plume into the City stormwater line is a likely source of the elevated PAH concentrations in dry-weather flow at the outfall. NW Natural is evaluating this preferential groundwater pathway as part of its remedial investigation of the Siltronic site (HAI, 2007).

As part of the Basin 22C source investigation, the City evaluated sediment data collected by upland sites from the Northwest Drainage Pond to determine what contaminants may be migrating offsite to Outfall 22C in sediment. Results indicate that PAHs, dioxins and furans, and manganese migrated from upland sources to the Northwest Drainage Pond. PAHs, dioxins and furans, and metals have been detected in North Doane Lake sediment; SLLI is evaluating the North Doane Lake pathway as part of the remedial investigation for the site (AMEC, 2011). SCEs also are underway at the Koppers site and in the ODOT drainage areas.

In 2007 and 2008, the City collected stormwater samples from the western branch of the conveyance system and from the outfall to determine whether additional source investigation was warranted in this portion of the basin where DEQ Cleanup Program sites are not located. Data indicated that major sources of PAHs and metals are not present in the western branch (BES, 2009) and that further source tracing was not warranted for other contaminants in Basin 22C (BES, 2010).

Table 3 lists investigations and evaluations completed by the City and others in the Basin 22C conveyance system.

Table 3. Investigations in the Basin 22C Stormwater Conveyance System

Data Collection Period	Party	Purpose	Documentation
2000	City	Compile basin background information to identify potential sources.	Preliminary Evaluation of City Outfalls (West Shore) (BES, 2000)

¹ Deliveries of solid pencil pitch to this facility ceased before 2002.

Data Collection Period	Party	Purpose	Documentation
2002	City	Evaluate inriver sediment data near City outfalls to prioritize basins for source tracing.	Programmatic Source Control Remedial Investigation Work Plan (CH2M HILL, 2004)
2002	Rhone-Poulenc	Collect sediment samples from the Northwest (NW) Drainage Pond for analysis of Rhone Poulenc-related contaminants.	Remedial Investigation/Source Control Evaluation Report, RP - Portland Site (AMEC, 2010)
2003	NW Natural	Collect water samples from the NW Drainage Pond for evaluation in NW Natural's source control evaluation.	City of Portland Outfall 22C Drainage Sampling Activities, Siltronic Corporation Property (HAI, 2006)
2002 – 2003, 2009	Rhone-Poulenc/ SLI	Collect a stormwater sample (2003) and dry-weather flow samples (2002, 2003, and 2009) from Outfall 22C for analysis of Rhone Poulenc-related contaminants.	Remedial Investigation/Source Control Evaluation Report, RP - Portland Site (AMEC, 2010)
2003, 2004	City	Analyze inline solids samples collected in the vicinity of the Koppers facility for waste characterization before line cleaning and post-cleaning for waste disposal.	City Outfall Basin 22C Inline Solids Sampling in the Vicinity of Koppers Industries, Inc. Technical Memorandum No. OF22C-2 (BES, 2007a)
2005	City	Evaluate existing data on groundwater plumes and identify the potential for City conveyance systems (including Basin 22C) to act as preferential pathways.	Relationships Between Upland Shallow Groundwater Plumes and the City Stormwater and Combined Conveyance System with the Portland Harbor (GSI, 2006b)
2005	NW Natural	Collect a sediment sample from the NW Drainage Pond, and collect stormwater and dry-weather flow samples from the outlets of the Tualatin Hills drainage culvert, the Koppers culvert, North Doane Lake, and Outfall 22C for analysis of GASCO-related contaminants.	City of Portland Outfall 22C Drainage Sampling Activities, Siltronic Corporation Property (HAI, 2006)
2006	City	Collect inline solids near the Koppers facility to determine whether there was a current source of PAHs to this part of the system.	City Outfall Basin 22C Inline Solids Sampling in the Vicinity of Koppers Industries, Inc. Technical Memorandum No. OF22C-2 (BES, 2007a)
NA	City	Evaluate existing sediment data from the NW Drainage Pond.	City Outfall Basin 22C Northwest Drainage Pond Evaluation. Technical Memorandum No. OF22C-3 (BES, 2007b)
2006	City	Focus source tracing activities based on evaluation of observed contaminants and identified sources.	Phase I Report for City of Portland Priority 1 Basins (GSI, 2006a)

Data Collection Period	Party	Purpose	Documentation
2007	City	Collect stormwater samples at the outlet of the Tualatin Hills drainage culvert to assess whether major sources are present in the western branch.	City Outfall Basin 22C Stormwater Investigation- Tualatin Hills Drainage Culvert. Technical Memorandum No. OF22C-3 ⁽¹⁾ (BES, 2009)
2007 – 2008	Lower Willamette Group	Collect harborwide stormwater and sediment trap data in Doane Creek upstream of Highway 30 to develop Open Space stormwater loading estimates for input to the inriver fate and transport model.	Portland Harbor RI/FS Round 3A and 3B Stormwater Data Report (Anchor and Integral, 2008)
2008	City	Evaluate stormwater data from City outfalls to identify additional source tracing needs.	Stormwater Evaluation Report. City of Portland, Bureau of Environmental Services (BES, 2010).
2010	NW Natural	Collect sediment and surface water samples from Doane Creek for analysis of GASCO-related contaminants.	Remedial Investigation Data Summary Report, Historical Manufactured Gas Plant Activities Siltronic Corporation Property, (HAI, 2011)

Notes:

NA = not applicable

(1) Technical memorandum number was duplicated in error, and should have been numbered OF22C-4.

The City's investigation and data evaluation confirmed that the only current major sources of contaminants in the basin are those that already had been identified and are being addressed under the DEQ Cleanup Program.

5 Completion of Source Identification

The lines of evidence evaluated to verify that source tracing is complete and all major sources have been identified include (1) results of source tracing activities conducted in the basin (including review of upland site information) and (2) land use at remaining upland areas not undergoing DEQ Cleanup Program investigation. Findings from this evaluation are summarized below:

- Source Investigation Results.** PAHs have been elevated in dry-weather flow samples collected from the outfall and historical GASCO operations have been identified as the likely upland source of PAH-contaminated groundwater to the basin. Sediment data evaluation also indicates current and/or historical sources of PAHs, dioxins and furans, and metals to the Northwest Drainage Pond. These contaminants have been detected at one or more DEQ Cleanup Program sites discharging to the pond. The City's investigations did not identify elevated contaminant concentrations in stormwater from the western branch of the conveyance system (BES, 2009) and did not identify any analytes as potentially warranting further source tracing in Basin 22C (BES, 2010).

- *Upland Investigation Coverage and Land Use:* The vast majority of the land use in Basin 22C is open space (see Figure 1). Figure 2 displays the spatial extent of DEQ Cleanup Program site investigations and other programmatic controls (see key to figures provided at beginning of this Appendix) within the developed portion of the basin. As shown in Figure 2, most of the basin area east of NW St. Helens Road is being investigated under DEQ oversight. Most remaining developed sites:
 - Have been designated by DEQ as not needing an SCE or as a low priority for completing an SCE;
 - Discharge to ODOT drainage systems that are being evaluated under the ODOT investigation;
 - Have been inspected by the City Industrial Stormwater Program to evaluate and provide technical assistance on industrial exposures to stormwater; and/or
 - Do not warrant investigation because of land use (e.g., residential) and lack of industrial exposures to stormwater.

Land uses at industrial sites currently not covered by DEQ Cleanup or Water Quality Programs consist of parking, equipment storage, drop-box storage, automotive service operations, and a foundry equipment wholesale business, all of which have minimal industrial exposures to stormwater. Current and future industrial activities that are exposed to stormwater will be addressed by the DEQ NPDES Program, and non-industrial activities are not a known or suspected major source of contaminants to the City stormwater conveyance system.

Based on these lines of evidence, the City concludes that Basin 22C source tracing is complete and all major sources have been identified.

6 Basin Source Controls

The City and DEQ collaborated under their respective authorities to identify control mechanisms for all sources identified in the basin. Source control for major and minor sources in Basin 22C includes ongoing City and DEQ programs that are described in the Municipal Report, SCMs completed (or planned) at contaminated sites under DEQ Cleanup Program agreements, and specific controls implemented within the City's shared stormwater conveyance system (e.g., targeted line cleaning). Source controls implemented in Basin 22C are displayed in Figures 1 and 2 and summarized in this section.

The City of Portland Police Bureau operates an evidence storage facility at the former Rivergate Rock Quarry at 7027 NW St. Helens Road. The City constructed stormwater treatment at the site to reduce sediment loading to the basin from the adjacent upgradient portion of Forest Park.

Table 4 presents site-specific, programmatic, and conveyance system source controls completed to date for Basin 22C.

Table 4. Basin 22C Source Controls

Site / Area	Source Controls	Implementation Timeframe
Source Control Measures (SCM) at DEQ Cleanup Program Sites ⁽¹⁾		
GASCO - Koppers Industries, Inc. (ECSI #84) ⁽²⁾ (Part of former GASCO site – ECSI #84)	The majority of site stormwater has been rerouted to the sanitary sewer system. DEQ is working with the site to complete and document formal abandonment of two remaining catch basins that are connected to Basin 22C. Additional SCMs to be determined.	2008; To be determined
GASCO-Siltronic (ECSI #84)	SCMs related to the GASCO PAH plume are being determined as part of the site RI.	To be determined
ODOT – Portland Harbor Source Control Evaluation (ECSI #5437)	To be determined	To be determined
Rhone Poulenc - Doane Lake (ECSI #155)	To be determined	To be determined
Santa Fe Pacific Pipelines - Portland Station (ECSI #2104)	NA ⁽³⁾	NA
Siltronic Corporation (ECSI #183) (See also GASCO [ECSI#84])	SCMs not anticipated for parking area draining to Outfall 22C, but need for SCMs to be determined.	To be determined
St. Helens Road Petroleum Contamination (ECSI #2630)	NA ⁽⁴⁾	NA
V & K Service (ECSI #2423)	NA ⁽³⁾	NA
City Conveyance System		
Tualatin Creek drainage culvert	After acquiring the former Rivergate Quarry site in the 1980s, the City constructed a sediment management facility at the site (including settling ponds, trash racks, and engineered swales) to reduce suspended sediment in runoff from approximately 725 acres of Forest Park.	Constructed ~1990 - 1993; operation ongoing
Northern branch	The City cleaned storm lines in the vicinity of the Koppers facility to remove contaminated inline solids.	2004

Site / Area	Source Controls	Implementation Timeframe
Other (Programmatic SCMs)		
6433 NW St. Helens	Stormwater Management Manual Requirements	Ongoing
See listing in Table 2	NPDES 1200-Z Stormwater Permit Requirements	Ongoing

Notes:

DEQ = Oregon Department of Environmental Quality; NPDES = National Pollutant Discharge Elimination System; ECSI = Environmental Cleanup Site Information; RI = remedial investigation; NA = not applicable

- (1) For upland sites, descriptions of SCMs are based on information in DEQ Milestone Report (DEQ, 2013), DEQ source control decisions, and/or reports on file with DEQ.
- (2) Site is within the larger Doane Lake Study Area site (ECSI #36). The Koppers site has a distinct ECSI number (#2348); however, the groundwater and stormwater pathways are being evaluated as part of the GASCO (ECSI #84) evaluation.
- (3) DEQ has determined that a source control evaluation is not needed or is a low priority at this site (DEQ, 2013).
- (4) Based on information in ECSI database (DEQ, 2000) and the fact that this site is not tracked in the DEQ Milestone Report (DEQ, 2013), a source control evaluation likely is not needed at this site.

All major contaminant sources have been controlled or will be controlled after implementation of SCMs has been completed under the programs identified above.

The City and ODOT both have NPDES MS4 stormwater permits that cover basin drainage areas. Other municipal programs (e.g., periodic inspection of and technical assistance to non-NPDES sites, illicit discharge monitoring, street sweeping, etc.) likely provide additional source control benefits in the basin and will help to address minor sources for which specific control measures have not been required. City programs that control current and future contaminant discharges to the conveyance system are described in the Municipal Report.

7 Conclusion

The City completed source tracing in Basin 22C and confirmed that the major sources of contaminants to the City conveyance system already had been identified. Given that necessary SCMs at identified sources have been implemented or are being determined under appropriate DEQ and City regulatory authorities, future discharges from Outfall 22C are unlikely to represent a significant source of contaminants to the river. The City concludes that it has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin 22C.

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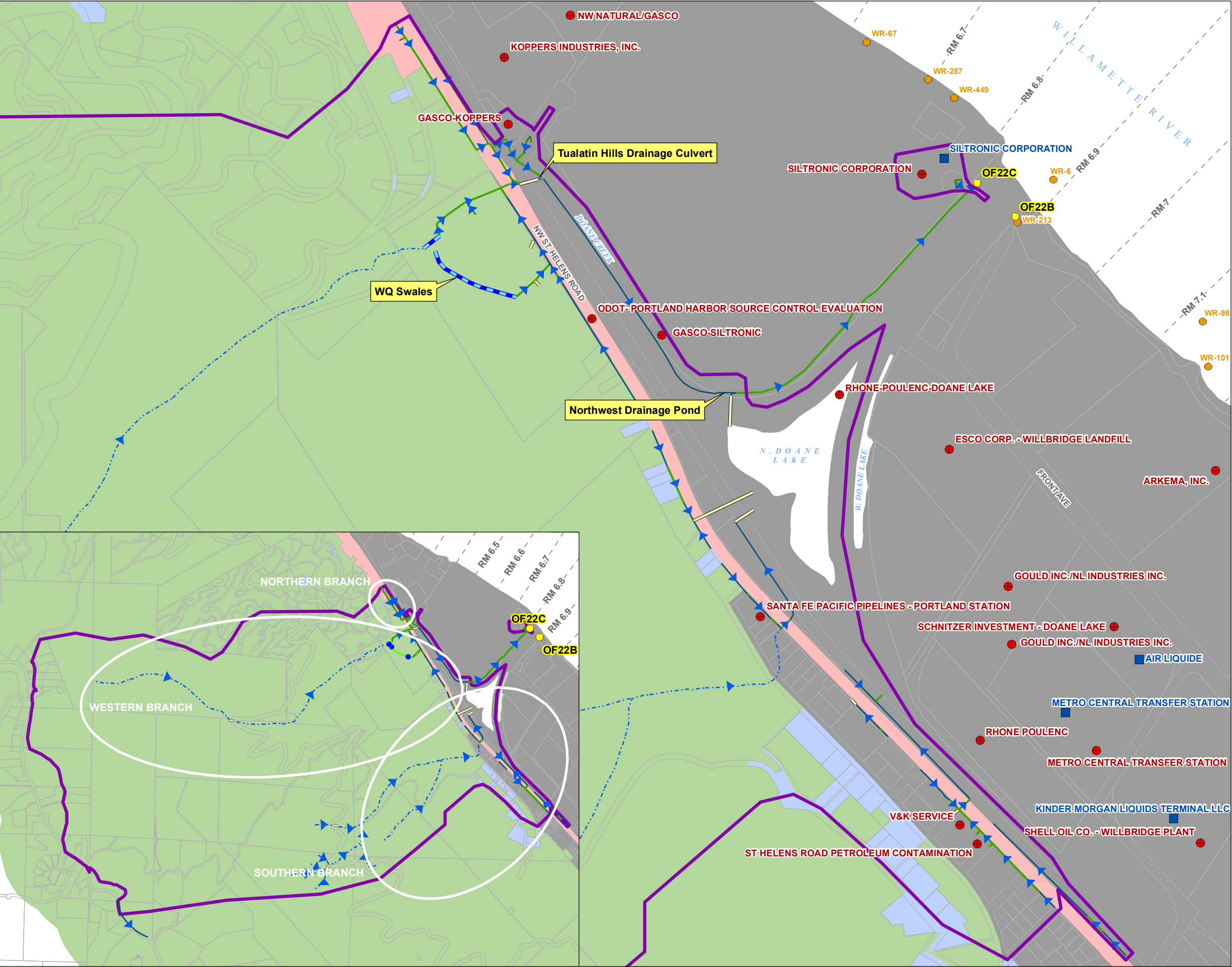
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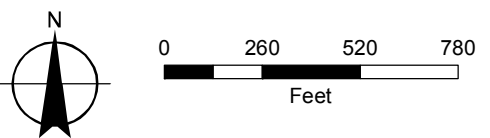
Figure 1: Basin 22C Overview and Conveyance System Source Controls

Figure 2: Basin 22C Upland Site Source Controls

FIGURE 1
Basin 22C
Overview and Conveyance
System Source Controls



- Basin 22C
- DEQ ECSI Site
- NPDES Stormwater Permit
- Conveyance System**
 - Storm Line
 - Ditch
 - Channel
 - Culvert
 - Water Quality (WQ) Swale
 - City Outfall
 - Non-City Outfall
- Land Use/Zoning**
 - Heavy Industrial
 - Residential
 - Parks and Open Space
 - Major Transportation
- All Other Data**
 - River Mile (RM)
 - Tax Lot
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO

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CITY OF PORTLAND
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Portland Oregon, 97204 -1912

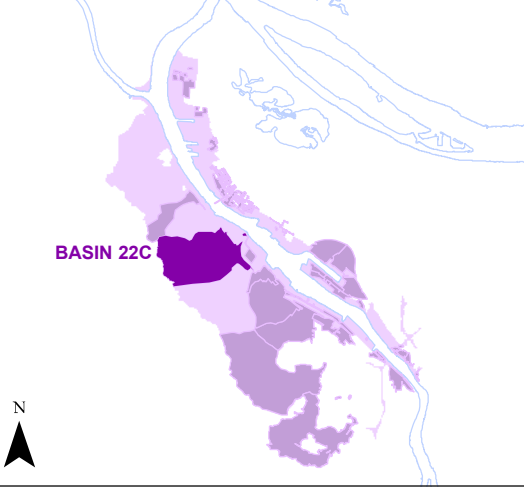
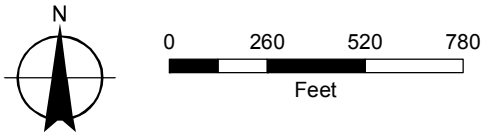




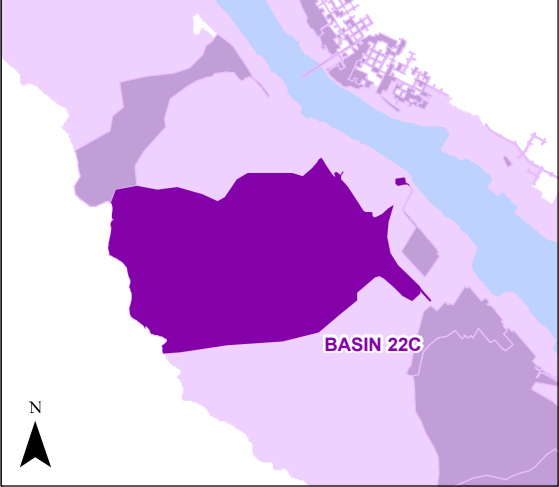
FIGURE 2
Basin 22C
Upland Site Source Controls

- Basin 22C
- Tax Lot
- DEQ Stormwater SCEs**
 - SCE implemented or pending
 - SCE not needed or low priority
- All Other Features**
 - NPDES Stormwater Discharge Permit
 - >50% of Site Area Redeveloped Under City SWMM
 - Stormwater Treatment Facility
 - Site Inspection - BES Industrial Stormwater Program
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO, Aerial Photo Taken 2012

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Completion Summary for City of Portland Outfall Basin 22D

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and several City programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled. This report summarizes the results of this collaborative effort in Outfall Basin 22D.

This Completion Summary includes a weight-of-evidence evaluation to demonstrate that source identification is complete and that there are no current (or anticipated future) major sources of contaminants to the Willamette River.

Basin 22D is located on the west side of the river in the Linnton area. The majority of the basin is open space within Forest Park and the remainder is residential properties with some drainage from State Highway 30 and a railroad corridor.

Although river sediment in the vicinity of the outfall does not contain elevated concentrations of any contaminants (i.e., the U.S. Environmental Protection Agency [EPA] has not identified the potential need for sediment remediation), the City collected and analyzed stormwater data from the basin and confirmed that source tracing was not needed. The Oregon Department of Transportation (ODOT) is evaluating discharges from Highway 30 under DEQ Cleanup Program oversight. The City concludes that major contaminant sources are not present and that ongoing implementation of programmatic source control measures (SCM) in the basin is sufficient for ensuring that discharges from Outfall 22D are protective of the river. Therefore, the City has met the remedial investigation (RI)/SCM objectives for Basin 22D.

2 Introduction

This Completion Summary presents a weight-of-evidence evaluation of whether further source investigation is needed in Basin 22D, and the rationale for concluding that current and future discharges from the basin are not likely to be significant sources of contaminants to river sediment. The purpose of this report is to demonstrate that, for Basin 22D, the City has met the joint RI/SCM objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ.

This report is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report), which provides additional background and detail regarding the City's harborwide source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Outfall 22D discharges to the west side of the Willamette River near River Mile 5.5, in the Linnton area. The drainage area for the Basin 22D conveyance system is approximately 242 acres. Figure 1 shows the location of the outfall and drainage basin boundary and provides an overview of the associated stormwater conveyance system.

3.2 Land Use and Potential Upland Sources

The majority of the land use in Basin 22D (92 percent) is open space (Forest Park), and the remainder is residential and major transportation (ODOT's Highway 30/NW St. Helens Road). Industrial properties are located between the highway and the river, adjacent to the outfall itself, but none of these properties discharges to Outfall 22D.

Sites in the DEQ Cleanup Program, as identified in DEQ's Environmental Cleanup Site Information (ECSI) database, were evaluated as potential sources of contaminants to the City stormwater conveyance system. A portion of one Cleanup Program site, ODOT - Portland Harbor Source Control Evaluation (ECSI #5437), is located in Basin 22D. This site, which encompasses all ODOT facilities within the Portland Harbor drainage basin, was added to the Cleanup Program in 2010, and a stormwater source control evaluation (SCE) is currently in progress (DEQ, 2012, 2013). The SCE will identify contaminants of interest and potential pathways to the river from the portion of Highway 30 within Basin 22D. No other Cleanup Program sites are located in the basin. In addition, no sites in the basin currently hold, or historically had, National Pollutant Discharge Elimination System (NPDES) permits to discharge to the Basin 22D conveyance system.¹

3.3 Outfall Setting

Outfall 22D does not discharge to a river reach identified by EPA as an area of potential concern (AOPC) based on results of river sediment sampling (EPA, 2010). Several non-City outfalls discharge in the immediate vicinity of Outfall 22D.

4 Basin Screening and Source Investigations

The City evaluated land use in the basin and concluded that the basin was not likely to contain major sources of contaminants. However, because of the relatively large basin size and the location of the outfall in an industrial area, the City collected and analyzed basin stormwater in 2008 to verify that source tracing was not needed. Based on the evaluation of these data and using a conservative screening approach, no analytes were identified as potentially warranting source tracing in Basin 22D (BES, 2010).

¹ The City and ODOT both have NPDES Municipal Separate Storm Sewer System (MS4) stormwater permits that cover basin drainage areas.

5 Completion of Source Identification

The lines of evidence evaluated to confirm that source tracing objectives have been met with regard to Basin 22D include (1) inriver sediment concentrations near the outfall, (2) stormwater screening results, and (3) land use. Findings from this evaluation are summarized below.

- *Inriver Sediment Concentrations.* River sediment in the vicinity of Outfall 22D does not contain elevated concentrations of any contaminants (i.e., the outfall does not discharge to an AOPC).
- *Stormwater Screening Results.* The City's stormwater screening evaluation (BES, 2010) did not identify any analytes as potentially warranting further source tracing in Basin 22D.
- *Land Use:* The vast majority of the basin consists of open space, and most of the remaining land use is residential. Major transportation land use areas are under evaluation by ODOT. The basin does not include industrial land uses.

Based on these lines of evidence, the City concludes that Basin 22D source investigation is complete and there are no major contaminant sources in the basin.

6 Basin Source Controls

Source control for potential sources in Basin 22D includes SCMs to be completed as needed under DEQ Cleanup Program oversight and ongoing City and DEQ programs that are described in the Municipal Report. Source controls implemented in Basin 22D are summarized in this section.

Figure 1 displays the spatial extent of DEQ Cleanup Program site investigations and other programmatic controls (see key to figures provided at beginning of this Appendix). As shown in Figure 1, a stormwater SCE is in progress at the one DEQ Cleanup Program site that is partially in the basin (ODOT). Because no other known or suspected major sources of contaminants were identified in Basin 22D, additional coordination between DEQ and the City to identify control mechanisms was not needed in this basin.

The basin includes stormwater treatment at some of the residential areas within the basin (see Figure 1). Ongoing municipal programs (e.g., street sweeping, etc.) likely provide additional source control benefits in the basin and will help to address minor sources for which specific control measures have not been required. City programs that control current and future contaminant discharges to the conveyance system are described in the Municipal Report.

7 Conclusion

The City completed an evaluation of Basin 22D and determined that no major sources of contaminants to the City conveyance system are present. Therefore, the City concludes that it has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin 22D.

8 References

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<http://www.deq.state.or.us/lq/ECSI/ecsidetail.asp?seqnbr=5437>
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Figure 1: Basin 22D Overview and Upland Site Source Controls

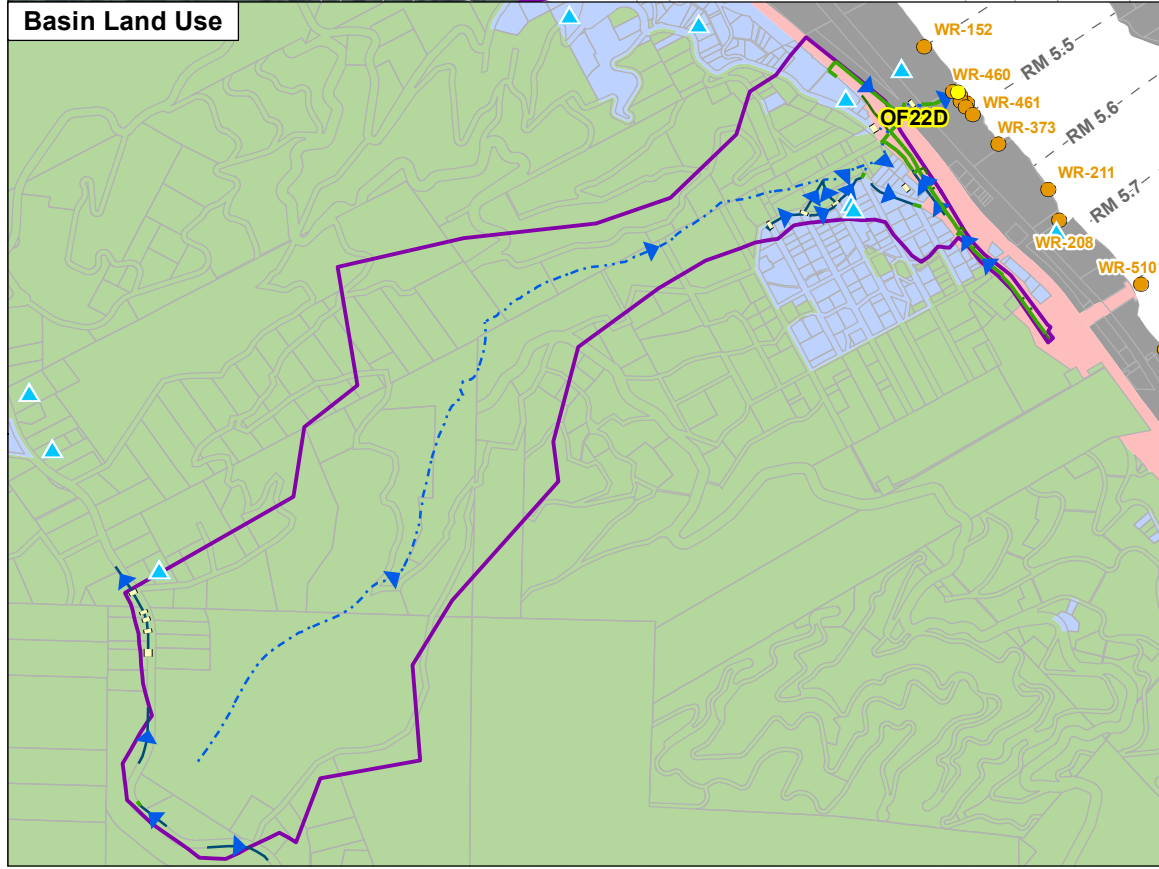
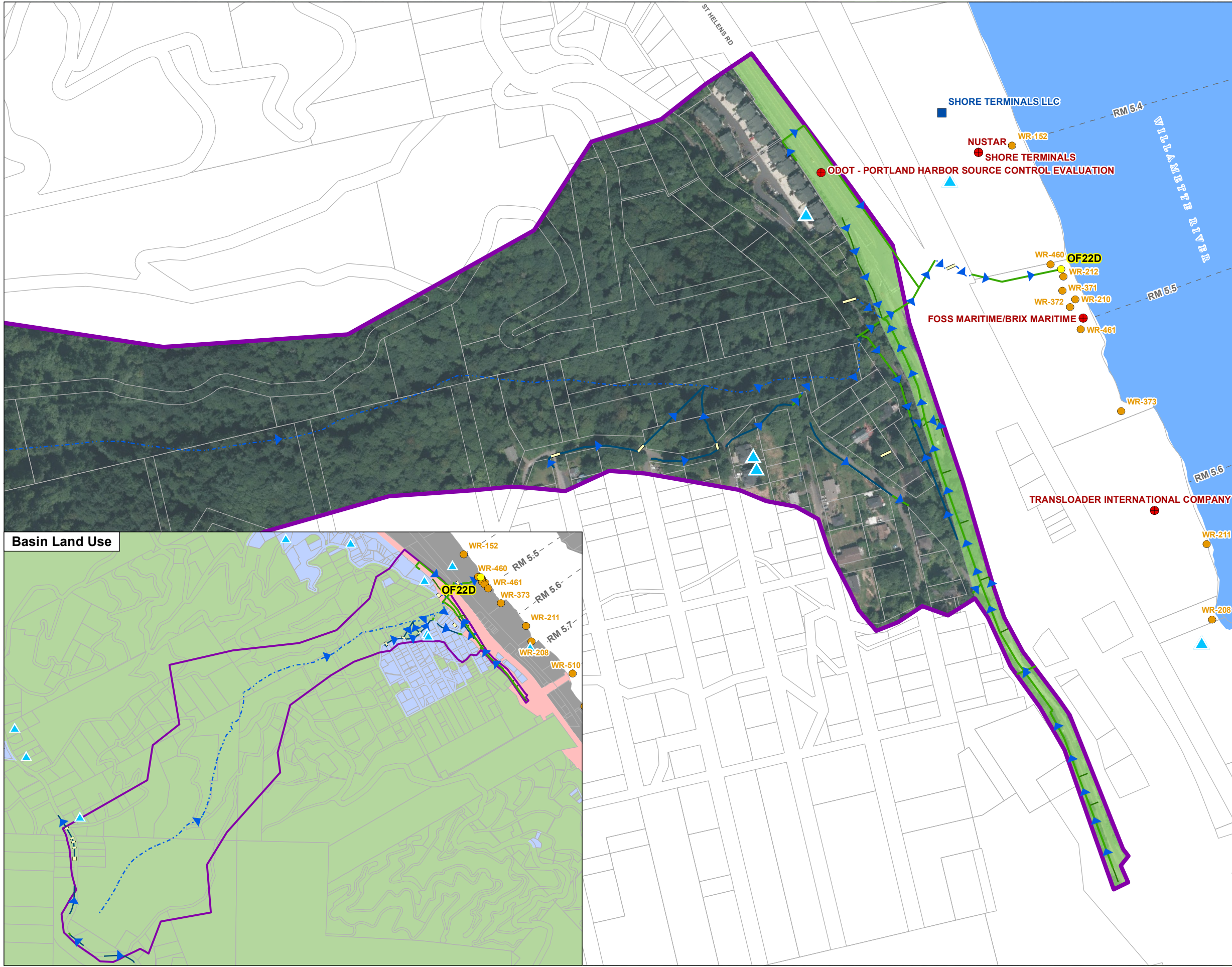
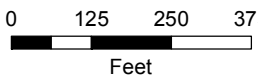
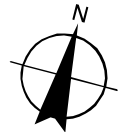


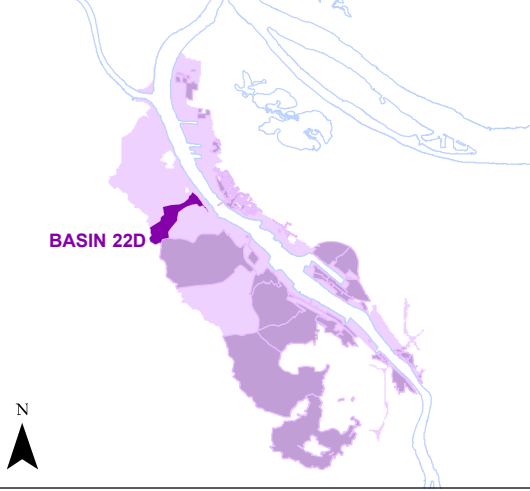
FIGURE 1
Basin 22D
Overview and
Upland Site Source Controls

- Basin 22D
- DEQ ECSI Site
- Stormwater Treatment Facility
- NPDES Stormwater Permit
- Conveyance System**
 - Storm Line
 - Culvert
 - Ditch
 - Channel
 - City Outfall
 - Non-City Outfall
- Land Use/Zoning (See Inset)**
 - Heavy Industrial
 - Residential
 - Parks and Open Space
 - Major Transportation
- DEQ Stormwater SCE**
 - SCE implemented or pending
- All Other Data**
 - River Mile (RM)
 - Tax Lot
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO

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Completion Summary for City of Portland Outfall Basins 23 and 24

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and several City programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled. The purpose of this report, which is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor*, is to demonstrate that the City has met the joint remedial investigation (RI)/source control measure (SCM) objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ for Outfall Basins 23 and 24.

Outfall 23 is located within the Portland Harbor Study Area (Study Area), but does not discharge stormwater to the river. The outfall formerly discharged to the west side of the Willamette River near River Mile (RM) 5.2, in the Linnton area.¹ The outfall historically conveyed stormwater from a residential area, until stormwater from the basin was rerouted to the sanitary system in the early 1970s, and subsequently served only as a combined sewer overflow (CSO) point. In 1992, the City abandoned the CSO diversion and eliminated any potential for a pathway through this outfall. A basin source investigation was not needed because there is no current pathway for contaminants to the river via Outfall 23.

Outfall 24 also is located within the Study Area, on the west side of the river near RM 4.4, and does not discharge stormwater to the river. The outfall historically served a residential and commercial portion of the Linnton area. Discharge from the entire drainage basin was diverted to the sanitary system in the early 1970s and the diversion was sealed in 2000. The outfall currently functions only as an emergency bypass for the Linnton Pump Station (i.e., sanitary sewer overflow) and the City has no record of bypasses occurring. Given that there is no stormwater drainage area affiliated with the outfall, a basin source investigation was not needed.

The drainage basins for both Outfalls 23 and 24 were redirected to the sanitary system before the listing of the Portland Harbor Superfund Site and neither basin represents a current or future source of contaminants to the river. Therefore, the City has met the RI/SCM objectives of the IGA and requests source control decisions from DEQ for Basins 23 and 24.

¹ See Figure 2-5 in the Municipal Report for the location of the Linnton Area and general locations of Outfalls 23 and 24.

Completion Summary for City of Portland Outfall Basin 42

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and several City programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled.

This report summarizes the results of this collaborative effort in Outfall Basin 42 and includes a weight-of-evidence evaluation to demonstrate that source identification is complete and that there are no current (or anticipated future) major sources of contaminants to the Willamette River.

Basin 42 is located on the east side of the river near the Broadway Bridge and the historical Albina industrial area. The basin is small and consists of open space, parking areas, TriMet light-rail tracks, and City streets. River sediment in the vicinity of the outfall does not contain elevated concentrations of any contaminants (i.e., the U.S. Environmental Protection Agency [EPA] has not identified the potential need for sediment remediation). No known or suspected contaminant sources to the Basin 42 stormwater conveyance system have been identified.

The City concludes that major contaminant sources are not present and ongoing implementation of programmatic source control measures (SCM) is sufficient for ensuring that discharges from Outfall 42 are protective of the river. Therefore, the City has met the remedial investigation (RI) /SCM objectives for Basin 42.

2 Introduction

This Completion Summary presents a weight-of-evidence evaluation of whether further source investigation is needed in Basin 42, and the rationale for concluding that current and future discharges from the basin are not likely to be significant sources of contaminants to river sediment. The purpose of this report is to demonstrate that, for Basin 42, the City has met the joint RI/SCM objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ.

This report is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report), which provides additional background and detail regarding the City's harborwide source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Outfall 42 discharges to the east side of the Willamette River between River Miles 11.7 and 11.8, approximately 400 feet upstream of the Broadway Bridge. The Basin 42 stormwater conveyance system drains approximately 6 acres near the Memorial Coliseum at the N. Broadway Street and N. Interstate Avenue interchange. Figure 1 shows the location of the outfall and drainage basin boundary and provides an overview of the associated stormwater conveyance system. As shown in Figure 1, the basin includes a water quality drainage swale and a sedimentation manhole (at Interstate Avenue, near the downstream end of the conveyance system). These features reduce the total suspended solids loading to Outfall 42 from the majority of the basin drainage area. The bioswale was constructed in 1996 during the Rose Quarter redevelopment to provide stormwater treatment for a portion of an arena parking lot and adjacent roadways. The sedimentation manhole was constructed by TriMet in approximately 2003 during development of the new Interstate Avenue light-rail line. City development standards that result in these types of stormwater improvements are described in the Municipal Report. The only portion of the basin that does not include stormwater treatment is a private parking area at the site of a former hotel on the west side of N. Interstate Avenue and a small portion of N. Thunderbird Way.

3.2 Land Use and Potential Upland Sources

Basin 42 is located near the historical Albina area in north Portland. Land use in the basin is commercial and open space (see Figure 1). With the exception of a small open space area in the middle of the basin, the remainder consists of parking lots used for event parking for the Rose Garden and Memorial Coliseum, TriMet light-rail tracks, and paved rights-of-way. The former hotel site at 1225 N. Thunderbird Way was demolished in 2001; TriMet subsequently used this area as a staging area for gravel and asphalt during construction of the Interstate MAX line. These construction operations ceased in 2009, and the site currently is used for event parking.

No current or historical pollutant sources have been identified in Basin 42. No DEQ Cleanup Program sites currently (or historically) are located within the basin, and no industrial sites have held permits to discharge to the Basin 42 conveyance system under National Pollutant Discharge Elimination System (NPDES) stormwater regulations.

3.3 Outfall Setting

Outfall 42 discharges upstream of the Broadway Bridge and the historical Albina industrial area. It does not discharge to a river reach identified by EPA as an area of potential concern (AOPC) for contaminant concentrations in river sediment (EPA, 2010).

4 Basin Screening and Source Investigations

Basin screening consisted of an evaluation of current and past land use, inriver sediment, and existing stormwater treatment, as described in Section 3. Based on a lack of evidence to indicate Basin 42 was likely to contain major sources of contaminants to the City conveyance system, no source investigations were conducted in Basin 42.

5 Completion of Source Identification

The lines of evidence evaluated to confirm that source evaluation objectives have been met with regard to Basin 42 include (1) inriver sediment concentrations near the outfall, (2) information on potential sources of contaminants, (3) drainage basin characteristics, and (4) land use. Findings from this evaluation are summarized below.

- *Inriver Sediment Concentrations.* River sediment in the vicinity of Outfall 42 does not contain elevated concentrations of any contaminants (i.e., the outfall does not discharge to an AOPC).
- *No Upland Sources:* Basin 42 contains no known or suspected upland sources of contaminants to the City stormwater conveyance system (e.g., DEQ Cleanup Program sites or NPDES permitted facilities).
- *Drainage Basin Characteristics:* Basin 42 is small (approximately 6 acres). Most of the stormwater discharging through this outfall is treated before discharging to the river (see Figure 1). The only area in the basin that does not receive treatment is the private event parking lot at 1225 N. Thunderbird Way.
- *Land Use/Zoning:* The basin is not zoned for industrial use, and consists primarily of open space, commercial parking, light-rail lines, and paved rights-of-way. No future industrial connections to the basin are anticipated.

Based on these lines of evidence, the City concludes that Basin 42 source investigation is complete and there are no major contaminant sources in the basin.

6 Basin Source Controls

Because no known or suspected major sources were identified in Basin 42, additional coordination between DEQ and the City to identify control mechanisms was not needed in this basin.

Conveyance system source controls in Basin 42 consist of a water quality treatment swale installed in 1996 (in the open space area between N. Larrabee Avenue and N. Interstate Avenue), and a sedimentation manhole that was installed in 2003 downstream of the bioswale as part of the stormwater system redevelopment affiliated with the Interstate light-rail construction project. These conveyance system source controls are shown in Figure 1. Together, these controls treat most of the stormwater discharging to Outfall 42.

Other municipal programs (e.g., street sweeping) provide additional source control benefits in the basin and will help to address minor sources for which specific control measures have not been required. City programs that control current and future contaminant discharges to the conveyance system are described in the Municipal Report. The City anticipates that these programs will provide additional future stormwater source control in the basin if changes in land use warrant it.

7 Conclusion

Based on the information summarized above, there are no major sources of contaminants in Basin 42. Therefore, future discharges from Outfall 42 are unlikely to represent a significant source of contaminants to the river. The City concludes that it has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin 42.

8 References

EPA. 2010. Re: Portland Harbor Superfund Site; Administrative Order on Consent for Remedial Investigation and Feasibility Study; Docket No. CERCLA-10-2001-0240. Portland Harbor Feasibility Study Source Tables. Letter from EPA to Mr. Bob Wyatt, Chairman, Lower Willamette Group. November 23, 2010.

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Figure 1: Basin 42 Overview and Conveyance System Source Controls

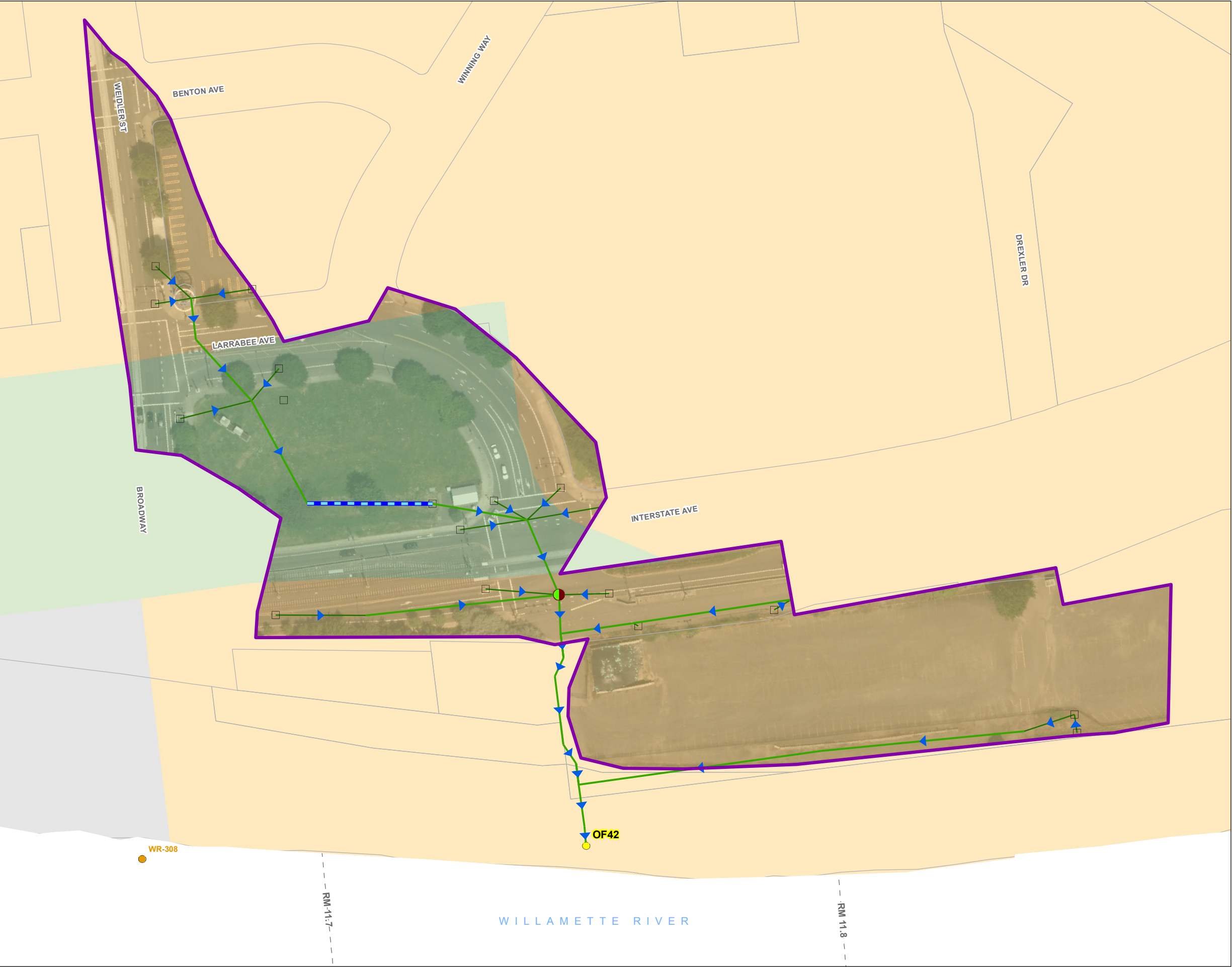
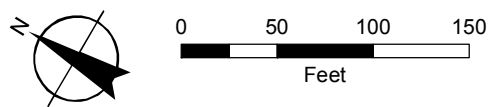


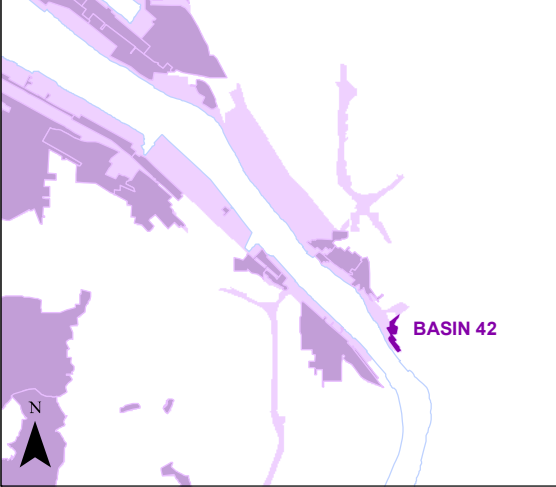
FIGURE 1
Basin 42
Overview and Conveyance
System Source Controls

- Basin 42
- Conveyance System**
 - Storm Line
 - Water Quality Swale
 - Sediment Removal Structure
 - Catch Basin
 - City Outfall
 - Non-City Outfall
- Land Use/Zoning**
 - Light Industrial
 - Commercial
 - Parks and Open Space
- All Other Data**
 - River Mile (RM)
 - Tax Lot
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: January 6, 2014
Data Sources: BES, METRO, Air Photo Taken 2012

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Completion Summary for City of Portland Outfall Basin 43

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and several City programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled. This report summarizes the results of this collaborative effort in Outfall Basin 43.

This Completion Summary includes a weight-of-evidence evaluation to demonstrate that source identification in the current Basin 43 is complete and a summary of source controls (implemented or planned) that will control future contaminant discharges to the Willamette River.

Outfall 43 is located at approximately River Mile (RM) 11.4, on the east side of the Willamette River within the historical Albina area. The outfall discharges to a reach of the river (RM11E) that has been targeted for focused inriver and upland investigations in response to detections of elevated concentrations of polychlorinated biphenyls (PCB) and other contaminants in river sediment, water, and fish tissue samples collected from this area.

Before 2011, the basin consisted of 51 acres of mostly light industrial land. By the time the Portland Harbor Study Area expanded upstream and included this basin, design was underway for the City's Combined Sewer Overflow (CSO) Abatement Program, and the City had determined that the majority of the Basin 43 industrial area would be diverted to the Columbia Boulevard Wastewater Treatment Plant (WWTP) via the new East Side Big Pipe tunnel. Stormwater from the eastern portion of the basin (see Figure 1) was diverted to the City's WWTP in 2011. As a result, the current basin now consists of about 14 acres of small manufacturing and commercial businesses, parking areas, railroad and light-rail corridors, and paved roads.

Once the CSO plans were finalized, the City modified the source investigation objective in the portion of Basin 43 that was slated for diversion (i.e., the eastern branch). The investigation in the eastern branch focused on identifying sources of contaminants that could violate current City wastewater discharge limitations and prohibitions after the diversion was complete.

Source investigation results in the current basin (i.e., western branch) did not indicate the presence of major contaminant sources, and the City concludes that no additional source investigations are warranted. DEQ has issued a source control decision/No Further Action determination to one of the two DEQ Cleanup Program sites in the current basin, and a stormwater pathway evaluation is underway at the second site (Cargill, Inc. [Cargill]) under DEQ oversight. Implementation of source control measures (SCM) under current and future source control programs, along with completion of the source control evaluation (SCE) at the

Cargill site, is expected to provide any necessary source control for Outfall 43 discharges. Therefore, the City has met the remedial investigation (RI)/SCM objectives for Basin 43.

2 Introduction

This Completion Summary presents a weight-of-evidence evaluation of whether further source investigation is needed in Basin 43, and the rationale for concluding that current and future discharges from the basin are not likely to be significant sources of contaminants to river sediment. The purpose of this report is to demonstrate that, for Basin 43, the City has met the joint RI/SCM objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ. Together the City and DEQ are using respective authorities to ensure that source controls are implemented where needed.

This report is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report) which provides additional background and detail regarding the City's harborwide source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Outfall 43 discharges to the east side of the Willamette River at approximately RM 11.4. Before the 2011 CSO diversion, the separated stormwater basin associated with this outfall was 51 acres. The current drainage area for this outfall is approximately 14 acres. Before the diversion, the stormwater conveyance system consisted of two main branches: a western branch (between the river and N. Interstate Avenue) and an eastern branch (between N. Interstate Avenue and Interstate Highway 5). The City diverted the entire eastern branch to the East Side tunnel in 2011. Figures 1 and 2 show the location of the outfall and the drainage basin boundaries and provide an overview of the associated stormwater conveyance system.

Additional detail on the Outfall 43 stormwater conveyance system and associated drainage basin is included in the *Albina Riverlots: City Basin Information and Source Investigation Approach Technical Memorandum* (BES, 2008) and the *Outfall Basin 43 Source Investigation Report* (BES, 2011).

3.2 Land Use and Potential Upland Sources

Basin 43 is located within the historical Albina area. This area has been used for industrial purposes since at least the early 1900s. Zoning in the basin is mostly light industrial. The area zoned as heavy industrial includes artist studios¹ (see Figures 2 and 3), a portion of the Cargill site (a grain distribution facility), a rail corridor, and paved parking. The light industrial area consists of light manufacturing operations (e.g., window inserts), artist studios², offices, parking areas, light-rail and rail corridors, and paved roads.

¹ The former fire station and Willamette Valve office at 820 and 822 N. River were converted to the River Street Studios in the mid-1980s. See http://www.portlandartstudios.com/rs_hist.html

² The former North Coast Seed Company building at 2127 N. Albina transformed into a collective of artist studios in the mid-1980s. See http://www.portlandartstudios.com/ncs_hist.html.

Sites that were identified initially as potential sources to the City's storm system (i.e., western branch) include one DEQ Cleanup Program site, as listed in DEQ's Environmental Cleanup Site Information (ECSI) database. Additionally, as a result of changes to the City's conveyance system during CSO construction activities, a small portion of another Cleanup Program site (Cargill) was added to the basin drainage area. Table 1 lists sites in both the western branch and the diverted eastern branch, indicates the associated contaminants of interest (COI), and the status of stormwater and preferential groundwater pathway evaluations. As shown in Table 1, one Cleanup Program site in the current basin (Tucker Building) has received a source control decision/No Further Action determination from DEQ, and the other (Cargill) currently is conducting an SCE. The City completed remediation (e.g., building demolition, soil removal) and redevelopment (e.g., construction of asphalt cap) of the Tucker Building site in 2004 as part of the construction of the N. Tillamook on-ramp to N. Interstate Avenue.

Operations in the diverted eastern branch include the City of Portland Water Bureau maintenance facility (which now includes the former Westinghouse site, former Master Chemical site, and former Kenton Foundry described in Table 1), the Portland Public Schools Headquarters building, and small manufacturing facilities. The three DEQ Cleanup Program sites in the eastern branch are being remediated and redeveloped as part of the Portland Water Bureau facility expansion.

Table 1. DEQ Cleanup Program Sites in Basin 43

DEQ Cleanup Program Site	Site COIs	Site Pathway Evaluations	
		Stormwater Pathway ⁽¹⁾	Preferential Groundwater Pathway ⁽²⁾
Sites Within and Partially Within Current Basin			
Cargill Incorporated (ECSI #5561) ⁽³⁾	No information ⁽⁴⁾	Source Control Evaluation in Progress	Source Control Evaluation Completed - Source Control Determination Pending
Tucker Building (ECSI #3036) ⁽⁵⁾	Stormwater COI: PAHs, TPHs, PCBs, metals ⁽⁶⁾ Groundwater COI: VOCs, PAHs, TPH, metals ⁽⁶⁾	Source Control Decision /No Further Action Issued	Source Control Decision /No Further Action Issued
Sites in Former Basin (pre-2011 CSO diversion)			
Westinghouse Property (Former) (ECSI #4497)	Stormwater COIs: PCBs ⁽⁶⁾ Groundwater COIs: No information ⁽⁷⁾	Source Control Evaluation In Progress	Source Control Evaluation in Progress
Kenton Foundry (Former) (ECSI #5758)	No information ⁽⁸⁾	Not shown	Not shown
Master Chemical Inc. (ECSI #1302)	None ⁽⁹⁾	Source Control Evaluation Not Needed	Not shown

Notes:

PAHs = polycyclic aromatic hydrocarbons; TPH = total petroleum hydrocarbons; VOCs = volatile organic compounds; ECSI = Environmental Cleanup Site Information; CSO = combined sewer overflow; COIs = contaminants of interest; PCBs = polychlorinated biphenyls

- (1) Source: DEQ Milestone Report, Figure 1b, "Status of Stormwater Source Control Evaluations, January 2013" (DEQ, 2013).
- (2) Source: DEQ Milestone Report, Figure 3, "Groundwater Source Control Evaluation Status, January 2013" (DEQ, 2013).
- (3) A small portion of this site was connected to Basin 43 as a result of City stormwater system changes affiliated with the CSO abatement project completed in 2011 (see Figure 1).
- (4) The site joined DEQ Cleanup Program in April 2011 and is not listed in Appendix Q of the draft FS (Anchor et al., 2012). ECSI database (DEQ, 2011) indicates no information is available.
- (5) This site also is part of the PacifiCorp - Albina Riverlots site (ECSI #5117) that is currently in the process of a source control evaluation.
- (6) Source: Table 4.2-2 in the Portland Harbor RI/FS Draft Final Remedial Investigation Report (Integral et al., 2011).
- (7) Groundwater COI are not listed in Appendix Q of the draft FS or Table 4.2-2 of the Portland Harbor RI/FS Draft Final Remedial Investigation Report (Integral Consulting et al., 2011), or in ECSI database (DEQ, 2012a).
- (8) Site joined DEQ Cleanup Program in October 2012 and is not listed in Appendix Q of the draft FS (Anchor et al., 2012). ECSI database (DEQ, 2012b) indicates no information is available.
- (9) DEQ ECSI database (DEQ, 1995) states there is no indication that significant spills have ever occurred or that any kind of persistent toxic substances were used at this site.

Industrial sites covered or historically covered by National Pollutant Discharge Elimination System (NPDES) stormwater regulations also were considered as potential sources of pollutants to the City conveyance system. One upland site within the basin (TEMCO, LLC Irving Elevator) currently holds an NPDES permit to discharge to the Basin 43 stormwater conveyance system; operations at this site (aka the Cargill site) have been covered by an NPDES permit since 2001.³ Note that the City operates under an NPDES Municipal Separate Storm Sewer System (MS4) stormwater permit that covers basin drainage areas.

3.3 Outfall Setting

Outfall 43 discharges to a reach of the river (referred to as RM11E) that the U.S. Environmental Protection Agency (EPA) designated as an area of potential concern (AOPC 25) based on elevated concentrations of PCBs, metals, and pesticides (EPA, 2010). In addition to Outfall 43, 3 other City outfalls (Outfalls 44, 44A, and 45), 3 Oregon Department of Transportation outfalls (WR-306), and approximately 12 private industrial outfalls also discharge to AOPC 25. Overwater activities (e.g., dock operations, material loading and unloading, dredging) occur within the AOPC in the vicinity of Outfall 43 (see Figures 1 and 2).

4 Basin Screening and Source Investigations

The City's initial source investigations in the basin were in the eastern branch in conjunction with remediation activities at the former Westinghouse site. The City collected stormwater solids samples from the Basin 43 conveyance system in the vicinity of the site before (in 2006) and after (in 2008) site remediation and interim redevelopment (BES, 2010b). PCB concentrations were elevated in these samples, upstream and downstream of the Westinghouse site, suggesting possible multiple current sources of PCBs to the eastern branch. PCBs were not elevated in the western branch (BES, 2011).

The City subsequently conducted phased investigations in the eastern and western branches of the basin, to determine whether there were major contaminant sources in the basin (BES, 2011). During Phase 1 of the investigation, the City collected and analyzed stormwater grab samples and concurrent inline sediment trap samples in 2008-2009 at multiple locations as part of a screening step to help inform subsequent sampling for source tracing purposes (Phase 2). The Phase 1 stormwater samples were collected at locations representative of cumulative discharges from the western and eastern branches, respectively; the samples were analyzed for a broad suite of analytes and the results evaluated using a conservative screening approach. Phase 1 results indicated the presence of PCBs and cadmium sources in the eastern branch and a low-level PCBs source in the western branch (BES, 2011).

Additional stormwater and stormwater sediments were collected (Phase 2) throughout the basin to evaluate potential source areas in each branch. Investigation work included line cleaning to remove possible legacy contaminants in inline solids in the Basin 43 conveyance system. Following line cleaning, concentrations of PCBs in stormwater in the eastern branch were low, indicating that current major sources of PCBs are not present.⁴ Because the eastern

³ Site operations covered by the NPDES permit have not changed, but have been conducted under multiple company names, including: TEMCO, LLC Irving Elevator, CLD Pacific Grain, and Cargill.

⁴ Phase 2 stormwater samples were not analyzed for cadmium because cadmium concentrations in Phase 1 results were an order-of-magnitude below City wastewater discharge limits.

branch was slated for diversion and contaminant concentrations in eastern branch stormwater fall within City wastewater discharge limits, no additional source tracing was warranted in this branch (BES, 2011).

In the western branch, Phase 2 results indicated that no major sources of PCBs currently discharge to the Basin 43 stormwater conveyance system and that additional source tracing was not needed (BES, 2011). As a best management practice following construction of the East Side Big Pipe tunnel through this area, the City cleaned lines and inlets in the western branch in 2012. Post-construction, the City was able to access a manhole near the downstream end of the western branch and collected post-cleanout stormwater samples to verify that further source control measures were not necessary in this area. Results of this investigation confirm that there are no current major PCB sources to Basin 43 (BES, 2012).

Table 2 lists investigations and evaluations completed by the City in the Basin 43 conveyance system.

Table 2. City Investigations in the Basin 43 Stormwater Conveyance System

Data Collection Period	Purpose	Documentation
NA	Describe existing inriver sediment data collected adjacent to the Albina Riverlots shoreline (RM11E), describe adjacent City basins and potential sources, and identify next steps to prioritize outfall basins for future source tracing activities.	Albina Riverlots: City Basin Information and Source Investigation Approach, Technical Memorandum (BES, 2008)
2006	Collect stormwater solids samples from the City conveyance system adjacent to the former Westinghouse property before site remediation and interim redevelopment to assess potential historical offsite migration.	Former Westinghouse Property Storm System Investigation and Source Control Activities Report (BES, 2010b)
2008 - 2011	Collect stormwater and solids data in both branches to determine major sources that may need to be controlled to protect the river (western branch) or the wastewater treatment plant (eastern branch).	Outfall Basin 43 Source Investigation Report, City of Portland Outfall Project, ECSI No. 2425 (BES, 2011)
2012	Final stormwater sampling to confirm that there were no major sources in the current basin.	Outfall Basins 43 and 44 Stormwater Investigations. Technical Memorandum No. OF43/44-1 (BES, 2012)

5 Completion of Source Identification

Most of the industrial area formerly within Basin 43 was diverted to the City's WWTP in 2011. The lines of evidence evaluated to verify that source tracing within the current basin boundary is complete include (1) source tracing results from the basin and (2) land use at remaining upland areas not undergoing DEQ Cleanup Program investigation or redevelopment. Findings from this evaluation are summarized below.

- *Source Tracing Results:* Results of the screening investigation (Phase 1) indicated that major current contaminant sources are not present (BES, 2011). Subsequent results of

the 2012 Phase 2 stormwater investigations in Basin 43 verified that there are no current major sources of PCBs to the conveyance system (BES, 2012).

- *Upland Investigation Coverage and Land Use:* Figure 3 displays the spatial extent of DEQ Cleanup Program site investigation and other programmatic controls (see key to figures provided at beginning of this Appendix) in the current basin. As shown in Figure 3, sites in the current basin:
 - Have received a source control decision/No Further Action determination, or are investigating the stormwater pathway and developing SCMs for implementation under DEQ Cleanup Program authority;
 - Are covered under NPDES stormwater regulations; and/or
 - Are monitored for stormwater exposures through periodic inspections under the City's Industrial Stormwater Program.

Land use in the remaining area is primarily artist studios, office buildings, parking areas, rail lines, and paved roadways. Industrial activities exposed to stormwater are being addressed by the DEQ Water Quality NPDES Program and non-industrial activities are not a known or suspected source of contaminants to the City stormwater conveyance system.

Based on these lines of evidence, the City concludes that the Basin 43 source investigation is complete and no major sources are present.

6 Basin Source Controls

The City and DEQ collaborated under their respective authorities to identify control mechanisms for major sources identified in the basin. Source control in Basin 43 includes SCMs completed under a DEQ Cleanup Program agreement with one upland site, ongoing City and DEQ programs that are described in the Municipal Report, and targeted conveyance system source control activities completed by the City in this basin. Upland site source controls implemented in Basin 43 are displayed in Figure 3 and summarized in this section.

One type of programmatic source control is the elimination of stormwater exposures to industrial activities. Table 3 lists the one site in the basin that currently holds an NPDES No Exposure Certification.

Table 3. Site with No Exposure Certification (NEC) in Basin 43

Address	Company	Time Period
808 N River	Van Raden Industries	2004 - Present

Table 4 summarizes additional site-specific, programmatic, and conveyance system source controls for Basin 43.

Table 4. Basin 43 Source Controls

Site / Area	Source Controls	Implementation Timeframe
Source Control Measures (SCM) at DEQ Cleanup Sites		
Cargill Incorporated (ECSI #5561)	To be determined	To be determined
Tucker Building (ECSI #3036) ⁽¹⁾	<p>City remediation and redevelopment of the former Tucker Building site addressed legacy contamination associated with historical operations and the current site stormwater pathway (BES, 2010a). The site received an NFA from DEQ in 2004. Stormwater source control activities included:</p> <ul style="list-style-type: none"> • Removal of the historical onsite stormwater conveyance system, including piping, catch basins, and residual legacy materials in the system. • Demolition of all site structures, removal of contaminated soil, and capping the site with new pavement or landscaping, thereby removing exposure of any historical site contaminants to stormwater. • Implementation of erosion controls during site remediation and redevelopment, including protection of catch basins potentially affected by soil tracking. • Recording of deed restriction to ensure long-term cap maintenance and integrity. 	2000 – 2002 Ongoing
City Conveyance System		
N. Albina Avenue and N. River Street	The City cleaned catch basins and storm lines potentially affected by the former Tucker Building site redevelopment after completion of the new N. Tillamook Avenue on-ramp to N. Interstate Avenue.	2002
	The City cleaned line segments in the vicinity of the former Tucker Building site as part of the East Side CSO tunnel construction project.	2007
	The City cleaned the N. Albina and N. River Street lines and associated catch basins to remove any residual solids in the conveyance system following completion of the East Side CSO tunnel construction project.	2012
Other (Programmatic Source Controls)⁽²⁾		
Van Raden Industries	NPDES No Exposure Certification	Ongoing

Notes

NFA = No Further Action determination; CSO = combined sewer overflow; DEQ = Oregon Department of Environmental Quality; NPDES = National Pollutant Discharge Elimination System

(1) Source: *Former Tucker Building Storm System Investigation and Source Control Activities Report*. (BES, 2010a).

(2) Programmatic source controls are described in the Municipal Report.

Other municipal programs (e.g., periodic inspection of and technical assistance to non-NPDES sites, illicit discharge monitoring, street sweeping, etc.) likely provide additional source control benefits in the basin and will help to address minor sources for which specific control measures have not been required. City programs that control current and future contaminant discharges to the conveyance system are described in the Municipal Report.

7 Conclusion

The City completed source tracing in Basin 43 and determined that major contaminant sources are not present in the basin. Therefore, future discharges from Outfall 43 are unlikely to represent a significant source of contaminants to the river. The City concludes that it has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin 43.

8 References

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List of Figures

Figure 1: Basin 43 Pre- and Post- Diversion Overview

Figure 2: Basin 43 Overview

Figure 3: Basin 43 Upland Site Source Controls

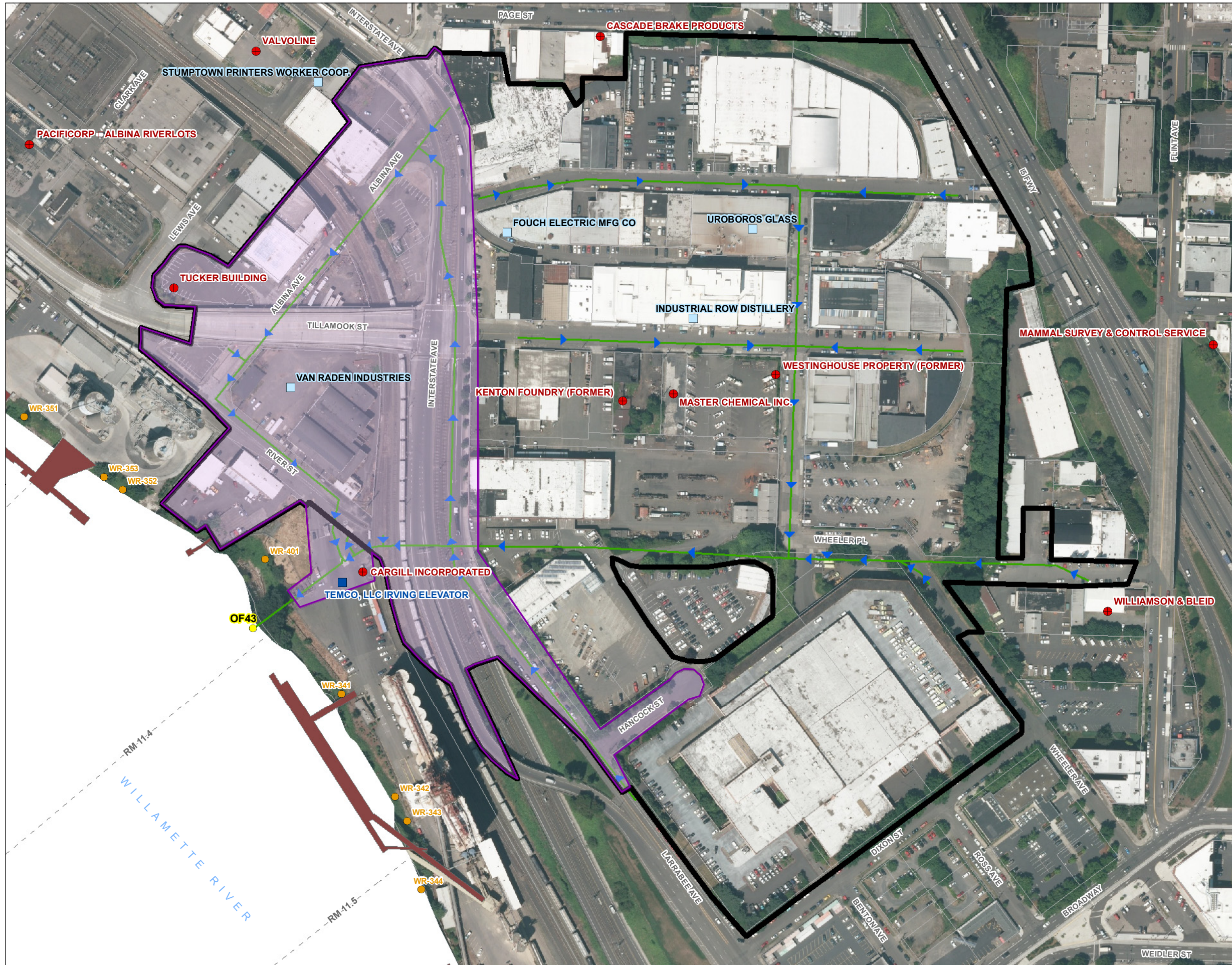
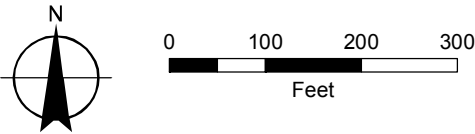


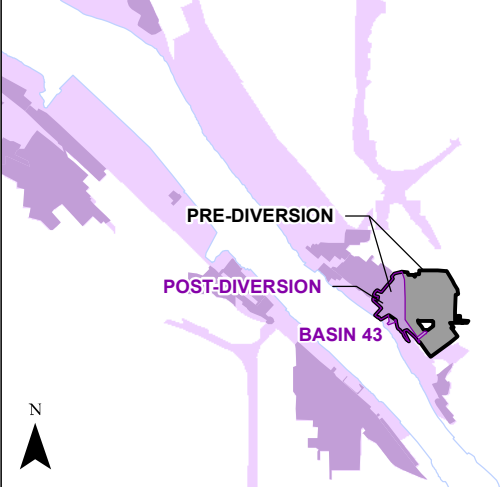
FIGURE 1
Basin 43
Pre- and Post- Diversion Overview

- Basin 43, Pre-Diversion
- Basin 43, Post-Diversion
- DEQ ECSI Site
- NPDES Stormwater Permit
- NPDES No Exposure Certification
- Conveyance System**
 - Storm Line
 - City Outfall
 - Non-City Outfall
- All Other Data**
 - River Mile (RM)
 - Dock
 - Tax Lot
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO
Air Photo Taken 2012

ENVIRONMENTAL SERVICES
CITY OF PORTLAND
1120 SW Fifth Avenue, Room 1000
Portland Oregon, 97204-1912



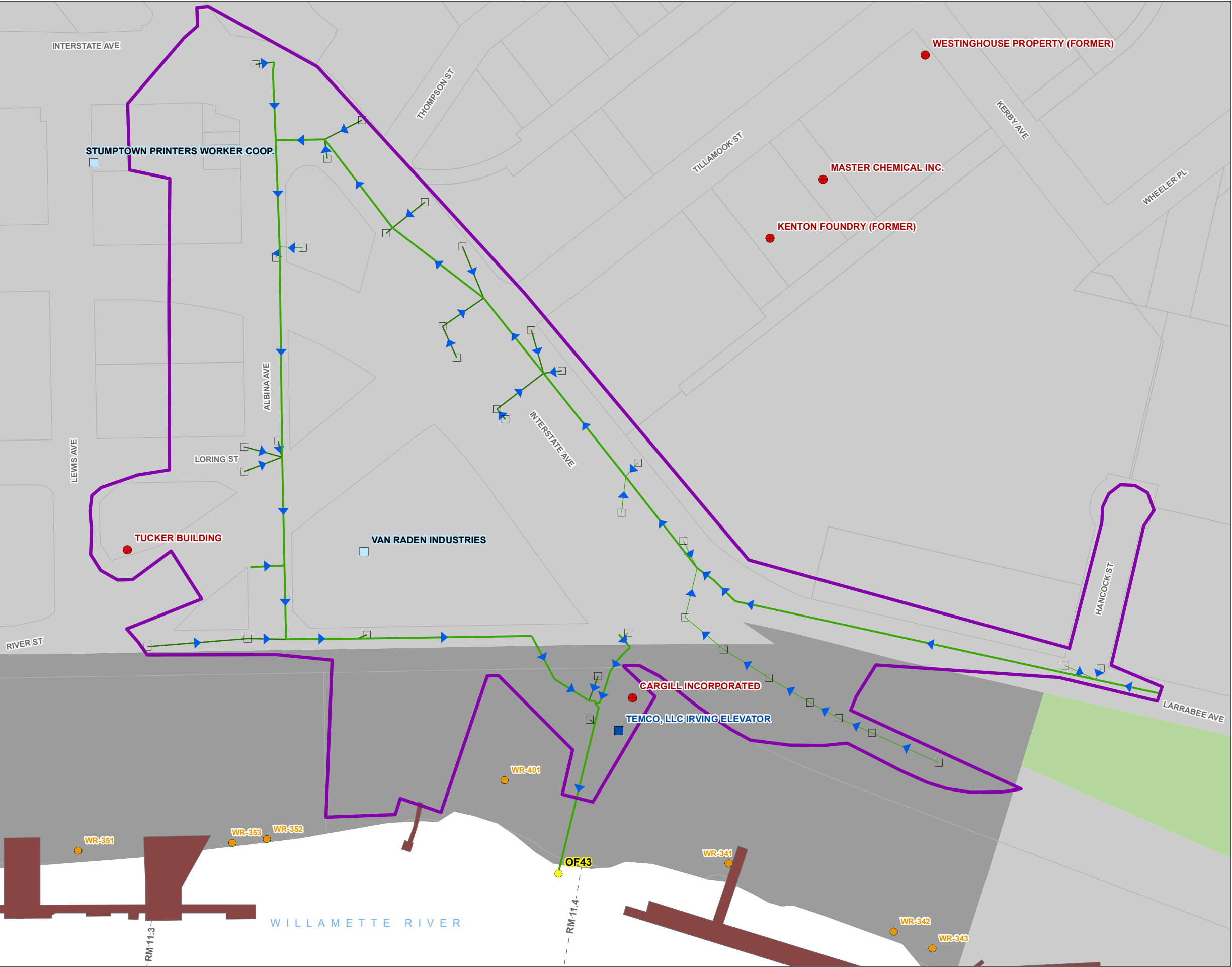
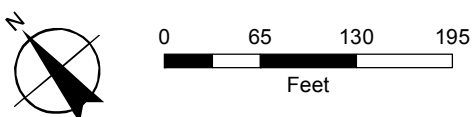


FIGURE 2
Basin 43
Overview

- Basin 43
- DEQ ECSI Site
- NPDES Stormwater Permit
- NPDES No Exposure Certification
- Conveyance System**
 - Storm Line
 - Catch Basin
 - City Outfall
 - Non-City Outfall
- Land Use/Zoning**
 - Heavy Industrial
 - Light Industrial
 - Parks and Open Space
- All Other Data**
 - River Mile (RM)
 - Dock
 - Tax Lot
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO

ENVIRONMENTAL SERVICES
CITY OF PORTLAND
1120 SW Fifth Avenue, Room 1000
Portland Oregon, 97204 -1912

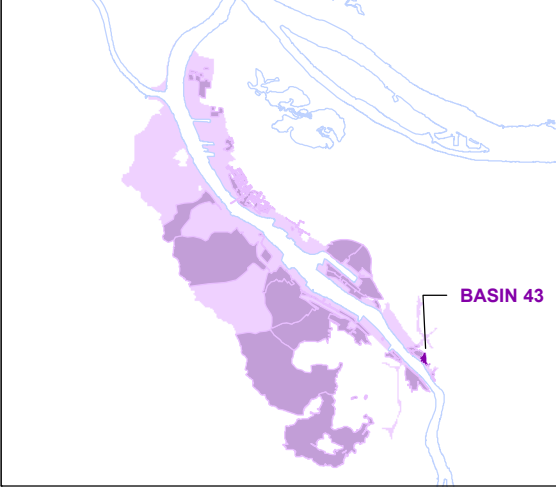
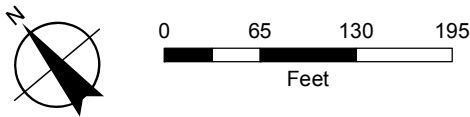




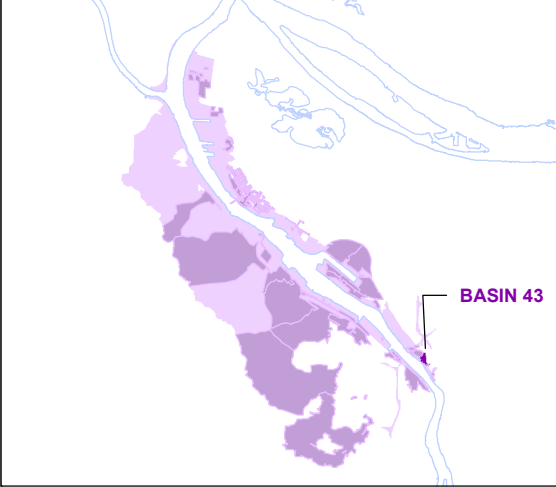
FIGURE 3
Basin 43
Upland Site Source Controls

- Basin 43
- Tax Lot
- DEQ Stormwater SCE**
 - SCE implemented or pending
- All Other Features**
 - NPDES Stormwater Discharge Permit
 - NPDES No Exposure Certification
 - Stormwater Treatment Facility
 - Site Inspection - BES Industrial Stormwater Program
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: January 9, 2014
Data Sources: BES, METRO, Air Photo Taken 2012

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Completion Summary for City of Portland Outfall Basin 44

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and several City programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled. This report summarizes the results of this collaborative effort in Outfall Basin 44.

This Completion Summary includes a weight-of-evidence evaluation to demonstrate that source identification is complete and a summary of source controls (implemented or planned) that will control future contaminant discharges to the Willamette River.

Outfall 44 is located at approximately River Mile (RM) 11.2, on the east side of the Willamette River in the historical Albina area. The outfall discharges to a reach of the river (RM11E) that has been targeted for focused inriver and upland investigations in response to detections of elevated concentrations of polychlorinated biphenyls (PCB) and other contaminants in river sediment, water, and fish tissue samples collected from this area. Current development in the basin includes an electrical power substation, light manufacturing operations (e.g., window inserts), a recycling facility, commercial buildings, artist studios, a railroad corridor, and paved roadways.

Source investigation activities included screening basin storm and solids data to determine the potential for sources to be present in the basin, and subsequent stormwater, inline solids, and surface soil sampling at selected upgradient locations to identify specific source areas in the basin. The results of the basin-level screening indicated that sources of PCBs were present in Basin 44, but not major sources of other contaminants. Subsequent investigation by the City, and by PacifiCorp at its Albina Substation, indicated that runoff from areas with contaminated erodible soils on and adjacent to the active and former substation properties likely contributed to the elevated PCB concentrations observed in the Basin 44 samples. PacifiCorp implemented source control measures (SCM) at and adjacent to the site. After completion of PacifiCorp's SCMs at the substation, the City collected stormwater samples from multiple locations in the basin; the results indicated that there are no current major PCB sources in Basin 44.

The City has identified all major sources of contaminants in the basin and necessary controls are being implemented under DEQ and/or City authority. Therefore, the City has met the remedial investigation (RI)/SCM objectives for Basin 44.

2 Introduction

This Completion Summary presents a weight-of-evidence evaluation of whether further source investigation is needed in Basin 44, and the rationale for concluding that current and future discharges from the basin are not likely to be significant sources of contaminants to river sediment. The purpose of this report is to demonstrate that, for Basin 44, the City has met the joint RI/SCM objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ. Together the City and DEQ identified major sources of contaminants to the basin and are using respective authorities to ensure that source controls are implemented where needed.

This report is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report), which provides additional background and detail regarding the City's harborwide source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Outfall 44 discharges to the east side of the Willamette River at approximately RM 11.2. The outfall conveys stormwater from an approximately 16-acre drainage basin. In addition to the main storm line to the outfall, the conveyance system includes branches along N. River and N. Loring Streets and the intersecting streets between the river and N. Interstate Avenue.

In 2002, the City completed installation of stormwater treatment in the storm line along N. Loring Street. This work was done as part of the Lower Albina Overcrossing Project, which entailed the construction of a new vehicle ramp from the Albina area up to N. Interstate Avenue. Construction of the ramp, on property acquired by the City, required implementation of stormwater treatment in accordance with the BES Stormwater Management Manual (SWMM). Because ramp stormwater discharged to multiple locations, including Basin 44, the project was allowed to implement offsite treatment to meet this requirement. The City installed a sedimentation manhole in Basin 44 to treat approximately 5 acres of basin drainage area (BES, 2010).

Figure 1 shows the location of the outfall and drainage basin boundary and provides an overview of the associated stormwater conveyance system. Additional detail on the Outfall 44 stormwater conveyance system and associated drainage basin is included in the *Albina Riverlots: City Basin Information and Source Investigation Approach Technical Memorandum* (BES, 2008) and the *Outfall Basin 44 Source Investigation Report* (BES, 2011).

3.2 Land Use and Potential Upland Sources

Basin 44 is located in the historical Albina area. The riverfront in this area has been used for industrial purposes since at least the early 1900s. Current land use in the basin is light industrial and includes an electrical power substation, light manufacturing operations (e.g., window inserts), a recycling facility, commercial buildings, artist studios, a railroad corridor, and paved roadways.

Sites that were identified as potential sources include three sites in (and one site formerly in) the basin that are in the DEQ Cleanup Program, as listed in DEQ's Environmental Cleanup Site Information (ECSI) database. Table 1 lists these sites and indicates the associated contaminants of interest (COI) and the status of site pathway evaluations. Of the three sites in the basin, one (PacifiCorp) has completed implementation of stormwater SCMs and currently is conducting a source control evaluation (SCE) under DEQ oversight. DEQ determined that SCEs at the remaining two sites currently in the basin are not needed. Stormwater from a portion of the fourth site (Glacier Northwest) discharged to Basin 44 at the time of the City's source investigation activities, but has since disconnected from the system; this site also is conducting an SCE under DEQ oversight.

Table 1. DEQ Cleanup Program Sites in Basin 44

DEQ Cleanup Program Site	Site COIs ⁽¹⁾	Site Pathway Evaluations	
		Stormwater Pathway ⁽²⁾	Preferential Groundwater Pathway ⁽³⁾
PacifiCorp Albina Riverlots (ECSI #5117)	<i>Stormwater:</i> TPH, PCBs <i>Groundwater:</i> No Sampling Reported	Source Control Evaluation In Progress	Source Control Evaluation in Progress
Valvoline (ECSI # 3215)	<i>Stormwater:</i> No Sampling Reported ⁽⁴⁾ <i>Groundwater:</i> No Sampling Reported ⁽⁴⁾	Source Control Evaluation Not Needed	Source Control Decision Equivalent
Vermiculite Northwest, Inc. (Former) (ECSI # 2761)	Asbestos ⁽⁵⁾	Source Control Evaluation Not Needed	Not Shown
Glacier Northwest (ECSI # 5449) ⁽⁶⁾	<i>Stormwater:</i> No Sampling Reported ⁽⁴⁾ <i>Groundwater:</i> No Sampling Reported ⁽⁴⁾	Source Control Evaluation In Progress	Source Control Evaluation in Progress

Notes:

TPH = total petroleum hydrocarbons; COIs = contaminants of interest; PCBs = polychlorinated biphenyls; ECSI = Environmental Cleanup Site Information; DEQ = Oregon Department of Environmental Quality

- (1) Unless otherwise noted, site contaminants of interest are those identified in Appendix Q (Source Control Inventory Tables) of the Portland Harbor RI/FS Draft Feasibility Study (FS) (Anchor et al., 2012).
- (2) Source: DEQ Milestone Report, Figure 1b, "Status of Stormwater Source Control Evaluations, January 2013" (DEQ, 2013).
- (3) Source: DEQ Milestone Report, Figure 3, "Groundwater Source Control Evaluation Status, January 2013" (DEQ, 2013).
- (4) Source: Table 4.2-2 in the Portland Harbor RI/FS Draft Final Remedial Investigation Report (Integral et al., 2011).
- (5) Site is not listed in Appendix Q of the draft FS or Table 4.2-2 of the Draft Final RI. ECSI database lists asbestos as a potential hazardous substance at this site. (DEQ, 2000).
- (6) Site is no longer in Basin 44. The northwestern portion of the site (former KF Jacobsen lease area) formerly discharged to the Basin 44 conveyance system but these connections were rerouted to a private Glacier outfall in May 2011 (ERM, 2012).

Industrial sites covered or historically covered by National Pollutant Discharge Elimination System (NPDES) stormwater regulations also were considered as potential sources of pollutants to the City conveyance system. Table 2 lists sites in the basin that historically held NPDES permits to discharge to the Basin 44 stormwater conveyance system. No sites currently in the basin hold NPDES permits. Note that the City operates under an NPDES Municipal Separate Storm Sewer System (MS4) stormwater permit that covers basin drainage areas.

Table 2. Historical NPDES Permit Coverage in Basin 44⁽¹⁾

Address	Company	Permit Type	Time Period
2308 N Clark	Valvoline Co N Clark	Stormwater (1200-H)	1993 – 1996
		Stormwater (1200-Z)	1998 – 1999
1208 N River	KF Jacobsen & Co Inc-Plant ^(1,2)	Gravel Mining (WPCF 1000)	1997 – 2001
		Stormwater for Gravel Mining (1200-A)	2001 – 2011

Notes:

NPDES = National Pollutant Discharge Elimination System; WPCF = Water Pollution Control Facilities

(1) Ross Island Sand & Gravel Co. is listed as a tenant covered under this permit.

(2) KF Jacobsen & Co. operations that discharged to Basin 44 were rerouted to a private outfall in May 2011. The site no longer discharges to Basin 44.

3.3 Outfall Setting

Outfall 44 discharges to a reach of the river (referred to as RM11E) that the U.S. Environmental Protection Agency (EPA) has designated as an area of potential concern (AOPC 25) based on elevated concentrations of PCBs, metals, and pesticides (EPA, 2010). In addition to Outfall 44, 3 other City outfalls (Outfalls 43, 44A, and 45), 1 Oregon Department of Transportation outfall (WR-306), and approximately 12 private industrial outfalls also discharge to AOPC 25. Overwater activities (e.g., dock operations, material loading and unloading) occur in the AOPC in the vicinity of Outfall 44.

4 Basin Screening and Source Investigations

The City initiated phased investigations in Basin 44 in 2008 as part of its evaluation of City basins discharging to RM11E, to determine whether there were major contaminant sources in the basin (BES, 2011). During Phase 1 of the investigation, the City collected and analyzed stormwater grab samples and concurrent inline sediment trap samples in 2008-2009 to determine the potential for sources to be present in the basin. The Phase 1 stormwater samples were collected at a location representative of cumulative discharges from the basin; the samples were analyzed for a broad suite of analytes and the results evaluated using a conservative screening approach. Phase 1 basin screening results indicated the potential presence of major sources of PCBs to the Basin 44 stormwater conveyance (BES, 2011).

During Phase 2 of the investigation, the City collected additional stormwater, inline solids, and surface soil samples at selected upgradient locations to evaluate potential source areas in the basin. The highest total PCB concentration for the Phase 1 basin-level stormwater samples was detected in a sample collected during the time of a 2008-2009 transformer replacement project at PacifiCorp's Albina Substation. Additionally, the Phase 2 solids sample with the highest PCB concentration was from a catch basin that the City observed to be capturing erodible soils migrating offsite from the vicinity of the transformer replacement project. Based on these results and the spatial pattern of PCB concentrations observed throughout the basin for the Phase 2 stormwater samples, the active substation site was determined to be a major source of PCBs to the City conveyance system (BES, 2011). These sample results supported DEQ's request for PacifiCorp to enter the DEQ Cleanup Program. PacifiCorp's subsequent investigations in the vicinity of the active substation properties identified the presence of PCBs in erodible soils at and adjacent to the site (Bridgewater, 2011).

Results of Phase 2 stormwater and solids sampling at upgradient locations in the basin also indicated a potential PCB source to a manhole located in N. Clark Avenue just northeast of the railroad tracks. Based on land use and operations in the vicinity, the City was not able to identify any potential sources. To determine whether the source of the PCBs detected at this location were legacy contaminants from historical industrial operations in the area or indicative of a current major source, the City cleaned the catch basins and connecting lines discharging to this manhole, installed catch basin filters to accumulate solids discharging to the system, and then resampled inline solids in 2010. Total PCB concentrations in the post-cleanout samples were low, indicating that a major current source of PCBs is not present in this portion of the basin (BES, 2011). During the Phase 2 investigation, the City also investigated possible sources of other contaminants (e.g., chlordane and phthalates) and determined that major sources of these contaminants are not present in the basin (BES, 2011).

As a final step to confirm that current PCB sources to Basin 44 had been controlled following completion of PacifiCorp's SCMs at the Albina Substation, the City collected one round of stormwater samples from six locations within the basin in 2012 (BES, 2012). The purpose of this investigation was to supplement performance monitoring data being collected by PacifiCorp by collecting data during a large storm event – conditions in which PCB-contaminated erodible soils could be mobilized to the Basin 44 conveyance system. Results indicated that there are no current major PCB sources in Basin 44 (BES, 2012).

Table 3 lists investigations and evaluations completed by the City and others in the Basin 44 conveyance system.

Table 3. Investigations in the Basin 44 Stormwater Conveyance System

Data Collection Period	Party	Purpose	Documentation
NA	City	Describe existing inriver sediment data collected adjacent to the Albina Riverlots shoreline (RM11E), describe adjacent City basins and potential sources, and identify next steps to prioritize outfall basins for future source tracing activities.	Albina Riverlots: City Basin Information and Source Investigation Approach, Technical Memorandum (BES, 2008)
2008 – 2011	City	Collected stormwater and solids data as part of a stormwater pathway screening evaluation of Basin 44 to determine whether Basin 44 is a significant pathway for contaminant discharges from upland sources to the river.	Outfall Basin 44 Source Investigation Report, City of Portland Outfall Project, ECSI No. 2425 (BES, 2011)
2011 – 2012	PacifiCorp	As part of SCM performance monitoring for the Albina Substation, PacifiCorp collected stormwater samples from City catch basins adjacent to the site.	Interim Stormwater Source Control Measures Completion Report, Albina Substation (Bridgewater, 2011)
2012	City	Final stormwater sampling to confirm that additional source control measures are not needed in the basin.	Outfall Basins 43 and 44 Stormwater Investigations. Technical Memorandum No. OF43/44-1 (BES, 2012)

Notes:

RM = River Mile; SCM = source control measure; NA = not applicable

5 Completion of Source Identification

The lines of evidence evaluated to verify that source tracing is complete and all major sources have been identified include (1) results of source tracing activities conducted in the basin (and upland site information) and (2) land use at remaining upland areas not undergoing DEQ Cleanup Program investigation. Findings from this evaluation are summarized below.

- *Source Tracing Results:* Results of the Basin 44 source investigation activities indicated a source of PCBs in the basin (BES, 2011). City source tracing results and data subsequently collected by PacifiCorp at its Albina Substation confirmed that contaminated erodible soils at and adjacent to the substation were a current source of PCBs to the basin (BES, 2011; Bridgewater, 2011). Data collected by the City and PacifiCorp following implementation of source controls indicate that this source has been controlled and that there are no current major sources of PCBs to the conveyance system (Bridgewater, 2011; BES, 2012). City source investigation results confirmed that major sources of other contaminants are not present in the basin (BES, 2011).
- *Upland Investigation and Land Use:* Figure 2 displays the spatial extent of DEQ Cleanup Program site investigation and other programmatic controls (see key to figures provided at beginning of this Appendix) in the current basin. As shown in Figure 2, almost all sites in the basin:
 - Are investigating the stormwater pathway and implementing SCMs under DEQ Cleanup Program authority;
 - Have been designated by DEQ as not needing an SCE or as a low priority for completing an SCE;
 - Are covered under NPDES industrial stormwater regulations; and/or
 - Are monitored for stormwater exposures through periodic inspections under the City's Industrial Stormwater Program.

Land use at sites not covered by DEQ Cleanup or Water Quality Programs consists of commercial operations, artist studios, and a parking lot. Industrial activities exposed to stormwater are being addressed by the DEQ Water Quality NPDES Program and non-industrial activities are not a known or suspected source of contaminants to the City stormwater conveyance system.

Based on these lines of evidence, the City concludes that the Basin 44 source investigation is complete and all major sources have been identified.

6 Basin Source Controls

The City and DEQ collaborated under their respective authorities to identify control mechanisms for major sources identified in the basin. Source control for major and minor sources in Basin 44 includes SCMs completed at one contaminated site under a DEQ Cleanup Program agreement, specific controls implemented in the City's shared stormwater conveyance system (e.g., targeted line cleaning), and ongoing City and DEQ programs that are described in the Municipal Report. Source controls implemented in Basin 44 are displayed in Figures 1 and 2 and summarized in this section.

One type of programmatic source control is the elimination of stormwater exposures to industrial activities. Table 4 lists sites that hold (or historically held) an NPDES No Exposure Certification (NEC).

Table 4. Sites with No Exposure Certification (NEC) in Basin 44 ⁽¹⁾

Address	Company	Time Period
2293 N Interstate	Stumptown Printers Worker Cooperative, Inc.	2012 – Present
2317 N Clark	Steelab LLC	2011 – Present
2223 N Randolph	Cloudburst	2012 – Present
2336 N Randolph	Forge Graphic Works	2013 - Present

Notes:

(1) Current NECs are indicated in bold.

Table 5 summarizes additional site-specific, programmatic, and conveyance system source controls for Basin 44.

Table 5. Basin 44 Source Controls

Site/Area	Source Controls	Implementation Timeframe
Source Control Measures (SCM) at DEQ Cleanup Program Sites ⁽¹⁾		
PacifiCorp Albina Riverlots (ECSI #5117)	PacifiCorp removed PCB-contaminated erodible soils from the active Albina Substation site and surrounding areas; repaved the access aprons to the site; and installed additional onsite berms to control overland stormwater runoff from the substation (Bridgewater, 2011).	2010
	PacifiCorp plugged the only onsite catch basin at the Substation that formerly connected to the Basin 44 conveyance system and installed an infiltration basin to infiltrate all stormwater from the drainage area for this catch basin. Permanent decommissioning of the catch basin is planned for 2013 (Bridgewater, 2012).	2012 - 2013
Glacier Northwest (ECSI # 5449)	Glacier Northwest/ CalPortland rerouted an approximately 1-acre portion of the site (former KF Jacobsen lease area) from Basin 44 to a private outfall, eliminating all stormwater contributions from this site to the river via Outfall 44 (ERM, 2012).	2011
Valvoline (ECSI #3215)	The site removed contaminated soil and capped the excavated area with clean fill.	2003
Vermiculite Northwest, Inc. (Former) (ECSI # 2761)	NA ⁽²⁾	NA

Site/Area	Source Controls	Implementation Timeframe
City Conveyance System		
N. Loring Street	The City installed a sedimentation manhole in the N. Loring Street line, as part of the Lower Albina Overcrossing Project. The structure reduces total suspended solids loading from approximately 5 acres in the eastern portion of the basin. The City cleaned catch basins and storm lines after completion of the ramp.	2002
N. Harding, N. Clark, and N. Lewis Avenues	As part of the localized source investigation for PCBs, the City cleaned the manholes and all associated catch basins and catch basin laterals on these streets in the drainage area between the railroad corridor and N. Interstate Avenue.	2009
N. Loring Street at N. Randolph Avenue	As part of the localized source investigation for chlordane, the City cleaned a manhole and affiliated catch basins and catch basin lateral lines at this intersection.	2009
N. Loring Street	In response to a transformer fire and oil release at the PacifiCorp Albina Substation in January 2010, PacifiCorp cleaned asphalt, sidewalks, impacted catch basins, and an adjacent City sedimentation manhole. PacifiCorp placed clean gravel in the right-of-way as a temporary SCM for contaminated erodible soils (PBS, 2010).	2010
N. River and N. Loring Streets, and vacated N. Harding Avenue	Following completion of contaminated soil removal activities at and around the Albina Substation, PacifiCorp cleaned catch basin inlets, connecting laterals, and approximately 805 linear feet of City stormwater lines in the vicinity of the site (Bridgewater, 2011).	2010
Other (Programmatic Source Controls)⁽³⁾		
Cloudburst	City Discharge Authorization⁽⁴⁾	Ongoing
See listing in Table 4	NPDES No Exposure Certifications	Ongoing

Notes:

DEQ = Oregon Department of Environmental Quality; NPDES = National Pollutant Discharge Elimination System; PCB = polychlorinated biphenyl; NA = not applicable; ECSI = Environmental Cleanup Site Information

(1) Descriptions of DEQ Cleanup Program site SCMs are based on information in reports on file with DEQ.

(2) DEQ has determined that a source control evaluation is not needed or is a low priority at this site (DEQ, 2013).

(3) Programmatic source controls are described in the Municipal Report.

(4) Additional site-specific stormwater pollution controls required and implemented under City Code.

All major contaminant sources have been controlled under the programs identified above. Other municipal programs (e.g., periodic inspection of and technical assistance to non-NPDES sites, illicit discharge monitoring, street sweeping, etc.) likely provide additional source control benefits in the basin and will help to address minor sources for which specific control measures have not been required. For example, during the initial phase of the basin source investigation, BES conducted site inspections at a number of sites (see Figure 2) to identify possible industrial exposures and to provide assistance on implementation of stormwater best management practices. City programs that control current and future contaminant discharges to the conveyance system are described in the Municipal Report.

7 Conclusion

The City completed source tracing in Basin 44 and identified the major and potential sources of contaminants to the City conveyance system. Because necessary SCMs at identified sources have been implemented or are being determined under appropriate DEQ and City regulatory authorities, future discharges from Outfall 44 are unlikely to represent a significant source of contaminants to the river. The City concludes that it has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin 44.

8 References

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<http://www.deq.state.or.us/lq/ECSI/ecsidetail.asp?seqnbr=2761>
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PBS. 2010. Letter to PacifiCorp Re: Albina Substation Environmental Soil Sampling. June 23, 2010.

List of Figures

Figure 1: Basin 44 Overview and Conveyance System Source Controls

Figure 2: Basin 44 Upland Site Source Controls

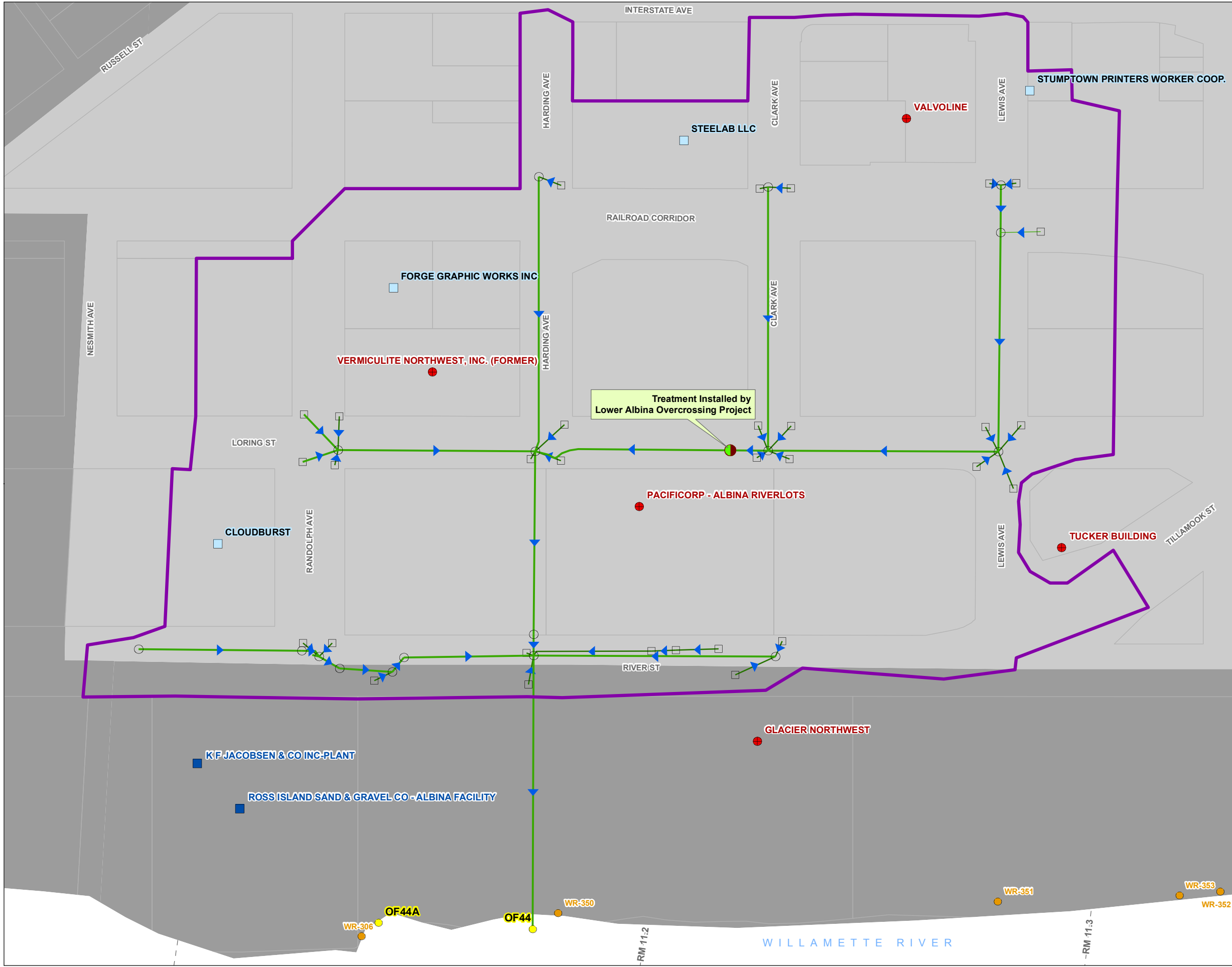
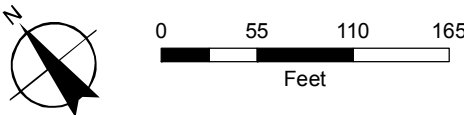


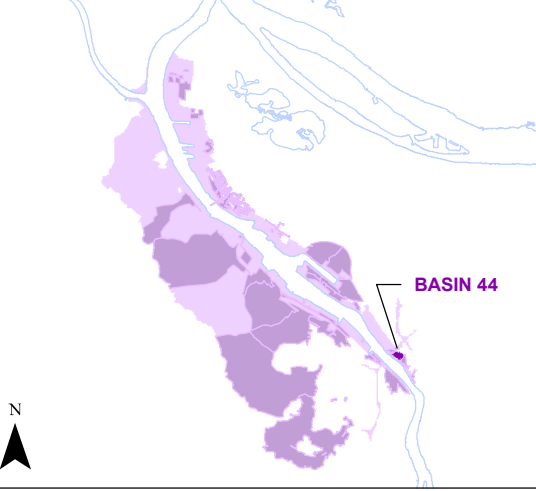
FIGURE 1
Basin 44
Overview and Conveyance
System Source Controls

- Basin 44
 - DEQ ECSI Site
 - NPDES Stormwater Permit
 - NPDES No Exposure Certification
- Conveyance System**
- Storm Line
 - Manhole
 - Catch Basin
 - Sediment Removal Structure
 - City Outfall
 - Non-City Outfall
- Land Use/Zoning**
- Heavy Industrial
 - Light Industrial
- All Other Data**
- River Mile (RM)
 - Tax Lot
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
 Date: December 19, 2013
 Data Sources: BES, METRO

ENVIRONMENTAL SERVICES
 CITY OF PORTLAND
 1120 SW Fifth Avenue, Room 1000
 Portland Oregon, 97204 -1912



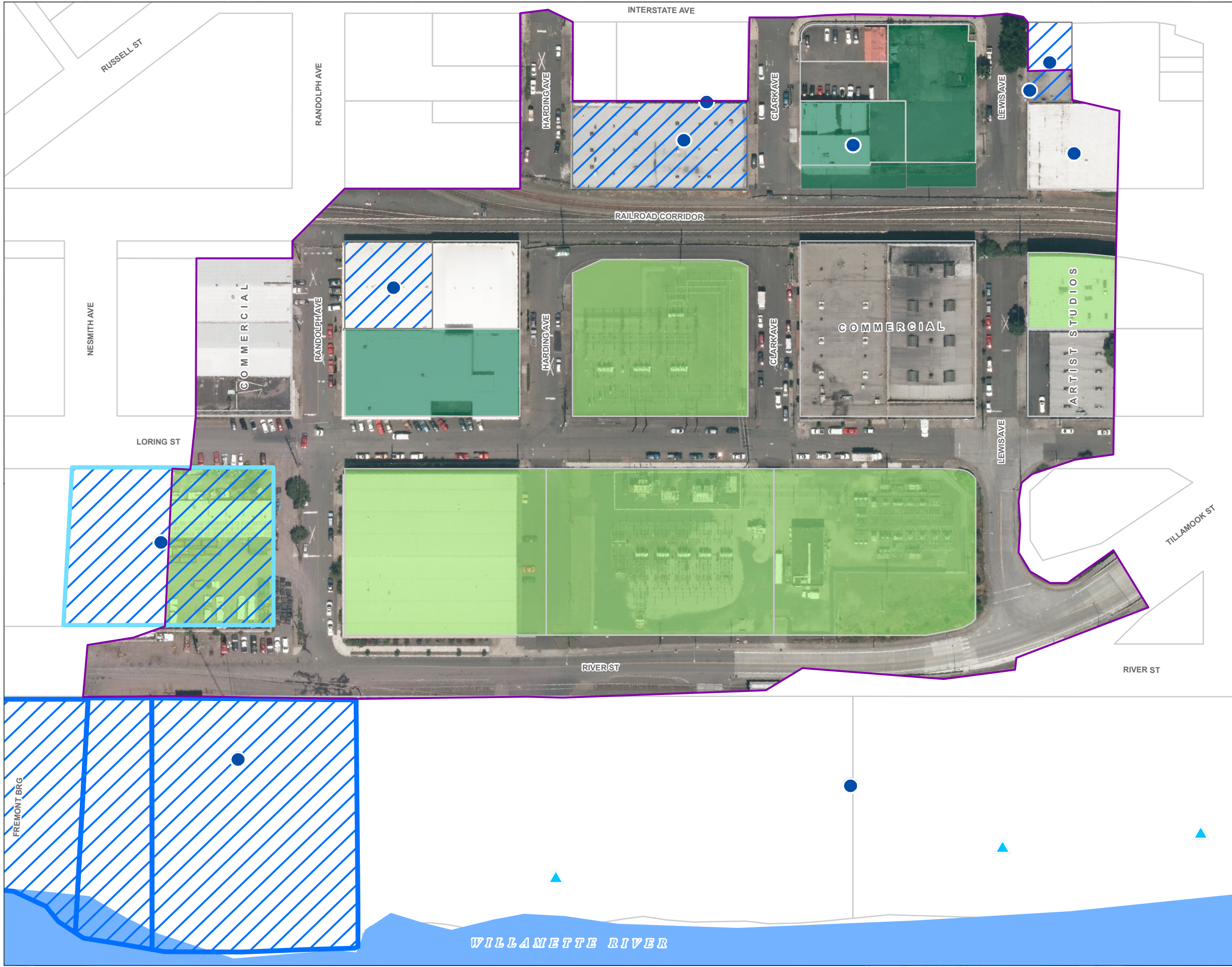
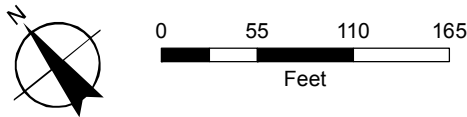
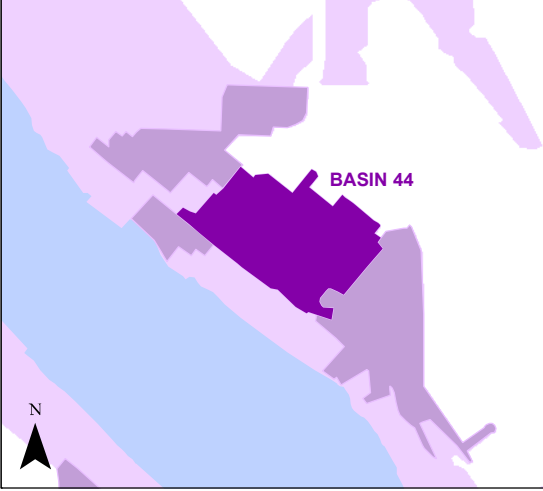


FIGURE 2
Basin 44
Upland Site Source Controls

- Basin 44
- Tax Lot
- DEQ Stormwater SCEs**
 - SCE implemented or pending
 - SCE not needed or low priority
- All Other Features**
 - NPDES Stormwater Discharge Permit
 - City Discharge Authorization
 - NPDES No Exposure Certification
 - Stormwater Treatment Facility
 - Site Inspection - BES Industrial Stormwater Program
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO, Aerial Photo Taken 2012
ENVIRONMENTAL SERVICES
CITY OF PORTLAND
1120 SW Fifth Avenue, Room 1000
Portland Oregon, 97204-1912



Completion Summary for City of Portland Outfall Basin 44A

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and several City programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled. This report summarizes the results of this collaborative effort in Outfall Basin 44A.

Outfall 44A is located on the east side of the Willamette River at approximately River Mile (RM) 11.2, within a reach of the river (referred to as RM11E) that was identified in 2007 as a target for focused inriver and upland investigations in response to detections of elevated concentrations of polychlorinated biphenyls (PCB) and other contaminants in river sediment, water, and fish tissue samples collected from this area.

Prior to 2011, the basin was about 115 acres. Under the City's combined sewer overflow (CSO) Abatement Program, almost all of the basin was slated for diversion to the Columbia Boulevard Wastewater Treatment Plant (WWTP) via the new East Side Big Pipe tunnel. In early 2011, the City completed a source evaluation of Basin 44A, determined that major contaminant sources are not present, and concluded that future discharges from the basin are not likely to represent a significant source to the Willamette River or to the WWTP. Diversion of the majority of the basin drainage area occurred in late 2011.

Current basin drainage area is limited to a small portion of one industrial site, Ross Island Sand & Gravel (RIS&G); DEQ determined that operations at this site do not warrant a source control evaluation (SCE) under DEQ Cleanup Program authority. This site is covered under federal stormwater regulations, which are expected to provide adequate source controls for current discharges to the outfall. In addition, the City plans to abandon the outfall, which will eliminate this potential pathway to the river. Therefore, the City has met the remedial investigation (RI)/source control measure (SCM) objectives for Basin 44A.

2 Introduction

This Completion Summary presents a weight-of-evidence evaluation of whether further source investigation is needed in Basin 44A, and the rationale for concluding that current and future discharges from the basin are not likely to be significant sources of contaminants to river sediment. The purpose of this report is to demonstrate that, for Basin 44A, the City has met the joint RI/SCM objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ. Together the City and DEQ evaluated sources of contaminants to the basin and are utilizing respective authorities to ensure that source controls are implemented where needed.

This report is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor*, which provides additional background and detail regarding the City's harborwide source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Outfall 44A discharges to the east side of the Willamette River at approximately RM 11.2. The outfall currently conveys stormwater from a 2.4-acre drainage basin located entirely within the RIS&G site. Before the 2011 CSO diversion, the basin drained approximately 115 acres. The former basin conveyance system includes several stormwater treatment facilities along various rights-of-way. These facilities were constructed by the City, Tri-Met, and private parties (e.g., Legacy Emanuel Hospital) to reduce total suspended solids loading to the former basin.

Figure 1 shows the location of the outfall, the pre- and post-diversion drainage basin boundaries, and provides an overview of the associated stormwater conveyance system. Additional detail on the Outfall 44A stormwater conveyance system and associated drainage basin is included in the *Albina Riverlots: City Basin Information and Source Investigation Approach Technical Memorandum* (BES, 2008) and the *Outfall Basin 44A Source Investigation Report* (BES, 2011).

3.2 Land Use and Potential Upland Sources

Basin 44A is located in the historical Albina area. Land use in the current basin is heavy industrial and consists entirely of sand and gravel operations on a portion of the RIS&G site (see Figure 2). Land use in the diverted basin is a mix of industrial, commercial, residential, and open space uses (see Figure 1).

The RIS&G site in the current basin has been evaluated by DEQ (DEQ, 2013). Sites that were identified as potential sources in the diverted basin include two DEQ Cleanup Program sites, as currently listed in DEQ's Environmental Cleanup Site Information (ECSI) database.¹ Table 1 lists these sites, the associated contaminants of interest (COI), and the status of stormwater pathway evaluations.

¹ A third DEQ Cleanup Program Site in the former basin, Campbell Dry Cleaner (Former) (ECSI #5680), joined the Cleanup Program in July 2013, after this portion of the basin was diverted, and therefore was not identified as a potential source.

Table 1. DEQ Cleanup Program Sites in Basin 44A

DEQ Cleanup Program Site	Site COIs ⁽¹⁾	Site Stormwater Pathway Evaluations ⁽²⁾
Sites in Current Basin		
Ross Island Sand & Gravel Company (ESCI #5577) ⁽³⁾	No Sampling Reported ⁽⁴⁾	Source Control Evaluation Not Needed
Sites in Former Basin (pre-2011 CSO diversion)		
PacifiCorp Albina Riverlots (Knott Street Substation) (part of ECSI #5117)	TPH, PCBs	Source Control Evaluation In Progress
Tarr Inc. (ECSI #1139)	VOCs, PAHs, TPH ⁽³⁾	Source Control Evaluation Not Needed

Notes:

TPH = total petroleum hydrocarbons; PCBs = polychlorinated biphenyls; PAHs = polycyclic aromatic hydrocarbons; VOCs = volatile organic compounds; COIs = contaminants of interest; ECSI = Environmental Cleanup Site Information; DEQ = Oregon Department of Environmental Quality; CSO = combined sewer overflow; SCE = source control evaluation

- (1) Unless otherwise noted, site COIs are those identified in Appendix Q (Source Control Inventory Tables) of the Portland Harbor RI/FS Draft Feasibility Study (FS) (Anchor et al., 2012).
- (2) Source: DEQ Milestone Report, Figure 1b, "Status of Stormwater Source Control Evaluations, January 2013" (DEQ, 2013), unless otherwise noted.
- (3) Site is no longer listed in the ECSI database. In 2008, DEQ requested the facility owners to conduct an SCE (DEQ, 2008). DEQ subsequently rescinded its request based on a site visit and additional information provided by the property owners (DEQ, 2011).
- (4) Source: Table 4.2-2 in the Portland Harbor RI/FS Draft Final Remedial Investigation Report (Integral et al., 2011).

Industrial sites covered or historically covered by National Pollutant Discharge Elimination System (NPDES) stormwater regulations also were considered as potential sources of pollutants to the City conveyance system. Sites within the basin that currently hold, or historically held, NPDES permits to discharge to the Basin 44A conveyance system are listed in Table 2. Sites with current NPDES permits are shown in Figure 2. The only site in the current basin operates under an NPDES permit.

Table 2. Current⁽¹⁾ and Historical NPDES Permit Coverage in Basin 44A

Address	Company	Permit Type	Time Period
Sites in Current Basin			
1208 N River	KF Jacobsen & Co Inc-Plant ⁽²⁾	Gravel Mining (WPCF 1000)	1997 – 2001
		Stormwater for Gravel Mining (1200-A)	2001 – present
Sites in Diverted Basin			
2429 N Borthwick	Priestly Oil & Chemical Co., Inc	Stormwater (1200-T)	1992 – 1995
	Tarr Acquisition LLC	Stormwater (1200-T)	1995 – 1996
		Stormwater (1200-Z)	1998 – 2012

Notes:

NPDES = National Pollutant Discharge Elimination System; WPCF = Water Pollution Control Facilities

(1) Current permits are indicated in bold.

(2) Ross Island Sand & Gravel Co. is listed as a tenant covered under this permit.

3.3 Outfall Setting

Outfall 44A discharges to a reach of the river (referred to as RM11E) that the U.S. Environmental Protection Agency (EPA) has designated as an area of potential concern (AOPC 25) based on elevated concentrations of PCBs, metals, and pesticides (EPA, 2010). In addition to Outfall 44A, 3 other City outfalls (Outfalls 43, 44 and 45), 1 Oregon Department of Transportation outfall, and approximately 12 private industrial outfalls also discharge to AOPC 25. Overwater activities (e.g., dock operations, material loading and unloading) occur within the AOPC in the vicinity of Outfall 44A.

4 Basin Screening and Source Investigations

The City initiated phased investigations in Basin 44A in 2008 as part of its evaluation of City basins discharging to RM11E, to determine whether there were major contaminant sources in the basin (BES, 2011). The objective of the investigations was to determine whether source controls may be needed at sites discharging to the basin (i.e., either to address current contaminant discharges to the river or to address future contaminant discharges to the City's WWTP). During Phase 1 of the investigation, the City collected and analyzed stormwater grab samples and concurrent inline sediment trap samples in 2008-2009 to determine the potential for sources to be present in the basin. The Phase 1 stormwater samples were collected at a location representative of the majority of the basin drainage area; samples were analyzed for a broad suite of analytes and the results were evaluated using a conservative screening approach. Phase 1 basin screening results did not indicate the potential presence of major contaminant sources to the basin (BES, 2011).

Because concurrent data collection in Basin 44 had identified the PacifiCorp Albina Substation as a source of PCBs to Basin 44, the City opted to conduct a Phase 2 investigation in the upper subbasin in the vicinity of the PacifiCorp Knott Street Substation to evaluate whether this site was a source to Basin 44A. The City analyzed stormwater solids collected from two catch

basins adjacent to the site and concluded that the site was not a likely major source to the Basin 44A conveyance system (BES, 2011).

Approximately 2.4 acres of the RIS&G site drainage area connects to the Basin 44A conveyance system downstream of the monitoring location used during Phase 1. In 2008, DEQ requested RIS&G to conduct an SCE (DEQ, 2008). Based on a site visit and additional information provided by the property owners, DEQ subsequently determined that an SCE was not warranted (DEQ, 2011). No other sites are in the current basin.

Table 3 lists investigations and evaluations completed by the City in the Basin 44A conveyance system.

Table 3. City Investigations in the Basin 44A Stormwater Conveyance System

Data Collection Period	Purpose	Documentation
NA	Describe existing inriver sediment data collected adjacent to the Albina Riverlots shoreline (RM11E), describe adjacent City basins and potential sources, and identify next steps to prioritize outfall basins for future source tracing activities.	Albina Riverlots: City Basin Information and Source Investigation Approach, Technical Memorandum (BES, 2008)
2008 – 2009	Collected stormwater and solids data as part of a stormwater pathway screening evaluation of Basin 44A to determine major sources that may need to be controlled to protect the river or the wastewater treatment plant.	Outfall Basin 44A Source Investigation Report, City of Portland Outfall Project, ECSI No. 2425 (BES, 2011)

Notes:

NA = not applicable

5 Completion of Source Identification

A 2.4-acre portion of the RIS&G site is the only drainage area to Basin 44A. The City is planning to abandon Outfall 44A by the end of 2014, which will eliminate this pathway from the RIS&G site. Figure 3 displays the spatial extent of DEQ Cleanup Program site investigation and other programmatic controls (see key to figures provided at beginning of this Appendix) in the current (post-diversion) basin. Given that only one site discharges to this basin, and this connection to the City system will be eliminated in 2014, source tracing is complete.

6 Basin Source Controls

A portion of the RIS&G site is the only area that discharges to the outfall. The City and DEQ collaborated under their respective authorities to identify whether additional source control measures were needed at this site. In 2011, the DEQ Cleanup Program determined that an SCE was not needed at this site (DEQ, 2011). Current operations at this site are covered by the DEQ Water Quality Program under the NPDES industrial stormwater regulations (see Table 2). The City Industrial Stormwater Program has inspected this site and provides technical assistance on stormwater best management practices. Ongoing compliance with the permit and program implementation by DEQ and the City is expected to provide necessary stormwater source control at this site.

In addition, the City plans to abandon Outfall 44A by the end of 2014. This will eliminate this basin as a pathway to the river.

7 Conclusion

The City completed source tracing in Basin 44A and determined that major sources of contaminants to the City conveyance system are not present. Planning for outfall abandonment is underway, thus future discharges from Outfall 44A will not occur. The City concludes that it has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin 44A.

8 References

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Figure 2: Basin 44A Overview

Figure 3: Basin 44A Upland Site Source Controls

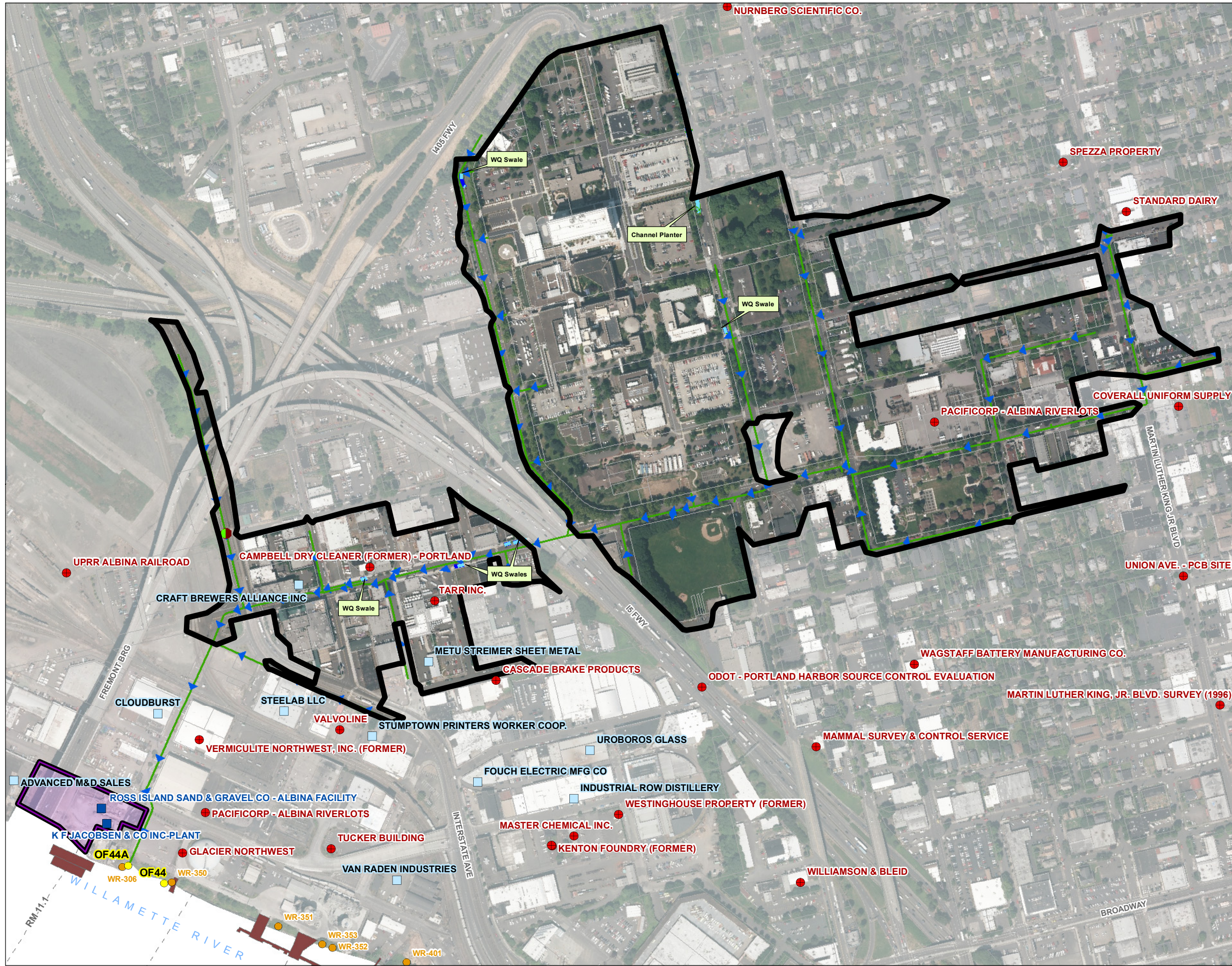
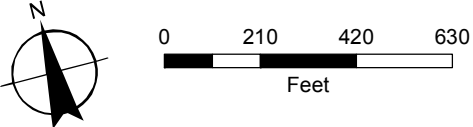


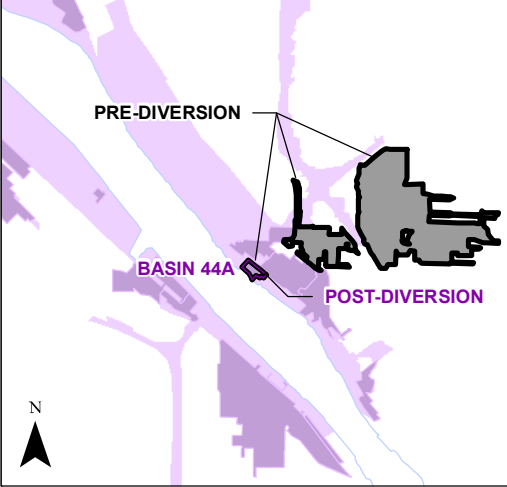
FIGURE 1
Basin 44A
Pre- and Post- Diversion Overview and
Conveyance System Source Controls

- Basin 44A, Pre-Diversion
 - Basin 44A, Post-Diversion
 - DEQ ECSI Site
 - NPDES Stormwater Permit
 - NPDES No Exposure Certification
- Conveyance System**
- Storm Line
 - Channel Planter
 - Water Quality (WQ) Swale
 - Sediment Removal Structure
 - City Outfall
 - Non-City Outfall
- All Other Data**
- River Mile (RM)
 - Dock
 - Tax Lot
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO,
Air Photo Taken 2012

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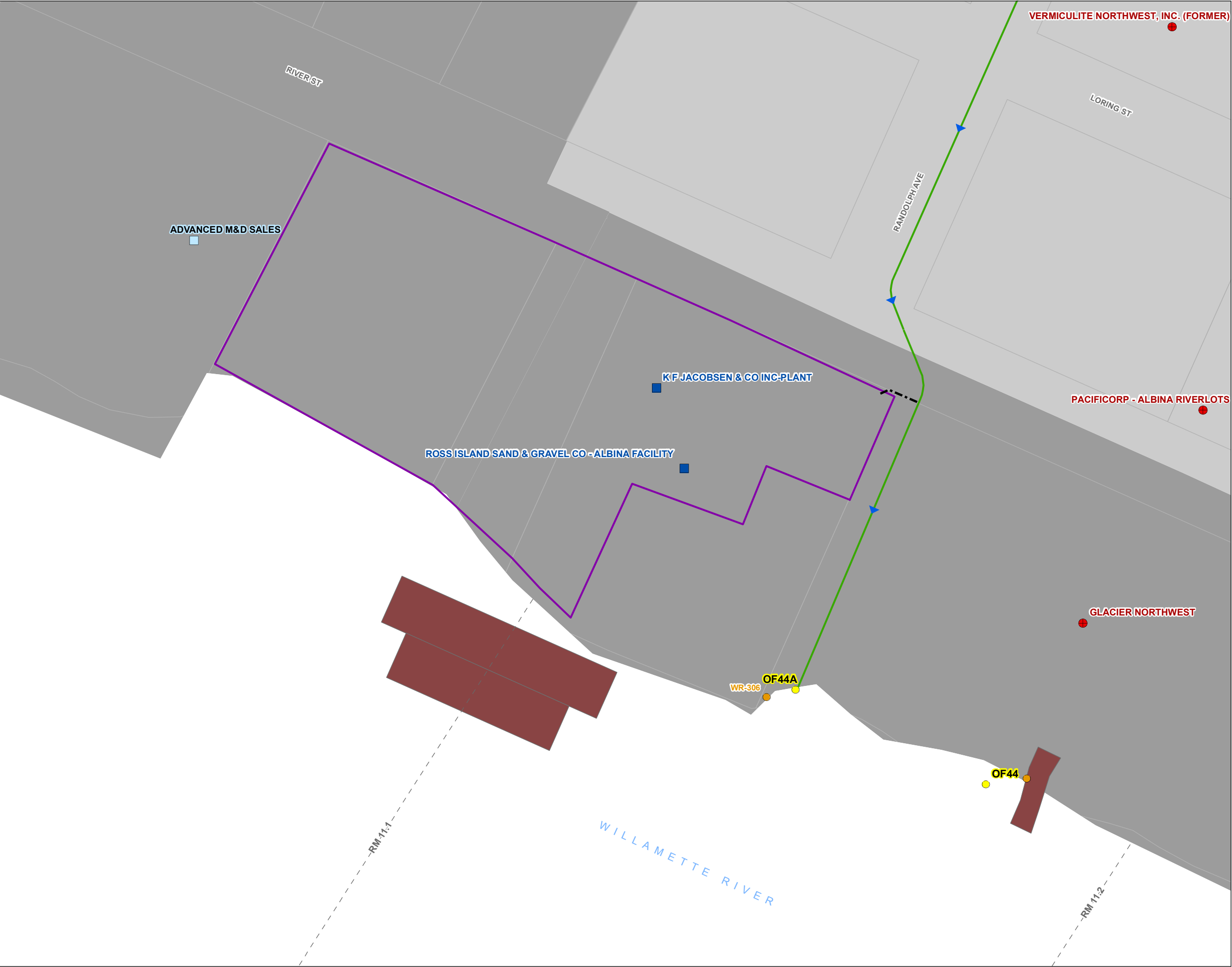
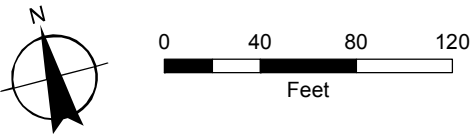


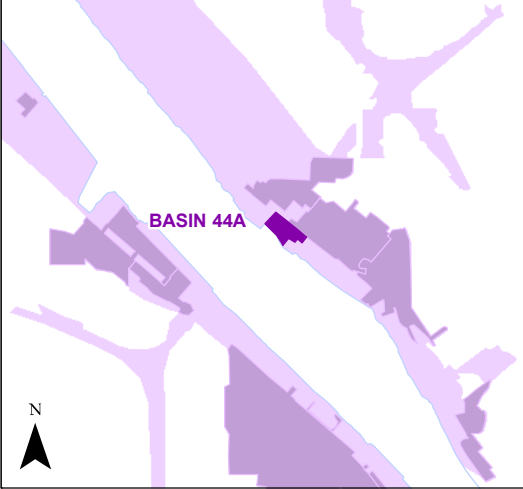
FIGURE 2
Basin 44A
Overview

- Basin 44A
- DEQ ECSI Site
- NPDES Stormwater Permit
- NPDES No Exposure Certification
- Conveyance System**
 - Storm Line
 - Site Connection
 - City Outfall
 - Non-City Outfall
- Land Use/Zoning**
 - Heavy Industrial
 - Light Industrial
- All Other Data**
 - River Mile (RM)
 - Dock
 - Tax Lot
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



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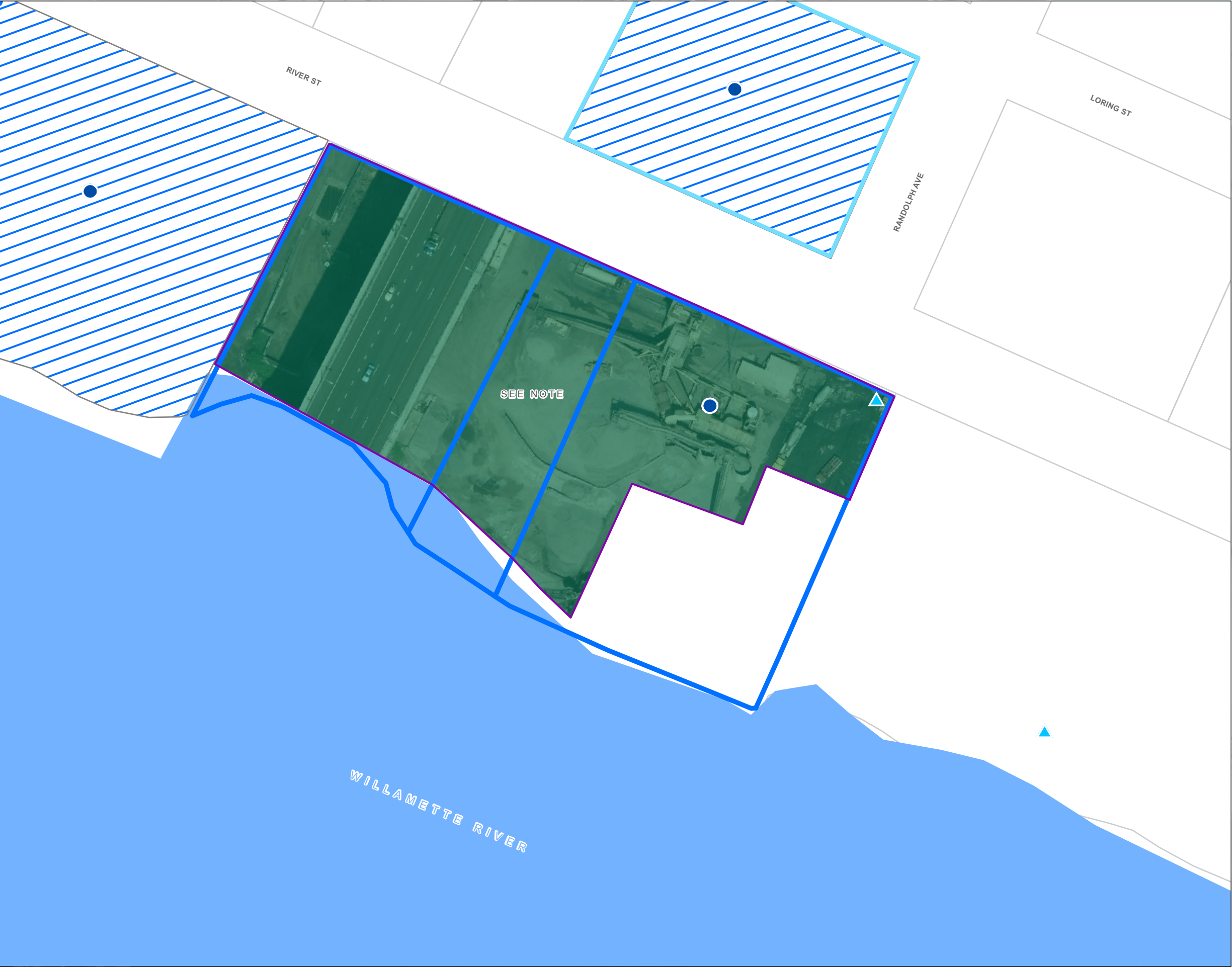
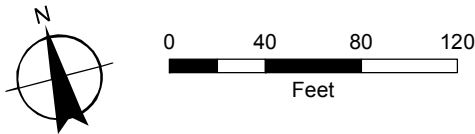


FIGURE 3
Basin 44A
Upland Site Source Controls

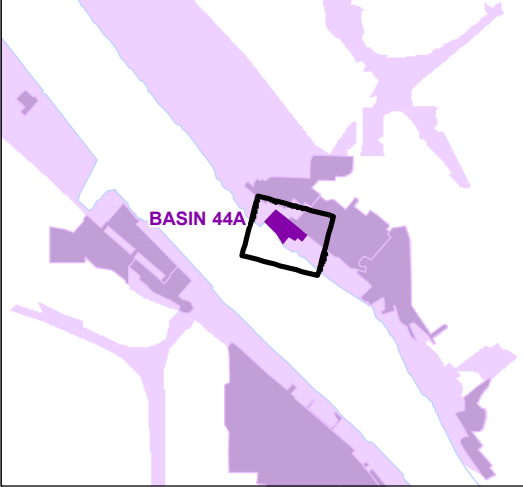
- Basin 44A
- Tax Lot
- DEQ Stormwater SCE**
 - SCE not needed or low priority
- All Other Features**
 - NPDES Stormwater Discharge Permit
 - City Discharge Authorization
 - NPDES No Exposure Certification
 - Stormwater Treatment Facility
 - Site Inspection - BES Industrial Stormwater Program
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary

NOTE:
The DEQ Milestone Report (DEQ, 2013) indicates only a portion of this site is in the DEQ Cleanup Program. However, based on discussion with DEQ, the entire area within the basin has been designated as not needing an SCE.



MAP NOTES:
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Completion Summary for City of Portland Outfall Basin 45

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and several City programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled. This report summarizes the results of this collaborative effort in Outfall Basin 45.

This Completion Summary includes a weight-of-evidence evaluation to demonstrate that source identification is complete and a summary of source controls (implemented or planned) that will control future contaminant discharges to the Willamette River.

Outfall 45 is located at approximately River Mile (RM) 11 on the east side of the Willamette River, just downstream of the Fremont Bridge. The outfall discharges to an area of the river (referred to as RM11E) that has been targeted for focused inriver and upland investigations in response to detections of elevated concentrations of polychlorinated biphenyls (PCB) and other contaminants in river sediment, water, and fish tissue samples collected from this area. Outfall 45 discharges stormwater from a relatively small basin that currently includes parcels associated with Union Pacific Railroad's (UPRR) Albina Yard, Northwest Copper Works, a party rental business, a dance theater, the City's Materials Testing Laboratory, and adjacent rights-of-way.

Elevated concentrations of PCBs were detected in river sediment samples collected by the Lower Willamette Group and other parties at locations upstream and downstream of the outfall, but PCBs were not significantly elevated in the sample closest to the outfall. Because the Portland Harbor Initial Study Area did not extend up to Outfall 45, inriver data alone were insufficient to determine whether the basin was a likely pathway for PCB sources to the river. For this reason, after the Study Area expanded to include Basin 45, the City conducted an inline solids source investigation in the basin to assess the potential presence of PCB sources and evaluated basin stormwater samples for a comprehensive suite of contaminants to verify that additional source tracing was not needed. Results of these investigations do not indicate the presence of major sources of PCBs or other contaminants in Basin 45.

Portions of two DEQ Cleanup Program sites are located in the basin. Both sites are conducting source control evaluations (SCE), which will identify and address any ongoing stormwater contributions from these sites to the river via Outfall 45. Investigation at the UPRR site includes evaluation of the potential preferential groundwater pathway to Basin 45 because of the proximity of known site groundwater contamination to Basin 45 conveyances.

The City concludes that no further source investigation is warranted in this basin. Implementation of source control measures (SCM) at upland sites, as needed, together with the

existing programmatic SCMs in the basin, are sufficient for ensuring discharges from Outfall 45 are protective of the river. Therefore, the City has met the remedial investigation (RI)/SCM objectives for Basin 45.

2 Introduction

This Completion Summary presents a weight-of-evidence evaluation of whether further source investigation is needed in Basin 45, and the rationale for concluding that future discharges from the basin are not likely to be significant sources of contaminants to river sediment. The purpose of this report is to demonstrate that, for Basin 45, the City has met the joint RI/SCM objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ. Together the City and DEQ are using their respective authorities to ensure that source controls are implemented where needed.

This report is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report), which provides additional background and detail regarding the City's harborwide source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Outfall 45 discharges to the east side of the Willamette River near RM 11. The outfall conveys stormwater from an approximately 10-acre drainage basin.¹ Figure 1 shows the location of the outfall and drainage basin boundary and provides an overview of the associated stormwater conveyance system. Additional detail on the Outfall 45 stormwater conveyance system and associated drainage basin is included in the *Outfall Basin 45 Inline Solids Sampling* technical memorandum (BES, 2008a) and the *Albina Riverlots: City Basin Information and Source Investigation Approach* technical memorandum (BES, 2008b).

3.2 Land Use and Potential Upland Sources

Basin 45 is located in the historical Albina area. The basin is primarily zoned as heavy industrial, with some light industrial zoning (see Figure 1). Industrial land use in the basin includes parcels associated with UPRR's Albina Yard (paved parking areas and unpaved vacant land) and a metals fabrication plant (Northwest Copper Works). The basin also includes a party rental business, a dance theater, the City's Materials Testing Laboratory, and adjacent rights-of-way.

Sites that were identified as potential sources include sites that are in the DEQ Cleanup Program, as listed in DEQ's Environmental Cleanup Site Information (ECSI) database. Portions of two Cleanup Program sites are within Basin 45. Table 1 list these sites and indicates the associated contaminants of interest (COI) and the status of site SCEs. The portion of the

¹ Stated basin acreage is likely overestimated as the delineation includes properties under the Oregon Department of Transportation (ODOT) Interstate-405/Fremont Bridge (i.e., stormwater in these areas is intercepted by the bridge and conveyed to ODOT outfall WR-306).

Cleanup Program sites in Basin 45 are peripheral properties (i.e., not associated with the main current or historical industrial operations) and the COIs listed in Table 1 may not be associated with these site areas.

Table 1. DEQ Cleanup Program Sites in Basin 45

DEQ Cleanup Site	Site COIs ⁽¹⁾	Site Pathway Evaluations	
		Stormwater Pathway ⁽²⁾	Preferential Groundwater Pathway ⁽³⁾
UPRR - Albina Yard (ECSI #178)	<i>Stormwater:</i> To be determined ⁽⁴⁾ <i>Groundwater:</i> SVOCs, PAHs, TPH, metals, phthalates ⁽⁵⁾	Source Control Evaluation in Progress	Source Control Evaluation Completed – Source Control Determination Pending
PacifiCorp - Albina Riverlots (ECSI #5117)	<i>Stormwater:</i> TPH, PCBs <i>Groundwater:</i> Not sampled	Source Control Evaluation In Progress	NA

Notes:

PAHs = polycyclic aromatic hydrocarbons; SVOCs = semivolatile organic compounds, TPH = total petroleum hydrocarbons; NA = not applicable; DEQ = Oregon Department of Environmental Quality; ECSI = Environmental Cleanup Site Information; RM = River Mile; PCBs = polychlorinated biphenyls; UPRR = Union Pacific Railroad; COIs = contaminants of interest

(1) Unless otherwise noted, site COIs are those identified in Appendix Q (Source Control Inventory Tables) of the Portland Harbor RI/FS Draft Feasibility Study (FS) (Anchor et al., 2012).

(2) Source: DEQ Milestone Report, Figure 1b, “Status of Stormwater Source Control Evaluations, January 2013” (DEQ, 2013).

(3) Source: DEQ Milestone Report, Figure 3, “Groundwater Source Control Evaluation Status, January 2013” (DEQ, 2013).

(4) The UPRR site extends along the east side of the Willamette River from approximately RM 9.8 to 11.1. Stormwater COIs listed in Appendix Q for other areas of the site that discharge (or formerly discharged) to the river include PAHs, TPH, metals, and PCBs.

(5) Source: Table 4.2-2 in the Portland Harbor RI/FS Draft Final Remedial Investigation Report (Integral et al., 2011).

Industrial sites covered or historically covered by National Pollutant Discharge Elimination System (NPDES) stormwater regulations also were considered as potential sources of pollutants to the City conveyance system. Table 2 lists one site that has a small runoff contribution to the basin and currently holds an NPDES permit.

Table 2. Current⁽¹⁾ and Historical NPDES Permit Coverage in Basin 45

Address	Company	Permit Type	Time Period
1402 N River St.	OldCastle APG West, Inc.	Stormwater (1200-Z)	2001 – 2011
	Central Premix Concrete Products Co.	Stormwater (1200-Z)	2011 - Present

Notes:

NPDES = National Pollutant Discharge Elimination System

(1) Current permits are indicated in bold.

Although the UPRR Albina Yard operates under an NPDES stormwater permit, permit coverage has not included the portion of the site in Basin 45. Note that both the City and Oregon Department of Transportation (ODOT) have NPDES Municipal Separate Storm Sewer System (MS4) stormwater permits that cover drainage areas in or adjacent to the basin.

3.3 Outfall Setting

Outfall 45 discharges to a reach of the river that the U.S. Environmental Protection Agency (EPA) has designated as an area of potential concern (AOPC 25) based on elevated concentrations of PCBs and other contaminants (EPA, 2010). In addition to Outfall 45, 3 other City outfalls (Outfalls 43, 44, and 44A), 1 ODOT outfall, and approximately 13 private industrial outfalls also discharge to AOPC 25.

4 Basin Screening and Source Investigations

In 2006, the City mapped known or suspected groundwater plumes in the vicinity of municipal stormwater pipes to determine plumes that might use the City system as a preferential pathway (GSI, 2006). The City identified a plume on the UPRR property that needed to be evaluated and referred the evaluation to DEQ.

In May 2007, the City conducted a video survey of the Basin 45 system to identify connections to the City's storm sewer lines and to determine target locations for sampling solids. A large portion of the basin is unpaved railroad property and the survey identified significant solids accumulation in many areas of the conveyance system. The City collected stormwater solids from the basin in July 2007 to evaluate whether legacy contaminated inline solids in the Basin 45 system were a possible current source of PCBs to river sediment and to assess the potential presence of PCB sources within the basin. The results indicated that PCB concentrations were not elevated in legacy solids within the Basin 45 system and that major sources of PCBs are not present in the basin (BES, 2008a). Following completion of the inline solids investigation, the City cleaned the Basin 45 storm system to restore flow capacity.

As part of the City's stormwater screening evaluation in 2008 (BES, 2010), the City collected stormwater samples from the downstream end of the basin (i.e., representing all collective discharges to the system) and analyzed samples for a broad array of contaminants. Based on the evaluation of these data and using a conservative screening approach, no analytes were identified as warranting further source tracing in Basin 45 (BES, 2010).

In addition, the City reviewed historical plumbing and conveyance system records and identified a number of possible connections from UPRR properties within Basin 45 that were not being evaluated as part of the Albina Yard RI/SCE (BES, 2008c). In response to this information, UPRR developed and is implementing a work plan to investigate the configuration of UPRR's stormwater system in this area and to characterize discharges to Basin 45 (CH2M HILL, 2012).

Table 3 lists investigations and evaluations completed by the City in the Basin 45 conveyance system.

Table 3. City Investigations in the Basin 45 Stormwater Conveyance System

Data Collection Period	Purpose	Documentation
NA	Describe existing inriver sediment data collected adjacent to the Albina Riverlots shoreline (RM11E), describe adjacent City basins and potential sources, and identify next steps to prioritize outfall basins for future source tracing activities.	Albina Riverlots: City Basin Information and Source Investigation Approach, Technical Memorandum (BES, 2008b)
2005	Evaluate existing data on groundwater plumes and identify the potential for City conveyance systems (including Basin 45) to act as preferential pathways.	Relationships Between Upland Shallow Groundwater Plumes and the City Stormwater and Combined Conveyance System with the Portland Harbor (GSI, 2006)
2007	Evaluate whether legacy inline solids within Basin 45 may be contributing PCBs to river sediment and assess the potential presence of PCB sources within the basin.	Outfall Basin 45 Inline Solids Sampling Technical Memorandum No. OF45-1 (BES, 2008a)
2008	Evaluate stormwater data from City outfalls to identify additional source tracing needs.	Stormwater Evaluation Report, City of Portland Outfall Project (BES, 2010)

Notes:

RM = River Mile; PCBs = polychlorinated biphenyls; NA = not applicable

5 Completion of Source Identification

The lines of evidence evaluated to verify that source tracing is complete include (1) results of source investigation activities conducted in the basin, (2) upland site investigation coverage, and (3) land use within the basin. Findings from this evaluation are summarized below.

- *Source Tracing Results.* The City's 2007 stormwater solids investigation (BES, 2008a) and 2008 stormwater screening evaluation (BES, 2010) did not indicate the presence of major sources of PCBs or other contaminants in Basin 45.
- *Upland Investigation Coverage:* Figure 2 displays the spatial extent of DEQ Cleanup Program site investigation and other programmatic controls (see key to figures provided at beginning of this Appendix) in the current basin. As shown in Figure 2, the need for SCMs is being determined on several parcels conducting SCEs under DEQ oversight. In addition, the City Industrial Stormwater Program has inspected the Northwest Copper Works site to evaluate and provide technical assistance on industrial exposures to stormwater.
- *Land Use:* Land use at sites not covered by DEQ Cleanup or Water Quality Programs mostly consists of indoor operations with minimal industrial exposures to stormwater. Sites include the City Materials Testing Laboratory, a party rental business, and a dance theater. Current and future industrial activities exposed to stormwater will be addressed by the DEQ Water Quality NPDES Program, and non-industrial activities are

not a known or suspected major source of contaminants to the City stormwater conveyance system.

Based on these lines of evidence, the City concludes that the Basin 45 source investigation is complete and no major sources are present.

6 Basin Source Controls

The City and DEQ collaborated under their respective authorities to identify control mechanisms for all potential sources identified in the basin. Two DEQ Cleanup Program sites within the basin (UPRR and PacifiCorp) are conducting SCEs to determine whether additional SCMs are needed to address the stormwater and/or preferential groundwater pathways. Source controls for minor sources also include ongoing City and DEQ programs that are described in the Municipal Report. Upland site source controls within Basin 45 are displayed in Figure 2.

One type of programmatic source control is the elimination of stormwater exposures to industrial activities. Table 4 lists one site that is partially within the basin and currently holds an NPDES no exposure certification.

Table 4. Site with No Exposure Certification (NEC) in Basin 45

Address	Company	NEC Time Period
1300 N River St.	Advanced M&D Sales	2011 – Present

Table 5 summarizes additional programmatic and conveyance system source controls for Basin 45.

Table 5. Basin 45 Source Controls

Site/Area	Source Controls	Implementation Timeframe
Source Control Measures (SCM) at DEQ Cleanup Program Sites		
PacifiCorp - Albina Riverlots (ECSI #5117)	To be determined	To be determined
UPRR Albina Railroad (ECSI #178) ⁽¹⁾	To be determined	To be determined
City Conveyance System		
Northwest Copper Works, Inc.	City Illicit Discharge Elimination Program identified an unauthorized process water discharge to the Basin 45 stormwater system and required site to reroute process water to the sanitary sewer system.	2009
North Russell St., N. River St., and N. Essex Ave.	City cleaned all the main branches of the Basin 45 system to remove accumulated inline solids.	2008
Other (Programmatic SCM)⁽²⁾		
See listing in Table 2	NPDES 1200-Z Stormwater Permit Requirements	Ongoing

Notes:

DEQ = Oregon Department of Environmental Quality; ECSI = Environmental Cleanup Site Information; NPDES = National Pollutant Discharge Elimination System

(1) For upland sites, description of SCMs are based on information in DEQ Milestone Report (DEQ, 2013), DEQ source control decisions, and/or reports on file with DEQ.

(2) Programmatic source controls are described in the Municipal Report.

All potential contaminant sources are being addressed under the programs identified above. Other municipal programs (e.g., periodic inspection of and technical assistance to non-NPDES sites, illicit discharge monitoring, street sweeping, etc.) likely will provide additional source control benefits in the basin and will help to address minor sources for which specific control measures have not been required. City programs that control current and future contaminant discharges to the conveyance system are described in the Municipal Report.

7 Conclusion

The City completed source tracing in Basin 45 and no major sources of contaminants to the City conveyance system were identified. Sites identified as potential sources are being addressed under appropriate DEQ and City regulatory authorities. Therefore, future discharges from Outfall 45 are unlikely to represent a significant source of contaminants to the river. The City concludes that it has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin 45.

8 References

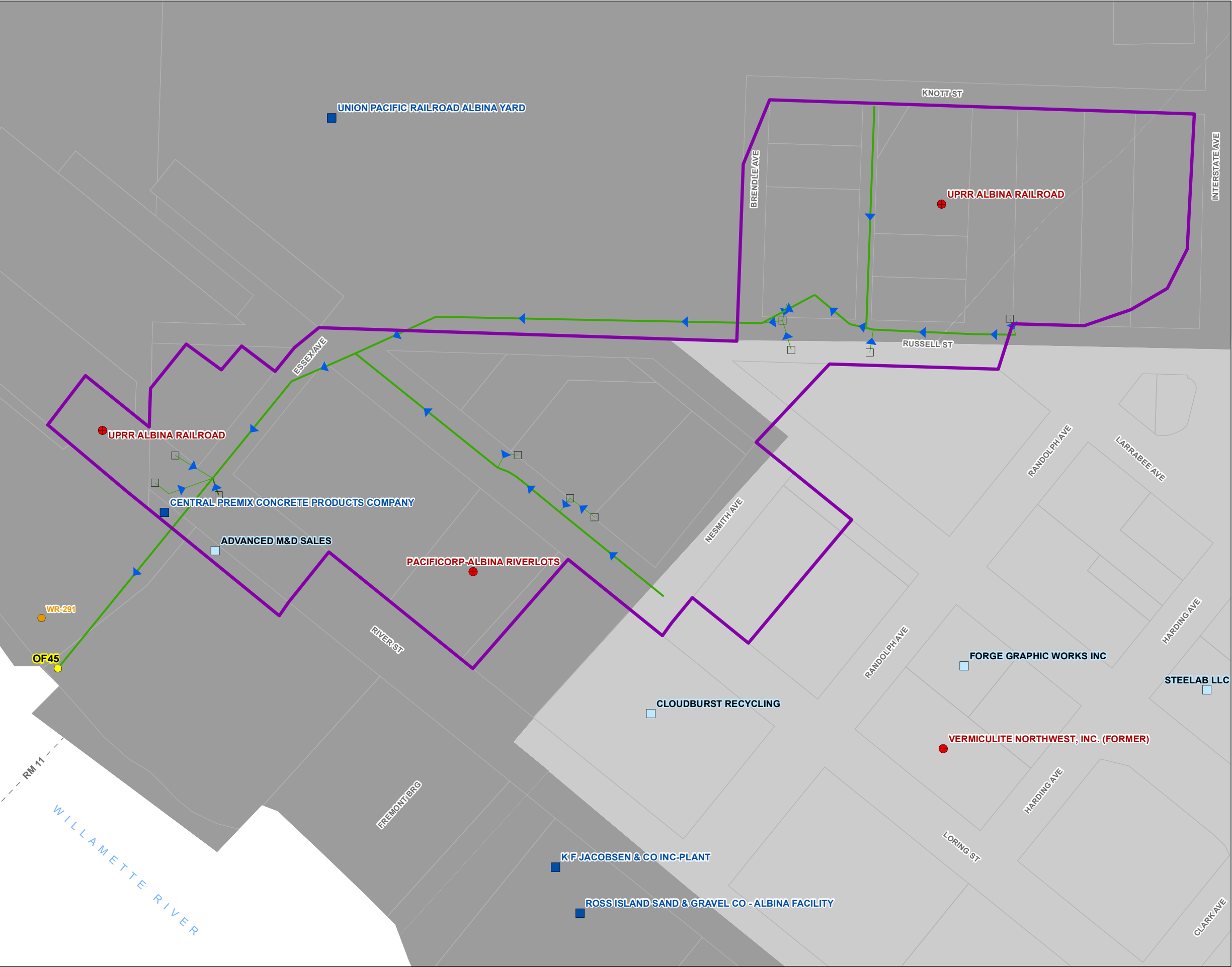
- Anchor et al. 2012. Portland Harbor RI/FS Draft Feasibility Study. Prepared for The Lower Willamette Group by Anchor QEA, LLC, Windward Environmental, LLC, Kennedy/Jenks Consultants, and Integral Consulting, Inc. February 2012.
- BES. 2008a. Outfall Basin 45 Inline Solids Sampling. Technical Memorandum No. OF45-1. City of Portland, Bureau of Environmental Services. June 17, 2008.
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- EPA. 2010. Re: Portland Harbor Superfund Site; Administrative Order on Consent for Remedial Investigation and Feasibility Study; Docket No. CERCLA-10-2001-0240. Portland Harbor Feasibility Study Source Tables. Letter from EPA to Mr. Bob Wyatt, Chairman, Lower Willamette Group. November 23, 2010.
- GSI. 2006. Relationships Between Upland Shallow Groundwater Plumes and the City Stormwater and Combined Conveyance System with the Portland Harbor. Technical Memorandum prepared by Groundwater Solutions, Inc., for the City of Portland Bureau of Environmental Services. March 16, 2006.
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List of Figures

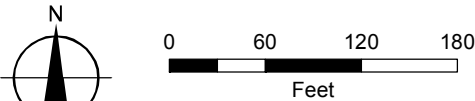
Figure 1: Basin 45 Overview

Figure 2: Basin 45 Upland Site Source Controls

FIGURE 1
Basin 45
Overview



- Basin 45
- DEQ ECSI Site
- NPDES Stormwater Permit
- NPDES No Exposure Certification
- Conveyance System**
 - Storm Line
 - Catch Basin
 - City Outfall
 - Non-City Outfall
- Land Use/Zoning**
 - Heavy Industrial
 - Light Industrial
- All Other Data**
 - River Mile (RM)
 - Tax Lot
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
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Data Sources: BES, METRO

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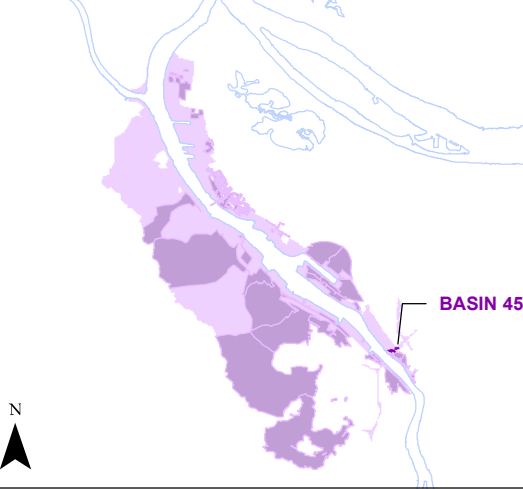
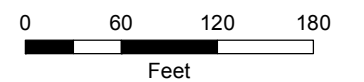
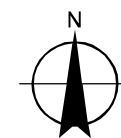


FIGURE 2
Basin 45
Upland Site Source Controls



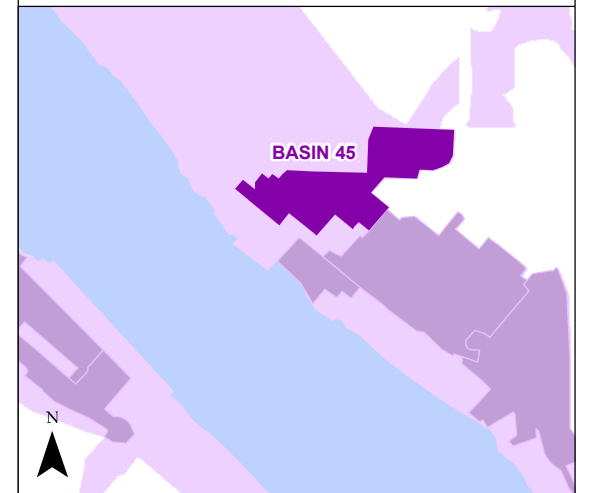
- Basin 45
- Tax Lot
- DEQ Stormwater SCE**
 - SCEs implemented or pending
- All Other Features**
 - NPDES Stormwater Discharge Permit
 - City Discharge Authorization
 - NPDES No Exposure Certification
 - Site Inspection - BES Industrial Stormwater Program
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:

Date: December 31, 2013
Data Sources: BES, METRO,
Aerial Photo Taken 2012

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Completion Summary for City of Portland Outfall Basin 46

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and several City programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled. This report summarizes the results of this collaborative effort in Outfall Basin 46.

Outfall 46 is located at approximately River Mile (RM) 10.4 on the east side of the Willamette River, at the Union Pacific Railroad (UPRR) Albina Yard. The outfall formerly drained an approximate 80-acre stormwater basin that included open space along the bluff in the Overlook neighborhood and a portion of UPRR Albina Yard. As of December 2011, the City's Combined Sewer Overflow (CSO) Abatement Program diverted the entire basin drainage area to the Columbia Boulevard Wastewater Treatment Plant (WWTP) via the new East Side Big Pipe tunnel. Therefore, there is no longer a stormwater drainage basin affiliated with Outfall 46. Figure 1 shows the pre-CSO Abatement Program drainage boundary in Basin 46.

Early CSO design plans anticipated that diversion to the tunnel would be just upstream of the UPRR Albina Yard. Therefore, the City conducted source investigations in Basin 46 including collecting and analyzing inline solids and stormwater samples to evaluate contaminant sources that would continue to discharge to the river and contaminant sources in the diverted area that could exceed current City wastewater discharge limitations and prohibitions. Subsequently, the CSO Abatement Program decided to send stormwater from the entire basin to the East Side Big Pipe tunnel.

Results of the solids investigation did not indicate major sources to the basin. The stormwater screening data indicated a source of polycyclic aromatic hydrocarbons (PAH) and copper to the City conveyance system. However, the City concluded that further source tracing was not warranted because the basin contained a known source of these contaminants (the UPRR Albina Yard) that was being evaluated under DEQ Cleanup Program oversight and concentrations did not indicate a potential WWTP concern.

Given that the entire basin was diverted in 2011, Outfall 46 does not represent a current source to the Willamette River. Therefore, the City has met the remedial investigation (RI)/source control measure (SCM) objectives for Basin 46.

2 Introduction

This Completion Summary presents a weight-of-evidence evaluation of whether further source investigation is needed in Basin 46, and the rationale for concluding that current and future discharges from the basin are not likely to be significant sources of contaminants to river sediment. The purpose of this report is to demonstrate that, for Basin 46, the City has met the joint RI/SCM objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ.

This report is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor*, which provides additional background and detail regarding the City's harborwide source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Outfall 46 discharged to the east side of the Willamette River at approximately RM 10.4. The City diverted the entire basin to the East Side Big Pipe tunnel in 2011 as part of the City's CSO Abatement Program. Before the CSO diversion, the outfall conveyed stormwater from an approximate 80-acre drainage basin. Figure 1 shows the location of the outfall, the pre-diversion drainage basin boundaries, and an overview of the associated stormwater conveyance system. Additional detail on the Outfall 46 stormwater conveyance system and associated drainage basin is included in the technical memorandum *City Outfall Basin 46 Inline Solids Sampling in the Vicinity of the Union Pacific Railroad Albina Yard* (BES, 2006).

3.2 Land Use and Potential Upland Sources

The former Basin 46 stormwater system is located in the historical Albina area. Land-use in the pre-diversion drainage area consists of open space, residential, and general employment along the Overlook neighborhood bluff east of N. Greeley Avenue and heavy industrial operations at the UPRR Albina Yard west of N. Greeley Avenue. The basin also included small portions of paved rights-of-way (see Figure 1).

Sites that were identified as potential sources before the 2011 CSO diversion included two DEQ Cleanup Program sites, as listed in DEQ's Environmental Cleanup Site Information (ECSI) database. A source control evaluation is underway at the UPRR site. DEQ has identified the other site (Industrial Battery) as a low priority for conducting a stormwater pathway evaluation because the former building and contaminated soils were removed. DEQ issued a No Further Action determination for this site in 1995 and the site is currently vacant and undeveloped. Table 1 lists the associated contaminants of interest (COI) and the status of the stormwater evaluations at these sites.

Table 1. DEQ Cleanup Program Sites in Former Basin 46

DEQ Cleanup Program Site	Site Contaminants of Interest	Site Stormwater Pathway Evaluation ⁽¹⁾
UPRR – Albina Yard (ECSI #178)	PAHs, TPH, metals ⁽²⁾	Source Control Evaluation In Progress
Industrial Battery Building (ECSI #935)	Lead ⁽³⁾	Need for Source Control Evaluation to be Determined/ Low Priority

Notes:

TPH = total petroleum hydrocarbons; DEQ = Oregon Department of Environmental Quality; UPRR = Union Pacific Railroad; ECSI = Environmental Cleanup Site Information, PAHs = polycyclic aromatic hydrocarbons

(1) Source: DEQ Milestone Report, Figure 1b, “Status of Stormwater Source Control Evaluations, January 2013” (DEQ, 2013).

(2) Site contaminants of interest are those identified in Appendix Q (Source Control Inventory Tables) of the Portland Harbor RI/FS Draft Feasibility Study (FS) (Anchor et al., 2012).

(3) Source: DEQ ECSI database (DEQ, 1995).

Industrial sites covered or historically covered by National Pollutant Discharge Elimination System (NPDES) stormwater regulations also were considered as potential sources of pollutants to the City conveyance system. Table 2 lists one site in the basin that historically held NPDES permits to discharge to the pre-diversion Basin 46 conveyance system.

Table 2. Historical NPDES Permit Coverage in Basin 46

Address	Company	Permit Type	Time Period
2745 N Interstate	Union Pacific Railroad Albina Yard	Stormwater (1200-T)	1993 – 1996
		Stormwater (1200-Z)	1997 – Present ⁽¹⁾

Notes:

NPDES = National Pollutant Discharge Elimination System

(1) Following the 2011 diversion, permit coverage was not required for those drainage areas that discharged to former Basin 46. The permit continues to cover other discharges to the river via non-City outfalls.

3.3 Outfall Setting

Outfall 46 is not located in or adjacent to any reach identified by the U.S. Environmental Protection Agency as an area of potential concern (AOPC) for contaminant concentrations in river sediment.

4 Basin Screening and Source Investigations

In 2005, the City conducted an inline solids investigation in Basin 46 to evaluate whether major contaminant sources were present and the potential need for additional source tracing.

Following the investigation, the City identified Basin 46 as a Priority 4 for additional source tracing based on the inline solids results and an analysis of inriver sediment concentrations in the vicinity of the outfall (BES, 2006); Priority 4 basins are considered the lowest priority for identifying sources.

As part of the City's stormwater screening evaluation in 2008 (BES, 2010), the City collected stormwater samples from the downstream end of the basin (i.e., representing cumulative discharges to the system) and analyzed the samples for a broad array of contaminants to verify the conclusions of the inline solids investigation. The objective of the investigation was to determine whether contaminant concentrations in stormwater indicated a potential need for additional site source control. Based on this evaluation and using a conservative screening approach, PAHs and copper were identified as potentially warranting further source tracing in Basin 46. Subsequent review of upland site status as part of the stormwater screening evaluation indicated the UPRR Albina Yard was the likely source of PAHs and copper to the basin, based on identified site COIs. Given that a stormwater pathway evaluation was underway at this site and the entire basin was slated for diversion in 2011, the City concluded that no further source tracing was needed in this basin (BES, 2010).

Table 3 lists investigations and evaluations completed by the City in the Basin 46 conveyance system.

Table 3. City Investigations in the Basin 46 Stormwater Conveyance System

Data Collection Period	Purpose	Documentation
2005	Collect solids samples from the conveyance system to evaluate potentially significant contaminant sources with the basin and to determine additional source investigation priority.	City Outfall Basin 46, Inline Solids Sampling in the Vicinity of the Union Pacific Railroad Albina Yard. Technical Memorandum No. OF 46-1 (BES, 2006).
2008	Evaluate stormwater data from City outfalls to identify additional source tracing needs.	Stormwater Evaluation Report, City of Portland Outfall Project (BES, 2010)

5 Completion of Source Identification

The entire Basin 46 drainage was diverted to the City's WWTP in 2011; therefore, additional source tracing is not warranted in the basin.

6 Basin Source Controls

As a result of the 2011 diversion of the former Basin 46 to the City WWTP, there is no longer a drainage basin affiliated with Outfall 46.

7 Conclusion

The City concludes that it has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin 46.

8 References

- Anchor et al. 2012. Portland Harbor RI/FS Draft Feasibility Study. Prepared for The Lower Willamette Group by Anchor QEA, LLC, Windward Environmental, LLC, Kennedy/Jenks Consultants, and Integral Consulting, Inc. February 2012.
- BES. 2006. City Outfall Basin 46 Inline Solids Sampling in the Vicinity of the Union Pacific Railroad Albina Yard. Technical Memorandum No. OF 46-1. City of Portland, Bureau of Environmental Services. June 28, 2006.
- BES. 2010. Stormwater Evaluation Report. City of Portland, Bureau of Environmental Services. February 2010.
- DEQ. 1995. DEQ Site Summary Full Report – Details for ECSI Site ID 935, Industrial Battery Building. DEQ Environmental Cleanup Site Information (ECSI) Database, updated August 1995; accessed February 16, 2013.
<http://www.deq.state.or.us/lq/ECSI/ecsidetail.asp?seqnbr=935>
- DEQ. 2013. Milestone Report, Upland Source Control at the Portland Harbor Superfund Site. Prepared by the Oregon Department of Environmental Quality. January 2013.

List of Figures

Figure 1: Basin 46 Pre-Diversion Overview

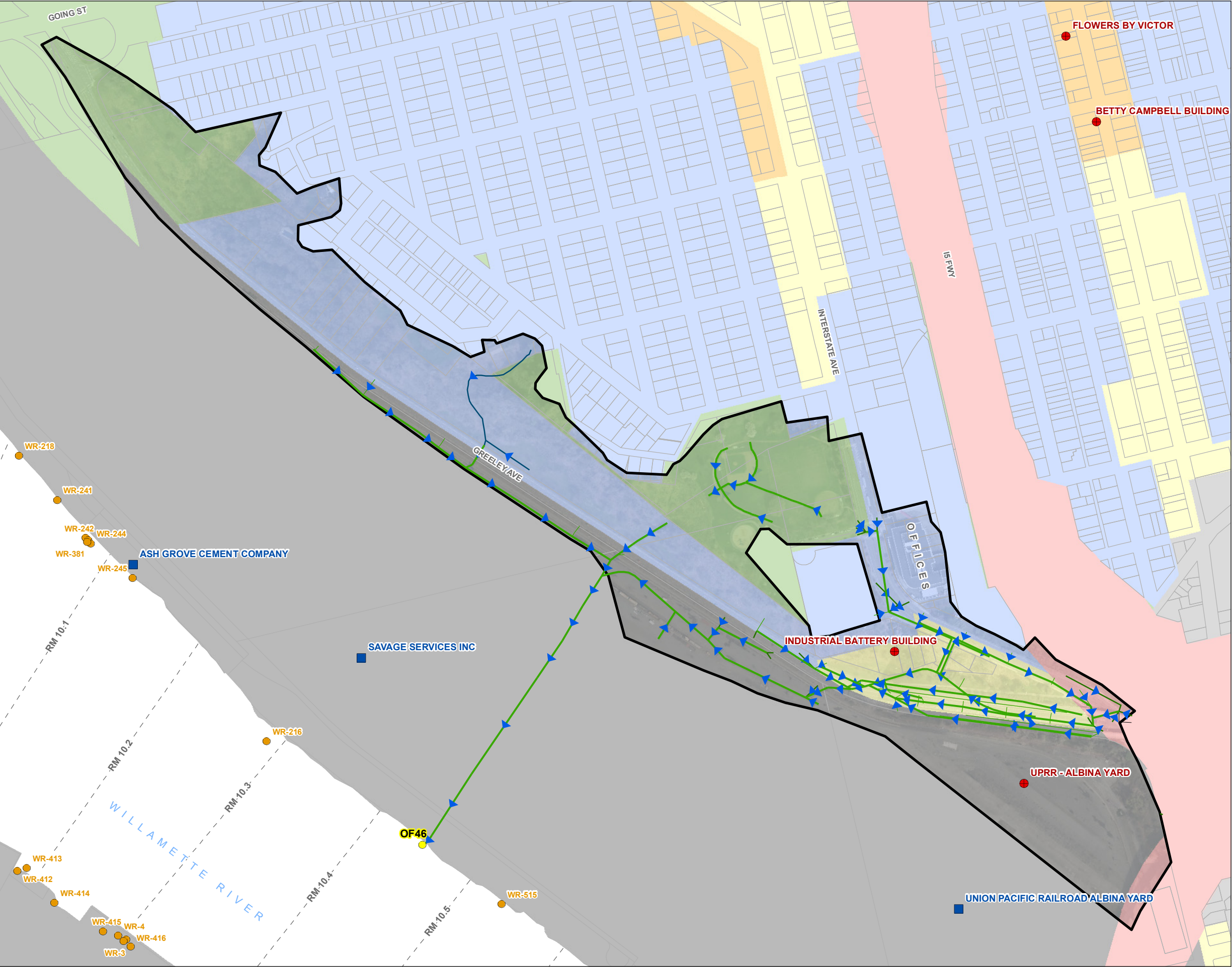
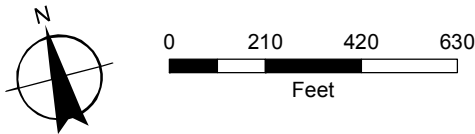


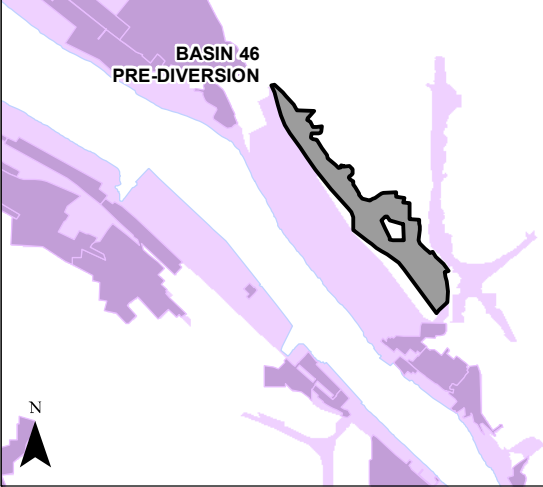
FIGURE 1
Basin 46
Pre-Diversion Overview

- Basin 46, Pre-Diversion
- DEQ ECSI Site
- NPDES Stormwater Permit
- Conveyance System**
 - Storm Line
 - Ditch
 - City Outfall
 - Non-City Outfall
- Land Use/Zoning**
 - Heavy Industrial
 - Light Industrial
 - General Employment
 - Commercial
 - Residential
 - Parks and Open Space
 - Major Transportation
- All Other Data**
 - River Mile (RM)
 - Tax Lot
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO, Air Photo Taken 2012

 ENVIRONMENTAL SERVICES
CITY OF PORTLAND
1120 SW Fifth Avenue, Room 1000
Portland Oregon, 97204 -1912



Completion Summary for City of Portland Outfall Basin 47

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and several programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled. This report summarizes the results of this collaborative effort in Outfall Basin 47.

This Completion Summary includes a weight-of-evidence evaluation to demonstrate that source identification in the current basin is complete and a summary of source controls (implemented or planned) that will control future contaminant discharges to the Willamette River.

Basin 47 is located on the east side of the Willamette River at approximately River Mile (RM) 9.9, just upstream of Swan Island. Outfall 47 discharges stormwater from a small basin that includes two sites: Federal Express and the City's new Swan Island Pump Station. An area of heavy industrial land occupied by a portion of the Union Pacific Railroad (UPRR) Albina Yard formerly discharged to the Basin 47 conveyance system; however, this part of the system was diverted to the Columbia Boulevard Wastewater Treatment Plant (WWTP) in late 2006 as part of the City's Combined Sewer Overflow (CSO) Abatement Program.

Early inriver sediment data collected by the Lower Willamette Group (LWG) in the vicinity of the outfall included one sample upstream of the outfall in which polychlorinated biphenyls (PCB) were elevated, but data were not collected at or immediately downstream of Outfall 47. Therefore, the City conducted an inline solids source investigation in the basin to determine whether Basin 47 is a potential pathway for discharge of PCBs to the river. This work led to an expansion of the remedial investigation being conducted at the UPRR site to include areas discharging to Basin 47 before the CSO diversion. The City also collected stormwater samples from the current basin and analyzed samples for a broad array of contaminants to verify that additional source tracing was not warranted. The results of the inline solids investigation indicated that there were no major contaminant sources in the basin, and the stormwater sampling results confirmed that additional source tracing was not needed. Additional sediment data collected by the LWG adjacent to the outfall showing low PCB concentrations also confirmed this conclusion.

The City concludes that major contaminant sources are not present, further source investigation is not warranted, and future discharges from the basin are unlikely to represent a significant source to the Willamette River. Implementation of programmatic source control measures (SCM) in the basin is sufficient for ensuring discharges from Outfall 47 are protective of the river. Therefore, the City has met the remedial investigation (RI)/SCM objectives for Basin 47.

2 Introduction

This Completion Summary presents a weight-of-evidence evaluation of whether further source investigation is needed in Basin 47, and the rationale for concluding that current and future discharges from the basin are not likely to be significant sources of contaminants to river sediment. The purpose of this report is to demonstrate that for Basin 47 the City has met the joint RI/SCM objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ. Together the City and DEQ are using their respective authorities to ensure that source controls are implemented where needed.

This report is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report), which provides additional background and detail regarding the City's harborwide source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Outfall 47 discharges to the east side of the Willamette River at approximately River Mile 9.9. Before the 2006 CSO diversion, the stormwater conveyance system consisted of two main branches; a western branch (conveying discharges from light industrial operations), and an eastern branch that conveyed discharges from the northern portion of the UPRR Albina Yard. The City diverted the entire eastern branch in late 2006.

The drainage area for the current Basin 47 conveyance system is approximately 9.5 acres. Figure 1 shows the location of the outfall and drainage basin boundary and provides an overview of the associated stormwater conveyance system. Additional detail on the Outfall 47 stormwater conveyance system and associated drainage basin is included in the technical memorandum *City Outfall Basin 47 Inline Solids Sampling* (BES, 2007).

3.2 Land Use and Potential Upland Sources

Zoning in Basin 47 is general employment, which is a Portland zoning category that is predominantly industrial, but allows for a mix of uses (see Figure 1).¹ Only two properties are located in the current basin: Federal Express and the City's Swan Island Pump Station. Land use at both sites is light industrial. The remaining area in the basin consists of N. Port Center Way. Land use in the portion of the basin that was diverted in 2006 was mainly heavy industrial (i.e., a portion of the UPRR Albina Yard) and rights-of-way (sections of N. Going Street and N. Greeley Avenue).

Sites that were identified as potential sources to the eastern branch (which has since been diverted to the City's WWTP) included UPRR Albina Yard- the only DEQ Cleanup Program site identified on DEQ's Environmental Cleanup Site Information (ECSI) database. This site was evaluated as a potential PCBs source to the system during the City's pre-diversion 2006 inline solids investigation. Table 1 lists this site and the associated contaminants of interest

¹ General employment is a Portland zoning category that allows a range of employment opportunities but emphasizes industrial and industrial-support uses. The zones can allow for the transition to a less industrial overall nature.

(COI) and status of the stormwater pathway evaluation. No DEQ Cleanup Program sites are located within the current basin.

Table 1. DEQ Cleanup Program Sites in Pre-diversion Basin 47

DEQ Cleanup Program Site	Site Contaminants of Interest	Site Stormwater Pathway Evaluation ⁽¹⁾
UPRR – Albina Yard (ECSE #178)	PAHs, TPH, metals ⁽²⁾	Source Control Evaluation In Progress

Notes:

PAHs = polycyclic aromatic hydrocarbons; TPH = total petroleum hydrocarbons; DEQ = Oregon Department of Environmental Quality; UPRR = Union Pacific Railroad; ECSE = Environmental Cleanup Site Information

(1) Source: DEQ Milestone Report, Figure 1b, “Status of Stormwater Source Control Evaluations, January 2013” (DEQ, 2013).

(2) Site contaminants of interest are those identified in Appendix Q (Source Control Inventory Tables) of the Portland Harbor RI/FS Draft Feasibility Study (FS) (Anchor et al., 2012).

Industrial sites covered or historically covered by National Pollutant Discharge Elimination System (NPDES) stormwater regulations also were considered as potential sources of pollutants to the City conveyance system. One site within the basin, Federal Express, had an NPDES permit to discharge to the Basin 47 conveyance system between 1998 and 2011. No sites in the basin currently are covered under NPDES stormwater permits. Note that the City operates under an NPDES Municipal Separate Storm Sewer System (MS4) stormwater permit that also covers basin drainage areas.

3.3 Outfall Setting

Outfall 47 discharges to an area of potential concern (AOPC 23) identified by the U.S. Environmental Protection Agency (EPA) based on elevated concentrations of PCBs and other contaminants in river sediment (EPA, 2010). In addition to Outfall 47, four non-City outfalls discharge to AOPC 23.

4 Basin Screening and Source Investigations

Early inriver sediment data collected by the LWG in the vicinity of Outfall 47 included one sample upstream of the outfall in which PCBs were elevated, but data were not collected at or immediately downstream of Outfall 47. Therefore, the City conducted the initial basin source investigation in 2006 to assess the potential presence of PCB sources. The investigation consisted of collecting and analyzing stormwater solids from both branches of the basin. This investigation occurred before the City diverted the eastern branch of the conveyance system to the WWTP, and the City included sampling locations downstream of UPRR’s Albina Yard connections in the investigation. The results indicated that major sources of PCBs were not present in Basin 47 (BES, 2007). Subsequent sediment data collected by the LWG adjacent to the outfall indicates low PCB concentrations, which also supports this conclusion (Integral et al., 2011).

In 2008, as part of the City’s stormwater screening evaluation (BES, 2010), the City collected stormwater samples from the downstream end of the current basin (i.e., representing all collective discharges to the system) and analyzed samples for a broad array of contaminants to

verify that further investigation was not needed. Based on the evaluation of these data and using a conservative screening approach, no analytes were identified as warranting further source tracing in Basin 47 because concentrations of all analytes were low in the stormwater samples (BES, 2010).

Table 2 lists investigations and evaluations completed by the City in the Basin 47 conveyance system.

Table 2. City Investigations in the Basin 47 Stormwater Conveyance System

Data Collection Period	Purpose	Documentation
2006	Evaluate the potential presence of PCB sources in the basin.	City Outfall Basin 47 Inline Solids Sampling. Technical Memorandum No. OF 47-1 (BES, 2007)
2008	Evaluate stormwater data from City outfalls to identify additional source tracing needs.	Stormwater Evaluation Report, City of Portland Outfall Project (BES, 2010)

Notes:

PCB = polychlorinated biphenyl

The City's investigation work did not identify any major sources of contaminants in Basin 47.

5 Completion of Source Identification

All of the heavy industrial area formerly within Basin 47 was diverted to the City's WWTP in 2006. The lines of evidence evaluated to verify that source tracing within the current basin boundary is complete include (1) source investigation results, (2) drainage basin characteristics, and (3) land use. Findings from this evaluation are summarized below.

- *Source Investigation Results.* The City's 2006 stormwater solids investigation (BES, 2007) and 2008 stormwater screening evaluation (BES, 2010) did not indicate the presence of major sources of PCBs or other contaminants in Basin 47.
- *Drainage Basin Characteristics and Land Use:* Basin 47 is relatively small and now consists of two sites with light industrial land use. One site is a Federal Express warehouse with minimal outdoor operations, and the other is the City's Swan Island Pump Station property. Both have stormwater controls in place. Current and future industrial activities exposed to stormwater will be addressed by the DEQ Water Quality NPDES Program, and non-industrial activities are not a known or suspected major source of contaminants to the City stormwater conveyance system.

Based on these lines of evidence, the City concludes that Basin 47 source investigation is complete and there are no major contaminant sources in the basin.

6 Basin Source Controls

Source control for minor sources in Basin 47 includes ongoing City and DEQ programs that are described in the Municipal Report and displayed in Figure 2 (see key to figures provided at beginning of this Appendix). As shown in Table 3, both sites have stormwater controls. The Federal Express site currently holds an NPDES no exposure certification, which indicates the elimination of stormwater exposures to industrial activities. At the Swan Island Pump Station site, the City constructed an ecoroof and stormwater treatment as part of the site redevelopment.

Table 3. Basin 47 Source Controls

Site/Area	Source Controls	Implementation Timeframe
Programmatic Source Controls⁽¹⁾		
City's Swan Island Pump Station	Stormwater Management Manual Requirements. Site stormwater treatment includes an oil-water separator, infiltration basin, drainage swale along the site perimeter, and ecoroof on the operations building.	Ongoing
Federal Express	City Discharge Authorization⁽²⁾	Ongoing
Federal Express	NPDES No Exposure Certification.	Ongoing

Notes:

NPDES = National Pollutant Discharge Elimination System

(1) Programmatic source controls are described in the Municipal Report.

(2) Additional site-specific stormwater pollution controls required and implemented under City Code.

Other municipal programs (e.g., illicit discharge monitoring, street sweeping, etc.) likely provide additional source control benefits in the basin and will help to address minor sources for which specific control measures have not been required. City programs that control current and future contaminant discharges to the conveyance system are described in the Municipal Report.

7 Conclusion

The City completed source tracing in Basin 47, no major sources of contaminants to the City conveyance system were identified, and both sites in the basin have stormwater controls. Therefore, future discharges from Outfall 47 are unlikely to represent a significant source of contaminants to the river. The City concludes that it has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin 47.

8 References

- Anchor et al. 2012. Portland Harbor RI/FS Draft Feasibility Study. Prepared for The Lower Willamette Group by Anchor QEA, LLC, Windward Environmental, LLC, Kennedy/Jenks Consultants, and Integral Consulting, Inc. February 2012.
- BES. 2007. City Outfall Basin 47 Inline Solids Sampling. Technical Memorandum No. OF 47-1. City of Portland, Bureau of Environmental Services. October 19, 2007.
- BES. 2010. Stormwater Evaluation Report. City of Portland, Bureau of Environmental Services. February 2010.
- DEQ. 2013. Milestone Report, Upland Source Control at the Portland Harbor Superfund Site. Prepared by the Oregon Department of Environmental Quality. January 2013.
- EPA. 2010. Re: Portland Harbor Superfund Site; Administrative Order on Consent for Remedial Investigation and Feasibility Study; Docket No. CERCLA-10-2001-0240. Portland Harbor Feasibility Study Source Tables. Letter from EPA to Mr. Bob Wyatt, Chairman, Lower Willamette Group. November 23, 2010.
- Integral et al. 2011. Portland Harbor RI/FS, Remedial Investigation Report. Prepared for the LWG. Prepared by Integral Consulting Inc., Windward Environmental LLC, Kennedy/Jenks Consultants, and Anchor QEA, LLC. August 29, 2011.

List of Figures

Figure 1: Basin 47 Overview

Figure 2: Basin 47 Upland Site Source Controls

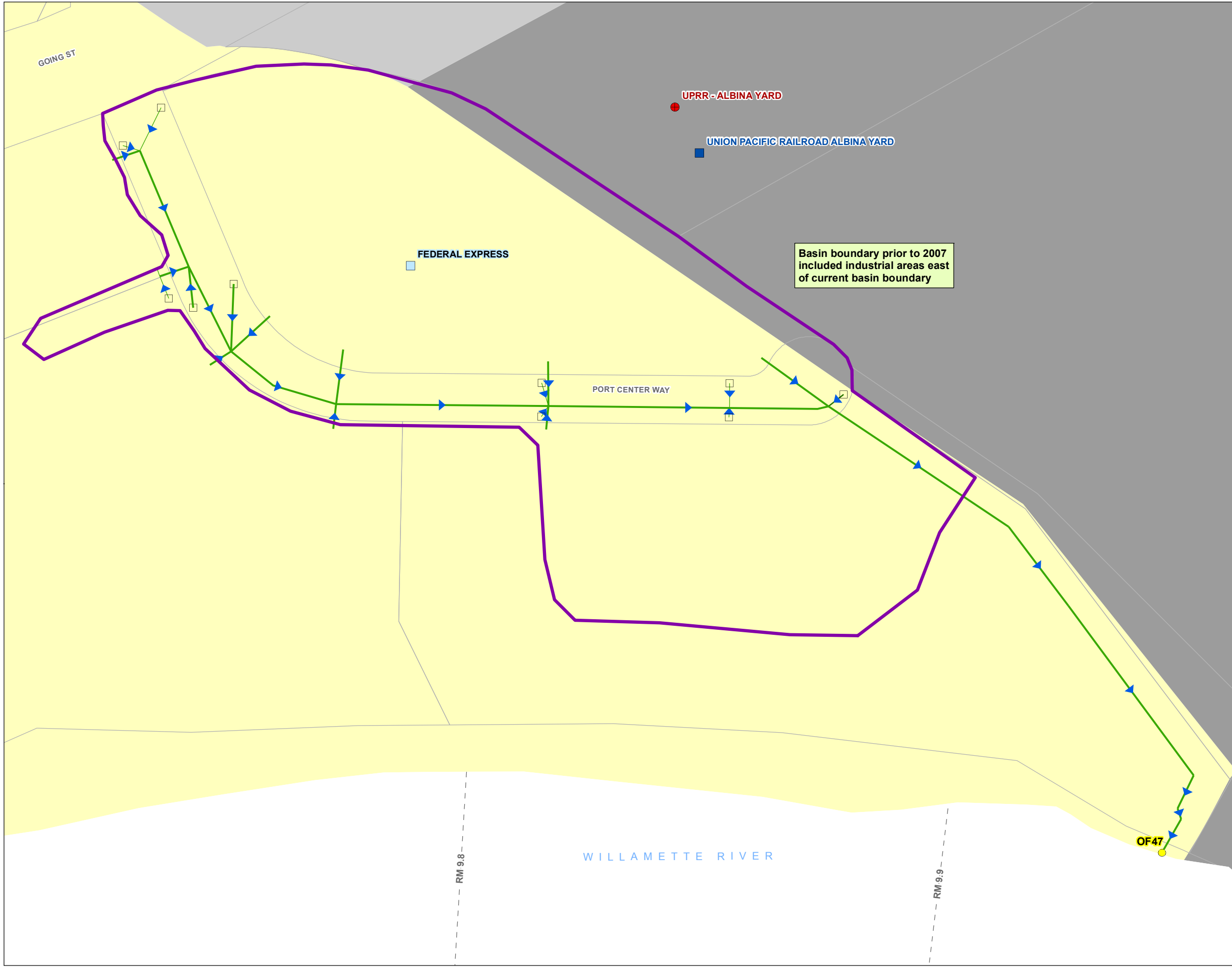
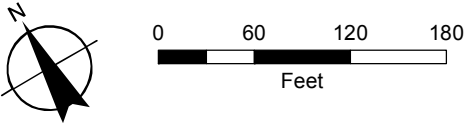


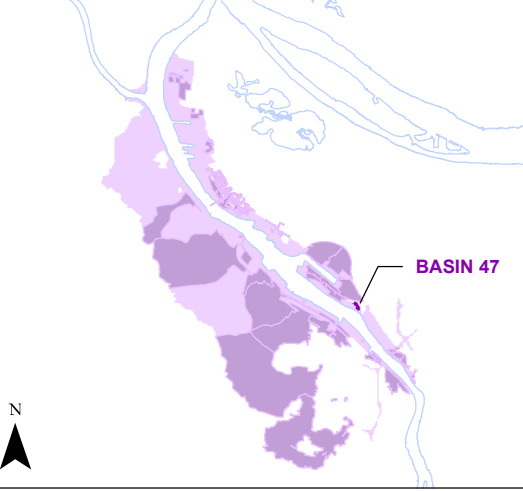
FIGURE 1
Basin 47
Overview

- Basin 47
- DEQ ECSI Site
- NPDES Stormwater Permit
- NPDES No Exposure Certification
- Conveyance System**
 - Storm Line
 - Catch Basin
 - City Outfall
 - Non-City Outfall
- Land Use/Zoning**
 - Heavy Industrial
 - Light Industrial
 - General Employment
- All Other Data**
 - River Mile (RM)
 - Tax Lot
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO

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1120 SW Fifth Avenue, Room 1000
Portland Oregon, 97204 -1912



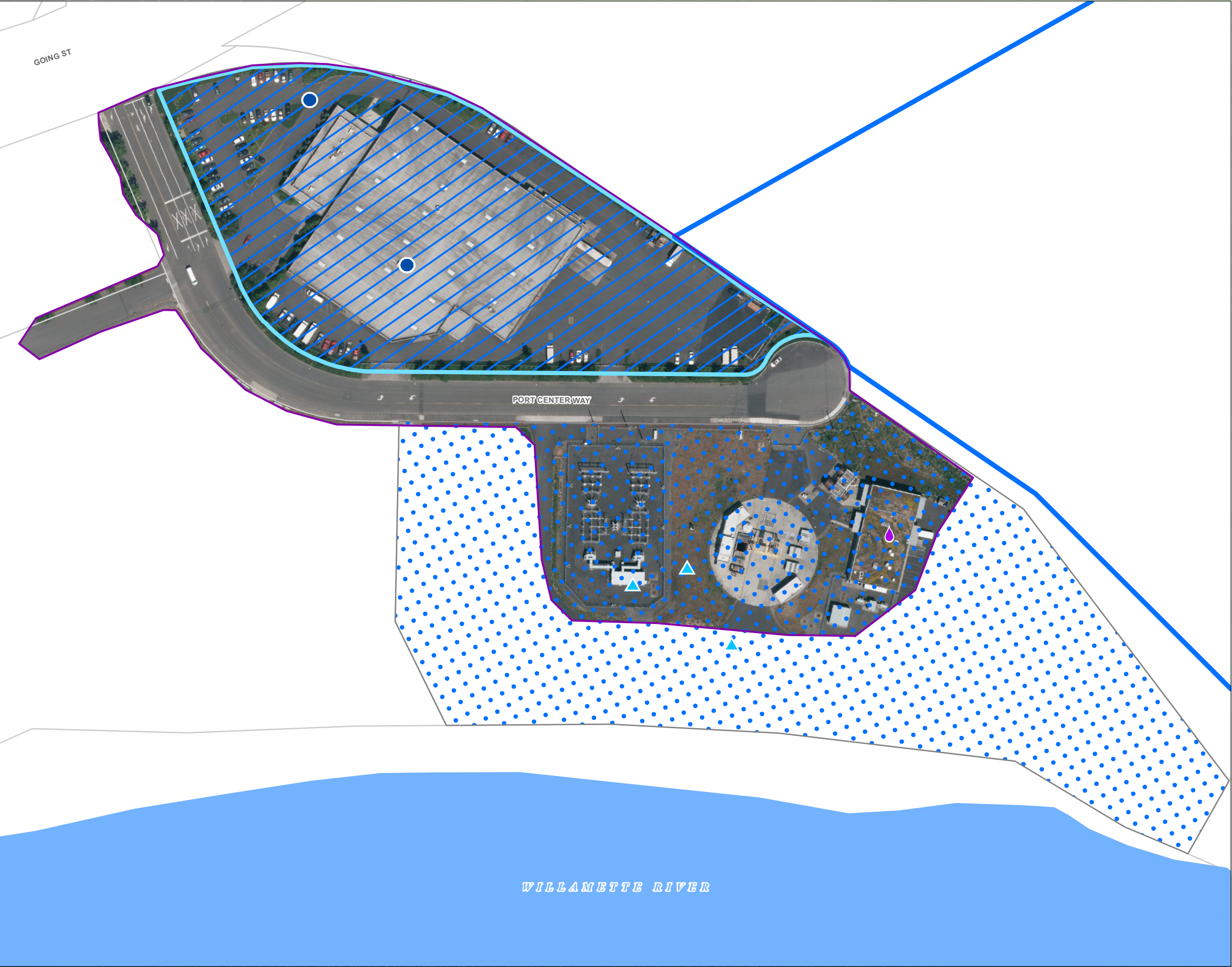
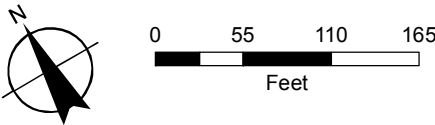


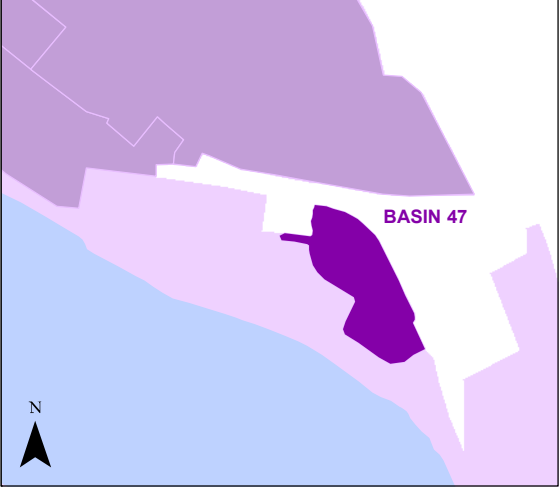
FIGURE 2
Basin 47
Upland Site Source Controls

- Basin 47
- Tax Lot
- All Other Features**
- NPDES Stormwater Discharge Permit
- City Discharge Authorization
- NPDES No Exposure Certification
- >50% of Site Area Redeveloped Under City SWMM
- Stormwater Treatment Facility
- Ecoroof
- Site Inspection - BES Industrial Stormwater Program
- Discharges to City Outfall
- Portland Harbor Hydroboundary



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO, Aerial Photo Taken 2012

ENVIRONMENTAL SERVICES
CITY OF PORTLAND
1120 SW Fifth Avenue, Room 1000
Portland Oregon, 97204-1912



Completion Summary for City of Portland Outfall Basin 48

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and several City programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled. This report summarizes the results of this collaborative effort in Outfall Basin 48.

This Completion Summary includes a weight-of-evidence evaluation to demonstrate that source identification is complete and that there are no current (or anticipated future) major sources of contaminants to the Willamette River via the Basin 48 conveyance system.

Basin 48 is located on the east side of the river in the St. Johns area. The basin is relatively small and consists almost entirely of paved streets in a residential neighborhood above the river bluff. The majority of stormwater flow from the basin is conveyed through a treatment pond and swale that were constructed in 1995. The outfall discharges at approximately River Mile (RM) 7.2 into a small embayment located adjacent to the McCormick & Baxter and Triangle Park environmental cleanup sites.

No known or suspected contaminant sources to the Basin 48 stormwater conveyance system have been identified. Evaluation of inriver sediment data collected in 2002 indicated elevated metals concentrations in sediment near the outfall; however, the adjacent McCormick & Baxter and Triangle Park sites were identified as likely sources of the contamination. The City collected and analyzed inline solids and stormwater from the basin and confirmed that additional source tracing was not warranted. The City concludes that major contaminant sources are not present and that ongoing programmatic source control measures (SCM) in the basin are sufficient for ensuring that discharges from Outfall 48 are protective of the river. Therefore, the City has met the remedial investigation (RI)/SCM objectives for Basin 48.

2 Introduction

This Completion Summary presents a weight-of-evidence evaluation of whether further source investigation is needed in Basin 48, and the rationale for concluding that current and future discharges from Basin 48 are not likely to be a significant source of contaminants to river sediment. The purpose of this report is to demonstrate that, for Basin 48, the City has met the joint RI/SCM objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ.

This report is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report), which provides additional background and detail regarding

the City's harborwide source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Outfall 48 discharges to the east side of the Willamette River near RM 7.2, in the St. Johns area. The outfall basin drains approximately 7.5 acres. Figure 1 shows the location of the outfall and drainage basin boundary and provides an overview of the associated stormwater conveyance system. As shown in Figure 1, stormwater discharge from most of the basin is routed through an engineered treatment pond and swale before discharging to the river. The City constructed this stormwater facility in 1997 as part of its Combined Sewer Overflow (CSO) Abatement Program. The system is designed to treat storm flows that fall within the 20-year storm design standard.

Additional detail on the Outfall 48 stormwater conveyance system and associated drainage basin is included in the *Programmatic Source Control Remedial Investigation Work Plan for the City of Portland Outfalls Project* (CH2M HILL, 2004) and the *Outfall Basin 48 Inline Solids Sampling, Technical Memorandum No. OF48-1* (BES, 2008).

3.2 Land Use and Potential Upland Sources

Land use in the majority of the basin is residential, consisting of the N. Willamette Boulevard right-of-way and other nearby residential streets located above the river bluff. The remaining area of the basin that includes the Basin 48 stormwater treatment facility is zoned open space. The City constructed the stormwater facility in 1995 as part of its CSO Abatement Program. Construction of the treatment facility, in an area formerly used for industrial purposes, included soil removal, installation of a geomembrane, and placement of new soil to support wetland vegetation. This precluded any legacy contamination from affecting stormwater quality in the facility.

There are no industrial facilities located within the basin and no potential pollutant sources have been identified in Basin 48. No DEQ Cleanup Program sites, as identified in DEQ's Environmental Cleanup Site Information (ECSI) database, are located in the basin, although two ECSI sites are located in the vicinity of the Basin 48 stormwater treatment facility. Remediation has been completed or is underway at both of these sites. Remediation of the McCormick & Baxter site (ECSI #74) included soil removal and capping and was completed in 2005. Remediation and redevelopment of the Triangle Park site (ECSI #277) is underway under U.S. Environmental Protection Agency (EPA) oversight. Both of these shoreline sites have associated groundwater contaminant plumes, and review of groundwater data from these sites indicates the Basin 48 stormwater system may intersect one or more of the plumes (GSI, 2006). Groundwater contamination at both sites is being evaluated by DEQ and/or EPA as part of the site remedial investigations.

3.3 Outfall Setting

Outfall 48 discharges to an area of potential concern (AOPC 15) identified by EPA based on elevated concentrations of metals and other contaminants in river sediment (EPA, 2010). AOPC 15 is a relatively small area consisting of a shallow water embayment adjacent to the McCormick & Baxter Superfund Site. Significant amounts of timber, debris, and sand accumulation have been observed on the riverbank in the immediate vicinity of Outfall 48, confirming that the embayment is subject to back eddies and potential redeposition of sediment from both upstream and downstream of the outfall (CH2M HILL, 2004). Remediation of the McCormick & Baxter site included construction of an inwater cap in the vicinity of Outfall 48.

4 Basin Screening and Source Investigations

The City identified Basin 48 as a Priority 3 for source tracing, based on elevated concentrations of metals in the surface sediment samples collected by the City near Outfall 48 in 2002 (CH2M HILL, 2004). Priority 3 designations were assigned to basins where significant concentrations of contaminants have been detected in sediment near the outfall and the contaminants likely are attributable to known upland sources that currently are being investigated under DEQ or EPA oversight. Although no potential sources were identified within Basin 48, the two properties adjacent to the outfall, the McCormick & Baxter Superfund Site and the Triangle Park DEQ Cleanup Program site, were identified as likely sources of the metals detected in the inriver sediment based on known site contaminants of interest (CH2M HILL, 2004).

To confirm that significant sources of metals or other contaminants were not present in the basin, the City collected and analyzed inline solids in 2006 (BES, 2008). Sufficient solids were not present for sampling in the system downstream of the Basin 48 stormwater treatment facility, so the City collected a sample from the treatment facility bypass line to represent solids contributions from the majority of the drainage basin. Analytical results did not indicate major sources of metals or other contaminants (BES, 2008).

Subsequently, as part of the City's stormwater screening evaluation, the City collected stormwater samples in 2007 from the downstream end of the basin (i.e., representing all collective discharges to the system). Based on the evaluation of these data and using a conservative screening approach, no analytes were identified as potentially warranting further source tracing in Basin 48 (BES, 2010).

Table 1 lists investigations and evaluations completed by the City in the Basin 48 conveyance system.

Table 1. City Investigations in the Basin 48 Stormwater Conveyance System

Data Collection Period	Purpose	Documentation
2000	Compile basin background information to identify potential sources.	Preliminary Evaluation of City Outfalls (Eastshore) (BES, 2000)
2002	Evaluate inriver sediment data near City outfalls to prioritize basins for source tracing.	Programmatic Source Control Remedial Investigation Work Plan (CH2M HILL, 2004)
2005	Evaluate existing data on groundwater plumes and identify the potential for City conveyance systems (including Basin 48) to act as preferential pathways.	Relationships Between Upland Shallow Groundwater Plumes and the City Stormwater and Combined Conveyance System Within the Portland Harbor (GSI, 2006)
2006	Collect and analyze inline solids within the Basin 48 conveyance system to evaluate whether the basin contains sources of contaminants detected in inriver sediment near the outfall.	City Outfall Basin 48 Inline Solids Sampling Technical Memorandum (BES, 2008)
2007	Evaluate stormwater data from City outfalls to identify additional source tracing needs.	Stormwater Evaluation Report, City of Portland Outfall Project (BES, 2010)

The City's investigation and data evaluation did not identify any current major sources of contaminants in Basin 48.

5 Completion of Source Identification

The lines of evidence evaluated to confirm that source tracing is complete include (1) results of source investigation activities conducted in the basin and (2) basin land use. Findings from this evaluation are summarized below.

- *Source Investigation Results.* Results of the inline solids investigation and stormwater evaluation did not indicate the presence of major contaminant sources in the basin (BES, 2008 and 2010).
- *Land Use:* The basin consists primarily of residential streets (see Figure 1). Although a small portion of the basin is on industrial-zoned land, the basin does not include industrial land uses. Land use in this area is the Basin 48 stormwater treatment facility. Non-industrial activities are not a known or suspected major source of contaminants to the City stormwater conveyance system.

Based on these lines of evidence, the City concludes that the Basin 48 source evaluation is complete and no additional source tracing is warranted.

6 Basin Source Controls

The primary source control in the basin is the stormwater treatment facility constructed in 1995, which treats basin stormwater and reduces suspended solids loading to Outfall 48. The City also has a National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) stormwater permit that covers basin drainage areas.

Ongoing municipal programs (e.g., street sweeping) likely provide additional source control benefits in the basin and will help to address minor sources for which specific control measures have not been required. City programs that control current and future contaminant discharges to the conveyance system are described in the Municipal Report.

7 Conclusion

Based on the information summarized above, there are no major sources of contaminants in Basin 48 and future discharges from Outfall 48 are unlikely to represent a significant source of contaminants to the river. The City concludes that it has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin 48.

8 References

- BES. 2000. Preliminary Evaluation of City Outfalls. Portland Harbor Study Area. Notebook 1: Eastshore Stormwater and CSO Outfalls. City of Portland, Bureau of Environmental Services. December 2000.
- BES. 2008. City Outfall Basin 48 Inline Solids Sampling. Technical Memorandum No. OF48-1. To K. Tarnow (DEQ) from L. Scheffler and D. Sanders (BES). January 17, 2008.
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- EPA. 2010. Re: Portland Harbor Superfund Site; Administrative Order on Consent for Remedial Investigation and Feasibility Study; Docket No. CERCLA-10-2001-0240. Portland Harbor Feasibility Study Source Tables. Letter from EPA to Mr. Bob Wyatt, Chairman, Lower Willamette Group. November 23, 2010.
- GSI. 2006. Relationships Between Upland Shallow Groundwater Plumes and the City Stormwater and Combined Conveyance System with the Portland Harbor. Technical Memorandum prepared by Groundwater Solutions, Inc., for the City of Portland Bureau of Environmental Services. March 16, 2006.

List of Figures

Figure 1: Basin 48 Overview and Conveyance System Source Controls

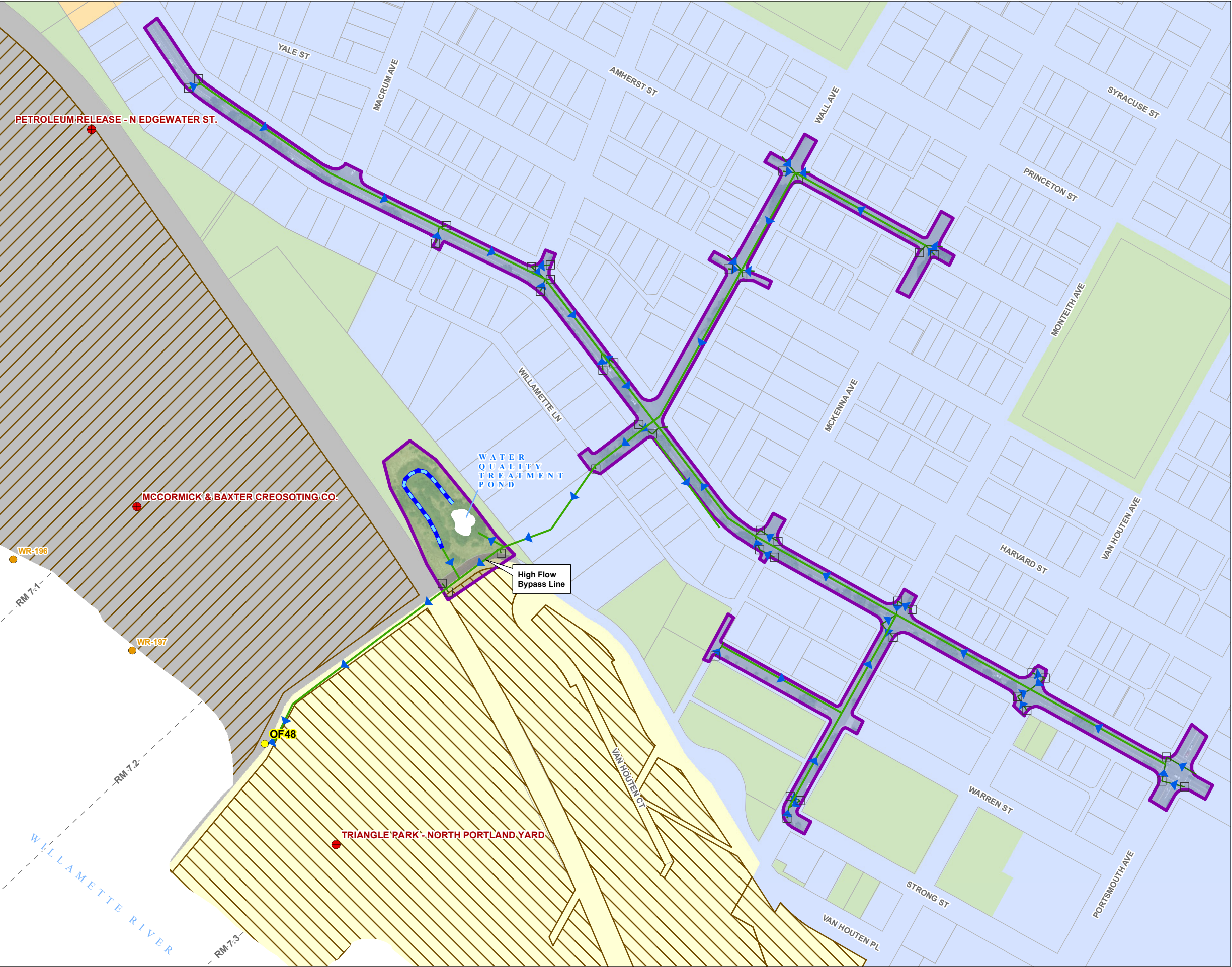
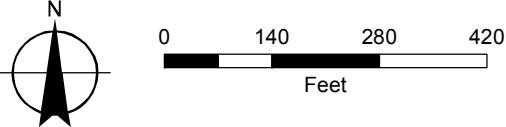


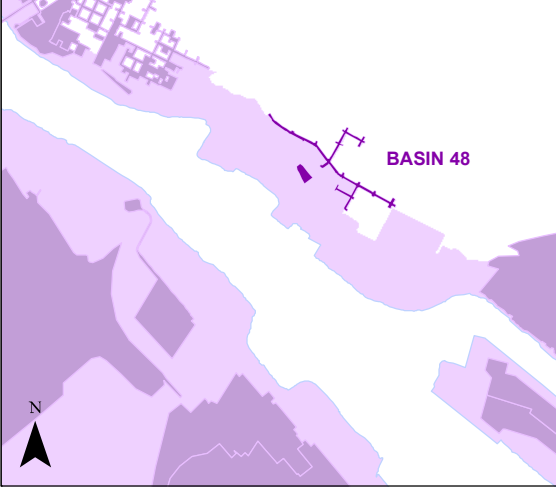
FIGURE 1
Basin 48
Overview and Conveyance
System Source Controls

- Basin 48
- DEQ ECSI Site
- Conveyance System**
 - Storm Line
 - Water Quality Swale
- Catch Basin
- City Outfall
- Non-City Outfall
- Land Use/Zoning**
 - Heavy Industrial
 - General Employment
 - Residential
 - Parks and Open Space
- DEQ Stormwater SCE**
 - SCEs implemented or pending
 - SCE not needed or low priority
- All Other Data**
 - River Mile (RM)
 - Tax Lot
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO

ENVIRONMENTAL SERVICES
CITY OF PORTLAND
1120 SW Fifth Avenue, Room 1000
Portland Oregon, 97204 -1912



Completion Summary for City of Portland Outfall Basin 49

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and several City programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled. This report summarizes the results of this collaborative effort in Outfall Basin 49.

This Completion Summary includes a weight-of-evidence evaluation to demonstrate that source identification is complete and that there are no current (or anticipated future) major sources of contaminants to the Willamette River via the Basin 49 conveyance system.

Outfall 49 discharges to the east side of the river at River Mile (RM) 6.4, near the downstream end of Willamette Cove. The drainage basin for this outfall is within a predominantly residential area in the St. Johns district. Basin 49 also includes small areas of commercial, major transportation (Oregon Department of Transportation [ODOT] Highway 30 Bypass), and open space land uses. The majority of stormwater flow from the basin is conveyed through a treatment facility that was constructed in 1995.

No known or suspected contaminant sources to the Basin 49 stormwater conveyance system have been identified. Evaluation of inriver sediment data collected near the outfall in 2002 indicated elevated mercury and polycyclic aromatic hydrocarbon (PAH) concentrations. However, subsequent reevaluation of the sediment data along with sediment data collected in 2004 by the Lower Willamette Group (LWG) indicated contaminant concentrations in the vicinity of the outfall were not significantly elevated relative to updated screening level values (SLV) and were similar to concentrations detected upstream. The City evaluated inline solids and stormwater samples from the basin and confirmed that additional source tracing in Basin 49 was not needed. The City concludes that major contaminant sources are not present and that ongoing programmatic source control measures (SCM) in the basin are sufficient for ensuring that discharges from Outfall 49 are protective of the river. Therefore, the City has met the remedial investigation (RI)/SCM objectives for Basin 49.

2 Introduction

This Completion Summary presents a weight-of-evidence evaluation of whether further source investigation is needed in Basin 49, and the rationale for concluding that current and future discharges from the basin are not likely to be significant sources of contaminants to river sediment. The purpose of this report is to demonstrate that, for Basin 49, the City has met the joint RI/SCM objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ.

This report is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report), which provides additional background and detail regarding the City's harborwide source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Outfall 49 discharges to the east side of the river at RM 6.4, near the downstream end of Willamette Cove. The drainage area for the Basin 49 conveyance system is approximately 33 acres located within the historical St. Johns district. Figure 1 shows the location of the outfall and drainage basin boundary and provides an overview of the associated stormwater conveyance system. As shown in Figure 1, stormwater discharge from the basin is routed through a stormwater treatment facility located approximately 500 feet upstream from Outfall 49. The City constructed this stormwater facility in 1995 as part of the City's Combined Sewer Overflow (CSO) Abatement Program; the facility treats stormwater runoff from almost the entire basin. The facility consists of a vegetated swale and sediment-removal inlets. The conveyance system also includes two small water quality swales located along N. Decatur Street that were installed in 2011 as part of pedestrian improvements affiliated with a residential redevelopment project. All three swales are designed to infiltrate stormwater and to reduce suspended sediment loading to the conveyance system. City programs that result in these types of stormwater improvements are described in detail in the Municipal Report.

Additional detail on the Outfall 49 stormwater conveyance system and associated drainage basin is included in the *Programmatic Source Control Remedial Investigation Work Plan for the City of Portland Outfalls Project* (CH2M HILL, 2004) and the *Outfall Basin 49 Inline Solids Sampling, Technical Memorandum No. OF49-1* (BES, 2006).

3.2 Land Use and Potential Upland Sources

Land use in Basin 49 is predominately residential, as shown in Figure 1. The basin also includes two small commercial areas, one small area zoned general employment¹ (occupied by an automotive service shop), a small area of major transportation (ODOT Highway 30 Bypass), and an area of open space near the outfall that is developed as the Basin 49 stormwater treatment facility. The basin is within the St. Johns Plan District, which provides a framework for strengthening St. Johns' role as the commercial and civic center of the North Portland peninsula.²

No current potential pollutant sources have been identified in Basin 49. The only DEQ Cleanup Program site located within the basin, as identified in DEQ's Environmental Cleanup Site Information (ECSI) database, is a small portion of the ODOT facility (ECSI #5437). ODOT is

¹ General employment is a Portland zoning category that allows a range of employment opportunities but emphasizes industrial and industrial-support uses. The zones can allow for the transition to a less industrial overall nature.

² The St. Johns Plan District describes the mixed-use development goals in this area (see <http://www.portlandoregon.gov/bps/index.cfm?&a=53424>).

conducting a source control evaluation under DEQ oversight (DEQ, 2012, 2013). No other Cleanup Program sites are located in the basin, although one Cleanup Program site, Willamette Cove (ECSI #2066) is located along the shoreline near the outfall. A plume of polycyclic aromatic hydrocarbon (PAH)-contaminated groundwater is present at the Willamette Cove site and may intersect the Basin 49 outfall pipe, based on review of existing groundwater data (GSI, 2006). Groundwater contamination at the Willamette Cove site is being evaluated by DEQ as part of the remedial investigation.

Because of the predominantly residential land use in the basin, no sites in the basin currently hold, or historically held, National Pollutant Discharge Elimination System (NPDES) permits to discharge to the Basin 49 conveyance system.

3.3 Outfall Setting

Outfall 49 discharges to an area of potential concern (AOPC 13) identified by the U.S. Environmental Protection Agency (EPA) based on elevated concentrations of metals, PAHs and other contaminants in river sediment (EPA, 2010). In addition to Outfall 49, two non-City outfalls also discharge to AOPC 13 in the vicinity of Outfall 49.

4 Basin Screening and Source Investigations

The City identified Basin 49 as a Priority 2 for source tracing, based on elevated concentrations of mercury and slightly elevated concentrations of PAHs in the surface sediment samples collected by the City near Outfall 49 in 2002 (CH2M HILL, 2004). Priority 2 designations were applied to outfalls where slightly elevated concentrations of contaminants in sediment were observed in the vicinity of the outfall, indicating that sources that could affect sediment quality may be present in the basin. No potential sources were identified within Basin 49, but two upstream contaminated sites, the Willamette Cove DEQ Cleanup Program site and the McCormick & Baxter Superfund Site, were identified as possible sources of mercury and/or PAHs to river sediment near Outfall 49 (CH2M HILL, 2004).

The City reevaluated the 2002 sediment data from near Outfall 49 together with sediment data collected in 2004 by the LWG (Integral, 2005) and using newly available SLVs from the Joint Source Control Strategy (DEQ/EPA, 2005). Based on this reevaluation, the City concluded that contaminant concentrations in the vicinity of the outfall were not significantly elevated and were similar to concentrations detected upstream (BES, 2006). To verify that major sources of mercury were not present in the basin, the City collected and analyzed inline solids samples from the Basin 49 conveyance system in 2005. The City collected the solids samples from the downstream ends of both major branches of the system, just upstream of the stormwater treatment swale. Mercury concentrations were either not detected or below background concentrations, demonstrating that there were no mercury sources in the basin (BES, 2006). Based on the results of the sediment reevaluation and the inline solids investigation, the City reprioritized Basin 49 as a Priority 4 basin for source tracing, the designation for basins in which the outfall does not appear to be a significant contaminant pathway to the river (BES, 2006).

As part of the City's stormwater screening evaluation (BES, 2010), the City evaluated stormwater and sediment trap data collected by the LWG in 2007 from the downstream end of the basin (i.e., representing all collective discharges to the system) (Anchor and Integral, 2008). Based on the evaluation of these data and using a conservative screening approach, no analytes

were identified as potentially warranting further source tracing in Basin 49 (BES, 2010). Mercury concentrations were all non-detect and PAH concentrations were low or not detected.

Table 1 lists investigations and evaluations completed by the City and others in the Basin 49 conveyance system.

Table 1. Investigations in the Basin 49 Stormwater Conveyance System

Data Collection Period	Party	Purpose	Documentation
2000	City	Compile basin background information to identify potential sources.	Preliminary Evaluation of City Outfalls (Eastshore) (BES, 2000)
2002	City	Evaluate inriver sediment data near City outfalls to prioritize basins for source tracing.	Programmatic Source Control Remedial Investigation Work Plan (CH2M HILL, 2004)
2005	City	Evaluate existing data on groundwater plumes and identify the potential for City conveyance systems (including Basin 49) to act as preferential pathways.	Relationships Between Upland Shallow Groundwater Plumes and the City Stormwater and Combined Conveyance System with the Portland Harbor (GSI, 2006)
2005	City	Reevaluate the original prioritization of Outfall Basin 49 based on additional sediment data and new screening level values, and collect and analyze inline solids from the basin to evaluate the possible presence of mercury sources in the basin.	City Outfall Basin 49 Inline Solids Sampling and Basin Priority Reassessment Technical Memorandum No. TM OF49-1 (BES, 2006)
2007-2008	Lower Willamette Group (LWG)	Collect stormwater and sediment trap samples representative of discharges from the whole basin to evaluate stormwater discharges representative of residential land use.	Portland Harbor RI/FS Round 3A and 3B Stormwater Data Report. Prepared for the LWG (Anchor and Integral, 2008)
2007	City	Evaluate stormwater data from City outfalls to identify additional source tracing needs.	Stormwater Evaluation Report, City of Portland Outfall Project (BES, 2010)

The City's investigation and data evaluation did not identify any current major sources of contaminants in Basin 49.

5 Completion of Source Identification

The lines of evidence evaluated to confirm that source tracing is complete include (1) results of source investigation activities and (2) land use in the basin. Findings from this evaluation are summarized below.

- *Source Investigation Results.* Results of the inline solids investigation do not indicate the presence of mercury sources in the basin (BES, 2006). In addition, the City's stormwater screening evaluation of stormwater samples representing cumulative discharges from the entire drainage basin did not identify any analytes, including mercury and PAHs, as potentially warranting further source tracing in Basin 49 (BES, 2010).

- *Land Use:* The vast majority of the basin consists of residential streets and properties. No industrial facilities are located in the basin. An automobile repair shop occupies the small portion of the basin that is zoned as general employment. Non-industrial activities are not a known or suspected major source of contaminants to the City stormwater conveyance system.

Based on these lines of evidence, the City concludes that Basin 49 source investigation is complete and there are no major contaminant sources in the basin.

6 Basin Source Controls

The primary source control in the basin is the stormwater treatment facility, constructed in 1995, which treats basin stormwater and reduces suspended solids loading to Outfall 49. ODOT is in the process of conducting a source control evaluation of facility drainage to the harbor, to determine whether additional source controls are warranted. The City and ODOT both have NPDES Municipal Separate Storm Sewer System (MS4) stormwater permits that cover basin drainage areas. Ongoing municipal programs (e.g., street sweeping, stormwater redevelopment standards) likely provide additional source control benefits in the basin and will help to address minor sources for which specific control measures have not been required. City programs that control current and future contaminant discharges to the conveyance system are described in the Municipal Report.

7 Conclusion

Based on the information summarized above, there are no major sources of contaminants in Basin 49 and future discharges from Outfall 49 are unlikely to represent a significant source of contaminants to the river. The City concludes that it has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin 49.

8 References

- Anchor and Integral. 2008. Portland Harbor RI/FS Round 3A and 3B Stormwater Data Report. Prepared for the Lower Willamette Group by Anchor Environmental, L.L. C. and Integral Consulting Inc. September 2008.
- BES. 2000. Preliminary Evaluation of City Outfalls. Portland Harbor Study Area. Notebook 1: Eastshore Stormwater and CSO Outfalls. City of Portland, Bureau of Environmental Services. December 2000.
- BES. 2006. City Outfall Basin 49 Inline Solids Sampling and Basin Priority Reassessment. Technical Memorandum No. OF49-1. To T. Roick (DEQ) from L. Scheffler and D. Sanders (BES). May 8, 2006.
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- DEQ/EPA. 2005. Portland Harbor Joint Source Control Strategy, Interim Final, dated December 2005.
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<http://www.deq.state.or.us/lq/ECSI/ecsdetail.asp?seqnbr=5437>
- DEQ. 2013. Milestone Report, Upland Source Control at the Portland Harbor Superfund Site. Prepared by the Oregon Department of Environmental Quality. January 2013.
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List of Figures

Figure 1: Basin 49 Overview and Conveyance System Source Controls

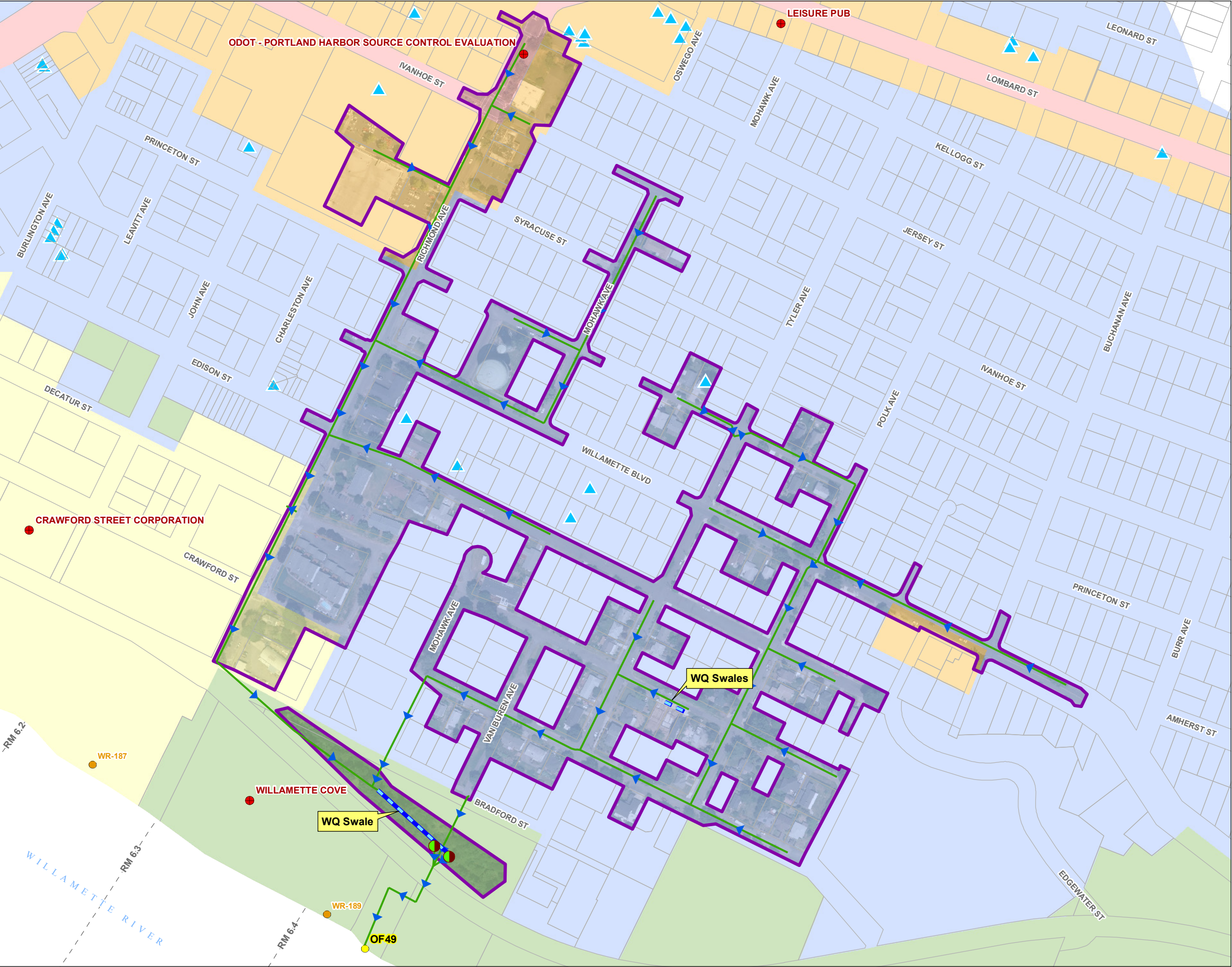
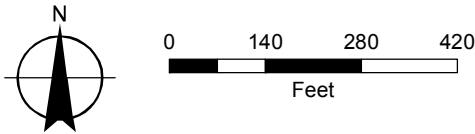


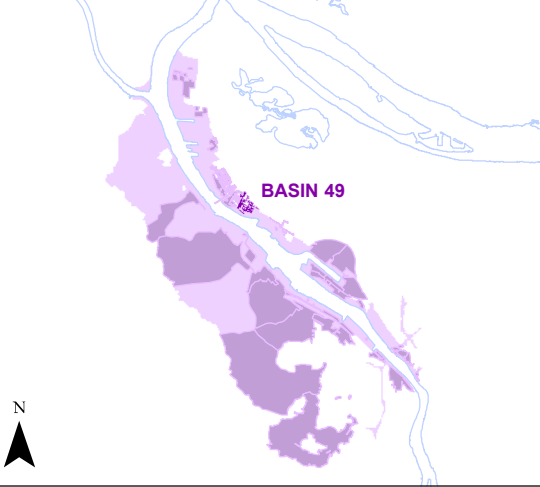
FIGURE 1
Basin 49
Overview and Conveyance
System Source Controls

- Basin 49
- DEQ ECSI Site
- Stormwater Treatment Facility
- Conveyance System**
 - Storm Line
 - Water Quality (WQ) Swale
 - Sediment Removal Structure
 - City Outfall
 - Non-City Outfall
- Land Use/Zoning**
 - General Employment
 - Commercial
 - Residential
 - Parks and Open Space
 - Major Transportation
- All Other Data**
 - River Mile (RM)
 - Tax Lot
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO

ENVIRONMENTAL SERVICES
CITY OF PORTLAND
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Completion Summary for City of Portland Outfall Basin 50

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and several City programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled. This report summarizes the results of this collaborative effort in Outfall Basin 50.

This Completion Summary includes a weight-of-evidence evaluation to demonstrate that source identification is complete and that there are no current (or anticipated future) major sources of contaminants to the Willamette River via the Basin 50 conveyance system.

Outfall 50 discharges to the east side of the river near River Mile (RM) 6. The drainage basin for this outfall is approximately 38.6 acres in the St. Johns district and includes residential, commercial, and industrial properties, as well as a small portion of the Oregon Department of Transportation (ODOT) Highway 30 Bypass. As is typical for the St. Johns district, the upper part of the basin remains predominantly residential, and the lower part, closer to the river, is a mix of industrial and non-industrial uses (including new residential development) on historically industrial land. Non-residential facilities located in the lower part of the basin include metal fabricators, an electrical wiring supply company, and the City's Water Pollution Control Laboratory (WPCL). A stormwater pollution reduction pond, constructed in 1997, treats stormwater runoff from the basin before it discharges from the outfall and the basin includes several other smaller stormwater treatment facilities that treat runoff from basin rights-of-way.

Evaluation of inriver sediment data collected in 2002 indicated elevated metals concentrations in sediment near the outfall; however, the adjacent upriver site was identified as a likely source of metals. The City conducted source investigations (including collection and analysis of solids and stormwater samples) and confirmed that major current contaminant sources were not present and that additional source tracing was not needed. The City concludes that ongoing programmatic source control measures (SCM) in the basin are sufficient for ensuring discharges from Outfall 50 are protective of the river. Therefore, the City has met the remedial investigation (RI)/SCM objectives for Basin 50.

2 Introduction

This Completion Summary presents a weight-of-evidence evaluation of whether further source investigation is needed in Basin 50, and the rationale for concluding that current and future discharges from the basin are not likely to be significant sources of contaminants to river sediment. The purpose of this report is to demonstrate that, for Basin 50, the City has met the joint RI/SCM objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ.

This report is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report), which provides additional background and detail regarding the City's harborwide source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Basin 50 is located in the historical St. Johns district on the east side of the river and discharges near RM 6. The outfall basin drains approximately 38.6 acres. Figure 1 shows the location of the outfall and drainage basin boundary and provides an overview of the associated stormwater conveyance system.

As shown in Figure 1, the conveyance system includes a stormwater pollution reduction pond at the downstream end of the basin, on the City's WPCL property. The City constructed the pond in 1997, as part of its Combined Sewer Overflow (CSO) Abatement Program, to remove pollutants from basin stormwater runoff through solids capture and natural vegetation filtration. Stormwater passes through a sedimentation manhole (see Figure 1) before being discharged to the pond via a storm line and vegetated spillway. When water in the pond exceeds the pond capacity, treated stormwater is discharged through an outlet grate at the west end of the pond and to Outfall 50. If stormwater inflows exceed the pond design criteria, the excess flow is diverted through a bypass line to Outfall 50 to avert damage or sediment agitation in the pond during high flows.

The conveyance system also includes additional stormwater treatment facilities (as shown in Figure 1) that further reduce suspended solids loading to Outfall 50.

- In 2007, a private contractor constructed water quality swales to treat stormwater runoff from N. Salem Avenue, between N. Edison Street and N. Crawford Street, as part of redevelopment requirements for adjacent new residential property.
- In 2007, a private contractor constructed water quality planters to treat stormwater runoff from N. Charleston Avenue and N. Edison Street, as part of redevelopment requirements for adjacent new residential property.
- The City constructed five water quality swales in 2012, along N. Ivanhoe Street between N. Leavitt Avenue and N. Charleston Avenue. The construction was completed by the City's Bureau of Environmental Services (BES) and Bureau of Transportation as part of pedestrian improvements. These swales treat runoff from the ODOT Highway 30 Bypass. The City has an agreement with ODOT to maintain the swales on their behalf.

City programs that result in these types of stormwater improvements are described in the Municipal Report. Additional information on the Outfall 50 stormwater conveyance system and associated drainage basin is included in the *Programmatic Source Control Remedial Investigation Work Plan for the City of Portland Outfalls Project* (CH2M HILL, 2004) and *Outfall Basin 50 Pollution Reduction Pond Solids Investigation, Technical Memorandum No. OF50-1* (BES, 2008).

3.2 Land Use and Potential Upland Sources

Land use in Basin 50 is a mix of residential, commercial, industrial (within the general employment¹ zoned area in the lower portion of the basin), major transportation (ODOT Highway 30 Bypass), and open space. Land use in the lower part of the basin includes the WPCL facility, which the City constructed in 1997 to house BES staff members and a full-service environmental laboratory. The WPCL site includes open space and showcases a variety of stormwater treatment facilities constructed to manage all site stormwater. Other non-residential land uses in the lower basin include metals fabrication, steel plate storage, and an electrical wiring supply business. The remainder of the basin is residential and commercial properties, vacant land, a railroad corridor, and streets, including a small area of major transportation (the Highway 30 bypass that serves as principal access to and from the St. Johns Bridge). The basin is within the St. Johns Plan district, which provides a framework for strengthening St. Johns' role as the commercial and civic center of the North Portland peninsula.²

Sites that were identified as potential sources of contaminants to the Basin 50 conveyance system include two sites within or partially within the basin that are in the DEQ Cleanup Program, as listed in DEQ's Environmental Cleanup Site Information (ECSI) database. The City investigated, remediated (removed contaminated soil), and redeveloped the WPCL site. Removal actions have been conducted at the former Crawford Street Corporation site and a stormwater source control evaluation (SCE) is underway. ODOT is conducting an SCE of all ODOT drainage areas within Portland Harbor. Table 1 lists these sites and indicates the associated contaminants of interest (COI) and the status of stormwater pathway evaluations.

¹ General employment is a Portland zoning category that allows a range of employment opportunities but emphasizes industrial and industrial-support uses. The zones can allow for the transition to a less industrial overall nature.

² The St. Johns Plan district describes the mixed-use development goals in this area (see <http://www.portlandoregon.gov/bps/index.cfm?&a=53424>).

Table 1. DEQ Cleanup Program Sites Within or Partially Within Basin 50

DEQ Cleanup Program Site	Site COIs	Site Stormwater Pathway Evaluations ⁽¹⁾
Within Basin		
BES Water Pollution Control Laboratory (ECSI # 2452)	PCBs in subsurface soil ⁽²⁾	Source Control Decision/No Further Action Issued
Partially Within Basin		
Crawford Street Corporation (ECSI # 2363) ⁽³⁾	VOCs, PAHs, TPH, PCBs, metals ⁽⁴⁾	Source Control Evaluation in Progress
ODOT – Portland Harbor Source Control Evaluation (ECSI #5437)	Not listed ⁽⁵⁾	Source Control Evaluation In Progress

Notes:

VOCs = volatile organic compounds; PAHs = polycyclic aromatic hydrocarbons; TPH = total petroleum hydrocarbons; PCBs = polychlorinated biphenyls; DEQ = Oregon Department Environmental Quality; COIs = contaminants of interest; BES = Bureau of Environmental Quality; ECSI = Environmental Cleanup Site Information; ODOT = Oregon Department of Transportation; WPCL = Water Pollution Control Laboratory.

- (1) Source: DEQ Milestone Report, Figure 1b, "Status of Stormwater Source Control Evaluations, January 2013" (DEQ, 2013).
- (2) Site COIs are not listed in Appendix Q (Source Control Inventory Tables) of the Portland Harbor RI/FS Draft Feasibility Study (FS) (Anchor et al., 2012) or Table 4.2-2 of the Portland Harbor RI/FS Draft Final Remedial Investigation Report (Integral et al., 2011). DEQ records indicate two PCB releases to subsurface soil at this site were discovered and remediated in 1993 (DEQ, 2010a and 2010b).
- (3) Some stormwater from the southern area of this site discharges to Outfall 50 via overland flow to the WPCL site. This area currently is used by Lampros Steel for structural steel plate storage and staging.
- (4) Source: Appendix Q of the Portland Harbor RI/FS Draft FS (Anchor et al., 2012).
- (5) Site is not listed in Appendix Q of the draft FS or Table 4.2-2 of the Portland Harbor RI/FS Draft Final Remedial Investigation Report (Integral et al., 2011), and site COIs are not listed in ECSI database (DEQ, 2012).

No sites in the basin currently hold, or historically held, National Pollutant Discharge Elimination System (NPDES) permits to discharge to the Basin 50 conveyance system. Note that the City and ODOT both have NPDES Municipal Separate Storm Sewer System (MS4) stormwater permits that cover basin drainage areas.

3.3 Outfall Setting

Outfall 50 discharges to an area of potential concern (AOPC 12) identified by the U.S. Environmental Protection Agency (EPA) based on elevated concentrations of metals and other contaminants in river sediment (EPA, 2010). In addition to Outfall 50, one non-City outfall also discharges to AOPC 12.

4 Basin Screening and Source Investigations

The City identified Basin 50 as a Priority 3 for source tracing, based on elevated concentrations of metals in the surface sediment samples collected by the City near Outfall 50 in 2002 (CH2M HILL, 2004). Priority 3 designations were assigned to basins where significant concentrations of contaminants have been detected in sediment near the outfall and the contaminants likely are attributable to known upland sources that currently are being investigated under DEQ or EPA oversight. No current potential sources of metals at the concentrations detected were identified

within Basin 50, but the adjacent upriver site (former Crawford Street Corporation site) was identified as a possible source to inriver sediment near Outfall 50 (CH2M HILL, 2004).

To confirm that discharges from Outfall 50 were not a significant source of metals or other contaminants to the river, the City collected and analyzed solids from the stormwater pollution reduction pond in 2007. A composite solids sample, representing solids discharged from Basin 50 that had accumulated in the pond during the 10-year period of operation, was collected just upstream of the pond's discharge grate. The sample was analyzed for a broad range of constituents, including metals, PCB Aroclors and congeners, pesticides, herbicides, polycyclic aromatic hydrocarbons (PAH), phthalates, and semivolatile organic compounds. For reference, data for solids that had been removed in 2004 from the pond spillway area near the inlet also were evaluated. The metals results for the 2004 and 2007 samples indicated that concentrations of metals discharged to the City stormwater conveyance system were too low to be the source of the elevated concentrations detected in the 2002 river sediment samples. Analytical results for the 2007 pond solids samples also did not indicate the presence of major sources of other contaminants in the basin (BES, 2008).

As part of the City's subsequent stormwater screening evaluation, the City collected stormwater samples in 2007 from the downstream end of the basin (i.e., representing all collective discharges to the system). Based on the evaluation of these data and using a conservative screening approach, no analytes were identified as potentially warranting further source tracing in Basin 50 (BES, 2010).

Table 2 lists investigations and evaluations completed by the City in the Basin 50 conveyance system.

Table 2. City Investigations in the Basin 50 Stormwater Conveyance System

Data Collection Period	Purpose	Documentation
2000	Compile basin background information to identify potential sources.	Preliminary Evaluation of City Outfalls (Eastshore) (BES, 2000)
2002	Evaluate inriver sediment data near City outfalls to prioritize basins for source tracing.	Programmatic Source Control Remedial Investigation Work Plan (CH2M HILL, 2004)
2004 and 2007	Analyze a sample of sediments removed from the spillway of the stormwater pollution reduction pond (2004) and a sediment sample from the area adjacent to the outlet grate (2007). Evaluate these data to determine whether solids discharging from the outfall are a source of elevated metals in river sediment and whether major contaminant sources are present in the basin.	Outfall Basin 50 Pollution Reduction Pond Solids Investigation - Technical Memorandum No. OF50-1 (BES, 2008)
2007	Evaluate stormwater data from City outfalls to identify additional source tracing needs.	Stormwater Evaluation Report, City of Portland Outfall Project (BES, 2010)

The City's investigation and data evaluation did not identify any current major sources of contaminants in Basin 50.

5 Completion of Source Identification

The lines of evidence evaluated to confirm that source tracing is complete include (1) results of source investigation activities conducted in the basin and (2) upland investigation and land use in the basin. Findings from this evaluation are summarized below:

- *Source Investigation Results:* The Basin 50 conveyance system includes a stormwater treatment pond at the downstream end of the basin. An investigation of sediments collected from the pond did not indicate the presence of major sources of metals or other contaminants in the basin (BES, 2008). In addition, the City's evaluation of stormwater samples representing the entire drainage basin verified that further source tracing in Basin 50 was not needed (BES, 2010).
- *Upland Investigation and Land Use:* Figure 2 displays the spatial extent of DEQ Cleanup Program site investigations and other programmatic controls in the current basin (see key to figures provided at beginning of this Appendix). As shown in Figure 2, almost all non-residential sites in the portion of the basin zoned general employment:
 - Are conducting an SCE or were issued a source control decision under the DEQ Cleanup Program;
 - Are covered under NPDES industrial stormwater regulations; and/or
 - Are monitored for stormwater exposures through periodic inspections under the City's Industrial Stormwater Program.

Two additional sites in the upper part of the basin (a limousine service and a dry-cleaning business) also have been inspected under the Industrial Stormwater Program to confirm that industrial exposures are not present. Land use at sites not covered by DEQ Cleanup or Water Quality Programs consists of residential properties, commercial businesses, an electrical wiring supply operation, and vacant land. Current and future industrial activities exposed to stormwater will be addressed by the DEQ Water Quality NPDES Program, and non-industrial activities are not a known or suspected source of contaminants to the City stormwater conveyance system.

Based on these lines of evidence, the City concludes that Basin 50 source investigation is complete and no additional source tracing is warranted.

6 Basin Source Controls

Source control in Basin 50 includes SCMs implemented or planned under DEQ Cleanup Program agreements, specific controls implemented within the City's shared stormwater conveyance system (e.g., the stormwater pollution reduction pond), and ongoing City and DEQ programs that are described in detail in the Municipal Report. Source controls implemented within Basin 50 are displayed in Figures 1 and 2 and summarized in this section.

One type of programmatic source control is the elimination of stormwater exposures to industrial activities. Table 3 lists the one site within the basin that currently holds an NPDES No Exposure Certification.

Table 3. Site with No Exposure Certification in Basin 50

Address	Company	Time Period
8613 N. Crawford Street	Peninsula Iron Works	2009 – Present

As shown in Figure 2, several properties within the basin have implemented stormwater controls as part of site redevelopment. These controls, such as swales and flow-through planter boxes, manage stormwater onsite and reduce stormwater runoff volume and sediment loading to Outfall 50.

Table 4 summarizes additional site-specific, programmatic, and conveyance system source controls for Basin 50.

Table 4. Basin 50 Source Controls

Site/Area	Source Controls	Implementation Timeframe
Source Control Measures (SCM) at DEQ Cleanup Program Sites		
BES Water Pollution Control Laboratory (ECSI # 2452)	Approximately 1,500 cubic yards of black sand and other potentially contaminated fill were excavated and disposed of offsite (GSI, 2006).	1994
	All site stormwater is subject to stormwater treatment. The City constructed stormwater treatment systems (i.e., vegetated infiltration swales for parking lot and roof runoff and the Basin 50 stormwater pollution reduction pond) as part of the site redevelopment.	1997
Crawford Street Corporation (ECSI # 2363)	A sand filter was installed in the northern area of the site to treat stormwater that is discharged to two catch basins affiliated with Columbia Forge & Machine Works operations.	Unknown
	Approximately 381 tons of black sand were removed from the southwest corner of the site along the beach and riverbank and disposed of offsite (Bridgewater, 2002).	2001
	Additional stormwater SCMs to be determined.	To be determined
ODOT – Portland Harbor Source Control Evaluation (ECSI #5437)	As part of a pedestrian improvement project, the City constructed five water quality swales to infiltrate ODOT runoff from N. Ivanhoe Street and to reduce solids loading to Outfall 50. Swales are maintained by the City under an agreement with ODOT.	2012
	Additional stormwater SCMs to be determined.	To be determined
City Conveyance System		
Entire Basin	The City constructed a stormwater pollution reduction pond at the downstream end of the basin (on the WPCL property) to remove pollutants from stormwater runoff through solids capture and natural vegetation filtration before discharging to Outfall 50. The only portion of the basin that is downstream of the pond is drainage from a stormwater quality swale at the WPCL.	1997

Site/Area	Source Controls	Implementation Timeframe
West end of N. Salem Avenue	The City installed a sedimentation manhole just upstream of the stormwater pollution reduction pond to reduce suspended solids loading to the pond.	2005
N. Salem Avenue	As part of a residential redevelopment, a private contractor constructed water quality swales in the right-of-way along N. Salem Avenue to infiltrate stormwater from the adjacent street and reduce solids loading to Outfall 50.	2007
N. Charleston Avenue and N. Edison Street	As part of a residential redevelopment, a private contractor constructed stormwater planter boxes in the right-of-way along N. Charleston Avenue and N. Edison Street to infiltrate stormwater from the adjacent street and reduce solids loading to Outfall 50.	2007
Other (Programmatic Source Controls)⁽¹⁾		
Peninsula Iron Works and several residential properties	Stormwater Management Manual Requirements	Ongoing
Peninsula Iron Works	City Discharge Authorization⁽²⁾	Ongoing
See listing in Table 4	NPDES No Exposure Certifications	Ongoing

Notes:

DEQ = Oregon Department of Environmental Quality; ECSI = Environmental Cleanup Site Information; ODOT = Oregon Department of Environmental Quality; WPCL = Water Pollution Control Laboratory; NPDES = National Pollutant Discharge Elimination System

- (1) Programmatic source controls are described in detail in the Municipal Report.
- (2) In compliance with City Code, the site prepared an Accidental Spill Prevention Plan to document measures being implemented at the site to minimize pollutant discharges to the storm system.

The City and ODOT both have NPDES MS4 stormwater permits that cover basin drainage areas. Ongoing municipal programs (e.g., periodic inspection of and technical assistance to non-NPDES sites, illicit discharge monitoring, street sweeping, etc.) likely provide additional source control benefits in the basin and will help to address minor sources for which specific control measures have not been required. City programs that control current and future contaminant discharges to the conveyance system are described in the Municipal Report.

7 Conclusion

Based on the information summarized above, there are no major sources of contaminants in Basin 50. Therefore, future discharges from Outfall 50 are unlikely to represent a significant source of contaminants to the river. The City concludes that it has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin 50.

8 References

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LLC, Kennedy/Jenks Consultants, and Anchor QEA, LLC. August 29, 2011.

List of Figures

Figure 1: Basin 50 Overview and Conveyance System Source Controls

Figure 2: Basin 50 Upland Site Source Controls

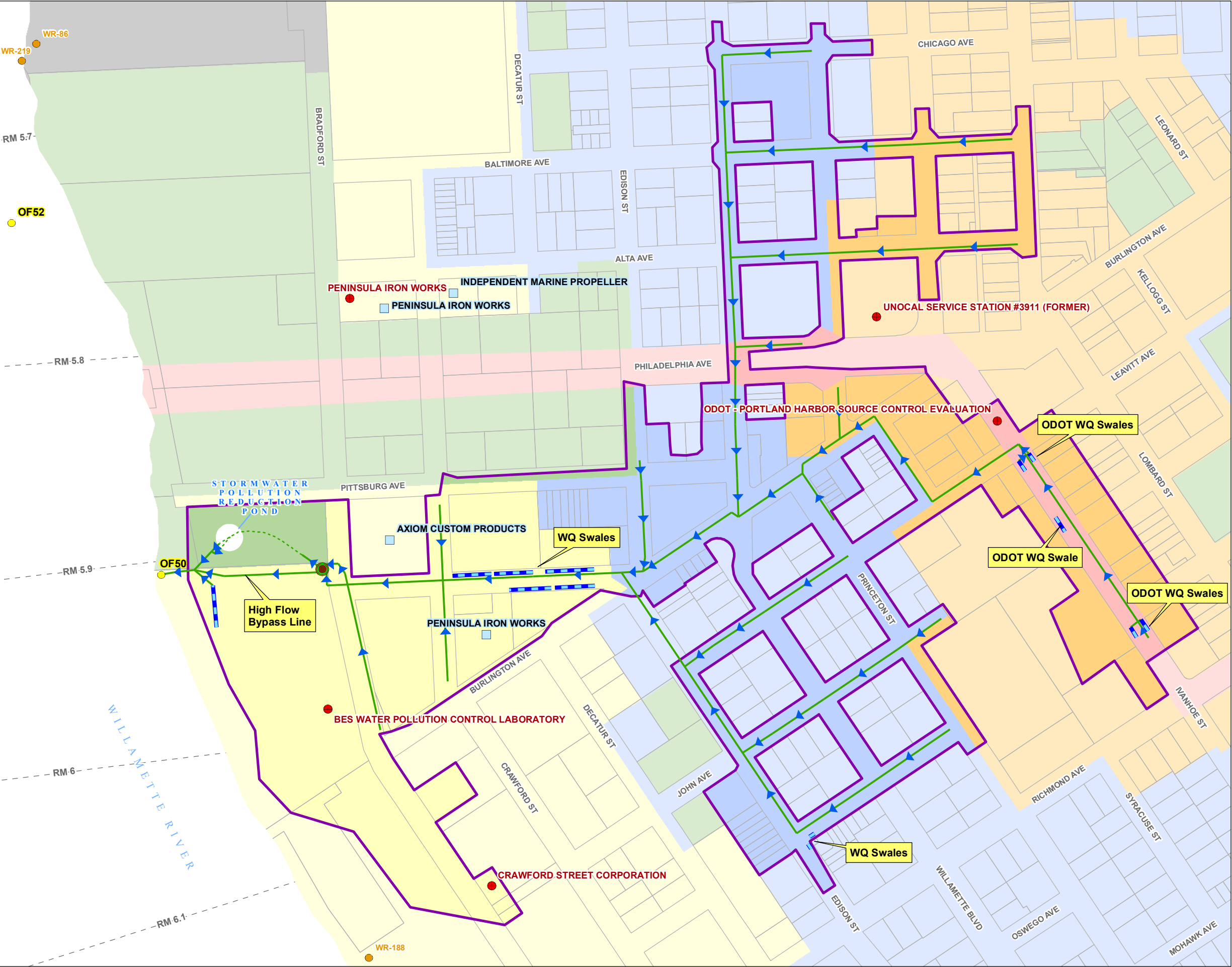
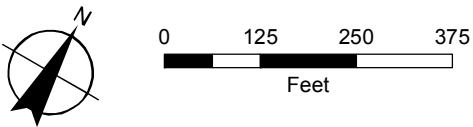


FIGURE 1
Basin 50
Overview and Conveyance
System Source Controls

- Basin 50
- DEQ ECSI Site
- NPDES No Exposure Certification
- Conveyance System**
 - Storm Line
 - Water Quality (WQ) Swale
 - Sediment Removal Structure
 - City Outfall
 - Non-City Outfall
- Land Use/Zoning**
 - Heavy Industrial
 - General Employment
 - Commercial
 - Residential
 - Parks and Open Space
 - Major Transportation
- All Other Data**
 - River Mile (RM)
 - Tax Lot
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO

ENVIRONMENTAL SERVICES
CITY OF PORTLAND
1120 SW Fifth Avenue, Room 1000
Portland Oregon, 97204-1912

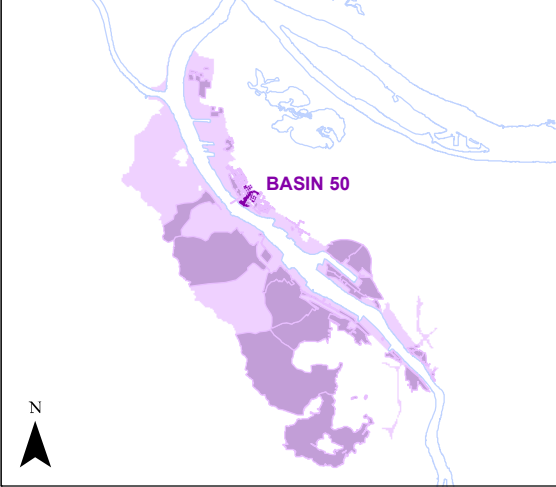










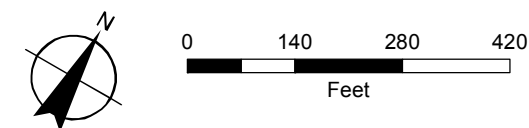


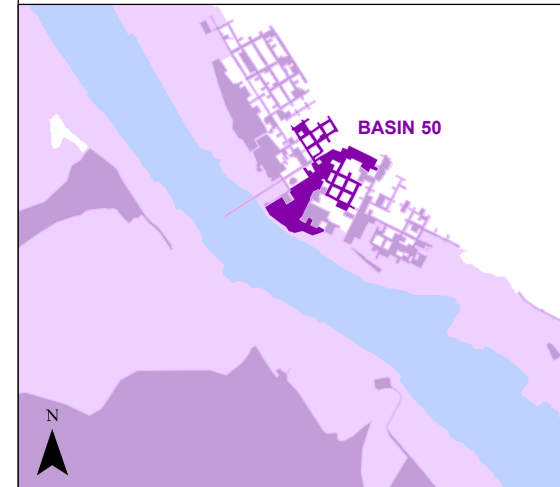
FIGURE 2
Basin 50
Upland Site Source Controls

-  Basin 50
-  Tax Lot
- DEQ Stormwater SCE**
-  SCE implemented or pending
- All Other Features**
-  NPDES No Exposure Certification
-  >50% of Site Area Redeveloped Under City SWMM
-  City Discharge Authorization
-  Stormwater Treatment Facility
-  Site Inspection - BES Industrial Stormwater Program
-  Discharges to City Outfall
-  Portland Harbor Hydroboundary

NOTES:
 The DEQ Milestone Report (DEQ, 2013) does not indicate that this portion of ODOT's right-of-way is in the DEQ Cleanup Program. However, based on discussions with DEQ, ODOT's SCE is anticipated to include this portion of Ivanhoe St.



MAP NOTES:
 Date: December 31, 2013
 Data Sources: BES, METRO, Aerial Photo Taken 2012
 ENVIRONMENTAL SERVICES
 CITY OF PORTLAND
 1120 SW Fifth Avenue, Room 1000
 Portland Oregon, 97204-1912



Completion Summary for City of Portland Outfall Basin 52

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and several City programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled. This report summarizes the results of this collaborative effort in Outfall Basin 52.

This Completion Summary includes a weight-of-evidence evaluation to demonstrate that source identification is complete and a summary of source controls (implemented or planned) to control future contaminant discharges to the Willamette River.

Basin 52 is located on the east side of the river in the St. Johns district. The outfall discharges at approximately River Mile (RM) 5.7, just downstream of the St. Johns Bridge. The basin includes a mix of light industrial and commercial properties, residential areas, a portion of Cathedral Park, and drainage from the eastern half of the St. Johns Bridge (Oregon Department of Transportation [ODOT] Highway 30).

Evaluation of inriver sediment data collected near the outfall in 2002 did not indicate that the outfall was a likely significant contaminant pathway to the river. The City collected stormwater data from the basin to verify this conclusion. Because results indicated that sources of polychlorinated biphenyls (PCB) and metals were present, the City conducted source tracing in Basin 52, including sediment trap, inline solids, and surface soil investigations. Based on these investigations, the City determined that erodible soils in the vicinity of the Peninsula Iron Works (PIW) facility are contaminated with PCBs and metals, the Independent Marine Propeller site is a source of metals, and the ODOT drainage system is a source of PCBs to the basin. Source control measures (SCM) to address these sources have been implemented or are being determined under respective DEQ and City authorities.

Because the major sources of contaminants to this basin have been identified and have been referred to appropriate programs for implementation of SCMs, future discharges from Outfall 52 are unlikely to represent a significant source of contaminants to the river. Therefore, the City has met the remedial investigation (RI)/SCM objectives for Basin 52.

2 Introduction

This Completion Summary presents a weight-of-evidence evaluation of whether further source investigation is needed in Basin 52, and the rationale for concluding that future discharges from the basin are not likely to be significant sources of contaminants to river sediment. The purpose of this report is to demonstrate that the City has met the RI/SCM objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ. Together the City and

DEQ identified major sources of contaminants to the basin and are using their respective authorities to ensure that source controls are implemented where needed.

This report is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report), which provides additional background and detail regarding the City's harborwide source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Outfall 52 discharges to the east side of the Willamette River near RM 5.7, offshore of Cathedral Park and just downstream of the St. Johns Bridge. The outfall drains approximately 24.5 acres in the St. Johns district. The Basin 52 stormwater conveyance system has three major subbasins (designated the north, central, and south branches). Figure 1 shows the location of Outfall 52 and the drainage basin boundary and provides an overview of the associated stormwater conveyance system.

As shown in Figure 1, the conveyance system includes drainage from ODOT Highway 30. The ODOT system includes a sedimentation manhole located beneath the St. Johns Bridge (see Figure 2) that is designed to settle suspended solids from the bridge stormwater runoff, reducing solids loading to Basin 52.

The basin system also includes a stormwater filter device installed in 2008 by a private contractor in a manhole at the corner of N. Crawford and N. Alta Avenue, to treat stormwater runoff from N. Alta Avenue as part of a residential redevelopment project. City programs that result in these types of stormwater improvements are described in the Municipal Report.

Additional information on the Outfall 52 stormwater conveyance system and associated drainage basin is included in the *Programmatic Source Control Remedial Investigation Work Plan for the City of Portland Outfalls Project* (CH2M HILL, 2004) and the *Outfall Basin 52 Source Investigation Report* (BES, 2012).

3.2 Land Use and Potential Upland Sources

Land use in Basin 52 is a mix of industrial and commercial uses near the river within the area zoned as general employment¹, residential, major transportation (Highway 30), and open space. Industrial operations include metal fabrication (e.g., PIW), Independent Marine Propeller (repair and machine shop), and a home/commercial fixtures manufacturing facility. Other uses include major transportation (the eastern portion of the St. Johns Bridge), commercial warehouses, a truck repair/storage business, offices, a restaurant, residential areas, open space (Cathedral Park), and a railroad corridor. The basin is within the St. Johns Plan district, which

¹ General employment is a Portland zoning category that allows a range of employment opportunities but emphasizes industrial and industrial-support uses. The zones can allow for the transition to a less industrial overall nature.

provides a framework for strengthening St. Johns' role as the commercial and civic center of the North Portland peninsula.²

Sites that were identified as potential sources of contaminants to the basin include three DEQ Cleanup Program sites located within or partially within the basin, as listed in DEQ's Environmental Cleanup Site Information (ECSI) database. Table 1 lists these sites and indicates the associated contaminants of interest (COI) and status of stormwater pathway evaluations. As indicated in Table 1, all three of the sites currently are conducting stormwater pathway evaluations under DEQ oversight.

Table 1. DEQ Cleanup Program Sites in Basin 52

DEQ Cleanup Program Site	Site COIs	Stormwater Pathway Evaluation ⁽¹⁾
Crawford Street Corporation (ECSI #2363)	VOCs, PAHs, TPH, PCBs, metals ⁽²⁾	Source Control Evaluation In Progress
ODOT - Portland Harbor Source Control Evaluation (ECSI #5437)	Not listed ⁽³⁾	Source Control Evaluation In Progress
Peninsula Iron Works (ECSI #5686)	Not listed ⁽³⁾	Source Control Evaluation In Progress ⁽⁴⁾

Notes:

PAHs = polycyclic aromatic hydrocarbons; TPH = total petroleum hydrocarbons; VOCs = volatile organic compounds; COIs = contaminants of interest; PCBs = polychlorinated biphenyls; ECSI = Environmental Cleanup Site Information; DEQ = Oregon Department of Environmental Quality

(1) Unless noted otherwise, the source is DEQ Milestone Report, Figure 1b, "Status of Stormwater Source Control Evaluations, January 2013" (DEQ, 2013a).

(2) Source: Appendix Q (Source Control Inventory Tables) of the Portland Harbor RI/FS Draft Feasibility Study (FS) (Anchor et al., 2012).

(3) Site is not listed in Appendix Q of the Draft FS (Anchor et al., 2012) or Table 4.2-2 of the Draft Final RI (Integral et al., 2011), and the DEQ ECSI database information does not list site COIs (DEQ, 2012, 2013b).

(4) Table 1 of the DEQ Milestone Report indicates that a source control decision is pending for this site (DEQ, 2013a).

Industrial sites covered or historically covered by National Pollutant Discharge Elimination System (NPDES) stormwater regulations also were considered as potential contaminant sources to the City conveyance system. One site historically held an NPDES permit to discharge to the Basin 52 conveyance system, as listed in Table 2. No sites have current NPDES permits to discharge to the basin. Note that the City and ODOT both have NPDES Municipal Separate Storm Sewer System (MS4) stormwater permits that cover basin drainage areas.

² The St. Johns Plan district describes the mixed-use development goals in this area (see <http://www.portlandoregon.gov/bps/index.cfm?&a=53424>).

Table 2. Historical NPDES Permit Coverage in Basin 52

Address	Company	Permit Type	Time Period
6618 N. Alta Avenue	Peninsula Iron Works	Stormwater (1200-Z)	2001

Notes:

NPDES = National Pollutant Discharge Elimination System

3.3 Outfall Setting

Outfall 52 discharges to an area of potential concern (AOPC 11) identified by the U.S. Environmental Protection Agency (EPA) based on elevated concentrations of PCBs, metals, and other contaminants in river sediment (EPA, 2010). In addition to Outfall 52, one other City outfall (Outfall 52A) and four non-City outfalls also discharge to AOPC 11.

4 Basin Screening and Source Investigations

The City identified Basin 52 as a Priority 4 for source tracing, based on the lack of elevated contaminant concentrations detected in river sediment collected by the City in 2002 in the vicinity of the outfall (CH2M HILL, 2004). Priority 4 basins are considered the lowest priority for source investigation.

To confirm that major sources were not present, the City collected stormwater samples in 2007 from a location in Basin 52 representing cumulative discharge from the entire basin (BES, 2010). The City analyzed stormwater samples for a broad suite of chemicals to identify stormwater contaminants potentially warranting further source tracing in the basin. Based on statistical analyses of the Basin 52 stormwater results in relation to harborwide stormwater data, the City determined that total PCBs and copper potentially warranted further source tracing within the basin (BES, 2010).

Following preliminary review of the Basin 52 stormwater screening data, the City conducted source investigation activities beginning in 2008 to evaluate potential sources of PCBs and copper to the Basin 52 conveyance system (BES, 2012). The City collected samples of stormwater solids (sediment trap and inline solids) and surface soil during iterative field investigations between June 2008 and January 2011.

Results of sediment trap sampling near the downstream end of each of the three major branches (of the conveyance system) indicated current sources of PCBs, chromium, and nickel to the north and central branches. The results did not indicate the presence of major sources of metals or PCBs to the south branch (BES, 2012). Follow-up targeted source investigations included analyzing inline solids collected from the north and central branches adjacent to two suspected sources: PIW and ODOT. In addition, the City collected surface soil samples in the north branch adjacent to PIW and the railroad corridor within the drainage area for a catch basin that yielded solids with elevated PCBs and metals concentrations (BES, 2012).

Source tracing results indicated that residual PCBs in erodible surface soils on and adjacent to the PIW site were a major source of PCBs to the north branch (BES, 2012). Based on this information, DEQ requested the site to enter the DEQ Cleanup Program to undertake a stormwater source control evaluation (DEQ, 2013b). In addition, outdoor operations at the

Independent Marine Propeller facility were identified as a major source of metals to the north and central branches (BES, 2012). PCBs and metals also were detected in the ODOT drainage system affiliated with the St. Johns Bridge (BES, 2012).

Table 3 lists investigations completed by the City in the Basin 52 conveyance system.

Table 3. City Investigations in the Basin 52 Stormwater Conveyance System

Data Collection Period	Purpose	Documentation
2000	Compile basin background information to identify potential sources.	Preliminary Evaluation of City Outfalls (Eastshore) (BES, 2000)
2002	Evaluate inriver sediment data near City outfalls to prioritize basins for source tracing.	Programmatic Source Control Remedial Investigation Work Plan (CH2M HILL, 2004)
2007	Evaluate stormwater data from City outfalls to identify additional source tracing needs.	Stormwater Evaluation Report, City of Portland Outfall Project (BES, 2010)
2008, 2010, 2011	Collect inline solids, sediment trap, and surface soil samples to identify sources of PCBs and metals within the basin.	Outfall Basin 52 Source Investigation Report (BES, 2012)

Notes:

PCBs = polychlorinated biphenyls

5 Completion of Source Identification

The lines of evidence evaluated to verify that source tracing is complete and all major sources have been identified include (1) source tracing results and (2) upland site investigation coverage and land use in the basin. Findings from this evaluation are summarized below.

- *Source Tracing Results:* Results of source investigations in Basin 52 indicated sources of PCBs and metals to the basin; no other analytes were identified for further source tracing. Sediment trap and solids sampling in the three major branches of the conveyance system identified specific sources of these contaminants to the north and central branches of the system; data do not indicate that there are current major sources of contaminants to the south branch (BES, 2012).
- *Upland Investigation Coverage and Land Use:* Figure 2 displays the spatial extent of upland site investigation and other programmatic controls in the basin (see key to figures provided at beginning of this Appendix). As shown in Figure 2, the majority of sites in the north and central branches of the basin are being investigated or likely do not need investigation because of land use and existing controls. Sites in these branches of the basin are:
 - Conducting an SCE under the DEQ Cleanup Program;
 - Covered under NPDES industrial stormwater regulations; and/or
 - Monitored for stormwater exposures through periodic inspections under the City's Industrial Stormwater Program.

Land uses at sites not covered by DEQ Cleanup or Water Quality Programs consist of a warehouse/ office/ restaurant complex, offices, parking, residential areas, and open space. Current and future industrial activities that are exposed to stormwater are being or will be addressed by the DEQ NPDES Program; non-industrial activities are not a known or suspected major source of contaminants to the City stormwater conveyance system.

Based on these lines of evidence, the City concludes that Basin 52 source tracing is complete and all major sources have been identified.

6 Basin Source Controls

The City and DEQ collaborated under their respective authorities to identify control mechanisms for all identified sources to the basin. Source control for major and minor sources to Basin 52 includes ongoing City and DEQ programs that are described in detail in the Municipal Report and SCMs completed (or planned) at contaminated sites under DEQ Cleanup Program agreements. Source controls implemented in Basin 52 are displayed in Figures 1 and 2 and summarized in this section.

One type of programmatic source control is elimination of stormwater exposures to industrial activities. Following evaluation of source investigation results and in response to pollution complaints, the City's Industrial Stormwater Program provided technical assistance to the Independent Marine Propeller site to address offsite migration of metals from site operations. The site made onsite operational changes that resulted in removing historical exposures of propeller grinding operations to stormwater and issuance of an NPDES No Exposure Certification (NEC). Table 4 lists sites that hold NECs in Basin 52.

Table 4. Sites with No Exposure Certifications (NEC) in Basin 52⁽¹⁾

Address	Company	NEC Time Period
6618 N. Alta	Peninsula Iron Works	2001 – Present
8638 N. Crawford	Axiom Custom Products	2012 – Present
8675 N. Crawford	Independent Marine Propeller	2012 – Present

Table 5 summarizes additional site-specific and programmatic source controls completed to date for Basin 52.

Table 5. Basin 52 Source Controls

Site/Area	Source Controls	Timeframe / Status
Source Control Measures (SCM) at DEQ Cleanup Program Sites		
Crawford Street Corporation (ECSI #2363)	To be determined	To be determined
ODOT - Portland Harbor Source Control Evaluation (ECSI #5437)	ODOT installed a sedimentation manhole to reduce solids loading from the St. Johns Bridge to Outfall 52.	2005
	Additional SCMs to be determined.	To be determined
Peninsula Iron Works (ECSI #5686)	Pending rerouting of roof drainage to reduce mobilization of contaminated erodible soils on and adjacent to site to the river. Additional SCMs to be determined.	2013; To be determined
City Conveyance System		
North branch	The City cleaned the manholes, catch basins, and catch basin laterals along N. Bradford Street right-of-way.	2010
North branch (N. Alta Ave.)	A stormwater canister filter in a manhole at N. Alta and N. Crawford treats stormwater from N. Alta Ave.	2008
South branch	The City cleaned the most downgradient manhole and all catch basin connections.	2010
Other (Programmatic Source Controls)		
Cathedral Place (NE corner of N. Baltimore and N. Bradford)	Ecoroofs⁽¹⁾	2005
Peninsula Iron Works	City Discharge Authorization⁽²⁾	Ongoing
Refer to Table 4	No Exposure Certifications	Ongoing

Notes:

DEQ = Oregon Department of Environmental Quality; ECSI = Environmental Cleanup Site Information; ODOT = Oregon Department of Transportation

(1) The City Sustainable Stormwater program collaborated with this site owner to pilot ecoroof construction techniques on existing roof membranes.

(2) In compliance with City Code, the site prepared an Accidental Spill Prevention Plan to document measures being implemented at the site to minimize pollutant discharges to the storm system.

Other municipal programs (e.g., periodic inspection of and technical assistance to non-NPDES sites, illicit discharge monitoring, street sweeping, etc.) likely provide additional source control benefits in the basin and will help to address minor sources for which specific control measures have not been required. The City and ODOT both have NPDES MS4 stormwater permits that cover basin drainage areas. City programs that control current and future contaminant discharges to the conveyance system are described in the Municipal Report.

7 Conclusion

The City completed source tracing in Basin 52 and identified the major sources of contaminants to the City conveyance system. Given that necessary source controls at identified sources have been implemented or are being determined under appropriate DEQ and City regulatory authorities, future discharges from Outfall 52 are unlikely to represent a significant source of contaminants to the river. The City concludes that it has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin 52.

8 References

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List of Figures

Figure 1: Basin 52 Overview and Conveyance System Source Controls

Figure 2: Basin 52 Upland Site Source Controls

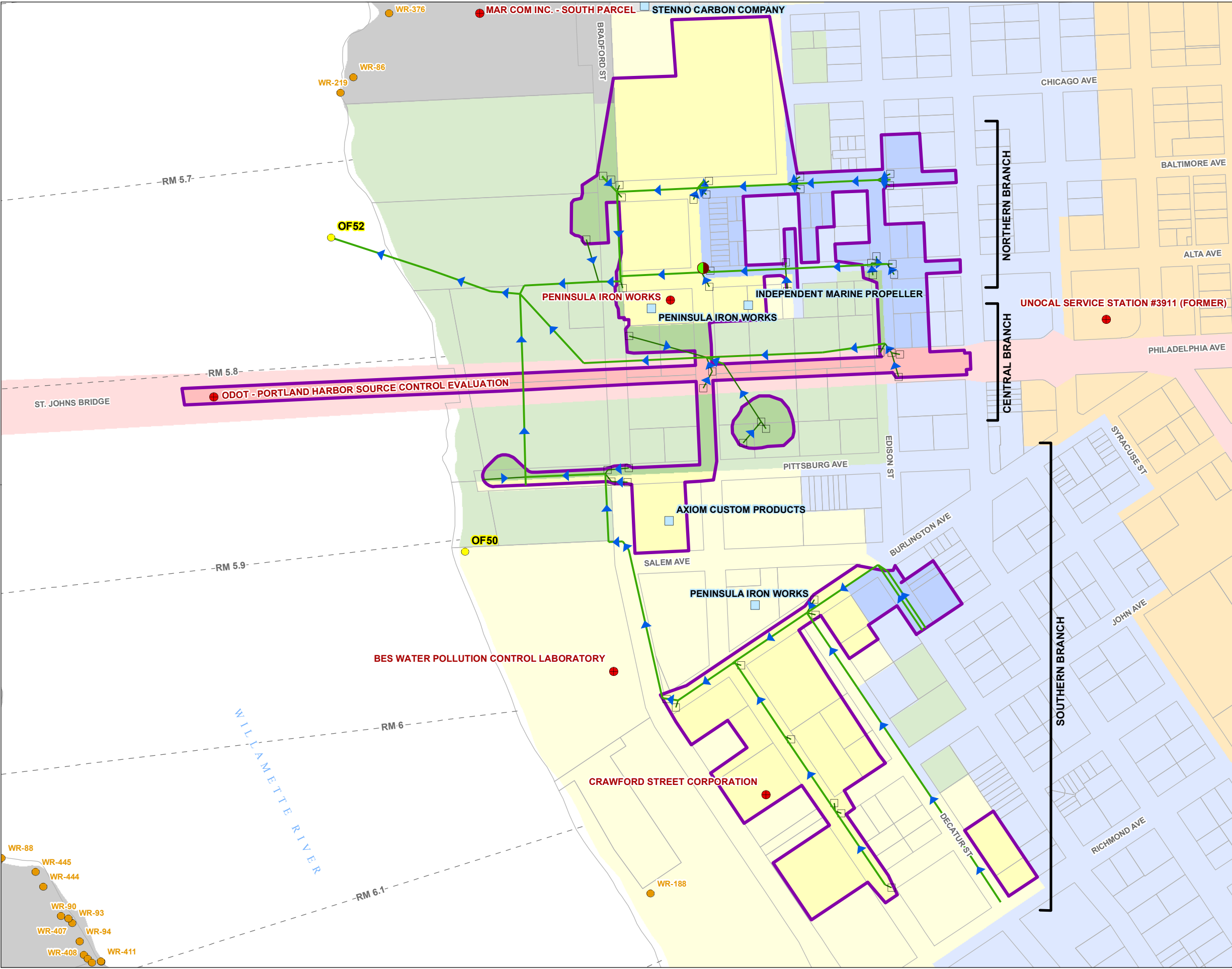
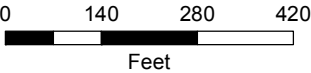


FIGURE 1
Basin 52
Overview and Conveyance
System Source Controls

- Basin 52
- DEQ ECSI Site
- NPDES No Exposure Certification
- Conveyance System**
 - Storm Line
 - Catch Basin
 - Sediment Removal Structure
 - City Outfall
 - Non-City Outfall
- Land Use/Zoning**
 - Heavy Industrial
 - General Employment
 - Commercial
 - Residential
 - Parks and Open Space
 - Major Transportation
- All Other Data**
 - River Mile (RM)
 - Tax Lot
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:

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Data Sources: BES, METRO



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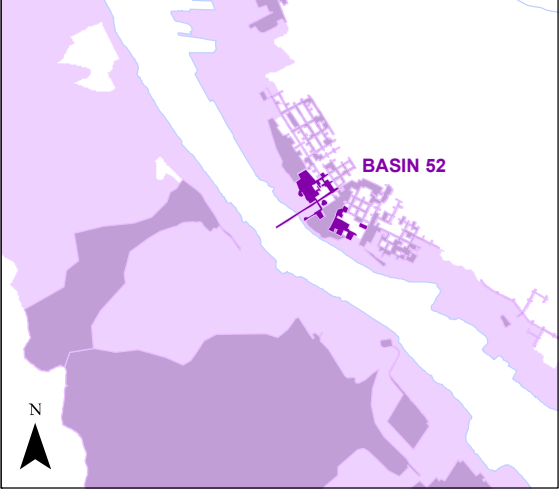
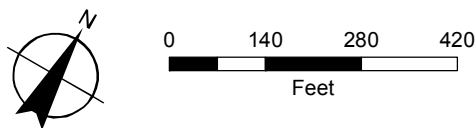




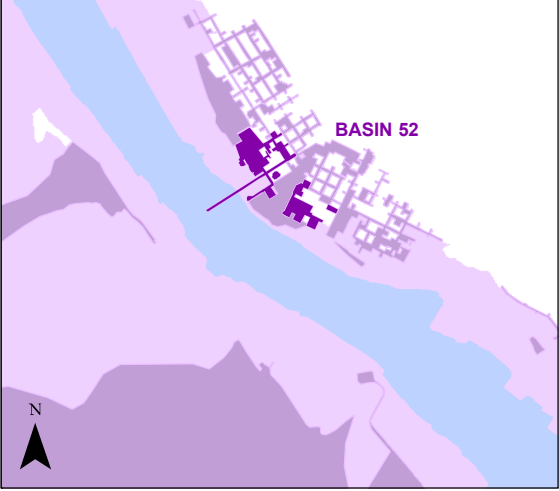
FIGURE 2
Basin 52
Upland Site Source Controls

- Basin 52
- Tax Lot
- DEQ Stormwater SCE**
 - SCE implemented or pending
- All Other Features**
 - NPDES No Exposure Certification
 - >50% of Site Area Redeveloped Under City SWMM
 - City Discharge Authorization
 - Stormwater Treatment Facility
 - Ecoroof
 - Site Inspection - BES Industrial Stormwater Program
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO, Aerial Photo Taken 2012

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Completion Summary for City of Portland Outfall Basin 52A

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and several City programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled. This report summarizes the results of this collaborative effort in Outfall Basin 52A.

This Completion Summary includes a weight-of-evidence evaluation to demonstrate that source identification is complete and that there are no current (or anticipated future) major sources of contaminants to the Willamette River via the Basin 52A conveyance system.

Outfall 52A discharges to the east side of the river at approximately River Mile (RM) 5.6, in the St. Johns district. Land use in Basin 52A is predominantly light industrial (warehouse operations), along with residential areas, a property recently acquired by the City's Parks & Recreation Bureau for extension of a natural area corridor, and a small segment of railroad right-of-way.

Evaluation of inriver sediment data collected in 2002 indicated slightly elevated concentrations of some contaminants in sediment near the outfall. However, because the outfall discharges adjacent to the Mar Com, Inc., site, which is being investigated under the DEQ Cleanup Program, the City concluded that detected contaminants may be related to this site and not to sources within the basin. To verify this conclusion, the City subsequently collected and analyzed catch basin solids from the Basin 52A conveyance system and stormwater samples representing discharges from the outfall. Results of these investigations did not indicate the presence of major contaminant sources in the basin. These findings indicate that no further source investigation is warranted in this basin and that the existing conveyance system and programmatic source control measures (SCM) are sufficient for ensuring discharges from Outfall 52A are protective of the river. Therefore, the City has met the remedial investigation (RI)/SCM objectives for Basin 52A.

2 Introduction

This Completion Summary presents a weight-of-evidence of whether further source investigation is needed in Basin 52A, and the rationale for concluding that current and future discharges from the basin are not likely to be significant sources of contaminants to river sediment. The purpose of this report is to demonstrate that, for Basin 52A, the City has met the joint RI/SCM objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ.

This report is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report), which provides additional background and detail regarding the City's harborwide source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Outfall 52A discharges to the east side of the river at approximately RM 5.6, at the Mar Com facility, within the St. Johns industrial area. The outfall and associated conveyance system were constructed in 1972 as part of new industrial development in the area; the system later was expanded to include residential streets and properties on the bluff above the industrial land. The current drainage area for the Basin 52A conveyance system is approximately 26 acres. Figure 1 shows the location of the outfall and drainage basin boundary and provides an overview of the associated stormwater conveyance system.

The system includes several water quality swales (as shown in Figure 1) that infiltrate stormwater runoff to reduce suspended solids loading to Outfall 52A.

- The City constructed two water quality swales in 2012, along N. Ivanhoe Street at N. New York Avenue. The construction was completed by the City's Bureau of Environmental Services and Bureau of Transportation as part of pedestrian improvements.
- Also in 2012, the City constructed a swale near the intersection of N. Edison Street and N. Baltimore Avenue as part of a project to extend stormwater and sanitary lines along N. Edison Street and associated right-of-way improvements. The swale treats runoff from N. Edison Street.

City programs that result in these types of stormwater improvements are described in detail in the Municipal Report. Additional information on the Outfall 52A stormwater conveyance system and associated drainage basin is included in the *Programmatic Source Control Remedial Investigation Work Plan for the City of Portland Outfalls Project* (CH2M HILL, 2004) and *City Outfall Basin 52A Catch Basin Solids Sampling Adjacent to Mar Com Inc., Technical Memorandum No. OF52A-1* (BES, 2006).

3.2 Land Use and Potential Upland Sources

Current land use in Basin 52A is predominantly light industrial, but also includes residential areas, a small portion of right-of-way in a commercial area, and open space (see Figure 1). Some of the former light industrial area is zoned as general employment (GE) and is expected to transition to less industrial land use.¹ The City's Bureau of Parks & Recreation recently purchased a piece of GE-zoned land for extension of the Baltimore Woods natural area corridor; this area is shown in Figure 1 as open space. In 2012, the City and other partners removed 1.2

¹ General employment is a Portland zoning category that allows a range of employment opportunities but emphasizes industrial and industrial-support uses. The zones can allow for the transition to a less industrial overall nature.

acres of impervious parking lot from this property and restored the area with Willamette Valley prairie native plantings.² Land use in the industrial part of the basin includes warehouse facilities (for material including clothing, new vehicle parts, kitchen cabinets, and carbon paper), parking/storage, vacant land, a railroad corridor, and paved and unpaved rights-of-way. Portions of the basin are within the St. Johns Plan district, which provides a framework for strengthening St. Johns' role as the commercial and civic center of the North Portland peninsula.³

Though the Mar Com site does not have piped connections to the Basin 52A conveyance system, the City identified this adjacent property as a potential pollutant source to Basin 52A based on proximity of the site to Basin 52A inlets and the potential for contaminated erodible soils to migrate offsite and into the basin via overland runoff, vehicle dragout, and fugitive dusts. This site is divided into two parcels in the DEQ Environmental Cleanup Site Information (ECSI) database. Remediation completed on the north parcel included removal of sandblast grit and contaminated soil (DEQ, 2009). Contaminants of interest (COI) in soil and sandblast grit at the north parcel include metals, polycyclic aromatic compounds (PAH), and volatile organic compounds (VOC). For the north parcel, DEQ issued a source control decision in 2003 and a No Further Action (NFA) determination in 2009 (DEQ, 2009). COIs associated with the south parcel include PAHs, metals, phthalates, organotins, and others (DEQ, 2011). DEQ issued a source control decision in 2011 for that portion of the south parcel that is above ordinary high water. The portion of the south parcel below ordinary high water will be addressed as part of U.S. Environmental Protection Agency's (EPA) Portland Harbor in-water remedy (DEQ, 2011).

No sites in the basin currently hold, or historically held, National Pollutant Discharge Elimination System (NPDES) permits to discharge to the Basin 52A conveyance system.

3.3 Outfall Setting

Outfall 52A discharges to an area of potential concern (AOPC 11) identified by EPA based on elevated concentrations of metals, PAHs, and other contaminants in river sediment (EPA, 2010). In addition to Outfall 52A, one other City outfall (Outfall 52) and four non-City outfalls also discharge to AOPC 11.

The outfall is located on the Mar Com North Parcel (ECSI #4797) downstream of former shipways and adjacent to a former dry dock. At low river stages, the outfall is above the high tide water line, and the outfall discharges to the ground surface where a plunge pool and erosional channel have formed. Overwater work and possible releases of contaminants may be associated with the former shipways and dry docks.

4 Basin Screening and Source Investigations

The City identified Basin 52A as a Priority 3 for source tracing, based on slightly elevated concentrations of PAHs, metals, and phthalates in the surface sediment samples collected by the City near Outfall 52A in 2002 (CH2M HILL, 2004). Priority 3 designations were assigned to basins where contaminants have been detected in sediment near the outfall but the

² More information at: <http://www.portlandoregon.gov/BES/index.cfm?&a=430932>

³ The St. Johns Plan district describes the mixed-use development goals in this area (see <http://www.portlandoregon.gov/bps/index.cfm?&a=53424>).

contaminants likely are attributable to other sources outside of the basin. In the case of Outfall 52A, the adjacent Mar Com site was identified as a likely source of the contaminants detected in the inriver sediment based on known site COIs and that no potential sources within Basin 52A were identified (CH2M HILL, 2004). Generally, concentrations in sediment were lowest near the outfall and increased toward the beach adjacent to the Mar Com site (BES, 2006).

To verify that offsite migration of contaminated erodible soil from the Mar Com north parcel and the adjacent railroad right-of-way was not a major source to the basin, the City collected and analyzed catch basin solids in 2005 (BES, 2006). Analytical results indicated concentrations of all constituents were relatively low, with the exception of total PAHs in the sample from the catch basin adjacent to the Mar Com site. This issue was referred to DEQ for consideration during development of the NFA determination for the Mar Com north parcel.

In 2007, the City collected stormwater samples from the downstream end of the basin (i.e., representing all collective discharges to the system) as part of the City's stormwater screening evaluation. Based on the evaluation of these data and using a conservative screening approach, no analytes were identified as potentially warranting further source tracing in Basin 52A (BES, 2010).

Table 1 lists investigations and evaluations completed by the City in the Basin 52A conveyance system.

Table 1. City Investigations in the Basin 52A Stormwater Conveyance System

Data Collection Period	Purpose	Documentation
2000	Compile basin background information to identify potential sources.	Preliminary Evaluation of City Outfalls (Eastshore) (BES, 2000)
2002	Evaluate inriver sediment data near City outfalls to prioritize basins for source tracing.	Programmatic Source Control Remedial Investigation Work Plan (CH2M HILL, 2004)
2005	Collect catch basin solids samples to evaluate whether solids originating from the Mar Com north parcel or the adjacent railroad corridor were sources of contaminants to the system.	City Outfall Basin 52A Catch Basin Solids Sampling Adjacent to Mar Com Inc. Technical Memorandum No. OF52A-1 (BES, 2006)
2007	Evaluate stormwater data from City outfalls to identify additional source tracing needs.	Stormwater Evaluation Report, City of Portland Outfall Project (BES, 2010)

The City's investigation and data evaluation did not identify any current major sources of contaminants in Basin 52A.

5 Completion of Source Identification

The lines of evidence evaluated to confirm that source tracing is complete include (1) results of source investigation activities conducted in the basin and (2) land use. Findings from this evaluation are summarized below.

- *Source Investigation Results.* Results of a targeted catch basin solids investigation adjacent to potential source areas indicated contaminant concentrations in erodible soils being

captured by catch basins adjacent to the railroad corridor and Mar Com site were generally low (BES, 2006). PAHs were elevated in the sample closest to the Mar Com north parcel; this issue was referred to DEQ for consideration during development of the site NFA determination. In addition, the City's stormwater screening evaluation of stormwater samples representing the entire drainage basin did not identify any analytes for further source tracing in Basin 52A (BES, 2010).

- *Land Use:* The majority of the land use in Basin 52A is light industrial, residential, and open space (see Figure 1). Figure 2 displays the spatial extent of programmatic controls that have been implemented at the industrial facilities in the basin (see key to figures provided at beginning of this Appendix). As shown in Figure 2, almost all light industrial sites in the basin have been inspected by the City's Industrial Stormwater Program to evaluate whether site coverage under a DEQ NPDES stormwater permit is warranted and to provide technical assistance on any industrial exposures to stormwater. The remainder of the sites do not have outdoor industrial operations. Land use at sites not inspected or covered by DEQ Water Quality programs consists of residences, vacant parcels, and paved parking. Current and future industrial activities that are exposed to stormwater are being or will be addressed by the DEQ NPDES Program; non-industrial activities are not a known or suspected major source of contaminants to the City stormwater conveyance system.

Based on these lines of evidence, the City concludes that Basin 52A source investigation is complete and there are no major contaminant sources in the basin.

6 Basin Source Controls

Source control for minor sources in Basin 52A includes specific controls implemented within the City's shared stormwater conveyance system and ongoing City and DEQ programs that are described in the Municipal Report. Note that the City has an NPDES Municipal Separate Storm Sewer System (MS4) stormwater permit that covers basin drainage areas. Source controls implemented within the basin are displayed in Figures 1 and 2 and summarized in this section.

One type of programmatic source control is the elimination of stormwater exposures to industrial activities. Table 2 lists sites that hold (or historically held) an NPDES No Exposure Certification (NEC).

Table 2. Sites with No Exposure Certification (NEC) in Basin 52A ⁽¹⁾

Address	Company	Time Period
6600 N St Louis	Stenno Carbon Company	2011 – Present
9175 N Bradford	DeWils Industries	2011 – Present
9300 N Decatur	Rodin	2000 – 2010
6710 N Catlin	Bushwacker Inc.	2005 – Present

Notes:

(1) Current NECs are indicated in bold.

Table 3 summarizes additional site-specific, programmatic, and conveyance system source controls for Basin 52A.

Table 3. Basin 52A Source Controls

Site/Area	Source Controls	Implementation Timeframe
Source Control Measures (SCM) at DEQ Cleanup Sites		
Mar Com, Inc. – North Parcel (ECSI #4797)	Removal of contaminated soil and sandblast grit. Any future redevelopment of this parcel would likely fall under City's Stormwater Management Manual Requirements and be subject to the Greenway requirements.	2007
City Conveyance System		
N. Ivanhoe Street	The City constructed two water quality swales on N. Ivanhoe as part of pedestrian improvements. The swales treat stormwater from the adjacent right-of-way.	2012
N. Edison Street	The City installed a water quality swale along N. Edison as part of a storm sewer extension project. The swale treats stormwater from the adjacent right-of-way.	2012
Other (Programmatic Source Controls)⁽¹⁾		
Bushwacker, Inc.	Stormwater Management Manual Requirements	Ongoing
Bushwacker, Inc.	City Discharge Authorization⁽²⁾	Ongoing
See listing in Table 2	NPDES No Exposure Certifications	Ongoing

Notes:

NPDES = National Pollutant Discharge Elimination System

(1) Programmatic source controls are described in detail in the Municipal Report.

(2) In compliance with City code, the site prepared a Stormwater Pollution Control Plan.

Ongoing municipal programs (e.g., illicit discharge monitoring, street sweeping, etc.) likely provide additional source control benefits in the basin and will help to address minor sources for which specific control measures have not been required. City programs that control current and future contaminant discharges to the conveyance system are described in the Municipal Report.

7 Conclusion

Based on the information summarized above, there are no major sources of contaminants in Basin 52A. Therefore, future discharges from Outfall 52A are unlikely to represent a significant source of contaminants to the river. The City concludes that it has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin 52A.

8 References

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Figure 1: Basin 52A Overview and Conveyance System Source Controls

Figure 2: Basin 52A Upland Site Source Controls

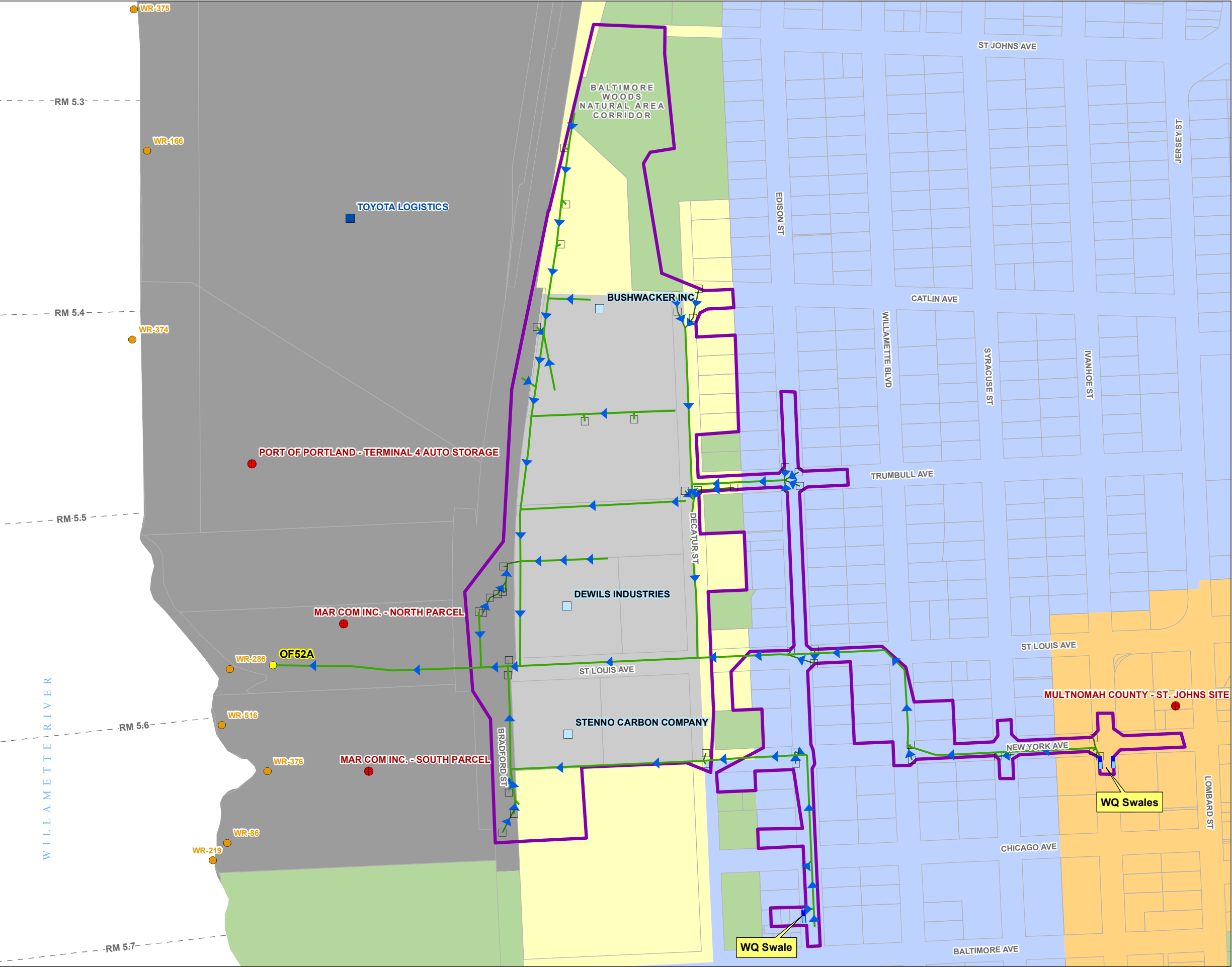
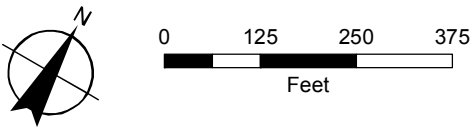


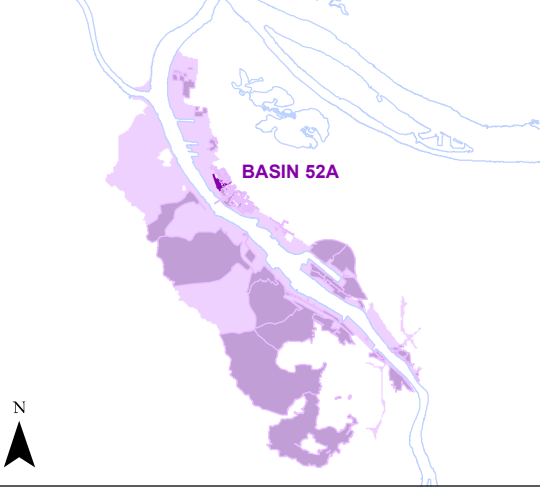
FIGURE 1
Basin 52A
Overview and Conveyance
System Source Controls

- Basin 52A
- DEQ ECSI Site
- NPDES Stormwater Permit
- NPDES No Exposure Certification
- Conveyance System**
 - Storm Line
 - Water Quality (WQ) Swale
 - Catch Basin
 - City Outfall
 - Non-City Outfall
- Land Use/Zoning**
 - Heavy Industrial
 - Light Industrial
 - General Employment
 - Commercial
 - Residential
 - Parks and Open Space
- All Other Data**
 - River Mile (RM)
 - Tax Lot
 - Discharges to City Outfall
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Date: December 31, 2013
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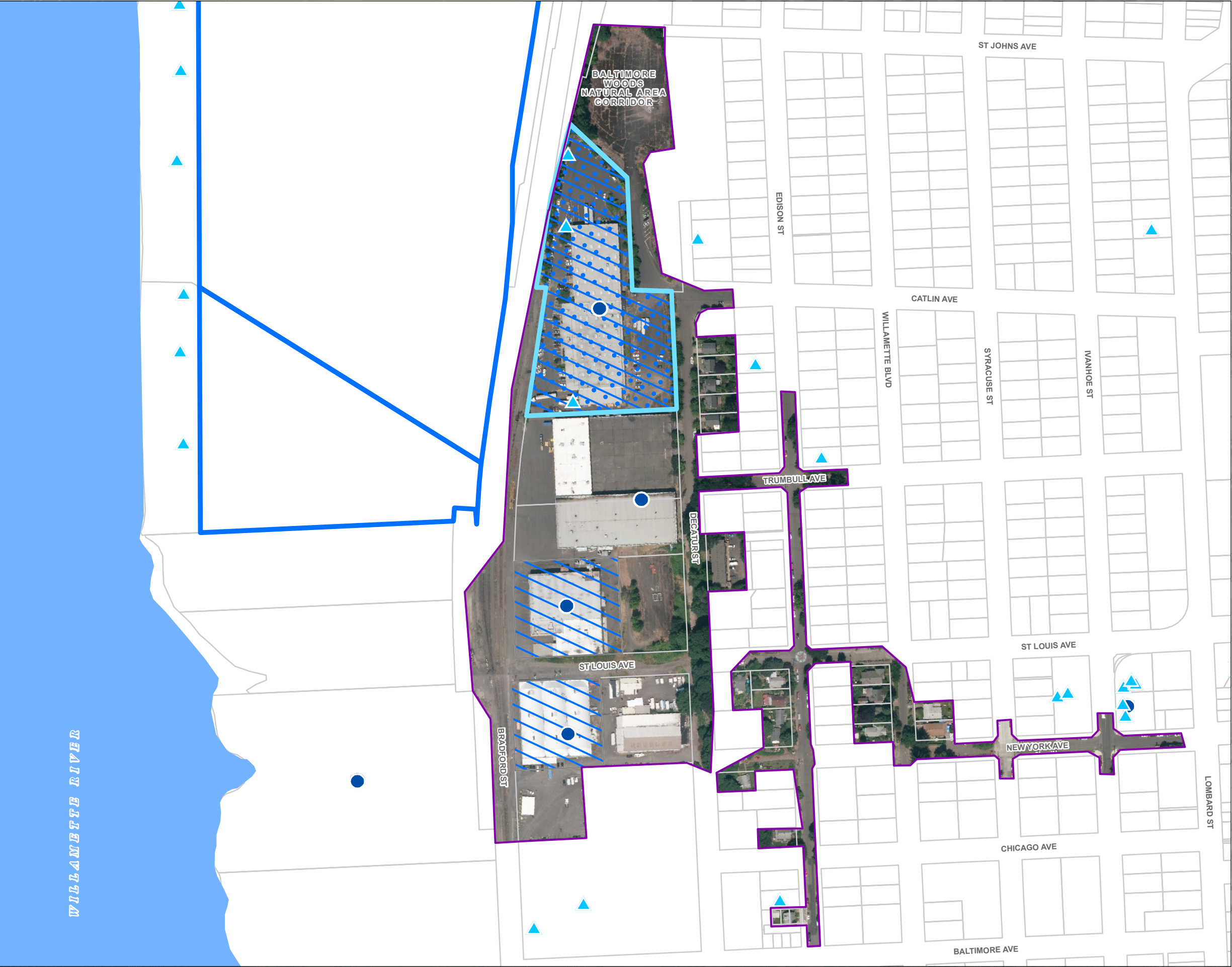
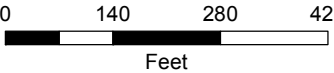


FIGURE 2
Basin 52A
Upland Site Source Controls

- Basin 52A
- Tax Lot
- All Other Features**
- NPDES Stormwater Discharge Permit
- City Discharge Authorization
- NPDES No Exposure Certification
- >50% of Site Area Redeveloped Under City SWMM
- Stormwater Treatment Facility
- Site Inspection - BES Industrial Stormwater Program
- Discharges to City Outfall
- Portland Harbor Hydroboundary

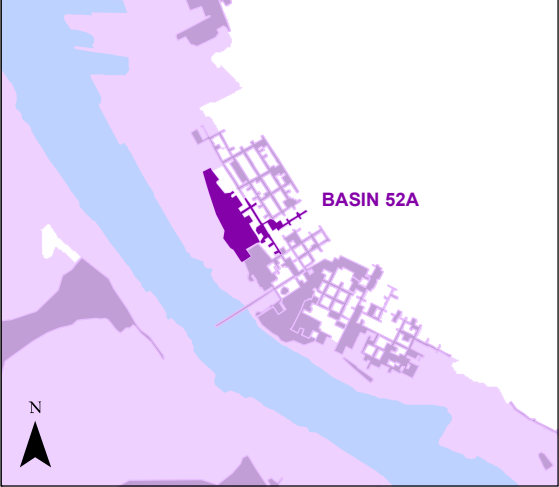


MAP NOTES:

Date: December 31, 2013
Data Sources: BES, METRO,
Aerial Photo Taken 2012



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Completion Summary for City of Portland Outfall Basin 52C

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and several programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled. This report summarizes the results of this collaborative effort in Outfall Basin 52C.

This Completion Summary includes a weight-of-evidence evaluation to demonstrate that source identification is complete and a summary of source controls (implemented or planned) to control future contaminant discharges to the Willamette River.

Basin 52C is located adjacent to the Port of Portland's (Port) Terminal 4 (T4) and south of the International Slip area in north Portland. This shoreline area has a long history of shipping-related activities and has been used exclusively for industrial purposes since the early 1900s. The Basin 52C conveyance system was not constructed until the 1980s. It drains approximately 22 acres of light industrial land (primarily parking lot) above the bluff behind T4.

Stormwater screening results and inline solids data indicated sources of polychlorinated biphenyls (PCB) to the basin. City evaluation of basin land use did not identify potential PCB sources, so the City conducted a source investigation along N. Lombard Street to determine whether PCBs may be migrating to the basin from offsite sources. Results of the investigation indicated that vehicle tracking of contaminated erodible soils from nearby industrial sites to N. Lombard is a likely pathway for PCB-contaminated soils to enter the basin. Source control measures (SCM) to address contamination in erodible soils have been implemented recently or are being determined under DEQ oversight at a number of DEQ Cleanup Program sites in the vicinity of the basin. Major in-basin sources of PCBs or other contaminants are not present.

Because major sources of contaminants are not present in the basin, and sources of PCBs in the vicinity of the basin have been identified and are implementing SCMs under DEQ oversight, future discharges from Outfall 52C are unlikely to represent a significant source of contaminants to the river. Therefore, the City has met the remedial investigation (RI)/SCM objectives for Basin 52C.

2 Introduction

This Completion Summary presents a weight-of-evidence evaluation of whether further source investigation is needed in Basin 52C, and the rationale for concluding that future discharges from the basin are not likely to be significant sources of contaminants to river sediment. The purpose of this report is to demonstrate that the City has met the RI/SCM objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ. The City and

DEQ have identified all potential major sources of contaminants to the basin and are using their respective authorities to ensure that source controls are implemented where needed.

This report is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report), which provides additional background and detail regarding the City's harborwide source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Outfall 52C discharges to the east side of the Willamette River near River Mile 4.4, in the T4/International Slip area. The drainage area for the outfall is approximately 22 acres located on the bluff above the T4 site. The conveyance system was constructed as a storm-only sewer in 1986. Figure 1 shows the location of the Outfall 52C drainage basin boundary and provides an overview of the associated stormwater conveyance system.

Additional detail on the Outfall 52C stormwater conveyance system and associated drainage basin is included in the *Programmatic Source Control Remedial Investigation Work Plan for the City of Portland Outfalls Project* (CH2M HILL, 2004) and the *Outfall Basins 52C and 53 North Lombard Street PCB Source Investigation Report* (BES, 2012).

3.2 Land Use and Potential Upland Sources

Outfall 52C discharges to Slip 1 of T4, but the conveyance system does not have any connections from the T4 site. Land use in Basin 52C is light industrial and approximately 80 percent of the basin consists of large paved parking areas west of N. Lombard Street that are owned by the Port and leased to Toyota for staging of new vehicles. East of N. Lombard Street, roof and parking drainage from three other properties discharge to the basin: Momentive Specialty Chemicals (formerly Borden Packaging and Industrial Products), which is a resin manufacturing operation; Pioneer Wiping Cloth Company; and the Port's Marine Facility Maintenance building. Before the 1950s, this area had residential and agricultural land uses.

The system also collects and conveys runoff from N. Lombard Street and N. Roberts Avenue. N. Lombard Street is a designated truck route serving adjacent industrial areas in the T4/International Slip area.

Sites that were identified as potential sources of contaminants to the basin include one DEQ Cleanup Program site that is partially within the basin (Borden Packaging), as listed in DEQ's Environmental Cleanup Site Information (ECSI) database; Table 1 indicates the associated contaminants of interest (COI) and status of the stormwater pathway evaluation. Only a small portion of the Borden facility discharges stormwater to Basin 52C and it is mostly roof drainage.

Table 1. DEQ Cleanup Program Site Partially in Basin 52C

DEQ Cleanup Program Site	Site COIs ⁽¹⁾	Stormwater Pathway Evaluation ⁽²⁾
Borden Packaging and Industrial Products (ECSI #1277)	Other (e.g., chlorinated and alcohol-based solvents)	Need for Source Control Evaluation to be Determined / Low Priority

Notes:

ECSI = Environmental Cleanup Site Information; DEQ = Oregon Department of Environmental Quality; COIs = contaminants of interest

- (1) Site contaminants of interest are those identified in Appendix Q (Source Control Inventory Tables) of the Portland Harbor RI/FS Draft Feasibility Study (FS) (Anchor et al., 2012).
- (2) DEQ Milestone Report, Figure 1b, "Status of Stormwater Source Control Evaluations, January 2013" (DEQ, 2013).

Industrial sites covered, or historically covered, by National Pollutant Discharge Elimination System (NPDES) stormwater regulations also were considered as potential contaminant sources to the City conveyance system. Table 2 lists industrial sites that currently hold, or historically held, NPDES permits to discharge to the Basin 52C conveyance system. Figure 1 shows sites with current NPDES stormwater permits. Note that the City and the Port have NPDES Municipal Separate Storm Sewer System (MS4) stormwater permits that also cover basin drainage areas.

Table 2. Current⁽¹⁾ and Historical NPDES Permit Coverage in Basin 52C

Address	Company	Permit Type	Time Period
10400 N Lombard	Toyota Logistic Services	Stormwater (1200-Z)	1999 – Present
10915 N Lombard	Borden Chemical Company / Hexion Specialty Chemicals / Momentive Specialty Chemicals ⁽²⁾	Cooling Water (100J)	1991 – Present

Notes:

NPDES = National Pollutant Discharge Elimination System

- (1) Current permits are indicated in bold.

- (2) Company name changed from Borden Chemical Company to Hexion Specialty Chemicals in 2005, and to Momentive Specialty Chemicals in 2010.

3.3 Outfall Setting

Outfall 52C discharges to an area of potential concern (AOPC 6) identified by the U.S. Environmental Protection Agency (EPA) based on elevated concentrations of PCBs and other contaminants in river sediment (EPA, 2010). In addition to OF 52C, five other non-City outfalls and various industrial dock and ramp structures are located in the eastern end of T4 Slip 1.

4 Basin Screening and Source Investigations

Basin 52C was designated as a Priority 3 basin for source investigation based on elevated concentrations of chromium, lead, polycyclic aromatic hydrocarbons, and phthalates detected in the surface sediment samples collected by the City in 2002 near Outfall 52C (CH2M HILL, 2004). Priority 3 designations were assigned to basins where significant concentrations of contaminants have been detected in sediment near the outfall and the contaminants likely are attributable to other sources outside the basin (e.g., T4) that were being investigated under DEQ oversight.

Initial source investigations conducted in the basin included stormwater and inline sediment trap sampling conducted by the Port as part of the T4 Recontamination Evaluation in 2005 (BBL, 2006). The City collected inline solids samples from the basin in 2005 to evaluate along with data collected by the Port. Results of these investigations indicated sources of PCBs to the City conveyance system (BES, 2012).

The Port collected additional stormwater and sediment trap data from Basin 52C in 2007-2008 (Ash Creek Associates/Newfields, 2009; Anchor and Integral, 2008), as part of the T4 evaluation and to support the land use loading evaluation being conducted by the Lower Willamette Group (Anchor QEA, 2011). The City evaluated the Port stormwater and sediment trap sample data to determine if data indicated that source tracing was needed in the basin.¹ Although most PCB concentrations in the Port samples were not significantly elevated, the concentrations were higher than expected given the current and historical land use. Therefore, the City determined that further source tracing was warranted in Basin 52C to identify sources of PCBs (BES, 2010). No other contaminants were identified for additional source investigation.

Because the types of land use in the basin did not indicate potential PCB source areas, the City considered the possibility that PCBs were migrating to the conveyance system from sources outside the basin via the N. Lombard Street truck route. This hypothesis was supported by several early inline solids samples collected from N. Roberts Avenue (for which PCBs were not detected) and from N. Lombard Street (for which PCBs were detected) (BES, 2012). The City subsequently conducted an investigation in 2010 in the N. Lombard Street right-of-way, both inside and outside of the basin, that included collecting catch basin solids and surface solids (sweepings) (BES, 2012). Results of this investigation, in conjunction with evaluation of data from contaminated sites in the vicinity of the basin, indicated that offsite migration of contaminated solids (e.g., vehicle drag-out) from nearby facilities with documented PCB soil contamination, to N. Lombard Street inlets, is a likely pathway for PCBs to Basin 52C (see *Outfall Basins 52C and 53 North Lombard Street PCB Source Investigation Report* [BES, 2012] for information about these offsite sources). This information was conveyed to the DEQ program managers of the identified DEQ Cleanup Program sites so that offsite migration would be included as part of the site source control evaluations. Because the potential sources of PCBs to the system have been identified and are in appropriate DEQ programs to select and implement source controls, the City concluded that no further City source investigation was needed in this basin (BES, 2012).

¹ The City identified some data quality concerns regarding portions of these data that may have warranted flagging or rejecting some analytical values that bias the calculated average concentration for total PCBs in stormwater (BES, 2008).

Table 3 lists investigations completed by the City and others in the Basin 52C conveyance system.

Table 3. Investigations in the Basin 52C Stormwater Conveyance System

Data Collection Period	Party	Purpose	Documentation
2000	City	Compile basin background information to identify potential sources.	Preliminary Evaluation of City Outfalls (Eastshore) (BES, 2000)
2002	City	Evaluate inriver sediment data near City outfalls to prioritize basins for source tracing.	Programmatic Source Control Remedial Investigation Work Plan (CH2M HILL, 2004)
2005	Port	Collect stormwater and stormwater solids (sediment trap) samples from the basin to evaluate recontamination potential, as part of the Terminal 4 Early Action.	Terminal 4 Recontamination Analysis (BBL, 2006)
2005	City	Collect inline solids samples within the City conveyance system to evaluate potential sources to the system.	Outfall Basins 52C and 53 North Lombard Street PCB Source Investigation Report (BES, 2012)
2007-2008	Port	Collect stormwater and sediment trap samples representative of discharges from the basin as part of the T4 evaluation and the LWG's land use loading evaluation.	Field Sampling Procedures Report, Storm Water Sampling Program Terminal 4 Upland Facility (Ash Creek Associates / Newfields, 2009) Portland Harbor RI/FS, Round 3A and 3B Stormwater Data Report (Anchor and Integral 2008)
2005, 2007-2008	City	Evaluate stormwater data from City outfalls to identify additional source tracing needs.	Stormwater Evaluation Report, City of Portland Outfall Project (BES, 2010)
2010	City	Collect catch basin and surface soil samples along N. Lombard Street to evaluate potential pathways and sources of PCBs to the basin.	Outfall Basins 52C and 53 North Lombard Street PCB Source Investigation Report (BES, 2012)

Notes:

LWG = Lower Willamette Group; PCBs = polychlorinated biphenyls; T4 = Terminal 4

5 Completion of Source Identification

The lines of evidence evaluated to verify that source tracing is complete and major sources are not present in the basin include (1) source tracing results and (2) upland site investigation coverage and land use in the basin. Findings from this evaluation are summarized below.

- Source Tracing Results:** Results of source investigations in Basin 52C indicated sources of PCBs to the basin; no other analytes were identified for further source tracing. Subsequent source investigation results indicate that (1) major upland sources are not present within the basin, (2) concentrations of PCBs were higher along the trucking route (N. Lombard Street) compared to the non-trucking route (N. Roberts Avenue), and (3) offsite migration of PCBs in erodible soils (e.g., via vehicle drag-out) from nearby industrial sites to basin inlets on N. Lombard Street is a likely pathway for PCBs to the

basin (BES, 2012). There are a number of industrial sites in the vicinity of the basin with known PCB soil contamination.

- *Upland Investigation Coverage and Land Use:* Figure 2 displays the spatial extent of programmatic controls (see key to figures provided at beginning of this Appendix) in the basin. A portion of one DEQ Cleanup Program site (Borden) is located within the basin; however, stormwater contributions to Basin 52C from this site are limited to runoff from a small parking lot and roof drainage, and DEQ has determined this site to be low priority for source investigation. Other sites have been inspected by the City's Industrial Stormwater Program to evaluate and provide technical assistance on industrial exposures to stormwater. Land use at sites currently not covered by DEQ Cleanup or Water Quality Programs consists of parking areas and roof drainage, with minimal industrial exposures to stormwater. Current and future industrial activities that are exposed to stormwater are being addressed by the DEQ NPDES Program.

The City has provided its basin investigation results to DEQ, so that sites outside of the basin will be encouraged to evaluate potential offsite migration of site contaminants via tracking of erodible soils, and will implement appropriate source controls under DEQ Cleanup Program oversight.

Based on these lines of evidence, the City concludes that Basin 52C source tracing is complete, that no major sources within the basin are present, and that nearby sources with potential offsite migration of PCBs to the basin have been identified and referred to DEQ.

6 Basin Source Controls

Source control for Basin 52C includes ongoing City and DEQ programs that are described in the Municipal Report. Given the likelihood of contaminant tracking into the basin from sources outside of the basin, source control measures completed (or planned) at nearby contaminated sites under DEQ Cleanup Program agreements also are believed to result in source control benefits to Basin 52C. Source controls implemented within Basin 52C are displayed in Figure 2 and summarized in Table 4. Source controls implemented at sites outside the basin that are affecting N. Lombard Street are not itemized below. See Table 1 of the *Outfall Basins 52C and 53 North Lombard Street PCB Source Investigation Report* (BES, 2012) for information about source controls at these offsite sources.

Table 4. Basin 52C Source Controls

Site/Area	Source Controls	Timeframe/Status
Source Control Measures (SCM) at DEQ Cleanup Program Sites		
Borden Packaging and Industrial Products (ECSI #1277)	Not needed ⁽¹⁾	To be determined
Other (Programmatic SCM)		
Momentive Specialty Chemicals, Inc.	City Discharge Authorization⁽²⁾	Ongoing
Toyota Logistic Services	NPDES 1200-Z Stormwater Permit Requirements.	Ongoing
Momentive Specialty Chemicals	NPDES No Exposure Certification (i.e., elimination of industrial exposures to stormwater)	Ongoing

Notes:

DEQ = Oregon Department of Environmental Quality; NPDES = National Pollutant Discharge Elimination System

(1) DEQ has determined that a source control evaluation is not needed or is a low priority at this site (DEQ, 2013).

(2) Additional site-specific stormwater pollution controls required and implemented under City Code.

Other municipal programs (e.g., periodic inspection of and technical assistance to non-NPDES sites, illicit discharge monitoring, street sweeping, etc.) likely provide additional source control benefits in the basin and will help to address minor sources for which specific control measures have not been required. City programs that control current and future contaminant discharges to the conveyance system are described in the Municipal Report.

7 Conclusion

The City completed source tracing in Basin 52C and determined that major sources of contaminants are not present in the basin. However, source investigation results indicate that vehicle tracking of contaminated erodible soils from nearby industrial sites is a likely pathway for PCBs into the basin. Necessary source controls at identified sources in the vicinity of the basin have been implemented or are being determined under the DEQ Cleanup Program. Future discharges from Outfall 52C are unlikely to represent a significant source of contaminants to the river. The City concludes that it has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin 52C.

8 References

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- EPA. 2010. Re: Portland Harbor Superfund Site; Administrative Order on Consent for Remedial Investigation and Feasibility Study; Docket No. CERCLA-10-2001-0240. Portland Harbor Feasibility Study Source Tables. Letter from EPA to Mr. Bob Wyatt, Chairman, Lower Willamette Group. November 23, 2010.

List of Figures

Figure 1: Basin 52C Overview

Figure 2: Basin 52C Upland Site Source Controls

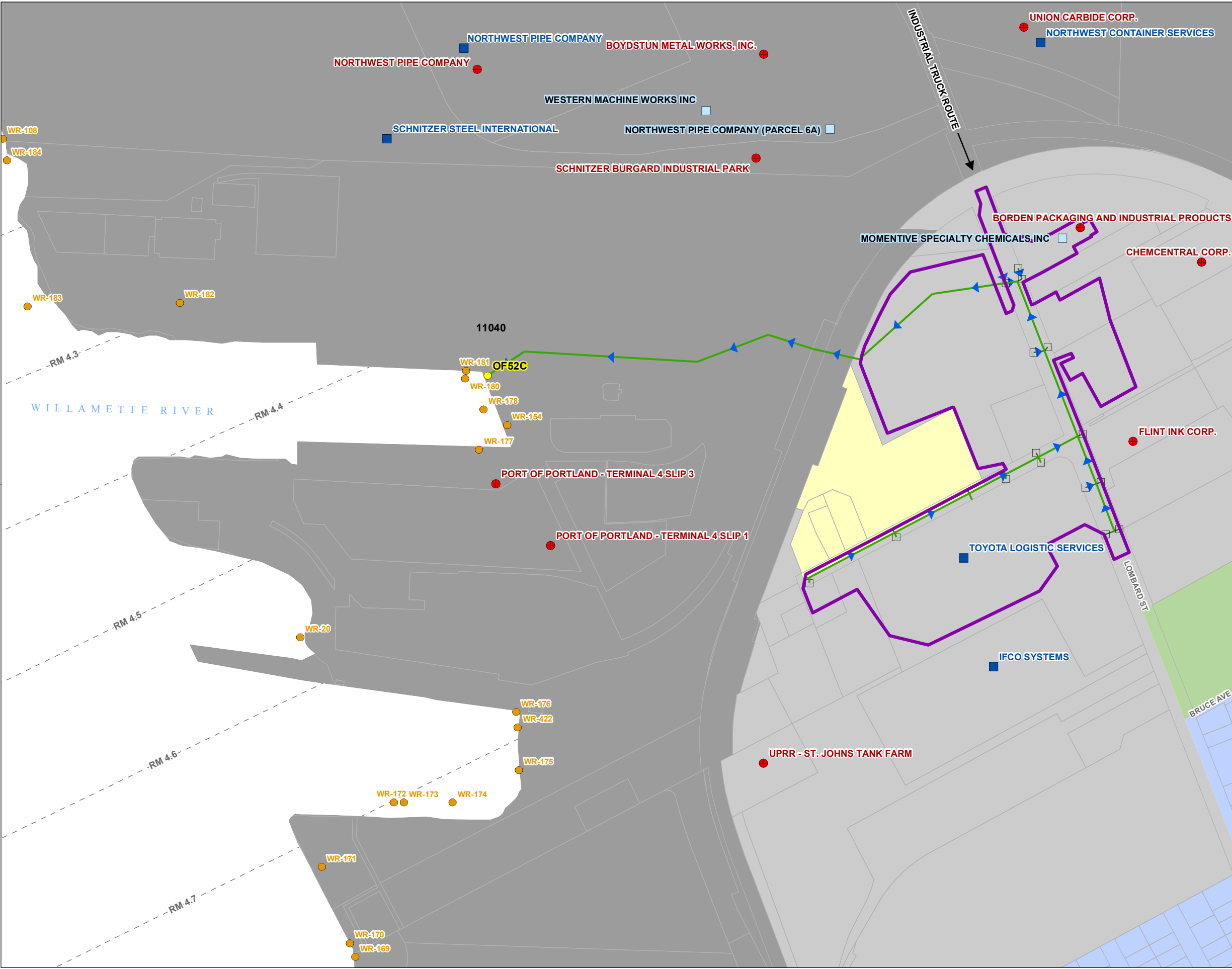
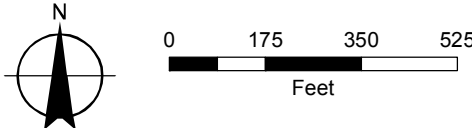


FIGURE 1
Basin 52C
Overview

- Basin 52C
- DEQ ECSI Site
- NPDES Stormwater Permit
- NPDES No Exposure Certification
- Conveyance System**
 - Storm Line
 - Catch Basin
 - City Outfall
 - Non-City Outfall
- Land Use/Zoning**
 - Heavy Industrial
 - Light Industrial
 - General Employment
 - Residential
 - Parks and Open Space
- All Other Data**
 - River Mile (RM)
 - Tax Lot
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO

ENVIRONMENTAL SERVICES
CITY OF PORTLAND
1120 SW Fifth Avenue, Room 1000
Portland Oregon, 97204-1912

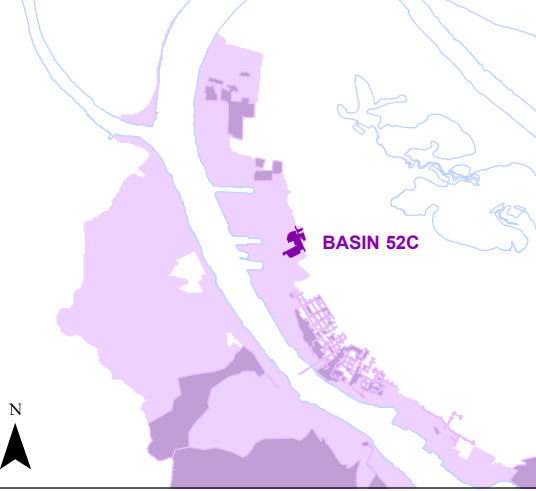
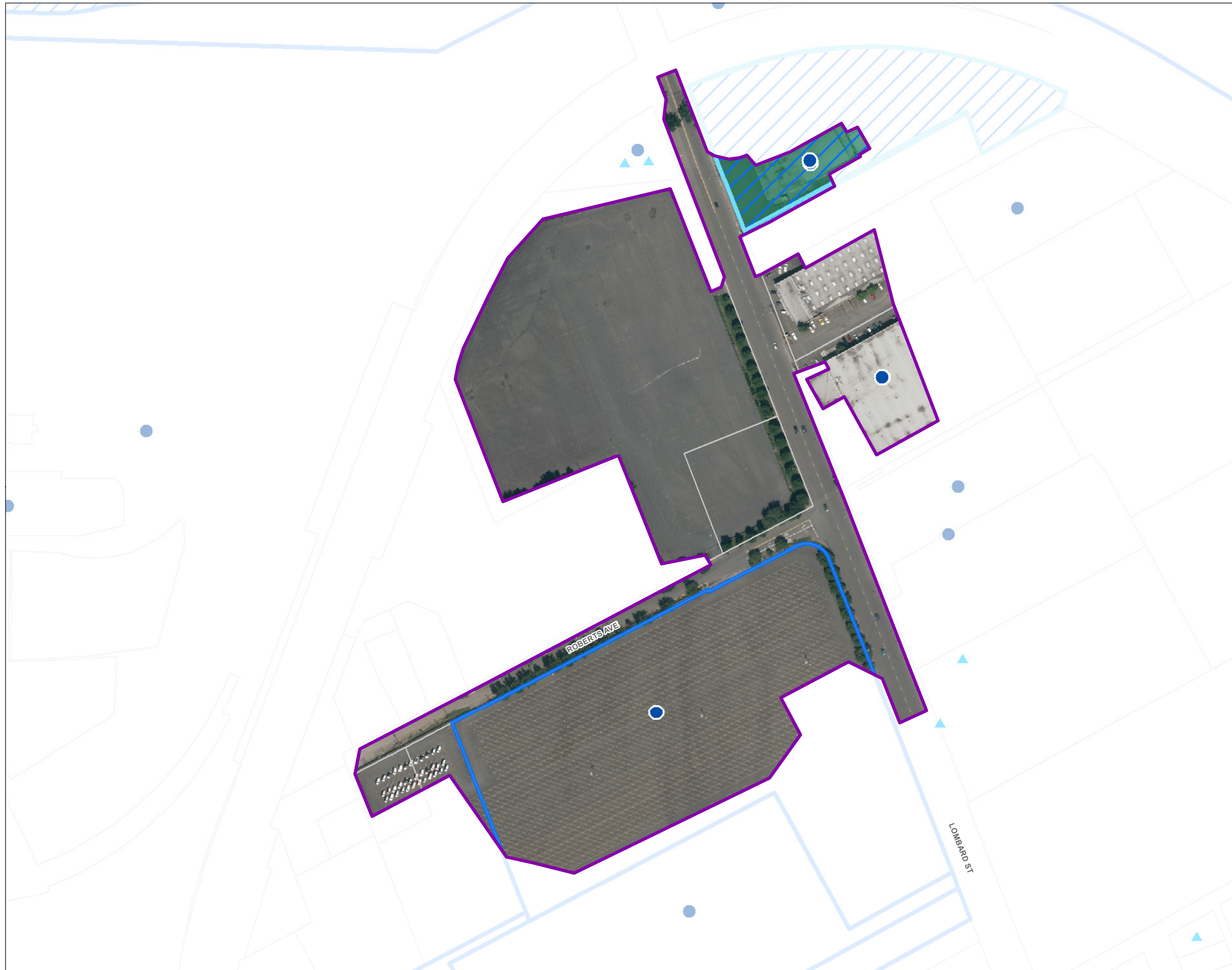
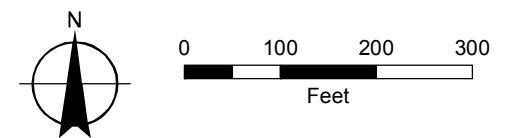


FIGURE 2
Basin 52C
Upland Site Source Controls

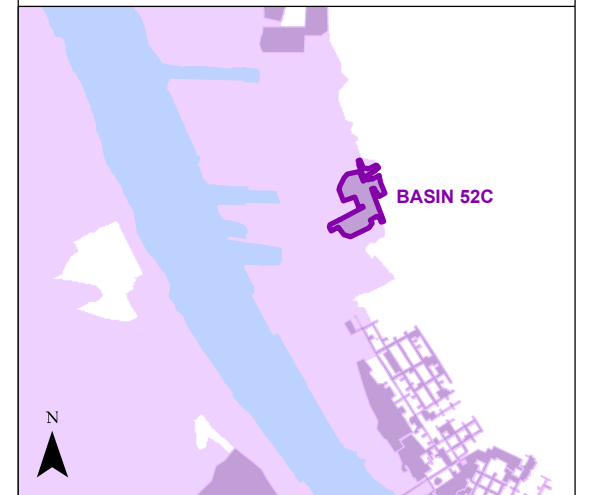


- Basin 52C
- Tax Lot
- DEQ Stormwater SCE**
 - SCE not needed or low priority
- All Other Features**
 - NPDES Stormwater Discharge Permit
 - City Discharge Authorization
 - NPDES No Exposure Certification
 - Stormwater Treatment Facility
 - Site Inspection - BES Industrial Stormwater Program
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO, Aerial Photo Taken 2012

 ENVIRONMENTAL SERVICES
CITY OF PORTLAND
1120 SW Fifth Avenue, Room 1000
Portland Oregon, 97204-1912



Completion Summary for City of Portland Outfall Basin 52D

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and several City programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled. This report summarizes the results of this collaborative effort in Outfall Basin 52D.

This Completion Summary includes a weight-of-evidence evaluation to demonstrate that source identification is complete and a summary of source controls (implemented or planned) to control future contaminant discharges to the Willamette River.

Basin 52D is located on the east side of the river within the International Slip area in north Portland, an area with a long history of shipbuilding and marine terminal operations. The outfall discharges at the head of International Slip at approximately River Mile (RM) 3.9. Outfall 52D was constructed relatively recently (1994), and the entire basin consists of three sites. Most of the land in Basin 52D is part of the Schnitzer Burgard Industrial Park (BIP), and land use in the basin is all industrial. Current operations in the basin include trucking/warehousing, truck leasing, and repair and cleaning of intermodal shipping containers.

Multiple sites comprise the Schnitzer BIP, and Schnitzer is in the process of conducting a stormwater source control evaluation (SCE) under DEQ oversight that covers all of Basin 52D (also known as BIP Basin 21) as part of its BIP Source Control Project. Current source investigation activities include stormwater and inline sediment data collection; Schnitzer and DEQ will determine source control measures (SCM) based on results of the SCE. The City will continue to provide Schnitzer with access to the conveyance system and to coordinate with DEQ on source investigation and controls in Basin 52D.

Because all potential contaminant sources to the basin are being investigated by Schnitzer BIP and SCMs for these sites will be determined under DEQ oversight, future discharges from Outfall 52D are unlikely to represent a significant source of contaminants to the river. Therefore, the City has met the remedial investigation (RI)/SCM objectives for Basin 52D.

2 Introduction

This Completion Summary presents a weight-of-evidence evaluation of whether further source investigation is needed in Basin 52D, and the rationale for concluding that future discharges from the basin are not likely to be significant sources of contaminants to river sediment. The purpose of this report is to demonstrate that the City has met the RI/SCM objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ. The City and

DEQ have identified all major sources of contaminants to the basin and are using their respective authorities to ensure that source controls are implemented where needed.

This report is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report), which provides additional background and detail regarding the City's harborwide source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Outfall 52D discharges on the east shore of the river at the head of International Slip, at about RM 3.8. The drainage area for the outfall is approximately 24 acres. Figure 1 shows the location of Outfall 52D and current drainage basin boundary and provides an overview of the associated stormwater conveyance system. Additional detail on the Outfall 52D stormwater conveyance system and associated drainage basin is included in the report titled *Basin 21 Storm Water Sampling and Analysis Data, Source Control Evaluation, Burgard Industrial Park, Portland, Oregon* (Bridgewater, 2013).¹

3.2 Land Use and Potential Upland Sources

Although the International Slip area has a long history of industrial operations associated with shipbuilding and marine terminals, Outfall 52D was constructed relatively recently (1994). Basin 52D consists entirely of private property, most of which is within the Schnitzer BIP. Current land use in the basin is industrial and includes: trucking/warehousing (at the former RoMar Transportation site); truck and equipment leasing (on a portion of the former Boydstun Metal Works site); and repair and cleaning of intermodal shipping containers (at the Portland Container Repair site). No public rights-of-way or public lands drain to this outfall.

All sites within or partially within the basin are in the DEQ Cleanup Program, as listed in DEQ's Environmental Cleanup Site Information (ECSI) database. Two of the three properties in the basin (Boydstun and Portland Container) are within the Schnitzer BIP (see Figure 1). Schnitzer BIP currently is conducting a stormwater pathway evaluation that includes all stormwater drainage to Outfall 52D (i.e., stormwater from these two sites and from the western portion of the RoMar site, which is outside of the Schnitzer BIP boundary). In addition, the RoMar site completed a site investigation and contaminated soil removal from the eastern portion of the site under DEQ oversight. Table 1 lists the DEQ Cleanup Program sites in the basin, the associated contaminants of interest (COI), and the current status of stormwater pathway evaluations.

¹ Note that delineation of drainage to Outfall 52D (also known as BIP Basin 21) does not match the current City delineation. The BES Industrial Stormwater Program verified the City delineation.

Table 1. DEQ Cleanup Program Sites In or Adjacent To Basin 52D

DEQ Cleanup Program Site	Site COIs ⁽¹⁾	Stormwater Pathway
Boydston Metal Works Inc. (ECSI #2362)	PAHs, PCBs, metals	Source Control Evaluation In Progress ^(2,3)
Portland Container Repair Corp (ECSI #2375)	TPH ⁽⁴⁾	Source Control Evaluation In Progress ^(2,3)
RoMar Transportation Systems, Inc. (ECSI #2437)	TPH, PCBs, metals ⁽⁴⁾	Source Control Decision/No Further Action ⁽⁵⁾
Schnitzer Burgard Industrial Park (SBIP) (ECSI #5324) ⁽⁶⁾	VOCs, TPH, PCBs, metals	Source Control Evaluation In Progress

Notes:

PAHs = polycyclic aromatic hydrocarbons; TPH = total petroleum hydrocarbons; VOCs = volatile organic compounds; DEQ = Oregon Department of Environmental Quality; COIs = contaminants of interest; PCBs = polychlorinated biphenyls; ECSI = Environmental Cleanup Site Information

(1) Unless otherwise noted, site COIs are those identified in Appendix Q (Source Control Inventory Tables) of the Portland Harbor RI/FS Draft Feasibility Study (FS) (Anchor et al., 2012).

(2) This ECSI site is not tracked in the DEQ Milestone Report (DEQ, 2013).

(3) The Schnitzer BIP Basin 21 source control evaluation includes evaluation of the stormwater pathway from this site to Outfall 52D (Bridgewater, 2012).

(4) COIs are not listed for this site in Appendix Q of the Draft FS (Anchor et al., 2012). COIs listed are identified in Table 4.2-2 of the Draft Final RI (Integral et al., 2011).

(5) Only stormwater from the developed portion of this site discharges to Basin 52D. Drainage from the site is included in the BIP Basin 21 evaluation, although the 2006 DEQ decision for the site concluded that further evaluation of this pathway was a low priority.

(6) The Schnitzer BIP site encompasses multiple individual ECSI sites, including, but not limited to, Boydston Metals and Portland Container Repair Corp.

Industrial sites covered, or historically covered, by National Pollutant Discharge Elimination System (NPDES) stormwater regulations also were considered as potential contaminant sources to the City conveyance system. Table 2 lists industrial sites that currently hold, or historically held, NPDES permits to discharge to the Basin 52D conveyance system. Figure 1 shows sites with current NPDES permits.

Table 2. Current⁽¹⁾ and Historical NPDES Permit Coverage in Basin 52D

Address	Company	Permit Type	Time Period
9449 N Burgard Way	Portland Container Repair Inc	Stormwater (1200-Z)	2001 – Present
9125 N Time Oil Rd.	Boydston Metal Works	Stormwater (1200-Z)	2001 – 2010

Notes:

NPDES = National Pollutant Discharge Elimination System

(1) Current permits are indicated in bold.

3.3 Outfall Setting

Outfall 52D discharges to an area of potential concern (AOPC 3) identified by the U.S. Environmental Protection Agency (EPA) based on elevated concentrations of PCBs and other contaminants (EPA, 2010). In addition to Outfall 52D, 4 non-City outfalls drain to the east end of the International Slip; 16 non-City outfalls discharge throughout the International Slip. Overwater activities (e.g., dock operations, material loading and unloading) occur within the AOPC in the vicinity of Outfall 52D.

4 Basin Screening and Source Investigations

Given that Outfall 52D drains only private industrial property, it had not been identified as part of the City's stormwater conveyance system until several years after the City's outfalls investigation was underway. After a records review confirmed that ownership of the outfall and connecting stormwater lines transferred to the City, the City began coordinating with DEQ and Schnitzer on the investigation of this basin. In 2010, DEQ requested Schnitzer, the current and/or former owner/operator of the properties within Basin 52D, to conduct a stormwater SCE for this basin (Bridgewater, 2012). To assist with this effort, the City conducted video surveys of the system in 2011 and reviewed as-built drawings and site drainage records to delineate the basin. Initial delineation of the drainage basin has been refined through smoke and flow testing conducted by Schnitzer (Bridgewater, 2012).

The Basin 52D (identified as Basin 21 by Schnitzer) source control investigation includes stormwater and solids sampling from locations in the conveyance system representing discharges to the conveyance system from each of the three sites as well as a location close to the outfall that represents the combined discharge from the whole basin (Bridgewater, 2012). To date, two of four planned rounds of stormwater sampling have been completed. During the second stormwater sampling event (March 5, 2013), City Field Operations staff collected splits of each of the stormwater samples. Preliminary evaluation of the results of the first two stormwater sampling events, informed by observations during the second sampling event (BES, 2013), indicate that PCBs are being discharged to the conveyance system from the Portland Container site.² This site is mostly unpaved (Bridgewater, 2012), and PCBs were detected in soil samples collected from this site in the early 1990s (AMEC, 2006). Results of the ongoing Basin 52D stormwater SCE will be used by DEQ to identify SCMs that may be necessary at the Portland Container site and elsewhere in the basin to address current and future discharges to the river via the Basin 52D conveyance system (Bridgewater, 2012).

² Stormwater samples from this location were collected at the discharge point from the site's stormwater treatment system, which includes a stormwater retention pond and filtration system.

Table 3 lists investigations completed in the Basin 52D conveyance system.

Table 3. Investigations in the Basin 52D Stormwater Conveyance System

Data Collection Period	Party	Purpose	Documentation
2012 – 2013	Schnitzer	Collected stormwater and solids data from sampling locations representing all sources to Basin 52D (i.e., BIP Basin 21) to evaluate whether major contaminant sources are discharging to the conveyance system and to determine if additional SCMs are needed in the basin.	Basin 21 Storm Water Sampling and Analysis Data (Bridgewater, 2013)
2013	City	Observed sampling and collected splits of the stormwater samples collected by Schnitzer during the March 5, 2013, stormwater sampling event to provide additional basis for interpretation of the analytical results.	Transmittal of data from sample splits to Schnitzer/Bridgewater (BES, 2013)

Notes:

BIP = Schnitzer Burgard Industrial Park; SCMs = source control measures

5 Completion of Source Identification

The lines of evidence evaluated to verify that source tracing is complete include (1) results of the ongoing Schnitzer BIP SCE and (2) the upland site investigation coverage in the basin. Findings from this evaluation are summarized below.

- *Source Control Evaluation Results:* The Basin 52D/BIP Basin 21 SCE is underway and includes sampling locations representative of the upland site stormwater discharges to the conveyance system. Preliminary results indicate that the Portland Container site is a major source of PCBs to the system (BES, 2013). Schnitzer and DEQ will evaluate subsequent results to verify that source tracing in the basin is complete.
- *Upland Investigation Coverage:* Figure 2 displays the spatial extent of programmatic controls (see key to figures provided at beginning of this Appendix) in the basin. As shown in Figure 2, the entire basin is covered under the DEQ Cleanup Program. In addition, all sites have been inspected for stormwater exposures by the City's Industrial Stormwater Program.

Based on these lines of evidence, the City concludes that City source tracing in Basin 52D is not needed and that all major sources will be identified at the conclusion of the Schnitzer BIP SCE.

6 Basin Source Controls

The City and DEQ will collaborate under their respective authorities to identify control mechanisms for major contaminant sources that are identified in the basin following completion of the Schnitzer BIP SCE. Additionally, source control for sites in Basin 52D includes ongoing City and DEQ programs that are described in the Municipal Report and SCMs completed at these sites under DEQ Cleanup Program agreements. Source controls implemented in Basin 52D are displayed in Figure 2 and summarized in this section.

One type of programmatic source control is elimination of stormwater exposures to industrial activities. Trucking operations at one site in the basin historically held and currently hold an NPDES No Exposure Certification (NEC) (see Table 4).

Table 4. Sites with No Exposure Certification (NEC) in Basin 52D⁽¹⁾

Address	Company	NEC Time Period
9333 N Time Oil ⁽²⁾	R & L Carriers	2008 – 2011
	Pro Truck Lines	2013 – present

Notes:

(1) Current NECs are indicated in bold.

(2) This address is the RoMar Transportation Systems site, where different trucking operations have operated following site development.

Table 5 summarizes additional site-specific and programmatic source controls completed to date for Basin 52D are summarized.

Table 5. Basin 52D Source Controls

Site/Area	Source Controls	Timeframe/Status
Source Control Measures (SCM) at DEQ Cleanup Program Sites ⁽¹⁾		
Boydston Metal Works, Inc.	To be determined. ⁽²⁾	To be determined
Portland Container Repair Corp (ECSI #2375)	PCB-contaminated soil in the northern portion of the site was excavated and removed from the site.	Early 1990s
	Stormwater filter system and stormwater retention pond treat all stormwater discharges from the site to the Basin 52D conveyance system.	Ongoing
	Additional SCMs to be determined. ⁽²⁾	To be determined
RoMar Transportation Systems, Inc. (ECSI #2437)	PCB-contaminated surface soil was excavated and removed from the eastern portion of the site.	1993
	Additional surface soil containing PCBs and chromium at concentrations above applicable risk-based standards was excavated and removed from the site.	2006
	Additional SCMs to be determined. ⁽³⁾	To be determined
Schnitzer Burgard Industrial Park (SBIP) (ECSI #2355/5324)	Additional SCMs to be determined.	To be determined

Site/Area	Source Controls	Timeframe/Status
Other (Programmatic Source Controls)		
Pro Truck Lines	City Discharge Authorization⁽⁴⁾	Ongoing
Portland Container Repair	NPDES 1200-Z Stormwater Permit Requirements	Ongoing
Pro Truck Lines	No Exposure Certifications	Ongoing

Notes:

PCBs = polychlorinated biphenyls; DEQ = Oregon Department of Environmental Quality; ECSI = Environmental Cleanup Site Information; NPDES = National Pollutant Discharge Elimination System

- (1) For upland sites, descriptions of SCMs are based on information in DEQ Milestone Report (DEQ, 2013), DEQ source control decisions, and/or reports on file with DEQ (AMEC, 2006; Bridgewater, 2000, 2013; Creekside, 2006).
- (2) SCMs for this site will be determined based on results of the Schnitzer BIP Basin 21 source control evaluation (Bridgewater, 2012).
- (3) Though this site was issued a source control decision and no further action determination by DEQ in 2006, data being collected by Schnitzer BIP may identify a need for additional source control on the western portion of the site. SCMs for this site will be determined on the basis of results of the Schnitzer BIP Basin 21 source control evaluation (Bridgewater, 2012).
- (4) Additional site-specific stormwater pollution controls required and implemented under City Code.

Other municipal programs (e.g., periodic inspection of and technical assistance to non-NPDES sites, illicit discharge monitoring, etc.) likely provide additional source control benefits in the basin and will help to address minor sources for which specific control measures have not been required. City programs that control current and future contaminant discharges to the conveyance system are described in the Municipal Report.

7 Conclusion

Only three sites are located within Basin 52D, and SCMs are being implemented and/or determined at all three sites under DEQ regulatory authority. Therefore, future discharges from Outfall 52D are unlikely to represent a significant source of contaminants to the river. The City concludes that it has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin 52D.

8 References

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- Anchor et al. 2012. Portland Harbor RI/FS Draft Feasibility Study. Prepared for The Lower Willamette Group by Anchor QEA, LLC, Windward Environmental, LLC, Kennedy/Jenks Consultants, and Integral Consulting, Inc. February 2012.
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EPA. 2010. Re: Portland Harbor Superfund Site; Administrative Order on Consent for Remedial Investigation and Feasibility Study; Docket No. CERCLA-10-2001-0240. Portland Harbor Feasibility Study Source Tables. Letter from EPA to Mr. Bob Wyatt, Chairman, Lower Willamette Group. November 23, 2010.

Integral et al. 2011. Portland Harbor RI/FS, Draft Final Remedial Investigation Report. Prepared for the LWG. Prepared by Integral Consulting Inc., Windward Environmental LLC, Kennedy/Jenks Consultants, and Anchor QEA, LLC. August 29, 2011.

List of Figures

Figure 1: Basin 52D Overview

Figure 2: Basin 52D Upland Site Source Controls

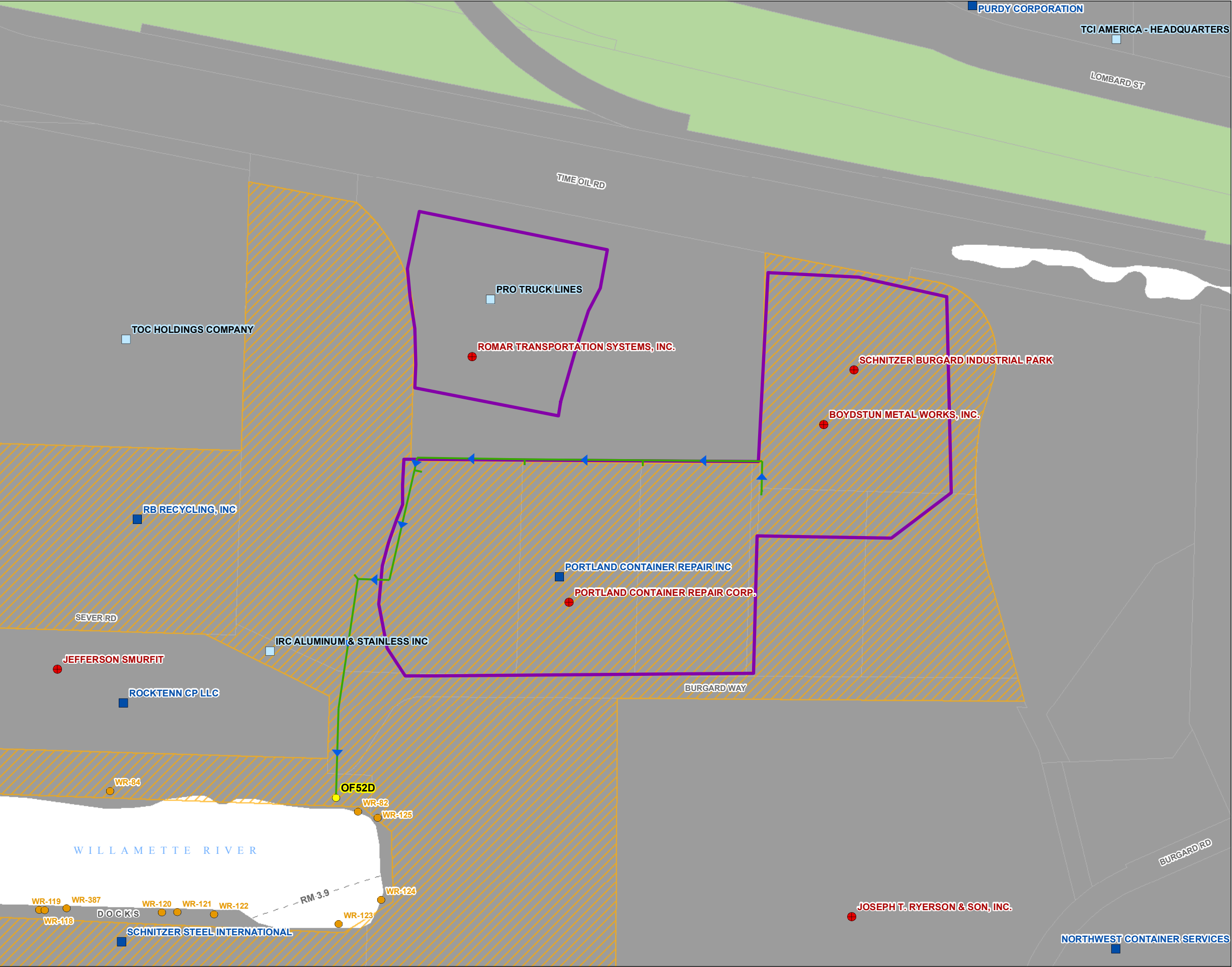


FIGURE 1

Basin 52D Overview

Legend:

- Basin 52D
- Schnitzer BIP
- DEQ ECSI Site
- NPDES Stormwater Permit
- NPDES No Exposure Certification

Conveyance System

- Storm Line
- City Outfall
- Non-City Outfall

Land Use/Zoning

- Heavy Industrial
- Parks and Open Space

All Other Data

- River Mile (RM)
- Tax Lot
- Discharges to City Outfall
- Portland Harbor Hydroboundary

MAP NOTES:

Date: December 31, 2013
Data Sources: BES, METRO

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CITY OF PORTLAND
1120 SW Fifth Avenue, Room 1000
Portland Oregon, 97204 -1912

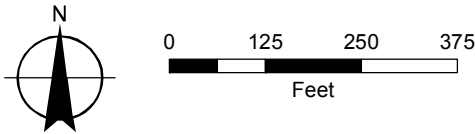
Basin 52D



FIGURE 2
Basin 52D
Upland Site Source Controls

- Basin 52D
- Tax Lot
- DEQ Stormwater SCE**
 - SCE implemented or pending
- All Other Features**
 - NPDES Stormwater Discharge Permit
 - City Discharge Authorization
 - NPDES No Exposure Certification
 - Stormwater Treatment Facility
 - Site Inspection - BES Industrial Stormwater Program
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary

NOTE:
The DEQ Milestone Report (DEQ, 2013) indicates that SCEs are not needed or are a low priority for the eastern and southern tax lots within the basin. Based on discussions with DEQ, these tax lots are currently being evaluated as part of the Schnitzer Burgard Industrial Park SCE, and therefore are shown here as SCE pending.



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO, Aerial Photo Taken 2012

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Completion Summary for City of Portland Outfall Basin 53

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and a number of City programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled. This report summarizes the results of this collaborative effort in Outfall Basin 53.

This Completion Summary includes a weight-of-evidence evaluation to demonstrate that source identification is complete and a summary of source controls (implemented or planned) to control future contaminant discharges to the Willamette River.

Basin 53 is located on the east side of the river in the St. Johns district in north Portland. St. Johns is one of Portland's oldest neighborhoods and includes a mix of industrial operations along the riverfront and residential development starting just east of the shoreline properties. This drainage basin is entirely within a residential area up on the bluff above the Port of Portland's (Port) Terminal 4 (T4) Auto Storage Facility. The basin primarily consists of residential streets and the outfall discharges at approximately River Mile (RM) 5.2. River sediment in the vicinity of the outfall does not contain elevated concentrations of any contaminants (i.e., the U.S. Environmental Protection Agency [EPA] has not identified the potential need for sediment remediation).

Data collected by the Port as part of its T4 recontamination evaluation suggested that sources of polychlorinated biphenyls (PCB) were present the basin. Because the basin is entirely residential and includes no sites with known PCB contamination, the City conducted an investigation along N. Lombard Street to determine if PCBs may be migrating to basin inlets from areas outside of the basin. Results of this investigation indicate that vehicle contaminant tracking from nearby industrial sites is a likely pathway for PCBs into the basin. Source control measures (SCM) to address contamination in erodible soils have been implemented or are being determined under DEQ oversight at a number of DEQ Cleanup Program sites near the basin.

Given that major sources of contaminants are not present in the basin, and the potential sources of PCBs in the vicinity of the basin have been identified and are implementing SCMs under DEQ oversight, future discharges from Outfall 53 are unlikely to represent a significant source of contaminants to the river. Therefore, the City has met the remedial investigation (RI)/SCM objectives for Basin 53.

2 Introduction

This Completion Summary presents a weight-of-evidence evaluation of whether further source investigation is needed in Basin 53, and the rationale for concluding that future discharges from the basin are not likely to be significant sources of contaminants to river sediment. The purpose

of this report is to demonstrate that the City has met the RI/SCM objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ. The City and DEQ have identified all potential major sources of contaminants to the basin and are using their respective authorities to ensure that source controls are implemented where needed.

This report is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report), which provides additional background and detail regarding the City's harborwide source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Outfall 53 discharges to the east side of the Willamette River at approximately RM 5.2. The outfall basin drains approximately 21 acres of residential land (mostly streets) in the St. Johns district. Figure 1 shows the location of Outfall 53 and the current drainage basin boundary and provides an overview of the associated stormwater conveyance system. The City worked with most residential properties within the basin to disconnect downspouts and infiltrate roof drainage, as part of the City's Combined Sewer Overflow Abatement Program.

As shown in Figure 1, the conveyance system includes stormwater treatment features in the northern part of the basin. In 2003, as part of a residential development on vacant land, a private party constructed two sedimentation manholes to treat stormwater runoff from the new residential properties and portions of N. Decatur and N. Edison Streets. In addition, as part of a street improvement project, the City installed a water quality swale in the right-of-way on N. Reno Avenue. The swale, installed in 2005, is designed to infiltrate stormwater runoff from a portion of N. Reno Avenue to reduce total suspended solids loading to Outfall 53. City programs that result in these types of stormwater improvements are described in the Municipal Report.

Additional detail on the Outfall 53 stormwater conveyance system and associated drainage basin is included in the *Programmatic Source Control Remedial Investigation Work Plan for the City of Portland Outfalls Project* (CH2M HILL, 2004) and the *Outfall Basins 52C and 53 North Lombard Street PCB Source Investigation Report* (BES, 2012).

3.2 Land Use and Potential Upland Sources

Outfall 53 discharges adjacent to the Port's T4 Auto Storage Facility, but the drainage basin for this outfall is on the bluff east of T4, entirely within a residential area of the St. Johns district. Most of the basin drainage area consists of residential streets, with several residential properties, and an approximately 0.25-mile section of N. Lombard Street. N. Lombard Street is a designated truck route serving adjacent industrial areas in the T4/International Slip area. Although a small area in the northern part of the basin is zoned general employment,¹ land use in this area is also residential. Portions of the basin are within the St. Johns Plan district, which

¹ General employment is a Portland zoning category that allows a range of employment opportunities but emphasizes industrial and industrial-support uses. The zones can allow for the transition to a less industrial overall nature.

provides a framework for strengthening St. Johns' role as the commercial and civic center of the North Portland peninsula.²

No DEQ Cleanup Program sites or industrial sites covered, or historically covered, by National Pollutant Discharge Elimination System (NPDES) stormwater regulations are located in Basin 53. Note that the City has an NPDES Municipal Separate Storm Sewer System (MS4) stormwater permit that covers basin drainage areas.

3.3 Outfall Setting

Outfall 53 is located adjacent to the Port's T4 Auto Storage Facility. The outfall is not located within or adjacent to any reach identified by the EPA as an area of potential concern (AOPC) for contaminant concentrations in river sediment (EPA, 2010). Eight non-City outfalls are located in the immediate vicinity of Outfall 53, and T4 dock operations surround the outfall area (see Figure 1).

4 Basin Screening and Source Investigations

The City identified Basin 53 as a Priority 4 for source tracing, based on the lack of elevated contaminant concentrations in the vicinity of the outfall (CH2M HILL, 2004). Priority 4 basins are considered the lowest priority for source investigation.

The Port conducted stormwater and sediment trap sampling in the basin during 2007 as part of a recontamination analysis for T4 (Ash Creek/Newfields, 2009; Anchor and Integral, 2008). These data also were also used by the Lower Willamette Group (LWG) as part of a harborwide land use loading evaluation (Anchor QEA, 2011). Results indicated the presence of PCB source(s) to Basin 53. The City evaluation of these data identified some data quality concerns (BES, 2008) and, in 2008, the City collected additional stormwater samples from Outfall 53 to develop a more robust data set. Specifically, the City's objectives for stormwater sampling in Basin 53 were to obtain additional data to further evaluate contaminant concentrations detected in the Port samples and to facilitate statistical analysis of stormwater discharges from the basin as part of the City's Portland Harbor stormwater screening effort (BES, 2010). Although concentrations were not significantly elevated, PCBs were detected in one of the City's three stormwater sampling events at concentrations higher than expected, given the absence of identified or suspected PCB sources in the basin and the long-term residential land use.

Based on a conservative analysis of City and Port data, the City determined that further source tracing was warranted in Basin 53 to identify possible sources of PCBs³ (BES, 2010).

² The St. Johns Plan district describes the mixed-use development goals in this area (see <http://www.portlandoregon.gov/bps/index.cfm?&a=53424>).

³ The *Stormwater Evaluation Report* also identified heptachlor epoxide as potentially needing source tracing based on the exceedance of the conservative fish consumption screening level value. The City later determined that source tracing was not warranted for this pesticide residue that has been banned since 1988. The basin mean and geometric mean for stormwater did not exceed ambient water quality criteria and it was not detected in the Port sediment trap sample. Additionally, the area adjacent to Outfall 53 was not identified as an AOPC, based on the risk assessments in the Portland Harbor Remedial Investigation.

In 2010, the City conducted an investigation to evaluate potential pathways by which PCBs could be migrating to the conveyance system from sources outside the basin (BES, 2012). The investigation included collecting catch basin solids and surface solids (sweepings) along the N. Lombard Street right-of-way, both inside and outside of the basin. N. Lombard Street is a trucking route for industrial properties in the T4/International Slip area with known PCB soil contamination. Results of this investigation indicated that offsite migration of contaminated solids (e.g., vehicle drag-out) from nearby facilities with documented PCB contamination to N. Lombard Street inlets is a likely pathway for PCBs to Basin 53 (see *Outfall Basins 52C and 53 North Lombard Street PCB Source Investigation Report* [BES, 2012] for information about these offsite sources). This information was conveyed to the DEQ program managers of the identified DEQ Cleanup Program sites so that offsite migration would be included as part of the site source control evaluations. Because the potential sources of PCBs to system have been identified and are in appropriate DEQ programs to select and implement source controls, the City concluded that no further City source investigation was needed in this basin (BES, 2012).

Table 1 lists investigations completed by the City and others in the Basin 53 conveyance system.

Table 1. Investigations in the Basin 53 Stormwater Conveyance System

Data Collection Period	Party	Purpose	Documentation
2000	City	Compile basin background information to identify potential sources.	Preliminary Evaluation of City Outfalls (Eastshore) (BES, 2000)
2002	City	Evaluate inriver sediment data near City outfalls to prioritize basins for source tracing.	Programmatic Source Control Remedial Investigation Work Plan (CH2M HILL, 2004)
2007-2008	Port	Collect stormwater and sediment trap samples representative of discharges from the basin as part of the T4 recontamination evaluation and the Lower Willamette Group land use loading evaluation.	Field Sampling Procedures Report, Storm Water Sampling Program Terminal 4 Upland Facility (Ash Creek Associates / Newfields, 2009) Portland Harbor RI/FS, Round 3A and 3B Stormwater Data Report (Anchor and Integral 2008)
2008	City	Collect stormwater samples representative of discharges from the whole basin and evaluate stormwater data from City outfalls to identify additional source tracing needs.	Stormwater Evaluation Report, City of Portland Outfall Project (BES, 2010)
2010	City	Collect catch basin and surface soil samples along N. Lombard Street to evaluate potential pathways and sources of PCBs to the basin.	Outfall Basins 52C and 53 North Lombard Street PCB Source Investigation Report (BES, 2012)

5 Completion of Source Identification

The lines of evidence evaluated to verify that source tracing is complete and major sources are not present in the basin include (1) inriver sediment concentrations near the outfall, (2) land use, and (3) source tracing results in the basin. Findings from this evaluation are summarized below.

- *Inriver Sediment Concentrations.* River sediment in the vicinity of Outfall 53 does not contain elevated concentrations of any contaminants (i.e., the outfall does not discharge to an AOPC).
- *Land Use:* Basin 53 consists entirely of residential land with no historical industrial use that could be a source of legacy contamination. Non-industrial activities are not a known or suspected major source of contaminants to the City stormwater conveyance system.
- *Source Tracing Results:* Relatively low concentrations of PCBs were detected in stormwater samples at the outfall. Source investigation results along N. Lombard Street show higher concentrations of PCBs along this major truck route north of the basin and decreasing concentrations south into the basin, indicating that offsite migration of PCBs in erodible soils (e.g., via vehicle dragout) from industrial sites to basin inlets on N. Lombard Street is a likely pathway for PCBs to the basin (BES, 2012). There are a number of industrial sites north of the basin with known PCB contamination.

The City has provided its investigation results to DEQ so that sites outside of the basin will evaluate potential offsite migration of site contaminants via tracking of erodible soils and appropriate source controls will be implemented under DEQ Cleanup Program oversight.

Based on these lines of evidence, the City concludes that Basin 53 source tracing is complete, no major sources within the basin are present, and nearby sources with potential offsite migration of PCBs to the basin have been identified.

6 Basin Source Controls

Source control for Basin 53 includes ongoing City and DEQ programs that are described in the Municipal Report and specific controls implemented within the City's shared stormwater conveyance system. Given the likelihood of contaminant tracking into the basin from sources outside of the basin, SCMs completed (or planned) at nearby contaminated sites under DEQ Cleanup Program agreements likely will result in source control benefits in Basin 53. Source controls implemented within Basin 53 are displayed in Figure 1. Table 2 summarizes source controls implemented in the basin. Source controls implemented at sites outside the basin that are affecting N. Lombard Street are not itemized below: See Table 1 of the *Outfall Basins 52C and 53 North Lombard Street PCB Source Investigation Report* (BES, 2012) for information about source controls at these offsite sources.

Table 2. Basin 53 Source Controls

Site/Area	Source Controls	Timeframe/Status
City Conveyance System		
N. Decatur Street and N. Edison Street	Two stormwater treatment facilities were constructed in the City system in conjunction with new residential development of adjacent properties. These facilities are designed to reduce suspended solids loading to Basin 53.	2003
N. Reno Avenue	The City constructed a water quality swale to reduce suspended solids loading to Basin 53. The swale treats stormwater discharged from a portion of N. Reno Avenue, between N. Edison Street and N. Willamette Boulevard.	2005

The City NPDES MS4 stormwater permit covers basin drainage areas. Other municipal programs (e.g., street sweeping, illicit discharge monitoring, etc.) likely provide additional source control benefits in the basin and will help to address minor sources for which specific control measures have not been required. City programs that control current and future contaminant discharges to the conveyance system are described in the Municipal Report.

7 Conclusion

The City completed source tracing in Basin 53 and determined that major sources of contaminants are not present within the basin. However, source investigation results indicate that vehicle tracking of contaminated erodible soils from nearby industrial sites is a likely pathway for PCBs into the basin. Necessary source controls at identified sources in the vicinity of the basin have been implemented or are being determined under the DEQ Cleanup Program. Future discharges from Outfall 53 are unlikely to represent a significant source of contaminants to the river. The City concludes that it has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin 53.

8 References

- Anchor and Integral. 2008. Portland Harbor RI/FS. Round 3A and 3B Stormwater Data Report. Prepared for the Lower Willamette Group, Portland, OR. Anchor Environmental, L.L.C., Seattle, WA. September 2008.
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- BES. 2008. Letter from D. Sanders (BES) to N. LaFranchise (Port of Portland). Subject: Stormwater Outfall Data Review. May 28, 2008.
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Figure 1: Basin 53 Overview and Conveyance System Source Controls

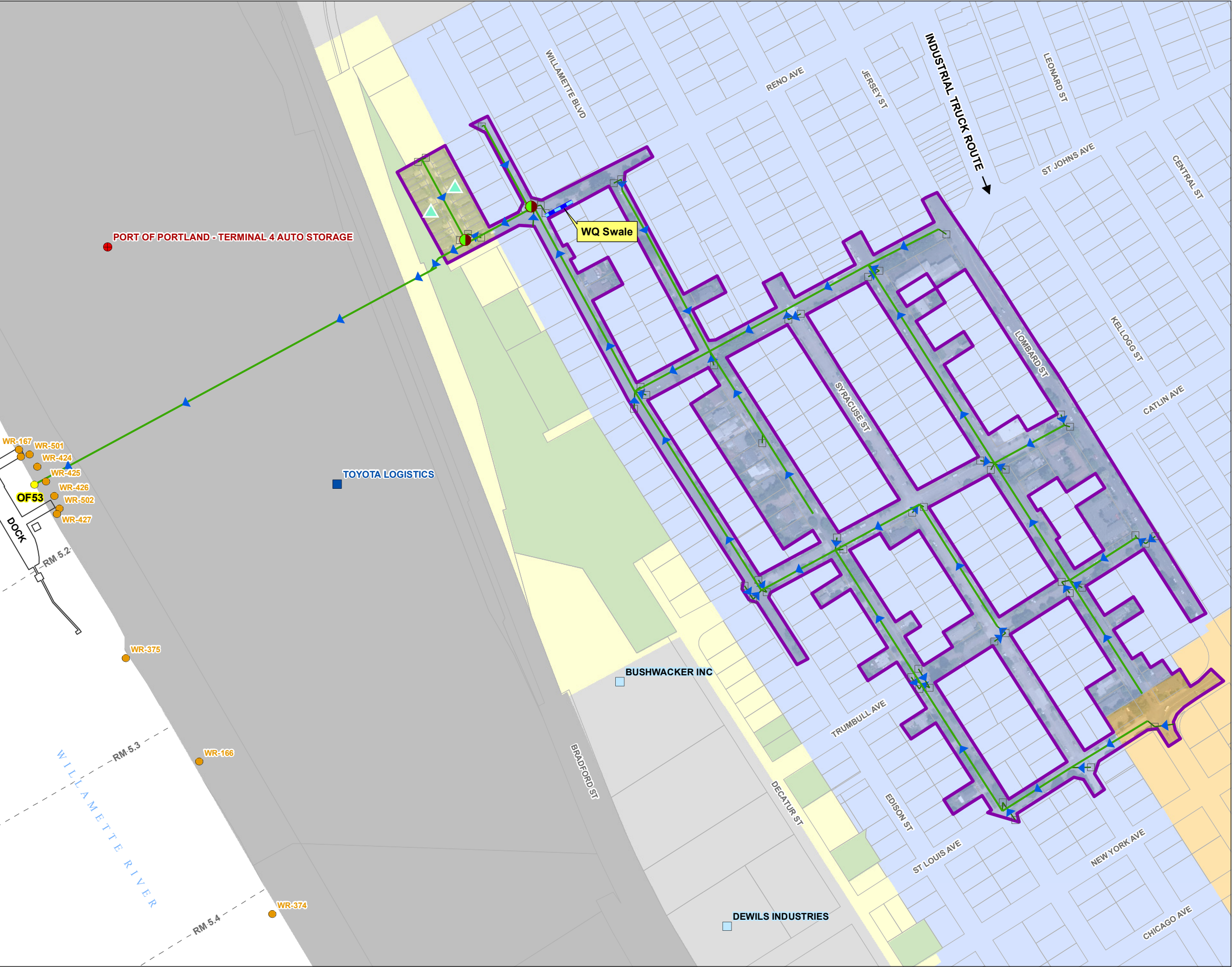


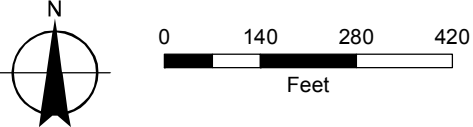
FIGURE 1
Basin 53
Overview and Conveyance
System Source Controls

- Basin 53
- DEQ ECSI Site
- NPDES Stormwater Permit
- NPDES No Exposure Certification
- Met stormwater treatment requirements with offsite treatment

- Conveyance System**
- Storm Line
 - Water Quality (WQ) Swale
 - Catch Basin
 - Sediment Removal Structure
 - City Outfall
 - Non-City Outfall

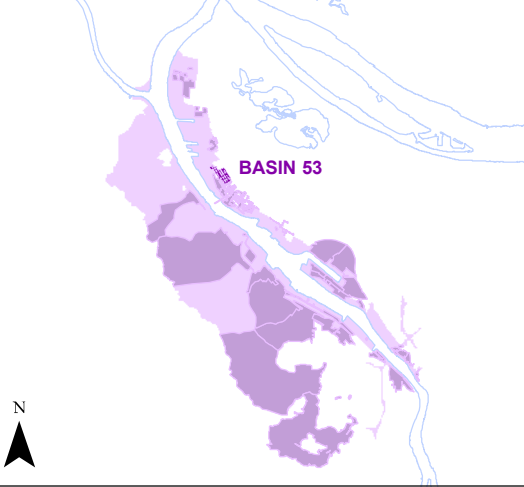
- Land Use/Zoning**
- Heavy Industrial
 - Light Industrial
 - General Employment
 - Commercial
 - Residential
 - Parks and Open Space

- All Other Data**
- River Mile (RM)
 - Tax Lot
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO

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CITY OF PORTLAND
1120 SW Fifth Avenue, Room 1000
Portland Oregon, 97204 -1912



Completion Summary for City of Portland Outfall Basin 53A

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and several City programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled. This report summarizes the results of this collaborative effort in Outfall Basin 53A.

This Completion Summary includes a weight-of-evidence evaluation to demonstrate that source identification is complete and a summary of source controls (implemented or planned) to control future contaminant discharges to the Willamette River.

Basin 53A is located in the South Rivergate Industrial Park area in north Portland. The conveyance system post-dates much of the harbor's early history of industrial operations. It was constructed in 1970 as a storm-only sewer, and all existing connections to the basin conveyance system have been in place since the early 1980s. Current land use in the basin is primarily industrial, with one facility (a food processing plant) currently vacant.

Inriver sediment data do not indicate that the outfall is a significant pathway for contaminants to the river. However, because the basin includes sites with documented contamination, the City collected samples of stormwater and sediment from the Basin 53A conveyance system for purposes of basin screening and source tracing.

Source tracing focused on polychlorinated biphenyls (PCB) and zinc, which were detected at elevated concentrations in stormwater and storm solids samples from near the downstream end of the basin. Two sources of PCBs and metals have been identified within the basin and the City source investigations indicate that no additional source investigation is needed. Both these upland sites are in the DEQ Cleanup Program, are conducting stormwater source control evaluations, and have implemented source control measures (SCM) under DEQ oversight; one of these was redeveloped recently. Other sites in the basin are being controlled by stormwater permits or No Exposure Certifications. The City's most recent stormwater data from this basin indicate that overall contaminant contributions to the system have decreased during the course of the City's source investigation activities, likely as a result of the SCMs implemented at these sites.

The major sources of contaminants have been identified in this basin and the sites are implementing SCMs under DEQ oversight. Therefore, the City has met the remedial investigation (RI)/SCM objectives for Basin 53A.

2 Introduction

This Completion Summary presents a weight-of-evidence evaluation of whether further source investigation is needed in Basin 53A, and the rationale for concluding that current and future discharges from the basin are not likely to be significant sources of contaminants to river sediment. The purpose of this report is to demonstrate that the City has met the RI/SCM objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ. The City and DEQ have identified all major sources of contaminants to the basin and are using their respective authorities to ensure that source controls are implemented where needed.

This report is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report), which provides additional background and detail regarding the City's harborwide source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Outfall 53A discharges to the east side of the Willamette River near River Mile 2.7. The current drainage area for Basin 53A is approximately 73 acres, located within the Rivergate area. The conveyance system was constructed by the Port of Portland in 1970 as a storm-only drainage system, and the basin expanded through the early 1980s as industrial sites in the area developed and connected to the system. The conveyance system drains industrial properties adjacent to N. Ramsey Blvd. and N. Rivergate Blvd. Redevelopment activities at one of these properties (EVRAZ/Oregon Steel) in 2005, resulted in removal of approximately 7 acres of active industrial land from the Basin 53A drainage area. Figure 1 shows the location of Outfall 53A and current drainage basin boundary, and provides an overview of the associated stormwater conveyance system. For additional detail, refer to the *Outfall Basin 53A Source Investigation Report* (BES, 2012).

3.2 Land Use and Potential Upland Sources

Basin 53A is located in the South Rivergate Industrial Park. Before the Industrial Park was developed, this area was used for placement of dredge material from the Willamette and Columbia Rivers. Fill placement began as early as the 1920s (Bureau Veritas, 2009) and continued periodically throughout the 1960s (Port of Portland, 1968). The land in Basin 53A is zoned heavy industrial, as shown in Figure 1, and current land uses are predominantly industrial. Industrial operations in the basin include a steel manufacturing facility, liquid and dry bulk products transfer facility, bulk fertilizer marine terminal, machine shop, and concrete casting facility. Another site (a former food processing plant) is currently vacant, but is expected to be redeveloped for industrial purposes. In addition to the industrial operations, one site in the basin is under commercial use (credit union).

Sites that were identified as potential sources include the three sites in the basin that are in the DEQ Cleanup Program, as listed in DEQ's Environmental Cleanup Site Information (ECSI) database. Table 1 lists these sites and indicates the associated contaminants of interest (COI)

and status of stormwater pathway evaluations. Of these three sites, two currently are conducting stormwater pathway evaluations under DEQ oversight.

Table 1. DEQ Cleanup Program Sites in Basin 53A

DEQ Cleanup Program Site ⁽¹⁾	Site COIs ⁽²⁾	Site Pathway Evaluations	
		Stormwater Pathway ⁽³⁾	Preferential Groundwater Pathway ⁽⁴⁾
Consolidated Metco - Rivergate Facility (ECSI #3295)	PAHs, TPH, PCBs, VOCs, metals, phthalates	Source Control Evaluation In Progress	Source Control Evaluation Completed - Source Control Determination Pending
Oregon Steel Mills - Rivergate (ECSI #141)	PCBs, metals	Source Control Evaluation In Progress	Source Control Evaluation in Progress
JR Simplot Company (ECSI #3343)	TPH ⁽⁵⁾	Need for Source Control Evaluation to be Determined/Low Priority	Need for Source Control Evaluation to be Determined/Low Priority ⁽⁶⁾

Notes:

PAHs = polycyclic aromatic hydrocarbons; TPH = total petroleum hydrocarbons; VOCs = volatile organic compounds; COIs = contaminants of interest; ECSI = Environmental Cleanup Site Information; PCBs = polychlorinated biphenyls; DEQ = Oregon Department of Environmental Quality

(1) In addition to the sites listed, the ECSI database also lists the South Rivergate Industrial Park (ECSI #2980) as within the basin boundary. This is a general study area designation that includes many non-DEQ Cleanup Program properties (including outside of Basin 53A), and, therefore, is not listed as a distinct Cleanup Program site in this table.

(2) Unless otherwise noted, site COIs are those identified in Appendix Q (Source Control Inventory Tables) of the Portland Harbor RI/FS Draft Feasibility Study (FS) (Anchor et al., 2012).

(3) Source: DEQ Milestone Report, Figure 1b, "Status of Stormwater Source Control Evaluations, January 2013" (DEQ, 2013).

(4) Unless otherwise noted, source is DEQ Milestone Report, Figure 3, "Groundwater Source Control Evaluation Status, January 2013" (DEQ, 2013). It is not known whether the groundwater source control evaluations considered the preferential pathway to the City stormwater conveyance system.

(5) COIs are not listed for this site in Appendix Q of the Draft FS (Anchor et al., 2012) or Table 4.2-2 of the Draft Final RI report ((Integral Consulting et al., 2011). COIs listed here for this site are based on information in DEQ's ECSI database (DEQ, 2002).

(6) Based on site stormwater source control evaluation status as indicated in Figure 1b in DEQ Milestone Report (DEQ, 2013). It is not known whether this status reflects consideration of the preferential pathway to the City stormwater conveyance system.

Industrial sites covered, or historically covered, by National Pollutant Discharge Elimination System (NPDES) stormwater regulations also were considered as potential contaminant sources to the City conveyance system. Five industrial sites currently hold, or historically held, NPDES permits to discharge to the Basin 53A conveyance system; these sites are listed in Table 2. Sites with current NPDES permits are shown in Figure 1. Note that the City operates under an NPDES Municipal Separate Storm Sewer System (MS4) stormwater permit that also covers basin drainage areas.

Table 2. Current⁽¹⁾ and Historical NPDES Permit Coverage in Basin 53A

Address	Company	Permit Type	Time Period
10001 N Rivergate	Steinfelds Products Co.	Cooling Water (100J)	1990 – 2001
		Stormwater (1200-F)	1992 – 1996
		Stormwater (1200-Z)	1997 – 2002
	Tree House Products	Stormwater (1200-Z)	2002 – 2005
	Bay Valley Foods, LLC	Stormwater (1200-Z)	2005 – 2008
13940 N Rivergate	Consolidated Metco Inc.	Stormwater (1200-H)	1992 – 1996
		Stormwater (1200-Z)	1997 – 2008
	Archer Daniels Midland Co.	Stormwater (1200-Z)	2013 – Present
14003 N Rivergate	Unocal Chemicals Division	Cooling Water (100J)	1996 – 2001
	Unocal Chemicals Division /PRODICA LLC/ Agrium US Inc. ⁽²⁾	Stormwater (1200-Z)	1997 – 2000
	JR Simplot Company	Stormwater (1200-Z)	2000 - Present
14025 N Rivergate	H.B. Fuller	Stormwater (1200-H)	1992 – 1995
14400 N Rivergate	Oregon Steel Mills, Inc.	Stormwater (1200-H)	1992 – 1996
	Oregon Steel Mills, Inc.	Stormwater (1200-Z)	1997 – 2002
	EVRAZ Oregon Steel Mills	Stormwater (1200-Z)	2002 – 2008
	EVRAZ, Inc., NA	Stormwater (1200-Z)	2008 – Present

Notes:

NPDES = National Pollutant Discharge Elimination System

(1) Current permits are indicated in bold.

(2) Name changed from Unocal Chemicals Division to PRODICA LLC (both were subsidiaries of Union Oil Co.) then to Agrium and finally JR Simplot.

3.3 Outfall Setting

Several private outfalls (as well as industrial dock/berth structures) are located upstream and downstream of Outfall 53A. The private outfalls and Outfall 53A discharge within a river reach identified by the U.S. Environmental Protection Agency (EPA) as an area of potential concern (AOPC 1) for PCBs, certain metals, and other contaminants (EPA, 2010).

4 Basin Screening and Source Investigations

The reach of river where Outfall 53A is located was incorporated into the Portland Harbor Superfund Site expanded study area in 2006. The City subsequently initiated investigations to identify and evaluate potential contaminants and sources in the basin.

In June 2005, the City investigated inline solids in a lateral connection from the EVRAZ site because site information indicated that PCBs were present in surface and subsurface soils (BES, 2005; Exponent, 2003). In July 2005, the City investigated dry-weather flow¹ in the basin to identify potential sources of mercury detected in a dry-weather flow sample collected in the basin by the City's Illicit Discharge Elimination Program in September 2002 (BES, 2005).

The City subsequently deployed sediment traps in the three branches of the Basin 53A conveyance system and at a downstream sampling location (representing all collective discharges to the system), and collected inline solid samples at targeted locations, to evaluate potential sources of metals and PCBs in the basin. These source investigation activities are described in detail in the *Outfall Basin 53A Source Investigation Report* (BES, 2012). The City also collected stormwater samples from the downstream sampling location as part of its Portland Harbor stormwater screening effort (BES, 2010). The stormwater samples were analyzed for a broad suite of analytes to identify stormwater contaminants potentially warranting further source tracing in the basin. Additional stormwater samples subsequently were collected for purposes of evaluating SCM effectiveness in the basin (BES, 2012). The results of these investigations, together with available information from the upland sites in the basin, were evaluated to identify the major sources of contaminants to Outfall 53A and determine the need for additional source controls.

Based on evaluation of the stormwater screening data, contaminants identified as potentially needing source tracing included PCBs and zinc (BES, 2010). Results of the source tracing investigations (i.e., sediment trap and inline solids sampling and review of upland site data) indicated stormwater discharges from two sites in the DEQ Cleanup Program (EVRAZ and ConMetco) likely represented the major sources to the basin. The City also identified other potential sources and pathways for the basin, including other sites in the basin, vehicle drag-out from industrial sites, air deposition, and the fill material underlying the basin. However, there was no evidence to indicate that any of these other potential sources are major contributors of contaminants to the conveyance system (BES, 2012).

Table 3 lists investigations completed by the City in the Basin 53A conveyance system.

¹ "Dry-weather flow" is defined as non-stormwater flows from various sources including, but not limited to diverted stream flow, groundwater infiltration, and approved or permitted discharges (e.g., remediated groundwater, structure dewatering, and non-contact cooling water).

Table 3. Investigations in the Basin 53A Stormwater Conveyance System

Data Collection Period	Party	Purpose	Documentation
2005	City	Evaluate inline solids and dry-weather flow to identify potential sources of PCBs and mercury.	Dry-Weather Flow and Inline Solids Sampling, City Outfall Basin 53A Stormwater Conveyance System (BES, 2005)
2005	City	Evaluate existing data on groundwater plumes and identify the potential for City conveyance systems (including Basin 53A) to act as preferential pathways.	Relationships Between Upland Shallow Groundwater Plumes and the City Stormwater and Combined Conveyance System with the Portland Harbor (GSI, 2006)
2008	City	Evaluate stormwater data from City outfalls to identify additional source tracing needs.	Stormwater Evaluation Report, City of Portland Outfall Project (BES, 2010)
2008 – 2010	City	Evaluate inline solids and stormwater data (together with upland site data) to identify possible current sources of basin-specific contaminants that may be discharging to the Willamette River via Outfall 53A and determine whether additional source identification is needed.	Outfall Basin 53A Source Investigation Report (BES, 2012)

Notes:

PCBs = polychlorinated biphenyls

5 Completion of Source Identification

The lines of evidence evaluated to confirm that source tracing is complete and all major sources have been identified include (1) inriver sediment concentrations, (2) results of source investigation activities conducted in the basin (and upland site information), and (3) stormwater data for the outfall. Findings from this evaluation are summarized below.

- *Inriver Sediment Concentrations:* Review of the magnitude and spatial distribution of contaminant concentrations in inriver sediment from upstream, adjacent to, and downstream of Outfall 53A indicates that the outfall is not a significant pathway for conveying contaminants to the Willamette River (BES, 2012). Concentrations adjacent to the outfall were either similar to or lower than upstream concentrations. This finding is consistent with patterns depicted on maps included in the Lower Willamette Group's remedial investigation report (Integral et al., 2011) that show results of a spatial analysis of concentrations of identified indicator chemicals within the Portland Harbor study area; these maps do not show elevated concentrations distributed in a manner that would indicate Outfall 53A is a significant pathway of any of the identified constituents of concern within AOPC 1.
- *Source Tracing Results:* Sources of all contaminants selected for source tracing have been identified. PCBs and zinc have been detected at the two active DEQ Cleanup Program sites in the basin at concentrations considerably higher than those detected in the Basin 53A conveyance system. These sites likely represented the major potential sources of PCBs and zinc to the system. BES Industrial Stormwater Program records indicate that

the JR Simplot site had occasional NPDES benchmark exceedances for zinc in the past, but that, through implementation of best management practices as part of the site's general stormwater permit, the site has demonstrated sufficient reductions to receive a monitoring waiver in 2010. Source tracing activities and a review of the historical and current uses of the other properties in the basin do not indicate that there are currently other major sources within the basin (BES, 2012).

- *Outfall 53A Stormwater Data:* Post-SCM monitoring data collected by the DEQ Cleanup Program sites to date (Bureau Veritas, 2012; AECOM, 2011, 2012) and results of follow-up stormwater sampling conducted by the City in 2010 (BES, 2012) indicate the SCMs are controlling upland site discharges of contaminants to the Basin 53A conveyance system. A comparison of the 2008 and 2010 stormwater data collected to represent the basin showed that contaminant concentrations were up to an order-of-magnitude lower in 2010; Table 4 presents a comparison of the 2008 and 2010 stormwater analytical results for metals and PCBs. PCBs and metal concentrations in the City's 2010 stormwater samples are within the lower range of Portland Harbor stormwater concentrations (DEQ, 2010).

Table 4. Comparison of 2008 and 2010 Stormwater Data for Basin 53A – Metals and PCBs Concentrations

Analyte ⁽¹⁾	2008 Geometric mean ⁽²⁾	2010 ⁽³⁾
Total PCBs (µg/L)	0.0370	0.000278 NJ
Arsenic (mg/L)	4.46	0.69
Cadmium (mg/L)	0.36	0.14
Chromium (mg/L)	42	12
Copper (mg/L)	23.1	7.97
Lead (mg/L)	16.2	4.24
Mercury (mg/L)	0.030	0.007
Nickel (mg/L)	5.82	2.13
Silver (mg/L)	0.13 ⁽⁴⁾	<0.01
Zinc (mg/L)	459	337

Notes:

mg/L = milligrams per liter; µg/L = micrograms per liter; NJ = tentatively identified and estimated, only one congener detected, which is unlikely to occur; PCBs = polychlorinated biphenyls

(1) Total metal and total PCB congener concentrations are reported.

(2) Stormwater Evaluation Report (BES, 2010).

(3) See Table 6 in Outfall Basin 53A Phase 1 and Source Investigation Report (BES, 2012).

(4) Three samples were non-detect and one detect at 0.17 mg/L.

Based on these lines of evidence, the City concludes that Basin 53A source tracing is complete and all major sources have been identified.

6 Basin Source Controls

The City and DEQ collaborated under their respective authorities to identify control mechanisms for all major sources identified in the basin. Source control for major and minor sources in Basin 53A includes ongoing City and DEQ programs that are described in the Municipal Report and SCMs completed (or planned) at contaminated sites under DEQ Cleanup Program agreements. Source controls implemented in Basin 53A are displayed in Figure 2 and summarized in this section.

One type of programmatic source control is elimination of stormwater exposures to industrial activities. Table 5 lists sites that hold, or historically held, an NPDES No Exposure Certifications.

Table 5. Sites with No Exposure Certification (NEC) in Basin 53A⁽¹⁾

Address	Company	NEC Time Period
9625 N Ramsey	Macro Manufacturing Company	2000 – Present
14025 N Rivergate	H.B. Fuller	1995 – 1999
	High-Temp, Inc.	2001 – Present

Notes:

(1) Current NECs are indicated in bold.

Additional site-specific and programmatic source controls for Basin 53A are summarized in Table 6.

Table 6. Basin 53A Source Controls

Site/Area	Source Controls	Timeframe/Status
Source Control Measures (SCM) at DEQ Cleanup Program Sites ⁽¹⁾		
Consolidated Metco – Rivergate Facility (ECSI #3295)	Cleanout of the onsite stormwater lines, and lining of a portion of the onsite conveyance system.	2009
	Site redevelopment by Archer-Daniels Midland included replacement of portions of the site stormwater conveyance system, demolition of former foundry facilities and installation of a stormwater treatment system.	2013
JR Simplot Company (ECSI #3343)	Not needed ⁽²⁾	NA
Oregon Steel Mills – Rivergate (ECSI #141)	Removal of approximately 7 acres of active industrial land from the Basin 53A drainage area as part of site redevelopment.	2005
	Routing of all stormwater runoff that drains to Basin 53A (except roof runoff from the pipe mill) through a sand filter or bioswale, line cleaning, and implementation of measures reducing potential for erosion/tracking of contaminated surface soil (e.g., soil removal and targeted paving of some areas).	2006 - 2007
Other (Programmatic Source Controls)⁽³⁾		
High-Temp, Inc., Archer-Daniels Midland, EVRAZ Oregon Steel Mills	Stormwater Management Manual Requirements	Ongoing
See listing in Table 2	NPDES 1200-Z Stormwater Permit Requirements	Ongoing
See listing in Table 4	No Exposure Certifications	Ongoing

Notes:

DEQ = Oregon Department of Environmental Quality; NPDES = National Pollutant Discharge Elimination System; NA = not applicable

(1) For upland sites, descriptions of SCMs are based on information in DEQ Milestone Report (DEQ, 2013), DEQ source control decisions, and/or reports on file with DEQ.

(2) DEQ has determined that a source control evaluation is not needed or is a low priority at this site (DEQ, 2013).

(3) Programmatic source controls are described in the Municipal Report.

Other municipal programs (e.g., periodic inspection of and technical assistance to non-NPDES sites, illicit discharge monitoring, street sweeping, etc.) likely provide additional source control benefits in the basin and will help to address minor sources for which specific control measures have not been required. City programs that control current and future contaminant discharges to the conveyance system are described in the Municipal Report.

7 Conclusion

The City completed source tracing in Basin 53A and identified the major sources of contaminants to the City conveyance system. Because necessary SCMs at the identified sources have been implemented or are being determined under appropriate DEQ and City regulatory authorities, future discharges from Outfall 53A are unlikely to represent a significant source of contaminants to the river. The City concludes that it has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin 53A.

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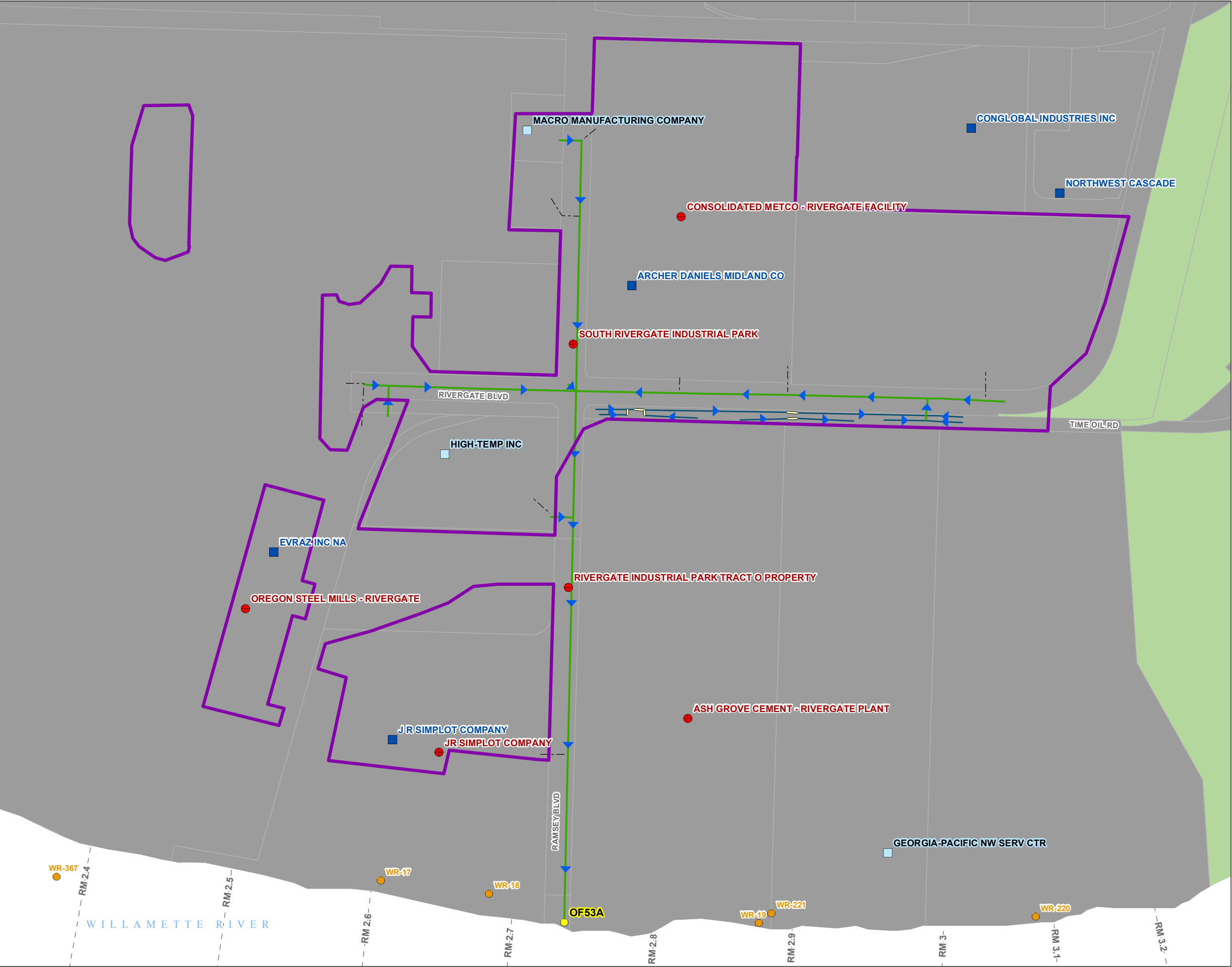
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List of Figures

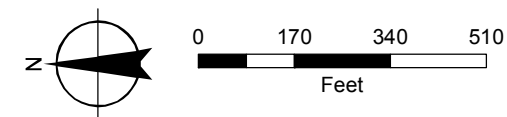
Figure 1: Basin 53A Overview

Figure 2: Basin 53A Upland Site Source Controls

FIGURE 1
Basin 53A
Overview

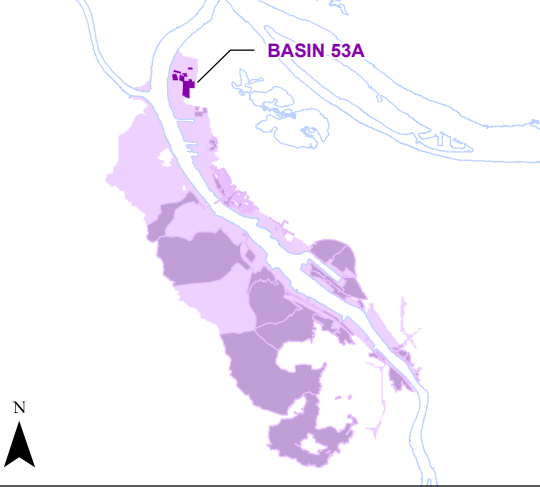


- Basin 53A
- DEQ ECSI Site
- NPDES Stormwater Permit
- NPDES No Exposure Certification
- Conveyance System**
 - Storm Line
 - Culvert
 - Ditch
 - Site Connection
 - City Outfall
 - Non-City Outfall
- Land Use/Zoning**
 - Heavy Industrial
 - Parks and Open Space
- All Other Data**
 - River Mile (RM)
 - Tax Lot
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: December 31, 2012
Data Sources: BES, METRO

 ENVIRONMENTAL SERVICES
CITY OF PORTLAND
1120 SW Fifth Avenue, Room 1000
Portland Oregon, 97204-1912



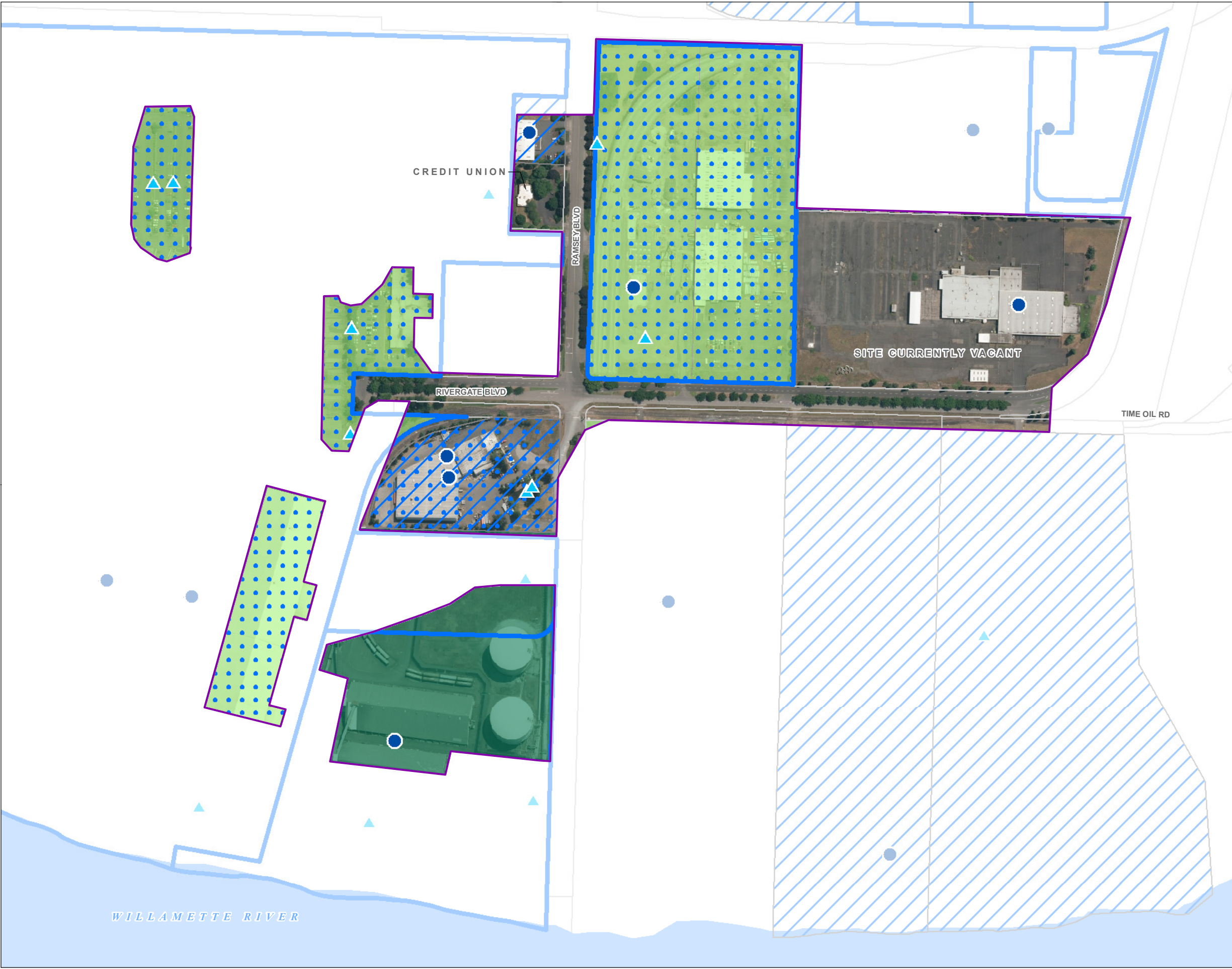
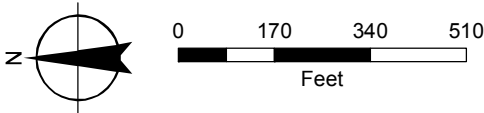


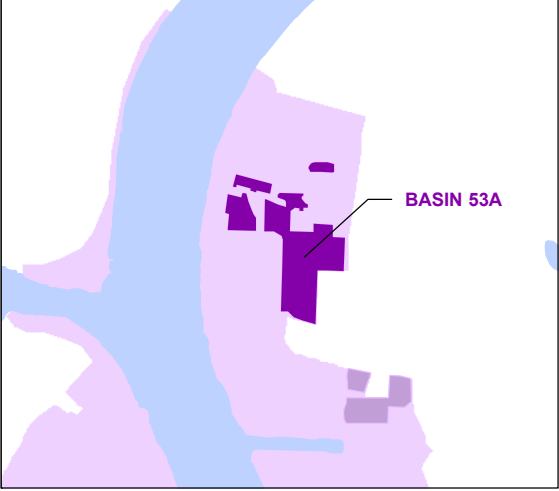
FIGURE 2
Basin 53A
Upland Site Source Controls

- Basin 53A
- Tax Lot
- DEQ Stormwater SCEs**
 - SCE implemented or pending
 - SCE not needed or low priority
- All Other Features**
 - NPDES Stormwater Discharge Permit
 - NPDES No Exposure Certification
 - >50% of Site Area Redeveloped Under City SWMM
 - Stormwater Treatment Facility
 - Site Inspection - BES Industrial Stormwater Program
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO, Aerial Photo Taken 2012

ENVIRONMENTAL SERVICES
CITY OF PORTLAND
1120 SW Fifth Avenue, Room 1000
Portland Oregon, 97204-1912



Completion Summary for City of Portland Outfall Basin M-1

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and several City programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled. This report summarizes the results of this collaborative effort in Outfall Basin M-1.

This Completion Summary includes a weight-of-evidence evaluation to demonstrate that source identification is complete and a summary of source controls (implemented or planned) that will control future contaminant discharges to the Willamette River.

Basin M-1 is located on the east side of the Willamette River in the Mocks Bottom area, along the east bank of the Swan Island Lagoon. Industrial development in this area was fairly recent (roughly the late-1960s to mid-1990s) and sites typically paved operational areas during initial development, so this area does not have a similar history of legacy contamination that has been observed in some of the older industrial areas in the harbor. This basin was one of two basins used by the City and DEQ to pilot different approaches to a conveyance system source investigation. Evaluation of inriver sediment data near the outfall indicated the presence of sediment contamination in the vicinity of the outfall, prompting the City to evaluate whether there may be major sources in the basin. The City conducted source tracing within the basin for a broad array of contaminants and subsequently narrowed the source tracing focus to polychlorinated biphenyls (PCB) based on source tracing results and on an evaluation of stormwater and storm solids samples from the downstream end of the basin.

Source investigation activities in Basin M-1 included inspection of all facilities, sampling in specific branches of the system where sources were suspected, and coordination with DEQ and the U.S. Environmental Protection Agency (EPA) on identified contaminated sites in the basin. Work also included evaluation of contaminant discharges via the dry-weather flow pathway. The City identified one site as a current source of PCBs and other contaminants to the basin and a second site as a potential source of other contaminants. Both sites are conducting investigations under DEQ Cleanup Program authority and are implementing source control measures (SCM) under DEQ oversight. Evaluation of a third site is pending under EPA authority. The majority of the industrial sites within the basin are conducting or have completed investigations under DEQ Cleanup Program authority, have been remediated, are covered by the DEQ Stormwater Quality Program, and/or have been redeveloped under the City's Stormwater Management Manual. Ongoing SCM implementation at the two identified sources, together with current and future source control programs in the basin, are expected to provide necessary source control for Outfall M-1 discharges.

The City has identified the major sources of contaminants to the basin and necessary controls are being implemented under EPA, DEQ, and/or City authority. Therefore, the City has met the remedial investigation (RI)/SCM objectives for Basin M-1.

2 Introduction

This Completion Summary presents a weight-of-evidence evaluation of whether further source investigation is needed in Basin M-1, and the rationale for concluding that current and future discharges from the basin are not likely to be significant sources of contaminants to river sediment. The purpose of this report is to demonstrate that, for Basin M-1, the City has met the joint RI/SCM objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ. Together, the City and DEQ identified all major sources of contamination to the basin and are using their respective authorities to ensure that source controls are implemented where needed.

This report is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report), which provides additional background and detail regarding the City's harborwide source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Outfall M-1 discharges to the Swan Island Lagoon on the east side of the Willamette River at approximately River Mile 8.5. The drainage area for the Basin M-1 conveyance system is approximately 162 acres. Figure 1 shows the location of the outfall and drainage basin boundary and provides an overview of the associated stormwater conveyance system.

Additional detail on the Outfall M-1 stormwater conveyance system and associated drainage basin is included in the *Phase 1 Data Evaluation Report and Phase 2 Work Planning for the City of Portland Outfall M-1* (CH2M HILL, 2003).

3.2 Land Use and Potential Upland Sources

Basin M-1 is located in the Mocks Bottom industrial area. The basin is zoned as light industrial and primarily is composed of transportation-related activities (e.g., warehousing and trucking) (see Figure 1). There is one facility that has heavy industrial land use; it conducts truck manufacturing. Tax lots in the Mocks Bottom area tend to be large and are dominated by warehouses, parking, and loading areas.

Sites that were identified as potential sources include four sites in the basin that are in the DEQ Cleanup Program, as listed in DEQ's Environmental Cleanup Site Information (ECSI) database. Table 1 lists these sites and indicates the associated contaminants of interest (COI) and the status of stormwater pathway evaluations. Stormwater pathway evaluations are in progress under DEQ oversight at two sites: the Freightliner – Truck Manufacturing Plant and Fred Devine Diving and Salvage Co. EPA is slated to provide oversight for the evaluation of a third

site (U.S. Navy and Marine Reserve Center). DEQ determined that a stormwater pathway evaluation at the remaining ECSI site either is not needed or is a low priority.

Table 1. DEQ Cleanup Program Sites in Basin M-1

DEQ Cleanup Site	Site COIs ⁽¹⁾	Site Pathway Evaluations	
		Stormwater Pathway ⁽²⁾	Preferential Groundwater Pathway ⁽³⁾
Freightliner – Truck Manufacturing Plant (ESCI #2366)	PAHs, PCBs, metals, phthalates	Source Control Evaluation in Progress	Source Control Evaluation in Progress
Fred Devine Diving and Salvage Co. (ESCI #2365)	SVOCs, PAHs, TPH, metals, phthalates	Source Control Evaluation in Progress	Source Control Evaluation Completed – Source Control Determination Pending
Roadway Express (ESCI #3807)	TPH	Need for Source Control Evaluation to be Determined / Low Priority	Source Control Decision Complete ⁽⁴⁾
U.S. Navy and Marine Reserve Center (ESCI #5109) ⁽⁵⁾	Not listed ⁽⁶⁾	Source Control Evaluation Needed	To Be Determined EPA Source Control Lead

Notes:

PAHs = polycyclic aromatic hydrocarbons; SVOCs = semivolatile organic compounds; TPH = total petroleum hydrocarbons; COIs = contaminants of interest; DEQ = Oregon Department of Environmental Quality; PCBs = polychlorinated biphenyls; ECSI = Environmental Cleanup Site Information; EPA = U.S. Environmental Protection Agency

- (1) Unless otherwise noted, site COIs are those identified in Appendix Q (Source Control Inventory Tables) of the Portland Harbor RI/FS Draft Feasibility Study (FS) (Anchor et al., 2012).
- (2) Source: DEQ Milestone Report, Figure 1b, “Status of Stormwater Source Control Evaluations, January 2013” (DEQ, 2013a).
- (3) Source: DEQ Milestone Report, Figure 3, “Groundwater Source Control Evaluation Status, January 2013” (DEQ, 2013a).
- (4) It is not known whether the source control decision considered the preferential pathway to the City stormwater conveyance system.
- (5) Site evaluation is pending under EPA authority.
- (6) Site is not listed in Appendix Q of the draft FS or Table 4.2-2 of the Portland Harbor RI/FS Draft Final Remedial Investigation Report (Integral et al., 2011), and site COIs are not listed in ECSI database.

Industrial sites covered, or historically covered, by National Pollutant Discharge Elimination System (NPDES) stormwater regulations also were considered as potential sources of pollutants to the City conveyance system. Table 2 lists sites within the basin that currently hold, or historically had, NPDES permits to discharge to the Basin M-1 conveyance system. Figure 1 shows sites with current NPDES permits. Note that the City operates under an NPDES Municipal Separate Storm Sewer System (MS4) stormwater permit that also covers basin drainage areas.

Table 2. Current⁽¹⁾ and Historical NPDES Permit Coverage in Basin M-1

Address	Company	Permit Type	Time Period
6936 N Fathom	Freightliner Truck Manufacturing Plant	Cooling Water (100J)	1992 - 2003
		Boiler Blowdown (500J)	1992 - 1995
		Washwater (1700J)	1993 - 1996
		Stormwater (1200-L)	1992 - 1996
		Stormwater (1200-Z)	1997 - 2008
	Western Star Truck Plant Portland LLC	Stormwater (1200-Z)	2008 - 2012
	Daimler Trucks North America	Stormwater (1200-Z)	2012 - Present
6707 N Basin	United Parcel Service	Stormwater (1200-T)	1995 - 1996
		Stormwater (1200-Z)	1997 - 2012
7000 N Cutter	Maletis Beverage Corp	Stormwater (1200-Z)	2002 - Present
6949 N Cutter	SIC Processing USA LP	Stormwater (1200-Z)	2009 - 2013
6845 N Cutter	Roadway Express	Stormwater (1200-Z)	1998 - 2009
	YRC Inc.	Stormwater (1200-Z)	2009 - Present
6840 N Cutter	Columbia Distributing Co.	Stormwater (1200-Z)	1998 - 2012
	Coho Distributing-Swan Island	Stormwater (1200-Z)	2012 - Present

Notes:

NPDES = National Pollutant Discharge Elimination System

(1) Current permits are indicated in bold.

3.3 Outfall Setting

Outfall M-1 discharges to an area of potential concern (AOPC 17b-Slip) identified by the EPA based on elevated concentrations of PCBs, pesticides, phthalates, PAHs, metals, and other contaminants in river sediment (EPA, 2010). In addition to Outfall M-1, four other City outfalls (Outfalls M-2, M-3, S-1, and S-2) and more than 50 non-City outfalls discharge to AOPC 17b-Slip.

Swan Island Lagoon is a sheltered off-channel area that generally is protected from natural disturbances, but anthropogenic disturbances, such as propwash, likely resuspends material into the water column. The pattern of sediment concentrations adjacent to the outfall may be influenced by more far-field sources (i.e., contaminated sediment from other portions of the lagoon resuspended and deposited in this area).

4 Basin Screening and Source Investigations

Source investigations in Basin M-1 represent a significant amount of coordination between the City and DEQ. The City's investigations in Basin M-1 started shortly after the 2000 listing of Portland Harbor and helped to shape DEQ's and the City's joint approach to future source investigation and control activities in other City basins. In 2001, DEQ and the City initiated a pilot project in Basin M-1 to develop an effective streamlined investigative process using DEQ and City authorities (CH2M HILL, 2002); results of this pilot project (CH2M HILL, 2003 and 2005) served as the basis for development of the 2003 IGA between DEQ and the City. As part of the Phase 1 of the pilot project, the City conducted comprehensive stormwater inspections at all sites in the basin and provided information to DEQ to better address site-specific stormwater pathway evaluations at DEQ Cleanup Program sites.

Following collection of inriver sediment samples in 2002 in the vicinity of the outfall and the basin assessment, the City conducted a second phase of the pilot study and investigated inline solids from the conveyance system in 2003 to identify potential source areas to the basin (CH2M HILL, 2005). The City identified Basin M-1 as a Priority 1 for additional source tracing based on elevated contaminant concentrations in the vicinity of the outfall (CH2M HILL, 2004). Priority 1 basins are considered the highest priority for identifying sources. The subsequent *Data Evaluation Report, Inline Solids in Basins M-1 and 18* (CH2M HILL, 2005) identified PCBs, PAHs, phthalates, dichlorodiphenyltrichloroethane (DDT), and metals (cadmium, chromium, copper, lead, and zinc) for source tracing.

In 2005, the City collected dry-weather flow samples to identify potential sources of metals detected during an Illicit Discharge Elimination Program dry-weather flow investigation in Basin M-1 in September 2002. The results of this investigation indicated that metals were being discharged from the Daimler Trucks North America facility (formerly Freightliner - Truck Manufacturing Plant) in dry-weather flow (BES, 2006).

In 2007, as part of the City's stormwater screening evaluation (BES, 2010a), the City collected stormwater samples from the most accessible location near the downstream end of the basin; this location excludes discharges from shoreline (and one upland) properties connected to the M-1 conveyance system. Additionally, the Lower Willamette Group (LWG) collected sediment trap and stormwater samples in 2007 in the upper northeastern branch of the basin to evaluate stormwater discharges from industrial land uses as part of its loading evaluation (Anchor and Integral, 2008). The City conducted a concurrent sediment trap investigation at that time (BES, 2008). Based on these evaluations and using a conservative screening approach, PCBs were the only contaminant identified as potentially warranting further source tracing in Basin M-1 because concentrations indicated the presence of a source(s) to the basin (BES, 2010a).

In 2009, following a review of data collected from the Freightliner stormwater conveyance system, the City collected inline solids samples to determine if the site was discharging PCBs and other contaminants to the City conveyance system. Additionally, in 2013, the City collected inline solids samples from the locations previously sampled in 2009 to evaluate whether results indicate an ongoing source to the river (BES, 2013). The results indicated that the site is a source of PCBs, metals, PAHs, and phthalates. A stormwater pathway evaluation is underway at the Daimler facility to identify onsite source areas and necessary controls (DEQ, 2013b). The Fred Devine Diving and Salvage Co. site also is in the process of investigating the stormwater

pathway under DEQ oversight, and EPA plans to evaluate the stormwater pathway at the U.S. Navy and Marine Reserve Center.

Data collected from other portions of the basin¹ and a review of facility operations within the basin did not indicate that other major contaminant sources were present, so the City determined that no further City source tracing in Basin M-1 was needed. Table 3 lists investigations and evaluations completed by the City and others in the Basin M-1 conveyance system.

Table 3. Investigations in the Basin M-1 Stormwater Conveyance System

Data Collection Period	Party	Purpose	Documentation
2000	City	Compile basin background information to identify potential sources.	Preliminary Evaluation of City Outfalls (Eastshore) (BES, 2000)
2002	City	Investigate inriver sediment quality in the vicinity of Outfall M-1 and develop recommendations for Phase 2 work to be conducted within the basin.	Phase 1 Data Evaluation Report and Phase 2 Work Planning for the City of Portland Outfall M-1 (CH2M HILL, 2003)
2002	City	Evaluate inriver sediment data near City outfalls to prioritize basins for source tracing.	Programmatic Source Control Remedial Investigation Work Plan (CH2M HILL, 2004)
2003	City	Investigate inline solids within the City's conveyance system and evaluate potential contaminant sources.	Data Evaluation Report, Inline Solids in Basin M-1 and 18 (CH2M HILL, 2005)
2005	City	Investigate dry-weather flow entering the City's stormwater conveyance system.	City Outfall Basin M-1 Dry Weather Flow Sampling Technical Memorandum (TM) (BES, 2006)
2005	City	Evaluate existing data on groundwater plumes and identify the potential for City conveyance systems (including Basin 18) to act as preferential pathways.	Relationships Between Upland Shallow Groundwater Plumes and the City Stormwater and Combined Conveyance System with the Portland Harbor (GSI, 2006)
2007	City	Evaluate stormwater data from City outfalls to identify additional source tracing needs.	Stormwater Evaluation Report, City of Portland Outfall Project (BES, 2010a)
2007	City	Investigate inline solids within the stormwater conveyance system.	Outfall Basin M-1 Sediment Trap Solids Investigation TM (BES, 2008)
2007	Lower Willamette Group (LWG)	Collect harborwide stormwater and sediment trap data to develop land use stormwater loading estimates for input to the inriver fate and transport model.	Portland Harbor RI/FS Round 3A and 3B Stormwater Data Report. Prepared for the LWG (Anchor and Integral, 2008)
2009	City	Investigate discharges to Basin M-1 from the Freightliner Truck Manufacturing Plant's Fathom Street outfall.	Outfall Basin M-1 Inline Solids Investigation TM (BES, 2010b)
2013	City	Conduct a follow up investigation of inline solids in the vicinity of the Freightliner Truck Manufacturing Plant's Fathom Street outfall to Basin M-1.	E-mail communication from BES to DEQ (BES, 2013)

¹ Note that given the system configuration, City source investigation data could not be collected downgradient of the Fred Devine Diving and Salvage Co. site connection to the basin.

Joint investigations by the City and DEQ resulted in the identification of major sources of PCBs and other contaminants in Basin M-1.

5 Completion of Source Identification

The lines of evidence evaluated to confirm that source tracing is complete and all major sources have been identified include (1) source investigation activities conducted in the basin (and upland site information) and (2) land use at remaining upland areas not undergoing DEQ Cleanup Program investigation or redevelopment. Findings from this evaluation are summarized below.

- *Source Tracing Results:* Upland sources of all contaminants selected for source tracing have been identified. The City's source investigations (BES, 2008, 2010b, and 2013) and an investigation conducted at the Freightliner – Truck Manufacturing Plant (ECSI #2366) confirmed that PCBs and other contaminants are present in stormwater solids at the site (Bridgewater, 2011). The City also determined that this site is a source of metals to Basin M-1 via dry-weather flow discharges to the basin (BES, 2006). Metals, PAHs, and phthalates also have been detected in stormwater solids at the Fred Devine Diving and Salvage Co. site (ECSI #2365) during investigation of the stormwater pathway (DEQ, 2012). Data collected from other portions of the basin and a review of facility operations in the basin did not indicate that other major contaminant sources were present.
- *Upland Investigation Coverage and Land Use:* Figure 2 displays the spatial extent of upland site investigations and other programmatic controls (see key to figures provided at beginning of this Appendix). As shown in Figure 2, the majority of the basin has been or is being investigated or likely does not need investigation given land use and existing controls. Sites in the basin:
 - Are or will be investigating the stormwater pathway and implementing SCMs under DEQ Cleanup Program or EPA authority;
 - Have been designated by DEQ as not needing a source control evaluation or as a low priority for completing a source control evaluation; and/or
 - Are covered under NPDES industrial stormwater regulations.

Land use at sites currently not covered by DEQ Cleanup or Water Quality Programs consist of parking areas and warehouse uses with minimal industrial exposures to stormwater. Current and future industrial activities exposed to stormwater will be addressed by the DEQ Water Quality NPDES Program, and non-industrial activities are not a known or suspected major source of contaminants to the City stormwater conveyance system.

Based on these lines of evidence, the City concludes that Basin M-1 source tracing is complete and all major sources have been identified.

6 Basin Source Controls

The City and DEQ collaborated under their respective authorities to identify control mechanisms for all major sources identified in the basin. Source control for major and minor sources in Basin M-1 includes SCMs completed (or planned) at contaminated sites under DEQ Cleanup Program or EPA agreements and ongoing City and DEQ programs that are described in the Municipal Report. Source controls implemented in Basin M-1 are displayed in Figure 2 and summarized in this section.

One type of programmatic source control is the elimination of stormwater exposures to industrial activities. Table 4 lists sites that hold, or historically held, an NPDES No Exposure Certification.

Table 4. Sites with No Exposure Certification (NEC) in Basin M-1⁽¹⁾

Address	Company	NEC Time Period
6840 N Fathom	CAMCO Manufacturing Inc.	1999 - Present
	Xpress Global Systems	2013 - Present
6645 N Ensign	Kool Pak Distribution	2000 - 2005
6650 N Basin	Kent Moving Systems	2003 - 2013
6707 N Basin	United Parcel Service	2012 - Present
6458 N Basin	Parker Hannifin Corp-Connector Div	2000 - Present
6310 N Basin	Swift Transportation	2003 - 2008
6211 N Ensign	Sternwheeler Rose	2000 - 2005

Notes:

(1) Current NECs are indicated in bold.

Table 5 summarizes additional site-specific, programmatic, and conveyance system source controls completed to date for Basin M-1.

Table 5. Basin M-1 Source Controls

Site/Area	Source Controls	Implementation Timeframe
Source Control Measures (SCM) at DEQ Cleanup Program Sites ⁽¹⁾		
Freightliner – Truck Manufacturing Plant (ECSEI #2366)	Installation of stormwater filtration unit, coating the roof of the plant building, cleaning portions of the onsite stormwater lines and additional erosion control best management practices.	2003-2010
	Cleaning of N. Fathom St. outfall and lateral connection to the municipal system.	2013
Fred Devine Diving and Salvage Co. (ECSEI #2365)	To be determined	To be determined
Roadway Express (ECSEI #3807)	Not needed ⁽²⁾	NA
U.S. Navy and Marine Reserve Center (ECSEI #5109) ⁽³⁾	To be determined	To be determined
City Conveyance System		
Ensign Street to Outfall	The City system between the Freightliner site connection to N. Ensign Street and the outfall was cleaned following a release from the Freightliner facility to the river.	2006
Fathom Street	Freightliner cleaned a portion of the Fathom Street line in response to a fuel release to the river via the City system.	2009
	Western Star (formerly Freightliner) cleaned a portion of the Fathom Street line following cleaning of the site lateral connection to the municipal system.	2013
Other (Programmatic Source Controls)⁽⁴⁾		
Roadway Express, United Parcel Service	Stormwater Management Manual Requirements	Ongoing
CAMCO Manufacturing, Tube Service Company, United Parcel Service, Xpress Global System	City Discharge Authorizations⁽⁵⁾	Ongoing
See listing in Table 2	NPDES 1200-Z Stormwater Permit Requirements	Ongoing
See listing in Table 4	NPDES No Exposure Certifications	Ongoing

Notes:

DEQ = Oregon Department of Environmental Quality; NPDES = National Pollutant Discharge Elimination System; NA = not applicable; ECSEI = Environmental Cleanup Site Information

- (1) For upland sites, descriptions of SCMs are based on information in DEQ Milestone Report (DEQ, 2013a), DEQ source control decisions, and/or reports on file with DEQ.
- (2) DEQ has determined that a source control evaluation is not needed or is a low priority at this site (DEQ, 2013a).
- (3) Evaluation of SCMs is pending under U.S. Environmental Protection Agency (EPA) authority.
- (4) Programmatic source controls are described in detail in the Municipal Report.
- (5) Additional site-specific stormwater pollution controls required and implemented under City Code.

All major contaminant sources have been controlled or will be controlled after implementation of SCMs has been completed under the programs identified above.

Other municipal programs (e.g., periodic inspection of and technical assistance to non-NPDES sites, illicit discharge monitoring, street sweeping, etc.) likely provide additional source control benefits in the basin and will help to address minor sources for which specific control measures have not been required. City programs that control current and future contaminant discharges to the conveyance system are described in the main text of the Municipal Report.

7 Conclusion

The City completed source tracing in Basin M-1 and identified the major and potential sources of contaminants to the City conveyance system. Because necessary SCMs at the identified sources have been implemented or are being determined under appropriate EPA, DEQ, and City regulatory authorities, future discharges from Outfall M-1 are unlikely to represent a significant source of contaminants to the river. However, given the sensitive nature of the lagoon, the City will continue to look for opportunities with existing and future City stormwater programs to reduce suspended solids loading from the basin to the river. The City concludes that it has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin M-1.

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List of Figures

Figure 1: Basin M-1 Overview

Figure 2: Basin M-1 Upland Site Source Controls

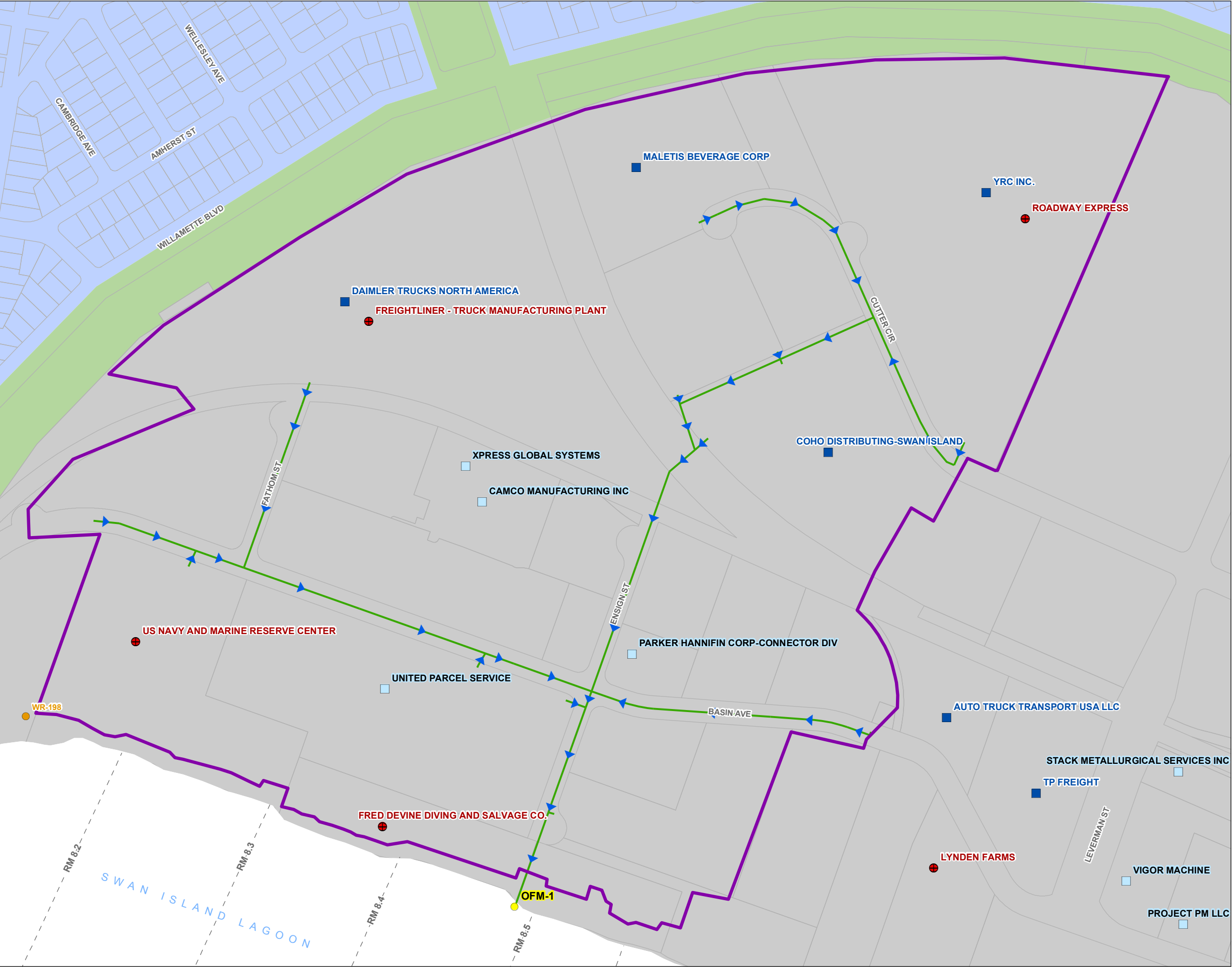


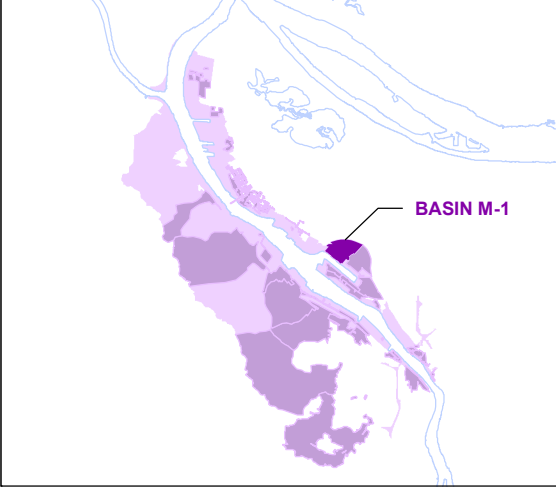
FIGURE 1
Basin M-1
Overview

- Basin M-1
- DEQ ECSI Site
- NPDES Stormwater Permit
- NPDES No Exposure Certification
- Conveyance System**
 - Storm Line
 - City Outfall
 - Non-City Outfall
- Land Use/Zoning**
 - Light Industrial
 - Residential
 - Parks and Open Space
- All Other Data**
 - River Mile (RM)
 - Tax Lot
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: January 9, 2014
Data Sources: BES, METRO

ENVIRONMENTAL SERVICES
CITY OF PORTLAND
1120 SW Fifth Avenue, Room 1000
Portland Oregon, 97204 -1912



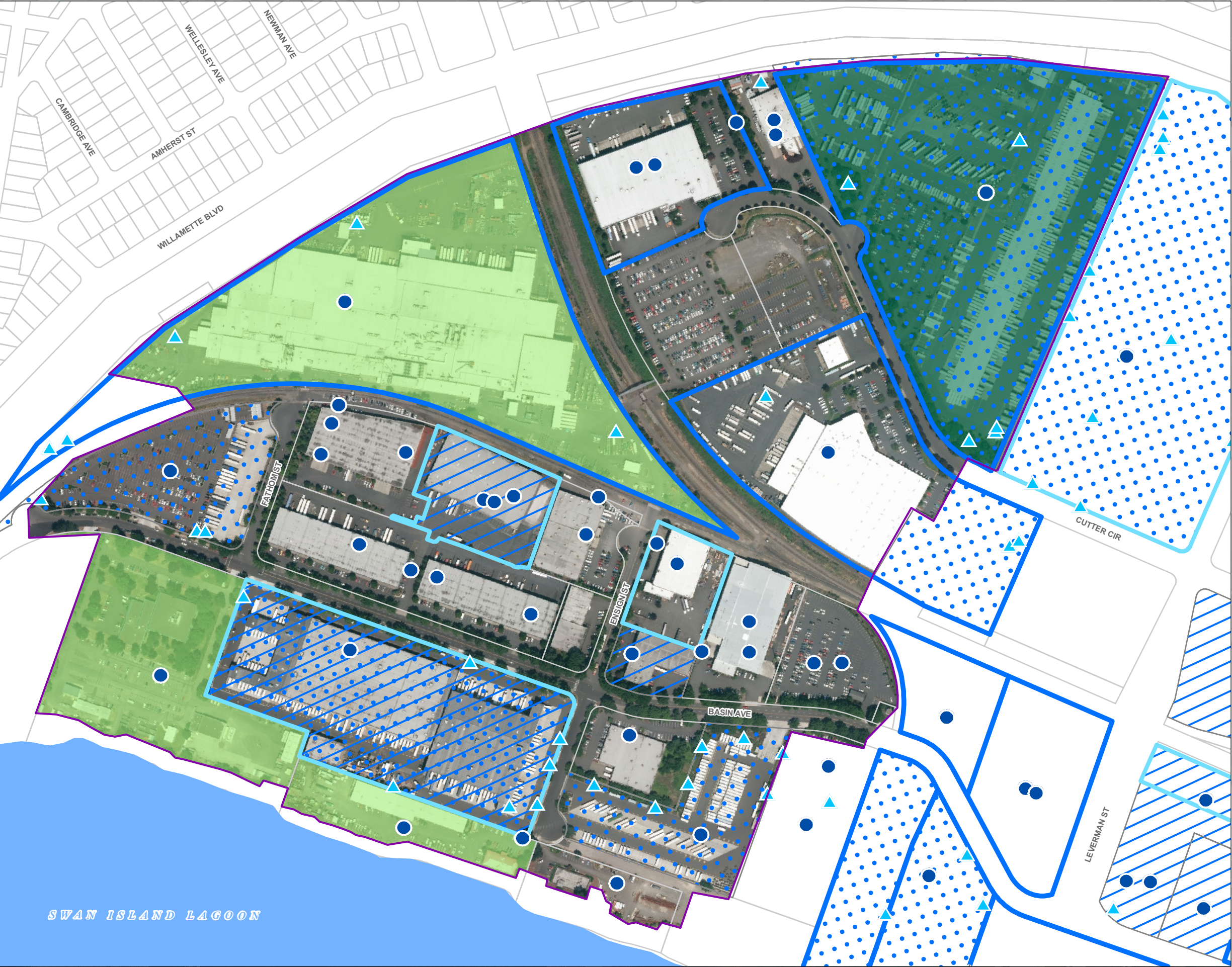


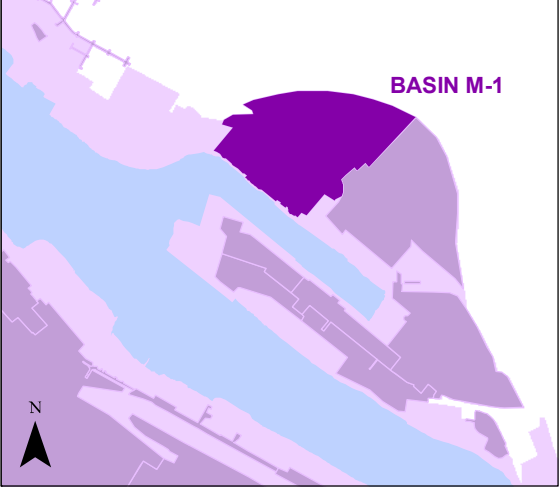
FIGURE 2
Basin M-1
Upland Site Source Controls

- Basin M-1
- Tax Lot
- DEQ/EPA Stormwater SCEs**
 - SCE implemented or pending
 - SCE not needed or low priority
- All Other Features**
 - NPDES Stormwater Discharge Permit
 - City Discharge Authorization
 - NPDES No Exposure Certification
 - >50% of Site Area Redeveloped Under City SWMM
 - Stormwater Treatment Facility
 - Site Inspection - BES Industrial Stormwater Program
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO, Aerial Photo Taken 2012

ENVIRONMENTAL SERVICES
CITY OF PORTLAND
1120 SW Fifth Avenue, Room 1000
Portland Oregon, 97204-1912



Completion Summary for City of Portland Outfall Basin M-2

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and several City programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled. This report summarizes the results of this collaborative effort in Outfall Basin M-2.

This Completion Summary includes a weight-of-evidence evaluation to demonstrate that source identification is complete and a summary of source controls (implemented or planned) that will control future contaminant discharges to the Willamette River.

Basin M-2 is located on the east side of the Willamette River in the Mocks Bottom area, near the east bank of the Swan Island Lagoon. Industrial development in this area was fairly recent (roughly the mid-1960s to mid-1990s) and sites typically paved operational areas during initial development, so this area does not have a similar history of legacy contamination that has been observed in some of the older industrial areas in the harbor. Evaluation of inriver sediment data did not indicate that the outfall is a significant pathway for contaminants to the Swan Island Lagoon. However, given the sensitive nature of the lagoon, the City investigated the basin dry-weather flow pathway and analyzed basin stormwater data to verify that additional source tracing was not needed.

Two DEQ Cleanup Program sites are located within the basin; DEQ determined that both sites are a low priority for completing stormwater source control evaluations. The City concludes that no further City source investigation is warranted in this basin, and that the current and future source control programs in the basin are expected to provide necessary source control for Outfall M-2 discharges. Therefore, the City has met the remedial investigation (RI)/source control measure (SCM) objectives for Basin M-2.

2 Introduction

This Completion Summary presents a weight-of-evidence evaluation of whether further source investigation is needed in Basin M-2, and the rationale for concluding that current and future discharges from the basin are not likely to be significant sources of contaminants to river sediment. The purpose of this report is to demonstrate that for Basin M-2 the City has met the joint RI/SCM objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ.

This report is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report), which provides additional background and detail regarding

the City's harborwide source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Outfall M-2 discharges to the Swan Island Lagoon on the east side of the Willamette River at approximately River Mile 8.8. The drainage area for the Basin M-2 conveyance system is approximately 135 acres. Figure 1 shows the location of the outfall and drainage basin boundary and provides an overview of the associated stormwater conveyance system.

Additional detail on the Outfall M-2 stormwater conveyance system and associated drainage basin is included in the *Programmatic Source Control Remedial Investigation Work Plan for the City of Portland Outfalls Project* (CH2M HILL, 2004).

3.2 Land Use and Potential Upland Sources

Basin M-2 is located within the Mocks Bottom industrial area. Tax lots in the Mocks Bottom area tend to be larger than in the older industrial areas, paved, and dominated by buildings, parking, and loading areas. Land use in the entire basin is light industrial (see Figure 1) with a majority of the properties being used for transportation-related activities (e.g., warehouse and trucking operations).

Sites identified as potential sources include the two sites in the basin that are in the DEQ Cleanup Program, as listed in DEQ's Environmental Cleanup Site Information (ECSI) database. Table 1 lists these sites and indicates the associated contaminants of interest (COI) and the status of stormwater pathway evaluations. DEQ has identified both sites as low priorities for conducting stormwater pathway evaluations. Contaminated soils were investigated and removed at the GI Trucking site; and at the Lynden Farms site, buildings were demolished and soils have been capped.

Table 1. DEQ Cleanup Program Sites in Basin M-2

DEQ Cleanup Program Site	Site COIs ⁽¹⁾	Site Stormwater Pathway Evaluations ⁽²⁾
GI Trucking (ECSI #1840)	Diesel and bunker oil ⁽³⁾	Need for Source Control Evaluation to be Determined/ Low Priority
Lynden Farms (ECSI #4461)	Heavy oil, PCBs ⁽⁴⁾	Need for Source Control Evaluation to be Determined/ Low Priority

Notes:

DEQ = Oregon Department of Environmental Quality; ECSI = Environmental Cleanup Site Information; PCBs = polychlorinated biphenyls; COIs = contaminants of interest

(1) Because sites are not listed in Appendix Q (Source Control Inventory Tables) of the Portland Harbor RI/FS Draft Feasibility Study (FS) (Anchor et al., 2012) or Table 4.2-2 of the Portland Harbor RI/FS Draft Final Remedial Investigation Report (Integral et al., 2011), site COIs represent those listed in the DEQ ECSI database.

(2) Source: DEQ Milestone Report, Figure 1b, "Status of Stormwater Source Control Evaluations, January 2013" (DEQ, 2013).

(3) Source: DEQ ECSI database (DEQ, 1996).

(4) Source: DEQ ECSI database (DEQ, 2009).

Industrial sites covered, or historically covered, by National Pollutant Discharge Elimination System (NPDES) stormwater regulations also were considered as potential sources of pollutants to the City conveyance system. Table 2 lists sites within the basin that currently hold, or historically had, NPDES permits to discharge to the Basin M-2 conveyance. Figure 1 presents sites with current stormwater NPDES permits. Note that the City operates under an NPDES Municipal Separate Storm Sewer System (MS4) stormwater permit that also covers basin drainage areas.

Table 2. Current⁽¹⁾ and Historical NPDES Permit Coverage in Basin M-2

Address	Company	Permit Type	Time Period
5910 N Cutter	Oregon Transfer Company	Non-contact Cooling water (100J)	2000 – Present
6447 N Cutter	Roadway Package Service (RPS)	Stormwater (1200-Z)	1998 – 2000
	FedEx Ground Package System Inc.	Stormwater (1200-Z)	2000 – 2008
6840 N Cutter	Columbia Distributing Co.	Stormwater (1200-Z)	1998 –2012
	Coho Distributing-Swan Island	Stormwater (1200-Z)	2012 – Present
6220 N Basin	Dallas & Mavis Forwarding Co., Inc.	Stormwater (1200-T)	1994 – 1996
		Stormwater (1200-Z)	1997 – 1998
	Active USA, Inc.	Stormwater (1200-Z)	2002 – 2003
	Auto Truck Transport USA LLC	Stormwater (1200-Z)	2003 – Present
6100 N Basin	Action Express	Stormwater (1200-T)	1993 – 1996
		Stormwater (1200-Z)	1998 – 2002
	SAIA Motor Freight Line, Inc.	Stormwater (1200-Z)	2002 – 2010
	TP Freight	Stormwater (1200-Z)	2010 – Present
6135 N Basin	Lynden Farms	Stormwater (1200-F)	1992 – 1996
		Stormwater (1200-Z)	1997 – 1998
5820 N Basin	G.I. Trucking Company	Stormwater (1200-T)	1993 – 1996
		Stormwater (1200-Z)	1999 – 2010
	SAIA Motor Freight	Stormwater (1200-Z)	2010 – Present

Notes:

NPDES = National Pollutant Discharge Elimination System

(1) Current permits are indicated in bold.

3.3 Outfall Setting

Outfall M-2 discharges to an area of potential concern (AOPC 17b-Slip) identified by the U.S. Environmental Protection Agency (EPA) based on elevated concentrations of PCBs, pesticides, phthalates, PAHs, metals, and other contaminants in river sediment (EPA, 2010). In addition to Outfall M-2, four other City outfalls (Outfalls M-1, M-3, S-1, and S-2) and more than 50 non-City outfalls discharge to AOPC 17b-Slip.

Swan Island Lagoon is a sheltered off-channel area that generally is protected from natural disturbances, but anthropogenic disturbances, such as propwash, likely resuspends material into the water column. The pattern of sediment concentrations adjacent to the outfall may be influenced by more far-field sources (i.e., contaminated sediment from other portions of the lagoon resuspended and deposited in this area).

4 Basin Screening and Source Investigations

The City identified Basin M-2 as a Priority 4 for source tracing based on the lack of elevated contaminant concentrations in the vicinity of Outfall M-2 (CH2M HILL, 2004); Priority 4 basins are considered the lowest priority for identifying sources. However, given the sensitive nature of the lagoon, the City investigated the basin dry-weather flow pathway (BES, 2006) and also analyzed basin stormwater data to verify that source tracing was not needed (BES, 2010).

The dry-weather flow investigation did not indicate that major sources of metals were present in the basin via this pathway (BES, 2006). In 2007, as part of its stormwater screening evaluation (BES, 2010), the City collected stormwater samples from the downstream end of the basin (i.e., representing all collective discharges to the system). Additionally, the Lower Willamette Group (LWG) collected sediment trap and stormwater samples in 2007 in the upper northeastern branch of the basin to evaluate stormwater discharges from light industrial land uses. Based on the evaluation of these data and using a conservative screening approach, no analytes were identified as potentially warranting further source tracing in Basin M-2 (BES, 2010).

Table 3 lists investigations and evaluations completed by the City and others in the Basin M-2 conveyance system.

Table 3. Investigations in the Basin M-2 Stormwater Conveyance System

Data Collection Period	Party	Purpose	Documentation
2000	City	Compile basin background information to identify potential sources.	Preliminary Evaluation of City Outfalls (Eastshore) (BES, 2000)
2002	City	Evaluate inriver sediment data near City outfalls to prioritize basins for source tracing.	Programmatic Source Control Remedial Investigation Work Plan (CH2M HILL, 2004)
2005	City	Investigate dry-weather flow entering the City's stormwater conveyance system.	City Outfall Basin M-2 Dry-Weather Flow Sampling Technical Memorandum (TM) (BES, 2006)
2007	Lower Willamette Group (LWG)	Collect harborwide stormwater and sediment trap data to develop land use stormwater loading estimates for input to the inriver fate and transport model.	Portland Harbor RI/FS Round 3A and 3B Stormwater Data Report. Prepared for the LWG (Anchor and Integral, 2008)
2007	City	Evaluate LWG sediment trap data from Basin M-2 and compare the LWG results with sediment trap data collected by the City from Basin M-1.	Outfall Basin M-1 Sediment Trap Solids Investigation TM (BES, 2008)
2007	City	Evaluate stormwater data from City outfalls to identify additional source tracing needs.	Stormwater Evaluation Report, City of Portland Outfall Project (BES, 2010)

The City's investigation and data evaluation did not identify any major sources of contaminants in Basin M-2.

5 Completion of Source Identification

The lines of evidence evaluated to confirm that source tracing objectives have been met with regard to Basin M-2 include (1) results of source investigation activities conducted in the basin (and upland site information) and (2) land use at remaining upland areas not undergoing DEQ Cleanup Program investigation or redevelopment. Findings from this evaluation are summarized below.

- *Source Investigation Results:* The City's dry-weather flow investigation (BES, 2006) and stormwater screening evaluation (BES, 2010) did not identify any analytes as potentially warranting further source tracing in Basin M-2.
- *Upland Investigation Coverage and Land Use:* All of the land use in Basin M-2 is light industrial (see Figure 1) and primarily consists of transportation-related activities, including trucking, warehousing, and parking. Figure 2 displays the spatial extent of upland site investigation and other programmatic controls (see key to figures provided at beginning of this Appendix). As shown in Figure 2, approximately half the sites in the basin have been designated by DEQ as either not needing or as a low priority for completing a stormwater source control evaluation, and/or are covered under NPDES industrial stormwater regulations. Land use at sites not covered by DEQ Cleanup or Water Quality Programs consists largely of parking areas and warehouse uses, with minimal industrial exposures to stormwater. Most sites have been inspected by the City for industrial stormwater exposures and have been provided technical assistance as needed to implement best management practices. Current and future industrial activities that are exposed to stormwater will be addressed by the DEQ NPDES Program; non-industrial activities are not a known or suspected major source of contaminants to the City stormwater conveyance system.

Based on these lines of evidence, the City concludes that the Basin M-2 source investigation is complete and there are no major contaminant sources in the basin.

6 Basin Source Controls

Source control for major and minor sources in Basin M-2 includes ongoing City and DEQ programs that are described in the Municipal Report. Source controls implemented in Basin M-2 are summarized in this section and displayed in Figure 2.

One type of programmatic source control is the elimination of stormwater exposures to industrial activities. Table 4 lists sites that hold (or historically held) an NPDES no exposure certification.

Table 4. Sites with No Exposure Certification (NEC) in Basin M-2⁽¹⁾

Address	Company	NEC Time Period
5926 N Basin	Marine Propulsion Services, Inc.	2000 - 2010
	Vigor Machine	2010 - Present
5914 N Basin	Project PM LLC	2011 - Present
5938 N Basin	Stack Metallurgical Services, Inc.	2000 - Present
5910 N Cutter	Oregon Transfer Company	2004 - Present
6000 N Cutter	Meridian Automotive Systems	2001 - 2006
6040 N Cutter	Oxis International, Inc.	2000 - 2010
	Northwest Paper Box	2010 - Present

Notes:

(1) Current NECs are indicated in bold.

Table 5 summarizes additional site-specific, programmatic, and conveyance system source controls for Basin M-2

Table 5. Basin M-2 Source Controls

Site/Area	Source Controls	Implementation Timeframe
Source Control Measures (SCM) at DEQ Cleanup Program Sites		
GI Trucking (ECSI #1840)	Contaminated soils removed.	1993
Lynden Farms (ECSI #4461)	Former facility demolished and site capped with pavement.	1999 - 2000
Other (Programmatic Source Controls)⁽¹⁾		
Lynden Farms, Federal Express, Coho Distributing	Stormwater Management Manual Requirements	Ongoing
Andersen Construction Company, FedEx Ground Package System Inc., Stack Metallurgical Services Inc., Professional Service Industries, Inc.	City Discharge Authorization⁽²⁾	Ongoing
See listing in Table 2	NPDES 1200-Z Stormwater Permit Requirements	Ongoing
See listing in Table 4	NPDES No Exposure Certifications	Ongoing

Notes:

NPDES = National Pollutant Discharge Elimination System; DEQ = Oregon Department of Environmental Quality

(1) Programmatic source controls are described in the Municipal Report.

(2) Additional site-specific stormwater pollution controls required and implemented under City Code.

Other municipal programs (e.g., periodic inspection of and technical assistance to non-NPDES sites, illicit discharge monitoring, street sweeping, etc.) likely provide additional source control benefits in the basin and will help to address minor sources for which specific control measures have not been required. City programs that control current and future contaminant discharges to the conveyance system are described in the Municipal Report.

7 Conclusion

Based on the information summarized above, there are no major pollutant sources in Basin M-2. The City therefore concludes that future discharges from Outfall M-2 are unlikely to represent a significant source of contaminants to the river. However, given the sensitive nature of the lagoon, the City will continue to look for opportunities with existing and future City stormwater programs to reduce suspended solids loading from the basin to the river. The City has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin M-2.

8 References

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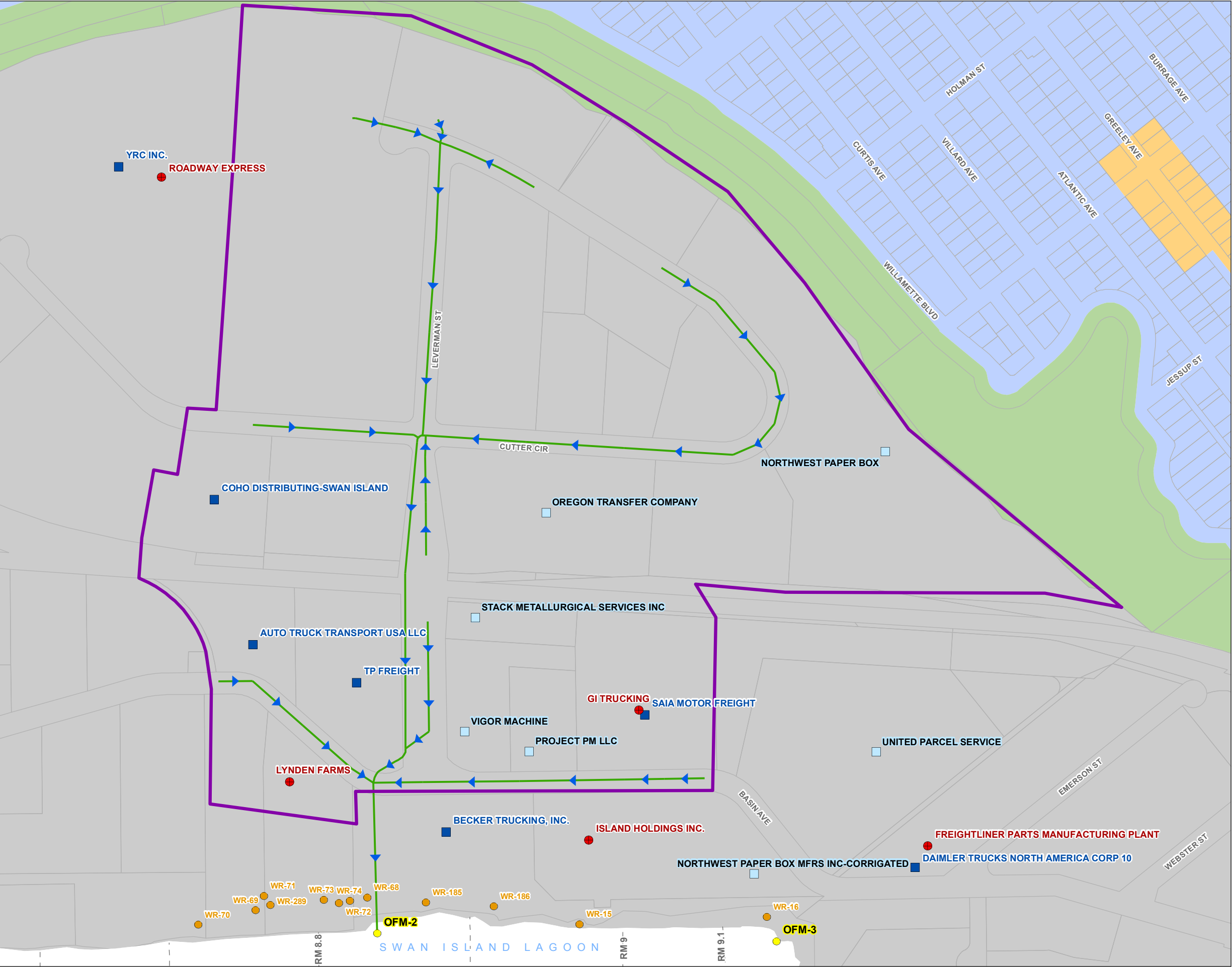
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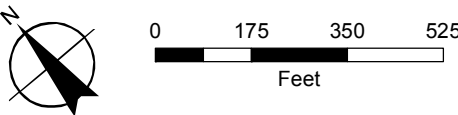
Figure 1: Basin M-2 Overview

Figure 2: Basin M-2 Upland Site Source Controls

FIGURE 1
Basin M-2
Overview



- Basin M-2
- DEQ ECSI Site
- NPDES Stormwater Permit
- NPDES No Exposure Certification
- Conveyance System**
 - Storm Line
 - City Outfall
 - Non-City Outfall
- Land Use/Zoning**
 - Light Industrial
 - Commercial
 - Residential
 - Parks and Open Space
- All Other Data**
 - River Mile (RM)
 - Tax Lot
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO

ENVIRONMENTAL SERVICES
CITY OF PORTLAND
1120 SW Fifth Avenue, Room 1000
Portland Oregon, 97204 -1912

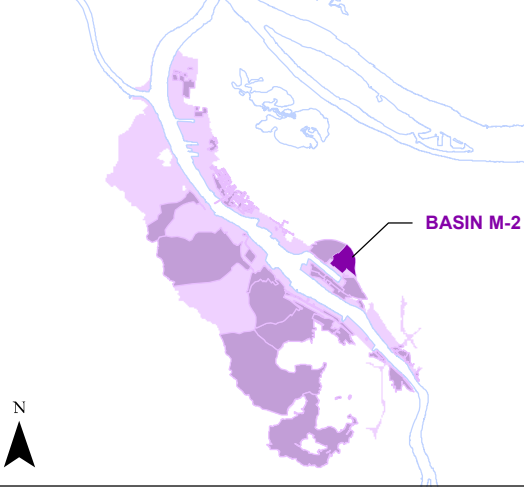
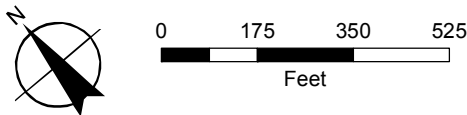




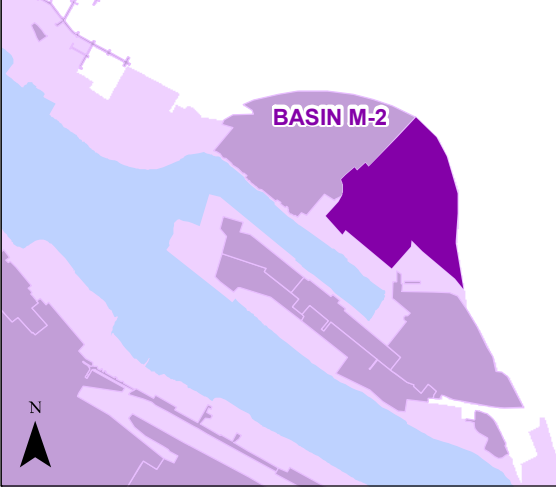
FIGURE 2
Basin M-2
Upland Site Source Controls

- Basin M-2
- Tax Lot
- DEQ Stormwater SCE**
 - SCE not needed or low priority
- All Other Features**
 - NPDES Stormwater Discharge Permit
 - City Discharge Authorization
 - NPDES No Exposure Certification
 - >50% of Site Area Redeveloped Under City SWMM
 - Stormwater Treatment Facility
 - Site Inspection - BES Industrial Stormwater Program
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO, Aerial Photo Taken 2012

ENVIRONMENTAL SERVICES
CITY OF PORTLAND
1120 SW Fifth Avenue, Room 1000
Portland Oregon, 97204-1912



Completion Summary for City of Portland Outfall Basin M-3

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and several City programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled. This report summarizes the results of this collaborative effort in Outfall Basin M-3.

This Completion Summary includes a weight-of-evidence evaluation to demonstrate that source identification is complete and a summary of source controls (implemented or planned) that will control future contaminant discharges to the Willamette River.

Basin M-3 is located on the east side of the Willamette River in the Mocks Bottom area, at the southeastern corner of Swan Island Lagoon. This area was undeveloped until World War II, when federal housing for shipyard workers was constructed. Industrial development in this area began in the early 1950s. An evaluation of inriver sediment in the vicinity of Outfall M-3 indicated the presence of sediment contamination in the vicinity of the outfall, prompting the City to evaluate whether there may be major sources in the basin. The City conducted source tracing in the basin and identified potential contaminant sources. Work included evaluation of contaminant discharges via the dry-weather flow pathway. In 2007, the City collected and analyzed stormwater data from the basin to verify that no further source tracing was needed.

Two DEQ Cleanup Program sites and small portions of two other Cleanup Program sites are located in the basin. Stormwater source control evaluations (SCE) are pending at two of these sites, and one is expected to include an evaluation of the preferential groundwater pathway to the basin. DEQ has determined that SCEs are not needed or are low priorities at the remaining two sites. The City concludes that no further City source investigation is warranted in the basin and that implementation of source control measures (SCM) at identified sources, together with current and future source control programs in the basin, are expected to provide necessary source control for Outfall M-3 discharges. Therefore, the City has met the remedial investigation (RI)/SCM objectives for Basin M-3.

2 Introduction

This Completion Summary presents a weight-of-evidence evaluation of whether further source investigation is needed in Basin M-3, and the rationale for concluding that current and future discharges from the basin are not likely to be significant sources of contaminants to river sediment. The purpose of this report is to demonstrate that for Basin M-3 the City has met the joint RI/SCM objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ.

This report is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report), which provides additional background and detail regarding the City's harborwide source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Outfall M-3 discharges to the southeastern corner of Swan Island Lagoon on the east side of the Willamette River at approximately River Mile 9.1. The drainage area for the Basin M-3 conveyance system is approximately 104 acres. Figure 1 shows the location of the outfall and drainage basin boundary and provides an overview of the associated stormwater conveyance system.

Additional detail on the Outfall M-3 stormwater conveyance system and associated drainage basin is included in the *Programmatic Source Control Remedial Investigation Work Plan for the City of Portland Outfalls Project* (CH2M HILL, 2004).

3.2 Land Use and Potential Upland Sources

Basin M-3 is located in the Mocks Bottom industrial area. Land use in the basin is predominantly light industrial with some non-industrial uses (e.g., bank, restaurants, sales, etc.). Zoning includes an area zoned as general employment, which allows for integration of commercial and industrial activities (see Figure 1).¹ Tax lots in the Mocks Bottom area tend to be large, paved, and dominated by buildings, parking, and loading areas. Industrial activities include transportation-related operations (e.g., warehousing and trucking), a dairy plant, and manufacturing facilities. Most industrial operations occur indoors, with outdoor areas mostly used for truck and vehicle parking and movement.

Sites identified as potential sources in the basin include two sites, and small portions of two other sites, that are in the DEQ Cleanup Program, as listed in DEQ's Environmental Cleanup Site Information (ECSI) database. Table 1 lists these sites and indicates the associated contaminants of interest (COI) and the status of the SCEs. The Freightliner site was one of the earlier facilities to develop in the basin, and buildings and pavement cover the majority of the site. Historical metal scrapping activities took place at the Fred Meyer site, in an area that has since been capped. The portion of the Union Pacific Railroad (UPRR) site that is within the basin is currently leased to Swan Island Dairy for truck parking, and the portion of the End of Swan Island Lagoon site in the basin is used for public boat ramp parking.

¹ General employment is a Portland zoning category that allows a range of employment opportunities but emphasizes industrial and industrial-support uses. The zones can allow for the transition to a less industrial overall nature.

Table 1. DEQ Cleanup Program Sites in Basin M-3

DEQ Cleanup Program Site	Site COIs ⁽¹⁾	Site Pathway Evaluations	
		Stormwater Pathway ⁽²⁾	Preferential Groundwater Pathway ⁽³⁾
Sites Within Basin			
Fred Meyer – Swan Island (ECSI #44)	PCBs ⁽⁵⁾	Need for Source Control Evaluation to be Determined / Low Priority	Not Shown
Freightliner Parts Manufacturing Plant (ECSI #115)	Metals	Source Control Evaluation In Progress	Source Control Evaluation in Progress
Portions of Sites Within Basin			
End of Swan Island Lagoon (ECSI #3901)	Not listed ⁽⁴⁾	Source Control Evaluation Not Needed	Source Control Evaluation Completed - Source Control Determination Pending
UPRR Albina Yard (ECSI #178)	PAHs, TPH, metals	Source Control Evaluation In Progress	Source Control Evaluation Completed - Source Control Determination Pending

Notes:

PAHs = polycyclic aromatic hydrocarbons; TPH = total petroleum hydrocarbons; COIs = contaminants of interest; PCBs = polychlorinated biphenyls; ECSI = Environmental Cleanup Site Information; DEQ = Oregon Department of Environmental Quality

- (1) Unless otherwise noted, site COIs are those identified in Appendix Q (Source Control Inventory Tables) of the Portland Harbor RI/FS Draft Feasibility Study (FS) (Anchor et al., 2012).
- (2) Source: DEQ Milestone Report, Figure 1b, “Status of Stormwater Source Control Evaluations, January 2013” (DEQ, 2013).
- (3) Source: DEQ Milestone Report, Figure 3, “Groundwater Source Control Evaluation Status, January 2013” (DEQ, 2013).
- (4) Only a small portion of the site is delineated within Basin M-3 and consists of a boat-ramp parking lot. The site is not listed in Appendix Q of the draft FS, Table 4.2-2 of the Draft Final RI, and site COIs are not listed in the ECSI database (DEQ, 2012).
- (5) Site is not listed in Appendix Q of the draft FS or Table 4.2-2 of the Portland Harbor RI/FS Draft Final Remedial Investigation Report (Integral et al., 2011). ECSI database (DEQ, 1992) lists PCBs in soil as site contaminants.

Industrial sites covered, or historically covered, by National Pollutant Discharge Elimination System (NPDES) stormwater regulations also were considered as potential sources of pollutants to the City conveyance system. Table 2 lists sites in the basin that currently hold, or historically had, NPDES permits to discharge to the Basin M-3 conveyance system. Figure 1 shows sites with current NPDES permits. Note that the City operates under an NPDES Municipal Separate Storm Sewer System (MS4) stormwater permit that also covers basin drainage areas.

Table 2. Current⁽¹⁾ and Historical NPDES Permit Coverage in Basin M-3

Address	Company	Permit Type	Time Period
4950 N Basin	Swan Island Dairy	Stormwater (1200-F)	1996
		Stormwater (1200-Z)	1998 – Present
5130 N Basin	Rose City Moving & Storage Co.	Stormwater (1200-Z)	1999 – 2012
5400 N Basin	Freightliner Trucks Manufacturing Plant II	Cooling water (100J)	1992 – 2008
	Daimler Truck North America Corp 10	Cooling water (100J)	2008 – Present
	Freightliner Trucks Manufacturing Plant II	Stormwater (1200-L)	1992 – 1996
		Stormwater (1200-Z)	1997 – 2008
	Daimler Trucks North America Corp 10	Stormwater (1200-Z)	2008 – Present
5550 N Basin	Nationsway Transport	Stormwater (1200-T)	1995 – 1996
		Stormwater (1200-Z)	1997 – 1999
	United Parcel Service	Stormwater (1200-Z)	2002 – 2008

Notes:

NPDES = National Pollutant Discharge Elimination System

(1) Current permits are indicated in bold.

3.3 Outfall Setting

Outfall M-3 discharges to an area of potential concern (AOPC 17b-Slip) identified by the U.S. Environmental Protection Agency (EPA) based on elevated concentrations of PCBs, pesticides, phthalates, PAHs, metals, and other contaminants in river sediment (EPA, 2010). In addition to Outfall M-3, four other City outfalls (Outfalls M-1, M-2, S-1, and S-2) and more than 50 non-City outfalls discharge to AOPC 17b-Slip.

Swan Island Lagoon is a sheltered off-channel area that generally is protected from natural disturbances, but anthropogenic disturbances (e.g. propwash from the public boat ramp adjacent to the outfall) may resuspend material into the water column during low water conditions. The pattern of sediment concentrations adjacent to the outfall may be influenced by adjacent sources (e.g., other non-municipal outfalls) and resuspension.

4 Basin Screening and Source Investigations

The City identified Basin M-3 as a Priority 1 for source tracing (CH2M HILL, 2004). Priority 1 basins are considered the highest priority for source tracing. The subsequent *Phase I Report for City of Portland Priority 1 Basins* identified PAHs and phthalates for source tracing based on further evaluation of the inriver sediment data (GSI, 2006a). The *Phase I Report* states that the spatial pattern of inriver sediment data suggests that the basin likely is not the source of PAHs and phthalates, but recommends source tracing to confirm there are no significant sources in the basin. In 2005, the City attempted to collect inline solids samples from a variety of locations in the basin for source tracing purposes. Inline samples were not collected because of the standing water in the lower portion of the basin (i.e., river backup) and the lack of solids

material in the upper portion of the basin. A dry-weather flow investigation was conducted at that time to identify potential metals sources to the basin via this pathway (BES, 2006).

In 2007, as part of the City's stormwater screening evaluation (BES, 2010), the City collected stormwater samples from the most accessible basin location near the downstream end of the basin; this location excludes discharges from one property (United Parcel Service) and a small portion of N. Basin Avenue drainage. Based on the evaluation of these data and using a conservative screening approach, no analytes were identified as potentially warranting further source tracing in Basin M-3 (BES, 2010).

Table 3 lists investigations and evaluations completed by the City in the Basin M-3 conveyance system.

Table 3. Investigations in the Basin M-3 Stormwater Conveyance System

Data Collection Period	Party	Purpose	Documentation
2000	City	Compile basin background information to identify potential sources.	Preliminary Evaluation of City Outfalls (Eastshore) (BES, 2000)
2002	City	Evaluate inriver sediment data near City outfalls to prioritize basins for source tracing.	Programmatic Source Control Remedial Investigation Work Plan (CH2M HILL, 2004)
2005	City	Evaluate existing data on groundwater plumes and identify the potential for City conveyance systems (including Basin 18) to act as preferential pathways.	Relationships Between Upland Shallow Groundwater Plumes and the City Stormwater and Combined Conveyance System with the Portland Harbor (GSI, 2006b)
2005	City	Investigate dry-weather flow entering the City's stormwater conveyance system.	City Outfall Basin M-3 Dry Weather Flow Sampling TM (BES, 2006)
2006	City	Compile existing information to focus source tracing activities based on evaluation of observed contaminants and identified sources.	Phase I Report for City of Portland Priority 1 Basins (GSI, 2006a)
2007	City	Evaluate stormwater data from City outfalls to identify additional source tracing needs.	Stormwater Evaluation Report, City of Portland Outfall Project (BES, 2010)

5 Completion of Source Identification

The lines of evidence evaluated to confirm that source tracing objectives have been met with regard to Basin M-3 include (1) results of source investigation activities conducted in the basin (and upland site information) and (2) land use at remaining upland areas not undergoing investigation. Findings from this evaluation are summarized below.

- *Source Investigation Results:* A City source investigation identified metals in dry-weather flow in the basin (BES, 2006). One ECSI site (Freightliner Parts Manufacturing Plant) is investigating the preferential groundwater pathway to Basin M-3 under DEQ oversight. Other contaminants identified for source tracing in the basin (i.e., polycyclic aromatic hydrocarbons and phthalates) also have been detected at this site during the site stormwater pathway evaluation (Bridgewater, 2011). The City's stormwater screening evaluation (BES, 2010) of data from the basin did not identify any analytes as potentially warranting further source tracing in Basin M-3.
- *Upland Investigation Coverage and Land Use:* Land use in Basin M-3 primarily consists of light industrial activities including transportation-related operations (e.g., warehousing and trucking), a dairy plant, and manufacturing facilities (see Figure 1). Figure 2 displays the spatial extent of upland site investigation and other programmatic stormwater source controls (see key to figures provided at beginning of this Appendix). As shown in Figure 2, one site and a small portion of another site in the basin are investigating the stormwater pathway and implementing SCMs under DEQ Cleanup Program authority. Two other sites in the basin have been designated by DEQ as not needing an SCE or as a low priority for completing an SCE. Approximately one third of the basin drainage area is covered by the DEQ Cleanup Program and/or NPDES industrial stormwater regulations. Land use at sites not covered by DEQ Cleanup or Water Quality Programs mostly consists of parking areas and large warehouse operations with minimal industrial exposure to stormwater. Current and future industrial activities that are exposed to stormwater at these sites will be addressed by the DEQ Water Quality NPDES Program; non-industrial activities are not a known or suspected major source of contaminants to the City stormwater conveyance system.

Based on these lines of evidence, the City concludes that the Basin M-3 source investigation is complete and there are no major contaminant sources in the basin.

6 Basin Source Controls

Source control in Basin M-3 includes SCMs completed (or planned) at contaminated sites under DEQ Cleanup Program agreements and ongoing City and DEQ programs that are described in the Municipal Report. Source controls implemented in Basin M-3 are summarized in this section and are displayed in Figure 2.

One type of programmatic source control is the elimination of stormwater exposures to industrial activities. Table 4 lists sites that hold, or historically held, an NPDES No Exposure Certification.

Table 4. Sites with No Exposure Certification (NEC) in Basin M-3⁽¹⁾

Address	Company	NEC Time Period
3004 N Wygant	Infiltrator Systems Inc	2010 – Present
5130 N Basin	Rose City Moving & Storage Co.	2012 – Present
5000 N Basin	Carpet Services, Inc.	2000 – 2010
5550 N Basin	UPS Portland South	2008 – Present
4825 N Basin	Metro Paint Processing Facility	2013 – Present

Notes:

(1) Current NECs are indicated in bold.

Table 5 summarizes additional site-specific, programmatic, and conveyance system source controls for Basin M-3. A small portion of the UPRR site listed in Table 5 discharges to the basin. This portion of the site is used for truck parking and was not a focus of the UPRR remedial investigation. The City does not anticipate that specific SCMs will be implemented in this area; an SCE is underway at the site to identify areas where additional controls are needed.

Table 5. Basin M-3 Source Controls

Site /Area	Source Controls	Implementation Timeframe
Source Control Measures (SCM) at DEQ Cleanup Program Sites ⁽¹⁾		
Fred Meyer – Swan Island (ECSI #44)	An interim impervious cap has been placed over contaminated soil at the site.	1988
Freightliner – Parts Manufacturing Plant (ECSI #115)	Cleaning portions of the onsite stormwater lines. Erosion control best management practices.	2007 Ongoing
UPRR Albina Yard (ECSI #178)	To be determined	To be determined
Other (Programmatic Source Controls)⁽²⁾		
United Parcel Service, PDX Development	Stormwater Management Manual Requirements	Ongoing
Rose City Moving & Storage Co., DSU Peterbilt	City Discharge Authorization⁽³⁾	Ongoing
See listing in Table 2	NPDES 1200-Z Stormwater Permit Requirements	Ongoing
See listing in Table 4	NPDES No Exposure Certifications	Ongoing

Notes:

ECSI = Environmental Cleanup Site Information; DEQ = Oregon Department of Environmental Quality; NPDES = National Pollutant Discharge Elimination System

(1) For upland sites, description of SCMs are based on information in DEQ Milestone Report (DEQ, 2013), DEQ source control decisions, and/or reports on file with DEQ.

(2) Programmatic source controls are described in detail in the Municipal Report.

(3) Additional site-specific stormwater pollution controls required and implemented under City Code.

Other municipal programs (e.g., periodic inspection of and technical assistance to non-NPDES sites, illicit discharge monitoring, street sweeping, etc.) likely provide additional source control benefits in the basin and will help to address minor sources for which specific control measures have not been required. City programs that control current and future contaminant discharges to the conveyance system are described in the Municipal Report.

7 Conclusion

The City completed source tracing in Basin M-3 and no major sources of contaminants to the City conveyance system were identified. Therefore, future discharges from Outfall M-3 are unlikely to represent a significant source of contaminants to the river. However, given the sensitive nature of the lagoon, the City will continue to look for opportunities with existing and future City stormwater programs to reduce suspended solids loading from the basin to the river. The City concludes that it has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin M-3.

8 References

- Anchor et al. 2012. Portland Harbor RI/FS Draft Feasibility Study. Prepared for The Lower Willamette Group by Anchor QEA, LLC, Windward Environmental, LLC, Kennedy/Jenks Consultants, and Integral Consulting, Inc. February 2012.
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Integral et al. 2011. Portland Harbor RI/FS, Draft Final Remedial Investigation Report. Prepared for the LWG. Prepared by Integral Consulting Inc., Windward Environmental LLC, Kennedy/Jenks Consultants, and Anchor QEA, LLC. August 29, 2011.

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Figure 1: Basin M-3 Overview

Figure 2: Basin M-3 Upland Site Source Controls

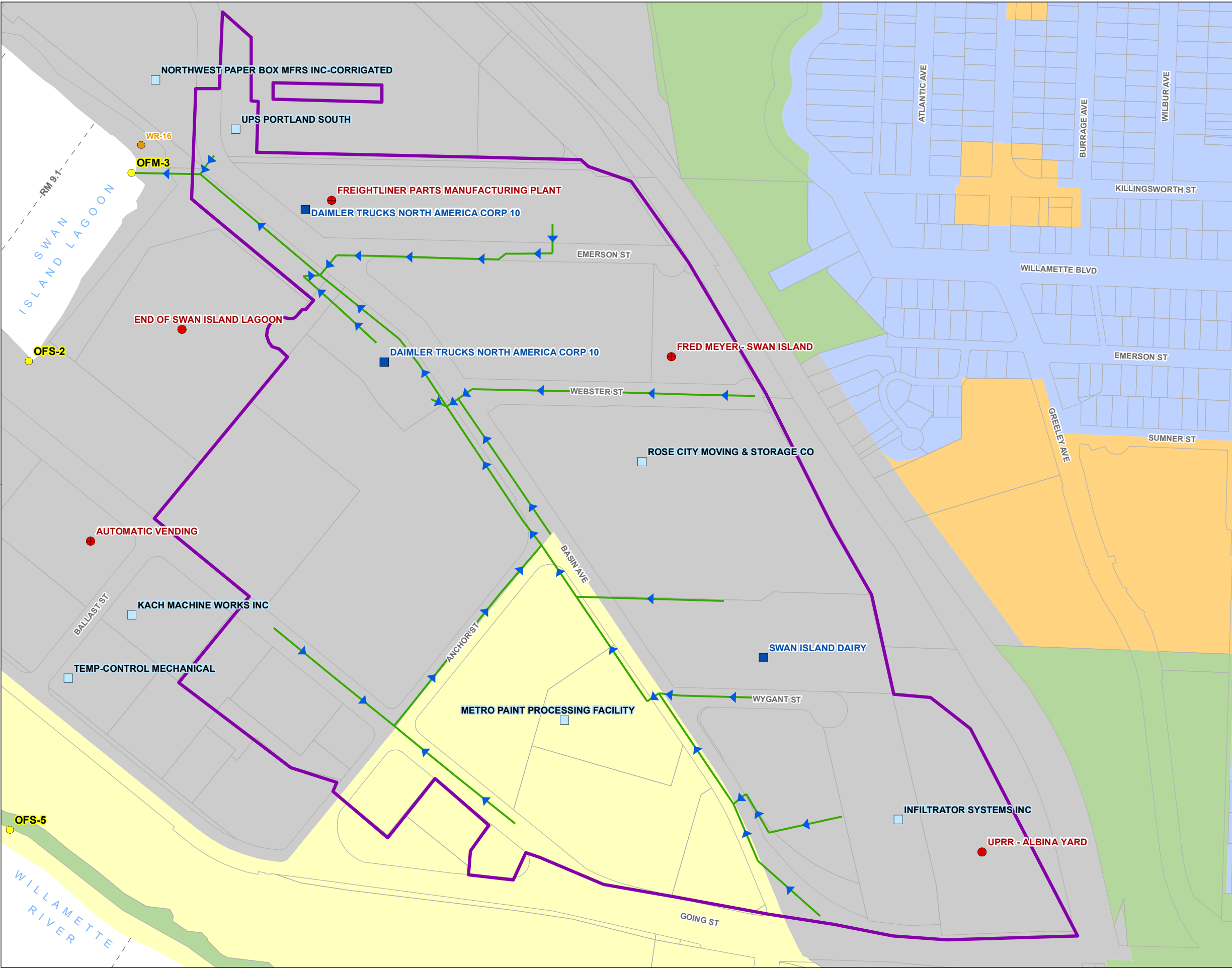
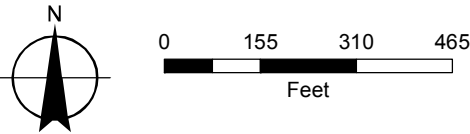


FIGURE 1
Basin M-3
Overview

- Basin M-3
- DEQ ECSI Site
- NPDES Stormwater Permit
- NPDES No Exposure Certification
- Conveyance System**
 - Storm Line
 - City Outfall
 - Non-City Outfall
- Land Use/Zoning**
 - Light Industrial
 - General Employment
 - Commercial
 - Residential
 - Parks and Open Space
- All Other Data**
 - River Mile (RM)
 - Tax Lot
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO

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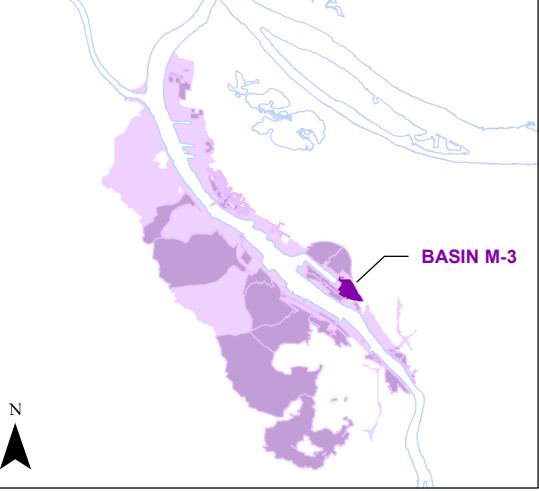
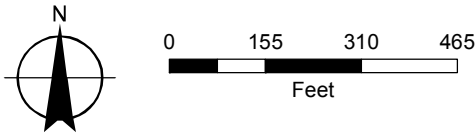




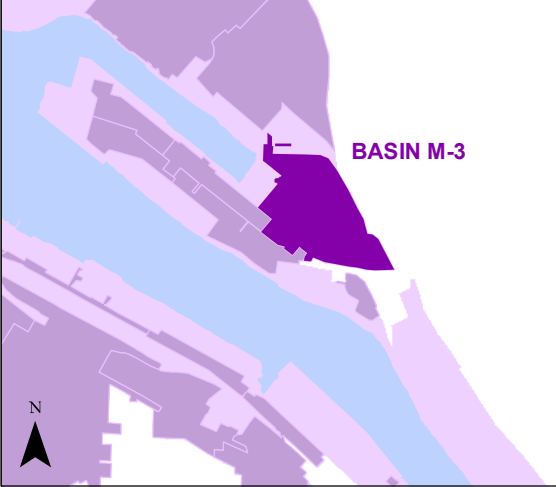
FIGURE 2
Basin M-3
Upland Site Source Controls

- Basin M-3
- Tax Lot
- DEQ Stormwater SCEs**
 - SCE implemented or pending
 - SCE not needed or low priority
- All Other Features**
 - NPDES Stormwater Discharge Permit
 - City Discharge Authorization
 - NPDES No Exposure Certification
 - >50% of Site Area Redeveloped Under City SWMM
 - Stormwater Treatment Facility
 - Site Inspection - BES Industrial Stormwater Program
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
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Data Sources: BES, METRO, Aerial Photo Taken 2012

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Completion Summary for City of Portland Outfall Basin S-1

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and several City programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled. This report summarizes the results of this collaborative effort in Outfall Basin S-1.

This Completion Summary includes a weight-of-evidence evaluation to demonstrate that source identification is complete and a summary of source controls (implemented or planned) that will control future contaminant discharges to the Willamette River.

Basin S-1 is located on the east side of the Willamette River in the Swan Island industrial area, along the west side of the Swan Island Lagoon. Most of the basin is occupied by portions of two sites: the Vigor Industrial site (also known as the Swan Island Portland Shipyard or the Shipyard site) and the EWH LLC site (EWH site; leased to metal fabrication and sandblasting/painting operations). The Shipyard site was in the DEQ Cleanup Program when the City initiated its source investigations, and the EWH site entered the Cleanup Program as a result of the City's investigations. The remainder of the basin consists of a portion of a truck repair and parts sales business (DSU-Peterbuilt & GMC).

Early evaluation of inriver sediment data in the vicinity of the outfall did not indicate the apparent presence of major sources in the basin. However, because of the sensitive nature of the lagoon, the City collected and analyzed basin stormwater data to confirm that source tracing was not needed. The results indicated that source tracing for polycyclic aromatic hydrocarbons (PAH) and copper was warranted in the basin. Subsequently, the City conducted three source investigations in Basin S-1 to trace sources of PAHs and copper to the conveyance system and to fill existing data gaps in Vigor Industrial's characterization of stormwater discharges and pathways to the basin from the Shipyard site. The investigation results identified sources of organotins, PAHs, metals, polychlorinated biphenyls (PCB), and bis(2-ethylhexyl)phthalate (BEHP) to the conveyance system.

Two sites have been identified as major sources to the Basin S-1 conveyance system. Both sites are in the DEQ Cleanup Program and are in the process of completing source control evaluations (SCE). Source control measure (SCM) implementation at these two upland sites, together with current and future source control programs in the basin, are expected to provide necessary source control for Outfall S-1 discharges.

The City has identified the major sources of contaminants to the basin and necessary controls are being implemented under DEQ and/or City authority. Therefore, the City has met the remedial investigation (RI)/SCM objectives for Basin S-1.

2 Introduction

This Completion Summary presents a weight-of-evidence evaluation of whether further source investigation is needed in Basin S-1, and the rationale for concluding that future discharges from the basin are not likely to be significant sources of contaminants to river sediment. The purpose of this report is to demonstrate that, for Basin S-1 the, City has met the joint RI/SCM objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ. Together, the City and DEQ identified all major sources of contamination to the basin and are using their respective authorities to ensure that source controls are implemented where needed.

This report is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report), which provides additional background and detail regarding the City's harborwide source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Outfall S-1 discharges to the Swan Island Lagoon on the east side of the Willamette River at approximately River Mile 8.7. The drainage area for the Basin S-1 conveyance system is approximately 23 acres. Figure 1 shows the location of the outfall and drainage basin boundary and provides an overview of the associated stormwater conveyance system.

Additional detail on the Outfall S-1 stormwater conveyance system and associated drainage basin is included in the *Programmatic Source Control Remedial Investigation Work Plan for the City of Portland Outfalls Project* (CH2M HILL, 2004) and the *Outfall Basin S-1 Source Investigation, Technical Memorandum No. OF S1-1* (BES, 2012).

3.2 Land Use and Potential Upland Sources

Basin S-1 is located at the north end of the Swan Island industrial area. Land use in the basin is mostly heavy industrial (see Figure 1). Current industrial activities in the basin include shipyard support operations (e.g., material loading and handling, refueling, waste storage, painting, parts coating and cleaning, etc.), metal fabrication, painting, material/equipment storage, and truck repair and parts sales. DEQ Cleanup Program sites, as listed in DEQ's Environmental Cleanup Site Information (ECSI) database, comprise almost the entire basin.

Two DEQ Cleanup Program sites are in the basin. One site was in the Cleanup Program when the City's source investigations were initiated, and the other was added as a result of these investigations. Table 1 lists these sites and indicates the associated contaminants of interest (COI) and the status of stormwater pathway evaluations. Both of these sites have pending stormwater pathway evaluations under DEQ oversight.

Table 1. DEQ Cleanup Program Sites in Basin S-1

DEQ Cleanup Program Site	Site COIs ⁽¹⁾	Site Stormwater Pathway Evaluations ⁽²⁾
Vigor Industrial/Swan Island Portland Shipyard (OU1) (ECSI #271)	VOCs, PAHs, TPH, PCBs, metals, butyltins, phthalates	Source Control Evaluation In Progress
EWB, LLC (ECSI #5685)	Not listed ⁽³⁾	Source Control Evaluation In Progress

Notes:

VOCs = volatile organic compounds; TPH = total petroleum hydrocarbons; COIs = contaminants of interest; PAHs = polycyclic aromatic hydrocarbons; PCBs = polychlorinated biphenyls; ECSI = Environmental Cleanup Site Information; DEQ = Oregon Department of Environmental Quality

- (1) Unless otherwise noted, site COIs are those identified in Appendix Q (Source Control Inventory Tables) of the Portland Harbor RI/FS Draft Feasibility Study (FS) (Anchor et al., 2012).
- (2) Source: DEQ Milestone Report, Figure 1b, "Status of Stormwater Source Control Evaluations, January 2013" (DEQ, 2013).
- (3) Site joined DEQ Cleanup Program in January 2012 and is not listed in Appendix Q of the draft FS. ECSI database (DEQ, 2012) does not identify site contaminants.

Both of these industrial sites have National Pollutant Discharge Elimination System (NPDES) stormwater permits. Table 2 shows the permit history within the basin. Figure 1 shows sites with current NPDES permits. Note that the City operates under an NPDES Municipal Separate Storm Sewer System (MS4) stormwater permit that also covers basin drainage areas.

Table 2. Current⁽¹⁾ and Historical NPDES Permit Coverage in Basin S-1

Address	Company	Permit Type	Time Period
5555 N Channel	Port of Portland – Ship Repair ⁽²⁾	Stormwater (1200-L)	1993 – 1996
	Cascade General ⁽²⁾	Stormwater (1200-Z)	1996 – 2008
	Vigor Industrial LLC⁽²⁾	Stormwater (1200-Z)	2008 – Present
5555 N Channel, Building 2	EWB LLC⁽²⁾	Stormwater (1200-Z)	2011 – Present

Notes:

NPDES = National Pollutant Discharge Elimination System

- (1) Current permits are indicated in bold.
- (2) Multiple tenants are included in the permit coverage areas.

3.3 Outfall Setting

Outfall S-1 discharges to an area of potential concern (AOPC 17b-Slip) identified by the U.S. Environmental Protection Agency (EPA) based on elevated concentrations of PCBs, phthalates, PAHs, metals, and other contaminants in river sediment (EPA, 2010). In addition to Outfall S-1, four other City outfalls (Outfalls M-1, M-2, M-3, and S-2) and more than 50 non-City outfalls discharge to the Swan Island Lagoon portion of AOPC 17b-Slip. Historically, overwater ship repairs also occurred along the west shore of the lagoon.

4 Basin Screening and Source Investigations

During the City investigation of sediment in the vicinity of City outfalls in the Initial Study Area, sediment samples could not be collected near Outfall S-1. Based on data collected at nearby outfalls with similar operations in the basins, the City identified Basin S-1 as a Priority 4 basin for source tracing (CH2M HILL, 2004). Priority 4 basins are considered the lowest priority for identifying sources. However, given the sensitive nature of the lagoon, the City collected and analyzed basin stormwater data in 2007 to verify that source tracing was not needed (BES, 2010). As part of the City's stormwater screening evaluation, the City sampled stormwater from the downstream end of the basin (i.e., at a location representing cumulative discharge from the entire basin). Based on the evaluation of these data and using a conservative screening approach, total PAHs and copper were identified as warranting further source tracing in Basin S-1 (BES, 2010). At this time, one site (the Shipyard site) was in the DEQ Cleanup Program.

The City conducted comprehensive source investigations in Basin S-1 in 2010 and 2011 to determine if the other two sites (EWH and DSU-Peterbuilt & GMC, Inc.) were major sources that needed to be controlled and to better understand contaminant pathways from the Shipyard site. As part of its ongoing evaluation of the stormwater pathway, Vigor Industrial collected data to evaluate whether the site is a source to Basin S-1, but data were not sufficient to characterize all potential source areas from the site to the basin. Therefore, the City applied a conservative source-tracing approach in the basin and investigated a broad array of contaminants in stormwater and stormwater solids, including some chemicals (e.g., organotins) specifically included to fill existing data gaps in Vigor Industrial's characterization of stormwater discharges from the Shipyard site to Basin S-1. Results of the Basin S-1 source investigations indicated elevated concentrations of PAHs, organotins, metals, PCBs, and BEHP in discharges to the City conveyance system. Data collected from inlets to Basin S-1 along N. Lagoon Avenue also indicate that offsite migration of Shipyard site contaminants likely is occurring via other pathways (e.g. vehicle drag-out and/or air deposition) (BES, 2012).

In 2011, the City requested a DEQ Site Assessment review of the EWH LLC property (on the corner of N. Dolphin Street and N. Lagoon Avenue) based on initial results of the stormwater sampling. Source investigation data verify that SCMs are needed at the Shipyard and the EWH sites. DEQ requested that the EWH site enter the DEQ Cleanup Program based on these results (DEQ, 2012), and both these identified sources currently are working with DEQ to complete SCEs and to implement appropriate SCMs.

For the third site (DSU-Peterbuilt & GMC), before source investigations were initiated in the basin, the City's Industrial Stormwater Program staff provided technical assistance on best management practices implementation to minimize stormwater exposure to industrial activities. Subsequent targeted stormwater sampling demonstrated that the site was not a major source.

Table 3 lists investigations and evaluations completed by the City in the Basin S-1 conveyance system.

Table 3. City Investigations in the Basin S-1 Stormwater Conveyance System

Data Collection Period	Purpose	Documentation
2000	Compile basin background information to identify potential sources.	Preliminary Evaluation of City Outfalls (Eastshore) (BES, 2000)
2002	Evaluate inriver sediment data near City outfalls to prioritize basins for source tracing.	Programmatic Source Control Remedial Investigation Work Plan (CH2M HILL, 2004)
2007	Evaluate stormwater data from City outfalls to identify additional source tracing needs.	Stormwater Evaluation Report, City of Portland Outfall Project (BES, 2010)
2010	Analyze solids from the piped Shipyard site connection to Basin S-1 and from catch basins along the egress route to identify contaminants being discharged and potential pathways by which they are entering the City conveyance system.	Outfall Basin S-1 Source Investigation (TM No. OF S1-1) (BES, 2012)
2011	Investigate stormwater discharges to identify sources of other contaminants present at elevated concentrations in Outfall S-1 stormwater screening samples.	Outfall Basin S-1 Source Investigation (TM No. OF S1-1) (BES, 2012)

As described above, the City's source investigation work has been used by DEQ to focus upland site investigations and to identify sites for DEQ Cleanup Program consideration. Joint investigations by the City and DEQ resulted in the identification of one or more sources of the contaminants selected for source tracing in Basin S-1.

5 Completion of Source Identification

The lines of evidence evaluated to verify that source tracing is complete and all major sources have been identified include (1) results of source investigation activities conducted in the basin (and upland site information) and (2) upland investigation coverage and remaining land use in the basin. Findings from this evaluation are summarized below.

- Source Tracing Results:** The City evaluated all three sites that drain to the City system (Shipyard site, EWH site, and DSU - Peterbuilt & GMC, Inc., site). Upland sources of all contaminants selected for source tracing have been identified. Evaluation of the 2010 stormwater solids data indicated the Shipyard site is contributing organotins to the City system via direct discharges from its lateral connection, and likely also through vehicle dragout of contaminated media onto N. Lagoon Avenue (BES, 2012). PAHs and metals have been identified as COIs for the Shipyard site (see Table 1) and have been detected at elevated concentrations in the site stormwater system. The 2011 stormwater sampling results also indicate that the EWH site is a major source of PAHs to Basin S-1 and also a source of metals (copper and zinc), PCBs, and BEHP. Both sites are conducting investigations under DEQ Cleanup Program oversight. Source tracing results indicate the remaining industrial facility in the basin (DSU - Peterbuilt & GMC, Inc.) is not a major source of contaminants to the City conveyance system.

- *Upland Investigation Coverage and Land Use:* Figure 2 displays the spatial extent of DEQ Cleanup site investigations and other programmatic controls (see key to figures provided at beginning of this Appendix). As shown in Figure 2, the majority of area in the basin is being investigated (or investigation is pending) under DEQ oversight, or likely does not need investigation because of existing controls. Industrial activities exposed to stormwater are being addressed at two of the three industrial sites in the basin by the DEQ Water Quality NPDES Program. The City Industrial Stormwater Program continues to provide technical assistance on minimizing industrial exposures to stormwater to the only unpermitted site in the basin. In summary, all sites in the basin are:
 - Investigating the stormwater pathway and developing SCMs for implementation under DEQ Cleanup Program authority (or an SCE is planned);
 - Covered under NPDES stormwater regulations; and/or
 - Monitored for stormwater exposures through periodic inspections under the City's Industrial Stormwater Program.

Based on these lines of evidence, the City concludes that Basin S-1 source investigation is complete and all major sources have been identified.

6 Basin Source Controls

The City and DEQ collaborated under their respective authorities to identify control mechanisms for major and minor sources located in the basin. Source control in Basin S-1 includes SCMs completed (or planned) at contaminated sites under DEQ Cleanup Program agreements and ongoing City and DEQ programs that are described in the Municipal Report. Source controls implemented in Basin S-1 are displayed in Figure 2 and summarized in this section.

One type of programmatic source control is the elimination of stormwater exposures to industrial activities. Currently, there are no NPDES No Exposure Certifications (NEC) in the basin, although the EWH site historically held an NEC from 2009 to 2011.

Table 4 summarizes additional site-specific and programmatic source controls completed to date in Basin S-1.

Table 4. Basin S-1 Source Controls

Site/Area	Source Controls	Implementation Timeframe
Source Control Measures (SCM) at DEQ Cleanup Program Sites⁽¹⁾		
Vigor Industrial/Swan Island Portland Shipyard (OU1) (ESCI #271)	Site has determined that stormwater treatment is warranted at the site. Design discussions are underway with DEQ.	To be determined; SCM planning is in progress.
EWH, LLC (ESCI #5685)	Stormwater lines and catch basins cleaned out.	2012
	Additional SCMs to be determined.	To be determined.
Other (Programmatic Source Controls)⁽²⁾		
Vigor Industrial	Stormwater Management Manual Requirements	Pending. Likely will apply during redevelopment.
DSU-Peterbuilt & GMC	City Discharge Authorization⁽³⁾	Ongoing
See listing in Table 2	NPDES 1200-Z Stormwater Permit Requirements	Ongoing

Notes:

DEQ = Oregon Department of Environmental Quality; NPDES = National Pollutant Discharge Elimination System; ESCI = Environmental Cleanup Site Information

(1) For upland sites, description of SCMs are based on information in DEQ Milestone Report (DEQ, 2013), DEQ source control decisions, and/or reports on file with DEQ.

(2) Programmatic source controls are described in the Municipal Report.

(3) Additional site-specific stormwater pollution controls required and implemented under City Code

All major contaminant sources have been controlled or will be controlled after implementation of SCMs has been completed under the programs identified above. Other municipal programs (e.g., periodic inspection of and technical assistance to non-NPDES sites, illicit discharge monitoring, street sweeping, etc.) likely provide additional source control benefits in the basin and will help to address minor sources for which specific control measures have not been required. City programs that control current and future contaminant discharges to the conveyance system are described in the Municipal Report.

7 Conclusion

The City completed source tracing in Basin S-1 and identified the major sources of contaminants to the City conveyance system. Because necessary SCMs at the identified sources are being determined and implemented under appropriate DEQ and City regulatory authorities, future discharges from Outfall S-1 are unlikely to represent a significant source of contaminants to the river. However, given the sensitive nature of the lagoon, the City will continue to look for opportunities with existing and future City stormwater programs to reduce suspended solids loading from the basin to the river. The City concludes that it has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin S-1.

8 References

- Anchor et al. 2012. Portland Harbor RI/FS Draft Feasibility Study. Prepared for The Lower Willamette Group by Anchor QEA, LLC, Windward Environmental, LLC, Kennedy/Jenks Consultants, and Integral Consulting, Inc. February 2012.
- BES. 2000. Preliminary Evaluation of City Outfalls. Portland Harbor Study Area. Notebook 1: Eastshore Stormwater and CSO Outfalls. City of Portland, Bureau of Environmental Services. December 2000.
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- CH2M HILL. 2004. Programmatic Source Control Remedial Investigation Work Plan of the City of Portland Outfalls Project. Prepared by CH2M HILL for the City of Portland Bureau of Environmental Services. March 19, 2004.
- DEQ. 2012. Environmental Cleanup Site Information (ECSI) Database Site Summary Report - Details for Site ID 5685, EWH, LLC. Last updated January 2012. Website accessed on February 20, 2013. <http://www.deq.state.or.us/lq/ECSI/ecsidetail.asp?seqnbr=5685>
- DEQ. 2013. Milestone Report, Upland Source Control at the Portland Harbor Superfund Site. Prepared by the Oregon Department of Environmental Quality. January 2013.
- EPA. 2010. Re: Portland Harbor Superfund Site; Administrative Order on Consent for Remedial Investigation and Feasibility Study; Docket No. CERCLA-10-2001-0240. Portland Harbor Feasibility Study Source Tables. Letter from EPA to Mr. Bob Wyatt, Chairman, Lower Willamette Group. November 23, 2010.

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Figure 1: Basin S-1 Overview

Figure 2: Basin S-1 Upland Site Source Controls

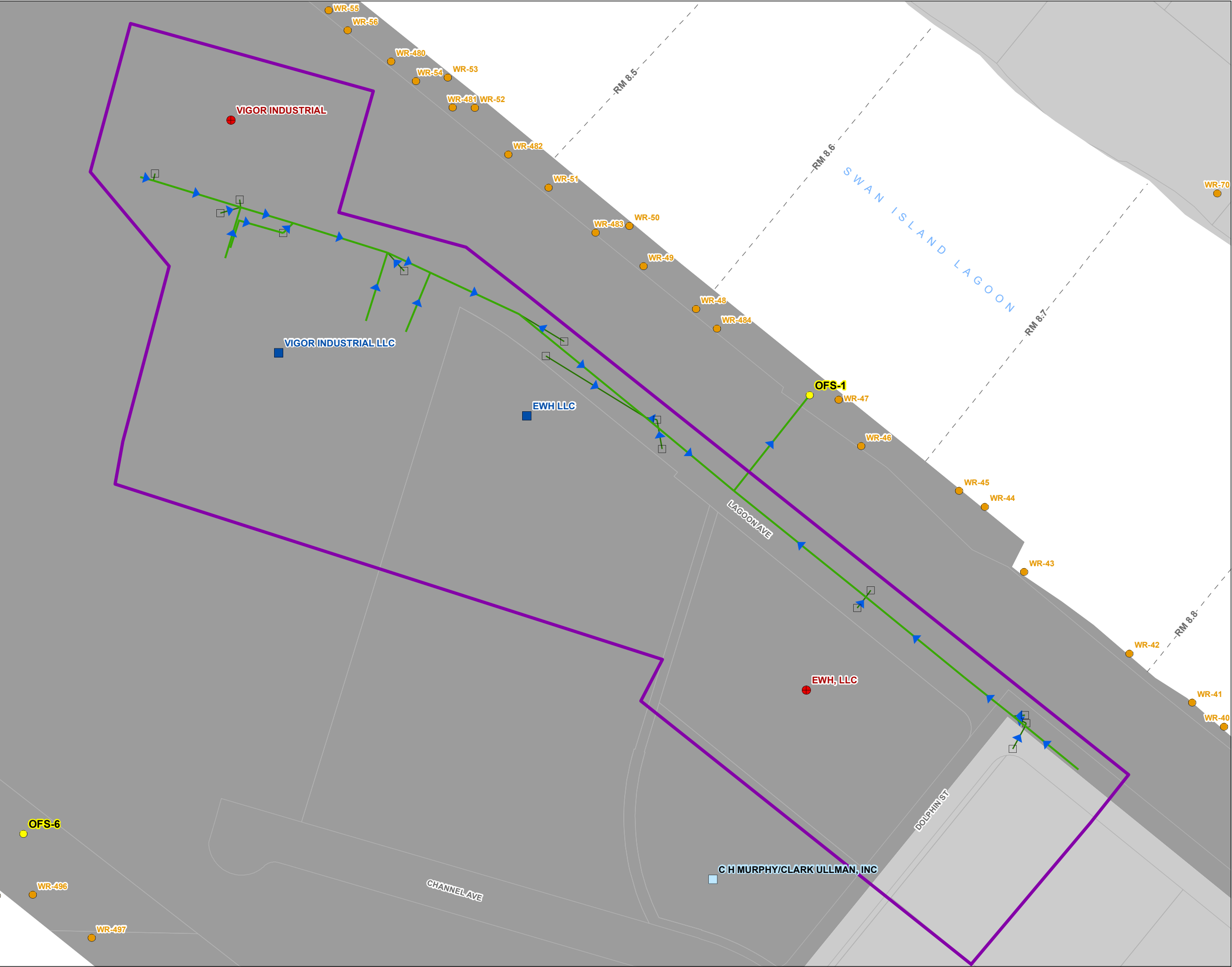


FIGURE 1
Basin S-1
Overview

- Basin S-1
- DEQ ECSI Site
- NPDES Stormwater Permit
- NPDES No Exposure Certification
- Conveyance System**
 - Storm Line
 - Catch Basin
 - City Outfall
 - Non-City Outfall
- Land Use/Zoning**
 - Heavy Industrial
 - Light Industrial
- All Other Data**
 - River Mile (RM)
 - Tax Lot
 - Discharges to City Outfall
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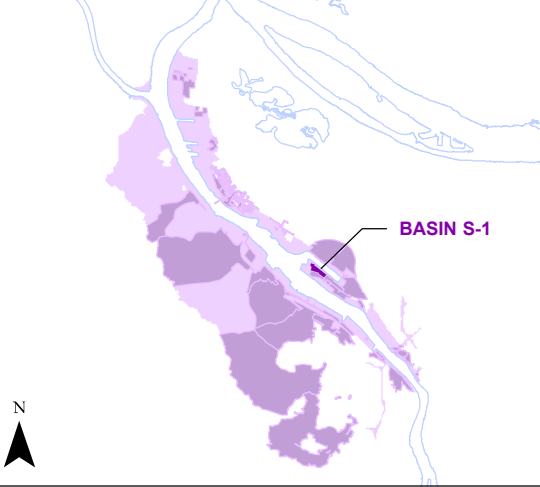
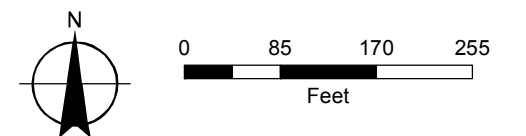


FIGURE 2
Basin S-1
Upland Site Source Controls



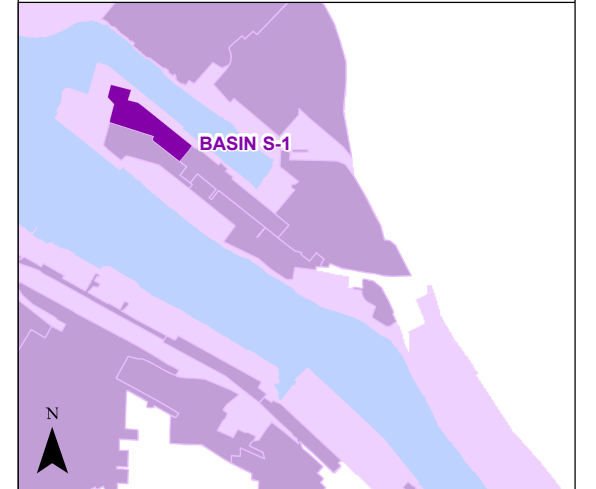
- Basin S-1
- Tax Lot
- DEQ Stormwater SCE**
 - SCE implemented or pending
- All Other Features**
 - NPDES Stormwater Discharge Permit
 - City Discharge Authorization
 - NPDES No Exposure Certification
 - Site Inspection - BES Industrial Stormwater Program
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary

NOTE:
The DEQ Milestone Report (DEQ, 2013) indicates only a portion of this site is in the DEQ Cleanup Program. However, based on discussions with DEQ, the entire site is being investigated under the Cleanup Program.



MAP NOTES:
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Data Sources: BES, METRO, Aerial Photo Taken 2012

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Completion Summary for City of Portland Outfall Basin S-2

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and several City programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled. This report summarizes the results of this collaborative effort in Outfall Basin S-2.

This Completion Summary includes a weight-of-evidence evaluation to demonstrate that source identification is complete and a summary of source controls (implemented or planned) that will control future contaminant discharges to the Willamette River.

Basin S-2 is located on the east side of the Willamette River in the Swan Island industrial area, at the southwestern corner of Swan Island Lagoon. Basin S-2 includes a small area of the Swan Island Portland Shipyard DEQ Cleanup Program site and is primarily occupied by light industrial facilities.

Evaluation of inriver sediment data did not indicate that the outfall is a significant pathway for contaminants to Swan Island Lagoon. However, given the sensitive nature of the lagoon, the City collected and analyzed basin stormwater data to verify that source tracing was not needed. The City also conducted an inline solids investigation in the basin following a release to the system to confirm that ongoing sources were not present. Three DEQ Cleanup Program sites are located within the basin. There are two operable units (OU) of the shipyard partially in the basin; DEQ issued a source control decision at OU3 and a source control evaluation (SCE) is underway at OU1. DEQ determined that an SCE is not needed or is a low priority at the third site.

The City concludes that no further source investigation is warranted. Implementation of source control measures (SCM) at upland sites, together with the existing programmatic SCMs in the basin, are expected to provide necessary source control for Outfall S-2 discharges. Therefore, the City has met the remedial investigation (RI)/SCM objectives for Basin S-2.

2 Introduction

This Completion Summary presents a weight-of-evidence evaluation of whether further source investigation is needed in Basin S-2, and the rationale for concluding that current and future discharges from the basin are not likely to be significant sources of contaminants to river sediment. The purpose of this report is to demonstrate that for Basin S-2 the City has met the joint RI/SCM objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ.

This report is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report), which provides additional background and detail regarding the City's harborwide source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Outfall S-2 discharges to the southwestern corner of Swan Island Lagoon on the east side of the Willamette River at approximately River Mile 9.1. The drainage area for the Basin S-2 conveyance system is approximately 27 acres. Figure 1 shows the location of the outfall and drainage basin boundary and provides an overview of the associated stormwater conveyance system. As shown in Figure 1, the basin includes a water quality drainage swale along the northwestern portion of N. Ballast Street. The City constructed this lined vegetated swale in 2012 to reduce total suspended solids loading to Outfall S-2.

Additional detail on the Outfall S-2 stormwater conveyance system and associated drainage basin is included in the *Programmatic Source Control Remedial Investigation Work Plan for the City of Portland Outfalls Project* (CH2M HILL, 2004) and *Outfall Basin S-2 Sediment Trap Investigation, Technical Memorandum No. OF S2-1* (BES, 2012).

3.2 Land Use and Potential Upland Sources

Basin S-2 is located in the Swan Island industrial area. Current land use in the basin is mostly light industrial (see Figure 1). Industrial operations in the basin include truck servicing and repair, truck assembly and testing, light manufacturing (e.g., electrical testing equipment and stage and theater equipment), and machine shop services. Outdoor activities at several of the industrial sites in the basin are primarily vehicle parking.

Sites that were identified as potential sources include three sites that are in the DEQ Cleanup Program, as listed in DEQ's Environmental Cleanup Site Information (ECSI) database. Table 1 lists these sites and indicates the associated contaminants of interest (COI) and the status of stormwater pathway evaluations. DEQ has issued a source control decision to a portion of the Shipyard site (OU3) and a stormwater SCE is underway at OU1. DEQ determined that a stormwater pathway evaluation at the other site is either not needed or is a low priority.

Table 1. DEQ Cleanup Program Sites in Basin S-2

DEQ Cleanup Program Site	Site COIs ⁽¹⁾	Site Stormwater Pathway Evaluations ⁽²⁾
Vigor Industrial/Swan Island Portland Shipyard OU1 (ECSI #271)	VOCs, PAHs, TPH, PCBs, metals, butyltins, phthalates	Source Control Evaluation In Progress
Swan Island Portland Shipyard OU3 (ECSI #271)/Crosby and Overton (ECSI #877)	PCBs	Source Control Decision ⁽³⁾
Automatic Vending (ECSI #1430)	TPH ⁽⁴⁾	Need for Source Control Evaluation to be Determined/Low Priority

Notes:

VOCs = volatile organic compounds; PAHs = polycyclic aromatic hydrocarbons; TPH = total petroleum hydrocarbons; PCBs = polychlorinated biphenyls; DEQ = Oregon Department of Environmental Quality; ECSI = Environmental Cleanup Site Information; COIs = contaminant of interest

(1) Unless otherwise noted, site COIs are those identified in Appendix Q (Source Control Inventory Tables) of the Portland Harbor RI/FS Draft Feasibility Study (FS) (Anchor et al., 2012).

(2) Source: DEQ Milestone Report, Figure 1b, "Status of Stormwater Source Control Evaluations, January 2013" (DEQ, 2013a).

(3) DEQ issued the source control decision after the January 2013 Milestone Report was completed.

(4) Site is not listed in Appendix Q of the draft FS. ECSI database (DEQ, 2013b) lists TPH in subsurface soil as a site contaminant.

Industrial sites covered, or historically covered, by National Pollutant Discharge Elimination System (NPDES) stormwater regulations also were considered as potential sources of pollutants to the City conveyance system. Table 2 lists sites within the basin that currently hold, or historically had, NPDES permits to discharge to the Basin S-2 conveyance system. Figure 1 shows sites with current NPDES permits. Note that the City operates under an NPDES Municipal Separate Storm Sewer System (MS4) stormwater permit that also covers basin drainage areas.

Table 2. Current⁽¹⁾ and Historical NPDES Permit Coverage in Basin S-2

Address	Company	Permit Type	Time Period
5555 N Channel	Port of Portland – Ship Repair	Stormwater (1200-L)	1993 – 1996
	Cascade General	Stormwater (1200-Z)	1996 – 2008
	Vigor Industrial LLC⁽²⁾	Stormwater (1200-Z)	2008 – Present

Notes:

NPDES = National Pollutant Discharge Elimination System

(1) Current permits are indicated in bold.

(2) Multiple tenants are included in the permit coverage areas.

3.3 Outfall Setting

Outfall S-2 discharges to an area of potential concern (AOPC 17b-Slip) identified by the U.S. Environmental Protection Agency (EPA) based on elevated concentrations of PCBs, phthalates, polycyclic aromatic hydrocarbons (PAH), metals, and other contaminants in river sediment (EPA, 2010). In addition to Outfall S-2, four other City outfalls (Outfalls M-1, M-2, M-3, and S-1) and more than 50 non-City outfalls discharge to AOPC 17b-Slip. Historically, overwater ship repairs also occurred along the west shore of the lagoon.

4 Basin Screening and Source Investigations

The City identified Basin S-2 as a Priority 4 for source tracing, based on the lack of elevated contaminant concentrations in the vicinity of Outfall S-2 (CH2M HILL, 2004). Priority 4 basins are considered the lowest priority for identifying sources. However, given the sensitive nature of the lagoon, the City collected and analyzed basin stormwater data in 2007 to verify that source tracing was not needed (BES, 2010). As part of the City's stormwater screening evaluation, the City collected stormwater samples from the downstream end of the basin (i.e., representing all collective discharges to the system). Based on the evaluation of these data and using a conservative screening approach, no analytes were identified as potentially warranting further source tracing in Basin S-2 (BES, 2010).

In 2009, a fire at the Daimler Trucks North America (Daimler) facility in the western portion of the basin (5411 N. Lagoon) resulted in contaminant releases to the City storm system. As part of the release response, a contractor cleaned the City storm line between the site and Outfall S-2. The City analyzed solids material removed from the line for disposal. Concentrations of polychlorinated biphenyls (PCB), semivolatile organic compounds (SVOC), and metals were elevated, but it could not be determined whether contaminant concentrations were related to the release, related to historical releases, or indicative of ongoing sources to Basin S-2. In 2011, to verify that major current sources were not present, the City conducted a sediment trap investigation in the western portion of the basin. In addition, the City required the Daimler site to characterize stormwater discharged from the site to verify that additional source control was not needed.

The City analyzed solids samples for contaminants detected in the spill response cleanout as well as organotins.¹ Evaluation of the 2011 source investigation data indicated that contaminant concentrations in solids discharging to the conveyance system are low and do not suggest the current presence of major contaminant sources. The investigation also concluded that offsite migration of tributyltin from OU1 of the Swan Island Shipyard to Basin S-2 likely is occurring (BES, 2012). This pathway is discussed in more detail in the Basin S-1 Completion Summary.

Table 3 lists investigations and evaluations completed by the City in the Basin S-2 conveyance system.

¹ Organotins were not analyzed in the cleanout sample, but had been detected in soils analyzed from nearby catch basins on N. Lagoon Avenue, during a source investigation in the adjacent Basin S-1 (BES, 2012b).

Table 3. City Investigations in the Basin S-2 Stormwater Conveyance System

Data Collection Period	Purpose	Documentation
2000	Compile basin background information to identify potential sources.	Preliminary Evaluation of City Outfalls (Eastshore) (BES, 2000)
2002	Evaluate inriver sediment data near City outfalls to prioritize basins for source tracing.	Programmatic Source Control Remedial Investigation Work Plan (CH2M HILL, 2004)
2007	Evaluate stormwater data from City outfalls to identify additional source tracing needs.	Stormwater Evaluation Report, City of Portland Outfall Project (BES, 2010)
2009	Analyze solids removed from western portion of the basin, as part of release response activities, to characterize material for disposal.	Outfall Basin S-2 Sediment Trap Investigation (TM No. OF S2-1) (BES, 2012)
2011	Investigate stormwater solids to verify that major sources were not present in the western portion of the basin.	Outfall Basin S-2 Sediment Trap Investigation (TM No. OF S2-1) (BES, 2012)

The City's investigation and data evaluation did not identify any current major sources of contaminants in Basin S-2.

5 Completion of Source Identification

The lines of evidence evaluated to confirm that source tracing is complete include (1) results of source investigation activities conducted in the basin (and upland site information) and (2) land use at remaining upland areas not undergoing DEQ Cleanup program investigation or redevelopment. Findings from this evaluation are summarized below.

- *Source Investigation Results:* The City's stormwater screening evaluation (BES, 2010) and stormwater solids investigation did not identify any analytes as potentially warranting further source tracing in Basin S-2.
- *Upland Investigation Coverage and Land Use:* The majority of the land use in Basin S-2 is light industrial (see Figure 1). Figure 2 displays the spatial extent of upland site investigation and other programmatic controls (see key to figures provided at beginning of this Appendix). As shown in Figure 2, three DEQ Cleanup Program sites are in the basin; SCE is pending at one site, a source control decision has been issued at the second site, and DEQ has determined that an SCE is not needed or is a low priority at the third site.

Land use at sites not covered by DEQ Cleanup or Water Quality Programs consists of distribution facilities and a few offices, storage, transportation, and manufacturing facilities (BES, 2000). All sites within the basin have been inspected by the City Industrial Stormwater Program to evaluate and provide technical assistance on industrial exposures to stormwater, and several sites do not have outdoor industrial operations. Current and future industrial activities that are exposed to stormwater are being addressed by the DEQ NPDES Program; non-industrial activities are not a known or suspected major source of contaminants to the City stormwater conveyance system.

Based on these lines of evidence, the City concludes that Basin S-2 source investigation is complete and there are no current major contaminant sources in the basin.

6 Basin Source Controls

The City and DEQ collaborated under their respective authorities to identify control mechanisms for minor sources located in the basin. Source controls include SCMs completed (or planned) at contaminated sites under DEQ Cleanup Program agreements and ongoing City and DEQ programs that are described in the Municipal Report. Source controls implemented in Basin S-2 are displayed in Figures 1 and 2 and summarized in this section.

One type of programmatic source control is the elimination of stormwater exposures to industrial activities. Table 4 lists sites that hold, or historically held, an NPDES No Exposure Certification.

Table 4. Sites with No Exposure Certification (NEC) in Basin S-2⁽¹⁾

Address	Company	NEC Time Period
5050 N. Lagoon	Stagecraft Industries	2010 - Present
5061 N. Lagoon	AM for Electronics	2010 - Present
3838 N Ballast	Kach Machine Works	2000 - Present

Notes:

(1) Current NECs are indicated in bold.

Table 5 summarizes additional site-specific, programmatic, and conveyance system source controls completed to date for Basin S-2.

Table 5. Basin S-2 Source Controls

Site/Area	Source Controls	Implementation Timeframe
Source Control Measures (SCM) at DEQ Cleanup Program Sites⁽¹⁾		
Vigor Industrial/Swan Island Portland Shipyard OU1 (ECSI #271)	Site has determined that stormwater treatment is warranted at the site. Design discussions are underway with DEQ.	To be determined; SCM planning is in progress.
Swan Island Portland Shipyard OU3 (ECSI #271) / Crosby and Overton (ECSI #877)	Cleaned portions of the onsite stormwater lines, inlets, and paved areas.	2008 - 2009
Automatic Vending (ECSI #1430)	Not needed.	NA
City Conveyance System		
N. Lagoon Avenue	The western portion of the stormwater conveyance system in N. Lagoon Avenue was cleaned in response to a contaminant release from a fire at the Daimler Facility.	2009
N. Ballast Street	The City constructed a water quality swale to reduce solids loading to Basin S-2. The swale treats stormwater discharged from the northwest half of N. Ballast Street, between N. Commerce and Lagoon Avenues.	2012
Other (Programmatic Source Controls)⁽²⁾		
Daimler Corp 2 Test Center; Daimler Corp 3 Test Center; DSU-Peterbuilt & GMC	City Discharge Authorization⁽³⁾	Ongoing
See listing in Table 2	NPDES 1200-Z Stormwater Permit Requirements	Ongoing
See listing in Table 4	NPDES No Exposure Certifications	Ongoing

Notes:

DEQ = Oregon Department of Environmental Quality; NPDES = National Pollutant Discharge Elimination System; ECSI = Environmental Cleanup Site Information; NA = not applicable

(1) For upland sites, description of SCMs are based on reports on file with DEQ.

(2) Programmatic source controls are described in detail in Municipal Report.

(3) Additional site-specific stormwater pollution controls required and implemented under City Code.

Other municipal programs (e.g., periodic inspection of and technical assistance to non-NPDES sites, illicit discharge monitoring, street sweeping, etc.) likely provide additional source control benefits in the basin and will help to address minor sources for which specific control measures have not been required. City programs that control current and future contaminant discharges to the conveyance system are described in the Municipal Report.

7 Conclusion

The City completed source tracing in Basin S-2 and no current major sources of contaminants to the City conveyance system were identified. Therefore, future discharges from Outfall S-2 are unlikely to represent a significant source of contaminants to the river. However, given the sensitive nature of the lagoon, the City will continue to look for opportunities with existing and

future City stormwater programs to reduce suspended solids loading from the basin to the river. The City concludes that it has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin S-2.

8 References

- Anchor et al. 2012. Portland Harbor RI/FS Draft Feasibility Study. Prepared for The Lower Willamette Group by Anchor QEA, LLC, Windward Environmental, LLC, Kennedy/Jenks Consultants, and Integral Consulting, Inc. February 2012.
- BES. 2000. Preliminary Evaluation of City Outfalls. Portland Harbor Study Area. Notebook 1: Eastshore Stormwater and CSO Outfalls. City of Portland, Bureau of Environmental Services. December 2000.
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- CH2M HILL. 2004. Programmatic Source Control Remedial Investigation Work Plan of the City of Portland Outfalls Project. Prepared by CH2M HILL for the City of Portland Bureau of Environmental Services. March 19, 2004.
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<http://www.deq.state.or.us/lq/ECSI/ecsidetail.asp?seqnbr=1430>
- EPA. 2010. Re: Portland Harbor Superfund Site; Administrative Order on Consent for Remedial Investigation and Feasibility Study; Docket No. CERCLA-10-2001-0240. Portland Harbor Feasibility Study Source Tables. Letter from EPA to Mr. Bob Wyatt, Chairman, Lower Willamette Group. November 23, 2010.

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Figure 1: Basin S-2 Overview and Conveyance System Source Controls

Figure 2: Basin S-2 Upland Site Source Controls

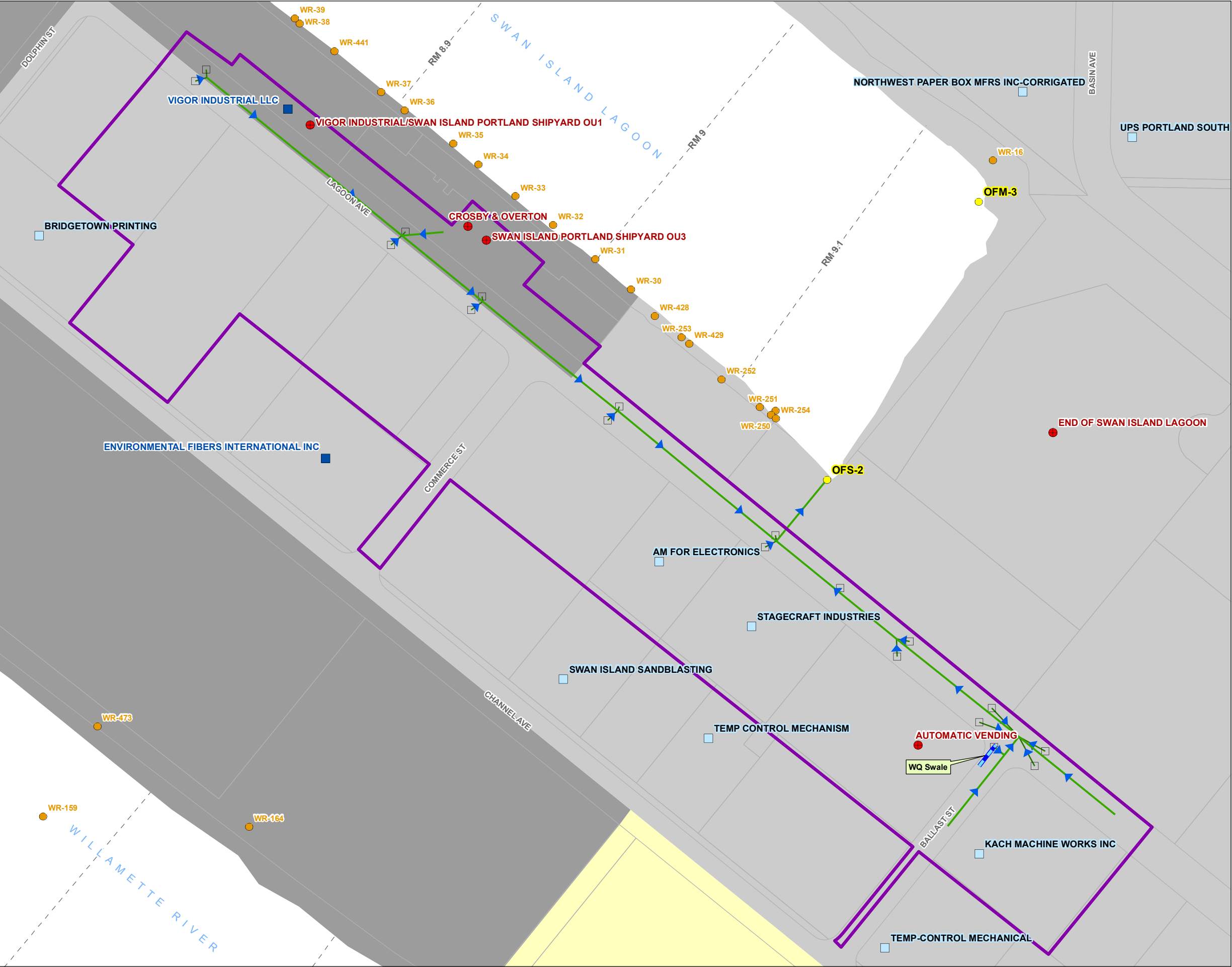
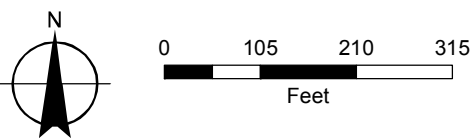


FIGURE 1
Basin S-2
Overview and Conveyance
System Source Controls

- Basin S-2
- DEQ ECSI Site
- NPDES Stormwater Permit
- NPDES No Exposure Certification
- Conveyance System**
 - Storm Line
 - Water Quality (WQ) Swale
 - Catch Basin
 - City Outfall
 - Non-City Outfall
- Land Use/Zoning**
 - Heavy Industrial
 - Light Industrial
 - General Employment
- All Other Data**
 - River Mile (RM)
 - Tax Lot
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO

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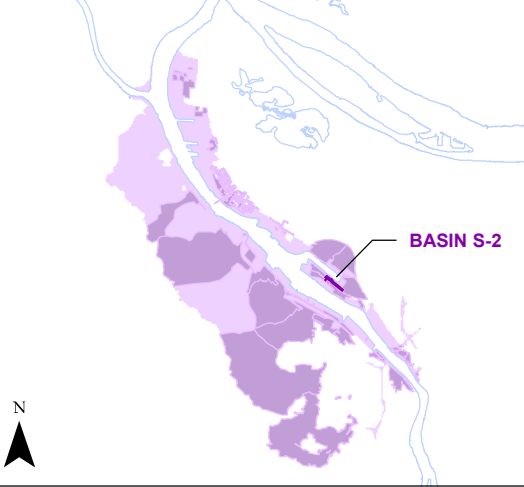
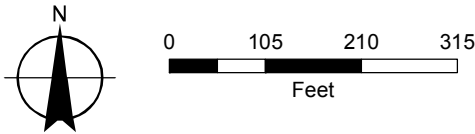




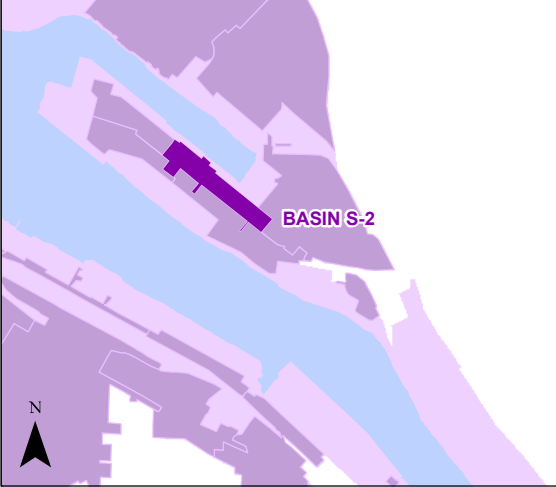
FIGURE 2
Basin S-2
Upland Site Source Controls

- Basin S-2
- Tax Lot
- DEQ Stormwater SCEs**
 - SCE implemented or pending
 - SCE not needed or low priority
- All Other Features**
 - NPDES Stormwater Discharge Permit
 - City Discharge Authorization
 - NPDES No Exposure Certification
 - >50% of Site Area Redeveloped Under City SWMM
 - Stormwater Treatment Facility
 - Site Inspection - BES Industrial Stormwater Program
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO, Aerial Photo Taken 2012

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Completion Summary for City of Portland Outfall Basin S-5

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and several City programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled. This report summarizes the results of this collaborative effort in Outfall Basin S-5.

This Completion Summary includes a weight-of-evidence evaluation to demonstrate that source identification is complete and a summary of source controls (implemented or planned) that will control future contaminant discharges to the Willamette River.

Basin S-5 is located on the southwestern portion of Swan Island, along the east side of the Willamette River. Current land use in this basin is light industrial (recycling, warehouse, sandblasting and painting, truck assembly and testing, and small manufacturing operations) and general employment (offices and associated parking).

Evaluation of inriver sediment data near the outfall showed slightly elevated contaminant concentrations in the vicinity of the outfall, indicating that contaminant sources may be present in the basin. Subsequently, the City conducted an inline solids investigation and a stormwater screening evaluation to identify any major sources in the basin and to confirm that further source tracing was not needed. In addition, the U.S. Environmental Protection Agency (EPA) has not identified the potential need for sediment remediation in the vicinity of the outfall.

The City concludes that no additional source investigations are warranted in this basin. Implementation of the existing programmatic source control measures (SCM) are sufficient for ensuring discharges from Outfall S-5 are protective of the river. Therefore, the City has met the remedial investigation (RI)/SCM objectives for Basin S-5.

2 Introduction

This Completion Summary presents a weight-of-evidence evaluation of whether further source investigation is needed in Basin S-5, and the rationale for concluding that current and future discharges from the basin are not likely to be significant sources of contaminants to river sediment. The purpose of this report is to demonstrate that for Basin S-5 the City has met the joint RI/SCM objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ.

This report is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report), which provides additional background and detail regarding the City's harborwide source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Outfall S-5 discharges to the east side of the Willamette River at approximately River Mile 9.2. The drainage area for the Basin S-5 conveyance system is approximately 38 acres. Figure 1 shows the location of the outfall and drainage basin boundary and provides an overview of the associated stormwater conveyance system. As shown in Figure 1, the basin includes five water quality swales along the western side of N. Channel Avenue. The City constructed two of these vegetated swales in 2009, and three more in 2013, to infiltrate stormwater and to reduce total suspended solids loading to Outfall S-5. City programs that result in these types of stormwater improvements are described in the Municipal Report.

Additional detail on the Outfall S-5 stormwater conveyance system and associated drainage basin is included in the *Programmatic Source Control Remedial Investigation Work Plan for the City of Portland Outfalls Project* (CH2M HILL, 2004) and *Outfall Basin S-5 Inline Solids Sampling, Technical Memorandum No. OF S5-1* (BES, 2006).

3.2 Land Use and Potential Upland Sources

Basin S-5 is located in the Swan Island industrial area. Zoning in the basin is light industrial and general employment.¹ A large office complex occupies nearly one-third of the southern portion of the basin. Other activities in the basin include recycling, warehousing, sandblasting and painting, truck assembly and testing, and small manufacturing operations. Most industrial activities in the basin are conducted within buildings, limiting industrial exposures to stormwater. There are no DEQ Cleanup Program sites in the basin.

Industrial sites covered, or historically covered, by National Pollutant Discharge Elimination System (NPDES) stormwater regulations were considered as potential sources of pollutants to the City conveyance system. Only one property in the basin has a current (and historical) NPDES stormwater permit: Environmental Fibers International Inc., located at the western end of the basin (see Figure 1). The facility recycles paper, cardboard, and plastic materials. Table 1 includes the history for the NPDES permits at this site. Note that the City operates under an NPDES Municipal Separate Storm Sewer System (MS4) stormwater permit that also covers basin drainage areas.

¹ General employment is a Portland zoning category that allows a range of employment opportunities but emphasizes industrial and industrial-support uses. The zones can allow for the transition to a less industrial overall nature.

Table 1. Current⁽¹⁾ and Historical NPDES Permit Coverage in Basin S-5

Address	Company	Permit Type	Time Period
4325 N Commerce	Greenstone Ind. - Portland Inc.	Stormwater (1200-Z)	1998 - 2001
	Environmental Fibers International Inc.	Stormwater (1200-Z)	2004 - Present

(1) Current permits are indicated in bold.

3.3 Outfall Setting

Outfall S-5 discharges to the main stem of the Willamette River, at the upstream end of Swan Island. The outfall does not discharge into an area of potential concern (AOPC) designated by the U.S. Environmental Protection Agency (EPA) as potentially warranting sediment remediation (EPA, 2010).

4 Basin Screening and Source Investigations

The City identified Basin S-5 as a Priority 2 for source tracing (CH2M HILL, 2004). Priority 2 designations were applied to outfalls where slightly elevated concentrations of contaminants in sediment were observed in the vicinity of the outfall, indicating that sources that could affect sediment quality may be present in the basin. In 2005, the City conducted an inline solids source investigation for metals and semivolatile organic compounds (SVOC). Material was not available for sampling in the eastern portion of the basin; the analytical results for samples subsequently collected from the western portion of the basin did not indicate that major contaminant sources are present in Basin S-5 (BES, 2006). To verify that additional source tracing was not needed, the City analyzed stormwater data collected in 2007 from the downstream end of the basin (i.e., representing all collective discharges to the system). Based on the evaluation of these data and using a conservative screening approach, no analytes were identified as potentially warranting further source tracing in Basin S-5 (BES, 2010).

Table 2 lists investigations and evaluations completed by the City in the Basin S-5 conveyance system.

Table 2. City Investigations in the Basin S-5 Stormwater Conveyance System

Data Collection Period	Purpose	Documentation
2000	Compile basin background information to identify potential sources.	Preliminary Evaluation of City Outfalls (Eastshore) (BES, 2000)
2002	Evaluate inriver sediment data near City outfalls to prioritize basins for source tracing.	Programmatic Source Control Remedial Investigation Work Plan (CH2M HILL, 2004)
2005	Investigate stormwater solids to determine if contaminants were being discharged at concentrations that could be detrimental to the Willamette River.	City Outfall Basin S-5 Inline Solids Sampling (TM No. OF S5-1) (BES, 2006)
2007	Evaluate stormwater data from City outfalls to identify additional source tracing needs.	Stormwater Evaluation Report, City of Portland Outfall Project (BES, 2010)

The City's investigation work did not identify any current major sources of contaminants in Basin S-5.

5 Completion of Source Identification

The lines of evidence evaluated to confirm that source tracing is complete in Basin S-5 include (1) inriver sediment concentrations near the outfall, (2) results of source investigation activities conducted in the basin, and (3) land use. Findings from this evaluation are summarized below.

- *Inriver Sediment Concentrations:* River sediment in the vicinity of Outfall S-5 does not contain elevated contaminant concentrations (i.e., the outfall does not discharge to an AOPC).
- *Source Investigation Results:* The City's inline solids investigation (BES, 2006) and stormwater screening evaluation (BES, 2010) did not identify any analytes as potentially warranting further source tracing in Basin S-5.
- *Land Use:* Land use in Basin S-5 is light industrial (e.g., warehousing and small manufacturing operations) and commercial offices (see Figure 1). Most industrial operations take place within buildings. Figure 2 displays the spatial extent of DEQ and City programmatic controls (see key to figures provided at beginning of this Appendix). As shown in Figure 2, most of the sites in the basin have been inspected by the City Industrial Stormwater Program to evaluate and provide technical assistance on industrial exposures to stormwater. Current and future industrial activities that are exposed to stormwater are being addressed by the DEQ NPDES Program; non-industrial activities are not a known or suspected major source of contaminants to the City stormwater conveyance system.

Based on these lines of evidence, the City concludes that Basin S-5 source investigation is complete and there are no major contaminant sources in the basin.

6 Basin Source Controls

Source control in Basin S-5 includes ongoing City and DEQ programs that are described in the Municipal Report. Source controls implemented in the basin are displayed in Figures 1 and 2 and summarized in this section.

One type of programmatic source control is the elimination of stormwater exposures to industrial activities. Table 3 lists sites that hold, or historically held, an NPDES No Exposure Certification.

Table 3. Sites with No Exposure Certification (NEC) in Basin S-5⁽¹⁾

Address	Company	NEC Time Period
4800 N Channel	Temp-Control Mechanical	2010 – Present
5016 N Channel	Temp-Control Mechanical	2010 – Present
5020 N Channel	Swan Island Sandblasting	2009 – Present

Notes:

(1) Current NECs are indicated in bold.

Table 4 summarizes additional programmatic source controls for Basin S-5.

Table 4. Basin S-5 Source Controls

Site/Area	Source Controls	Implementation Timeframe
City Conveyance System		
N Channel Avenue	The City constructed two unlined water quality swales to reduce total suspended solids loading to Outfall S-5. The swales treat stormwater discharged from a portion of N. Channel Avenue northwest of the intersection of N. Ballast Street and N. Channel Avenue.	2009
	The City constructed three additional lined water quality swales along the west side of N. Channel Avenue between N. Ballast Street and N. Dolphin Street. The swales are designed to reduce suspended solids loading to Outfall S-5.	2013
Other (Programmatic Source Controls)⁽¹⁾		
Environmental Fibers International; Temp-Control Mechanical	Stormwater Management Manual Requirements	Ongoing
Daimler Corp 2 Test Center	City Discharge Authorization⁽²⁾	Ongoing
Environmental Fibers	NPDES 1200-Z Stormwater Permit Requirements	Ongoing
See listing in Table 3	NPDES No Exposure Certifications	Ongoing

Notes:

NPDES = National Pollutant Discharge Elimination System

(1) Programmatic source controls are described in detail in the Municipal Report.

(2) Additional site-specific stormwater pollution controls required and implemented under City Code.

Other municipal programs (e.g., periodic inspection of and technical assistance to non-NPDES sites, illicit discharge monitoring, street sweeping, etc.) likely provide additional source control benefits in the basin and will help to address minor sources for which specific control measures have not been required. City programs that control current and future contaminant discharges to the conveyance system are described in the Municipal Report.

7 Conclusion

The City completed source tracing in Basin S-5 and concludes that no current major sources of contaminants to the City conveyance system are present. Therefore, future discharges from Outfall S-5 are unlikely to represent a significant source of contaminants to the river. The City concludes that it has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin S-5.

8 References

- BES. 2000. Preliminary Evaluation of City Outfalls. Portland Harbor Study Area. Notebook 1: Eastshore Stormwater and CSO Outfalls. City of Portland, Bureau of Environmental Services. December 2000.
- BES. 2006. Outfall Basin S-5 Inline Solids Sampling, Technical Memorandum No. OF S5-1. City of Portland, Bureau of Environmental Services. June 6, 2006.
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- EPA. 2010. Re: Portland Harbor Superfund Site; Administrative Order on Consent for Remedial Investigation and Feasibility Study; Docket No. CERCLA-10-2001-0240. Portland Harbor Feasibility Study Source Tables. Letter from EPA to Mr. Bob Wyatt, Chairman, Lower Willamette Group. November 23, 2010.

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Figure 1: Basin S-5 Overview and Conveyance System Source Controls

Figure 2: Basin S-5 Upland Site Source Controls

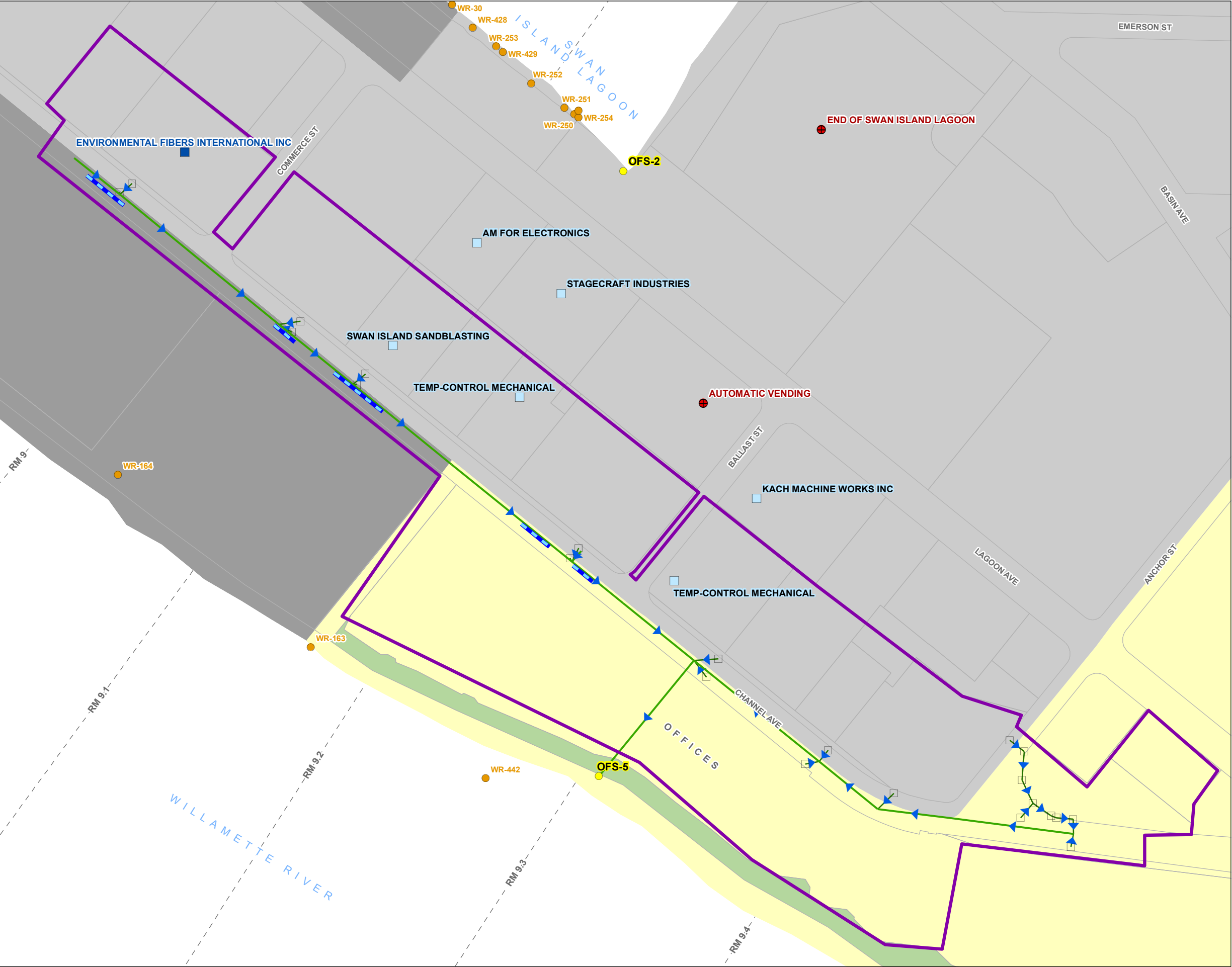
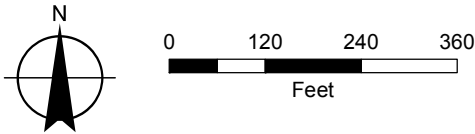


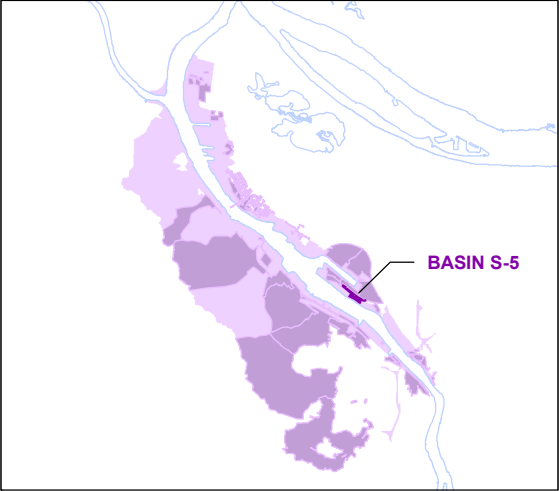
FIGURE 1
Basin S-5
Overview and Conveyance
System Source Controls

- Basin S-5
- DEQ ECSI Site
- NPDES Stormwater Permit
- NPDES No Exposure Certification
- Conveyance System**
 - Storm Line
 - Water Quality Swale
 - Catch Basin
 - City Outfall
 - Non-City Outfall
- Land Use/Zoning**
 - Heavy Industrial
 - Light Industrial
 - General Employment
 - Parks and Open Space
- All Other Data**
 - River Mile (RM)
 - Tax Lot
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: January 13, 2013
Data Sources: BES, METRO

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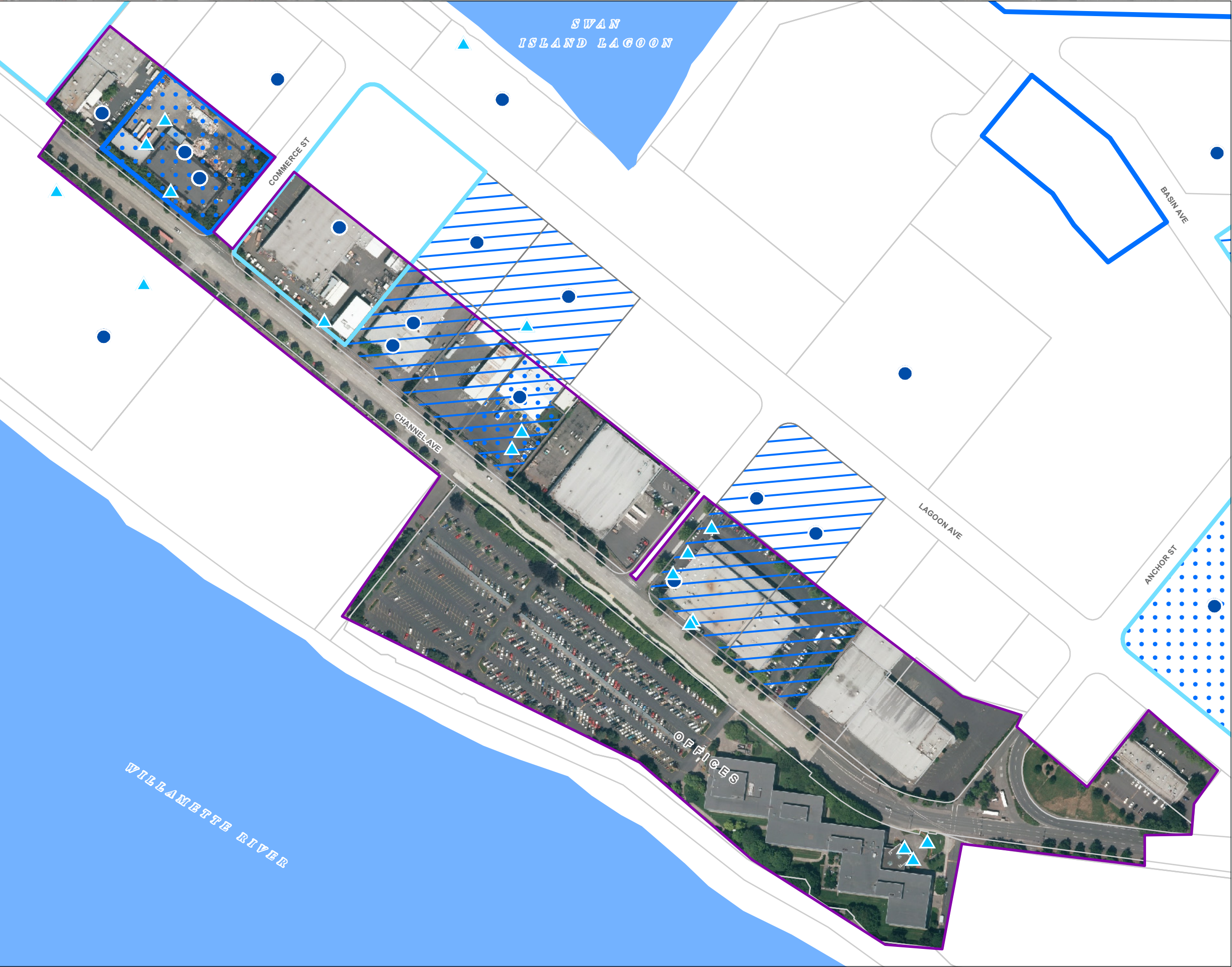
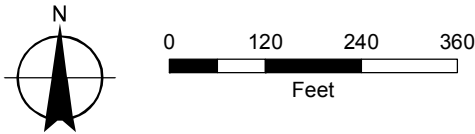


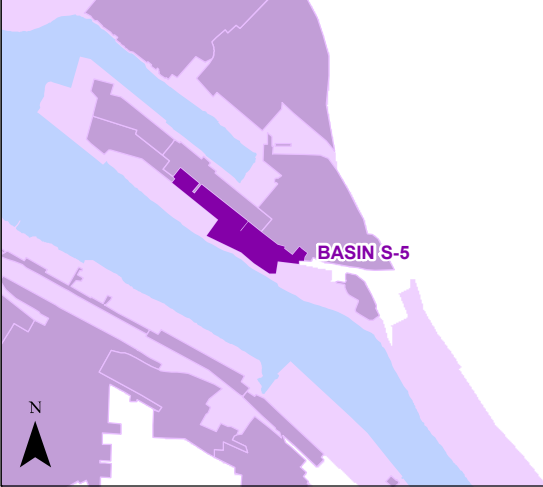
FIGURE 2
Basin S-5
Upland Site Source Controls

- Basin S-5
- Tax Lot
- All Other Features**
- NPDES Stormwater Discharge Permit
- City Discharge Authorization
- NPDES No Exposure Certification
- >50% of Site Area Redeveloped Under City SWMM
- Stormwater Treatment Facility
- Site Inspection - BES Industrial Stormwater Program
- Discharges to City Outfall
- Portland Harbor Hydroboundary



MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO, Aerial Photo Taken 2012

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Completion Summary for City of Portland Outfall Basin S-6

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and several City programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled. This report summarizes the results of this collaborative effort in Outfall Basin S-6.

This Completion Summary includes a weight-of-evidence evaluation to demonstrate that source identification is complete and a summary of source controls (implemented or planned) that will control future contaminant discharges to the Willamette River.

Basin S-6 is located on the east side of the Willamette River, in the Swan Island industrial area, on the northwest portion of Swan Island. Two DEQ Cleanup Program sites occupy a little more than half of the basin: the Vigor Industrial site (also known as the Swan Island Portland Shipyard; Shipyard site) and the EWH, LLC site (EWH site), which is leased for metal fabrication and sandblasting/painting operations.

Early evaluation of inriver sediment data near the outfall did not indicate the apparent presence of major sources in the basin. To verify that major sources were not present in the basin, the City conducted an inline solids source investigation in 2005. Results indicated that the Shipyard site was a source of contaminants to the basin, but was inconclusive about other potential source areas. In 2007, the City collected stormwater samples from the basin as part of its Portland Harbor stormwater screening effort to determine whether additional source investigation was needed in the basin. The results indicated that copper and zinc concentrations were slightly elevated, but further source tracing was not recommended because the City had already identified the Shipyard site as a source of metals and other contaminants to the basin and a source control evaluation (SCE) was underway at this site. In addition, City source investigation of the adjacent Basin S-1 identified a previously unknown contaminated site (EWH site) that has since entered the DEQ Cleanup Program. This site also discharges to Basin S-6.

Vigor Industrial has initiated the design of stormwater source control measures (SCM) under DEQ oversight. EWH has entered into an agreement with DEQ to evaluate the stormwater pathway. SCM implementation at these sites, together with current and future source control programs in the basin, are expected to provide necessary source control for Outfall S-6 discharges.

The City has identified the major sources of contaminants to the basin and necessary controls are being implemented under DEQ and/or City authority. Therefore, the City has met the remedial investigation (RI)/SCM objectives for Basin S-6.

2 Introduction

This Completion Summary presents a weight-of-evidence evaluation of whether further source investigation is needed in Basin S-6, and the rationale for concluding that future discharges from the basin are not likely to be significant sources of contaminants to river sediment. The purpose of this report is to demonstrate that, for Basin S-6, the City has met the joint RI/SCM objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ. Together, the City and DEQ identified all major sources of contamination to the basin and are using their respective authorities to ensure that source controls are implemented where needed.

This report is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report), which provides additional background and detail regarding the City's harborwide source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Outfall S-6 discharges to the east side of the Willamette River at approximately River Mile 8.6. The drainage area for the Basin S-6 conveyance system is approximately 22 acres. Figure 1 shows the location of the outfall and drainage basin boundary and provides an overview of the associated stormwater conveyance system. As shown in Figure 1, the basin includes a water quality swale along the western side of N. Channel Avenue. The City constructed this lined vegetated swale in 2013, to reduce total suspended solids loading to Outfall S-6. City programs that result in this type of stormwater improvements are described in the Municipal Report.

Additional detail on the Outfall S-6 stormwater conveyance system and associated drainage basin is included in the *Programmatic Source Control Remedial Investigation Work Plan for the City of Portland Outfalls Project* (CH2M HILL, 2004) and the *City Outfall Basin S-6 Inline Solids Sampling Technical Memorandum No. OF S6-1* (BES, 2008).

3.2 Land Use and Potential Upland Sources

Basin S-6 is located on the northwestern end of the Swan Island industrial area. Land use in the basin is a mix of heavy and light industrial activities. Current industrial operations in the basin include machine shops, metal fabrication and sandblasting/painting, material storage, service and repair of marine equipment, commercial printing, and truck and employee parking.

Sites that were identified as potential upland sources include the two sites in the basin that are in the DEQ Cleanup Program, as listed in DEQ's Environmental Cleanup Site Information (ECSI) database. Table 1 lists the associated contaminants of interest (COI) and the status of stormwater pathway evaluations for these sites. As indicated in Table 1, these sites are in the process of completing stormwater pathway evaluations under DEQ oversight.

Table 1. DEQ Cleanup Program Sites in Basin S-6

DEQ Cleanup Program Site	Site COIs ⁽¹⁾	Site Stormwater Pathway Evaluations ⁽²⁾
Vigor Industrial/Swan Island Portland Shipyard (OU1) (ESCI #271)	VOCs, PAHs, TPH, PCBs, metals, butyltins, phthalates	Source Control Evaluation In Progress
EWI, LLC (ESCI #5685)	Not listed ⁽³⁾	Source Control Evaluation In Progress

Notes:

VOCs = volatile organic compounds; PAHs = polycyclic aromatic hydrocarbons; TPH = total petroleum hydrocarbons; PCBs = polychlorinated biphenyls; ESCI = Environmental Cleanup Site Information; COIs = contaminants of interest; DEQ = Oregon Department of Environmental Quality

- (1) Site COIs are those identified in Appendix Q (Source Control Inventory Tables) of the Portland Harbor RI/FS Draft Feasibility Study (FS) (Anchor et al., 2012).
- (2) Source: DEQ Milestone Report, Figure 1b, "Status of Stormwater Source Control Evaluations, January 2013" (DEQ, 2013).
- (3) Site joined Cleanup Program in January 2012 and is not listed in Appendix Q of the draft FS. ESCI database (DEQ, 2012) does not identify site contaminants.

Industrial sites covered, or historically covered, by National Pollutant Discharge Elimination System (NPDES) stormwater regulations also were considered as potential sources of pollutants to the City conveyance system. Table 2 lists sites within the basin that currently hold, or historically held, NPDES permits to discharge to the Basin S-6 conveyance. Sites with current NPDES permits are shown in Figure 1. Note that the City operates under an NPDES Municipal Separate Storm Sewer System (MS4) stormwater permit that also covers basin drainage areas.

Table 2. Current⁽¹⁾ and Historical NPDES Permit Coverage in Basin S-6

Address	Company	Permit Type	Time Period
5555 N Channel	Port of Portland Ship Repair ⁽²⁾	Stormwater (1200-L)	1993 – 1996
	Cascade General, Inc. ⁽²⁾	Stormwater (1200-Z)	1996 – 2008
	AGG Enterprises, Inc.	Stormwater (1200-Z)	2001 – 2002
	Vigor Industrial LLC⁽²⁾	Stormwater (1200-Z)	2008 – Present
5555 N. Channel, Building 2	EWI LLC⁽²⁾	Stormwater (1200-Z)	2011 – Present

Notes:

NPDES = National Pollutant Discharge Elimination System

- (1) Current permits are indicated in bold.
- (2) Multiple tenants are included in the permit coverage areas.

3.3 Outfall Setting

Outfall S-6 does not discharge to a river reach identified by U.S. Environmental Protection Agency (EPA) as an area of potential concern (AOPC) based on results of river sediment sampling (EPA, 2010).

4 Basin Screening and Source Investigations

The City identified Basin S-6 as a Priority 4 basin for source tracing based on evaluation of inriver sediment data near the outfall, which did not indicate the presence of major sources in the basin (CH2M HILL, 2004). Priority 4 basins are considered the lowest priority for identifying sources.

Following collection of additional inriver sediment data and EPA identification of the adjacent inriver area as an AOPC (EPA, 2005), the City conducted a source investigation in the basin to identify potential sources to the basin. Based on a review of sediment data and EPA's COIs for the Swan Island area, the City identified three metals (copper, lead, and zinc), phthalates, and polychlorinated biphenyls (PCB) as contaminants for further screening in the basin (BES, 2008). The City collected inline solids samples from Basin S-6 in 2006 to assess the possible presence of major contaminant sources within the basin. Investigation results indicate that metals (copper, lead, and zinc) and PCBs were being discharged to the Basin S-6 stormwater conveyance system from the Shipyard site; the investigation was inconclusive about other potential source areas (BES, 2008).

The City collected and analyzed basin stormwater data in 2007 to verify that additional source tracing was not needed (BES, 2010). As part of the City's stormwater screening evaluation, the City sampled stormwater from the downstream end of the basin (i.e., at a location representing cumulative discharge from the entire basin). Based on the evaluation of these data and using a conservative screening approach, copper and zinc were identified as potentially warranting further source tracing in Basin S-6. However, the City concluded that further source tracing in Basin S-6 was not warranted because results of the 2006 inline solids investigation had confirmed that elevated concentrations of these metals were being discharged to basin from the Shipyard site and a stormwater pathway evaluation was already underway at this site under DEQ oversight (BES, 2010). Subsequent source investigation results in the adjacent Basin S-1 also indicated that that offsite migration of Shipyard site contaminants likely is occurring via other pathways (e.g. vehicle drag-out and/or air deposition) (BES, 2012). Shipyard site contaminants also may be migrating to Basin S-6 via these pathways.

Table 3 lists investigations and evaluations completed by the City in the Basin S-6 conveyance system.

Table 3. City Investigations in the Basin S-6 Stormwater Conveyance System

Data Collection Period	Purpose	Documentation
2000	Compile basin background information to identify potential sources.	Preliminary Evaluation of City Outfalls (Eastshore) (BES, 2000)
2002	Evaluate inriver sediment data near City outfalls to prioritize basins for source tracing.	Programmatic Source Control Remedial Investigation Work Plan (CH2M HILL, 2004)
2006	Evaluate inline solids data to identify major contaminant sources in the basin.	City Outfall Basin S-6 Inline Solids Sampling (TM No. OF S6-1) (BES, 2008)
2007	Evaluate stormwater data from City outfalls to identify additional source tracing needs.	Stormwater Evaluation Report, City of Portland Outfall Project (BES, 2010)

As described above, the City's source investigation work has been used by DEQ during evaluation of data collected by the Shipyard site. In addition, City source investigation of the adjacent Basin S-1 identified a previously unknown contaminated site (EWH site) that has since entered the DEQ Cleanup Program (BES, 2012). This site also discharges to Basin S-6 and may be a current source of contaminants to the basin. DEQ currently is working with the Shipyard and EWH site to complete SCEs and to implement appropriate SCMs. Joint investigations by the City and DEQ resulted in the identification of one or more sources of the contaminants selected for source tracing in Basin S-6.

5 Completion of Source Identification

The lines of evidence evaluated to confirm that source tracing is complete and all major sources have been identified include (1) inriver sediment concentrations near the outfall, (2) results of source tracing activities conducted in the basin (and upland site information), and (3) upland investigation coverage. Findings from this evaluation are summarized below.

- *Inriver sediment concentration:* River sediment in the vicinity of Outfall S-6 does not contain elevated contaminant concentrations (i.e., the outfall does not discharge to an AOPC).
- *Source Investigation Results:* A source of all contaminants identified for further source tracing (copper and zinc) has been identified. Evaluation of the 2006 stormwater solids data indicated that the Shipyard site is a source of these contaminants to the basin (BES, 2008). The EWH site also may be a source of copper and zinc to the basin, based on findings in the Basin S-1 source investigation (BES, 2012). Both sites are being investigated further under DEQ oversight.
- *Upland Investigation Coverage and Land Use:* Figure 2 displays the spatial extent of DEQ Cleanup Program site investigations and other programmatic controls (see key to figures provided at beginning of this Appendix). As shown in Figure 2, all sites in the basin are being investigated under DEQ oversight, or likely do not need investigation because of existing controls. Sites in the basin are:
 - Investigating the stormwater pathway and developing SCMs for implementation under DEQ Cleanup Program authority; and/or
 - Have demonstrated that they do not have industrial exposures to stormwater (see Section 6).

Industrial activities exposed to stormwater are being addressed by the DEQ Water Quality NPDES Program, and non-industrial activities are not a known or suspected source of contaminants to the City stormwater conveyance system.

Based on these lines of evidence, the City concludes that Basin S-6 source investigation is complete and all major sources have been identified.

6 Basin Source Controls

The City and DEQ collaborated under their respective authorities to identify control mechanisms for major and minor sources located in the basin. Source control in Basin S-6 includes SCMs completed (or planned) at contaminated sites under DEQ Cleanup Program agreements and ongoing City and DEQ programs that are described in the Municipal Report. Source controls implemented in Basin S-6 are displayed in Figure 2 and summarized in this section.

One type of programmatic source control is the elimination of stormwater exposures to industrial activities. Table 4 lists sites that hold an NPDES No Exposure Certification.

Table 4. Sites with No Exposure Certification (NEC) in Basin S-6⁽¹⁾

Address	Company	NEC Time Period
5300 N Channel	Bridgetown Printing	2010 – Present
5565 N Dolphin	C H Murphy/Clark Ullman Inc.	2009 – Present

Notes:

(1) Current NECs are indicated in bold.

Table 5 summarizes additional site-specific and programmatic source controls completed to date in Basin S-6.

Table 5. Basin S-6 Source Controls

Site/Area	Source Controls	Implementation Timeframe
Source Control Measures (SCM) at DEQ Cleanup Program Sites⁽¹⁾		
Vigor Industrial/Swan Island Portland Shipyard (OU1) (ESCI #271)	Site has determined that stormwater treatment is warranted at the site. Design discussions are underway with DEQ.	To be determined; SCM planning is in progress
EWH, LLC (ESCI #5685)	Stormwater lines and catch basins cleaned out.	2012
	Additional SCMs to be determined.	To be determined.
City Conveyance System		
N. Channel Avenue	The City constructed a lined water quality swale along the west side of N. Channel Avenue between N. Dolphin Street and N. Commerce Street. The swale is designed to reduce suspended solids loading to Outfall S-6.	2013
Other (Programmatic Source Controls)⁽²⁾		
Vigor Industrial	Stormwater Management Manual Requirements	Pending. Likely will apply during redevelopment.
See listing in Table 2	NPDES 1200-Z Stormwater Permit Requirements	Ongoing
See listing in Table 4	NPDES No Exposure Certifications	Ongoing

Notes:

NPDES = National Pollutant Discharge Elimination System; DEQ = Oregon Department of Environmental Quality; ESCI = Environmental Cleanup Site Information

(1) For upland sites, descriptions of SCMs are based on information in DEQ Milestone Report (DEQ, 2013), DEQ source control decisions, and/or reports on file with DEQ.

(2) Programmatic source controls are described in the Municipal Report.

All major contaminant sources have been controlled or will be controlled after implementation of SCMs has been completed under the programs identified above. Other municipal programs (e.g., periodic inspection of and technical assistance to non- NPDES sites, illicit discharge monitoring, street sweeping, etc.) likely provide additional source control benefits in the basin and will help to address minor sources for which specific control measures have not been required. City programs that control current and future contaminant discharges to the conveyance system are described in the Municipal Report.

7 Conclusion

The City completed source tracing in Basin S-6 and identified the major source of contaminants to the City conveyance system. Given that necessary SCMs at the identified source are being determined and implemented under appropriate DEQ and City regulatory authorities, future discharges from Outfall S-6 are unlikely to represent a significant source of contaminants to the river. The City concludes that it has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin S-6.

8 References

- Anchor et al. 2012. Portland Harbor RI/FS Draft Feasibility Study. Prepared for The Lower Willamette Group by Anchor QEA, LLC, Windward Environmental, LLC, Kennedy/Jenks Consultants, and Integral Consulting, Inc. February 2012.
- BES. 2000. Preliminary Evaluation of City Outfalls. Portland Harbor Study Area. Notebook 1: Eastshore Stormwater and CSO Outfalls. City of Portland, Bureau of Environmental Services. December 2000.
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- CH2M HILL. 2004. Programmatic Source Control Remedial Investigation Work Plan of the City of Portland Outfalls Project. Prepared by CH2M HILL for the City of Portland Bureau of Environmental Services. March 19, 2004.
- DEQ. 2012. Environmental Cleanup Site Information (ECSI) Database Site Summary Report - Details for Site ID 5685, EWH, LLC. Last updated January 2012. Website accessed on February 20, 2013. <http://www.deq.state.or.us/lq/ECSI/ecsidetail.asp?seqnbr=5685>
- DEQ. 2013. Milestone Report, Upland Source Control at the Portland Harbor Superfund Site, January 2013. Prepared by the Oregon Department of Environmental Quality. January 2013.
- EPA. 2005. EPA Letter to Lower Willamette Group. Portland Harbor RI/FS - Identification of Round 3 Data Gaps. December 2, 2005.
- EPA. 2010. Re: Portland Harbor Superfund Site; Administrative Order on Consent for Remedial Investigation and Feasibility Study; Docket No. CERCLA-10-2001-0240. Portland Harbor Feasibility Study Source Tables. Letter from EPA to Mr. Bob Wyatt, Chairman, Lower Willamette Group. November 23, 2010.

List of Figures

Figure 1: Basin S-6 Overview and Conveyance System Source Controls

Figure 2: Basin S-6 Upland Site Source Controls

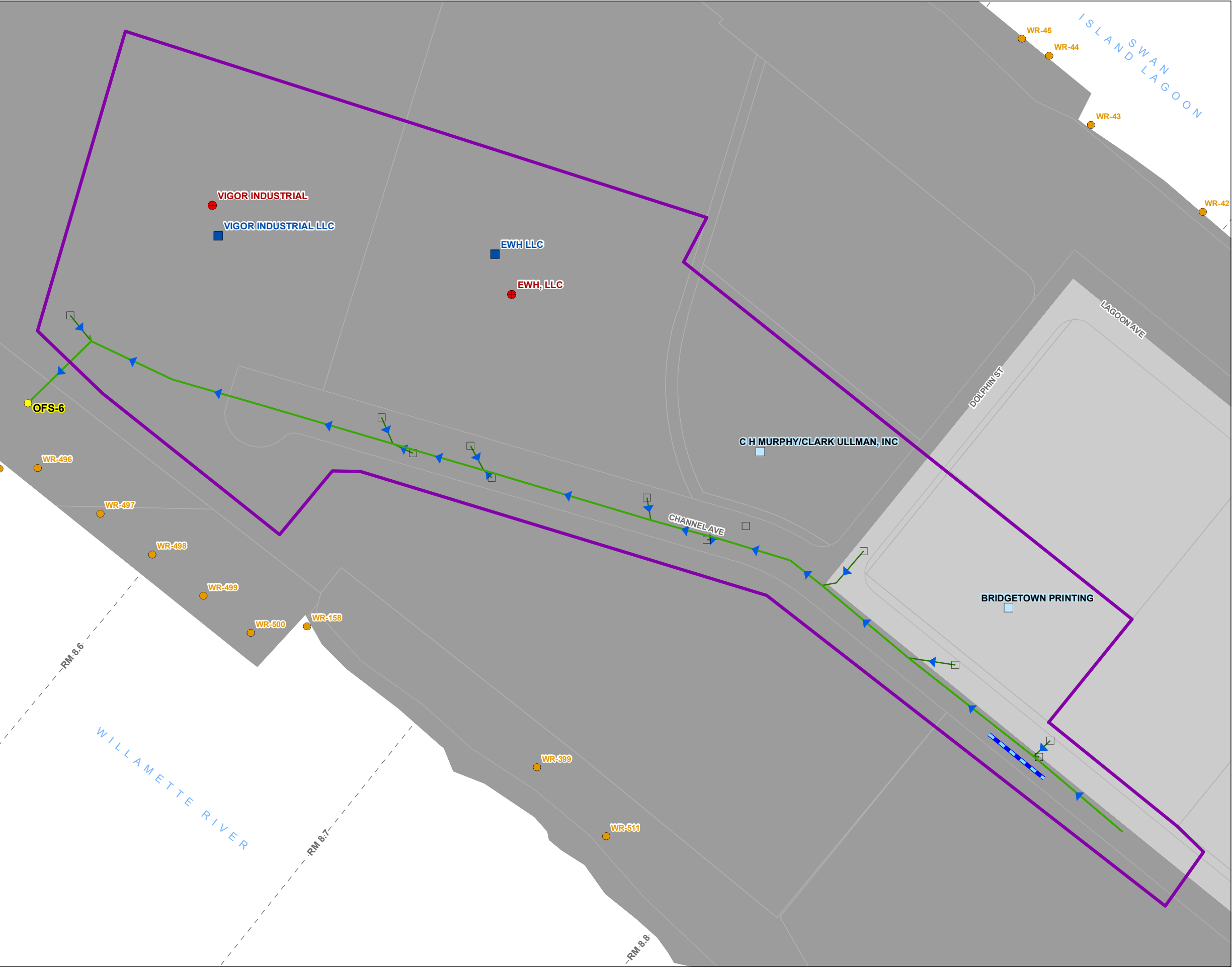
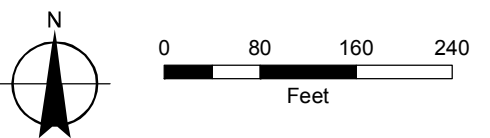


FIGURE 1
Basin S-6
Overview and Conveyance
System Source Controls

- Basin S-6
- DEQ ECSI Site
- NPDES Stormwater Permit
- NPDES No Exposure Certification
- Conveyance System**
 - Storm Line
 - Water Quality Swale
 - Catch Basin
 - City Outfall
 - Non-City Outfall
- Land Use/Zoning**
 - Heavy Industrial
 - Light Industrial
- All Other Data**
 - River Mile (RM)
 - Tax Lot
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary



MAP NOTES:
Date: January 6, 2013
Data Sources: BES, METRO

ENVIRONMENTAL SERVICES
CITY OF PORTLAND
1120 SW Fifth Avenue, Room 1000
Portland Oregon, 97204 -1912

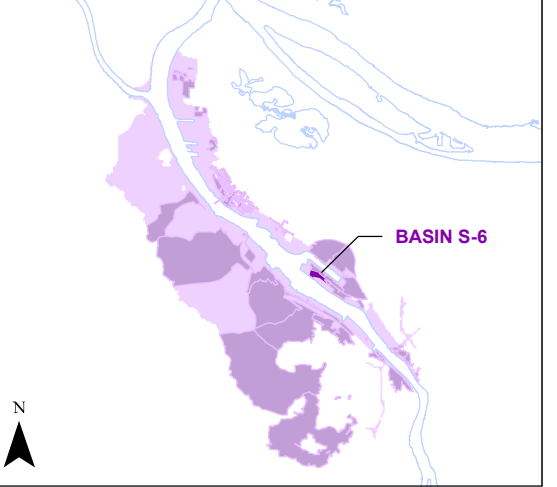
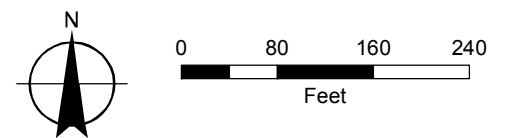


FIGURE 2
Basin S-6
Upland Site Source Controls



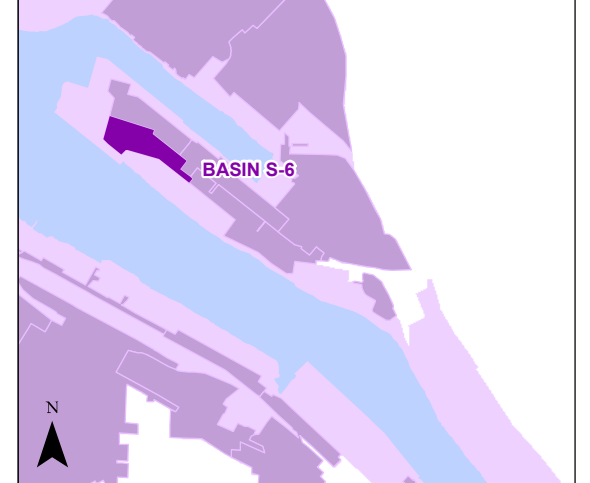
- Basin S-6
- Tax Lot
- DEQ Stormwater SCE**
 - SCE implemented or pending
- All Other Features**
 - NPDES Stormwater Discharge Permit
 - City Discharge Authorization
 - NPDES No Exposure Certification
 - Stormwater Treatment Facility
 - Site Inspection - BES Industrial Stormwater Program
 - Discharges to City Outfall
 - Portland Harbor Hydroboundary

NOTE:
 The DEQ Milestone Report (DEQ, 2013) indicates only a portion of this site is in the DEQ Cleanup Program. However, based on discussions with DEQ, the entire site is being investigated under the Cleanup Program.



MAP NOTES:
 Date: December 31, 2013
 Data Sources: BES, METRO, Aerial Photo Taken 2012

ENVIRONMENTAL SERVICES
 CITY OF PORTLAND
 1120 SW Fifth Avenue, Room 1000
 Portland Oregon, 97204-1912



APPENDIX B

Portland Harbor Land Use Map Development

Development of a Land Use Map for Portland Harbor

City of Portland (City) zoning regulates general land use patterns for development in the City and can be used as a rough surrogate for evaluating land use. Properties in the City are mapped with zoning designations grouped into the general categories of single- and multi-dwelling residential, commercial, employment, industrial, and open space. In order to develop a current map of land use within the Portland Harbor Study Area (Study Area), the City's Bureau of Environmental Service (BES) first assigned each zoning class a land use specification in accordance with Table 1.

Table 1. Generalized Land Use Designations Based on Zoning Codes		
General Land Use Code	Detailed Zoning Code	Zoning Description
IND (Heavy Industrial)	IH	Heavy Industrial
LIND (Light Industrial)	IG1 IG2	General Industrial 1 General Industrial 1
GE (General Employment)	EG1 EG2 EX	General Employment 1 General Employment 2 Central Employment
COM (Commercial)	CG CN1 CN2 CS CM CO1 CO2 CX	General Commercial Neighborhood Commercial 1 Neighborhood Commercial Storefront Commercial Mixed Residential/ Commercial Office Commercial 1 Office Commercial 1 Central Commercial
RES (Residential)	R10 R7 R5 R3 R2.5 R1 RX RH IR	Residential 10,000 sq ft lots Residential 7,000 sq ft lots Residential 5,000 sq ft lots Residential 3,000 sq ft lots Residential 2,500 sq ft lots Residential 1,000 sq ft lots Central Residential High Density Residential Institutional Residential
POS (Parks and Open Space)	OS RF R20 RUR	Open Space Residential Farming Residential 20,000 sq ft lots Rural (Multnomah County zoning code)

Note:

sq ft = square-foot

Complete descriptions of the detailed zoning codes are located in Title 33 of the City Code¹, which sets development, density, and design standards for new development and property alterations. Residential, commercial, and open space zoning classifications are self-explanatory; general explanations of the employment and industrial zones are as follows.

- *General Employment Zones*: These zones allow a range of employment opportunities with the intent to promote viable and attractive industrial/commercial areas. Although the emphasis is on industrial and industrial-support uses, the zones also allow new development that is similar in character to existing development and allow for non-industrial uses within industrial areas. Within the Portland Harbor area, this zoning category is sometimes used to allow an area to transform to a less industrial nature (e.g., redevelopment of the Pearl District).
- *Industrial Zones*: These zones are intended to restrict areas designated as industrial sanctuaries to industrial development. General Industrial zones include some restrictions on the types of allowable industrial operations, while the Heavy Industrial zone allows for all kinds of industries, including those not desirable in other zones due to objectionable impacts or appearance.

As a second step for developing a current map of Study Area land use, BES used additional overlays to improve the accuracy of the information and to refine the map, as follows.

1. To reflect land use at properties that are managed by public entities as conservation or natural areas but are not zoned as Parks and Open Space, BES used data from Metro and BES to adjust the land use in these areas.²
2. Major Transportation (i.e., freeways and highways) land use is not designated through zoning but is a land use category that is important for stormwater evaluation. To reflect Major Transportation land use, BES used the area delineated as Oregon Department of Transportation (ODOT) right-of-way.³

Lastly, as a final step to develop the map, zoning classifications that extend over the actual river area were removed. This step facilitates the calculation of land use acreages in the upland portion of the Study Area.

¹ Portland Code Title 33 descriptions of land use zoning at <http://www.portlandoregon.gov/bps/34560>

² Metro's Outdoor Recreation and Conservation Areas GIS layer and a delineation of the properties acquired by the City for the Baltimore Woods natural area corridor.

³ Delineated using information from ODOT by the BES municipal stormwater program. Delineation typically includes the developed and undeveloped portions of the right-of-way. In some cases the delineation includes undeveloped areas adjacent to ODOT rights-of-way that are not actually being used for Major Transportation (e.g., land purchased by ODOT near onramps, but not used).

When using zoning as a surrogate for land use, consideration is needed of areas where actual land use does not match zoning for a variety of possible reasons. For example, commercial zones can contain residential properties that were built before this type of regulation existed or industrial-zoned land may be undeveloped. There also are processes that allow new development to occur at variance with current zoning. For the purpose of this *Municipal Stormwater Source Control Report for Portland Harbor*, the land use information provides a general sense of land use within the hydroboundary but should not be used as definitive source of information regarding land use at the individual property scale.