DEPARTMENT OF ECOLOGY
State of Washington

Lower Duwamish Waterway
RM 1.2-1.7 East
(Saint Gobain to Glacier Northwest)

Source Control Action Plan
Final Report

June 2009

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Lower Duwamish Waterway
RM 1.2-1.7 East
(Saint Gobain to Glacier Northwest)

Source Control Action Plan
Final Report

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Executive Summary

The purpose of this Source Control Action Plan (SCAP) is to identify potential contamination sources and the actions necessary to keep sediments along the Lower Duwamish Waterway (LDW) from becoming contaminated again after any cleanup occurs. This SCAP focuses on the River Mile (RM) 1.2–1.7 East Source Control Area and is based on a thorough review of information pertinent to sediment recontamination as presented in *Lower Duwamish Waterway, RM 1.2-1.7 East (Saint Gobain to Glacier Northwest), Summary of Existing Information and Identification of Data Gaps Report* (E & E 2009).

The LDW site, located in Seattle, Washington, was added to the National Priorities List (Superfund) by the U.S. Environmental Protection Agency (EPA) on September 13, 2001. The Washington State Department of Ecology (Ecology) added the site to the Washington State Hazardous Sites List on February 26, 2002. Contaminants of concern (COCs) found in LDW sediments include polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), dioxin/furans, arsenic, other metals, and phthalates. These COCs may pose threats to people, fish, and wildlife.

In December 2000, EPA and Ecology entered into an order with King County, the Port of Seattle, the city of Seattle, and The Boeing Company to perform a Remedial Investigation (RI) and Feasibility Study (FS) of sediment contamination in the waterway. EPA is the lead agency for the Remedial Investigation/Feasibility Study (RI/FS). Ecology is the lead agency for controlling current sources of pollution to the site, in cooperation with the city of Seattle, King County, the Port of Seattle, the city of Tukwila, and EPA.

Phase 1 of the RI/FS, published in July 2003 (Windward 2003a), used existing data to identify potential human health and ecological risks, information needs, and high priority areas for cleanup. Seven candidate early action areas (EAAs, or "Tier 1" source control areas) were identified (Windward 2003b). Data collected during Phase 2 of the RI was used to identify additional sites where long-term cleanup actions may be necessary. The RM 1.2-1.7 East Source Control Area was identified as one of these "Tier 2" source control areas.

As part of the source control efforts in the LDW, Ecology works with other members of the Source Control Work Group (SCWG) and its consultants to develop SCAPs for areas of sediment contamination that will or may require cleanup (Figure 1). The SCAP for each of these sediment areas identifies potential sources of sediment contaminants that could recontaminate sediments after cleanup. In addition, the SCAPs describe source control actions that are planned or currently underway, and sampling and monitoring that will be conducted to identify additional sources.

Sections 1 and 2 of this SCAP provide background information about the LDW site and the RM 1.2-1.7 East Source Control Area including contaminants of concern in adjacent sediments and upland media (Figure 2). Metals, PAHs, PCBs, total petroleum hydrocarbons (TPHs), phthalates and semi-volatile organic compounds (SVOCs) are the main COCs in sediments adjacent to the RM 1.2-1.7 East Source Control Area. In upland media, COCs include TPHs and halogenated

organic compounds.[1] While this SCAP focuses on these COCs, other contaminants that could result in sediment recontamination will be addressed as sources are identified.

Section 3 describes potential sources of sediment recontamination that may affect sediments adjacent to the RM 1.2-1.7 East Source Control Area. These sources include direct discharge of stormwater and/or storm drain solids from outfalls, discharge of groundwater, soil erosion from the shoreline banks, surface runoff, and contamination that may result from spills or releases from adjacent and upland facilities of concern. Section 3 also describes the significance of these potential sources and facilities and identifies the actions that are planned or are underway to prevent them from recontaminating the sediments adjacent to the RM 1.2 -1.7 East Source Control Area.

Section 4 discusses monitoring activities that will be conducted to observe known sources, identify additional sources, support remedial action decisions, and assess progress. Section 5 describes how source control efforts will be tracked and reported.

The Executive Summary Table lists the source control actions that have been identified for the RM 1.2-1.7 East Source Control Area. The table describes potential contaminant sources for each facility, source control actions to be conducted, the priority level for each action item, parties involved in source control actions for each facility or task, and milestone/target dates for completion of the identified actions. The milestones and targets are best-case scenarios based on consultation with the identified agencies or facilities. They reflect reasonably achievable schedules, and include the time required for planning, contracting, field work, laboratory analysis, and activities dependent on weather.

[1] Although not explicitly addressed in the SMS, VOCs in pore water may cause adverse effects on benthic invertebrates and other aquatic biota, and are therefore considered COCs for source control efforts in the LDW.

Executive Summary Table

Source Control Facility/Outfall	Action Item	Priority	Responsible Party/Parties	Status	Estimated Completion Date
Adjacent Facilities					
Saint Gobain Containers Inc.	Review the PRP response to the 104(e) letter sent in July 2008 to Saint Gobain Containers Inc. (SGCI), and evaluate what further site investigation is necessary.	High	Ecology	Planned	April 2010
	Determine appropriate engineering controls for the inaccessible contamination located beneath the soil/water separator described in the 1991 Limited UST Assessment.	High	SGCI	Planned	December 2012
	Conduct a source control inspection at the facility to confirm that the SWPPP is up to date, the facility is complying with the NPDES permit, and best management practices are being implemented.	Medium	Ecology & SPU	Planned	October 2010
	Sample catch basins as needed to evaluate the presence of COCs entering the storm drain system. If COCs are identified within the LFPP catch basins, conduct source tracing to identify the source of the contamination.	Medium	Ecology & SPU	Planned	October 2010
Longview Fibre Paper and Packaging	Review the PRP response to the 104(e) letter sent in March 2008 to Longview Fibre Paper and Packaging (LFPP), and evaluate whether further site investigation is necessary.	High	Ecology	Planned	April 2010
	Review the latest groundwater monitoring regarding on-site exceedances of TPH-D. Due to the proximity to the LDW a remedial action plan should be created to assure that the TPH-D contamination does not reach the LDW.	High	LFPP	Planned	December 2012

Source Control Facility/Outfall	Action Item	Priority	Responsible Party/Parties	Status	Estimated Completion Date
Longview Fibre Paper and Packaging (continued)	Conduct a source control inspection at the facility to confirm that the SWPPP is up to date, the facility is complying with the NPDES permit, and best management practices are being implemented.	Medium	Ecology & SPU	Planned	October 2010
	Sample catch basins as needed to evaluate the presence of COCs entering the storm drain system. If COCs are identified within the LFPP catch basins, conduct source tracing to identify the source of the contamination.	Medium	Ecology & SPU	Planned	October 2010
Certainteed Gypsum	Review the PRP response to the 104(e) letter sent in July 2008 to Certainteed Gypsum, and evaluate whether further site investigation is necessary.	High	Ecology	Planned	April 2010
	Conduct a source control inspection at the facility to confirm that the SWPPP is up to date, the facility is complying with the NPDES permit, and best management practices are being implemented.	Medium	Ecology & SPU	Planned	October 2010
	Sample catch basins as needed to evaluate the presence of COCs entering the storm drain system. If COCs are identified within the LFPP catch basins, conduct source tracing to identify the source of the contamination.	Medium	Ecology & SPU	Planned	October 2010
	Locate and review the closure report for the 500 gallon UST documented in Ecology's UST database before groundwater concerns can be dismissed. This report was not available for review during the production of this report.	Low	Ecology	Planned	October 2010

Source Control Facility/Outfall	Action Item	Priority	Responsible Party/Parties	Status	Estimated Completion Date
Upland Facilities					
Philip Services Corporation	Continue progress towards a new permit and Agreed Orders between Ecology and PSC. One order will implement the cleanup action plan (CAP) for the eastern portion of the site.	Medium	Ecology & PSC	Planned	December 2014
Art Brass Plating	Art Brass will proceed to complete its RI and reduce source levels via operation of its interim action, as set out in the MTCA Agreed order and with Ecology oversight.	Medium	Ecology & Art Brass Plating	Planned	December 2014
	King county and Ecology will conduct a source control inspection at the facility to ensure that the facility has remained in compliance. Dangerous Waste Compliance concerns have been identified at the facility in the past.	Medium	Ecology & SPU	Planned	October 2010
Blaser Die Casting	Blaser will proceed to complete its RI with Ecology oversight, as required by the MTCA Enforcement Order.	Medium	Ecology & Blaser Die Casting	Planned	December 2014
Capital Industries Inc.	Capital will proceed to complete its RI with Ecology oversight, as set out in the MTCA Agreed order.	Medium	Ecology & Capital Industries	Planned	December 2014

High = High priority action item – to be completed prior to sediment cleanup.
Medium = Medium priority action item – to be completed prior to or concurrent with sediment cleanup.
Low = Low priority action item – ongoing actions or actions to be completed as resources become available

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Acronyms/Abbreviations

Adapt	LSI Adapt
AET	Apparent Effects Threshold
AST	aboveground storage tank
BEHP	bis(2-ethylhexyl)phthalate
bgs	below ground surface
Blaser	Blaser Die Casting
BMP	best management practice
BTEX	benzene, toluene, ethylbenzene and total xylenes
CAP	Cleanup Action Plan
city	City of Seattle
COC	contaminant of concern
county	King County
CSCSL	Confirmed and Suspected Contaminated Site List
CSL	Cleanup Screening Level
CSO	combined sewer overflow
DCA	dichloroethane
DCE	dichloroethene
DMR	discharge monitoring report
DNAPL	dense non-aqueous phase liquid
DW	dry weight
EAA	Early Action Area
Ecology	Washington Department of Ecology
EF	exceedance factor
E & E	Ecology and Environment Inc.
EPA	U.S. Environmental Protection Agency
FS	Feasibility Study
GIS	Geographic Information System
gpd	gallons per day
HCIM	hydraulic control interim measure
HVOCs	halogenated volatile organic compounds
HWTR	Hazardous Waste and Toxics Reduction
JHG	James Hardie Gypsum
KCIA	King County International Airport
KCIW	King County Industrial Waste
KCIWP	King County Industrial Waste Program
LAET	Lowest Apparent Effects Threshold
2LAET	Second Lowest Apparent Effects Threshold
LDW	Lower Duwamish Waterway
LDWG	Lower Duwamish Waterway Group
LFPP	Longview Fibre Paper and Packaging
LUST	leaking underground storage tank
mg/kg	milligrams per kilogram
mg/l	milligrams per liter
MLLW	mean lower low water

Acronyms/Abbreviations (Cont.)

MTBE	methyl tertiary-butyl ether
MTCA	Model Toxics Control Act
NFA	No Further Action
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollution Discharge Elimination System
OC	organic carbon
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
ppm	parts per million
PSC	Philip Services Corporation
PSDDA	Puget Sound Dredged Disposal Analysis
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RCW	Revised Code of Washington
RM	river mile
ROD	Record of Decision
RSI	Risk Science International
SCAP	Source Control Action Plan
SCWG	Source Control Work Group
SD	storm drain
SGCI	Saint-Gobain Containers Inc.
SMS	Washington State Sediment Management Standards
SPU	Seattle Public Utilities
SQS	Sediment Quality Standards
SVE	soil vapor extraction
SVOC	semi-volatile organic compound
SWPPP	Stormwater Pollution Prevention Plan
TCE	trichloroethene
TOC	total organic carbon
TPH	total petroleum hydrocarbons
TRI	Toxics Release Inventory
UPRR	Union Pacific Railroad
UST	underground storage tank
VC	vinyl chloride
VCP	Voluntary Cleanup Program
VOC	volatile organic compound
WSDOH	Washington State Department of Health

1.0 Introduction

This Source Control Action Plan (SCAP) describes potential sources of contaminants that may affect sediments adjacent to the RM 1.2-1.7 East Source Control Area.[2] This source control area is located on the eastern side of the Lower Duwamish Waterway (LDW) Superfund Site between river mile (RM) 1.2 and 1.7, as measured from the southern end of Harbor Island. It is one of several source control areas identified as part of the overall cleanup process for the LDW Superfund Site (Figure 1). The sediments adjacent to the RM 1.2-1.7 East Source Control Area extend from the eastern shoreline to the eastern limit of the LDW navigational channel. The Washington State Department of Ecology (Ecology) identified the properties within the RM 1.2-1.7 East Source Control Area as properties that can discharge stormwater to the adjacent sediments. Ecology also included four upland facilities of concern because contaminated groundwater emanating from these properties is migrating toward the sediments adjacent to the RM 1.2-1.7 East Source Control Area. Stormwater from these four facilities drains to the combined sewer system and does not drain directly to the LDW. For this reason these four upland facilities are not included in the RM 1.2-1.7 East drainage basin[3], but they are part of the RM 1.2-1.7 East Source Control Area.

The RM 1.2-1.7 East drainage basin only includes the facilities that can discharge stormwater to the adjacent sediments (Figure 2). Together these three facilities have approximately 27 acres between the LDW and East Marginal Way South. Most of the stormwater from this area discharges to the LDW.

The purpose of this plan is to evaluate the significance of the sources and to determine what actions are needed to minimize the potential for recontamination of sediments adjacent to the RM 1.2-1.7 East Source Control Area after any proposed cleanup. In addition, this SCAP describes:

- Source control actions/programs that are planned or currently underway,
- sampling and monitoring activities that will be conducted to identify additional sources and assess progress, and
- The method of tracking and reporting these source control efforts.

The information in this document was obtained from various sources, including the following documents:

[2] This SCAP incorporates data published through March 2009. Personal communications and e-mails beyond this date may have also provided additional information. Section 5, Tracking and Reporting of Source Control Activities, describes how newer data will be disseminated.

[3] The area referred to herein as the "RM 1.2-1.7 East Drainage Basin" is actually a sub-drainage basin of the LDW valley. The LDW valley drainage basin has been divided into the sub-drainage basins, defined tentatively by storm water collection systems and outfalls, as shown in Figure 1.

- Lower Duwamish Waterway, RM 1.2-1.7 East (Saint Gobain to Glacier Northwest), Summary of Existing Information and Identification of Data Gaps Report, Ecology and Environment Inc. (E & E), February 2009, on the Washington State Department of Ecology (Ecology) website at:
  http://www.ecy.wa.gov/programs/tcp/sites/lower_duwamish/sites/RM_12_17_East/DataGapsRM12/DataGapsRptRM12.html
- *Lower Duwamish Waterway Source Control Strategy*, Washington State Department of Ecology, January 2004, on the Ecology website at: http://www.ecy.wa.gov/pubs/0409043.pdf

1.1 Organization of Document

Section 1 of this SCAP describes the LDW Superfund Site, the strategy for source control, the responsibilities of the public agencies involved in source control for the LDW, and the scope and limitations of this report. Section 2 provides background information on the RM 1.2-1.7 East Source Control Area, including a description of the contaminants of concern (COCs) for sediments associated with this Source Control Area. Section 3 provides an overview of potential sources of contaminants that may affect sediments adjacent to the RM 1.2-1.7 East Source Control Area including storm drain (SD) outfalls and facilities within the RM 1.2-1.7 East Source Control Area. Section 3 also describes actions planned or currently underway to control potential sources of contaminants. Sections 4 and 5 describe monitoring and tracking/reporting activities, respectively. References are listed in Section 6, and figures and tables are presented at the end of the document.

As new information about the sites and potential sources discussed in this document becomes available and as source control progress is made, Ecology will update the information in this SCAP as needed. The status of source control actions is summarized in the LDW Source Control Status Reports (Ecology 2007, Ecology 2008a, Ecology 2008e, and as updated).

1.2 Lower Duwamish Waterway Site

The LDW is the downstream portion of the Duwamish River, extending from the southern tip of Harbor Island to just south of Turning Basin 3 (Figure 1). It is a major shipping route for bulk and containerized cargo. Most of the areas adjacent to the LDW have been developed for industrial and commercial operations. These include cargo handling and storage, marine construction, boat manufacturing, marina operations, concrete manufacturing, paper and metals fabrication, food processing, and airplane parts manufacturing. In addition to industrial uses, the LDW is also used for fishing, recreation, and wildlife habitat. Residential areas near the LDW include the South Park and Georgetown neighborhoods.

Beginning in 1913, this portion of the Duwamish River was dredged and straightened to promote navigation and industrial development, resulting in the river's current form. Shoreline features within the LDW include constructed bulkheads, piers, wharves, buildings extending over the water, and steeply sloped banks armored with riprap or other fill materials (Weston 1999). This development left intertidal habitats dispersed in relatively small patches, with the exception of Kellogg Island, which is the largest contiguous area of intertidal habitat remaining along the Duwamish River (Tanner 1991). Over the past 20 years, public agencies and volunteer

organizations have worked to restore intertidal and subtidal habitat within the river. Some of the largest restoration projects are at Herring House Park/Terminal (T) 107, Turning Basin 3, Hamm Creek, and T-105.

The presence of chemical contamination in the LDW has been recognized since the 1970s (Windward 2003a). In 1988, the United States Environmental Protection Agency (EPA) investigated sediments in the LDW as part of the Elliott Bay Action Program. Contaminants identified by the EPA study included metals, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), phthalates, and other organic compounds. In 1999, EPA completed a study of approximately 6 miles of the LDW, from the southern tip of Harbor Island to just south of the turning basin near the Norfolk combined sewer overflow (CSO) (Weston 1999). This study confirmed the presence of PCBs, PAHs, phthalates, mercury, and other metals that may pose threats to people, fish, and wildlife.

In December 2000, EPA and Ecology signed an agreement with King County (county), the Port of Seattle, the City of Seattle (city), and The Boeing Company, collectively known as the Lower Duwamish Waterway Group (LDWG). Under the agreement, the LDWG is conducting a Remedial Investigation (RI) and Feasibility Study (FS) of the LDW to assess risks to human health and the environment and to evaluate cleanup alternatives. The RI for the site is being done in two phases. Results of Phase 1 were published in July 2003 (Windward 2003a). The Phase 1 RI used existing data to describe the nature and extent of chemical distributions in LDW sediments, develop preliminary risk estimates, and identify candidate sites for early cleanup action. The Phase 2 RI is currently underway and is designed to fill critical data gaps identified in Phase 1. Based on the results of the Phase 2 RI, additional areas for cleanup may be identified. During Phase 2, an FS is being conducted that will address cleanup options for contaminated sediments in the LDW.

On September 13, 2001, EPA added the LDW to the National Priorities List. This is EPA's list of hazardous waste sites that warrant further investigation and cleanup under Superfund. Ecology added the site to the Washington State Hazardous Sites List on February 26, 2002.

An interagency Memorandum of Understanding, signed by EPA and Ecology in April 2002 and updated in April 2004, divides responsibilities for the site (EPA and Ecology 2002; EPA and Ecology 2004). EPA leads the RI/FS, while Ecology leads source control issues.

In June 2003, the *Technical Memorandum: Data Analysis and Candidate Site Identification* (Windward 2003b) was issued. Seven candidate sites for early action [Early Action Areas (EAAs), or "Tier 1" sites] were recommended (Figure 1). The Tier 1 source control areas include:

- EAA-1: Duwamish/Diagonal CSO and SD
- EAA-2: West side of the LDW, just south of the First Avenue S. Bridge, approximately 2.2 miles from the south end of Harbor Island
- EAA-3: Slip 4, approximately 2.8 miles from the south end of Harbor Island

- EAA-4: South of Slip 4, on the east side of the LDW, just offshore of the Boeing Plant 2 and Jorgensen Forge properties, approximately 2.9 to 3.7 miles from the south end of Harbor Island
- EAA-5: T117 and adjacent properties, approximately 3.6 miles from the south end of Harbor Island, on the west side of the LDW
- EAA-6: East side of the LDW, approximately 3.8 miles from the south end of Harbor Island
- EAA-7: Norfolk CSO/SD, on the east side of the LDW, approximately 4.9 to 5.5 miles from the south end of Harbor Island

Of the seven recommended EAAs, five either had sponsors to begin investigations or were already under investigation by an LDWG member or group of members. These five sites are EAAs 1, 3, 4, 5, and 7. EPA leads cleanups at two areas, EAAs 3 and 5. The other three EAA cleanup projects were begun before the current LDW RI/FS was initiated. Cleanup at EAA-4, under EPA Resource Conservation and Recovery Act (RCRA) management, is in the planning stage. The EAA-1 and EAA-7 cleanups are under King County management as part of the Elliott Bay–Duwamish Restoration Program. Cleanup at EAA-1 was partially completed in March 2004, and a partial sediment cleanup was conducted at EAA-7 in 1999. Early action cleanups may involve members of the LDWG or other parties as appropriate. Planning and implementation of early action cleanups are concurrent with the Phase 2 investigation.

Further information about the LDW can be found on Ecology's website: http://www.ecy.wa.gov/programs/tcp/sites/lower_duwamish/lower_duwamish_hp.html and on EPA's website: http://yosemite.epa.gov/r10/cleanup.nsf/sites/lduwamish.

1.3 Lower Duwamish Waterway Source Control Strategy

The Lower Duwamish Waterway Source Control Strategy (Ecology 2004) describes the process for identifying source control issues and implementing effective source controls for the LDW. The goal of the strategy is to minimize the potential for recontamination of sediments to levels exceeding the LDW sediment cleanup goals and the Washington State Sediment Management Standards (SMS). This goal is based on the principles of source control for sediment sites described in EPA's *Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites; February 12, 2002* (EPA 2002), and the Washington State SMS (WAC 173-204). The first principle is to control sources early, starting with identifying all ongoing sources of contaminants to the site. EPA's Record of Decision (ROD) for the site will require that sources of sediment contamination to the entire LDW site be evaluated, investigated, and controlled as necessary. Dividing source control work into specific SCAPs and prioritizing those plans to coordinate with sediment cleanups will address the guidance and regulations and will be consistent with the selected remedial actions in the EPA ROD.

The source control work will be identified in a series of detailed, area-specific SCAPs, which will be prioritized to coordinate with sediment cleanups. Each SCAP will document what is known about the respective source control area, the potential sources of recontamination, past cleanup actions taken to address them, and actions necessary to achieve adequate source control for an area. Because the scope of source control for each site will vary, it will be necessary to adapt each plan to its respective area.

The success of this strategy depends on the coordination and cooperation of all public agencies with responsibility for source control in the LDW area, as well as prompt compliance by the businesses and facility owners that must make changes necessary to control releases from their facilities. Existing administrative and legal authorities will be used to perform inspections and require necessary source control actions. Source control priorities are divided into four tiers. Tier 1 consists of source control actions associated with the EAAs. Tier 2 consists of source control actions associated with any final, long-term sediment cleanup actions identified through the Phase 2 RI and the EPA ROD. Tier 3 consists of source identification and potential source control actions in areas of the LDW that are not identified for cleanup, but where source control may be needed to prevent future contamination. Tier 4 consists of source control work identified by post-cleanup sediment monitoring (Ecology 2004). This document is a SCAP for a Tier 2 source control area.

The Lower Duwamish Waterway Source Control Strategy can be found on Ecology's website:
http://www.ecy.wa.gov/programs/TCP/sites/lower_duwamish/source_control/sc.html

Further information about Lower Duwamish Waterway source control can be found at Ecology's Lower Duwamish Source Control website:
http://www.ecy.wa.gov/programs/tcp/sites/lower_duwamish/lower_duwamish_hp.html
And at the King County Industrial Waste program website:
http://www.kingcounty.gov/environment/wastewater/IndustrialWaste/SourceControl/Duwamish.aspx

1.4 Source Control Work Group

The primary public agencies responsible for source control for the LDW are Ecology, the city of Seattle, King County, the Port of Seattle, the city of Tukwila, and EPA. All of these agencies, except for the Port of Seattle and the city of Tukwila, are directly involved in source control for the RM 1.2-1.7 East Source Control Area.

To coordinate among these agencies, Ecology formed the Source Control Work Group (SCWG) in January 2002. The purpose of the SCWG is to share information, discuss strategy, actively participate in developing SCAPs, jointly implement source control measures, and share progress reports on source control activities for the LDW area. Ecology chairs the monthly SCWG meetings. All final decisions on source control actions and completeness will be made by Ecology, in consultation with EPA, as outlined in the April 2004 Ecology/EPA Lower Duwamish Waterway Memorandum of Understanding (EPA and Ecology 2004).

Other public agencies with relevant source control responsibilities include the Washington State Department of Transportation, Puget Sound Clean Air Agency, and the Seattle/King County Department of Public Health. These agencies are invited to participate in source control with the SCWG as appropriate (Ecology 2004).

1.5 Scope of Document

The scope of this document is geographically limited to the area within the RM 1.2-1.7 East Source Control Area (Figures 2 and 3), including the four upland facilities of concern, and discharge points into the LDW along the waterfronts of the facilities adjacent to the LDW within this boundary.

This report addresses seven main facilities of concern within the RM 1.2-1.7 East Source Control area. Facilities adjacent to the LDW include Saint Gobain Containers; Longview Fibre Paper and Packaging, and Certainteed Gypsum, these facilities are discussed in Section 3.2. Facilities upland of the LDW include Philip Services Corporation, Art Brass Plating, Blaser Die Casting, and Capital Industries; these facilities are discussed in Section 3.3.

This report summarizes the COCs that have been identified in the sediments adjacent to the RM 1.2-1.7 East Source Control Area and identifies potential sources of recontamination within upland media. Data on existing sediment contamination associated with the RM 1.2-1.7 East Source Control Area are summarized in Section 2 and include sediment data published through March 2007. However, source control actions in this report are focused only on upland sources that have potential pathways for contaminants to reach sediments near the RM 1.2-1.7 East Source Control Area.

Some SCAPs include discussion of the impacts of combined sewer overflow (CSO) outfalls as a contaminant pathway when such outfalls exist in the respective Source Control Area. There is no CSO outfall in the RM 1.2-1.7 East Source Control Area. However, if any contaminants from this Source Control Area are discharged to the combined sewer system, it is possible for them to be released to the LDW through one or more CSO outfalls. Such releases are not covered here, but are addressed in the SCAPs with associated CSO outfalls. Section 3.1 explains the combined sewer system in more detail.

Atmospheric deposition of air pollution is a potential source of contamination to sediments adjacent to the RM 0.0-0.1 East Source Control Area from local or regional sources outside of the RM 0.0-0.1 East Source Control Area. However, this document contains only a limited discussion of atmospheric deposition (Section 3.4). Air pollution is a concern for the wider LDW region. Ecology and other agencies, such as the Port of Seattle and the Puget Sound Clean Air Agency (PSCAA), are currently developing options and recommendations for addressing action items relating to air pollution.

2.0 RM 1.2-1.7 East Source Control Area

This section describes the history and current conditions of the RM 1.2-1.7 East Source Control Area. It located along the eastern side of the LDW Superfund Site between 1.2 and 1.7 miles from the southern tip of Harbor Island (Figure 2). Sediments located adjacent to the RM 1.2-1.7 East Source Control Area have accumulated chemical contaminants from numerous sources, both historical and potentially ongoing. These chemicals may have entered the LDW through direct discharges, spills, bank erosion, groundwater discharges, surface water runoff, atmospheric deposition, or other non-point source discharges.

Historically, the Duwamish River meandered through the mud flats of the river delta. In the late 1800s and early 1900s, extensive modifications were made to straighten the Duwamish River to create a navigable channel. Many of the current slips are remnants of old river meanders. Dredged material, in addition to imported fill, was likely used to fill in the upland areas near the RM 1.2-1.7 East Source Control Area.

The RM 1.2-1.7 East Source Control Area has been industrialized since the 1920s. Historical and current commercial and industrial operations within the RM 1.2-1.7 East Source Control Area include glass manufacturing, corrugated product manufacturing, gypsum recycling and manufacturing, RCRA hazardous waste treatment, storage, and disposal, metal finishing, die casting, metal fabrication and painting.

The RM 1.2-1.7 East Source Control Area shoreline consists of various materials, including sheet pile bulkheads, riprap, and fill material. As described further in Section 3, ten storm drain outfalls currently discharge to sediments associated with the RM 1.2-1.7 East Source Control Area.

Groundwater within the Duwamish Valley alluvium is typically encountered under unconfined conditions within approximately 10 feet (3 meters) of the ground surface. Groundwater in this unconfined aquifer is found within the fill material and native alluvial deposits. The direction of groundwater flow in the unconfined aquifer is generally toward the LDW. However, the direction may vary locally depending on the nature of subsurface material and tidal influence of the LDW. The upland area affected by tidal fluctuations is generally within 300 to 500 feet (100 to 150 meters) of the LDW (Windward 2003a) and varies depending on location.

2.1 Contaminants of Concern in Sediments

Several environmental investigations from 1998 to 2006 have included sampling in sediments adjacent to the RM 1.2-1.7 East Source Control Area. These investigations include the National Oceanic and Atmospheric Administration (NOAA) Duwamish Waterway Characterization Study in 1998 (NOAA 1998), the EPA Site Inspection of the Lower Duwamish River in 1999 (Weston 1999), several investigations conducted by James Hardie Gypsum that took place between 1995 and 2000, and investigations conducted between 2005 and 2007 for the Lower Duwamish Waterway Phase 2 RI (Windward 2005a, 2005b, 2007a, 2007b, and 2007c). Analytical results

from these investigations are compiled in a sediment database created by the LDWG and can be accessed at www.ldwg.org.

A total of 36 surface sediment samples and 16 subsurface sediment samples have been collected within sediments associated with the RM 1.2-1.7 East Source Control Area at the locations depicted in Figure 4. Appendix A of the *RM 1.2-1.7 East Summary of Existing Information and Identification of Data Gaps Report* (E & E 2009) summarizes all of the data from each location.

Analytical results from the sediment investigations were compared to SMS, which include both the Sediment Quality Standards (SQS) and Cleanup Screening Levels (CSL) (WAC 173-204). Sediments that meet the SQS criteria have a low likelihood of adverse effects on benthic organisms. However, exceeding the SQS criteria does not necessarily lead to adverse effects or toxicity, and the SQS exceedance factor does not correspond to the level of sediment toxicity. The CSL is defined as the maximum chemical concentration and level of biological effects permissible at a cleanup site, to be achieved by year 10 after cleanup has been completed. The CSL is greater than or equal to the SQS and represents a higher level of risk to benthic organisms than SQS levels. SQS and CSL values provide a basis for identifying sediments that may pose a risk to some ecological receptors. The SMS for most organic compounds are based on total organic carbon (TOC)-normalized concentrations.

To allow for comparison of applicable SMS compounds to SQS and CSL, organic compounds were organic carbon (OC) normalized. Detected concentrations (dry-weight basis) were normalized to the TOC concentrations in samples. However, comparison to TOC-normalized concentrations is only effective at predicting adverse effects in sediments with TOC content within the range of 0.5 to 4.0 percent. All of the sediment samples with SQS exceedances in the vicinity of the RM 1.2-1.7 East Source Control Area had TOC (as % of dry weight) within this range. Analytical results that exceed SQS and CSL are presented in Tables 1 and 2.

Since clean up levels differ among chemicals, the Exceedance Factor (EF) is a uniform way of showing how much a contaminant exceeds a given criteria. The EF is the ratio of the measured concentration to the criteria concentration. An EF of greater than one means that the measured concentration exceeds the cleanup criteria by a factor equal to the EF (e.g., an EF of 2.0 means the measured concentration is twice the criteria for that compound.

COCs in sediments were identified from analyses of samples collected from the sediments associated with the RM 1.2-1.7 East Source Control Area. The sediment COCs are those contaminants that exceeded the SQS in at least one sample. At each sediment sampling location for which a contaminant was detected with an SQS EF $\geq$ 1, Figure 4 lists the contaminants and the associated maximum SQS EF of all samples from that location. The following are the COCs identified in sediments adjacent to the RM 1.2-1.7 East Source Control Area:

Contaminants of Concern Identified through Sediment Sampling				
Contaminant of Concern	Surface Sediment		Subsurface Sediment	
	> SQS	> CSL	> SQS	> CSL
Metals				
Mercury			●	
Zinc	●	●		
PAHs				
Acenaphthene			●	●
Anthracene			●	
Benzo(a)anthracene			●	●
Benzo(a)pyrene			●	●
Benzo(g,h,i)perylene			●	
Benzofluoranthenes (total)			●	●
Chrysene	●		●	●
Dibenzo(a,h)anthracene			●	
Dibenzofuran			●	
Fluoranthene			●	●
Fluorene			●	●
Indeno(1,2,3-cd)pyrene			●	
Phenanthrene			●	●
Pyrene			●	
Total HPAH (total)			●	
Total LPAH (total)			●	●
PCBs				
PCBs (total)	●	●	●	●
Phthalates				
Bis(2-ethylhexyl)phthalate			●	
Other SVOCs				
Benzyl alcohol	●			
Phenol	●			

Notes:
This table includes data published through March 12, 2007. Exceedance factors and concentrations are given in Tables 1 and 2 in Section 7.
Source: Lower Duwamish Waterway Group Website sediment database (www.ldwg.org).
Key:
CSL = cleanup screening level
HPAH = high-molecular-weight polycyclic aromatic hydrocarbon
LPAH = low-molecular-weight polycyclic aromatic hydrocarbon
PAH = polyaromatic hydrocarbon
PCB = polychlorinated biphenyl
SQS = sediment quality standards
SVOC = semi-volatile organic compound

2.1.1 Metals

Metals exceeded SQS at one surface sediment sampling location (JHGSA-SD1-32-0010) and one subsurface sediment sampling location (LDW-SC27), located adjacent to Certainteed Gypsum, and Saint Gobain Containers respectively. Zinc was detected at JHGSA-SD1-32-0010 at 1500 milligrams per kilogram (mg/kg) dry weight (DW), an SQS EF of 3.7. Mercury was detected at LDW-SC27 at 0.52 mg/kg DW, an SQS EF of 1.3.

2.1.2 PAHs

One PAH exceedance was detected in surface sediment at JHGSA-SD1-02-0010, adjacent to Certainteed Gypsum to the west; and several PAHs exceeded SQS in subsurface sediment at LDW-SC23, located adjacent to Saint Gobain Containers. At JHGSA-SD1-02-0010, the chrysene concentration was 4.1 mg/kg DW [280 mg/kg organic carbon (OC)], an SQS EF of 2.5. At LDW-SC23, the highest EFs included Fluoranthene at 24 mg/kg DW (1800 mg/kg OC), with an SQS EF of 11, and Acenaphthene at 2.1 mg/kg DW (160 mg/kg OC), with an SQS EF of 10.

2.1.3 PCBs

Total PCBs exceeded SQS at five surface sediment sampling locations (JHGSA-SD1-COMP32-00, LDW-SS60, DR144, B4b, LDW-SS325) and 4 subsurface sediment sampling location (LDW-SC31, 2, LDW-SC27, LDW-SC23). JHGSA-SD1-COMP32-00, LDW-SC31, 2, and LDW-SS60, DR144 are near Certainteed Gypsum and LDW-SC27, B4b, LDW-SS325, and, LDW-SC23 are located adjacent to Saint Gobain Containers. Total PCBs were detected in surface sediment at concentrations ranging from 0.27 mg/kg DW (13 mg/kg OC) at LDW-SS325 to 0.69 mg/kg DW (68 mg/kg OC) at JHGSA-SD1-COMP32-00. These concentrations had SQS EFs of 1.1 and 5.7 respectively.

2.1.4 Phthalates

Phthalates exceeded SQS at one subsurface sediment sampling location (LDW-SC23), adjacent to Saint Gobain Containers. Here Bis(2-ethylhexyl) phthalate had an SQS EF of 1.6 at a sediment depth of 2 to 4 feet and an SQS EF of 1.3 at a depth of 3 to 4 feet.

2.1.5 Other SVOCs

Two semi-volatile organic compound (SVOC) exceedances were detected in surface sediment at B4b, and DR092, which are located adjacent to Saint Gobain Containers and Certainteed Gypsum respectively. Benzyl Alcohol was detected at B4b at 70 µg/kg DW, with an SQS EF of 1.2, and Phenol was detected at DR092 at 520 µg/kg DW, with an SQS EF of 1.2.

2.2 Contaminants of Concern in Upland Media

Several environmental investigations and cleanup activities have been conducted at facilities of concern within RM 1.2-1.7 East to address contamination of upland media (including

stormwater, storm drain solids, groundwater, seeps, and soil). These investigations are summarized in Section 3.

A COC was identified in upland media whenever a contaminant was detected above an applicable screening level in one or more samples of upland media, even if not detected in samples collected from the sediments adjacent to the RM 1.2-1.7 East Source Control Area. Applicable screening level criteria included Model Toxics Control Act (MTCA) Method A cleanup levels for soil and groundwater, Ecology stormwater compliance benchmark levels for facilities covered under the Industrial Stormwater General Permit for stormwater discharge, and SMS criteria for both storm drain solids and sediments sampled within the LDW in association with a facility of concern.

Each COC identified in upland media was considered for screening against levels defined by Ecology's screening tool to determine whether the potential COC could be ruled out. However, the screening tool is limited to SMS compounds found in soil or groundwater, and it is limited to predicting exceedances of SMS numerical criteria only for protection of benthic invertebrates. It was determined that the screening tool did not apply to the COCs identified for the RM 1.2-1.7 East Source Control Area either because they were not SMS compounds, or because they were found in media other than soil or groundwater (e.g., storm drain solids or storm water). Ecology's screening tool is discussed in more detail in *RM 1.2-1.7 East Summary of Existing Information and Identification of Data Gaps Report.*

The upland COCs and pathways in the table below show the results of Ecology's review of available information on LDW sediments between RM 1.2 and 1.7. This table shows COCs discovered in upland media and cannot be used to determine which upland COCs are also sediment COCs in the LDW. Comparison with sediment and seep data collected for the LDW sediment investigation indicates that not all of the upland COCs shown below are problematic for sediment source control.

The following table summarizes the COCs in upland media determined on the basis of the applicable screening level criteria:

Contaminants of Concern Identified in Upland Media			
Facility of Concern	**Contaminant of Concern**	**Media**	**Potential Pathway to LDW Sediments**
Adjacent Facilities of Concern			
Saint-Gobain Containers	Chromium compounds, ethylene glycol, lead compounds	Air emissions, stormwater discharges	Air deposition, stormwater
Longview Fibre Paper and Packaging	Gasoline range organics, diesel range organics, lube oil range organics	Soil, groundwater, air	Groundwater
Certainteed Gypsum	N/A	N/A	N/A
Upland Facilities of Concern			
Philip Services Corporation	BTEX, Chlorinated ethenes, chlorinated ethanes, chlorinated methanes, ketones, aromatic VOCs, 1,4-dioxane, PAHs, phenols, PCBs and inorganics	Groundwater	Groundwater
Art Brass Plating	PCE, TCE, Cis-DCE, Vinyl Chloride, Arsenic, Barium, Iron, Manganese	Soil, groundwater	Groundwater
Blaser Die Casting	Chlorinated Ethenes: Trichloroethene (TCE), cis-1,2-Dichloroethene (cis-1,2-DCE), trans-1,2-Dichloroethene (trans-1,2-DCE), 1,1-Dichloroethene (1,1-DCE), and vinyl chloride (VC).	Air, soil, and groundwater	Groundwater
Capital Industries	PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, vinyl chloride, 1,4 dioxin and manganese	Air, soil, and groundwater	Groundwater

3.0 Potential Sources of Sediment Recontamination

Potential sources of sediment recontamination include direct discharges from public and private storm drain systems and direct and/or indirect discharges from facilities that are within the RM 1.2-1.7 East Source Control Area, both adjacent to and upland from the LDW. These outfalls are illustrated in Figure 5. Of the ten outfalls along this reach of the waterway, five originate from the three facilities of concern that are adjacent to the waterway; the remaining five are municipal. A groundwater seep is also shown on Figure 5. The ten outfalls are discussed in Section 3.1.

3.1 Outfalls

The LDW area is served by separated storm drain/sanitary sewer systems and combined sewer systems. Although there is no CSO outfall in this Source Control Area, contaminants from this area that enter a combined system may still reach the LDW. Storm drains in separated areas convey stormwater runoff directly to the LDW, while under normal conditions sanitary sewage and industrial wastewater are treated at a regional waste water treatment plant before being discharged into Puget Sound. In a combined system, stormwater runoff is combined with sanitary sewage and industrial wastewater and conveyed to the treatment plant.

Most of the waterfront properties are served by separated storm drain systems that discharge stormwater directly to the LDW and sanitary systems that convey sewage and industrial wastewater to the treatment plant. Although there are situations when the combined sewer system can overflow to the LDW, there are no CSO outfalls in the RM 1.2-1.7 East Source Control Area. Therefore, the combined sewer pathway is not discussed in this report.

Stormwater from properties east of East Marginal Way South flows into a combined system that under normal conditions goes to the treatment plant. Therefore, stormwater from the four upland facilities of concern (Section 3.3) does not provide a potential pathway to the sediments adjacent to the RM 1.2-1.7 East Source Control Area and is not discussed in Section 3.3.

3.1.1 Storm Drain Outfalls

Storm drains discharging to the LDW carry precipitation runoff collected from streets, parking lots, roof drains, yards, gardens, etc. A wide range of contaminants may become dissolved or suspended in runoff as rainwater flows over the land. Urban areas may accumulate particulates, dust, oil, asphalt, rust, rubber, metals, pesticides, detergents, or other materials as a result of urban activities. These can migrate into storm drains during wet weather. Storm drains can also convey materials from businesses, residences, vehicle washing, landscaped areas, erosion of contaminated soil, groundwater infiltration, and materials illegally dumped into the system or onto the ground.

Stormwater can discharge via outfalls from private sites adjacent to the river or from publicly owned storm drain systems. Figure 5 illustrates known storm drain system lines and outfalls

within the RM 1.2-1.7 East Source Control Area. Public stormwater outfalls include Outfalls 2007 through 2011, and private stormwater outfalls include Outfalls 2013 through 2017. These direct discharges are permitted by Ecology through two types of National Pollutant Discharge Elimination System (NPDES) permits.

3.1.2 NPDES Permits

Six types of NPDES permits cover various discharges to the LDW. However, only two types of permits apply to the RM 1.2-1.7 East Source Control Area – the Phase I Municipal Stormwater Permit and the Industrial Stormwater General Permit. Permits that do not apply to the RM 1.2-1.7 East Source Control Area include the Phase II Municipal Stormwater Permit, as well as boat yard, sand and gravel, general, and individual permits.

Phase I Municipal Stormwater Permit

Stormwater runoff into municipal separated storm drains that discharge to surface waters must have a NPDES permit under the federal Clean Water Act. Phase I of the municipal stormwater program went into effect in 1990 and applies to municipalities with populations of more than 100,000, including the city of Seattle and King County. Within the RM 1.2-1.7 East Source Control Area, this permit applies to outfalls 2007 through 2011 and requires King County to adequately identify and map all drainage structures on the properties. These structures are identified in Figure 5.

The original Phase I permit was issued in 1995 and was reissued on January 17, 2007. The new permit represents a significant shift in approach to stormwater monitoring. The new permit requires monitoring of in-line water and storm drain solids, during both wet and dry seasons. Contaminants to be monitored include the Washington SMS list, as well as toxicity testing for effluent and receiving sediments. The permit requires all permittees to monitor one stormwater drainage/outfall representing each type of land use: residential, commercial, and industrial. Complete monitoring requirements are in Special Condition S.8 of the permit, which is available online at:

http://www.ecy.wa.gov/programs/wq/stormwater/municipal/phaseIpermit/phipermit.html

In addition to the expanded monitoring described above, the Phase I permit also contains more traditional requirements such as system maintenance, best management practices (BMPs), and business inspections. In addition, the Phase I permit contains programmatic requirements in the areas of education/outreach, illicit discharge detection and elimination, and the development of municipal stormwater codes and regulations. Before this permit was reissued, the city of Seattle and King County formed a joint program to conduct the source control inspection process throughout the LDW drainage basin. The City's source control authority comes from the City Stormwater, Grading, and Drainage Control Code (SMC 22.800), which was established in part to meet the requirements of its NPDES municipal stormwater permit. King County's source control authority, associated with the joint program, stems from its authorized pretreatment program and their attendant industrial and hazardous waste management programs. For King County storm drain outfalls, their source control authority comes from King County Water Quality Code (Chapter 9.12 KCC).

Ongoing source control programs conducted by the city, county, and Ecology help reduce the amount of pollution entering public storm drains and sanitary/combined sewer systems that discharge to the LDW. Such programs also address discharges from private outfalls. These source control programs include the 2003-2006 city/county joint inspection program, the ongoing Seattle Public Utilities (SPU) program, the ongoing King County Industrial Waste Program KCIWP, the Ecology Urban Waters Initiative, and Ecology's coordination with city/county programs. LDW source control activities generally go beyond what is required under the NPDES program. In particular, the level of source tracing and characterization these programs conduct exceeds what is required by NPDES.

Industrial Stormwater General Permit

The Industrial Stormwater General Permit covers 112 industries within the LDW drainage basin. The Industrial Stormwater General Permit requires a facility to monitor its stormwater discharge for copper, zinc, oils, and total suspended solids. Development and implementation of a Stormwater Pollution Prevention Plan (SWPPP) is also required under the permit. Within the RM 1.2-1.7 East Source Control Area, facilities covered under the Industrial Stormwater General Permit include Longview Fibre Paper and Packaging (outfall 2013), and Certainteed Gypsum (Listed as James Hardie- outfalls 2014 through 2017).

3.2 Adjacent Facilities of Concern

3.2.1 Saint Gobain Containers

Saint-Gobain Containers Inc. (SGCI) is adjacent to the LDW on the east side between RM 1.2 and 1.5. The facility is bordered on the north by the J.A. Jack and Sons facility and on the south by the Longview Fibre Paper and Packaging facility. East Marginal Way South borders the facility to the east and the LDW borders the facility to the west.

According to King County tax records, the SGCI facility encompasses two tax parcels, 1722802315 (east) and 1924049002 (west), both listed under the address 5801 East Marginal Way South (Figure 6) (King County 2008a). The most recent property sales record listed in King County's tax records indicates that Ball-Foster Glass Container Co. LLC purchased the east parcel from Ball Glass Container Corporation on September 15, 1995. The current owner of this tax parcel is listed as SGCI. Four structures are listed for this tax parcel, including a 27,315-square-foot office building built in 1970, a 195,592-square-foot storage warehouse (1960), a 166,193-square-foot industrial light manufacturing building (1960), and a 24,970-square-foot storage warehouse (1929) (King County 2008a).

Available information from Ecology, EPA, and King County online databases and permits is summarized in the table below. This site information and further details are described in *RM 1.2-1.7 East Summary of Existing Information and Identification of Data Gaps Report* (E & E 2009).

Facility Summary: Saint Gobain Containers Inc.	
Address	5801 East Marginal Way South
Property Owner	Saint-Gobain Containers (east) King County (west)
Former/Alternative Facility Names	Ball Glass Ball-Foster Glass Ball-Incon Northwestern Glass Company
Former/Alternative Addresses	N/A
Former/Alternative Lessee/Operator Names	N/A
Tax Parcel Nos.	1722802315 (east) 1924049002 (west)
Parcel Size	12.76 acres (east) 8.76 acres (west)
NPDES Permit No.	SO3001134
EPA RCRA ID No.	WAD044589935
EPA TRI Facility ID No.	98134BLLNC5801E
Ecology Facility/Site ID No.	94925241
Ecology UST Site ID No.	5333
Ecology LUST Release ID No.	N/A
Listed on CSCSL	No
Approved Air Operating (Title V) Permit No.	11656
EPA CAA ID No.	5303300004
KCIW Permit No.	555-03

Relevant current site use, past site use, environmental investigation, cleanup action, and facility inspection information is summarized in the sections below to provide background for potential contaminant sources and source control actions identified for the SGCI facility.

3.2.1.1 Current Site Use

SGCI manufactures commercial glass containers for the food and beverage industry (CRA 2006a). Most operations are conducted in secure buildings with concrete floors that do not have any open floor drains. An exception is in the production area where there is a drain that flows to an oil-water separator and water treatment system. All glass-forming machines are surrounded by oil absorbents to contain oil leakage (CRA 2006a).

Storm Drain System/Wastewater

Surface drainage from the facility flows offsite to storm drains and to the combined sewer system that are located throughout the facility. Storm drains on Ohio Avenue drain to the LDW, which forms the west property line of the Facility. Figure 7 depicts five outfalls that discharge to

the LDW, numbered 001 through 005 (CRA 2006a). Wastewater generated during production is collected in various sumps across the property and is routed to the facility's wastewater treatment center. No information concerning the details of the wastewater treatment center was available for review. Site drainage can also be seen in Figure 7.

The facility has wastewater discharge permit 555-03 from King County Industrial Waste (KCIW) to discharge 50,000 gallons per day of excess water to the combined sewer system. Most of the water is treated and recirculated back into the glass-making process (Ecology 2003a). Non-contact cooling water had been previously discharged directly to the LDW, but is now recycled onsite. No septic systems exists onsite (SGCI 2005). No process in the facility is allowed to discharge contaminated water to any drain or discharge point that leads to the LDW under normal circumstances.

Past Site Use

SGCI was originally constructed as the Northwestern Glass Company. The current facility has undergone several name and ownership changes but is only known to have produced glass containers (CRA 2006a). The site and surrounding area were originally operated by the Seattle Export Lumber Company, which closed sometime between 1929 and 1949. The property was later occupied by the U.S. Plywood Corporation - Lumber Division Mill, the Monsanto Chemical Company, and the Northwestern Glass Company facility. According to the historic photos, there were several steel tanks along the Marginal Way frontage; however the owners of the tanks are unknown. Contents of the tanks are also unknown. Historical photos indicate that the current SGCI facility began to take shape sometime between 1956 and 1967. The 1967 historic map shows the entire property as having been converted over to glass manufacturing and storage by the Northwestern Glass Company (SGCI 2005).

3.2.1.2 Environmental Investigations and Cleanup Activities

The following investigations have been conducted at SGCI:

- Removal/Permanent Closure of Underground Storage Tanks (December 1989)
- Limited Soil/Groundwater Investigation (October 2005)
- Initial-Phase Focused Groundwater Investigation (September 2006)

These investigations are described in detail in RM 1.2-1.7 East Summary of Existing Information and Identification of Data Gaps Report (E & E 2009).

Removal/Permanent Closure of Underground Storage Tanks (December 1989

In December 1989, O'Sullivan Construction Inc. was contracted by Bell-Incon Glass Packaging Corporation to remove and close in place nine on-site underground storage tanks (USTs). Five USTs were removed and four USTs were closed in place at the SGCI facility. The four USTs that were closed in place included three 12,000 gallon USTs containing waste oil and one 7,500 gallon UST containing hydraulic fluid. The five USTs that were removed included two 12,000 gallon USTS containing fuel oil, one 3,000 gallon UST containing gasoline, one 6,500 gallon

UST containing waste oil, and one 1,500 gallon UST containing Oil lubricant. The four USTs that were closed in place were done so due to structural obstructions, which include a railroad spur track, and an oil/water separator (SGCI 2005).

After UST removal was complete, soil samples were collected from the UST excavation pit as well as from the soil stockpiles. Samples locations and analytical results were unavailable for review; however, UST documentation did state that analytical results of the post excavation samples revealed exceedances above MTCA Method A cleanup standards. Further information about these exceedances were unavailable for review (SGCI 2005).

Due to the exceedances discovered during UST removal activities, a limited UST assessment was conducted in January and February 1990. Environmental Resources Management-Northwest (ERM-NW) was retained to conduct the limited UST Assessment. The purpose of the assessment was to further examine the UST area where MTCA Method A cleanup standard exceedances were found, while also determining the extent of the petroleum hydrocarbon release (SGCI 2005). Further information regarding sample locations and the source of the TPH-D was unavailable for review.

During the limited UST assessment, over-excavation of the impacted area discovered during initial UST removal activities was conducted to the greatest extent possible. Not all impacted soils were able to be removed at this time due to the railroad spur track and the oil/water separator. There was no information available if institutional controls were implemented in order to ensure appropriate cleanup actions are undertaken if the railroad spur and oil/water separator are ever removed (SGCI 2005).

Following over excavation activities, confirmation samples were collected from the northwest, west, and southeast sidewall areas as well as the excavation pit floor, east sidewall, and the area adjacent to oil water separator. Another soil sample was also collected near the groundwater surface within the excavation. These samples were analyzed for TPH-D. Analytical results showed that samples collected along the excavation pit floor, east sidewall and area adjacent to the oil/water separator contained exceedances of MTCA Method A cleanup standards for TPH-D. Confirmation samples BFS-1 (excavation floor), EWS-1 (east sidewall), and NWOWS (area near oil/water separator) exhibited TPH-D concentrations of 840 ppm, 643 ppm, and 15,947 ppm respectively. Samples BFS-1 and EWS-1 were exceedances based on the old MTCA Method A cleanup standard for TPH-D of 200 ppm. Today, these samples fall below the MTCA Method A cleanup standard for TPH-D of 2,000. Sample NWOWS exceeds both old and new standards (SGCI 2005).

Investigation files indicate that 283 tons of diesel impacted soils were removed from the excavation and properly transported to and disposed in the Cedar Hills Landfill. The excavation was backfilled with pit run to 16 inches below ground surface. Crushed rock was then placed to six inches below surface grade (SGCI 2005).

Limited Soil and Groundwater Investigation (October 2005)

From August 15 through August 19, 2005, Conestoga-Rovers and Associates conducted a limited soil and groundwater investigation prompted by a TCE plume that was originally

discovered just south of the SGCI facility by Philip Services Corporation (PSC). A total of nine soil borings consisting of two soil borings and seven soil/groundwater borings were advanced utilizing direct push technologies to determine the presence or absence of volatile organic compounds (VOCs) and characterize the compounds, if present. All nine soil borings were initially drilled to 10 feet bgs and labeled GP-1 through GP-9. Only soil samples were collected from zero to ten feet bgs. Following initial soil sampling of GP-1 through GP-9, GP-1, and GP-4 through GP-9 were advanced to 39 to 49 feet bgs in order to collect depth discrete groundwater samples. Results of this investigation revealed that there were no VOCs of concern detected in the soil, but TCE ranging from 2.7 to 14,000 µg/L was detected in three groundwater sampling locations (GP-5, GP-7, and GP-8; Figure 8) at approximately 25 to 40 feet bgs (CRA 2005).

Initial Phase Groundwater Investigation

From July 17 through July 19, 2006, Conestoga-Rovers and Associates conducted an Initial Phase groundwater investigation based on critical data gaps concluded from the Limited Soil/Groundwater Investigation. Field investigation activities included advancing a total of nine soil borings to collect depth-discrete groundwater samples and further characterize and delineate VOC impact on soil and groundwater (Figure 9). One boring was driven 44 feet bgs to collect both near-surface soil samples (former machine shop) and depth-discrete groundwater samples. A second boring was advanced to collect a continuous stratigraphic core. Six of the 10 borings were advanced to a depth of 49 feet bgs to collect depth-discrete groundwater samples. Two contingency borings were advanced to 49 feet bgs to further characterize and delineate VOC impact identified from expedited groundwater sample data collected from VAS-5. In addition, single well response data (slug testing) were collected at depth-discrete intervals from certain VAS borings (CRA 2006b).

Analytical results from this investigation indicated no VOC compounds in soil samples that exceeded MTCA method B soil standards for carcinogenic and non non-carcinogenic soils. TCE concentrations were detected above MTCA Method B standards in 22 groundwater samples collected from seven borings. Cis-dichloroethene (cis-DCE) concentrations were detected above Method B standards in 24 groundwater samples collected from seven borings. Vinyl chloride (VC) concentrations were detected above Method B standards in 34 groundwater samples collected from nine borings (CRA 2006b).

3.2.1.3 Facility Inspections

The following facility investigations have been conducted at SGCI:

- Hazardous Waste Compliance Inspection, Saint-Gobain Containers (March 2003)
- Stormwater Compliance Inspection, Saint-Gobain Containers (December 2005)
- King County Industrial Waste Field Inspection (January 2007)
- EPA Request for Information (July 2008)

Ecology performed a Hazardous Waste Compliance Inspection at the SGCI facility on March 19, 2003. Ecology noted that one such inspection had been conducted at the facility before (in January 1997) and that no violations were observed (Ecology 2003a).

On December 28, 2005, Ecology conducted a Stormwater Compliance Inspection at the SGCI facility and recommended that SGCI should determine the origin of a visible petroleum sheen that was observed around the raw glass storage areas, and should implement the necessary source control BMPs to correct the problem (Ecology 2005).

Ecology also recommended that SGCI should collect and submit a stormwater sampling result each quarter if one or more of the permit sample collection criteria cannot be met. SGCI submitted numerous discharge monitoring reports (DMRs) to Ecology stating that there had been no qualifying storm event; however, as of the latest modification, completed in December 2004, Ecology required that if one or more sample collection criteria could not be met, the permittee must still collect and submit a stormwater sample (Ecology 2005)

On January 18, 2007, King County conducted an Industrial Waste Inspection at the SGCI facility. During this annual inspection, King County noted major improvements since the previous annual inspection. Observed improvements included revisions of the pretreatment system, such as a new oil skimmer. No violations were found at this time (King County 2007a)).

In July 2008, EPA sent SGCI general notice 107(e) and request for information 104(e) letters to SGCI (EPA 2008b). No response information from SGCI was available for review at the time of publication.

3.2.1.4 Potential Contaminant Sources

Stormwater/Wastewater

The SGCI facility discharges stormwater to the LDW from five storm drains located on Ohio Avenue (Figure 7). Wastewater is discharged to the combined sewer system under Wastewater Discharge Authorization No. 555-03. This major discharge authorization permits SGCI to discharge treated industrial wastewater generated from glass container manufacturing into the combined sewer system in accordance with effluent limitations and monitoring requirements. The maximum permitted discharge volume is 50,000 gallons per day (gpd). Annual KCIW field inspections monitor compliance with the permit requirements. No sampling results were available for review concerning both stormwater and wastewater discharges. Because there are no sampling results available for review, it is possible that storm drain solids and contamination could be reaching the LDW sediments via the stormwater pathway.

Spills

According to Ecology's files, one recorded spill consisting of diesel fuel occurred on October 2, 1997. Correspondence in Ecology's files dated October 16, 1997, described this spill as a 50-gallon diesel release due to the over filling of a rented compressor fuel tank. The spill occurred in a parking lot near Ohio Ave and approximately 10 gallons of diesel entered the storm drain and flowed into the LDW.

Any future spills may be a potential source of contamination both through the facility's storm drain system and through surface runoff due to the facility's proximity to the LWD. There are

two drum storage areas within the storeroom and the forklift shop (Figure 10). These drums are in buildings with concrete floors, but since no secondary containment surrounds them, and they are close to the storm drain system, spills could reach the river.

Various aboveground storage tanks (ASTs) at the site are located outside. The tanks have containment dikes around them of sufficient size to contain their entire contents and to allow adequate freeboard. The dike floors and walls are welded steel. There are also roofs over each AST area to prevent rainwater accumulation. Regular inspections of these containment areas will identify any deterioration and will help prevent spills. All of these tanks and their associated containment structures are on concrete slabs. There is an additional AST, the lube oil tank, inside a building on a concrete floor that is free of any cracks or opening. Because this tank only sits within a depressed area and because spills and cracks can happen at any time, the lube oil tank should have appropriate secondary containment to prevent spills.

Groundwater

Historical petroleum hydrocarbon, TCE, Cis-dichloroethene, and Vinyl Chloride contamination has been identified in soil and groundwater. According to the 2005 Limited Soil/Groundwater Investigation conducted by Conestoga-Rovers & Associates, groundwater elevation data indicate a net groundwater flow west southwesterly toward the LDW with some slight fluctuations due to tidal variation and/or other factors (CRA 2005). Because residual contamination was left in place after the 1989 UST removal and there have been exceedances of MTCA Method B groundwater standards, groundwater is a potential contamination pathway (SGCI 2005).

3.2.1.5 Source Control Actions

The following source control actions will be conducted for the SGCI facility.

- Ecology will review the PRP response to the 104(e) letter sent to SGCI in July 2008 and will evaluate what further site investigation is necessary.
- Ecology will determine appropriate engineering controls for the inaccessible contamination located beneath the soil/water separator described in the 1991 Limited UST Assessment.
- SPU and Ecology will conduct a source control inspection at the facility to confirm that the SWPPP is up to date, the facility is complying with the NPDES permit, and best management practices are being implemented.
- SPU and Ecology will sample catch basins as needed to evaluate the presence of COCs entering the storm drain system. If COCs are identified within the SGCI catch basins, SPU and Ecology will conduct source tracing to identify the source of the contamination.

3.2.2 Longview Fibre Paper and Packaging

Longview Fibre Paper and Packaging Inc. (LFPP) is adjacent to the LDW on the east side at approximately RM 1.5. The property is approximately 3 acres and is bordered by the LDW on the west, SW Fidalgo Street on the north, and East Marginal Way South on the east as seen in Figure 11.

Facility Summary: Longview Fibre Paper and Packaging	
Address	5901 East Marginal Way South
Property Owner	Longview Fibre Paper and Packaging
Former Property Owners	N/A
Former/Alternative Facility Names	Longview Fibre Company
Former/Alternative Addresses	N/A
Former/Alternative Lessee/Operator Names	N/A
Tax Parcel No.	1924049091
Parcel Size	3.36 acres
NPDES Permit No.	SO3000206
EPA RCRA ID No.	WAD009282161
EPA TRI Facility ID No.	N/A
Ecology Facility/Site ID No.	2226
Ecology UST Site ID No.	7348
Ecology LUST Release ID No.	3449
Listed on CSCSL	Yes
EPA CAA ID No.	5303315019
KCIW Permit #	KC631-631-02

According to King County tax records, there are three buildings on the LFPP property including a 119,990-square-foot distribution warehouse built in 1955, a 7,986-square-foot office building (1955), and a 10,500-square-foot storage warehouse (1980) (King County 2008a).

Available information from Ecology, EPA, and King County online databases and permits is summarized in the table above. This site information and further details are described in *RM 1.2-1.7 East Summary of Existing Information and Identification of Data Gaps Report* (E & E 2009).

3.2.2.1 Current Site Use

The facility manufactures, warehouses, and ships corrugated products. The company's products include paperboard, value-added corrugated and solid-fiber containers, and commodity and specialty Kraft paper (LFPP 2008). Activities associated with this corrugated box manufacturing include gluing, printing, laminating, and shipping (EMCON 2001). All manufacturing, storage, shipping, and maintenance activities are performed in enclosed structures with minimal potential for pollutants to enter the stormwater system. Refueling is done outside, and the area surrounding the double-walled diesel tank is bermed and paved to prevent releases of spilled fuel to the stormwater system (EMCON 2001).

According to Ecology's UST List, three USTs have been removed from the LFPP property. One (capacity not specified) stored heating fuel, and another stored between 111 and 1,100 gallons (contents not specified); the capacity and contents of the third UST are not specified. UST

removal dates are not listed. The LFPP facility is also listed on Ecology's LUST list with Release ID No. 3449. This release is reported to have affected groundwater and soil. Cleanup started June 1, 1995, and monitoring commenced on March 10, 2003 (Ecology 2008b).

Storm Drain System

A single discharge point (Outfall 001) discharges stormwater from the facility into the LDW. The outfall pipe is approximately 18 inches in diameter and is located on the west side of the site. According to the 2001 SWPPP, stormwater discharges offsite via several catch basins leading either to Outfall 001 or to the combined sewer system. Figure 12 shows the catch basins located throughout the site, outfall 001, and areas that discharge to the combined sewer system (EMCON 2001). Stormwater from the site conveys by sheet flow to three onsite catch basins located in the parking lot, on the rooftop, and on SW Fidalgo Street.

Past Site Use

According to King County tax records, the current warehouse and office building were built in 1955. Historical photographs indicate that no major structures were built on the property until sometime between 1946 and 1956. The 1936, 1941, 1946, and 1956 aerial photos show that there was no development until LFPP was built. Little is known about the history of the industrial activities conducted at LFPP prior to the 1987 UST removal.

3.2.2.2 Environmental Investigations and Cleanup Activities

Diesel Fuel Leak Investigation and Remediation

In December 1990, a large amount of diesel fuel was released into the soil at the Longview Fibre Seattle plant through a recirculation pipe that connected the boiler to the former boiler-fuel UST. This pipe was not capped or disconnected from the boiler when the UST was removed in 1987. Measurements collected by LFPP indicated that approximately 5,940 to 7,830 gallons of diesel were released to the surrounding soil. LFPP product recovery began in January 1991, immediately after discovering the release. The estimated quantity of diesel recovered by LFPP from monitoring well MW-1 and from product recovery sumps (perforated culverts installed in test pits) totaled 4,420 gallons. Additionally, an estimated 2,147 gallons of diesel was removed with contaminated soil excavated from the release site in October 1992. This resulted in a total estimated recovered diesel volume of 6,567 gallons. No excavation or sidewall samples were collected at any time during product recovery. The only soil samples that were collected consisted of stockpile soil samples that were collected for the purpose of disposal and soil re-use. According to the lab reports associated with these soils samples, all stockpile samples collected during October 1992, tested positive for diesel using Ecology's Hydrocarbon Identification Method and exceeded the MTCA Method A cleanup level for total petroleum hydrocarbons as Diesel (TPH-D) (CH2MHILL 1995).

Regular monitoring of the three on-site monitoring wells was initiated in March 1990 to complete the post-UST removal investigation. The goal of this monitoring was to confirm the absence of or decline of total petroleum hydrocarbons in groundwater to concentrations below Ecology cleanup levels. During monitoring events in November 1991, February 1992, and June

1992 no visual evidence of petroleum product was observed. However, in samples collected during September and November 1995 sample results confirmed that there was still some residual hydrocarbon product beneath the west end of the plant site. Concentrations of TPH-Diesel and TPH-Heavy Oil (Oil) were detected in MW-3 during September and December 1995 at concentrations of 23,500 ppb (280,000 ppb diluted) and 1,880 ppb (15,000 diluted) respectively. Both of these concentrations exceed the MTCA Method A cleanup levels for diesel and heavy oil of 500ppb and 800 ppb. Based on these results, it was determined that residual product still remains beneath the west end of the site and thus groundwater monitoring needs to continue (CH2MHILL 1995).

Since 1995, annual groundwater monitoring has been conducted at LFPP. The most recent groundwater monitoring was conducted in October 2007 at MW-2. Samples were analyzed for TPH-D and resulted in 2,300 ppb, exceeding the MTCA Method A cleanup level of 500 ppb. Previous samples collected from MW-2 in 2004 through 2006 also exceeded MTCA A cleanup standards. Conditions at MW-3 are currently unknown. It is also unknown why sampling is no longer conducted in that area (CH2MHILL 1995).

3.2.2.3 Facility Inspections

On February 26, 2003, Ecology performed a dangerous waste compliance inspection at the LFPP facility. Ecology noted that the annual waste reports completed during 2000 and 2001 indicated that no regulated waste was generated. Ecology did not observe any violations during this inspection (Ecology 2003b)

3.2.2.4 Potential Contaminant Sources

Stormwater

Because LFPP is close to the LDW and is permitted to discharge stormwater to the LDW, it is possible for any surface contaminants to be carried by stormwater to the LDW. No information was available on any monitoring results of outfall 001. Depending on monitoring results, there may be more additional areas of concern than initially anticipated.

Spills

Spills may be a potential source of contamination both through the facility's storm drain system and through surface runoff due to the facility's proximity to the LWD.

3.2.2.5 Source Control Actions

The following source control actions will be conducted for LFPP:

- Ecology will review the PRP response to the 104(e) letter EPA sent to LFPP in March 2008 and evaluate whether further site investigation is necessary.
- The latest groundwater monitoring should be reviewed concerning on-site exceedances of TPH-D. Due to the proximity to the LDW a remedial action plan should be created to assure that the TPH-D contamination does not reach the LDW.

- SPU and Ecology will conduct a source control inspection at the facility to confirm that the SWPPP is up to date, the facility is complying with the NPDES permit, and best management practices are being implemented.
- SPU and Ecology will sample catch basins as needed to evaluate the presence of COCs entering the storm drain system. If COCs are identified within the LFPP catch basins, SPU and Ecology will conduct source tracing to identify the source of the contamination.

3.2.3 Certainteed Gypsum Inc.

Certainteed Gypsum Inc. is adjacent to the LDW on the east side between RM 1.2 and 1.7. The property is bordered on the north by the Longview Fibre Paper and Packaging property and on the south by the Glacier Northwest property.

Facility Summary: Certainteed Gypsum Inc.	
Address	5931 East Marginal Way South
Property Owner	BPB Gypsum
Former Property Owners	See Section 3.2.3.2
Former/Alternative Facility Names	James Hardie Gypsum Certainteed Gypsum Lone Star Northwest Norwest Gypsum
Former/Alternative Lessee/Operator Names	N/A
Tax Parcel No.	1924049092
Parcel Size	10.08 acres
Former/Alternative Addresses	N/A
NPDES Permit No.	SO3000056
EPA RCRA ID No.	WAD980382972 (inactive since 12/31/2004)
EPA TRI Facility ID No.	N/A
Ecology Facility/Site ID No.	2253
Ecology UST Site ID No.	7095
Ecology LUST Release ID No.	1903
Listed on CSCSL	No
EPA CAA ID No.	5303301119

The most recent property sales record listed in King County's tax records indicates that James Hardie Gypsum (JHG) purchased tax parcel No. 1924049092 from Lone Star Northwest on May 23, 1997. The current owner of the property is listed as BPB Gypsum (King County 2008a).

The three buildings on the property include a 173,732-square-foot light industrial manufacturing building built in 1954, a 25,434-square-foot storage warehouse built in 1954, and a 50,214-

square-foot storage warehouse built in 1999 (King County 2008a). All of the buildings on the property are within tax parcel No. 1924049092 (Figure 13).

Available information from Ecology, EPA, and King County online databases and permits is summarized in the table below. This site information and further details are described in *RM 1.2-1.7 East Summary of Existing Information and Identification of Data Gaps Report* (E & E 2009).

3.2.3.1 Current Site Use

The facility manufactures and recycles wallboard (Weston 2000). An aerial photo taken in July 2006 in the area of the Certainteed Gypsum facility is included as Figure 13.

The Certainteed Gypsum facility covers approximately 10 acres, which is nearly 100 percent impervious area (Weston 2000). The plant consists of the main wallboard plant building, a rock storage silo, parking areas, several areas for truck loading and unloading, and a dock along the waterway (Weston 2006).

According to Ecology's UST list, six USTs have been removed from the Certainteed Gypsum property; four stored heating fuel, one stored unleaded gasoline, and one had unspecified contents. The capacity and removal dates of the six USTs are not listed. The Certainteed Gypsum facility is also listed on Ecology's LUST list with Release ID No. 1903. Cleanup following the release started June 1, 1995, and the site was reported cleaned up on January 26, 2001 (Ecology 2008b).

Certainteed Gypsum was entered into the No Further Action list on February 23, 2006, under the facility name Certainteed Gypsum Manufacturing and is listed as No further Action after an assessment of the Independent Remedial Action was conducted under the Voluntary Cleanup Program (Ecology 2008b).

Storm Drain System

Figure 14 illustrates Certainteed Gypsum's storm drain system. According to the 2000 SWPPP, the drainage system is comprised of constructed and natural features that function together to control stormwater. The constructed features include two concrete storm drains, a retention pond that consists of a concrete settling basin with an infiltration trench, a sump, multiple roof drains, and three concrete pipe outfalls that discharge to the LDW. The buried storm drains run outside the north and south walls of the wallboard manufacturing plant and discharge through two gated outfalls to the LDW. Sanitary side sewers convey wastewater from the facility to the combined sewer on East Marginal Way South (Weston 2000).

3.2.3.2 Past Site Use

Certainteed Gypsum Inc. formerly called Kaiser Gypsum and JHG, has manufactured gypsum products since 1954. From 1954 until 1988, about an acre of the west central portion of the plant property was used to store off-specification wallboard (former wallboard recycle pile). Limited quantities of solid waste such as lumber, metal scrap, and plastic wrap were also placed on the former wallboard recycle pile (Weston 2004).

3.2.3.3 Environmental Investigations and Cleanup Activities

The following investigations and cleanup actions have been conducted at Certainteed Gypsum:

- Remedial Investigation of the Northwest Gypsum Solid Waste Landfill – June 26, 1987
- Removal of Diesel Storage Tank – June 16, 1987
- Underground Storage Tank Closure – November 1990
- Characterization of the Recycle Pile – James Hardie Gypsum – July 1991
- Water Quality Certification/Modification - June 13, 1996
- Ecology VCP sampling January 2004 –October 2005

Risk Science International (RSI) conducted a remedial investigation of the solid landfill at the Norwest Gypsum facility on May 20, 1987. The site RI involved installing four groundwater monitoring wells, sampling remedial surface water and groundwater, sampling landfill core, surveying local groundwater use, and characterizing the hydrogeology of the property (RSI 1987). Ecology gave JHG a copy of the Potential Hazardous Waste Site Identification Form, dated April 13, 1990, which summarized the results of the 1987 RI as follows:

1. "Soils exceeded 10 times the drinking water standards for arsenic, chromium, lead, and possibly cadmium and mercury."
2. "Groundwater samples exceeded drinking water standards for chromium, lead, and mercury" (Weston 2004).

On June 16, 1987, Northwest Gypsum contracted Joe Hall Construction to remove and test a 1,000-gallon UST containing diesel. During testing, a very small leak was observed. After excavating around the tank, it was confirmed during pressurization that the tank had sprung a pin-hole-sized leak and a small amount of diesel had leaked out. The tank was drained, and dry ice was applied to the affected area. Approximately one wheelbarrow-full of frozen soil containing diesel oil was removed. The soil surrounding the contamination was also removed to make sure all contaminated soil had been removed. The 1,000-gallon tank was then removed from the premises, defumed, scrapped, and disposed of at a scrap yard. Due to the small nature of the spill no sampling was conducted. All parties agreed that all impacted materials were in fact removed, and that the spill did not encounter any media except the dry sand (Lovell 1987).

In November 1990, JHG contracted O'Sullivan Construction for the clean closure of four USTs. Two 1,000-gallon USTs and one 500-gallon UST were cleanly removed, and one UST of unknown capacity was abandoned in place and slurry-filled (O'Sullivan, 1991).

Between February and March 1991, JHG contracted Roy Weston Consultants to determine the nature and concentration of metals in manufactured wallboard that was stockpiled at JHG. Nineteen samples were collected from wallboard recently purchased by JHG that awaited recycling, wallboard manufactured by other companies that had been received by JHG for recycling, and stockpiled material. This investigation concluded that the stockpiled material did

not pose a threat to local groundwater quality and was acceptable for recycling (O'Sullivan 1991).

According to Order Number 95-2-000837, released from Ecology on June 13, 1996, JHG and Lone Star Northwest were granted a water quality certification/modification to begin work on a project to modify the area around the Kaiser Pier. The purpose was to deepen a portion of the Duwamish River channel via dredging in order to enhance berthing facilities to accommodate larger bulk cargo vessels. Included in this project was dredging of approximately 9,000 cubic yards of intertidal and subtidal sediment from 0.75 acres of the Duwamish river adjacent to the Kaiser Dock (King County, Washington, Township 19, Section 24N, Range 4E). This material constituted Puget Sound Dredged Disposal Analysis (PSDDA) Dredged Material Management Unit Numbers 4 and 5, and was disposed of at the PSDDA program's open water site in Elliott Bay. The dredging was designed to result in a final channel depth of -30 feet mean lower low water (MLLW), plus one foot of overdredge allowance. In addition, three breasting dolphins and 28 piles were proposed to be driven to support pier and walkway extensions. In 1987, as part of a property transfer evaluation, RSI was retained to conduct an RI of the former wallboard recycle pile (Weston 2004).

In February 2004, BPB Gypsum formerly entered into Ecology's Voluntary Cleanup Program (VCP) with the objective of having the facility removed from the Confirmed and Suspected Contaminated Site List (CSCSL) and obtaining a No Further Action (NFA) determination for the wallboard recycling pile. From January 24, 2004 through October 19 2005, soil, subsurface wallboard and groundwater samples were collected and analyzed for chosen COCs. Quarterly groundwater sampling was conducted for 6 consecutive quarters in which time no concentrations exceeding Ecology-approved water quality criteria at 4 of the monitoring wells over a series of five consecutive quarterly sampling events. Low-level concentrations of mercury were detected in samples collected from the up-gradient well in two of the six sampling events (September 2004 and July 2005) and constitute an "area background" [WAC 173-340-200] condition. Certainteed Gypsum obtained a NFA determination on February 23, 2006 (Weston Solutions 2006).

3.2.3.4 Facility Inspections

On October 16, 1996, Ecology conducted a Stormwater Compliance Inspection to evaluate compliance with the NPDES Stormwater Permit. During this inspection, Ecology made several observations that led to the following required actions (Ecology 1996):

- Provide adequate cover and containment for oil, both new and old.
- Revise SWPPP to reduce trackout of gypsum into the yard, driveways, and East Marginal Way South. Provide an interim procedure until construction is complete, and then revise the SWPPP.
- Discharging process wastewater to the storm drain system violates condition S4 of the Stormwater Permit. Discharging this wastewater to the ground or groundwater would require a state waste discharge permit. Only stormwater is authorized to be discharged through the stormwater system.

On September 13, 1999, JHG conducted an internal environmental audit of the facility using independent environmental consultants. On September 21, a preliminary report was released stating that the settling basin was overflowing and discharging water into the LDW. It was also learned that the stormwater gate had been left open, thus allowing the release into the LDW to occur. JHG estimated that approximately 1,500 gallons of tire wash water was discharged into the river over three weeks. As soon as the company learned of the situation, the gates were closed and the cause of the incident was investigated. It was discovered that the source was a truck tire wash station designed to drain into a settling basin adjacent to the stormwater outfall basin (Figure 14). The cause of the release was immediately corrected and the incident was reported to Ecology on October 15, 1999 (James Hardie Gypsum 1999).

On April 25, 2006, Ecology conducted a Stormwater Compliance Inspection at Certainteed Gypsum as required by Revised Code of Washington (RCW) 90.48.560. Ecology (2006) noted several concerns and recommendations to Certainteed Gypsum:

- Update the facility's SWPPP to reflect current conditions as stated in condition S9 of the Industrial Stormwater General Permit. In addition, retain a copy of the SWPPP and permit onsite.
- Collect stormwater samples and submit results to Ecology each quarter as stated in condition S4.A of the Industrial Stormwater General Permit (modification date: December 1, 2004), if one or more of the permit sample collection criteria cannot be met.
- Clean up all gypsum debris on the river bank and do not allow any of the debris to fall into the river; implement necessary source control and/or BMPs to ensure no debris enters the river in the future.
- Inspect and clean all catch basins and other stormwater drainage treatment systems.
- Repair the wheel wash station and add any additional source control and/or operational BMPs to keep gypsum dust from being tracked offsite.
- Clean up all areas that have an accumulation of gypsum dust.
- Inspect the portions of the site that border the Duwamish Waterway to determine whether gypsum-contaminated stormwater is flowing directly into the Duwamish Waterway. Where needed, redirect this stormwater into the facility's drainage system.

In July 2008, EPA sent general notice 107(e) and request for information 104(e) letters to Certainteed Gypsum. No information was available for review at the time of publication.

3.2.3.5 Potential Contaminant Sources

Stormwater

The Certainteed Gypsum facility discharges stormwater associated with industrial activities from the facility as part of the NPDES stormwater permit program under stormwater baseline general permit No. S03-000056. Due to lack of stormwater data and history of spills and leaks at the facility, the potential of contaminant migration via stormwater is very high. Areas of concern include the loading and unloading area and the outdoor storage area where various particulates, reagents, and petroleum products are used regularly.

Spills

Spills are a potential pathway of contamination both through the facility's storm drain system and through surface runoff since the facility is directly adjacent to the LDW. Three spills of significant materials have occurred on-site, according to the JHG 2000 SWPPP. A spill of asphalt wax emulsion occurred in January 1986 and reached the river because the storm drain gates were inoperable. In March 1987, another spill occurred because a rubber hose from a lignosite transfer system failed, causing lignosite to spray out of the system and bypass the dike ("lignosite" is short for the emulsifier lignosulfate). This spill also reached the river. Most recently there was a spill in February 2000 of Diloflo (poly naphthalene sulfonate sodium salt, a dispersing agent for pulp and paper applications). This was contained by the containment around the tank farm and was promptly pumped through a filter and reclaimed into the tank.

Groundwater

According to the February 2006 Groundwater Quality Assessment Final Report, contaminants of potential concern identified by Ecology have not been detected at concentrations exceeding Ecology-approved water quality criteria at monitoring wells over a series of five consecutive quarterly sampling events (Weston Solutions Inc. 2006).

An assessment of the wallboard recycle pile indicated that potentially complete exposure pathways to human, aquatic, avian, and benthic receptors in the LDW were present. However, the information in this report demonstrates that contaminants in the soil, subsurface wallboard, and associated groundwater are below Ecology-approved water quality criteria levels and therefore do not pose a threat to human health or the environment (Weston Solutions Inc. 2006).

3.2.3.6 Source Control Actions

The following source control actions will be conducted for Certainteed Gypsum:

- Ecology will review the PRP response to the 104(e) letter EPA sent in July 2008, and evaluate whether further site investigation is necessary.
- SPU and Ecology will conduct a source control inspection at the facility to confirm that the SWPPP is up to date, the facility is complying with the NPDES permit, and best management practices are being implemented.
- SPU and Ecology will sample catch basins as needed to evaluate the presence of COCs entering the storm drain system. If COCs are identified within the Certainteed Gypsum catch basins, SPU and Ecology will conduct source tracing to identify the source of the contamination.
- Ecology will locate and review the closure report for the 500 gallon UST documented in Ecology's UST database before groundwater concerns can be dismissed. This report was not available for review during the production of this report. .

3.3 Upland Facilities of Concern

The following facilities have been included in this report due to concerns about significant groundwater contamination within the RM 1.2-1.7 East Source Control Area (Figure 15). Results

from local groundwater investigations have indicated that contaminants in groundwater emanating from the vicinity of these upland facilities exceed cleanup levels. These cleanup levels were formulated by PSC and are based on groundwater protection of surface water. This contaminated groundwater could migrate to the sediments adjacent to the RM 1.2-1.7 East Source Control Area. Figure 16 shows contamination exceedances discovered during the groundwater investigations described below[4].

Although migration of contaminants through the combined sewer and any associated CSO is also of concern, this pathway will not be addressed in this document since there are no CSOs located within the RM 1.2-1.7 East Source Control Area. Because of this exclusion, KCIW and other discharge permits were not investigated for this report. This pathway is addressed in documents related to other source control areas. For more information on the CSO pathway, see documents related to the RM 1.7-2.0 East (Slip 2-Slip 3) Source Control Area (SAIC February 2009 and SAIC June 2009) and to documents pertaining to the RM 1.0 – 1.2 East Source Control Area and the RM 1.7-2.0 East Source Control Areas (these documents will be finalized after the publication of this document.).

3.3.1 Philip Services Corporation

Philip Services Corporation (PSC) is located approximately 4,500 feet northeast of the LDW. Properties neighboring the PSC facility include the Union Pacific Railroad (UPRR) to the northeast, the Stone-Drew/Ash and Jones property owned by SAD Properties LLC to the southwest, and the former Amalgamated Sugar Company property owned by PSC to the north. The former facility layout and surrounding properties are shown in Figure 17.

According to King County tax records, the PSC property encompasses two tax parcels, 1722800206 and 5084400124. Commercial building records were not given for either tax parcel (King County 2008a).

PSC was entered into Ecology's CSCSL on March 1, 1988. This site has a remedial action in progress through Ecology's Hazardous Waste Toxic Reduction program (Ecology 2008b). This site has confirmed groundwater, soil, and air contamination; however, groundwater is the only potential contaminant pathway from PSC that poses a risk to LDW sediments. Confirmed contaminants in groundwater are halogenated organic compounds, EPA priority pollutants (metals and cyanide), PCBs, petroleum products, phenolic compounds, and PAHs. Suspected contaminants in groundwater include base/neutral/acid organics, non-halogenated solvents, and arsenic. Contaminants in groundwater listed as below MTCA cleanup levels after assessment include pesticides, reactive wastes, corrosive wastes, radioactive wastes, asbestos, and methyl tertiary-butyl ether (MTBE). Confirmed contaminants in soil are identified as base/neutral/acid organics, halogenated organic compounds, EPA priority pollutants (metals and cyanide), PCBs, phenolic compounds, PAHs, and arsenic (Ecology 2008b).

[4]Signed orders between Ecology and these facilities limit the COCs included in these investigations to primarily TCE and its degradation products. No information on metals releases or impact of those releases on the environment was available for review.

Suspected contaminants in soil include petroleum products and non-halogenated solvents. Contaminants in groundwater listed as below MTCA cleanup levels after assessment include pesticides, reactive wastes, corrosive wastes, radioactive wastes, asbestos, and MTBE. Confirmed contaminants in air are halogenated organic compounds and non-halogenated solvents. Contaminants in air listed as below MTCA cleanup levels after assessment include base/neutral/acid organics, EPA priority pollutants (metals and cyanide), PCBs, pesticides, phenolic compounds, PAHs, reactive wastes, corrosive wastes, radioactive wastes, asbestos, and MTBE. Although there are no current operations at the PSC site, the possibility of a hydraulic control interim measure (HCIM) system failure makes groundwater a potential pathway of contamination to LDW sediments. Figure 18 shows former known chemical storage areas at PSC which may have contributed to the groundwater contamination on-site.

Facility Summary: Philip Services Corporation	
Address	734 South Lucile Street
Property Owner	Philip Environmental
Former Property Owners	N/A
Former/Alternative Facility Names	Philip Environmental Burlington Environmental Inc. Chemical Processors (Chempro) Preservative Paint Company
Former/Alternative Lessee/Operator Names	N/A
Tax Parcel Nos.	5084400124 (north) 1722800206 (south)
Parcel Size	0.33 acres 1.62 acres
Former/Alternative Addresses	N/A
NPDES Permit No.	N/A
EPA RCRA ID No.	WAD000812909
EPA TRI Facility ID No.	98108BRLNG734SL
Ecology Facility/Site ID No.	47779679
Ecology UST Site ID No.	7401
Ecology LUST Release ID No.	N/A
Listed on CSCSL	Yes
EPA CAA ID No.	N/A
KCIW Permit No.	7670-02

Available information from Ecology, EPA, and King County online databases and permits is summarized in the table above. This site information and further details are described in *RM 1.2-1.7 East Summary of Existing Information and Identification of Data Gaps Report* (E & E 2009).

3.3.1.1 Current Site Use

According to Ecology's most recent files, the PSC facility is currently a storage area for the corrective actions taking place on-site. The only operation currently being conducted on the PSC property is a groundwater extraction/treatment system (Ecology 2008c).

3.3.1.2 Past Site Use

The PSC facility was a hazardous waste treatment, storage, and disposal facility from 1980 until 2002. The facility is still permitted under RCRA (40 CFR 260-299); however, the facility stopped accepting waste in December 2002. PSC closed the facility in January 2003 in accordance with applicable RCRA, state, and Toxics Substances Control Act requirements. There are currently no waste operations conducted at the facility, although corrective action activities at the site still continue. In August 2003, all structures were removed from the property, with the exception of two tanks associated with the soil and groundwater treatment system that continues to operate as part of the corrective action at the facility. The property remains secured by an 8-foot chain-link fence topped with barbed wire that extends around the perimeter of the facility property (PSC 2003).

According to the Release Reports for PSC in EPA's TRI database, several chemicals were listed for 1998, including 1,2-dichloroethane, asbestos, benzene, butyl acrylate, carbon tetrachloride, cyanide compounds, dichloromethane, ethylene glycol, isopropyl alcohol, lead compounds, methyl ethyl ketone, methyl isobutyl ketone, n-butyl alcohol, n-methyl-2-pyrrolidone, naphthalene, toluene, trichloroethylene, xylene, and zinc compounds. Ethylene glycol and nitrate compounds were listed for 1999-2002, and lead compounds and mercury compounds were listed for 2000-2002. TRI data for PSC are summarized by report type in Appendix B of the *RM 1.2-1.7 East Summary of Existing Information and Identification of Data Gaps Report* (E & E 2009).

According to Ecology's HWTR site manager, 1,4-dioxane has been identified as a COC for the PSC property. PSC is currently negotiating an access agreement with the owner of 637 South Lucile Street, a property that was once used by General Electric (GE) and used 1,1,1-TCA in a vapor degreaser. PSC plans to sample soils, soil gas, and groundwater on the property and determine if any releases in the past at the former GE property may be adding to the groundwater contamination they are detecting in their wells (Ecology 2009a).

Surface Releases and Spills

Documented spills and releases at the facility occurred on four separate occasions from 1979 to 1990. The quantity of these spills was not always known. In addition to the documented spills and releases at the facility, undocumented releases are believed to have occurred at the facility since 1970. Between 1970 and 1987, releases from the many storage tanks onsite may have occurred due to leaks in the tanks and piping. Surface releases are also thought to have impacted soil and groundwater at the facility by way of leaking drums or leaking equipment. PCBs have been detected in groundwater at the facility and were likely released as surface spills. In addition, the onsite furnace used a product called Therminol, which was an insulating oil product known

to contain PCBs. A furnace fire in early 1974 may have also resulted in PCB contamination in the soils surrounding the furnace, and residual liquid may have been released during replacement of the furnace. Between 1991 and 1993, the entire facility was capped with concrete and a storm water management system was installed to ensure complete containment of any future release (PSC 2003).

Contamination has also been found on the UPRR property to the east and northeast, in an area referred to as Argo Yard. The contamination discovered by PSC's investigations has not been listed as a separate site of concern because the site boundary is determined by the extent of contamination. Soils and groundwater are contaminated in these areas (VOCs, SVOCs, metals, PCBs, petroleum). PSC agreed to clean up the contamination that lies adjacent to its property (Ecology 2009a).

The PSC site was divided into two parts (not in accordance with the two tax parcels) based on the extent of contamination. The eastern part of the site includes the facility property, the contamination on UPPR property to the immediate east and north, and groundwater contamination west of PSC's property to 4th Avenue. The western part includes groundwater contamination west of 4th Avenue. A draft Cleanup Action Plan (CAP) is being developed for the eastern portion of the site. PSC has taken responsibility for a portion of the contamination in UPRR's Argo Yard and has included this area in their draft CAP. After public comment, the plan is to replace the existing RCRA permit with a new streamlined corrective action-only RCRA permit and 2 MTCA Agreed Orders, one for each part of the site (Ecology 2009b).

3.3.1.3 Environmental Investigations and Cleanup Activities

Remedial investigation activities (including groundwater, soil, and soil gas investigations) have been ongoing at the facility since 1988. However, groundwater is the only potential contaminant pathway from PSC that poses a risk to LDW sediments. The results of the groundwater investigations indicated that:

- Groundwater contamination appears to have migrated offsite toward the southwest.
- Dense non-aqueous phase liquid (DNAPL), which is primarily composed of chlorinated solvents, is assumed to be present in groundwater under the facility as well as immediately to the west of the facility.

Chemicals associated with paint manufacturing, chlorinated solvents, petroleum products, VOCs, SVOCs, PCBs, and metals have been detected in both soil and groundwater at the facility. The facility is currently paved, preventing further contamination from reaching the soils and preventing direct human exposure to the existing contamination. Groundwater contamination migrating from the facility is primarily limited to chlorinated solvent compounds such as TCE and VC, and light petroleum compounds such as benzene and toluene (PSC 2003), but also includes 1,4-dioxane (Ecology 2009a).

Hydraulic Control Interim Measure

In June 2001, EPA and Ecology required that PSC implement groundwater interim measures, including a measure that would establish hydraulic control of non-aqueous phase liquids and

dissolved plumes emanating from the facility. During 2003 and 2004, PSC implemented the hydraulic control interim measure (HCIM). The HCIM was designed to isolate the contaminated soil and groundwater in the vicinity of the facility and to minimize the potential for migration of COCs offsite. The barrier wall was installed between October 2003 and January 2004, and was keyed into the underground aquitard and the intermediate silt unit to contain the most highly impacted groundwater. The barrier wall was coupled with groundwater extraction on the inside of the wall to provide hydraulic containment by maintaining an inward-directed hydraulic gradient. The barrier wall currently surrounds the source areas and areas of the most highly impacted groundwater as identified in the 2003 RI report written by PSC. This area includes a large portion of the facility and portions of neighboring properties including the TASCO site now owned by PSC, and the SAD and Aronson properties not owned by PSC (Figure 19). To ensure that the HCIM is performing properly, monitoring wells on both sides of the barrier wall continue to be monitored for water levels, general water quality parameters, and COCs (Geomatrix 2006).

3.3.1.4 Potential Contaminant Sources

Groundwater

Groundwater is the only potential contaminant pathway from PSC that poses a risk to sediments adjacent to the RM 1.2-1.7 East Source Control Area. Although there are no current operations at the PSC site, there is still current groundwater contamination flowing downgradient from the PSC facility. There is also the possibility of an HCIM system failure leading to contaminant migration to LDW sediments. Figure 18 shows former known chemical storage areas at PSC which may have contributed to the groundwater contamination on-site.

Groundwater contamination migrating from the facility is primarily limited to chlorinated solvent compounds such as TCE and VC, and light petroleum compounds such as benzene and toluene (PSC 2003).

3.3.1.5 Source Control Actions

The following source control action will be conducted for PSC:

- Ecology will continue its progress towards a new permit and Agreed Orders between Ecology and PSC. One order will implement the CAP for the eastern portion of the site.

3.3.2 Art Brass Plating

3.3.2.1 Current Site Use

Art Brass Plating Inc. is upland of the LDW, on the east side. The property is bordered to the north by a vacant office building and to the south by South Findlay Street. Fuji's Teriyaki and wholesale fish retail store borders the property to the east, and 3rd Avenue South borders it to the west (Figure 15).

According to King County tax records, the Art Brass Plating property is tax parcel 5263300240. The address listed is 5516 3rd Ave S. The most recent property sales record listed in King

County's tax record indicates that Evan Dean and Carmen R. Allstrom (current owners) bought the property from Helen V. Warner in 1986. The property name is listed as Art Brass Plating Co. The two buildings on the property include a 9,016-square-foot warehouse built in 1988 and a 9,128-square-foot office/warehouse built in 1983 (King County 2008a).

Facility Summary: Art Brass Plating	
Address	5516 3rd Ave S.
Property Owner	Evan D. and Carmen R. Allstrom
Former Property Owners	N/A
Former/Alternative Facility Names	Art Brass Plating
Former/Alternative Lessee/Operator Names	Warner, Helen V.
Tax Parcel No.	5263300240
Parcel Size	0.46 acres
Former/Alternative Addresses	N/A
NPDES Permit No.	N/A
EPA RCRA ID No.	WAD981772957
EPA TRI Facility ID No.	98108RTBRS55163
Ecology Facility/Site ID No.	88531932
Ecology UST Site ID No.	N/A
Ecology LUST Release ID No.	N/A
Listed on CSCSL	Yes
EPA CAA ID No.	5303300386
KCIW Permit No.	N/A

3.3.2.2 Past Site Use

Art Brass was established at the turn on the 20th century as a manufacturer of builders' hardware items. It created brass cast mailboxes, bank and elevator ornamental brass, and bronze fixtures. Around 1915, nickel plating was added to the operation. Just before WWII, Art Brass focused on decorative plating and polishing rather than casting, offering cadmium, zinc, silver, copper, nickel, chromium, brass, and bronze plating on zinc die-cast, steel, and brass (Art Brass 2008).

Release reports for Art Brass Plating in the EPA's TRI database list chromium compounds for 1988-2004 and nickel compounds for 2005. The Waste Quantity Reports for Art Brass Plating list chromium compounds for 1991-2004 and nickel compounds for 2005. TRI data for Art Brass Plating is summarized by report type in Appendix B of the *RM 1.2-1.7 East Summary of Existing Information and Identification of Data Gaps Report* (E & E 2009).

Materials Handled at the Facility

Some operations within Art Brass require toluene to be applied in a permitted spray booth.[5] Other spent solutions, combined waste solids, and accumulated paint waste are stored in a no-outlet, no-cross-contact bermed area. They are profiled, manifested, and shipped off by Envirotech Systems for incineration or by Clean Harbors for further treatment or reuse. Art Brass does not use any chemical listed in the CFR 413.02 or 433.11 definition of Total Toxic Organics in any area that drains to the sanitary system (King County 2005).

3.3.2.3 Environmental Investigations and Cleanup Activities

There is an agreed order with Ecology (DE#5296) that requires Art Brass to conduct an RI and implement interim actions (Ecology 2009a). The following investigations and cleanup actions have been conducted at Art Brass Plating:

- Soil and Groundwater Sampling (March 1999)
- Old Plating Area Clean-out and Engineering Report (April 1999)
- Interim Action – Air Sparging and Soil Vapor Extraction (SVE) system (2008)
- Remedial Investigation (2009) (Initiated)

Soil and Groundwater Sampling (March 1999)

On March 29, 1999, Art Brass contracted Professional Services Industries Inc. to conduct a soil and groundwater investigation to address some of the compliance issues mentioned in Ecology's final warning letter. The objective of this investigation was to determine whether plating fluids had breached the secondary containment system inside the building, migrated through an annular space between the floor and wall, and reached the soil and groundwater below the exterior wall. Two locations were identified and marked by Art Brass Plating where a release may have occurred. These locations were the subject of the investigation (Figure 20) (PSI 1999).

The scope of the investigation included advancing two strataprobes to a maximum depth of 9 feet bgs at the subject location selected by Art Brass Plating. Soil and groundwater samples were collected from each probe location and submitted to an Ecology-accredited laboratory for chemical analysis. The samples were evaluated for total metals (Cu, Cr, Ni, Pb, and Zn) and total cyanide concentration. The results were compared with MTCA Method A cleanup levels (PSI 1999).

Based on the results of the investigation, PSI concluded that a relatively minor release of plating fluid may have occurred on the west side of the building, which resulted in elevated lead and zinc concentrations within the near surface soil. Lead concentrations did not exceed the MTCA Method A cleanup level at this location, but chromium concentrations did. No cyanide was detected in either the soil or the groundwater at either probe location (PSI 1999).

[5] Information regarding the nature of this permit was unavailable at the time of publication of this report.

Old Plating Area Clean-out and Engineering Report (April 1999)

In April 1999, Advanced Chemical Technologies Inc. (ACT) reviewed the cleanout of the old plating area and an engineering report, as required by the "Final Warning" letter from Ecology. During this assessment ACT examined the plating area to determine whether any environmental damage was present. Conclusions of this assessment included:

- Use of the area for hazardous materials operations had ceased but hazardous material storage had started in the renovated areas.
- Undesired flows had ceased.
- Waste in the secondary containment system had been removed.
- The slab and sump areas were in good condition and were not likely to be potential release paths for hazardous materials.
- The gaps in the slab-to-wall areas were release paths for hazardous materials to the exterior wall-to-foundation joint. Significant leakage to the soil under the slab was not likely. Leakage was not from a tank or containment breach but was apparently from spray rinse operations depositing between the wall and the containment berm.
- The surface and near-surface paving, and soil under the exterior wall leak paths, were to be sampled for heavy metals. This screening method would determine the need for further investigation.
- The company was to be aware of and follow, as needed for the release investigation and evaluation, the administration and clean up requirements of the Dangerous Waste Regulations, the MTCA, and their referenced methods.

Interim Action – Air sparging and Soil Vapor Extraction (SVE) system (2008)

Art Brass has implemented an air sparging and SVE interim action beneath their property, which extends across 3rd Avenue South, north of South Findlay Street). Further information about the interim action was not available in time for this document publication, but will be at Ecology's central records at the Northwest Regional Office (Ecology 2009a).

Remedial Investigation (2009)

In 2009, Art Brass started a RI. The primary COCs are TCE and its breakdown products, but elevated levels of nickel have also been recently found in some groundwater samples. High levels of TCE have been found in groundwater as far west as 1st Avenue South, approaching the TCE detections SGCI found along East Marginal Way South between Mead and Fidalgo Streets. Further information about the RI was not available in time for this document publication, but is available through Ecology central records at the Northwest Regional Office (Ecology 2009a).

3.3.2.4 Facility Inspections

On June 18, 1997, Ecology performed a Dangerous Waste Compliance Inspection at the Art Brass Plating facility. During the inspection Ecology observed the following conditions that were not in compliance (Ecology 1997):

- A drum of TCE still bottoms dated February 1, 1996, had exceeded the accumulation time limits.
- A sack of hydroxide sludge was open and unlabeled.
- There was not a detailed hazardous waste training plan (the section in the spill contingency plan lacked detail).
- The waste code "F009" was not being applied to batch-tested waste amounts or to sludges.
- There was an accumulation in the secondary containment under process tanks and in the waste treatment area (acid storage area); (the inspection report did not identify the accumulated substances).
- Spilled hazardous substances/wastes that should have been cleaned up promptly were allowed to accumulate in the containment area.
- Dripping hazardous wastewater from the bin under the sludge press was allowed to run onto the floor instead of contained in a tray.
- Weekly inspections and periodic general inspections with log recordkeeping need to be done (was not evident at time of inspection).
- Cigarettes were stored in the "No Smoking" waste treatment/accumulation area.

No information was available to determine whether these compliance issues have been addressed.

Dangerous Waste Compliance Inspection, Art Brass Plating (August 1998)

On August 26, 1998, Ecology performed another Dangerous Waste Compliance Inspection at the Art Brass Plating facility. Ecology observed the following conditions not in compliance (Ecology 1998a):

- **WAC 173-303-170(3):** The generator did not treat dangerous waste onsite in accordance with the requirements for Treatment by Generator (including, by reference, WAC 173-303-200, -630, and -640). Concentrated wastes from the floor and from process tanks were being treated by precipitation and separation of solids during batch treatment in tanks in the waste treatment area. (Decanted and separated water was being reused as rinse water.) Although the KCIW program imposes conditions on rinse water quality for discharge after reuse, the waste treatment process itself is regulated under WAC 173-303. Problems included (1) hazardous waste and risk marking on treatment and holding tanks were lacking, and (2) daily inspections were not performed. A 55-gallon drum of partially treated waste was open and unlabeled, and lacked an accumulation start date. The tank containment appeared to lack necessary detection equipment. A layer of waste liquid was standing in the containment area under the filter press. This violation was also noted in the previous June 18, 1997, inspection. Log record keeping for batches treated was not adequate for waste tracking and reporting.
- **WAC 173-303-200(I)(a):** Dangerous waste was accumulated onsite for more then 90 days. A drum of waste sodium sulfite had been determined to be unusable approximately six months earlier, but had been held in the waste treatment area since then with no progress toward arranging proper disposal.

- **WAC 173-303-200(1)(c),(d):** A container of dangerous waste was not labeled "Hazardous Waste" or "Dangerous Waste." The major risks associated with the waste were not posted, and the container was not marked with an accumulation start date. The drum of waste sodium sulfite mentioned above lacked required labeling and marking. A sack of hydroxide sludge lacked an accumulation start date. This was also a violation in the June 18, 1997, inspection.
- **WAC 173-303-200(1)(b) and by reference -630(2):** A container of dangerous waste was not maintained in good condition. The 70-gallon steel drum of waste sodium sulfite mentioned above was in poor condition and severely corroded. The bottom was at risk of rupture.
- **WAC 173-303-200(1)(e) and by reference -350:** The contingency plan was not adequate. The plan lacked critical information on emergency equipment. It did not mention the location and function of, or the procedures for using, the emergency holding tank. This was another violation seen at the June 18, 1997, inspection.
- **WAC 173-303-145(2):** Spills of dangerous waste were not adequately cleaned up; a tank holding did not meet the applicable requirements. Dragout spills to the plating room floor were ongoing. Waste spills were left standing on the floor using the containment as an accumulation tank. The floor didn't meet tank design, operation, and maintenance requirements. This violation was also noted in the June 18, 1997, inspection. Some progress had been made toward removing 11 cubic yards of accumulated waste from the floor, but a similar amount of waste was estimated to remain on the floor under the process tanks. Ecology also noted a potential threat to human health caused by lack of segregation between cyanide and acid process areas (spills could mix on the floor, creating toxic cyanide vapor). Another potential threat to the environment (soil, groundwater, and site stormwater) noted was from waste migration out of the building. Ecology observed blue-green corroded mortar and bubbled paint in three locations on the outside of the concrete building wall within 18 inches of grade level. The soil under the floor and under the wall was at high risk of ongoing contamination. An unknown white residue on the asphalt pavement by a plating room back door may also have been waste-related.

No information was available to determine whether these compliance issues have been addressed.

Final Warning Letter (September 22, 1998)

On September 22, 1998, Ecology sent Art Brass a "Final Warning Letter" in reference to the inspection of June 16, 1997. The following compliance action items were to be completed (Ecology 1998b):

- Remove all solid and liquid hazardous waste from the floor.
- Decontaminate the floor and lower 3 feet of wall surfaces.
- Obtain an assessment from an independent licensed professional engineer of the condition and integrity of the containment as a tank system for the time it has been in service. Include the wall and footing and cracks and joints.

- At significant cracks and at wall areas with known problems, sample the surrounding soils for migrating hazardous waste constituents including copper, nickel, zinc, lead, chrome III and VI, and total cyanides.
- Check groundwater conditions for dissolved metals and pH.
- If possible, clean up to MTCA standards any hazardous waste constituents that migrated beyond containment. Submit a plan for Ecology approval describing any planned removal/disposal of soil and/or concrete. Then complete the work. Submit a full report of these activities with appropriate sample results verifying cleanup.
- If a full cleanup is not possible at this time, file a deed restriction stating the conditions that remain, providing for restricted use of the property.

No information was available to determine whether these compliance issues have been addressed.

Cyanide and Nickel Violations

During the 2000 KCIW permit renewal process, King County lowered the discharge limits for Art Brass, requiring the company to isolate cyanide wastewater and install a cyanide treatment system. By the end of 2001, Art Brass was in Significant Non-Compliance for violations of the monthly amenable cyanide limit (0.32 milligrams per liter (mg/l)) (King County 2005).

Following the 2001 violation, another cyanide violation was committed in October 2004, which was attributed to a reduction in the chlorine concentration in the cyanide treatment system. Due to the low chlorine strength, the solution was being pumped into the treatment tank but the necessary oxidation-reduction potential was not being achieved. To resolve this issue, Art Brass installed an alarm that sounds if the chlorine solution pump is on for more than five minutes (King County 2005).

Art Brass Plating had another discharge limit violation in October 2005. This violation was for nickel (9.93 parts per million [ppm]) on a composite sample collected by King County. A "No Further Action" was issued because Art Brass had responded quickly, the violation was of short duration. (King County 2008c).

King County Industrial Waste Field Inspection (August 2007)

On August 13, 2007, King County conducted an annual Industrial Waste Field Inspection for Art Brass Plating Inc. During this inspection, King County reviewed the company's permits, self-monitoring information, and major changes made since the last inspection. Compliance issues observed by King County during this inspection included elevated levels of trichloroethylene (TCE) discovered in a monitoring well used to trace a TCE plume. The King County inspector informed the Art Brass representative that discharge from the well was not covered under the existing permit and that the company would need to apply for a new authorization if it wished to discharge contaminated groundwater (King County 2007).

Another issue observed during this inspection was that there were no pH meter calibration records onsite. The King County inspector informed the Art Brass representative that dated records of the calibration checks should be maintained (King County 2007).

King County Compliance Inspection (November 2007)

On November 6, 2007, King County compliance specialist Tammy Hines collected a heavy metals composite sample at Art Brass Plating. The results of the composite sample (4.2 ppm for copper and 2.73 ppm for nickel) exceeded the discharge limits of 3.0 ppm and 2.5 ppm, respectively. A No Further Action was issued for the nickel result because it fell within the confidence limit (King County 2008c).

To further investigate the copper violation, Art Brass Plating submitted the split composite sample provided by King County to Art Brass's contract laboratory (B&P Laboratories Inc.). These results were 2.38 ppm for copper and 0.93 ppm for nickel, both within King County's discharge limits (King County 2008c).

Where discrepancy exists between King County results and a contract laboratory's results, King County's policy is to compare the average value of the two lab's results with the discharge limits. In this case, the average for copper was 3.30 ppm, which violated the 3.0 ppm limit. For nickel, the average of 1.83 ppm was in compliance with the discharge limit of 2.5 ppm (King County 2008c).

Art Brass Plating representative Bob Hay hypothesized sloppy plating practices on the evening shift as the cause of the violation. In response to this violation, the evening shift metal plating personnel were threatened with a three-day suspension if proper plating procedures were not used (King County 2008c).

King County Industrial Waste Field Annual Inspection (June 2008)

On June 11, 2008, King County conducted its annual Industrial Waste Field Inspection for Art Brass Plating Inc. During this inspection, King County examined permit information, self-monitoring requirements, and any major changes since the last annual inspection. The county noted construction going on throughout and around the Art Brass facility. Construction activities included installation of a soil vapor extraction (SVE) system for onsite TCE. This system is comprised of laterals installed into ditches as wells and other vertical points that have suction applied. There are a total of 51 vertical points and wells and six runs of laterals (Aspect 2008). Observed discharges to the King County sewer system included rinse waters from both non-cyanide and cyanide systems waste. The pH was recorded as 7.8, and approximately 25,000 gallons per day were estimated to have been released recently. No problems or violations were observed during this inspection (Ecology 2008d).

3.3.2.5 Potential Contaminant Sources

Groundwater

Art Brass Plating was entered into Ecology's CSCSL on July 21, 2005, and is listed as having confirmed soil and groundwater contamination. Confirmed contaminants in soil and groundwater are halogenated organic compounds. The status of this site is currently listed as "Remedial Investigation/Feasibility Study" (Ecology 2008b). Groundwater migration from the Art Brass facility is a potential pathway of contamination.

Spills

On August 4, 1999, Art Brass released a report describing the events of August 3, 1999, that led to the required implementation of the Contingency Plan. According to the report submitted by Mr. Bob Hay, an environmental engineer, on the morning of August 3, 1999, an Art Brass Plating Inc. employee observed brass plating solution exiting the plating shop back door, adjacent to South Findlay Street and running west toward the drain at the intersection of South Findlay and 3rd Avenue South. The cause of the spill was an employee topping off the brass tank with water, and leaving the tank unattended after filling. This allowed the tank to overflow out of the building to the asphalt adjacent to South Findlay Street. Approximately 30 gallons of the brass plating solution containing cyanide concentrations above reportable release limits were released into the asphalt drainage system. The spill was halted approximately 15 feet from the storm drain and cleanup measures and decontamination were started immediately. Approximately 30 gallons of the solution was vacuumed up and placed in a poly drum along with approximately 100 pounds of surrounding gravel (Art Brass 1999).

Employees then used 5-gallon buckets of water and water with calcium hypochlorite to rinse the spill area while vacuuming up the rinsate and placing it in poly drums. The poly drums were then transported to a tank in the waste treatment area for processing. Exposed equipment was decontaminated, and the original condition of the zone was returned to normal. The remaining steel drum was labeled hazardous waste and reported to King County Industrial Waste and Ecology. Corrective measures resulting from this incident were implemented (Art Brass 1999).

As the spill history at Art Brass indicates, spills from industrial activities taking place at this site are a potential pathway for contaminates to the King County Sewer System, which has the possibility to overflow to the LDW during a CSO event. If allowed to percolate into the ground, spills could also lead to further groundwater contamination.

3.3.2.6 Source Control Actions

The following source control actions will be conducted for Art Brass Plating:

- Art Brass will proceed to complete its RI and reduce source levels via operation of its interim action, as set out in the MTCA Agreed Order, with Ecology oversight.
- King County and Ecology will conduct a source control inspection at the facility, to ensure that the facility has remained in compliance. Dangerous Waste Compliance concerns have been identified at the facility in the past.

3.3.3 Blaser Die Casting

Blaser Die Casting (Blaser) is east of the LDW, and is bordered on the north by South Orcas Street and on the south by South Mead Street. Capital Industries borders the property to the southeast and 3rd Avenue borders the property to the east (Figure 15).

According to King County tax records, Blaser is on tax parcel No. 1722801495 and is listed under the address 5700 3rd Avenue South (King County 2008a).

The most recent property sales record listed in King County's tax records indicates that Orcas Foley LLC purchased tax parcel 1722801495 from Scougal Rubber Corporation on December 4, 1996. The current owner of the tax parcel is listed as "Orcas Foley, LLC." Three structures are listed as located on the parcel, including a 12,818-square-foot shop/warehouse built in 1966, a 10,050-square-foot storage warehouse built in 1982, and a 4,800-square-foot storage warehouse built in 1972. According to King County tax records, the current property name of tax parcel 1722801492 is Blaser Tool and Mold Co. (King County 2008a).

Facility Summary: Blaser Die Casting	
Address	5700 3rd Avenue South
Property Owner	Orcas Foley LLC.
Former Property Owners	N/A
Former/Alternative Facility Names	Blaser Tool and Mold Co.
Former/Alternative Lessee/Operator Names	Scougal Rubber Corporation
Tax Parcel No.	1722801495
Parcel Size	0.89 acres
Former/Alternative Addresses	N/A
NPDES Permit No.	N/A
EPA RCRA ID No.	N/A
EPA TRI Facility ID No.	N/A
Ecology Facility/Site ID No.	7118747
Ecology UST Site ID No.	N/A
Ecology LUST Release ID	N/A
Listed on CSCSL	Yes
EPA CAA ID No.	N/A
KCIW Permit No.	N/A

3.3.3.1 Current Site Use

Blaser performs die casting at 5700 3rd Avenue South. Blaser's raw materials are zinc ingots (96.5 % pure zinc) which are melted and poured into molds. Blaser uses machine oil for lubrication and has water-based hydraulic lifts.

3.3.3.2 Past Site Use

Blaser Die Casting has occupied its present location since 1962 and employs approximately 50 people. Before 1962, the property was residential or unoccupied. Further information related to the historical use of the Blaser Die Casting Facility was not available for review.

3.3.3.3 Environmental Investigations and Cleanup Activities

Previous investigations by PGG have assessed the nature and extent of contamination in soil and groundwater at the Blaser Die Casting site. A soil source control action was finished in January 2008 and reported to Ecology. The source control action included excavation and disposal of 1,200 tons of soil and 7,250 gallons of groundwater at Blaser's southwest corner due to contamination of TCE and its degradation products. The excavation extended into groundwater, removing soil at the capillary fringe. Groundwater contamination is expected to decrease in concentration and in lateral and vertical extent as a result of source control. The source of contamination is uncertain (PGG 2008).

Blaser is currently monitoring groundwater to the southwest from the former soil source area. Blaser's consultant states there is no evidence that TCE had ever been used by Blaser or that TCE was ever used at the property as a part of Blaser's manufacturing process (PGG 2008). Vertical profiling of groundwater quality indicates that groundwater contamination at the Blaser site has a shallow vertical extent. Further, the Blaser consultant states that this groundwater plume is vertically distinct from a deeper groundwater plume that originates upgradient from Blaser (PGG 2008). Ecology has not confirmed these hypotheses. Currently Blaser is performing a RI under a MTCA enforcement order (DE#5479) (Ecology 2009a).

3.3.3.4 Facility Inspections

On April 15, 2009, a dangerous waste compliance inspection was conducted at Blaser. During the inspection multiple compliance issues were observed. These compliance issues included improper discharges into the sanitary sewer, improperly designated wastes, improperly maintained storm drains, improperly recycled wastes, poor spill response procedures, and improperly stored products/wastes.
During this inspection there was no evidence observed of solvent use on-site. There are floor drains within areas of operation; however all drains go to the sanitary sewer. There is an underground vault for stormwater detention beneath the building but no details were available (Ecology 2009d)

3.3.3.5 Potential Contaminant Sources:

Groundwater

Blaser was entered into Ecology's CSCSL on November 30, 2005. Confirmed contaminants in soil, groundwater, and air are identified as halogenated organic compounds. Blaser's status is listed as "awaiting site hazard assessment" (Ecology 2008b). Until remediation is complete, groundwater migrating from the Blaser Die Casting facility is a potential pathway of contamination.

Spills

Spills from industrial activities taking place at this site are a potential pathway of contamination to reach the King County combined sewer system, which could overflow to the LDW during a CSO event. If allowed to percolate into the ground, spills could also lead to further groundwater contamination.

3.3.3.6 Source Control Actions

The following source control action will be conducted for Blaser Die Casting:

- Blaser will proceed to complete its RI with Ecology oversight, as required by the MTCA Enforcement Order.

3.3.4 Capital Industries Inc.

3.3.4.1 Current Site Use

Capital Industries Inc. (Capital) is east of the LDW, south of South Mead Street, and north of South Fidalgo Street. To the east of the Capital property is 4th Avenue South, and to the west is 1st Avenue South. According to King County tax records, the Capital property encompasses three contiguous tax parcels listed as 1722802255 (5801 3rd Avenue South), 1722801620 (5801 3rd Ave South), and 1722802245 (5820 1st Ave South) (Figure 15). These tax parcels total 3.8 acres. The most recent property sales record listed in King County's tax record indicates that tax parcel 1722801620 was purchased by Capital from Ronald S. Taylor on February 17, 1989. Tax parcel 1722802245 was purchased by Capital from Henry T. Chinn on November 11, 1998, and there is no information on the sale transfer of tax parcel 1722802255 (King County 2008a).

Facility Summary: Capital Industries Inc.	
Address	5801 3rd Avenue South, Seattle, WA
Property Owner	Capital Industries Inc.
Former Property Owners	N/A
Former/Alternative Facility Names	N/A
Former/Alternative Lessee/Operator Names	N/A
Tax Parcel Nos.	1722801620, 1722802245, 1722802255
Parcel Size	166,468 square feet
Former/Alternative Addresses	N/A
NPDES Permit No.	N/A
EPA RCRA ID No.	WAD009245465
EPA TRI Facility ID No.	98108CPTLN58013
Ecology Facility/Site ID No.	11598755
Ecology UST Site ID No.	N/A
Ecology LUST Release ID No.	N/A
Listed on CSCSL	Yes

The four buildings included within tax parcel 1722801620 include a 44,445-square-foot office building built in 2004, a 19,800-square-foot metal fabrication building built in 1973, a 60,000-square-foot metal fabrication building, and an 11,099-square-foot building made of structural steel located west of the office building (Figure 21) (King County 2008a).
Within parcel no. 1722802255, there is a 32,040-square-foot storage warehouse that was built in 1980. On parcel No. 1722802245, located at 5820 1st Avenue South, there is an 11,700-square-foot press manufacturing building built in 2005.

3.3.4.2 Past Site Use

Based on a review of historical records, including Sanborn Fire Insurance Maps and city directories, Capital has occupied its current location since 1965. Before then, the property was primarily residential. The Capital property has been operated exclusively for metal fabrication and related work since 1965 (Farallon 2008).

According to the release reports for Capital in EPA's TRI database, methyl isobutyl ketone compounds were listed for 1995-1999. TCE compounds were listed for 1989-1991 and toluene compounds were listed for 1988-1994. Xylene compounds were listed for 1988-1997. All releases listed for Capital are defined by the EPA's TRI database as "onsite disposal or other releases which include emissions to the air, discharges to bodies of water, disposal at the facility to land, and disposal in underground injection wells" (EPA 2008a).

3.3.4.3 Environmental Investigations and Cleanup Activities

Several investigations at the Capital property were conducted between January 2004 and May 2007 after Capital Plant 2 (Figure 21) was destroyed by fire in January 2004. These investigations included sub-slab soil vapor sampling and analysis, soil vapor and construction monitoring during redevelopment, and the first of three phases of subsurface investigations. The first phase subsurface investigation was attempted to evaluate the nature and extent of halogenated volatile organic compounds (HVOCs) in soil and groundwater. Contamination was investigated immediately down gradient of the Capital property, but the extent was not determined (Ecology 2009c).

In 2008 further downgradient groundwater sampling was conducted downgradient of the Plant 2 and 4. Analytical results revealed TCE and breakdown products south and west of Plants 2 and 4 extending to at least 1st Ave. S. and 300' to the south (Ecology 2009c). Groundwater contamination was found to extend westward to at least 1st Avenue South and about 300 ft southward of South Fidalgo Street (Figure 21). Concentrations of PCE and TCE have been detected in soil above the screening levels at Plant 4 only. A second phase of direct push groundwater sampling further south and west is due to start as soon as access agreements are obtained. This work is being performed in accordance with Agreed Order DE#5348 (Ecology 2009c).

3.3.4.4 Facility Inspections

No facility inspections are known to have been conducted at the Capital Industries facility.

3.3.4.5 Potential Contaminant Sources

Groundwater/Soil

Capital Industries was added to Ecology's CSCSL on October 4, 2006, and is listed as having groundwater contamination consisting of HVOCs such as TCE, tetrachloroethene (PCE), cis-1,2-DCE, and VC. Groundwater is considered a potential pathway for contaminants to reach LDW sediments.

Spills

Spills from industrial activities taking place at this site are a potential pathway for contaminants to reach the combined sewer system, which could overflow to the LDW during a CSO event. If allowed to percolate into the ground, spills could also lead to further groundwater contamination.

3.3.4.6 Source Control Actions

The following source control action will be conducted for Capital Industries:

- Capital will proceed to complete its RI with Ecology oversight, as set out in the MTCA Agreed order.

3.4 Atmospheric Deposition

Atmospheric deposition occurs when air pollution deposits enter the LDW directly or through stormwater. Such deposits can become a possible source of contamination to RM 1.2-1.7 East sediments. Air pollution is generated from air emissions that can be either from a point source or widely dispersed. Examples of point source emissions include paint overspray, sand-blasting, industrial smokestacks, and fugitive dust and particulates from loading/unloading of raw materials (sand, gravel, and concrete). Examples of widely dispersed emissions include port-related diesel emissions (marine vessels, cargo handling equipment, trucks, locomotives). Multiple properties within the RM 1.2-1.7 East Source Control Area have current operations with known point source emissions of air pollution that may contribute contaminants to the adjacent sediments.

Multiple studies have been conducted and continue to be conducted to identify potential sources of air pollution in the Puget Sound Area. Below are several studies that have been conducted in an effort to identify and model the effects of air pollutants in the Puget Sound area.

In October 2003, The final report for the Puget Sound Air Toxics Evaluation was released by the Puget Sound Clean Air Agency. Research for this report was conducted from 2000 to 2003 with the goal of identifying and monitoring chemicals and emission sources that pose the greatest potential health risks to citizens in the Puget Sound region. The monitoring study, which was conducted by the Washington State Department of Ecology in partnership with the Puget Sound Clean Air Agency and USEPA, sampled 17 outdoor air pollutants at six different locations throughout the greater Seattle/King County area. These six locations include areas near or in

Beacon Hill, Georgetown, Lake Sammamish, Lake Forest Park, the Maple Leaf reservoir in north Seattle, and the city of SeaTac. The results of this study were used to focus Agency attention on those compounds and mixtures that are likely to present the greatest risk of cancer and some non-cancer effects. The priority air toxics identified during this study include diesel exhaust and wood smoke.

In 2006, the Sediment Phthalates Work Group was formed out of concern for phthalate recontamination at sediment cleanup sites in the larger Puget Sound region. To meet its goal of better understanding the sources of phthalates in sediments, the work group reviewed existing information about all possible pathways to sediments, including stormwater and atmospheric deposition. The group concluded that phthalates reach sediments via a complex pathway involving off-gassing to air followed by attachment to particulates, deposition to the ground, and transport to sediments through stormwater (Sediment Phthalates Work Group 2007).

In March 2008, King County department of Natural resources and Parks released the Passive Atmospheric Deposition Sampling – Lower Duwamish Waterway Monitoring Report- October 2005 to April 2007. This monitoring report presents the results of atmospheric deposition sampling conducted as part of source control efforts for the Lower Duwamish Waterway Superfund Cleanup. Sampling was conducted by use of passive deposition samplers designed to collect rainfall (i.e. wet deposition) and dry particulate (i.e. dry deposition). This sampling was conducted in two phases. Phase I was conducted between January 2005 and May 2005. Phase II was conducted between October 2005 and April 2007. The purpose of this sampling was to assess whether atmospheric deposition is a potential source of phthalates, selected PAHs, and PCBs (King County 2008b).

Based on comparison to results from other atmospheric deposition networks that employed high-volume air sampling techniques to collect gaseous and particulate phase air samples, the total deposition results from this study are likely to be biased low for the lighter phthalates, low- to mid-range PAH compounds, and low- to mid-range PCB congeners. Because side-by-side comparison sampling of the passive atmospheric deposition samplers with high-volume air samplers was not conducted, it is not possible to assess the degree of bias (King County 2008b).

The sampling stations were located at Beacon Hill, Duwamish Valley, Georgetown, KCIA, and South Park Community Center. The following range of atmospheric deposition flux values was observed (KingCounty2008b):

Analyte	Range of Air Deposition Flux (µg/m^2/day)	Location of Highest Values
Butyl benzyl phthalate	0.163 to 7.007	South Park
Bis(2-ethylhexyl)phthalate	0.261 to 12.240	Duwamish Valley
Benzo(a)pyrene	0.008 to 2.225	KCIA
Pyrene	0.035 to 4.652	KCIA
Aroclor 1254	<0.011 to 0.044	Georgetown
Aroclor 1260	<0.011 to 0.034	Georgetown

Detailed results are provided in King County's Monitoring Report – October 2005 to April 2007 (King County 2008b).

In July 2008, The Washington Department of Health Services Office of Environmental and Occupational Toxicology Under Cooperative Agreement with the U.S. Department of Health and Human Services Agency for Toxic Substances and Disease Registry released the Summary of Results of Duwamish Valley Regional Modeling and Health Risk Assessment. This study was conducted on behalf of the residents of Georgetown and South Park neighborhoods in south Seattle after requests were made to conduct an assessment of pollutant impacts on their health (WADOH 2008).

The Washington State Department of Health hired a consultant to model air emissions from multiple sources in south Seattle. The objective of the multiple-source air modeling project in the Duwamish valley was to identify key air pollution sources affecting residential areas of south Seattle (WADOH 2008). The purpose of this study was to:

- identify and prevent harmful human health effects resulting from exposure to hazardous substances in the environment;
- identify priorities for future work in the area,
- summarize the findings of the modeling effort; and
- recommends future actions

Results of this study included the chronic cancer, non cancer, and theoretical cancer risks associated with point, mobile, and woodstove sources in Seattle. The conclusions of this report include:

- On-road mobile sources contribute to the highest risks near major roadways over a large area of south Seattle.
- Risks and hazards are greatest near major highways and drop dramatically about 200 meters from the center of highways.
- Point sources, especially those that emit chromium compounds, have the potential to impact residential areas in south Seattle resulting in increased theoretical cancer risk.
- Wood stove / fireplace use in the winter season contributes to health risk.

Currently, there is a tremendous effort to reduce diesel exhaust in this area, including projects at the Port of Seattle under the Northwest Ports Clean Air Strategy as well as on-going projects at Ecology. The Ecology deposition study that is currently being conducted will help to further explore source control actions for diesel exhaust such as retrofitting vehicles and equipment to emit less diesel, as well as implementing programs that require use of lower sulfur and alternative fuels, and anti-idling programs to reduce emissions.

PSCAA is also currently monitoring air toxics at several sites, including one in the Duwamish valley. They are monitoring for PAHs at the Duwamish site. Monitoring commenced in November 2008, and will conclude in November 2009. The results/report will be available in late spring/summer 2010.

3.4.1 Source Control Actions

Atmospheric deposition should be further evaluated to assess this pathway as a potential source of phthalates (particularly bis(2-ethylhexyl)phthalate [BEHP]) and other contaminants, such as PCBs, in stormwater discharge. However, at this time, there are no available resources to address this issue.

Because air pollution is a concern for the greater Puget Sound region, Ecology is currently planning to conduct research regarding atmospheric deposition. Based on their actions or recommendations, the LDW source control team will develop options for addressing air pollution.

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4.0 Monitoring

Monitoring efforts by SPU, Ecology, KCIWP, and Puget Sound Clean Air Agency will continue to assist in identifying and tracing ongoing sources of COCs present in LDW sediments or in upland media. This information will be used to focus source control efforts on specific problem areas within the RM 1.2-1.7 East Source Control Area and to track the progress of the source control program. The following types of samples will continue to be collected:

- in-line sediment trap samples from storm drain systems,
- on-site catch basin sediment samples, and
- soil and groundwater samples as necessary.

If monitoring data indicate that additional sources of sediment recontamination are present, then Ecology will identify additional source control activities as appropriate.

Because source control is an iterative process, monitoring is necessary to identify trends in concentrations of COCs. Monitoring is anticipated to continue for some years. Any decisions to discontinue monitoring will be made jointly by Ecology and EPA, based on the evidence. At this time, Ecology plans to review the progress and data associated with the source control actions for each SCAP annually, and this information will be updated in the Source Control Status Report, which is scheduled for publication twice a year. In addition, Ecology may prepare Technical Memoranda to update the SCAPs as needed.

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5.0 Tracking and Reporting of Source Control Activities

Ecology will lead tracking, documenting, and reporting the status of source control to EPA and the public. Each agency performing source control work will document its source control activities and provide regular updates to Ecology. Ecology will update information in the SCAPs in the Source Control Status Reports that are published twice a year.

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_____. 2007a. Lower Duwamish Waterway Phase 2 Remedial Investigation Report, Draft. Prepared for Lower Duwamish Waterway Group. November 2007.

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_____. 2007c. Lower Duwamish Waterway Phase 2 Remedial Investigation, Data Report: Subsurface Sediment Sampling for Chemical Analyses. Prepared for Lower Duwamish Waterway Group. January 29, 2007.

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7.0 Tables

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Table 1
Contaminants Above Screening Levels in Surface Sediment
RM 1.2-1.7 East

Sample Location Name	Sample River Mile Location	Sampling Event	Sample Collection Date	Contaminant	Concentration Value	Concentration Units		TOC % DW	Concentration (mg/kg OC)	SQS[1]	CSL[1]	SQS/CSL Units	SQS Exceedance Factor[2]	CSL Exceedance Factor[2]
Metals and Trace Elements														
JHGSA-SD1-32-0010	1.6	JamesHardieOutfall	7/3/2000	Zinc	1500	mg/kg dw		2.04		410	960	mg/kg dw	3.7	1.6
PAHs														
JHGSA-SD1-02-0010	1.6	JamesHardieOutfall	7/3/2000	Chrysene	4.1	mg/kg dw		1.48	280	110	460	mg/kg OC	2.5	0.61
PCBs														
DR144	1.5	EPA SI	8/17/1998	PCBs (total calc'd)	0.308	mg/kg dw		1.84	16.7	12	65	mg/kg OC	1.4	0.26
JHGSA-SD1-COMP32-00	1.7	JamesHardieOutfall	7/3/2000	PCBs (total calc'd)	0.69	mg/kg dw		1.01	68	12	65	mg/kg OC	5.7	1.0
LDW-SS60	1.6	LDWRI-SurfaceSedimentRound1	1/19/2005	PCBs (total calc'd)	0.25	mg/kg dw	J	1.08	23	12	65	mg/kg OC	1.9	0.35
B4b	1.4	LDWRI-Benthic	8/28/2004	PCBs (total calc'd)	0.4	mg/kg dw		2.79	14	12	65	mg/kg OC	1.2	0.22
LDW-SS325	1.3	LDWRI-SurfaceSedimentRound3	10/4/2006	PCBs (total calc'd)	0.27	mg/kg dw		2.11	13	12	65	mg/kg OC	1.1	0.2
Other SVOCs														
B4b	1.4	LDWRI-Benthic	8/28/2004	Benzyl alcohol	70	ug/kg dw	J	2.79		57	73	ug/kg dw	1.2	0.96
DR092	1.6	EPA SI	8/27/1998	Phenol	520	ug/kg dw		0.7		420	1200	ug/kg dw	1.2	0.43

Key:

AET - Apparent Effects Threshold
DW - Dry weight
CSL - Cleanup Screening Level
PAH - Polynuclear aromatic hydrocarbon
PCB - Polychlorinated biphenyl
OC - Organic carbon
TOC - Total organic carbon
SQS - Sediment Quality Standard
SVOC - Semivolatile organic compound

Notes:

1. SQS and CSL values are substituted with AET values for dry weight comparison where organic compounds are not OC-normalized (when TOC % DW is outside of the 0.5-4.0% range).
2. Exceedance factors are the ratio of the detected concentration to the CSL or SQS (or to AET values where applicable); exceedance factors are shown only if they are greater than 1.

Source:

Lower Duwamish Waterway Group, 2007. Online Lower Duwamish Waterway Group Draft Remedial Investigation Report (November 2007) Database. http://www.ldwg.org.

Table 2
Contaminants Above Screening Levels in Subsurface Sediment
RM 1.2-1.7 East

Sample Location Name	Sample River Mile Location	Sample Depth Interval (feet)	Sampling Event	Sampling Event Year	Contaminant	Concentration Value	Concentration Units		TOC % DW	Concentration (mg/kg OC)	SQS[1]	CSL[1]	SQS/CSL Units	SQS Exceedance Factor[2]	CSL Exceedance Factor[2]
Metals and Trace Elements															
LDW-SC27	1.4	0 to 2	LDW Subsurface Sediment 2006	2006	Mercury	0.52	mg/kg dw		2.24		0.41	0.59	mg/kg dw	1.3	0.88
PAHs															
LDW-SC23	1.2	2 to 3	LDW Subsurface Sediment 2006	2006	Acenaphthene	0.57	mg/kg dw		1.39	41	16	57	mg/kg OC	2.6	0.72
LDW-SC23	1.2	3 to 4	LDW Subsurface Sediment 2006	2006	Acenaphthene	1.5	mg/kg dw		2.29	66	16	57	mg/kg OC	4.1	1.2
LDW-SC23	1.2	3 to 4	LDW Subsurface Sediment 2006	2006	Acenaphthene	2.1	mg/kg dw		1.3	160	16	57	mg/kg OC	10	2.8
LDW-SC23	1.2	3 to 4	LDW Subsurface Sediment 2006	2006	Anthracene	8.8	mg/kg dw		1.3	680	220	1200	mg/kg OC	3.1	0.57
LDW-SC23	1.2	2 to 4	LDW Subsurface Sediment 2006	2006	Benzo(a)anthracene	3.2	mg/kg dw		2.14	150	110	270	mg/kg OC	1.4	0.56
LDW-SC23	1.2	3 to 4	LDW Subsurface Sediment 2006	2006	Benzo(a)anthracene	2.7	mg/kg dw		2.29	120	110	270	mg/kg OC	1.1	0.44
LDW-SC23	1.2	3 to 4	LDW Subsurface Sediment 2006	2006	Benzo(a)anthracene	7.1	mg/kg dw		1.3	550	110	270	mg/kg OC	5	2
LDW-SC23	1.2	2 to 4	LDW Subsurface Sediment 2006	2006	Benzo(a)pyrene	2.5	mg/kg dw		2.14	120	99	210	mg/kg OC	1.2	0.57
LDW-SC23	1.2	3 to 4	LDW Subsurface Sediment 2006	2006	Benzo(a)pyrene	3	mg/kg dw		1.3	230	99	210	mg/kg OC	2.3	1.1
LDW-SC23	1.2	3 to 4	LDW Subsurface Sediment 2006	2006	Benzo(g,h,i)perylene	0.73	mg/kg dw		1.3	56	31	78	mg/kg OC	1.8	0.72
LDW-SC23	1.2	2 to 4	LDW Subsurface Sediment 2006	2006	Benzofluoranthenes (total-calc'd)	6	mg/kg dw		2.14	280	230	450	mg/kg OC	1.2	0.62
LDW-SC23	1.2	3 to 4	LDW Subsurface Sediment 2006	2006	Benzofluoranthenes (total-calc'd)	6.4	mg/kg dw		1.3	490	230	450	mg/kg OC	2.1	1.1
LDW-SC23	1.2	2 to 4	LDW Subsurface Sediment 2006	2006	Chrysene	7.2	mg/kg dw		2.14	340	110	460	mg/kg OC	3.1	0.74
LDW-SC23	1.2	3 to 4	LDW Subsurface Sediment 2006	2006	Chrysene	3.1	mg/kg dw		2.29	140	110	460	mg/kg OC	1.3	0.3
LDW-SC23	1.2	3 to 4	LDW Subsurface Sediment 2006	2006	Chrysene	7.8	mg/kg dw		1.3	600	110	460	mg/kg OC	5.5	1.3
LDW-SC23	1.2	3 to 4	LDW Subsurface Sediment 2006	2006	Dibenzo(a,h)anthracene	0.18	mg/kg dw		1.3	14	12	33	mg/kg OC	1.2	0.42
LDW-SC23	1.2	3 to 4	LDW Subsurface Sediment 2006	2006	Dibenzofuran	0.65	mg/kg dw		1.3	50	15	58	mg/kg OC	3.3	0.86
LDW-SC23	1.2	2 to 4	LDW Subsurface Sediment 2006	2006	Fluoranthene	7.4	mg/kg dw	J	2.14	350	160	1200	mg/kg OC	2.2	0.29
LDW-SC23	1.2	3 to 4	LDW Subsurface Sediment 2006	2006	Fluoranthene	10	mg/kg dw		2.29	440	160	1200	mg/kg OC	2.8	0.37
LDW-SC23	1.2	3 to 4	LDW Subsurface Sediment 2006	2006	Fluoranthene	24	mg/kg dw		1.3	1800	160	1200	mg/kg OC	11	1.5
LDW-SC23	1.2	3 to 4	LDW Subsurface Sediment 2006	2006	Fluorene	1.8	mg/kg dw		1.3	140	23	79	mg/kg OC	6.1	1.8
LDW-SC23	1.2	3 to 4	LDW Subsurface Sediment 2006	2006	Indeno(1,2,3-cd)pyrene	0.93	mg/kg dw		1.3	72	34	88	mg/kg OC	2.1	0.82
C	1.7	0 to 3	Hardie Gypsum-2	1999	Phenanthrene	2.2	mg/kg dw		1.9	120	100	480	mg/kg OC	1.2	0.25
LDW-SC23	1.2	3 to 4	LDW Subsurface Sediment 2006	2006	Phenanthrene	12	mg/kg dw		1.3	920	100	480	mg/kg OC	9.2	1.9
LDW-SC23	1.2	3 to 4	LDW Subsurface Sediment 2006	2006	Pyrene	14	mg/kg dw		1.3	1100	1000	1400	mg/kg OC	1.1	0.79
LDW-SC23	1.2	2 to 4	LDW Subsurface Sediment 2006	2006	Total HPAH (calc'd)	31.5	mg/kg dw	J	2.14	1500	960	5300	mg/kg OC	1.6	0.28
LDW-SC23	1.2	3 to 4	LDW Subsurface Sediment 2006	2006	Total HPAH (calc'd)	25	mg/kg dw		2.29	1100	960	5300	mg/kg OC	1.1	0.21
LDW-SC23	1.2	3 to 4	LDW Subsurface Sediment 2006	2006	Total HPAH (calc'd)	64	mg/kg dw		1.3	4900	960	5300	mg/kg OC	5.1	0.92
LDW-SC23	1.2	3 to 4	LDW Subsurface Sediment 2006	2006	Total LPAH (calc'd)	25	mg/kg dw		1.3	1900	370	780	mg/kg OC	5.1	2.4
PCBs															
2	1.6	0 to 4	Hardie Gypsum-1	1998	PCBs (total calc'd)	0.29	mg/kg dw		2.3	13	12	65	mg/kg OC	1.1	0.2
LDW-SC31	1.7	0 to 1	LDW Subsurface Sediment 2006	2006	PCBs (total calc'd)	0.37	mg/kg dw		2.52	15	12	65	mg/kg OC	1.3	0.23
LDW-SC31	1.7	1 to 3	LDW Subsurface Sediment 2006	2006	PCBs (total calc'd)	0.33	mg/kg dw		2.18	15	12	65	mg/kg OC	1.3	0.23
LDW-SC23	1.2	4 to 6	LDW Subsurface Sediment 2006	2006	PCBs (total calc'd)	0.88	mg/kg dw		1.46	60	12	65	mg/kg OC	5	0.92
LDW-SC23	1.2	6 to 8	LDW Subsurface Sediment 2006	2006	PCBs (total calc'd)	0.4	mg/kg dw		2.25	18	12	65	mg/kg OC	1.5	0.28
LDW-SC27	1.4	0 to 1	LDW Subsurface Sediment 2006	2006	PCBs (total calc'd)	2	mg/kg dw		1.8	110	12	65	mg/kg OC	9.2	1.7
LDW-SC27	1.4	0 to 1	LDW Subsurface Sediment 2006	2006	PCBs (total calc'd)	0.25	mg/kg dw		1.54	16	12	65	mg/kg OC	1.3	0.25
LDW-SC27	1.4	0 to 2	LDW Subsurface Sediment 2006	2006	PCBs (total calc'd)	3.3	mg/kg dw		2.24	150	12	65	mg/kg OC	13	2.3
LDW-SC27	1.4	1 to 2	LDW Subsurface Sediment 2006	2006	PCBs (total calc'd)	1.51	mg/kg dw		1.82	83	12	65	mg/kg OC	6.9	1.3
LDW-SC27	1.4	1 to 2	LDW Subsurface Sediment 2006	2006	PCBs (total calc'd)	3.2	mg/kg dw		1.22	260	12	65	mg/kg OC	22	4
LDW-SC27	1.4	2 to 3	LDW Subsurface Sediment 2006	2006	PCBs (total calc'd)	0.29	mg/kg dw		2.27	13	12	65	mg/kg OC	1.1	0.2
LDW-SC27	1.4	2 to 3	LDW Subsurface Sediment 2006	2006	PCBs (total calc'd)	0.84	mg/kg dw		2.14	39	12	65	mg/kg OC	3.3	0.6
Phthalates															
LDW-SC23	1.2	2 to 4	LDW Subsurface Sediment 2006	2006	Bis(2-ethylhexyl)phthalate	1.6	mg/kg dw		2.14	75	47	78	mg/kg OC	1.6	0.96
LDW-SC23	1.2	3 to 4	LDW Subsurface Sediment 2006	2006	Bis(2-ethylhexyl)phthalate	0.78	mg/kg dw		1.3	60	47	78	mg/kg OC	1.3	0.77

Key:

AET - Apparent Effects Threshold
DW - Dry weight
CSL - Cleanup Screening Level
PAH - Polynuclear aromatic hydrocarbon
PCB - Polychlorinated biphenyl
OC - Organic carbon
TOC - Total organic carbon
SQS - Sediment Quality Standard

Notes:

1. SQS and CSL values are substituted with AET values for dry weight comparison where organic compounds are not OC-normalized (when TOC % DW is outside of the 0.5-4.0% range).
2. Exceedance factors are the ratio of the detected concentration to the CSL or SQS (or to AET values where applicable); exceedance factors are shown only if they are greater than 1.

Source:

Lower Duwamish Waterway Group, 2007. Online Lower Duwamish Waterway Group Draft Remedial Investigation Report (November 2007) Database. http://www.ldwg.org.

8.0 Figures

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RM 0 - 0.1 East
Spokane St. to Ash Grove Cement

EAA-1
RM 0.1-0.9 East
Duwamish/Diagonal Way

RM 0 - 1.0 West
Spokane St. to Kellogg Island

RM 0.9 - 1.0 East
Slip 1

RM 1.0-1.2 East
KC lease parcels

RM 1.0-1.3 West
Kellogg Island to Lafarge Cement

RM 1.2-1.7 East
St. Gobain to Glacier Northwest

RM 1.3 - 1.6 West
Glacier Bay

RM 1.7 - 2.0 East
Slip 2 to Slip 3

RM 1.6 - 2.1 West
Terminal 115

RM 2.0 - 2.3 East
Slip 3 to Seattle Boiler Works

RM 2.3 - 2.8 East
Seattle Boiler Works to Slip 4

EAA - 2
RM 2.1 - 2.2 West
Trotsky Inlet

EAA - 3
RM 2.8 East
Slip 4

EAA-4
RM 2.8-3.7 East
Boeing Plant 2 to Jorgensen Forge

RM 2.2 - 3.4 West
Riverside Drive

EAA-6
RM 3.7-3.9 East
Boeing Isaacson/Central KCIA

EAA - 5
RM 3.4 - 3.8 West
Terminal 117

RM 3.9 - 4.3 East
Slip 6

RM 3.8 - 4.2 West
Sea King Industrial Park

RM 4.3 to 4.9 East
Boeing Developmental Center

RM 4.2 - 4.8 West
Restoration Areas

EAA -7
RM 4.9 East
Norfolk CSO/SD

C/LDW Maps /Scap Location 17 June 08

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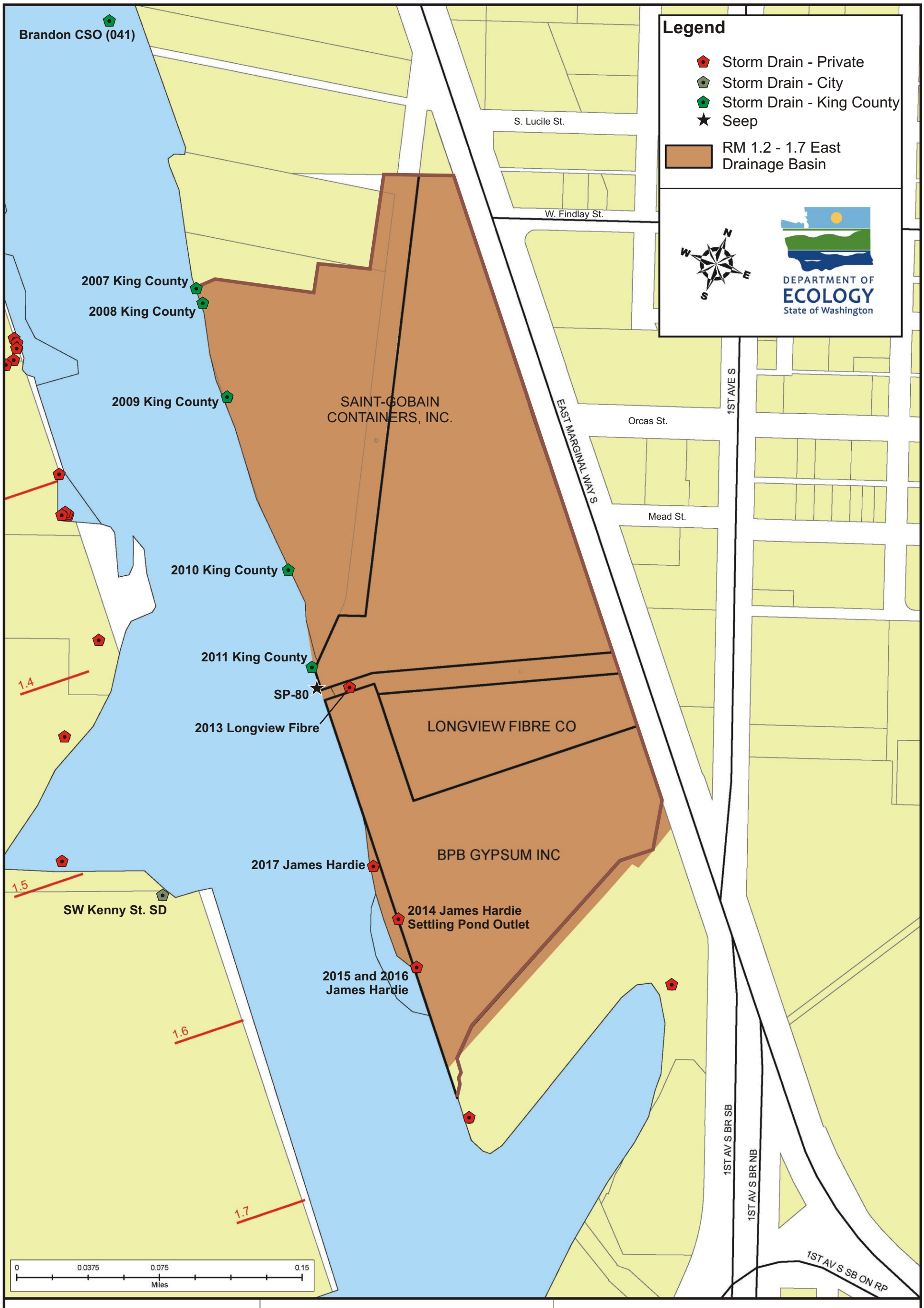
ECOLOGY
State of Washington

SCAP Locations (October 2008)

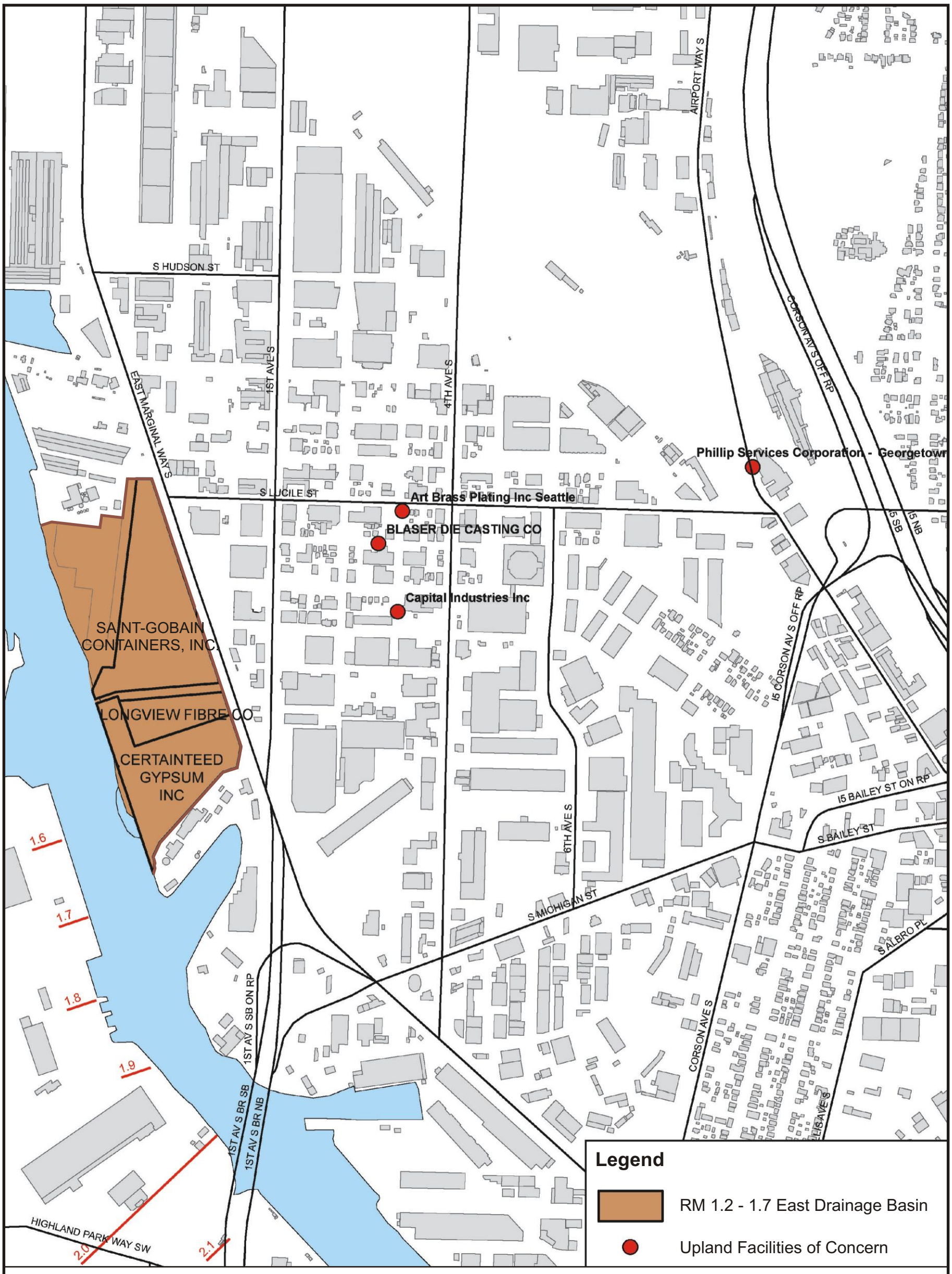
0 0.25 0.5 1 Miles

The SCAP area boundaries are an approximation. Final boundaries will be determined jointly by the EPA and Ecology.
Drainage basins leading to these areas will be defined in the future.

ecology and environment, inc. International Specialists in the Environment Seattle, Washington	LOWER DUWAMISH WATERWAY RM 1.2-1.7 EAST Seattle, Washington	Figure 1 SOURCE CONTROL AREAS		
	Base Map Reference: Department of Ecology, 2008.	Date: 6/30/09	Drawn by: AES	10:002330WD1404\fig 1



ecology and environment, inc. International Specialists in the Environment Seattle, Washington	LOWER DUWAMISH WATERWAY RM 1.2-1.7 EAST Seattle, Washington	Figure 2 RM 1.2-1.7 EAST DRAINAGE BASIN Date: 6/30/09 | Drawn by: AES | 10:002330WD1404\fig 2



DEPARTMENT OF ECOLOGY
State of Washington

Note: Upland property locations are approximate.
See site specific figures for exact locations.

N W E S

0 0.05 0.1 0.2
Miles

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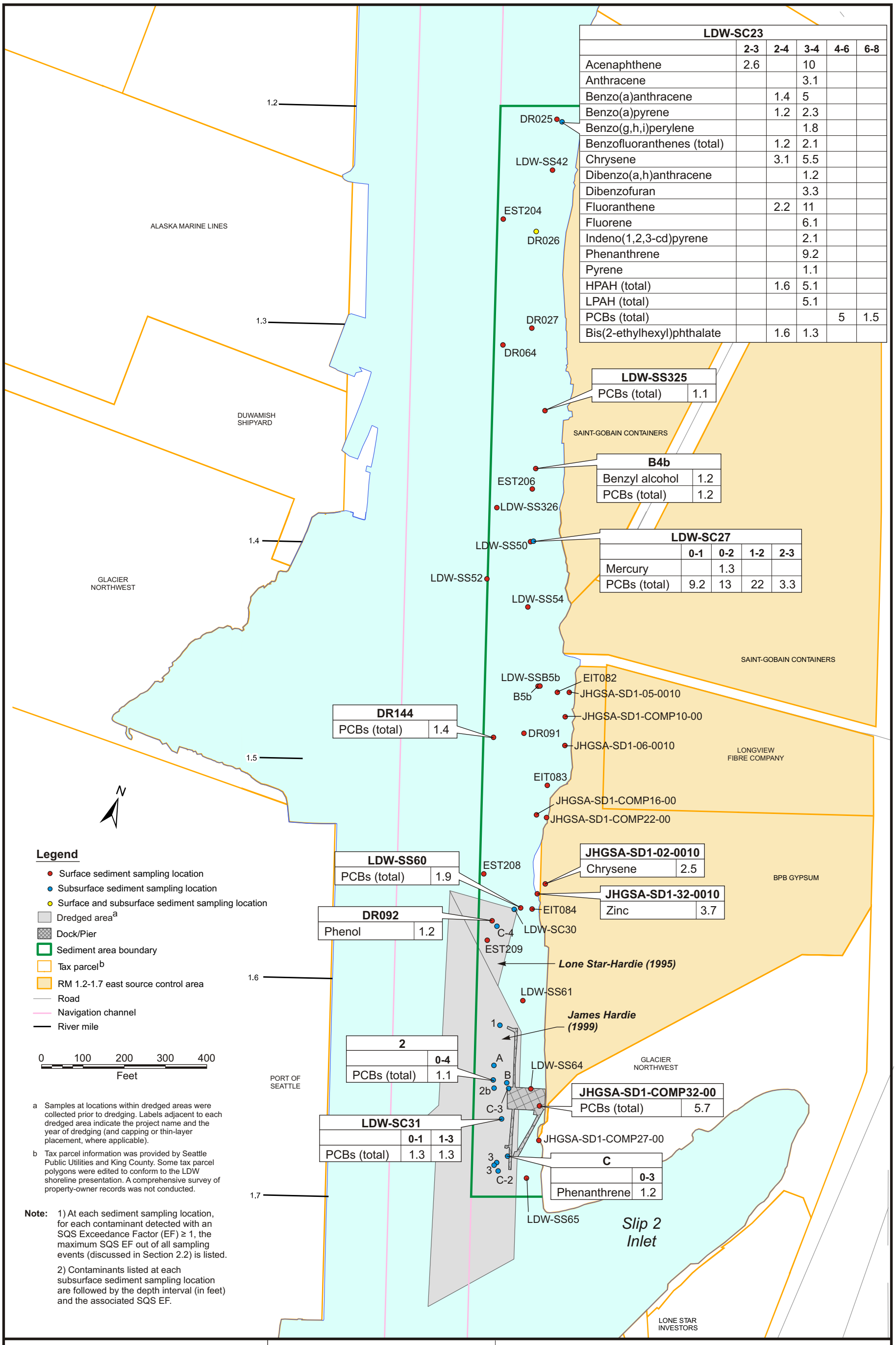
Seattle, Washington

LOWER DUWAMISH WATERWAY
RM 1.2-1.7 EAST
Seattle, Washington

Figure 3
RM 1.2-1.7 EAST DRAINAGE BASIN
AND UPLAND FACILITIES

Date:	Drawn by:	
6/30/09	AES	10:002330WD1404\fig 3



a Samples at locations within dredged areas were collected prior to dredging. Labels adjacent to each dredged area indicate the project name and the year of dredging (and capping or thin-layer placement, where applicable).

b Tax parcel information was provided by Seattle Public Utilities and King County. Some tax parcel polygons were edited to conform to the LDW shoreline presentation. A comprehensive survey of property-owner records was not conducted.

Note: 1) At each sediment sampling location, for each contaminant detected with an SQS Exceedance Factor (EF) ≥ 1, the maximum SQS EF out of all sampling events (discussed in Section 2.2) is listed.

2) Contaminants listed at each subsurface sediment sampling location are followed by the depth interval (in feet) and the associated SQS EF.

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LOWER DUWAMISH WATERWAY
RM 1.2-1.7 EAST
Seattle, Washington

Figure 4
SEDIMENT SAMPLING LOCATIONS AND ASSOCIATED CONTAMINANTS DETECTED IN EXCEEDANCE OF SQS

Base Map Reference: Windward 2007.

Date: 6/30/09

Drawn by: AES

10:002330WD1404\fig 4

Storm Drain and sanitary/combined sewer lines outside of the RM 1.2-1.7 Ease Source Control Area are shown for illustration purposes only and are not pathways of consideration for this report.

Upland facilities are not shown because the storm drain/combined sewer pathway is not relevant to upland facilities for this source control area.

Not found
Not found
Brandon CSO (041)
2007 King County
2008 King County
2009 King County
2010 King County
2011 King County
SP-80
2013 Longview Fibre
2017 James Hardie
SW Kenny St SD
2014 James Hardie
Settling pond outlet
2015 and 2016 James Hardie
1st Ave S bridge SD
Michigan CSO
This is same as 2502

East Marginal Way
1st Ave
Marginal Way
Unnamed
SR 509 Ramp
SR 509
Front St
Michigan St

Outfall Type
- CSO-KC
- SD Private
- SD-City
- SD-KC
- SD-WSDOT
- Seep

- Catch Basin
- Catch Basin - Lg. Inlet
- Inlet (Street Drain)
- Sand Box
- Culverts, Inlets and Laterals

- Drainage Mainline
- Sanitary Mainline
- Combined Mainlines
- King County Mainline
- Parcel Boundary
- Building

0 50 100 200 300 400 Feet
0 25 50 100 150 200 Meters

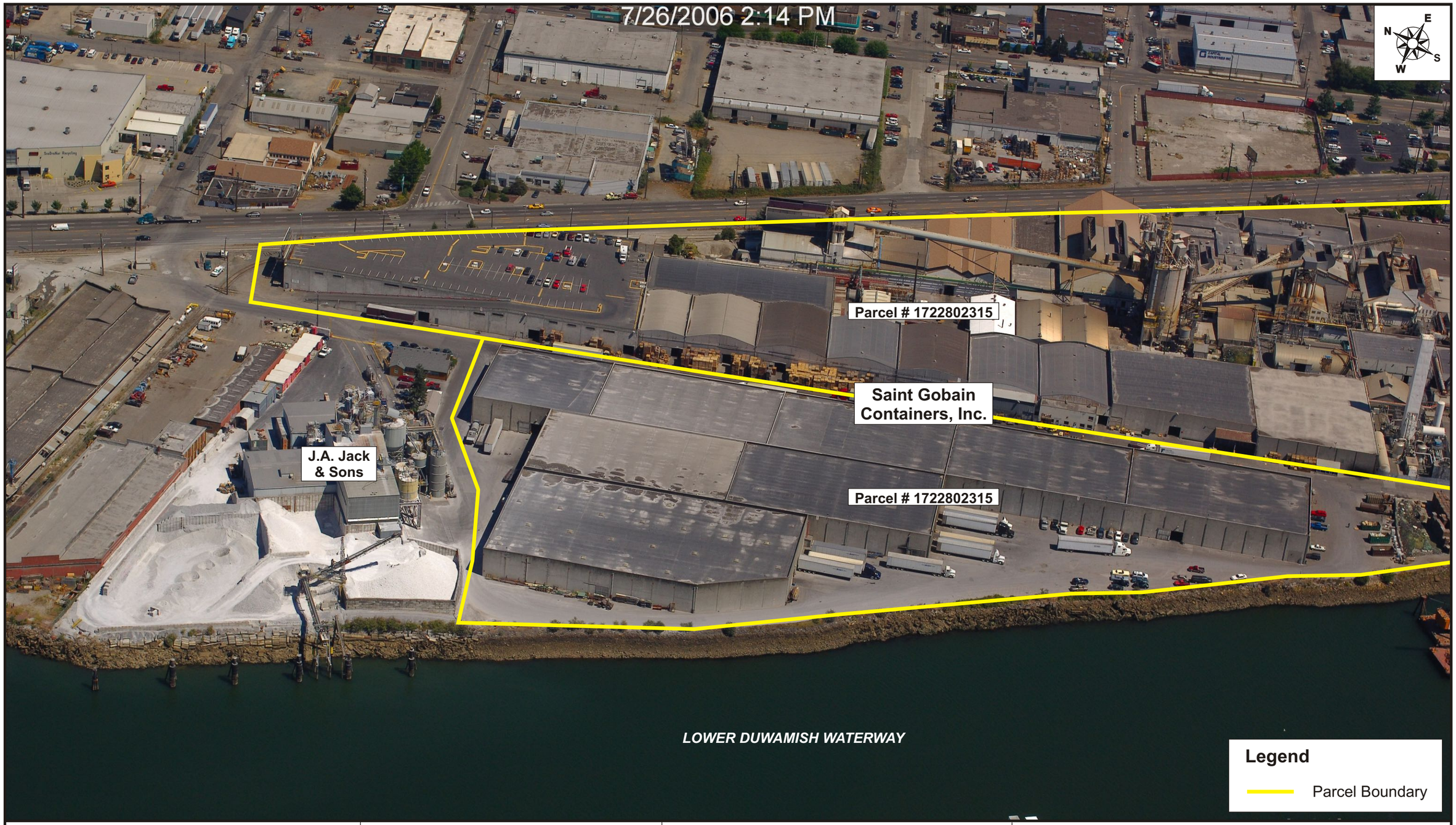
N W E S

LOWER DUWAMISH WATERWAY
RM 1.2 - 1.7 EAST
Seattle, Washington

FIGURE 5
STORM DRAIN SYSTEM WITHIN RM 1.2 - 1.7 EAST

Base Map Reference: E&E GIS Dept.
M:\Seattle\Drainage_Basin_Mapping\Maps\Mxds\RM_1-2_1-7_East

Date: 01/12/2009 | Drawn by: RLS | Figure 4.mxd



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Base Map Reference: Department of Ecology, 2006a.

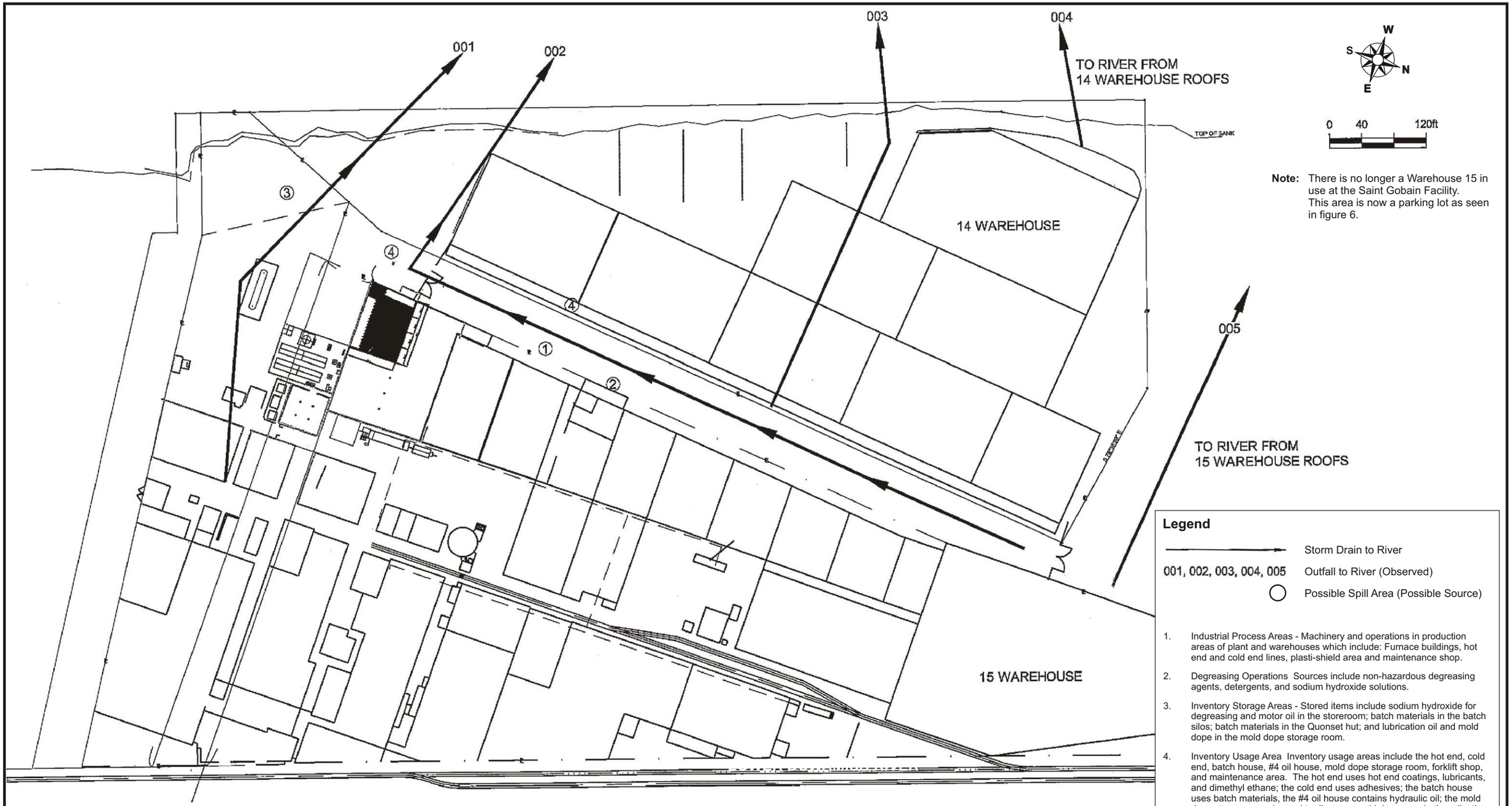
Note: Property continues on Figure 10.

LOWER DUWAMISH WATERWAY
RM 1.2-1.7 EAST
Seattle, Washington

Figure 6

AERIAL PHOTOGRAPH OF SAINT GOBAIN

Date:	Drawn by:	
6/30/09	AES	10:002330WD1404\fig 6



Note: There is no longer a Warehouse 15 in use at the Saint Gobain Facility. This area is now a parking lot as seen in figure 6.

Legend

- Storm Drain to River
- 001, 002, 003, 004, 005 — Outfall to River (Observed)
- Possible Spill Area (Possible Source)

1. Industrial Process Areas - Machinery and operations in production areas of plant and warehouses which include: Furnace buildings, hot end and cold end lines, plasti-shield area and maintenance shop.
2. Degreasing Operations Sources include non-hazardous degreasing agents, detergents, and sodium hydroxide solutions.
3. Inventory Storage Areas - Stored items include sodium hydroxide for degreasing and motor oil in the storeroom; batch materials in the batch silos; batch materials in the Quonset hut; and lubrication oil and mold dope in the mold dope storage room.
4. Inventory Usage Area Inventory usage areas include the hot end, cold end, batch house, #4 oil house, mold dope storage room, forklift shop, and maintenance area. The hot end uses hot end coatings, lubricants, and dimethyl ethane; the cold end uses adhesives; the batch house uses batch materials, the #4 oil house contains hydraulic oil; the mold dope storage room is used to dispense mold dopes and other oils; the fork lift repair shop uses motor oil, anti freeze, hydraulic oil, and transmission oil.

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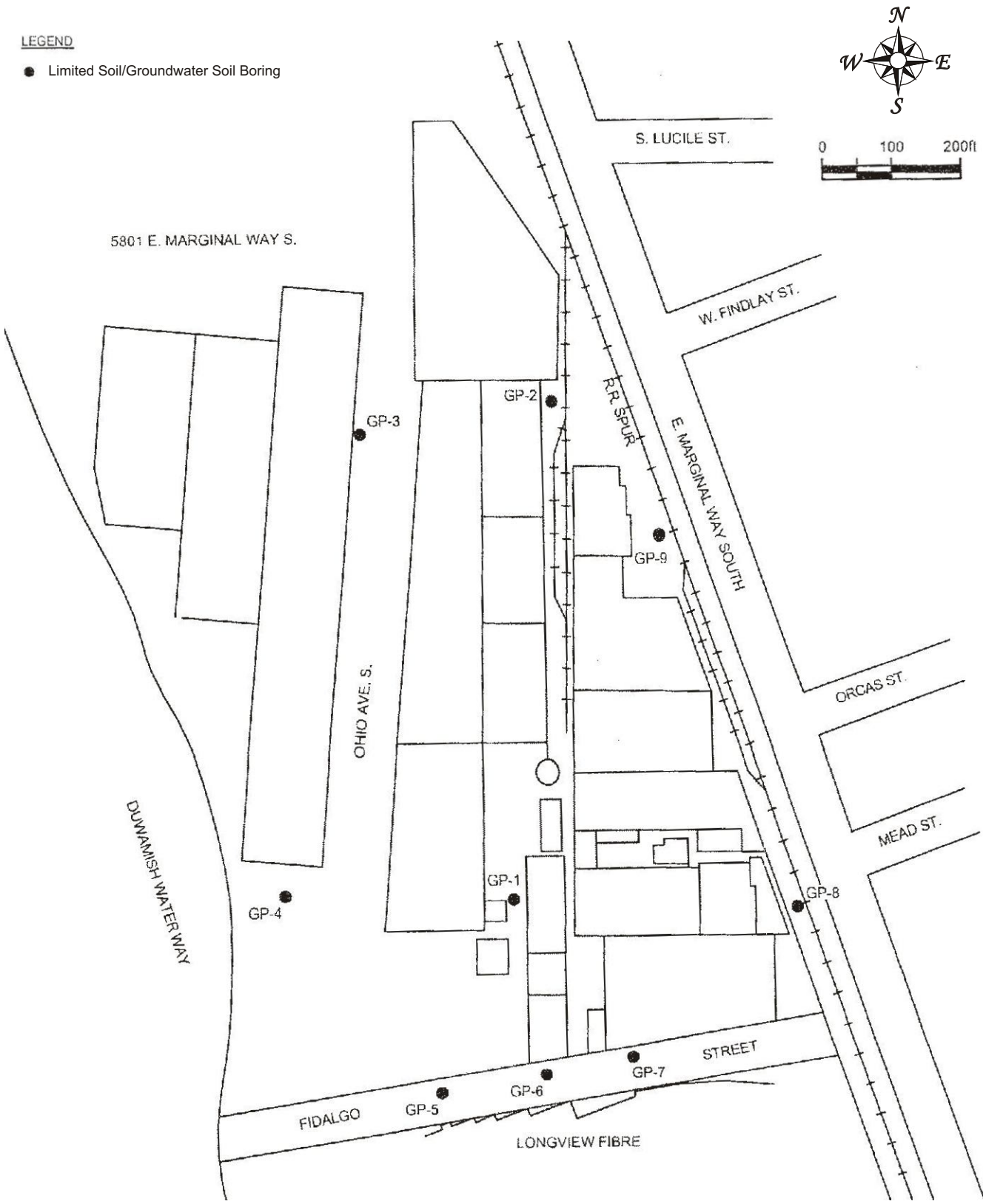
Seattle, Washington

Base Map Reference: Conestoga-Rovers & Associates (CRA), 2006a.

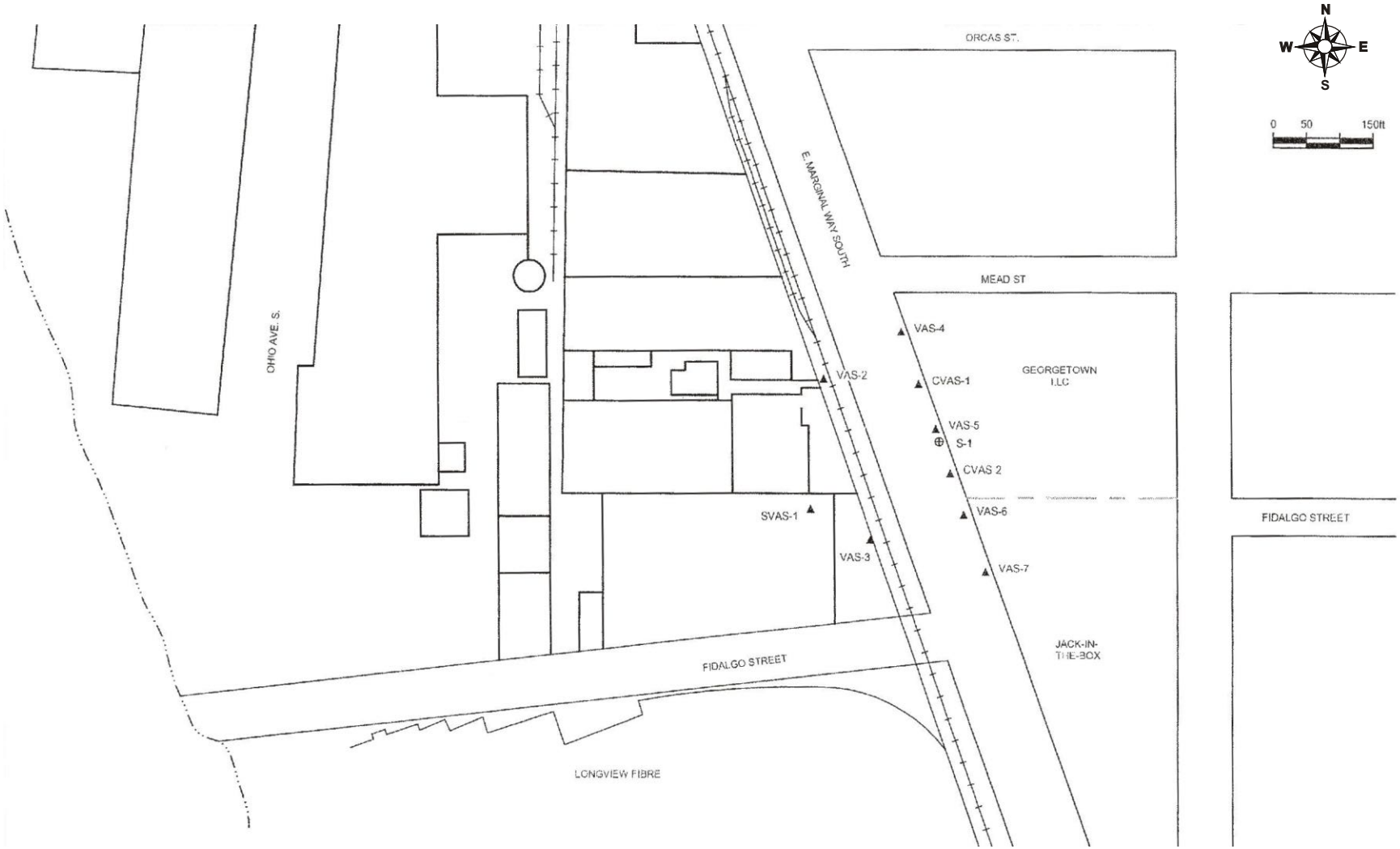
LOWER DUWAMISH WATERWAY
RM 1.2-1.7 EAST
Seattle, Washington

Figure 7
SAINT GOBAIN SITE DRAINAGE

Date:	Drawn by:	
6/30/09	AES	10:002330WD1404\fig 7



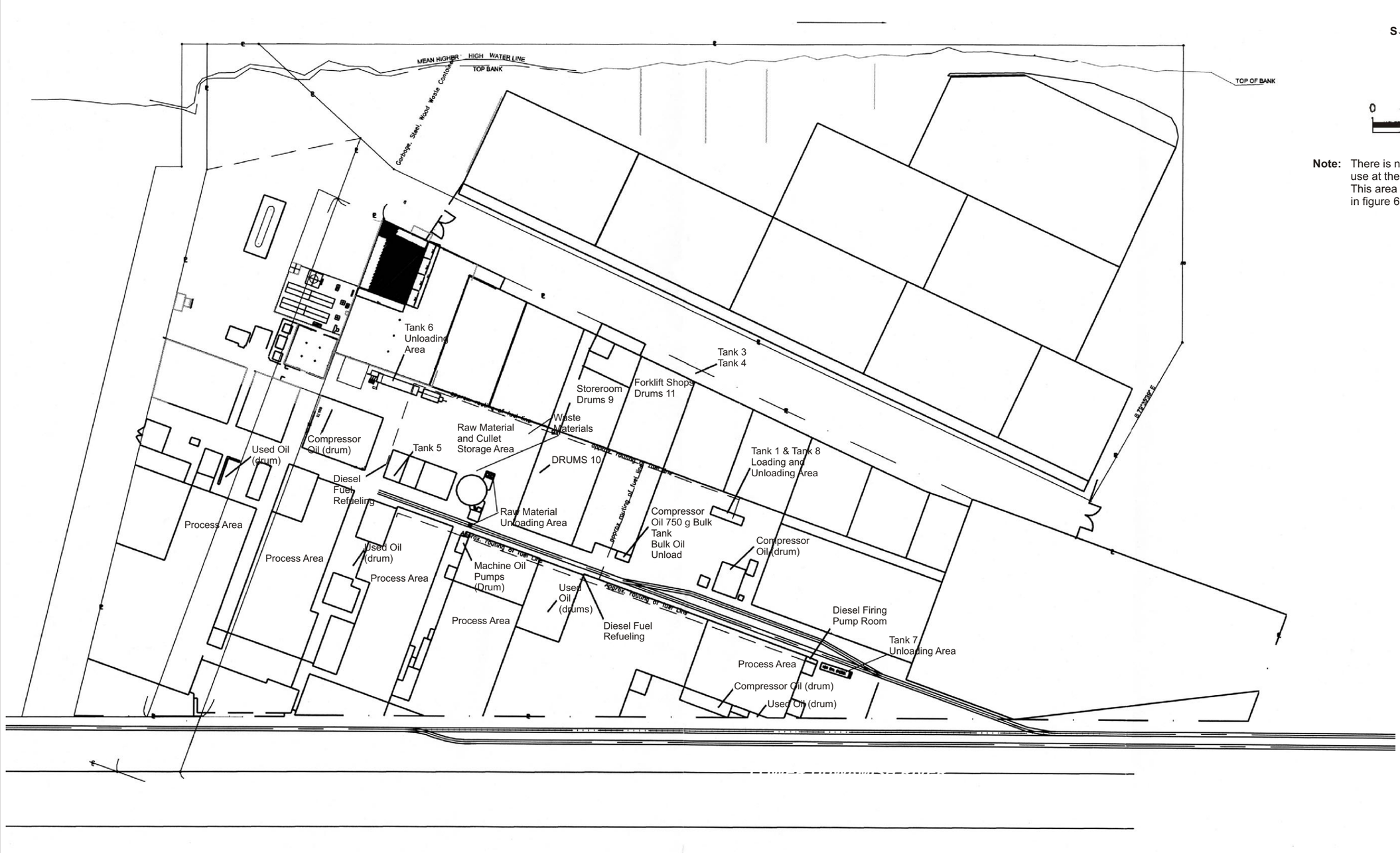
ecology and environment, inc. International Specialists in the Environment Seattle, Washington	LOWER DUWAMISH WATERWAY RM 1.2-1.7 EAST Seattle, Washington	Figure 8 LIMITED SOIL/GROUNDWATER INVESTIGATION SAINT-GOBAIN CONTAINERS, INC. SEATTLE, WASHINGTON		
	Base Map Reference: Conestoga-Rovers and Associates (CRA), 2005.	Date: 6-30-09	Drawn by: AES	10:002330WD1404\fig 8



LEGEND

▲ Initial Phase Focused Groundwater Investigation Soil Boring

ecology and environment, inc. International Specialists in the Environment Seattle, Washington	LOWER DUWAMISH WATERWAY RM 1.2-1.7 EAST Seattle, Washington	Figure 9 INITIAL PHASE FOCUSED GROUNDWATER INVESTIGATION SAINT GOBAIN CONTAINERS, INC., SEATTLE, WASHINGTON		
	Base Map Reference: Conestoga-Rovers and Associates (CRA), 2005.	Date: 6/30/09	Drawn by: AES	10:002330WD1404\fig 9



Note: There is no longer a Warehouse 15 in use at the Saint Gobain Facility. This area is now a parking lot as seen in figure 6.

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Base Map Reference: Conestoga-Rovers & Associates (CRA), 2006a.

LOWER DUWAMISH WATERWAY
RM 1.2-1.7 EAST
Seattle, Washington

Figure 10
SAINT GOBAIN SITE LAYOUT

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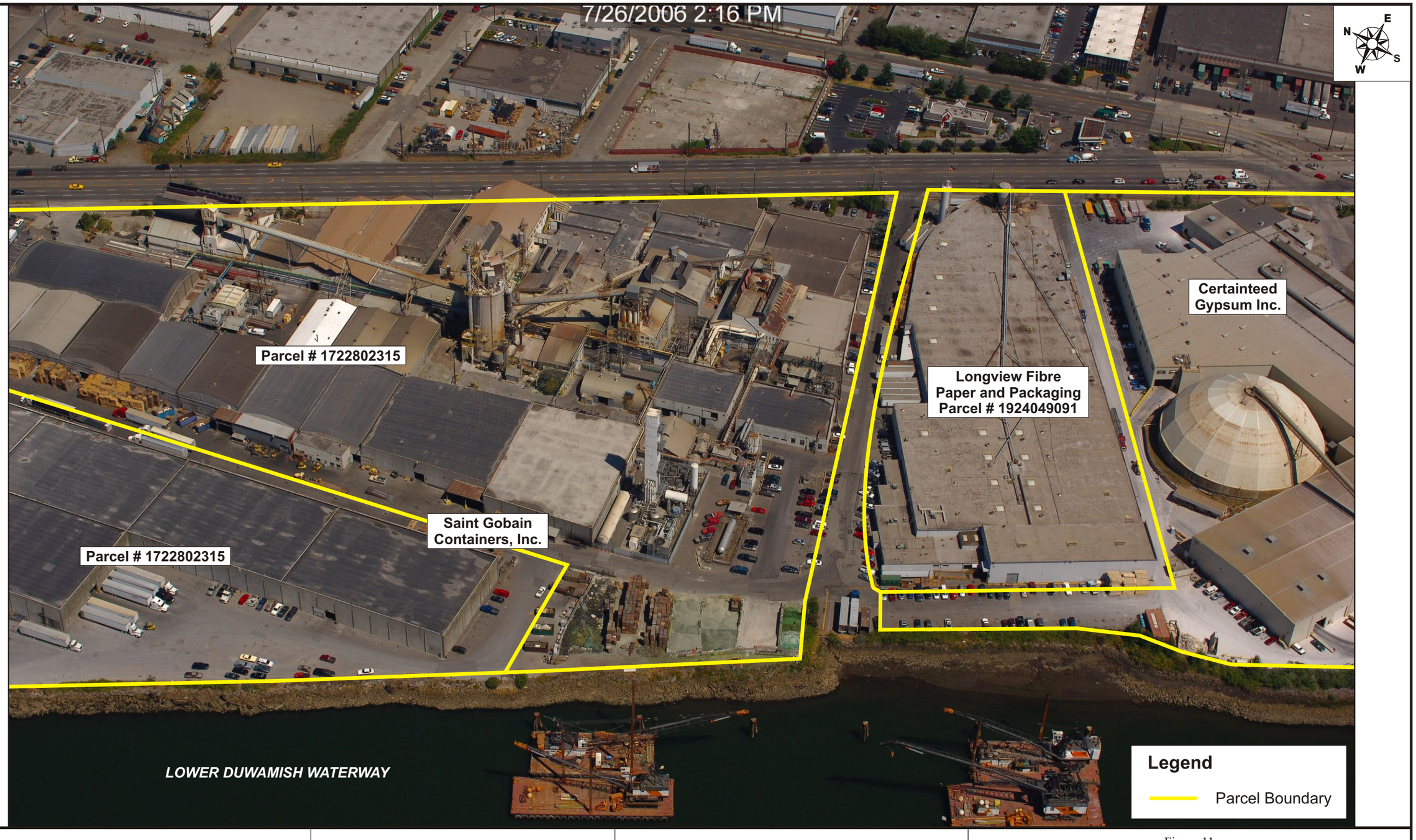

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Base Map Reference: Department of Ecology, 2006a.

LOWER DUWAMISH WATERWAY
RM 1.2-1.7 EAST
Seattle, Washington

Figure 11
AERIAL PHOTOGRAPH OF
LONGVIEW FIBRE PAPER AND PACKAGING

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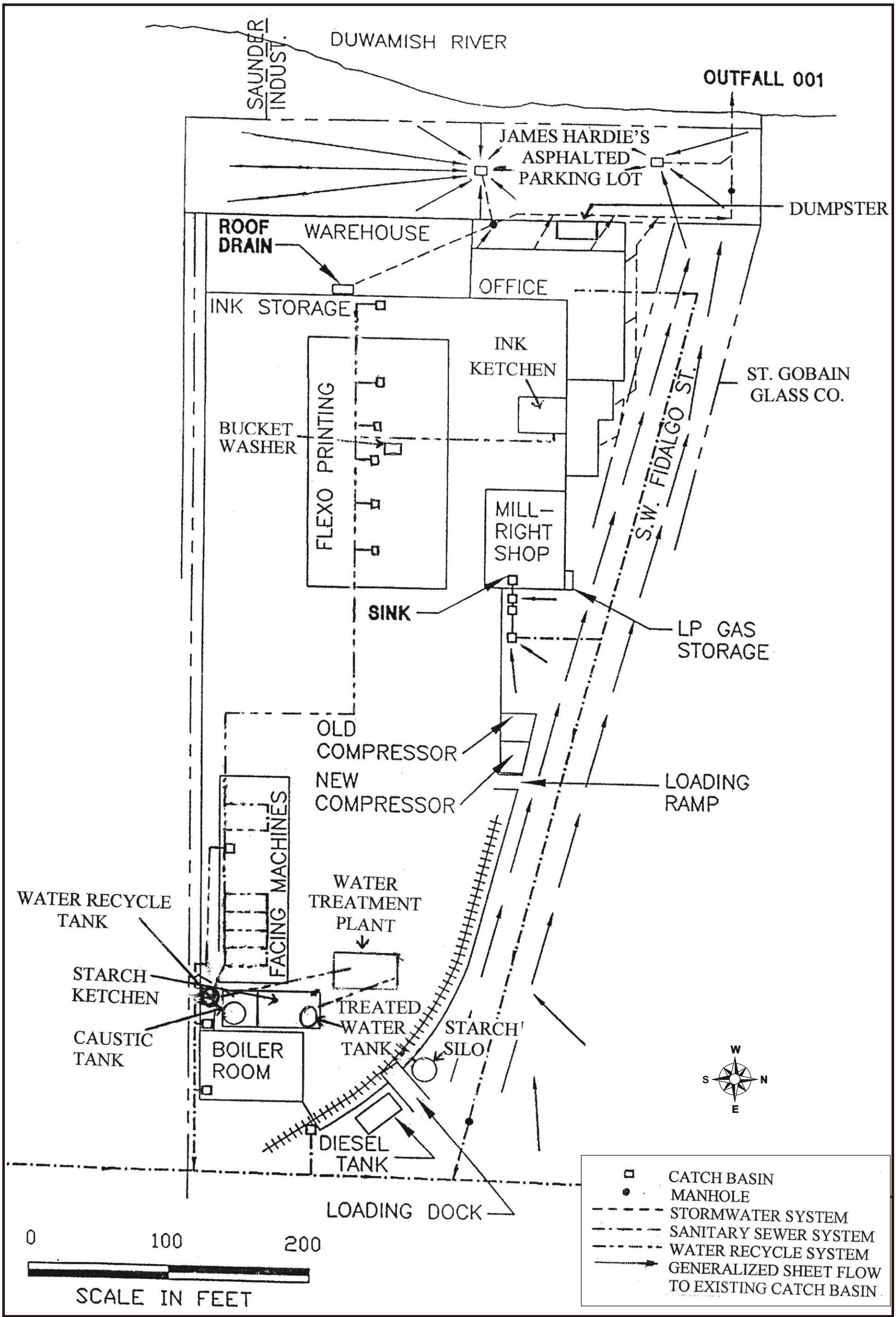

ecology and environment, inc. International Specialists in the Environment Seattle, Washington	LOWER DUWAMISH WATERWAY RM 1.2-1.7 EAST Seattle, Washington	Figure 12 SANITARY SEWER SYSTEM AND SITE LAYOUT FOR LONGVIEW FIBRE		
	Base Map Reference: CH2MHill 1996.	Date: 6/30/09	Drawn by: AES	10:002330WD1404\fig 12

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Base Map Reference: Department of Ecology, 2006a.

LOWER DUWAMISH WATERWAY
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Seattle, Washington

Figure 13
AERIAL PHOTOGRAPH OF
CERTAINTEED GYPSUM

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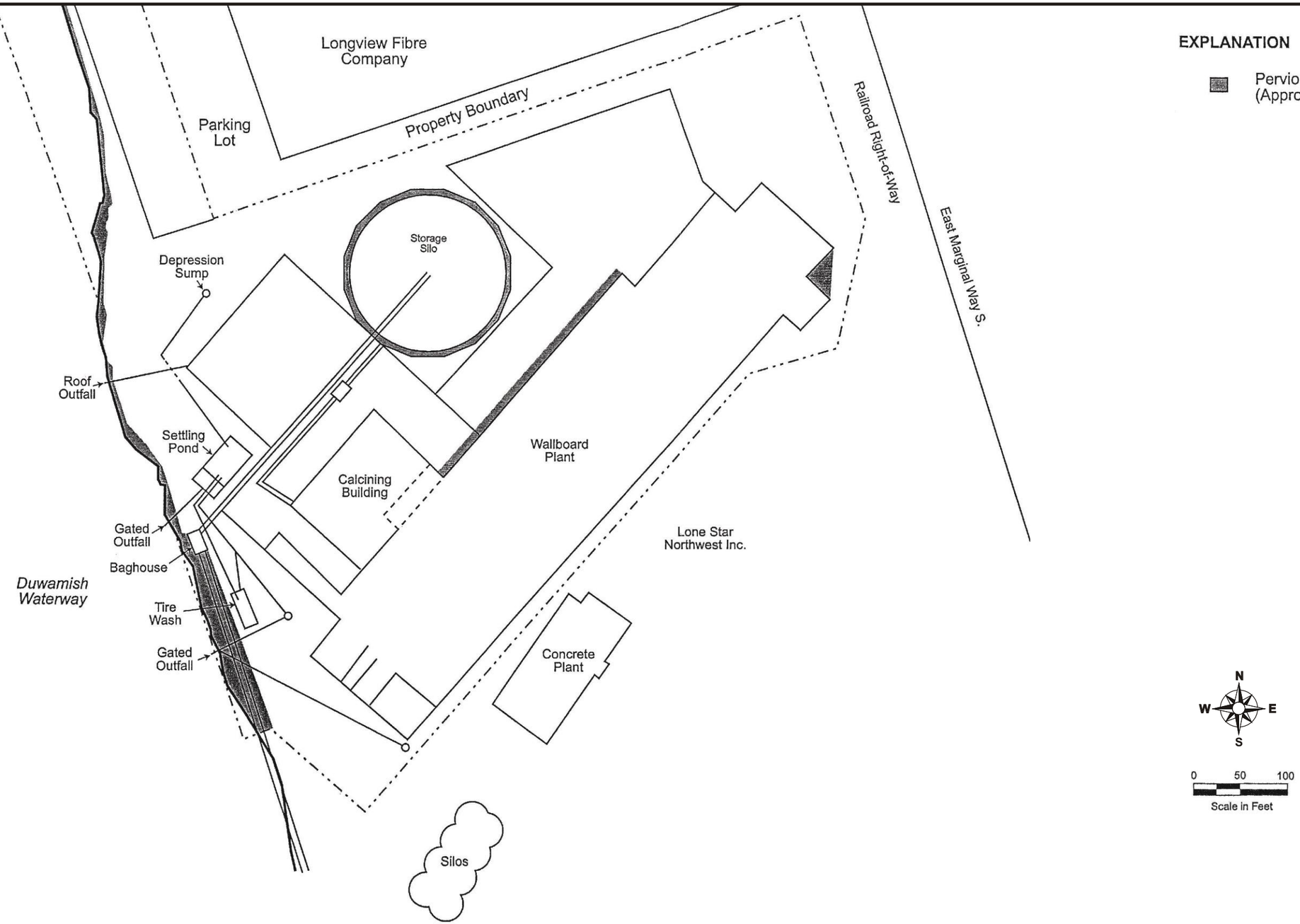
6/30/09	AES	10:002330WD1404\fig 13



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Base Map Reference: Department of Ecology, 2008.

LOWER DUWAMISH WATERWAY
RM 1.2-1.7 EAST
Seattle, Washington

Figure 14

STORM WATER OUTFALLS FOR CERTAINTEED GYPSUM

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Aerial Photograph Reference: Google Earth Pro 2008.

LOWER DUWAMISH WATERWAY
RM 1.2-1.7 EAST
Seattle, Washington

Figure 15
SITE LOCATIONS OF UPLAND PROPERTIES

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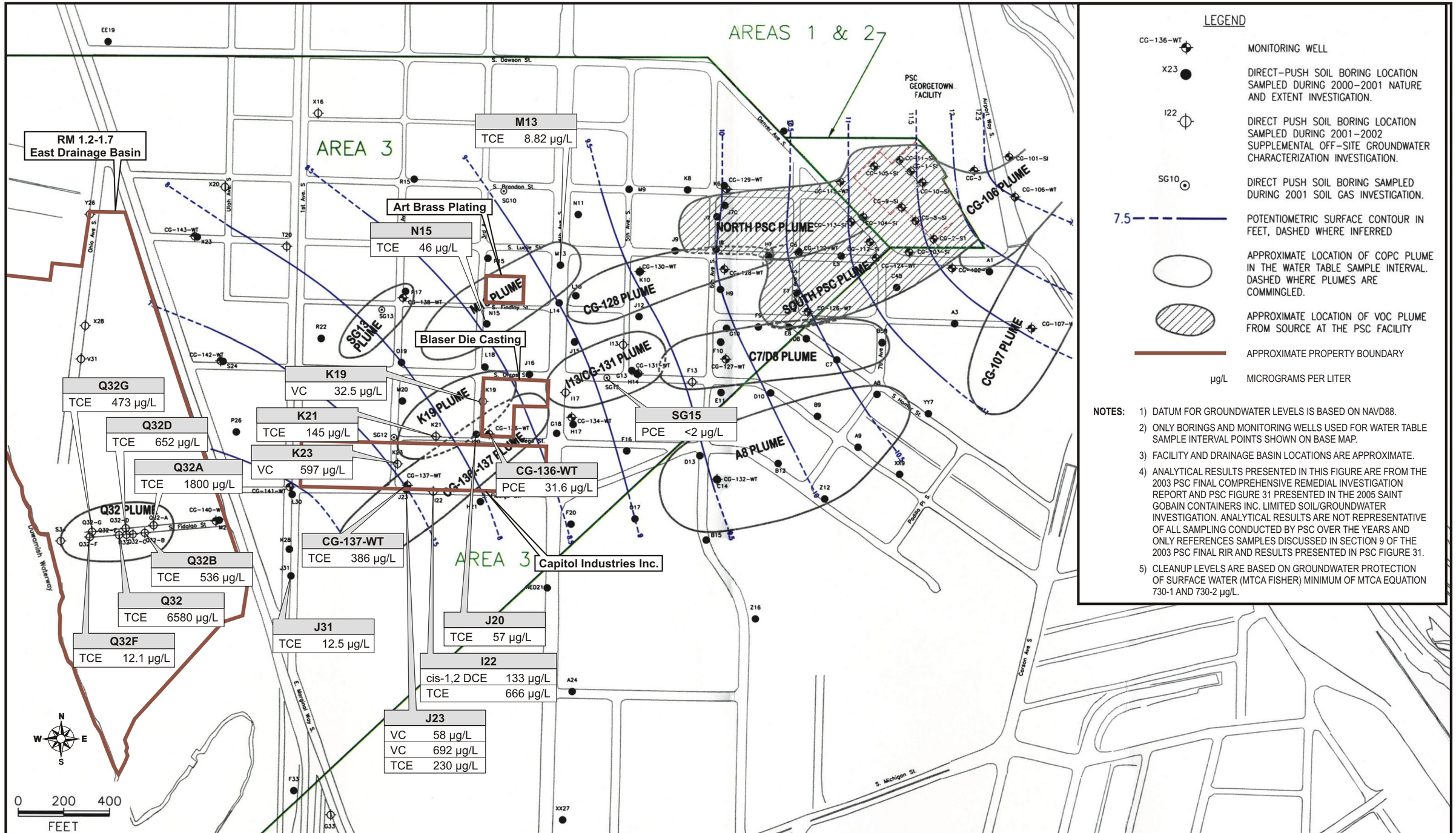

LEGEND

- CG-136-WT — MONITORING WELL
- X23 — DIRECT-PUSH SOIL BORING LOCATION SAMPLED DURING 2000-2001 NATURE AND EXTENT INVESTIGATION.
- I22 — DIRECT PUSH SOIL BORING LOCATION SAMPLED DURING 2001-2002 SUPPLEMENTAL OFF-SITE GROUNDWATER CHARACTERIZATION INVESTIGATION.
- SG10 — DIRECT PUSH SOIL BORING SAMPLED DURING 2001 SOIL GAS INVESTIGATION.
- 7.5 — POTENTIOMETRIC SURFACE CONTOUR IN FEET, DASHED WHERE INFERRED
- APPROXIMATE LOCATION OF COPC PLUME IN THE WATER TABLE SAMPLE INTERVAL. DASHED WHERE PLUMES ARE COMMINGLED.
- APPROXIMATE LOCATION OF VOC PLUME FROM SOURCE AT THE PSC FACILITY
- APPROXIMATE PROPERTY BOUNDARY
- µg/L — MICROGRAMS PER LITER

NOTES:

1) DATUM FOR GROUNDWATER LEVELS IS BASED ON NAVD88.
2) ONLY BORINGS AND MONITORING WELLS USED FOR WATER TABLE SAMPLE INTERVAL POINTS SHOWN ON BASE MAP.
3) FACILITY AND DRAINAGE BASIN LOCATIONS ARE APPROXIMATE.
4) ANALYTICAL RESULTS PRESENTED IN THIS FIGURE ARE FROM THE 2003 PSC FINAL COMPREHENSIVE REMEDIAL INVESTIGATION REPORT AND PSC FIGURE 31 PRESENTED IN THE 2005 SAINT GOBAIN CONTAINERS INC. LIMITED SOIL/GROUNDWATER INVESTIGATION. ANALYTICAL RESULTS ARE NOT REPRESENTATIVE OF ALL SAMPLING CONDUCTED BY PSC OVER THE YEARS AND ONLY REFERENCES SAMPLES DISCUSSED IN SECTION 9 OF THE 2003 PSC FINAL RIR AND RESULTS PRESENTED IN PSC FIGURE 31.
5) CLEANUP LEVELS ARE BASED ON GROUNDWATER PROTECTION OF SURFACE WATER (MTCA FISHER) MINIMUM OF MTCA EQUATION 730-1 AND 730-2 µg/L.

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Base Map Reference: Phillip Services Corporation (PSC), 2003.

LOWER DUWAMISH WATERWAY
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Figure 16

CONCENTRATIONS OF VOCS WITHIN RM 1.2-1.7 GROUNDWATER

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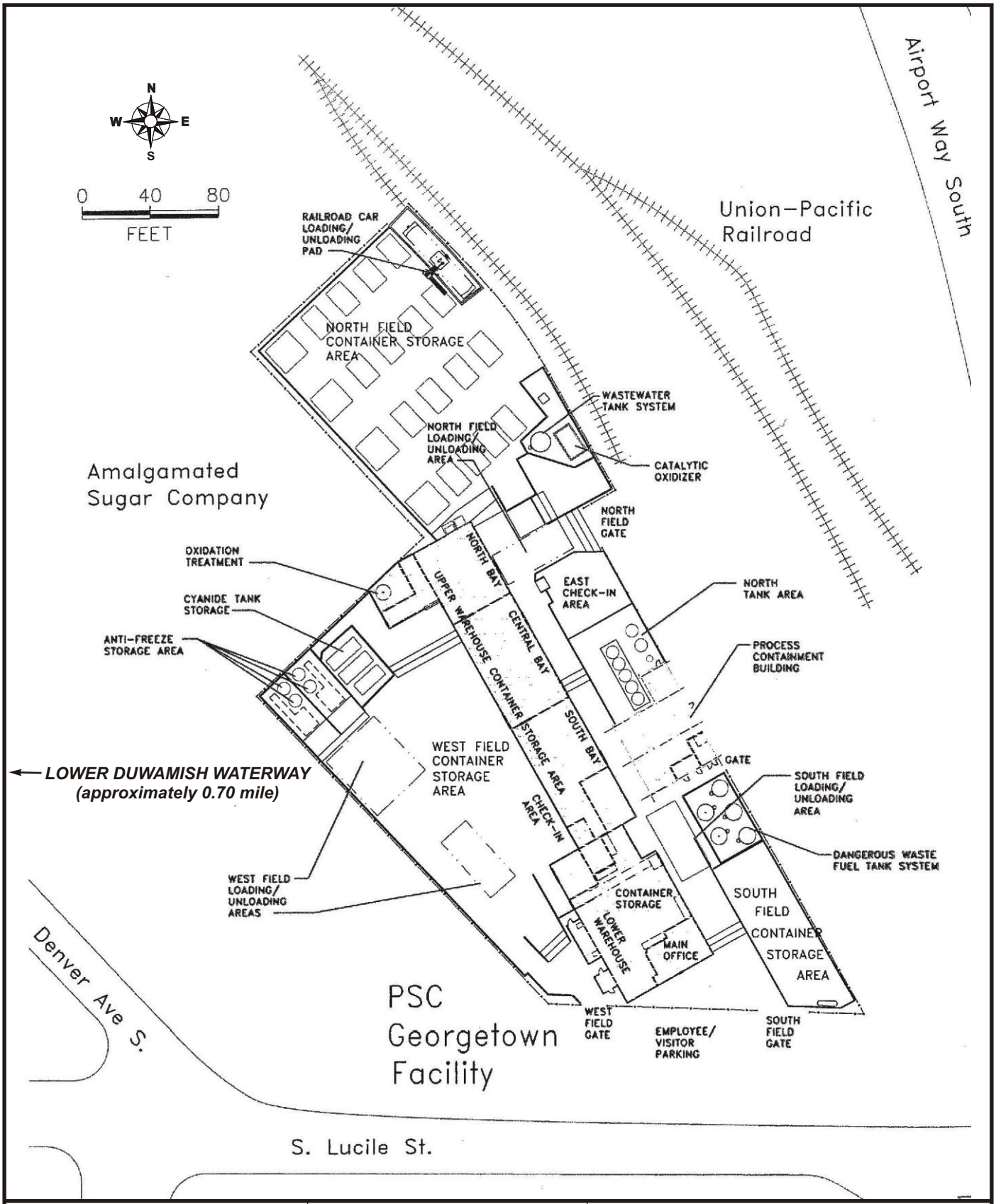
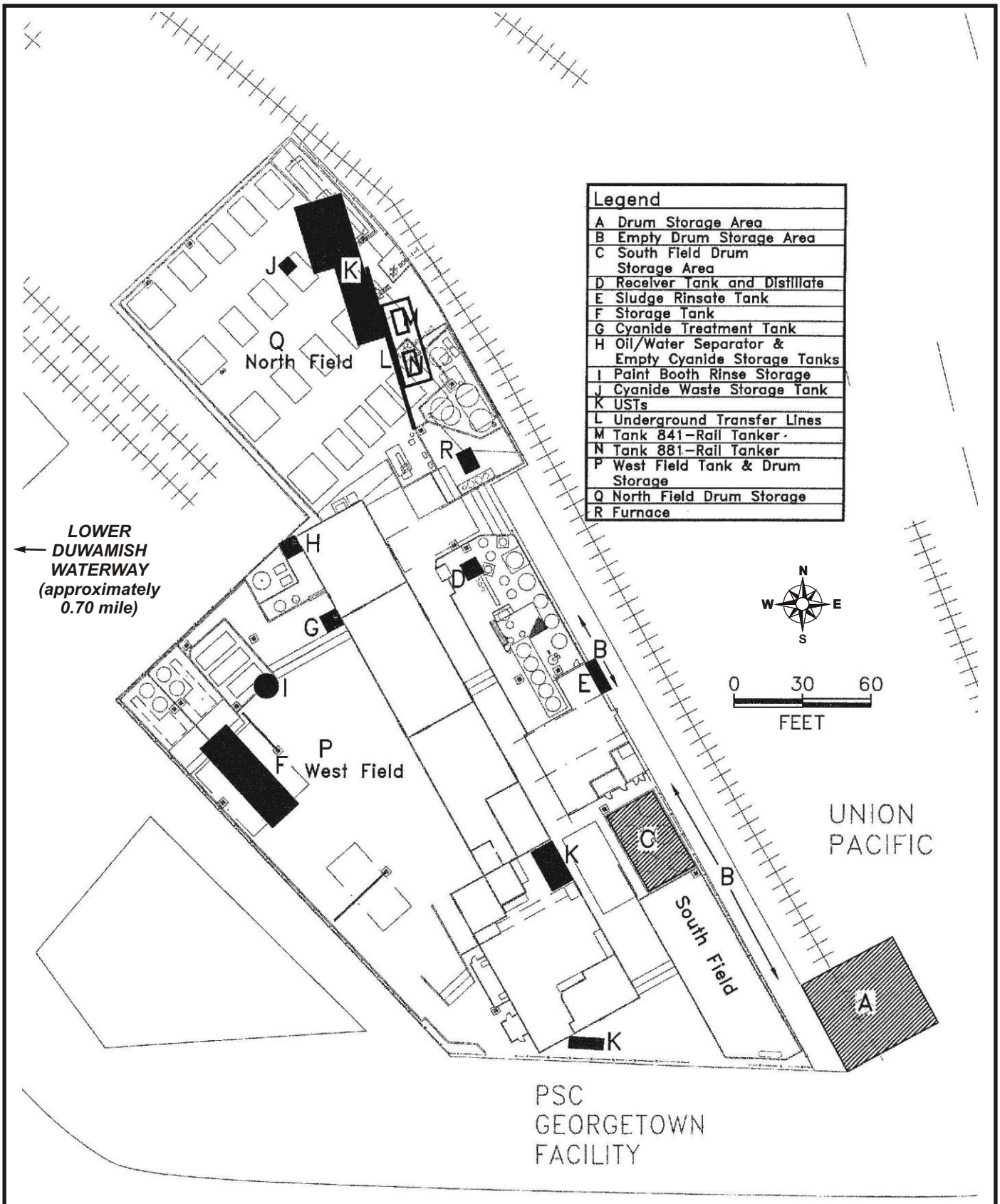
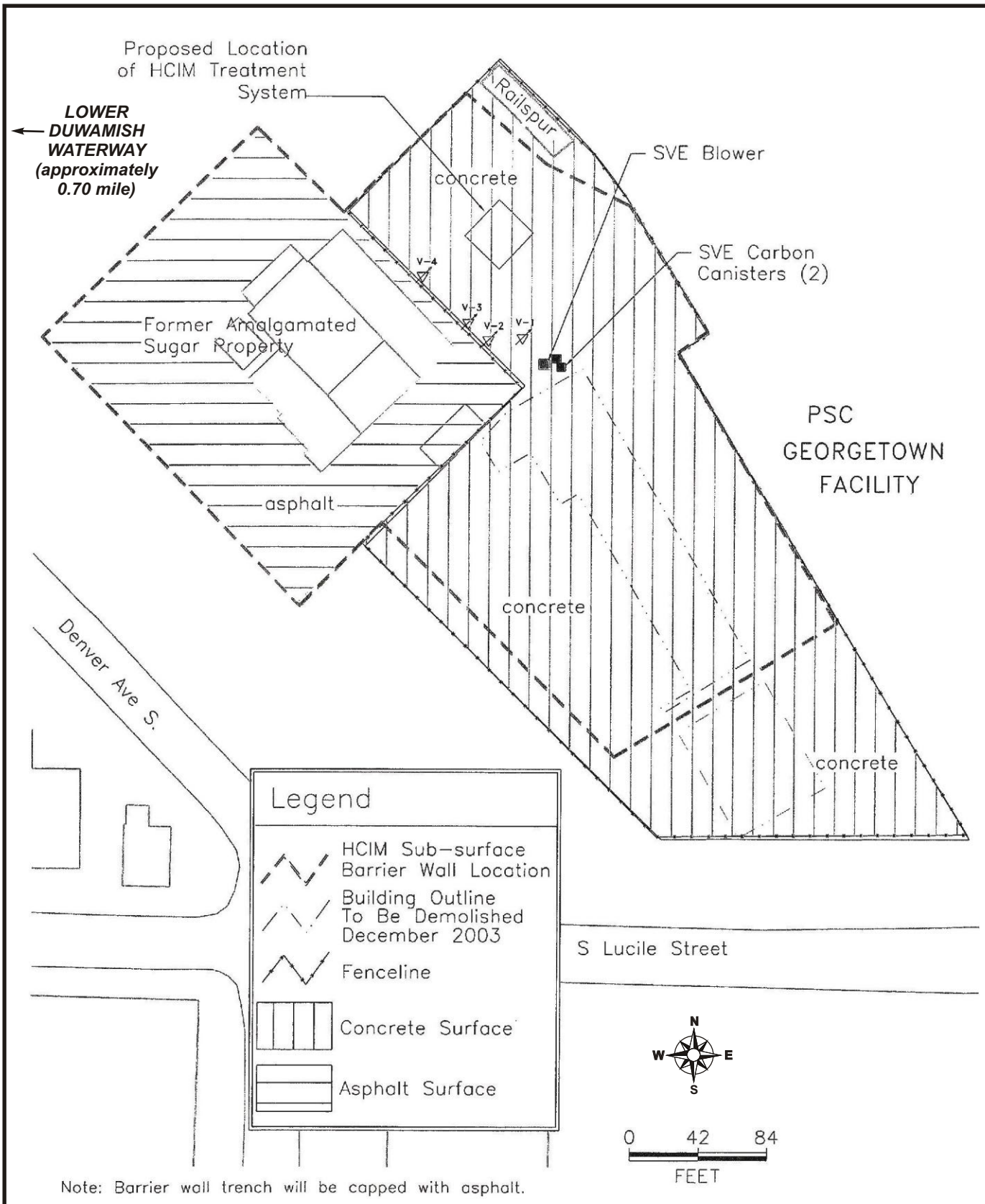


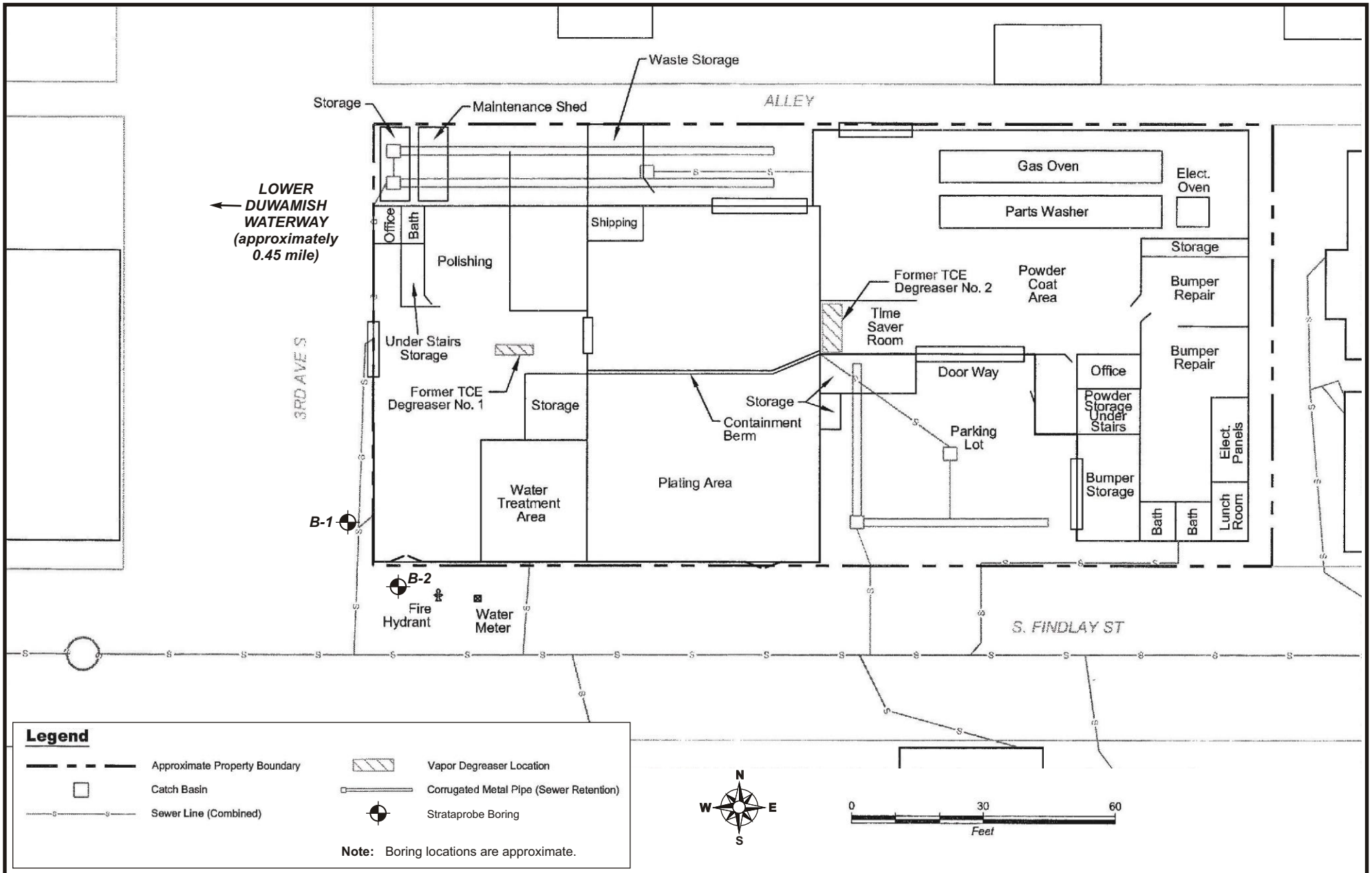
ecology and environment, inc. International Specialists in the Environment Seattle, Washington	LOWER DUWAMISH WATERWAY RM 1.2-1.7 EAST Seattle, Washington	Figure 17 FORMER FACILITY LAYOUT FOR PSC		
	Base Map Reference: PSC 2003.	Date: 6-30-09	Drawn by: AES	10:002330WD1404\fig 17



ecology and environment, inc. International Specialists in the Environment Seattle, Washington	LOWER DUWAMISH WATERWAY RM 1.2-1.7 EAST Seattle, Washington	Figure 18 FORMER KNOWN CHEMICAL STORAGE AT PSC		
	Base Map Reference: PSC 2003.	Date: 6-30-09	Drawn by: AES	10:002330WD1404\fig 18



ecology and environment, inc. International Specialists in the Environment Seattle, Washington	LOWER DUWAMISH WATERWAY RM 1.2-1.7 EAST Seattle, Washington	Figure 19 PSC HCIM LAYOUT		
	Base Map Reference: PSC 2003.	Date: 6-30-09	Drawn by: AES	10:002330WD1404\fig 19



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LOWER DUWAMISH WATERWAY
RM 1.2-1.7 EAST
Seattle, Washington

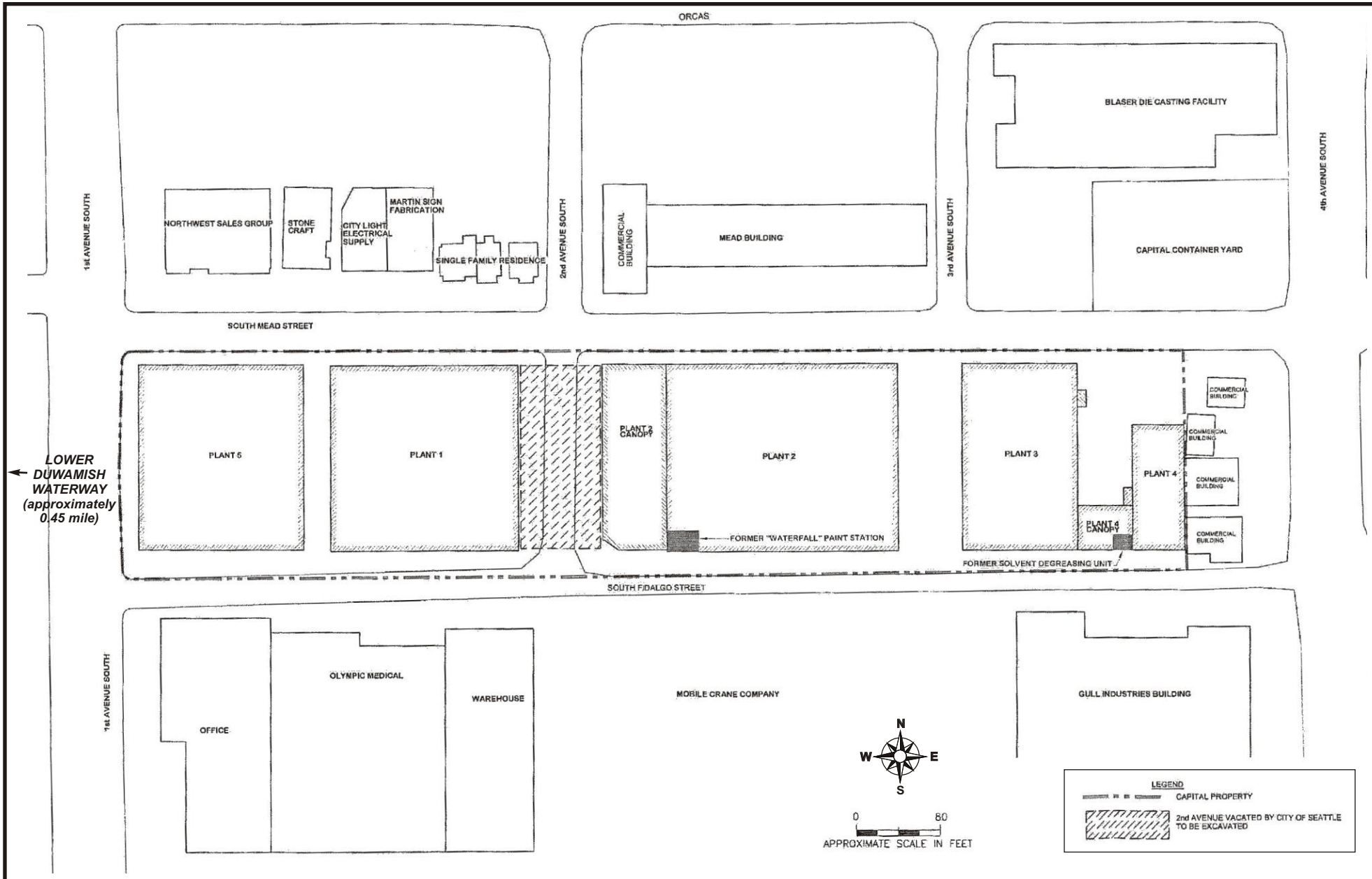
Figure 20
ART BRASS FACILITY MAP

Base Map Reference: Aspect Consulting 2008.

Date: 6/30/09

Drawn by: AES

10:002330WD1404\fig 20



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RM 1.2-1.7 EAST
Seattle, Washington

Figure 21
FACILITY LAYOUT FOR CAPITAL INDUSTRIES

Base Map Reference: Farallon 2008.

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