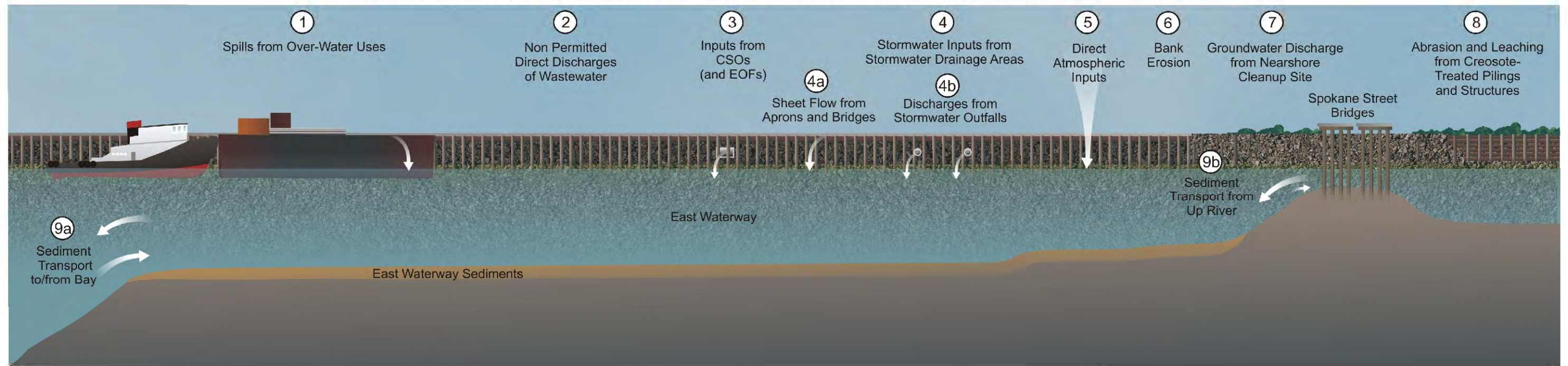
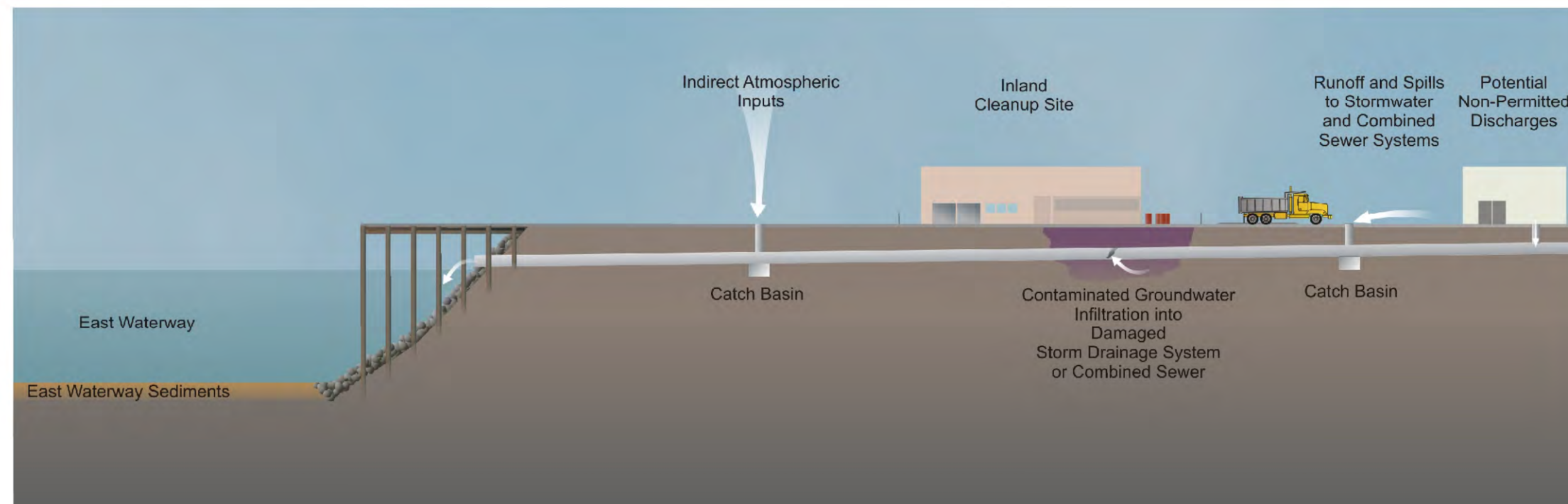


Direct Pathways Considered as Part of East Waterway Source Control Evaluation



Indirect Pathways Potentially Contributing to CSO and Stormwater Pathways



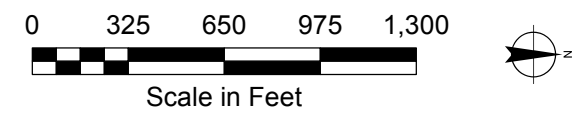


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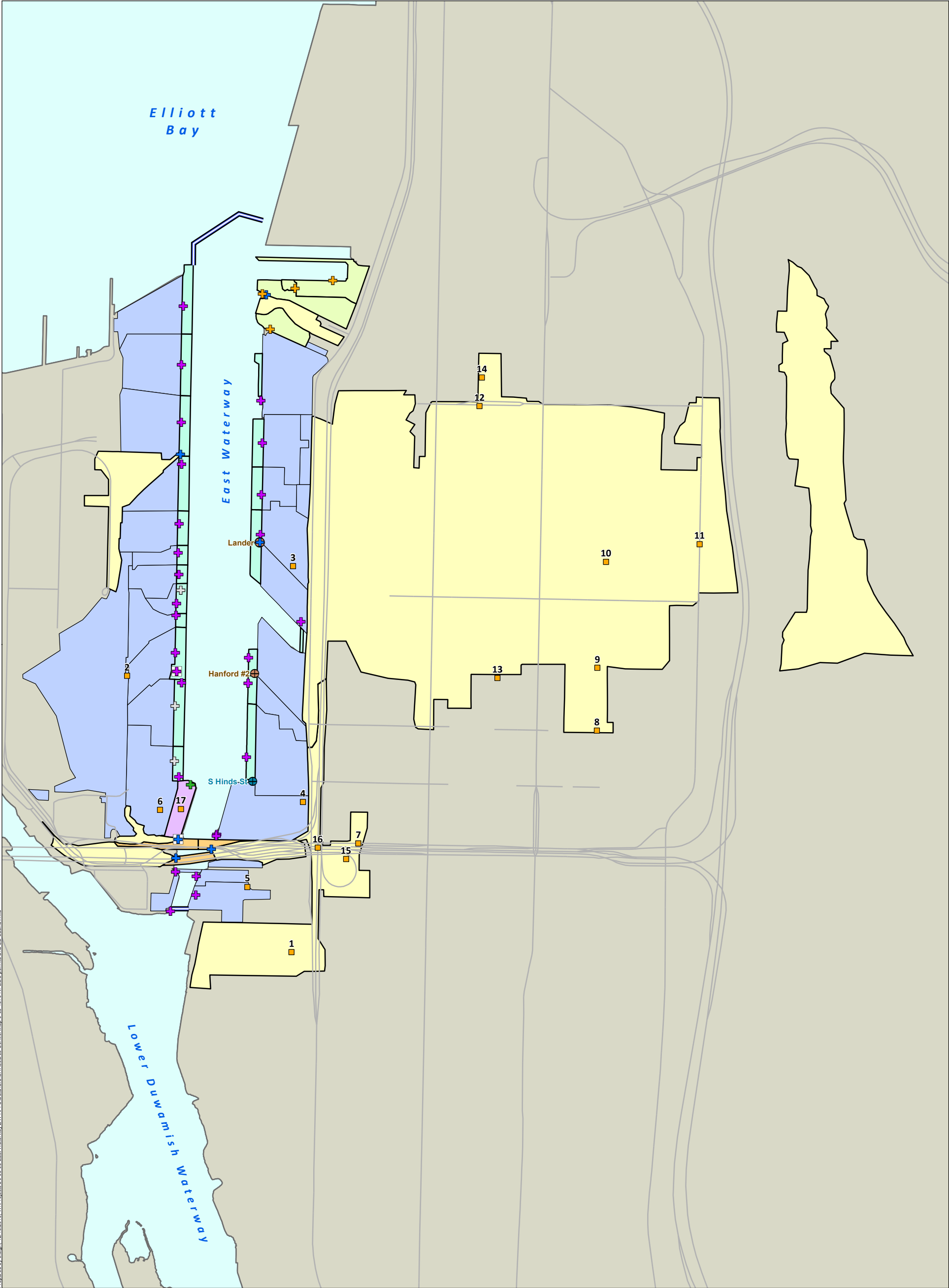
Harbor Island Sediment OU

Approximate Operable Unit Boundary (OU)

Notes:
1. All locations approximate.
2. OU = Operable Unit



Map 9-2
Location of Selected Former Industrial Operations
Supplemental Remedial Investigation
East Waterway Operable Unit

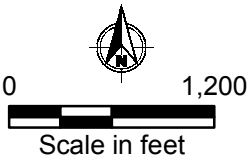


Prepared by: craph, 12/13/2013, W:\Projects\00-06-08 East Waterway\VIEW RUFSD\GIS\SR\Source Control\Map 9-03 NPDES permits and SD basins.mxd

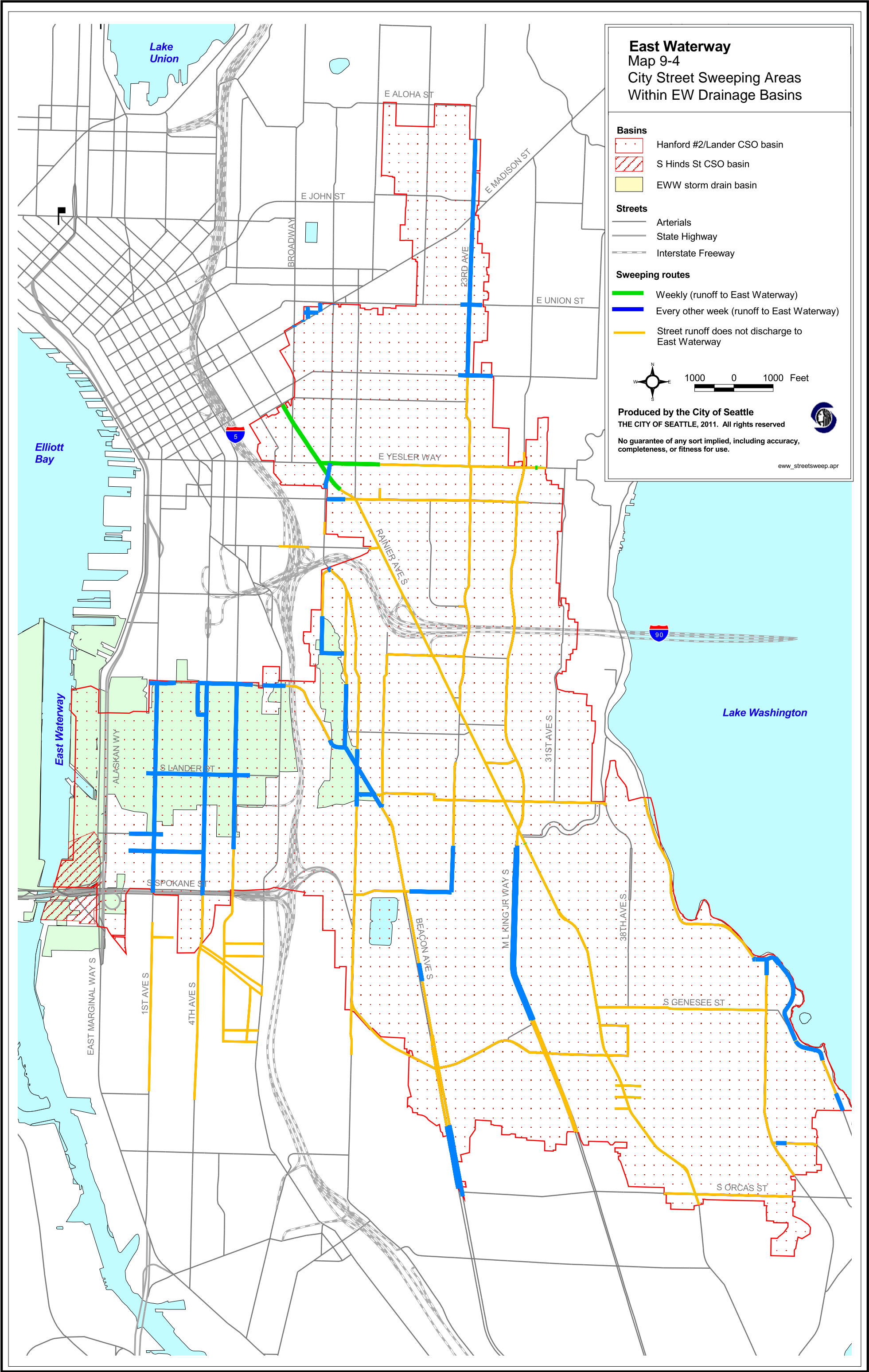
NPDES Permitted Facility ¹	Storm Drain Outfalls²	Basin/Sub-Basin
Combined Sewer Overflow Outfalls	Port of Seattle	Port of Seattle Basin
City of Seattle CSO/SD	City of Seattle	Port of Seattle Apron or Bridge
King County CSO	US Coast Guard	SPU Basin
King County CSO/City of Seattle SD	City EOF/Port SD	SPU Bridge
	City EOF/City SD	Olympic Tug and Barge Basin
	Private	Coast Guard Basin
	Unknown Outfall	East Waterway Study Area Boundary

¹ Sources: 2009 Environmental Data Resources Inc. East Waterway Drainage Area. EDR DataMap™ Environmental Atlas™. Prepared for Anchor QEA, LLC. December 4, 2009; WA Dept. of Ecology PARIS database, August 29, 2011. The T-18 NPDES permit includes all discharges from T-18 from outfalls 7-24, as well as any discharge to Elliott Bay and the West Waterway.

² Only outfalls with active stormwater discharges from separated storm drain basins are shown on this figure.



Map 9-3
NPDES Permitted Facilities EW Storm Drain Basins
Supplemental Remedial Investigation
East Waterway Study Area



NOTE:
Details of inspections are presented in Appendix L.

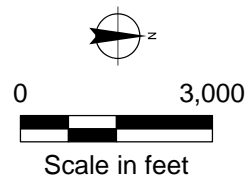
Q:\Jobs\060003-01 East Waterway SRI-FSWMaps\SRI\Map 9-5 Inspection Locations.mxd ckibinger 1/23/2014 4:52:58 PM



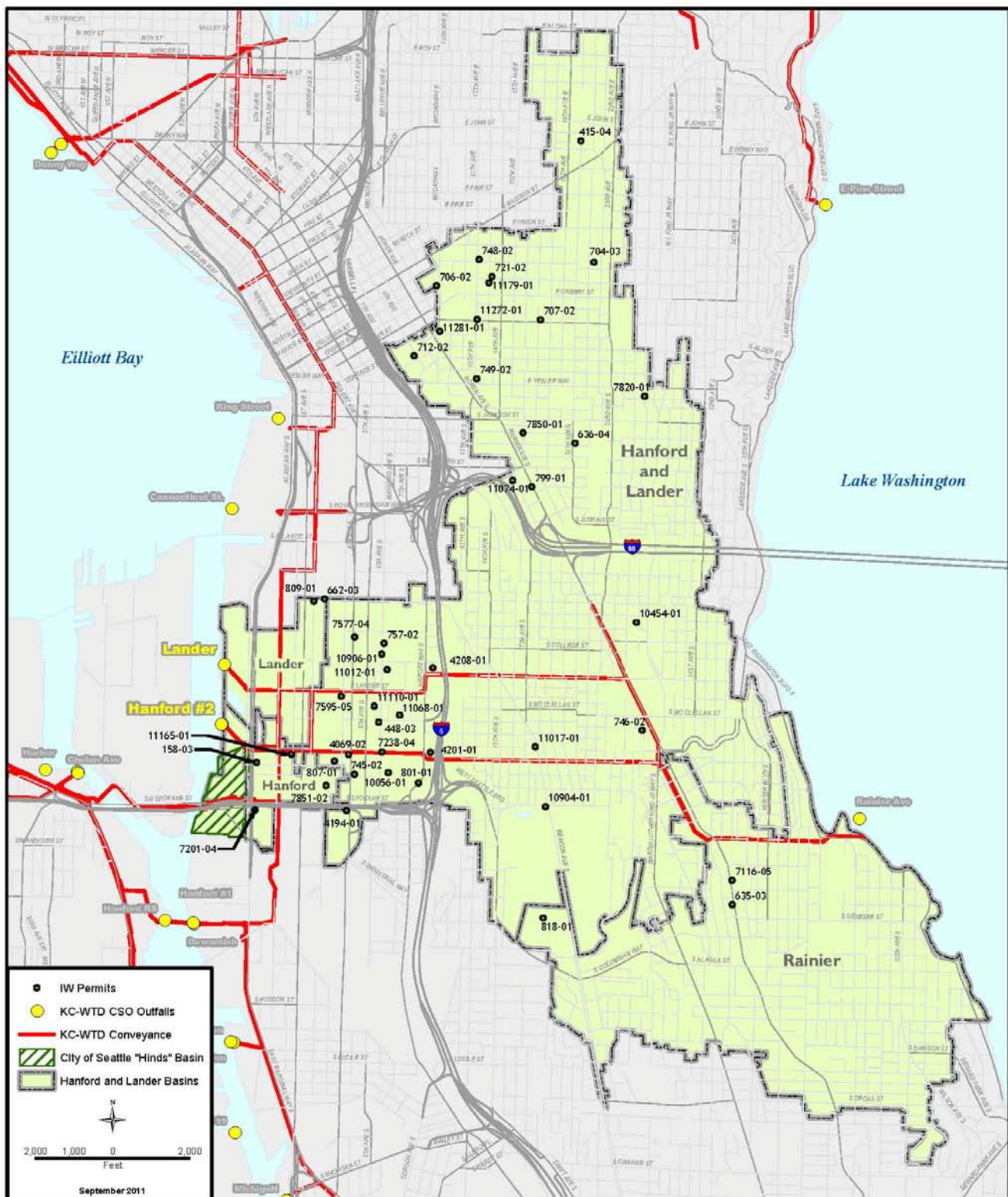
Combined Sewer Basins
Hinds (City of Seattle)
Lander (King County)
Hanford (King County)

Storm Basins
City of Seattle
Port of Seattle
Private
USCG

Port of Seattle ECAP Assessments
Seattle Public Utilities Business Inspections
King County Industrial Waste Inspections



Map 9-5
Inspection Locations
Supplemental Remedial Investigation
East Waterway Operable Unit



King County

Department of
Natural Resources and Parks
**Wastewater Treatment
Division**

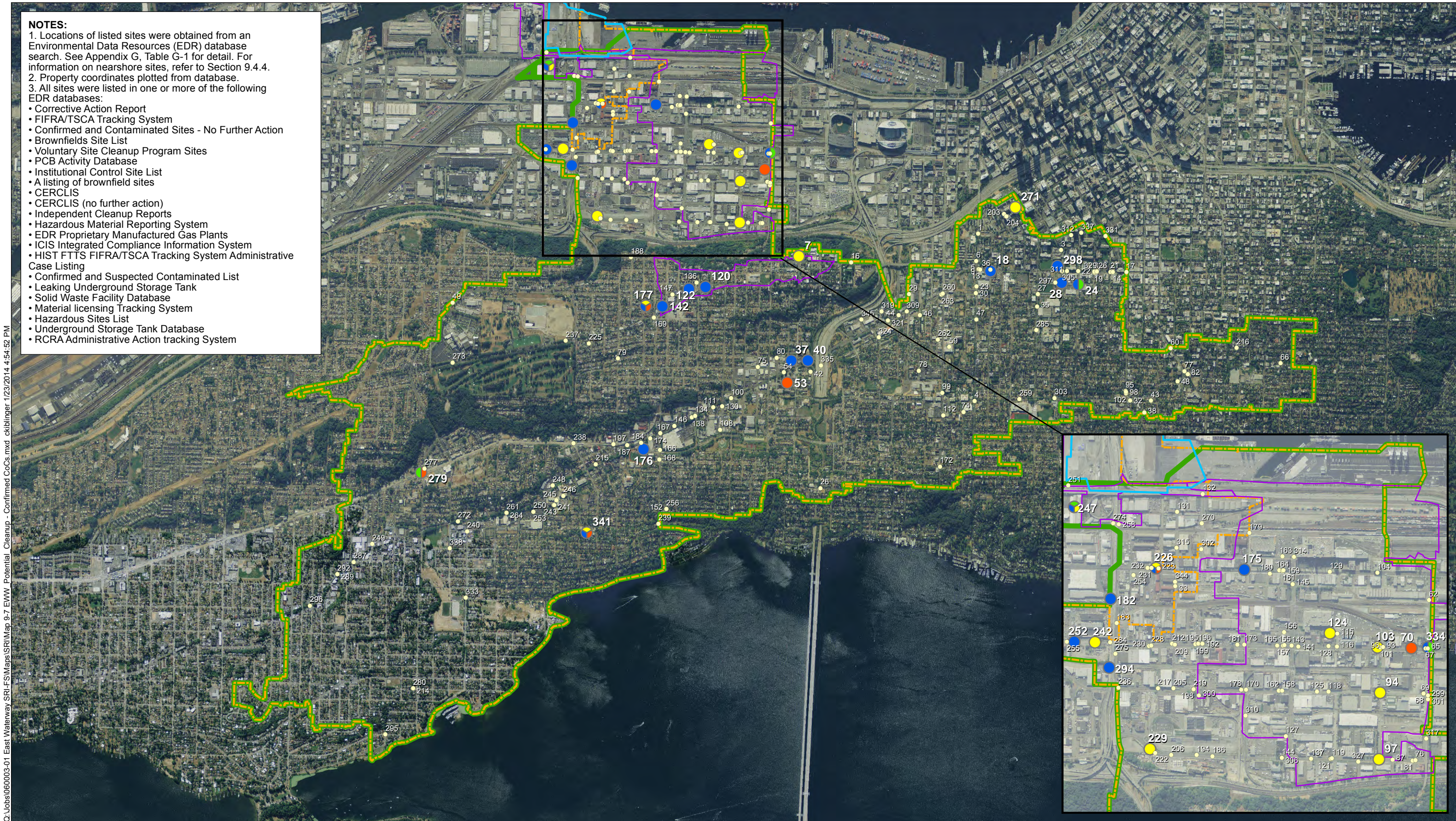
The information included on this map has been compiled from a variety of sources and is subject to change without notice. King County makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. King County shall not be liable for any general, special, indirect, incidental, or consequential damages including, but not limited to, lost revenues or lost profits resulting from the use or misuse of the information contained on this map. Any sale of this map or information on this map is prohibited except by written permission of King County.

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Shaun O'Neil 20110926

**Industrial Waste
Permits in the
Hanford/Lander
CSO Basin**

Map 9*-

County Industrial Waste Permits in the Hanford/Lander CSO Basin Map
Supplemental Remedial Investigation
East Waterway Operable Unit



Combined Sewer Basins
Hinds (City of Seattle)
Lander (King County)
Hanford (King County)

Storm Basins
City of Seattle

Listed Site³

Sites with Confirmed CoCs
PAH
PCB
Arsenic
Metals

0 2,500
Scale in feet

Map 9-7
Listed Sites Reported within EW Combined Sewer and Inland Storm Drainage Basins
Supplemental Remedial Investigation
East Waterway Operable Unit

NOTES:
1. Locations of listed sites were obtained from an Environmental Data Resources (EDR) database search. See Appendix E, Table E-1 for detail.
2. Property coordinates plotted from database.
3. All spills were listed on one or more of the following EDR databases:
- Emergency Response Notification System
- Reported Spills
- Toxic Chemical Release Inventory
4. Additional locations added from:
a. Ecology's Facility/Site searchable database
- Old Facility Contingency Plan
- Reported in NERTS
- Enforcement Final
- Non-Enforcement Final
b. City of Seattle Reported Spills

Q:\Jobs\060003-01 East Waterway SRI-FSWMaps\SRIMap 9-8 EWW Spill.mxd ckblinger 1/23/2014 4:58:50 PM

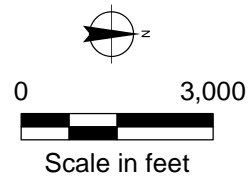


2009 Environmental Data Resources Inc.
East Waterway Drainage Area. EDR DataMap™
Environmental Atlas™. Prepared for
Anchor QEA LLC December 4, 2009.

- Spill Site
- Spills Directly to East Waterway

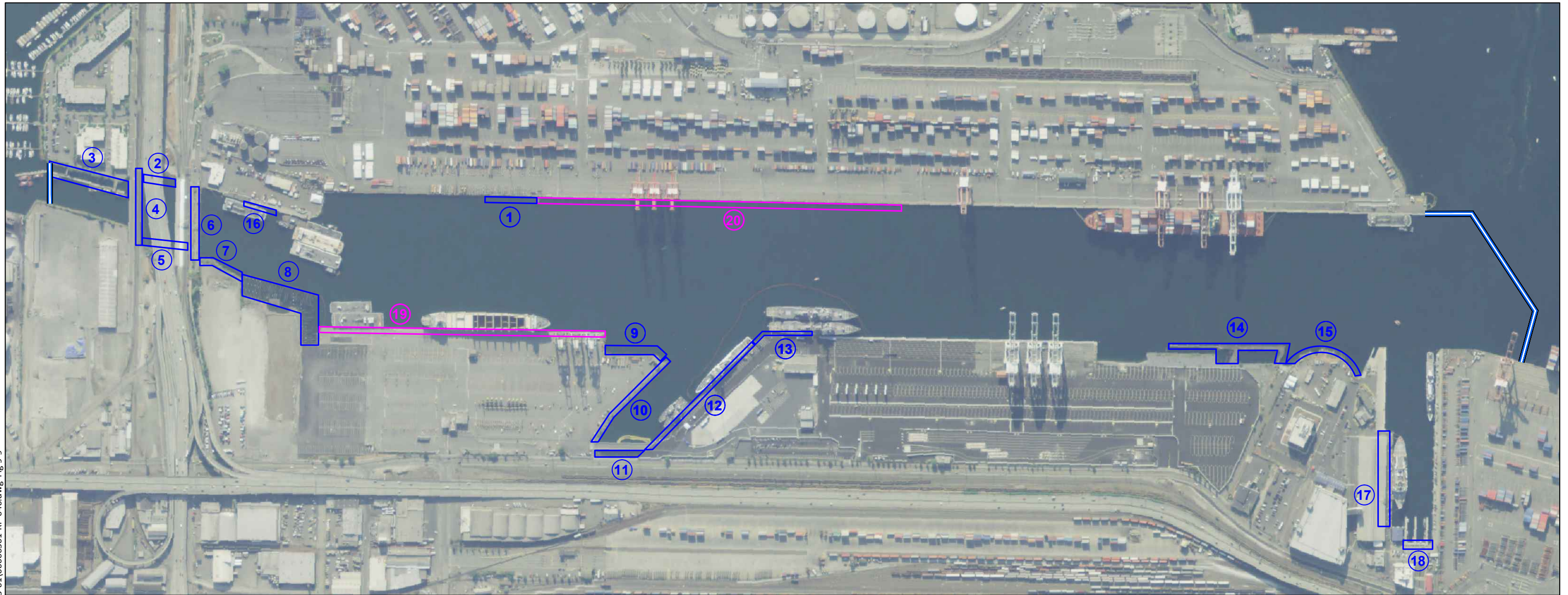
- Combined Sewer Basins
- Hinds (City of Seattle)
 - Lander (King County)
 - Hanford (King County)

- Storm Basins
- City of Seattle
 - Port of Seattle
 - Private
 - USCG



Map 9-8
Reported Spill Sites
Supplemental Remedial Investigation
East Waterway Operable Unit

Jan 24, 2014 9:04am chewett K:\Vobs\060003-PORT OF SEATTLE\060003-01\06000301-RP-046.dwg Fig 9-9



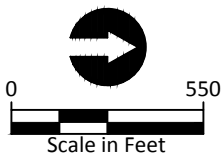
Creosoted Bulkheads, Pile and Fender Pile Areas:

- | | | | |
|---|---|---|--|
| 1 Terminal 18B
~ 20 Fender Piles | 6 Spokane Street Pedestrian Bridge
~ 300 Foundation Piles | 11 Bank 4
~ 20 Stub Piles | 16 Olympic Tug and Barge Bulkhead
~ 5 Fender Piles |
| 2 Bank 10
~ 5 Stub Piles
~ 10 Lineal Foot Bulkhead | 7 Bank 7A
~ 5 Piles | 12 Slip 27
~ 85 Fender Piles | 17 USCG Southeast Pier
~ 1400 Foundation Piles |
| 3 Bank 9B
~ 20 Dock and Walkway Piles | 8 Bank 7B and 7C
~ 1,700 Piles | 13 Terminal 30
~ 20 Fender Piles | 18 USCG East Pier
~ 40-50 Stub Piles |
| 4 Rail Bridge
~ 270 Foundation Piles | 9 Bank 6
~ 5 Stub Piles | 14 Pipe Rack and Dock
~ 750 Foundation Piles | |
| 5 Bank 8
~ 100 Lineal Foot Bulkhead | 10 Bank 5 - Slip 27 South Side
~ 40 Stub Piles | 15 Bank 2
~ 50 Piles (some Stub)
~ 20 Lineal Foot Bulkhead | |

Chromated Copper Arsenate (CCA) Pile and Fender Pile Areas⁵:

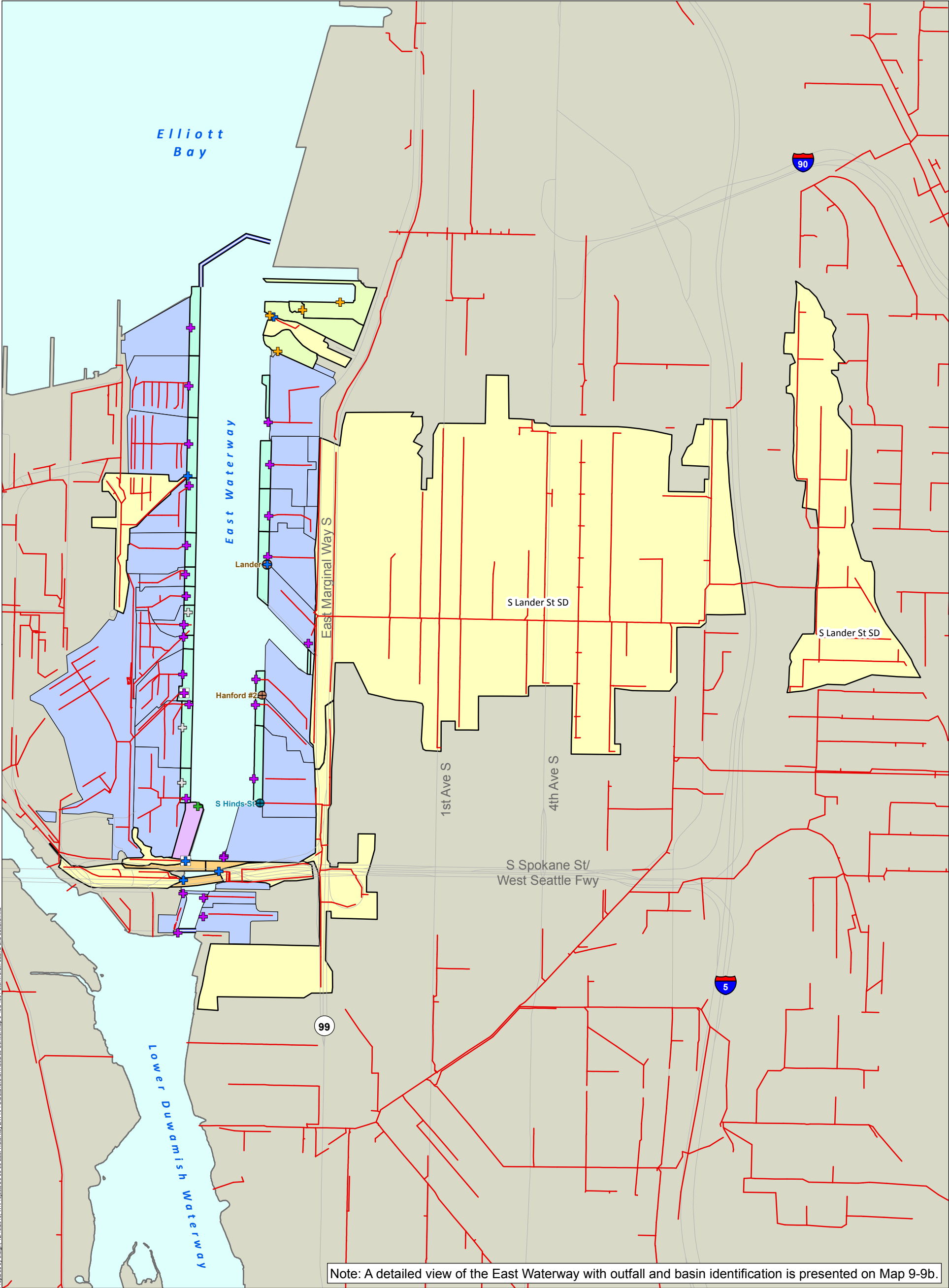
- 19 Terminal 25**
~ CCA Fender Piles
~ Concrete Structural Piling
- 20 Terminal 18A**
~ CCA Fender Piles
~ Concrete Structural Piling

East Waterway Study Area Boundary



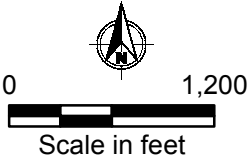
- NOTES:**
1. Stub Pile: Pile that extends 3 feet or less above the surface.
 2. Pile counts based on visual observations made at low tide on 5/27/2010. Pile counts approximate (+/- 10%).
 3. Pipe rack and dock structure pile counts approximate (+/- 20%).
 4. Coast Guard area inspected on 6/8/2010.
 5. Terminal 18 Pile Counts updated on 1/9/12 based on Port improvements.
 6. Fender Pile: Non-structural protective mooring piling.

Map 9-9
Current Location of Creosote and CCA Treated Structures
Supplemental Remedial Investigation
East Waterway Operable Unit

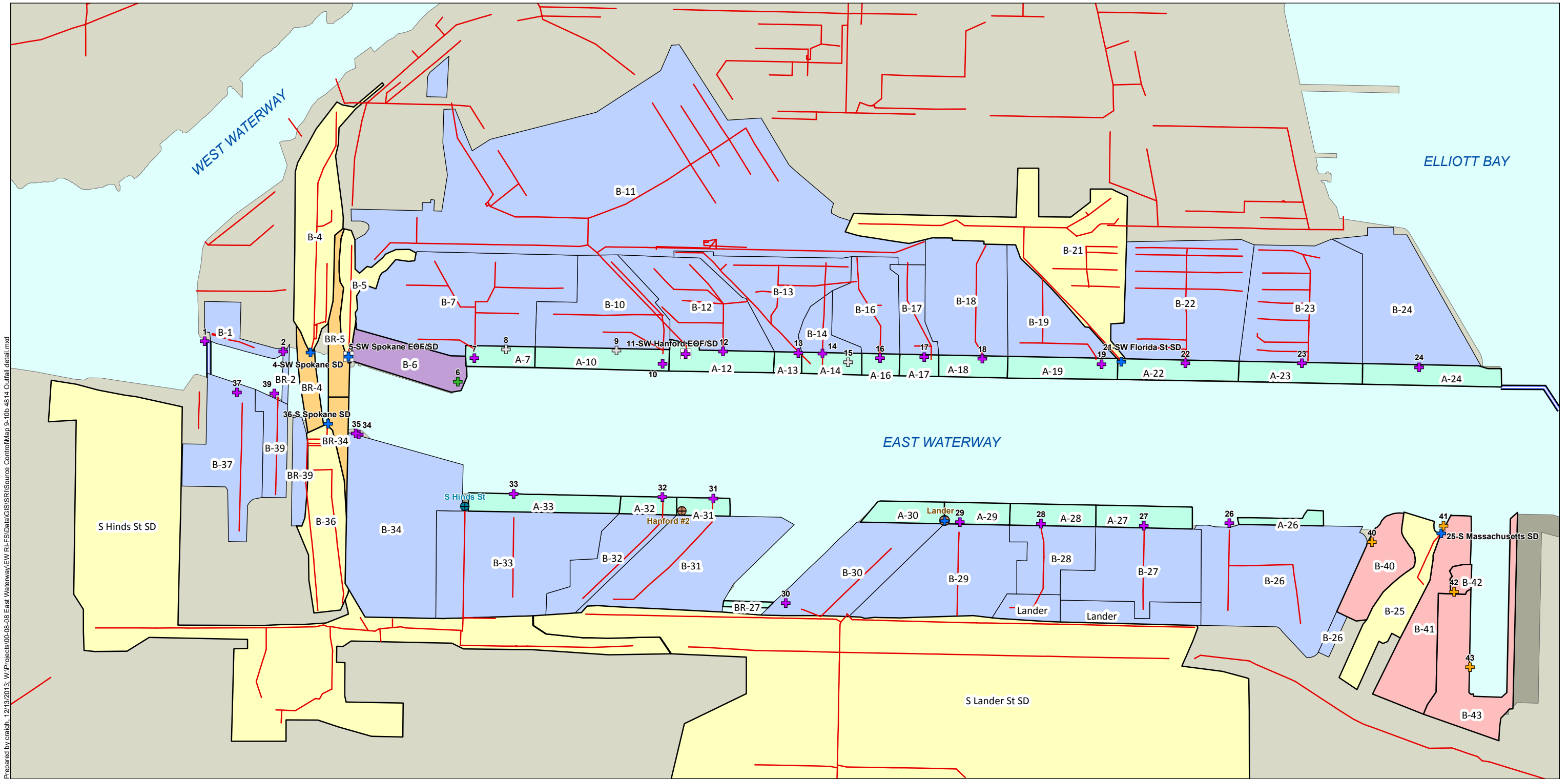


Storm Drain Outfalls¹	Combined Sewer Overflow Outfalls	Basin/Sub-Basin
Port of Seattle	City of Seattle CSO/SD	Labeled with sub-basin ID
City of Seattle	King County CSO	Port of Seattle Basin
US Coast Guard	King County CSO/City of Seattle SD	Port of Seattle Apron or Bridge
City EOF/Port SD	Storm Water Line	SPU Basin
City EOF/City SD	Road	SPU Bridge
Private	East Waterway Study Area Boundary	Olympic Tug and Barge Basin
Unknown Outfall		Coast Guard Basin

¹ Only outfalls with active stormwater discharges from separated storm drain basins are shown on this figure.



Map 9-10a
EW Storm Drain System Overview
Supplemental Remedial Investigation
East Waterway Study Area



Storm Drain Outfalls¹

- Port of Seattle
- City of Seattle
- US Coast Guard
- City EOF/Port SD
- City EOF/City SD
- Private
- Unknown Outfall

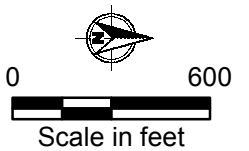
Combined Sewer Overflow Outfalls

- City of Seattle CSO/SD
- King County CSO
- King County CSO/City of Seattle SD
- Storm Water Line
- East Waterway Study Area Boundary

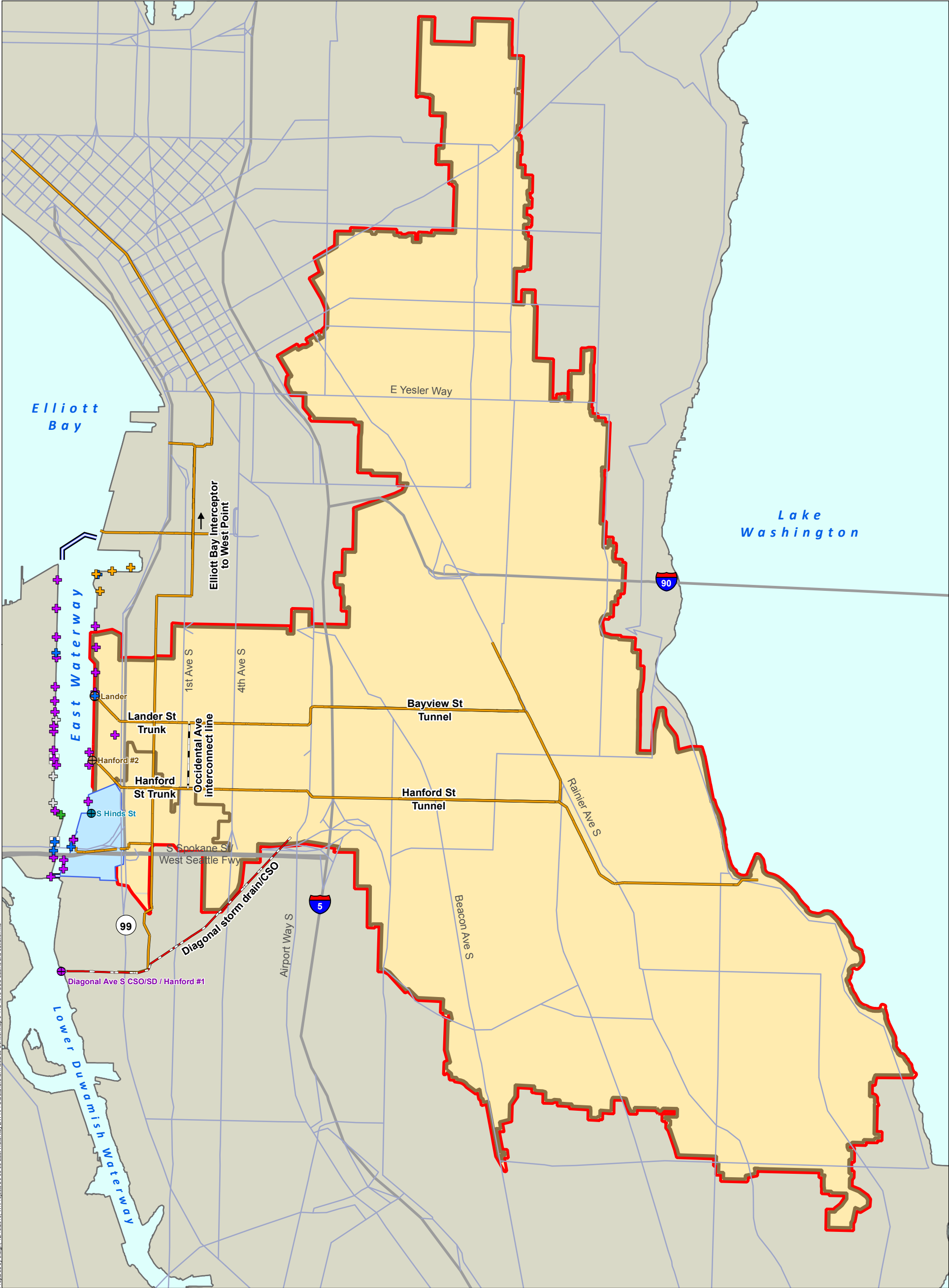
Basin/Sub-Basin

- Labeled with sub-basin ID
- Port of Seattle Basin
- Port of Seattle Apron or Bridge
- SPU Basin
- SPU Bridge
- Olympic Tug and Barge Basin
- Coast Guard Basin

¹ Only outfalls with active stormwater discharges from separated storm drain basins are shown on this figure.



Map 9-10b
EW Storm Drain Outfall Detail
Supplemental Remedial Investigation
East Waterway Study Area



S Hinds CSO Basin¹

Lander CSO Basin²

Hanford #2 CSO Basin²

Combined Sewer Trunk Line

Diagonal Storm Drain

City of Seattle CSO/SD

King County CSO

King County CSO/City of Seattle SD

King County CSO/City of Seattle CSO/SD

Storm Drain Outfalls

Port of Seattle

City of Seattle

US Coast Guard

City EOF/Port SD

City EOF/City SD

Private

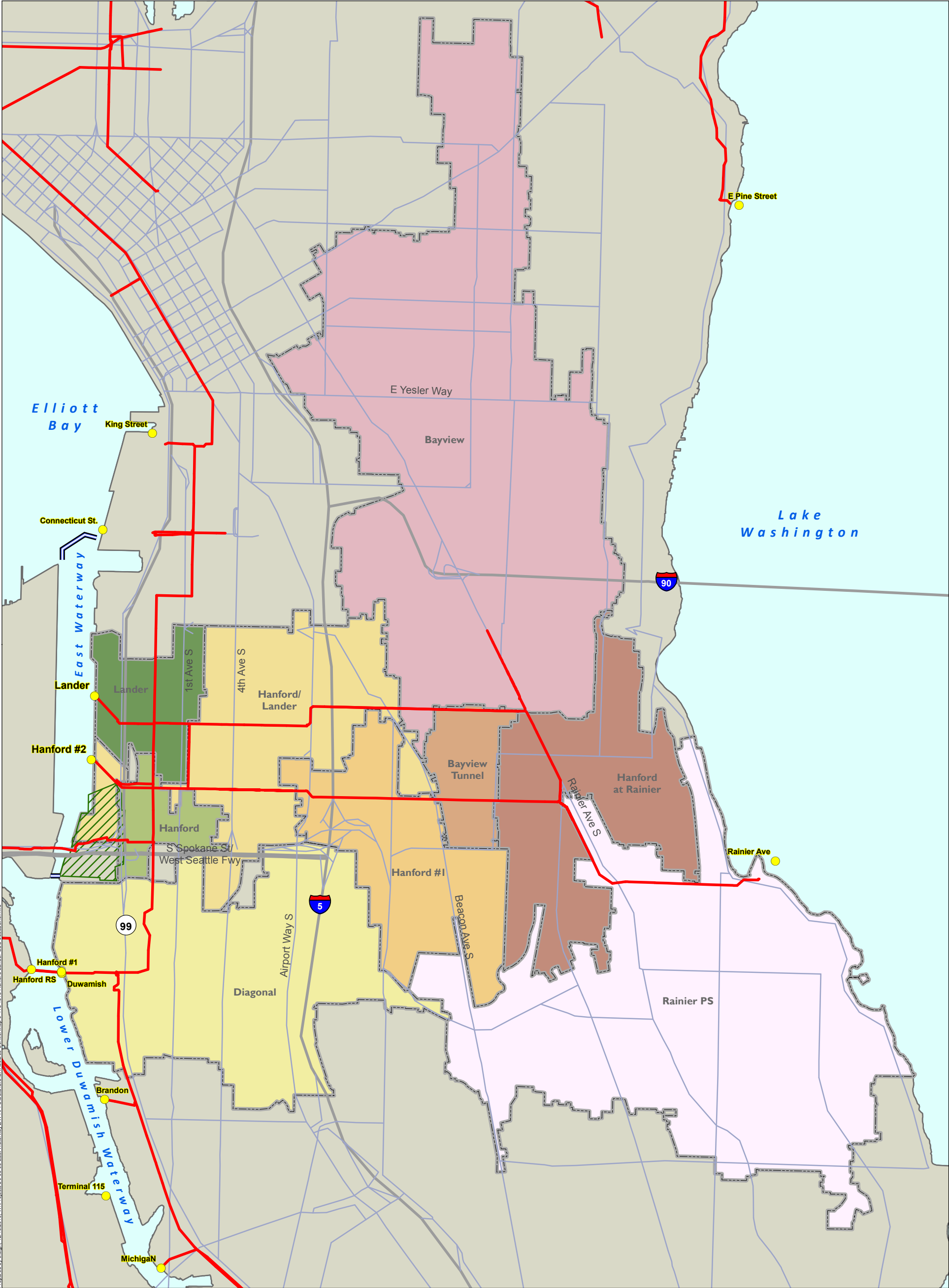
Unknown Outfall

East Waterway Study Area Boundary

0 1,800
Scale in feet

Map 9-11a
EW CSO Basins and Outfalls
Supplemental Remedial Investigation
East Waterway Study Area

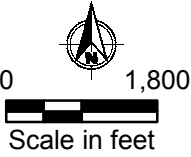
¹ Source: City of Seattle. The City's Hinds CSO discharges to the Hinds CSO/SD outfall owned by the City of Seattle.
² Source: King County. The Lander and Hanford No. 2 CSO basins are largely coincident. The Lander CSO discharges to a CSO/SD outfall owned by King County; the City is responsible for operating and maintaining the separated SD system. The Hanford No. 2 CSO discharges to a CSO outfall owned by King County.
Note: Service area boundaries have not been completely validated.



Hanford and Lander Basins

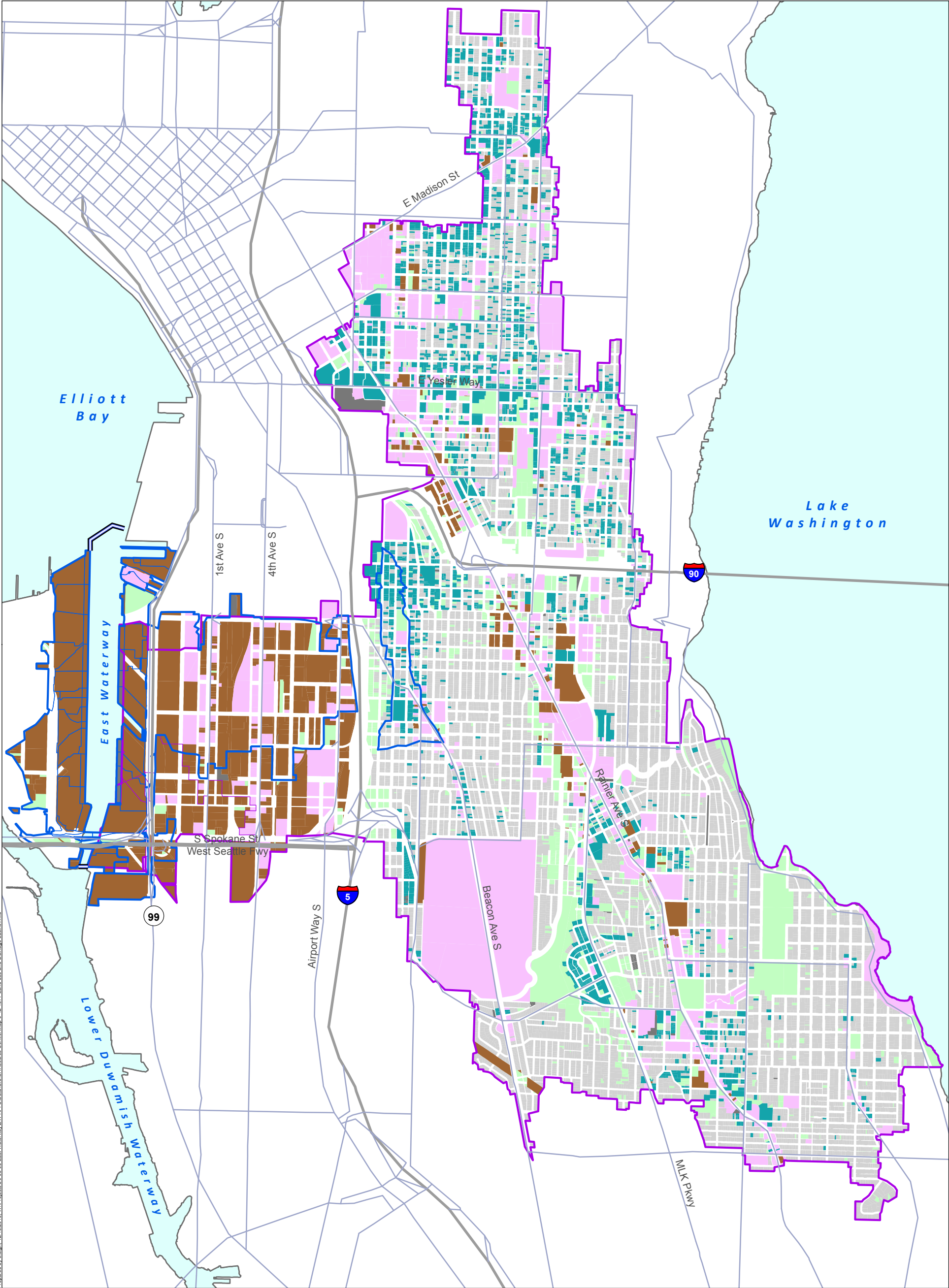
- Lander RS
- Hanford RS
- Diagonal
- Hanford/Lander
- Hanford #1 RS
- Lander post Bayview
- Hanford/Rainier
- Bayview
- Rainier PS

- City of Seattle "Hinds" Basin
- KC-WTD CSO Outfalls
- KC-WTD Conveyance
- East Waterway Study Area Boundary



Map 9-11b
 Hanford/Lander CSO Basin with Subbasins
 Supplemental Remedial Investigation
 East Waterway Study Area

Source: King County. Note: Service area boundaries have not been completely validated.



Prepared by craph. 12/13/2013. W:\Projects\00-06-08 East Waterway\EW RLI\SDData\GIS\Source Control\Map 9-12 4877 Land use and drainage basins.mxd

Land Use

Commercial

Industrial

Single-Family Residential

Multi-Family Residential

Parks/Open Space/Vacant

Other

Right-of-Way

SD Basin Area

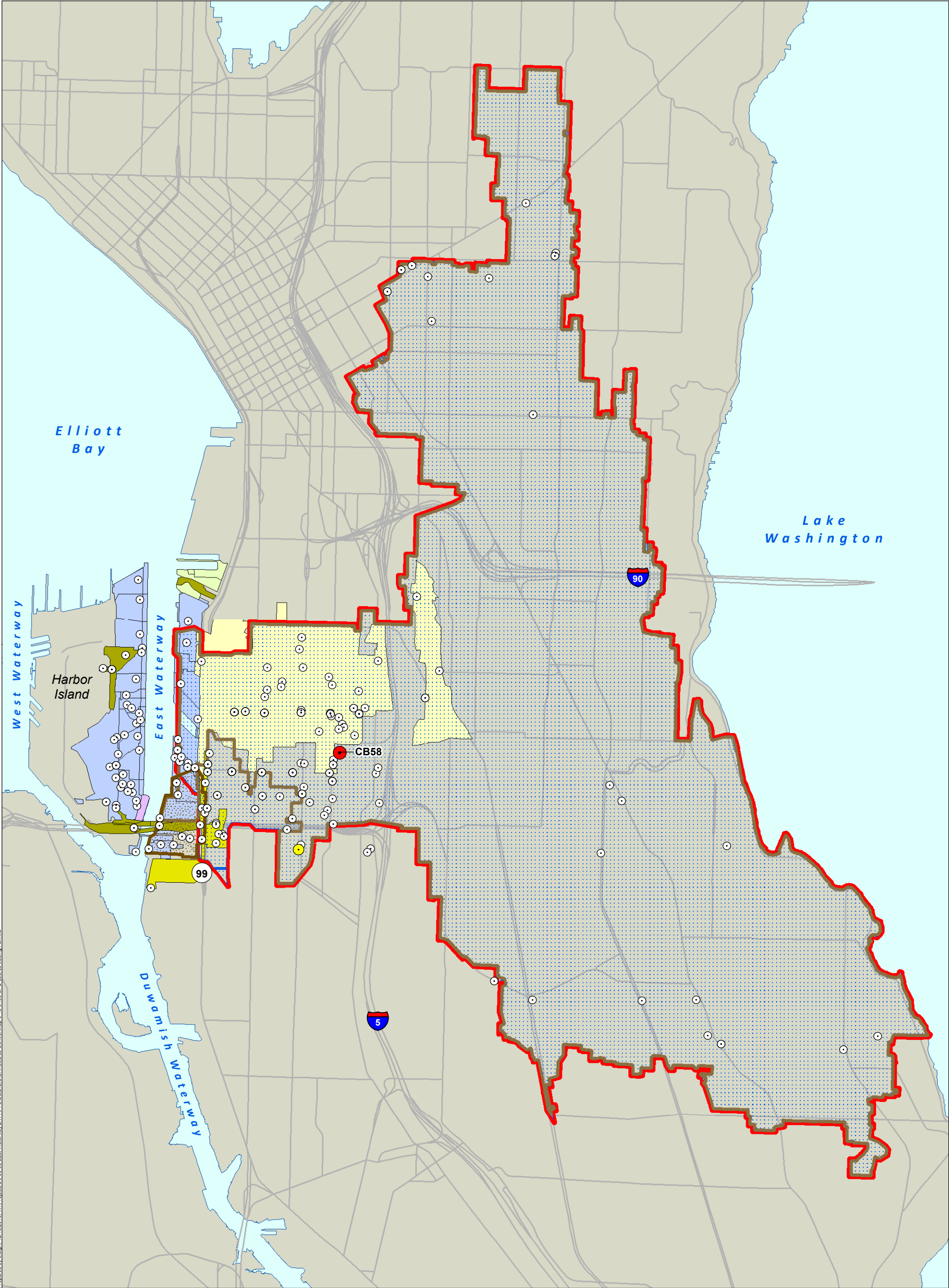
CSO Basin Area

East Waterway Study Area Boundary

01,800

Scale in feet

Map 9-12
EW Land Use and Drainage Basins
Supplemental Remedial Investigation
East Waterway Study Area



Prepared by craph. 12/13/2013. W:\Projects\00-06-08 East Waterway\EW RLI\SDData\GIS\RI\Source Control\Map 9-13 5465 SPU source tracing As.mxd

Arsenic^a

- > 2LAET
- > LAET
- No Exceedance/Non-Detect

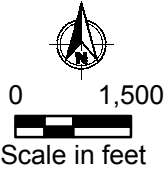
CSO Basins

- Combined Sewer Service Area
- S Hinds CSO
- Lander CSO
- Hanford #2 CSO

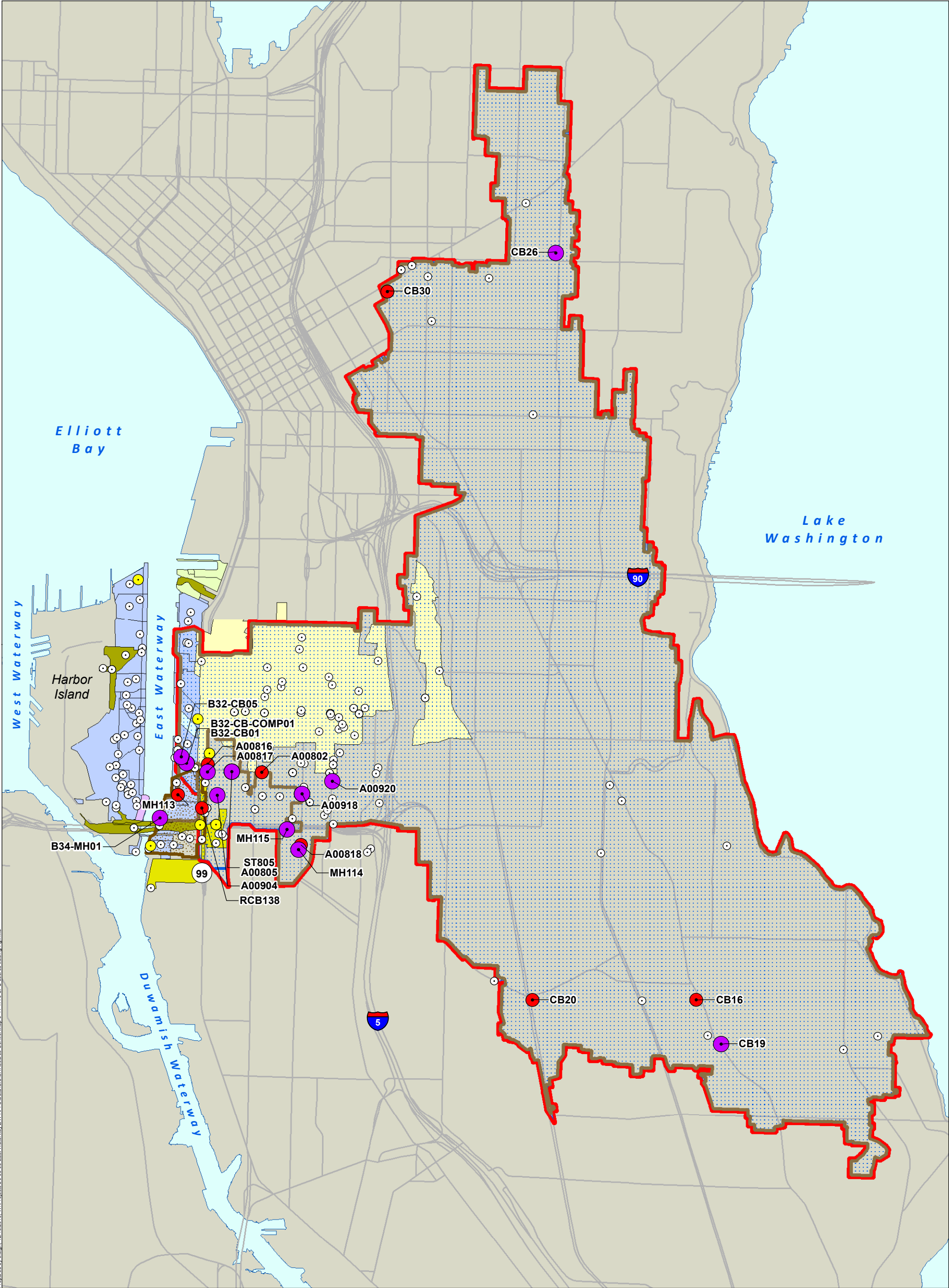
Storm Drainage Basins

- Port Nearshore SD
- S Lander St SD
- S Hinds St SD
- SPU Nearshore SD
- Olympic Tug and Barge
- Coast Guard

^a Results are based on SD and CSO solids data. Basin composite samples shown in centroid of basin for Port Nearshore SD basins. For co-located samples, most recent data is shown on top of older data; for multiple samples taken on the same date from different locations in the pipe, lesser exceedance categories are shown on top of greater exceedance categories.



Map 9-13
Source Tracing Results, Arsenic
Supplemental Remedial Investigation
East Waterway Study Area



Mercury^a

- > 2x 2LAET
- > 2LAET
- > LAET
- No Exceedance/Non-Detect

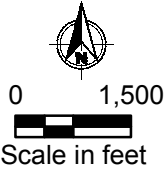
CSO Basins

- Combined Sewer Service Area
- S Hinds CSO
- Lander CSO
- Hanford #2 CSO

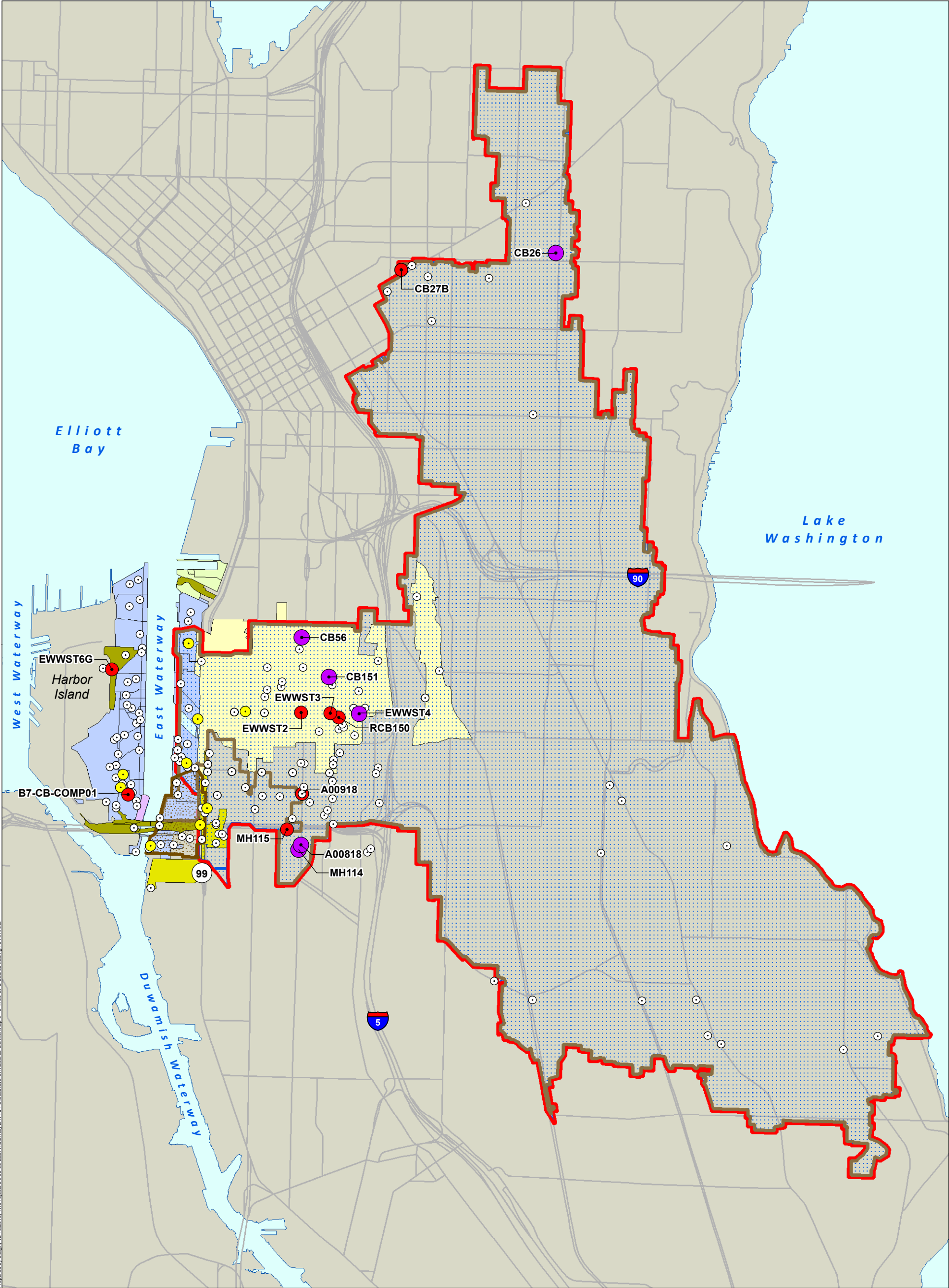
Storm Drainage Basins

- Port Nearshore SD
- S Lander St SD
- S Hinds St SD
- SPU Nearshore SD
- Olympic Tug and Barge
- Coast Guard

^a Results are based on SD and CSO solids data. Basin composite samples shown in centroid of basin for Port Nearshore SD basins. For co-located samples, most recent data is shown on top of older data; for multiple samples taken on the same date from different locations in the pipe, lesser exceedance categories are shown on top of greater exceedance categories.



Map 9-14
Source Tracing Results, Mercury
Supplemental Remedial Investigation
East Waterway Study Area



HPAH^a

- > 2x 2LAET
- > 2LAET
- > LAET
- No Exceedance/Non-Detect

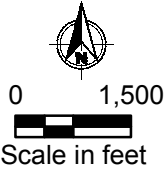
CSO Basins

- Combined Sewer Service Area
- S Hinds CSO
- Lander CSO
- Hanford #2 CSO

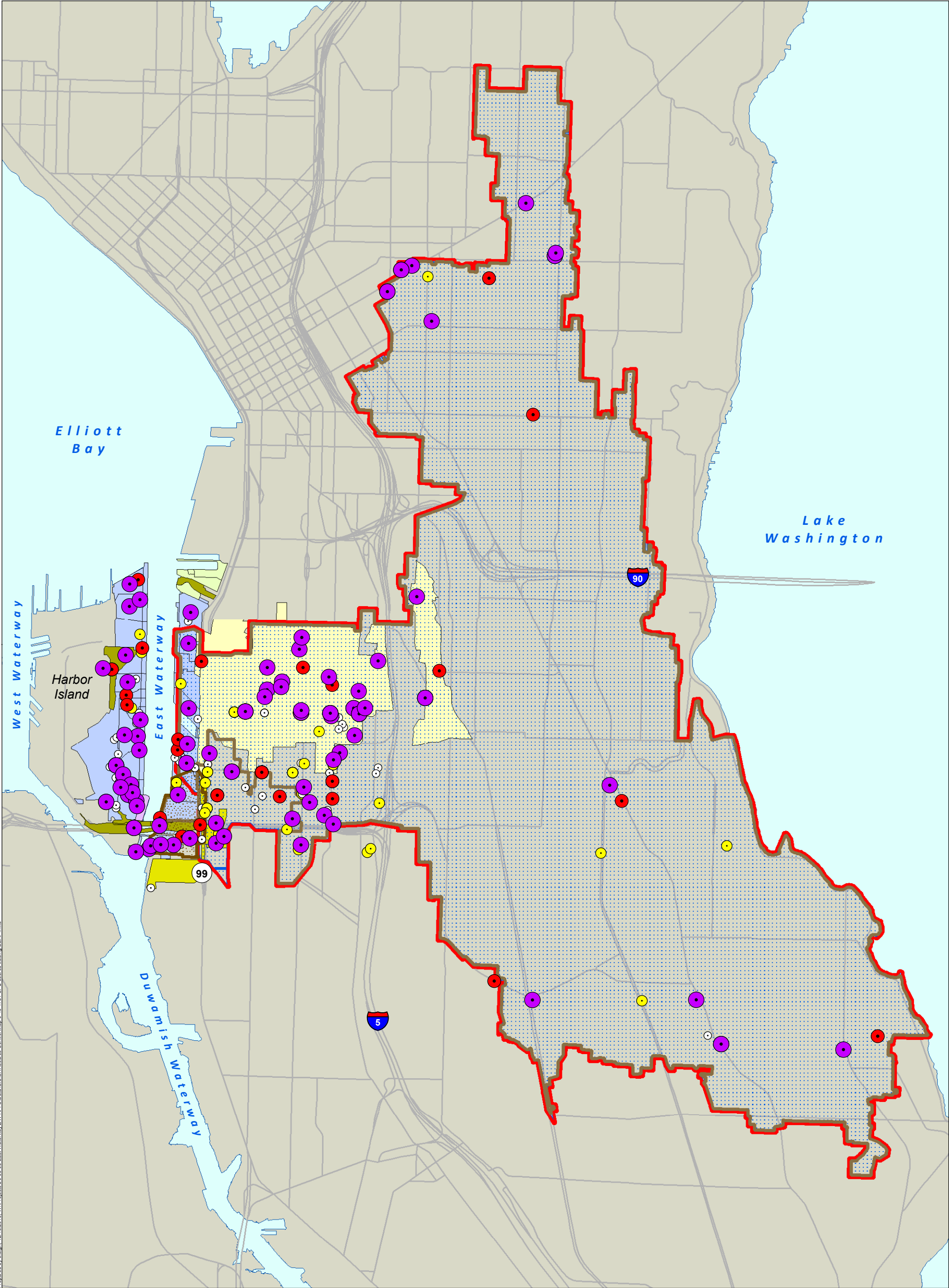
Storm Drainage Basins

- Port Nearshore SD
- S Lander St SD
- S Hinds St SD
- SPU Nearshore SD
- Olympic Tug and Barge
- Coast Guard

^a Results are based on SD and CSO solids data. Basin composite samples shown in centroid of basin for Port Nearshore SD basins. For co-located samples, most recent data is shown on top of older data; for multiple samples taken on the same date from different locations in the pipe, lesser exceedance categories are shown on top of greater exceedance categories.



Map 9-15
Source Tracing Results, HPAH
Supplemental Remedial Investigation
East Waterway Study Area



Prepared by cgraph, 12/13/2013, W:\Projects\00-08-08 East Waterway\VIEW R\F\SDData\GIS\SRISource Control\Map 9-16 4781 SPU source tracing BEHP.mxd

BEHP^a

- > 2x 2LAET
- > 2LAET
- > LAET
- No Exceedance/Non-Detect

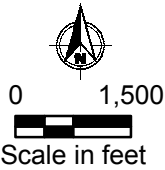
CSO Basins

- Combined Sewer Service Area
- S Hinds CSO
- Lander CSO
- Hanford #2 CSO

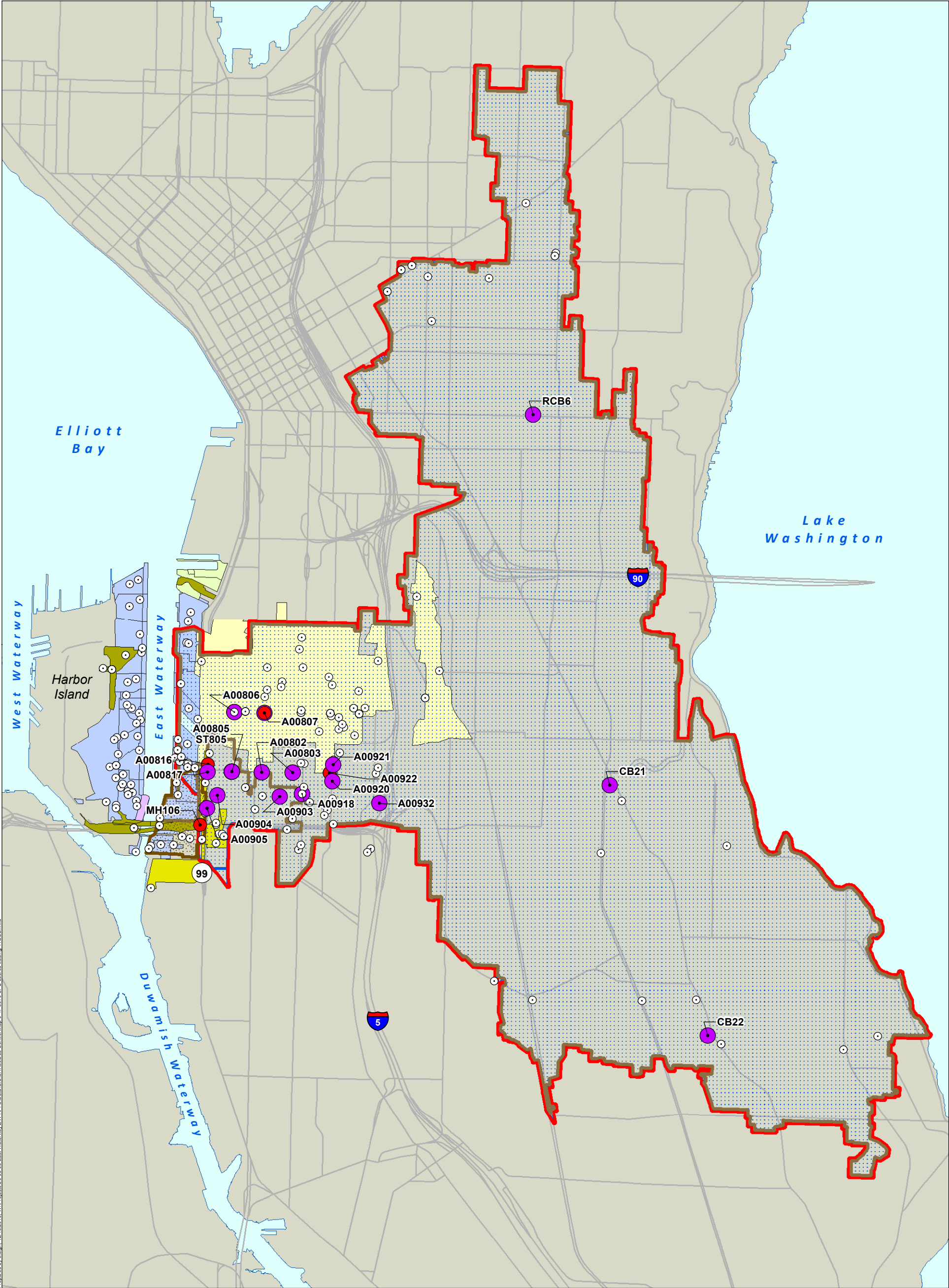
Storm Drainage Basins

- Port Nearshore SD
- S Lander St SD
- S Hinds St SD
- SPU Nearshore SD
- Olympic Tug and Barge
- Coast Guard

^a Results are based on SD and CSO solids data. Basin composite samples shown in centroid of basin for Port Nearshore SD basins. For co-located samples, most recent data is shown on top of older data; for multiple samples taken on the same date from different locations in the pipe, lesser exceedance categories are shown on top of greater exceedance categories.



Map 9-16
Source Tracing Results, BEHP
Supplemental Remedial Investigation
East Waterway Study Area



1,4-Dichlorobenzene^a

- > 2x 2LAET
- > 2LAET
- > LAET
- No Exceedance/Non-Detect

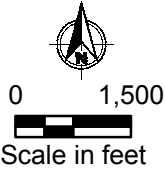
CSO Basins

- Combined Sewer Service Area
- S Hinds CSO
- Lander CSO
- Hanford #2 CSO

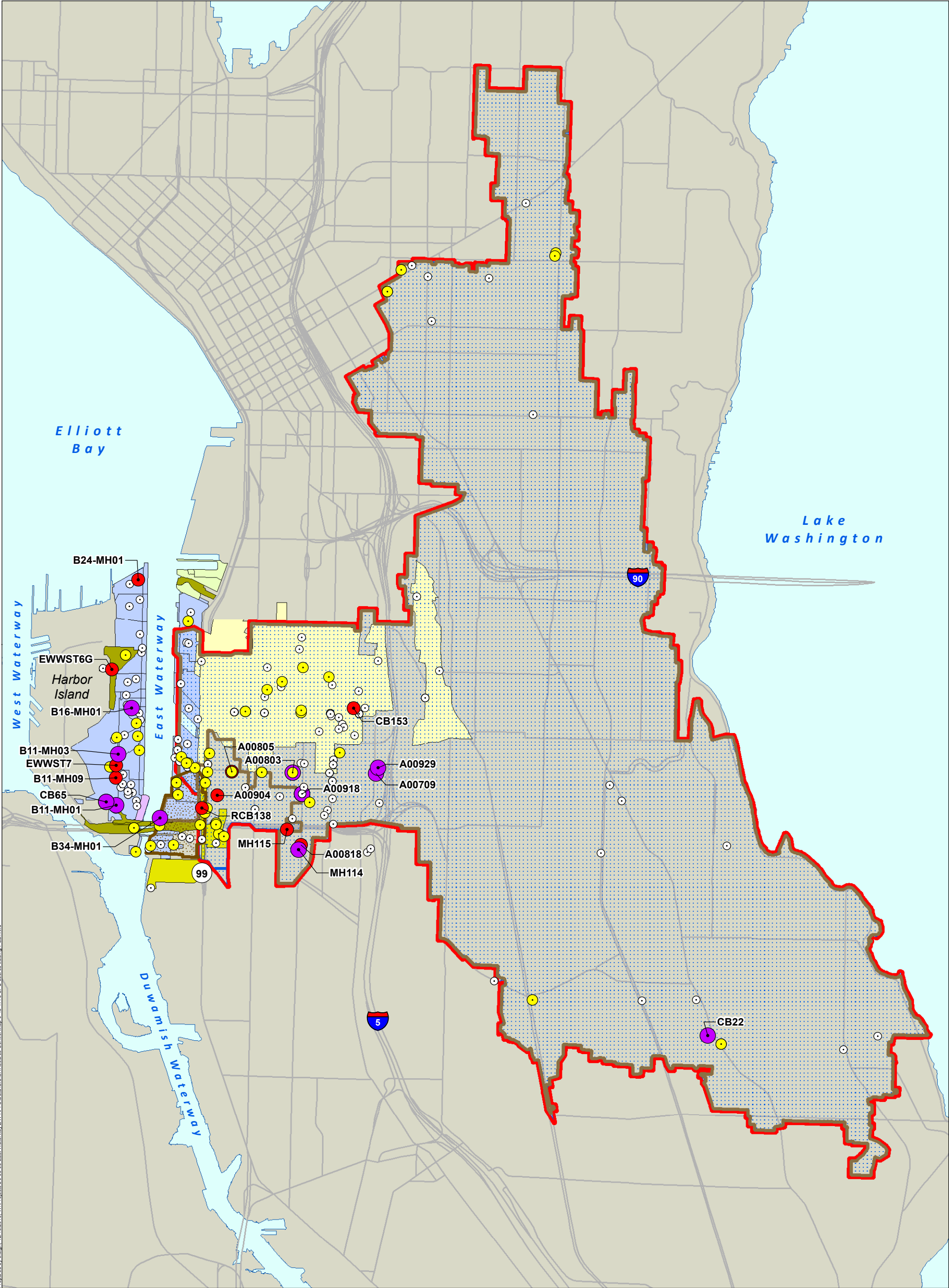
Storm Drainage Basins

- Port Nearshore SD
- S Lander St SD
- S Hinds St SD
- SPU Nearshore SD
- Olympic Tug and Barge
- Coast Guard

^a Results are based on SD and CSO solids data. Basin composite samples shown in centroid of basin for Port Nearshore SD basins. For co-located samples, most recent data is shown on top of older data; for multiple samples taken on the same date from different locations in the pipe, lesser exceedance categories are shown on top of greater exceedance categories. 1,4-Dichlorobenzene had a very low frequency of detections in the vast majority of samples. See Table 9-16 for frequency of detections.



Map 9-17
Source Tracing Results, 1,4-Dichlorobenzene
Supplemental Remedial Investigation
East Waterway Study Area



Prepared by craph. 12/13/2013. W:\Projects\00-06-08 East Waterway\VIEW RUFSD\GIS\SRIS\Source Control\Map 9-18 4778 SPU source tracing PCB.mxd

Total PCBs^a

- > 2x 2LAET
- > 2LAET
- > LAET
- No Exceedance/Non-Detect

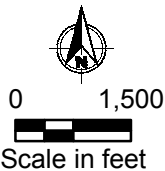
CSO Basins

- Combined Sewer Service Area
- S Hinds CSO
- Lander CSO
- Hanford #2 CSO

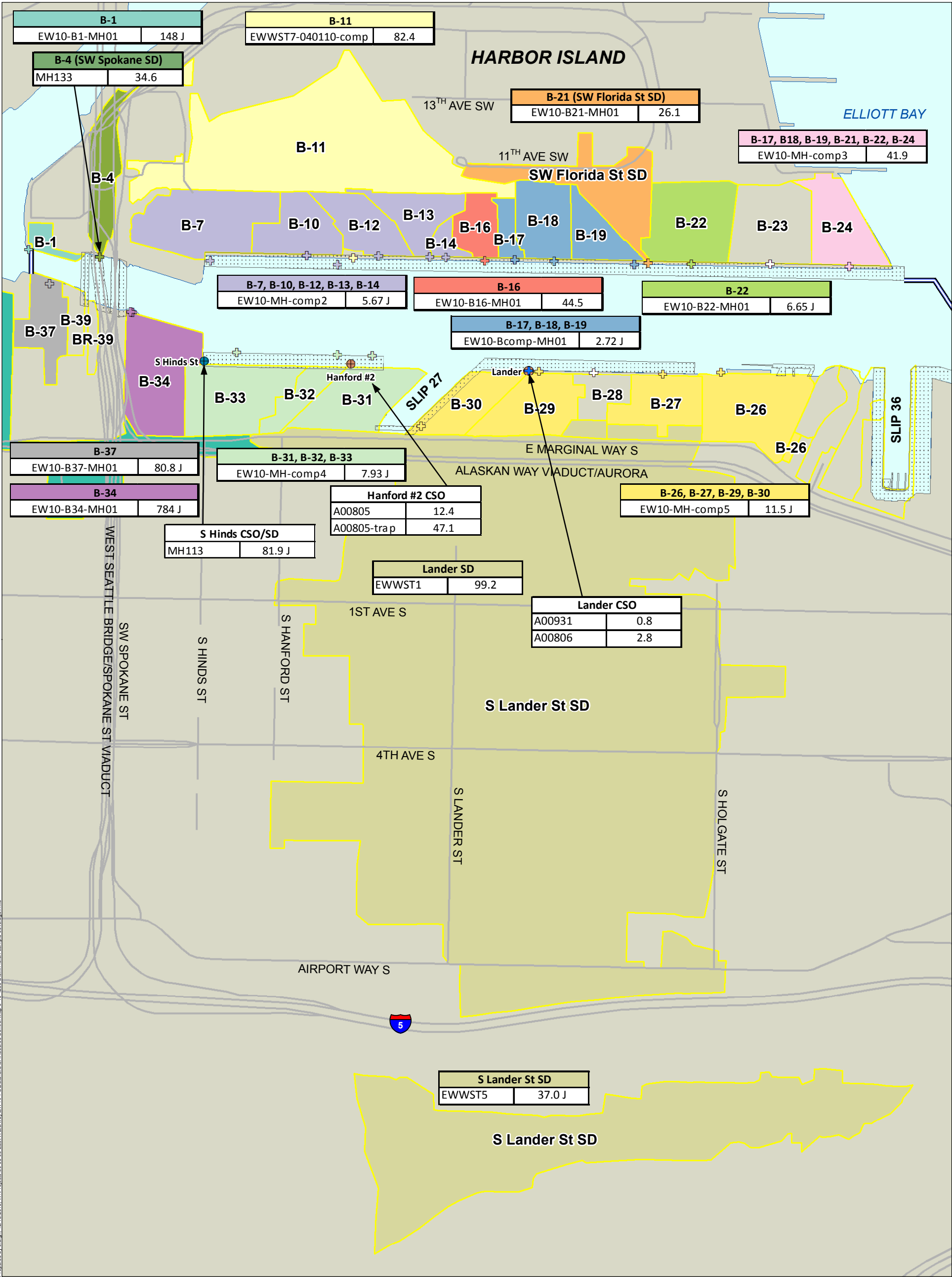
Storm Drainage Basins

- Port Nearshore SD
- S Lander St SD
- S Hinds St SD
- SPU Nearshore SD
- Olympic Tug and Barge
- Coast Guard

^a Results are based on SD and CSO solids data. Basin composite samples shown in centroid of basin for Port Nearshore SD basins. For co-located samples, most recent data is shown on top of older data; for multiple samples taken on the same date from different locations in the pipe, lesser exceedance categories are shown on top of greater exceedance categories.



Map 9-18
Source Tracing Results, Total PCBs
Supplemental Remedial Investigation
East Waterway Study Area



Source Tracing Basins^a

Basin Boundary

Basin B-34

Composite Group 4

Basin B-37

Composite Group 5

Hinds

S Lander St SD

Basin B-1

B-4, SW Spokane SD

Basin B-11

Composite Group 2

Basin B-16

Composite Group 6

B-21, SW Florida SD

Basin B-22

Composite Group 3

Outfalls

City of Seattle CSO/SD

King County CSO

King County CSO/City of Seattle SD

Storm Drain Outfall, Sampled^b

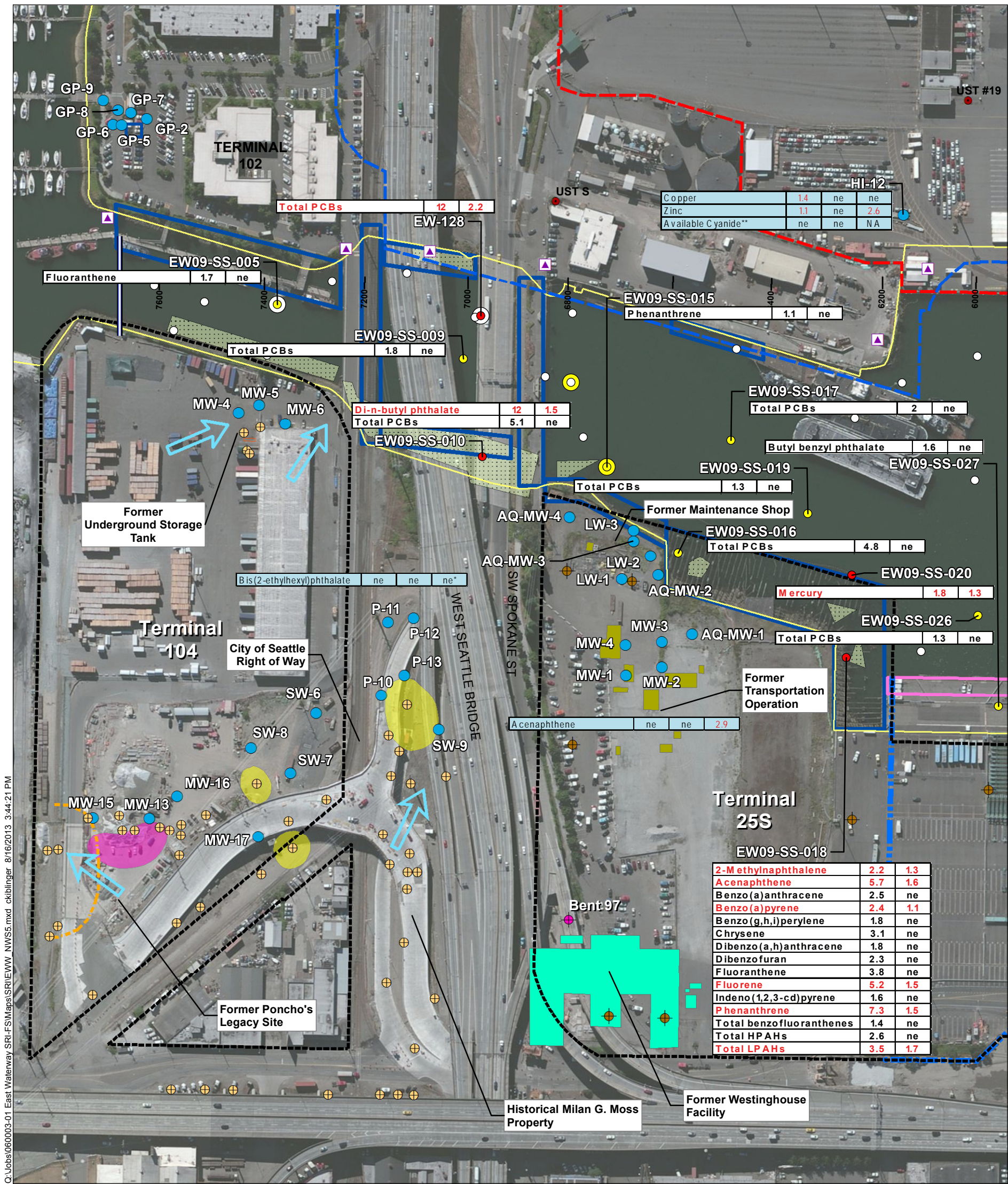
Road

Dock/Pier/Bridge

East Waterway Study Area Boundary

^a All results shown in ng TEQ/kg dw.
^b Storm drains are colored according to their corresponding basin sample group; sampled storm drains not associated with a basin sample group are white.
Note: Basins B-23, B-28, B-39, and BR-39 either had no sediment or did not have sufficient sediment volume to analyze for Dioxin/Furans. CSO basins are not shown because of the scale of the map - see Map 9.4.3-2.

Map 9-19
Source Tracing Results, Dioxins/Furans
Supplemental Remedial Investigation
East Waterway Study Area



Q:\Jobs\060003-01 East Waterway SRI-FS\Maps\SRI\EWV NWS5.mxd ckblinger 8/16/2013 3:44:21 PM

Surface Sediment SMS Status

- > CSL, Detect
- > SQS and ≤ CSL, Detect
- ≤ SQS or Non-detect

Toxicity Test Results^a

- Fails CSL
- Fails SQS
- Pass
- Evaluated Groundwater Sampling Location
- Other Groundwater Sample Location
- ▲ Storm Drain
- Approximate location of USTs removed from Terminal 18
- PCB Soil Removal Area (Bent 97)
- Historical Boring
- Harbor Island Soil and Groundwater OU Boundary
- Historical Turning Basin
- MHHW Line
- Reported Groundwater Flow Direction
- Intertidal Surface Sediment Sampling Areas
- Portion of Terminal 18 where capping or other environmental work was completed during terminal expansion
- Nearshore Properties

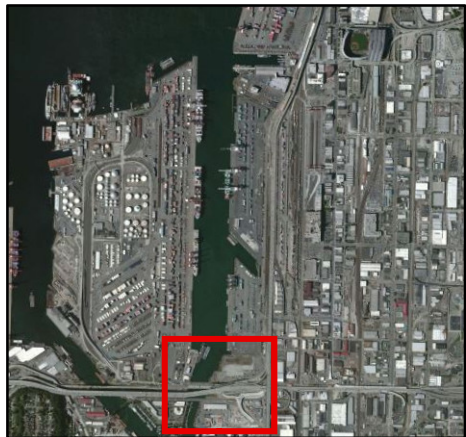
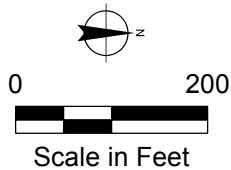
- TCE
- TPH
- Arsenic Concentration Contour
- Creosoted Bulkheads, Pile and Fender Pile Areas^b
- CCA Pile and Fender Pile Areas^b
- Former Transportation Operation
- Former Westinghouse Property
- East Waterway Study Area Boundary

Sediment Analyte	Sediment Exceedance Factor	
	SQS	CSL
PCBs	15	2.8

Chemicals in red exceeded CSL. The EF has no regulatory relevance and is presented here to provide an indication of the general magnitude of the concentration. Sampling locations were analyzed for all SMS chemicals. "ne" = not exceeded.

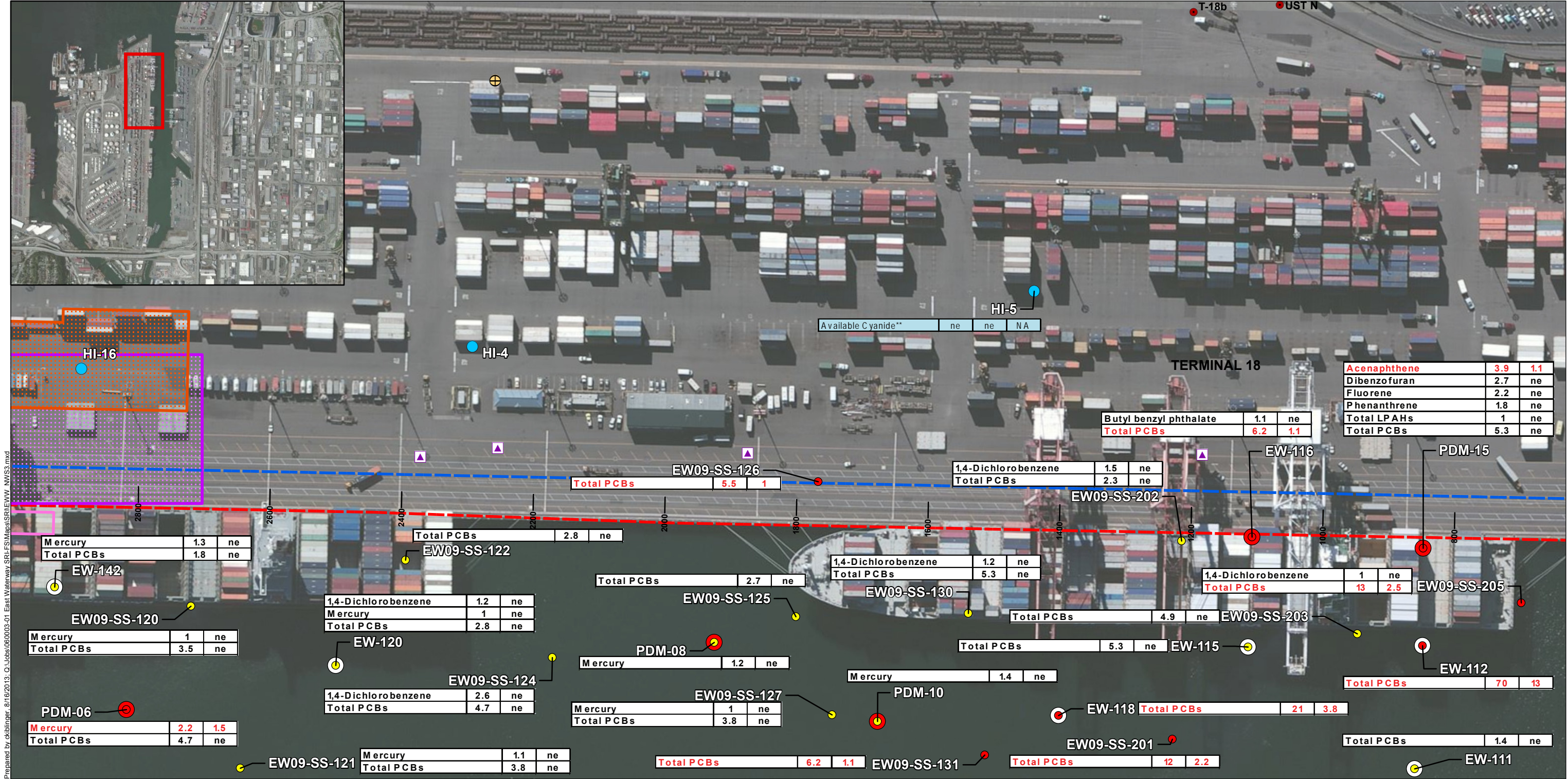
Groundwater Analyte	Groundwater Exceedance Factor		Groundwater Reference Value
	Chronic	Acute	
Arsenic	5	2.6	6.5

- Values in red exceeded the Groundwater Reference Values and/or Ambient Water Quality Criteria (AWQC)
- The EF has no regulatory significance and is presented here to provide an indication of the general magnitude of the concentration
- ne = not exceeded
- Only maximum EF is shown, if applicable
- Evaluated groundwater data is presented in Appendix J
- NA = not applicable
- One duplicate result detected Bis(2-ethylhexyl)phthalate. All other samples analyzed at the well including the parent of the duplicate did not detect the compound and therefore is not an exceedance.
- Total cyanide was detected however all available cyanide were below the AWQC



Map 9-20
Southern Nearshore Cleanup Site
Supplemental Remedial Investigation
East Waterway Study Area

^a Toxicity test results on Map 4-11.
^b For more detailed piling information see Map 9-9.



Sediment Analyte	Sediment Exceedance Factor	
	SQS	CSL
PCBs	15	2.8

Chemicals in red exceeded CSL. The EF has no regulatory relevance and is presented here to provide an indication of the general magnitude of the concentration. Sampling locations were analyzed for all SMS chemicals. "ne" = not exceeded.

Groundwater Analyte	Groundwater Exceedance Factor		
	AWQC		Sediment Reference Value
	Chronic	Acute	
Arsenic	5	2.6	6.5

1. Values in red exceeded the Groundwater Reference Values and/or Ambient Water Quality Criteria (AWQC)
2. The EF has no regulatory significance and is presented here to provide an indication of the general magnitude of the concentration
3. ne = not exceeded
4. Only maximum EF is shown, if applicable
5. Evaluated groundwater data is presented in Appendix J
6. NA = not applicable

- Surface Sediment SMS Status
- > CSL, Detect
 - > SQS and ≤ CSL, Detect
 - ≤ SQS or Non-detect
- Toxicity Test Results^a
- Fails CSL
 - Fails SQS
 - Pass

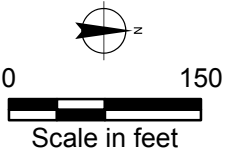
^a Toxicity test results on Map 4-11.

- Harbor Island Groundwater Operable Unit (OU) compliance monitoring well¹
- ⊕ Harbor Island Groundwater OU inland monitoring well²
- ▲ Storm Drain
- Approximate location of USTs removed from Terminal 18
- Station
- Harbor Island Soil and Groundwater OU Boundary
- CCA Pile and Fender Pile Areas⁴
- Former Terminal 18 hot spot³
- Approximate location of Terminal 18 dock pipeline spill³
- Portion of Terminal 18 where capping or other environmental work was completed during terminal expansion

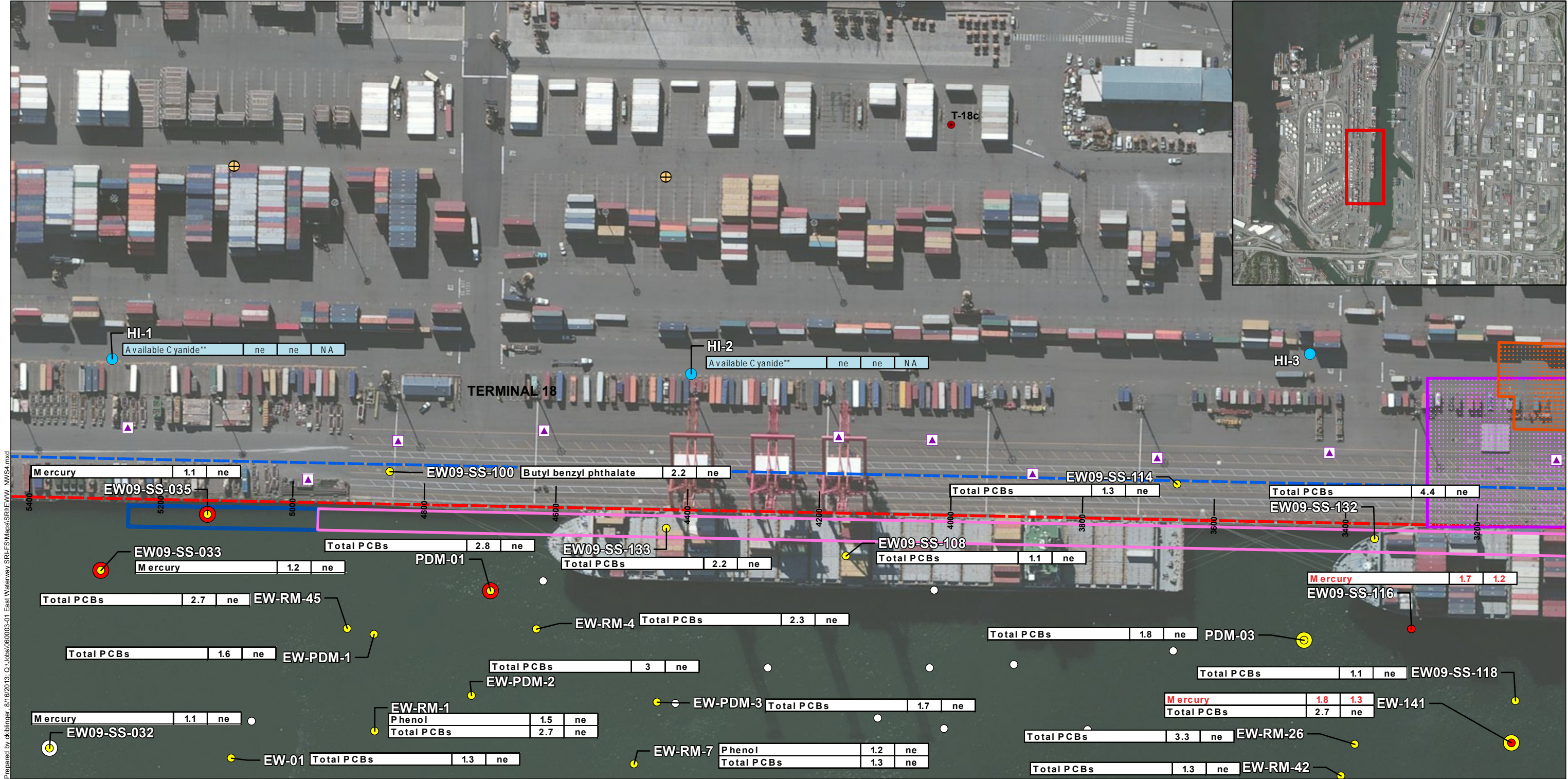
NOTES:

1. "Compliance" is defined for the purposes of this report as wells closest to the East Waterway and does not reflect any well designations based on the Harbor Island Soil and Groundwater OU or related reports and agreements.
2. "Inland" is defined for the purposes of this report as wells farther away from the East Waterway shoreline.
3. Sources for these investigations are presented in Section 9 and results are presented in Appendix J.
4. For more detailed piling information see Map 9-9.

^{**} Total cyanide was detected however all available cyanide were below the AWQC.



Map 9-21
Northern Harbor Island Nearshore Cleanup Site
Supplemental Remedial Investigation
East Waterway Study Area



Prepared by dtkilinger, 8/16/2013, Q:\Jobs\060003-01 East Waterway SRI\FS\MapSRI\EWV_NVS4.mxd

Sediment Analyte	Sediment Exceedance Factor	
	SQS	CSL
PCBs	15	2.8

Chemicals in red exceeded CSL. The EF has no regulatory relevance and is presented here to provide an indication of the general magnitude of the concentration. Sampling locations were analyzed for all SMS chemicals. "ne" = not exceeded.

Groundwater Analyte	Groundwater Exceedance Factor		
	AWQC		Sediment Reference Value
	Chronic	Acute	
Arsenic	5	2.6	6.5

1. Values in red exceeded the Groundwater Reference Values and/or Ambient Water Quality Criteria (AWQC)
2. The EF has no regulatory significance and is presented here to provide an indication of the general magnitude of the concentration
3. ne = not exceeded
4. Only maximum EF is shown, if applicable
5. Evaluated groundwater data is presented in Appendix J
6. NA = not applicable

- Surface Sediment SMS Status
- > CSL, Detect
 - > SQS and ≤ CSL, Detect
 - ≤ SQS or Non-detect
- Toxicity Test Results^a
- Fails CSL
 - Fails SQS
 - Pass

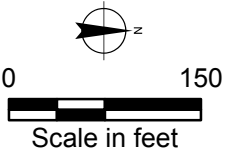
^a Toxicity test results on Map 4-11.

- Harbor Island Groundwater Operable Unit (OU) compliance monitoring well¹
- Harbor Island Groundwater OU inland monitoring well²
- ▲ Storm Drain
- Approximate location of USTs removed from Terminal 18
- Station
- Harbor Island Soil and Groundwater OU Boundary
- Creosoted Bulkheads, Pile and Fender Pile Areas⁴
- CCA Pile and Fender Pile Areas⁴
- Former Terminal 18 hot spot³
- Approximate location of Terminal 18 dock pipeline spill³
- Portion of Terminal 18 where capping or other environmental work was completed during terminal expansion

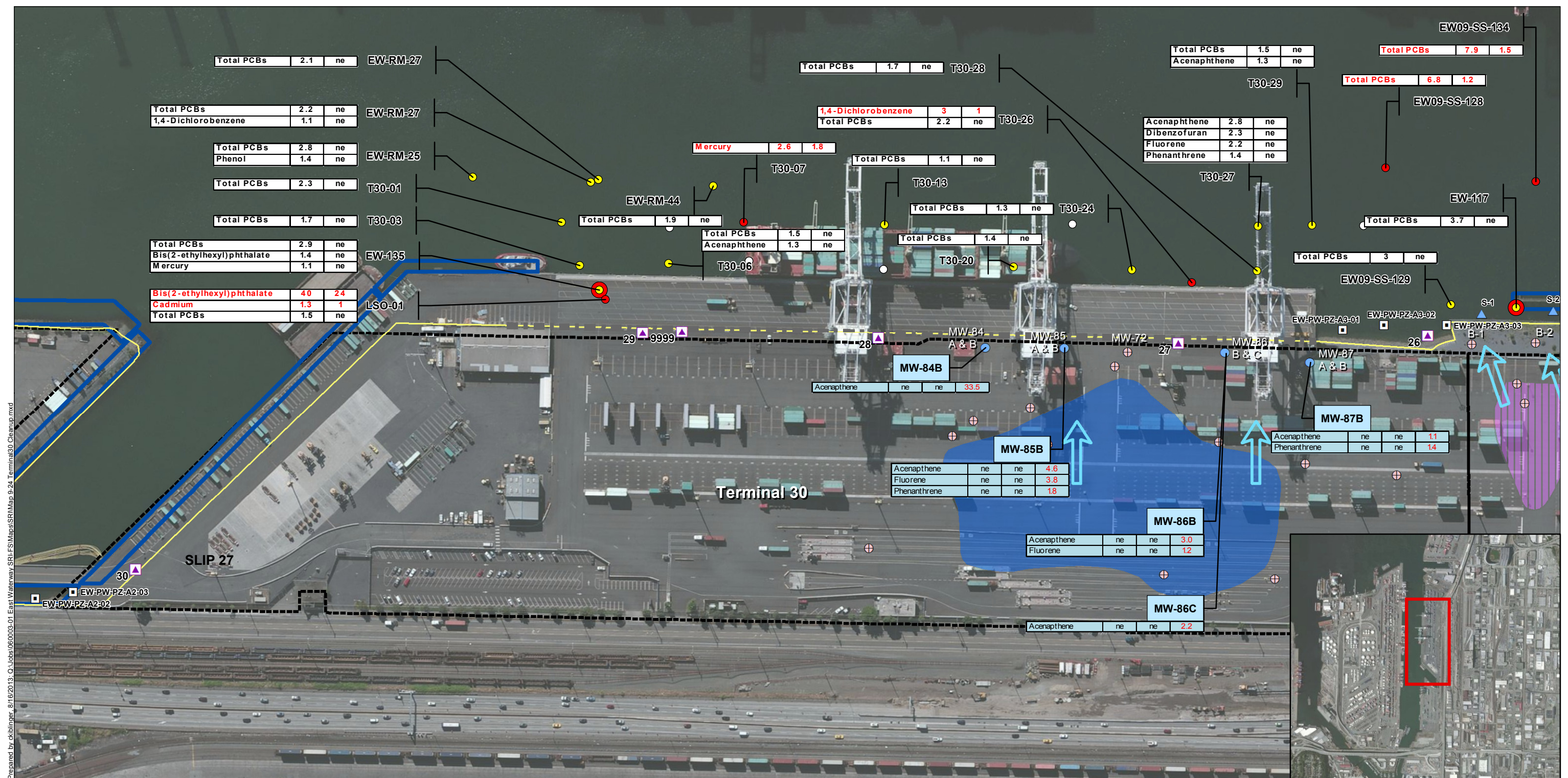
NOTES:

1. "Compliance" is defined for the purposes of this report as wells closest to the East Waterway and does not reflect any well designations based on the Harbor Island Soil and Groundwater OU or related reports and agreements.
2. "Inland" is defined for the purposes of this report as wells farther away from the East Waterway shoreline.
3. Sources for these investigations are presented in Section 9 and results are presented in Appendix J.
4. For more detailed piling information see Map 9-9.

^{**} Total cyanide was detected however all available cyanide were below the AWQC.










Map 9-22
Middle Harbor Island Nearshore Cleanup Site
Supplemental Remedial Investigation
East Waterway Study Area



Sediment Analyte	Sediment Exceedance Factor	
	SQS	CSL
PCBs	15	2.8

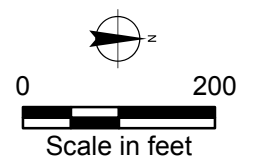
Chemicals in red exceeded CSL. The EF has no regulatory relevance and is presented here to provide an indication of the general magnitude of the concentration. Sampling locations were analyzed for all SMS chemicals. "ne" = not exceeded.

Groundwater Analyte	Groundwater Exceedance Factor		
	AWQC		Sediment Reference Value
	Chronic	Acute	
Arsenic	5	2.6	6.5

-  Evaluated Seep Sample Location
-  Evaluated Groundwater Sample Location
-  Other Groundwater Sample Location
-  Former GW and Well Locations (Dames & Moore, 1989)¹
-  Porewater Sample Location
-  Storm Drain
-  East Waterway Study Area Boundary

- ■ ■ Bulkhead
- Creosoted Bulkheads, Pile and Fender Pile Areas²
- MHHW Line
- Reported Groundwater Flow Direction
- GATX Soil Excavation
- Nearshore Properties
- Maximum Extent of Historical Diesel Product

- Surface Sediment SMS Status
- > CSL, Detect
 - > SQS and ≤ CSL, Detect
 - ≤ SQS or Non-detect
- Toxicity Test Results^a
- Fails CSL
 - Fails SQS
 - Pass



Map 9-24
Terminal 30 Nearshore Cleanup Site
Supplemental Remedial Investigation
East Waterway Study Area



Type A Engineered Bank¹

- | | | |
|-------------------------|---------------|-----------------------|
| ① Terminal 18A Bulkhead | ⑦ Slip 27 | ⑫ USCG Slip 36 |
| ② Terminal 18B Bulkhead | ⑧ Terminal 30 | ⑬ USCG East Pier |
| ③ Bank 9A | ⑨ Bank 3A | ⑭ USCG North Pier |
| ④ Terminal 25 | ⑩ Bank 3B | ⑮ USCG Southeast Pier |
| ⑤ Bank 6A | ⑪ Bank 3C | ⑯ USCG Southwest |
| ⑥ Bank 5 | | |

Type B Engineered Bank²

- | | |
|-------------------------|-----------|
| ⑰ Bank 11 | ⑳ Bank 7B |
| ⑱ Olympic Tug and Barge | ㉑ Bank 7C |
| ㉒ Bank 10 | ㉓ Bank 6B |
| ㉔ Bank 9B | ㉕ Bank 4 |
| ㉖ Bank 8A | ㉗ Bank 2A |
| ㉘ Bank 7A | |

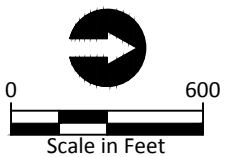
Type C Non-Engineered Bank³

- | |
|-----------|
| ㉙ Bank 8B |
| ㉚ Bank 2B |
| ㉛ Bank 1 |

Type D Non-Engineered Bank⁴

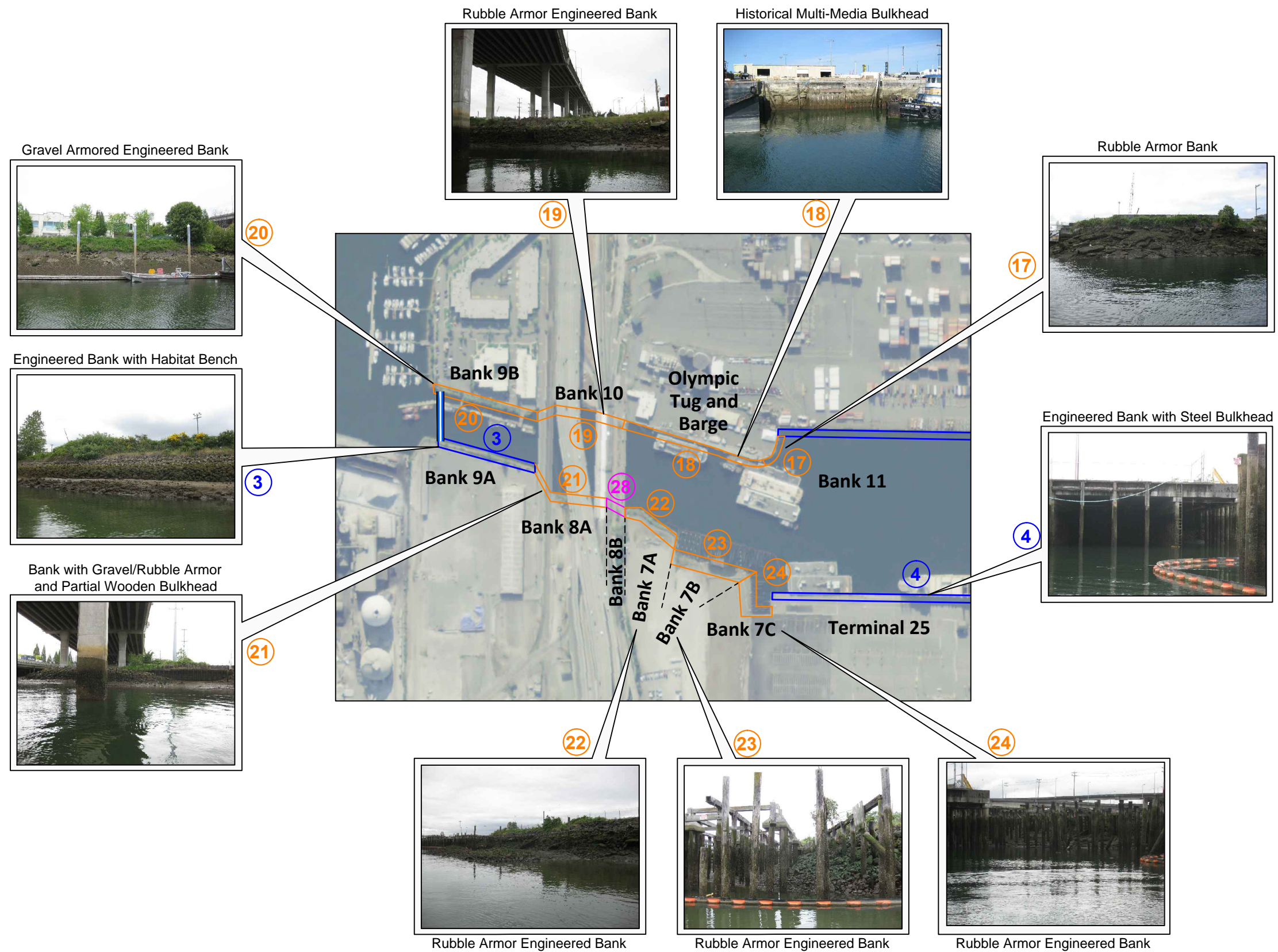
None

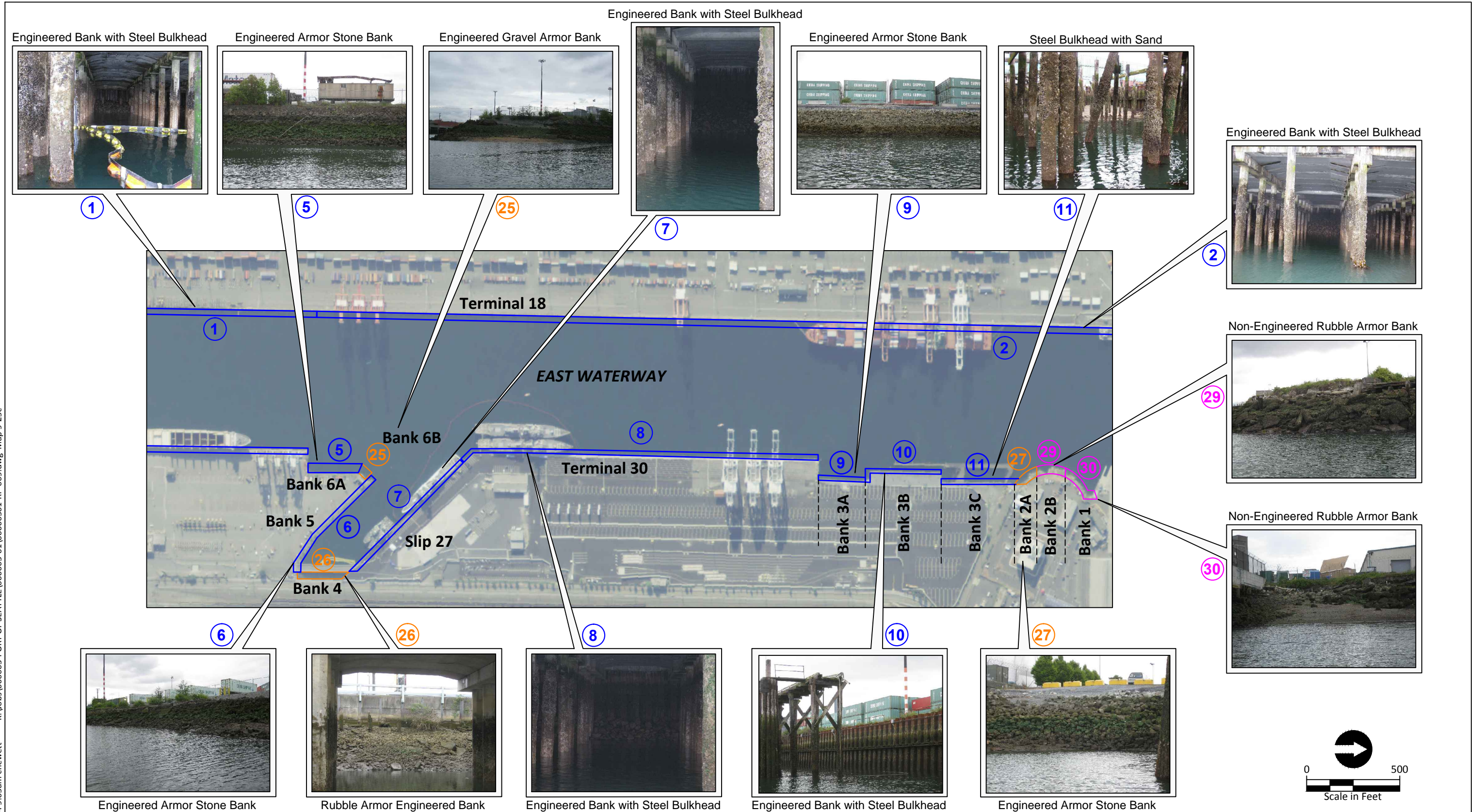
== East Waterway Study Area Boundary



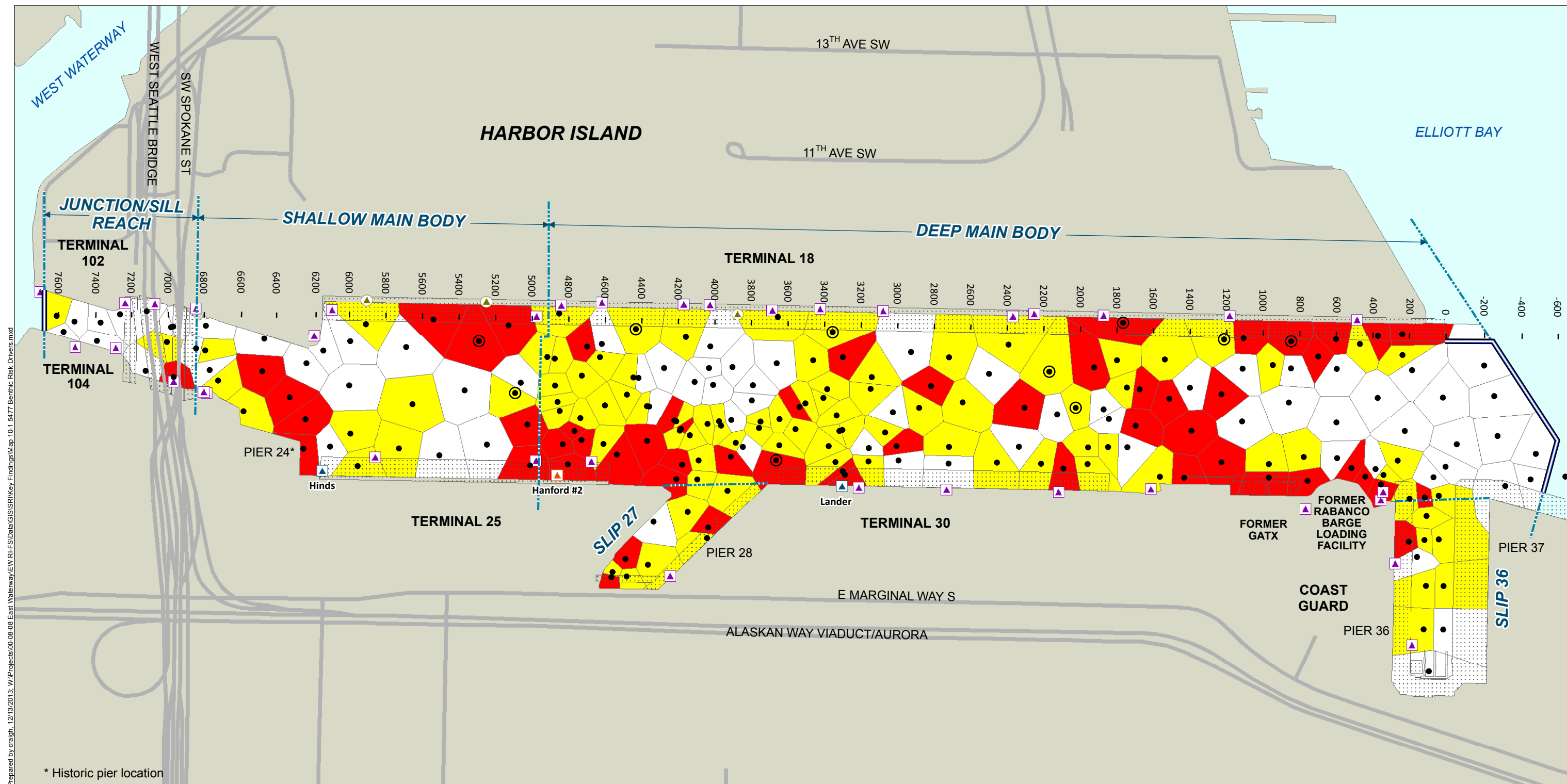
NOTES:

1. Type A: Engineered bank with armor stone and/or metal bulkhead.
2. Type B: Engineered bank with rubble or gravel armor and/or wooden or concrete bulkhead.
3. Type C: Non-engineered rubble armored slope or non-engineered mud/gravel bank.
4. Type D: Non-engineered steep bank, higher potential for bank erosion.





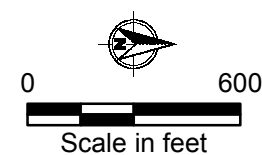
Map 9-25c
Bank Construction Types
Supplemental Remedial Investigation
East Waterway Operable Unit



Final SMS Status (Chemical Criteria and Toxicity Combined) in Surface Sediment

- > CSL
- > SQS and ≤ CSL
- ≤ SQS
- TBT Exceedance Location
- Surface Sediment Sampling Location

- ▲ CSO
- ▲ Storm Drain
- ▲ CSO/Storm Drain
- ▲ Unknown Outfall
- Dock/Pier/Bridge
- Road
- East Waterway Study Area Boundary



Map 10-1
Benthic Risk Drivers
Supplemental Remedial Investigation
East Waterway Study Area