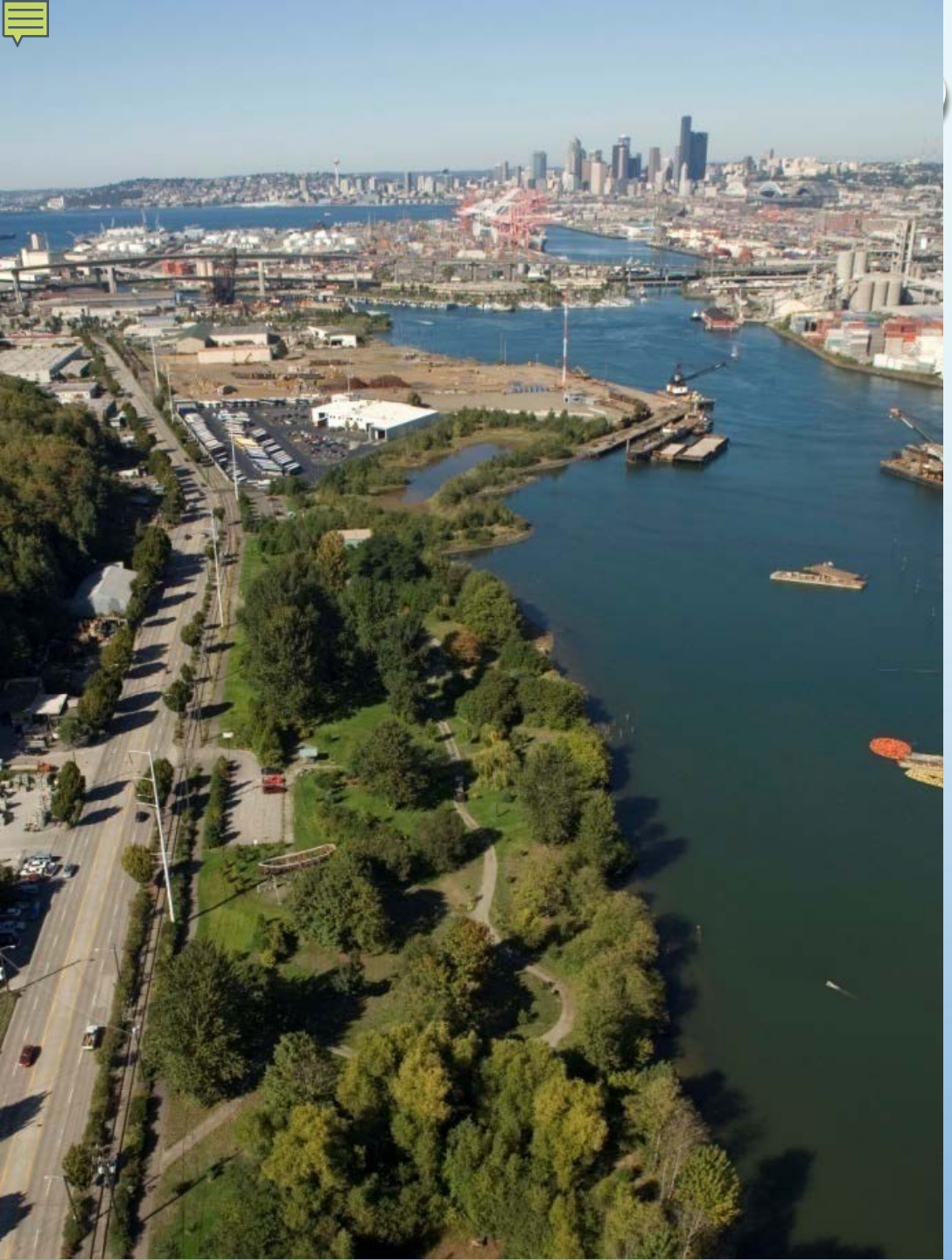
SMARM 2015
MAY 6, 2015

US EPA REGION 10 SEDIMENT CLEANUP SUMMARY

RAVI SANGA EPA R10 RPM

A LOT OF WORK HAS BEEN DONE

- Lower Duwamish Cleanup Decision
  - Early Action Cleanups
- East Waterway Remedial Investigation
- Lockheed West RD/RA
- Pacific Sound Resources 5 Year Review
- Commencement Bay
  - Thea Foss Long Term Monitoring
  - Blair Waterway TBT Cleanup
- Bremerton Gas Works Remedial Investigation



LOWER DUWAMISH WATERWAY

FINAL CLEANUP PLAN

(also known as the Record of Decision, or ROD)

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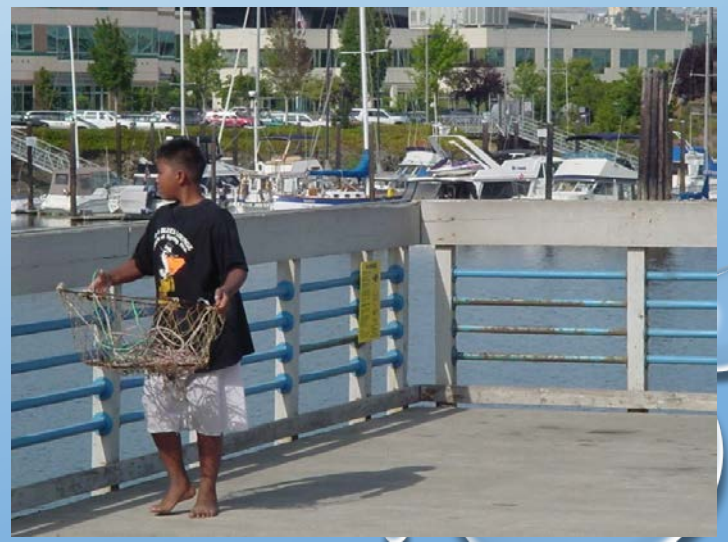
Lower Duwamish Waterway

- Over 100 years of industrial and urban use has polluted waterway sediments
- Sediment is contaminated with harmful chemicals
- Resident fish and shellfish (like perch, sole, crabs) are unsafe to eat

Cleanup Objectives (RAO's)

Reduce risks to:

1. People who eat resident fish and shellfish.
2. People coming into contact (skin contact and ingestion) with contaminated sediments.
3. Bottom-dwelling organisms, such as crabs and clams.
4. Fish, birds, and mammals.



Key Parts of the Cleanup

Clean up early action areas

DEPARTMENT OF ECOLOGY State of Washington

Source Control

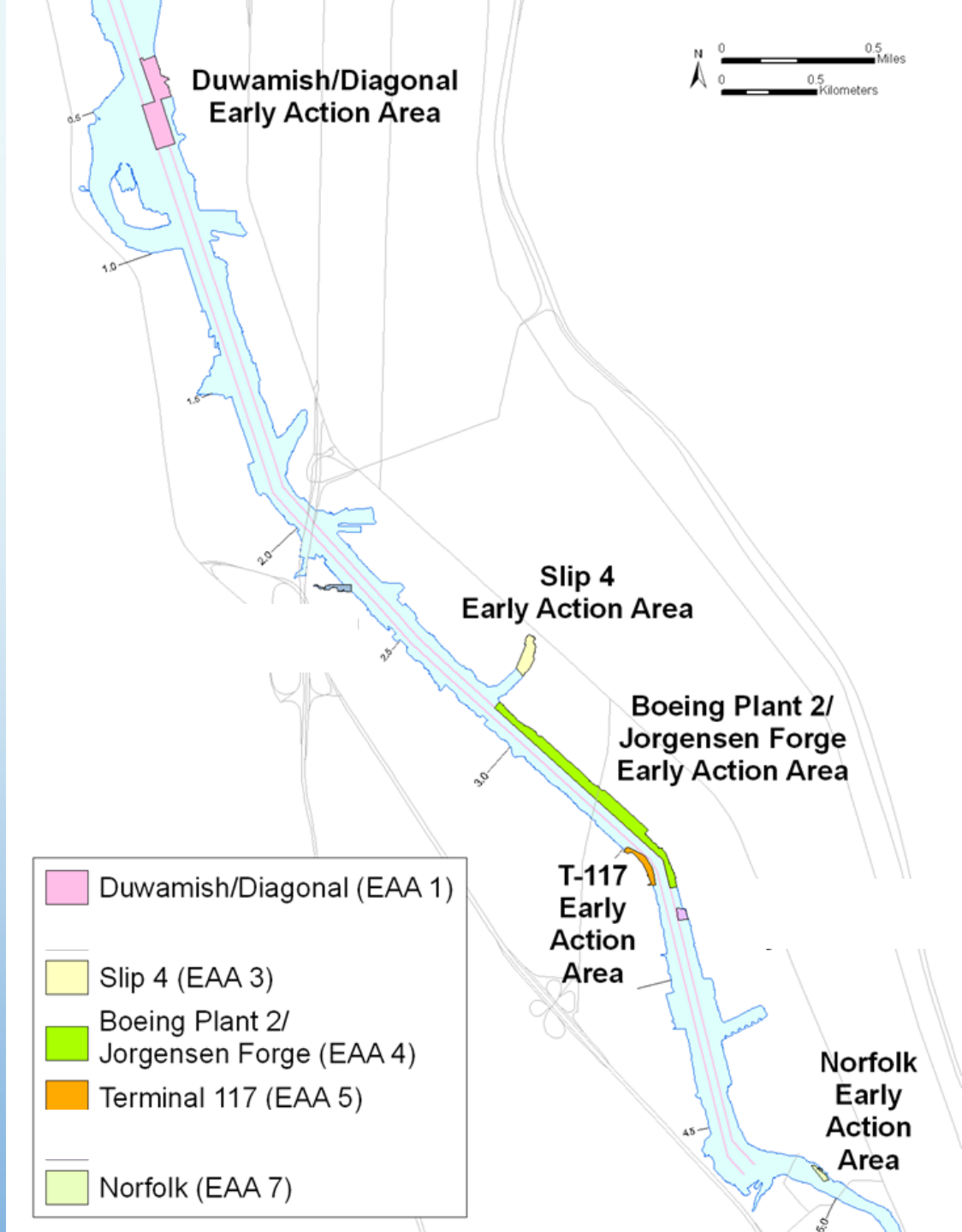
EPA United States Environmental Protection Agency Region 10

Sediment Cleanup

…towards a cleaner river…

Clean Up Early Action Areas

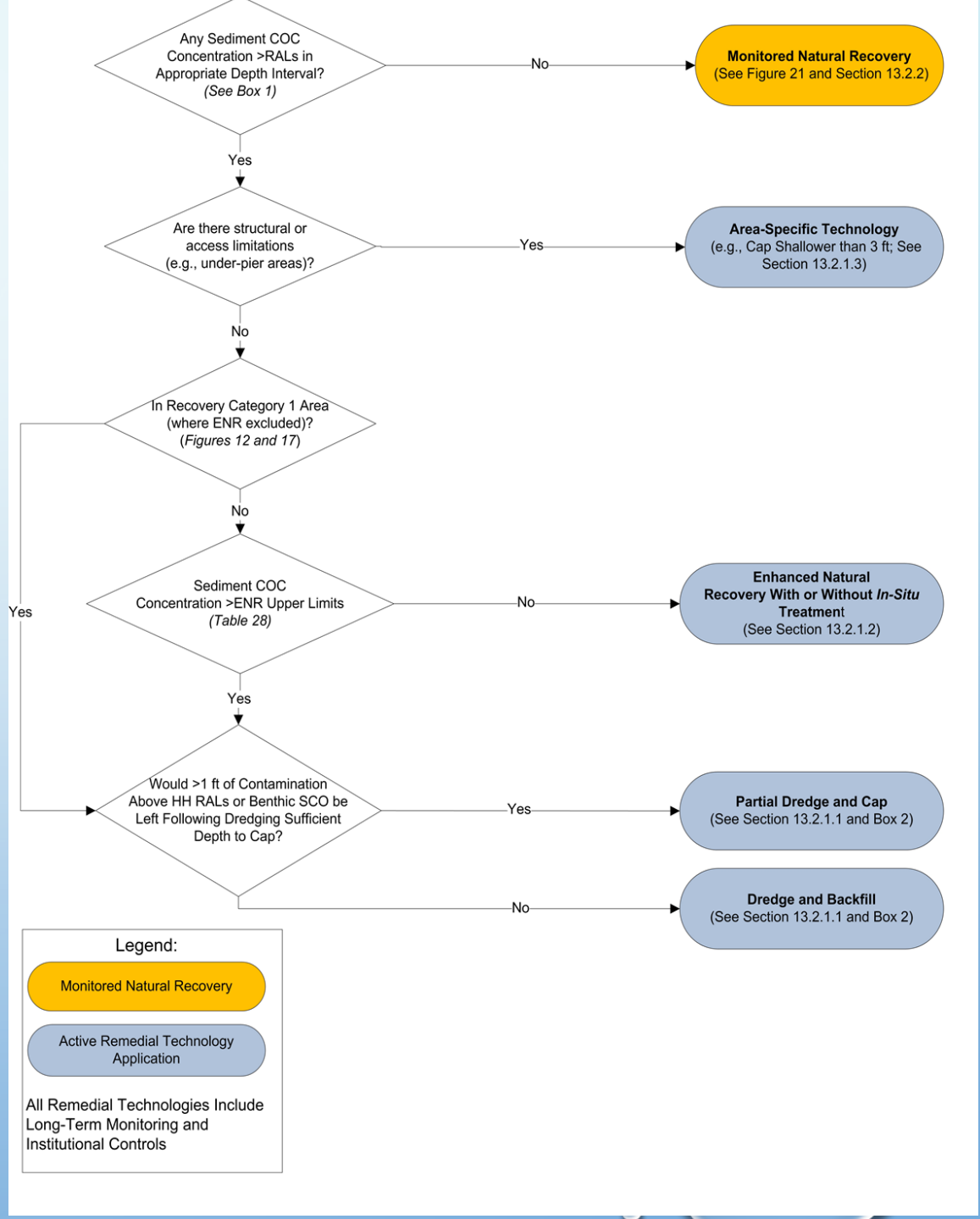
- Most completed by 2015
- Address 29 acres of the most contaminated areas in the waterway
- Remove approximately 280,000 cubic yards of contaminated sediments
- Projected to reduce surface sediment PCB concentrations by 50%



TOGETHER, THE SELECTED REMEDY AND EAAS WILL:

- DREDGE, CAP, OR ADD ENHANCED NATURAL RECOVERY OVER 206 ACRES
- CLEANUP OVER 1.2 MILLION CUBIC YARDS OF CONTAMINATED SEDIMENTS FROM THE WATERWAY
- REDUCE PCB CONCENTRATIONS IN THE RIVER BY 90% OR MORE

FLOW CHARTS AND TEXT PROVIDE DETAILS ON TECHNOLOGY SELECTION

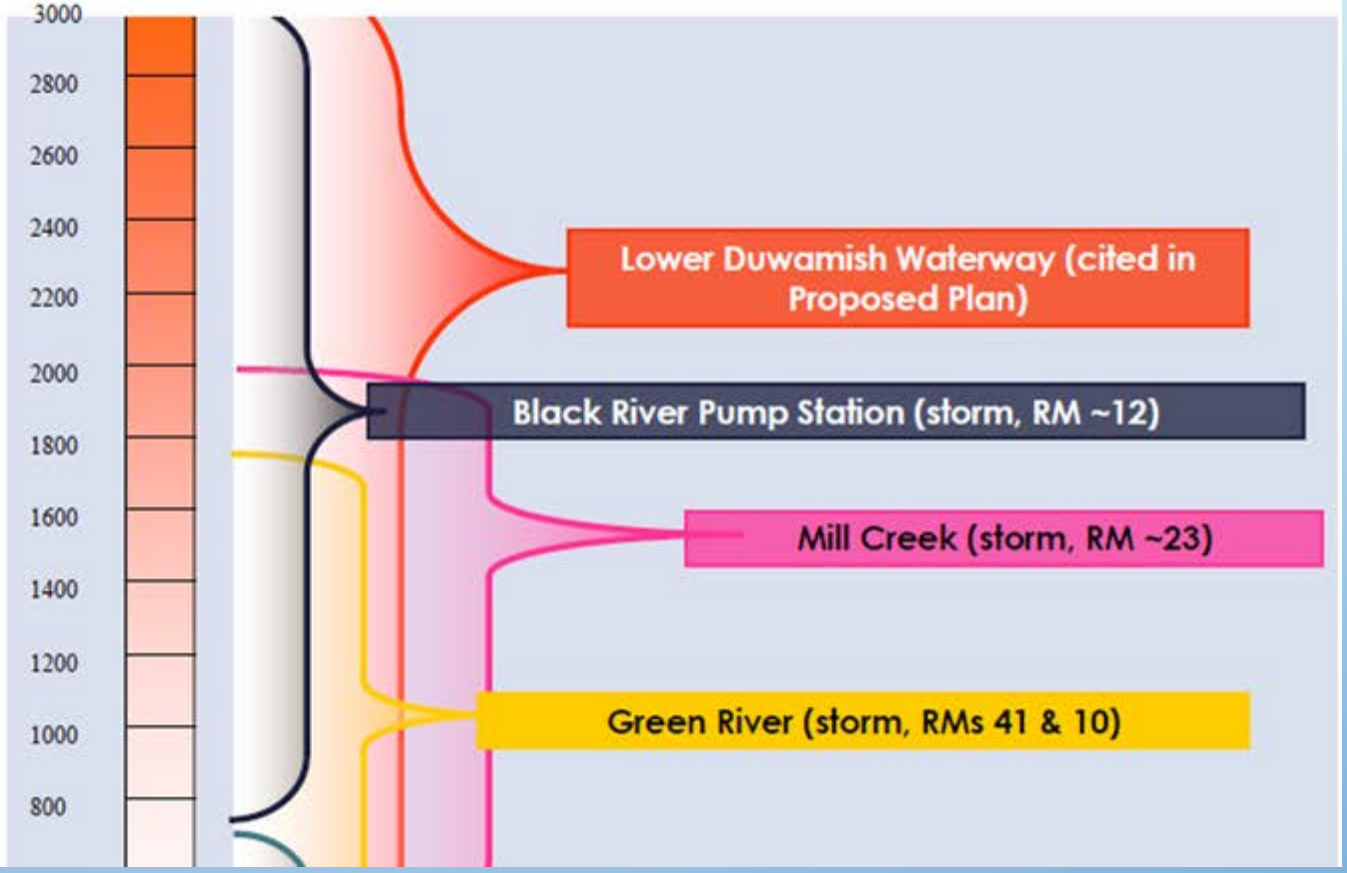


Green-Duwamish: PCBs in Surface Water

pg/L or parts per quadrillion

Green River & Tributaries storm flow data from King County, 2014

Duwamish River, River Mile 11 data from USGS, 2014

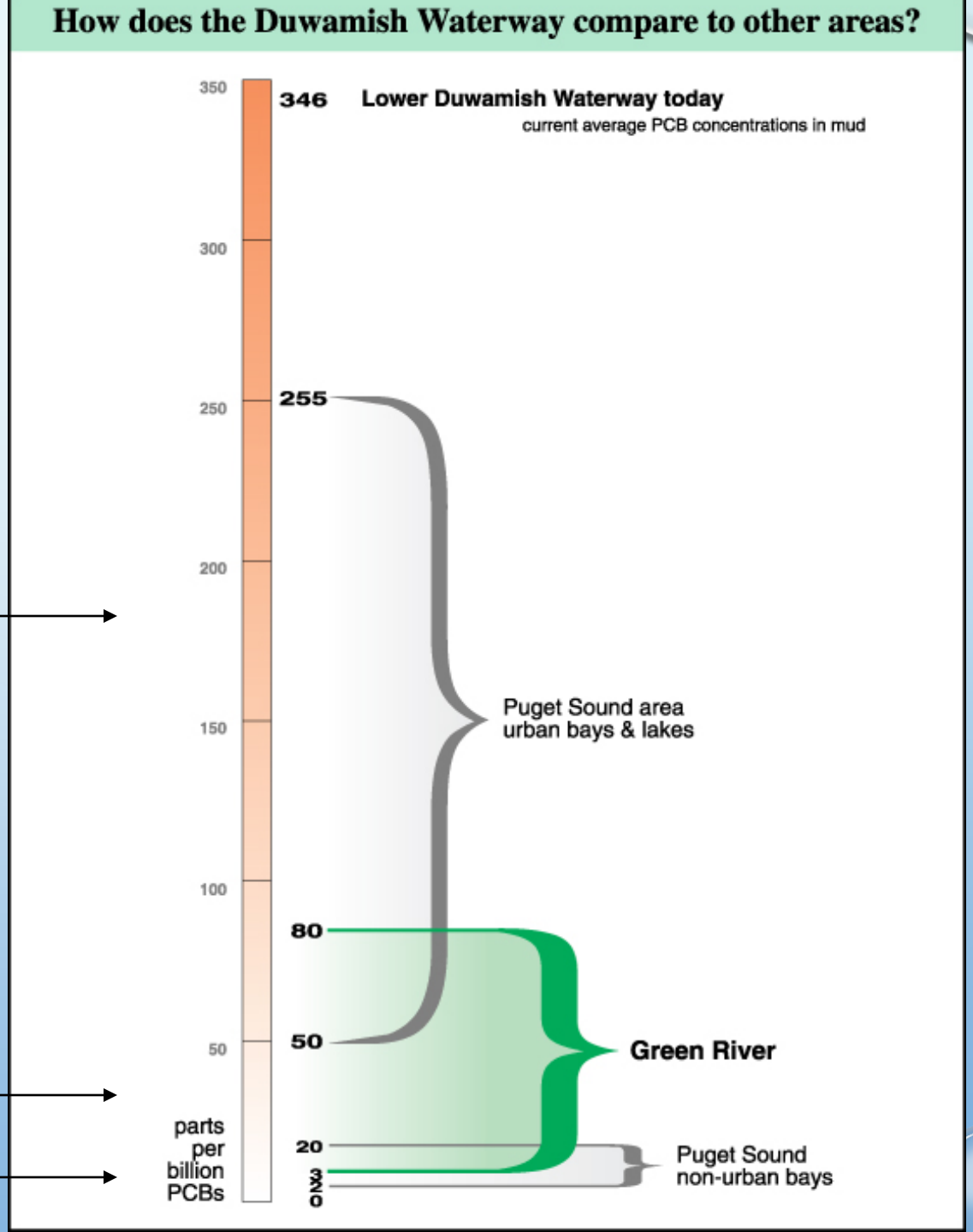


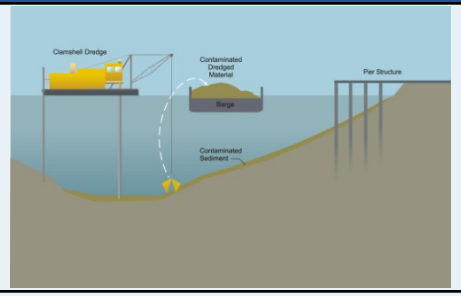
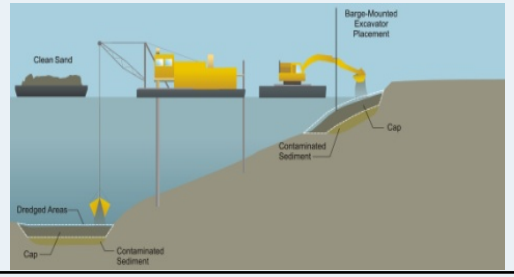
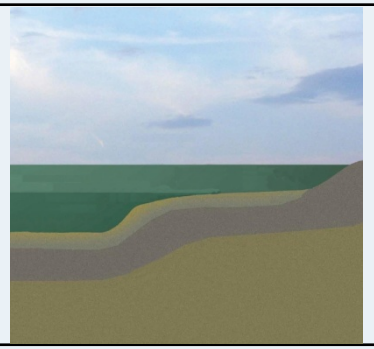
Duwamish Cleanup Goals

Early actions predicted to reduce PCBs by half

Proposed cleanup is predicted to reduce PCBs by 90% or more

ROD cleanup level is 2 ppb PCBs



Remedy	Area	Time	Cost	Follow-Up
 ***Dredging***	105 Acres	7 Years	**$342 Million**	
 ***Capping***	24 Acres			
Enhanced Natural Recovery (ENR)	48 Acres			
 ***Monitored Natural Recovery (MNR)***	235 Acres	10 Years		
	412 Acres	**17 Years**		

Lower Duwamish Source Control

- WA DEPT OF ECOLOGY IS THE LEAD FOR "SOURCE CONTROL" TO THE LOWER DUWAMISH WATERWAY SITE
- A "SOURCE" TO THE LDW MUST INCLUDE: A CONTAMINANT RELEASE, AN AFFECTED MEDIA, AND A PATHWAY TO REACH THE LDW
- **SOURCES** INCLUDE CONTAMINATED SOILS, BUILDING MATERIALS, INDUSTRIAL ACTIVITIES, AND OTHER HUMAN ACTIVITIES
- **PATHWAYS** INCLUDE GROUNDWATER MIGRATION, STORMWATER RUNOFF, COMBINED SEWER OVERFLOWS AND AIR DEPOSITION
- NEAR-TERM GOAL: TO CONTROL SOURCES "SUFFICIENTLY" SO ACTIVE SEDIMENT CLEANUP CAN BEGIN
  - UNLIKELY THAT RECONTAMINATION ABOVE THE RALS WILL OCCUR
- LONG-TERM GOAL: MINIMIZE SEDIMENT RECONTAMINATION & IMPROVE EFFECTIVENESS OF NATURAL RECOVERY.

FOUNDATION OF THE SOURCE CONTROL STRATEGY

24-Source Control Areas

- Data Gaps
- Action Plans

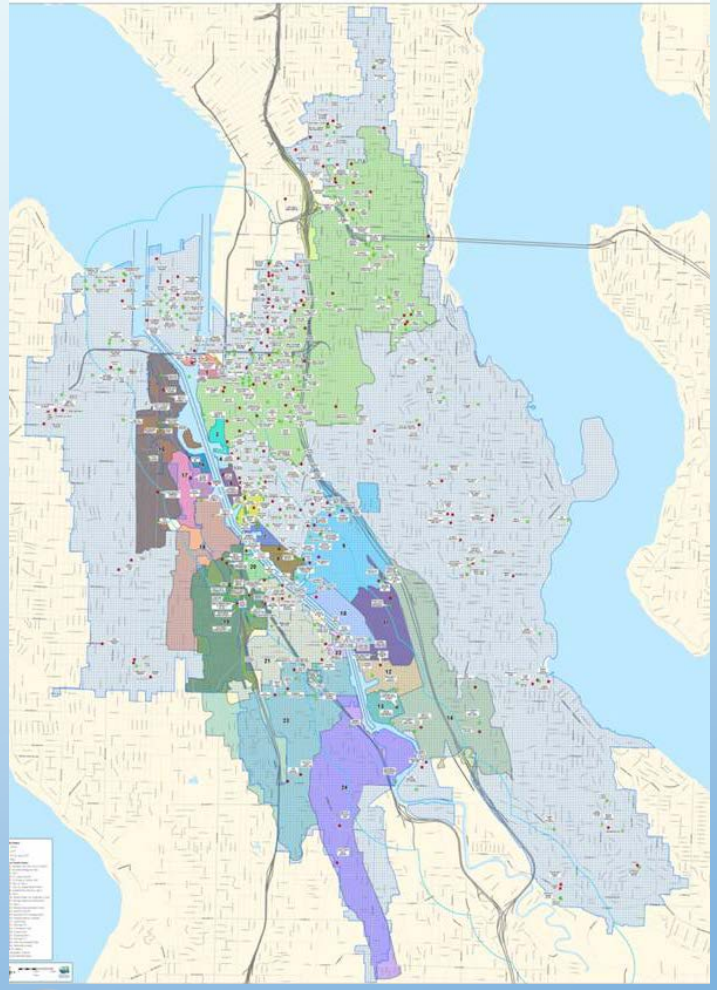
Technical Studies

Inter-agency Agreements

Implementation Plans

Site Cleanups

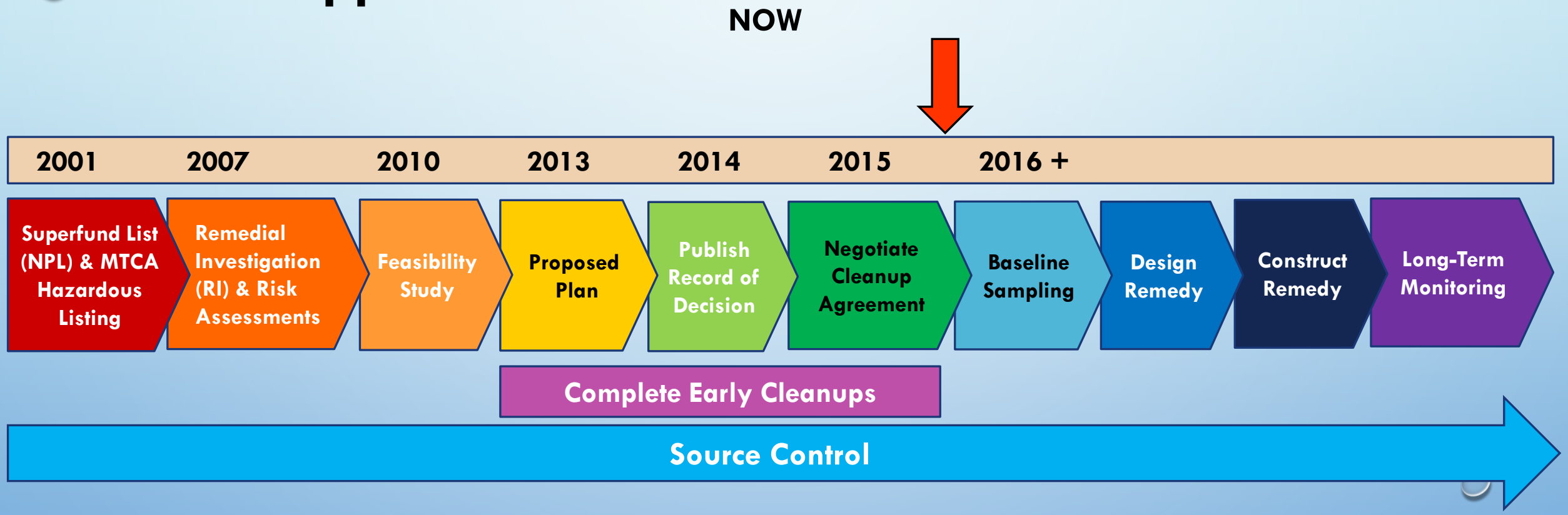
Water Quality Permits



SOURCE CONTROL: NEXT STEPS

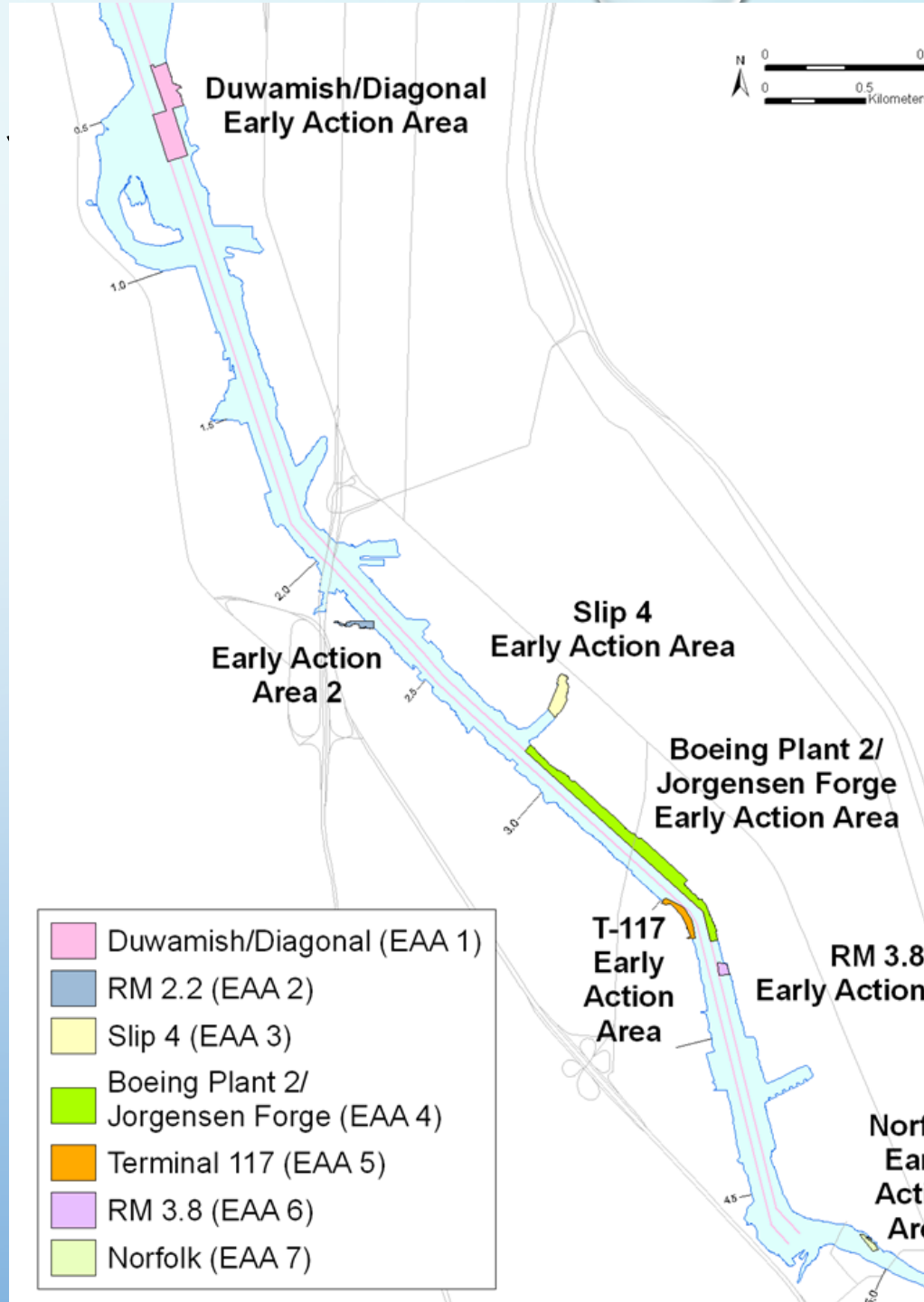
- REVISE THE SOURCE CONTROL STRATEGY
  - INCLUDE THE IMPLEMENTATION PLANS
- CONTINUE WITH SITE CLEANUPS
- ADMINISTER WATER QUALITY PERMITS
- COORDINATE BETWEEN EPA AND ECOLOGY CLEANUP AND WATER PROGRAMS

What Happens Next



EARLY ACTION

- WILL BE COMPLETED BY THE END OF 2015
- ADDRESS 29 ACRES OF THE MOST CONTAMINATED AREAS IN THE WATERWAY
- REMOVE APPROXIMATELY 280,000 CUBIC YARDS OF CONTAMINATED SEDIMENTS
- PROJECTED TO REDUCE SURFACE SEDIMENT PCB CONCENTRATIONS BY 50%



T-117 PORT EARLY ACTION AREA REMOVAL ACTION

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T-117 UPLAND SOILS/BANK REMEDIATION

- <u>CLEANUP BY THE NUMBERS</u>
  - 8,000 TONS OF DEMOLITION DEBRIS
    - 2,500 TONS REUSED/SALVAGED
    - 3,500 RECYCLED
  - REMOVED 57 CREOSOTE-TREATED WOOD PILES
    - REPLACED WITH 4 STEEL PILES AND A POLYETHYLENE DEBRIS DEFLECTOR

T-117 Riverbank Pre-construction

T-117 UPLAND EXCAVATION

- EXCAVATED 77,000 TONS (48,000 CUBIC YARDS) OF UPLAND SOIL
- ONLY 2 EXCEEDANCES (FOR DIESEL EXHAUST) AMONG ~180 DAYS (SHIFTS) OF AIR, NOISE, LIGHT MONITORING

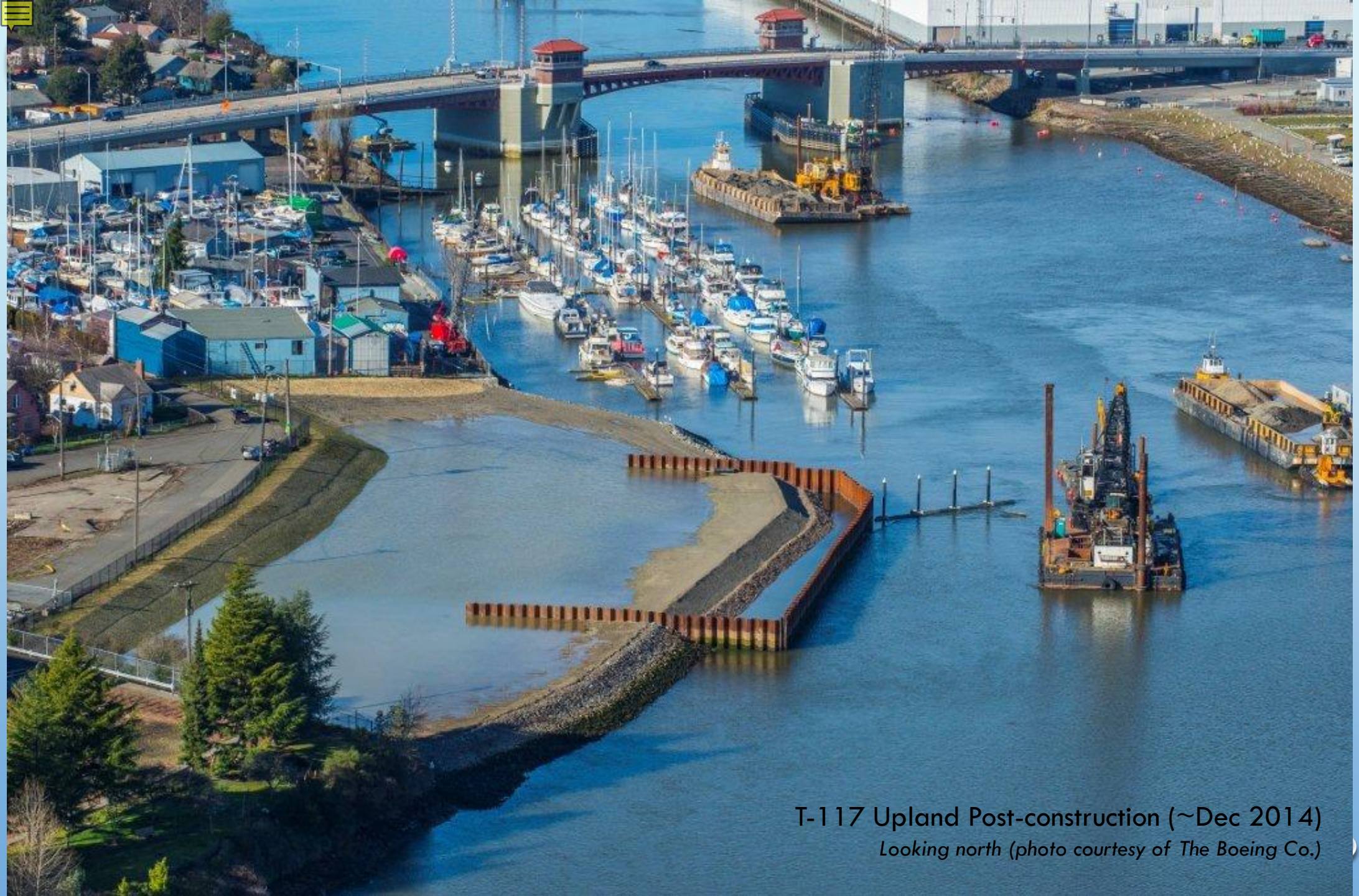
T-117 UPLAND EXCAVATION

- PLACED 53,000 TONS (88,000 CY) OF BACKFILL
- 860 FEET RIVER BANK REPLACED

T-117 during construction (2013/2014)

T-117 SEDIMENT

- 14,000 CY DREDGED SEDIMENTS OVER 64 DAYS OF WORK
- 25,000 TONS OF CLEAN SAND BACKFILL AND ARMOR STONE
- REMOVAL/BACKFILL FROM ADDITIONAL 25 FEET OF ADJACENT RIVER BANK



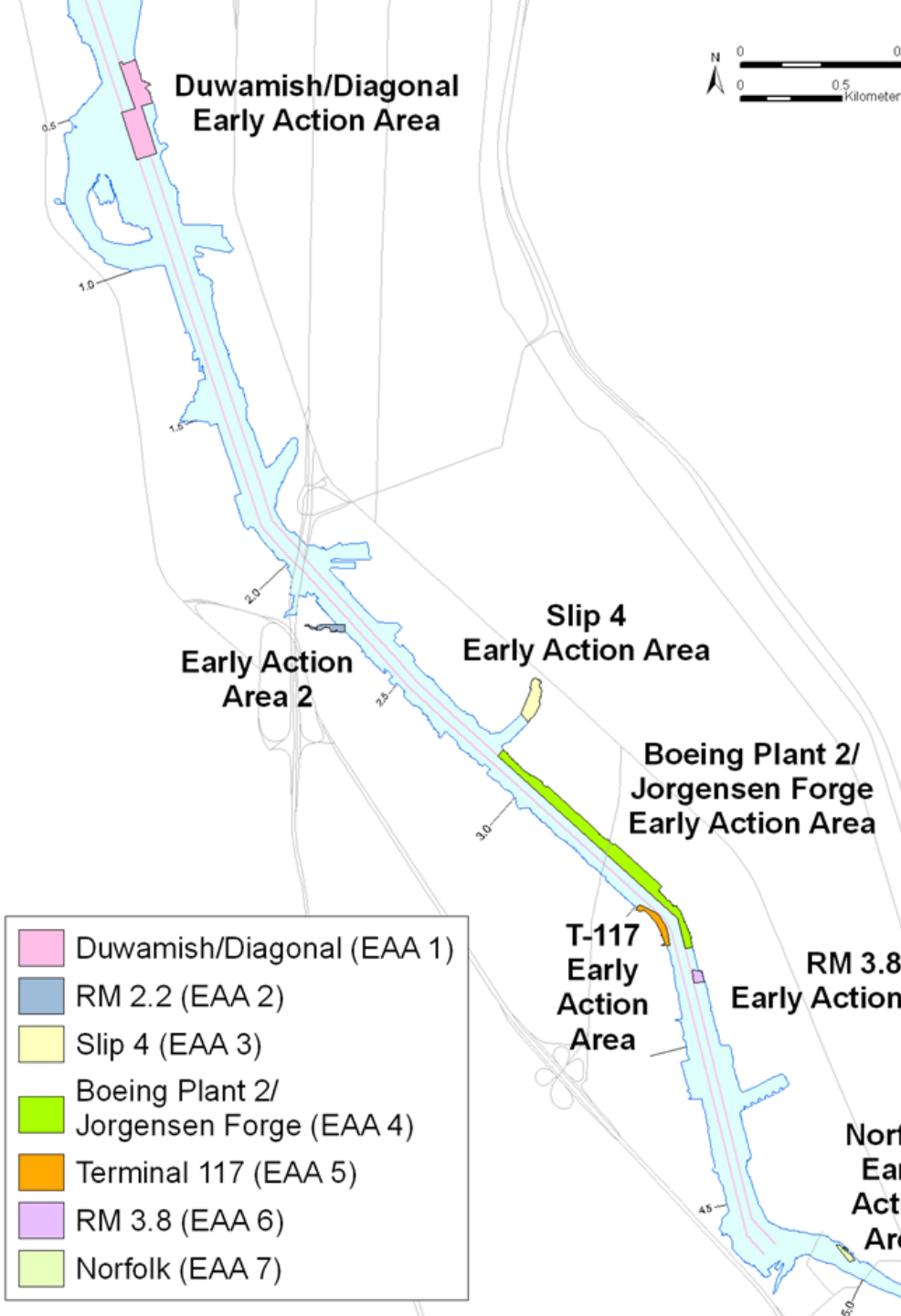
T-117 Upland Post-construction (~Dec 2014)

Looking north (photo courtesy of The Boeing Co.)

T-117 Riverbank Post-construction (Nov 2014)

Looking South

ANOTHER EARLY ACTION EMJ/JORGENSEN



EMJ REMOVAL ACTION

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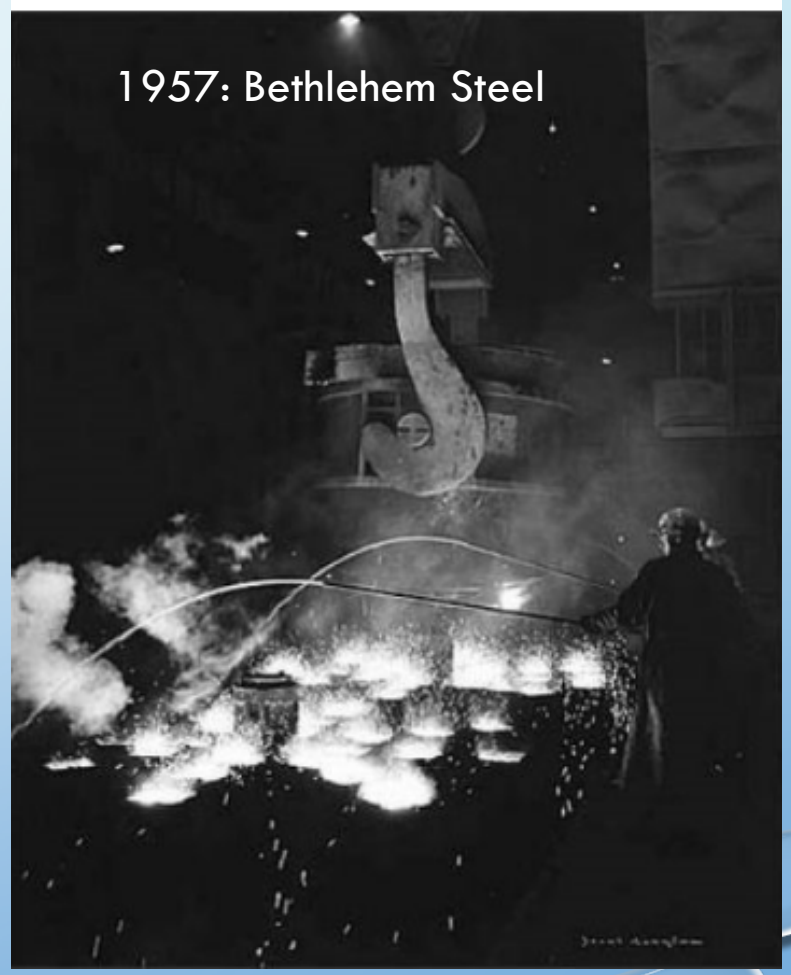
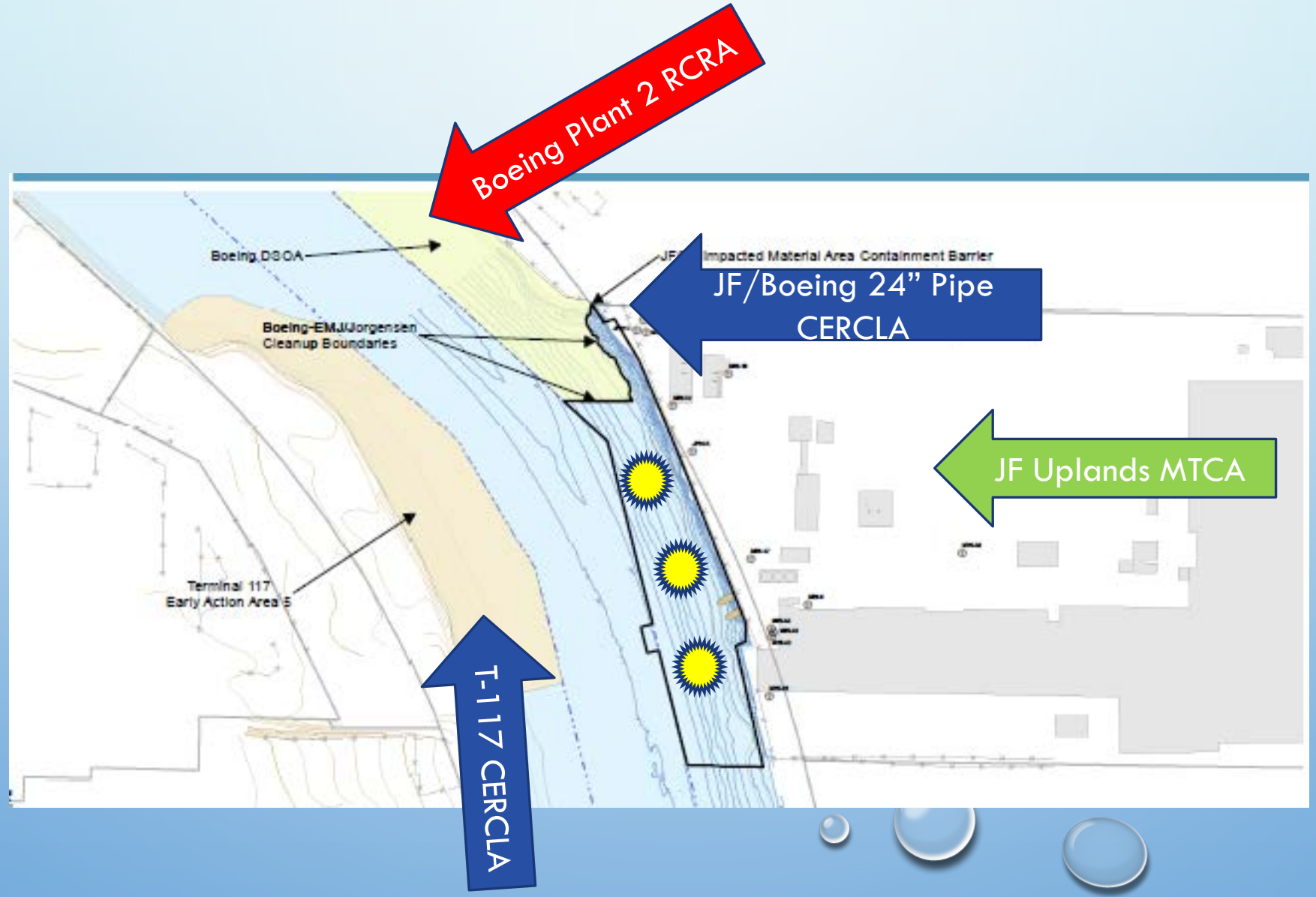
EMJ BACKGROUND

- EAA OF THE LDW- ADJACENT TO BOEING PLANT 2
- PRP-LED NTCRA(STARTED: 2003; EECA 2008-2011; REMOVAL ORDER: 2012)
- METAL FOUNDRY (FORMERLY BETHLEHEM STEEL)
- PRIMARY COCS: CO-LOCATED PCBS AND METALS (AS, CD, CR, CU, PB, HG, AG, ZN)
- SEDIMENT SITE: ~12000 YDS^3 SEDIMENT, 3000 YDS^3 BANK
- UPLANDS IS ECOLOGY MTCA SITE
- "24" PIPE" RUNS ALONG THE NORTHERN PROPERTY LINE WITH BOEING PLANT 2



EMJ BACKGROUND

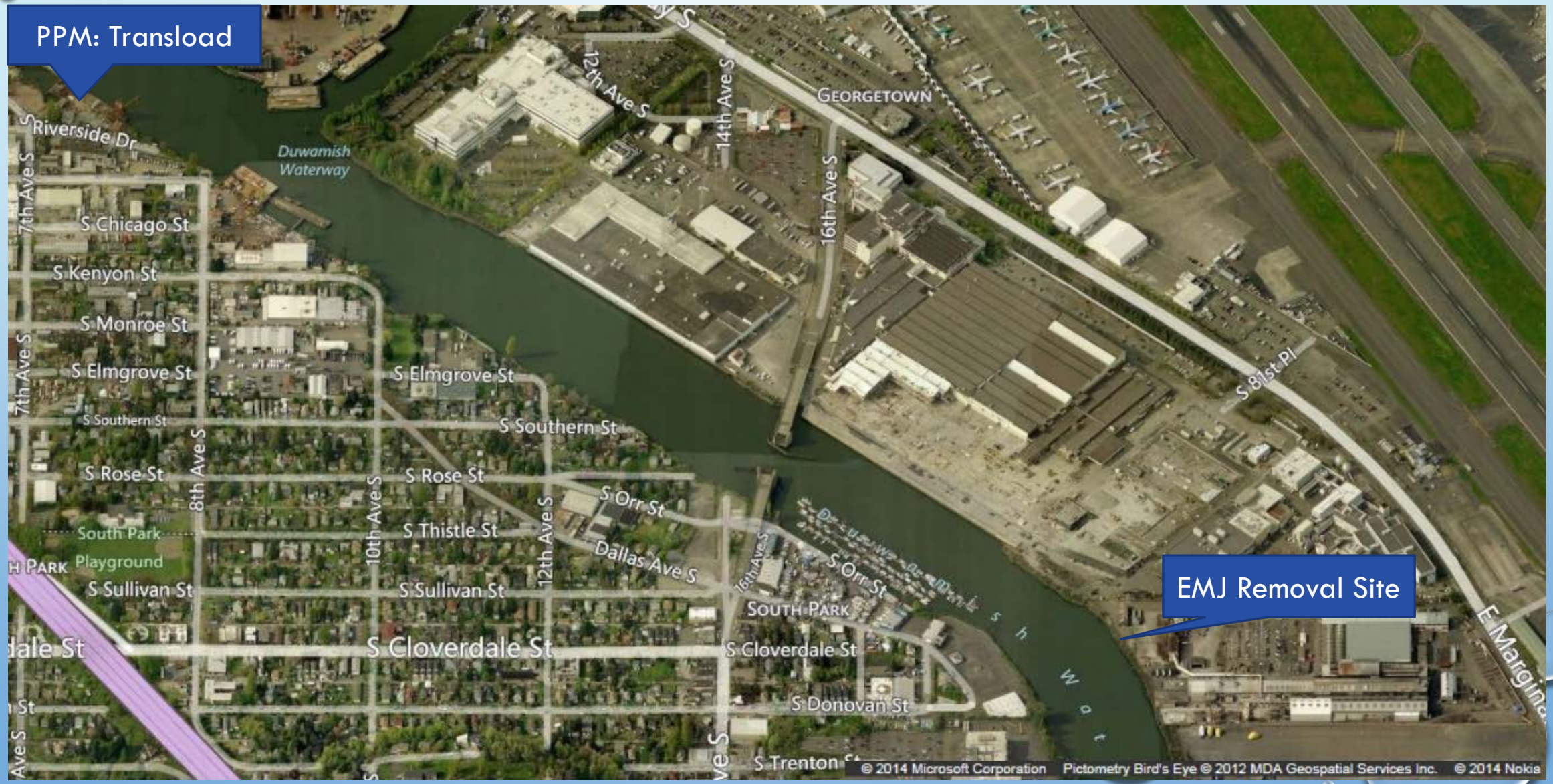


EPA'S ACTION MEMORANDUM

- * COMPLETE EXCAVATION OF ALL BANK AND SEDIMENTS WITHIN EAA EXCEEDING RVALS;
- * STORMWATER MANAGEMENT;
- * LONG-TERM SEDIMENT AND GROUNDWATER MONITORING.

COC	RvAL (mg/kg)
PCBs	12 ppm OC
Cadmium	5.1
Lead	450
Chromium	390
Mercury	0.41
Silver	6.1
Zinc	410
Arsenic	51

EMJ REMOVAL


PPM: Transload
EMJ Removal Site
S Riverside Dr
Duwamish Waterway
12th Ave S
14th Ave S
16th Ave S
GEORGETOWN
7th Ave S
S Chicago St
S Kenyon St
S Monroe St
S Elmgrove St
S Southern St
S Rose St
8th Ave S
10th Ave S
12th Ave S
S Orr St
S Thistle St
Dallas Ave S
South Park
Playground
S Sullivan St
S Cloverdale St
SOUTH PARK
S Donovan St
S Trenton
S 81st Pl
E Marginal
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Pictometry Bird's Eye © 2012 MDA Geospatial Services Inc.
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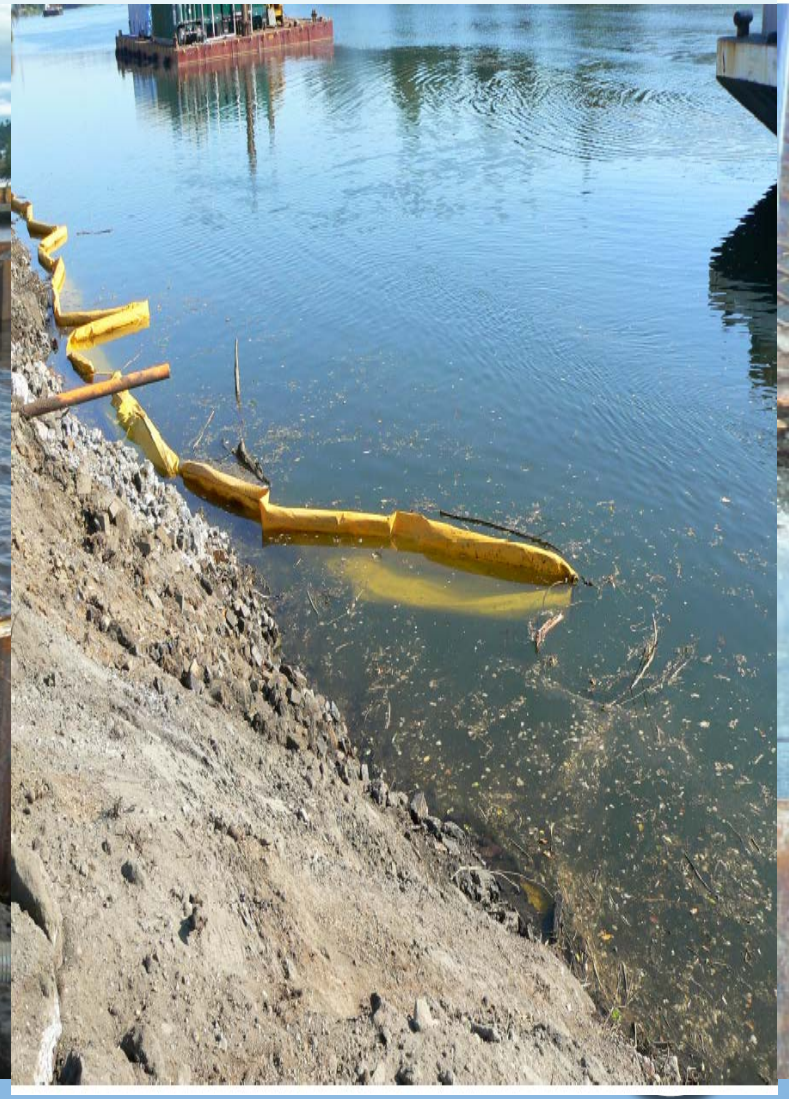
UNANTICIPATED ISSUES



LOCKHEED WEST SEATTLE SUPERFUND

- RD/RA CLEANUP ACTIVITIES

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2Lynda <lpriddy@earthlink.net>06-553-4951

Removal-Focus Alternative 3C Plus

Alternative Description: Removal of sediment with concentrations above the CSL within the former Dry Dock areas and remaining CSL footprint, and ENR to the Study Area Boundary. Removal to SQS in portions of the West Waterway navigation channel, shoreline/intertidal, area, and former shipway area.

Remediation Below -10 ft MLLW

	Area (AC)	Volume (CY)
Removal	11.6	151,650
ENR	28.4	45,900
Dredge Residual Management Layer	11.6	14,000

Former Shipway Area Remediation

	Area (AC)	Volume (CY)
Removal	0.8	6,500
Backfill/Habitat Mix	1	9,850

Shoreline/Intertidal Remediation

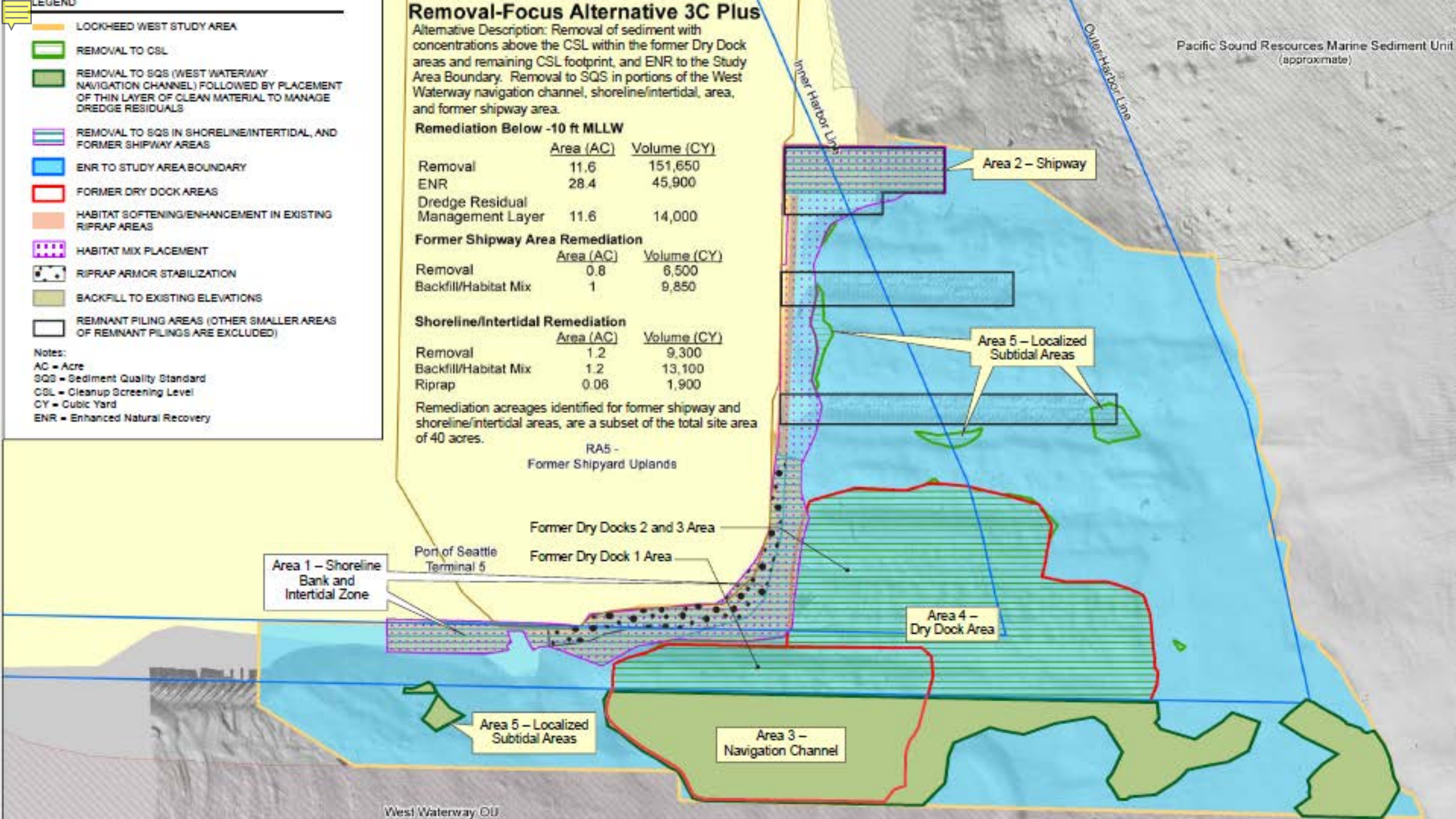
	Area (AC)	Volume (CY)
Removal	1.2	9,300
Backfill/Habitat Mix	1.2	13,100
Riprap	0.06	1,900

Remediation acreages identified for former shipway and shoreline/intertidal areas, are a subset of the total site area of 40 acres.

LEGEND

- LOCKHEED WEST STUDY AREA
- REMOVAL TO CSL
- REMOVAL TO SQS (WEST WATERWAY NAVIGATION CHANNEL) FOLLOWED BY PLACEMENT OF THIN LAYER OF CLEAN MATERIAL TO MANAGE DREDGE RESIDUALS
- REMOVAL TO SQS IN SHORELINE/INTERTIDAL, AND FORMER SHIPWAY AREAS
- ENR TO STUDY AREA BOUNDARY
- FORMER DRY DOCK AREAS
- HABITAT SOFTENING/ENHANCEMENT IN EXISTING RIPRAP AREAS
- HABITAT MIX PLACEMENT
- RIPRAP ARMOR STABILIZATION
- BACKFILL TO EXISTING ELEVATIONS
- REMNANT PILING AREAS (OTHER SMALLER AREAS OF REMNANT PILINGS ARE EXCLUDED)

Notes:
AC = Acre
SQS = Sediment Quality Standard
CSL = Cleanup Screening Level
CY = Cubic Yard
ENR = Enhanced Natural Recovery



SITEWIDE REMEDIATION TOTALS

- DREDGING: 13.6 ACRES AND 167,450 CY
- BACKFILL SHORELINE AND INTERTIDAL AREAS: 2.2 ACRES AND 22,950 CY OF HABITAT MIX
- THIN COVER FOR DREDGE RESIDUALS MGM'T/ENR LAYER: 40 ACRES (ENTIRE SITE) AND 59,900 CY
- $ 47.7 MILLION, CAPITAL COST ($48.1 MILLION DISCOUNTED RATE)

NEXT STEPS

- UAO ISSUED MARCH 5, 2015
- UAO EFFECTIVE APRIL 13, 2015
- START RD/RA
  - NAME RD/RA CONTRACTOR 10 DAYS AFTER UAO EFFECTIVE DATE – TETRA TECH
  - RD WORK PLAN SUBMITTED 60 DAYS AFTER UAO EFFECTIVE DATE
  - PRELIMINARY DESIGN (30%) SUBMITTAL 60 DAYS AFTER SUBMITTAL OF THE PRE-REMEDIAL DESIGN DATA REPORT

EAST WATERWAY OPERABLE UNIT (OU) OF THE HARBOR ISLAND SUPERFUND SITE

EPA Project Manager:
Ravi Sanga
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206 553 4092

EAST WATERWAY OU

- SUPPLEMENTAL REMEDIAL INVESTIGATION
- CURRENTLY REVIEWING FEASIBILITY STUDY
- PROPOSED PLAN EXPECTED 2016
- ROD/CLEANUP DECISION 2018

THEA FOSS WATERWAY – COMMENCEMENT BAY

MAY 2015 SMARM UPDATE

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THEA FOSS WATERWAY – COMMENCEMENT BAY

MAY 2015 SMARM UPDATE

- CITY OF TACOMA PERFORMED REHABILITATION WORK ON THE 11TH STREET BRIDGE (AKA MURRAY MORGAN BRIDGE) OVER THE WATERWAY BETWEEN 2011 AND 2013
- POST-PROJECT MONITORING FOUND ELEVATED METALS CONCENTRATIONS IN SEDIMENTS BELOW THE BRIDGE (LEAD CONCENTRATIONS NEARLY 7 TIMES SQO)
- DREDGING AND THIN-LAYER CAPPING IN A 3,000 SQUARE FOOT AREA BENEATH BRIDGE (WITHIN NAVIGATION CHANNEL) WAS PERFORMED FEBRUARY 2015
- ROUGHLY 128 CUBIC YARDS (CY) OF SEDIMENT DREDGED FROM AREA; ABOUT 118 CY CLEAN CAPPING MATERIAL PLACED

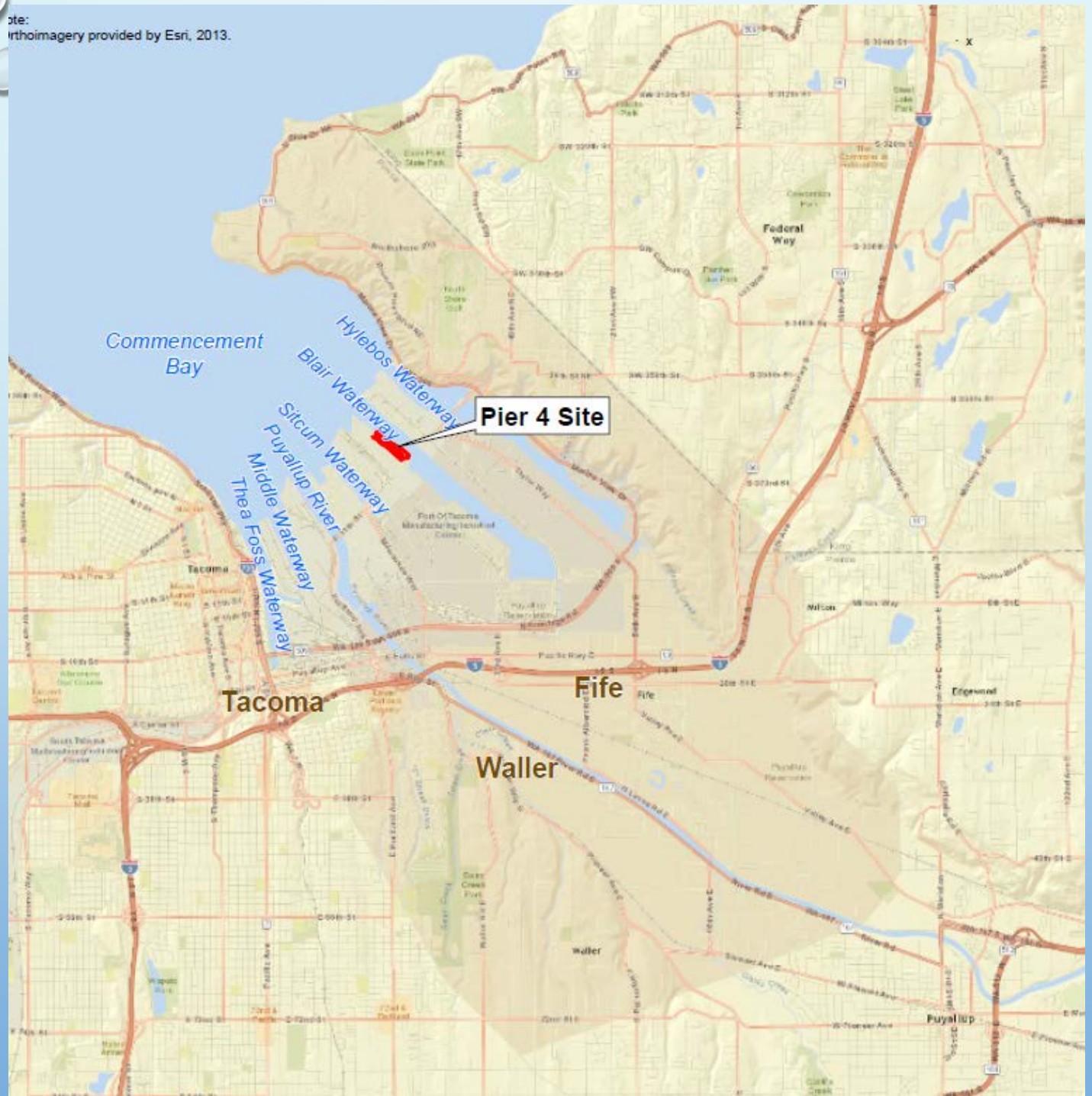
THEA FOSS WATERWAY – COMMENCEMENT BAY

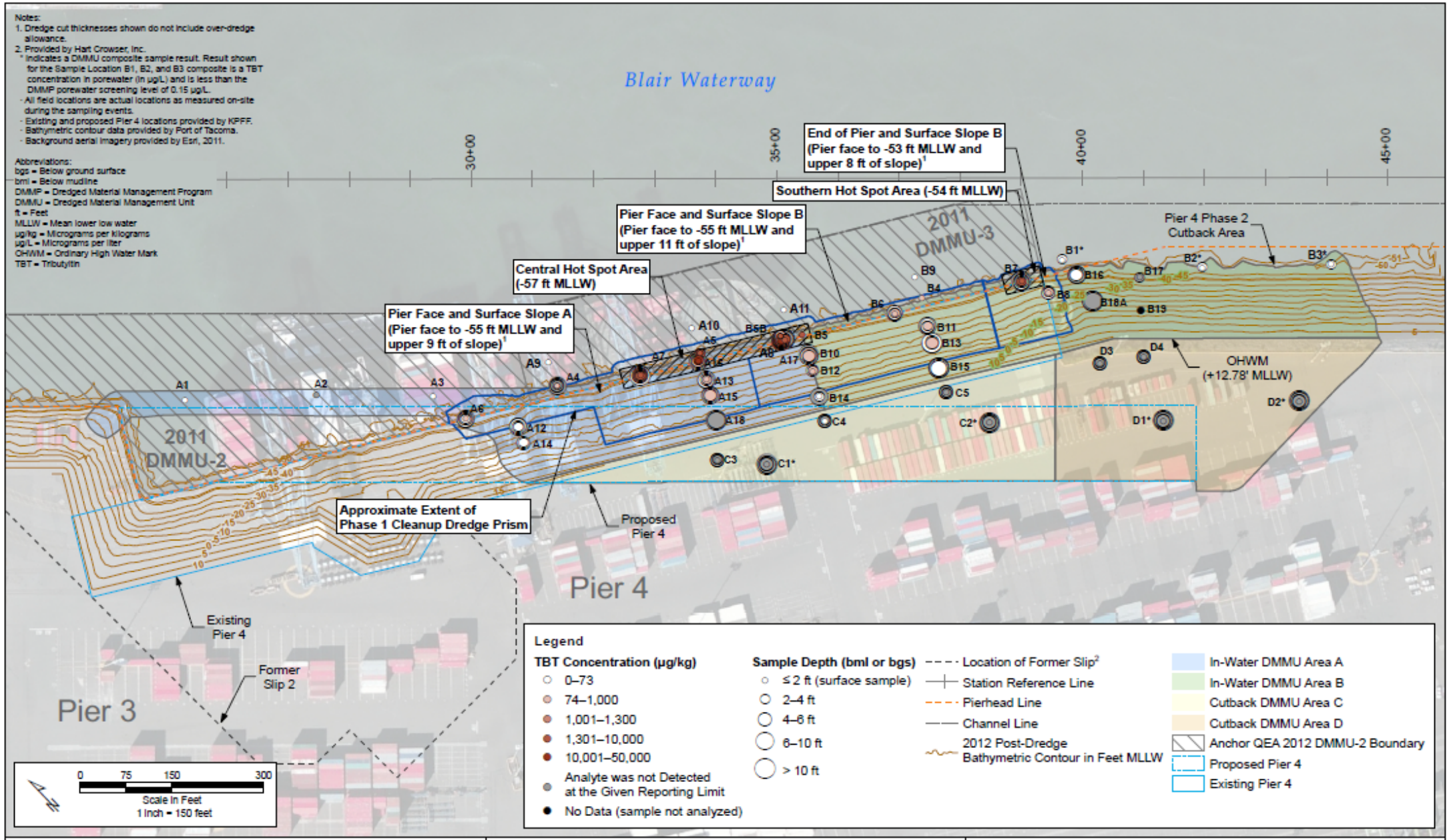
MAY 2015 SMARM UPDATE

- DISPOSAL
  - DREDGED MATERIALS WERE PLACED IN WATER-TIGHT CONTAINERS ON BARGE
  - CONTAINERS TRANSFERRED DIRECTLY TO TRUCK AND THEN TO TRAIN
  - TRANSPORTED TO ROOSEVELT LANDFILL FOR DISPOSAL
- POST-CONSTRUCTION MONITORING
  - CONCENTRATIONS WELL BELOW SQOS
- FINAL WATERWAY DEPTHS RANGED BETWEEN -6” TO +12” OF PRE-PROJECT DEPTHS

BLAIR WATERWAY TBT REMOVAL ACTION

- OSC KATHY PARKER
- PARKER.KATHY@EPA.GOV
- 206-553-0062
- PARKER.KATHY@EPAMAIL.EPA.GOV


ote:
rthoimagery provided by Esri, 2013.
Commencement Bay
Hylebos Waterway
Blair Waterway
Sitcum Waterway
Puyallup River
Middle Waterway
Thea Foss Waterway
Pier 4 Site
Tacoma
Fife
Waller
Federal Way
Puyallup



Port of Tacoma

FLOYD | SNIDER
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Removal Action Work Plan
Pier 4 Phase 1 Removal Action Project
Tacoma, Washington

Figure A.2
Phase 1 Dredge Areas and Design Dredge Cut Thicknesses

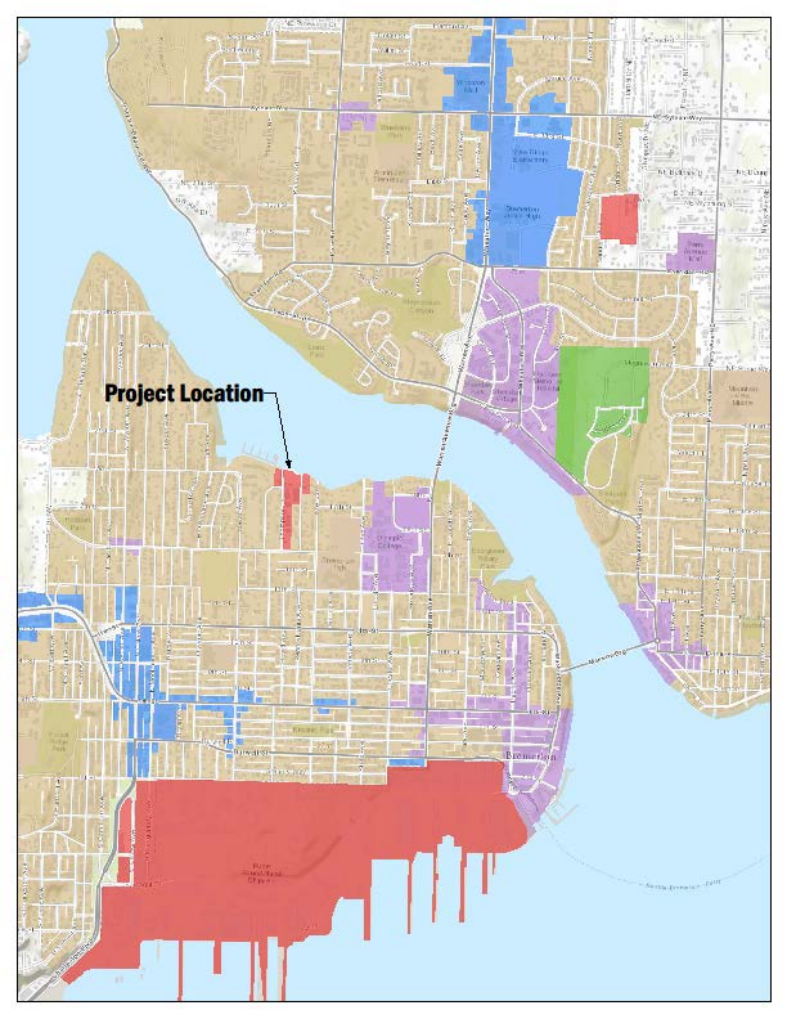
I:\GIS\Projects\POT_Pier_4\MXD\Task 8040\Post-Dredge Confirmation Plan\Figure A.2 Phase 1 Dredge Areas and Design Dredge Cut Thicknesses.mxd 11/12/2014

BREMERTON GAS WORKS

MAY 2015 SMARM UPDATE

- FORMER MANUFACTURED GAS PLANT
- SITE LOCATED ALONG PORT WASHINGTON NARROWS IN NORTH BREMERTON
- LISTED ON THE NATIONAL PRIORITIES LIST IN MAY 2012
- CASCADE NATURAL GAS CORP. CONDUCTING SITE INVESTIGATION WITH EPA OVERSIGHT

circa 1952-53



BREMERTON GAS WORKS (CONTINUED)

MAY 2015 SMARM UPDATE

Beach Sediments – October 2010
Prior to First Removal Action

- 2 REMOVAL ACTIONS ON THE BEACH
  - NOVEMBER 2010 (PRE-LISTING)
  - OCTOBER 2013
- CONTAMINATION HAS BEEN FOUND IN UPLAND SOILS, GROUNDWATER AND SEDIMENTS
- PRIMARY CONTAMINANTS OF CONCERN
  - PAHS, METALS, BTEX

BREMERTON GAS WORKS (CONTINUED)

MAY 2015 SMARM UPDATE

- RECENTLY FINALIZED RI/FS SCOPING MEMO (MARCH 2015)
- DRAFT RI/FS WORK PLAN CURRENTLY UNDER DEVELOPMENT – HOPE TO FINALIZE AND BEGIN FIELD INVESTIGATION IN LATTER PART OF 2015

EPA PROJECT MANAGER:

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Newly installed cap – October 2013
After completion of second Removal Action

THANK YOU !