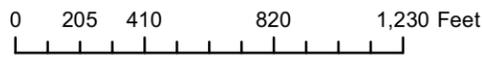


**NOTE:**  
 • aerial imagery is from September 2005, is courtesy of "Metro", and it is intended for reference purposes only

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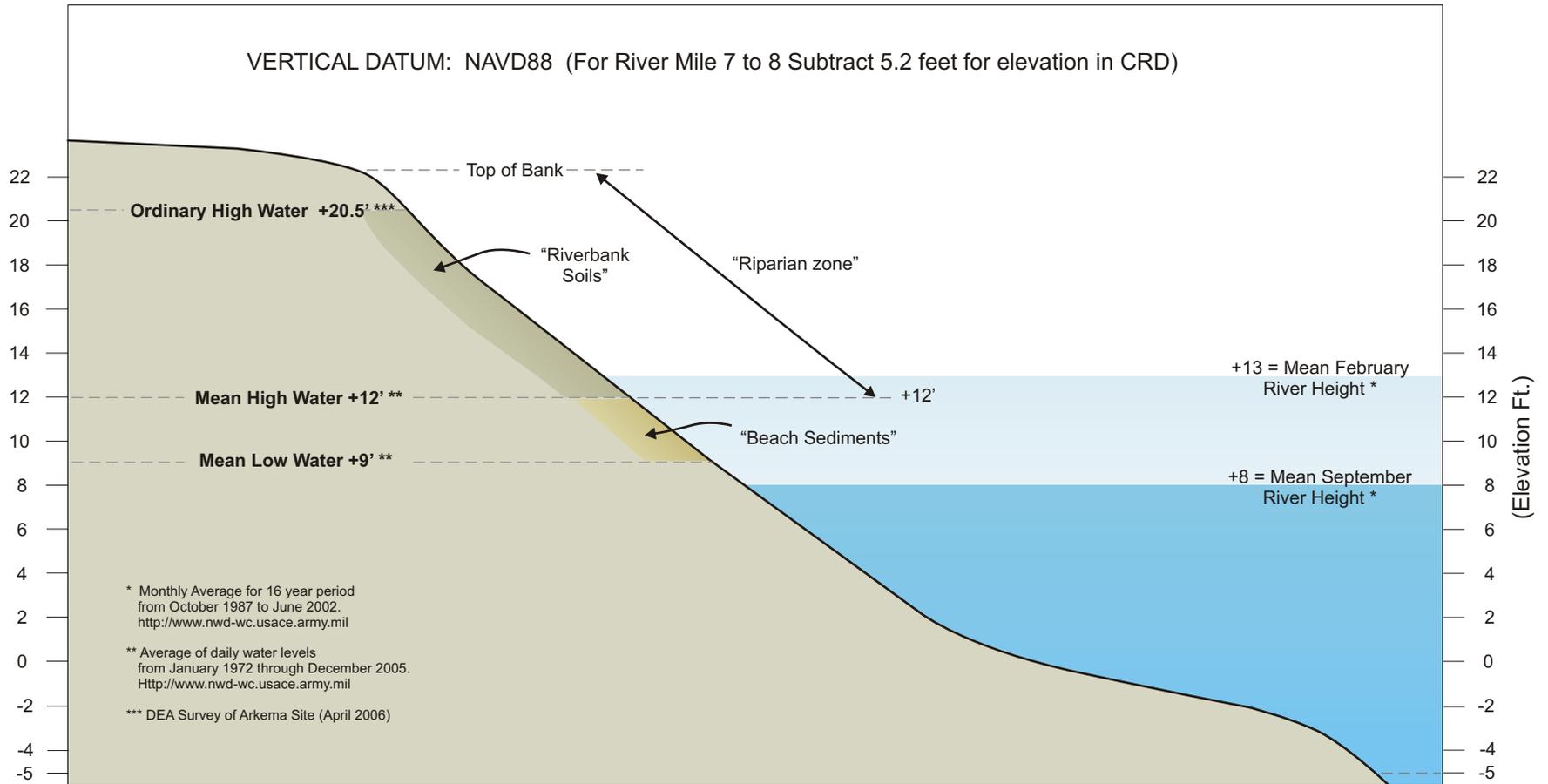


- Navigation Channel
- Sites
- River Mile Line
- Direction of River Flow

**DRAFT**

**Figure 1-1**  
**Arkema EE/CA**  
**Aerial Photograph and Adjacent Properties**

## Schematic Willamette River Bank Cross Section (River mile 2 to 11)



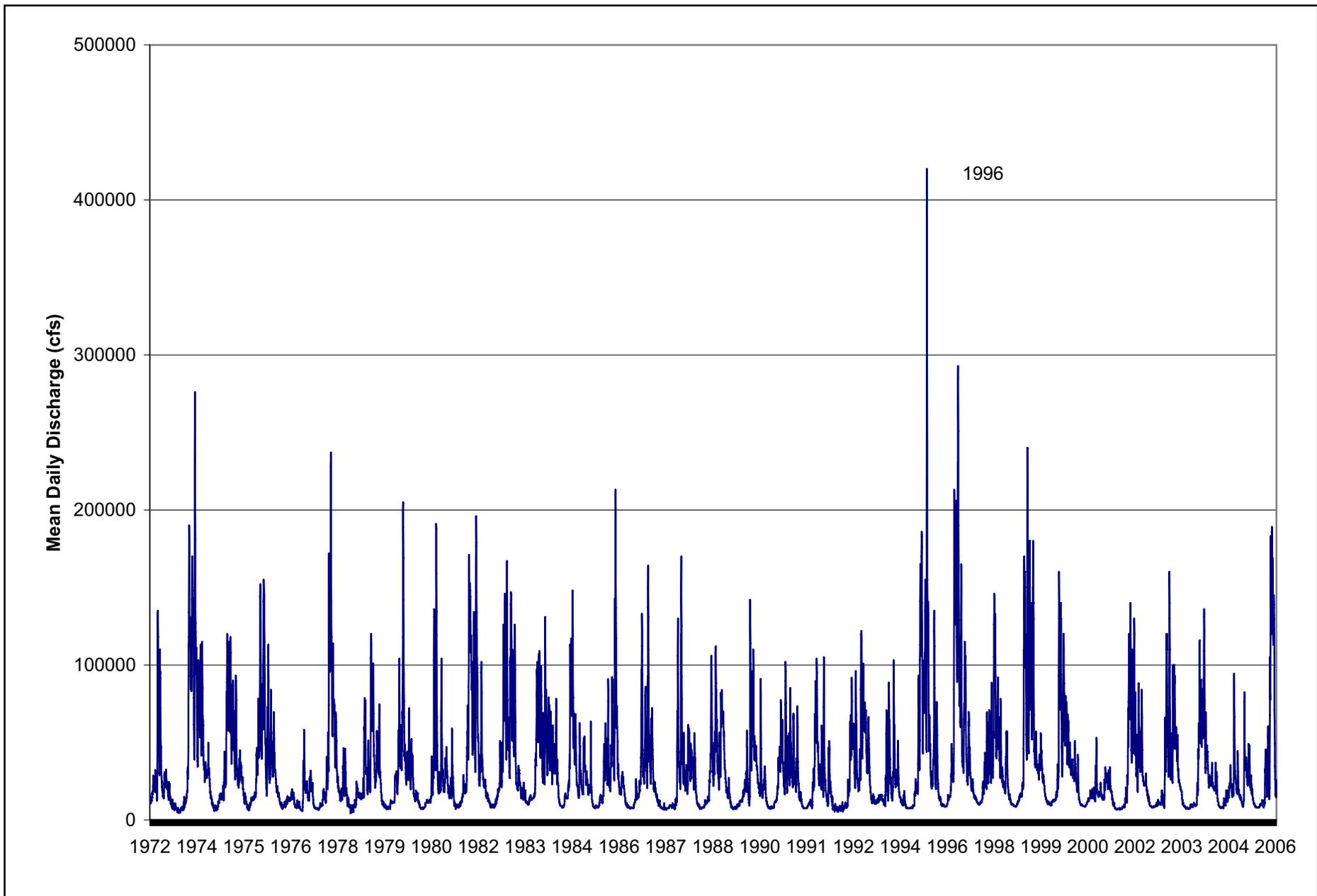
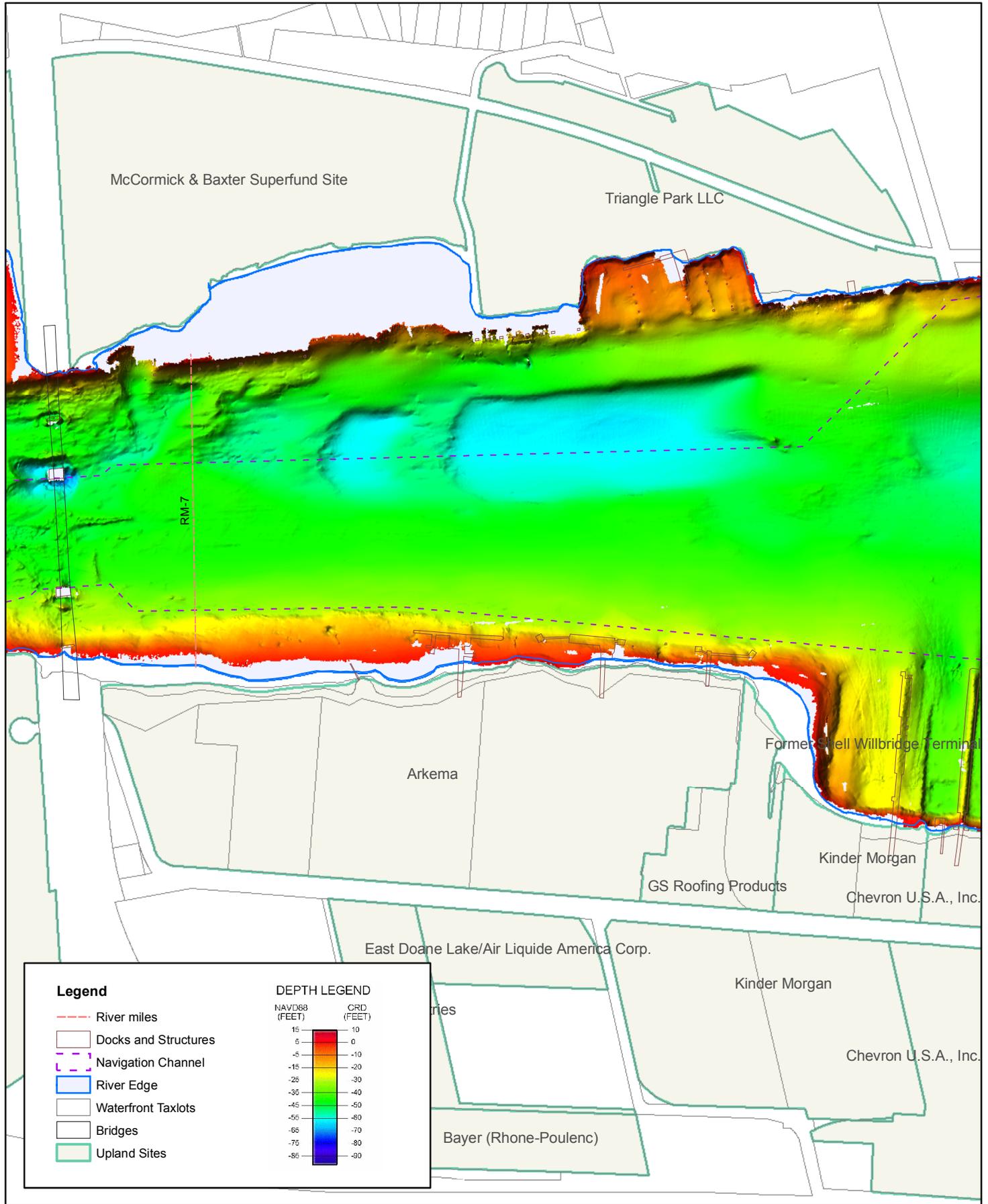
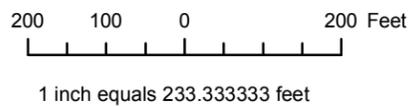
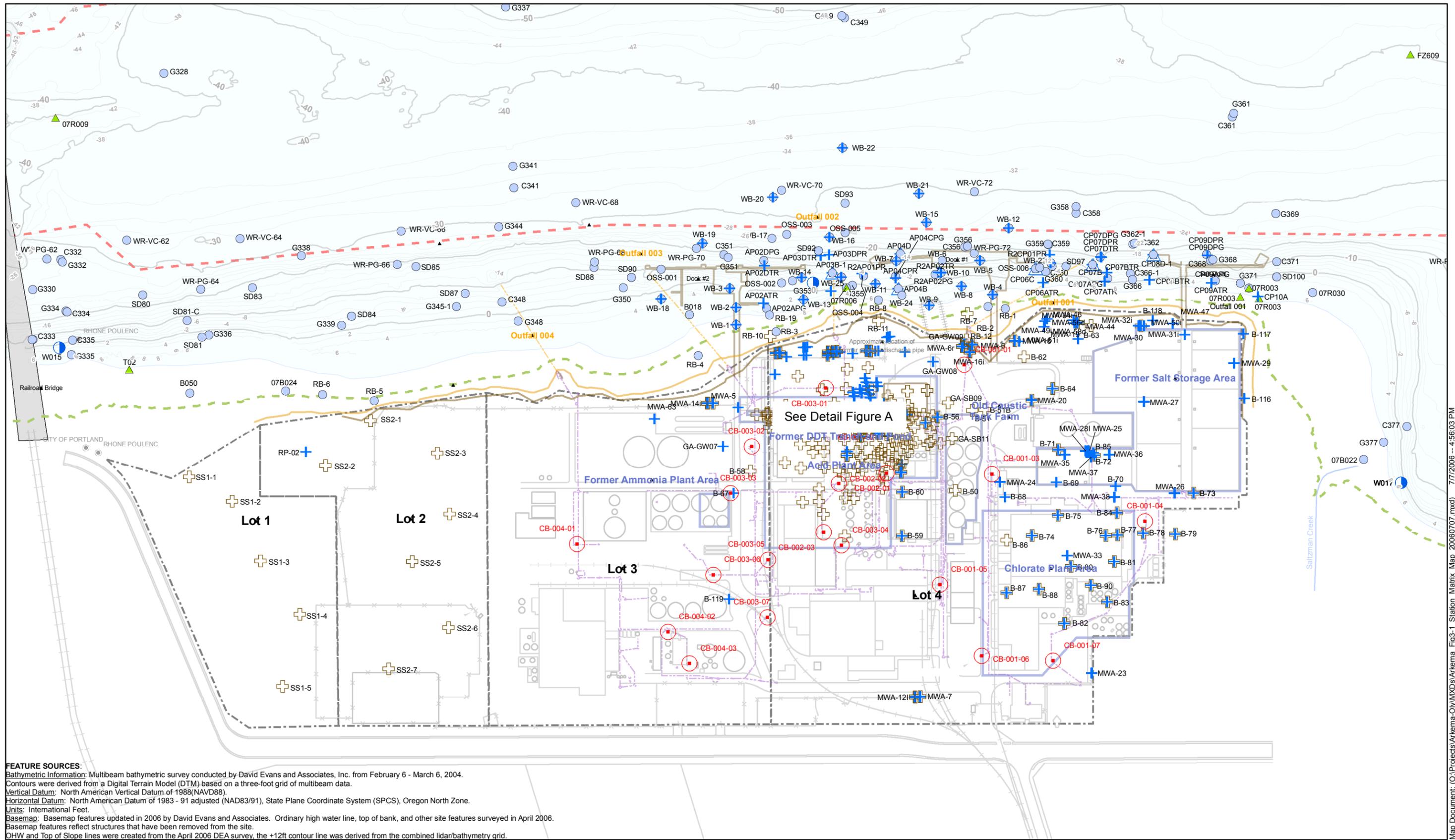


Figure 2-2. Historical Daily Mean Flows Recorded from the USGS Gauge Located on the Morrison Bridge





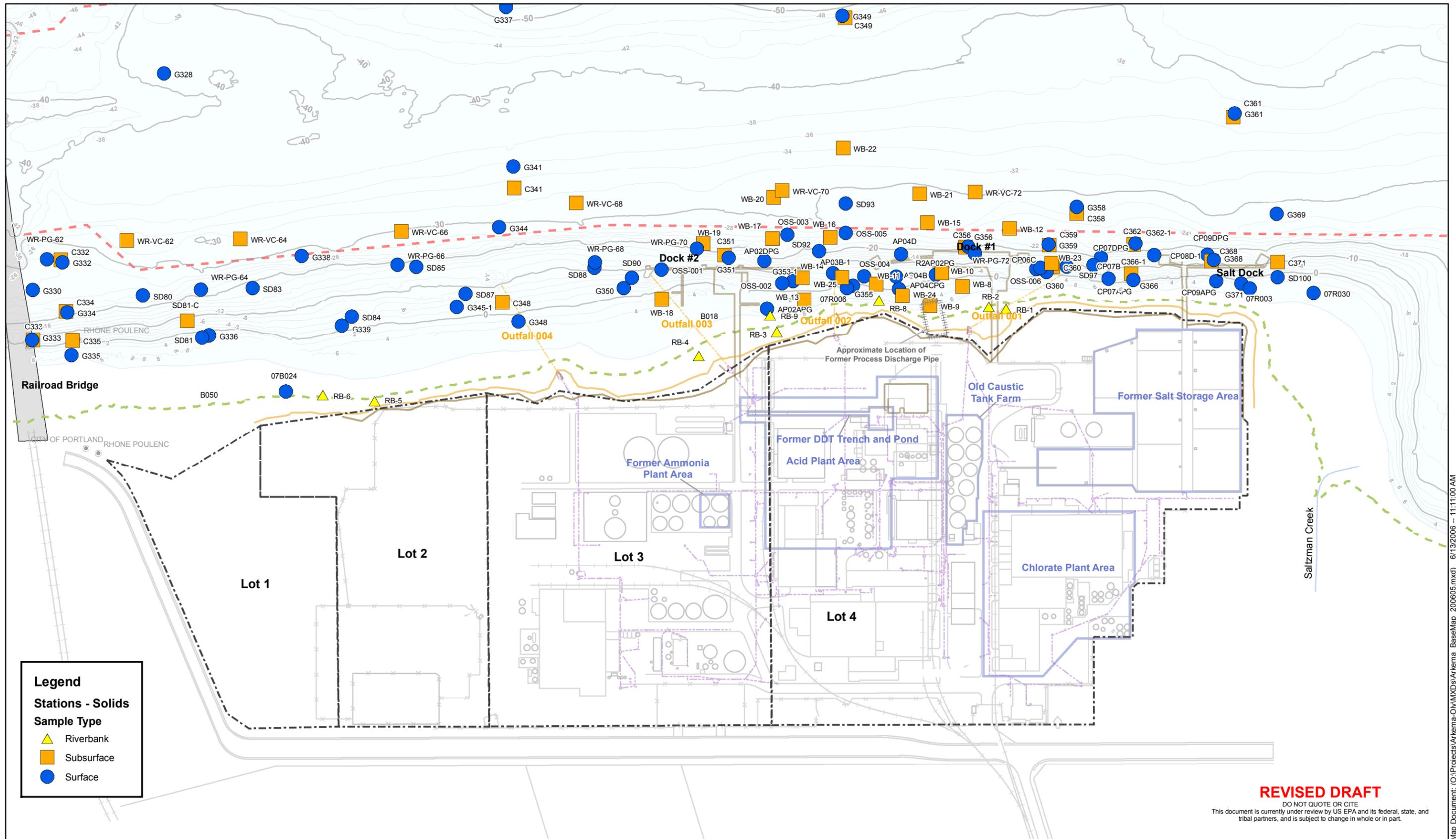


- |              |               |                    |                       |                     |
|--------------|---------------|--------------------|-----------------------|---------------------|
| Tissue       | Pore Water    | River              | Bathymetry (2, 10 ft) | Ordinary High Water |
| Sediment     | Surface Water | Navigation Channel | Index Contour         | Top of Bank         |
| Soil         | Groundwater   | Bridges            | 2' contour            | E-Sewer-L           |
| Catch Basins | 12ft Contour  |                    |                       | Storm Drain         |

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**Figure 3-1a**  
**Arkema EE/CA**  
**Historical Station Locations**  
**(All Samples)**





**Legend**

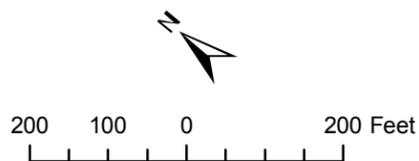
**Stations - Solids**

**Sample Type**

- ▲ Riverbank
- Subsurface
- Surface

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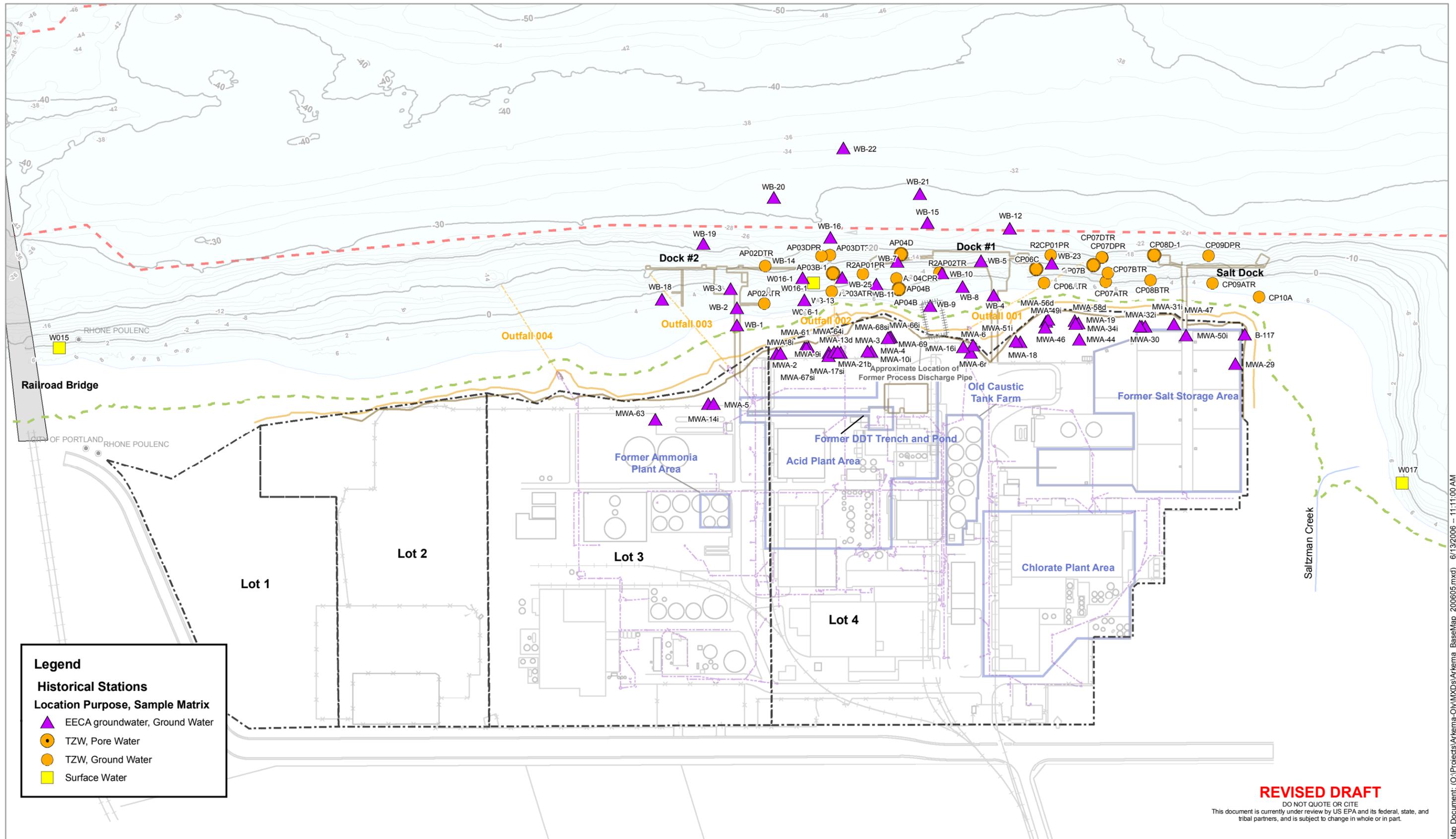


**FEATURE SOURCES:**  
 Bathymetric Information: Multibeam bathymetric survey conducted by David Evans and Associates, Inc. from February 6 - March 6, 2004. Contours were derived from a Digital Terrain Model (DTM) based on a three-foot grid of multibeam data.  
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 Lot Lines: Created by importing pdf file from ERM, georeferencing to CAD lines (RMS error = 2.3042) and heads-up digitizing the lot lines.

- Ordinary High Water
- Top of Bank
- E-Sewer-L
- Storm Drain
- - - 12ft\_Contour
- - - Navigation Channel
- - - Property Lines
- Bridges
- River
- Outfalls

**Figure 3-2**  
**Arkema Site**  
**Historical Sample Locations**  
**(Sediment and Riverbank Soil Samples)**

Map Document: (O:\Projects\Arkema-01\MXDs\Arkema\_BaseMap\_200605.mxd) 6/13/2006 11:11:00 AM



**Legend**

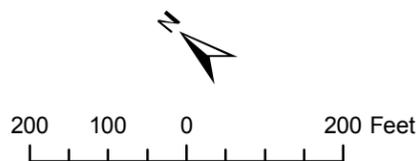
**Historical Stations**

**Location Purpose, Sample Matrix**

- ▲ EECA groundwater, Ground Water
- TZW, Pore Water
- TZW, Ground Water
- Surface Water

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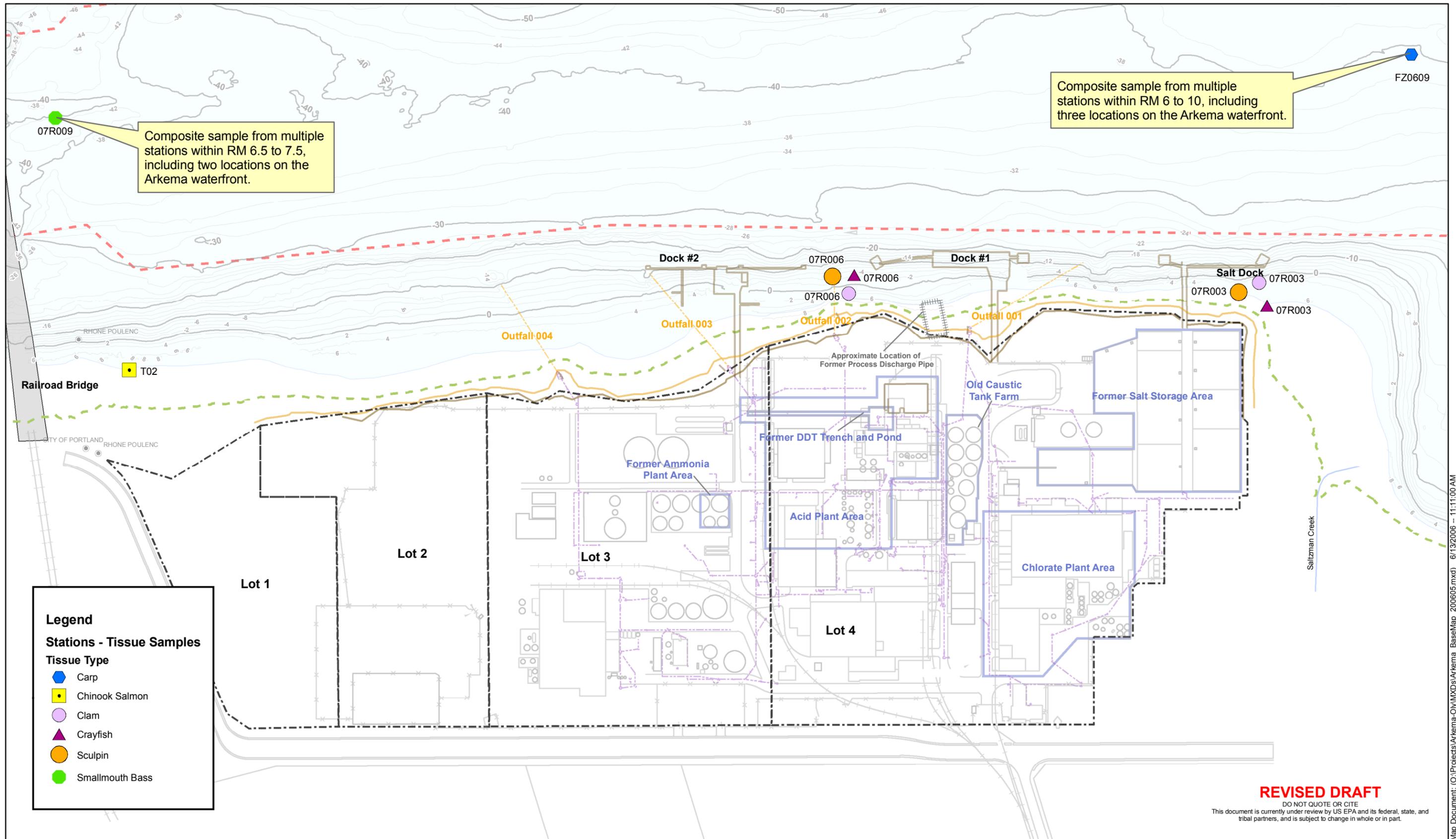


**FEATURE SOURCES:**  
 Bathymetric Information: Multibeam bathymetric survey conducted by David Evans and Associates, Inc. from February 6 - March 6, 2004. Contours were derived from a Digital Terrain Model (DTM) based on a three-foot grid of multibeam data.  
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- Ordinary High Water
- Top of Bank
- E-Sewer-L
- Storm Drain
- - - 12ft Contour
- - - Navigation Channel
- - - Property Lines
- Bridges
- River
- Outfalls

**Figure 3-3**  
**Arkema Site**  
**Historical Station Locations**  
**(Water Samples)**

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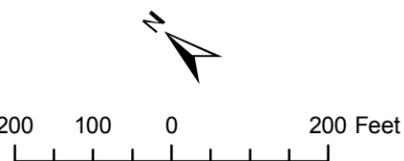


**Legend**

**Stations - Tissue Samples**

**Tissue Type**

- ◆ Carp
- Chinook Salmon
- Clam
- ▲ Crayfish
- Sculpin
- Smallmouth Bass



**FEATURE SOURCES:**  
 Bathymetric Information: Multibeam bathymetric survey conducted by David Evans and Associates, Inc. from February 6 - March 6, 2004. Contours were derived from a Digital Terrain Model (DTM) based on a three-foot grid of multibeam data.  
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<span style="color: orange;">—</span> Ordinary High Water	<span style="color: green;">- - -</span> 12ft Contour	<span style="color: red;">- - -</span> Navigation Channel	<span style="border: 1px solid black;"> </span> Property Lines
<span style="color: brown;">—</span> Top of Bank	<span style="color: green;">■</span> Bridges	<span style="color: blue;">—</span> River	<span style="border: 1px dashed black;"> </span> Outfalls
<span style="color: purple;">- - -</span> E-Sewer-L	<span style="color: grey;">■</span>		
<span style="color: orange;">- - -</span> Storm Drain			

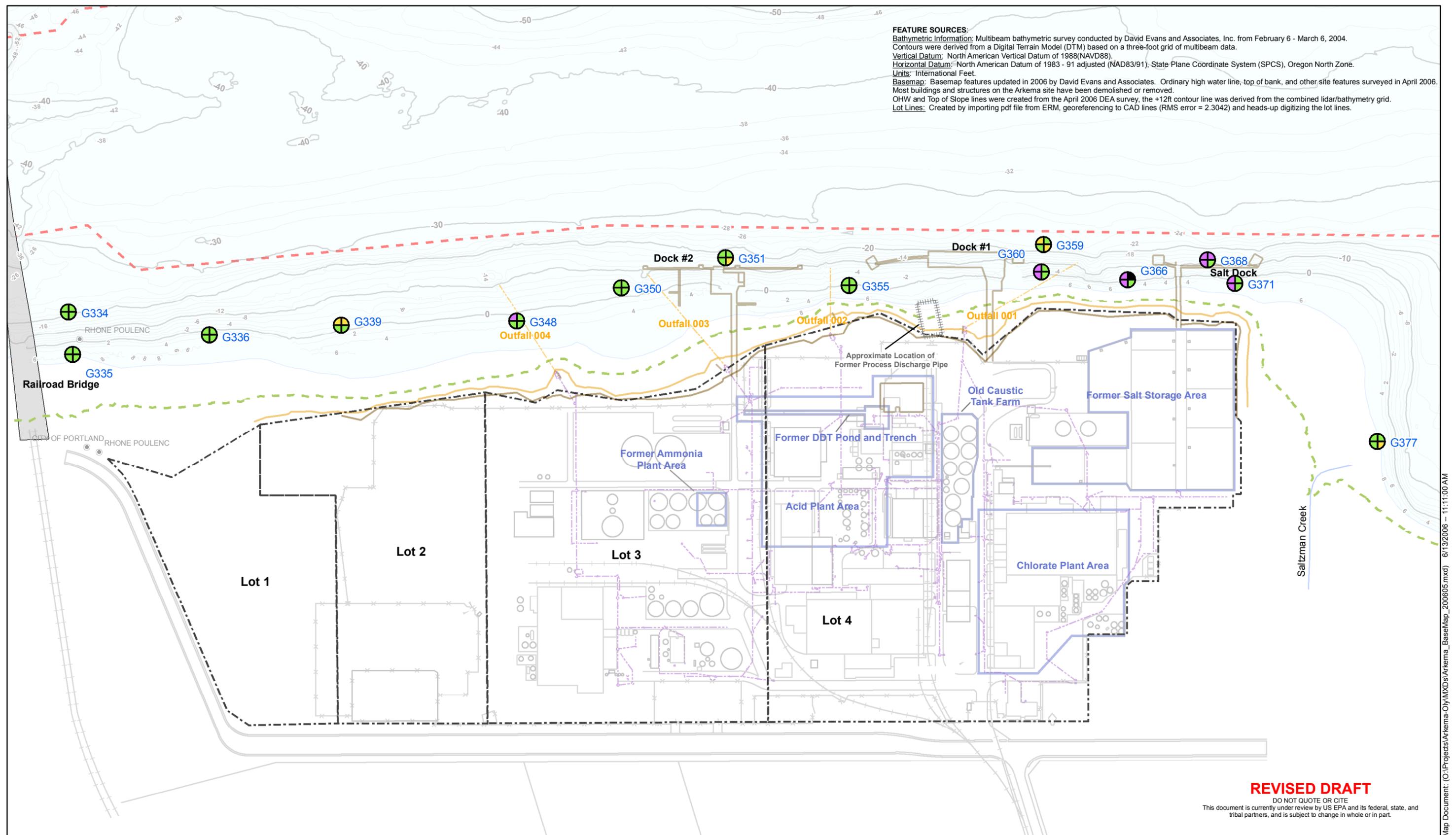
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**Figure 3-4**  
**Arkema Site**  
**Historical Station Locations**  
**(Tissue Samples)**

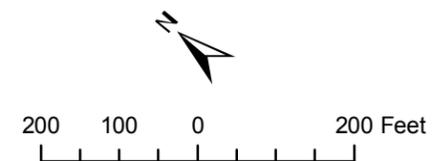


Map Document: (O:\Projects\Arkema-OWM\XDS\Arkema\_Basemap\_200605.mxd) 6/13/2006 11:11:00 AM

**FEATURE SOURCES:**  
 Bathymetric Information: Multibeam bathymetric survey conducted by David Evans and Associates, Inc. from February 6 - March 6, 2004. Contours were derived from a Digital Terrain Model (DTM) based on a three-foot grid of multibeam data.  
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- Ordinary High Water
- Top of Bank
- - - E-Sewer-L
- - - Storm Drain
- - - 12ft Contour
- Bridges
- Navigation Channel
- River
- Outfalls
- Property Lines

Biassay Sample	Chironomid Mean % Mortality (MT-Mc) CT_MnPc_Mt	Hyalella Mean % Mortality (MT-Mc) HY_MnPc_Mt	Chironomid Mean Weight (Wt/Wc) CT_Mn_Wt	Hyalella Mean Weight (Wt/Wc) HY_Mn_Wt
⊕	≤ 10%	≤ 10%	≥ 0.8	≥ 0.75
⊕	> 10% and ≤ 25%	> 10% and ≤ 25%	< 0.8 and ≥ 0.7	< 0.75 and ≥ 0.6
⊕	≥ 25%	> 25%	< 0.7	< 0.6
○	No Data			

**Figure 3-5**  
**Arkema EE/CA**  
**Portland Harbor Stage 2**  
**Bioassay Testing Results**

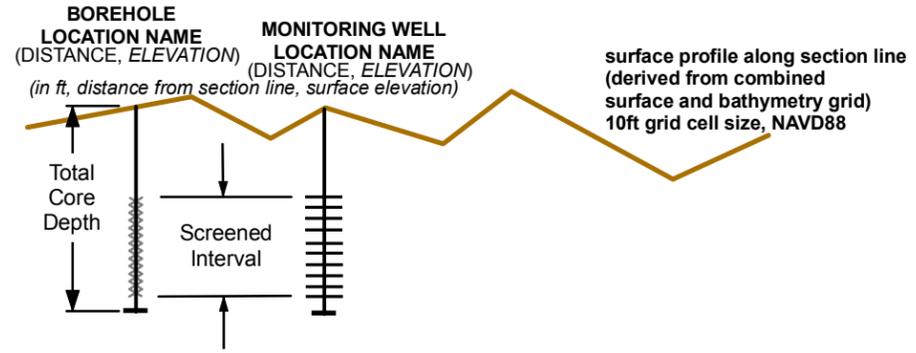
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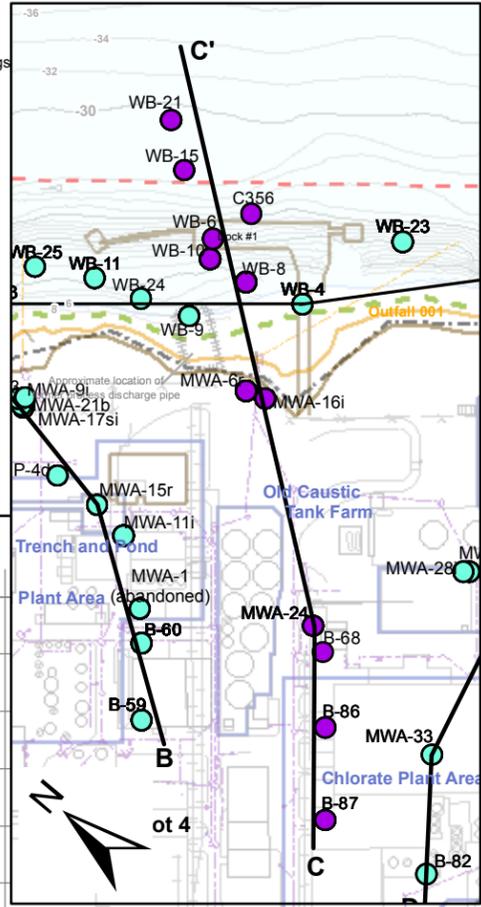
Notes:

1) Due to projection onto the section line, lithology was estimated at some well and borehole stations based on best professional judgment



Map View Legend

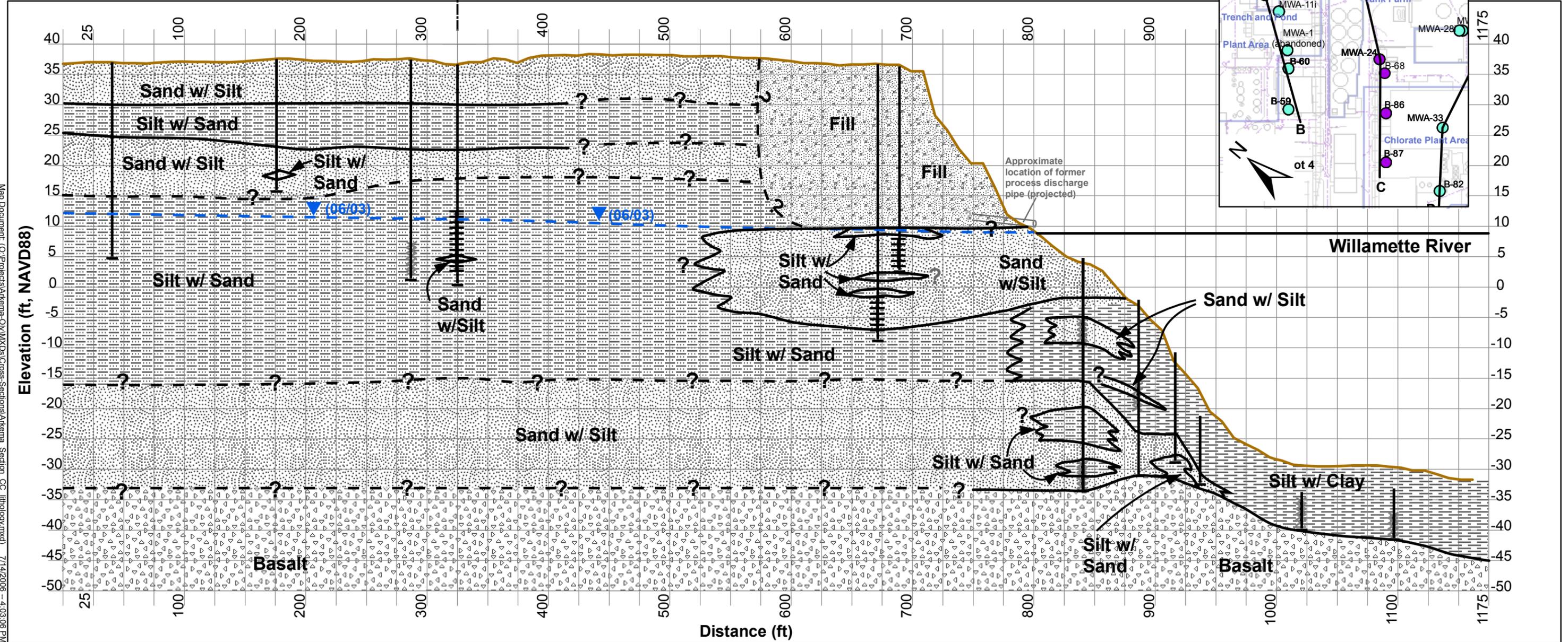
- Section\_CC Selected Wells and Borings
- Section\_AA
- Section\_BB
- Section\_DD
- Navigation Channel
- River
- 12ft\_Contour
- Ordinary High Water
- Top of Bank
- Bathymetry (2, 10 ft)**
- Index Contour
- 2' contour



Plant West  
C

Plant East  
C'

Section C-C'



Map Document: (O:\Projects\Arkema-City\MXDs\Cross-Sections\Arkema\_Section\_C-C'\_lithology.mxd) 7/14/2006 -- 4:03:06 PM



Section View: Vertical Exaggeration: 5X

- Fill
- Silt with some clay and fine sand
- Sand with varying amounts of silt
- Basalt
- Silt with varying amounts of fine sand
- Inferred soil or geologic contact (queried where uncertain)
- Shallow-zone groundwater surface (approximate) June 2003; based on monitoring well data only.

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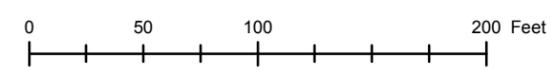
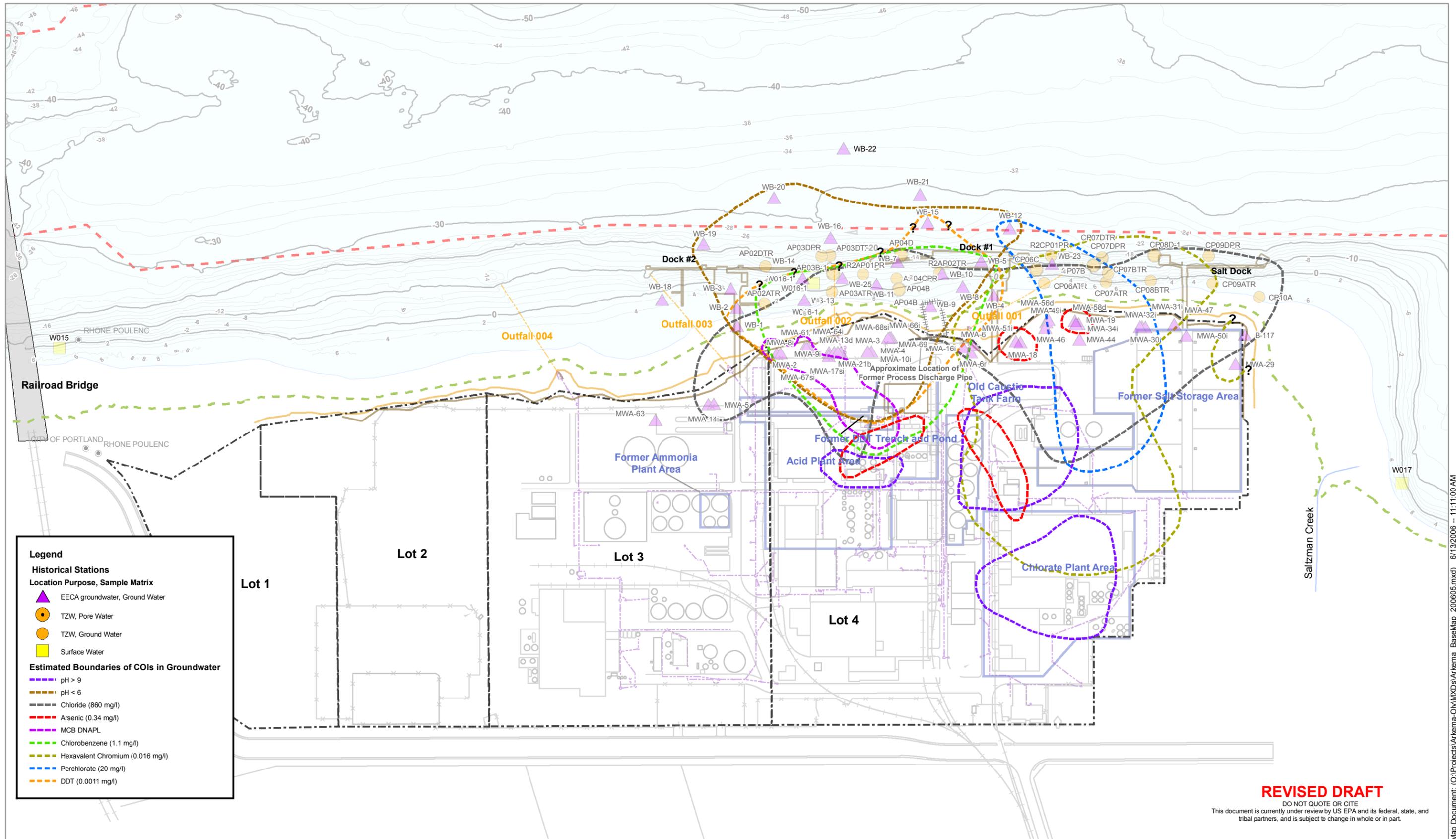


Figure 3-8  
Cross-Section C-C'





**Legend**

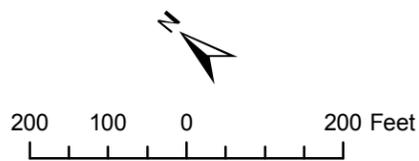
**Historical Stations**  
**Location Purpose, Sample Matrix**

- ▲ EECA groundwater, Ground Water
- TZW, Pore Water
- TZW, Ground Water
- Surface Water

**Estimated Boundaries of COIs in Groundwater**

- pH > 9
- pH < 6
- Chloride (860 mg/l)
- Arsenic (0.34 mg/l)
- MCB DNAPL
- Chlorobenzene (1.1 mg/l)
- Hexavalent Chromium (0.016 mg/l)
- Perchlorate (20 mg/l)
- DDT (0.0011 mg/l)

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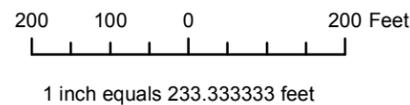
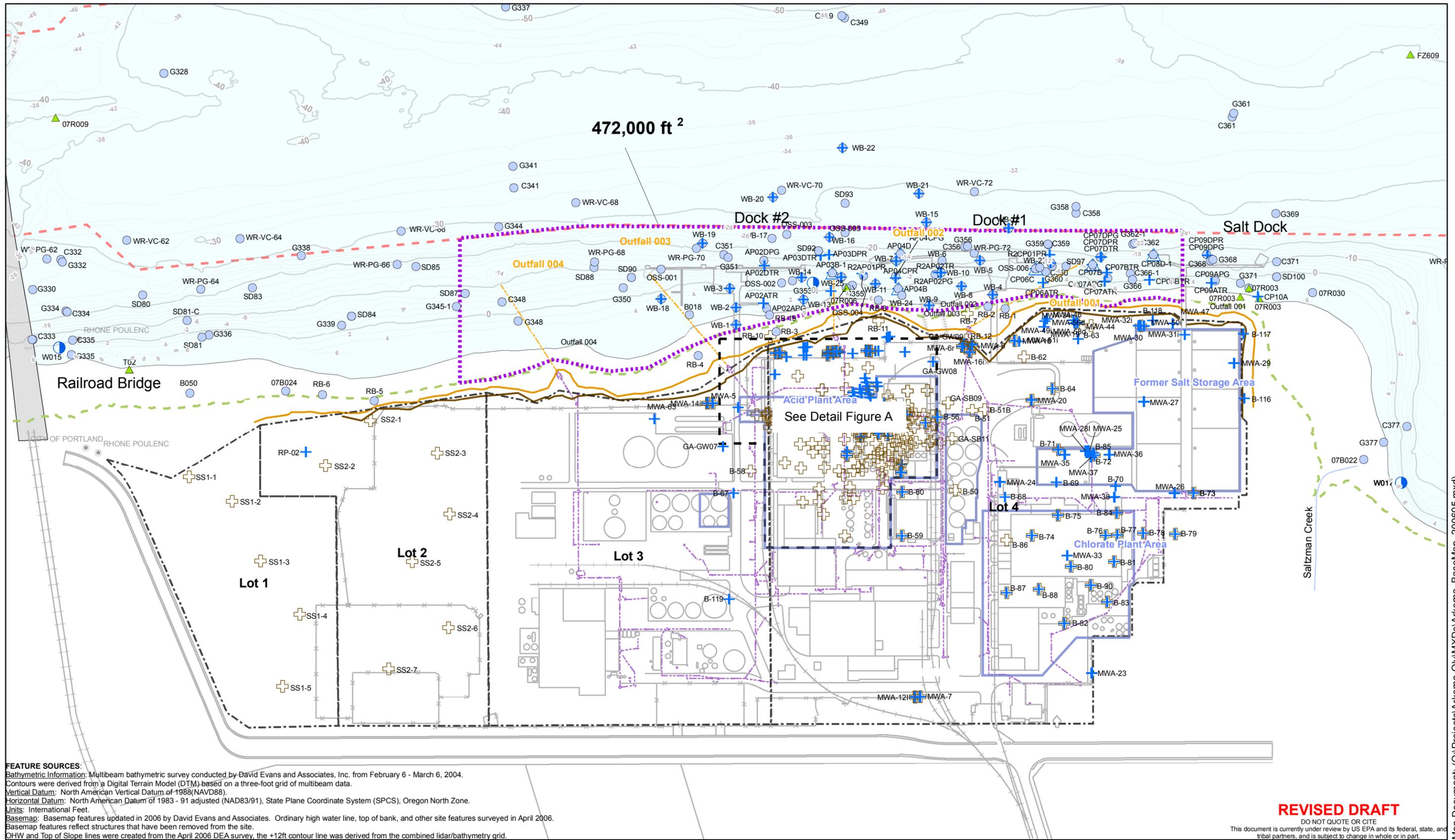


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 Bathymetric Information: Multibeam bathymetric survey conducted by David Evans and Associates, Inc. from February 6 - March 6, 2004. Contours were derived from a Digital Terrain Model (DTM) based on a three-foot grid of multibeam data.  
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- Ordinary High Water
- Top of Bank
- E-Sewer-L
- Storm Drain
- 12ft Contour
- Navigation Channel
- Property Lines
- Bridges
- River
- Estimated Boundaries of COIs in Groundwater
- Outfalls

**Figure 4-3**  
**Arkema Site**  
**Estimated Boundaries of COIs in Groundwater**

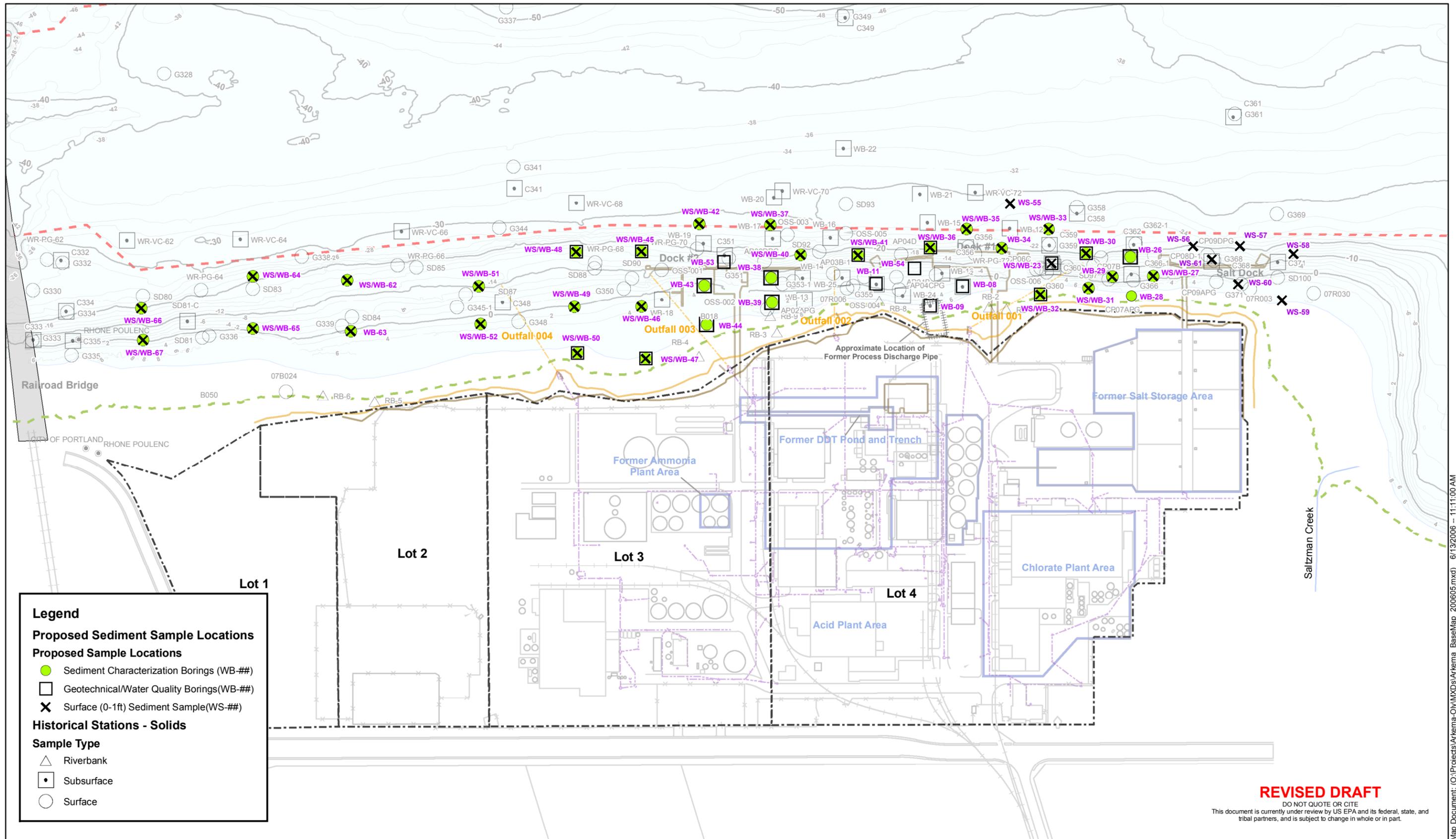
Map Document: (O:\Projects\Arkema-OW\MXDs\Arkema\_BaseMap\_200605.mxd) 6/13/2006 11:11:00 AM



- |            |                 |                            |                    |                       |
|------------|-----------------|----------------------------|--------------------|-----------------------|
| ▲ Tissue   | ▲ Pore Water    | ■ Bridges                  | Navigation Channel | — Ordinary High Water |
| ● Sediment | ● Surface Water | ■ Preliminary RAA Boundary | — River            | — Top of Bank         |
| ⊕ Soil     | ⊕ Groundwater   | ⊕ 12ft Contour             | — Sewer            | — Storm Drain         |
|            |                 |                            | ● Outfalls         |                       |

**Figure 6-1**  
**Arkema**  
**Preliminary RAA**

Map Document: (O:\Projects\Arkema-Oily\MXDs\Arkema\_BaseMap\_200605.mxd) 5/26/2006 -- 5:33:27 PM



**Legend**

**Proposed Sediment Sample Locations**

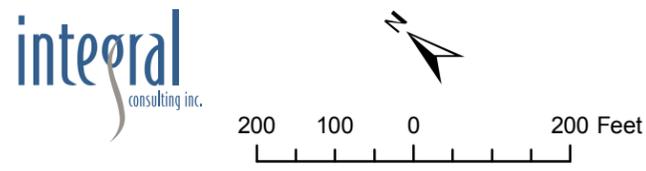
- Sediment Characterization Borings (WB-##)
- Geotechnical/Water Quality Borings(WB-##)
- ✕ Surface (0-1ft) Sediment Sample(WS-##)

**Historical Stations - Solids**

**Sample Type**

- △ Riverbank
- Subsurface
- Surface

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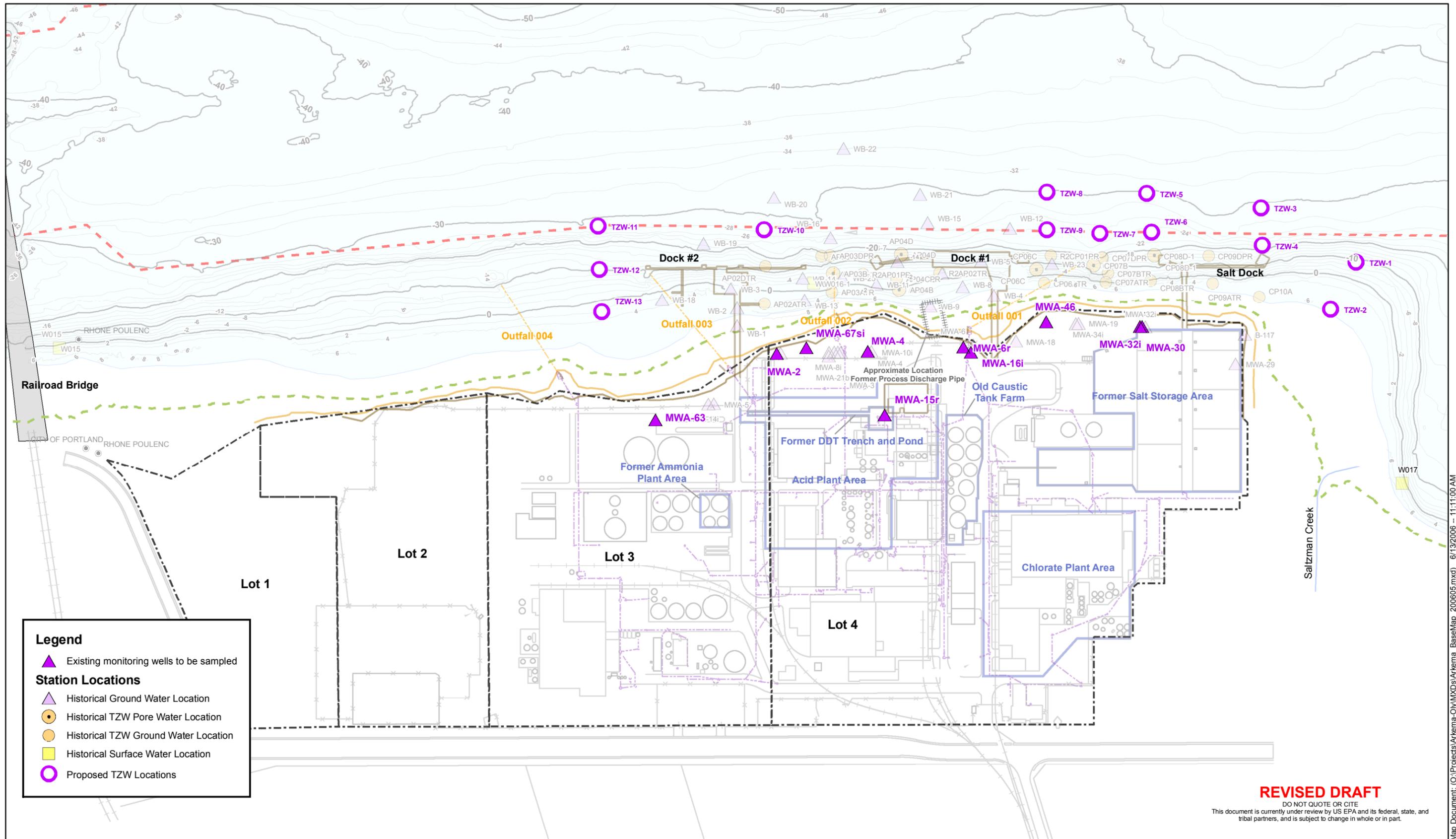


**FEATURE SOURCES:**  
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- Ordinary High Water
- Top of Bank
- E-Sewer-L
- Storm Drain
- 12ft\_Contour
- Bridges
- Navigation Channel
- River
- Property Lines
- Outfalls

**Figure 8-1**  
**Arkema Site**  
**Proposed Sediment**  
**Sampling Locations**

Map Document: (O:\Projects\Arkema-01\MapDocs\Arkema\_BaseMap\_200605.mxd) 6/13/2006 11:11:00 AM

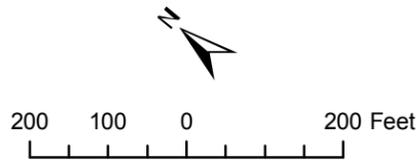


**Legend**

- ▲ Existing monitoring wells to be sampled
- Station Locations**
- ▲ Historical Ground Water Location
- Historical TZW Pore Water Location
- Historical TZW Ground Water Location
- Historical Surface Water Location
- Proposed TZW Locations

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— Ordinary High Water	12ft_Contour	Navigation Channel	Property Lines
— Top of Bank	— Bridges	— River	— Outfalls
— E-Sewer-L	— Storm Drain		

**Figure 8-2**  
**Arkema Site**  
**Proposed Water Sampling Locations**

Map Document: (O:\Projects\Arkema-OW\MXDs\Arkema\_BaseMap\_200605.mxd) 6/13/2006 11:11:00 AM

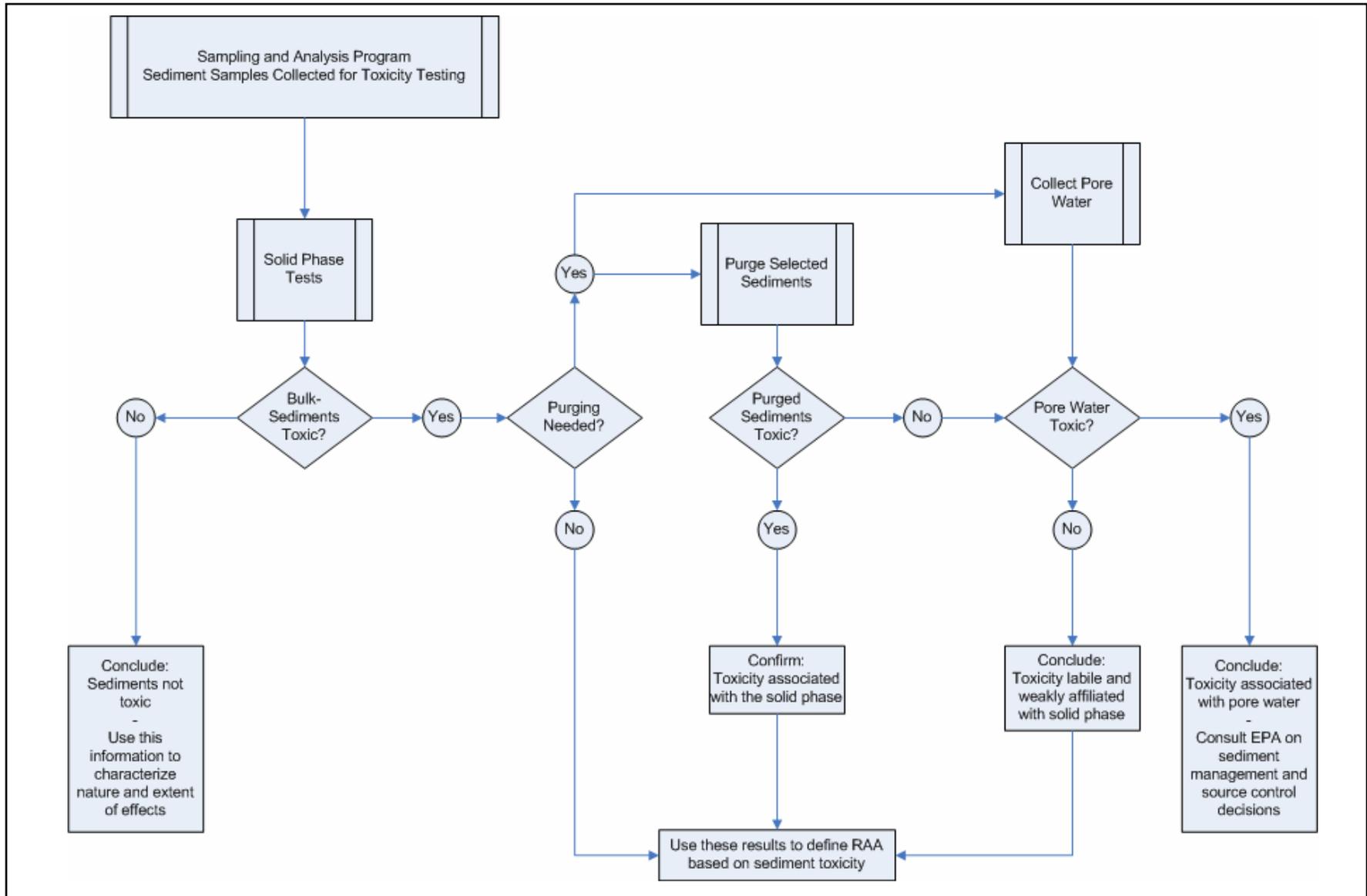
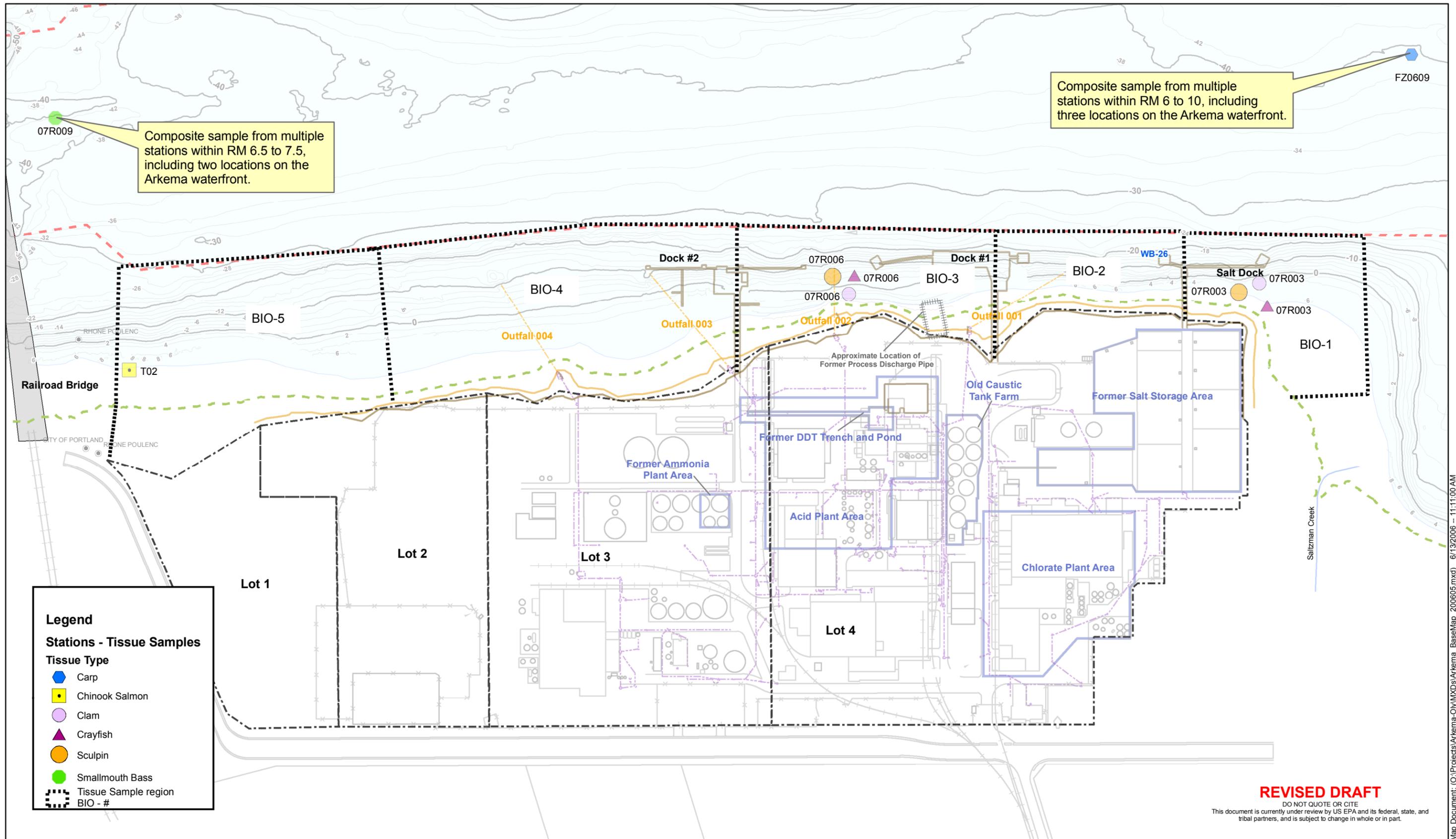


Figure 8-3. General Framework<sup>a</sup> for Sediment Toxicity Testing Using a Combination of Bulk-sediment, Purged Sediment, and Pore-water Tests to Characterize the Nature and Extent of Contamination and Define the Remedial Action Area.

<sup>a</sup>Specific tests and methods are provided in the FSP and QAPP.



**Legend**

**Stations - Tissue Samples**

**Tissue Type**

- Carp
- Chinook Salmon
- Clam
- ▲ Crayfish
- Sculpin
- Smallmouth Bass
- Tissue Sample region
- BIO - #

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<span style="border-bottom: 1px solid orange; width: 20px; display: inline-block;"></span> Ordinary High Water	<span style="border-bottom: 1px dashed green; width: 20px; display: inline-block;"></span> 12ft Contour	<span style="border-bottom: 1px dashed red; width: 20px; display: inline-block;"></span> Navigation Channel	<span style="border-bottom: 1px dashed black; width: 20px; display: inline-block;"></span> Property Lines
<span style="border-bottom: 1px solid brown; width: 20px; display: inline-block;"></span> Top of Bank	<span style="border: 1px solid gray; width: 20px; height: 10px; display: inline-block;"></span> Bridges	<span style="border: 1px solid lightblue; width: 20px; height: 10px; display: inline-block;"></span> River	<span style="border: 1px dashed black; width: 20px; height: 10px; display: inline-block;"></span> Outfalls
<span style="border-bottom: 1px dashed purple; width: 20px; display: inline-block;"></span> E-Sewer-L			
<span style="border-bottom: 1px dashed orange; width: 20px; display: inline-block;"></span> Storm Drain			

200 100 0 200 Feet

**Figure 8-4**  
**Arkema Site**  
**Proposed Tissue**  
**Sampling Locations**

Map Document: (O:\Projects\Arkema-01\MapDocs\Arkema\_BaseMap\_200605.mxd) 6/13/2006 11:11:00 AM

# DRAFT SCHEDULE

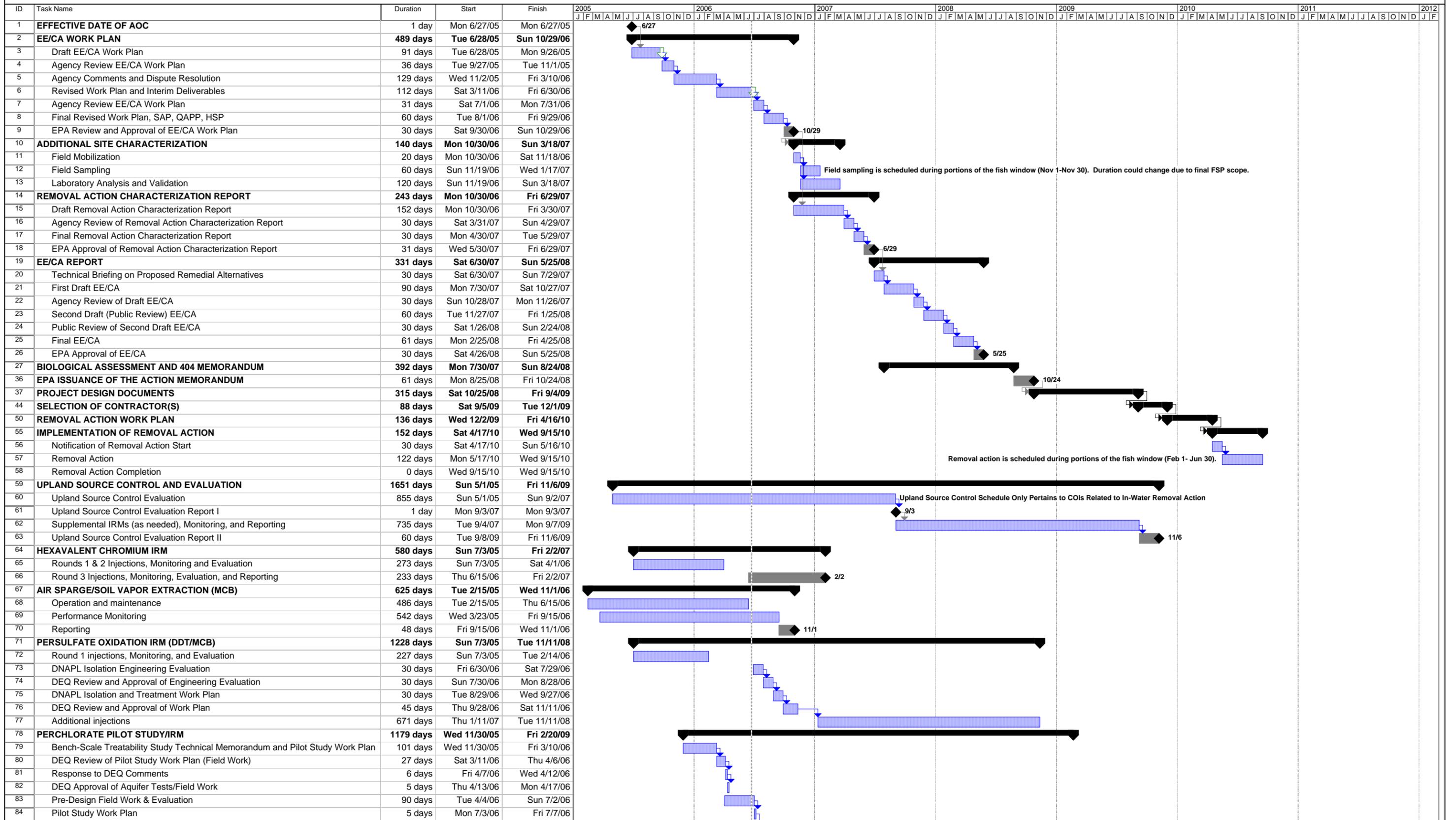
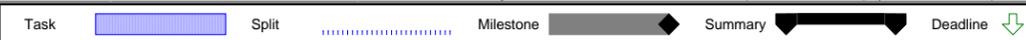


Figure 9-1 Project Schedule



Note: Dates and duration of tasks shaded in gray are dependent on timing of agency review.



# DRAFT SCHEDULE

- 12 **Field Sampling**  
*Field sampling is scheduled during portions of the fish window (Nov 1-Nov 30). Duration could change due to final FSP scope.*
- 57 **Removal Action**  
*Removal action is scheduled during portions of the fish window (Feb 1- Jun 30).*
- 60 **Upland Source Control Evaluation**  
*Upland Source Control Schedule Only Pertains to COIs Related to In-Water Removal Action*
- 109 **Preliminary Hot Spot Evaluation and Submittal**  
*Comparison to Pre-Calculated, Highly Concentrated Hot Spot Values.*
- 143 **RECORD OF DECISION (With Contingencies)**  
*Assumes 60 day DEQ review and 30 day public comment period.*

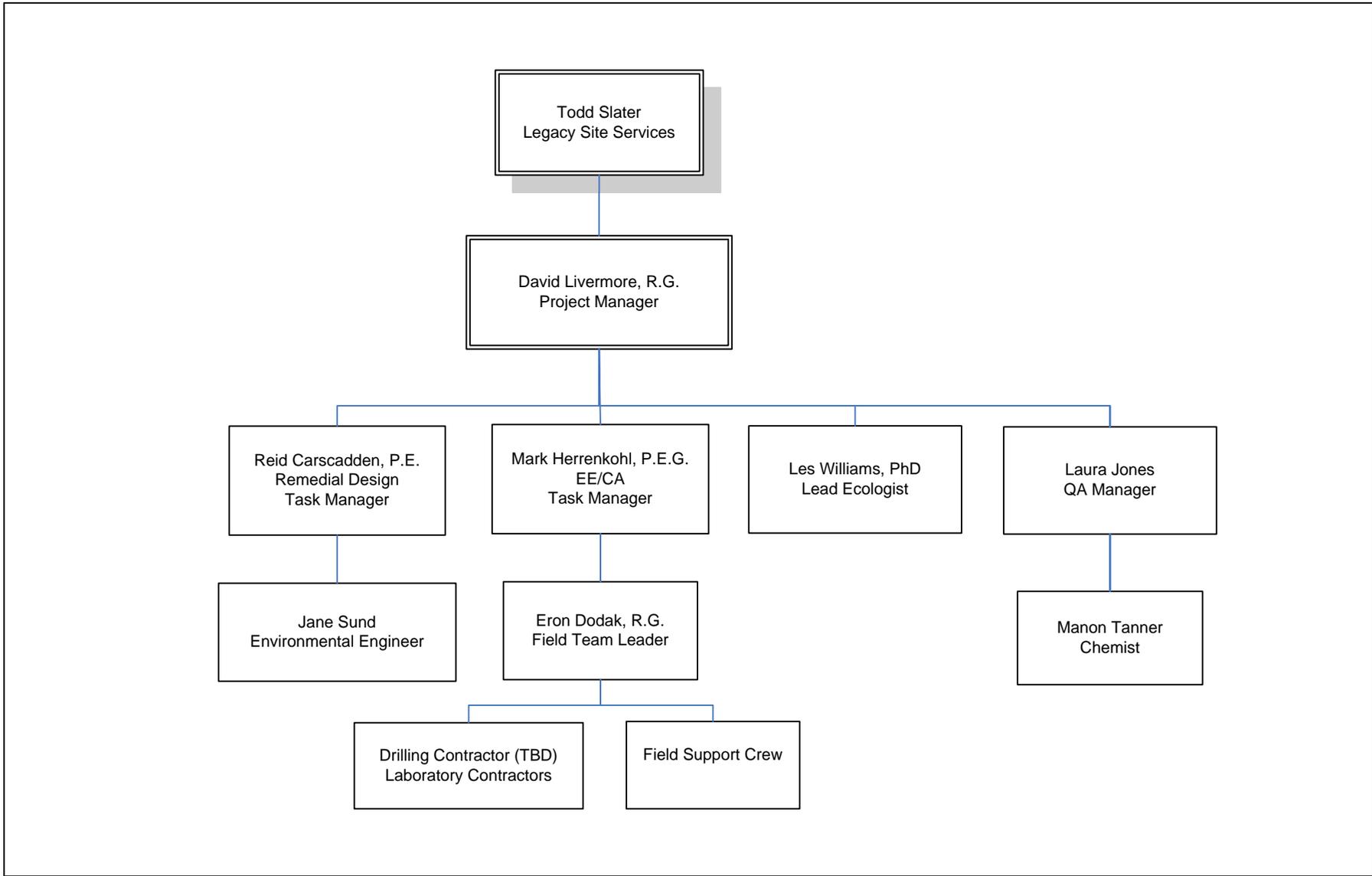


Figure 10-1. Arkema EE/CA Project Team

**DRAFT**