



# Former ASARCO East Helena Facility Prickly Pear Creek Realignment Project

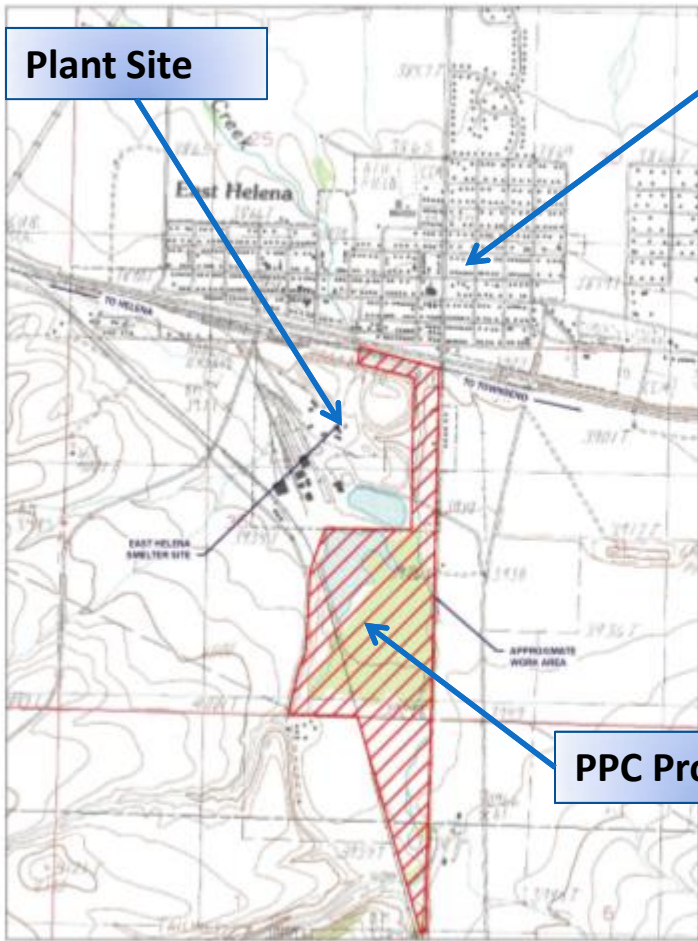
April 29, 2014

Presented by Joel Gerhart, Pioneer Technical Services, Inc. and Jay Dehner, CH2M HILL  
On Behalf of the Montana Environmental Custodial Trust



## PRESENTATION OUTLINE

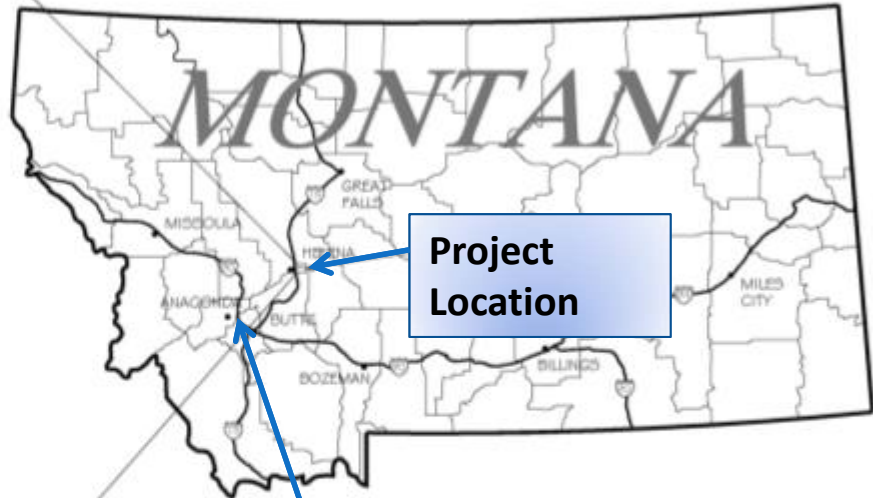
- ✓ Orientation
- ✓ Cleanup Model - RCRA
- ✓ Corrective Measures Strategy
- ✓ South Plant Hydraulic Controls
- ✓ PPC Stream Design and Challenges



East Helena

Plant Site

PPC Project Area



Conference

Project Location

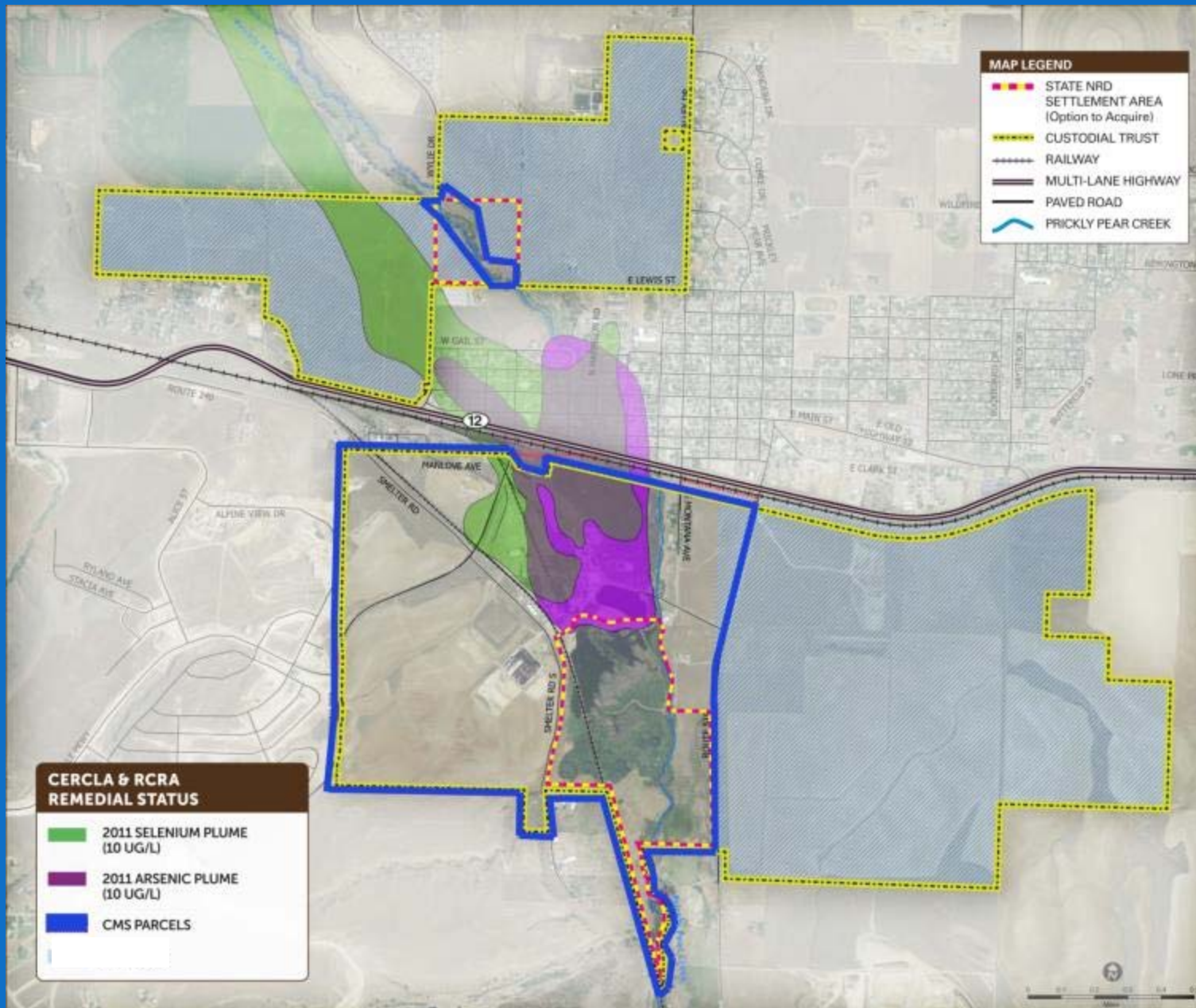
<p>Scale: 1" = 100'</p>	<p>FIGURE 1 PROJECT LOCATION MAP PRICKLY PEAR CREEK REALIGNMENT PROJECT</p> <p>PIONEER TECHNICAL SERVICES, INC. 301 E. BRIDGEMAN HELENA, MONTANA 59601 (406) 457-8222</p>	<p>DATE: 3/13/14</p>
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## Over 100 Years ASARCO Operations Caused Significant Environmental Damage

- Widespread surface soil contamination from stack emissions (addressed under CERCLA)
- Significant soil contamination in former operating areas (surface and at depth)
- Contaminated groundwater migrating from the former Smelter site



# Areas Being Addressed By Custodial Trust Under RCRA



## RCRA Corrective Action Overview

- Conducted pursuant to First Modification to the 1998 Consent Decree
- USEPA is lead agency
- Implemented by The Montana Environmental Trust Group, LLC, Trustee of the Montana Environmental Custodial Trust
- Remedy Performance Standards
  - Protection of human health and the environment
  - Control the source(s) of contamination
  - Meet Media Cleanup Objectives

## Work Completed to Date

- RCRA Facility Investigation (RFI)
- Groundwater Modeling
- Corrective Measures Study (CMS) underway to identify and evaluate potential remedies
- Demolition of most existing buildings and infrastructure
- Interim Measures being implemented concurrent with CMS

Highway 12/East Helena

End of PPC Construction

Plant Site

Lower Lake

Upper Lake

South Plant Area

Slag Pile

Prickly Pear Creek

Smelter Dam

Tito Park





## East Helena Smelter Site Interim Measures Conceptually Approved by EPA in August, 2012

- Objectives

- Reduce contaminant mass migrating from the former Smelter Site groundwater
- Eliminate the potential for people and wildlife to have direct contact with groundwater and onsite surface soil containing high concentrations of inorganic contaminants

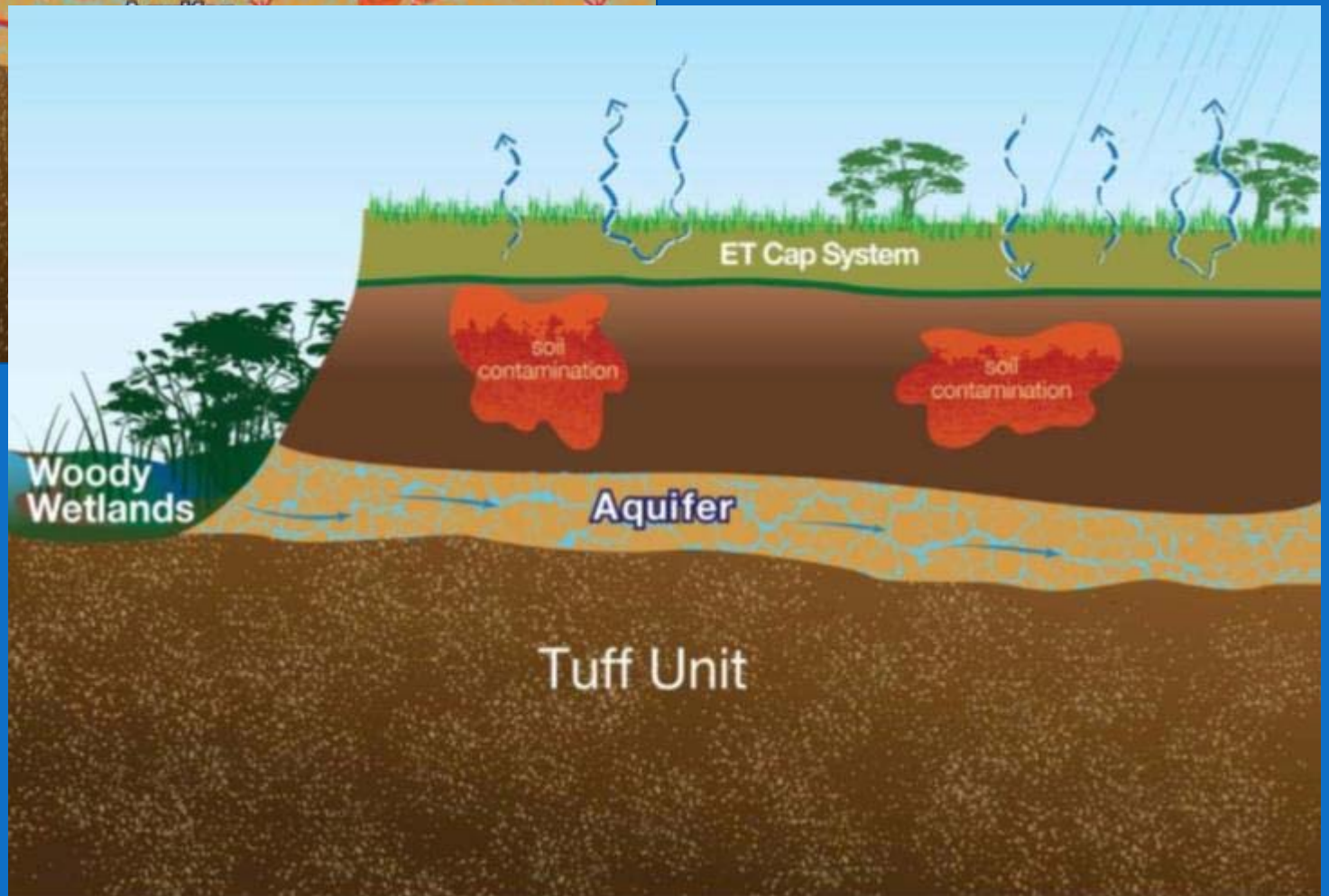
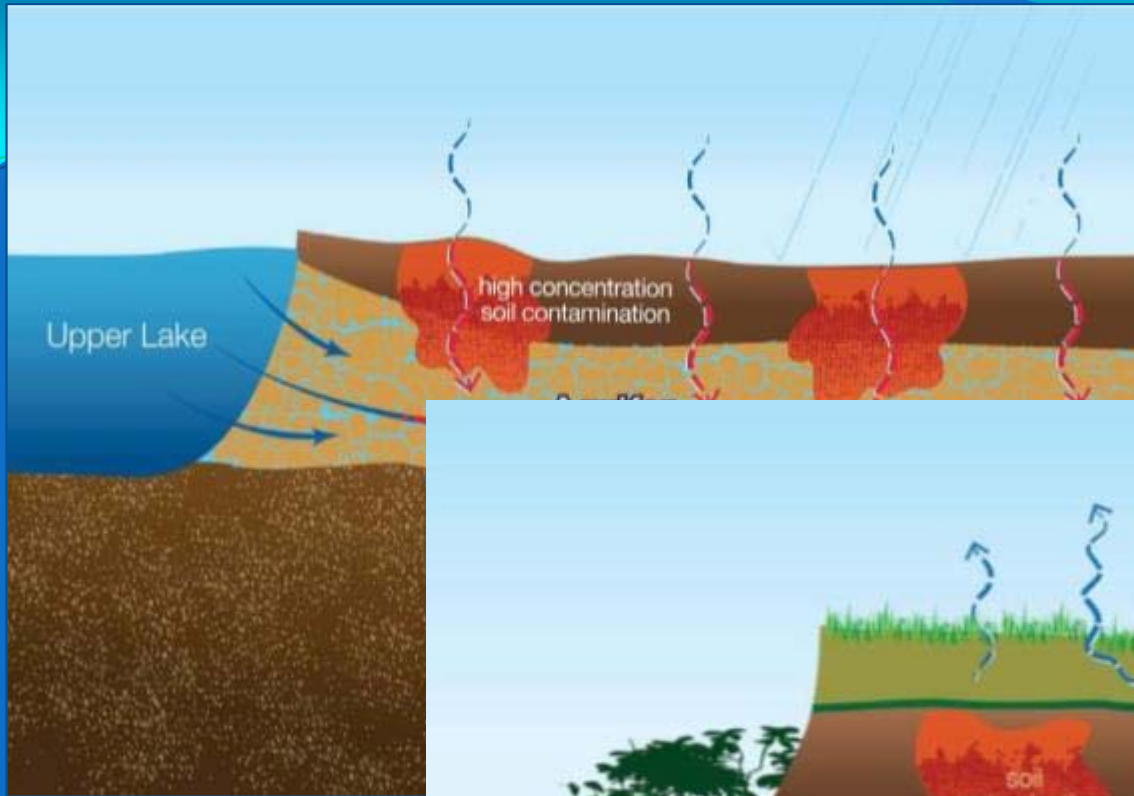
- Three Inter-related Interim Measures

- South Plant Hydraulic Control (SPHC)
- Evapotranspirative (ET) Cover System
- Source Removal

## SPHC Objectives

- Eliminate standing water on the south end of the site (Upper and Lower Lakes) which will result in:
  - ✓ Reduced surface water recharge to groundwater
  - ✓ Lower groundwater elevations
  - ✓ Potentially, reduced hydraulic gradients across the site to decrease groundwater flow velocity
  - ✓ Substantial reduction of off-site contaminant transport

# SPHC IM Concept Overview



# How Does Prickly Pear Creek Realignment Fit into Cleanup?

- ✓ Key part of South Plant Hydraulic Control (SPHC)
  - Removes Dam
  - Dewatering Upper and Lower Lakes
  - Lowers groundwater table without pumping
  - Reduces contact with contaminants in soils
- ✓ Added benefits:
  - Stop erosion of slag pile
  - Improved fish passage
  - Creates stable and functional stream corridor

IM Concept Overview  
SPHC PPC Realignment Components

## Primary Components

1. Construct PPC Temporary Bypass (done)
2. Remove Smelter Dam
3. Remove Upper Lake Diversion and Breach Dike
4. Reconstruct Tito Park/Lower Lake Areas
5. Construct PPC Realignment

## Key Design Objectives

- ✓ Groundwater elevations as low as possible to meet gradients and water interface with wetland areas.
- ✓ Create a sustainable creek
  - ✓ Develop stable flow conditions and gradients;
  - ✓ Designing for low and high flows,
  - ✓ Adequate storage capacity and
  - ✓ Natural processes
- ✓ Design a stable stream channel and floodplain that meets all applicable permitting requirements
- ✓ Afford materials for use in other construction actions (such as ET Cover)

**Steep, Narrow, Slag and Bench Erosion**

**Smelter Dam**

**Diversion**

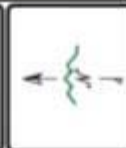
**Upper Lake Complex**

**Flat Depositional Reach**

**Legend**

- EXISTING PALUSTRINE EMERGENT WETLAND
- EXISTING SCRUB SHRUB WETLAND
- EXISTING FORESTED WETLAND
- EXISTING OPEN WATER - LAGOONING
- EXISTING OPEN WATER - CONSOLIDATED BOTTOM

**LEGEND**  
WETLAND SURVEY PLOTS (OCTOBER 2004)



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BY: J. [unreadable]  
SCALE: 1" = 100'  
0 200 400

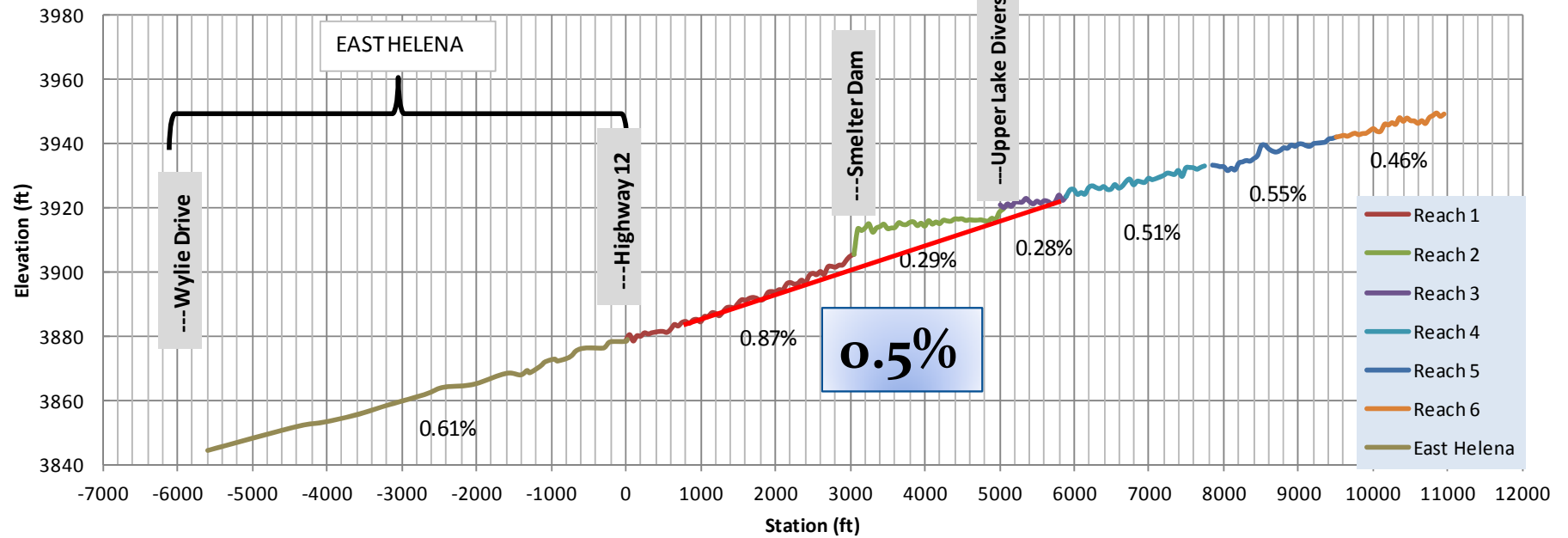
**FIGURE 3** WETLAND DELINEATION  
PRICKLY PEAR CREEK  
REALIGNMENT PROJECT

**PIONEER**  
TECHNICAL SERVICES, INC.  
205 E. BRIDGEMONT  
HELENA, MONTANA 59601  
(406) 457-6200

DATE: 3/13/14

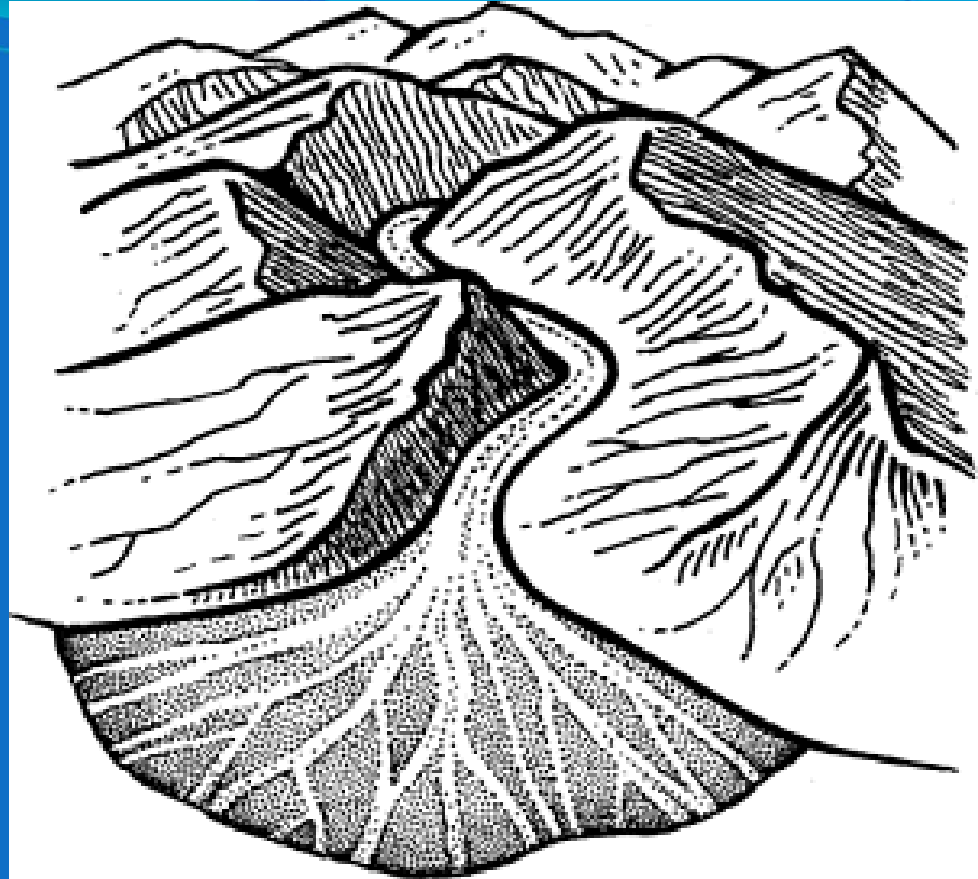
# Channel Slope

## Prickly Pear Creek 2011 Profile



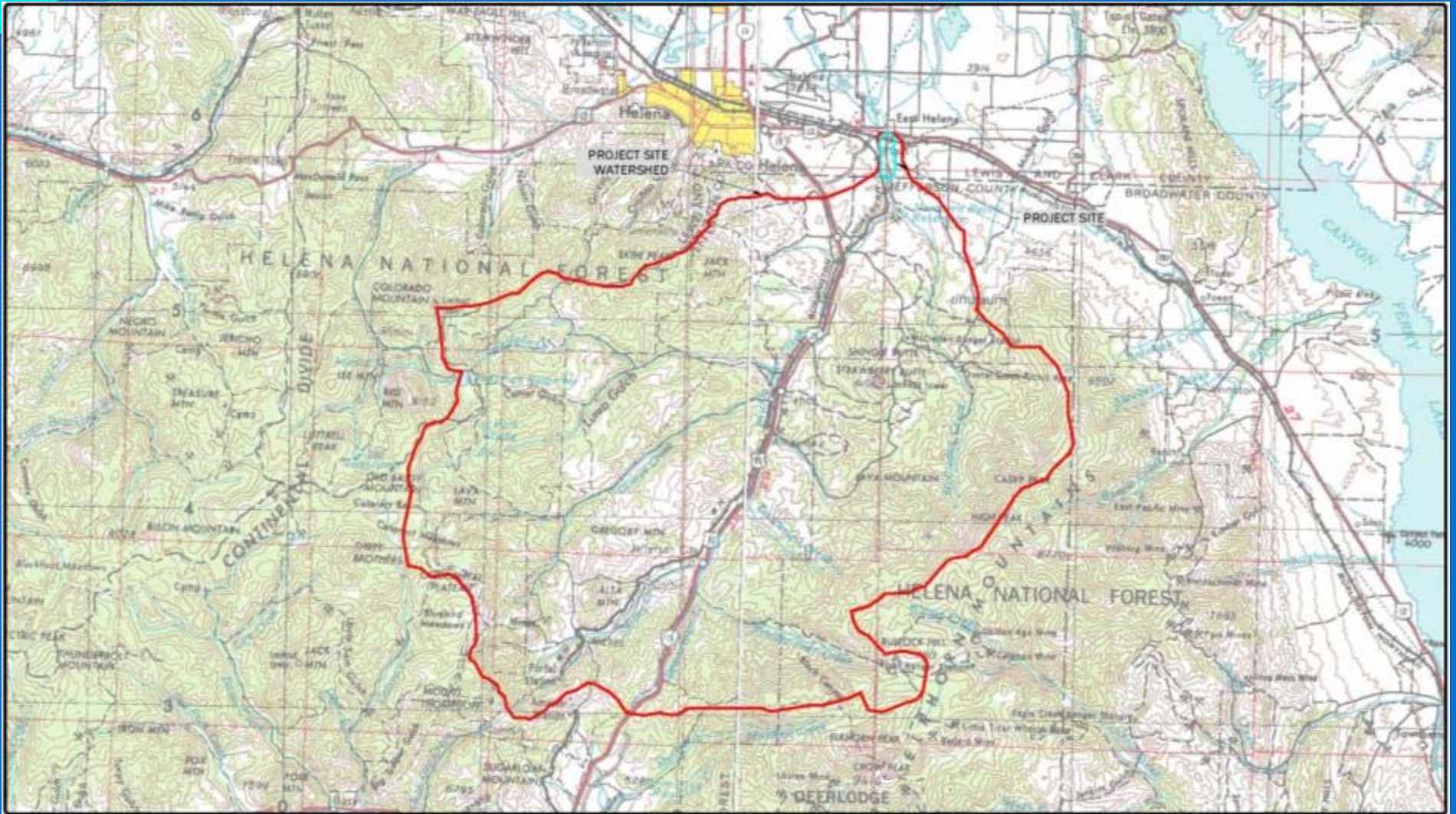


## GEOMORPHIC SETTING



“The (Helena Valley) alluvium consists of broad, gently sloping alluvial fans formed by Prickly Pear and Tenmile Creeks...”

---Swenson, 1951



DATE: \_\_\_\_\_  
 DRAWN BY: \_\_\_\_\_  
 CHECKED BY: \_\_\_\_\_  
 DATE: \_\_\_\_\_  
 SCALE: \_\_\_\_\_  
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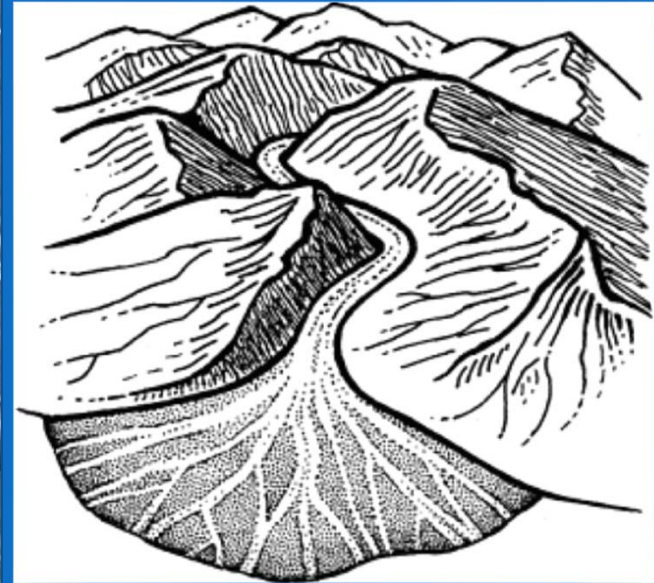


**FIGURE 4**  
**WATERSHED MAP**  
**PRICKLY PEAR CREEK**  
**REALIGNMENT PROJECT**  
**EAST HELENA SMELTER**

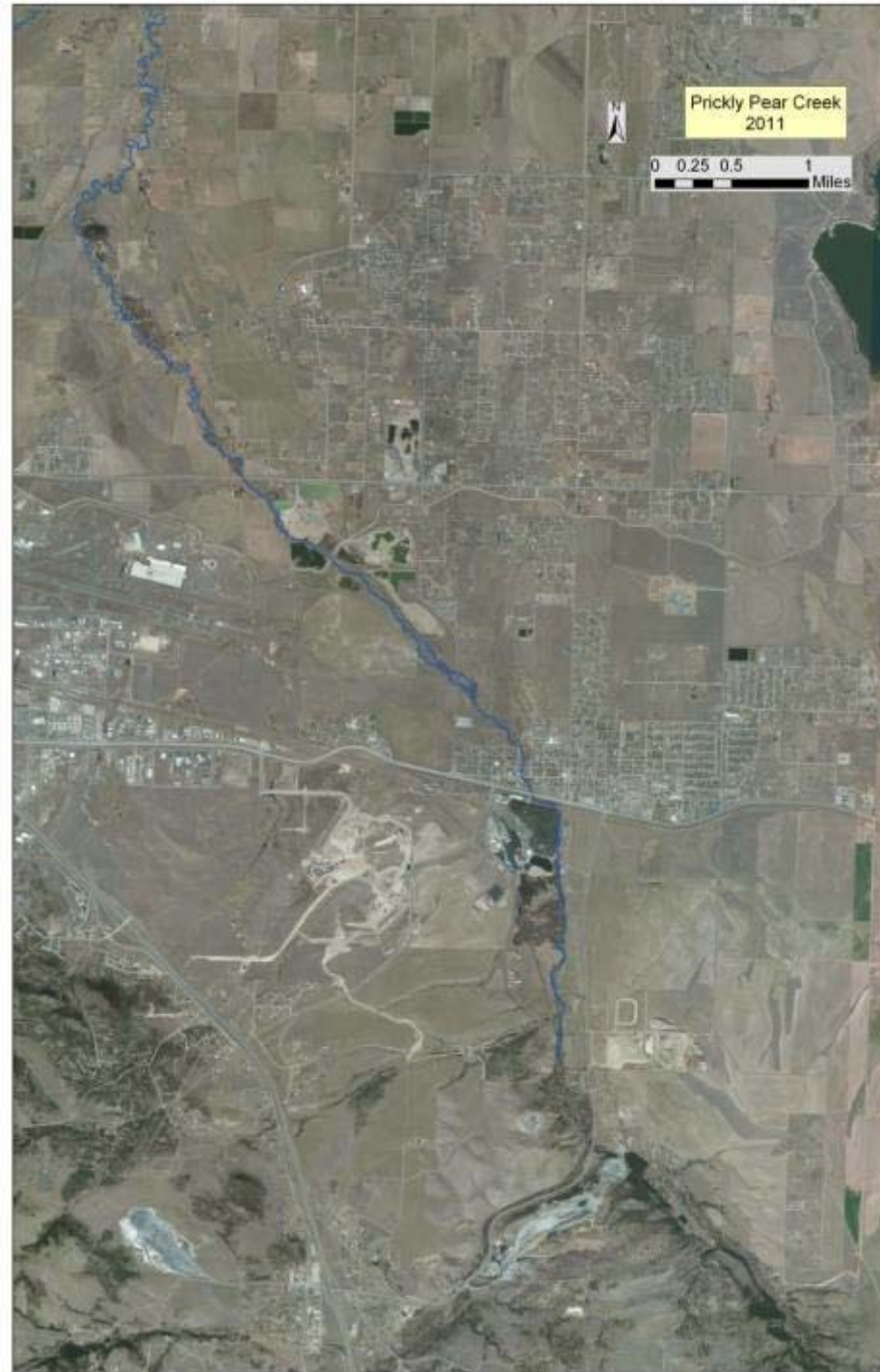
**PIONEER**  
 TECHNICAL SERVICES, INC.  
 201 E. BRIDGEMAN  
 HELENA, MONTANA 59601  
 (406) 837-8300

DATE: 01/21/14

# General Setting: Alluvial Fan



# Primary Channel



# Distributary Channels



Prickly Pear Creek During the 1981 flood  
~ 200 Year Flood



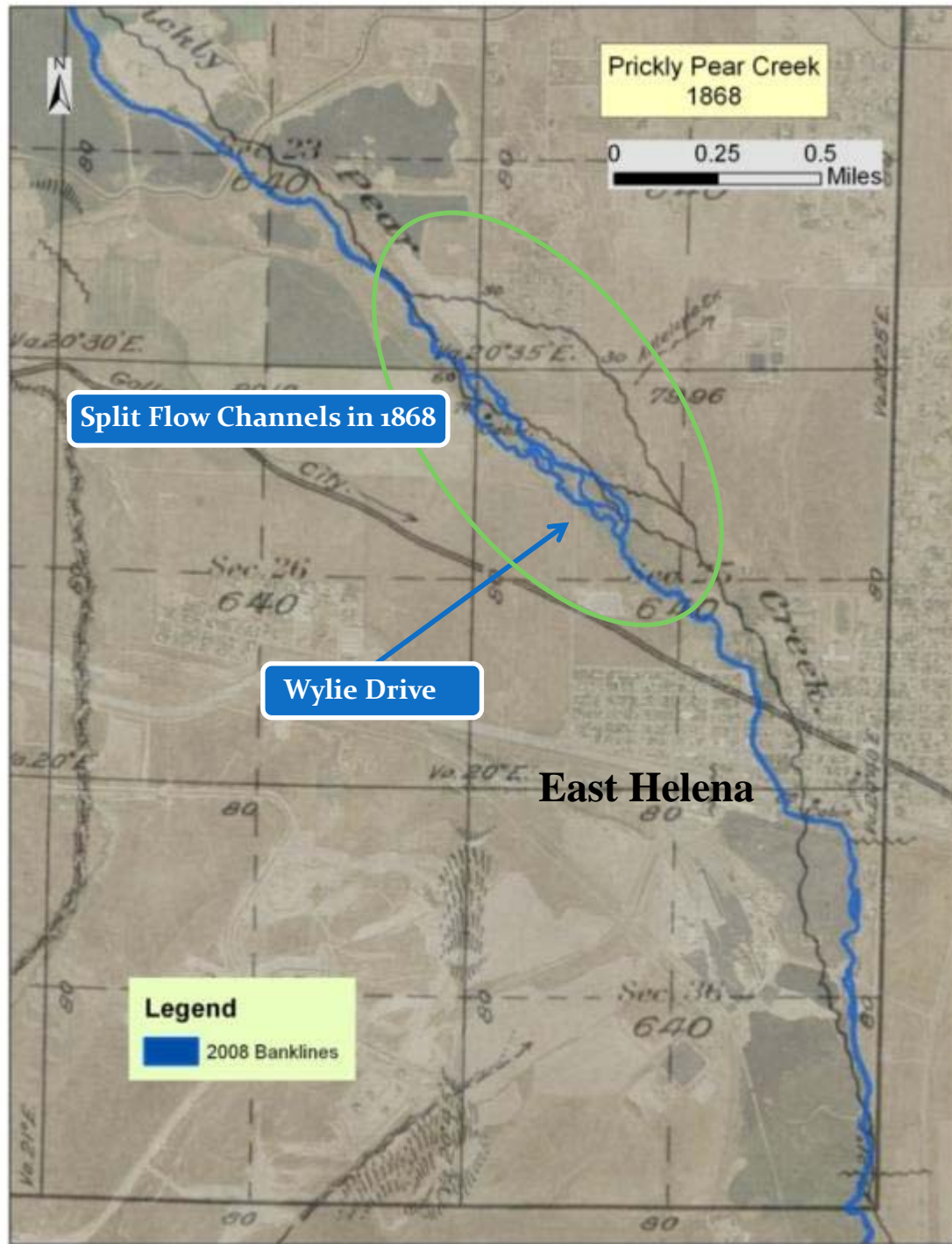
**Prickly Pear Creek During the 1981 flood  
~ 200 Year Flood**

**East Helena**

**Prickly Pear Creek**

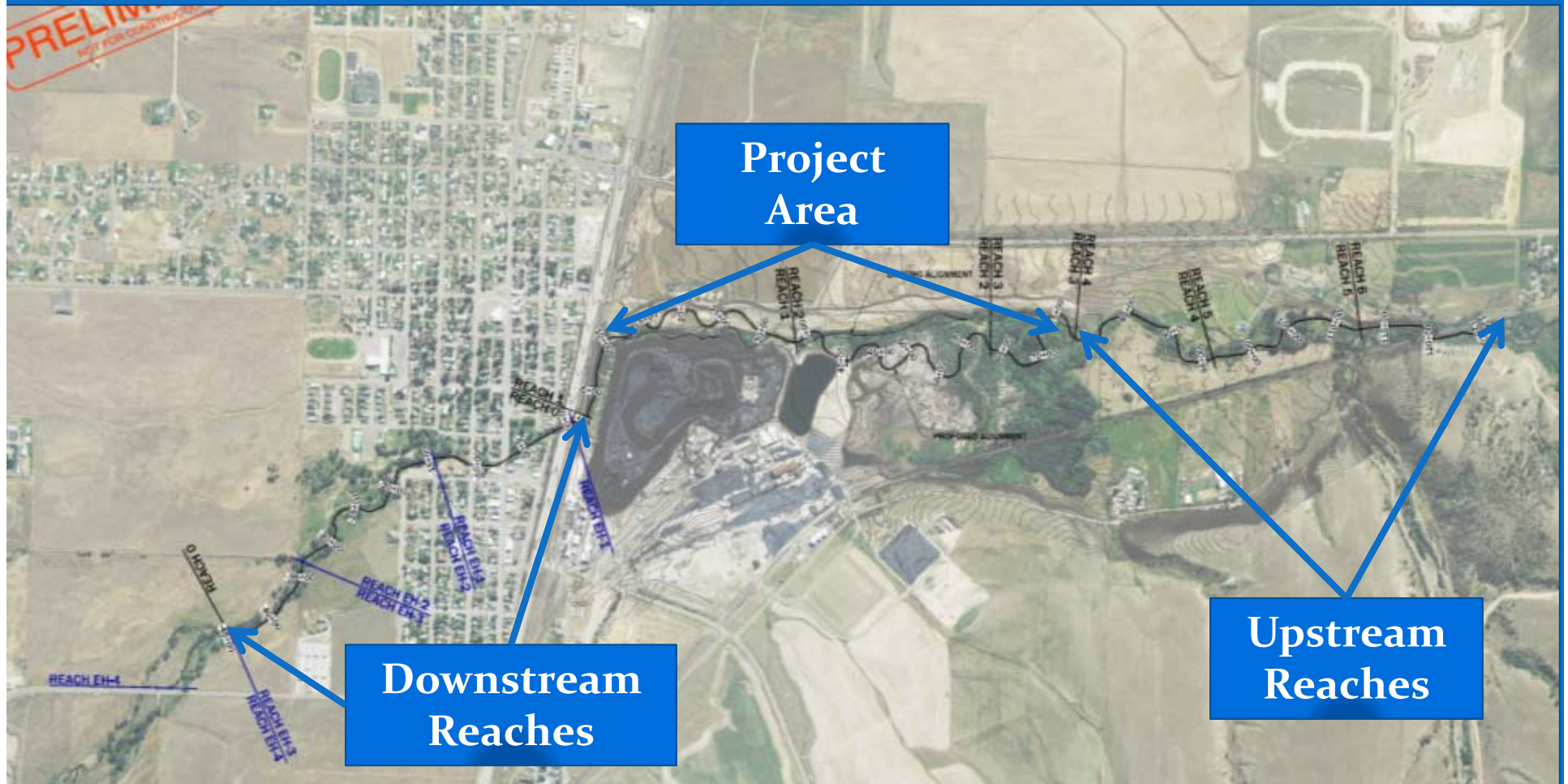


# 1868 Split Flow





# Sediment Transport Modeling Area



# Highway 12 Bridge Issues



# Berms and Dense Vegetation Along Base of Concrete Walls



# Main Street Bridge Deposition



# Sediment Sources: Boulder Batholith



## Slag Pile Erosion into the Channel



“ East Bench ”

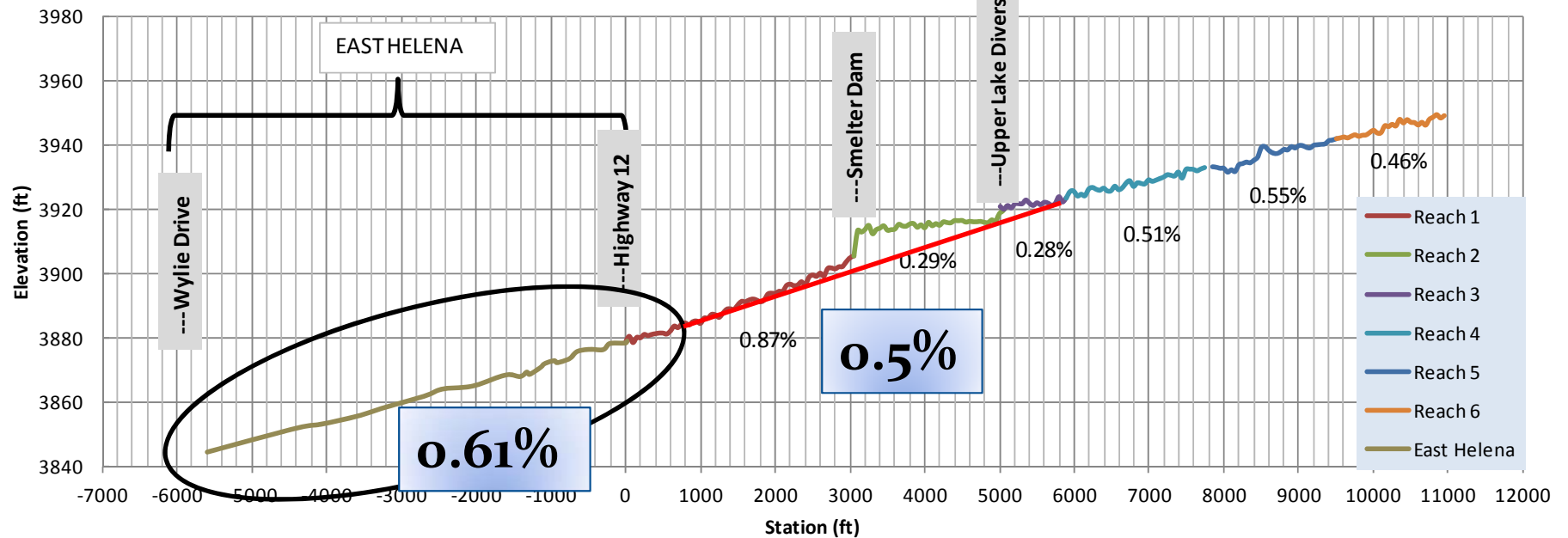




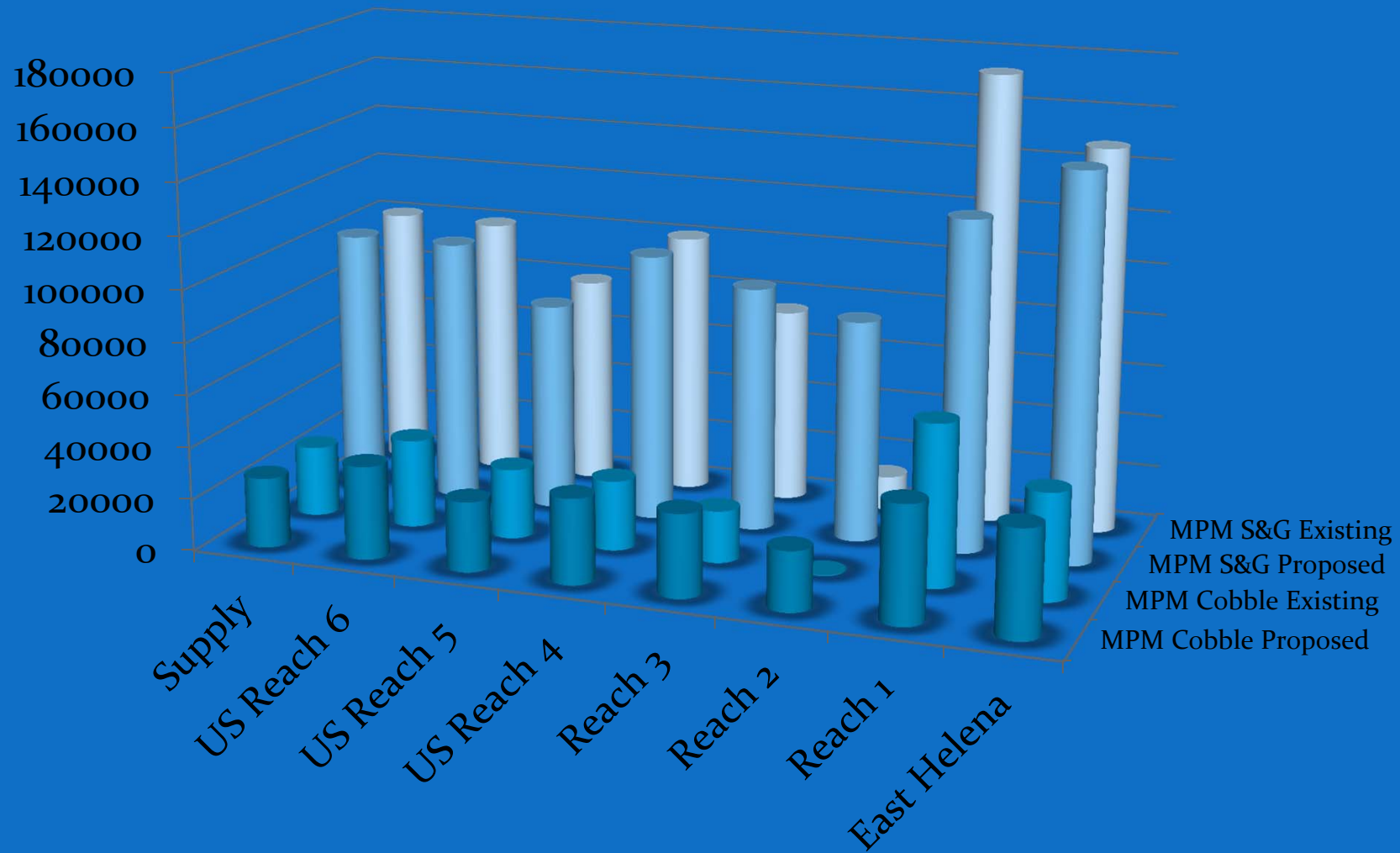


# Channel Slope

Prickly Pear Creek  
2011 Profile



# Sediment Transport Modeling Results



## Project Implications: Sediment Delivery

- Magnitude of Supply/Changes to Supply
  - ✓ Removal of Upper Lake Sediment Trap
  - ✓ Removal of Smelter Dam Storage
  - ✓ Recovery of Native Load Through Smelter Reach
  - ✓ Removal of Slag Material Inputs from Smelter Site
  - ✓ Removal of East Bench Material Inputs from Smelter Site
- Changes in Sediment Delivery
  - ✓ In Sync With Hydrograph (Removal of Dam Effects)
  - ✓ Return to Native Sediments
- East Helena Reach has Sufficient Capacity

**BN ROW**

**North Segment/East  
Bench/Montana Ave.**

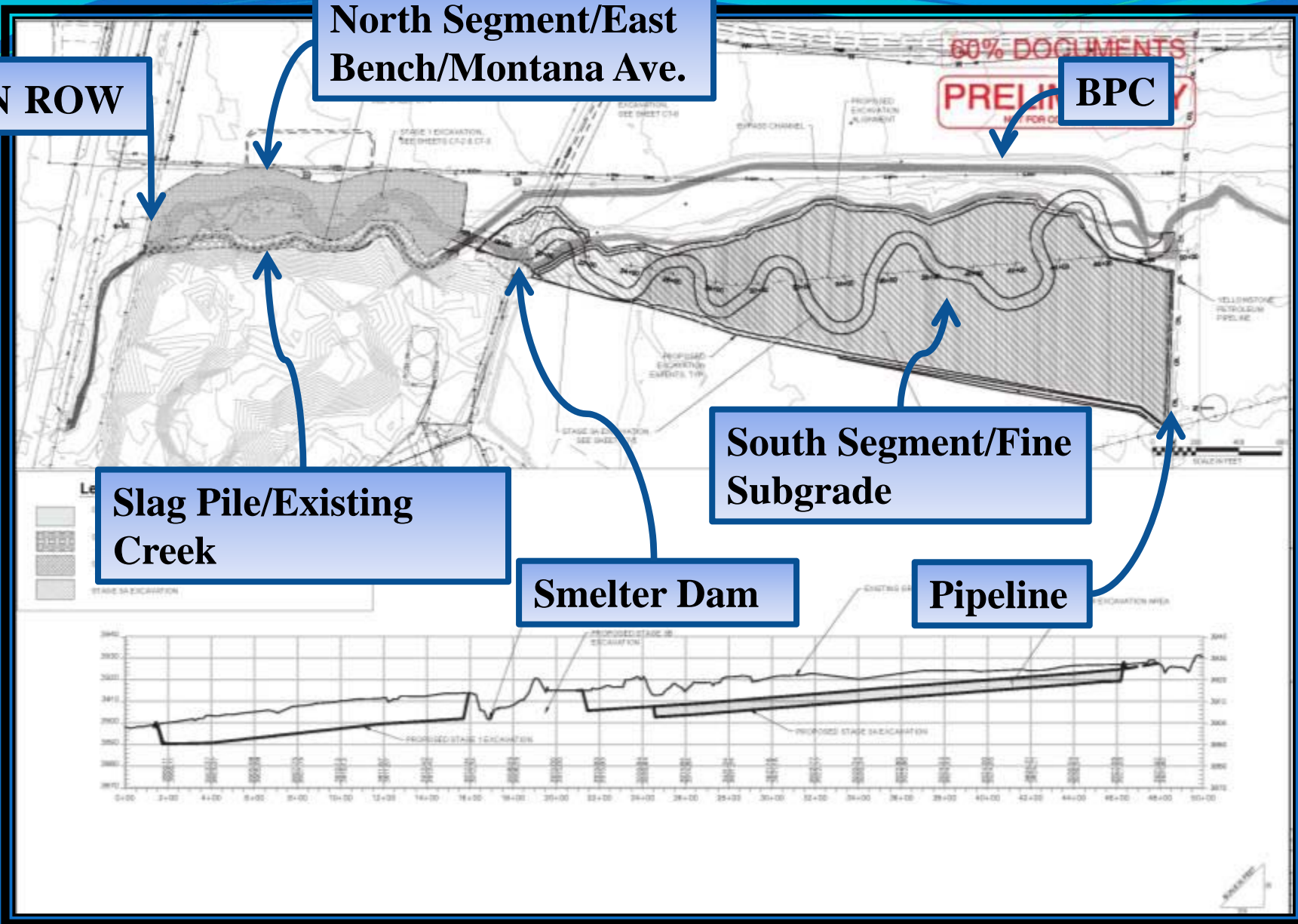
**60% DOCUMENTS  
PRELIMINARY**  
**BPC**

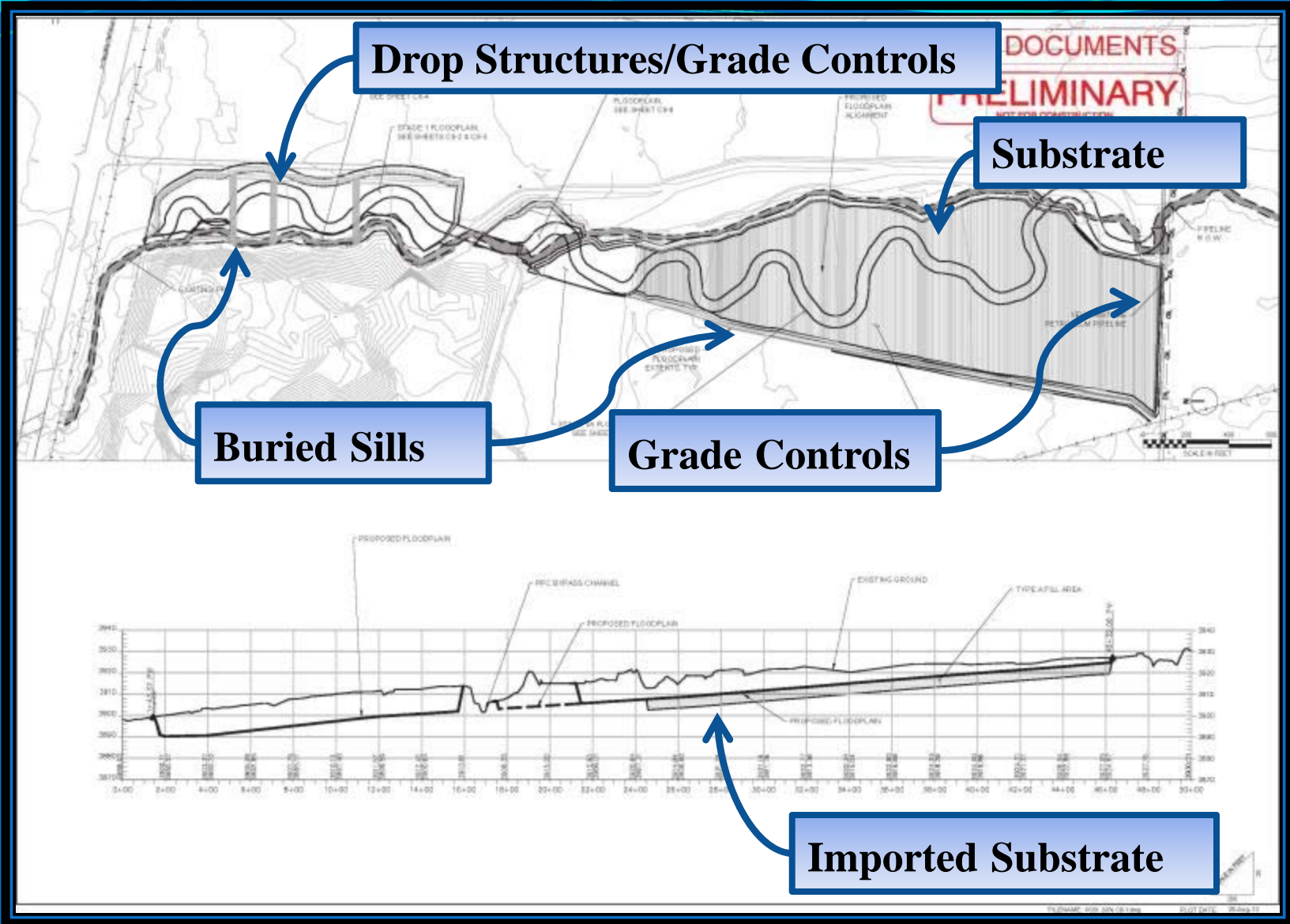
**Slag Pile/Existing  
Creek**

**South Segment/Fine  
Subgrade**

**Smelter Dam**

**Pipeline**





**Drop Structures/Grade Controls**

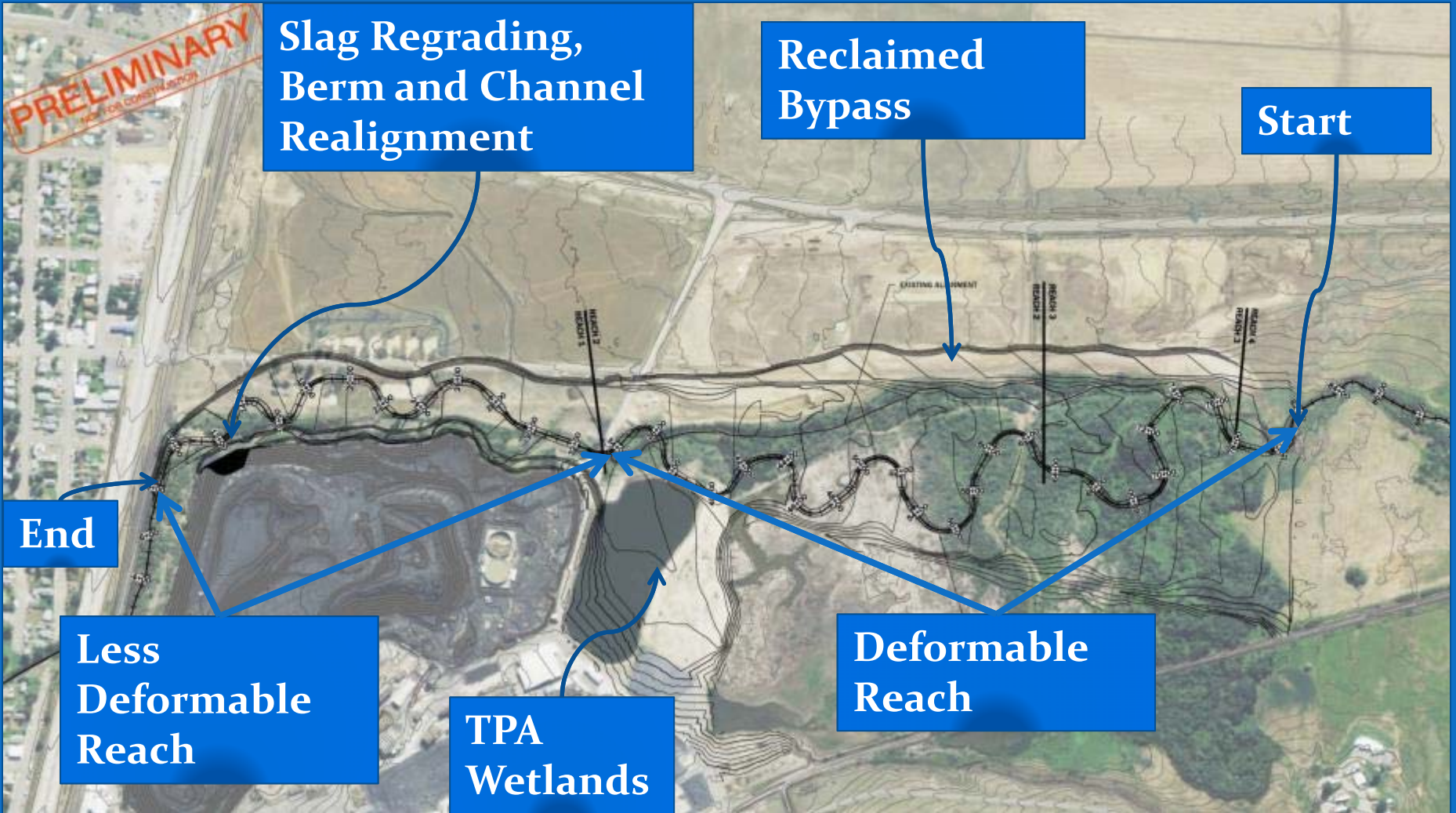
**Substrate**

**Buried Sills**

**Grade Controls**

**Imported Substrate**

# 90 % Stream Reconstruction Plan



**Broadened Floodplain  
Riparian Area**

**Reclaimed  
Bypass**

**Start**

**PRELIMINARY**  
NOT FOR CONSTRUCTION

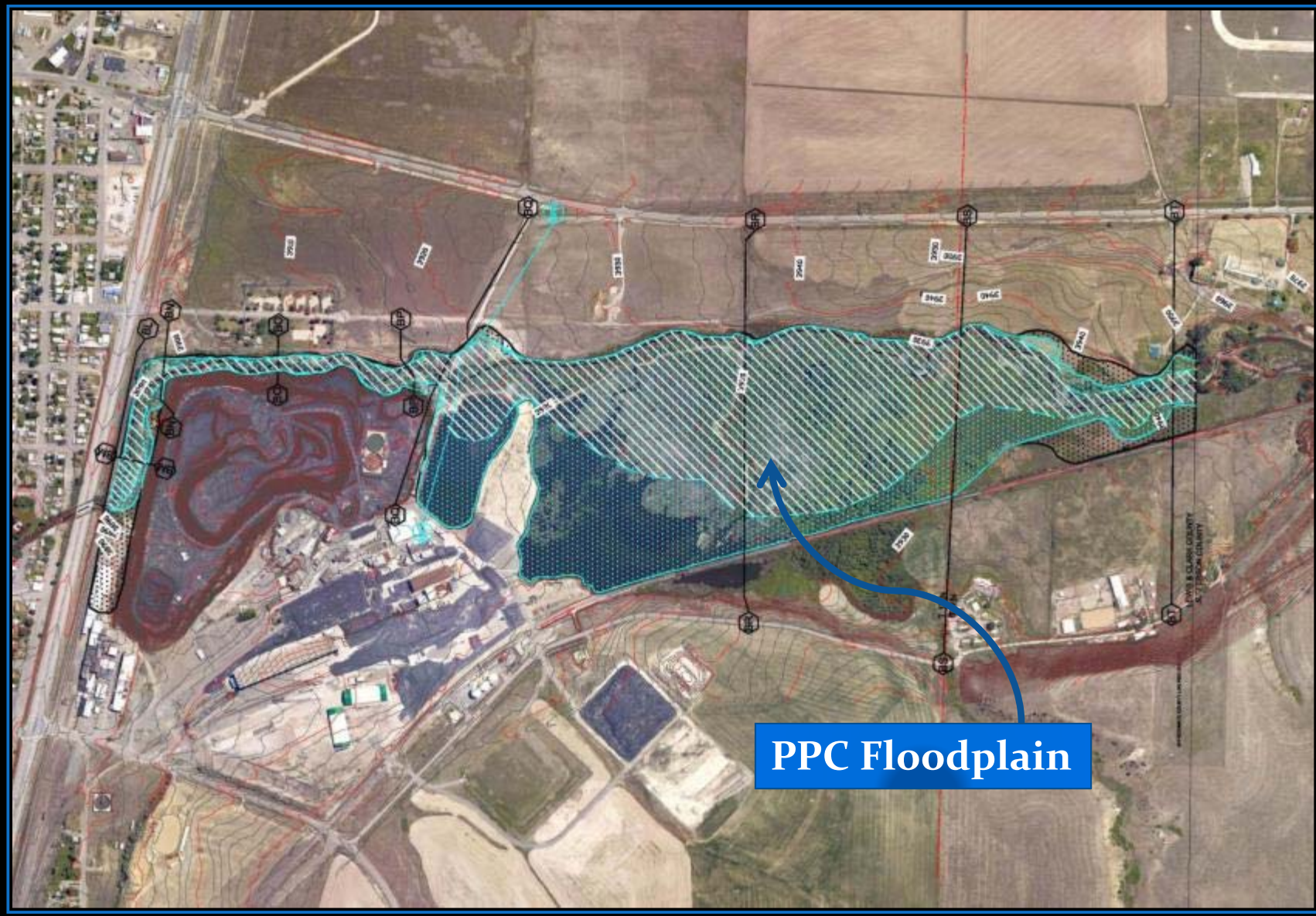
**End**

**TPA  
Wetlands**

**Variable  
Wetland  
Forms and  
types**

<b>Legend</b>				CREATED: _____ DRAWN BY: _____ DATE: _____ SCALE: _____ SHEET: _____	<b>FIGURE 11</b> REVEGETATION PLAN PRICKLY PEAR CREEK REALIGNMENT PROJECT  201 S. BROADWAY HELIX, MONTANA 59601 (406) 457-8050
SUBSIDENT AREAS 1' TO 12' BELOW 2 YR FLOW (1.52 ACRES) EMERGENT 1 AREA 0' TO -1' BELOW 2 YR FLOW (5.62 ACRES) EMERGENT 2 AREA 0' TO 0.5' ABOVE 2 YR FLOW (10.98 ACRES)	SCRUB SHRUB AREAS 0' TO 2' ABOVE 2 YR FLOW (22.68 ACRES) UPLAND HABITAT AREAS (45.39 ACRES) COLONIZING DEPOSITIONAL	RIPARIAN AREAS (15.97 ACRES) RIPARIAN BUFFER (5.21 ACRES)			

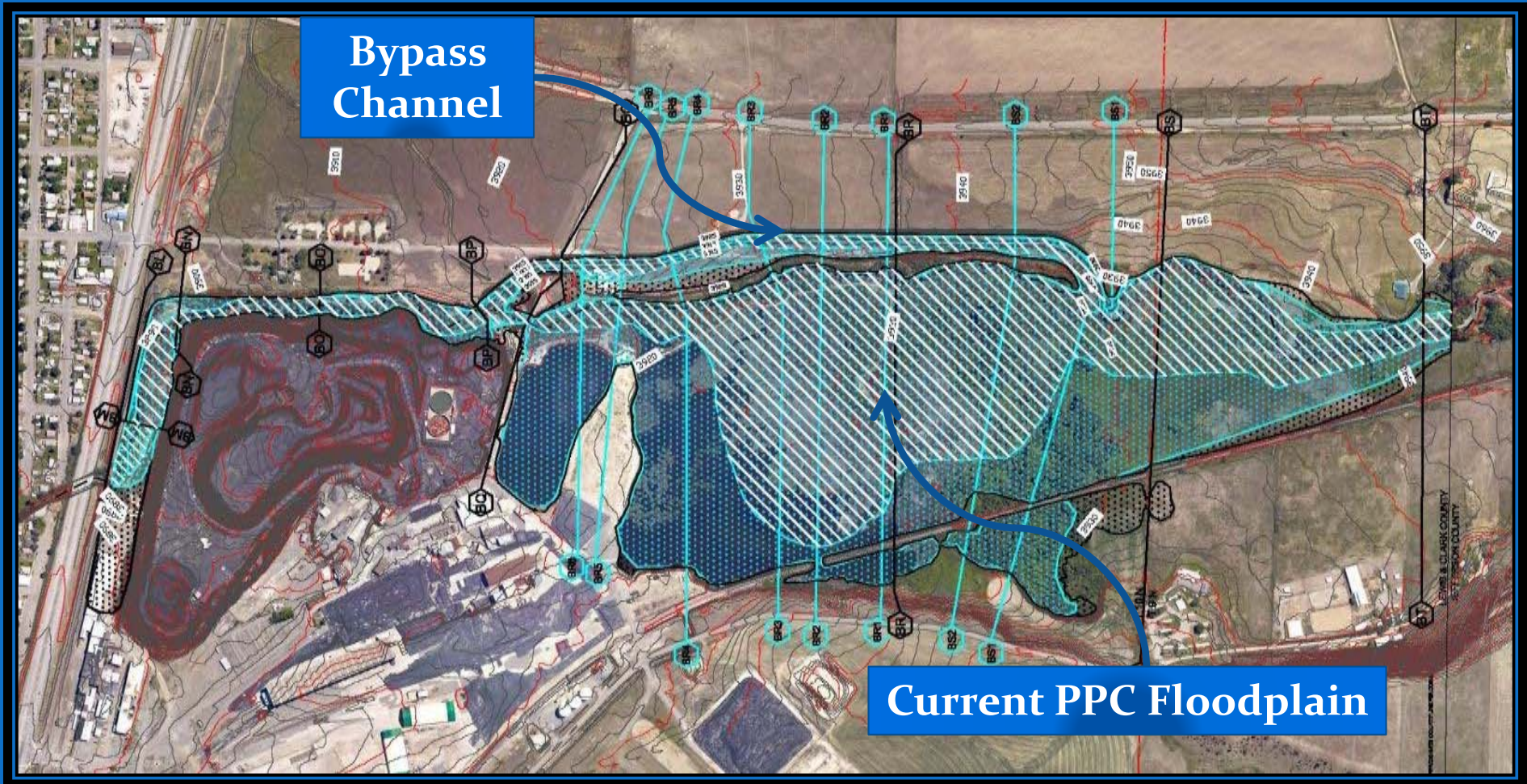
# PRE - PROJECT FLOODPLAIN



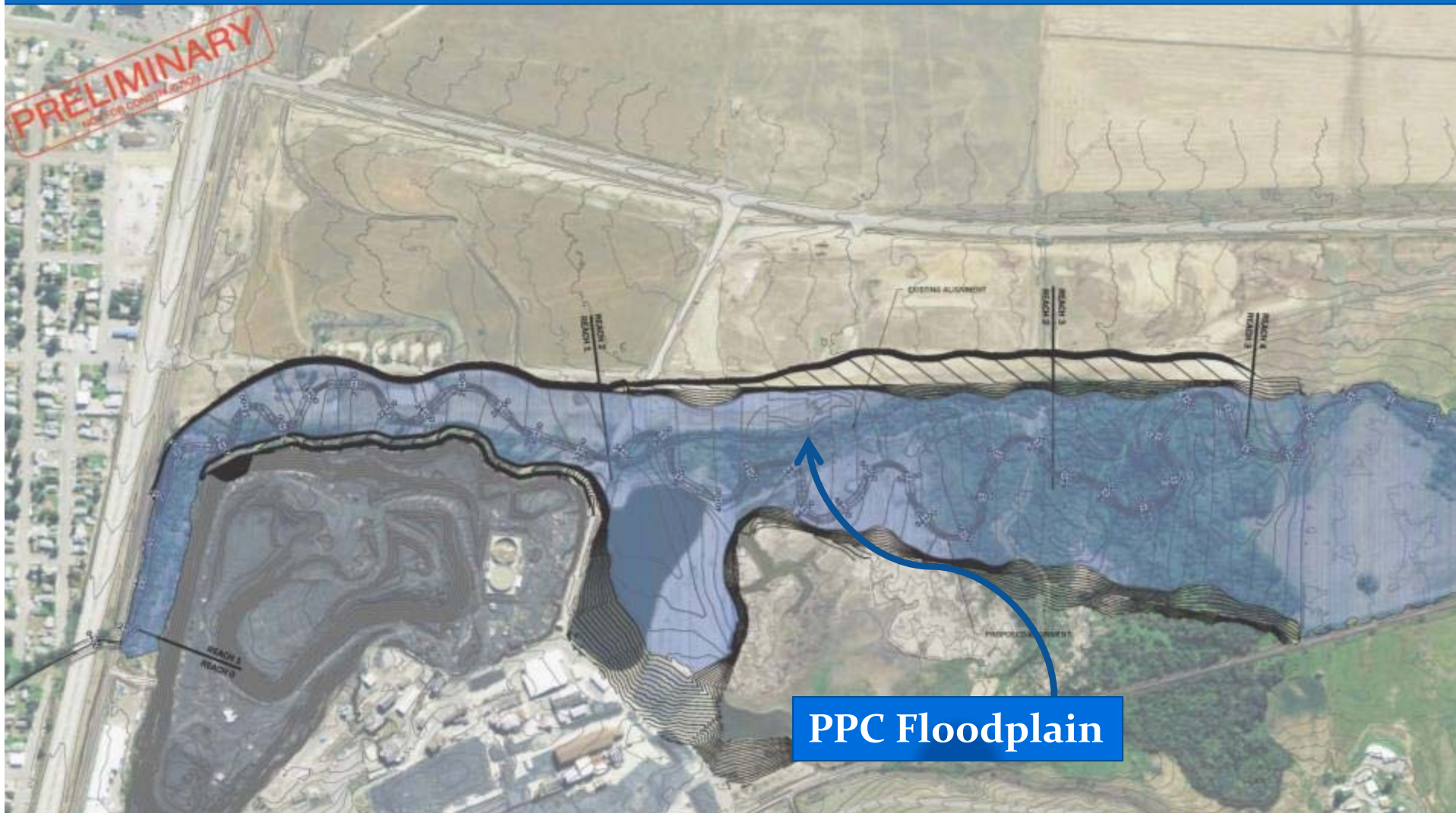
PPC Floodplain



# CLOMR 1 (CURRENT) FLOODPLAIN



# PROPOSED FINAL FLOODPLAIN AREA





QUESTIONS?