Condit Dam Decommissioning – Current Status

Klickitat and White Salmon Rivers
Fisheries and Watershed Science Conference

March 16, 2010

PACIFICORP ENERGY
A DIVISION OF PACIFICORP

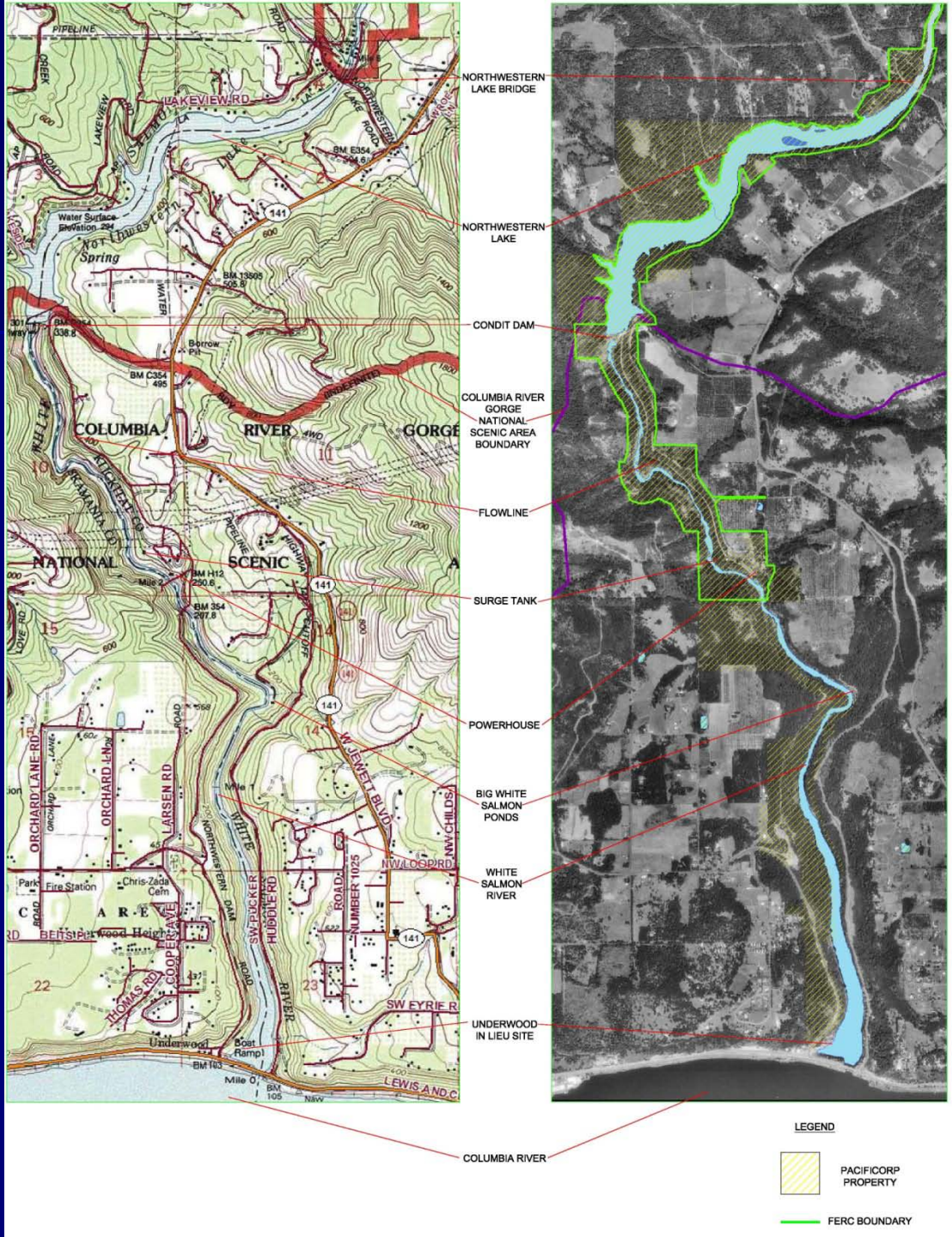
Presentation Agenda

- Project Overview
- Key Removal Issues
- Facilities Removal
- Management Plans
- Expected Outcome

Project Overview

- Project is located near White Salmon, WA
  - 45-miles east of Portland, OR
- 3-Miles upstream of the Columbia River
- Only man-made impoundment between Mt. Adams and the Columbia River
- Only one Columbia mainstem dam (Bonneville) between mouth of White Salmon River and Pacific Ocean

Project Location



Project Overview

- **Reservoir**
  - 11,000-foot long, covering 92 acres
  - Supplied by 386 square mile basin that extends to Mt Adams
  - Contains 2.3 million yds^3 of reservoir sediment

Project Overview

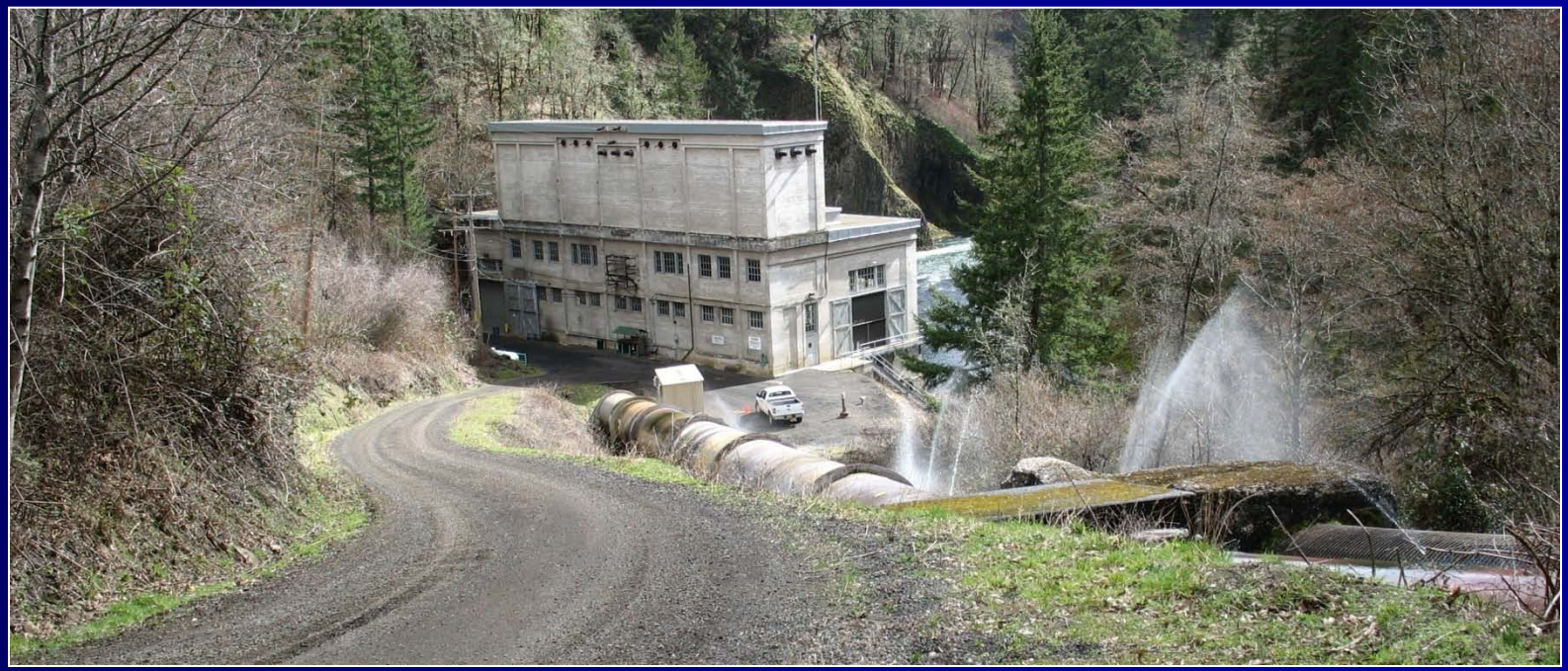
- **DAM**
  - Concrete gravity dam, 125' high by 471' long
  - 250‘-long spillway
  - Ten 10‘-high Obermeyer gates
  - Five radial gates 10‘-wide x 10' high
  - One vertical lift gate, 6’ x 12’

Project Overview

- **Water Conveyance**
  - 13.5' diameter by 5,100-foot long wood stave flowline
  - 40-foot diameter concrete surge tank
  - The flowline bifurcates into 2 penstocks, 9' diameter x 650' long
  - One penstock is steel pipe, while the other is wood stave

Project Overview

- **Powerhouse**
  - Generation: 14.7 megawatts peak
  - 2 double horizontal Francis turbines
  - 77,850 megawatt hours of power per year

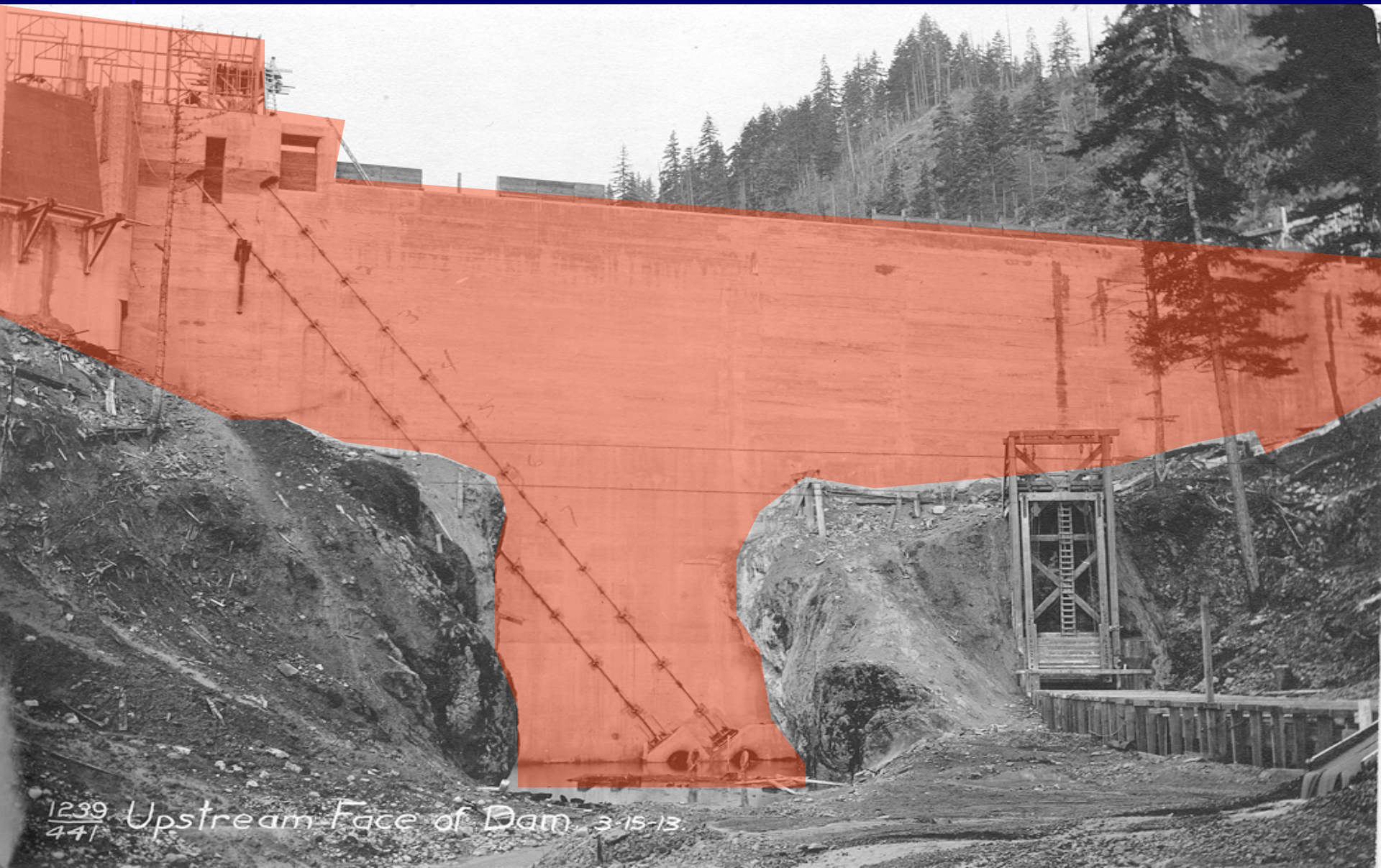


Key Dam Removal Issues

- Aquatic Habitat
- Sediment / Water Quality
- Site Management / Restoration
- Cultural / Historical Resources
- Public safety - security

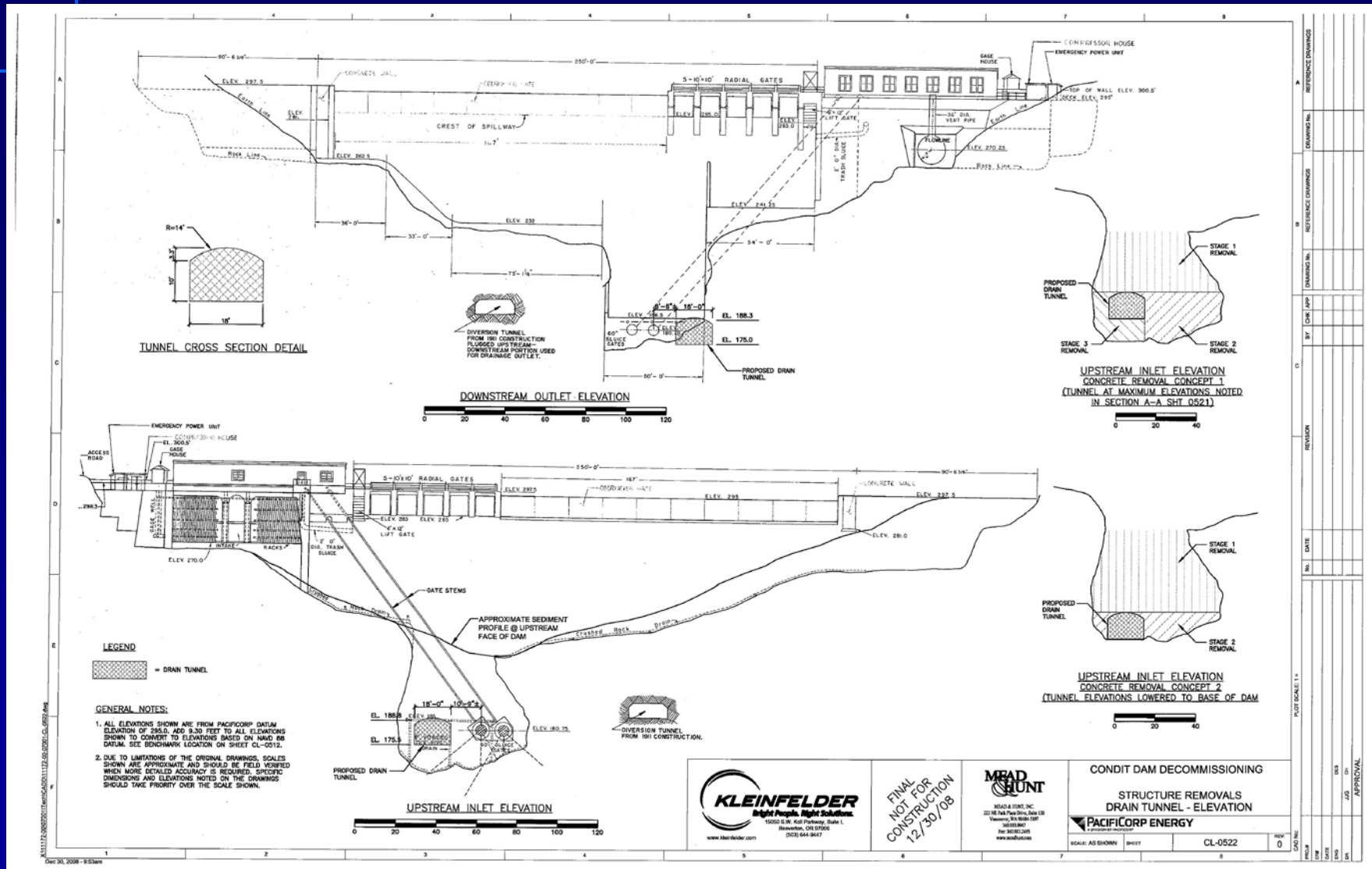
Facilities Removal - Dam

Facilities Removal - Dam



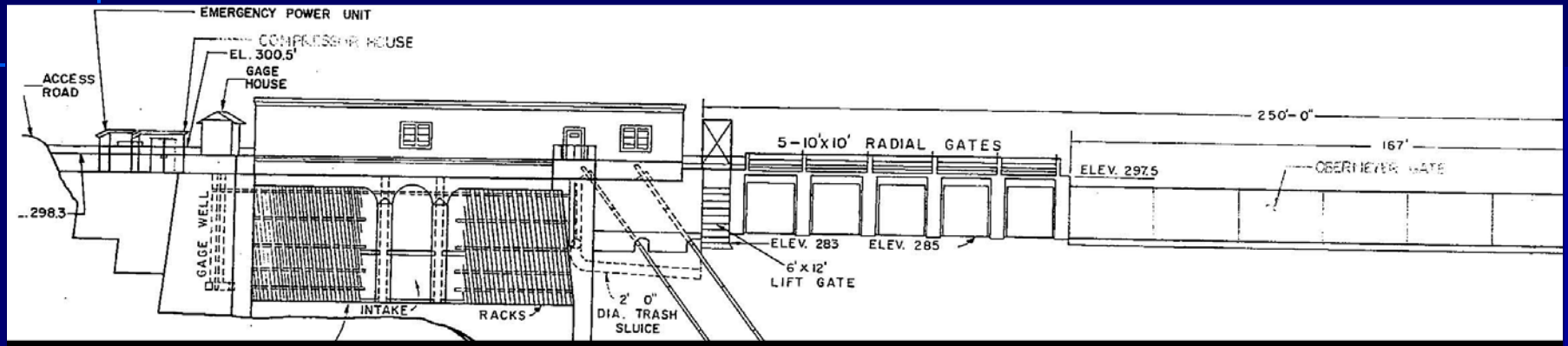
Facilities Removal - Dam

Use Drain Tunnel to Drain Reservoir and Mobilize Sediment



Facilities Removal - Dam

Approx. 6 Hours to Drain with Maximum of 10,000 cfs Flow



Facilities Removal - Dam

- Once reservoir is drained tunnel to be kept open
- Conventional concrete removal
- Demolition will likely start at the top and successive layers blasted into blocks
- Dust Control Plan will limit transport of concrete dust
- Crushing operations will occur in proximity to Condit dam

Facilities Removal – Surge Tank

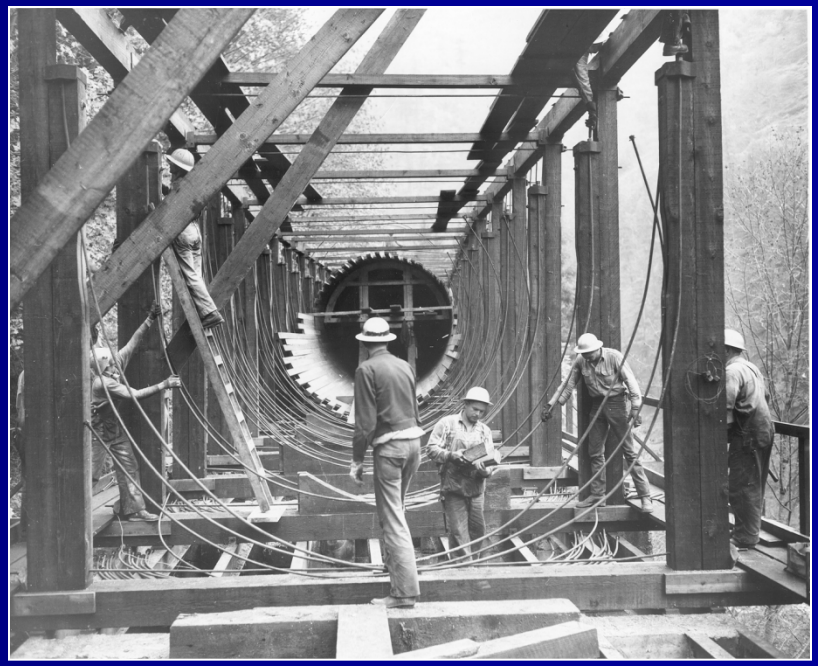
Facilities Removal – Surge Tank

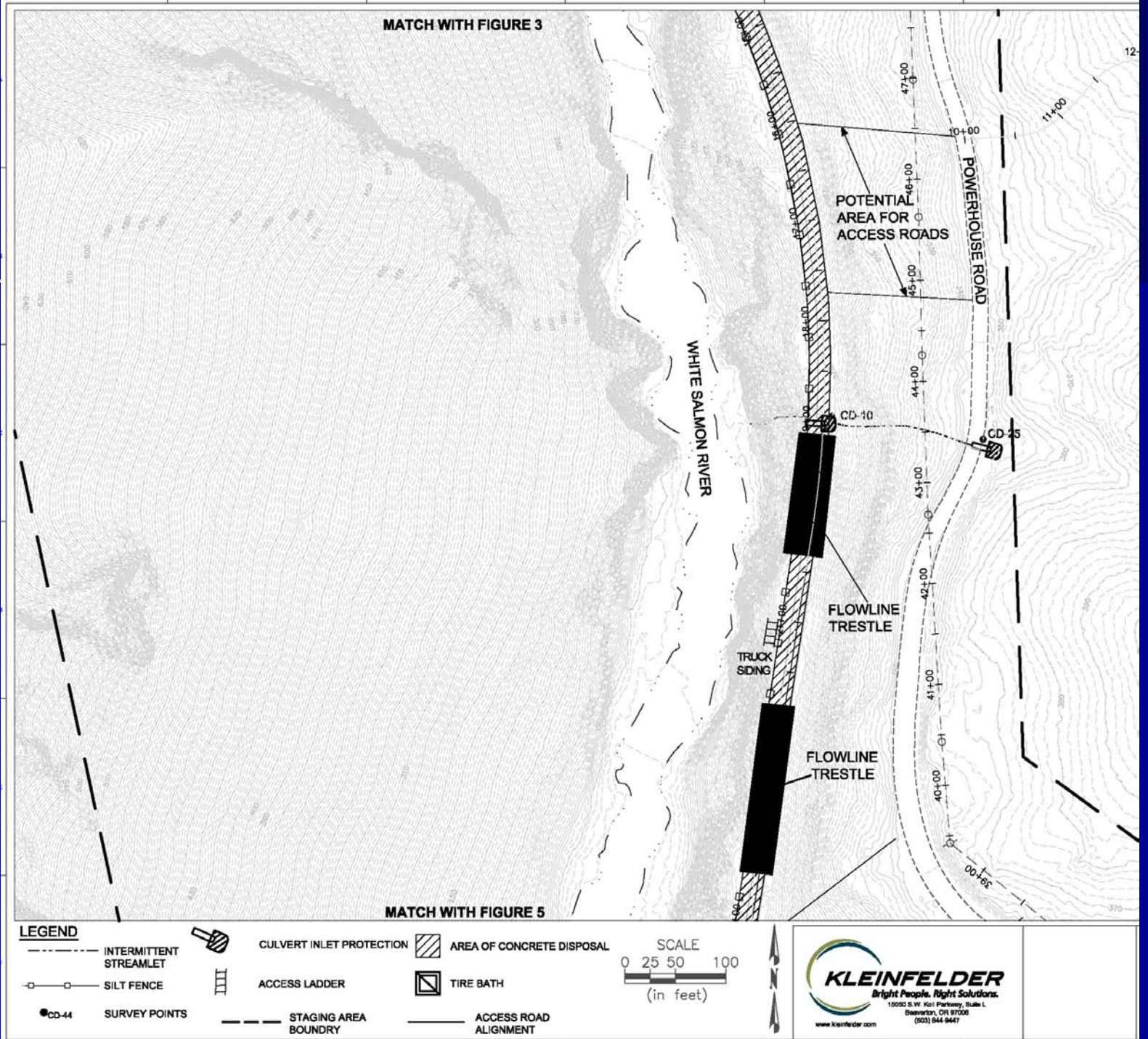
- Interior electrical equipment removed
- Surge Tank will be collapsed and entombed
- Safety measures in spillway area
- Erosion Control Plan details cover and revegetation specifications

Facilities Removal - Flowline

Facilities Removal – Flowline & Penstocks

- Remove flowline timber framework, wood stave pipe, and concrete thrust block
- Use flowline alignment for concrete disposal
- Cover and revegetate for restoration
- Penstocks removed up to the powerhouse
- Seal penstocks with concrete bulkheads




MATCH WITH FIGURE 3
POTENTIAL AREA FOR ACCESS ROADS
POWERHOUSE ROAD
WHITE SALMON RIVER
CD-10
CD-25
FLOWLINE TRESTLE
TRUCK SIDING
FLOWLINE TRESTLE
MATCH WITH FIGURE 5
LEGEND
INTERMITTENT STREAMLET
SILT FENCE
CD-44 SURVEY POINTS
CULVERT INLET PROTECTION
ACCESS LADDER
STAGING AREA BOUNDRY
AREA OF CONCRETE DISPOSAL
TIRE BATH
ACCESS ROAD ALIGNMENT
SCALE
0 25 50 100
(in feet)
N
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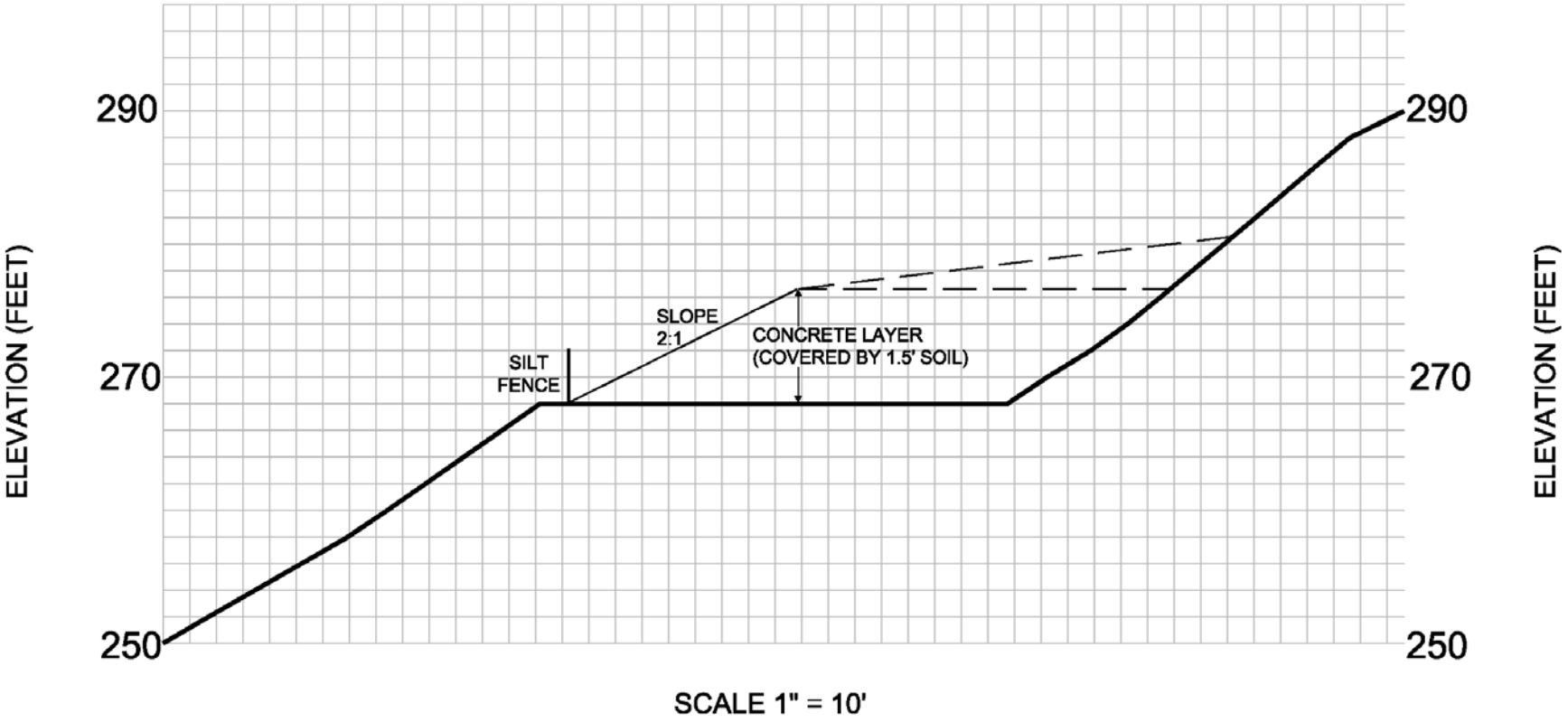

290
270
250
ELEVATION (FEET)
SLOPE
2:1
SILT
FENCE
CONCRETE LAYER
(COVERED BY 1.5' SOIL)
290
270
250
ELEVATION (FEET)
SCALE 1" = 10'

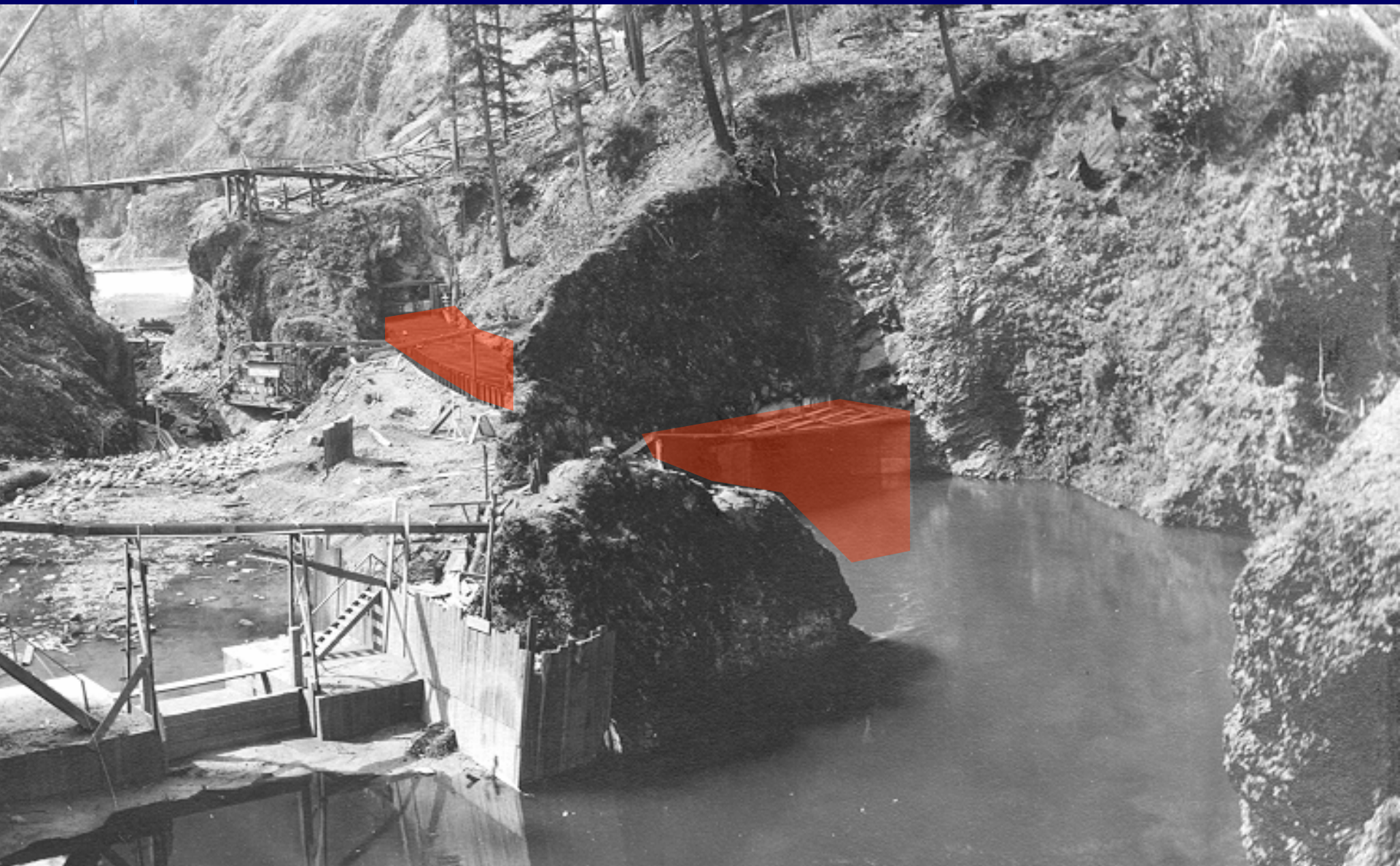
Facilities Removal – Flowline & Penstocks

Facilities Removal – Coffer Dams

Facilities Removal – Coffer Dams

Coffer Dams will be removed by May after breach to open fish passage

Facilities Removal – Tunnels & Flumes



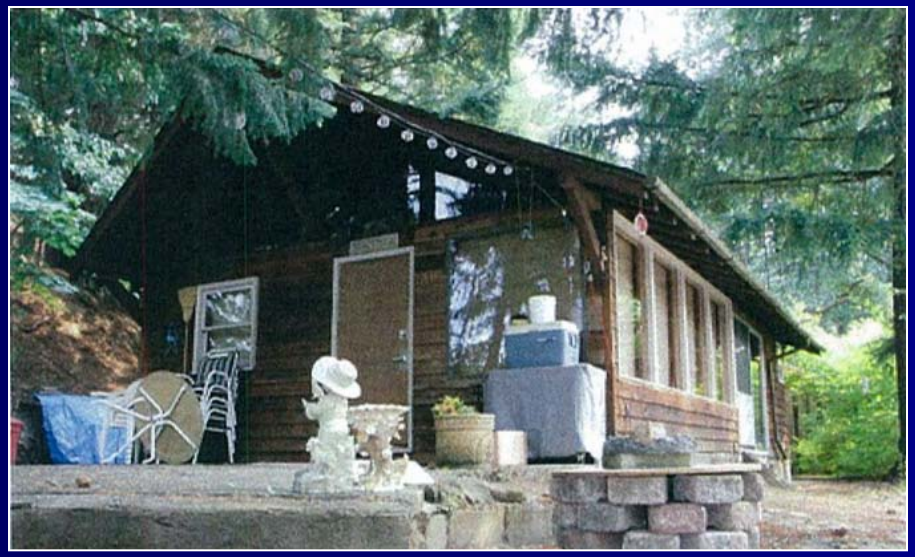
Facilities Removal – Tailrace

Facilities Removal – Tailrace

- Remove vertical tailrace wall
- Leave base slab
- Area will fill with sediment after breaching

Management Plans

Historic Properties Management Plan



Key Elements:

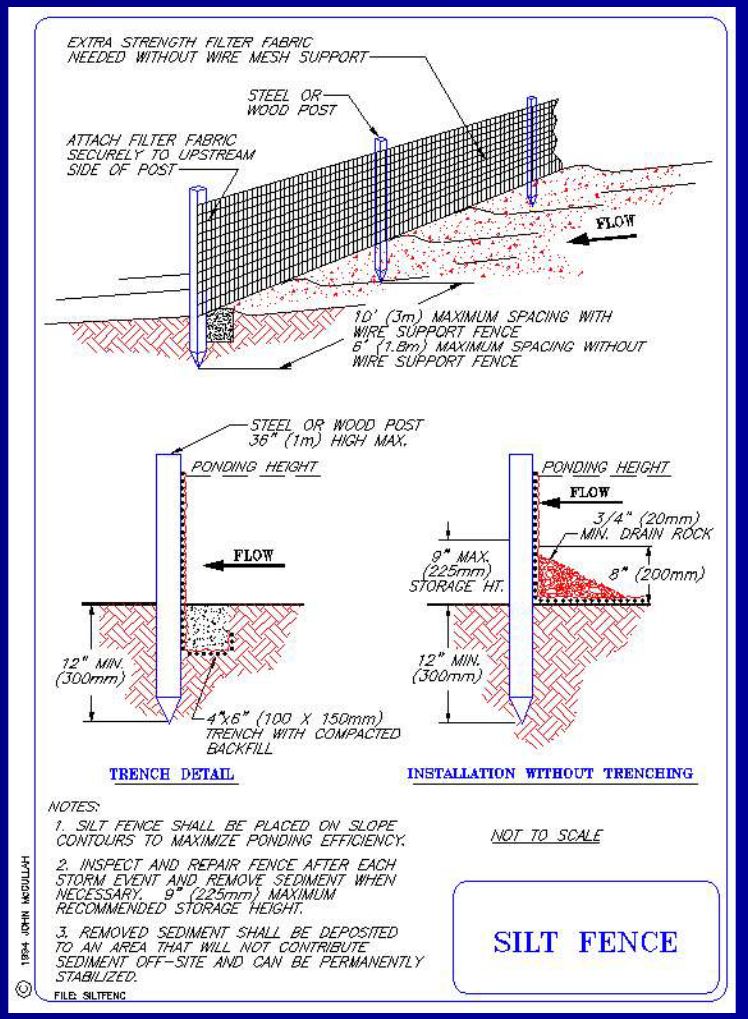
- Provides historic context for existing structures and older historic and archaeological features
- Evaluates the impact of decommissioning on historical resources
- Specifies provisions for additional surveys and archaeological monitoring for protection of undocumented historical resources

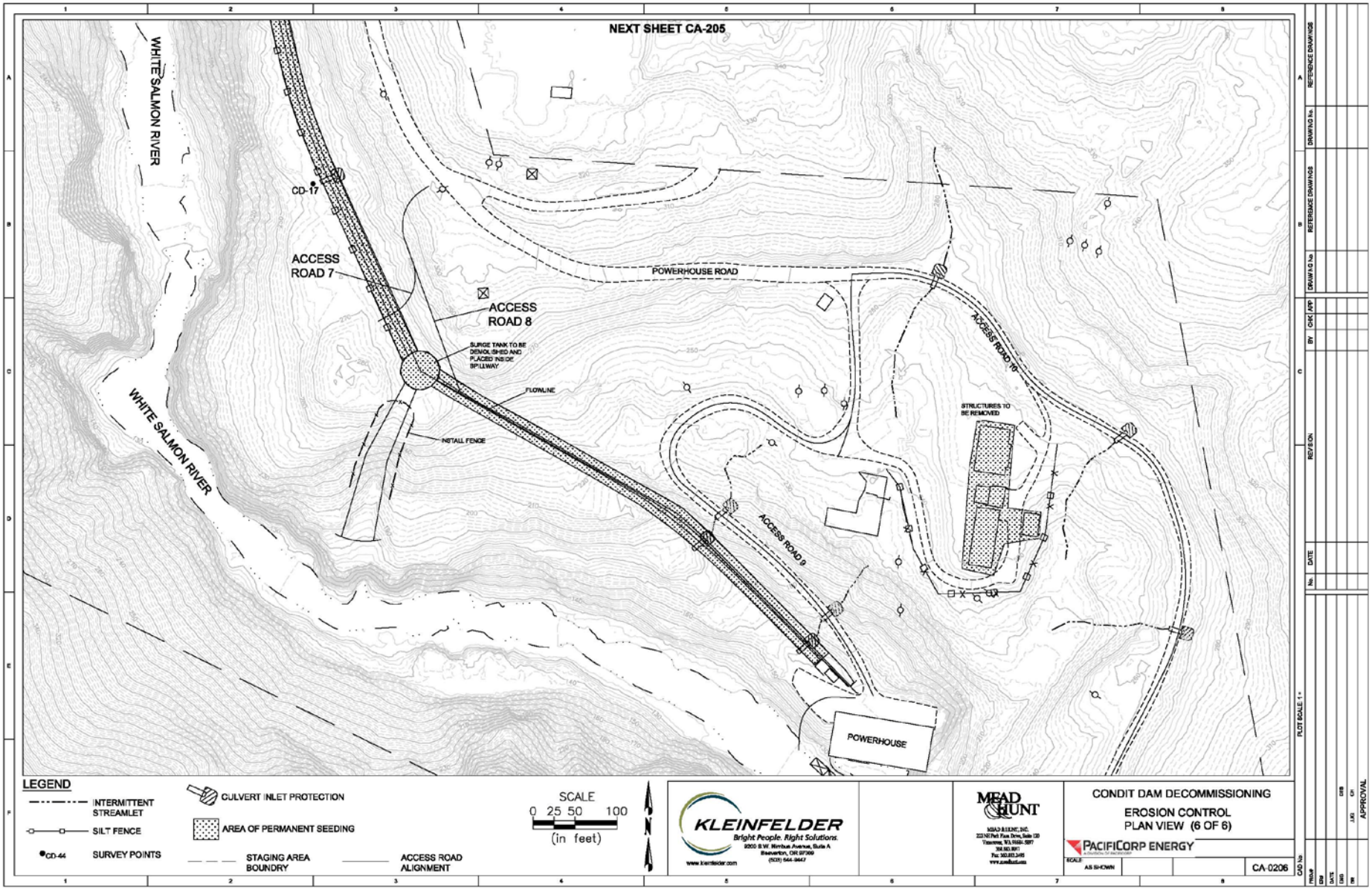
Management Plans

Erosion Control Plan

Key Elements:

- Provides guidance for protecting tributary water quality
- Identifies proposed decommissioning staging areas and temporary roads
- Specifies BMPs to minimize erosion and implement revegetation




NEXT SHEET CA-205
WHITE SALMON RIVER
CD-17
ACCESS ROAD 7
ACCESS ROAD 8
POWERHOUSE ROAD
SURGE TANK TO BE DEMOLISHED AND PLACED INSIDE SPILLWAY
FLOWLINE
INSTALL FENCE
WHITE SALMON RIVER
ACCESS ROAD 10
STRUCTURES TO BE REMOVED
ACCESS ROAD 9
POWERHOUSE
LEGEND
INTERMITTENT STREAMLET
SILT FENCE
CD-44 SURVEY POINTS
CULVERT INLET PROTECTION
AREA OF PERMANENT SEEDING
STAGING AREA BOUNDRY
ACCESS ROAD ALIGNMENT
SCALE
0 25 50 100
(in feet)
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MEAD & HUNT
CONDIT DAM DECOMMISSIONING
EROSION CONTROL
PLAN VIEW (6 OF 6)
PACIFICORP ENERGY
SCALE AS SHOWN
CA-0206
REFERENCE DRAWINGS
DRAWING No.
CHK APP
BY
REVISION
DATE
No.
PLOT SCALE 1:1
CAD No.
APPROVAL

Management Plans

Dust Control Plan

Key Elements:

- Specifies BMP's to minimize generation and duration of dust associated with blasting, dam demolition, and staging operations
- Addresses the desiccation of the former lakebed
- BMPs will provide protection of air and water quality

Management Plans

Spill Prevention, Countermeasures, and Control Plan

Key Elements:

- Condit dam SPCC amended for decommissioning operations
- Specifies BMPs for spill prevention, containment, cleanup, reporting, training, and monitoring for petroleum and other hazardous fluids

Management Plans

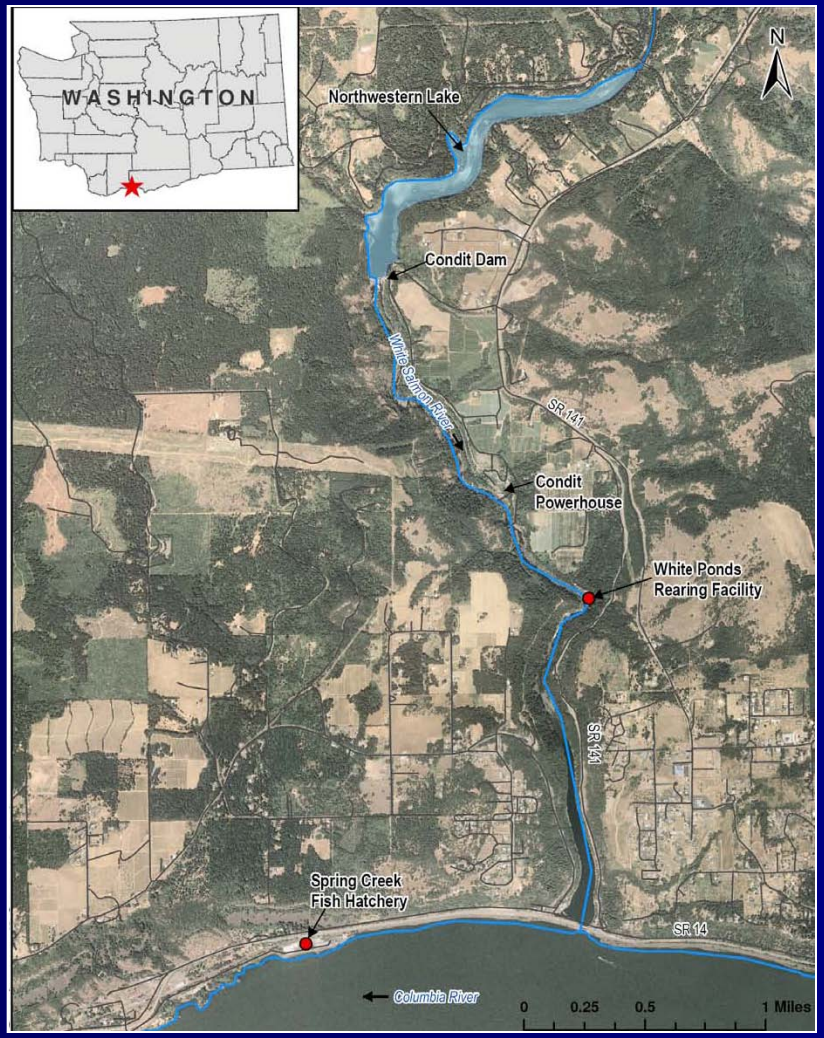
Aquatic Resources Protection Plan

Key Elements:

- Evaluated potential impacts to salmon, steelhead, bull trout, and western pond turtles
- Developed management strategies to minimize impact and manage fish passage

Management Plans

Fish Hatcheries Protection Plan



Management Plans

Fish Hatcheries Protection Plan for Big White Salmon Ponds Facility and Spring Creek National Fish Hatchery

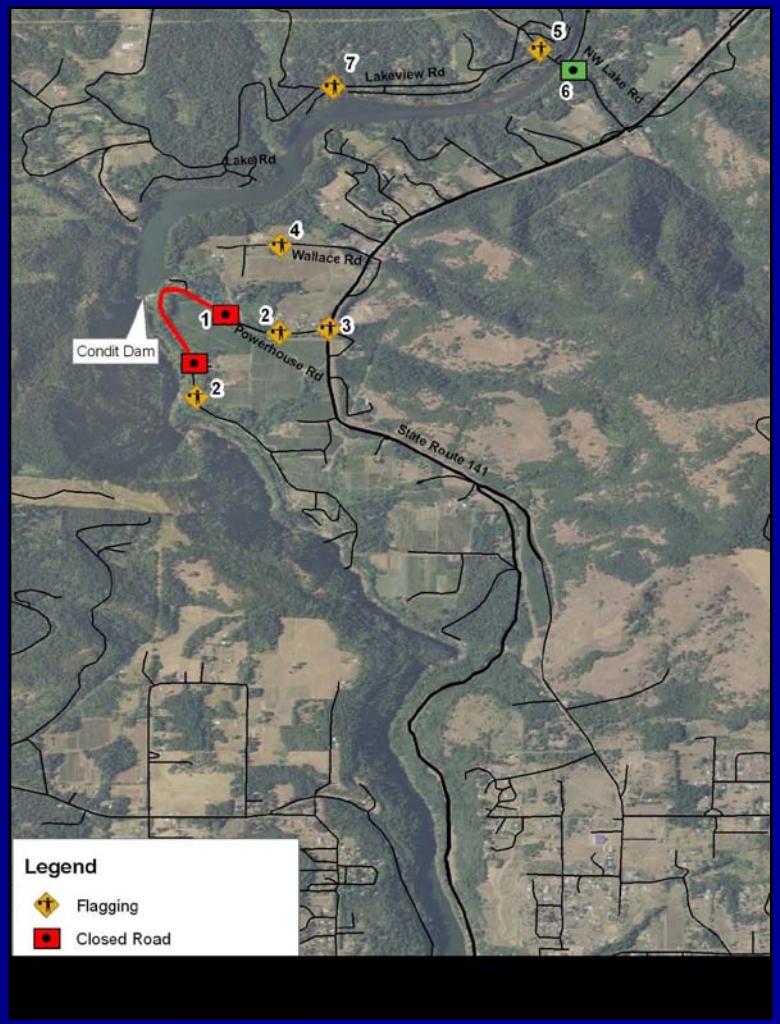
- Evaluated potential impacts
- Formulated measures for protection

Management Plans

Public Safety and Traffic Control Plan

Key Elements:

- Presents specific measures to protect public during breach and deconstruction
- Provides guidance to minimize project-related traffic accidents and minimize number and duration of delays



Management Plans

Sediment Assessment, Stabilization, and Management Plan

Sediment & Woody Debris Removal

Tunnel

Crane Location

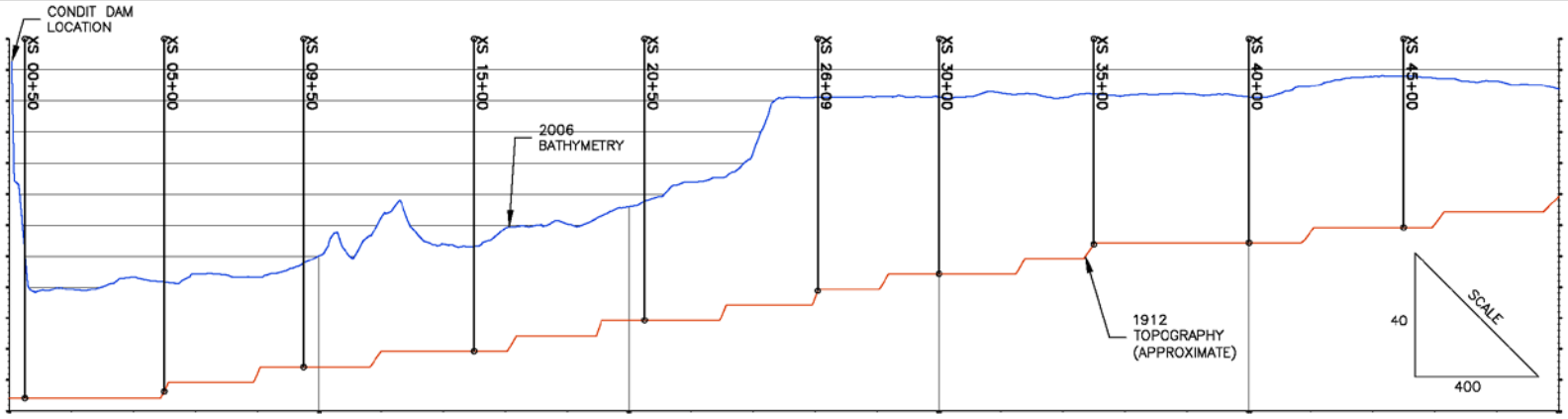
Management Plans

Sediment Assessment, Stabilization, and Management Plan

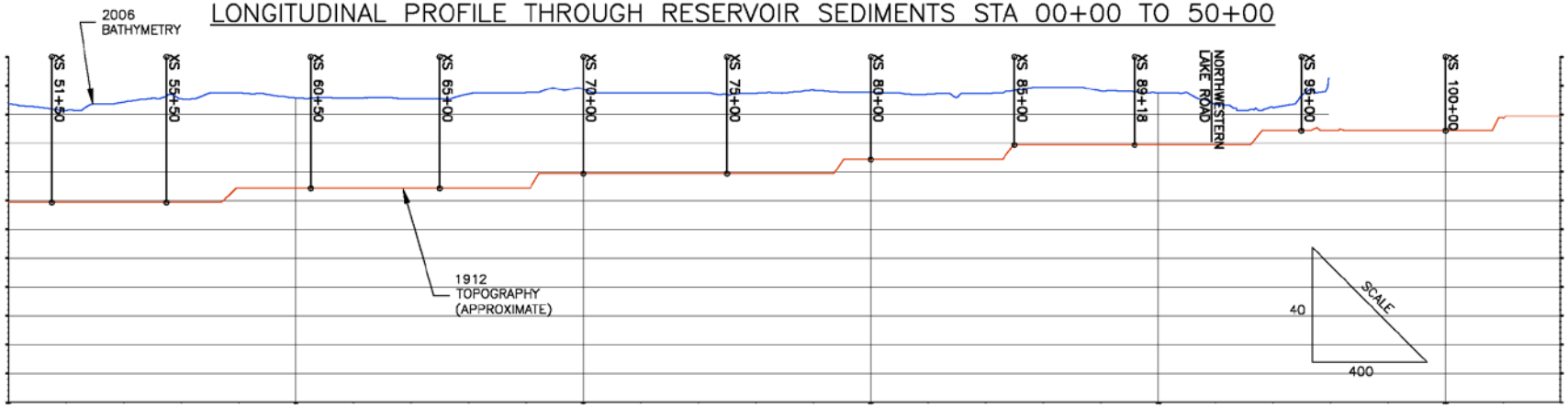
Key Elements:

- 1.6 to 2.2 million cubic yards sediment released (75% fines)
  - Removed during initial breach and following year
- Active management as needed to recontour slopes
  - Public safety
  - Slope stability
  - Revegetation

Table 2.3 Size Distribution of Reservoir Sediment				
Material Description	**Minimum Size (millimeters)**	**Maximum Size (millimeters)**	**% of Material**	**Volume (cubic yards)**
Clay		0.004	7.4	178,257
Silt	0.004	0.0625	28.8	697,783
Very Fine Sand	0.0625	0.125	23.6	571,936
Fine Sand	0.125	0.25	16.2	392,217
Medium Sand	0.25	0.5	10.8	260,805
Coarse Sand	0.5	1	7.6	183,103
Very Coarse Sand	1	2	2.3	56,695
Very Fine Gravel	2	4	1.1	25,938
Gravel and larger	4		2.3	54,805
	Total		2,421,539	



LONGITUDINAL PROFILE THROUGH RESERVOIR SEDIMENTS STA 00+00 TO 50+00



LONGITUDINAL PROFILE THROUGH RESERVOIR SEDIMENTS STA 50+00 TO 104+00

NOTE:
SURFACE TOPOGRAPHY INFORMATION PROVIDED BY OTHERS.

THE BASIS OF COORDINATES FOR THIS SURVEY IS THE WASHINGTON STATE COORDINATE SYSTEM, SOUTH ZONE, NAD 83 CORS96 EPOCH: 2002.0000 IN US SURVEY FEET.

THE VERTICAL DATUM IS CONDIT DATUM (PACIFIC POWER CONDIT PROJECT DATUM). THE VERTICAL DIFFERENCE BETWEEN NAVD 88 ELEVATIONS AND CONDIT DATUM ELEVATIONS IS −9.30 FOR THE CONDIT PROJECT DATUM.

ELEVATIONS AND CONTOURS ARE ON CONDIT DATUM. TO CONVERT TO NAVD 88, ADD 9.30 FEET.

CENTERLINE ALIGNMENT USED FOR PROFILE INFORMATION REPRESENTS THE 1912 CHANNEL ALIGNMENT FOR THE WHITE SALMON RIVER.

THE PROFILE IS CUT ALONG THE 1912 THALWEG (LOW FLOW CHANNEL) OF THE WHITE SALMON RIVER.

LEGEND

- 2006 BATHYMETRY
- 1912 TOPOGRAPHY (APPROXIMATE)
- XS 00+50 — CROSS–SECTION LOCATION

GRAPHIC SCALE
200 0 100 200 400
(in feet)

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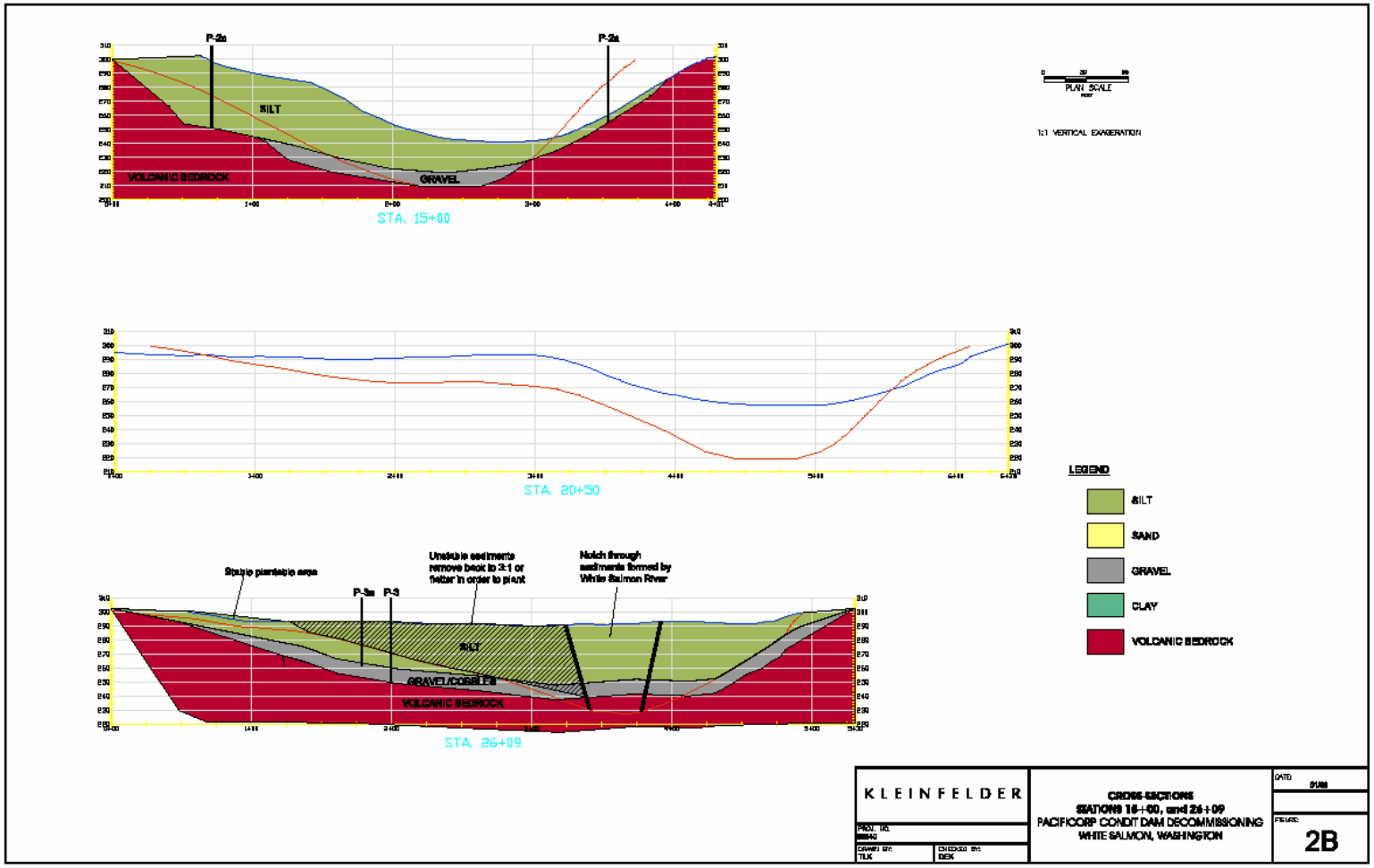
CONDIT DAM DECOMMISSIONING
NORTHWESTERN LAKE – PROFILE THROUGH RESERVOIR SEDIMENTS

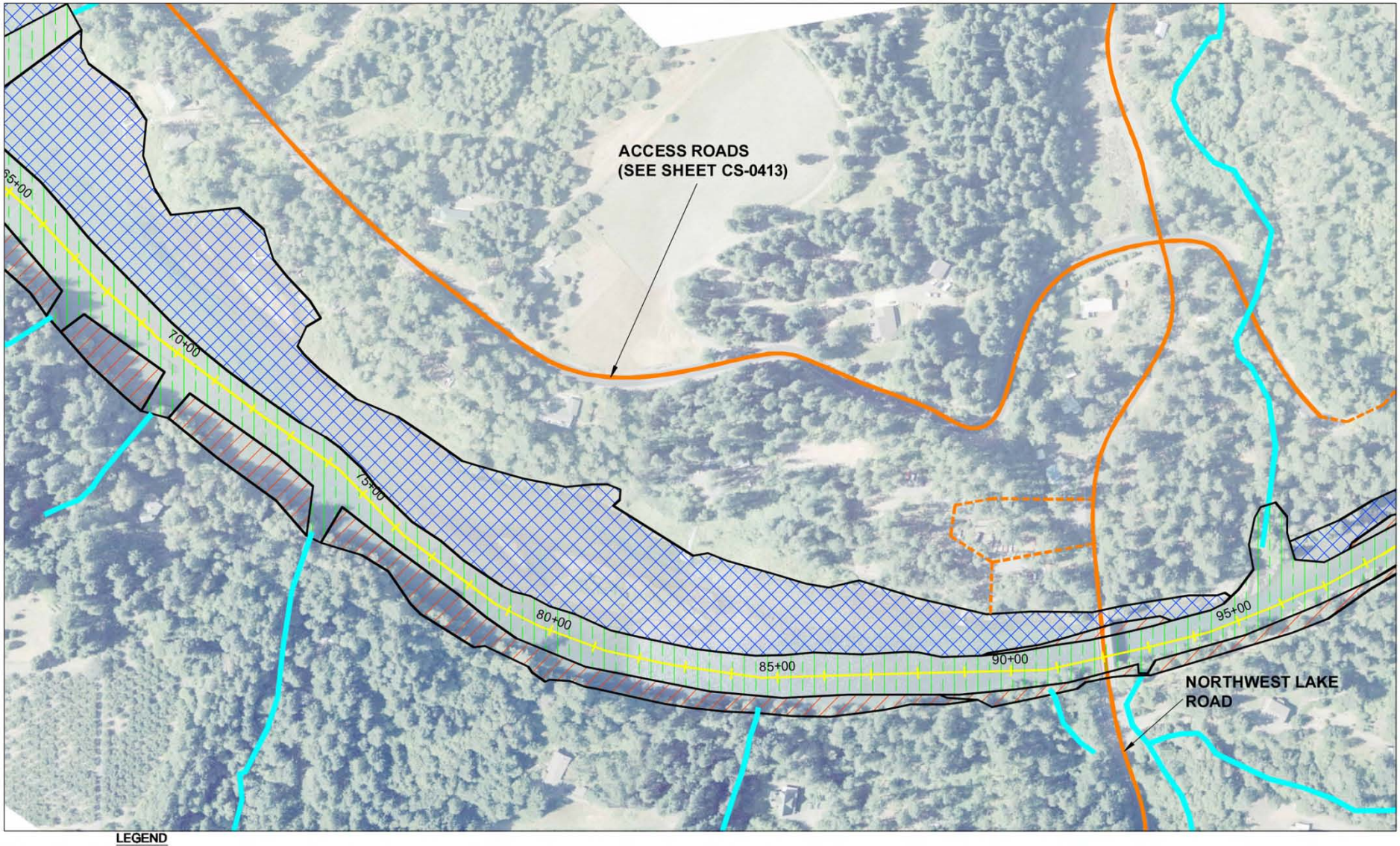
PACIFICORP ENERGY

SCALE: 1:200	SHEET 1 OF 1	FIGURE C1	REV. XX

Management Plans

Sediment Assessment, Stabilization, and Management Plan





LEGEND

- APPROXIMATE SEDIMENT REMOVAL ZONE BY NATURAL RIVER PROCESS
- APPROXIMATE SEDIMENT REMOVAL ZONE BY CONTRACTOR (GOOD EQUIPMENT ACCESS)
- APPROXIMATE SEDIMENT REMOVAL ZONE BY CONTRACTOR (POOR EQUIPMENT ACCESS)
- HISTORIC THALWEG
- STREAMS (APPROXIMATE)
- UNPAVED ROAD OR DRIVEWAY
- PAVED ROAD OR HIGHWAY

GRAPHIC SCALE
100 0 50 100 200
(in feet)

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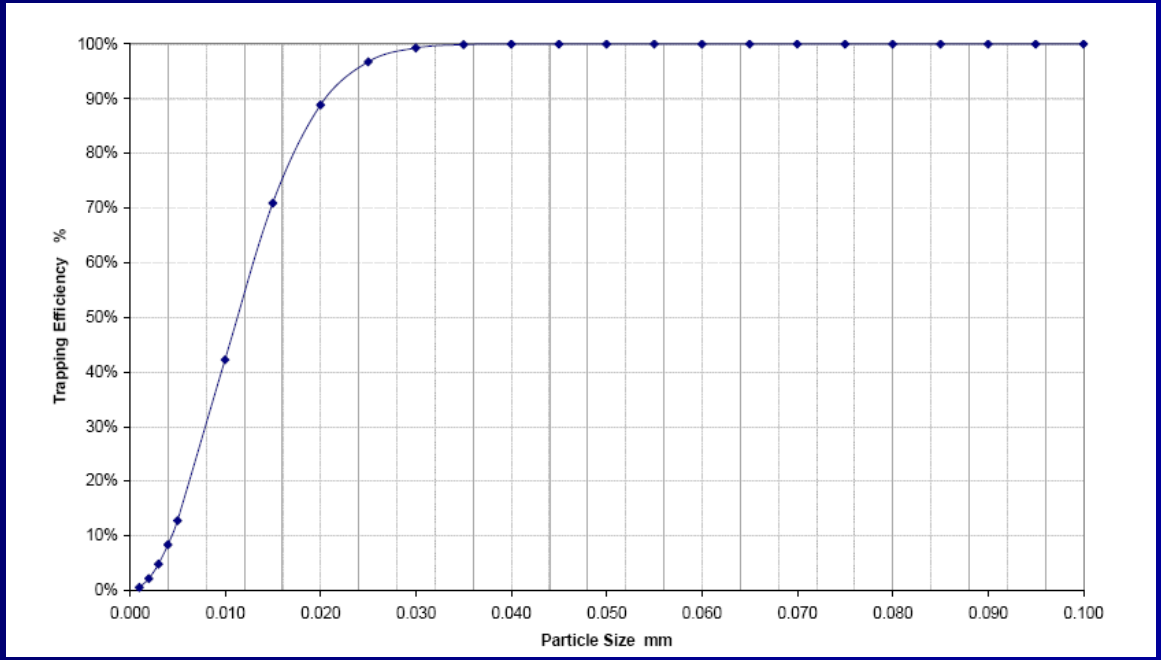
CONDIT DAM DECOMMISSIONING
SEDIMENT REMOVAL
PLAN (4 OF 5)

PACIFICORP ENERGY

SCALE 1:200	SHEET 4 OF 5	FIGURE D5	REV. XX

Sediment/Water Quality Predicted Effects

- An estimated 245,000 cubic yards will be trapped at the mouth of the White Salmon River
- All particles sand size and larger will settle within 5 miles of the mouth of the White Salmon River
- Two-thirds of clay-sized particles that pass Bonneville dam will reach the Columbia River mouth



Sediment/Water Quality Predicted Effects

- At breach - 150,000 ppm TSS and 76,000 NTUs turbidity
- Three miles below mouth of White Salmon River - 1,600 ppm TSS and 790 NTUs turbidity
- TSS concentrations decrease exponentially with time
- Variables – incomplete mixing, preferential flow patterns, river bed geometry, other hydrodynamic factors

Management Plans

Woody Debris Management Plan

Key Elements:

- Identifies channel areas with potential for woody debris transport and deposition
- Provides guidance to evaluate when woody debris may impede sediment flow, restrict fish passage, or present a public safety concern
- Specifies how woody debris conditions will be monitored
- Establishes criteria for woody debris to be stockpiled for other agency restoration work

Management Plans

Woody Debris Management Plan

Management Plans

Revegetation and Wetlands Management Plan

Key Elements:

- Focused on reservoir area after draining and sediment management
- Delineates revegetative strategy to establish wetland, herbaceous, and upland habitat
- Specifies monitoring and criteria for determining successful replanting

Table 2-1 Plants Identified in the Uplands and Wetlands of the Condit Project

Common Name	Scientific Name	Wetland Indicator Status (WIS)
Beaked hazlenut	*Corylus cornuta var. californica*	FACU
Bedstraw	*Galium triflorum*	FACU
Bigleaf maple	*Acer macrophyllum*	FACU
Bird's foot trefoil	*Lotus corniculatus*	FAC
Bitter cherry	*Prunus emarginata*	FACU
Black cottonwood	***Populus balsamifera* ssp. *Trichocarpa***	**FAC**
Black hawthorne	*Crataegus douglasii*	FAC
Bracken fern	*Pteridium aquilinum*	FACU
Broad-leaved starflower	*Trientalis latifolia*	FAC-
Canada thistle	*Cirsium arvense*	FACU+
Cascara	*Rhamnus purshiana*	FAC-
Cattail	***Typha latifolia***	**OBL**
Climbing nightshade	*Solanum dulcamara*	FAC+
Cow parsnip	*Heracleum lanatum*	FAC+
Curly dock	*Rumex crispus*	FACW
Douglas-fir	*Pseudotsuga menziesii*	FACU
Enchanter's nightshade	*Circaea alpina*	FACW

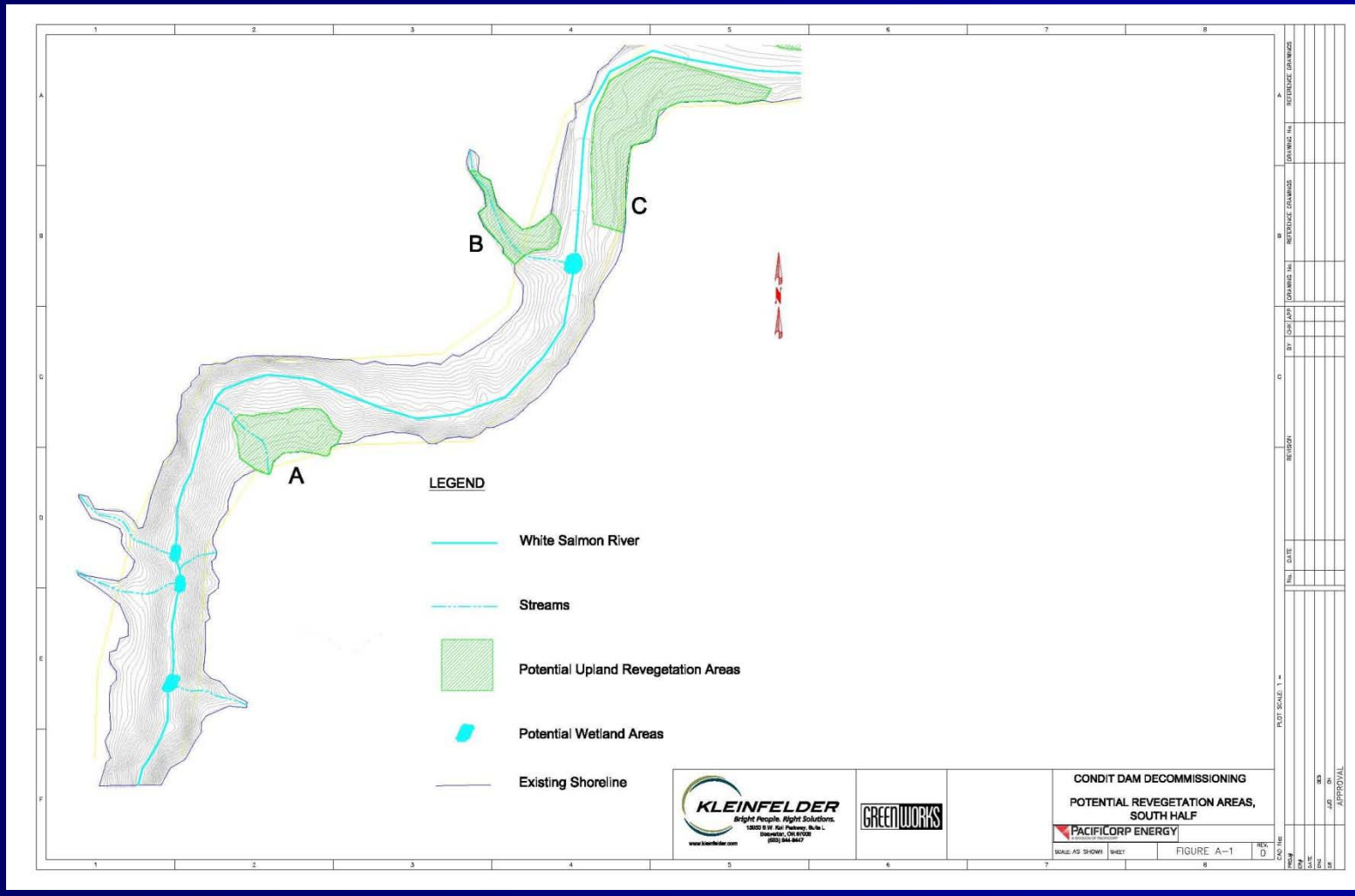
Table 3-1 Estimated Revegetation Zone Acreage

Management Areas	
Actively Managed Zones	**Estimated Area**
Upland Areas (Section 3.2) (seeded with herbaceous mix and planted with bare-root tree saplings)	*20 acres* *(15 to 20 acres)*
Riparian Areas (Section 3.3) (seeded with herbaceous mix and planted with bare-root tree saplings and live willow stakes)	*3 acres* *(5,200 l.f. at 25' width)*
Wetland Areas (Section 3.4) (primarily natural establishment with limited planting)	*4.8 acres*
Non-Actively Managed Zones	**Estimated Area**
Steep Slopes/Rocky Substrate (Section 3.5.1) (no planting attempted)	*35 acres*
Total Management Area	***62 acres***

Note: Actual site conditions following reservoir drawdown will undoubtedly change the total acreage of each of the revegetation zones and may require modifications to the management approach. .

Management Plans

Revegetation and Wetlands Management Plan



Management Plans

Environmental Monitoring Plan

Key Elements:

- Specifies water and sediment quality monitoring
- Monitoring sites include the White Salmon and Columbia Rivers
- Monitoring will evaluate pH, turbidity, TSS, DO, mercury, and temp
- Will verify that BMPs are effective and when project-related impacts are no longer observed

Management Plans

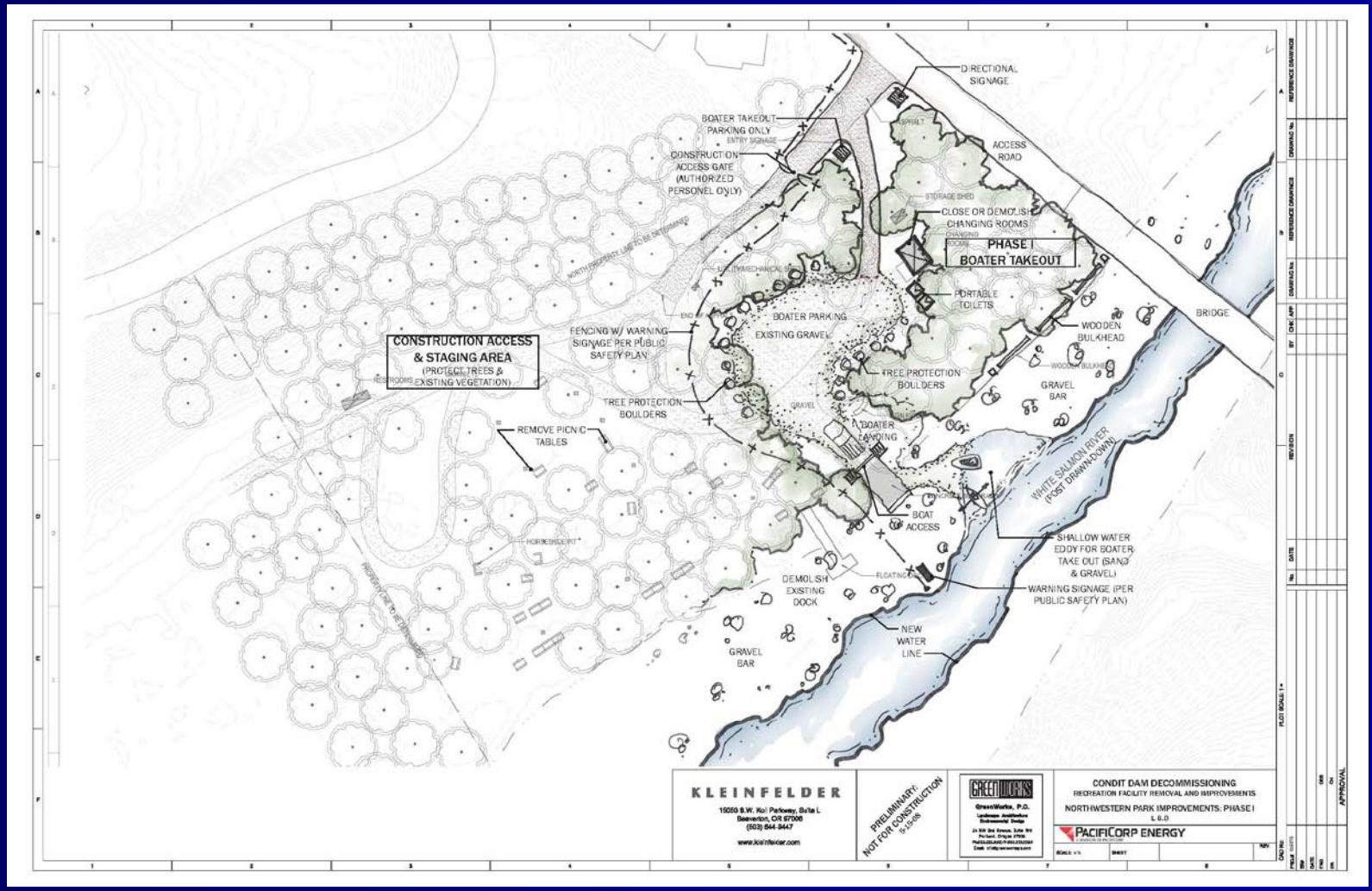
Recreation Facilities Improvement

Key Elements:

- Identifies changes to recreational facilities related to decommissioning and restoring the river
- Provides suggestions for opportunities to enhance public access and education about the area's history

Management Plans

Northwestern Park during Decommissioning



Expected Outcomes

- Increased River Habitat
  - **18 miles of potential river habitat available to steelhead & salmon**
  - **Restoration of natural runs of anadromous fish upstream of the dam**
  - **Benefit wildlife dependent upon anadromous fish**
  - **Restore the conservation value of designated critical habitat in the lower White Salmon River**
  - **By increasing summer flows in the bypass reach, temperatures will be restored to cooler conditions**
  - **Unregulated flows are expected to restore the transport of sediment and large woody debris through the former reservoir and lower White Salmon River which will benefit habitat quality**
  - **Increase whitewater recreation opportunities**

Status

- WDOE Final Second Supplemental EIS – 1/21/10
- WDOE 401 Certificate
- US Army Corps of Engineers 404 Certificate
- FERC Surrender Order

- Procurement of Demolition/Management Plans Contract

- Engagement with City of White Salmon and Klickitat/Skamania Counties

- Removal in 2011

- Cost cap of $28.5m

For more information please visit:

pacificorp.com/es/hydro/hl/condit