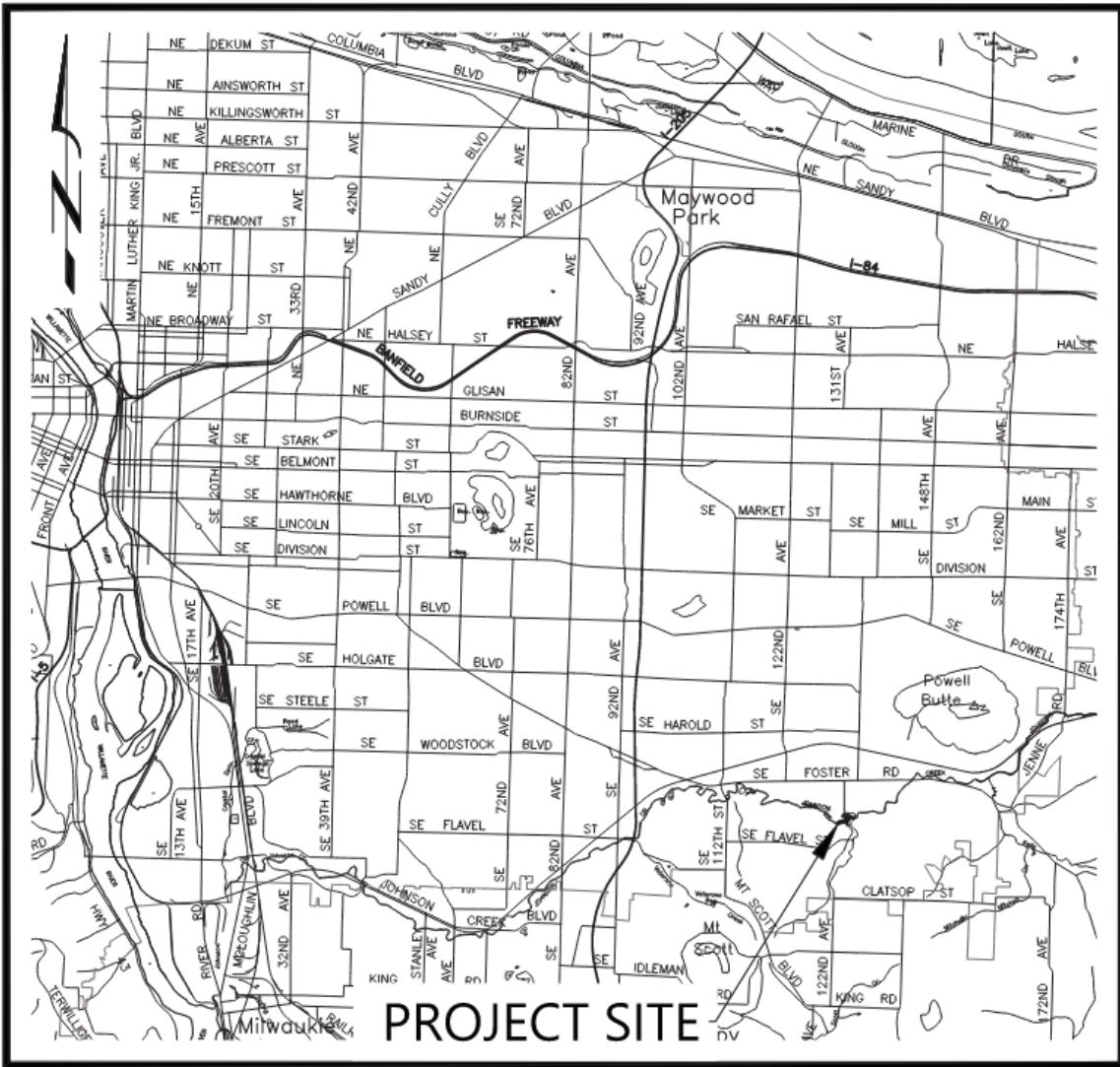




Johnson Creek Watershed Council Science Symposium : October 17, 2023

Cedar Crossing Stream Restoration (City of Portland Bureau of Environmental Services)

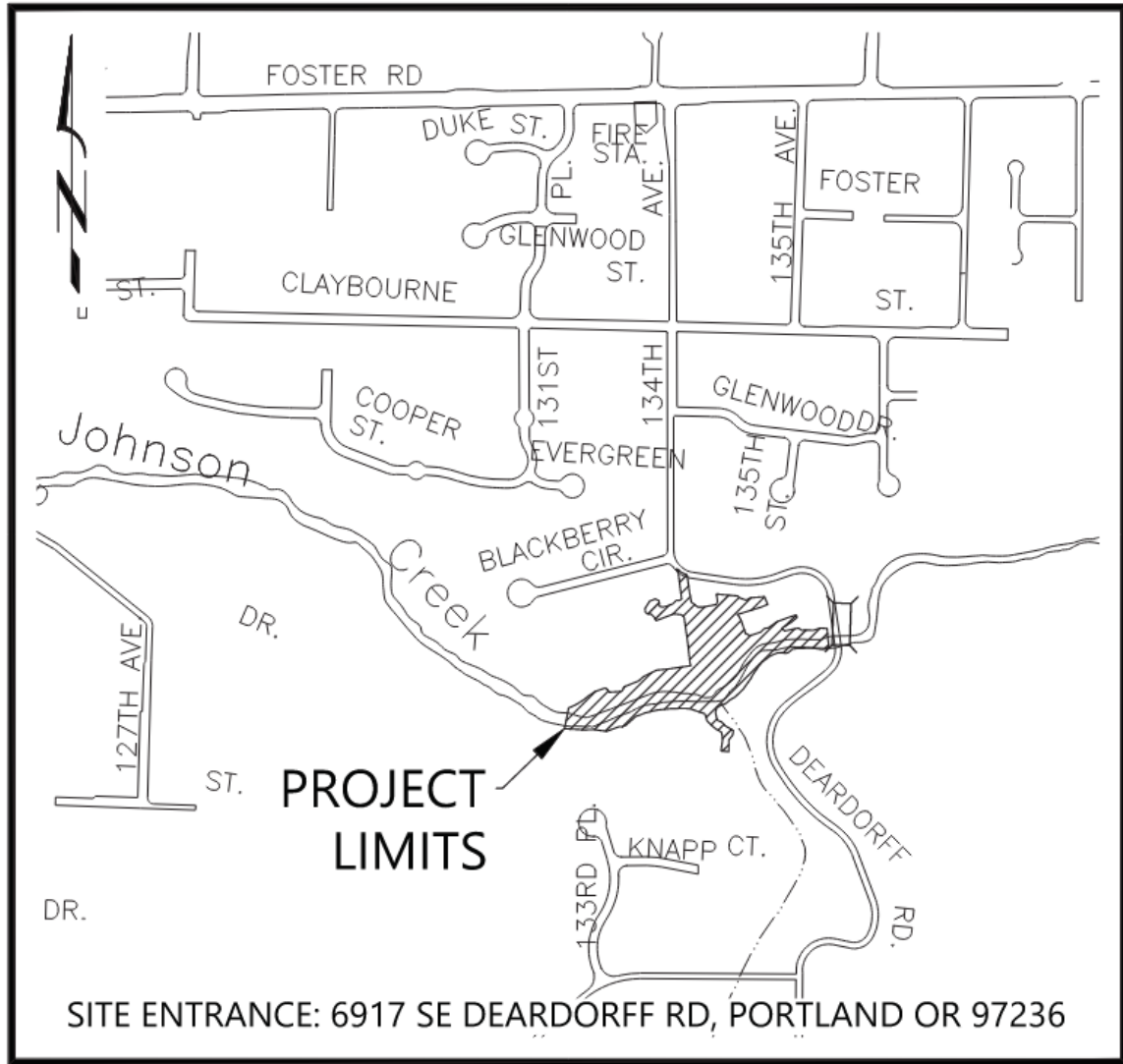




PROJECT SITE

VICINITY MAP

SCALE: 1" = 6000'



PROJECT LIMITS

SITE ENTRANCE: 6917 SE DEARDORFF RD, PORTLAND OR 97236

PROJECT MAP

SCALE: 1" = 400'

Where/what is Cedar Crossing?



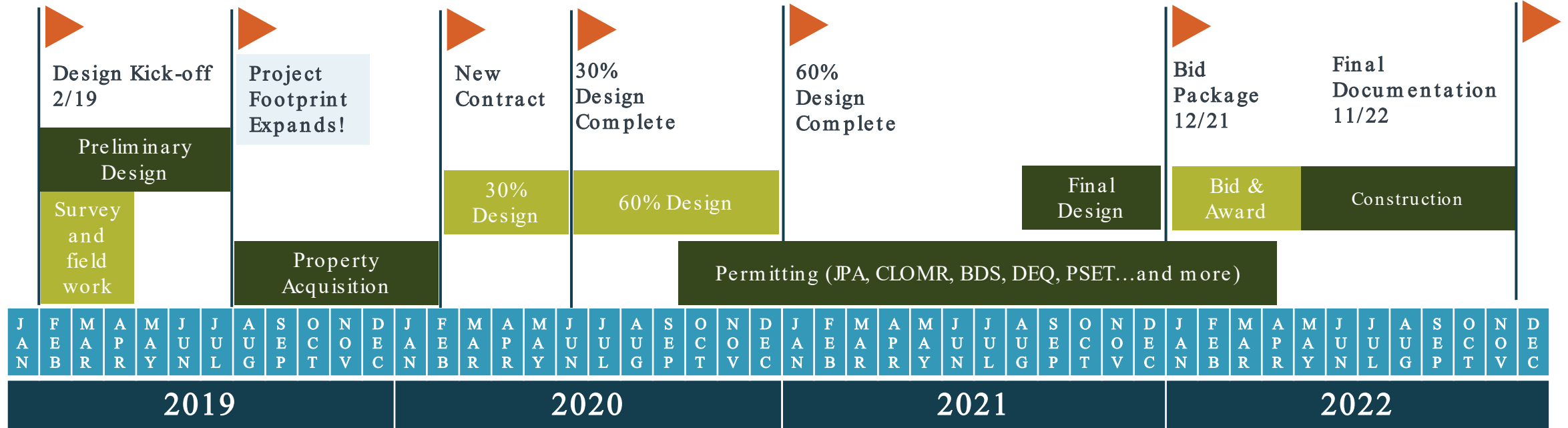
Where/what is Cedar Crossing?



Cedar Crossing Project History

2017 – Project Proposal

2018 – Project Awarded!



Liz Gilliam
Mike Rafferty
Karina Nordahl
Chris Lastomirsky
Kevin Timmins

Gary Wolff
Nick Cook
Damion Coe
Josh Owens
Jess Bornsheuer

Susan Terzo
Emily Neuhaus
David Helzer
Mac Baldner
Roger Tiffany

Jennifer Antak
Cody Kent
Daniel Kelley
Diane Tremmel
Melissa Brown

Madeline Pommier
Leah Benschung
Lisa Moscinski
Brandon Namm
Marc Peters

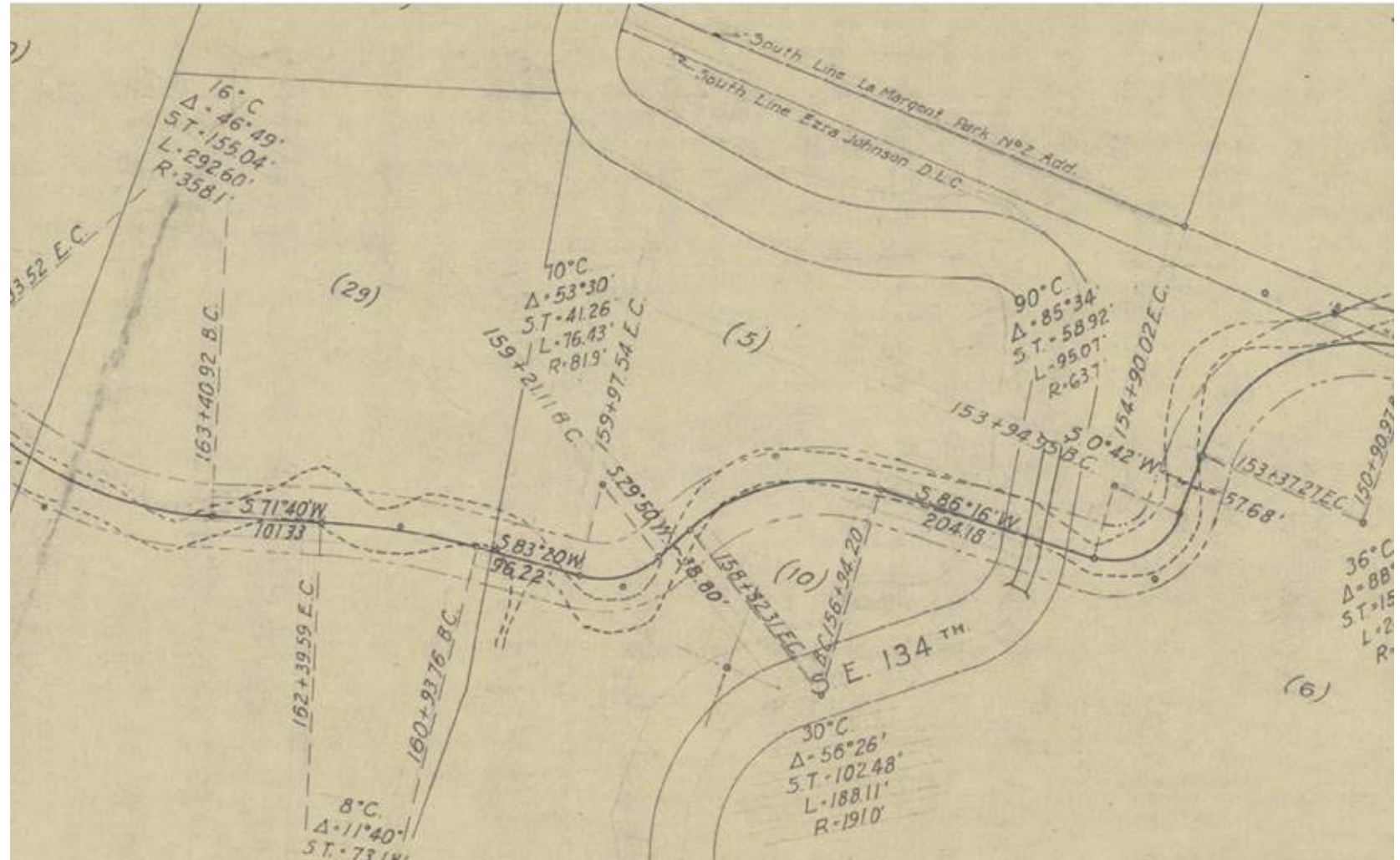
Brianna Wells
Lisa Huntington
Kate Marone
Erick Brennecke
AND MANY MORE!!!!

Site History



USACE...

- In the early 1930s, Johnson Creek was fairly natural
- Works Progress Administration (WPA)
- Flood Control Project
- Increase conveyance?





Johnson Cr. 9.26.34



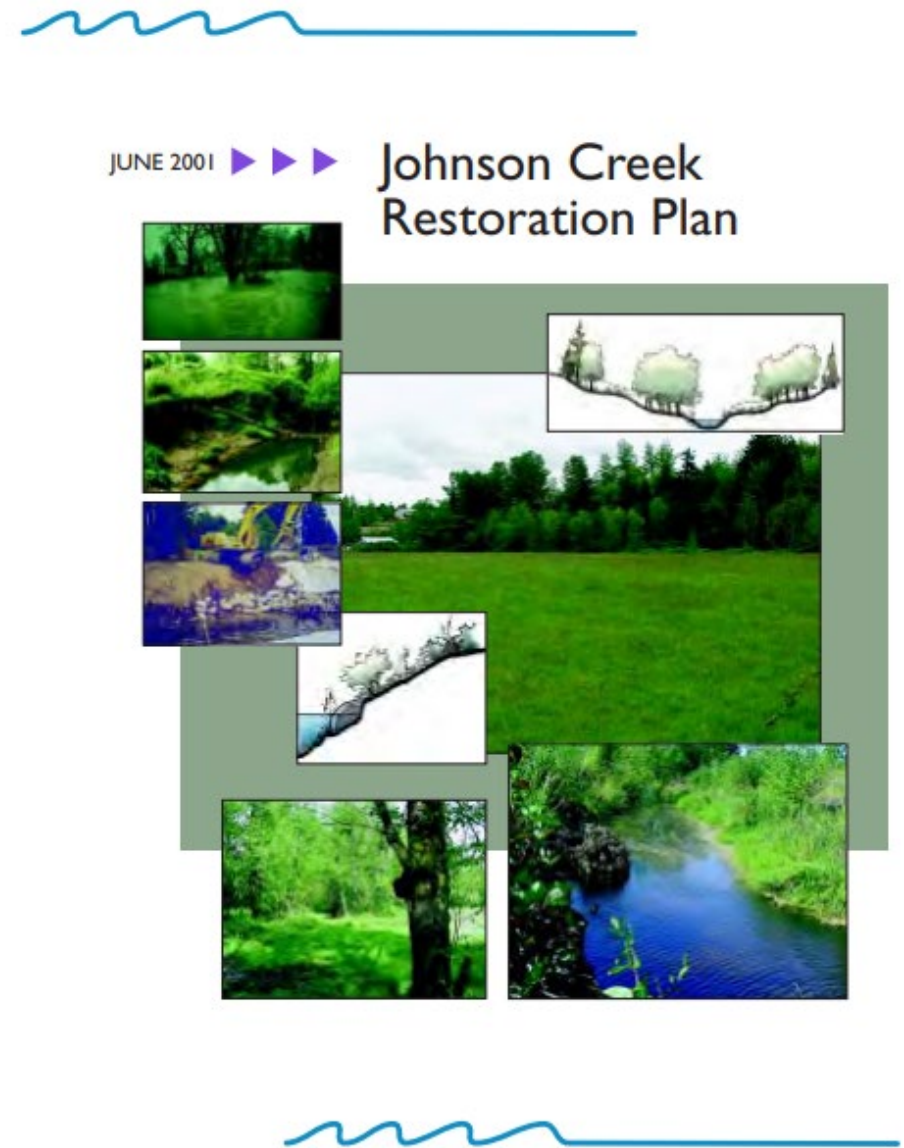
- Channel over-widened
- Confined within rock walls
- Sediment and wood cleaned out by USACE until the 80s
- Bed features in lower 700 feet homogenous



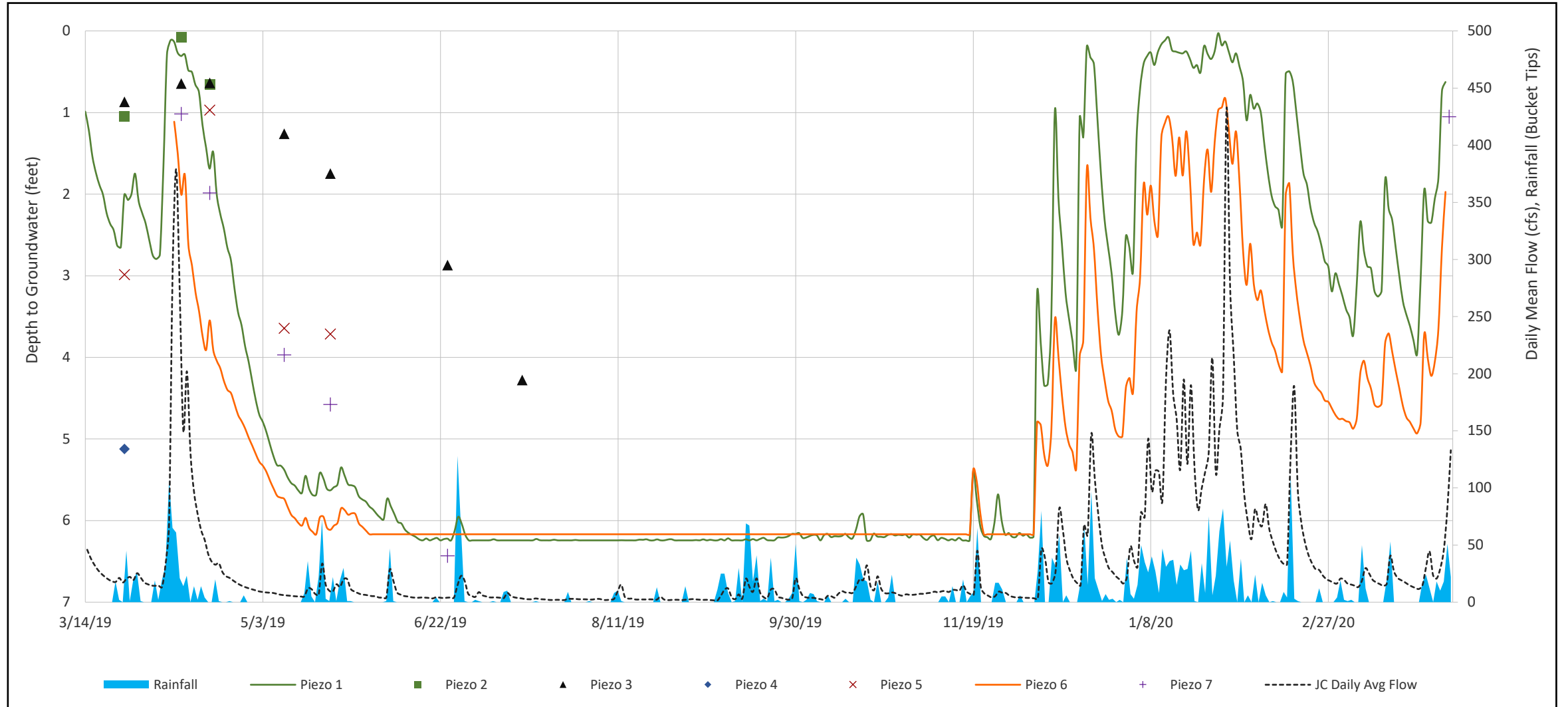
Project Goals

Project Goals:

- Reconnect the creek to the historic floodplain
- Enhance native riparian vegetation and add tree canopy
- Create backwater/high flow refuge habitat for ESA species
- Improve, enhance, and create riverine and wetland habitat to benefit a variety of native species and to assist in the recovery of ESA-listed salmonids



First...we science!



And then we science some more!

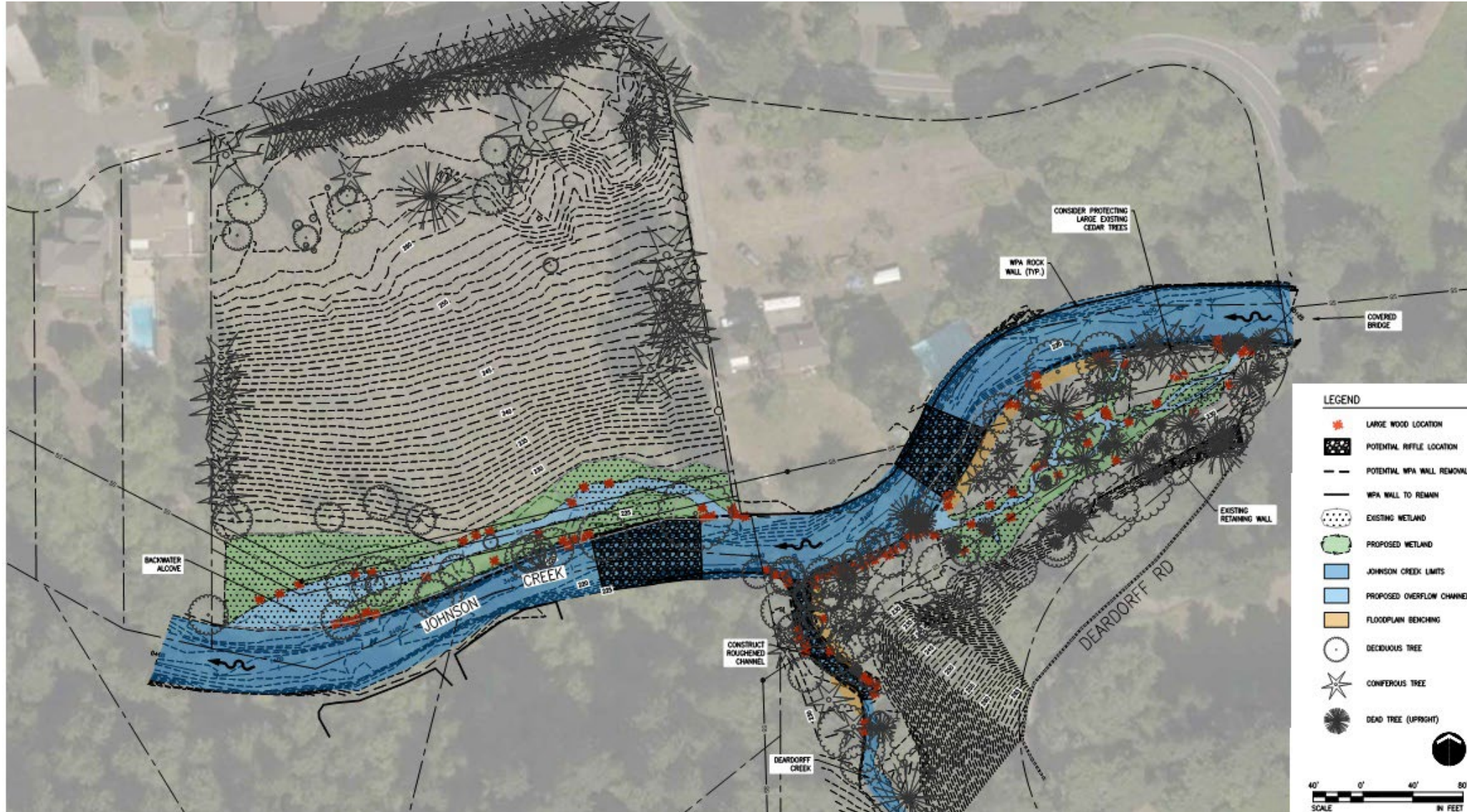


| Class | Max (mm) | % Passing by Size Class | | |
|---------------|----------|-------------------------|----------|----------|
| | | Otak | BES | |
| | | D/S Riffle | Riffle 2 | Riffle 3 |
| Sand | 2 | 1.9% | 0.0% | 0.0% |
| Fine Gravel | 8 | 6.5% | 0.0% | 2.1% |
| Med Gravel | 16 | 13.1% | 3.7% | 9.7% |
| Coarse Gravel | 32 | 25.2% | 14.7% | 26.2% |
| VC Gravel | 64 | 77.6% | 58.7% | 62.1% |
| Small Cobble | 128 | 99.1% | 92.7% | 94.5% |
| Large Cobble | 256 | 100.0% | 98.2% | 97.9% |
| Boulder | > 256 | 0.0% | 100.0% | 100.0% |



Project Design

30% Design: Round 1



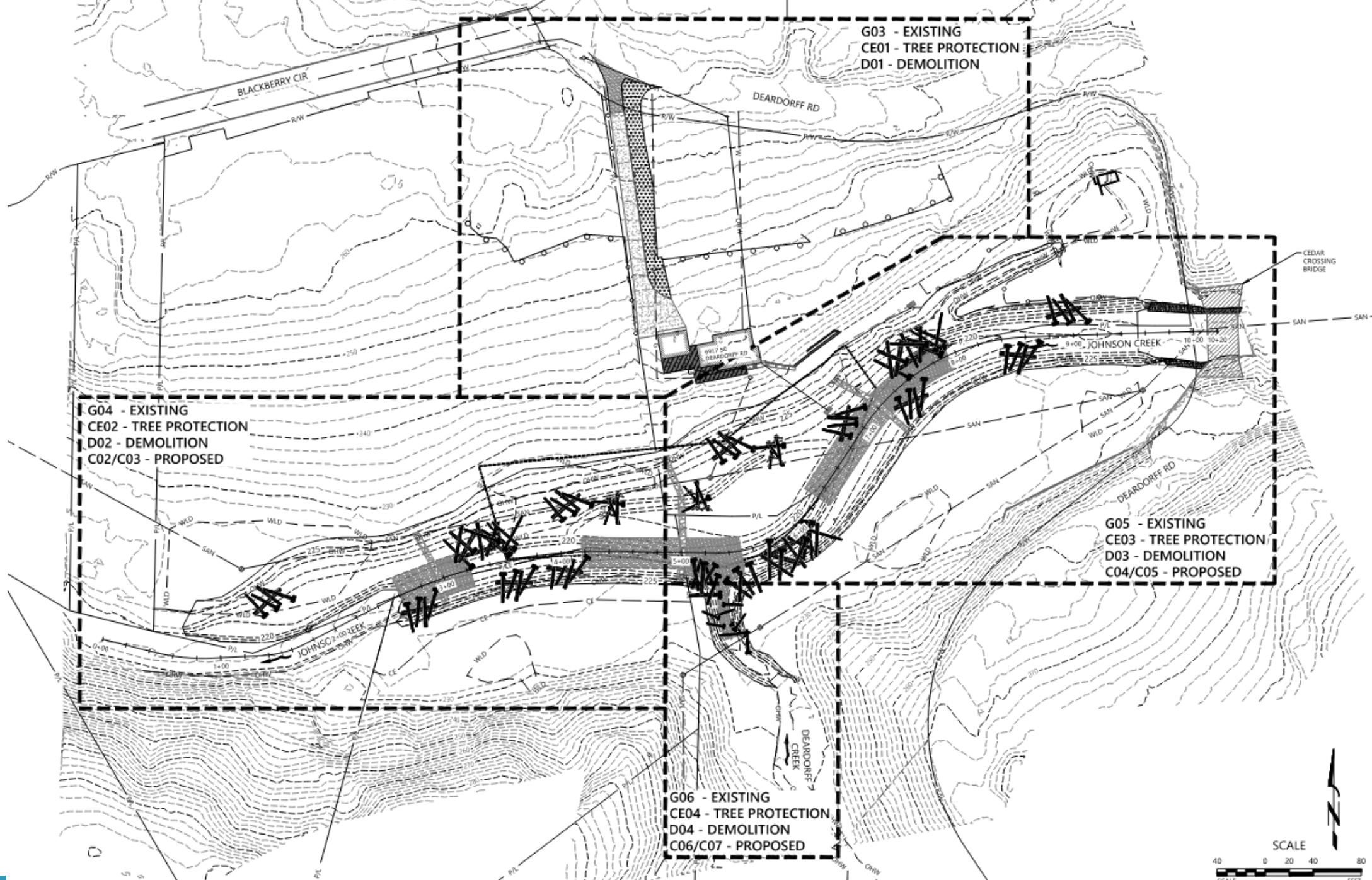


Final Design

- Add heterogeneity to the streambed – constructed riffles and pools
- Reconnect the floodplain – constructed riffles and pools + floodplain excavation
- Add salmonid habitat – pool depth, large woody material, spawning gravels
- Save as many trees as possible – arborist consultation/observation, careful soil lift construction

INDEX NOTES

1. FOR CLARITY, TREE LOCATIONS AND NUMBERS CAN BE VIEWED IN SHEETS C18-C20, WITH ACCOMPANYING TABLES ON SHEETS C22-C23



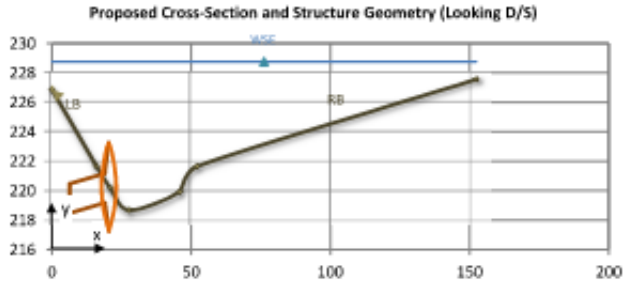
Sticks ...

Single Log Stability Analysis Model Inputs

| Site ID | Structure Type | Structure Position | Meander | Station | d_w (ft) | $R_{w,sp}$ | u_{crit} (ft/s) |
|---------|-----------------|--------------------|---------|---------|------------|------------|-------------------|
| JC | Flow Deflection | Left bank | Outside | 6+00 | 10.08 | 3.00 | 6.16 |

| Multi-Log Structures | Layer | Log ID |
|----------------------|---------|--------|
| | Stacked | A2 |

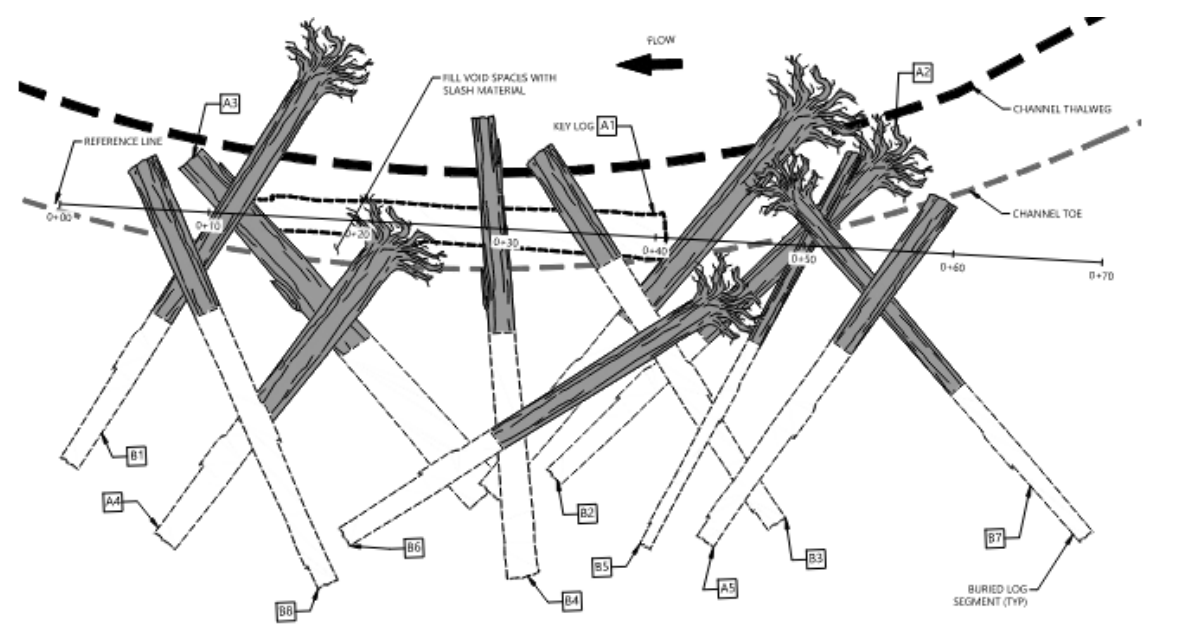
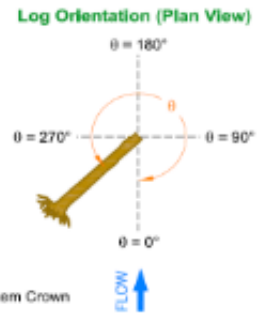
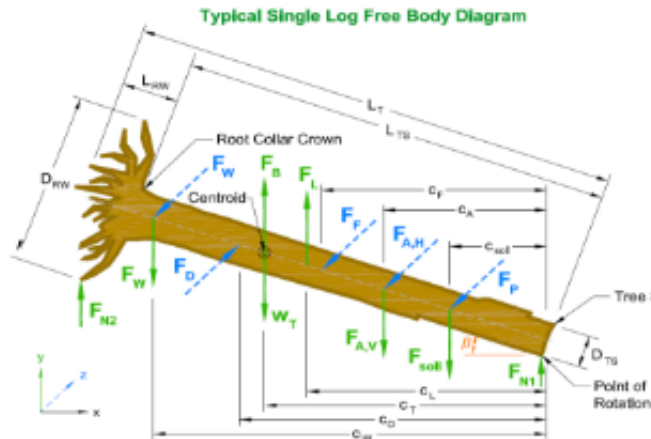
| Channel Geometry Coordinates | | |
|------------------------------|--------|--------|
| Proposed | x (ft) | y (ft) |
| Fidpln LB | 0.00 | 226.86 |
| Top LB | 15.85 | 221.70 |
| Toe LB | 21.03 | 220.16 |
| Thalweg | 27.80 | 218.68 |
| Toe RB | 45.87 | 219.93 |
| Top RB | 52.04 | 221.65 |
| Fidpln RB | 152.40 | 227.55 |



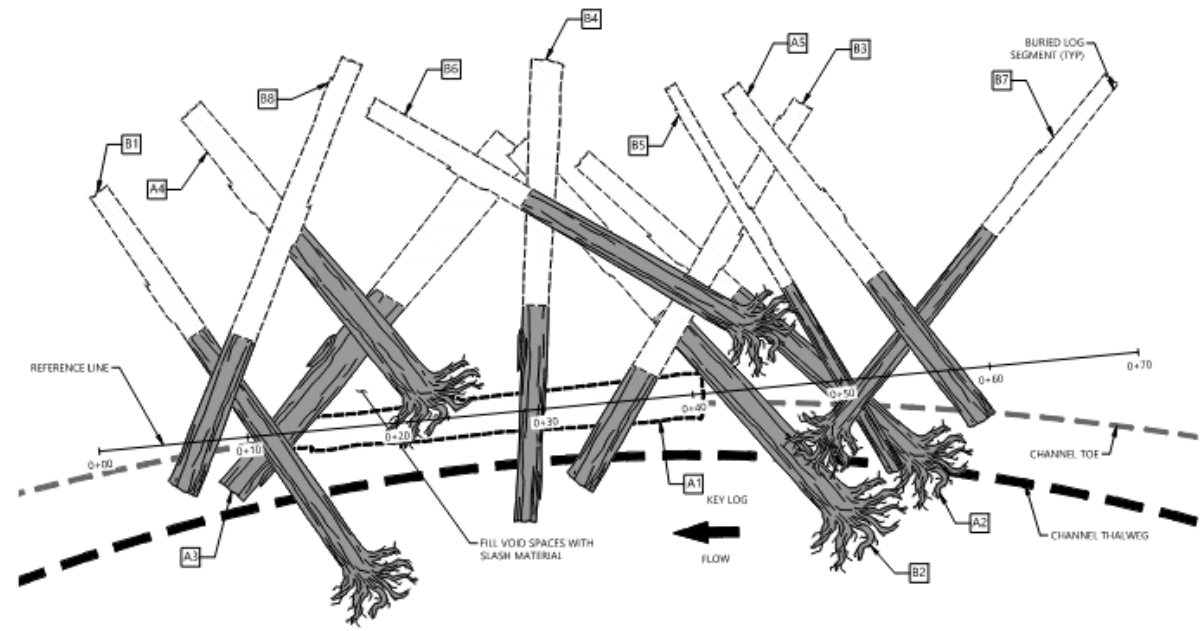
| Wood Species | Rootwad | L_T (ft) | D_{TS} (ft) | L_{RW} (ft) | D_{RW} (ft) | γ_{TL} (lb/ft ³) | γ_{TR} (lb/ft ³) |
|--------------------|---------|------------|---------------|---------------|---------------|-------------------------------------|-------------------------------------|
| Douglas-fir, Coast | Yes | 30.0 | 2.00 | 3.00 | 6.00 | 33.5 | 38.0 |

| Structure Geometry | θ (deg) | β (deg) | Define Fixed Point | x_T (ft) | y_T (ft) | $y_{T,min}$ (ft) | $y_{T,max}$ (ft) | A_{TP} (ft ²) |
|--------------------|----------------|---------------|---------------------|------------|------------|------------------|------------------|-----------------------------|
| | 28.0 | -1.5 | Root collar: Bottom | 19.03 | 219.18 | 217.28 | 223.28 | 21.53 |

| Soils | Material | γ_s (lb/ft ³) | γ'_s (lb/ft ³) | ϕ (deg) | Soil Class | $L_{T,acc}$ (ft) | $d_{b,max}$ (ft) | $d_{b,avg}$ (ft) |
|------------|--------------------|----------------------------------|-----------------------------------|--------------|------------|------------------|------------------|------------------|
| Stream Bed | Very coarse gravel | 130.8 | 81.4 | 40.0 | 5 | 0.00 | 0.00 | 0.00 |
| Bank | Gravel/sand | 111.7 | 69.5 | 39.0 | 5 | 24.48 | 4.33 | 2.14 |

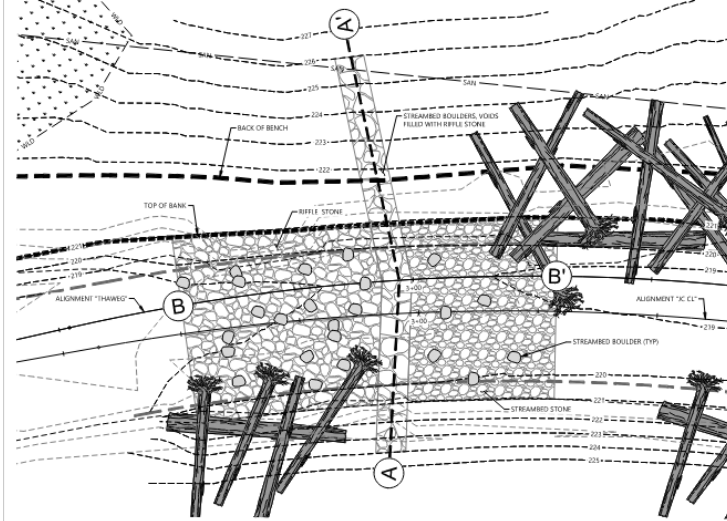


1 TYPE 1 LARGE WOOD STRUCTURE (LEFT BANK)
CD05 NTS

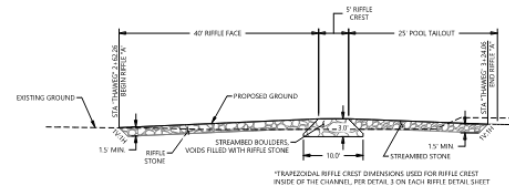


2 TYPE 1 LARGE WOOD STRUCTURE (RIGHT BANK)
CD05 NTS

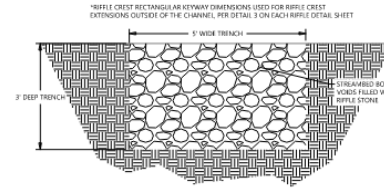
And stones...



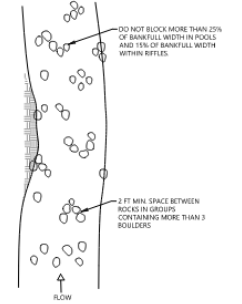
1 RIFFLER 'A' PLAN
CD009 NTS



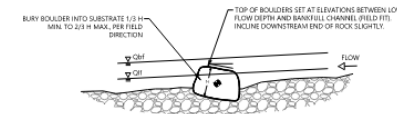
2 RIFFLER 'A' PROFILE (B - B')
CD009 NTS



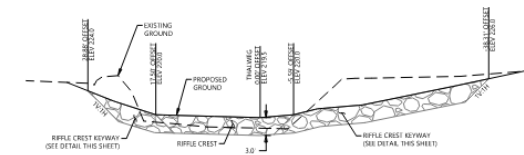
4 RIFFLER CREST KEYWAY
CD009 NTS



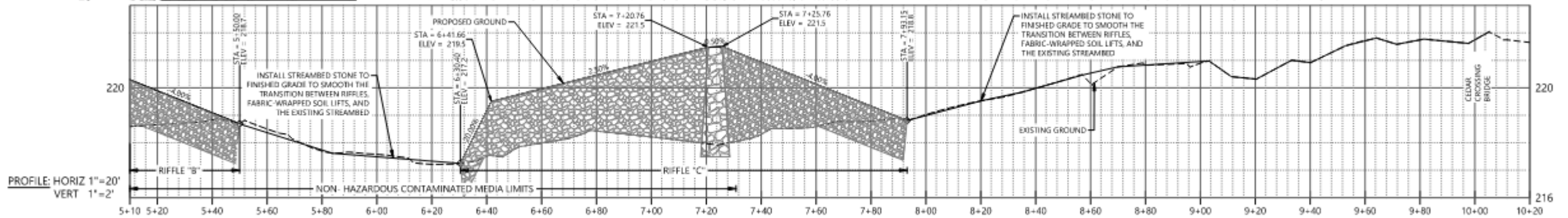
6 STREAMBED BOULDER CLUSTER PLACEMENT
CD009 NTS



5 STREAMBED BOULDER PLACEMENT
CD009 NTS

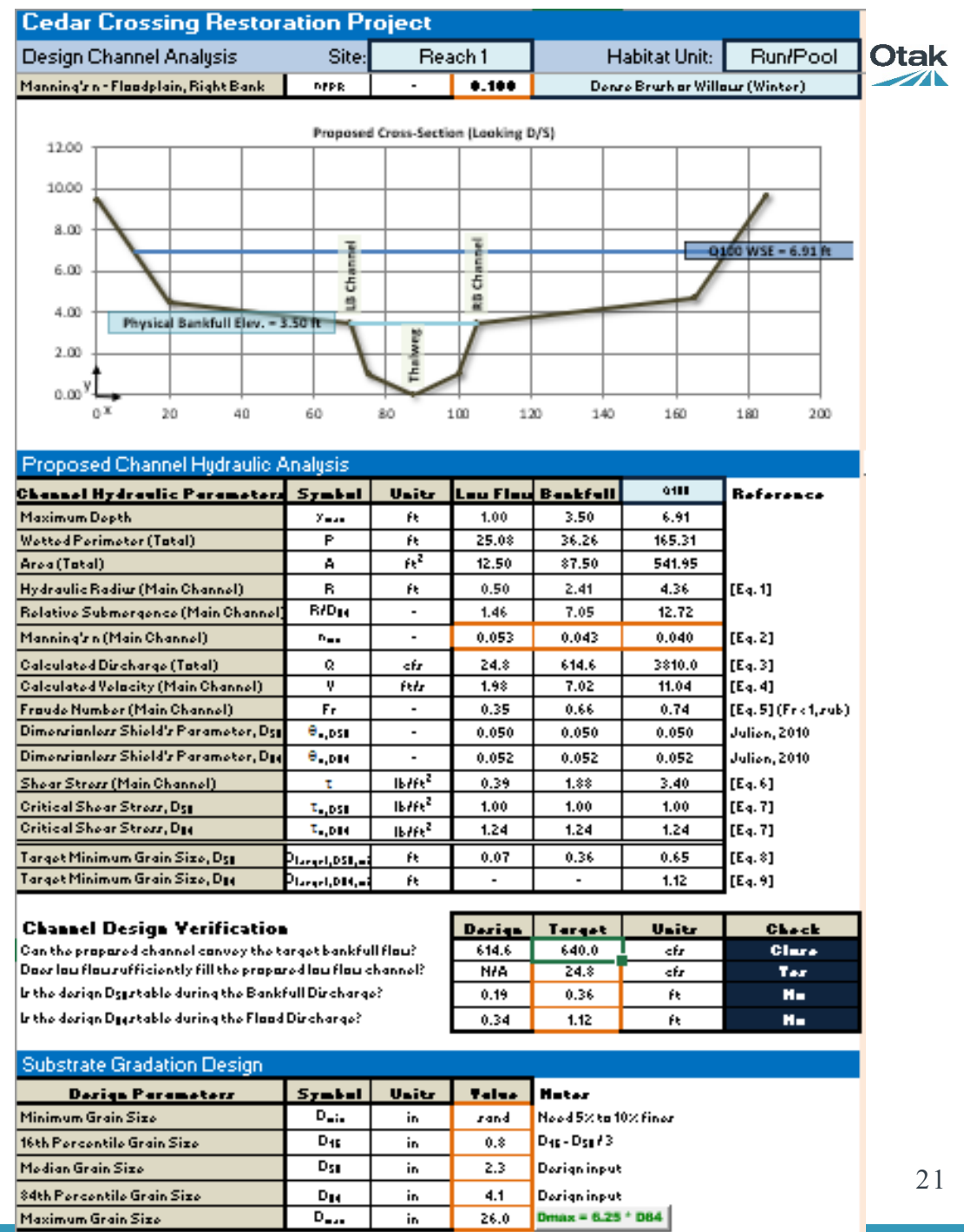


3 RIFFLER CREST 'A' SECTION (A-A')
CD009 NTS



Hydraulics

- Test design, determine permit pathways with hydraulic modeling
- Frequent floodplain activation to generate velocity refugia areas
- Main channel depths at low flows that can support adult and juvenile salmonids
- In-channel velocity heterogeneity



Modeling

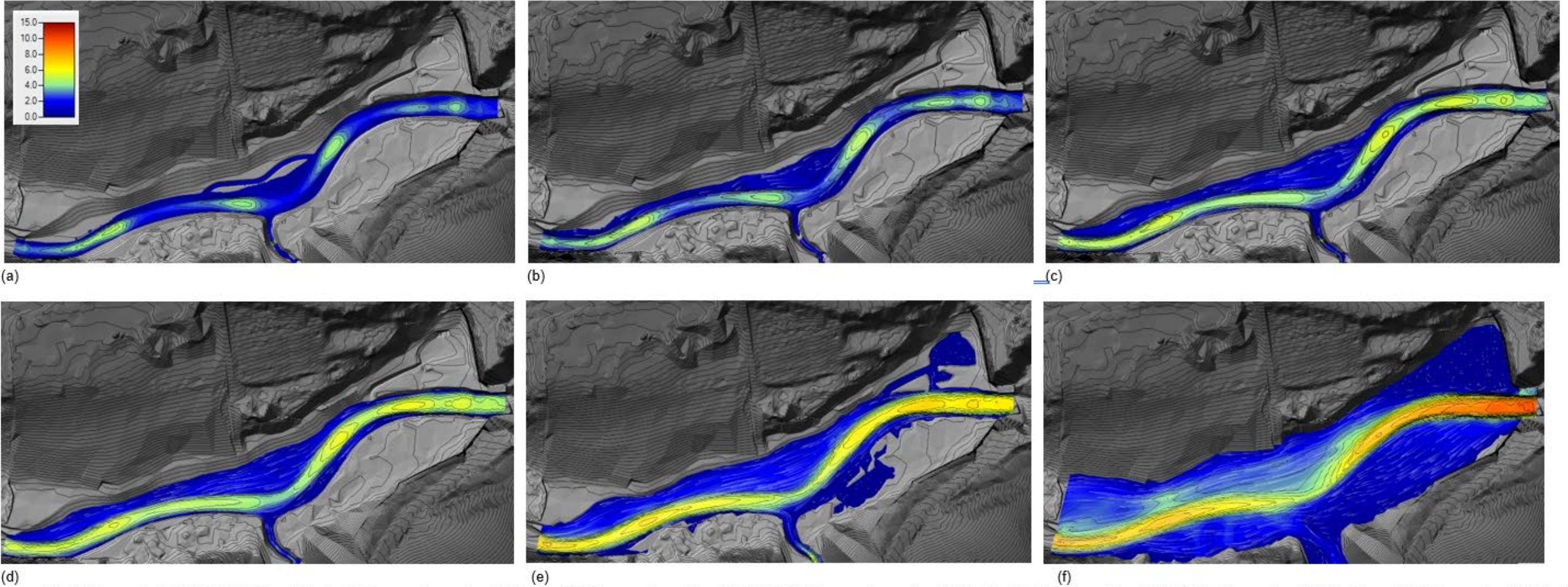


Figure 7. 2D Flow velocity (ft/s) distribution at the (a) 10% exceedance flow [143 cfs], (b) 5% exceedance flow [228 cfs], (c) 1% exceedance flow [484 cfs]. (d) ~50% 2-year flow [626 cfs], (e) 2-year flow [1280 cfs], and (f) 100-year flow [3180 cfs].

UNIQUE CHALLENGES

- TREES!
- Johnson Creek Interceptor (sewer)
- Property acquisitions/easements
- Legacy DDT contamination
- Lead paint... On one door
- Private properties
- WPA wall we want to remove... is a historical resource
 - Opportunity for cross-project permitting integration
- FEMA/ESA nexus...who has authority for what?!?

Fish Salvage



Total=1,309

Lower Columbia River Coho Salmon: 3
 Reticulate Sculpin: 573
 Speckled Dace: 79
 Redside Shiner: 179

Western Brook Lamprey: 4
 Pacific Lamprey ammocetes: 14
 Unidentified lamprey: 9
 Steelhead/Rainbow Trout: 7
 Largescale Sucker: 3

Signal Crayfish: 424
 Gambusia: 10
 Pumpkinseed: 4











