



A SEWER RUNS THROUGH IT

Navigating SacSewer's Aging Sewer Creek Crossings



SACRAMENTO AREA
SEWER DISTRICT
SERVING YOU 24/7

Presented By



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Agenda

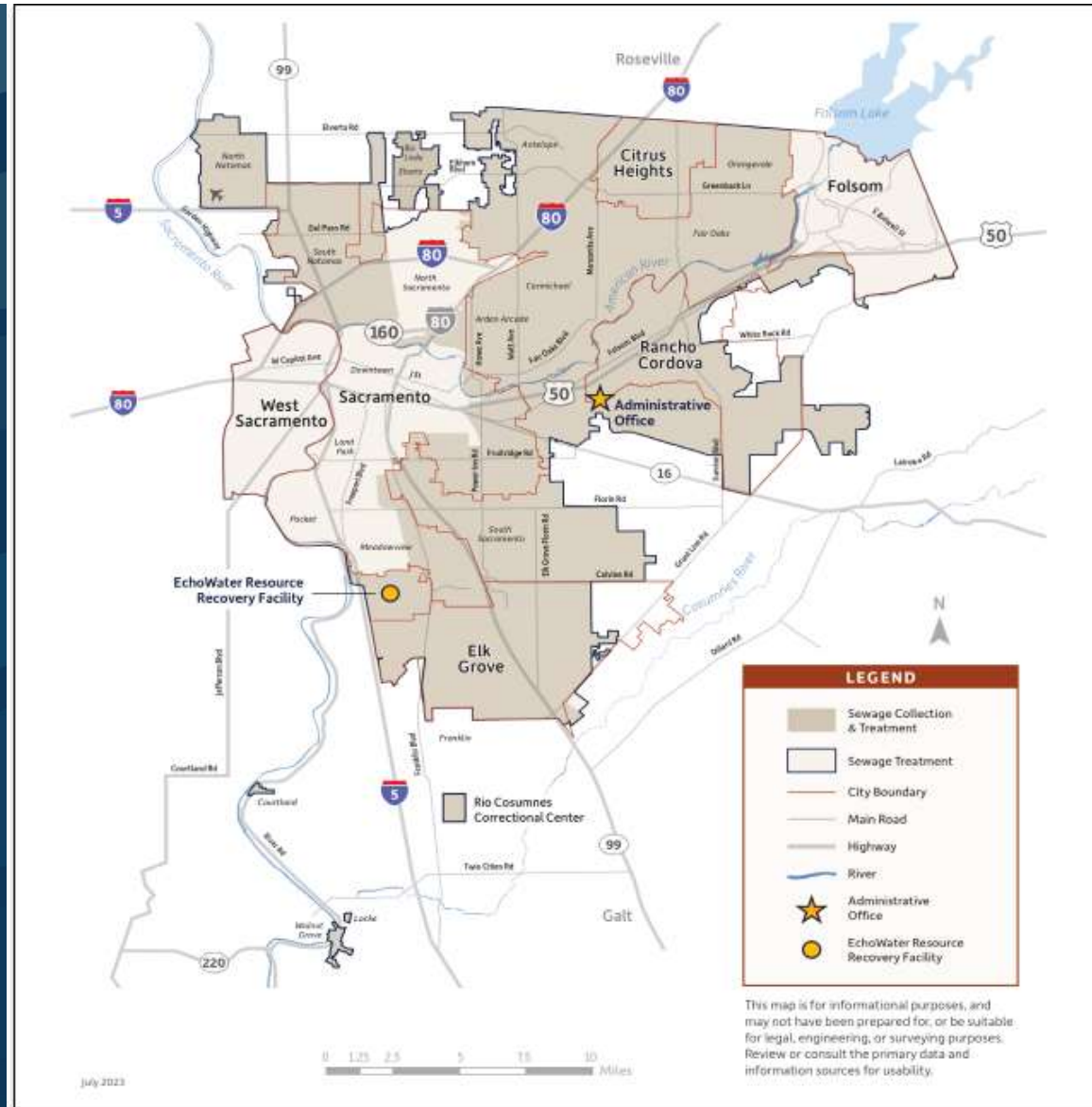
- **Project and Client Background**
- **Crossing Types**
- **Alternative Analysis**
- **Design Considerations**
- **Case Studies/Implemented Solutions**
- **Recommendations for You!**

The background of the slide features a series of horizontal, wavy lines in various shades of blue, creating a textured, water-like effect. The lines are layered and overlap, with some being darker and others lighter, giving a sense of depth and movement. The overall color palette is monochromatic, ranging from deep navy to a lighter, muted blue.

Background

SacSewer's Service Area

- 5,000 miles of sewer pipe
- 387 square miles
- 1.6 million customers
- 4- to 120-inches in diameter
- ~650 waterway crossings



SacSewer's Creek Crossing Asset Management and Maintenance

Regular Creek Crossing Inspections

- Annual Crossing Inspections
- Post 2-year Storm Inspections
- CCTV Inspections

As-Needed Reinforcement

- Erosion control measures
- Joint support

Prioritization for Repair

- Asset prioritization



Why this project is important?

Prevent spills!

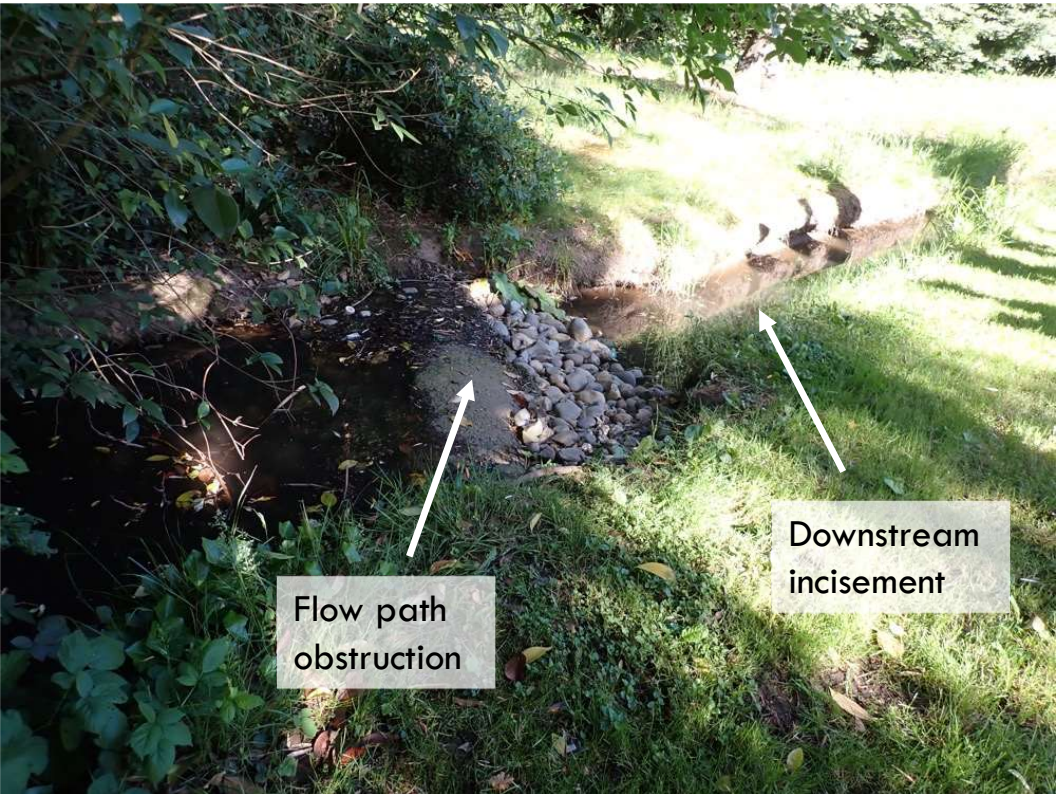
Exposed creek crossings are at an increased risk for:

- Corrosion
- Impact from debris or trees
- Vandalism
- Erosion
- Infiltration



Crossing Types

Partially Exposed Buried Encasement



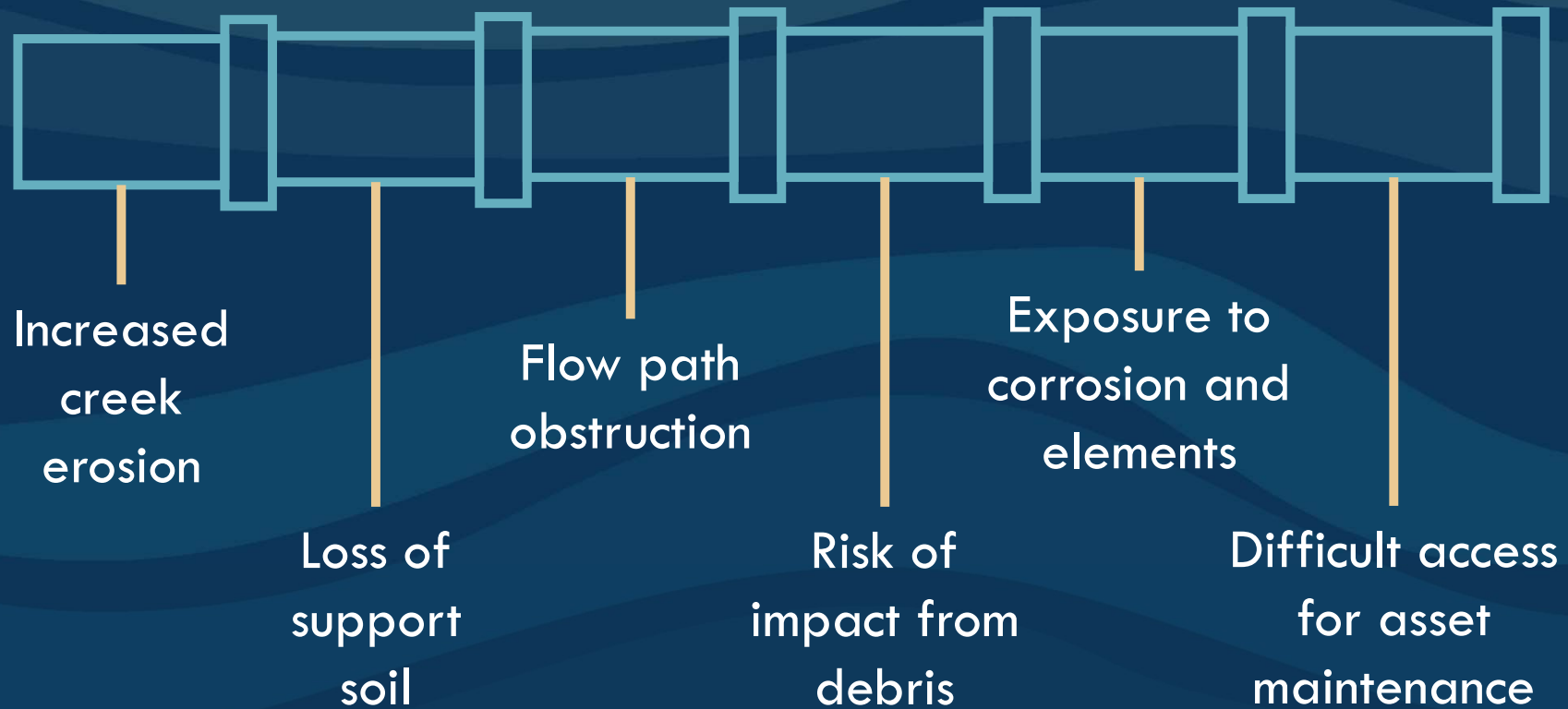
Partially Exposed Buried Crossing



Exposed Aerial Crossing



Issues with Creek Crossings



Alternative Analysis

Evaluated Alternatives

Alternative	Description
Status Quo	Maintain existing crossing
Protect in Place	Add protection around existing crossing
Rehabilitation	Replace pipe, piers, and/or casing
Vertical Shift Up	Shift up to remove from creek/flowpath
Vertical Shift Down	Shift down to remove from creek/flowpath
Gravity Reroute	Find alternate route which avoids crossing
Replace with Pump Station	Replace crossing with pump station
Install Inverted Siphon to Eliminate Crossing	Replace crossing with inverted siphon

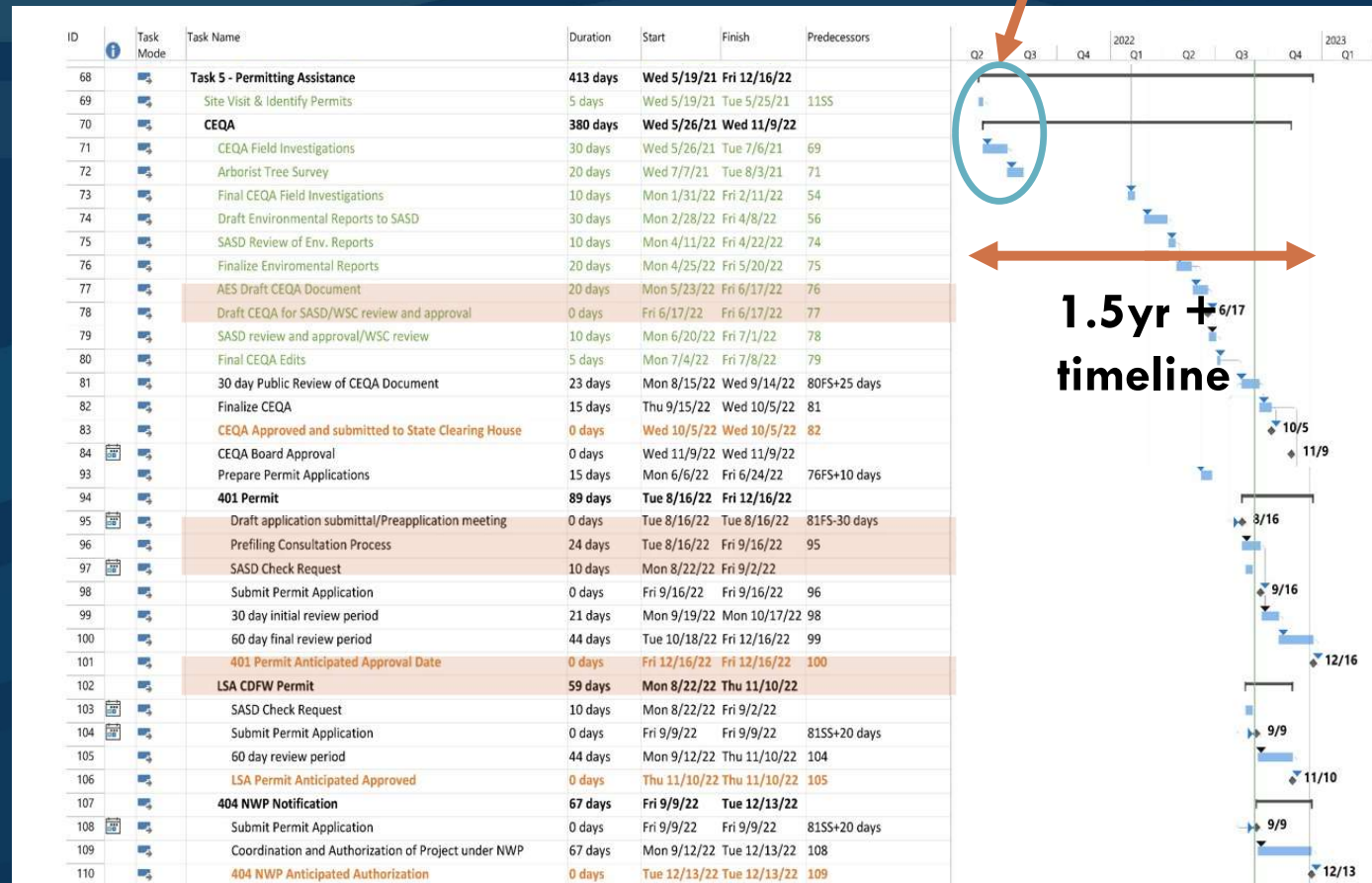
Design Considerations

Permitting and Environmental

CEQA and Permits are Main Schedule Driver

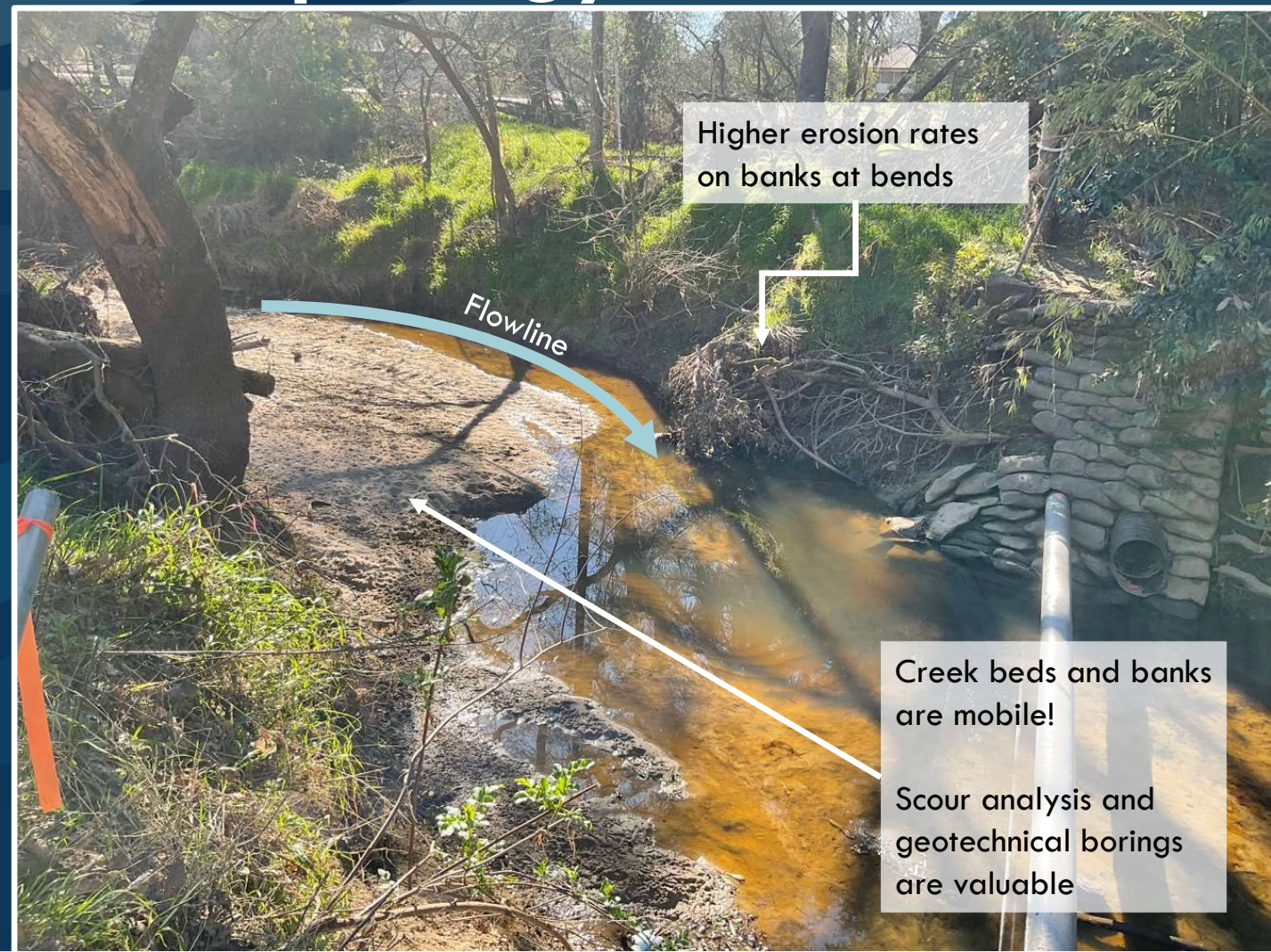
- California Environmental Quality Act Process
- Army Corps Of Engineers 404 Permit
- Waterboard 401 Permit
- CDFW Lake and Streambed Alteration Agreement

Seasonal Limits on Biologist Field Work



Geotechnical/Geomorphology Issues

Remote access and hand augered borings



Creek Flow Velocity Analysis

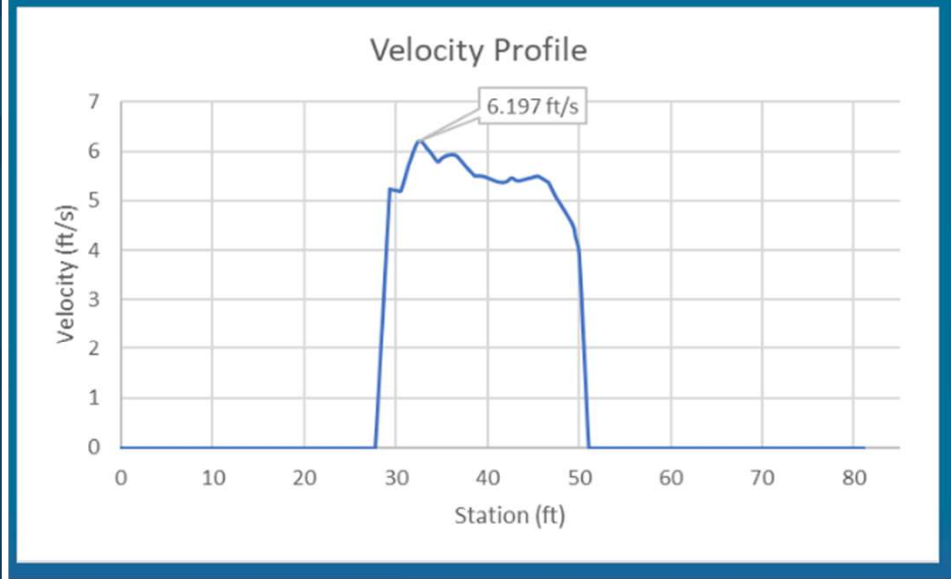
Floodway Modeling Informed Design Criteria

- **Maximum velocities occurred in lower flow periods**
- **Horizontal Loading Criteria**
- **Vertical Impact Criteria**

Depth = 0.5 ft

Max Velocity = 6.20 ft/s

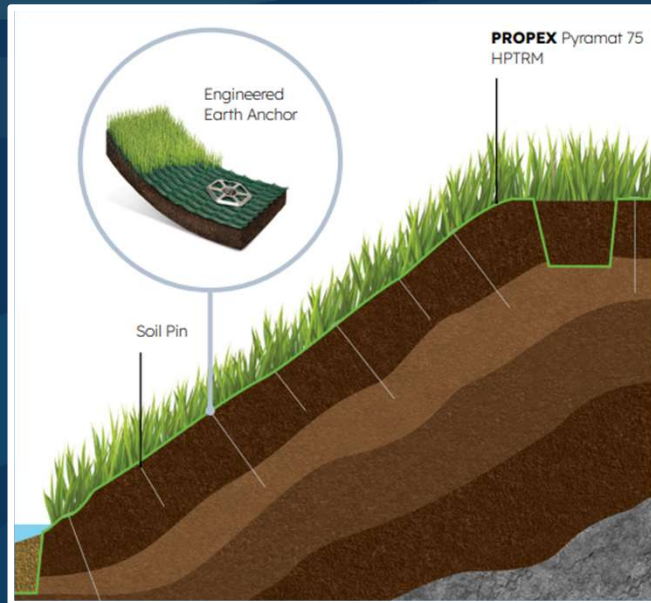
Water Surface Elevation = 108 ft



Bank and Bed Protection



Engineered Mattress



Bank Armoring



Soil Filled Gabions

Implemented Solutions

Campfire Way

Existing Issues

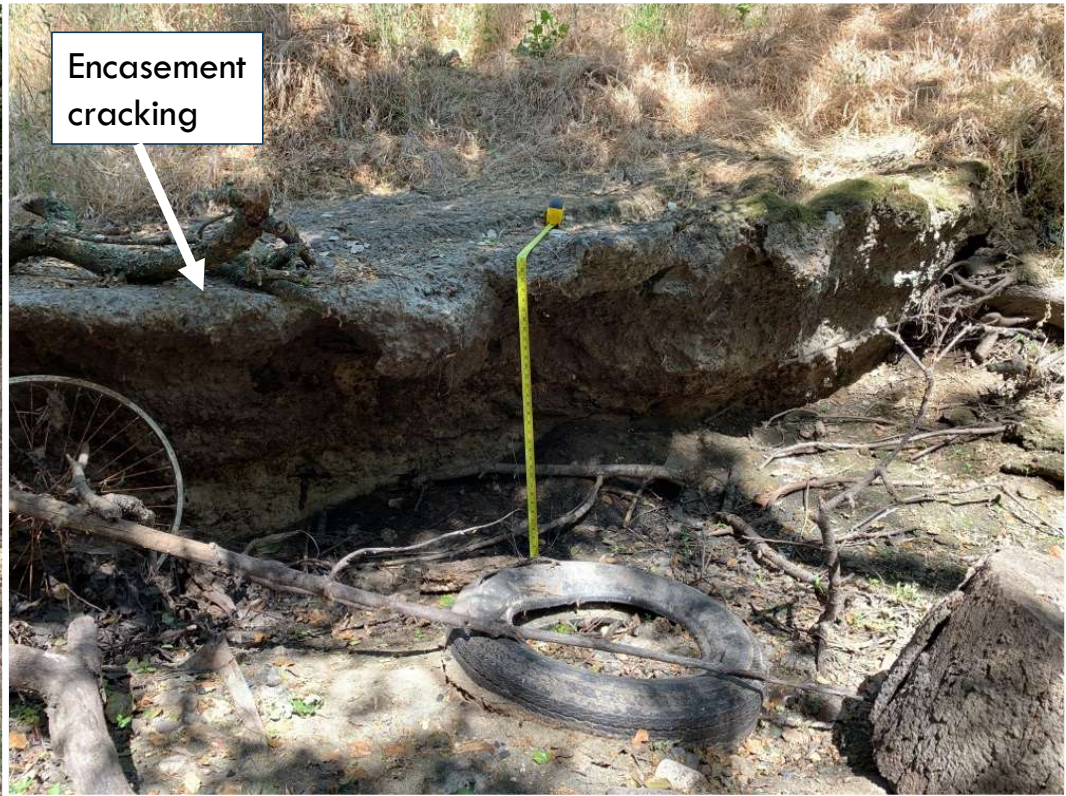
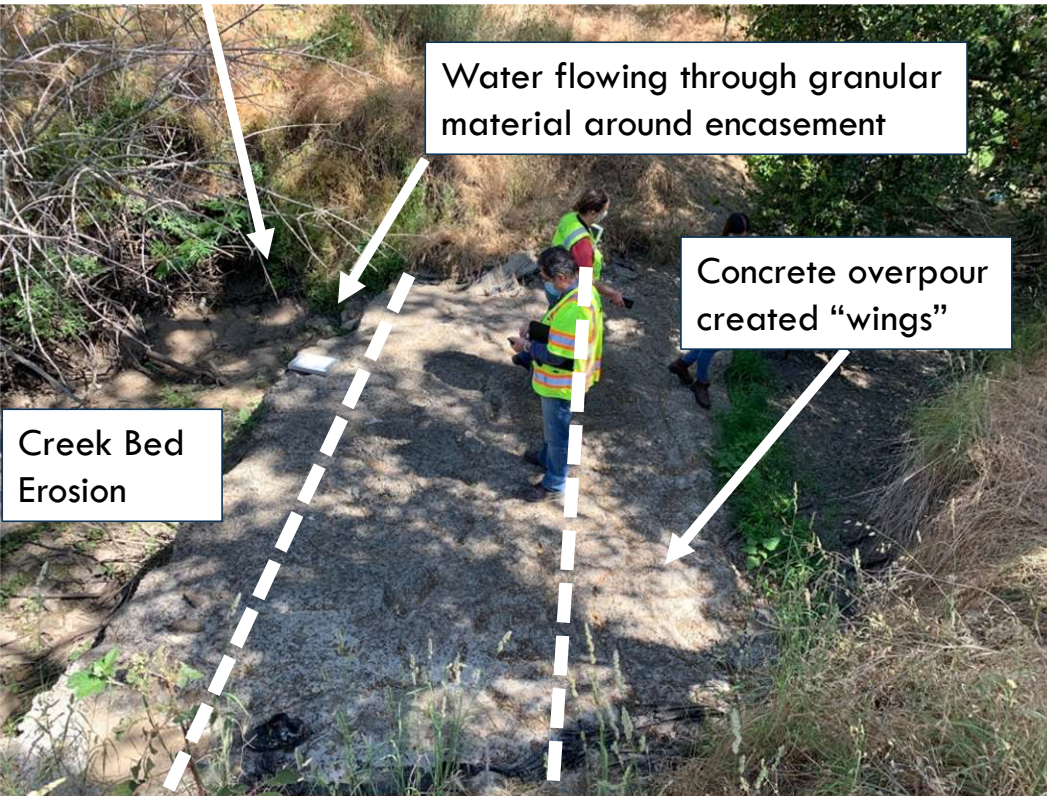
Bank Erosion

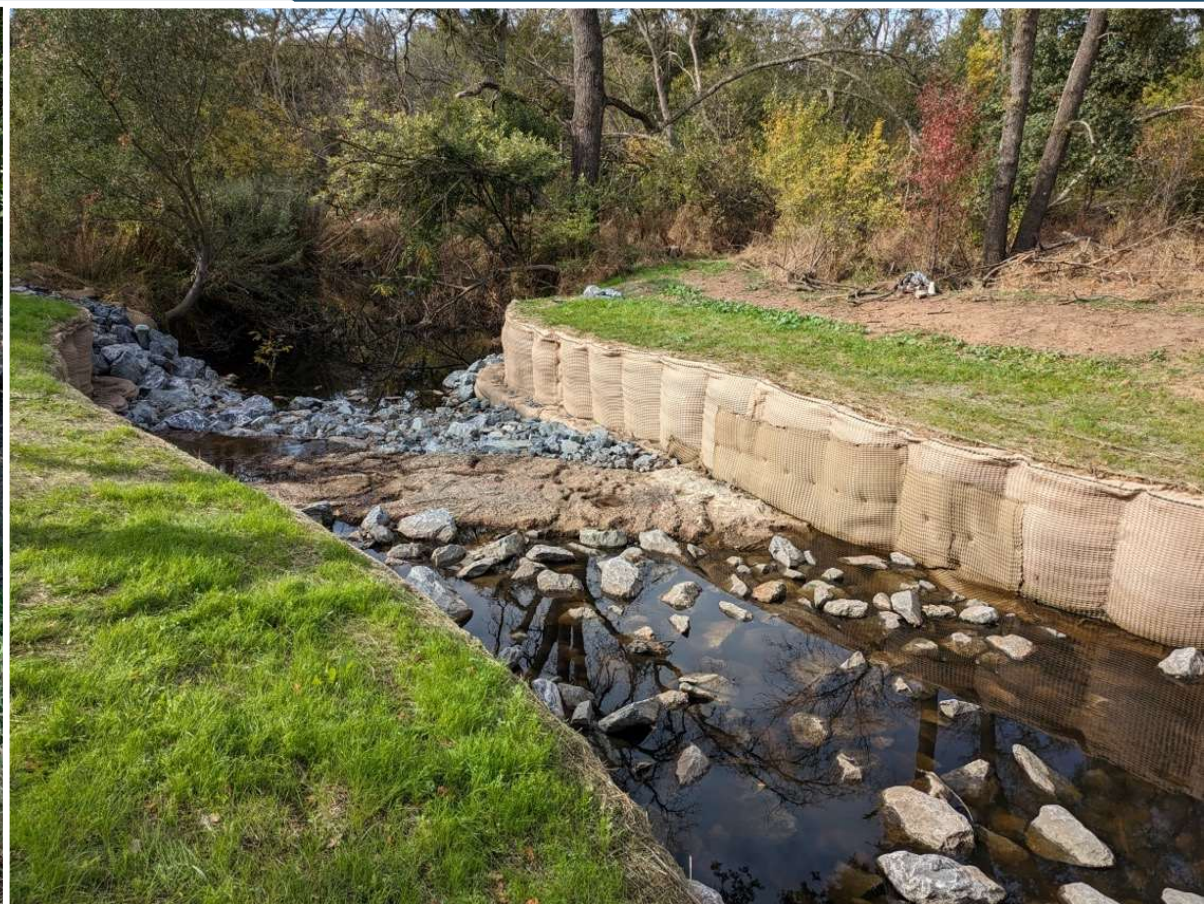
Water flowing through granular material around encasement

Concrete overpour created "wings"

Creek Bed Erosion

Encasement cracking





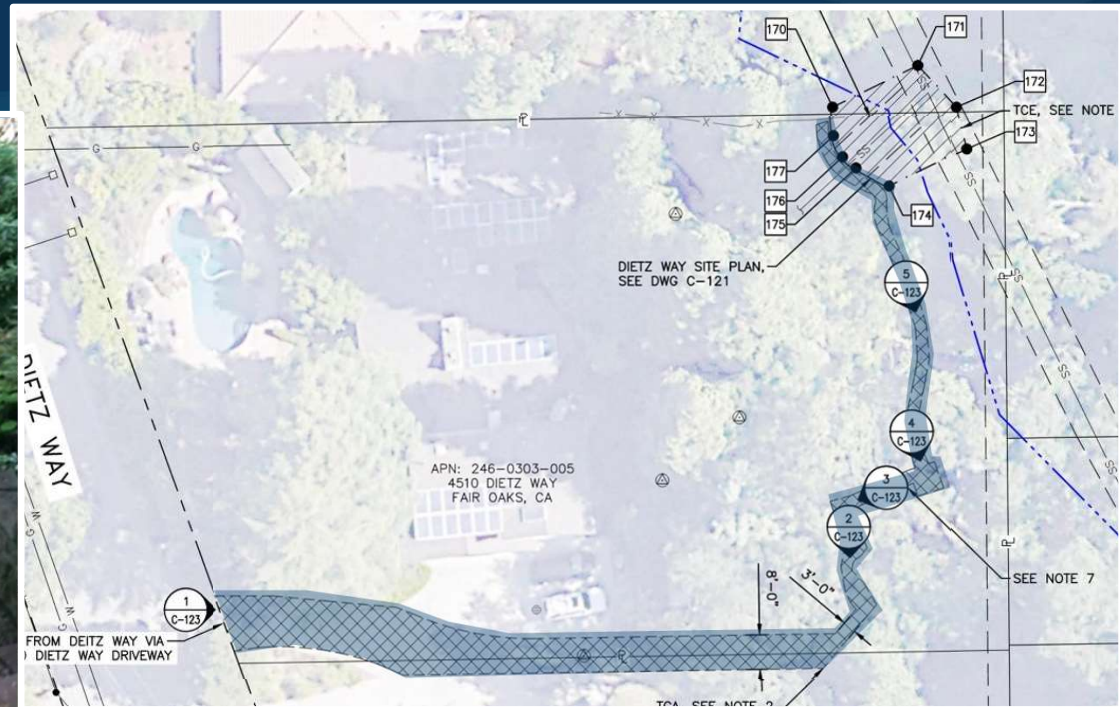
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Dietz Way

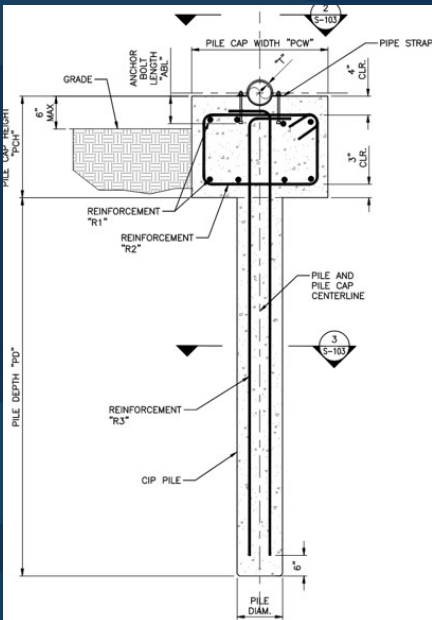


Access

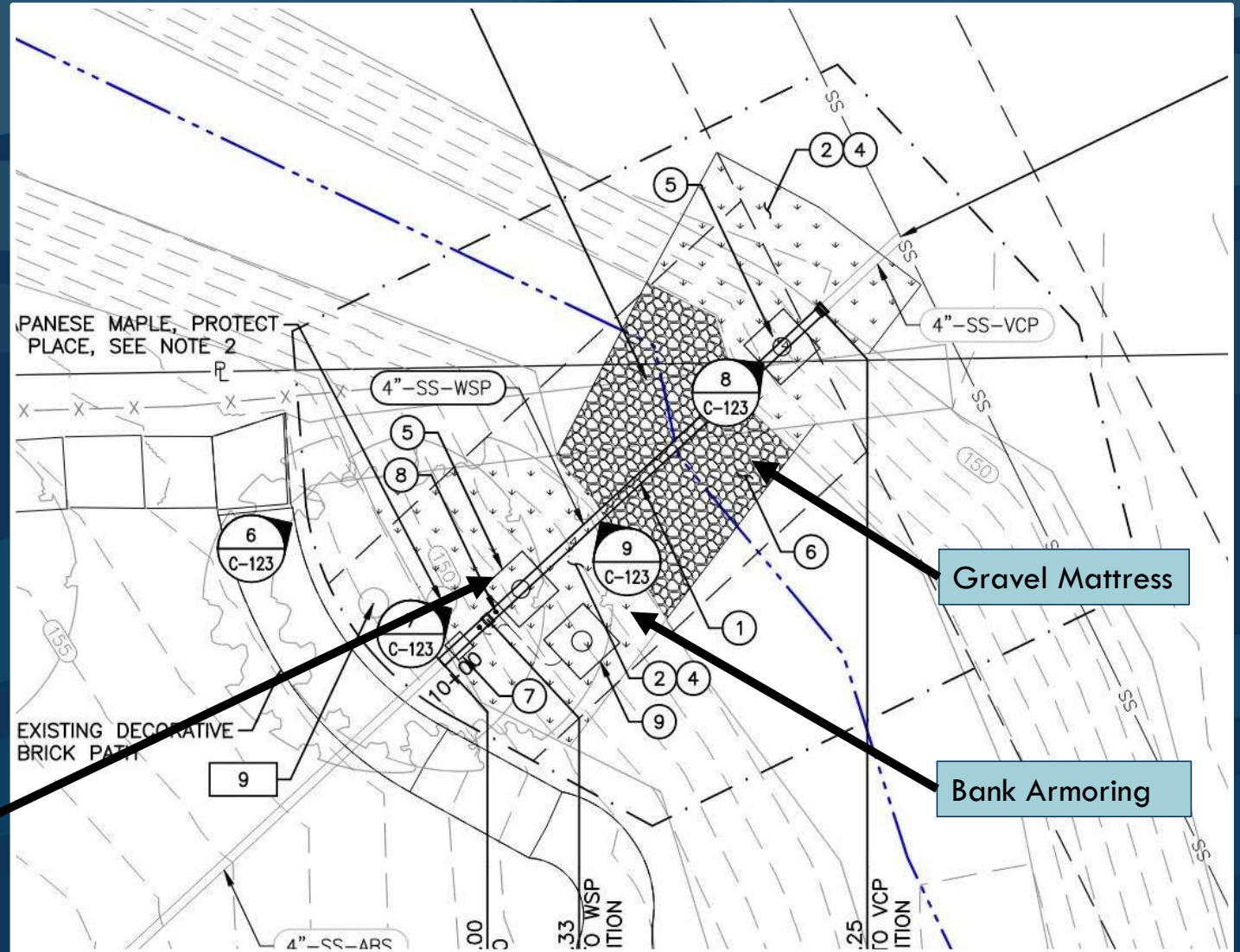
- Very remote access through wood stairs and walkways
- All equipment must be hand carried

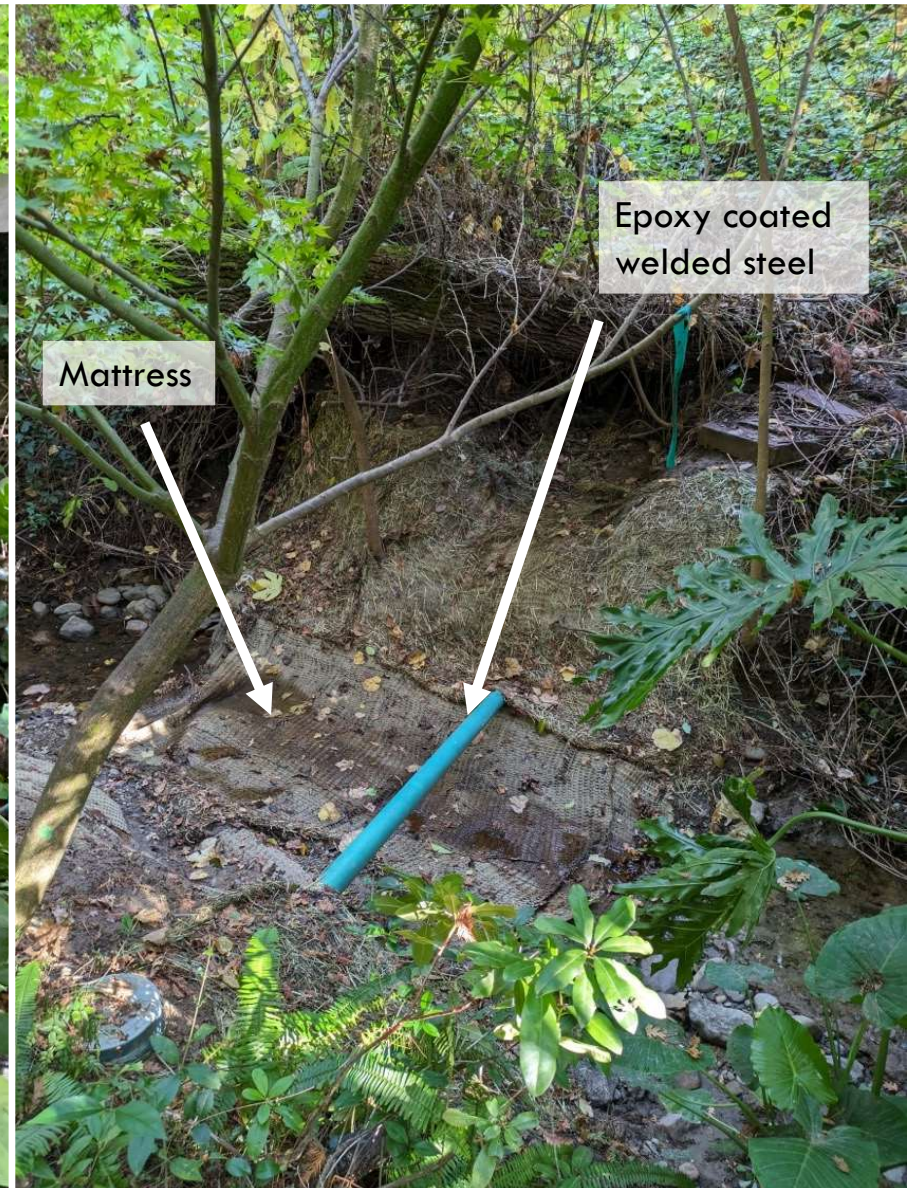
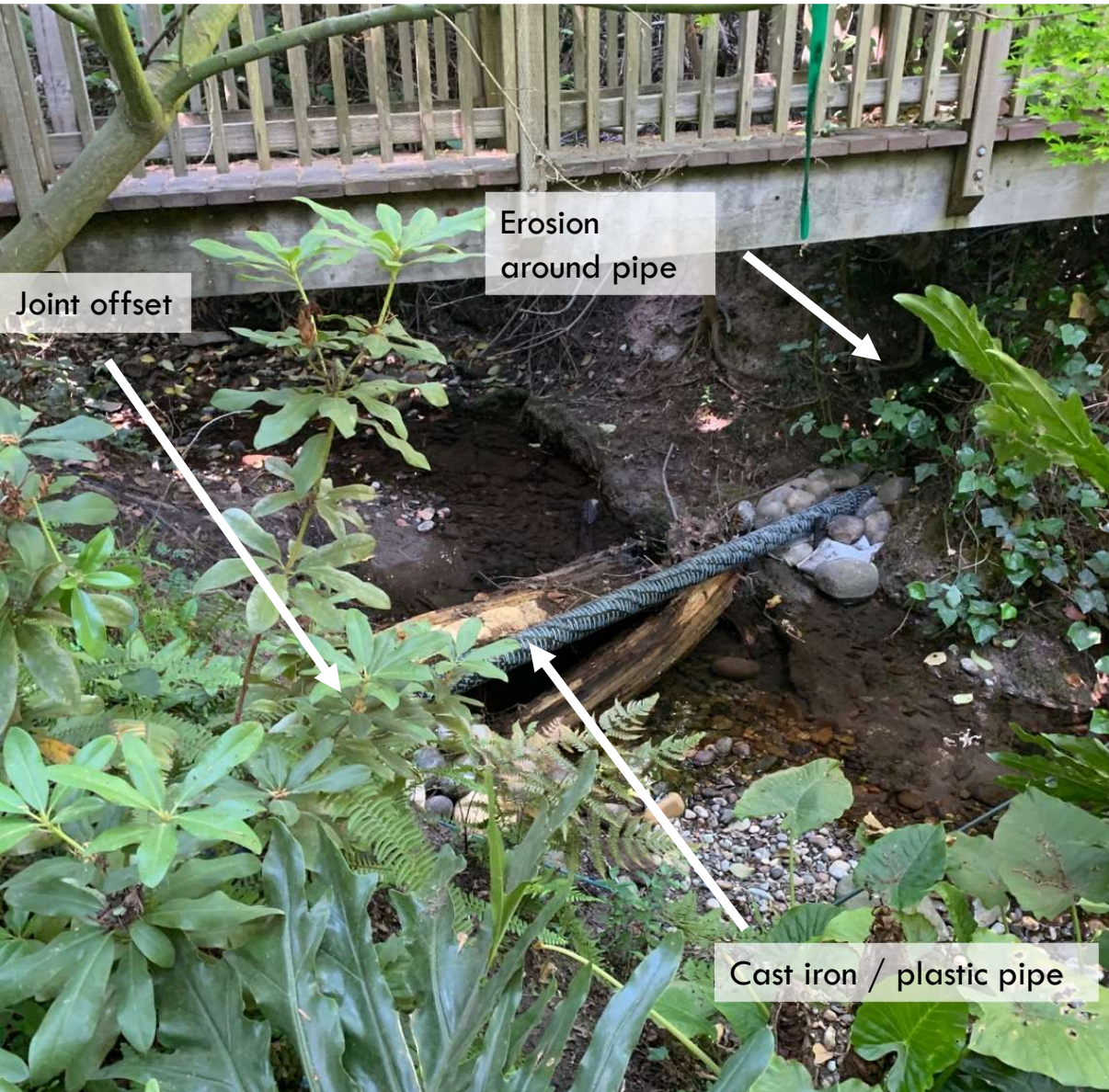


Solutions



Hand augured piers supports





Arcade Creek



Recommendations

For Owners

1. Bundle Creek Crossings when possible
2. Timeline – Permitting and Field Work Considerations

For Designers

1. Consider manufactured products for bed and bank projection -- \$\$ Savings
2. Timeline – Permitting and Field Work Considerations
3. Everything is moving, plan for changes at your sites



Questions?



WISC