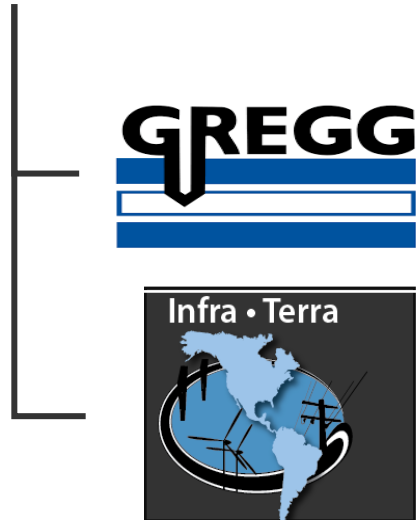


Shortcut Pipeline Improvements Phase 3 A Trenchless Solution to a Critical Pipeline Replacement



Project Team



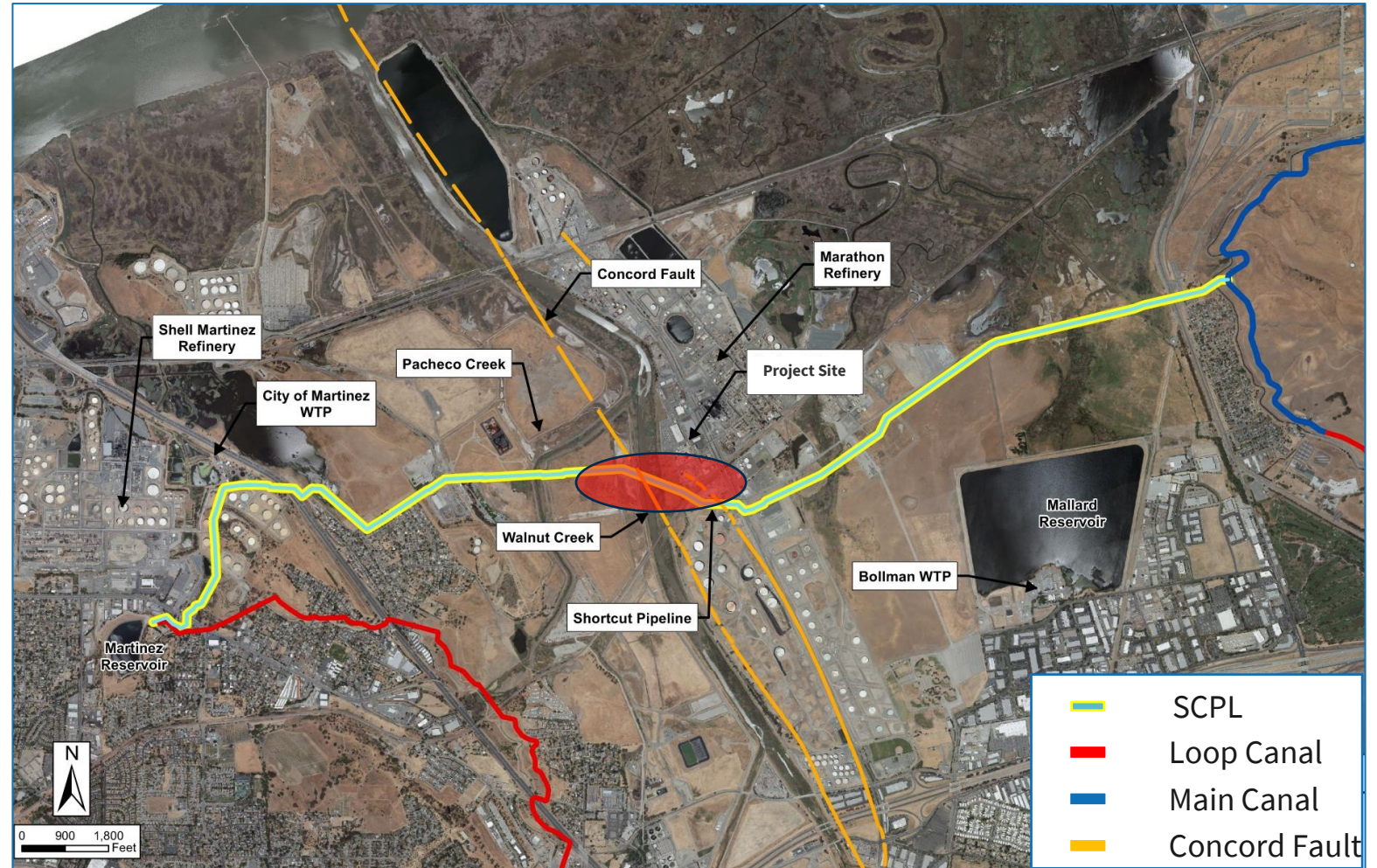


Project Background



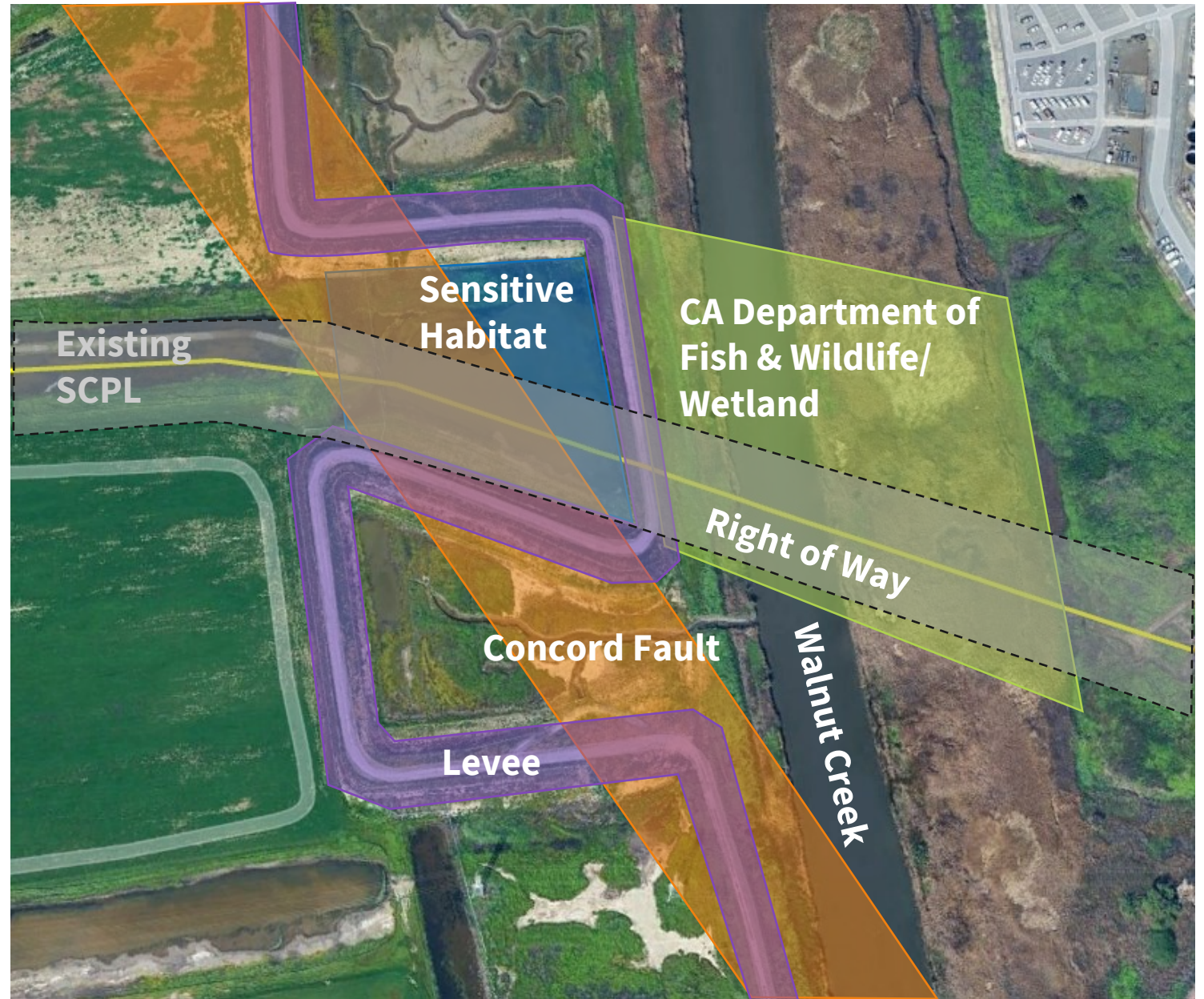
Existing Shortcut Pipeline (SCPL)

- Constructed in 1972 by U.S. Bureau of Reclamation (USBR)
- 5 miles of 48 to 60-inch steel and concrete pressure pipe (AWWA C303) w/ ~167 cfs design flow
- Contra Costa Canal to Mallard Reservoir, City of Martinez, and industrial customers



Repairing SCPL

- Identified 4 feet of Settlement beneath Walnut Creek
- Site challenges:
 - Constrained easements and right of way
 - Wetlands, creeks, levees and sensitive habitats
 - Earthquake fault zones
 - Industrial sites w/ history of contamination (hydrocarbons, metals, TCE, PCE)





Design

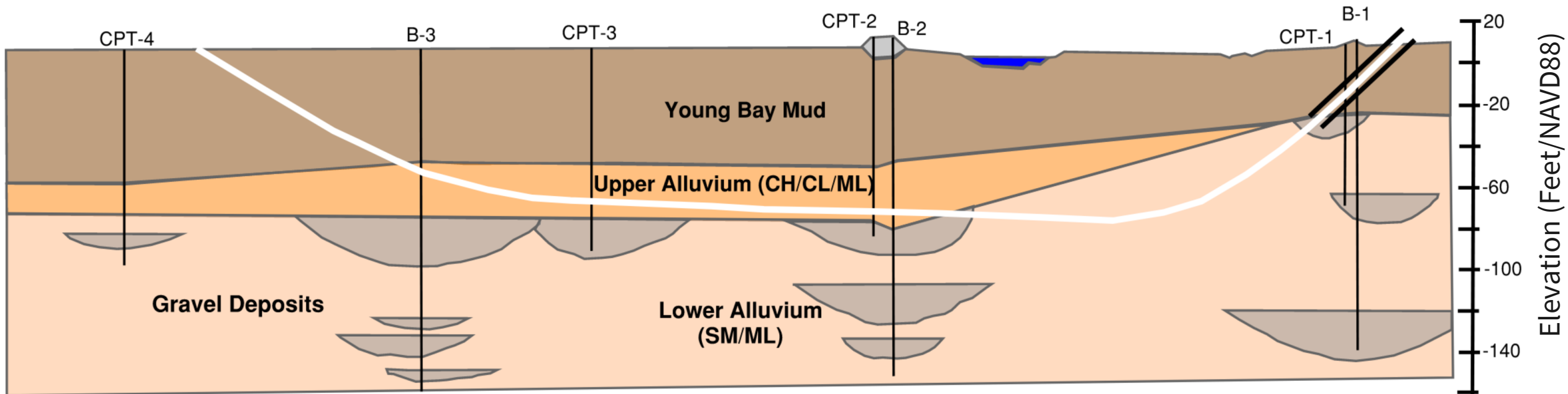


Design Constraints, Alternatives, and Decisions

Constraint	Alternatives	Decision
Walnut Creek Crossing	<ol style="list-style-type: none">1. Open cut w/ creek diversion2. Trenchless	Trenchless methods
Geology (Young Bay Mud), Hydrology, Habitat	<ol style="list-style-type: none">1. Microtunnel2. Horizontal Directional Drilling (HDD)	HDD
Fixed land rights and defined bend radii	<ol style="list-style-type: none">1. Steel2. High-Density Polyethylene (HDPE)	HDPE
Flow Requirements, Site Accessibility and Constructability	<ol style="list-style-type: none">1. Twin 36-inch diameter pipes2. Single large diameter pipe (48-inches and greater)	Twin-bore 36-inch pipelines to replace existing 48-inch pipeline

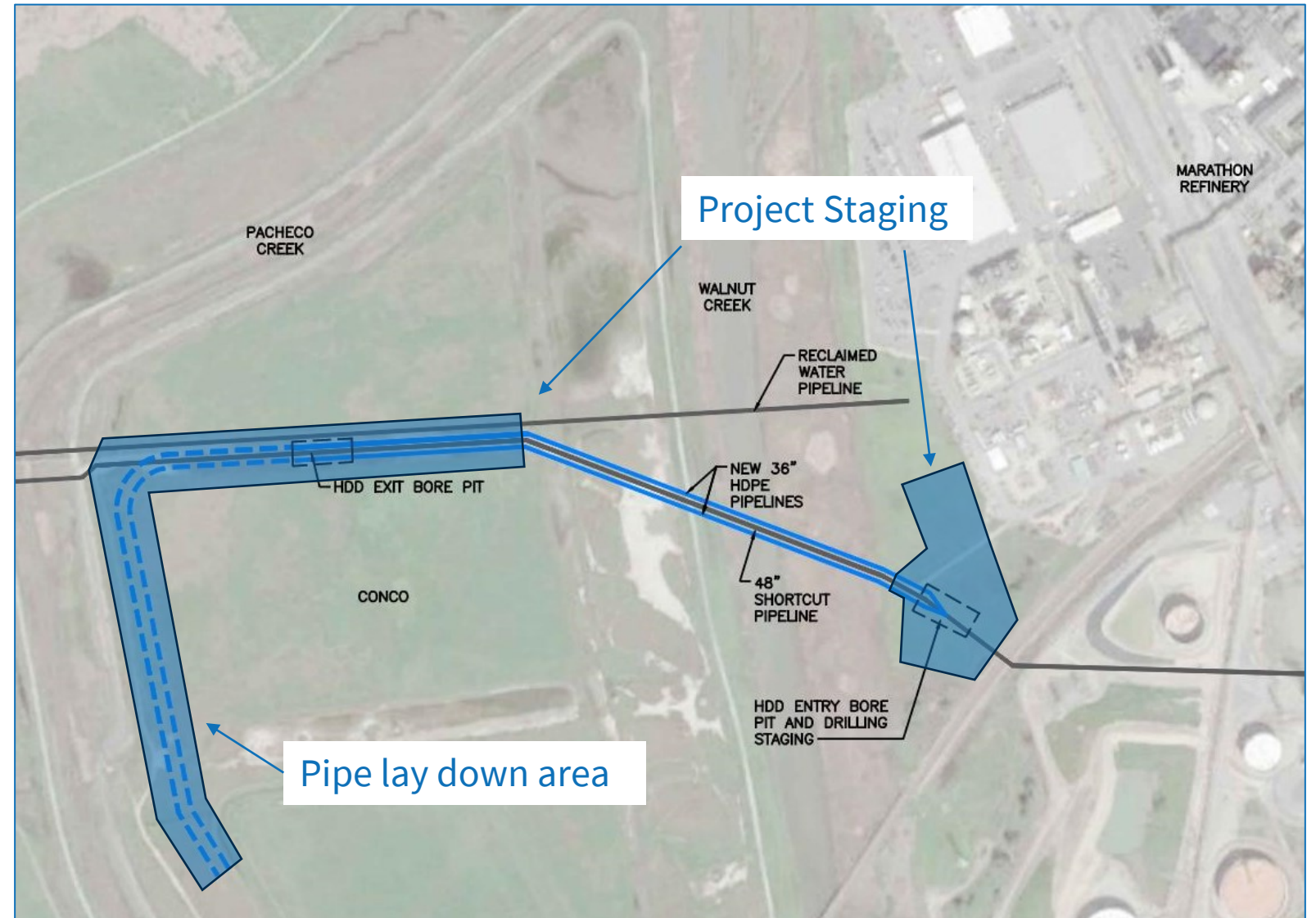
Geotechnical Considerations

- 20-50 feet of Young Bay Mud at surface
- Trenchless alignment in deeper, stable alluvial soils



Final Trenchless Alignment

- Twin 2,000-foot long 36-inch HDPE pipelines
- Offset \pm ~20 feet from SCPL within existing easement
- Long HDPE lay down area
- TCE applications and negotiations for project staging took approximately 2 years



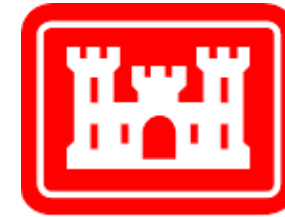
Regulating Agencies and Permitting



**State Water
Resources
Control Board**



*CA Governor's Office of
Land Use and
Climate Innovation*



**US Army Corps
of Engineers®**



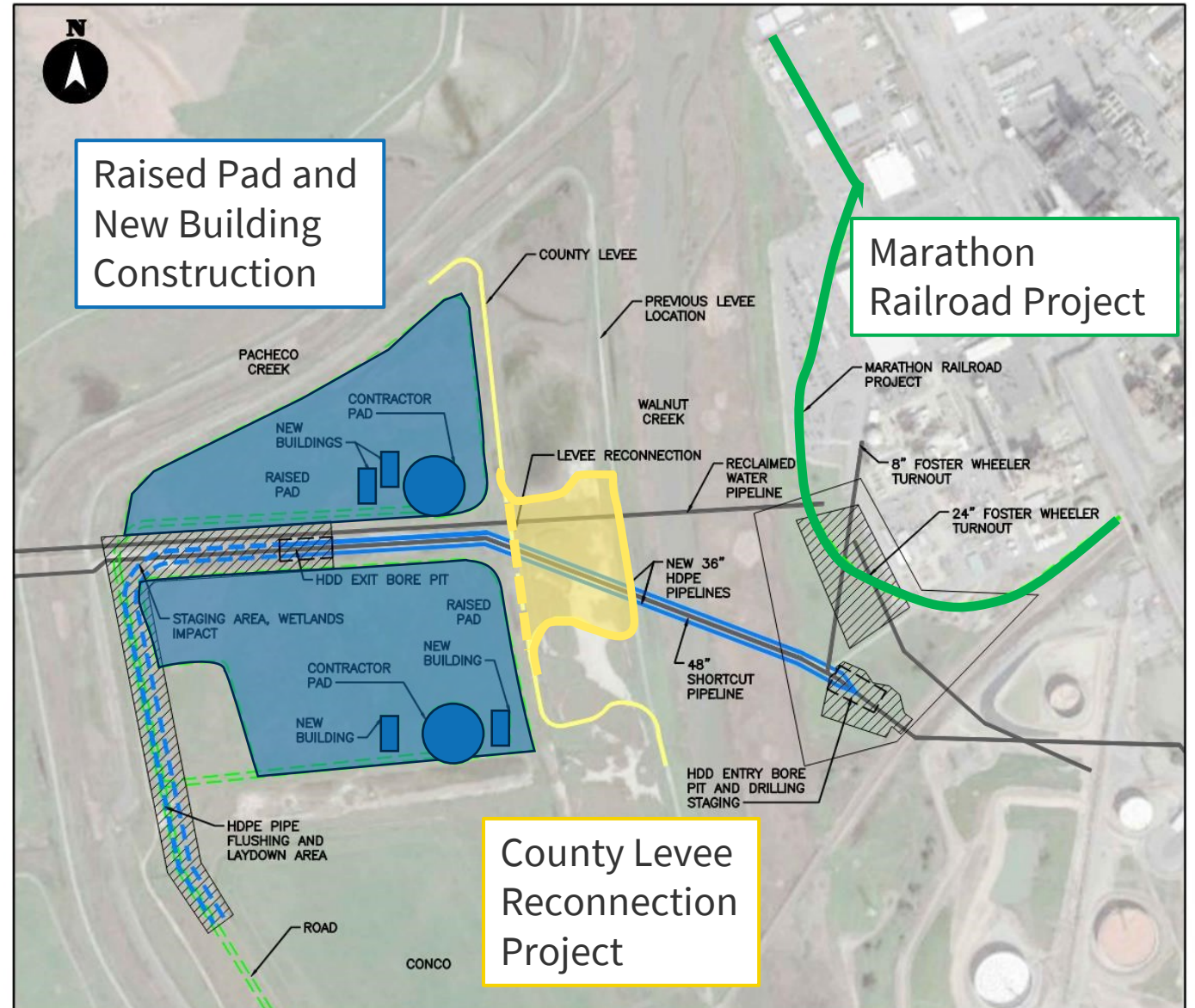
**San Francisco Bay
Conservation and Development
Commission**



**Contra Costa County
Flood Control**
& Water Conservation District

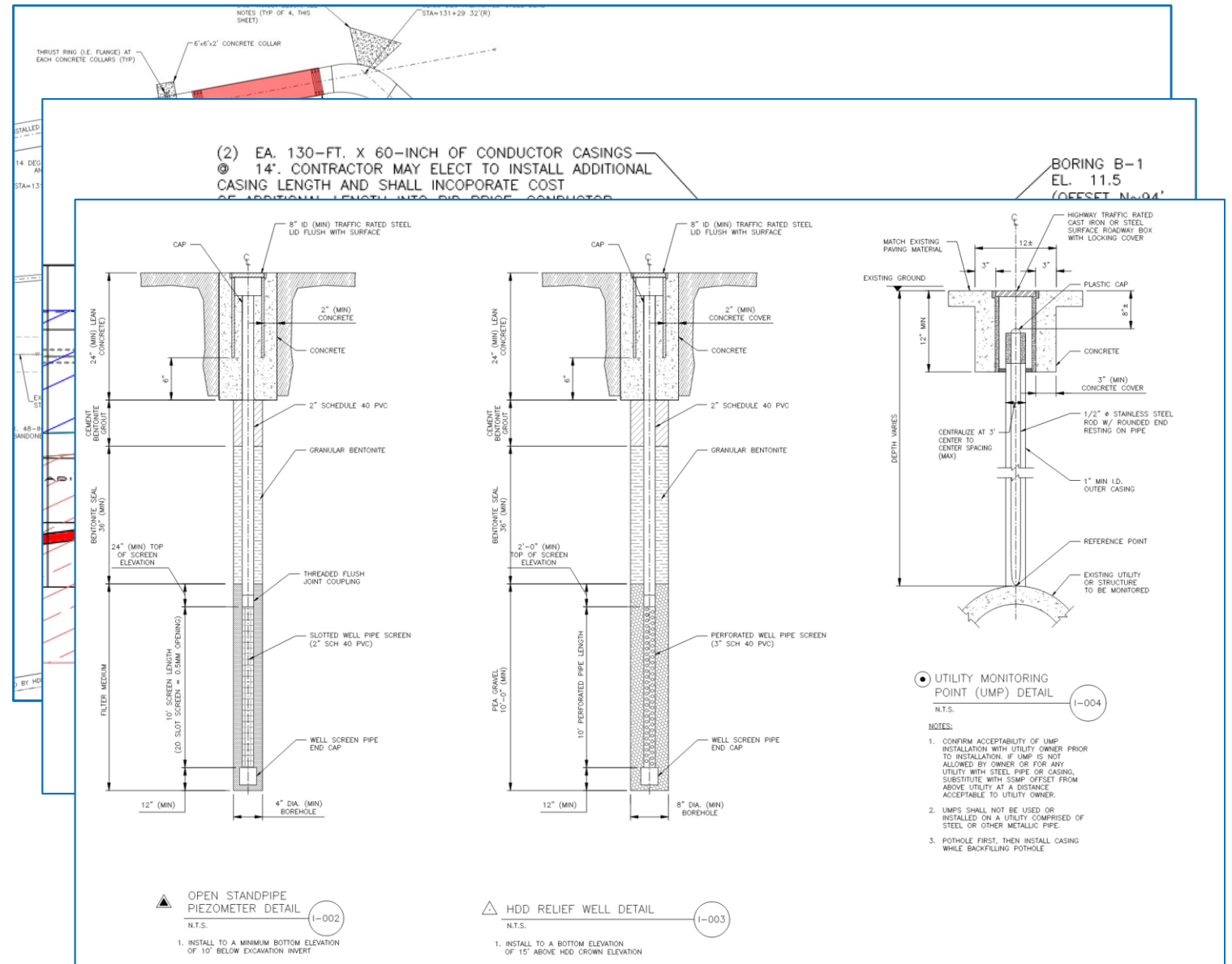
Design Challenges

- Conflicts with private projects on both ends of crossing
 - Compress project timeline. Require completion of HDD work in 2024
- Long review process for environmental permits
 - Overestimate impacts: begin bidding January 2024 w/ draft conditions
 - Issue final conditions by addendum 7 weeks later



Risk Mitigation

- Differential Settlement, Fault Displacement, and Hydrofracture Risk
 - Direct buried flexible joint couplings w/ min 12" deflection
 - Surface casing at entry
 - Install HDPE below Young Bay Mud
 - Require relief wells at exit and settlement monitors at existing facilities





Construction



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Mobilization Schedule

- Bid Advertised
January 2024
- Contract awarded
in April 2024
- Site preparation
began in May and
work commenced
in June 2024 due to
environmental
permit restrictions



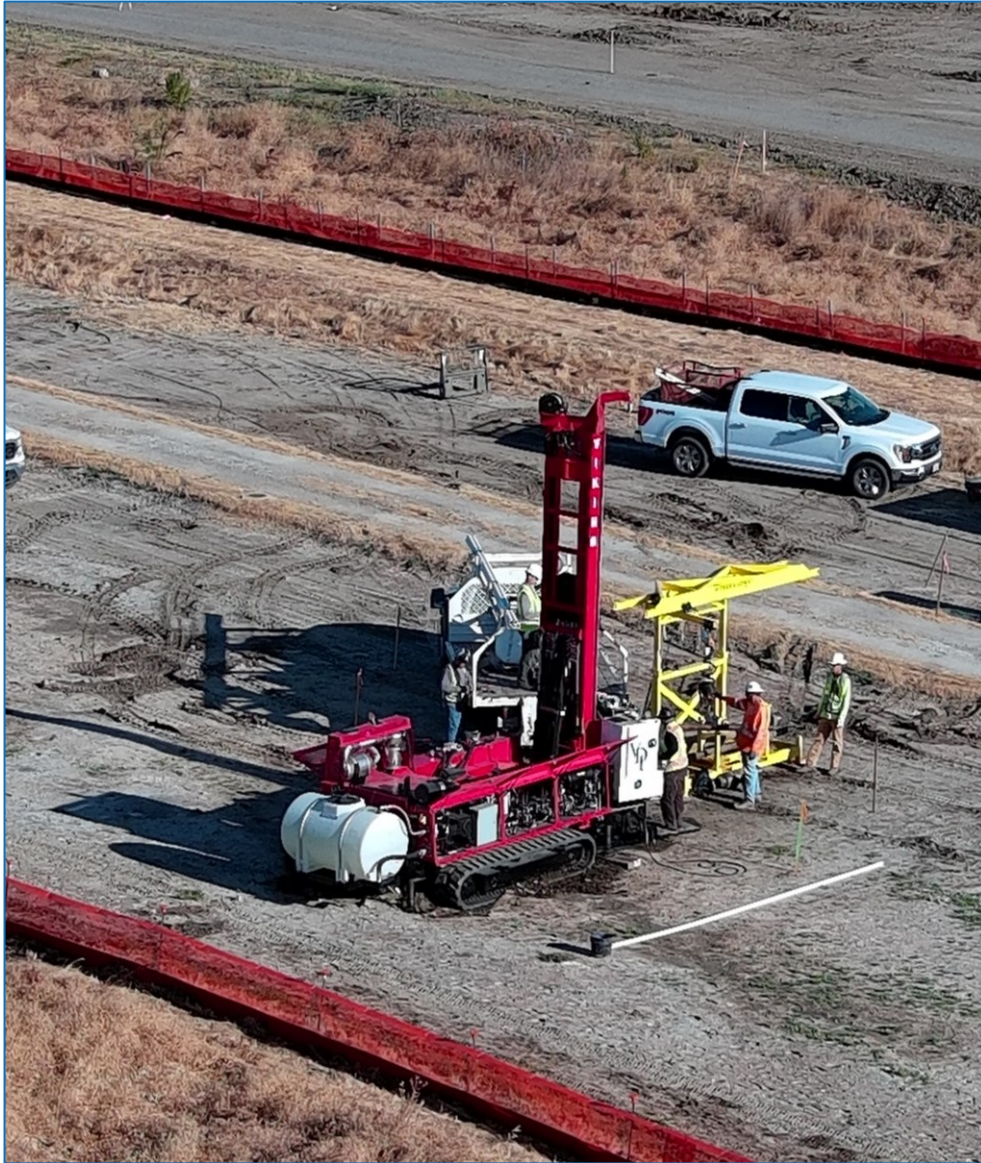
Clearing and grubbing with hand tools only!

Site Preparation

- Wildlife Exclusion Fence installed.
- Geotextile fabric and base rock application



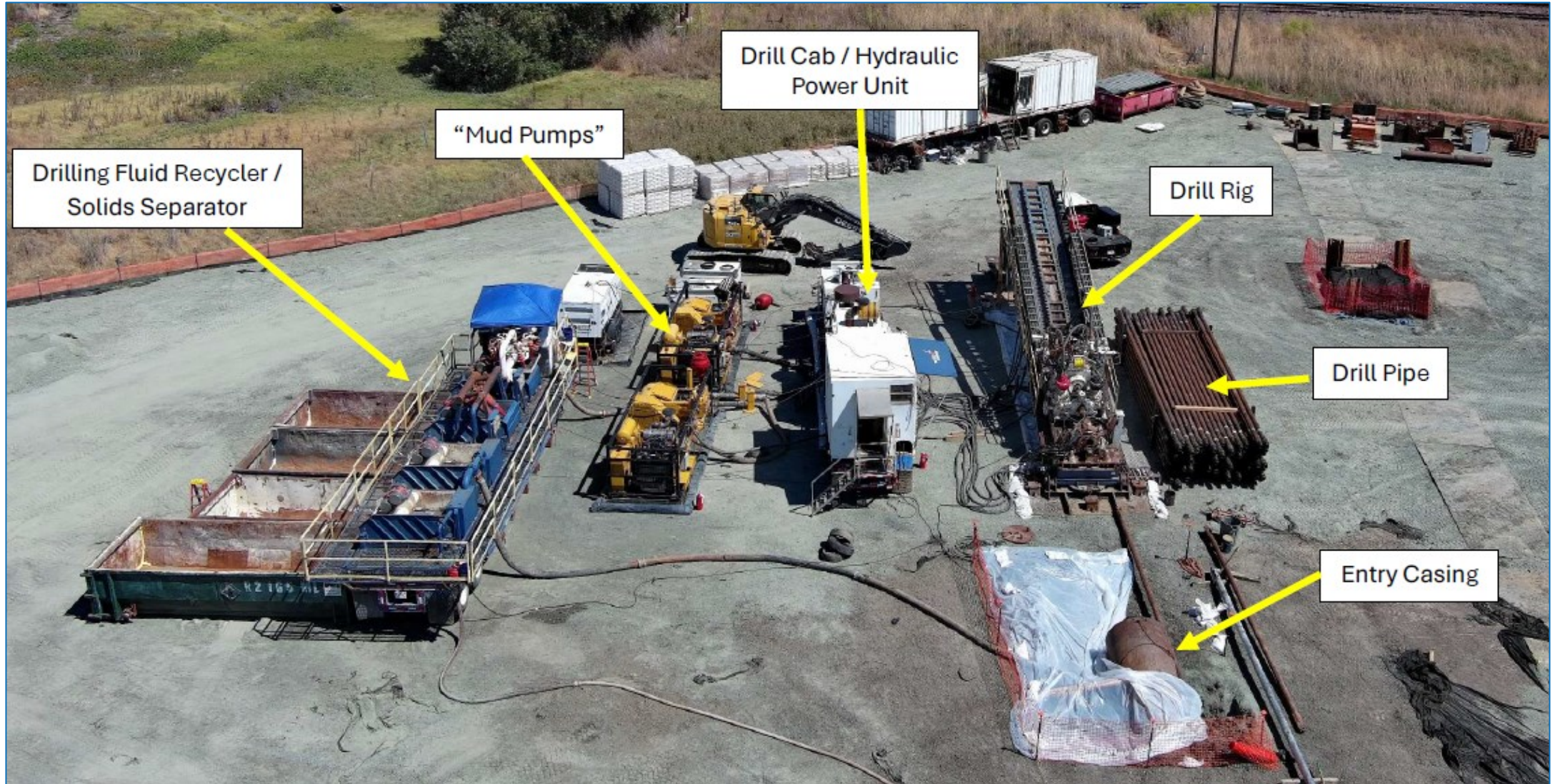
Piezometer and Relief Well Installation



Conductor Casing Installation



HDD Work Area Layout(North Bore)



Pilot Bore



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Reamers: 24", 36" and 48"



HDPE Fusion



HDPE Staging and Support for Pullback



HDD Process

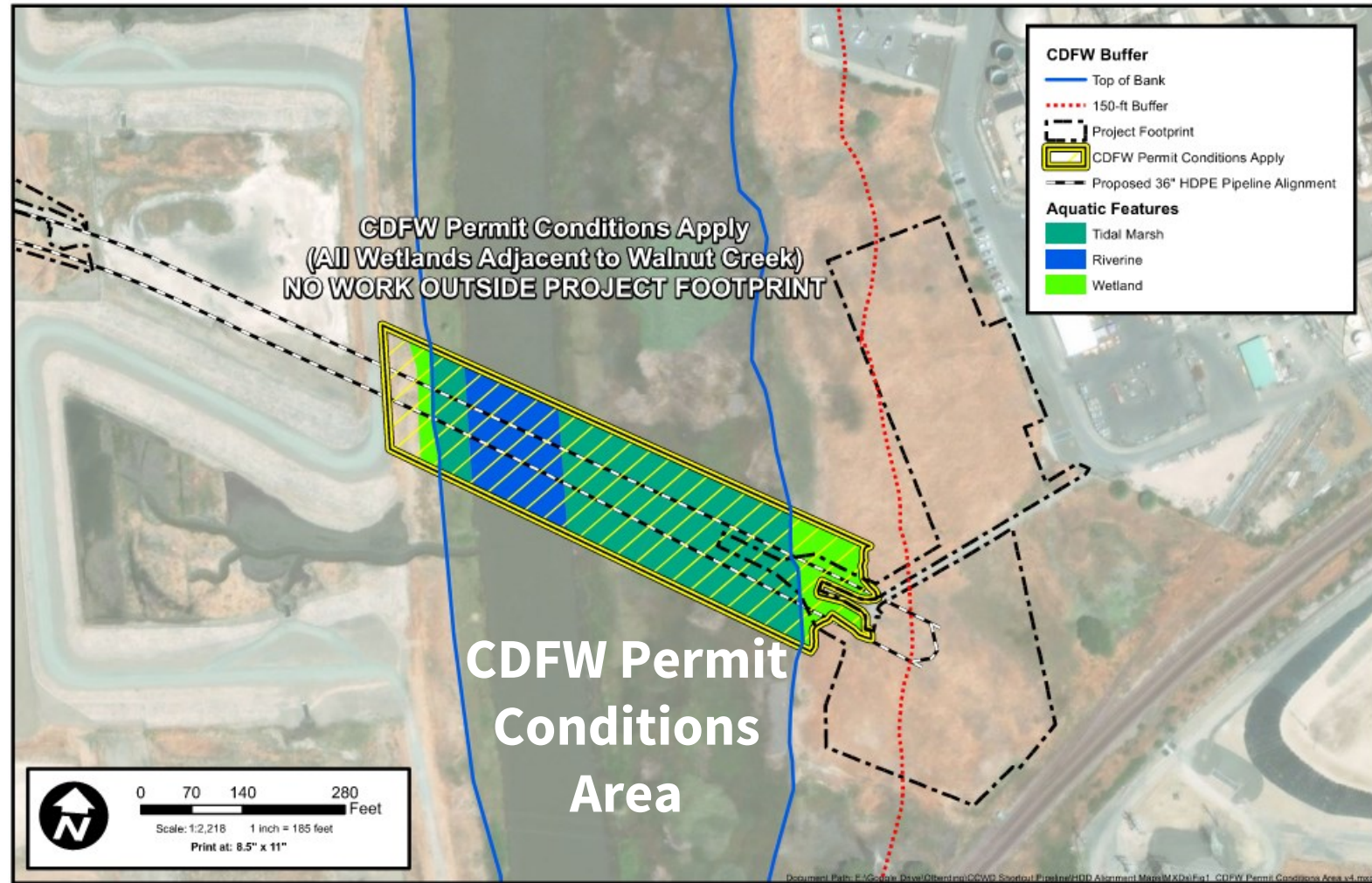




Challenges & Lessons Learned

Environmental Permit Challenges

- Strict environmental controls and work windows:
 - Begin early communication with regulators
 - Seek clarification on jurisdictional boundaries and enforcement intent
 - Contract with biological consultant for surveys, report preparation, and daily inspection



Inadvertent Drilling Fluid Returns

- Stop work and notice to regulators required
- Quick and consistent reporting key to resuming work
- Decrease pressure, increase rate of penetration, and modify tooling passes to reduce occurrence
- Consider access along alignment for monitoring and response



Considerations for Future Work

- Trenchless techniques may reduce project footprint but do not eliminate impacts along the alignment!
- Consider guidance, monitoring, inspection, IDFR response, lighting, fencing, etc...



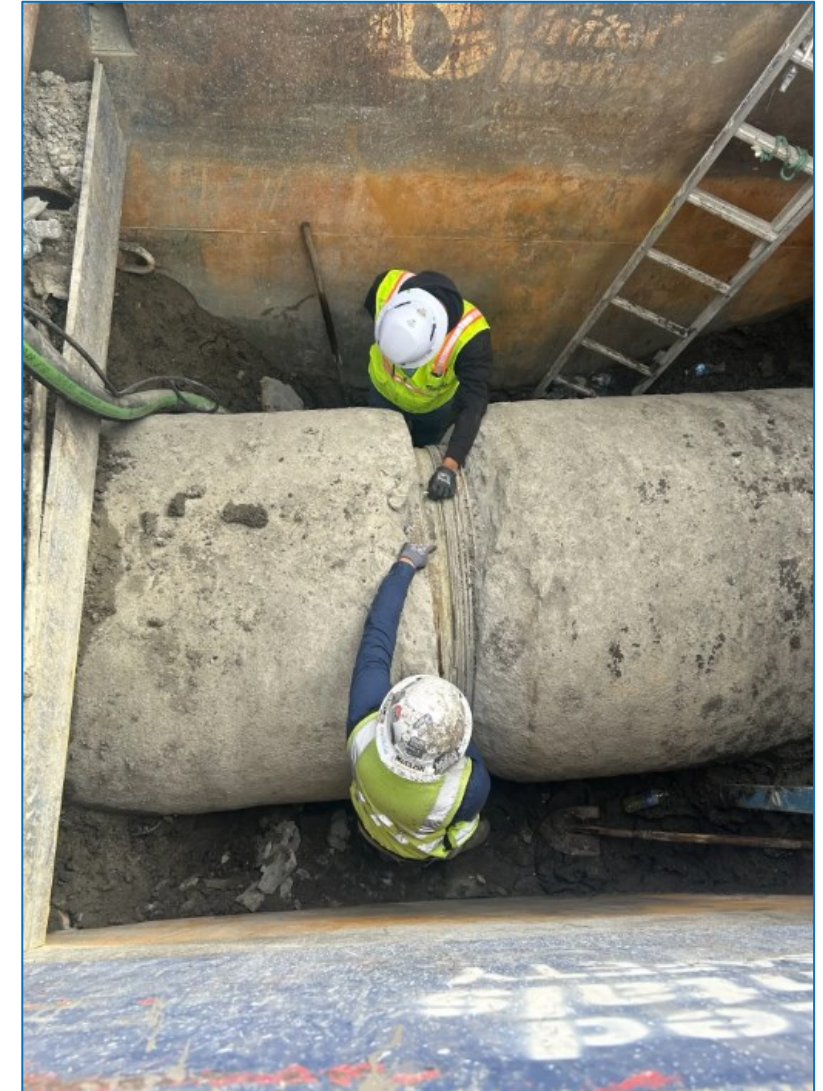
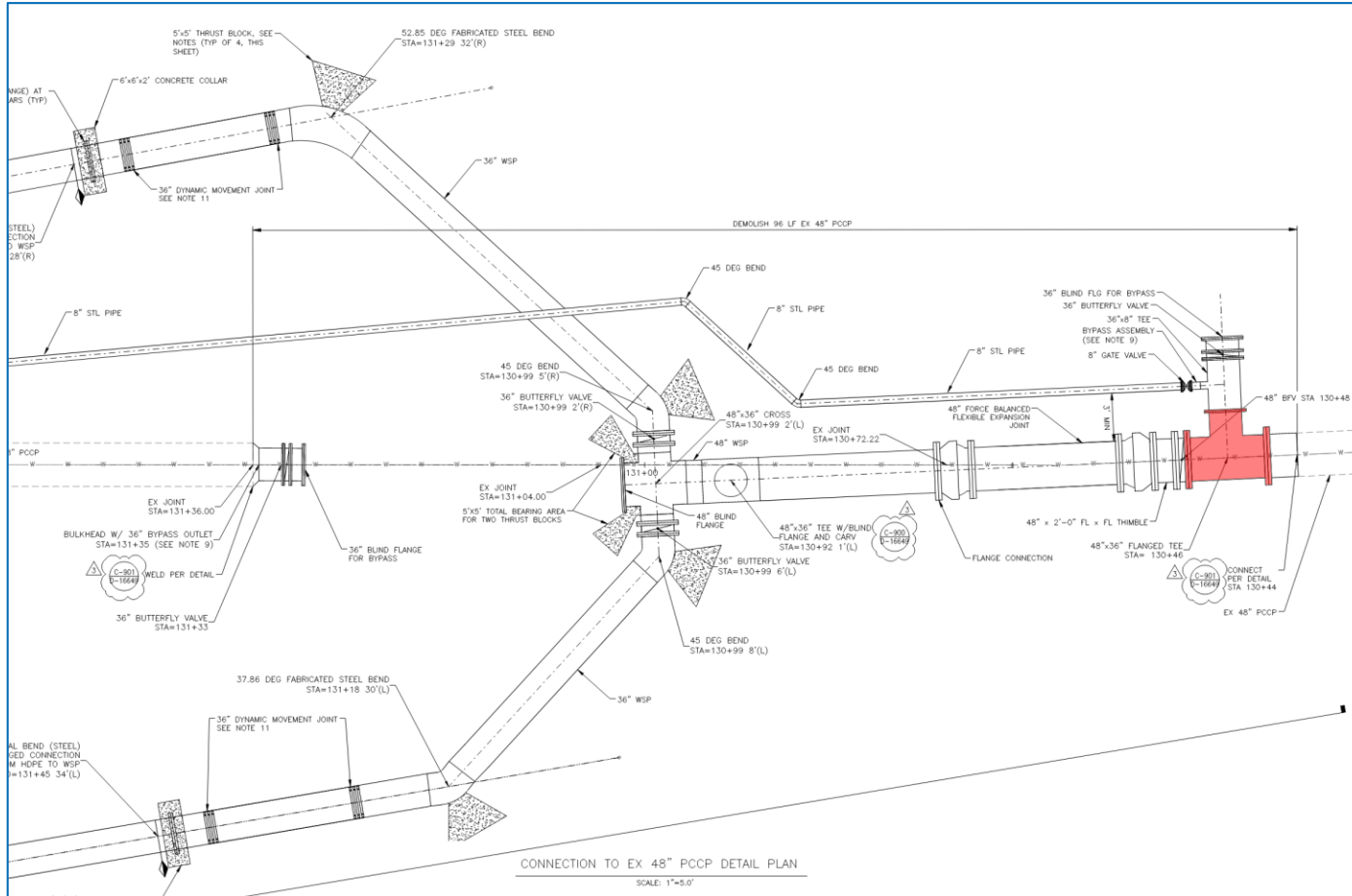
Considerations for Future Work

- High ROI on geotechnical investigation, invest in this step
- Anticipate long lead time for permits, allow time for the amendment process as needed
- Confirm 24/7 operations allowable during critical work
- During HDD, focus on fluid circulation, mechanical cleaning and solids recovery



Remaining Work – Spring 2025

- Install bypass and steel manifolds on either end of new HDPE pipeline crossings to tie into existing SCPL.





Questions?



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