



CALIFORNIA
WATER FIX
RELIABLE. CLEAN. WATER.

DWR-2

ENGINEERING OVERVIEW



TOPICS OF DISCUSSION

- **California WaterFix proposed facilities and refinements**
- **Construction potential effects on other users of water and mitigation**
- **Flood protection measures**



PROPOSED FACILITIES

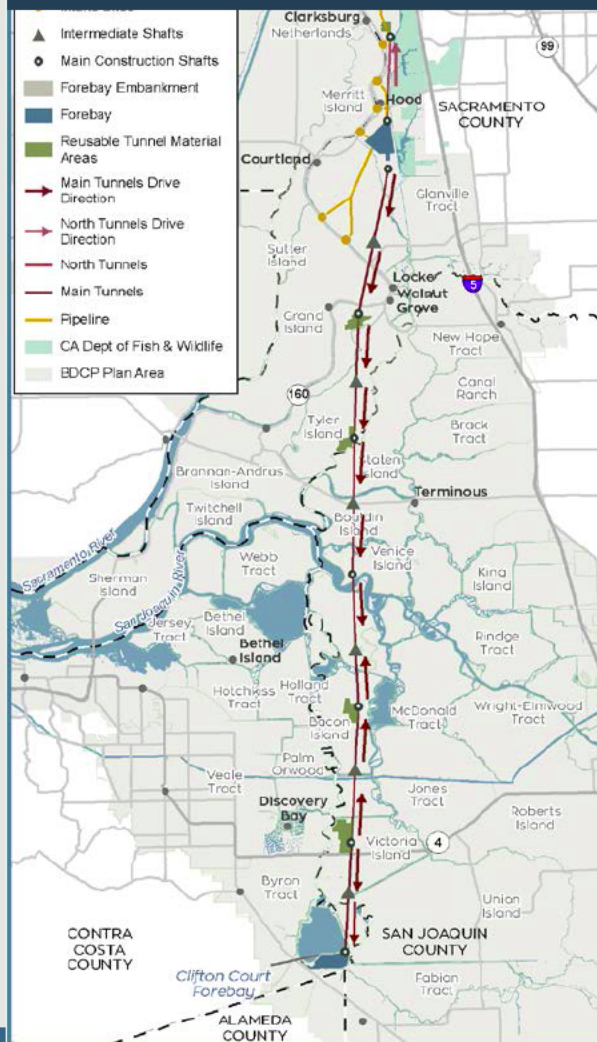
- **Intake facilities**
- **Tunnels**
- **Forebays**
- **Clifton Court Pumping Plant**
- **Head of Old River Operable Gate**



ENGINEERING REFINEMENTS

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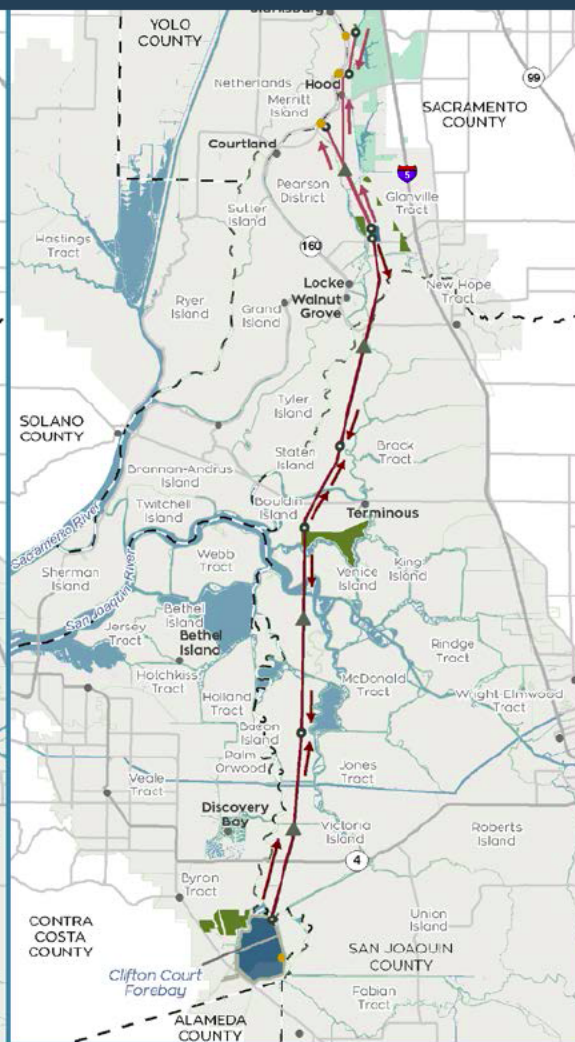
July 2012
Pipeline Tunnel Option
(Northern PP)



July 2013
Modified Pipeline Tunnel
Option (Northern PP)



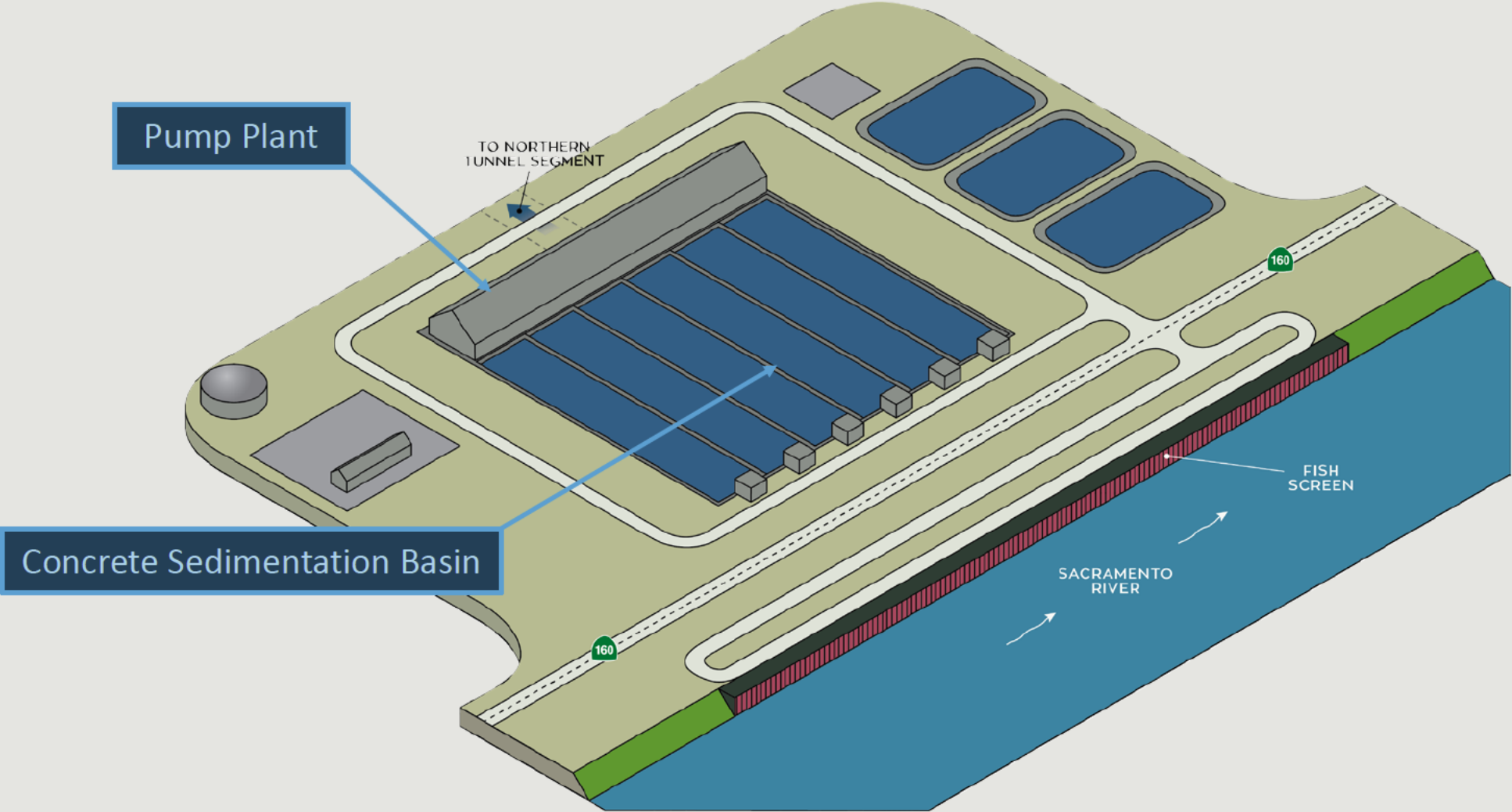
July 2015
Californian WaterFix
(Southern PP)





INTAKE CHANGES

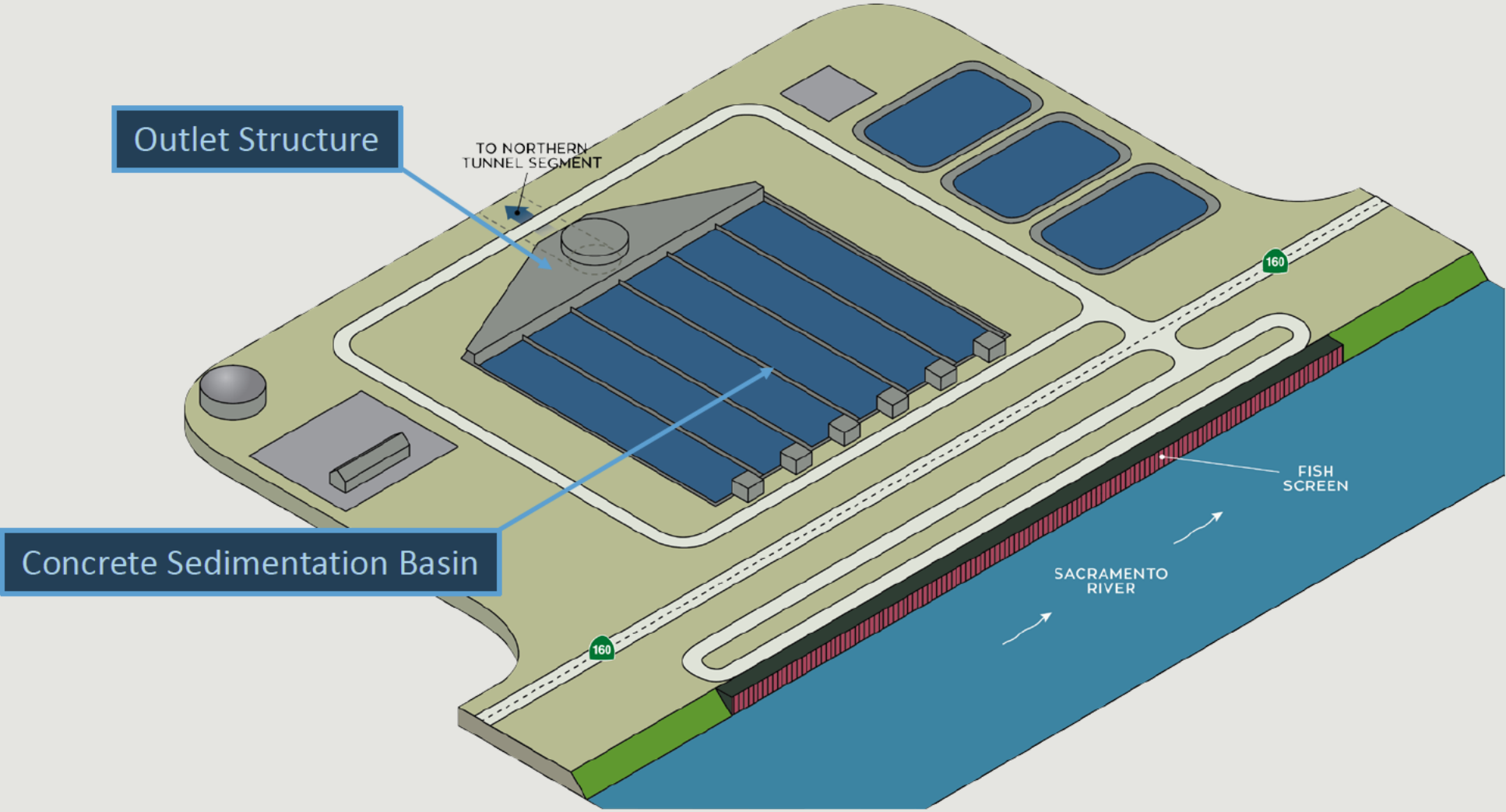
2013 Intake Facility with Northern Pumping Plant





INTAKE CHANGES

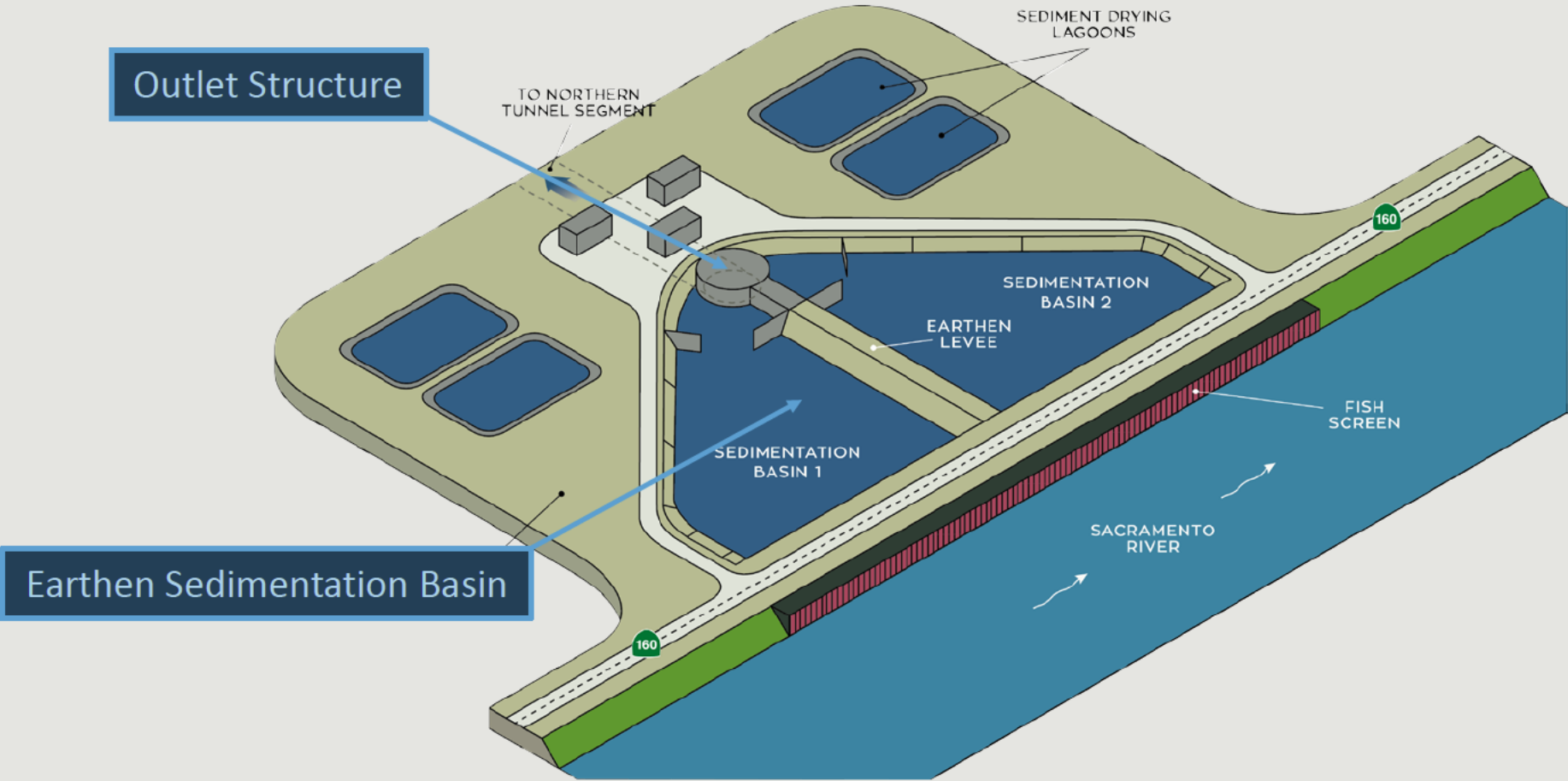
2014 Intake Facility with Southern Pumping Plant





INTAKE CHANGES

2015 Intake Facility with Southern Pumping Plant

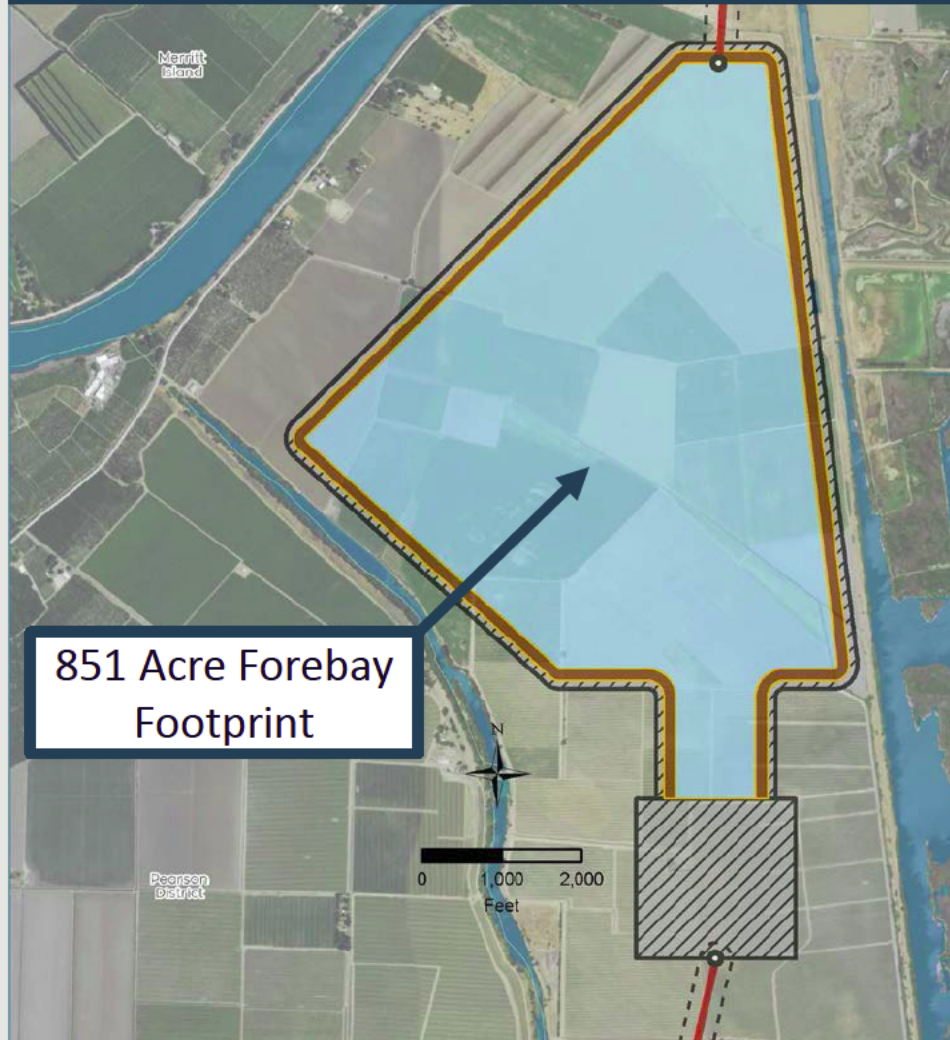




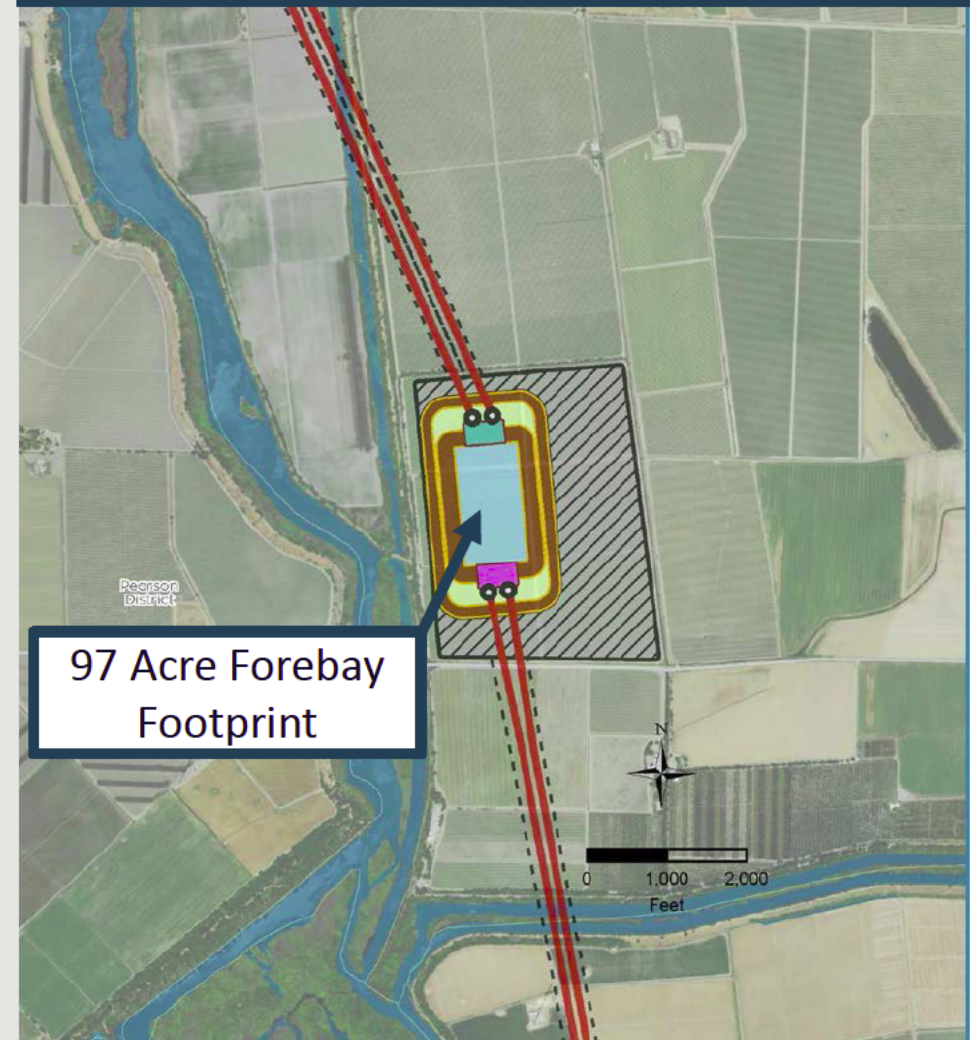
INTERMEDIATE FOREBAY CHANGES

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Pipeline Tunnel Option
(Northern PP)



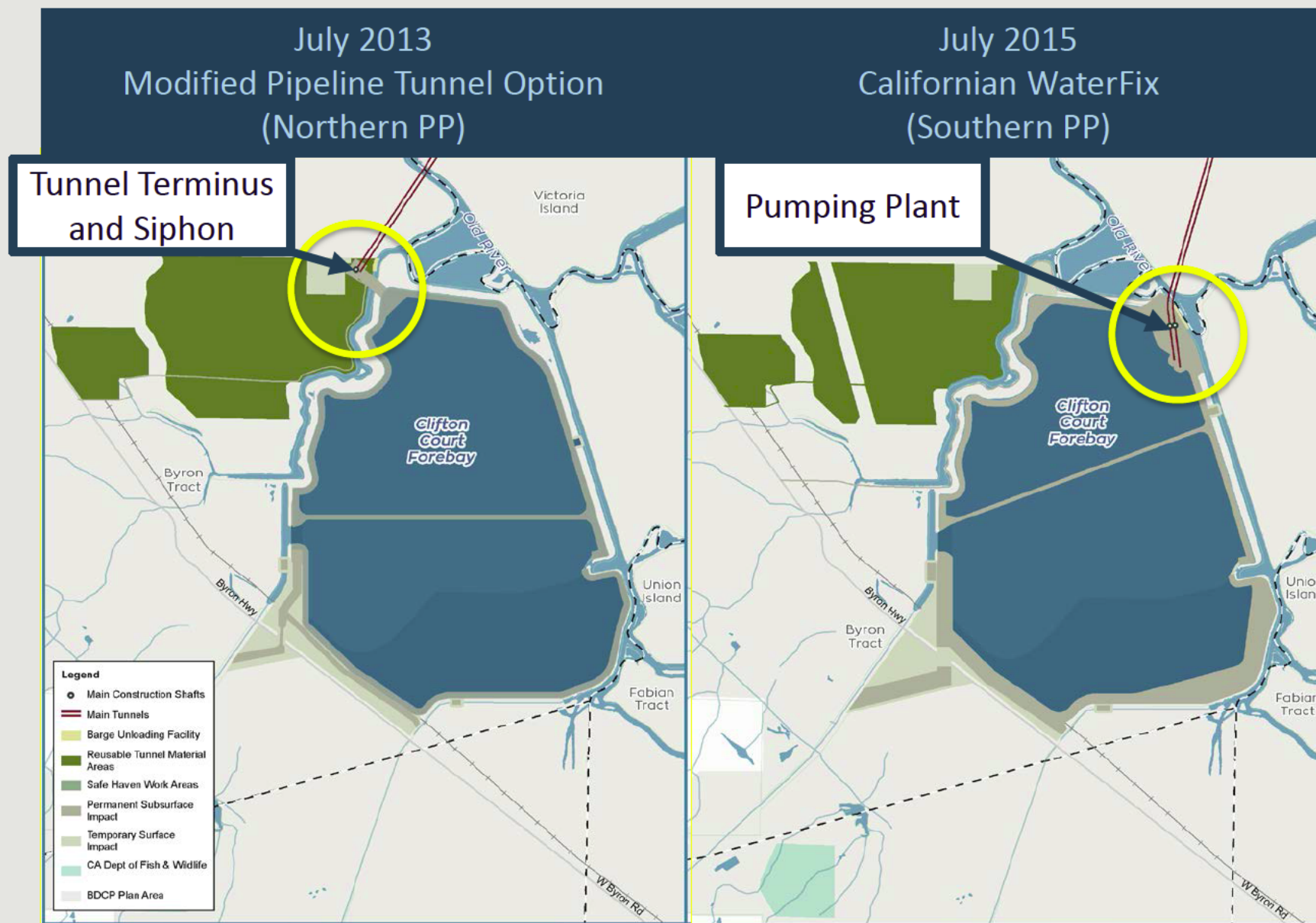
Modified Pipeline Tunnel and
California WaterFix





CLIFTON COURT CHANGES

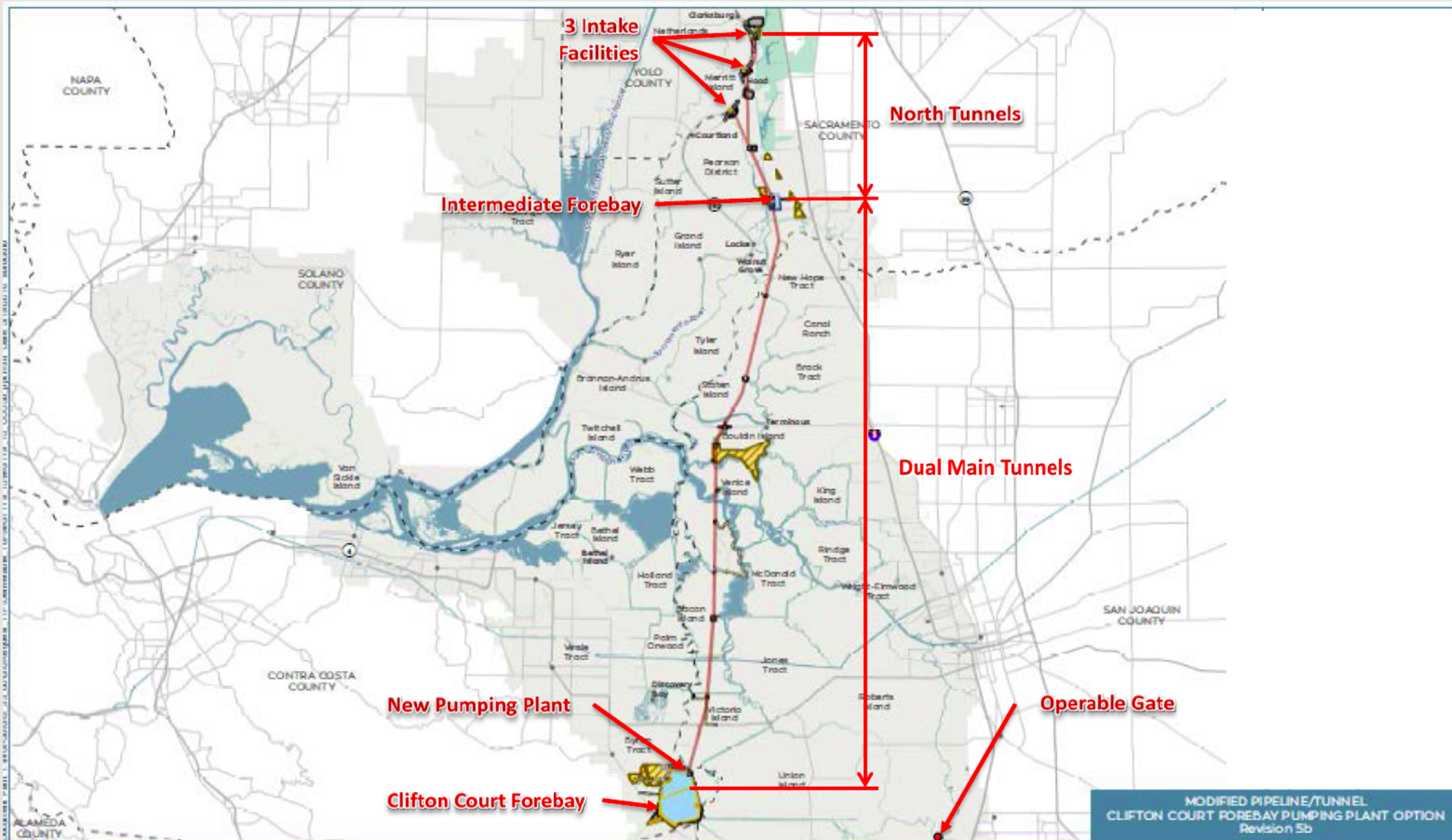
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CALIFORNIA WATER FIX FACILITIES

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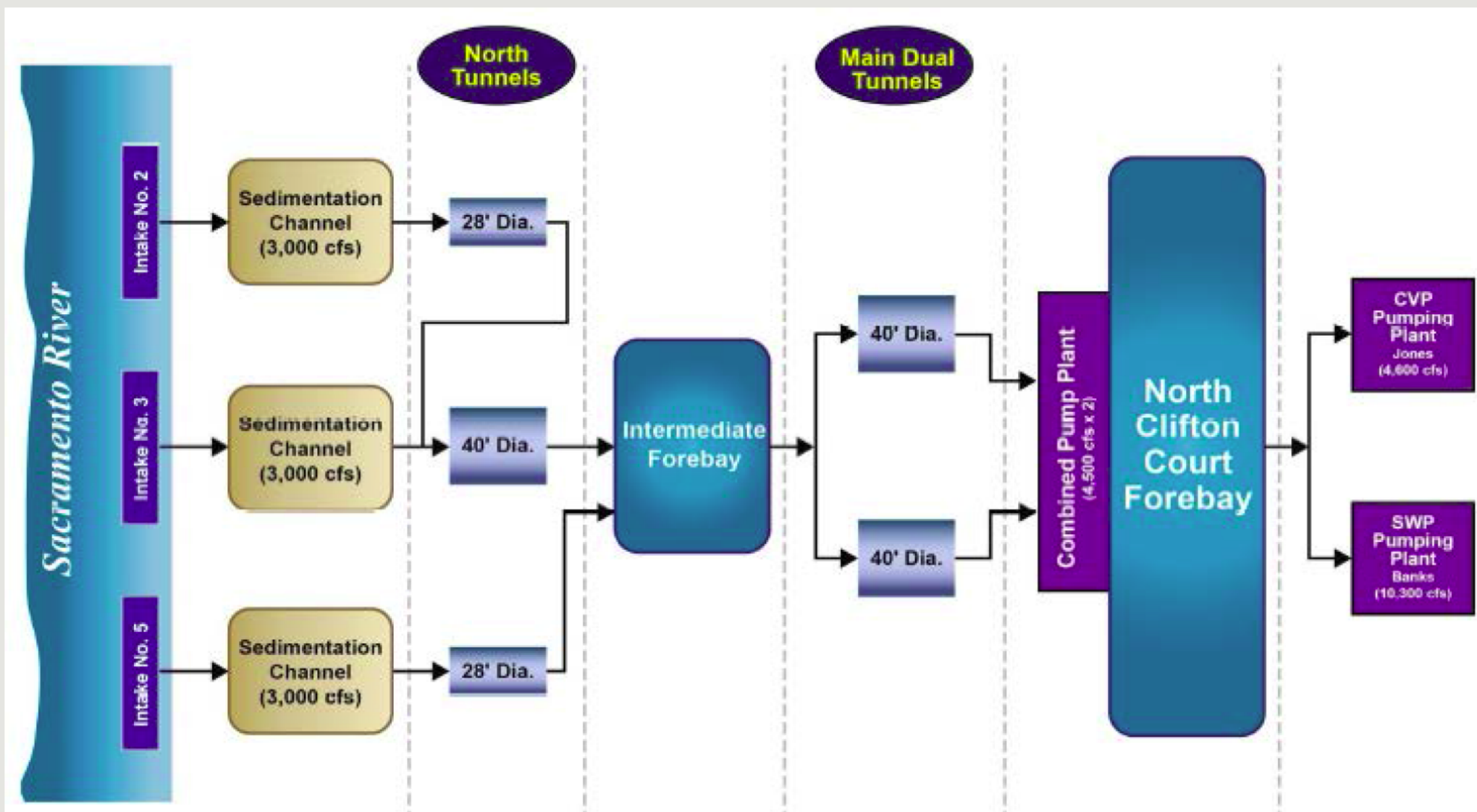




CONVEYANCE SCHEMATIC

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9,000 CFS GRAVITY SYSTEM





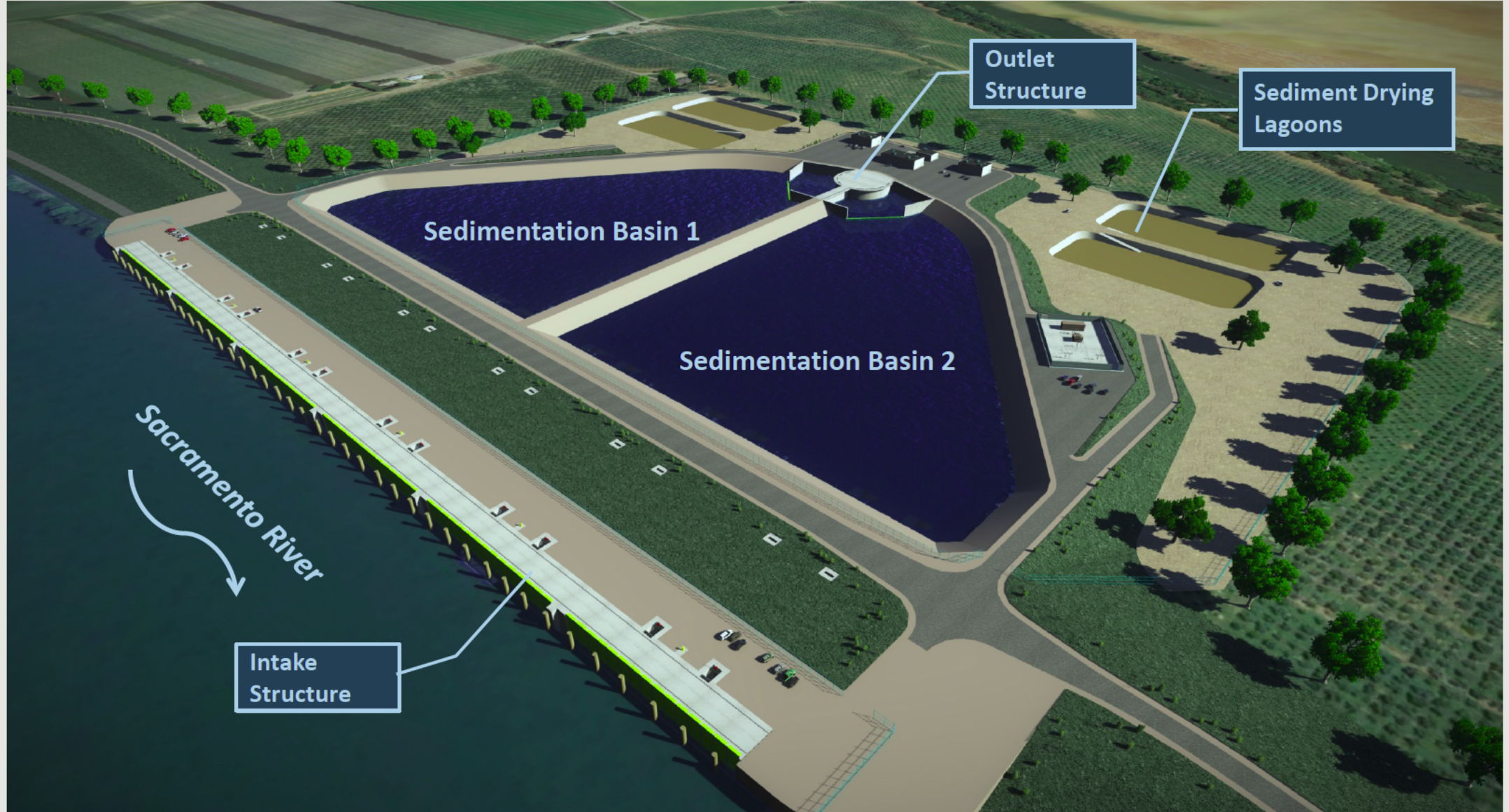
GENERAL INTAKE DESIGN CRITERIA

General	
Intake	On-bank
Number of Intakes	3
Maximum Single Intake Capacity	3,000 cfs
Maximum System Flow Capacity	9,000 cfs
Hydraulic Intake Criteria	
Screen Approach Velocity	.20 fps
Screen Sweeping Velocity	≥0.20 fps



TYPICAL RIVER INTAKE RENDERING

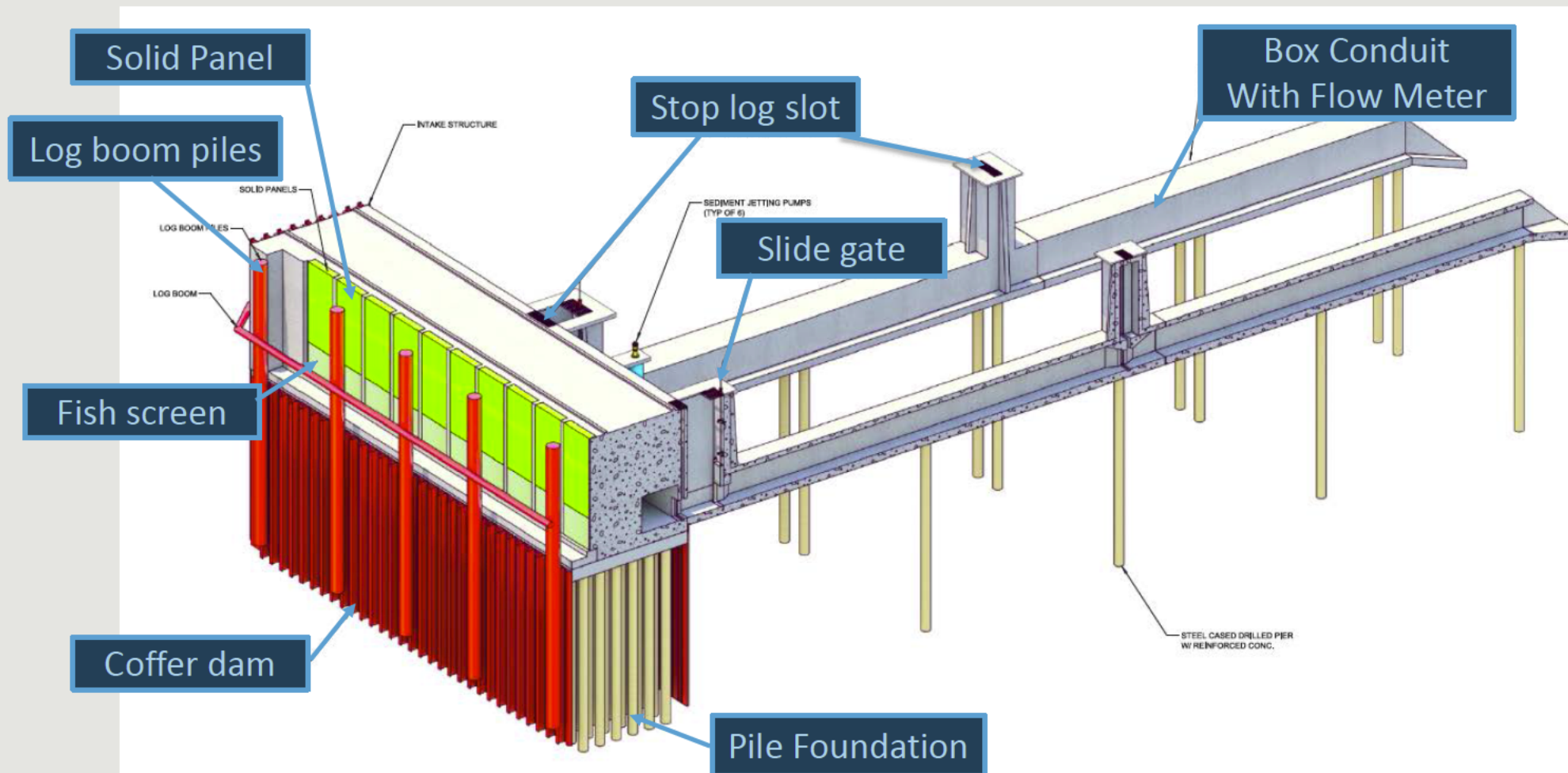
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ISOMETRIC VIEW OF AN INTAKE BAY

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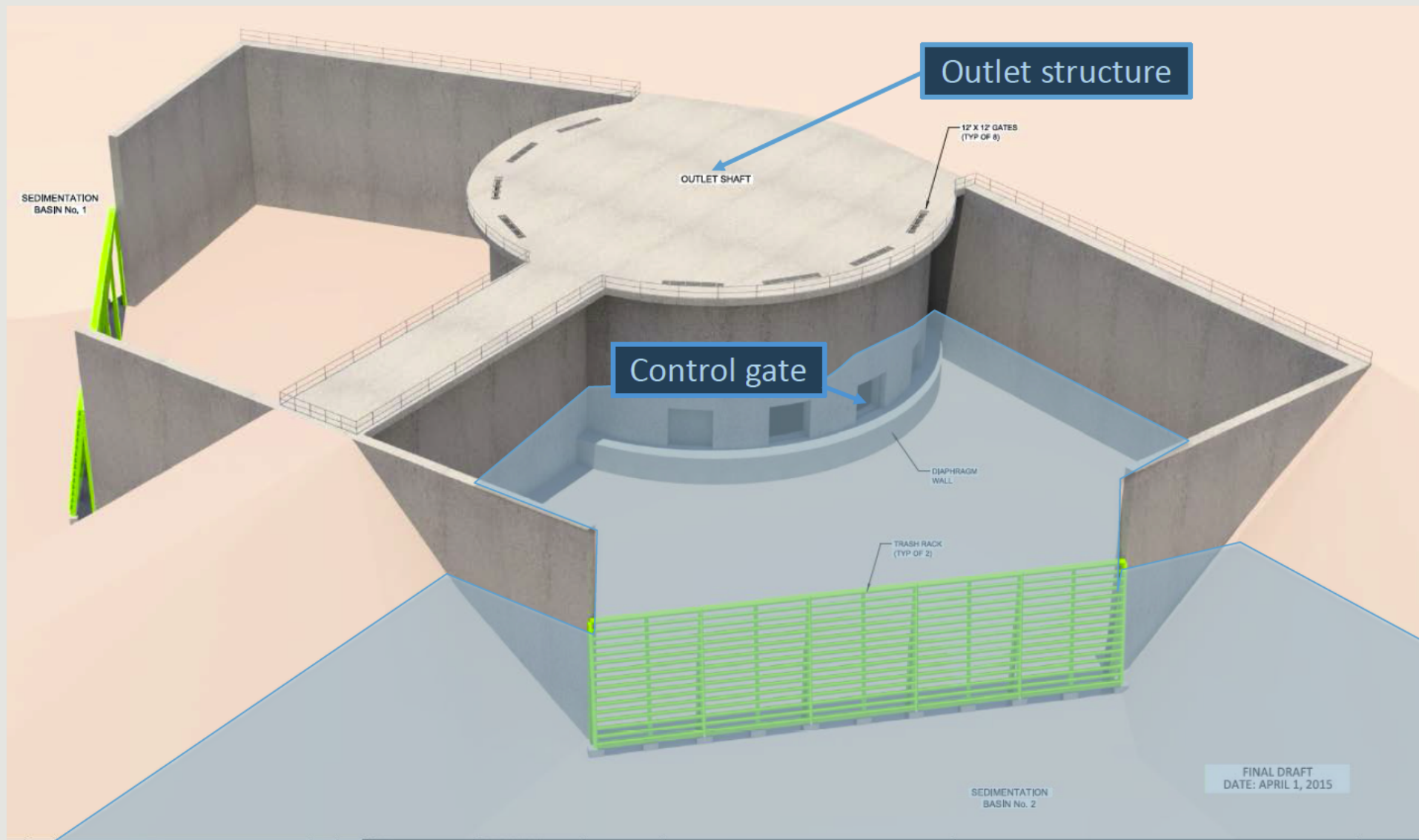
FINAL DRAFT
DATE: APRIL 1, 2015

VERIFY SCALE
BAR(S) ONE INCH ON
ORIGINAL DRAWING



OUTLET STRUCTURE

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- **Slurry Cutoff Walls**
 - Hydraulically isolate construction areas for dewatering
 - Control Seepage from forebays and sedimentation basins
- **Toe drains**
- **Tunnel lining system**
- **Geotechnical studies and monitoring program**



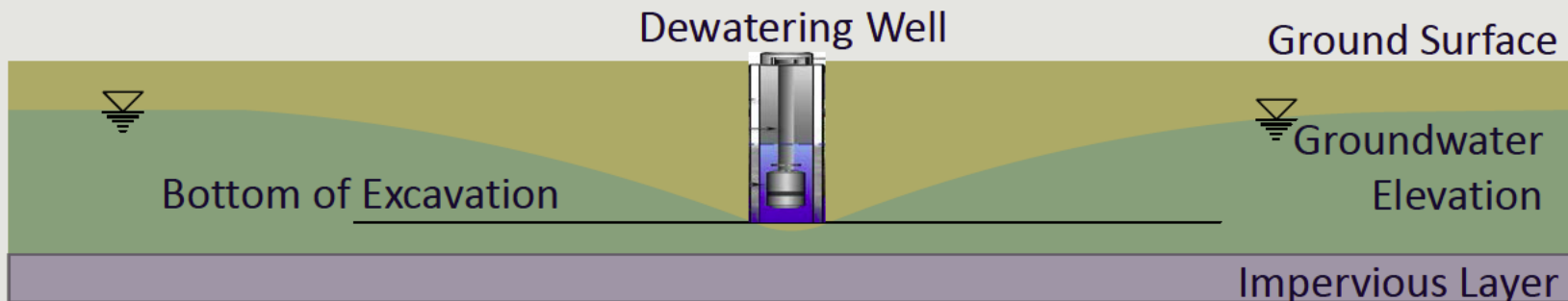
DEWATERING

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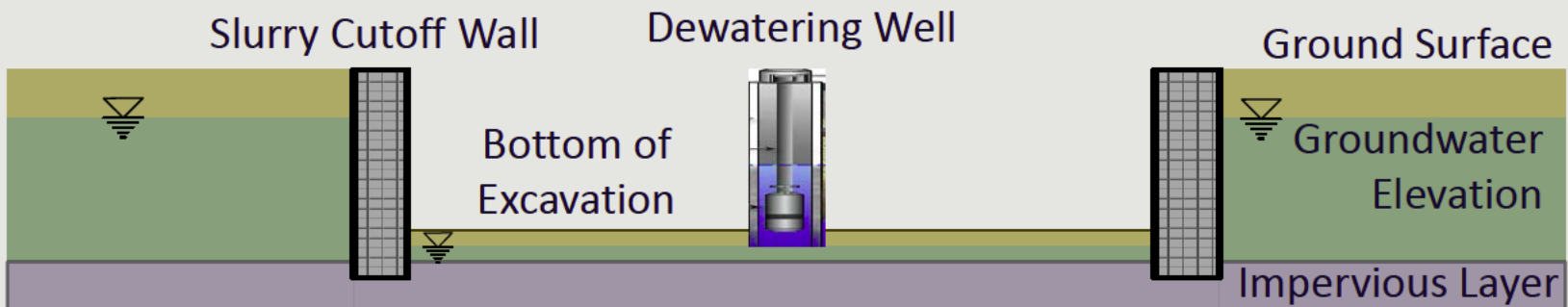
Long-Term Groundwater Elevation Prior to Construction



Groundwater Elevation During Dewatering Actions



Groundwater Elevation During Dewatering with Slurry Cutoff Walls





INTAKE CONSTRUCTION

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EXISTING WATER DIVERSIONS

- **Total number of effected water rights**
 - Temporarily effected: 10
 - Permanently effected: 5
- **Mitigations for temporarily effected diversions**
 - Provide new groundwater wells
 - Provide alternate water supply from a permitted source

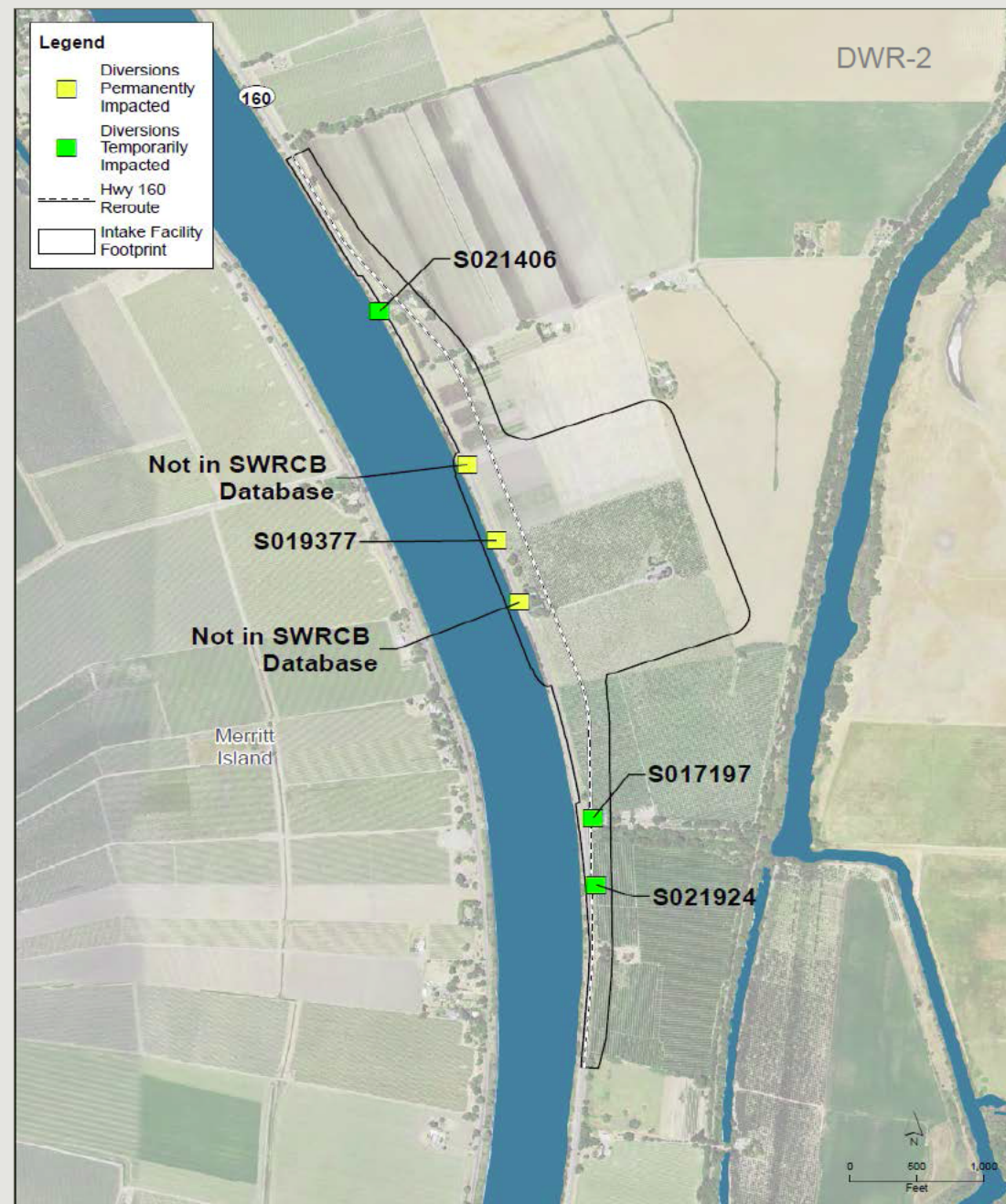


EXISTING WATER DIVERSIONS

- **Mitigations for permanently effected diversions**
 - Provide temporary mitigation measures until the mitigation measures below are completed:
 - Relocate existing diversions outside of the intake structure footprint
 - Provide a new turnout from the proposed CWF sedimentation basins

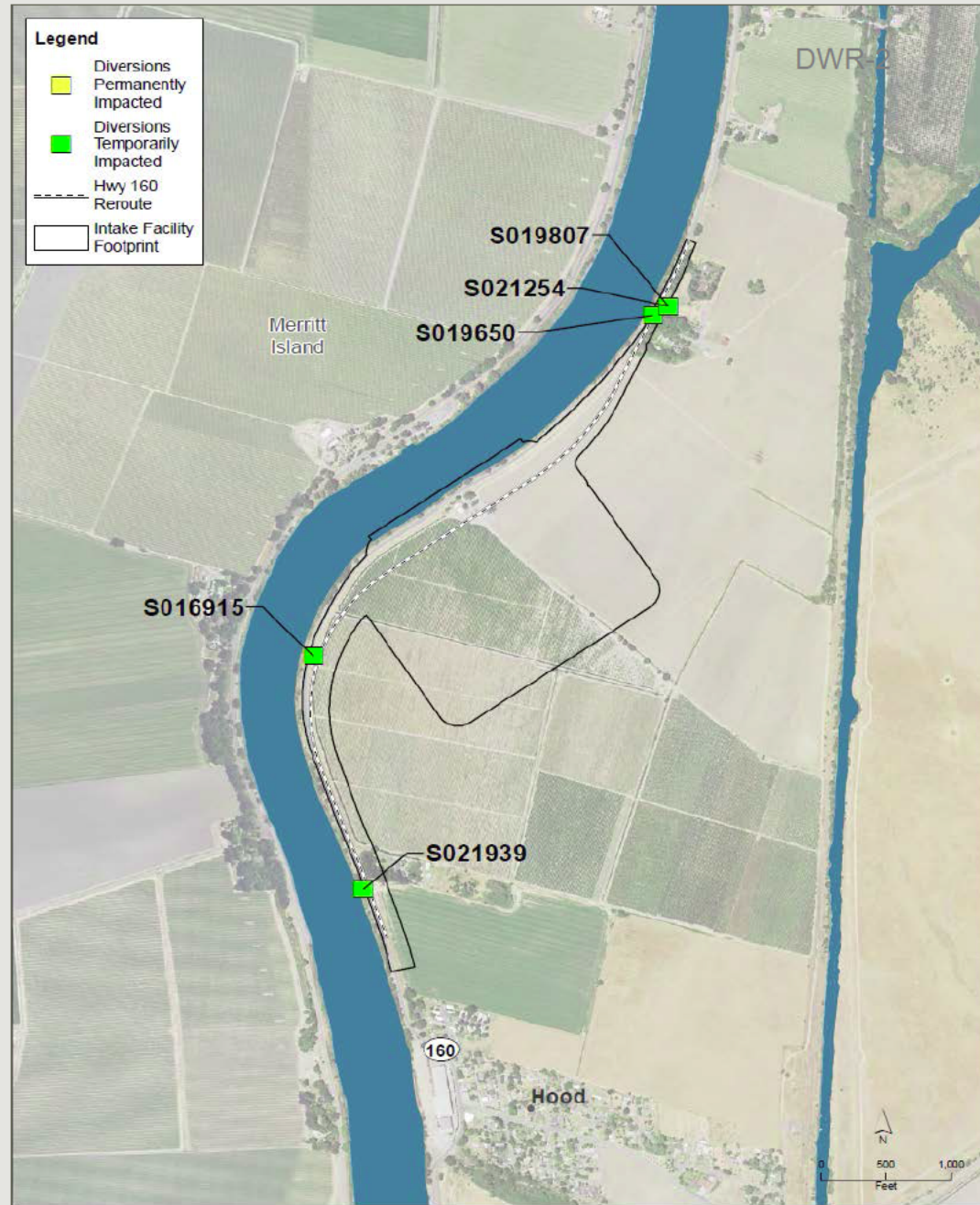


INTAKE 2 DIVERSIONS



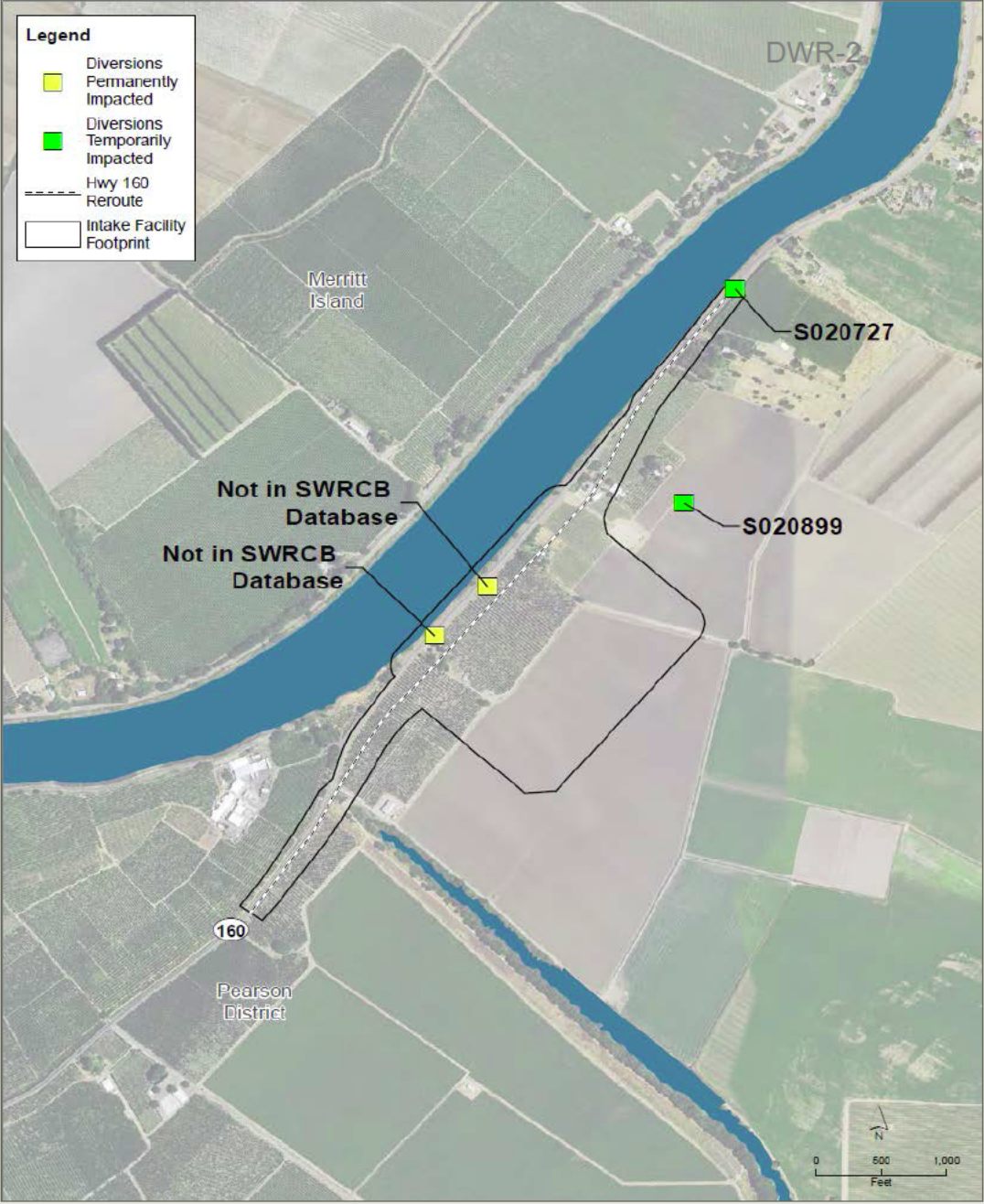


INTAKE 3 DIVERSIONS





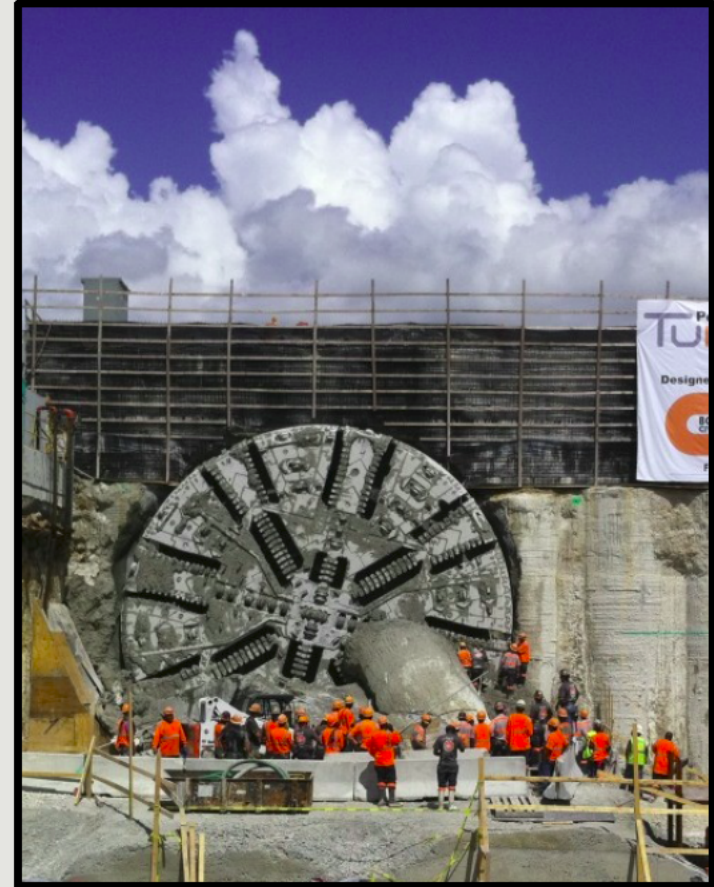
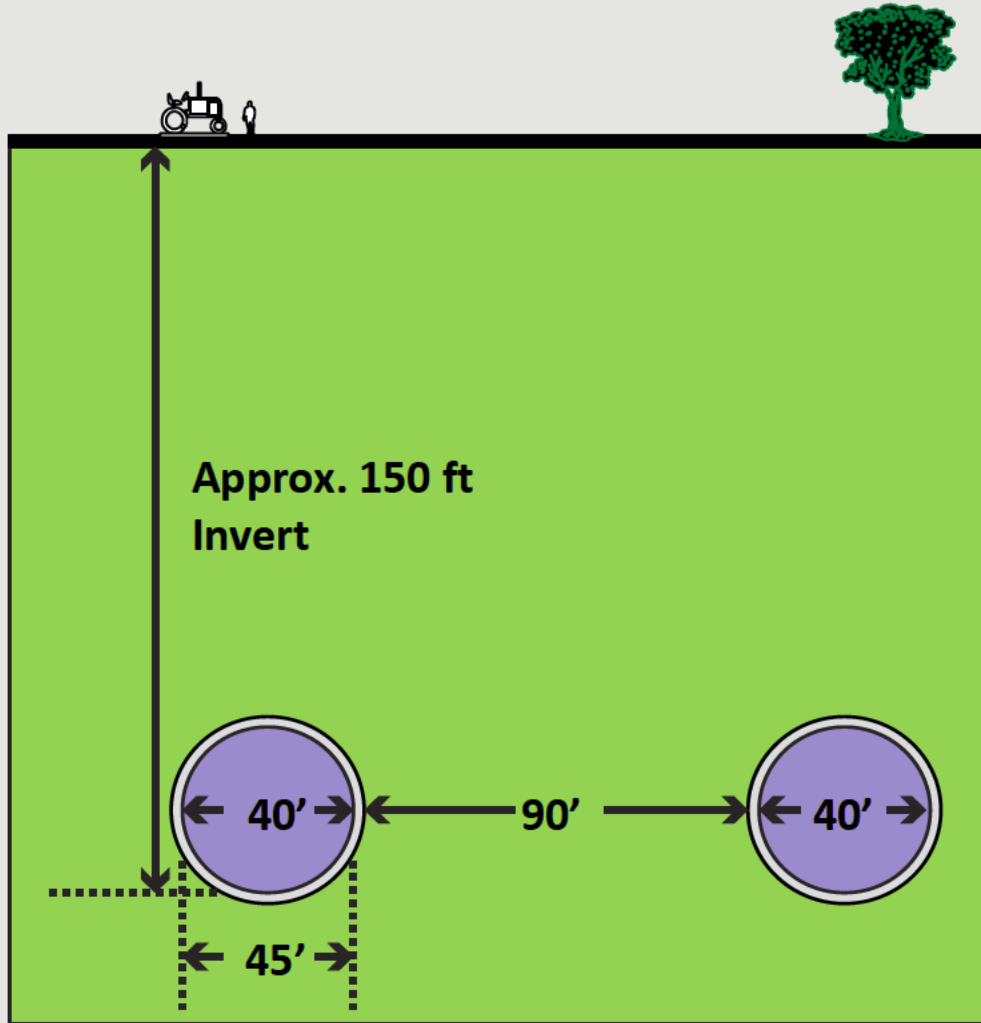
INTAKE 5 DIVERSIONS





MAIN TUNNELS

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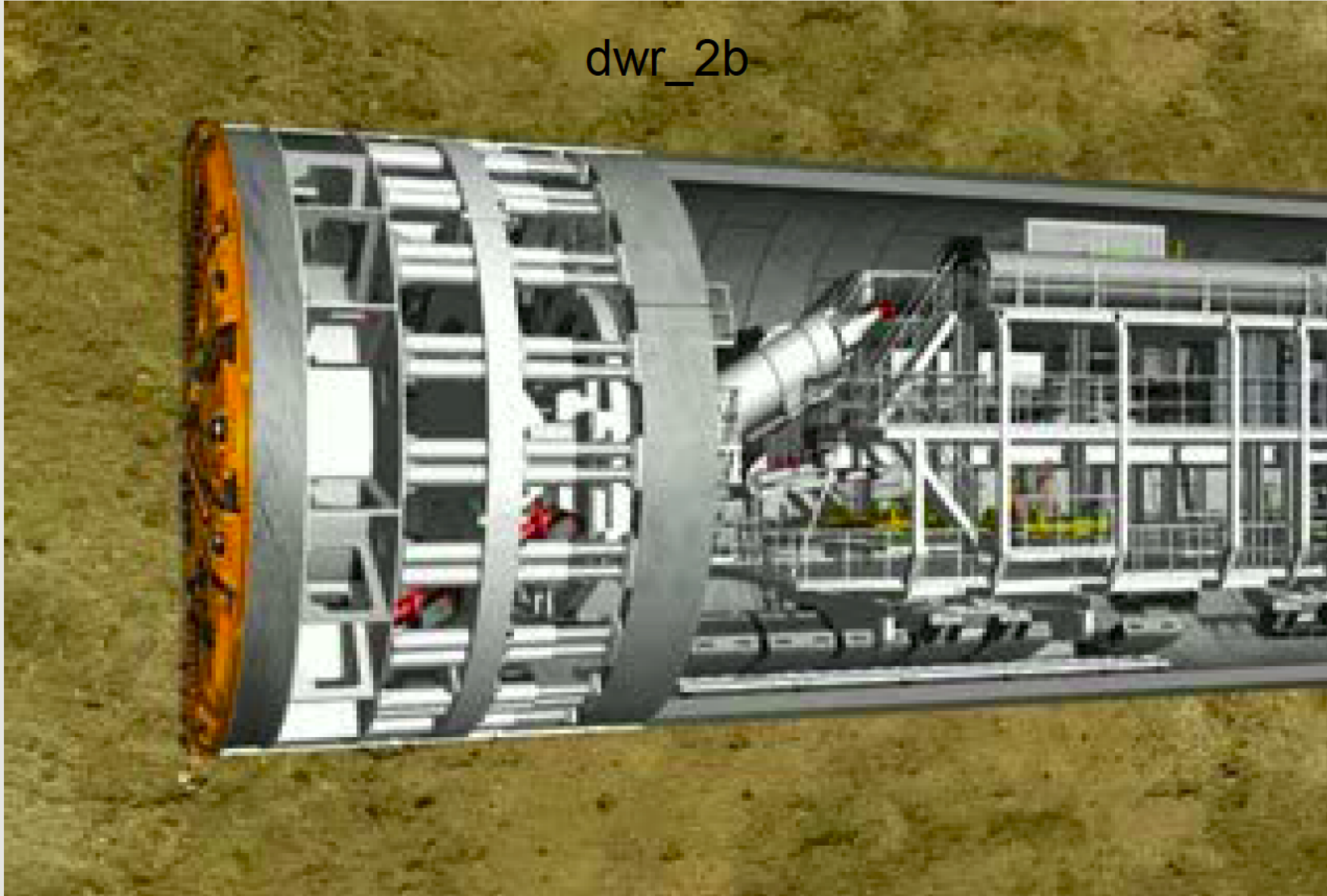




TUNNEL BORING MACHINE EXCAVATION ANIMATION

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TUNNEL SEGMENT INSTALLATION ANIMATION

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dwr_2c



SHAFT CONSTRUCTION

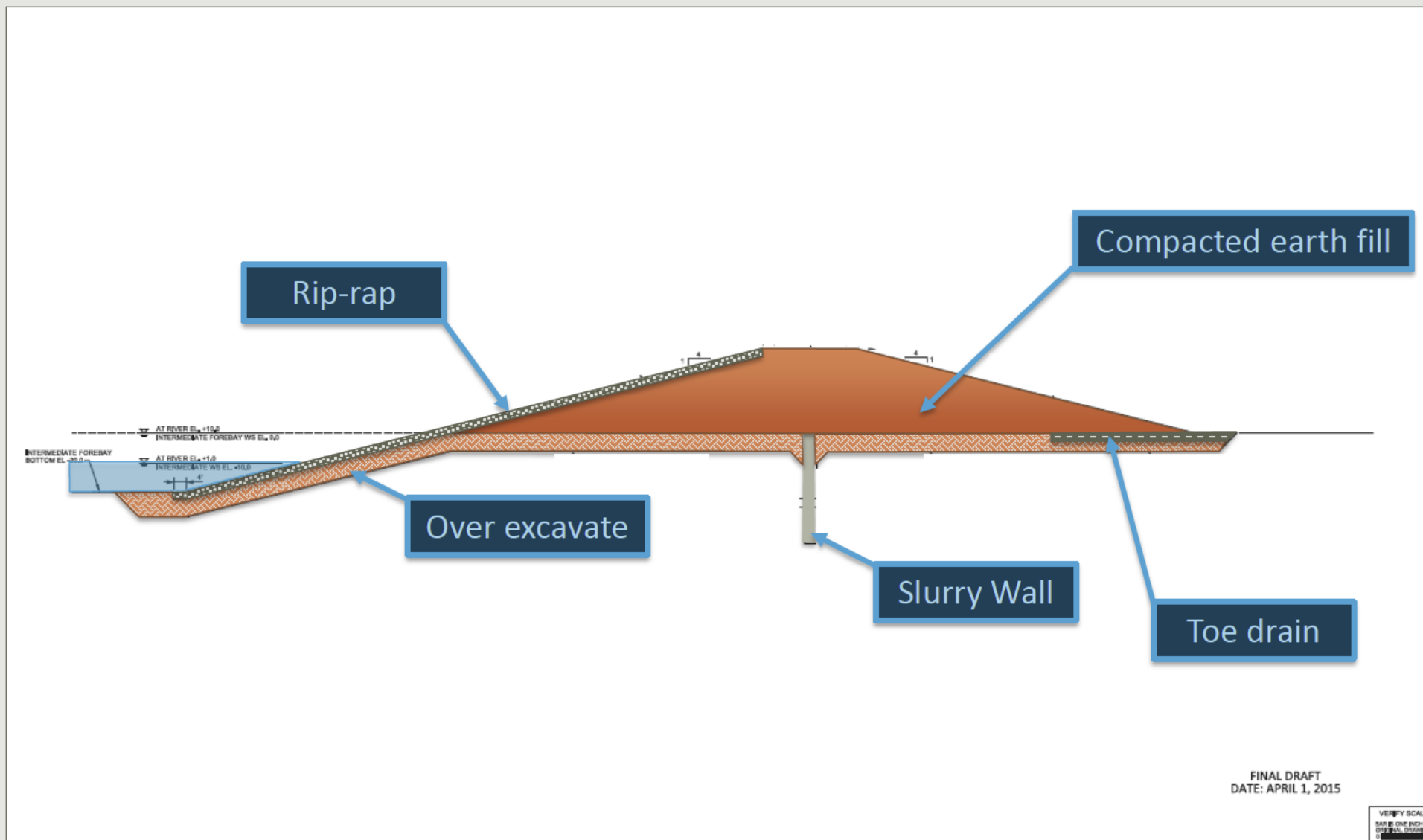
- Excavate diaphragm wall
- Install reinforcing steel
- Place concrete
- Remove soil inside shaft
- Install tremie concrete bottom
- Dewater shaft
- Install dewatering pump





FOREBAY EMBANKMENT

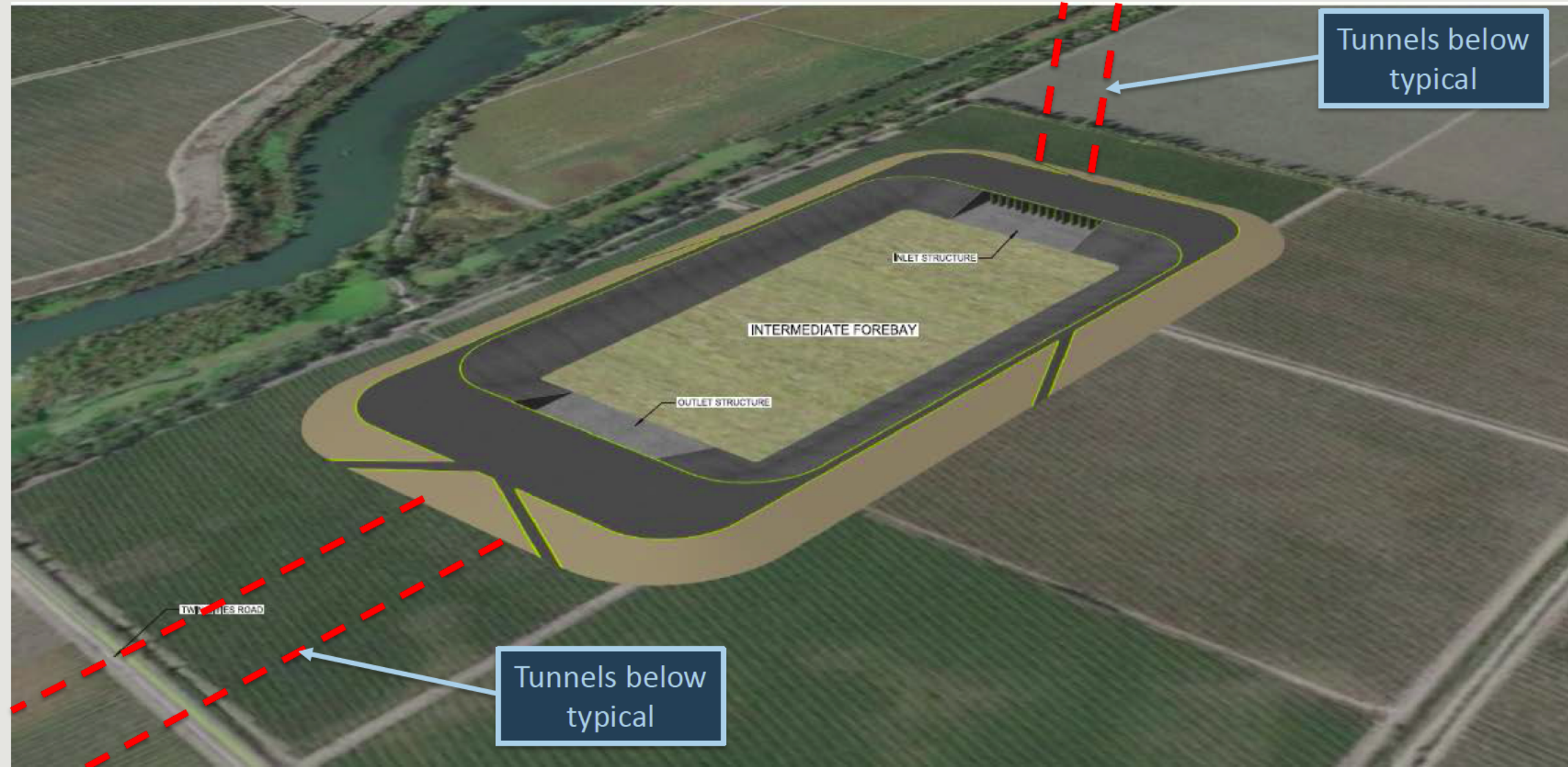
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INTERMEDIATE FOREBAY RENDERING

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CLIFTON COURT FOREBAY

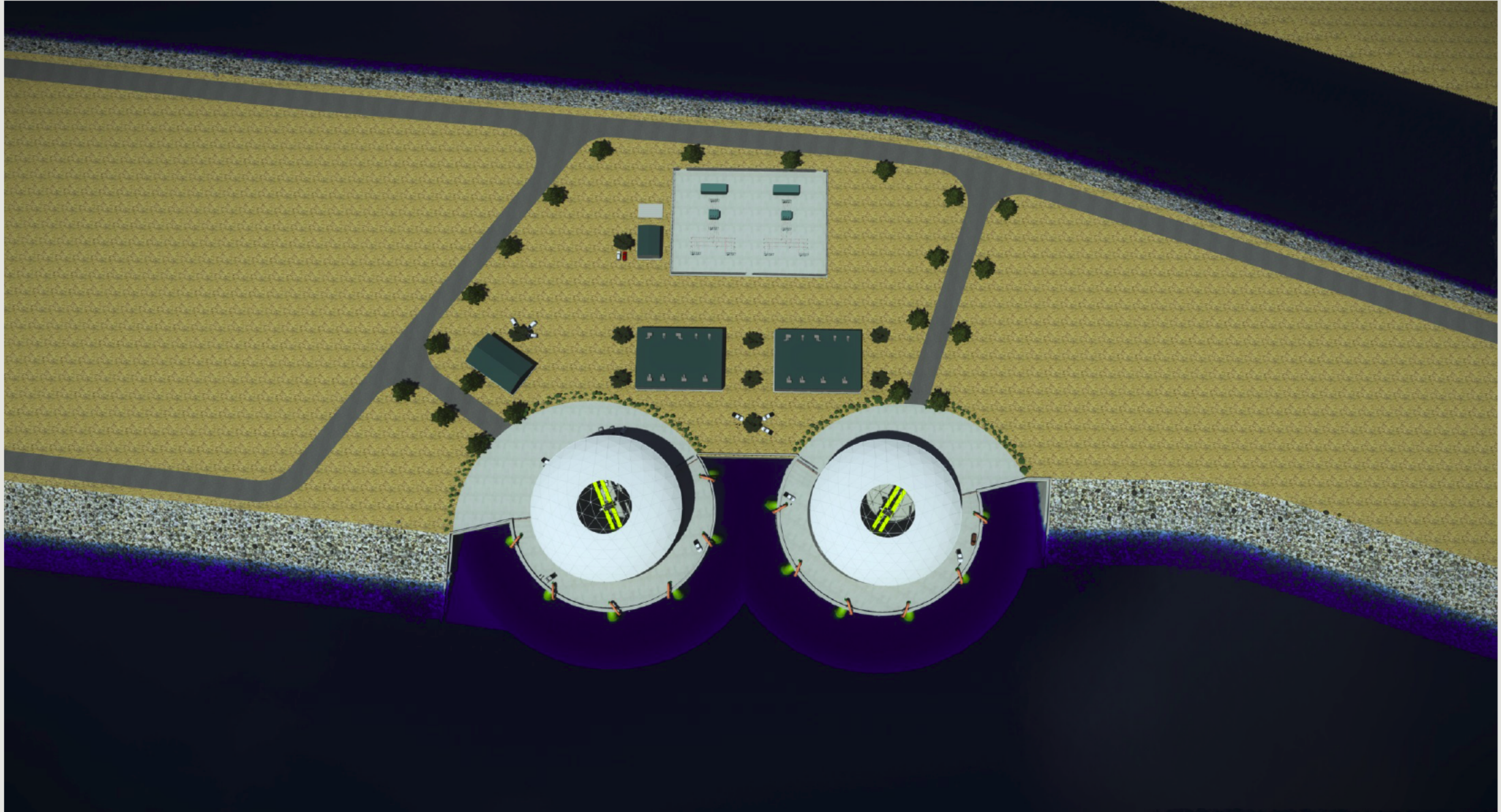
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CLIFTON COURT PUMPING PLANT RENDERING

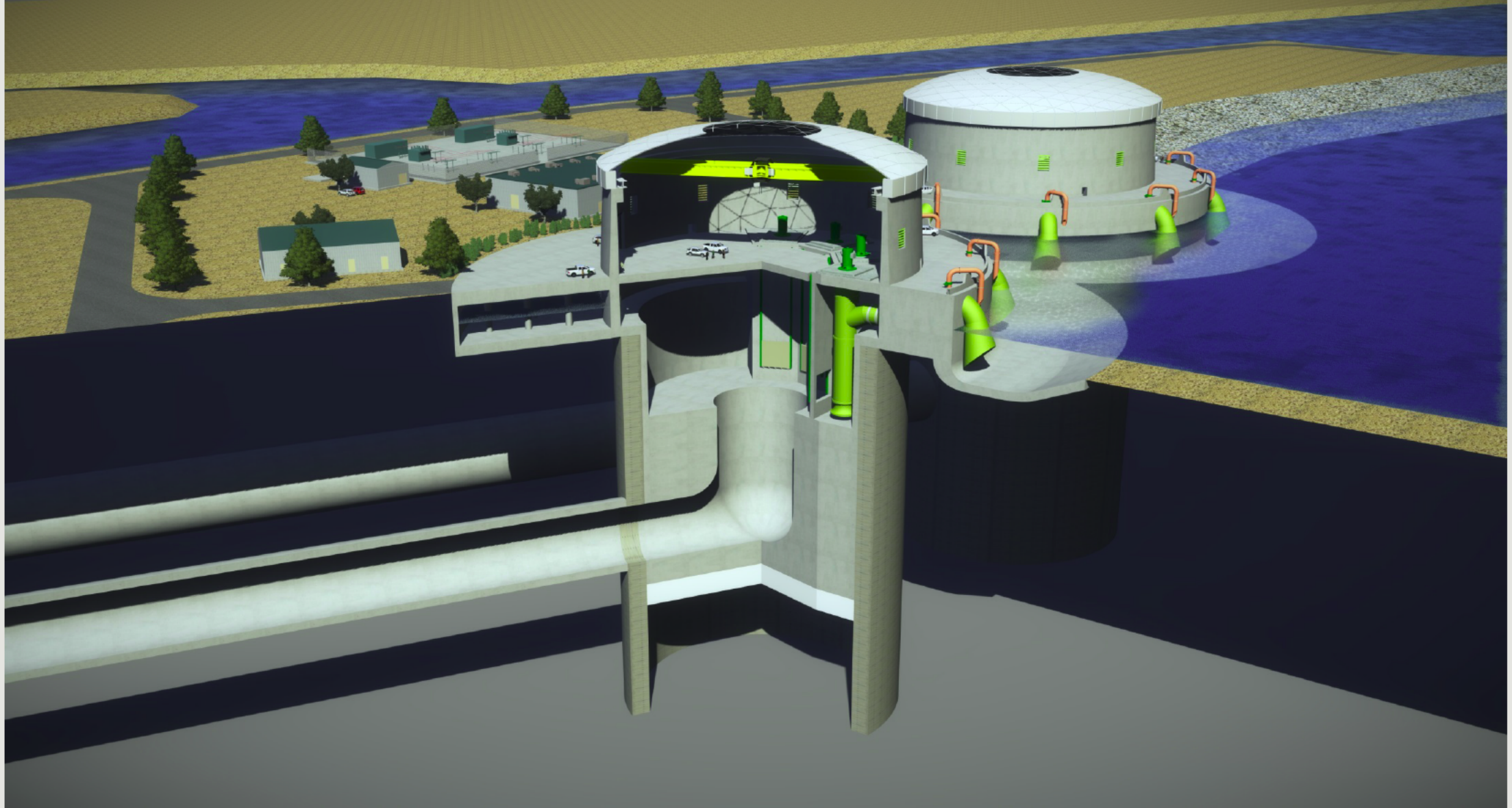
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CLIFTON COURT PUMPING PLANT RENDERING

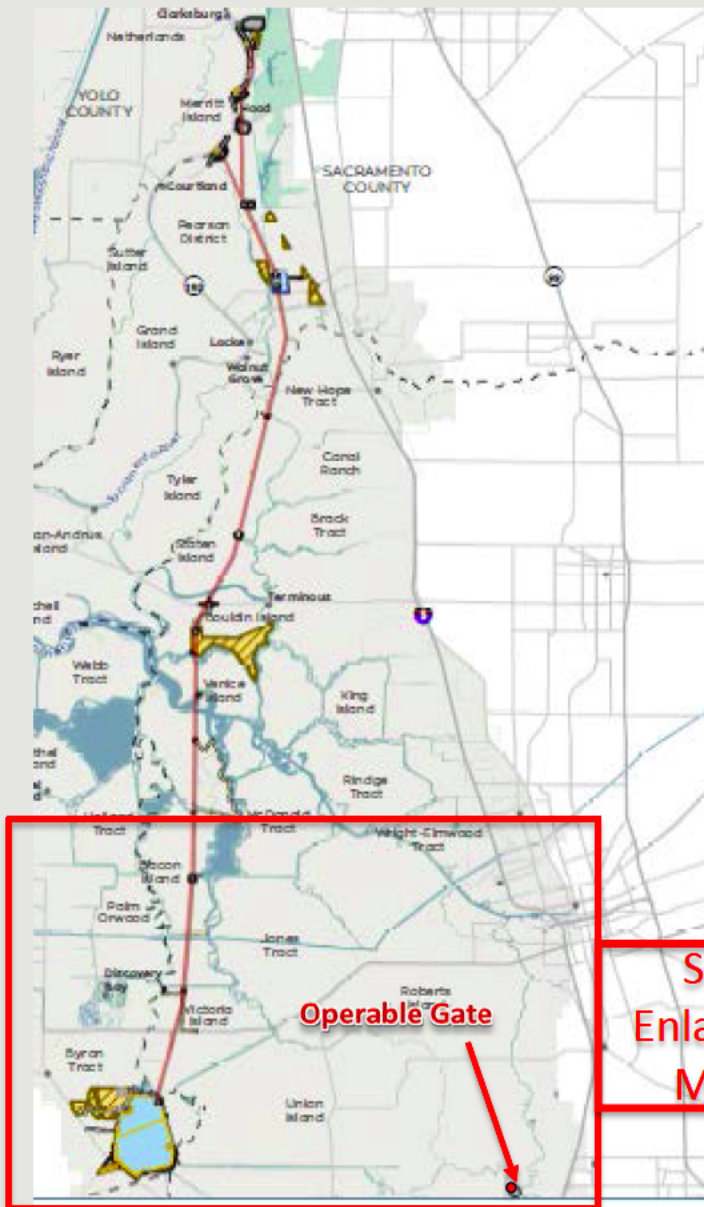
DWR-2



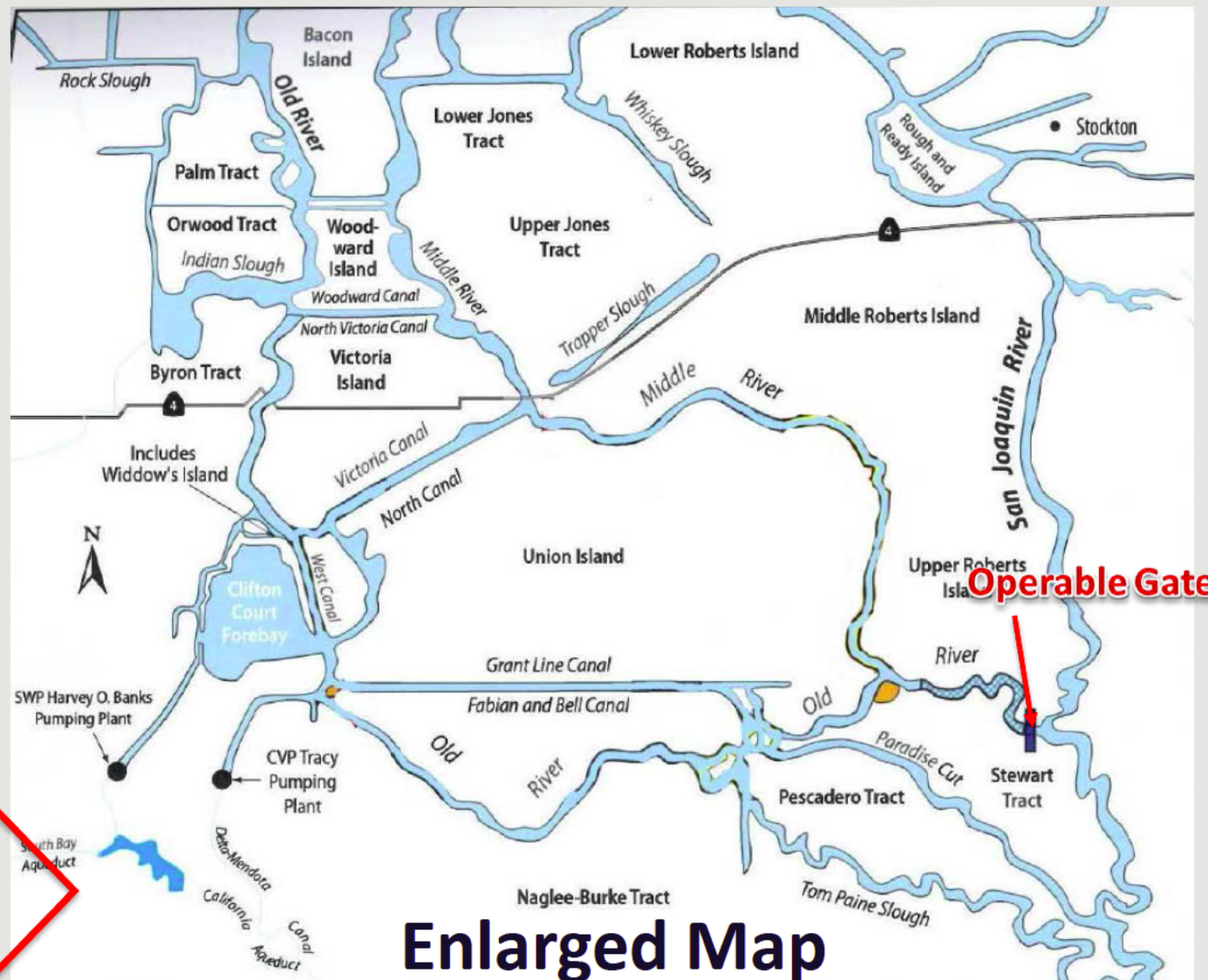


HEAD OF OLD RIVER OPERABLE GATE LOCATION

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See
Enlarged
Map





HEAD OF OLD RIVER OPERABLE GATE

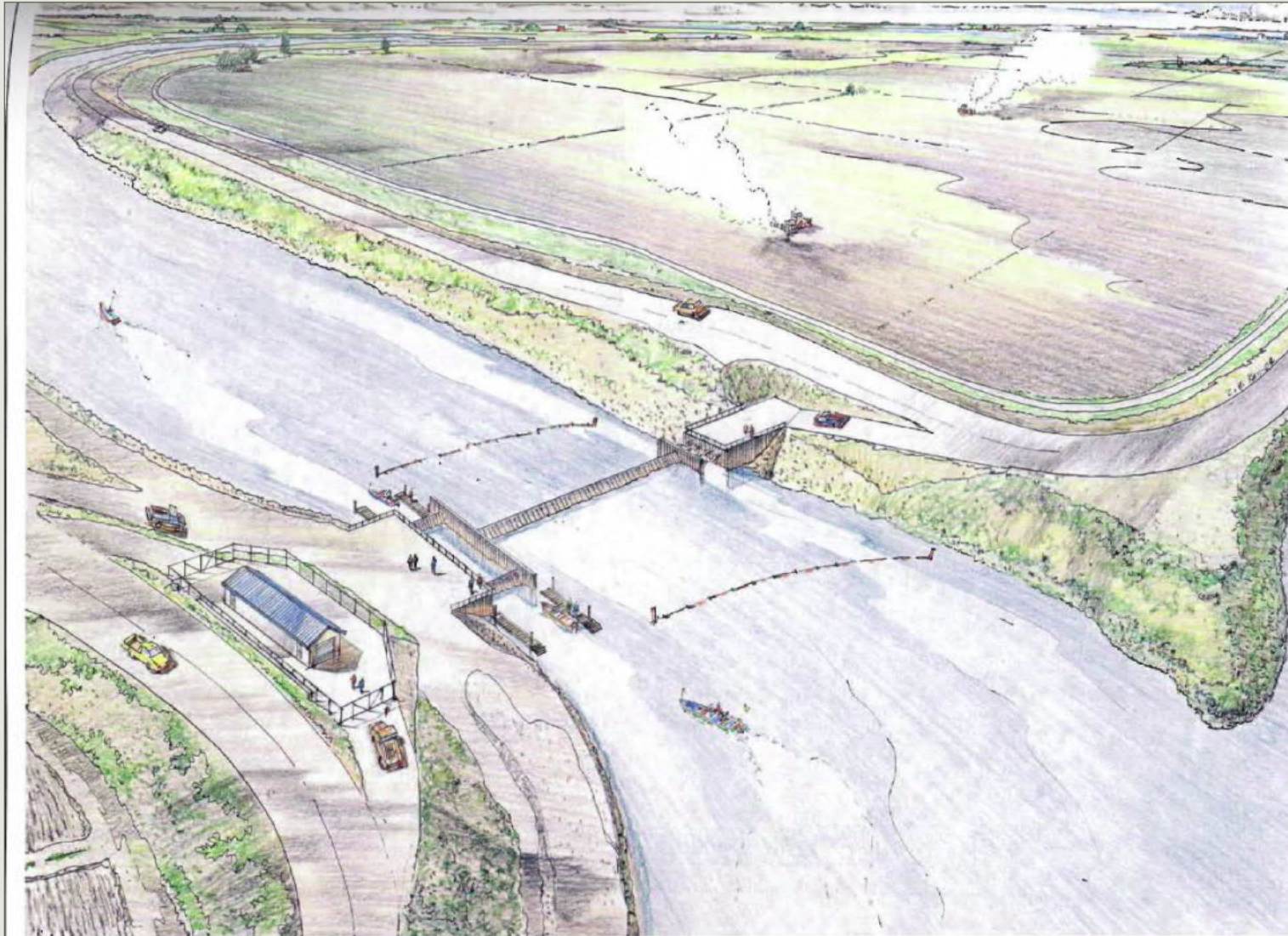
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- **Located where San Joaquin and Old Rivers diverge**
- **Consists of five bottom-hinged gates, fish passage structure, boat lock, and other appurtenant facilities**
- **Within the confines of the existing channel (no levee relocation)**



HEAD OF OLD RIVER OPERABLE GATE RENDERING

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Source: California Department of Water Resources.



FLOOD PROTECTION

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- **At intake sites**
 - Temporary and long term protection measures
 - In accordance with USACE Section 408 permitting
- **Along surrounding levees**
 - Assessment of existing conditions
 - Improvements to be performed
 - Monitoring program before and during construction