



CALIFORNIA
WATER FIX
RELIABLE. CLEAN. WATER.

DWR-1361

ENGINEERING PART 2 REBUTTAL TESTIMONY



TESTIMONY OVERVIEW

- **Proposed WaterFix Refinements**
- **Noise**
- **Air quality**
- **Transportation impacts from construction**
- **Barges and barge landings**
- **Adequacy of existing engineering**
- **Seismic design criteria for tunnels**



CALIFORNIA WATERFIX – OVERALL PROGRAM



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community
[usnetapp01\CR-ES-RWEngineering-T\Projects\Bay\Delta\DHCCP\BTF_CER_Overall_PPT.mxd] [Printed 6/25/2018] [Photography Date: None] [Prepared by: Enrique Chen (Geodetics & Mapping Team)] [Checked by: Tedman Tran] [Job#: GIS18-06-23]



DESIGN REFINEMENTS & PROPOSED MODIFICATIONS

WaterFix will reduce permanent impacts to Delta wetlands by

MORE THAN 500 ACRES

And reduce temporary impacts to wetlands by

NEARLY 2,000 ACRES

Eliminate barge landing at Snodgrass Slough

BENEFITS: Reduces barge traffic in the northern portion of the Delta; reduces impacts to wetlands

Move a shaft site on Mandeville Island

BENEFITS: Avoids wetlands

Eliminate the Clifton Court Forebay modifications by moving the terminus of the main tunnels and forebay to a new location

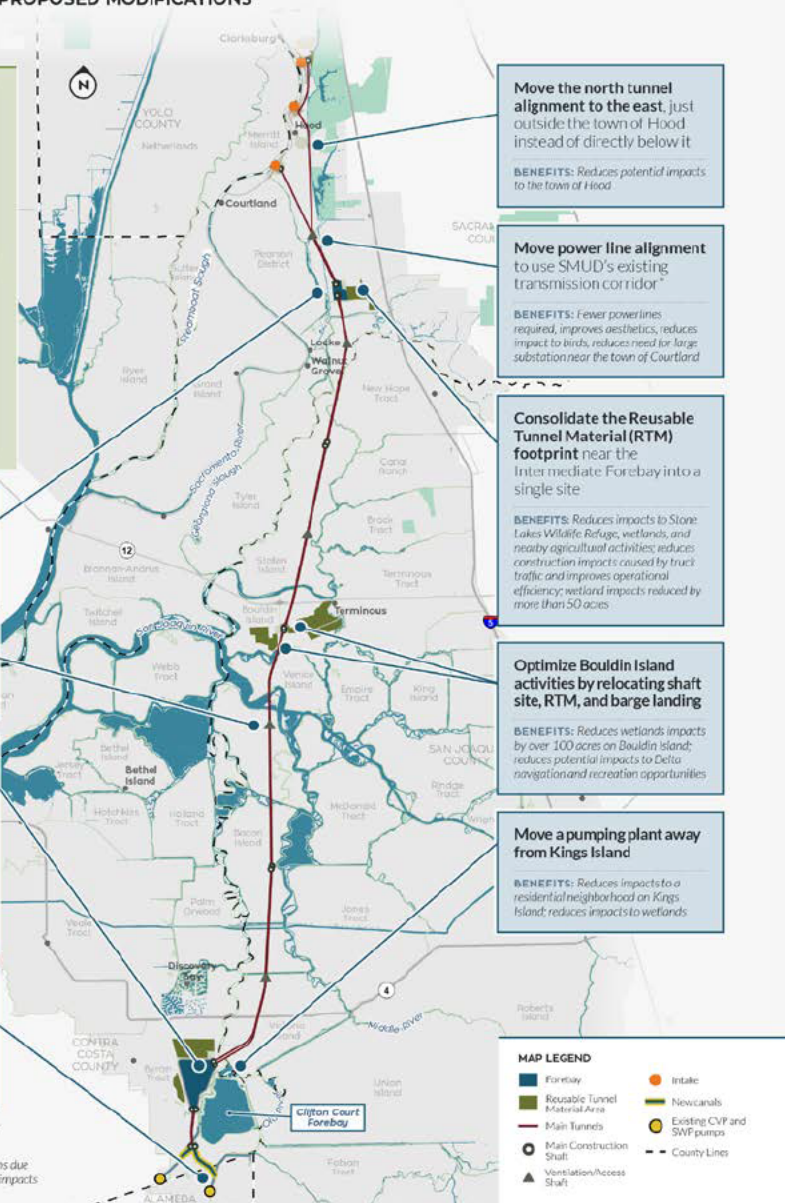
BENEFITS: Reduces impacts to wetlands, salmon, and smelt; improves construction access; reduces permanent impacts to wetlands by 270 acres and temporary impacts to wetlands by over 1,900 acres

Eliminate the need to relocate a 500 kV and 230 kV transmission line from the Tracy substation

BENEFITS: Reduces wetland impacts and eliminates unnecessary costs

* Previously implemented, not subject to further environmental review

** Map includes proposed footprint modifications due to ongoing optimization of the design to reduce impacts



Move the north tunnel alignment to the east, just outside the town of Hood instead of directly below it

BENEFITS: Reduces potential impacts to the town of Hood

Move power line alignment to use SMUD's existing transmission corridor**

BENEFITS: Fewer powerlines required; improves aesthetics; reduces impact to birds; reduces need for large substation near the town of Courtland

Consolidate the Reusable Tunnel Material (RTM) footprint near the Intermediate Forebay into a single site

BENEFITS: Reduces impacts to Stone Lakes Wildlife Refuge; wetlands; and nearby agricultural activities; reduces construction impacts caused by truck traffic and improves operational efficiency; wetland impacts reduced by more than 50 acres

Optimize Bouldin Island activities by relocating shaft site, RTM, and barge landing

BENEFITS: Reduces wetlands impacts by over 100 acres on Bouldin Island; reduces potential impacts to Delta navigation and recreation opportunities

Move a pumping plant away from Kings Island

BENEFITS: Reduces impacts to a residential neighborhood on Kings Island; reduces impacts to wetlands

MAP LEGEND

- Forebay
- Reusable Tunnel Material Area
- Main Tunnels
- Main Construction Shaft
- Intake
- New canals
- Existing CVP and SWP pumps
- County Lines
- Ventilation/Access Shaft

DESIGN REFINEMENTS & PROPOSED MODIFICATIONS

1 OF 3



DESIGN REFINEMENTS & PROPOSED MODIFICATIONS

WaterFix will reduce permanent impacts to Delta wetlands by

MORE THAN 500 ACRES

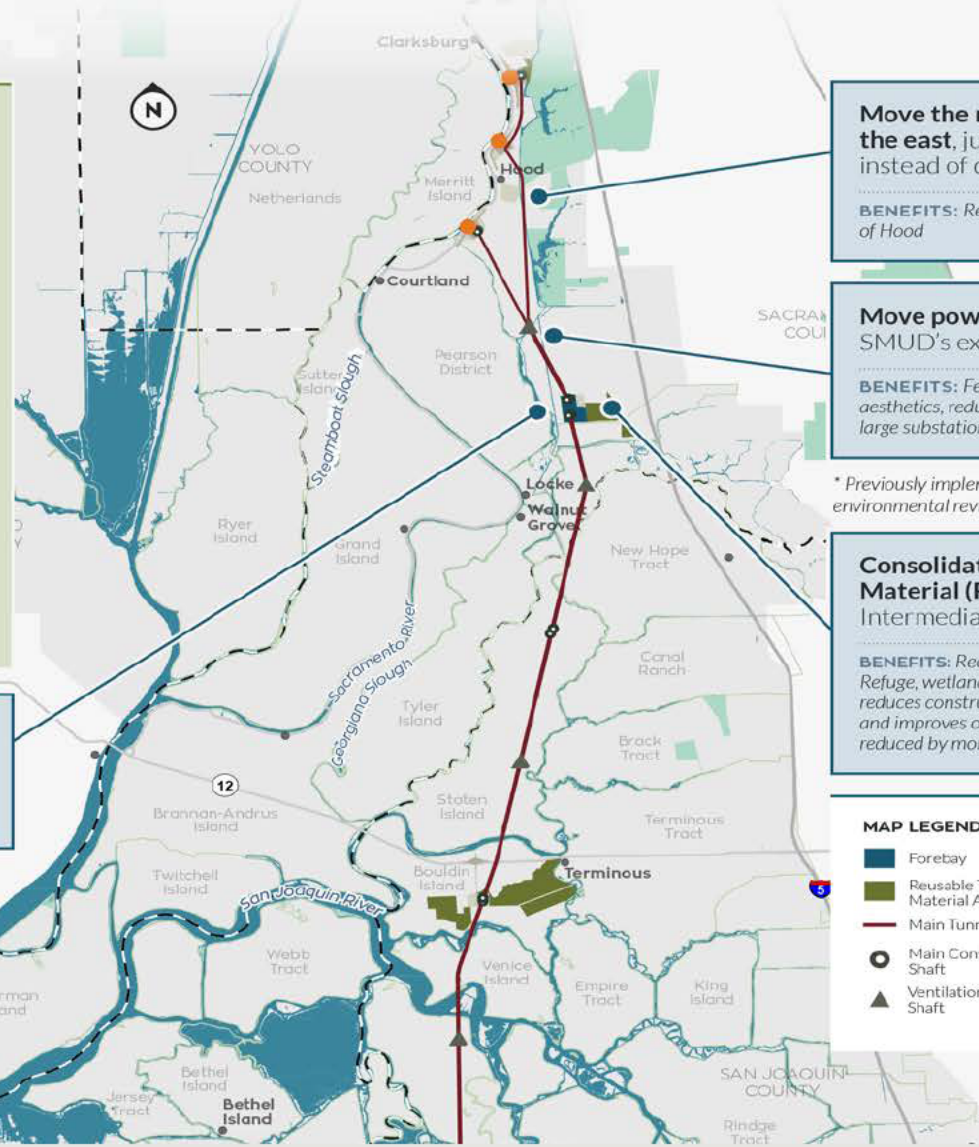
And reduce temporary impacts to wetlands by

NEARLY 2,000 ACRES

Eliminate barge landing at Snodgrass Slough

BENEFITS: Reduces barge traffic in the northern portion of the Delta; reduces impacts to wetlands

** Map includes proposed footprint modifications due to ongoing optimization of the design to reduce impacts



Move the north tunnel alignment to the east, just outside the town of Hood instead of directly below it

BENEFITS: Reduces potential impacts to the town of Hood

Move power line alignment to use SMUD's existing transmission corridor*

BENEFITS: Fewer powerlines required, improves aesthetics, reduces impact to birds, reduces need for large substation near the town of Courtland

* Previously implemented, not subject to further environmental review

Consolidate the Reusable Tunnel Material (RTM) footprint near the Intermediate Forebay into a single site

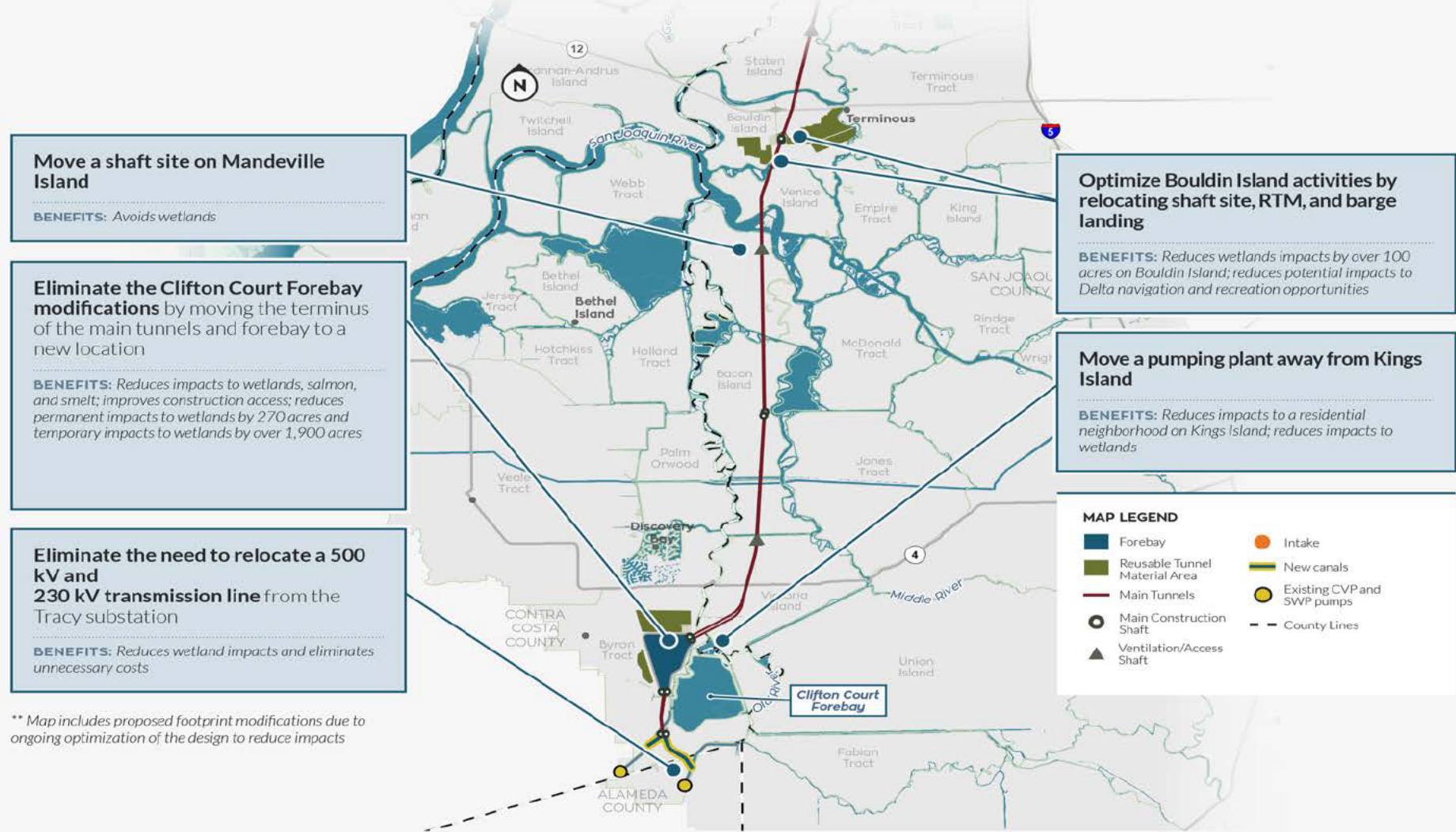
BENEFITS: Reduces impacts to Stone Lakes Wildlife Refuge, wetlands, and nearby agricultural activities; reduces construction impacts caused by truck traffic and improves operational efficiency; wetland impacts reduced by more than 50 acres

MAP LEGEND

- Forebay
- Reusable Tunnel Material Area
- Main Tunnels
- Main Construction Shaft
- Ventilation/Access Shaft
- Intake
- New canals
- Existing CVP and SWP pumps
- County Lines



DESIGN REFINEMENTS & PROPOSED MODIFICATIONS (CONT'D)

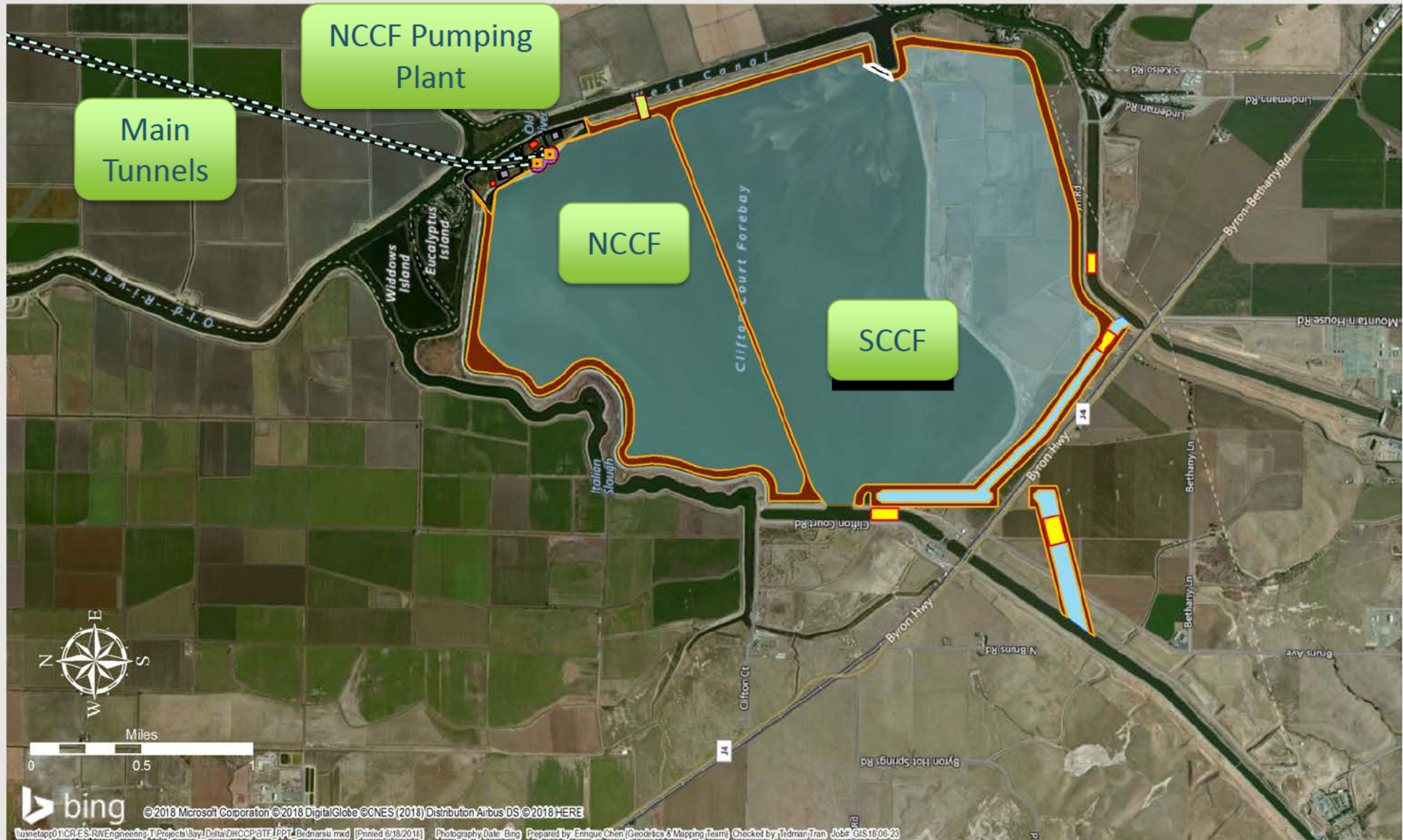


** Map includes proposed footprint modifications due to ongoing optimization of the design to reduce impacts



APPROVED CLIFTON COURT FOREBAY OPTION

DWR-1361





PROPOSED BYRON TRACT FOREBAY OPTION

DWR-1361



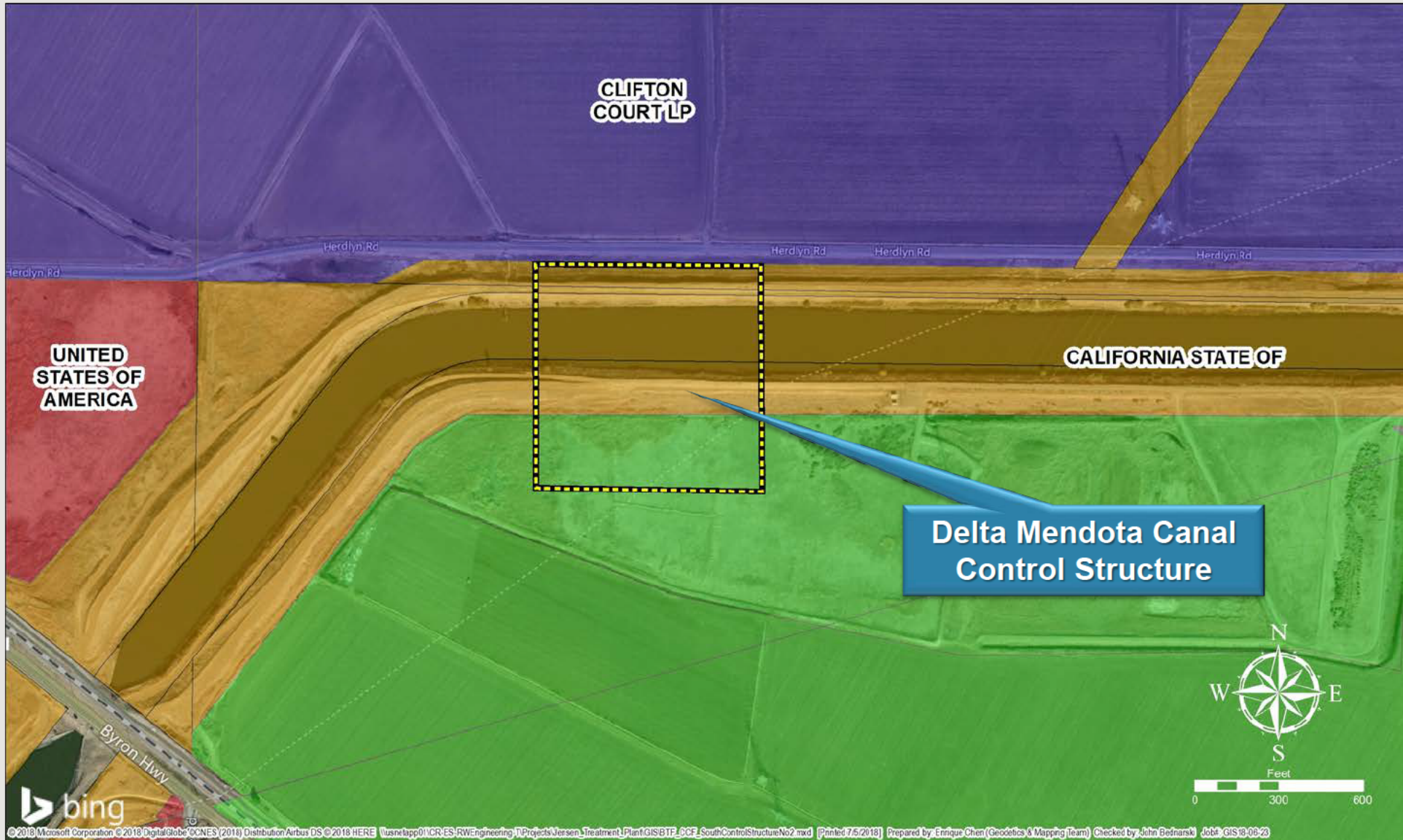


DELTA MENDOTA CANAL CONTROL STRUCTURE





DELTA MENDOTA CANAL CONTROL STRUCTURE



© 2018 Microsoft Corporation. © 2018 DigitalGlobe/SCNES (2018) Distribution Airbus DS © 2018 HERE. \\usnetapp01\CR-ES-RW\Engineering_T\Projects\Jensen_Treatment_Plant\GIS\BTF_OCF_SouthControlStructureNo2.mxd [Printed 7/5/2018] Prepared by: Enrique Chien (Geodetics & Mapping Team) Checked by: John Bednarski Job#: GIS18-08-23



NOISE FROM IMPACT PILE DRIVING

- **Noise level calculations based on FTA guidance**
- **Final EIR/EIS**
 - Used maximum source levels for impact pile drivers based on FTA guidance
 - Impact pile drivers are disclosed as worst-case
- **DWR has committed to non-impact pile driving where feasible**
 - Multiple alternative methods may be possible
 - Need complete geotechnical data
- **DWR has committed to noise abatement plan**
 - Enclosures around noise-generating equipment



AIR QUALITY

- **Revisions made to the Construction Equipment Exhaust Reduction Plan**
- **Ongoing air district coordination for criteria pollutant offset mitigation**
- **Revisions made to Mitigation Measure AQ-9 to reduce localized particulate matter (PM) concentrations**
- **Analysis conducted of Valley Fever and commitments to reduce public exposure to *Coccidioides immitis***



TRANSPORTATION IMPACTS

- **Analysis in the FEIR/FEIS examined “worst-case” traffic scenario**
- **Analysis used traffic engineering methodologies**
 - Applied San Joaquin, Sacramento and Yolo County standards
- **Proposed Project:**
 - reduces number of vehicle trips by nearly 29% when compared to Approved Project
 - reduces number of impacted roadway segments by nearly 11% compared to Approved Project
 - reduces number of unacceptable pavement conditions by nearly 11% when compared to Approved Project.



BARGES AND BARGE LANDINGS

- **Proposed removal of temporary barge landings at Snodgrass Slough and West Canal**
 - No change to barge deliveries of segments to Bouldin Island
 - Byron Tract will now receive segment deliveries that were previously planned for Clifton Court
- **Size and location of temporary barge landings**
 - Are appropriate for adjacent waterways
- **Water traffic and potential bridge openings**
 - Impact on vehicular traffic will be mitigated
 - Existing traffic mitigation measures Trnas-1a, Trans-1b, and Trans-1c

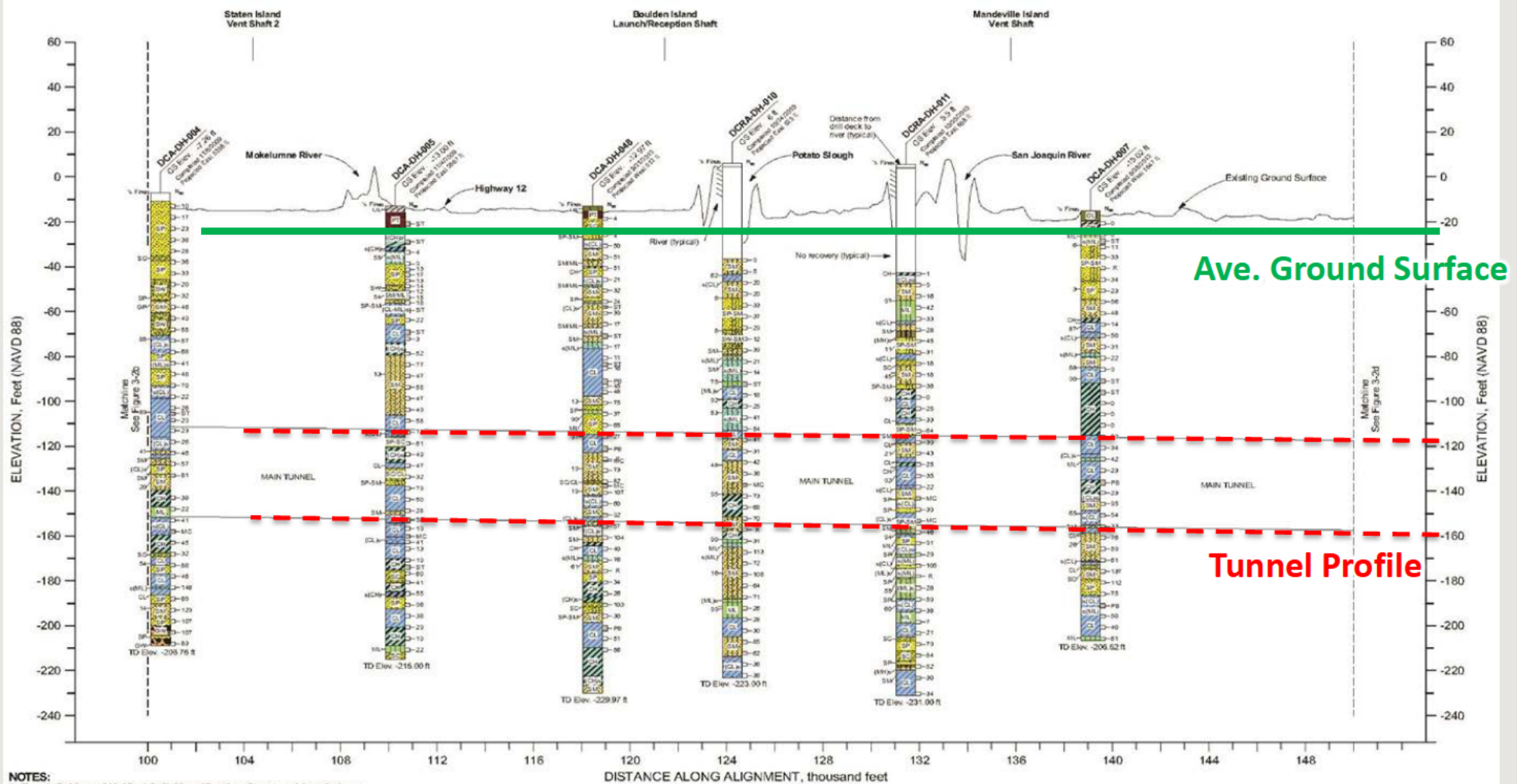


ADEQUACY OF EXISTING INFORMATION

- **Existing engineering data and investigations**
 - Appropriate for conceptual-level design ($\pm 10\%$ design complete)
 - Appropriate for EIR/EIS process
- **Geotechnical data**
 - Appropriate for conceptual tunnel design
 - Current data will be supplemented with upcoming 2-phase investigation program
 - Soils at tunnel depth are suitable for proposed tunneling methods
- **Gas Wells**
 - Tunnel alignment avoids all active gas wells
- **Levee monitoring programs**
 - Will be developed in upcoming design phases
 - Will be coordinated with reclamation districts and other stakeholders



GEOTECHNICAL PROFILE AT TUNNEL DEPTH

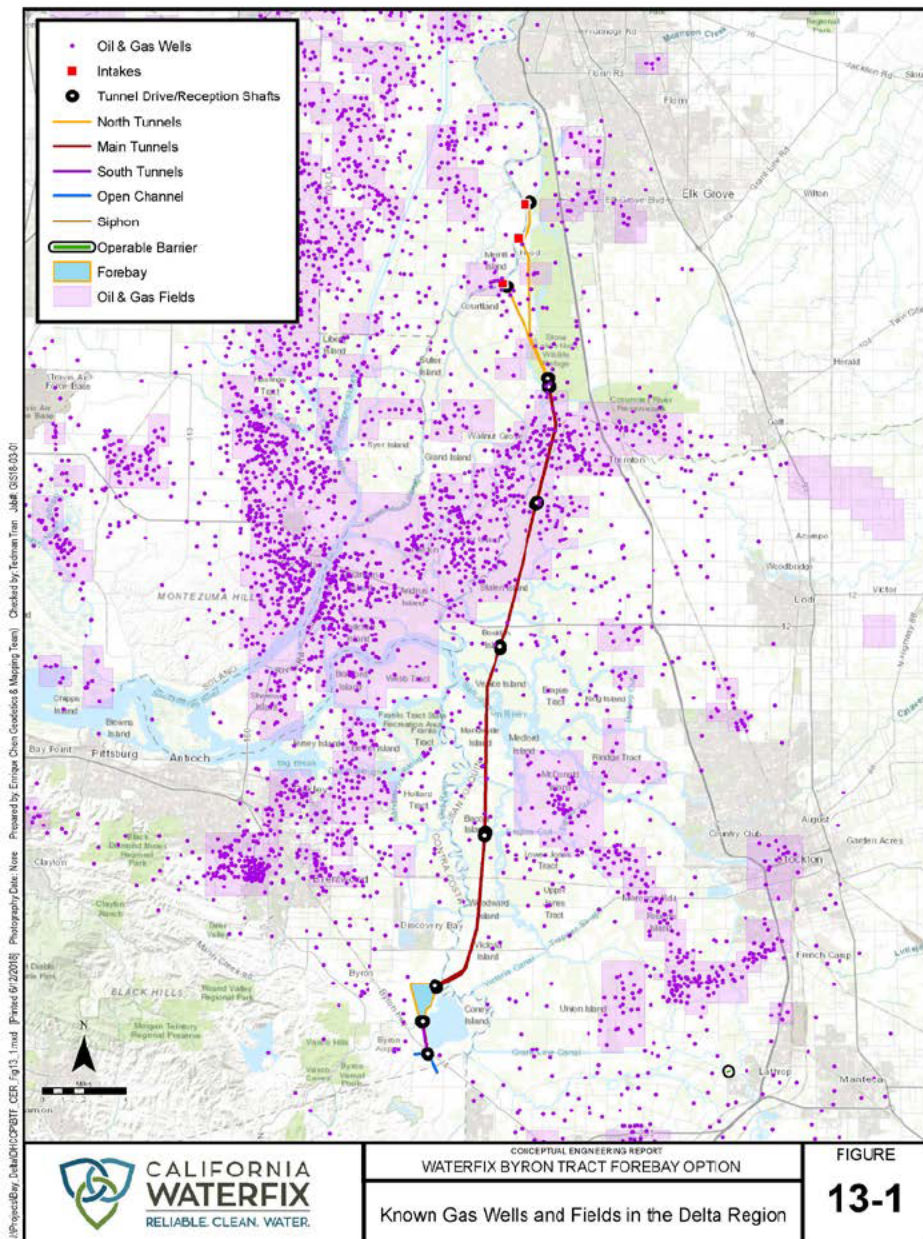


- NOTES:
1. For definition of Unified Soil Classification System abbreviations, consult ASTM D2487.
 2. Consult geotechnical data report for Pipeline/Tunnel Option (draft April 2013) for complete boring logs and subsurface data.



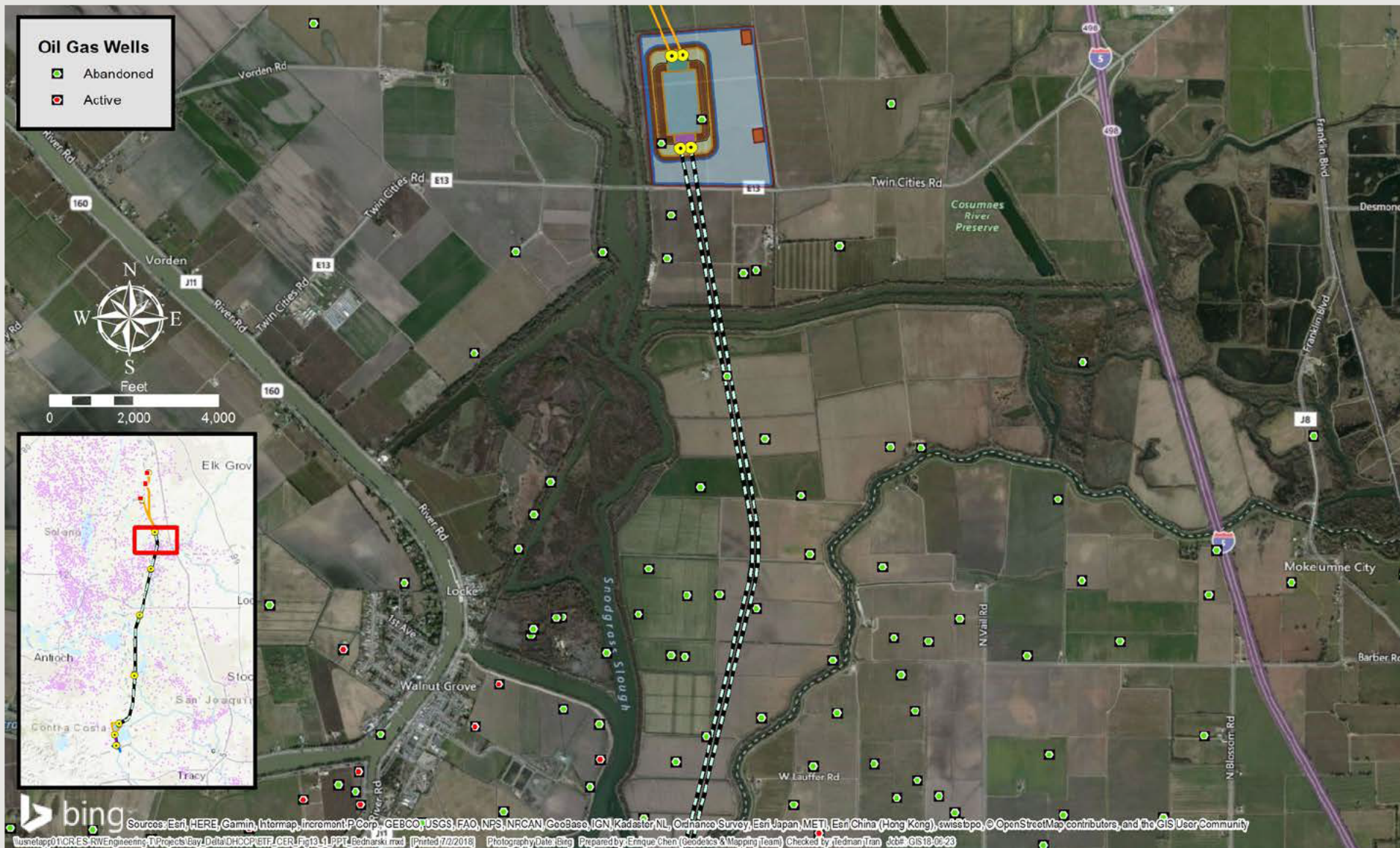


KNOWN GAS WELLS AND FIELDS IN DELTA REGION





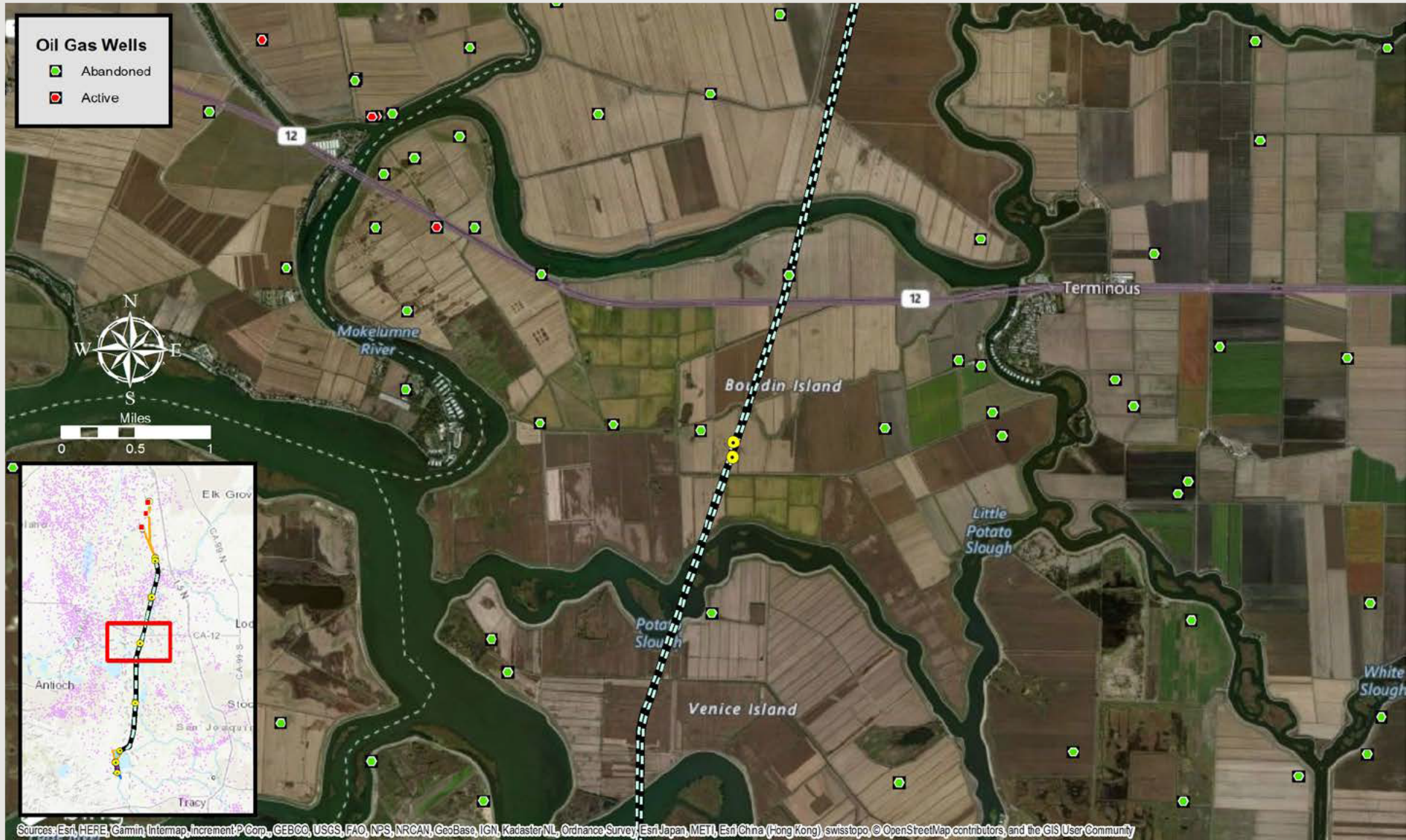
GAS WELLS – DETAIL AT INTERMEDIATE FOREBAY





GAS WELLS – DETAIL AT BOULDIN ISLAND

DWR-1361





SEISMIC DESIGN CRITERIA FOR TUNNELS

- **Concerns expressed by protestants over original seismic event criteria**
 - Protestants incorrectly cited ASCE 7-10 as the appropriate seismic event criteria for tunnels (2,475-year return period)
 - Original DWR criteria was correct
 - 975-year return event, specified in DWR 2012 Seismic Loading Criteria Report
- **Maximum criteria revised to the 2,475-year return event**
 - Consistent with DWR intent in 2012 Seismic Loading Criteria Report
 - Matches High Speed Rail tunnel criteria
- **Protestants wrongly claimed that CWF tunnels would not withstand the larger event**
 - Specialized studies confirm good performance of CWF tunnels



SEISMIC ASSESSMENT STUDY – ARUP 2018

- **Evaluated enhanced Seismic Design Criteria**
- **Findings: Current tunnel design can withstand 2,475-year event**
 - No structural failures
 - No leakage from tunnels
 - No increased design or construction costs to achieve seismic criteria