
Subject: Summary of Utility Crossings (Final Draft)

Project feature: Site Development / Logistics

Prepared for: California Department of Water Resources (DWR) / Delta Conveyance Office (DCO)

Prepared by: Delta Conveyance Design and Construction Authority (DCA)

Copies to: File

Date/Version: December 23, 2021

Reference no.: EDM_PW_CE_TMO_Utility-Crossings_000976

1. Introduction

The proposed tunnel alignments for the Delta Conveyance Project (DCP), for both the Central and Eastern corridor options would be expected to cross under various utilities across the length of the alignments. Additionally, project facilities located near ground surface or aboveground may also cross over existing surface and subsurface utilities. Although these utility crossings do not inherently pose conflicts with the DCP, the purpose of this technical memorandum (TM) is to identify the crossings.

Note that as of the writing of this TM, the tunnel alignments are preliminary and subject to change during conceptual or detailed design due to results of geotechnical and other explorative studies, facility optimization studies, or findings of the Environmental Impact Report (EIR). Further, the locations of utilities identified within this TM are based on information that is available to DCA at this time. During the design phase, utilities that would be crossed by DCP facilities would be located and surveyed, or otherwise verified by the subject utility provider. Additionally, it is possible that the current project alignments could cross under existing utilities where the locations are confidential and/or not currently known by the DCA. During the design phase, more in-depth analysis of easement locations associated with acquired parcels and utilities surveys would be completed to understand and avoid conflicts with existing utilities.

A summary of the identified utility crossings and the organizations who operate them along the corridor alignments are summarized in Table 1, and the general locations of the crossings are presented in Figure 1 for the Central Corridor alignment and in Figure 2 for the Eastern Corridor alignment. These crossings are described in more detail, by utility type and provider, in Sections 2 through 5 of this TM.

Table 1 Utility Crossings by Corridor

Utility Operator	Description of Utility	Applicability	
		Central Corridor	Eastern Corridor
Sacramento Area Sewer District	Dual 8-inch diameter Courtland sewer force main Dual 10-inch diameter Walnut Creek sewer force main	X	X
Sacramento Regional County Sanitation District	Proposed Harvest Water transmission pipeline ¹	X	X

Table 1 Utility Crossings by Corridor

Utility Operator	Description of Utility	Applicability	
		Central Corridor	Eastern Corridor
Sacramento County Water Agency	Hood Water Treatment Plant and groundwater well	X	X
Woodbridge Irrigation District	Unlined irrigation canal		X
City of Stockton	Stockton Delta Water Supply raw water supply pipeline		X
Contra Costa Water District	Old River Pipeline	X	X
Discovery Bay Community Services District	Wastewater treatment plant outfall	X	X
Byron-Bethany Irrigation District	Mountain House raw water supply pipeline	X	X
East Bay Municipal Utility District	Mokelumne Aqueducts	X	X
Pacific Gas and Electric Company	Numerous natural gas pipelines	X	X
Lodi Gas Storage, LLC	20-inch natural gas pipeline	X	X
California Resources Company	12-inch and 4-inch natural gas pipelines	X	X
Miscellaneous Fuels	Numerous active and abandoned petroleum product pipelines	X	X

Notes:

¹ Currently under design. Nature of crossing, if any, not currently known.

Legend

○

Utility Crossing

●

7,500 cfs Option Only

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Tunnel

■

Temporary Construction

ID

Utility Operator

1Sacramento County Water Agency (SCWA)

2Sacramento Area Sewer District (SASD)

3Sacramento Regional County Sanitation District (RegionalSan)

4Pacific Gas and Electric (PG&E)

5Lodi Gas Storage, LLC.

6East Bay Municipal Utility District (EBMUD)

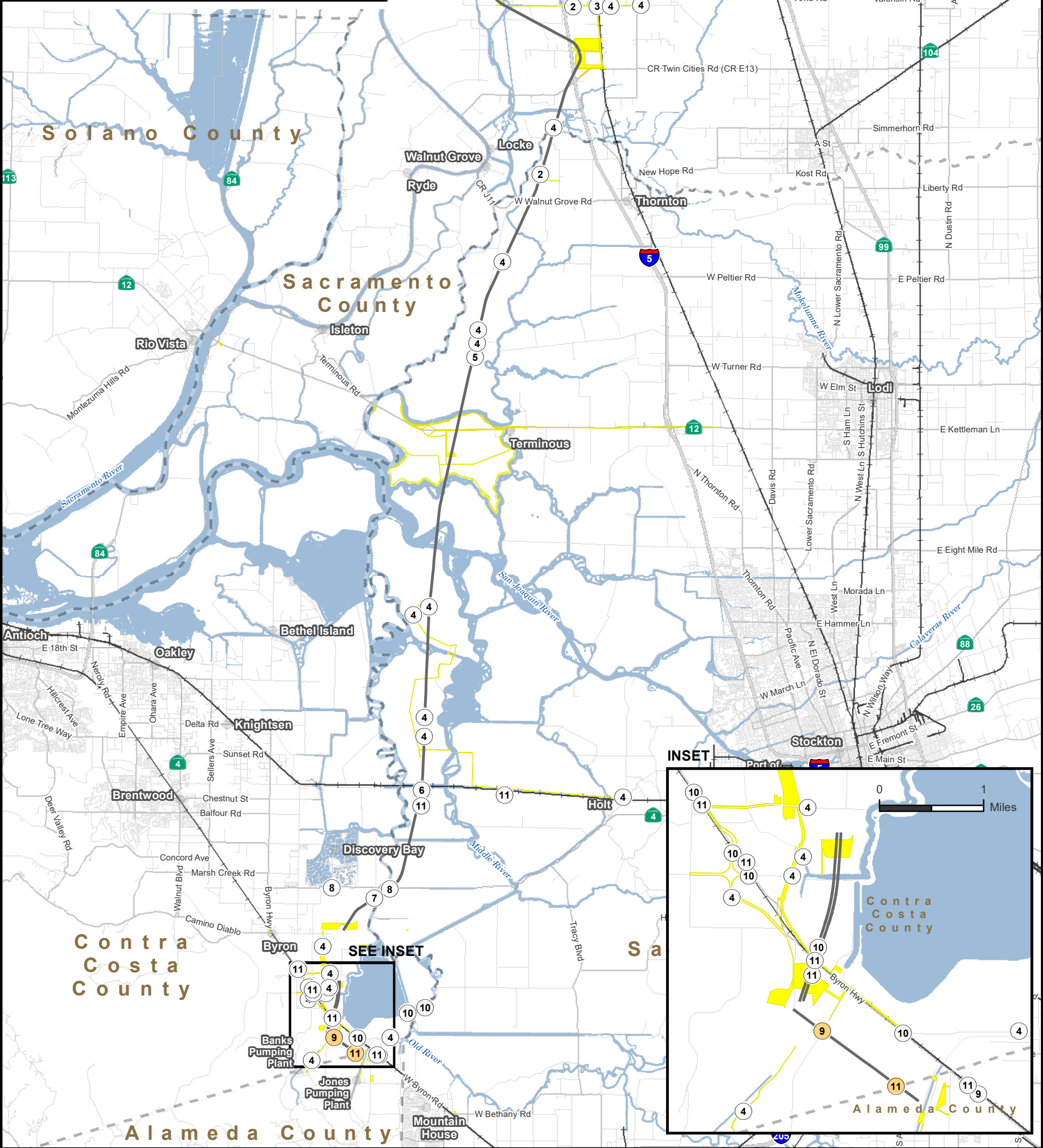
7Discovery Bay Community Services District (CSD)

8Contra Costa Water District (CCWD)

9Byron-Bethany Irrigation District (BBID)

10California Resources Corporation (CRC)

11Miscellaneous Fuels



Legend

○

Utility Crossing

●

7,500 cfs Option Only

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Tunnel

■

Temporary Construction

ID

Utility Operator

1

Sacramento County Water Agency (SCWA)

2

Sacramento Area Sewer District (SASD)

3

Sacramento Regional County Sanitation District (RegionalSan)

4

Pacific Gas and Electric (PG&E)

5

Lodi Gas Storage, LLC.

6

Woodbridge Irrigation District (WID)

7

City of Stockton Municipal Utilities Department

8

East Bay Municipal Utility District (EBMUD)

9

Discovery Bay Community Services District (CSD)

10


Contra Costa Water District (CCWD)

11

Byron-Bethany Irrigation District (BBID)

12

Miscellaneous Fuels



DELTA CONVEYANCE DESIGN
& CONSTRUCTION AUTHORITY

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PRIVILEGE DISCUSSION DRAFT

For Illustration Purposes Only

N

0 3.5
Miles

Figure 2
Utility Crossings Eastern Corridor

Data Source: DCA, DWR

2. Water and Wastewater

2.1 Sacramento Area Sewer District

The Sacramento Area Sewer District (SASD) operates two wastewater pipelines in the project area. One of the pipelines extends from the Courtland Pump Station, on Wilson Road southwest of Intake C-E-5, through approximately 10 miles of dual 8-inch diameter sewer force mains in the project area, extending along Lambert Road and Bruceville Road to the Rio Cosumnes Correctional Center (RCCC) (SASD, 2010). The Central and Eastern corridors would both cross under this pipeline at the intersection of Lambert Road, Sangiovese Road, and the Intake Haul Road. The crossing would be at the same location for both corridors because the tunnel alignment is the same for both corridors at this portion of the alignment.

The second pipeline extends from Walnut Grove through 10.2 miles of dual 10-inch diameter sewer force mains under Snodgrass Slough and Dead Horse Cut; along Lauffer Road, Vail Road, Barber Road, North Cameron Road, and North Thornton Road; under Mokelumne River, Lost Slough, and Cosumnes River Preserve; and along Desmond Road and Bruceville Road to the RCCC (SASD, 2006). The crossings with this pipeline would occur at different locations, Central on Lauffer Road and Eastern on Barber Road, as shown on Figures 1 and 2.

Based upon information obtained from SASD, the tunnel inverts would be below the force main crossings, as summarized below. As such, it is not anticipated that construction or operation of the project would conflict with operation of the existing facility; however, coordination with SASD would occur during a future design phase.

- At the crossing of the Central and Eastern alignments between Twin Cities Complex and the Intakes near the Intersection of Lambert Road, Sangiovese Road, and Intake Haul Road, the bottom of the Courtland force main HDD would be approximately 100 feet below the ground surface and the top of the tunnel would be approximately 120 feet below ground surface (DCDCA 2021a). Therefore, construction of the tunnel would not be expected to impact this pipeline. Further, the DCA may consider shifting the tunnel alignment slightly to avoid this crossing during a future design phase.
- At the crossing of the Central Corridor alignment between Twin Cities Complex and Bouldin Island tunnel shaft, the bottom of the open-cut Walnut Grove force main would be approximately 10 feet below the ground surface and the top of the tunnel would be approximately 120 feet below ground surface (DCDCA 2021a). Therefore, construction of the tunnel would not be expected to impact this pipeline.
- At the crossing of the Eastern Corridor alignment between Twin Cities Complex and Terminous Tract tunnel shaft, the bottom of the open-cut Walnut Grove force main would be approximately 10 feet below the ground surface and the top of the tunnel would be approximately 110 feet below ground surface (DCDCA 2021a). Therefore, construction of the tunnel would not be expected to impact this pipeline.

2.2 Sacramento Regional County Sanitation District

Sacramento Regional County Sanitation District's (RegionalSan) Harvest Water Program (RegionalSan 2020) has proposed a transmission pipeline along a segment of Franklin Boulevard that would be affected by the DCP. Under the Central and Eastern Corridor options, Franklin Boulevard would be re-routed to accommodate connections from the Union Pacific Railroad to Twin Cities Complex. Under both corridors, new underground power would be located in the Franklin Boulevard shoulder, though the tunnel alignments would not cross Franklin Boulevard.

Although final design has not been completed, in the Initial Study (RegionalSan 2020), it is estimated that the pipeline would be located 6.5 to 40 feet below ground surface depending upon construction methods. The road re-alignment would occur at the ground surface. The new underground power alignment would be installed within 10 feet of the ground surface; however, the underground power facilities would not be located in the same alignment as the recycled water transmission pipeline. Therefore, construction of the DCP facilities would not be expected to impact this pipeline.

2.3 Sacramento County Water Agency

The Sacramento County Water Agency (SCWA) operates the Hood Water Treatment Plant (WTP) and a groundwater well (W-25), adjacent to Hood-Franklin Road just west of Snodgrass Slough. The closest edge of WTP site is located approximately 175 feet west of the tunnel alignment for both the Central and Eastern corridors and for project design capacity options of 4,500, 6,000, and 7,500 cfs (SCWA, 2017). W-25 is the closest identified water supply well; it reaches a depth of 160 feet and is screened from 125 to 140 feet in depth, while the top of the tunnel would be located approximately 115 feet below the ground surface at Hood-Franklin Road. However, this well is located over 300 feet from the centerline of the tunnel at this location.

2.4 Woodbridge Irrigation District

Woodbridge Irrigation District (WID) operates a number of irrigation canals which serve properties on Canal Ranch Tract. The proposed tunnel alignment for the Eastern Corridor would pass under one of the WID unlined canals just north of Hog Slough. At this location, the proposed tunnel alignment would be located approximately 115 feet below the ground surface at the canal crossing, and would not be expected to impact this unlined canal. The Central Corridor would not cross under this canal.

2.5 City of Stockton Municipal Utilities

The City of Stockton's Municipal Utilities Department operates the Stockton Delta Water Supply raw water pipeline that extends from an intake on Little Connection Slough to the Delta Water Treatment Plant on Lower Sacramento Road, which is located north of the City of Stockton. The pipeline is located along West 8 Mile Road in the vicinity of the King Island shaft site near Bishop Cut along the Eastern Corridor (CDM Smith, 2013). At this crossing, the bottom of the Delta Water Supply pipeline would be located approximately 10 feet below the ground surface and the top of the tunnel would be located approximately 105 feet below the ground surface. Therefore, construction of the tunnel would not be expected to impact this pipeline.

2.6 Contra Costa Water District

Contra Costa Water District (CCWD) operates water intakes near Old River at the Old River Pumping Plant and Victoria Canal at the Middle River Pumping Plant. The Central and Eastern Corridors would cross the Middle River Pipeline (between the Middle River and Old River pumping plants) and/or Old River Pipeline on the west side of Old River (CCWD, 2017). Along the Central and Eastern corridor alignments east of Old River, the top of the tunnel would be approximately 115 feet below ground surface and 105 feet below the bottom of Old River. The bottom of Middle River Pipeline upstream of the Old River Pumping Plant would be at 15 feet below the ground surface. Therefore, construction of the tunnel would not be expected to impact these pipelines.

The raw water pipeline continues from the crossing with the tunnel to the northwest to State Route (SR) 4, along which the line parallels. The Central and Eastern Corridors would include an access road and roadway improvements at the intersection of SR 4 and Western Farms Ranch Road. These improvements would occur at ground surface while the water pipeline at this location would still be approximately 15 feet below the ground surface. As such, these roadway improvements would also not be expected to impact these pipelines.

2.7 Town of Discovery Bay Community Services District

The Town of Discovery Bay's WWTP is located approximately 1.3 mile north of the proposed Southern Forebay for the Central and Eastern Corridors. Although the tunnel alignments were routed to avoid passing directly under the WWTP, the tunnel alignments would cross Italian Slough near the WWTP outfall into Old River, approximately 0.5 mile southeast of the WWTP on Western Farm Ranch Road and SR 4 (Discovery Bay CSD, 2012). Along the Central and Eastern corridor alignments near Old River, the top of the tunnel would be approximately 115 feet below ground surface and 105 feet below the bottom of Old River. The bottom of WWTP outfall would be located above the bottom of Old River. Therefore, construction of the tunnel would not be expected to impact this outfall.

2.8 Byron-Bethany Irrigation District

Byron-Bethany Irrigation District (BBID) operates a raw water supply pipeline from a pump station on the 70 Canal along Bruns Road and the Byron Highway to the Mountain House Community Services District (MHCS D) WTP (MHCS D, 2016).

For the Central and Eastern Corridors with a project design capacity of 7,500 cubic feet per second (cfs), the CVP connection tunnel would extend under the raw water supply pipeline along Bruns Road. The top of the tunnel would be located approximately 105 feet below the ground surface at the crossing of Bruns Road; and the bottom of the BBID pipeline would be located above the top of the tunnel. Therefore, construction of the tunnel would not be expected to impact this pipeline.

The raw water pipeline would continue parallel to Byron Highway to the WTP. The Byron Highway would be realigned in the vicinity of this raw water pipeline for the Central and Eastern Corridors and the Bethany Reservoir Alternative. The roadway realignment would not affect the BBID pipeline. However, design of roadway realignment would be coordinated during the design phase with BBID and MHCS D to maintain access to the pipeline.

A new 230-kilovolt (kV) power alignment would cross over Byron Highway and the BBID pipeline; however, this alignment would be overhead and would not impact the pipeline.

2.9 East Bay Municipal Utility District

East Bay Municipal Utility District (EBMUD) operates the Mokelumne Aqueducts which transport water from the Mokelumne River to the East Bay. Near the Central and Eastern Corridors, the Mokelumne Aqueducts alignment runs generally east-to-west between Holt and Bixler (EBMUD, 2020). The Central Corridor would cross under the Mokelumne Aqueducts on the north side of Woodward Island. The Eastern Corridor alignment would cross under the Mokelumne Aqueducts on Upper Jones Tract. Although the Mokelumne Aqueducts are generally elevated above the ground surface, portions of the aqueducts are buried. In addition, the foundational structures that support the aqueducts extend below the ground surface. EBMUD is evaluating replacement of the aqueducts in a tunnel system that would be constructed parallel to the existing aqueducts.

The Central Corridor would cross the Mokelumne Aqueducts near the central northern limit of Woodward Island. Two of the three aqueducts are located above the ground surface and rest on pipe saddles that are supported on piles. The aqueduct piles at this location are located at least 60 feet below the ground surface; and the top of the tunnel would be located approximately 120 feet below the ground surface. The third aqueduct is buried with a bottom of the pipeline located approximately 40 feet below the ground surface. As described in the *Tunnel Effects Assessment TM* (DCDCA, 2021b), construction of the Central Corridor tunnel would not be expected to affect the existing Mokelumne Aqueducts. A bridge would be constructed over the Mokelumne Aqueducts and the adjacent railroad to provide access to Mandeville Island and Bacon Island tunnel shafts. Design of the tunnel and the bridge would be coordinated with the EBMUD and the railroad during the design phase to avoid interferences or interruptions.

The Eastern Corridor would cross the Mokelumne Aqueducts on Upper Jones Tract where all three aqueducts are above the ground surface and rest on pipe saddles that are supported on piles. The piles at this location are located approximately 50 feet below the ground surface and the top of the tunnel would be located approximately 110 feet below the ground surface. As described in the *Tunnel Effects Assessment TM* (DCDCA, 2021b), construction of the Eastern Corridor tunnel would not be expected to affect the existing Mokelumne Aqueducts. Design of the tunnel would be coordinated with the EBMUD during the design phase to avoid interferences or interruptions.

The Eastern Corridor would cross over the Mokelumne Aqueducts a second time southeast of the Lower Roberts Island Launch Shaft site. A new access road, which would include SCADA within the roadway shoulder, and rail spur would be constructed from Embarcadero on Rough and Ready Island over Burns Cutoff to the Lower Roberts Island reusable tunnel material (RTM) storage area. These surface improvements would intersect with the Mokelumne Aqueducts just north of Burns Cutoff and west of the Stockton Deep Water Ship Channel. Although the rail spur in particular would be expected to carry heavy loads, which could impact the Mokelumne Aqueducts, these crossing structures would be designed to limit loads to mitigate the potential for impacts. Design of the crossing structure would be coordinated with the EBMUD and the railroad during the design phase to avoid interferences or interruptions.

2.10 Other Irrigation and Agricultural Drainage Facilities

Many construction sites are located on existing agricultural lands. Local irrigation and drainage facilities have been installed by existing and previous landowners at most of the construction sites, including groundwater wells. These facilities are owned by private landowners, or potentially by reclamation or irrigation districts. Many of these systems include facilities that either provide irrigation water or convey subsurface drainage between the parcels that would be acquired for the DCP and adjacent parcels. Most of these facilities are buried and cannot be identified from aerial photographs. During the design phase when access to specific parcels can be acquired, these buried facilities would be mapped on a site-specific basis. If the facilities located on a parcel to be used for a DCP feature extends to adjacent parcels, the irrigation or drainage conveyance would be installed in underground pipes or canals through, or around, the construction site parcels to maintain service to the adjacent properties.

During a future design phase, the depths and conditions of wells adjacent to the construction sites would also be evaluated.

The design would be coordinated with adjacent landowners to maintain wells and water supplies for the existing water uses on properties adjacent to the constructed facilities.

3. Oil and Natural Gas

3.1 Pacific Gas and Electric

Pacific Gas and Electric (PG&E) is one of the largest investor-owned utility providers of natural gas and electricity in the U.S. (Choose Energy, 2019) and operates an extensive power network across the project area and northern and central California. This network includes power production facilities, electric transmission and distribution lines, natural gas storage, and natural gas pipelines. Please see Section 5 regarding electricity infrastructure. The tunnel alignments avoid PG&E's McDonald Island gas storage facility, which injects and recovers natural gas to meet customer demands. The tunnel alignment, access roads, and connections to power lines and communications systems would, however, cross existing PG&E natural gas pipelines at a total of 18 locations along the Central Corridor and 15 locations along the Eastern Corridor (CEC, 2015; EIA, 2019). The majority of the pipelines are relatively shallow, having been installed in open trenches. The current tunnel alignments avoid crossing gas lines at river crossing locations, where deep horizontal directional drilling (HDD) is generally employed to install the gas pipelines. Although it is not anticipated the tunnel and other project facilities would impact these pipelines, during the design phase, coordination with PG&E would occur to avoid interference or interruption of service.

3.2 Lodi Gas Storage, LLC

Lodi Gas Storage, LLC (Lodi Gas) operates a natural gas storage facility in the Lodi gas field, approximately 5 miles northeast of the City of Lodi, and transports the natural gas via a 20-inch diameter pipeline which extends to Sherman Island within the Delta (CEC, 2015). The Central Corridor crosses the gas pipeline associated with this facility on Staten Island, while the Eastern corridor crosses the same pipeline on Brack Tract, parallel to two PG&E lines, as shown on Figures 1 and 2, respectively. At the crossings along both the Central and Eastern Corridors, the top of tunnel would be approximately 110 feet below ground surface while the Lodi Gas pipelines are anticipated to be buried within the upper 10 feet. As such, it is not anticipated the tunnel and other project facilities would impact these pipelines; however, during the design phase, coordination with Lodi Gas would occur to avoid interference or interruption of service.

3.3 California Resources Company

California Resources Company (CRC) operates a 12-inch natural gas pipeline along Byron Highway (Contra Costa, 2020) and around the southern end of Clifton Court Forebay (CEC, 2015; EIA, 2019). The tunnel alignment between the Southern Forebay Outlet Structure and the South Delta Outlet and Control Structure for the Central and Eastern Corridors would cross under Byron Highway with the top of the tunnel located approximately 100 feet below the ground surface. The existing pipeline is located on the existing Byron Highway bridge and would be relocated on the new bridge following the re-alignment of Byron Highway under the Central and Eastern Corridors. Therefore, it is assumed that this pipeline would be located within 10 feet of the ground surface in this location and would not be affected by the tunnel construction.

Additionally, a new overhead power line from the Tracy Substation to the South Delta Pumping Plant would cross this pipeline. It is expected that tower footings for the new overhead line could be sited to avoid potential conflicts with the underground gas pipeline; thus, it is not anticipated to conflict with this pipeline. During the design phase, coordination with CRC would occur to avoid interference or interruption of service.

3.4 Miscellaneous Fuel Pipelines

There are a number of operators which transport petroleum and petroleum products from the San Francisco Bay Area to storage and distribution points elsewhere in California and beyond. Due to the cyclical nature of the oil and gas industry, pipelines which transport these products changes ownership relatively frequently and may have several owners during its lifecycle. Further, the locations of these facilities are generally confidential to maintain safety and security of the infrastructure. With this in mind, the active fuel line crossings in the Southern Complex, whose current owners include Chevron, Kinder Morgan, Phillips 66, Crimson Pipeline, LLC, and abandoned pipelines formerly owned by the now-bankrupt Tidewater Oil Company and Venoco (EIA, 2018), have all been grouped together on Figures 1 and 2. In total, there are 7 crossings.

The majority of the potential crossings with fuels pipelines identified would be located near Byron Highway. Several of these pipelines will be relocated during an upcoming bridge replacement project over the California Aqueduct (Contra Costa, 2020). Depending on actual location they could also need to be relocated for the work on the Central and Eastern Corridors, as Byron Highway would be realigned. The tunnel alignment between the Southern Forebay Outlet Structure and the South Delta Outlet and Control Structure for the Central and Eastern Corridors would cross under Byron Highway, with the top of the tunnel located approximately 100 feet below the ground surface and also well below these pipelines. Additionally, a new overhead power line from the Tracy Substation to the South Delta Pumping Plant would cross several pipelines. It is expected that tower footings for the new overhead line could be sited to avoid potential conflicts with the underground gas pipelined. Other than potential conflicts with Byron Highway realignment, the project is not anticipated to pose a conflict with these facilities.

In the case of the abandoned pipelines, at this time, it is not known if these pipelines will be removed or relocated with the upcoming Byron Highway bridge project to be completed by Contra Costa County.

Additional crossings with fuel pipelines on Woodward Island and Lower Jones Tract, for the Central and Eastern Corridors respectively, were also identified. Neither crossing location is situated immediately before or after a water crossing, so the pipelines would not have been installed via HDD and are thus expected to be buried within the upper 10 feet.

During the design phase, coordination with the appropriate owners and operators would occur to avoid interference or interruption of service.

4. Communications

Telephone, internet, and television services is provided by several entities throughout the Delta. These providers use extensive networks of above- and below ground cable networks, including fiberoptic cables. During design, extensive surveys and would be completed to identify locations and potential crossings of these communication lines to avoid conflicts. The supervisory control and data acquisition (SCADA) system for the DCP would be connected to the existing facilities, as described in the *SCADA/Communications Route Design Approach TM* (DCDCA, 2021c).

5. Electricity

Electrical power is available in the project area from many utility providers, including Sacramento Municipal Utility District (SMUD) in Sacramento County and Western Area Power Administration (WAPA) and Pacific Gas & Electric Company (PG&E), as well as several additional providers whose services are not anticipated to be utilized. These providers use extensive networks of above- and below ground transmission (high-voltage) and distribution (low-voltage) lines. During design, extensive surveys and would be completed to identify locations and potential crossings of these power lines to avoid conflicts. Interfaces with existing overhead and underground electric transmission and distribution infrastructure is discussed in detail in the *Electrical Power Load and Routing Study TM* (DCDCA, 2021d).

6. References

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7. Document History and Quality Assurance

Reviewers listed have completed an internal quality review check and approval process for deliverable documents that is consistent with procedures and directives identified by the Engineering Design Manager (EDM) and the DCA.

Approval Names and Roles			
Prepared by	Internal Quality Control review by	Consistency review by	Approved for submission by
Jacqueline Todak / EDM Planner	Phil Ryan / EDM Design Manager	Gwen Buchholz / DCA Environmental Consultant	Terry Krause / EDM Project Manager
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