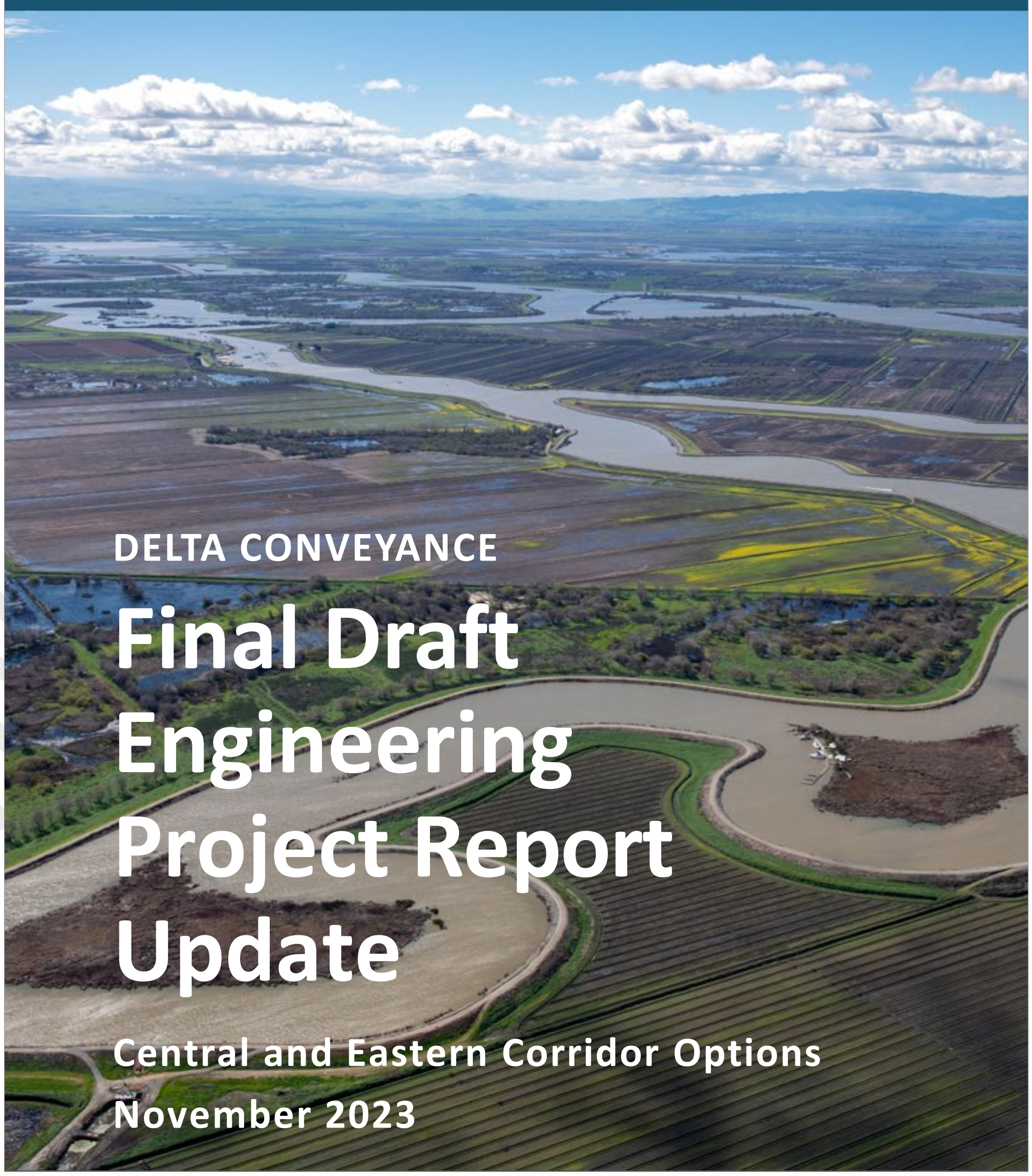
DCA

DELTA
CONVEYANCE
DESIGN &
CONSTRUCTION
AUTHORITY



DELTA CONVEYANCE

Final Draft Engineering Project Report Update

Central and Eastern Corridor Options

November 2023

Delta Conveyance Final Draft Engineering Project Report Update – Central and Eastern Corridor Options

Project Feature: Project-wide

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

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

Date/Version: November 2023 / Version 1

Reference no.: EDM_PW_CE_RPT_C-E-EPR-Update_001274_V01_FD_20231130

Delta Conveyance Design and Construction Authority
980 9th Street, Suite 2400
Sacramento, CA 95814
(888) 853-8486
info@dcdca.org

The California Department of Water Resources (DWR) requested the Delta Conveyance Design and Construction Authority (DCA) develop an update to the conceptual engineering information for the Delta Conveyance Project Central and Eastern corridor options dated May 2022. This update includes changes due to errata (e.g. errors, mislabeling, etc.) and incorporates minor updated engineering information to support the Delta Conveyance Project Final Environmental Impact Report (FEIR). This update only includes changes and does not reproduce information that has not been updated, unless otherwise noted. Updates are shown in redline strikeout. Removed text is red and crossed out and added text is red and underlined. Because many appendices in the Narrative Report and technical memoranda did not include page numbers, the page numbers listed in the descriptions of updates in this document refer to the overall PDF page numbers from the May 2022 Engineering Project Report (EPR) documents.

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 QC review by	Consistency review by	Approved for submission by
Karen Askeland/ EDM Environmental Liaison	Phil Ryan / EDM Senior Technical Consultant	Gwen Buchholz / DCA Environmental Consultant Adam Murdock / EDM Design Manager	Terry Krause / EDM Project Manager

This interim document is considered preliminary and was prepared under the responsible charge of Philip K. Ryan, California Professional Engineering License C41087.

Table of Contents

ATTACHMENTS – Air Quality

Narrative Report Updates

The following updates were made to the narrative report.

Revisions to EPR Narrative Section 2

2.1.2.5 Operations Phase Methods for Intakes

The following revisions are made to EPR Narrative Section 2.1.2.5, Operations Phase Methods for Intakes (May 2022 C/E EPR Narrative PDF page 37).

> Once a year, during the warm summer months (assumed to be May through September), the sediment would be dredged from the sedimentation basin using a portable floating hydraulic suction dredge. The sediment basin dredge would discharge a sediment slurry into the sediment drying lagoons using a combination of portable (floating) piping in the basin and permanently installed piping leading to the lagoons. The sediment would be removed during the summer to maximize natural drying in the sediment drying lagoons. During the annual sedimentation basin dredging period, each drying lagoon would be filled up to three times. Generally, each drying lagoon would be filled only once per year for median project conditions.
>
> Minor vegetation management would be conducted at least monthly along the side slopes of the basins to keep them free of unwanted vegetative growth. Minor debris collection would be conducted on a continuous basis.
>
> Since the basin embankments would be the jurisdictional flood control levee, the levee side slopes and outside of the toe area would be inspected and maintained in full conformance with the CVFPB and USACE requirements. These requirements would include routine inspection and repair of all bulges, leaks, erosion, or other damage as soon as possible after detection.
>
> Sediment dredged from the sedimentation basin would be separated from the dredged water and dried in the sediment drying lagoons for removal off site by trucks. The sediment is anticipated to be large silt and sand particles with minimal organic material. Therefore, no substantial odors are anticipated from the sediment drying lagoon operations.
>
> Sediment dredged from the sedimentation basin would be conveyed from the dredge to the drying lagoons. The lagoons would be equipped with several inlet valves such that the dredged slurry would be distributed around the full lagoon area. The lagoons would include an outlet structure with an adjustable weir to decant water off the top of the sediment slurry and underdrains to transport water from beneath the dredged sediment.
>
> The suction dredge would operate to fill each lagoon up to the level of the top of the adjustable

weir in its full up position. Once the first lagoon is full, the dredge would begin to fill a second lagoon. It would be expected to take up to about 2 days to fill each lagoon. Therefore, it would take about 6 to 8 days to fill all four lagoons.

After the lagoon is filled, the weir gate would be used to decant the water off the top of the sediment. The decanting process would take about 2 days ~~a day~~. After decanting the remaining water would be allowed to drain into the outlet structure through the underdrains. Decant and underdrain water would be pumped back into the sedimentation basin. Each time the lagoons are filled, about 0.5 to 1 foot of sediment would be expected to settle to the bottom of the lagoon. Once the sediment was collected and most of the water removed by decanting and underdrains, the basin would be allowed to dry ~~for 2 to 3 days~~ while being mixed with agricultural or municipal style mixing implements. ~~Over the next two to three days, t~~ The basin would be cleaned using dozers and front end loaders and the sediment would be trucked off site for disposal at a permitted disposal site or used for beneficial uses off site.

Each lagoon would be filled and drained for about 4~~3~~ days, then the sediment would be dried and removed in about 3-4 ~~4-6~~ days. Therefore, the fill and drain/dry sequence would be about 7-8 ~~7-9~~ days, which would approximately match the dredged material filling rate so continuous, or nearly continuous, operation would be possible. Up to about 1,800 to 2,100 cubic yards of sediment would be removed from each lagoon each time this cycle occurs. The volume of sediment collected would depend upon the volume, suspended sediment concentration, and flow rate of water diverted at the intake.

Revisions to EPR Narrative Section 4

4.1 Roads

EPR Narrative Section 4.1, Roads, (May 2022 C/E EPR Narrative PDF page 87) is updated to include the following information to be consistent with the Logistics Strategy Technical Memorandum.

No construction traffic would be allowed on levee roads, including SR 160, except when the highway is re-aligned during intake construction, or for individuals or vehicles traveling from homes or businesses located along levee roads.

Narrative Report Update – Appendices

The following updates were made to the EPR Narrative appendices.

APPENDIX A – Summary of Information for the Project Design Capacity of 6,000 cfs with Cylindrical Tee Fish Screens

Text in EPR Narrative Appendix A Table A2 (May 2022 C/E EPR Narrative PDF page 173) has been updated to correct a typographical error.

TABLE A2. TUNNEL REACH LENGTHS AND SHAFT INVERT ELEVATIONS AND DEPTHS FOR CENTRAL CORRIDOR BETWEEN INTAKES AND SOUTHERN COMPLEX FOR A PROJECT DESIGN CAPACITY OF 6,000 CFS

Shaft Location	Shaft Invert (Bottom) Elevation (feet)	Shaft Invert Depth from Ground Level (feet)	Tunnel Length from Upstream Shaft (feet)	Stream Crossings Over the Tunnel from Upstream Shaft
Tunnel Reception Shaft at Intake C-E-3	-143	148	Not Applicable	Not Applicable
Tunnel Maintenance Shaft at Intake C-E-5	-144	152	13,254	Not Applicable
Tunnel Launch Shaft Site on Twin Cities Complex	-146	156	29,828	Snodgrass Slough
Tunnel Maintenance Shaft on New Hope Tract	-148	149	22,365	Mokelumne River
Tunnel Maintenance Shaft on Staten Island	-151	141	22,168	South Fork Mokelumne River
Tunnel Reception Shaft and Tunnel Launch Shaft on Bouldin Island	-154	135	31,971	South Fork Mokelumne River
Tunnel Maintenance Shaft on Mandeville Island	-156	141	24,624	Potato Slough San Joaquin River
Tunnel Reception Shaft on Bacon Island	-159	145	28,481	~~Old River~~ Connection Slough
Tunnel Working Shaft Site on Byron Tract (within Southern Complex)	-162	153	30,401	Railroad Cut Indian Slough Old River
Tunnel Launch Shaft Site on Byron Tract (Southern Forebay Inlet Structure at the South Delta Pumping Plant)	-163	157	5,069	Not Applicable
TOTAL TUNNEL LENGTH			208,160	

Text in EPR Narrative Appendix A Table A9 (May 2022 C/E EPR Narrative PDF page 189) has been updated to correct a typographical error.

TABLE A9. TUNNEL REACH LENGTHS AND SHAFT INVERT ELEVATIONS AND DEPTHS FOR EASTERN CORRIDOR FROM INTAKES TO SOUTHERN COMPLEX FOR A PROJECT DESIGN CAPACITY OF 6,000 CFS

Shaft Location	Shaft Invert (Bottom) Elevation (feet)	Shaft Invert Depth from Ground Level (feet)	Tunnel Length from Upstream Shaft (feet)	Stream Crossings Over the Tunnel from Upstream Shaft
Tunnel Reception Shaft at Intake C-E-3	-140	143	Not Applicable	Not Applicable
Tunnel Maintenance Shaft at Intake C-E-5	-142	150	13,254	Not Applicable
Tunnel Launch Shaft Site on Twin Cities Complex	-145	155	29,828	Snodgrass Slough
Tunnel Maintenance Shaft on New Hope Tract	-147	153	24,111	Snodgrass Slough Mokelumne River
Tunnel Maintenance Shaft on Canal Ranch Tract	-149	152	15,857	Beaver Slough
Tunnel Reception Shaft on Terminous Tract	-151	148	27,001	Hog Slough Sycamore Slough
Tunnel Maintenance Shaft on King Island	-154	142	20,820	White Slough ~~San Joaquin River~~
Tunnel Reception Shaft and Tunnel Launch Shaft on Lower Roberts Island	-156	145	29,329	~~White Slough~~ Disappointment Slough San Joaquin River
Tunnel Maintenance Shaft on Upper Jones Tract	-159	150	27,344	Whiskey Slough Hayes Slough ~~Old River~~
Tunnel Working Shaft Site on Byron Tract (within Southern Complex)	-162	153	29,801	Middle River Woodward Canal – North Victoria Canal Old River
Tunnel Launch Shaft Site on Byron Tract (Southern Forebay Inlet Structure at the South Delta Pumping Plant)	-163	157	5,069	Not Applicable
TOTAL TUNNEL LENGTH			222,413	

The following information is revised in EPR Narrative Appendix A Table A23 (May 2022 C/E EPR Narrative PDF page 219).

TABLE A23. ACCESS ROADS TO CONSTRUCTION SITES FOR PROJECT DESIGN CAPACITY OF 6,000 CFS

Purpose of Access	Road	Starting Location	Ending Location	Existing Roadway	Action	Modification	Asphalt Overlays
Twin Cities Complex Road Improvements (Central and Eastern Corridors)	Twin Cities Road	0.15 miles east of Franklin Boulevard	Interstate 5	2~~3~~2-feet wide: Two 10-foot paved lanes with 1-foot shoulders	Widen 1.4 mile paved road	32-feet wide: two 12-foot paved lanes with 4-foot wide shoulders and a 44-foot wide portion with three 12-foot paved lanes (including left-turn merge lane) with 4-foot wide shoulders	Mid-Construction & End of Construction

APPENDIX B – Summary of Information for the Project Design Capacity of 7,500 cfs with Cylindrical Tee Fish Screens

Text in EPR Narrative Appendix B Table B2 (May 2022 C/E EPR Narrative PDF page 238) has been updated to correct a typographical error.

TABLE B2. TUNNEL REACH LENGTHS AND SHAFT INVERT ELEVATIONS AND DEPTHS FOR CENTRAL CORRIDOR BETWEEN INTAKES AND SOUTHERN COMPLEX FOR A PROJECT DESIGN CAPACITY OF 7,500 CFS

Shaft Location	Shaft Invert (Bottom) Elevation (feet)	Shaft Invert Depth from Ground Level (feet)	Tunnel Length from Upstream Shaft (feet)	Stream Crossings Over the Tunnel from Upstream Shaft
Tunnel Reception Shaft at Intake C-E-2	-140	147	Not Applicable	Not Applicable
Tunnel Maintenance Shaft at Intake C-E-3	-143	148	11,121	Drainage
Tunnel Maintenance Shaft at Intake C-E-5	-144	152	13,254	Not Applicable
Tunnel Launch Shaft Site on Twin Cities Complex	-146	156	29,828	Snodgrass Slough
Tunnel Maintenance Shaft on New Hope Tract	-148	149	22,365	Mokelumne River
Tunnel Maintenance Shaft on Staten Island	-151	140	22,168	South Fork Mokelumne River
Tunnel Reception Shaft and Tunnel Launch Shaft on Bouldin Island	-154	134	31,971	South Fork Mokelumne River
Tunnel Maintenance Shaft on Mandeville Island	-156	141	24,624	Potato Slough San Joaquin River
Tunnel Reception Shaft on Bacon Island	-159	145	28,481	~~Old River~~ Connection Slough
Tunnel Working Shaft Site on Byron Tract (within Southern Complex)	-162	153	30,401	Railroad Cut Indian Slough Old River
Tunnel Launch Shaft Site on Byron Tract (within Southern Complex)	-163	157	5,069	Not Applicable
TOTAL TUNNEL LENGTH			219,281	

Text in EPR Narrative Appendix B Table B5 (May 2022 C/E EPR Narrative PDF page 241) has been updated to correct a typographical error.

TABLE B5. TUNNEL REACH LENGTHS AND SHAFT INVERT ELEVATIONS AND DEPTHS FOR EASTERN CORRIDOR FROM INTAKES TO SOUTHERN COMPLEX FOR A PROJECT DESIGN CAPACITY OF 7,500 CFS

Shaft Location	Shaft Invert (Bottom) Elevation (feet)	Shaft Invert Depth from Ground Level (feet)	Tunnel Length from Upstream Shaft (feet)	Stream Crossings Over the Tunnel from Upstream Shaft
Tunnel Reception Shaft at Intake C-E-2	-140	147	Not Applicable	Not Applicable
Tunnel Reception Shaft at Intake C-E-3	-140	143	11,121	Drainage
Tunnel Maintenance Shaft at Intake C-E-5	-142	150	13,254	Not Applicable
Tunnel Launch Shaft Site on Twin Cities Complex	-146	155	29,828	Snodgrass Slough
Tunnel Maintenance Shaft on New Hope Tract	-147	155	24,111	Snodgrass Slough Mokelumne River
Tunnel Maintenance Shaft on Canal Ranch Tract	-149	151	15,857	Beaver Slough
Tunnel Reception Shaft on Terminous Tract	-152	150	27,001	Hog Slough Sycamore Slough
Tunnel Maintenance Shaft on King Island	-154	143	20,820	White Slough
Tunnel Reception Shaft and Tunnel Launch Shaft on Lower Roberts Island	-157	146	29,329	~~White Slough~~ Disappointment Slough San Joaquin River
Tunnel Maintenance Shaft on Upper Jones Tract	-159	161	27,344	Whiskey Slough Hayes Slough ~~Old River~~
Tunnel Working Shaft Site on Byron Tract (within Southern Complex)	-162	153	29,801	Middle River Woodward Canal – North Victoria Canal Old River
Tunnel Launch Shaft Site on Byron Tract (Southern Forebay Inlet Structure at the South Delta Pumping Plant)	-163	157	5,069	Not Applicable
TOTAL TUNNEL LENGTH			233,534	

Air Quality Appendices – See Attachment A

The revisions to the air quality appendices are provided in Attachment A.

Technical Memoranda Updates

The following EPR technical memoranda have been revised to reflect revisions included in this EPR Update.

- Reusable Tunnel Material Technical Memorandum
- SCADA/Communications Routing and Basic Design Approach – Central and Eastern Corridors Technical Memorandum
- Potential Future Field Investigations – Central and Eastern Corridors Technical Memorandum

Reusable Tunnel Material Technical Memorandum

The following revisions are made in Reusable Tunnel Material TM Section 9, Reusable Tunnel Material Storage (May 2022 C/E EPR Reusable Tunnel Material TM PDF page 26).

> In the temporary situation, sufficient area will be provided to stockpile all RTM at the site where it would be generated, but subject to area and height restrictions discussed below. It is expected that RTM generated at Twin Cities will be processed and moved to the Southern Complex for the construction of the Southern Forebay along with the RTM generated at the Southern Forebay. However, sufficient area will be provided to stockpile all RTM generated at these sites to mitigate the risk of any delays in construction of the Southern Forebay. The temporary storage stockpile area and height for each option are summarized in Tables 15 and 16 below. In the permanent situation, sufficient area would be provided to stockpile all surplus RTM at the site at which it would be generated. For the dual launch shaft sites at Twin Cities and the Southern Forebay it is assumed the RTM from both tunnel drives would be consolidated into a single permanent stockpile. The permanent storage stockpile areas and heights for each option are summarized in Tables 17 and 18 below.

SCADA/Communications Routing and Basic Design Approach – Central and Eastern Corridors Technical Memorandum

The following revisions are made to the SCADA/Communications Routing and Basic Design Approach – Central and Eastern Corridors TM.

The following text in SCADA/Communications Routing and Basin Design Approach – Central and Eastern Corridors TM Section 1, Introduction, has been deleted (May 2022 C/E EPR SCADA/Communications Routing and Basin Design Approach TM PDF page 1).

> This technical memorandum (TM) describes the communications criteria and physical characteristics to establish planning level communication routes for the supervisory control and data acquisition (SCADA) system serving the Delta Conveyance Project (Project). The communications network connects three major operations centers, up to three intakes, and up to four remote data sites that require high speed, reliable data communications throughout construction and long-term operations. This TM defines communications design criteria, describes physical characteristics of communications media, and provides planning level installation notes. It then identifies potential routes for each fiberoptic connection, using existing telecommunications routes and planned road modifications as much as possible. Finally, network route design approaches are analyzed ~~with relative costs~~. The purpose of this TM is to evaluate physical media

options, recommend the most viable media, and identify potential media routes with the minimum environmental footprint.

The following text in SCADA/Communications Routing and Basin Design Approach – Central and Eastern Corridors TM Section 3.2, Physical Media Options, and Table 1 has been revised (May 2022 C/E EPR SCADA/Communications Routing and Basin Design Approach TM PDF pages 4 and 5).

- Capacity (bandwidth based on the frequency range of the underlying electro-magnetic waveform)
- Vulnerability (based on sensitivity to electro-magnetic interference [EMI])
- Constructability (based on installation and construction requirements)
- Maintenance (based on accessibility, frequency of routine maintenance, and replaceability)
  - ~~Cost (based on construction and maintenance (includes leasing) costs)~~

TABLE 1. CHARACTERISTICS OF COMMUNICATION MEDIA

Installation/ Media Option	Capacity (Hz)	Vulnerability (to EMI)	Constructability	Maintenance	~~Cost ($)~~
Overhead/ Fiberoptic	500 THz	N/A	Use existing or new power poles along existing ROW	Splices every 3-5 miles; repeaters every 20 miles	~~$$ initial cost~~ ~~$ maintenance~~
Underground/ Fiberoptic	500 THz	N/A	Use dedicated conduit along Project or public ROW	Splices every 3-5 miles; repeaters every 20 miles	~~$$$ initial cost~~ ~~$ maintenance~~
Inside Tunnel/ Fiberoptic	500 THz	N/A	Design and construction issues for installation in Project tunnels	Splices every 3-5 miles; repeaters every 20 miles; difficult access	~~$$ initial cost~~ ~~$$ maintenance~~
Leased/ Satellite Radio	3 GHz	High	Building or pole mounted dish antennas	Covered by lease agreement	~~$ initial cost~~ ~~$$ maintenance~~
Leased/ Cellular	900 MHz	Medium	Building or pole mounted Yagi antennas, signals may be unavailable	Covered by lease agreement	~~$$ initial cost~~ ~~$$ maintenance~~
Unlicensed/ Microwave	900 MHz	Medium	Building or pole mounted Yagi antennas, Omni antenna on TV tower	Antenna replacement	~~$$$ initial cost~~ ~~$ maintenance~~
Licensed/ Microwave	450 MHz	Low	Building or pole mounted Yagi antennas, Omni antenna on TV tower	Antenna replacement	~~$$$ initial cost~~ ~~$ maintenance~~

Notes:
Comparative cost:
$ = low
$$ = medium
$$$ = high
GHz = gigahertz
MHz = megahertz
N/A = not applicable
THz = terahertz
TV = television

The following text in SCADA/Communications Routing and Basin Design Approach – Central and Eastern Corridors TM Section 4, Alternatives Analysis has been revised (May 2022 C/E EPR SCADA/Communications Routing and Basin Design Approach TM PDF page 7).

Connecting the operations centers and all remote data sites with a fiberoptic system requires point-to-point routes. One point is defined by the facility site locations. The other point is defined by router locations in an existing fiberoptic network, typically owned by a telecommunication provider. Surface connections will require OH or UG installations. Each design assumes no spare fiber pairs in existing fiber cables and therefore, new fiberoptic cable must be installed from the nearest router to each operations center and to each remote data site. ~~For relative cost comparison purposes only, each design assumes the cost-estimating guidelines listed below. Equipment costs are minor and not included.~~ Each cable includes at least six fiber pairs, to include three segregated networks (SCADA, Business, and Security) with three spare pairs.

~~Fiber cable material and installation cost estimating guidance are:~~

- ~~6 pair single mode cable $6,000/mile~~
- ~~24 pair single mode cable $16,000/mile~~
- ~~36 pair single mode cable $18,000/mile~~
- ~~48 pair single mode cable $21,000/mile~~
- ~~OH installation using existing power poles with overlash $15,000/mile~~
- ~~OH installation using existing power poles without overlash $26,000/mile~~
- ~~UG installation pulled through existing or new conduit $25,000/mile~~
- ~~UG direct burial (plowing into ground along existing ROW) $70,000/mile~~
- ~~UG duct bank installation (trench and cover two 2-inch conduits) $100,000/mile~~
- ~~UG horizontally directionally drilled cable in carrier pipe $400/foot~~

~~All costs presented herein are raw construction costs for relative comparisons and do not include markups for contractor's overhead, profit, and general conditions. They also do not include contingencies, soft costs, and related markups.~~

The following text in SCADA/Communications Routing and Basin Design Approach – Central and Eastern Corridors TM Section 4.1.1, Backbone Group, and Table 4 has been revised (May 2022 C/E EPR SCADA/Communications Routing and Basin Design Approach TM PDF page 9).

Table 4 summarizes ~~shows relative cost estimates for~~ the Backbone Group fiber routes.

TABLE 2. BACKBONE GROUP FIBER ROUTES ~~AND RELATIVE COSTS~~

Route ID	OH Miles	UGA Miles	UGE Miles	UGN Miles	UGT Miles	Total Miles	~~Cable Cost~~	~~Installation Cost~~	~~Total Cost~~
B01			1.31	4.62		5.93	~~$ 95,000~~	~~$ 415,000~~	~~$ 510,000~~
B02	7.91			2.25		10.16	~~$ 163,000~~	~~$ 363,000~~	~~$ 526,000~~
B03[1]		3.43		7.70	0.17	11.30 (10.84[1])	~~$181,000~~ ~~($173,000[1])~~	~~$ 1,139,000~~ ~~($1,107,000[1])~~	~~$ 1,320,000~~ ~~($1,280,000[1])~~
B04[1]	5.02	3.1	.87	2.30	0.12	11.41 (10.95[1])	~~$ 183,000~~ ~~($175,000[1])~~	~~$ 823,000~~ ~~($791,000[1])~~	~~$ 1,006,000~~ ~~($966,000[1])~~
B05[2]			0.88			0.88	~~$14,000~~	~~$62,000~~	~~$76,000~~
	12.93					**38.80[3]** **(39.68[2])** **(37.88[1])**			~~**$3,362,000[3]**~~ ~~**($3,438,000[2])**~~ ~~**($3,282,000[1])**~~

Notes:

[1] For 3,000 cfs design capacity option only, B03 and B04 would connect to the C-E-5 site versus the C-E-3 site and would therefore each be 0.46 miles shorter than for other design flow capacity options. The ~~cost and~~ length of connection to Intake C-E-5 in that case is covered by facility group F02 which as the same length and size of cable required for the backbone group.

[2] 7,500 cfs design capacity only

[3] 4,500 and 6,000 cfs capacity only

The following text in SCADA/Communications Routing and Basin Design Approach – Central and Eastern Corridors TM Section 4.1.2, Facilities Group, and Table 5 has been revised (May 2022 C/E EPR SCADA/Communications Routing and Basin Design Approach TM PDF page 10).

> Table 5 summarizes ~~shows the relative cost estimates for~~ the Facilities Group fiber routes.

TABLE 3. FACILITIES GROUP FIBER ROUTES ~~AND RELATIVE COSTS~~

Route ID	OH Miles	UGA Miles	UGE Miles	UGN Miles	UGT Miles	Total Miles	~~Cable Cost~~	~~Installation Cost~~	~~Total Cost~~
F01[1]				.58		.58[1]	~~$ 4,000~~	~~$ 40,000~~	~~$ 44,000[1]~~
F02				2.56		2.56	~~$ 15,000~~	~~$ 179,000~~	~~$194,000~~
F03				0.12		0.12	~~$ 1,000~~	~~$ 8,000~~	~~$9,000~~
						2.68 **(3.26[1])**			~~**$202,000**~~ ~~**$(246,000[1])**~~

Notes:

[1] 7,500 cfs option only

The following text in SCADA/Communications Routing and Basin Design Approach – Central and Eastern Corridors TM Section 4.1.4, Central Corridor Group, and Table 7 has been revised (May 2022 C/E EPR SCADA/Communications Routing and Basin Design Approach TM PDF pages 11 and 12).

> A summary of ~~Relative cost estimates for~~ the Central corridor group is ~~are~~ shown in Table 7.

TABLE 4. CENTRAL CORRIDOR GROUP ~~RELATIVE COSTS~~

Route ID	OH Miles	UGA Miles	UGE Miles	UGN Miles	UGT Miles	Total Miles	~~Cable Cost~~	~~Installation Cost~~	~~Total Cost~~
C01		1.11		1.11		2.22	~~$ 13,000~~	~~$ 155,000~~	~~$ 168,000~~
C04	3.53	1.86		7.8	0.45	13.64	~~$ 82,000~~	~~$ 985,000~~	~~$1,718,000~~
						17.18			~~**$1,886,000**~~

Central corridor OH and UG segments are shown in Attachment 3.

In summary, the potential media routes with the minimum environmental footprint for the Central Corridor, establishes the network backbone and SCADA connections to all operations centers, facilities, and selected remote sites. This includes 57.74 to 60.12 miles of new fiberoptic cable~~, with a total relative cost of $5,370,000 to $5,570,000~~, depending on design flow capacity option.

The following text in SCADA/Communications Routing and Basin Design Approach – Central and Eastern Corridors TM Section 4.1.5, Eastern Corridor Group, and Table 8 has been revised (May 2022 C/E EPR SCADA/Communications Routing and Basin Design Approach TM PDF pages 12 and 13).

Table 8 summarizes ~~shows the relative cost estimates for~~ the Eastern Corridor Group.

TABLE 5. EASTERN CORRIDOR GROUP ~~RELATIVE COSTS~~

Route ID	OH Miles	UGA Miles	UGE Miles	UGN Miles	UGT Miles	Total Miles	~~Cable Cost~~	~~Installation Cost~~	~~Total Cost~~
E01		1.11		1.11		2.22	~~$ 13,000~~	~~$ 155,000~~	~~$ 168,000~~
E04	3.53	1.33		2.02	0.33	7.21	~~$ 43,000~~	~~$ 1,024,000~~	~~$ 1,067,000~~
E06	1.29	0.00	0.00	5.50	0.00	6.79	~~$ 41,000~~	~~$ 172,000~~	~~$ 213,000~~
						16.22			~~**$1,448,000**~~

Attachment 4 shows the Eastern Corridor Group OH and UG segments.

In summary, the potential media routes with the minimum environmental footprint for the Central Corridor, establishes the network backbone and SCADA connections to all operations centers, facilities, and selected remote sites. This includes 56.78 to 59.16 miles of new fiberoptic cable, ~~with a total relative cost of $4,932,000 to $5,132,000,~~ depending on design flow capacity option.

The following text in SCADA/Communications Routing and Basin Design Approach – Central and Eastern Corridors TM Section 4.1.6, Inside Tunnel Group, and Table 9 has been revised (May 2022 C/E EPR SCADA/Communications Routing and Basin Design Approach TM PDF page 13).

Table 9 summarizes ~~shows the relative cost estimates for~~ the Inside Tunnel Group.

TABLE 6. TUNNEL GROUPS ~~AND RELATIVE COSTS~~

Route ID	OH Miles	UGA Miles	UGE Miles	UGN Miles	UGT Miles	Total Miles	~~Cable Cost~~	~~Installation Cost~~	~~Total Cost~~
B01			1.31	4.62		5.93	~~$ 95,000~~	~~$ 415,000~~	~~$ 510,000~~
B04	5.02	3.1	0.87	2.30	0.12	11.41	~~$ 183,000~~	~~$ 823,000~~	~~$ 1,006,000~~
F03				0.12		0.12	~~$ 1,000~~	~~$ 8,000~~	~~$9,000~~
TN1 (C)	39.42					39.42	~~$ 828,000~~	~~$ 1,025,000~~	~~$ 1,853,000~~
TN2 (E)	42.12					42.12	~~$ 885,000~~	~~$ 1,095,000~~	~~$ 1,980,000~~
Central Corridor Totals (B01, B04, F03, TN1)						**56.88**			**~~$ 3,378,000~~**
Eastern Corridor Totals (B01, B04, F03, TN2)						**59.58**			**~~$ 3,505,000~~**

~~Note: Costs shown reflect 4,500 through 7,500 cfs Project design flow capacity options. 3,000 cfs option would be slightly lower, but was not estimated for this comparative analysis.~~

The following text in SCADA/Communications Routing and Basin Design Approach – Central and Eastern Corridors TM Section 4.2, Comparison of Design Approaches, and Table 10 has been revised (May 2022 C/E EPR SCADA/Communications Routing and Basin Design Approach TM PDF pages 14 and 15).

> The selection of one of the two design approaches is required to design and install the fiberoptic network for construction and long-term operations. Table 10 summarizes the fiber cable mileage ~~and installation costs~~ to establish fiber connections to all operations centers, the intakes, and remote data points.

TABLE 7. ~~RELATIVE COSTS FOR~~ CENTRAL, EASTERN, AND INSIDE TUNNEL DESIGN APPROACHES

Surface Routes	Total Miles	~~Total Cost~~	Inside Tunnel Routes	Total Miles	~~Total Cost~~
Central Corridor			**Central Corridor**		
Backbone	38.80	~~$ 3,362,000~~	Backbone	56.76	~~$ 3,369,000~~
Facilities	2.68	~~$ 202,000~~	Facilities	0.12	~~$ 9,000~~
Remote Sites	17.18	~~$ 1,886,000~~	Remote Sites	0.00	~~0~~
	58.66	~~$ 5,450,000~~		56.88	~~$ 3,378,000~~
Eastern Corridor			**Eastern Corridor**		
Backbone	38.80	~~$ 3,362,000~~	Backbone	59.46	~~$ 3,496,000~~
Facilities	2.68	~~$ 202,000~~	Facilities	0.12	~~$ 9,000~~
Remote Sites	16.22	~~$ 1,448,000~~	Remote Sites	0.00	~~0~~
	57.70	~~$5,012,000~~		59.58	~~$ 3,505,000~~

Note: 6,000 cfs design flow capacity option values are used in this table.

> Fiber cable installation inside the tunnel would not provide data communications during the construction period. Assuming video camera data communications would be unnecessary during construction, two options that could provide high speed Internet data communications during the construction period are:
>
> - Installing a microwave master station on one of the TV towers near Walnut Grove
> - Leasing a satellite channel dedicated to the Project for the duration of the construction period

> Depending on the tunnel alignment, the Inside Tunnel design approach would eliminate about 11 to 12 miles of surface route installation. ~~The Inside Tunnel design approach also would eliminate fiber-based leased line costs during construction and long-term operations, although satellite channel lease costs or microwave radio installation costs during construction could be incurred.~~
>
> The Inside Tunnel design approach would only provide access to the fiberoptics cable at the tunnel shafts, or about every 5 miles. This distance of cable inside the tunnel is too long to replace the cable by simple pulling methods, so any repair or replacement of the cable would require entry into the tunnel. In actual practice, this would likely mean the tunnel would have to be drained, which would result in a lengthy shutdown to drain the tunnel, conduct the repair, and refill the system. Therefore, a problem with the cable inside the tunnel would probably result in the system being operated without the full loop of link segments for some period of time. This would result in some remote sites not being monitored and would severely reduce the overall reliability of the system. Also, ~~the cost of~~ a cable replacement operation inside the tunnel would be expected to be more difficult than ~~several times the cost of~~ periodic replacement of surface installed cables, which can simply be repulled through their existing conduits.

The following text in SCADA/Communications Routing and Basin Design Approach – Central and Eastern Corridors TM Section 5, Delta Broadband Action Plan, and Table 11 has been revised (May 2022 C/E EPR SCADA/Communications Routing and Basin Design Approach TM PDF page 16).

> Table 11 summarizes the length of ~~shows relative costs to install~~ a fiber cable from Intake C-E-3 near Hood to Clarksburg (DB1) and to Walnut Grove (DB2), generally along State Route 160. These broadband links are only part of the overall Delta Broadband Action plan. They were considered since they would serve the communities most impacted by the Project, including Clarksburg, Hood, Courtland, Locke, and Walnut Grove. Installing fiber to improve the Delta broadband capability is optional for all design approaches.

TABLE 8. DELTA BROADBAND GROUP ROUTES ~~AND RELATIVE COSTS~~

Route ID	Fiber Pairs	OH Miles	UGA Miles	UGE Miles	UGT Miles	Total Miles	~~Cable Cost~~	~~OH Cost~~	~~UG Cost~~	~~Total Cost~~
DB1	24	2.87		0.57	0.16	3.60	~~$ 58,000~~	~~$ 75,000~~	~~$ 338,000~~	~~$ 471,000~~
DB2	36	10.46	1.52	0.82		12.8	~~$ 230,000~~	~~$ 272,000~~	~~$ 164,000~~	~~$ 666,000~~
		13.33	1.52	1.39	0.16	16.4				~~$ 1,137,000~~

The following text in SCADA/Communications Routing and Basin Design Approach – Central and Eastern Corridors TM Section 6, Recommendations, has been revised (May 2022 C/E EPR SCADA/Communications Routing and Basin Design Approach TM PDF page 16).

> It is also recommended overhead fiber installation be minimized in favor of installing fiberoptic cables underground along existing or proposed road rights-of-way. Given the ~~cost advantage and~~ ability to minimize impacts, overhead

> installation would still appear to be the best option for the B02 (SDPP to Brentwood Router) and portions of the B04 (C-E-3 to Freeport Router) Backbone segments.

SCADA/Communications Routing and Basin Design Approach – Central and Eastern Corridors TM Attachment 3, Central Corridor Route Maps, has been revised. The key map, and maps 2 and 3 (May 2022 C/E EPR SCADA/Communications Routing and Basin Design Approach TM PDF pages 23, 25 and 26, respectively) have been updated and are included in the Mapbooks section of this EPR Update.

SCADA/Communications Routing and Basin Design Approach – Central and Eastern Corridors TM Attachment 4, Eastern Corridor Route Maps, has been revised. The key map, and maps 2 and 3 (May 2022 C/E EPR SCADA/Communications Routing and Basin Design Approach TM PDF pages 38, 40 and 41, respectively) have been updated and are included in the Mapbooks section of this EPR Update.

Potential Future Field Investigations – Central and Eastern Corridors Technical Memorandum

The following revisions are made to Potential Future Field Investigations – Central and Eastern Corridors TM Section 2, Geotechnical Investigations to Support 408 Permitting, (May 2022 C/E EPR Potential Future Field Investigations TM PDF pages 1 and 2).

> The following activities are anticipated to take place between the adoption of the EIR and the start of 65 percent level of design to support the submission of a formal 408 application to the U.S. Army Corps of Engineers (USACE) to address intake construction and the tunneled crossing of the Stockton Deep Water Ship Channel (SDWSC). ~~Geotechnical investigations or the installation of monitoring equipment would begin following the completion of all required permits. These activities would be completed within approximately one year.~~ These activities would require approximately 48 months to be completed, however the activities may not occur concurrently or sequentially and could occur over a longer time period. The duration of individual activities is presented in Attachment C of the Potential Future Field Investigations TM.

The following revisions are made to Potential Future Field Investigations – Central and Eastern Corridors TM Section 3, Geotechnical Investigations Prior to Construction Phase, (May 2022 C/E EPR Potential Future Field Investigations TM PDF page 3).

> The following activities are anticipated to be conducted between adoption of the EIR and the start of construction, exclusive of the previous 408-support explorations. ~~Geotechnical investigations or the installation of monitoring equipment would begin following the completion of all required permits. These activities would be completed within approximately one year.~~ These activities would require approximately 48 months to be completed, however the activities may not occur concurrently or sequentially and could occur over a longer time

period. The duration of individual activities is presented in Attachment C of the Potential Future Field Investigations TM.

Mapbook Updates

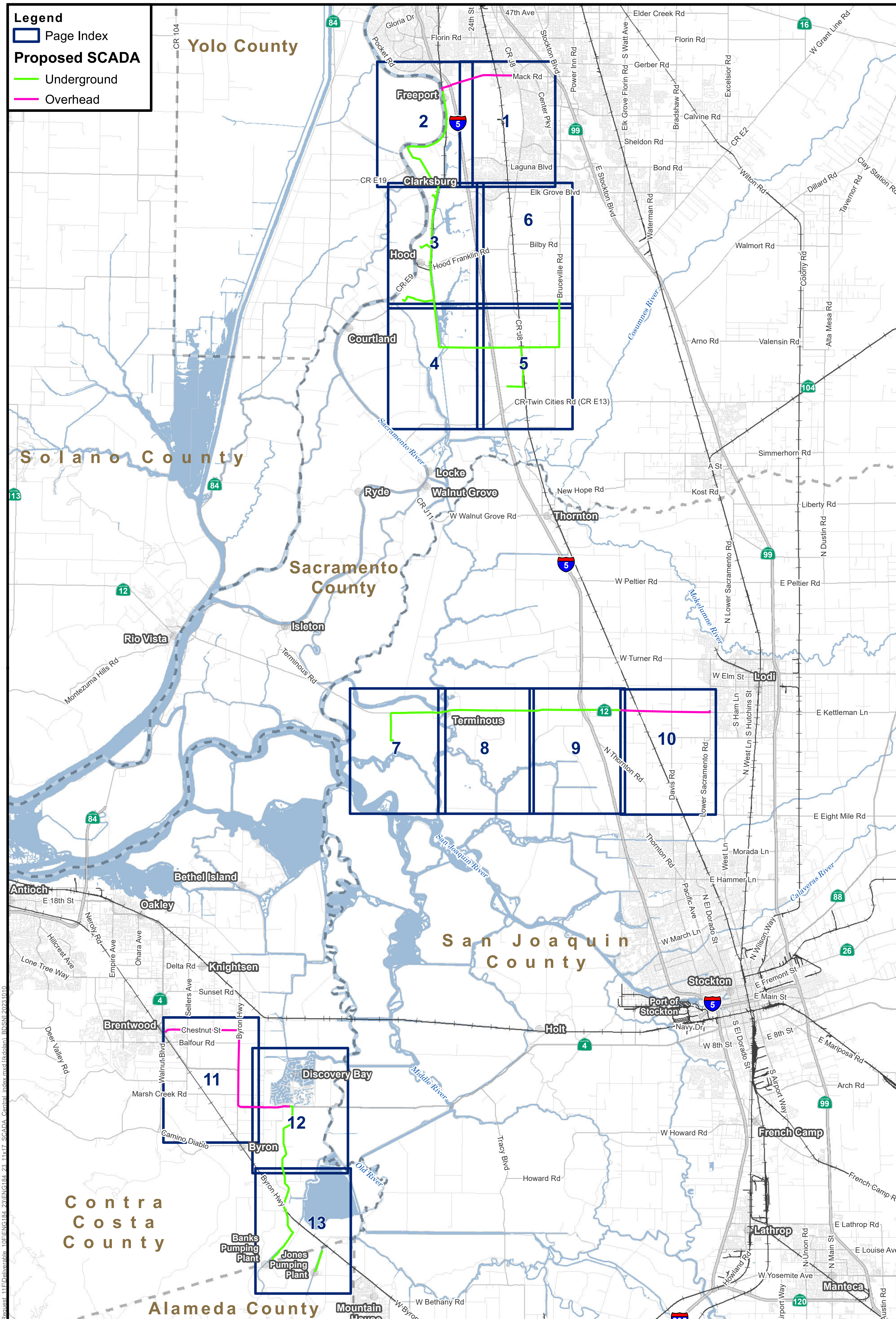
The following mapbook pages have been revised to reflect revisions included in this EPR Update. The revised pages are provided.

- Central Mapbook– SCADA
  - Key Map
  - Map 2
  - Map 3
- Eastern Mapbook– SCADA
  - Key Map
  - Map 2
  - Map 3

Central Mapbook– SCADA

The following pages from the Central Mapbook– SCADA were updated.

- Key Map
- Map 2
- Map 3



DCA
DELTA CONVEYANCE DESIGN & CONSTRUCTION AUTHORITY

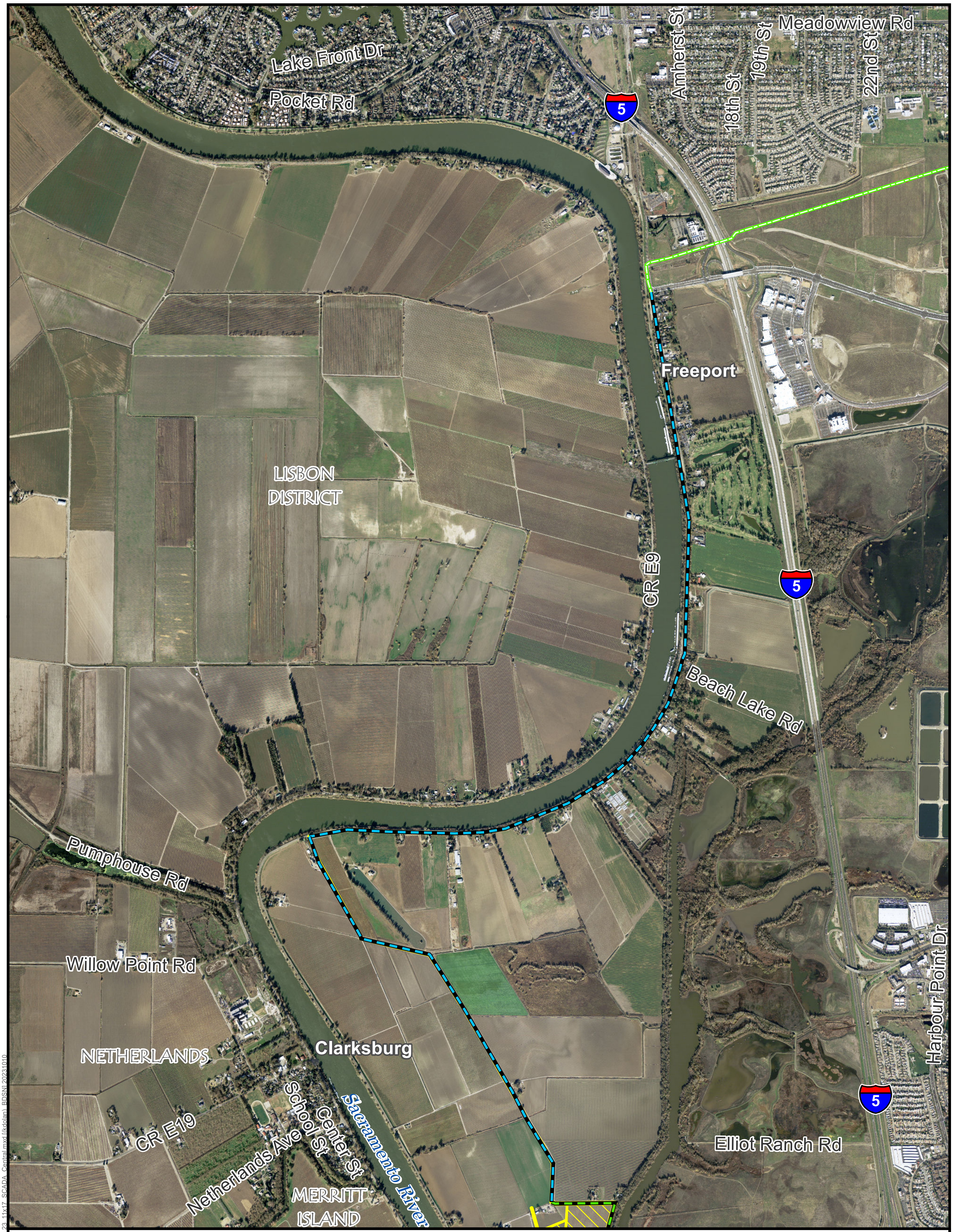
This mapbook is a scaled representation of the GIS data and only shows major facilities.
For Illustration Purposes Only

N

0 3.5 Miles

Key Map
Central SCADA
November 2023

Data Source: DCA, DWR



SCADA Proposed Fiber Routes

Proposed Underground SCADA

- Within Existing Roadway
- Outside Roadway

Proposed Overhead SCADA

- New Line on Existing Poles

- Permanent Subsurface Impact
- Permanent Surface Impact
- Temporary Surface Impact

This mapbook is a scaled representation of the GIS data and only shows major facilities.

DCA DELTA CONVEYANCE DESIGN & CONSTRUCTION AUTHORITY

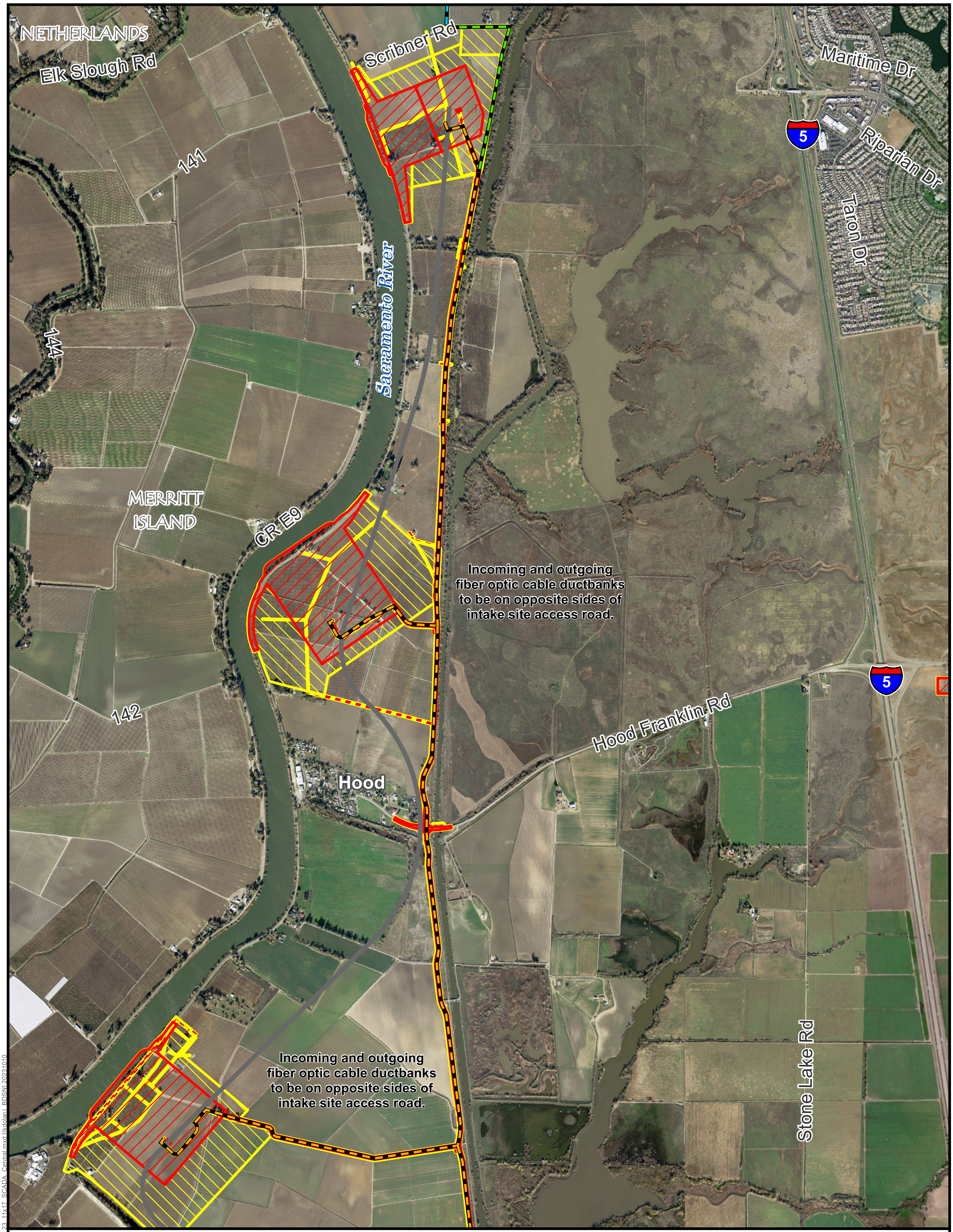
For Illustration Purposes Only

N

0 1,000 2,000 Feet

Map 2
SCADA - Central
November 2023

Data Source: DCA, DWR



SCADA Proposed Fiber Routes
Proposed Underground SCADA
Within Existing Roadway
Within Proposed Roadway Improvements
Outside Roadway

Tunnel

Permanent Subsurface Impact
Permanent Surface Impact
Temporary Surface Impact

This mapbook is a scaled representation of the GIS data and only shows major facilities.

DCA DELTA CONVEYANCE DESIGN & CONSTRUCTION AUTHORITY

For Illustration Purposes Only

N
0 1,000 2,000 Feet

Map 3
SCADA - Central
November 2023

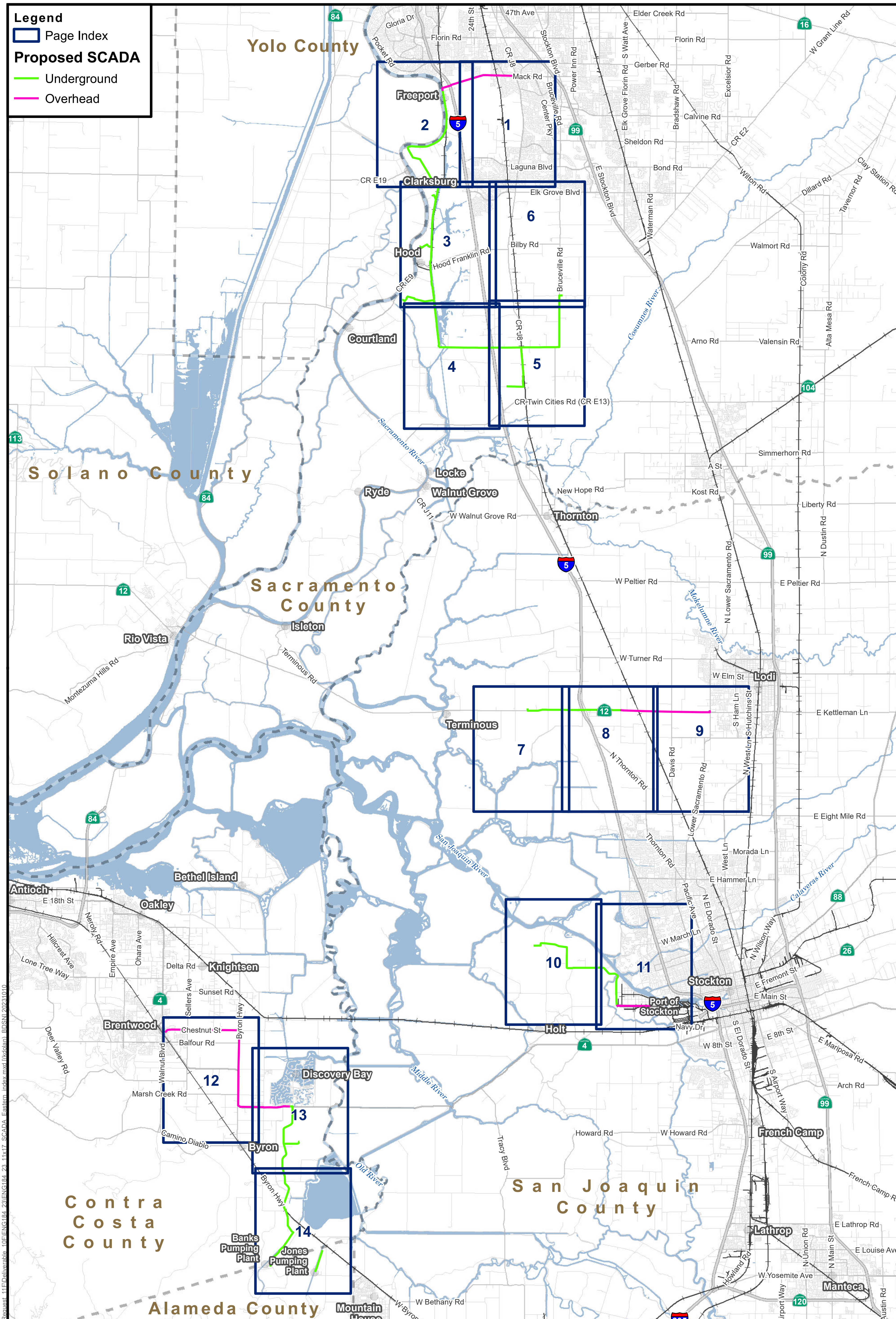
T:\WGL-38\GIS_33_00\GISRequest_11F\Deliverable_10F\ENG184_23\ENG184_23_11x17_SCADA_Central.mxd [(kdolan)_BDSN]_20231010

Data Source: DCA, DWR

Eastern Mapbook– SCADA

The following pages from the Eastern Mapbook– SCADA were updated.

- Key Map
- Map 2
- Map 3



This mapbook is a scaled representation of the GIS data and only shows major facilities.

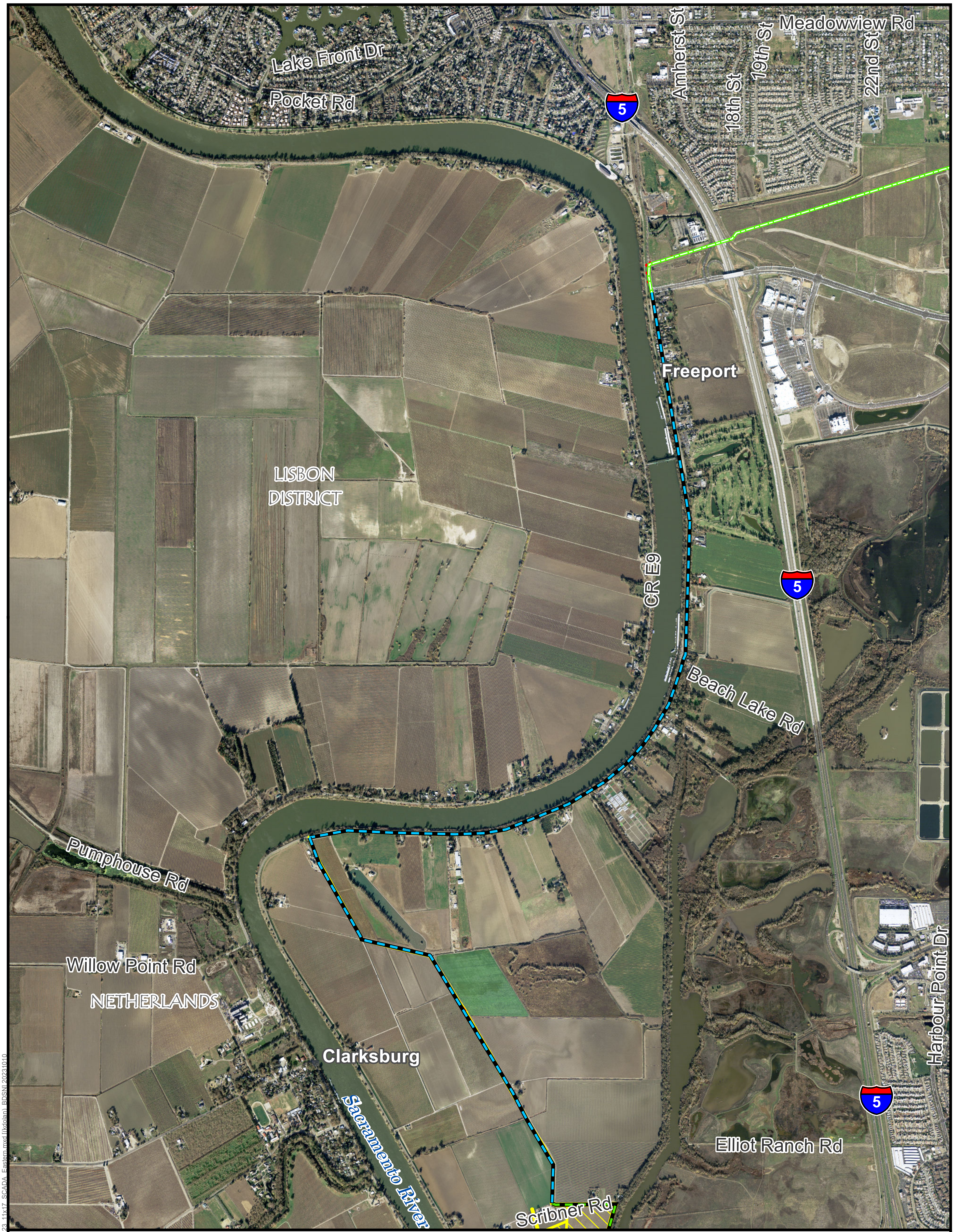
For Illustration Purposes Only

N

0 3.5 Miles

Key Map
Eastern SCADA
November 2023

Data Source: DCA, DWR



SCADA Proposed Fiber Routes
Proposed Underground SCADA
Within Existing Roadway
Outside Roadway
Proposed Overhead SCADA
New Line on Existing Poles

Permanent Subsurface Impact
Permanent Surface Impact
Temporary Surface Impact

This mapbook is a scaled representation of the GIS data and only shows major facilities.

T:\WGI-38\GIS_33_00\GISRequest_11F\Deliverable_10F\ENG184_23\ENG184_23_11x17_SCADA_Eastern.mxd [(kdolan)_BDSN] 20231010

DCA
DELTA CONVEYANCE DESIGN & CONSTRUCTION AUTHORITY

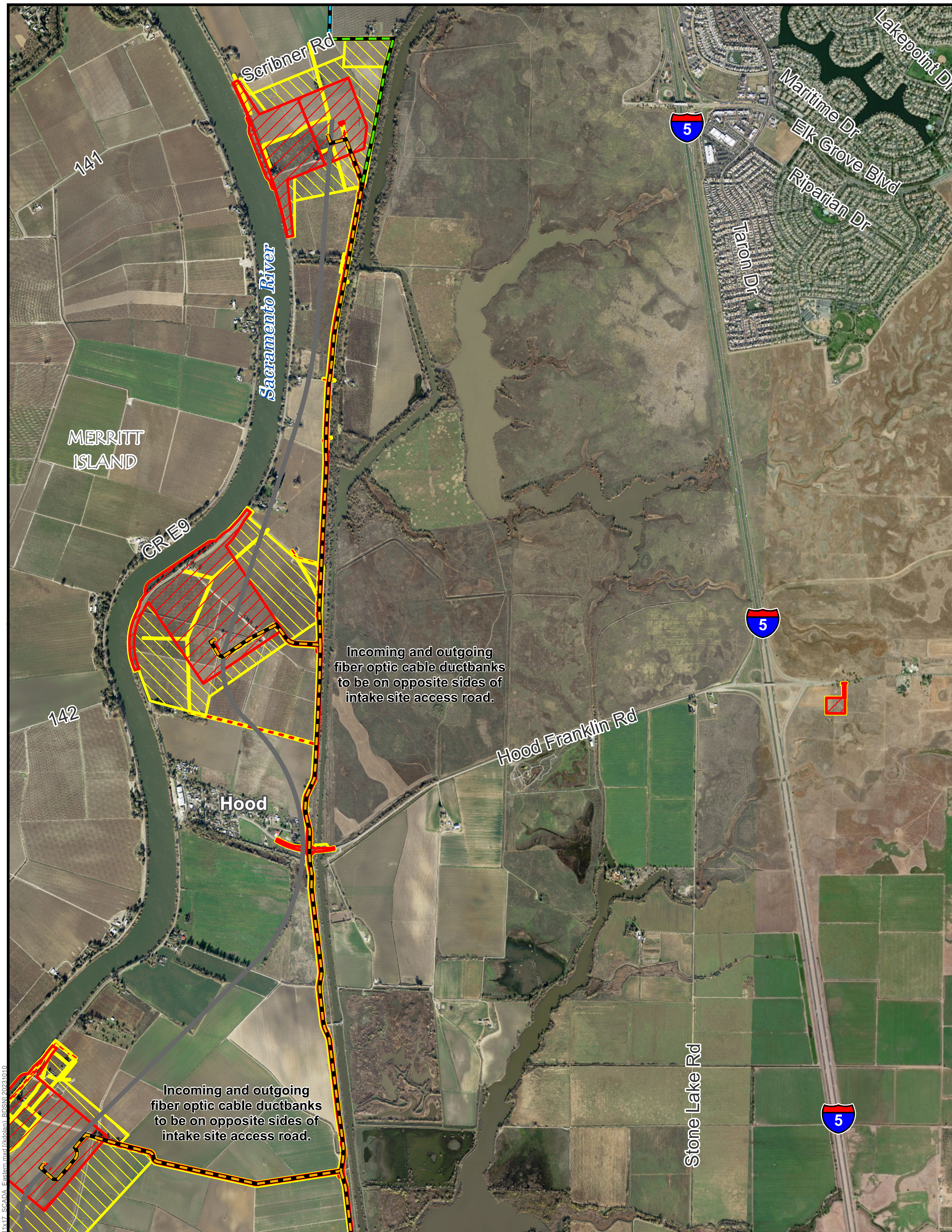
For Illustration Purposes Only

N

0 1,000 2,000
Feet

Map 2
SCADA - Eastern
November 2023

Data Source: DCA, DWR



This mapbook is a scaled representation of the GIS data and only shows major facilities.

DCA DELTA CONVEYANCE DESIGN & CONSTRUCTION AUTHORITY

For Illustration Purposes Only

N

0 1,000 2,000 Feet

Map 3
SCADA - Eastern
November 2023

Data Source: DCA, DWR