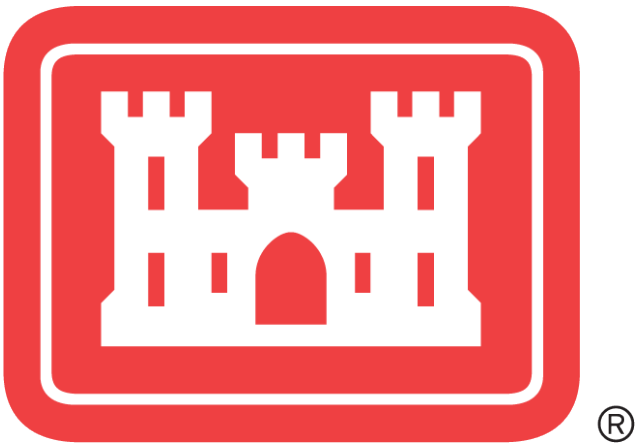
Supplemental Biological Assessment

Lower San Joaquin River, California, Project
America's Water Infrastructure Act of 2018
Reach TS-30L Levee Improvements



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U.S. Army Corps of Engineers

Sacramento District

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I. INTRODUCTION

The U.S. Army Corps of Engineers, Sacramento District (USACE) is requesting reinitiation of consultation with the U.S. Fish and Wildlife Service (USFWS) under Section 7 of the Endangered Species Act (ESA) (16 U.S.C. § 1536) to evaluate anticipated effects to listed species and their habitats from planned improvements to the Ten Mile Slough, mile marker 30, left bank segment (TS-30L) as part of the Lower San Joaquin River Project, San Joaquin County, California (LSJR), fully described in the Lower San Joaquin River Feasibility Study Recommended Plan (LSJRFS), San Joaquin County, California (LSJRFS, January 2018). The LSJR Project is a cooperative flood risk management effort by the USACE with its Non-Federal Sponsors (NFSs) – the San Joaquin Area Flood Control Agency (SJAFCA) and the Central Valley Flood Protection Board (CVFPB), represented by California Department of Water Resources (DWR) – to reduce flood risk in the Stockton area. The LSJR Project was authorized for construction in America's Water Infrastructure Act of 2018 (Public Law [P.L.] 115-270), which expedited the completion of the feasibility study and allowed the study to proceed directly to the preconstruction engineering and design phase of the project, as described in Section 1322(b)(2)(F) of the Water Resources Development Act of 2016 (P.L. 114-322). The overall purpose of the LSJR Project is to decrease flood risk by achieving a 200-year level of protection to north and central Stockton. A Biological Opinion (BO) for the LSJR Project was initially issued on June 13, 2016, entitled "Formal Consultation on the Lower San Joaquin River Feasibility Study, San Joaquin County, California" (Reference number 08ESMF00-2015-F-0206; USFWS 2016). Amendments and supplements to the 2016 LSJR BO, as described in the Consultation History section of this document, discuss changes and design refinements which have occurred after the initial consultation period.

This Supplemental Biological Assessment (SBA) supplements the Biological Assessment (BA), Terrestrial & Aquatic Species, San Joaquin River Basin, Lower San Joaquin River, CA Interim Feasibility Study (2015 LSJR BA) that USACE submitted to the USFWS on November 6, 2015. The Smith Canal element of the LSJR Project is currently under construction with mitigation provided as described in the August 19, 2019, Smith Canal supplemental BO (2019 Smith Canal BO). Consultation for the Smith Canal element remains on-going due to additional design refinements. This SBA seeks re-consultation over only the TS-30L elements of the project. Details of final design for TS-30L were unknown at the time the 2015 LSJR BA was submitted. This SBA provides technical information and analysis assessing the adverse effects that the TS-30L improvement work may have on Federally threatened, endangered, or candidate species and their designated critical habitat.

Specifically, reinitiation is being pursued for two reasons: (1) compensation measures in the 2016 LSJR BO for the Valley Elderberry Longhorn Beetle (VELB) direct that transplants and compensatory seedlings of elderberry occur within the Fourteen Mile Slough setback area or an approved conservation bank; otherwise USACE will

coordinate the use of a new site through reinitiation of formal consultation; and (2) where removal of vegetation is not otherwise required for construction of the project features, conservation measures for all species direct that USACE evaluate the suitability of the levees for a vegetation variance (now called a design deviation). If that evaluation is not completed or a deviation is not approved then USACE would reinitiate consultation. While the original design contemplated removal of vegetation on the land and waterside slopes to accommodate project features, inclusion of an armored patrol road within the waterside easement, and associated vegetation removal was not analyzed in the original consultation.

This SBA will satisfy Section 7 consultation for construction, operations and maintenance, and mitigation activities for TS-30L. Courtesy copies of all letter correspondence will be sent to the California Department of Fish and Wildlife (CDFW) and the National Marine Fisheries Service (NMFS). If the project conditions change significantly, USACE will initiate additional consultation as appropriate.

A. Threatened, Endangered, Proposed Threatened, or Proposed Endangered Species

USACE received a species list for the Project Area from the USFWS's Information for Planning and Consultation (IPaC) online system on May 8, 2023 (Project Code 2023-0079350; Appendix A). USACE determined that the proposed action would have "No Effect" on six of these species as explained in Table 1. Therefore, these six species are not discussed further in this document.

Threatened, Endangered, or Proposed Species that may be affected by the proposed action:

Giant garter snake (*Thamnophis gigas*) **T** [
Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) **T**

E = Endangered, **T** = Threatened, **P** = Proposed, and **CH** = Critical Habitat.

B. Critical Habitat

There is no designated Critical Habitat within the TS-30L Project Area. There is critical habitat for the Delta Smelt (*Hypomesus transpacificus*) near the TS-30L Project Area. Designated Critical Habitat for the Delta Smelt includes the existing contiguous waters contained within the Delta. The agricultural ditch adjacent to TS-30L is not hydrologically connected to the rest of the system and, therefore, does not meet the definition of an existing contiguous water of the Delta. In addition, due to the level of disconnection between the agricultural ditch and the remainder of the system, it is highly unlikely that indirect effects from the project could have impact on the nearby aquatic ecosystem. Therefore, effects to Delta Smelt Designated Critical Habitat are not discussed further.

C. Candidate Species

The monarch butterfly has been listed as a Candidate Species for listing under the Endangered Species Act. It has been considered in this document.

Monarch butterfly (*Danaus plexippus*) **C**

Table 1 - Summary of Effects to Listed Species

Evolutionarily Significant Unit (ESU) / Distinct Population Segment (DPS) / Other	Listing Status	Resource Agency Jurisdiction	Critical Habitat Designation/Action Area within Designated Critical Habitat (DCH)	Factors Affecting Determination	ESA Section 7 Effects Determination
Mammals					
Riparian Brush Rabbit (*Sylvilagus bachmani riparius*)	Endangered (February 23, 2000: 65 FR 8881-8890)	USFWS	None designated	The TS-30L Project Area contains only marginal dense brushy vegetation that could serve as habitat for the Riparian Brush Rabbit and the nearest documented occurrence is over 10 miles away (CDFW 2023). Therefore, it is highly improbable that Riparian Brush Rabbit would be affected by construction of the TS-30L levee improvements.	No effect
Reptiles					
Giant Garter Snake (*Thamnophis gigas*; GGS)	Threatened (October 20, 1993: 58 FR 54053)	USFWS	None designated	Replacement of the current earthen vegetated waterside slope with riprap would permanently alter habitat in the Project Area. Since snakes use small mammal burrows, soil crevices, and/or rock crevices for shelter for brumation during the winter season and aestivating during extremely hot days during their active period, the proposed project will likely have an adverse effect on giant garter snakes. While snakes could use rock crevices as shelter, the thermal properties of rock limit their usage, as compared to soil. During the summer months, rocky crevices can be a desirable benefit (Huey et.al., 1989, Sabo, 2003; and O'Sullivan et.al., 2023). However, in the winter, earthen burrows may be preferable (Huey, 1991; and Sprague and Bateman, 2018). In addition, during construction of the project, the waterside agricultural ditch would be unavailable as forage habitat. Staging areas would also temporarily be unavailable as habitat. Increased traffic near the rice fields along the haul routes also present the possibility of a mortality.	May affect, likely to adversely affect

Table 1 - Summary of Effects to Listed Species (continued)

Evolutionarily Significant Unit (ESU) / Distinct Population Segment (DPS) / Other	Listing Status	Resource Agency Jurisdiction	Critical Habitat Designation/Action Area within Designated Critical Habitat (DCH)	Factors Affecting Determination	ESA Section 7 Effects Determination
Amphibians					
California Tiger Salamander (*Ambystoma californiense*), Central California DPS	Threatened (May 4, 2004: 69 FR 24876)	USFWS	Outside DCH	The TS-30L Project Area is outside the extant documented range of this species (CDFW 2023). Grassland, savannah, open woodland, and vernal pool habitats would remain consistent with regional baseline conditions. Therefore, available habitat would not be diminished.	No effect
Evolutionarily Significant Unit (ESU) / Distinct Population Segment (DPS) / Other	**Listing Status**	**Resource Agency Jurisdiction**	**Critical Habitat Designation/Action Area within Designated Critical Habitat (DCH)**	**Factors Affecting Determination**	**ESA Section 7 Effects Determination**
Insects					
Monarch Butterfly (*Danaus plexippus*)	Candidate (December 17, 2020: 85 FR 81813)	USFWS	None designated	The existing landside slope is covered in aggregate and, is therefore unvegetated. The waterside slope is vegetated along portions of its length. Some of these species may provide nectar sources for monarch butterflies; however, a monarch specific survey has not been conducted. Removal of waterside vegetation could remove potential nectar sources. However, planting on the landside and plantings in the San Joaquin River WestLongitudinal mitigation area would reduce the duration of these adverse effects.	Not Applicable
Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*; VELB)	Threatened (August 8, 1980: 45 FR 52803)	USFWS	Outside DCH	Construction of the project would require transplanting 10 existing elderberry shrubs and the permanent loss of 11.4 acres of associated riparian habitat. Offsite compensation would replace this acreage. However, there would be a time lag before planted seedlings reached suitable size to serve as host plants for the species.	May affect, likely to adversely affect

Table 1 - Summary of Effects to Listed Species (continued)

Evolutionarily Significant Unit (ESU) / Distinct Population Segment (DPS) / Other	Listing Status	Resource Agency Jurisdiction	Critical Habitat Designation/Action Area within Designated Critical Habitat (DCH)	Factors Affecting Determination	ESA Section 7 Effects Determination
Crustaceans					
Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)	Threatened (September 19, 1994: 59 FR 48136)	USFWS	Outside DCH	There are no known vernal pools near the TS-30L Project Area nor any in a proximate enough distance such that any hydrologic changes induced by the project could affect hydrolically connected vernal pools.	No effect
Vernal Pool Tadpole Shrimp (*Lepidurus packardi*)	Endangered (September 19, 1994: 59 FR 48136)	USFWS	Outside DCH	There are no known vernal pools near the TS-30L Project Area nor any in a proximate enough distance such that any hydrologic changes induced by the project could affect hydrolically connected vernal pools.	No effect
Flowering Plants					
Large-flowered Fiddleneck (*Amsinckia grandiflora*)	Endangered (May 8, 1985: 50 FR 19374)	USFWS	Outside DCH	The TS-30L site lacks hilly grasslands with steep, north facing slopes and shade. This project would not reduce regionally available habitat.	No effect
Palmate-bracted Bird's beak (*Cordylanthus palmatus*)	Endangered (July 1, 1986: 51 FR 23765)	USFWS	None designated	The TS-30L site lacks suitable habitat–saline alkaline seasonally-flooded lowland plains (CDFW 2022). Regional saline alkaline seasonally-flooded lowland plains vegetation would remain consistent with baseline conditions.	No effect

II. CONSULTATION TO DATE

USACE received the 2016 LSJR BO for the overall project on June 13, 2016, based on information known at the time of the completion of the feasibility study.

In addition, USACE is currently engaged in formal consultation with the USFWS for efforts on the Smith Canal portion of the LSJR Project. Construction of the Smith Canal effort is led by the NFS, SJAFCA, with USACE Regulatory as the responsible Federal agency. USFWS issued the 2019 Smith Canal BO for the Smith Canal segment on August 19, 2019. Consultation histories for completed consultations, and those in progress, for Smith Canal are detailed in the respective BOs and BAs.

Several staff level meetings, teleconferences, and phone calls have been completed throughout the development of TS-30L and the mitigation site. Listed below are site visits conducted in support of the TS-30L project, major meetings involving leadership, as well as a summary of recent discussions.

Consultation history

USACE has been conducting regular meetings with USFWS for the TS-30L Project since December 8, 2020. These have been separated into environmental coordination and mitigation specific meetings both occurring on a roughly bi-weekly basis via WebEX.

March 9, 2021 – USFWS (Steven Schoenberg) joined USACE (Robert Skillen) at TS-30Lthe TS30L for site visit.

November 2021 – Sacramento District (SPK) Planning Division leadership (Dan Artho) and Bay Delta Office Leadership (Daniel Welsh, Stephanie Milsap) met to discuss concerns with TS-30L mitigation and BO status.

December 2021 – USFWS- Led (Steven Schoenberg) SPK staff to complete TS-30L Habitat Evaluation Procedures Surveys.

2July 26, 2022 – USACE and the NFS (SJAFCA and DWR) met with USFWS (Steven Schoenberg) to conduct a site visit of proposed mitigation sites.

III. DESCRIPTION OF PROPOSED ACTION

A. Background

The LSJR Feasibility Study's recommended plan, which covers North and Central Stockton, would be constructed in phases based on flood risk reduction benefits. Phases are as follows:

TS-30L
Phase A- Shima Tract
Phase B- Fourteenmile closure structure and Fourteenmile Levees
Phase C- Southern end of Tenmile Slough and Calaveras River Right Bank
Phase D- Calaveras River Left Bank
Phase E- San Joaquin River and French Camp Slough

The Feasibility Study concluded that the Delta Front (Tenmile Slough, Fourteenmile Slough, and the Shima Tract) represents the greatest risk, therefore construction of the Project will begin with the Delta Front levees. Reach TS-30L is part of Delta Front and was selected for final design and construction. It is the first segment of the LSJR Project that is proposed for construction by USACE.

USACE, SJAFCA, and the CVFPB propose fix-in-place improvements to the levee at TS-30L. Reach TS-30L levee improvements include modifying approximately 5,900 feet of existing levee geometry to meet current levee design and operation standards, providing seepage mitigation measures via cutoff wall installation, adding rock slope protection to protect against wave-run up and installing all-weather maintenance and access roads to allow inspection and flood fighting. To compensate for unavoidable resource impacts associated with the levee improvements at TS-30L, USACE is proposing to construct a mitigation site at a nearby privately owned parcel of land currently used for agriculture, hereafter referred to as the San Joaquin River West Parcel[1]. A summary of changes to the TS-30L levee improvements based on the current, updated designs are given in Table 2.

[1] In the draft mitigation strategy plan released to USFWSUSFWS on April 10, 2023, this parcel was named the Longitudinal Parcel; however, the forthcoming National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) documents refer to the parcel as the San Joaquin River West Parcel.

Table 2- Summary of Changes to the Project Description

Project Element	Original Project Design	Revised Project Design	Original Project Effect	Revised Project Effect
Levee Crown	20-foot crown width, cutoff wall installed through the center of the crown	No change	Degrade levee halfway, permanent loss of associated vegetation	No change
Landside Slope	2H[2]:1V	3H:1V	Permanent loss of all landside vegetation	No change
Waterside Slope	3H:1V with erosion protection	2.5H:1V with erosion protection	Permanent loss of up to 80 percent of waterside vegetation	Permanent loss of all waterside vegetation
Landside Access Road	None proposed	All weather access and patrol road	None	Permanent loss of additional habitat to accommodate patrol road
Waterside Access Road	None proposed	All weather access and patrol road	None	Permanent loss of additional habitat to accommodate patrol road
Borrow Areas	Detail not provided at time of Feasibility Study	Stockton East Water District proposed borrow area	Unknown	No effect
Haul Routes	Detail not provided at time of Feasibility Study	Utilization of existing roads	Unknown	No effect
Staging Areas	Detail not provided at time of Feasibility Study	North and south staging areas on agricultural land and vacant parcel	Unknown	Temporary loss of rice field habitats
Compensatory Mitigation	Purchase of mitigation credits and elderberry transplant to 14-mile Slough setback area	Construction of compensation area at Longitudinal Parcel, transplant elderberries to USFWS approved conservation bank	Full compensation of unavoidable adverse effects	No change
On-going OMRR&R	Continuation of typical maintenance procedures	No change	Permanent loss of habitat due to grouting rodent burrows	No change
Schedule	Completed in one season	No change	Temporary loss of habitat associated with staging, borrow and some construction areas	No change

[2] H:V means horizontal to vertical, such that 2H:1V means for every 2 feet of horizontal distance, there is a 1-foot increase in height.

B. Project Location

TS-30L is a dry-land levee located on the west side of Stockton between Fourteenmile Slough and the San Joaquin River with a north-south orientation (Figure 1). It is about 1.1 miles long and separates the Brookside residential development (land side) on the east from the Wright Elmwood Agricultural Tract (water side) on the west. TS-30L is bounded on the south by West March Lane and on the north by Fourteenmile Slough.

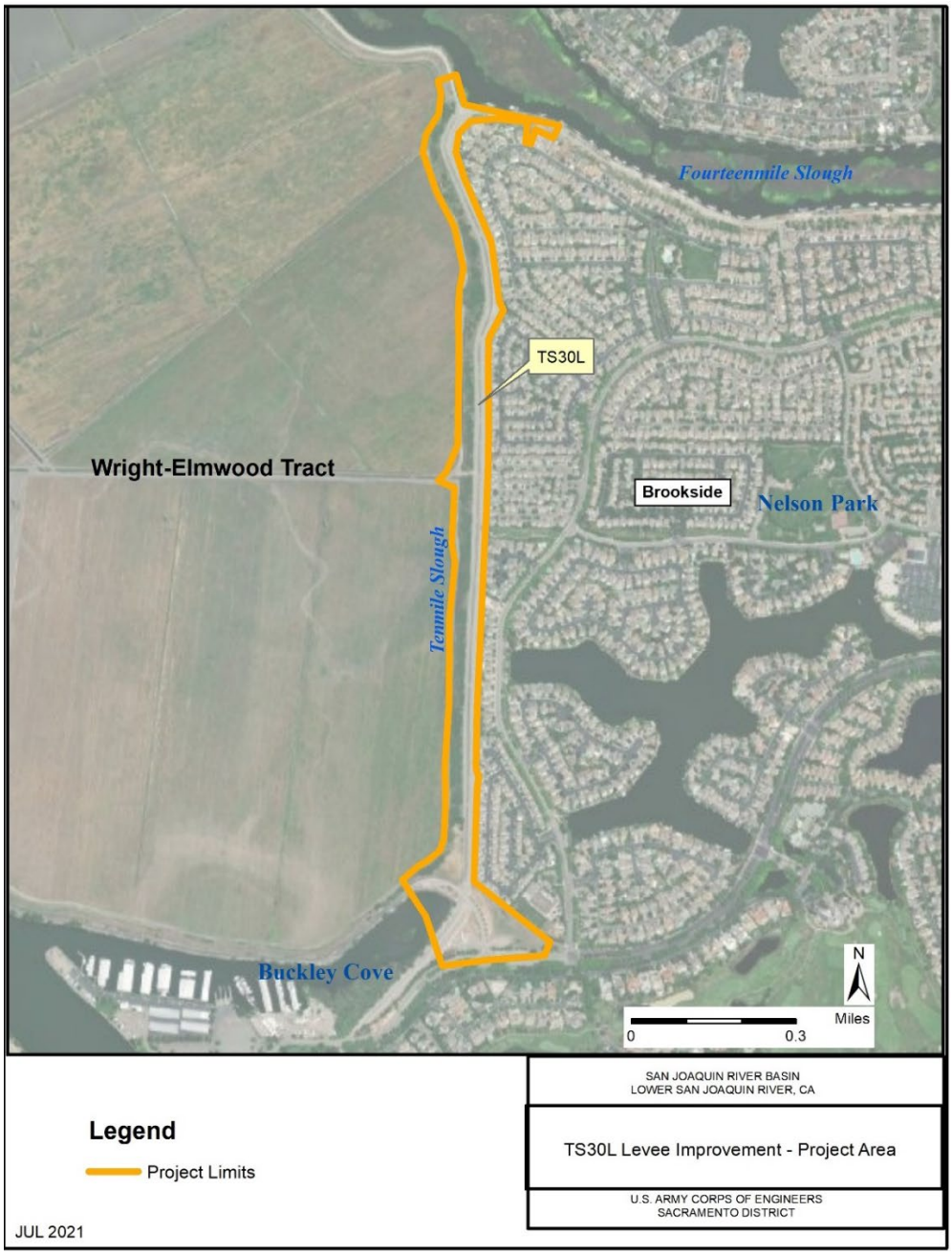

Figure 1- TS 30L location and context. Northern staging area, borrow area, and haul routes are not shown in this figure.

C. Construction of the Levee Improvement

The proposed improvements for TS-30L, described in Appendix A of the 2015 LSJR BA and the 2016 LSJR BO for the LSJR Project, from Fourteenmile slough to March Lane included a cutoff wall, geometry improvements, and erosion protection. Levee geometry improvements involve clearing and grubbing the waterside levee crest edge and landside slope, then adding material to the landside to meet current USACE levee design criteria for side slopes and crown width. Levees would have two access roads located along the levee crown and within the landside levee toe access easement. Erosion protection (riprap) would be placed on the waterside slope at a thickness of two feet. Full designs are given in Appendix B of this document.

To accommodate levee improvements, all vegetation within the grading limits would be removed (Appendix B). The project footprint has been reduced to the extent feasible to preserve as much vegetation as possible while still allowing construction to proceed safely. These updates to the plans are shown in red in Figures 2, 3, and 4.

Consistent with the original project designs, a soil-bentonite slurry seepage cutoff wall would be installed to an average depth of 21 feet below current ground surface elevation. To construct the cutoff wall, the levee would be degraded by 1/3 to ½ of its current height. Then a 12-foot-wide trench would be excavated in the levee centerline and filled with bentonite slurry to a depth of 21 feet below ground surface. Subsequently, a soil-bentonite mix would be used to backfill the trench and displace the slurry. After the soil-bentonite has cured, the levee would be reconstructed.

For TS-30L, the levee would be reshaped to achieve a waterside slope of 2.5H:1V and a landside slope of 3H:1V along its length, reshaping from the current 3H:1V and 2H:1V slopes, respectively. The reshaped levee would be widened to a 20-foot-wide crown along its length with the levee centerline shifted 20 feet towards the waterside. The landside levee toe will be shifted 10 feet towards waterside to accommodate the 15-foot landside access road. The 2015 LSJR BA and 2016 LSJR BO previously described changes in levee slope and width as primarily occurring on the landside; however, material will be added to the waterside instead to avoid impacting the residential neighborhood to the east.

Following levee reconstruction, rockslope protection consisting of a 2-foot-thick layer of 12-inch diameter riprap would be added to the waterside along the entire length from the crown to the patrol road. Riprap will be sourced from one or more commercial quarries from the greater Stockton area or the Sierra Nevada foothills. The landside slope would be covered and armored with three inches of ¾-inch aggregate from the crown to the patrol road.

The levee crown would be armored with a 6-inch-thick aggregate base covered with triple-pass chip seal to form the levee road. The existing waterside agricultural ditch

would be recreated upon completion of construction waterward of the new patrol road. The waterside patrol road would be slightly elevated above the existing ground surface upon completion of the improvements to prevent flooding from the agricultural ditch. The waterside patrol road, land side patrol road, and access ramps would be surfaced with four inches-inch-thick aggregate base.

Piezometers would be installed along the new waterside toe, just inland of the patrol road, to a depth of approximately six feet to 10 feet below ground surface spaced every 500 feet to monitor soil pore pressure and compaction. The top of the piezometers would be at grade level. The piezometer network would remain in perpetuity.

Construction of the levee improvements would likely be phased as follows: mobilization, vegetation removal, earthwork to degrade the levee and move the levee centerline westward, installation of cutoff wall, levee reconstruction and compaction, placement of erosion protection, installation of maintenance roads, installation of piezometers, demobilization, and site clean-up.

Earlier designs envisioned a larger footprint to accommodate construction (shown in Appendix B); however, USACE revised designs to reduce impacts and preserve, to the extent practical, a habitat connectivity corridor, shown in Figures 2, Figure 3, and Figure 4. It is estimated that an additional 57 trees and shrubs to the west of the waterside patrol road would be preserved. Non-native species, if any, would not be preserved.

Upon completion of the work, areas west of the waterside patrol road would be re-seeded with a native seed mix that would benefit pollinator species.

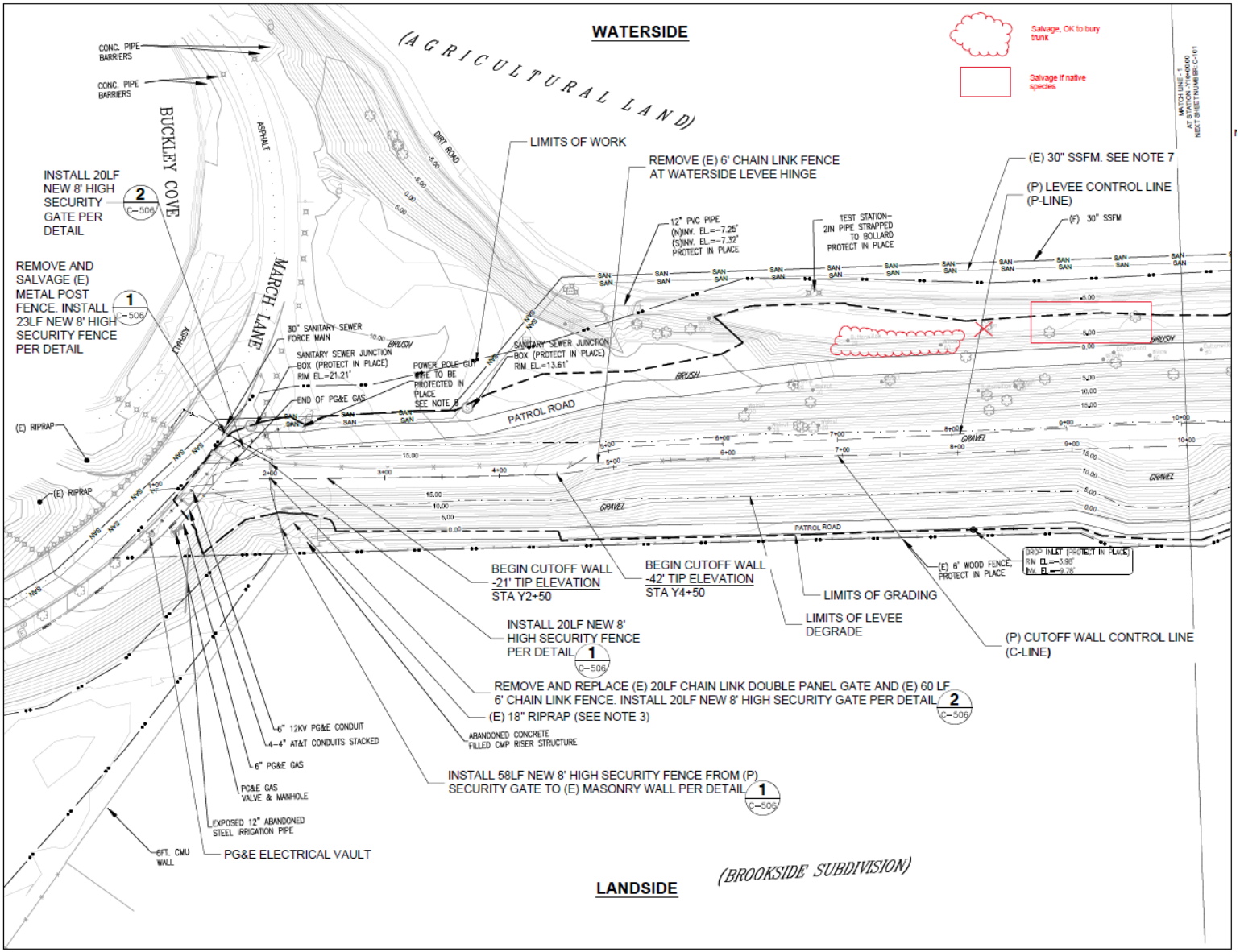

Figure 2- Preserved vegetation on the waterside based on footprint reduction since 100% designs, first section

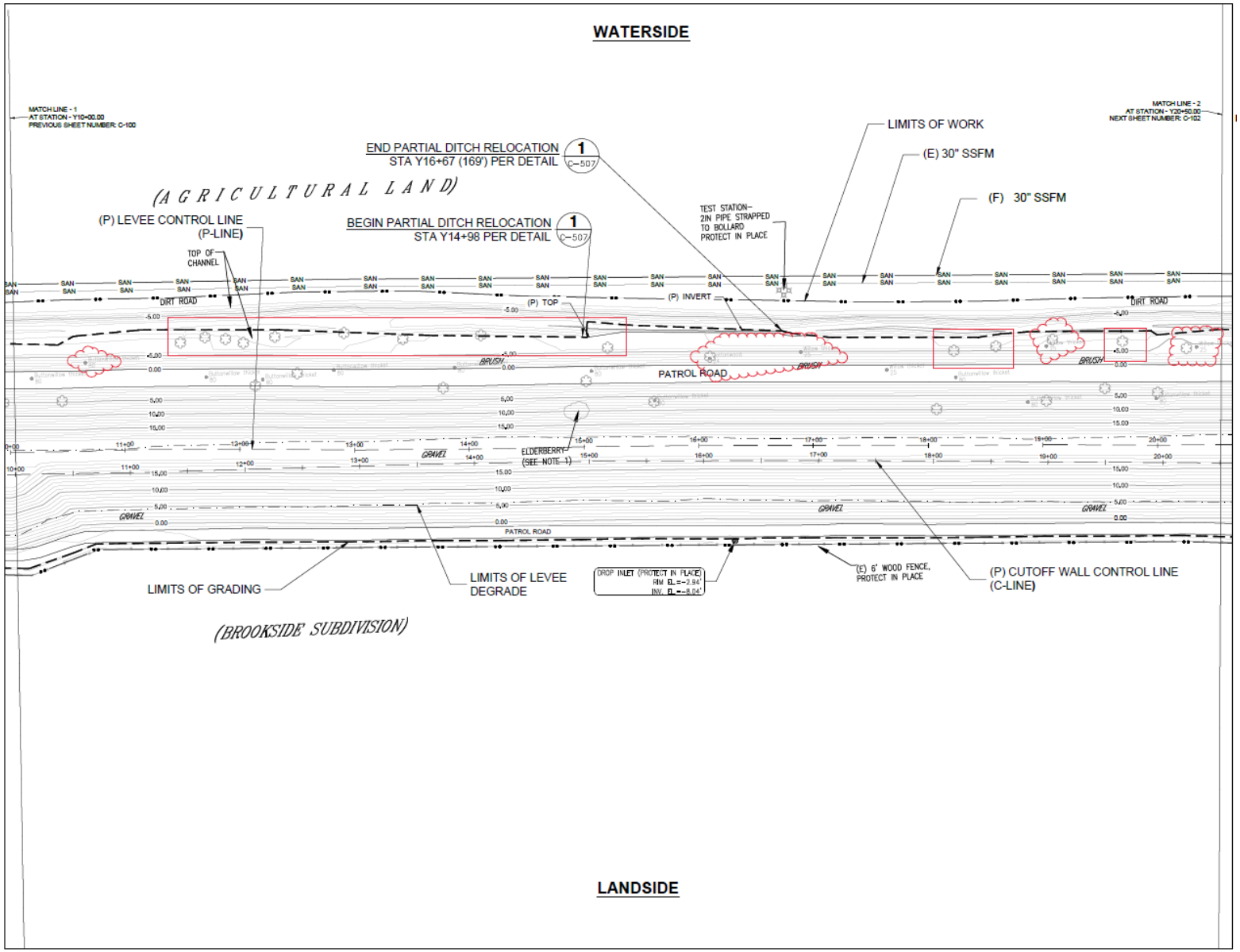

Figure 3- Preserved waterside vegetation based on footprint reduction since 100% designs, second section

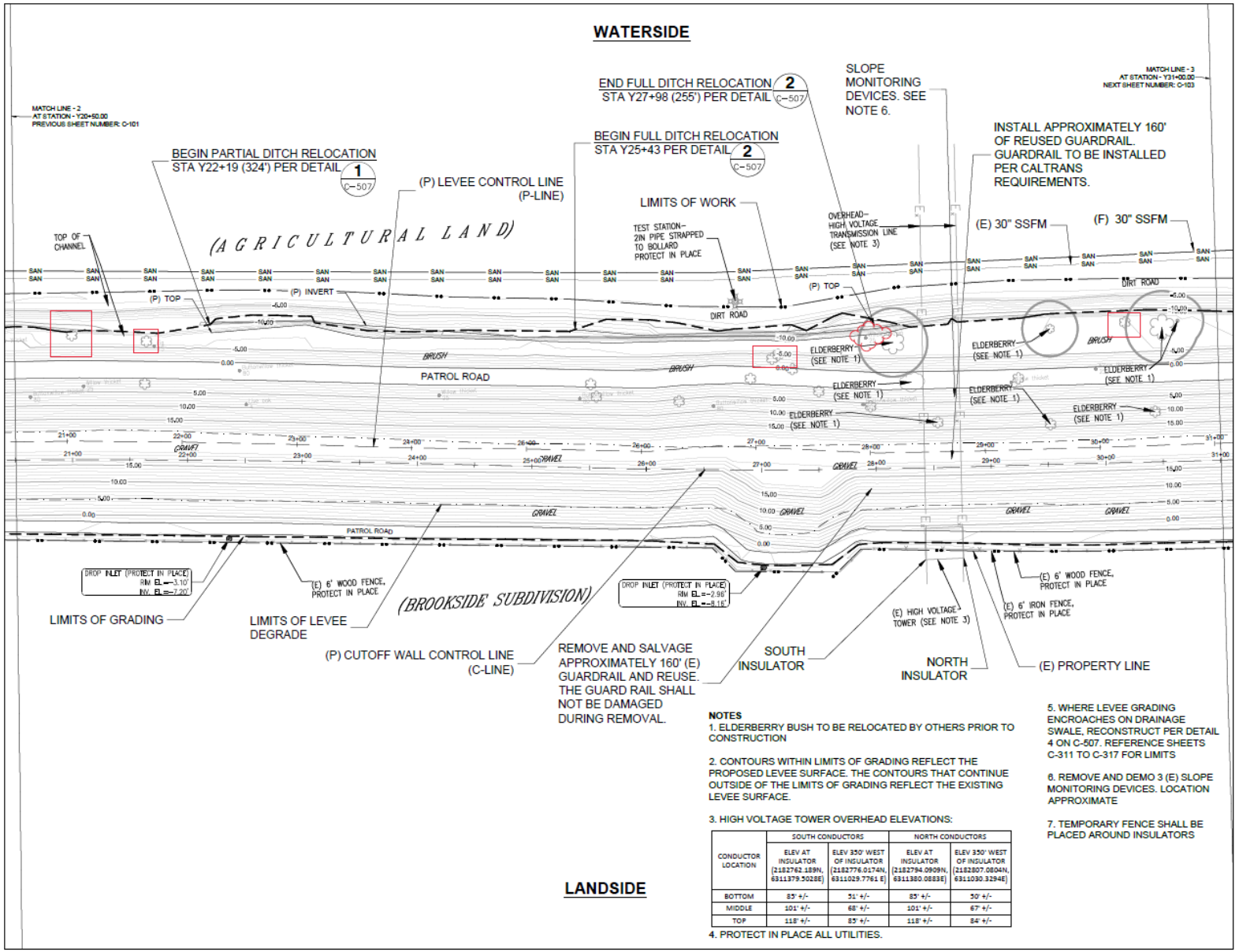

Figure 4- Preserved waterside vegetation based on footprint reduction since 100% designs, third section

D. Staging Areas

The southern staging area is a 1.7-acre corner lot located adjacent to March Lane and Brookside Road (Figure 5). The northern staging area is 9.8 acres and is in a rice field at the northern end of Reach TS-30L (Figure 5). The northern staging area will be allowed to dry and then leveled to facilitate equipment access. Temporary piping will be installed to convey water from an irrigation ditch along the perimeter to the surrounding rice fields. Upon completion of the levee improvement project, the staging areas would be restored to their pre-disturbance conditions and returned to their original purposes.



Figure 5- Staging areas in relation to the project site

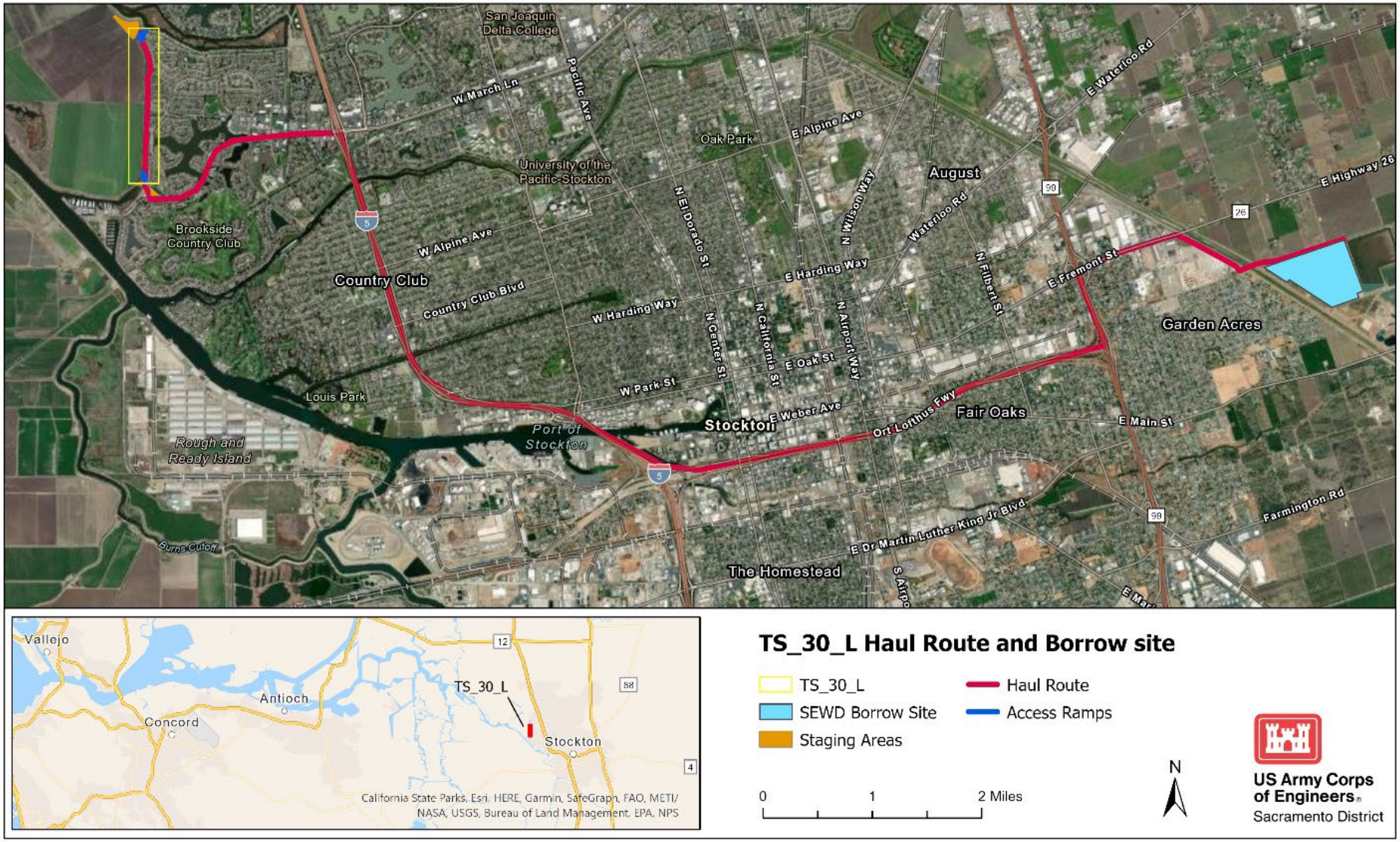

Figure 6- Borrow area and haul routes in relation to the project site

E. Borrow Areas

The proposed borrow site is located 11 miles east of TS-30L on 110 acres of agricultural land (Figure 6); fill material would be hauled by truck from this location to construct the levee improvements. The borrow area would not be restored to grade following the project, rather, the borrow site will be used by the Stockton East Water District (SEWD) as a groundwater recharge basin after construction is completed. The borrow site would be reseeded with a native seed mix to prevent erosion when not holding water.

F. Haul Routes

The haul route from the borrow site will utilize SEWD-owned roads, then cross over the Stockton Diverting Canal before using public streets to cross the city (Figure 6). The route will then follow Cardinal Avenue to State Route (SR) 26, then SR 99, SR 4, Interstate 5, and the West March Lane exit. March Lane leads directly to the southern end of Reach TS-30L. No trees would be removed along the haul route; however, trees with branches overhanging the roadway would be limbed as necessary to allow access by large trucks.

G. Compensatory Mitigation Areas

To compensate for unavoidable adverse impacts to habitat from the construction of the project, USACE would construct a mitigation site at the San Joaquin River West Parcel (Figure 7). Fifty acres of the parcel would be acquired for mitigation. The parcel is currently privately owned and used for annual crops such as wheat, alfalfa, and hay. The parcel is also seasonally fallowed. The parcel is located 1.7 miles from TS-30L at the confluence of the San Joaquin River and White Slough but is separated from those waterbodies by a levee. Numerous irrigation ditches run through the site. Compensatory mitigation plans are currently at the 10 percent level of design and are included in Appendix C.

Targeted species and acreages that would be included are 40.865 acres of riparian habitat suitable for VELB and 2.163 acres of aquatic habitat for giant garter snakes (GGS). Included in these acres are a part of the total 42.084 acres of riparian habitat for commitments under the Fish and Wildlife Coordination Act (FWCA) (which includes the acres that are suitable for VELB), and 2.163 acres of wetland habitat for commitments under the FWCA (which includes the acres that are suitable for GGS). All acres in the compensation area would contain pollinator supporting habitat, milkweed species (*Asclepias* sp.) have been specifically included on 9.620 acres. Where habitat types overlap, *e.g.*, riparian for VELB and riparian under the FWCA, these acres are combined (stacked) rather than constructed and accounted for separately.



Figure 7- Aerial image of the San Joaquin River West parcel

Soil surveys and professional elevation surveys would be conducted in May of 2023 to determine if soils would require amendments and depth to groundwater. These results would be shared with USFWS when received. Construction of the mitigation site would require minor earthwork to bring the site to appropriate grade. Material removed to lower grades to the appropriate elevation for the target communities would be reused on other areas of the parcel to raise elevations. It is not anticipated that any material would need to be imported to or exported from the site to achieve the habitat mitigation goals. Existing ditches would be enhanced into wetlands by widening the channels to allow a gentle bank and planting native species along the margins. Riparian habitat would be planted in the remainder of the site. Existing native trees would be retained, non-native and invasive species would be removed. Plant material would be sourced from local native plant nurseries. In the event that a species of interest could not be acquired locally, the plants would be grown directly by the contractor. Following earthwork and planting, beaver exclusion fencing, and deer friendly fencing would be placed around the perimeter of the site to allow plants to establish. Irrigation lines would be installed to ensure plant establishment. Following the plant establishment period, the fencing and irrigation lines would be removed. It is estimated that the plant establishment period would last between 3-5 years; however, achievement of ecological success criteria would be the determining factor in completion of the plant establishment period. Proposed ecological success criteria are included in the LSJR Mitigation Strategy and Implementation Plan. Final ecological success criteria would be developed jointly between USACE and USFWS in the long-term habitat management plan. The proposed mitigation site construction schedule is given in Table 3 below.

Table 3 - Compensatory Mitigation Schedule

Action	Start Date	Projected Completion
10 % Designs	March 2023	May 2023
Soil and Elevation Surveys	March 2023	June 2023
Plant Acquisition	May 2023	August 2023
35% Designs	May 2023	June 2023
95% Designs	August 2023	November 2023
100% Designs	November 2023	December 2023
Property Acquisition	October 2023	December 2023
Mitigation Site Pre-construction survey and submittals	December 2023	April 2024
Construction/Earthwork	May 2024	August 2024
Site Planting	August 2024	August 2025
Plant Establishment Period	August 2025	August 2030
Long-Term Maintenance	August 2030	Perpetuity

Maintenance and access roads would remain on the site. Signage designating the area as sensitive habitat would be installed around the site and remain in perpetuity.

Full construction and planting plans are given in Appendix C. The plans are currently at the10 percent level of design. Continuing design refinements would be made with involvement of USFWS through existing bi-weekly mitigation meetings and through formal comment on the plans. In addition, long-term and operations and maintenance manuals will be completed with continuing input and involvement from the USFWS.

H. Construction Schedule

Construction on the TS-30L levee improvement project would follow the schedule outlined in Table 4. Vegetation removal would consist of removing the aboveground mass of trees and shrubs using chainsaws, mowers, brush hogs, and other similar equipment. Ground disturbance and grubbing would not be completed at the vegetation removal phase.

Table 4 - TS-30L Construction Schedule

Action	Start Date	Projected Completion
Vegetation Removal	December 2023	February 2024
Elderberry Transplant	December 2023	February 2024
Construction	September 2024	March 2025
Revegetation of temporarily disturbed areas including staging, borrow areas, and areas west of the waterside patrol road	March 2025	May 2025

I. On-going Operation & Maintenance Repair, Replacement, and Rehabilitation (OMRR&R) Activities

Actions to maintain the levee in the proposed condition in perpetuity would include, but are not limited to, the following:

- Grouting of rodent burrows;
- Mowing of landside vegetation up to two times per year;
- Replacement of riprap, as needed, up to 600 cubic yards (cy) of material per occurrence;
- Replacement of aggregate, as needed, up to 600 cyubic ards of material per occurrence;
- Replenishment of chip seal;
- Repair and re-compaction of patrol roads, up to one cumulative mile per occurrence;
- Removal of encroachments (fences, decks, patios, etc.), as needed;
- Removal of woody vegetation from the levee crown and slopes, up to twice per year;

- Noxious weed abatement, about twice per year or more frequently, as needed;
- Repairs to the levee structure during emergency flood operations including sandbagging on the landside, as needed;
- Minor repair and replacement of piezometer network; and
- Personnel access for inspections, as needed, minimum of twice per year.

J. Avoidance and Minimization Measures

Avoidance and minimization measures are adapted from the 2016 LSJR BO. Additions to proposed to avoidance and minimization measures are shown in **bold** text, removals are shown in strikeout text (~~example text~~). Avoidance and minimization measures are considered part of the Proposed Action and have been integrated into project plans and specifications.

1. VALLEY ELDERBERRY LONGHORN BEETLE

Construction Phase

Avoidance and Minimization Measures

The following is a summary of measures based on the **Framework for Assessing Impact to the Valley Elderberry Longhorn Beetle, May 2017 (USFWS, 2017).** ~~*Conservation Guidelines for the Valley Elderberry Longhorn Beetle* (USFWS 1999a; Appendix B).~~ These measures will be implemented to minimize any potential effects on VELB or their habitat, including restoration and maintenance activities, long-term, protection, and compensation if shrubs cannot be avoided during construction.

- When a 100-foot (or wider) buffer is established and maintained around elderberry shrubs, complete avoidance (i.e., no adverse effects) will be assumed.
- Where encroachment on the 100-foot buffer has been approved by the USFWS, a setback of 20 feet from the dripline of each elderberry shrub will be maintained whenever possible.
- Shrubs that are closer than 100 feet to any work, but outside the construction footprint (construction, ETL compliance, OMRRR) are assumed to be avoided by the application of other avoidance measures such as signage, fencing, worker education, and post-construction monitoring that demonstrates no effect on health and viability (see compensation measures, below), and will not be subject to transplantation or the need for offset compensation.
- During construction activities, all areas to be avoided will be fenced and flagged.
- Contractors will be briefed on the need to avoid damaging elderberry shrubs and the possible penalties for not complying with these requirements.

- Signs will be erected every 50 feet along the edge of the avoidance area, identifying the area as an environmentally sensitive area.
- Any damage done to the buffer area will be restored.
- Buffer areas will continue to be protected after construction from adverse effects of the project, such as during maintenance actions.
- No insecticides, herbicides, fertilizers, or other chemicals that might harm the beetle or its host plant will be used in the buffer areas.
- Trimming of elderberry plants may be subject to mitigation measures.
- Elderberry shrubs that cannot be avoided would be transplanted ~~to an appropriate riparian area at least 100 feet from construction activities or~~ to an approved conservation bank. **Proposed banks are included in Appendix E.**
- Elderberry shrubs to be removed will be transplanted during their dormant season **(approximately November, after they have lost their leaves, through the first two weeks in February). If transplantation occurs during the growing season, increased mitigation ratios will apply.**
- Any areas that receive transplanted elderberry shrubs and elderberry cuttings will be protected in perpetuity.
- The Corps will work to develop and identify off-site compensation areas prior to or concurrent with any take of VELB.
- The Corps will submit its site suitability study to the Service for review and comment prior to implementation; and request and receive written concurrence from the Service that the site(s) is suitable for compensation for this project prior to construction.
- Management of compensation areas will include all measures specified in USFWS's conservation guidelines (**USFWS 2017**~~1999a~~) related to weed and litter control, fencing, and the placement of signs.
- Monitoring of compensation areas will occur for five consecutive years. Annual monitoring reports will be submitted to the Service **for those five years**.
- Dust control measures shall be implemented when construction activities take place within 100 feet of elderberry shrubs.
- Off-site areas will be protected in perpetuity and have a funding source for maintenance (endowment).

<u>Compensation Measures</u>

Compensation for landside and waterside effects to VELB will be addressed in accordance with the **Framework for Assessing Impact to the Valley Elderberry Longhorn Beetle, May 2017**~~the VELB Guidelines~~ (USFWS **2017**~~1999~~). Shrubs will be removed and transplanted to an approved Conservation Bank ~~for VELB Recovery or to an approved site within the Action Area and outside the levee footprint~~. Transplanted shrubs will be moved prior to construction during dormancy, approximately November through the first **two**~~2~~ weeks in February after they lose their leaves. Transplanting during the dormant period will reduce shock to the plant and increase transplantation success. However, transplanted elderberry shrubs may experience stress, a decline in health, or death due to changes in soil, hydrology, microclimate, or associated

vegetation. ~~Transplanted elderberry shrubs and compensatory seedlings and associated native plants would be planted at a USFWS and Corps approved site, which could include one or both of the proposed habitat compensation areas described below (see "Proposed Habitat Compensation Sites" subsection below).~~ **USACE proposes to construct compensatory habitat at the San Joaquin River West Parcel. Compensatory seedlings and associate plantings would be planted at a rate of 3 acres created for every 1 acre lost.**

Operation and Maintenance Phase

The avoidance, minimization, and compensation measures described here are examples of the types of measures that may be appropriate during the operation and maintenance phase of the project.

Avoidance and Minimization Measures
When a 100-foot (or wider) buffer is established and maintained around elderberry shrubs, complete avoidance (i.e., no adverse effects) will be assumed.

- Where encroachment on the 100-foot buffer has been approved by the USFWS, a setback of 20 feet from the dripline of each elderberry shrub will be maintained whenever possible.
- During maintenance activities, all areas to be avoided will be fenced and flagged.
- Maintenance personnel will be briefed on the need to avoid damaging elderberry shrubs and the possible penalties for not complying with these requirements.
- Dust control measures shall be implemented when Operations, and Maintenance, Repair, Replacement, and Rehabilitation (OMRR&R) activities take place **within 100 feet of elderberry shrubs**.
- Maintenance workers will be trained on identification of elderberry plants.
- No restrictions or measures are required for areas which are to be maintained free of any woody vegetation; it is assumed these areas will be maintained on an interval such that any elderberry plants will not achieve the minimum 1 inch necessary for potential beetle occupation.

2. GIANT GARTER SNAKE

Construction Phase

Avoidance and Minimization Measures
The following measures will be implemented to minimize effects on GGS habitat that occurs within 200 feet of any construction activity. These measures are based on USFWS guidelines for restoration and standard avoidance measures included as appendices in USFWS (1997).

- For each discrete reach affecting snake habitat, construction will be initiated during the snake active period (May 1-October 1) and prior to September 15, but may continue beyond the active period provided that work is continuous (lapses shall be no greater than 24 hours).
- All construction personnel, including workers and contractors, will participate in a worker environmental awareness training program conducted by a Service-approved biologist prior to commencement of construction activities.
- A GGS survey would be conducted 24 hours prior to construction in potential habitat. Should there be any interruption in work for greater than two weeks; a biologist would survey the Project Area again no later than 24 hours prior to the restart of work.
- **The biological monitor would conduct a morning inspection before each work day, including the work site, and any parked equipment, and the exclusion fence; (c) and an additional second inspection of habitat during construction for each work day.**
- **Exclusionary fencing would be installed between potential habitat and ground disturbance areas fencing will be buried at least six inches below the ground to prevent snakes from burrowing and moving under the fence, and will be inspected daily.**
- GGS encountered during construction activities will be allowed to move away from construction activities on their own.
- Movement of heavy equipment to and from the construction site will be restricted to established roadways. Stockpiling of construction materials will be restricted to designated staging areas, which will be located more than 200 feet away from GGS aquatic habitat.
- GGS habitat within 200 feet of construction activities will be designated as an environmentally sensitive area and delineated with signs or fencing. This area will be avoided by all construction personnel.
- If a frac-out is identified, all work will stop, including the recycling of the bentonite fluid. In the event of a frac-out into water, the location and extent of the frac-out will be determined, and the frac-out will be monitored for 4 hours to determine whether the fluid congeals (bentonite will usually harden, effectively sealing the frac-out location).
- USFWS, NMFS, CDFW, and the Regional Water Quality Control Board will be notified immediately of any spills and will be consulted regarding clean-up procedures. A Brady barrel will be onsite and used if a frac-out occurs. Containment materials, such as straw bales, also will be onsite prior to and during all operations, and a vacuum truck will be on retainer and available to be operational onsite within notice of 2 hours. The site supervisor will take any necessary follow-up response actions in coordination with agency representatives. The site supervisor will coordinate the mobilization of equipment stored at staging areas (e.g., vacuum trucks) as needed.

- If the frac-out has reached the surface, any material contaminated with bentonite will be removed by hand to a depth of 1-foot, contained, and properly disposed of, as required by law. The drilling contractor will be responsible for ensuring that the bentonite is either properly disposed of at an approved Class II disposal facility or properly recycled in an approved manner.
- Project-related vehicles will observe a ~~20~~**15**-mile-per-hour speed limit within construction areas, except on existing paved roads where they will adhere to the posted speed limits.
- Aquatic habitat for the snake which will be affected by construction will be inspected for the snake, then dewatered, and maintained dry and absent of aquatic prey for 5 days prior to the initiation of construction activities. If complete dewatering is not possible, the Service will be contacted to determine if any additional measures may be necessary to minimize effects to the snake.

Compensation Measures

- Habitat (primarily upland) temporarily impacted for one **construction** season (~~May 1- October 1~~ **lasting six calendar months and commencing during the snake active season**) will be restored after construction by applying appropriate erosion control techniques and replanting/seeding with appropriate native plants. This includes upland snake habitat primarily between the edge of the levee crown to the waterside easement of work locations (excludes hard surfaces) impacted by cutoff wall and reshaping actions; all temporary fill and construction debris shall be removed prior to such restoration work. Aquatic ditches will be recreated.
- Aquatic habitat permanently impacted will be replaced at a 3:1ratio.
- Upland habitat permanently impacted will be replaced at a 1:1ratio.
- Animal burrows exist throughout the project footprint (includes easements). These burrows are a special element of upland habitat used by the snake as refugia. Animal burrows in the footprint will be removed or filled as part of construction activities and new animal burrows will be subject to grouting throughout the project life as part of operation and maintenance. To offset the effect on the snake of construction and grouting of animal burrows for all reaches of the project considered potential snake habitat, there will be a one-time purchase of 22.62 snake credits at an approved snake conservation bank before any project construction. **This purchase has been completed.**
- The Corps will ensure that mitigation is acquired prior to any disturbance of snake habitat. Habitat will be protected, managed, and maintained, in perpetuity.
- Quantify alternative snake refugia (i.e., alternatives to animal burrows, consisting of upland features within 30 ft of snake aquatic habitat, including but not limited to brush piles; riprap with voids sufficient to allow

snake use; animal burrows in uplands outside of maintenance zones but within levees, including islands). This assessment will be done within one year prior to the initial onset of project work, and repeated at five year intervals until completion of all project work in the LSJRFS.

Permanent impacts to GGS aquatic habitat within the construction area would be compensated **by creating GGS habitat at the San Joaquin River West Parcel at a ratio of 3:1 for permanent impacts to aquatic habitat.** No permanent impacts to GGS upland habitat is anticipated. ~~Purchasing bank credits from a USFWS and Corps approved conservation bank per an agreed upon compensation ratio~~.

Operations and Maintenance Phase
The avoidance, minimization, and compensation measures described here are examples of the types of measures that may be appropriate during the O&M phase of the project.

Avoidance and Minimization Measures

- Snake-impacting OMRR&R activities will be planned so that they would occur between May 1 and October 1 during the snake's active season to minimize impacts to the species.
- Grouting of animal burrows on upland within 30 water side ft of snake aquatic habitat will only be done between May 1 and September 1, and during times of day when air temperatures are between 13 and 34 degrees Centigrade (55.4 and 93.2 Fahrenheit). Grouting will be permitted without restriction on levee road and ramp road surfaces, on the land side of the levee, and on upland farther than 30 feet from the water side.
- Construction personnel will participate in USFWS-approved worker environmental awareness program.
- A GGS survey would be conducted 24 hours prior to OMRR&R activities in potential habitat. Should there be any interruption in work for greater than two weeks; a biologist would survey the Project Area again no later than 24 hours prior to the restart of work.
- GGS encountered during OMRR&R activities will be allowed to move away from construction activities on their own.
- Movement of heavy equipment to and from the construction site will be restricted to established roadways. Stockpiling of construction materials will be restricted to designated staging areas, which will be located more than 200 feet away from GGS aquatic habitat.

Summary of Impacts and Mitigation

Species or Habitat Type	Location of Impact	Magnitude of Impact	Duration of Impact	Compensation Ratio	Total Compensation[3]	Location of Compensation
GGS Upland	Northern Staging Area	9.8 acres	Temporary- one construction season	Restore after completion of construction	9.8 acres	On-site
GGS Upland	Waterside slope up to existing aggregate within the project footprint	13.88 acres	Temporary- one construction season	Restore after completion of construction[4]	13.88 acres	On-site
GGS Aquatic	Agricultural ditch	2.3 acres	Temporary- one construction season	Restore after completion of construction	2.3 acres	On-site
GGS Aquatic	Wetland habitat near ditch	0.6 acres	Permanent	3:1	1.8 acres	San Joaquin River West
VELB Existing Shrubs	Waterside slope	10 shrubs	Permanent	N/A	Transplant 10 shrubs	USFWS-approved bank
VELB Riparian	Waterside slope	11.4 acres	Permanent	3:1	34.2 acres	San Joaquin River West
FWCA Riparian Habitat	Waterside slope	13.88 acres	Permanent	2.5:1	34.7 acres	San Joaquin River West
FWCA Wetland Habitat	Wetland habitat near ditch	0.6 acres	Permanent	3:1	1.8 acres	San Joaquin River West

[3] VELB Riparian and FWCA Riparian acres are combined; 34.7 acres of habitat would be created at San Joaquin River West and count for both. GGS aquatic and FWCA Wetland are combined; 1.8 acres of habitat would be created at San Joaquin River West and count for both.

[4] Riprap provides upland habitat for this species and is considered restoration following construction completion.

K. Action Area

The action area is defined as “all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action.” 50 CFR § 402.02. The action area encompasses all area(s) in which the effects of the action will be felt. The action area is defined by measurable or detectable changes (stressors) in land, air and water, or other measurable factors that result from the proposed action and interrelated or interdependent actions.

The action area for the TS-30L levee improvement includes the levee improvement areas, borrow area, staging areas, haul routes, compensation area, and portions of the surrounding agricultural fields. Since there is not a hydrologic connection between the agricultural ditch and other nearby waterbodies, it is not anticipated that effects would be carried downstream. In addition, best management practices (BMP’s) would reduce these effects to the extent feasible. Air quality BMP’s would also reduce the effects of fugitive dust and constrain the impacts to the Project Areas. Haul routes and roads are currently used as roads, and, therefore, no additional effects are anticipated along the haul routes. Although TS-30L is a portion of the larger LSJR project, overall effects for the LSJR project have been analyzed in the 2016 BO. and a summary of these effects is given in Table 5. Effects to the action area in this SBA will focus on the changes to the TS-30L area. Future documents will assess additional changes to the other areas of the LSJR project as those details are developed.

Table 5 - Summary of LSJR Project Effects

Action Area (Sub-Regions)	Cost Reaches	Waterway	Reach Description	Proposed Measure(s)	Waterside Vegetation Clared for Construction & ETL Compliance	Total Existing Woody Riparian (WR)/SRA Within Project Footprint	Total # Acres Waterside Woody Riparian Lost (Lower Levee)	Total Linear Footage Waterside SRA Lost	Qualitatitive Value[1] of Habitat (Species)
Mosher Slough	MC_30L (6,600 ft)	Mosher Slough	Thornton road to railroad tracks	Cutoff Wall	Removal of 100 vegetation in upper half of levee within contruction footprint. Removal of upto 75% of vegetation on lower half of levee slope for ETL compliance.	3.5 acres (WR) 0 lf (SRA)	1.5 acres	0 lf	Low quality habitat for all life stages of delta smelt. Poor water quality for juvenile rearing and migration for salmon, steelhead and green sturgon.
	MC_10L_20L (10,700 ft)		Shima Tract to Thornton Road	Cutoff Wall, Levee Height fix (sea level rise)					
Delta Front	ST_10R_20R (5,700 ft)	Shima Tract	Mosher Slough to Fivemile Slough	Cutoff Wall, Erosion protection (landside)	Removal of 100 vegetation in upper half of levee within contruction footprint. Removal of upto 75% of vegetation on lower half of levee slope for ETL compliance.	2.75 acres (WR) 0 lf (SRA)	.75 acres	0 lf	Low quality habitat for all life stages of delta smelt. Poor water qualityfor juvenile rearing and migration for salmon, steelhead and green sturgon.
	FS_10R (1,700 ft)	Fivemile Slough	Shima Tract to Fourteenmile Slough						
	FM_60L (1,600 ft) FM_50L (300 ft) FM_40L (1,500 ft) FM_30L (7,000 ft)	Fourteenmile Slough	Fivemile Slough to Proposed Closure Structure	Seismic fix, slope, Reshaping Levee Height Fix(sea level rise), Erosion protection(Landside)	Removal of 100% vegetation in upper half of levee within contruction footprint. Removal of upto 75% of vegetation on lower half of levee slope for ETL compliance. Removal of all vegetation for Closure structure easement.				High quality for spawning and rearing habitat for delta smelt. Poor water quality habitat for juvenile rearing and migration for salmon, steelhead, and green sturgeon.
				Closure structure					
			Approx 1,500 ft west of Fivemile Slough	Seismic fix, Levee Height Fix(sea level rise), Erosion protection(Landside)					
			Approx 1250 feet Southeast setback out from proposed closure structure	Seismix fix (adjacent levee). Erosion protection (landside), Setback levee					
			From setback cut South to Tenmile Slough						
	TS_30L (5,900 ft) TS_20L (1,600 ft)	Tenmile Slough	Fourteenmile Slough to March Lane	Cutoff wall, Slope reshaping, Erosion protection(waterside)	Removal of 100% vegetation in upper half of levee within construction footprint. **Removal of 100% vegetation on lower half of levee slope.**				High quality for spawning and rearing habitat for delta smelt. Poor water quality habitat for juvenile rearing CH for delta smelt. Low quality habitat for salmon steelhead, and green sturgeon.
			March Lane to West March Lane/Buckley Clove Way						
	TS_10L (4,000 ft)	Tenmile Slough/Buckley Cove Marina/San Joaquin River	West March Lane/Buckley Cove Way to Calaveras river.	Seismic fix, Slope Reshaping					
Calaveras River	CR_10R-80R (23,000 Ft)	Calaveras River- Right/North Bank	San Joauin River to NEl Dorado St	Cutoff Wall	Removal of 100% vegetation in upper half of levee within construction footprint. Removal of upto 75% of vegetation on lower half of levee slope for ETL compliance.	11 acres (WR) 10.406 lf (SRA)	3.0 acres	7,805 lf	High quality habitat for delta smelt spawning and rearing. High quality habitat for steelhead adult migration and juvenile rearing and migration. Medium quality habitat for green sturgeon juvenile rearing and migration at confisence of Calaveras River. Medium quality EFH for salmon.
		Calaveras River- Left/South Bank	San Joauin River to approx I-5						
		Calaveras River- Left/South Bank	Approx I-5 to approx NPershing Ave	Cutoff Wall, Slope Reshaping					
		Calaveras River - Left/South Bank	Approx N Pershing ave to approx NPacific st	Cutoff Wall					
		Calaveras River - Left/South Bank	Approx N Pacific to El Dorado Street						
San Joaquin River Downstream of French Camp Slough	SC_30 (800 ft)	Smith Canal	At the mouth of the cnal between Brown's Island and Dad's Point.	Closure structure	Removal of 100% vegetation in upper half of levee within contruction footprint. Removal of upto 75% of vegetation on lower half of levee slope for ETL compliance. Removal of all vegetation for Closure structure easement.	9 acres (WR) 7,949 lf (SRA)	3 acres	6,318 lf	**SJR**: High quality habitat for delta smelt spawning and rearing. High quality habitat for steelhead adult migration and juvenile rearing and migration. High quality habitat for green sturgeon juvenile rearing and migration at confluence. **Smith Canal**: Low quality habitat for delta smelt and green sturgeon. Low quality habitat for salmon and steelhead juvenile rearing and migration.
	SJR_10R (8,600 ft)	San Joaquin River	For approx 2,100 ft upstream of Calaveras River to the proposed Smith Canal Closure Structure	Cutoff Wall, Levee Height fix (sea level rise)					
	SJR_20R (600 ft)	Smith Canal	Dad's Point from the closure structure to approx 375 ft down Monte Diablo Ave	Floodwall					
	SJR_30R (3,500 ft)	San Joaquin River	Railroad bridge just upstream of Port of Stockton to Burns Cutoff	Cutoff Wall, Slope Reshaping	Removal of 100% vegetation in upper half of levee within contruction footprint. Removal of upto 75% of vegetation on lower half of levee slope for ETL compliance.				**SJR**: High quality habitat for delta smelt spawning and rearing. High quality habitat for steelhead and salmon adult migration and juvenile rearing and migration. High quality habitat for green sturgeon juvenile rearing and migration at confluence.
	SJR_40R-70R (12,600 ft)		Burns Cutoff to French Camp Slough	Cutoff Wall					
French Camp Slough and Duck Creek	FCS_10R (9,000 ft)		Part of CS-E-9 "a" and "b" NEPA Reaches	Cutoff Wall	Removal of 100% vegetation in upper half of levee within construction footprint. Removal of upto 75% vegetation on lower half of levee slope for ETL compliance.	4.75 acres (WR) 7,153 lf (SRA)	.75 acres	5,509 lf	Low quality habitat for delta smelt. Low quality habitat for straying juvenile rearing and migrating salmon, steelhead and green sturgeon. Medium quality habitat for salmon and steelhead highwater habitat.
	DC_10R	Duck Creek ("a" only)	French Camp Slough to 500 ft past I-5 crossing	Cutoff Wall					
	DC_20R	Duck Creek	500 ft past I5 crossing to approx Odell Ave	New Levee					
	DC_30R	Duck Creek	Approx Odell Ave to Mckinley Ave	Fix in-place Cutoff Wall, Levee Reshaping, Levee height Fix					

[1]High, Medium and low qualitative values were based on best professional judgement and personal communications with Jeff Stuart (NMFS). Parameters considered include d temperature, pollutants, dissolved oxygen and flows.

Levee Improvement Areas
Existing habitats within the construction footprint were described in the supplemental Coordination Act Report completed in 2022 with the results of a Habitat Evaluation Procedures (HEP) survey led by USFWS to evaluate the quality of the acres of riparian habitat that would be impacted at TS-30L. Riparian scrub-shrub, riparian forest, and wetland cover types are present at TS-30L. In addition, an aquatic resource delineation was conducted by USACE on March 9, 2021, for the irrigation ditch and the wetlands located between the ditch and the TS-30L levee. The findings of the surveys indicate that riparian cover types combined consist of 11.4 acres on the waterside slopes and toe, 2.3 acres of irrigation ditch adjacent to some segments of the waterside toe, and 0.6 acres of wetland adjacent to and associated with the ditch. Habitat surveys conducted in support of the project (not including the supplemental CAR report) are included in Appendix D. The landside of the levee slopes consists of crushed aggregate and are unvegetated.

Habitats in this area on the waterside levee slope, and the footprint of the land and waterside patrol roads, would be permanently lost starting with the vegetation removal phase as described in Table 4. Since the waterside slope would be converted to riprap without soil, vegetation would not regrow. Similarly, within the boundaries of the patrol road, no vegetation would be allowed to regrow, and these areas would be considered developed lands from a habitat perspective.

During the construction, the airspace above the improvement area could also be unavailable as habitat or a transit corridor due to vehicular traffic and fugitive dust. The ground below the improvement area would be subject to vibration from heavy equipment for the duration of the construction phase as noted in Table 4. Areas within the levee improvement footprint would also be subject to noise for the duration of the project.

Borrow Area
The U.S. Bureau of Reclamation (USBR) described the proposed borrow site as heavily disturbed from annual crop production of corn, asparagus, and tomatoes with bare ground in the winter (USBR, 2018). The USBR further identified that regular cultivation practices such as herbicide spraying and mowing prevented the establishment of riparian vegetation within the ditches that provide water to the parcel (USBR, 2018).

Areas within the proposed borrow area would be subject to temporary vegetation removal, noise, and dust for the duration of the construction phase of the project. Upon completion of the project, the borrow area would be converted from a fallowed field to a groundwater infiltration set aside. After completion of fill extraction, the area would be reseeded with a native seed mix. In future years, seasonal wetlands could develop in this area; however, the future condition of the borrow area is beyond the scope of this analysis.

Staging Areas
The northern staging area is an irrigated rice field. The southern staging area is an undeveloped parcel of land covered in non-native herbaceous vegetation, with ornamental trees along the perimeter.

Areas used for staging would be subject to vegetation removal, dust, noise, vibration, and vehicular traffic for the duration of the construction phase of the project. Staging areas would be surrounded by both wildlife exclusion fencing as well as chain link fencing for the duration of the construction phase making these areas unavailable as habitat for the entirety of construction. Following construction, these areas would be returned to their previous uses. The northern staging area would return to rice cultivation and the southern staging area would be reseeded with a native seed mix.

Haul Routes
All haul routes are along existing paved and dirt roads and are therefore either paved or kept free of vegetation.

Haul routes would be subject to additional vehicular traffic than usual. Since many heavy-duty trucks would be using these routes, there would likely be more noise and vibration than usual. Low hanging branches along roadways would be removed to allow access for truck traffic. Since load are required to be covered, and dirt roads would be regularly sprayed with water, it is not anticipated that there would be any additional fugitive dust.

Compensation Area- San Joaquin River West Parcel
Habitat surveys within the proposed compensation parcel were conducted in December 2022. Habitat is primarily annual grasses and nonnative forbs. The parcel is used for agriculture but was fallowed at the time of survey.

Habitats in the compensation area would be subject to noise, fugitive dust, vibration, and increased vehicular traffic starting with the construction as listed in Table 3. Most existing vegetation would be removed, except for native trees. After planting is completed as described in Table 3, habitat benefits would begin to accrue as vegetation matures and is able to provide food and shelter. Over time, the mitigation area will provide more valuable habitat than its original state. Minor periodic disturbances associated with personnel conducting hand weeding, signage repair, and other maintenance task would occur regularly for the life of the site; however, these disturbances are expected to be low in intensity and short in duration.

Surrounding Agricultural Fields
The surrounding agricultural fields are annually used for rice cultivation. Ditches line and run through the parcel, with some amount of volunteer vegetation, such as bulrush (*Schoenoeplectus* sp.) and cattail (*Typha* sp.), along some of them.

The surrounding agricultural fields are likely to experience some degree of spillover from the construction of the levee improvement. With the implementation of air quality management BMP's, fugitive dusts are anticipated to be restricted to the construction site, borrow areas and staging areas. Construction sites are generally 95dB throughout their area with periodic exceedances of 100dB (NRC, 2012). Given that the topography of the site is generally flat, noise from the site could be expected to extend approximately 3200 feet from the construction site. The distance at which ground vibrations can be felt varies based on soil type, water content, and equipment used. Since these calculations have not been completed, the maximum distance for type of equipment used would be 800 feet (NHDOT, 2012) and is the distance assumed.

IV. STATUS OF THE SPECIES AND CRITICAL HABITAT IN THE ACTION AREA

For species that are described and covered in this consultation, habitat preferences and distributions are based on published data, agency documents, review of the IPaC from the USFWS (Project Code: 2023-0079350) and environmental surveys.

A. Giant Garter Snake

Status. The USFWS listed GGS as a threatened species under the ESA on October 20, 1993 (58 FR 54053). A Recovery Plan was approved in 2017 (USFWS 2017). Recovery actions are focused on protecting existing, occupied habitat and identifying and protecting areas for habitat restoration, enhancement, or creation, including areas that are needed to provide connectivity between populations (USFWS 2017). Critical habitat has not been designated for this species.

Distribution. GGS inhabit agricultural wetlands and other waterways such as rice fields, irrigation and drainage canals, sloughs, ponds, small lakes, low gradient streams, and adjacent uplands in the Central Valley (USFWS 2020). Historical records suggest that GGS inhabited freshwater marshes, streams, and wetlands throughout the length of the Sacramento and San Joaquin Valleys in Central California (USFWS 2017). Today only about five percent of its historical wetland habitat acreage remains. Currently, this species is only known from nine isolated population clusters within the Central Valley, from Chico to an area just southwest of Fresno (USFWS 2017).

GGS have been reduced in distribution and abundance due to habitat loss and degradation throughout the Central Valley. Several factors may degrade habitat for the species, including upstream watershed modifications, water storage and diversion projects, and urban and agricultural development. Contamination from agricultural runoff

may also have detrimental effects. On-going agricultural practices such as tilling, grading, harvesting and operation of other equipment may also result in mortality and increased rates of predation. Clearing and maintenance of irrigation canals and draining of rice fields may also result in mortality and degradation of habitat (USFWS; 2017).

There are known populations of GGS within the counties of the Project Area (CDFW 2023). There are two known occurrences of GGS within two miles of the Project Area. One is located near the Roberts Island II Dredged Material Placement Site on the left bank of the San Joaquin River, and another near Louis Park in Stockton (CDFW 2023).

The aquatic ditch and surrounding wetland habitat and rice fields are considered suitable habitat for GGS. The levee itself could be considered suitable as upland brumation and aestivation habitat for GGS. The northern staging area is also considered suitable habitat as GGS are known to use rice fields as foraging habitat.

Life History. GGS feed primarily on small fishes, tadpoles, and frogs in agricultural wetlands and associated waterways, including irrigation and drainage canals, rice fields, marshes, sloughs, ponds, low-gradient streams, and adjacent uplands. They use small mammal burrows and other soil crevices above prevailing flood elevations throughout the winter dormancy period, and require emergent, herbaceous wetland vegetation, such as cattails and bulrushes, as escape cover and foraging habitat during the active season (early April to mid-October). They have also been observed using revetment as cover (Halstead et al. 2010). GGS are believed to be most numerous in rice-growing regions (USFWS 2017). The snakes are typically absent from the larger rivers, wetlands with sand, gravel, or rock substrates, and riparian areas lacking suitable basking sites or suitable prey populations (USFWS 2017). Habitually, GGS hibernate from October to March in abandoned burrows of small mammals located above prevailing flood elevations, and breeds during March and April.

B. Valley Elderberry Longhorn Beetle

VELB are a medium-sized beetle native to riparian habitats in the Sacramento and San Joaquin Valleys of California. They are nearly always found on or close to their host plant, elderberry. Males range in length from about one-half to nearly one inch with antennae about as long as their bodies. Females are slightly broader than males and have shorter antennae. Adult males have red-orange wing covers with four elongate spots, while adult females have dark colored wing cover.

Throughout its range, the beetle is estimated to inhabit approximately 20 percent of all suitable elderberry shrubs. Elderberry shrubs are found in or near riparian and oak woodland habitats. The presence of exit holes in elderberry stems indicates previous valley elderberry longhorn beetle habitat use. Exit holes are cylindrical and approximately 0.25 inch in diameter. Exit holes can be found on stems that are one or

more inches in diameter. The holes may be located on the stems from a few inches to about nine to 10 feet above the ground (Barr 1991).

Status. The USFWS listed VELB as threatened under the ESA on August 8,1980 (45 FR 52803). A final, revised Recovery Plan was approved in 2019 (USFWS 2019). The recovery strategy includes: 1) the establishment of sufficiently large populations throughout the species' range to ensure each population has the resiliency to withstand stochastic events; 2) maintaining the species' current level of representation (genetic and ecological diversity) so it potentially has the capacity to adapt to future environmental changes; and 3) increasing the species' current level of redundancy through the establishment of a sufficiently large number of local- and meta-populations widely distributed throughout the species' range to allow the species to withstand catastrophic events (USFWS 2019). Critical habitat was designated along the American River within Sacramento County in 1980 (45 FR 52803 USFWS 2019a). The proposed action falls outside the critical habitat.

Distribution. VELB's range extends from southern Shasta County to Madera County up to 500 feet elevation (USFWS 2019). Ten elderberry shrubs are present within the TS-30L Project Area but no exit holes were documented during site surveys. CNDDB lists the nearest occurrence about six miles from the project site.

Since the shrubs are present in riparian habitat, and the land use of the property to the west has not changed since large scale agriculture began, it is reasonable to assume that the shrubs in the project site are suitable habitat for VELB.

Life History. VELB's life history is assumed to follow a sequence of events similar to those of related taxa. Female beetles deposit eggs in crevices in the bark of living elderberry shrubs. Presumably, the eggs hatch shortly after they are laid, and the larvae bore into the pith of the trunk or stem. When larvae are ready to pupate, they move through the pith of the plant, open an emergence hole through the bark and return to the pith for pupation. Adults exit through the emergence holes and can sometimes be found on elderberry foliage, flowers, or stems or on adjacent vegetation. The entire life cycle of VELB is thought to encompass 2 years, from the time eggs are laid and hatch until adults emerge and die (USFWS 2019).

C. Monarch Butterfly

Adult monarch butterflies have two sets of bright orange wings with a black border, black veins spanning three to four inches in length. A double row of white spots is visible on the upper side of the wings. Caterpillars have black, yellow, and white stripes (USFWS 2021).

Status. The USFWS determined that the monarch butterfly is a candidate species for listing under the ESA on December 17, 2020, based on a 12-month finding in response

to a petition to list the species under the act (85 FR 81813). Listing the monarch butterfly was found to be warranted but precluded by higher priority actions to amend the Lists of Endangered and Threatened Wildlife and Plants (85 FR 81813). As of May 3, 2022, the listing priority number remains eight in the candidate notification of review (87 FR 26152).

Monarch butterflies are facing a number of threats which are contributing to their decline including conversion of grasslands to agriculture, exposure to pesticides and loss of host plants due to herbicides, loss of overwintering sites in Mexico and California, urban development, and climate change (85 FR 81813).

Distribution. The monarch butterfly exists in several populations throughout the world (Nail, Drizd, and Voorhies, 2019). Within Western North America, northwestern populations are understood to migrate between Washington and Oregon to California, and more northeasterly populations from Idaho and Montana south to Mexico (Dingle, et al., 2005). There are numerous citizen science, non-governmental organizations, and government agencies that track populations and occurrences of monarch butterflies. Records within CNDDB only identify overwintering sites, which are located along the California Coast (CDFW, 2023); however, Journey North tracks all monarch butterfly sightings. Journey North reported adult monarch butterflies within two miles of the Project Area within the last five years (Journey North, 2023).

Life History. Monarchs have a complex migratory lifecycle that is completed intergenerationally. Eggs are laid on a number of milkweed (*Asclepias* sp.) where the caterpillars will feed exclusively for five instar stages before a roughly 2-week pupation (Journey North, 2023). Breeding adults live only two to five weeks, but overwintering adults can live six to nine months (USFWS, 2023). Migration in the Western United States commences from overwintering on the coast around February with groups disassociating eastward and northward as they move inland in the spring, ovipositing opportunistically (Dingle, et.al., 2005). Subsequent generations return roughly south-southwest in the autumn.

V. ENVIRONMENTAL BASELINE AND CUMULATIVE EFFECTS

This section will be used along with the species and critical habitat information from the preceding section to describe the pre-action condition of the species and critical habitat that will be exposed to the stressors and subsidies of the action(s) under consultation. The purpose of this section is also to provide a summary of the relevant local information on the impacts that other factors (human and natural) in the action area have had on the viability of the species and value of critical habitat. These other factors may have occurred in the past, may continue to affect the species and habitat today, or will affect the species and habitat in the future.

A. Environmental Baseline

The environmental baseline is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species or its habitat and ecosystem within the Project Area (USFWS and NMFS, 1998). The environmental baseline "includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early Section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation process" (50 CFR § 402.02).

Agricultural Uses

Historically, the parcel on which the TS-30L segment is located, would have been a seasonal wetland or marsh, likely with emergent vegetation, and numerous dendritic channels. However, land in and around Stockton has been used for agricultural purposes for over 150 years (Visit Stockton, 2023). Cultivation of the land for crops has historically involved draining wetlands, channelizing waterways into irrigation ditches, alteration of natural hydrology, plowing, removal of native vegetation, extirpation of native species, destruction of soil structure, alteration of soil chemistry, and alteration of land grade.

Levee Maintenance

Levee maintenance activities consist of regularly grouting (filling with cement) rodent burrows, routine uses of rodenticide, herbicide, and insecticide to control for unwanted biota, burning of vegetation on the levee, periodic placement of rock substrates (bank hardening), and vehicular traffic. Increased vehicular traffic can result in mortalities on road surfaces as well as introduce non-native plant species.

Utility Maintenance Activities

Periodic utility maintenance activities include ground disturbance to access underground pipes and vegetation removal for access to utilities. Vehicular access to offroad areas to access utilities can result in mortalities for wildlife, soil compaction, and introduction of non-native species.

Recreational Uses

Recreational uses of the Project Area result in increased noise and disturbance of some species in the surrounding area. Disturbance of native wildlife by domestics, sometimes resulting in mortality, sometimes also occurs due to outdoor and feral cats, as well as dogs off leash. Pets can also transmit diseases to wildlife through feces or harass wildlife out of territories through scent marking.

B. Cumulative Effects

Cumulative effects include the effects of future State, Tribal, local, or private actions that are reasonably certain to occur in the action area. Future Federal actions that are unrelated (*i.e.*, not interrelated, or interdependent) to the proposed action are not

considered in this analysis because they will be subject to separate consultation pursuant to Section 7 of the ESA.

Construction of the proposed groundwater recharge basin at the SEWD borrow site is likely to occur with or without the completion of this project, as that action has been separately funded by USBR. However, the groundwater recharge basin project proponents would likely need to find another project for which to provide fill.

The immediate vicinity of the TS-30L project, as bounded by the San Joaquin River to the south and west and White Slough to the north and east up to the Brookside development, is listed in the City of Stockton General Plan (City of Stockton, 2018) and the County of San Joaquin General Plan (County of San Joaquin, 2022) as an agricultural/open space set aside. Further, the area is subject to the Delta Plan (Delta Stewardship Council, 2019), which restricts incompatible activities, such as residential development.

Within the Greater Stockton Area, residential and commercial development continue. The parcel immediately to the north, referred to as the Shima Tract is scheduled for residential development under the Sanctuary plan (City of Stockton, 2021). All areas to the west of the proposed project are not planned for development for the foreseeable future (Delta Stewardship Council, 2019).

Continued development for residential and commercial purposes will continue to reduce the habitat available for all species in the region for the foreseeable future.

VI. EFFECTS OF THE ACTION

Initial evaluation of the effects of the proposed project indicated that there could be an effect on several resources. Section VI.A describes potential direct and indirect effects on Federally listed species in the Project Area, and Section VI.B describes potential effects on the environment and how these effects could directly or indirectly affect these species.

A. Potential Effects to Listed Species

Section 9 of the ESA prohibits the take of listed threatened and endangered species. Under this act, “take” means to “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct” (16 U.S.C. § 1532[19]). The proposed project could result in take of some special status species that have the potential to occur in the vicinity of the Project Area.

Giant Garter Snake

The proposed action **May Affect, and is Likely to Adversely Affect**, giant garter snakes. Construction of the project would result in a direct loss of 0.6 acres of aquatic habitat. In addition, there would be a temporary loss of the 2.3 acres of habitat within the irrigation ditch, and a temporary loss of 9.8 acres of foraging habitat due to use of the northern staging area, and a temporary loss of 11.6 acres of upland GGS habitat to account for the levee slopes within 200 feet of aquatic habitat. Fencing would be installed to exclude GGS from the project site, including staging areas, and would remain for the duration of the construction. A service approved biologist would inspect the fencing daily to verify its integrity and ensure no GGS are within the Project Areas. While this measure would reduce the chances for mortality, it makes habitat temporarily completely unavailable within the Project Area. Upon completion of the project, the northern staging area would be returned to cultivation and available for use as foraging habitat. The levee slopes would consist of riprap which is also suitable as upland habitat for GGS.

Since snakes use small mammal burrows, soil crevices, and/or rock crevices for shelter for brumation during the winter season and aestivating during extremely hot days during their active period any ground disturbing work near GGS suitable habitat carries the risk of crushing a snake in its burrow. However, the proposed action would commence during the active season for the snakes; therefore, it is anticipated that the chances for mortality are low, since noise, vibration, and general disturbance in the area would deter the snakes from the construction footprint. In addition, installation of wildlife exclusion fencing, and use of biological monitors would reduce the chances of a snake entering or remaining in the construction areas. It is likely that there would be excess ground vibration beyond the project construction area and, therefore, the proposed project will likely have some additional adverse effect by harassing snakes away from suitable habitat, just outside the construction area. In addition, due to increased vehicular traffic near GGS habitat, there is an elevated chance that a snake could be hit by a construction vehicle while basking on a road. However, use of wildlife exclusion fencing, biological monitors, and enforcement of a speed limit of 15 mph within the Project Area would reduce these effects to the extent practical. These effects would cease following the completion of construction.

Valley Elderberry Longhorn Beetle

The proposed action **May Affect, and is Likely to Adversely Affect,** the valley elderberry longhorn beetle. Ten elderberry shrubs would be permanently transplanted to a conservation bank, permanently moving suitable habitat from the current area to the conservation bank and the San Joaquin River West compensation area. Transplant stress could result in the loss or reduction in health of the mature shrubs which could adversely affect any present larvae. In addition, there would be a time lag between the removal of the habitat and the compensation seedlings reaching a suitable size to provide habitat benefits.

Transplanting of shrubs currently existing within the project footprint would occur during the dormant season for the plant and would be conducted by persons familiar with the work. These measures would reduce the chances for mortality or stress to the shrubs to the extent practical. Further, since construction work would be completed outside of the VELB flight season, it is extremely unlikely that a mortality would occur.

Currently, the shrubs on the waterside slope of the levee are subject to pesticide drift from the adjacent rice field, in addition to dust from the adjacent road. The San Joaquin River West Parcel would plant compensatory seedlings in the interior areas of the parcel to reduce the chances of pesticide drift. The compensation ratio of 3:1 accounts for the time lag required for the compensatory seedlings to reach an appropriate size to provide a habitat benefit. In the long run, habitat in the San Joaquin River West compensation area would be of higher quality and subject to less disturbance than the relict shrubs currently present on the waterside levee slope.

Monarch Butterfly

The Monarch butterfly is currently listed as a candidate ESA species due to loss of habitat, use of pesticides, and climate change. Candidate species receive no statutory protection under the ESA. However, USFWS encourages cooperative conservation efforts for these species because they are, by definition, species that may warrant future protection under the ESA. Construction of the project would result in a short-term loss of habitat due to loss of vegetation on the levee slopes for the Monarch butterfly. However, construction of the compensation area would result in the creation of a greater amount of superior habitat, since pollinator specific species to be included in the area would not be subject to pesticide drift, compared to those currently present on the levee slopes. Since the loss of habitat would only last for one season, the effect is expected to be muted and inclusion of pollinator species within the compensation area will benefit the species in the long run.

B. Environmental and Indirect Effects

1. ENVIRONMENTAL EFFECTS

Levee improvements would result in a permanent loss of vegetation along the waterside of the structure. Within the greater area, no landscape level effects are anticipated. Changes to the levee structure are not anticipated to cause environmental effects beyond the direct take of habitat which would be fully compensated at the San Joaquin River West Parcel.

2. INDIRECT EFFECTS

Indirect effects, as defined by the ESA, are those effects that are caused by the proposed action and are later in time but are still reasonably certain to occur. Since rock heats differently than soil, it can be anticipated that there would be a long-term shift in

the microclimate of the immediate vicinity. Areas directly around the levee could be expected to be slightly warmer during the summer months for longer into the night than an earthen bank would be. In the summer months, this would be a benefit to GGS, who are ectotherms, as they could use the additional warmth for additional active hours and metabolic support. However, in the winter, the effect would be reversed as the insulative properties of stone are far inferior to those of natural soil. Therefore, the quality of winter refugia would be reduced. Taken together, the overall effect is insignificant.

VII. CONCLUSION

In conclusion, the proposed levee improvements at TS-30L, as described in this SBA, **may affect, and are likely to adversely affect,** the giant garter snake and the valley elderberry longhorn beetle. This determination is based on the understanding of the actions required to complete the proposed action.

Implementation of avoidance and minimization measures proposed would reduce mortality and adverse effects to the extent attainable while achieving the project objectives and construction of the compensation area as described would fully compensate for unavoidable adverse effects to the listed species.

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
Phone: (916) 414-6600 Fax: (916) 414-6713

In Reply Refer To:
Project Code: 2023-0079350
Project Name: TS_30_L Levee Improvement

May 08, 2023

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)

(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see https://www.fws.gov/birds/policies-and-regulations.php.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.php.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/birds/policies-and-regulations/executive-orders/e0-13186.php.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Note: IPaC has provided all available attachments because this project is in multiple field office jurisdictions.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Migratory Birds
- Wetlands

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
(916) 414-6600

This project's location is within the jurisdiction of multiple offices. However, only one species list document will be provided for all offices. The species and critical habitats in this document reflect the aggregation of those that fall in each of the affiliated office's jurisdiction. Other offices affiliated with the project:

San Francisco Bay-Delta Fish And Wildlife
650 Capitol Mall
Suite 8-300
Sacramento, CA 95814
(916) 930-5603

PROJECT SUMMARY

Project Code: 2023-0079350
Project Name: TS_30_L Levee Improvement
Project Type: Levee / Dike - Maintenance/Modification
Project Description: Located in Stockton a total size of 144 acres. The levee improvements will include moving 6000ft of levee next to an agricultural ditch.
Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@37.9687459,-121.2156245884236,14z



Counties: San Joaquin County, California

ENDANGERED SPECIES ACT SPECIES

There is a total of 10 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Riparian Brush Rabbit *Sylvilagus bachmani riparius*	Endangered

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/6189

REPTILES

NAME	STATUS
Giant Garter Snake *Thamnophis gigas*	Threatened

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/4482

AMPHIBIANS

NAME	STATUS
California Tiger Salamander *Ambystoma californiense*	Threatened

Population: U.S.A. (Central CA DPS)
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
Species profile: https://ecos.fws.gov/ecp/species/2076

FISHES

NAME	STATUS
Longfin Smelt *Spirinchus thaleichthys* Population: San Francisco Bay-Delta DPS No critical habitat has been designated for this species.	Proposed Endangered

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate
Valley Elderberry Longhorn Beetle *Desmocerus californicus dimorphus* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7850	Threatened

CRUSTACEANS

NAME	STATUS
Vernal Pool Fairy Shrimp *Branchinecta lynchi* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/498	Threatened
Vernal Pool Tadpole Shrimp *Lepidurus packardi* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2246	Endangered

FLOWERING PLANTS

NAME	STATUS
Large-flowered Fiddleneck *Amsinckia grandiflora* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5558	Endangered
Palmate-bracted Bird's Beak *Cordylanthus palmatus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1616	Endangered

CRITICAL HABITATS

There is 1 critical habitat wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Delta Smelt *Hypomesus transpacificus* For information on why this critical habitat appears for your project, even though Delta Smelt is not on the list of potentially affected species at this location, contact the local field office. https://ecos.fws.gov/ecp/species/321#crithab	Final

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

MIGRATORY BIRDS

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Belding's Savannah Sparrow *Passerculus sandwichensis beldingi* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/8	Breeds Apr 1 to Aug 15
Bullock's Oriole *Icterus bullockii* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Mar 21 to Jul 25
California Gull *Larus californicus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 1 to Jul 31

NAME	BREEDING SEASON
Clark's Grebe *Aechmophorus clarkii* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Jun 1 to Aug 31
Common Yellowthroat *Geothlypis trichas sinuosa* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/2084	Breeds May 20 to Jul 31
Lawrence's Goldfinch *Carduelis lawrencei* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9464	Breeds Mar 20 to Sep 20
Long-eared Owl *asio otus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3631	Breeds Mar 1 to Jul 15
Nuttall's Woodpecker *Picoides nuttallii* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9410	Breeds Apr 1 to Jul 20
Oak Titmouse *Baeolophus inornatus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9656	Breeds Mar 15 to Jul 15
Olive-sided Flycatcher *Contopus cooperi* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3914	Breeds May 20 to Aug 31
Tricolored Blackbird *Agelaius tricolor* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3910	Breeds Mar 15 to Aug 10
Western Grebe *aechmophorus occidentalis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/6743	Breeds Jun 1 to Aug 31
Wrentit *Chamaea fasciata* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 15 to Aug 10
Yellow-billed Magpie *Pica nuttalli* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9726	Breeds Apr 1 to Jul 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

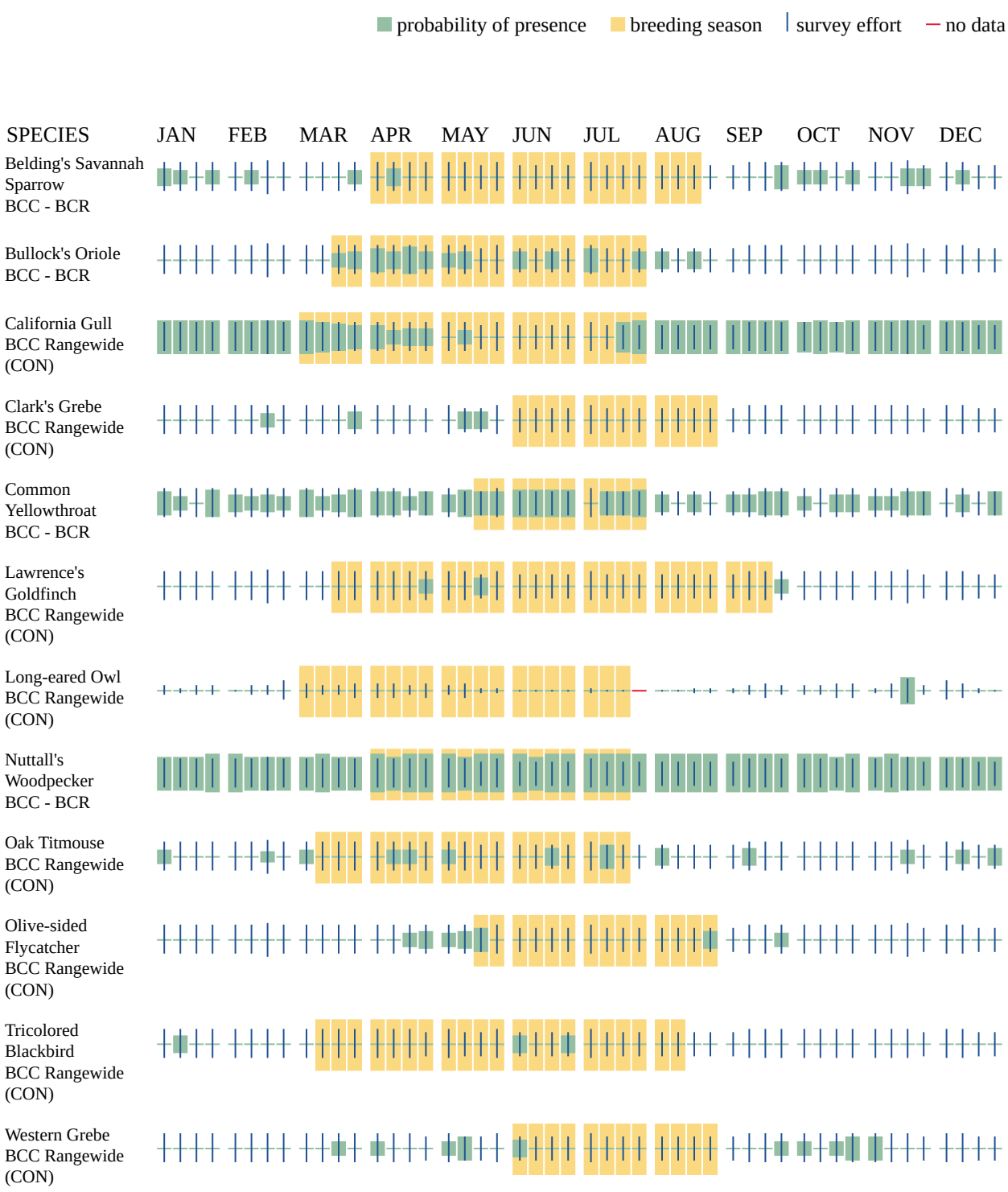
Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

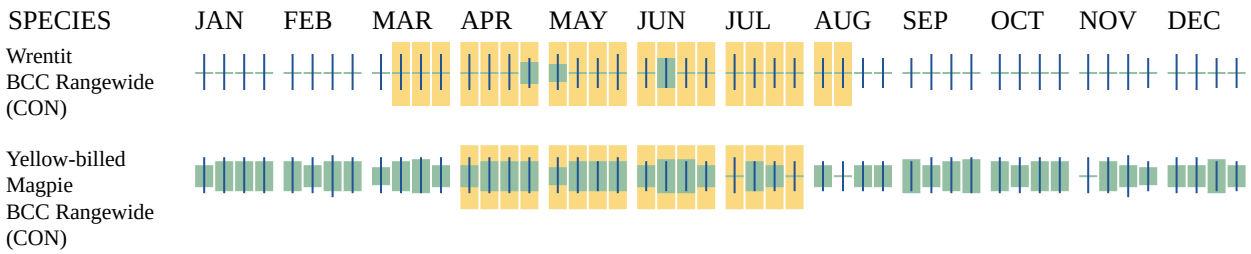
Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.





Additional information can be found using the following links:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

MIGRATORY BIRDS FAQ

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?
The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?
To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?
Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects
For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?
If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report
The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

WETLANDS

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

WETLAND INFORMATION WAS NOT AVAILABLE WHEN THIS SPECIES LIST WAS GENERATED. PLEASE VISIT HTTPS://WWW.FWS.GOV/WETLANDS/DATA/MAPPER.HTML OR CONTACT THE FIELD OFFICE FOR FURTHER INFORMATION.

IPAC USER CONTACT INFORMATION

Agency: Army Corps of Engineers
Name: Steven Mclemore
Address: 1325 J Street
City: Sacramento
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Appendix B
TS-30L Construction Plans

US Army Corps of Engineers®
SACRAMENTO DISTRICT

LOWER SAN JOAQUIN RIVER REACH TS_30_L LEVEE IMPROVEMENT SAN JOAQUIN COUNTY, CALIFORNIA PROJECT 475448



SOLICITATION NO.:
CONTRACT NO.:
DESIGN FILE NO.: 7-04-1877
ISSUE DATE: NOVEMBER 2022

REGISTERED PROFESSIONAL ENGINEER
SERGIO JIMENEZ
NO. C 55698
Exp. 12/31/22
CIVIL
STATE OF CALIFORNIA

USACE SACRAMENTO SIGNATURE BLOCK
PREPARED UNDER THE DIRECTION OF:

JAMES HANDURA
COLONEL, CORPS OF ENGINEERS, SACRAMENTO DISTRICT

APPROVED BY:

RICK POEPPELMAN, P.E.
CHIEF, ENGINEERING DIVISION

APPROVED FUNCTIONAL ADEQUACY:

WILLIAM HALL, P.E.
CHIEF, CIVIL WORKS DESIGN BRANCH

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: DMM / BFL
DRAWN BY: M. HARRINGTON
CHECKED BY: K. BRUSTAD
QUALITY CHECKED BY: S. JIMENEZ
SIZE: ANSI D

ISSUE DATE: NOVEMBER 2022
SOLICITATION NO.: XXXXXX-XX-X-XXXX
CONTRACT NO.:

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
1325 J ST.
SACRAMENTO, CA 95814

PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

LOWER SAN JOAQUIN RIVER REACH
TS_30_L LEVEE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

TITLE SHEET

SHEET ID
G-001

FINAL SUBMITTAL

SHEET INDEX

SHEET NO	SHEET NUMBER	SHEET TITLE
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3	G-003	SYMBOLS AND LEGENDS
4	G-004	GENERAL NOTES
5	G-005	BORROW SITE AND HAUL ROUTES
6	G-006	STAGING AND STOCKPILE AREA AND HAUL ROUTES
7	V-001	PROJECT SURVEY CONTROL AND CONTROL LINE PLAN AND TABLES
8	V-002	PROPOSED LEVEE CENTERLINE CONTROL LINE PLAN AND TABLES
9	V-003	PROPOSED CUTOFF WALL CONTROL LINE PLAN AND TABLES
10	V-004	PROPOSED RAMPS CONTROL LINES AND PLANS AND TABLES
11	V-005	PROPOSED LIMITS OF WORK POINT TABLE
12	V-006	OVERALL SITE PLAN AND KEY MAP
13	V-007	STAGING AREA TEMPORARY IMPROVEMENTS
14	B-001	BORING LOG LEGEND
15	B-201	BORING LOG PLAN AND PROFILE STA 1+00 TO 30+00
16	B-202	BORING LOG PLAN AND PROFILE STA 30+00 TO 60+00
17	V-100	AERIAL PLAN STA 1+00 TO 10+00
18	V-101	AERIAL PLAN STA 10+00 TO 20+50
19	V-102	AERIAL PLAN STA 20+50 TO 31+00
20	V-103	AERIAL PLAN STA 31+00 TO 41+50
21	V-104	AERIAL PLAN STA 41+50 TO 52+00
22	V-105	AERIAL PLAN STA 52+00 TO 62+00
23	C-100	LEVEE PLAN STA 1+00 TO 10+00
24	C-101	LEVEE PLAN STA 10+00 TO 20+50
25	C-102	LEVEE PLAN STA 20+50 TO 31+00
26	C-103	LEVEE PLAN STA 31+00 TO 41+50
27	C-104	LEVEE PLAN STA 41+50 TO 52+00
28	C-105	LEVEE PLAN STA 52+00 TO 62+00
29	C-200	LEVEE PROFILE STA 1+00 TO 10+50
30	C-201	LEVEE PROFILE STA 10+50 TO 21+00
31	C-202	LEVEE PROFILE STA 21+00 TO 31+50
32	C-203	LEVEE PROFILE STA 31+50 TO 42+00
33	C-204	LEVEE PROFILE STA 42+00 TO 52+50
34	C-205	LEVEE PROFILE STA 52+50 TO 63+00
35	C-311	CROSS SECTIONS STA 1+00 TO 9+00
36	C-312	CROSS SECTIONS STA 10+00 TO 18+00
37	C-313	CROSS SECTIONS STA 19+00 TO 27+00
38	C-314	CROSS SECTIONS STA 28+00 TO 36+00
39	C-315	CROSS SECTIONS STA 37+00 TO 45+00
40	C-316	CROSS SECTIONS STA 46+00 TO 54+00
41	C-317	CROSS SECTIONS STA 55+00 TO 61+00
42	C-501	LEVEE CUTOFF WALL SECTION AND DETAIL
43	C-502	TYPICAL CUTOFF WALL CONSTRUCTION SEQUENCE AND DETAILS
44	C-503	TYPICAL KEY AND BENCHING DETAILS
45	C-504	SETTLEMENT PLATE INSTALLATION
46	C-505	TYPICAL ROADWAY DETAILS
47	C-506	SECURITY FENCE DETAILS
48	C-507	IRRIGATION DITCH RELOCATION
49	C-508	WATERSIDE ACCESS RAMP PLAN AND PROFILE
50	C-509	MARCH LANE ACCESS RAMP PLAN AND PROFILE
51	C-510	NORTHERN ACCESS RAMP PLAN AND PROFILE
52	CG-100	EROSION CONTROL PLAN STA 1+00 TO 10+00
53	CG-101	EROSION CONTROL PLAN STA 10+00 TO 20+50
54	CG-102	EROSION CONTROL PLAN STA 20+50 TO 31+00
55	CG-103	EROSION CONTROL PLAN STA 31+00 TO 41+50
56	CG-104	EROSION CONTROL PLAN STA 41+50 TO 51+50
57	CG-105	EROSION CONTROL PLAN STA 51+50 TO 61+00

ABBREVIATIONS

AB	AGGREGATE BASE
AC	ASPHALT CONCRETE
ALT	ALTERNATE
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
APPROX	APPROXIMATE
AVE	AVENUE
BLDG	BUILDING
BVCE	BEGIN VERTICAL CURVE ELEVATION
BVCS	BEGIN VERTICAL CURVE STATION
CL	CENTERLINE, CONTROL LINE
CLR	CLEARANCE
CONC	CONCRETE
CMP	CORRUGATED METAL PIPE
CMU	CONCRETE MASONRY UNIT
DI	DROP INLET
DWSE	DESIGN WATER SURFACE ELEVATION
DWG	DRAWING
(E)	EXISTING, EAST
E	EASTING
EG	EXISTING GRADE
ELEV, EL	ELEVATION
EP	EDGE OF PAVEMENT
ES	EDGE OF SHOULDER
ETW	EDGE OF TRAVELED WAY
EVCE	END VERTICAL CURVE ELEVATION
EXIST	EXISTING
(F)	FUTURE
FG	FINISHED GRADE
FT	FEET
FTG	FOOTING
GALV	GALVANIZED
GB	GRADE BREAK
H	HORIZONTAL
HMA	HOT MIX ASPHALT
HP	HINGE POINT
HSS	HIGH STRENGTH STEEL
ID	INSIDE DIAMETER
IN	INCHES
INV	INVERT
IP	IRON PIPE
JBOX	JUNCTION BOX
LF	LENGTH FOOT
LN	LANE
LT	LEFT
LVC	LENGTH OF VERTICAL CURVE
MAX	MAXIMUM
MIN	MINIMUM
(N)	NORTH
N	NORTHING
NO	NUMBER
NTS	NOT TO SCALE
Ø	DIAMETER
OC	ON CENTER
OD	OUTSIDE DIAMETER
OG	ORIGINAL GROUND
(P)	PROPOSED
PC	POINT OF CURVATURE
PG	PROFILE GRADE
PG&E	PACIFIC GAS & ELECTRIC
PI	POINT OF INTERSECTION
PIP	PROTECT IN PLACE
PP	POWER POLE
PT	POINT OF TANGENCY
PVC	POLYVINYL CHLORIDE
PVI	POINT OF VERTICAL INTERSECTION
R	RADIUS
R/W	RIGHT OF WAY
RD	ROAD
RT	RIGHT
(S)	SOUTH
SB	SOIL-BENTONITE
SD	STORM DRAIN
SDMH	STORM DRAIN MANHOLE
SHT	SHEET
SR	STATE ROUTE
SS	SANITARY SEWER
SSFM	SANITARY SEWER FORCE MAIN
SSMH	SANITARY SEWER MANHOLE
STA	STATION
STD	STANDARD
TCE	TEMPORARY CONSTRUCTION EASEMENT
TOL	TOP OF LEVEE
TOP	TOP OF PIPE
TOT	TOTAL
TOW	TOP OF WALL
T-UG	TELEPHONE UNDERGROUND
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
USCS	UNIFIED SOIL CLASSIFICATION SYSTEM
UPRR	UNION PACIFIC RAILROAD
V	VERTICAL
VAR	VARIES
(W)	WEST
WSE	WATER SURFACE ELEVATION

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: DMM / BFL
DRAWN BY: M. HARRINGTON
CHECKED BY: K. BRUSTAD
QA/QC PERFORMED BY: S. JIMENEZ
SIZE: ANSI D

ISSUE DATE: NOVEMBER 2022
SOLICITATION NO.: XXXXXX-XX-X-XXXX
CONTRACT NO.:

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
1325 J ST
SACRAMENTO, CA 95814

PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

LOWER SAN JOAQUIN RIVER REACH
WS SAN JOE IMPROVEMENT PROJECT
SAN JOAQUIN COUNTY, CALIFORNIA

SHEET INDEX AND ABBREVIATIONS

SHEET ID
G-002

FINAL SUBMITTAL

EXISTING TOPOGRAPHIC FEATURES

LEGEND

EXISTING	DESCRIPTION
	BOLLARD
	BORE HOLE
	CATCH BASIN
	CONTROL POINT
X X	FENCE
COMM	ABOVE GROUND COMMUNICATION LINE
COMM	UNDERGROUND COMMUNICATION LINE
E E	ELECTRICAL LINE ABOVE GROUND
E E	ELECTRICAL LINE UNDERGROUND
FUEL	FUEL LINE
	FIRE HYDRANT ASSEMBLY
G	GAS LINE
	GAS METER
	GUY WIRE
	HAUL ROUTE
	MANHOLE
	PIPE GATE
	APPROX. PARCEL BOUNDARY
R/W	PROPERTY RIGHT-OF-WAY
	BOUNDARY EASEMENT
PB	PULL BOX
SAN	SANITARY SEWER
S	SANITARY SEWER MANHOLE
	SHRUB
	SIGN
x 2524.4	SPOT ELEV
SD	STORM DRAIN LINE
	STREET LIGHT
T	TELEPHONE LINE UNDERGROUND
	TREE
	UTILITY POLE
W W	WATER LINE
W	WATER MANHOLE WITH AIR RELEASE VALVE
W	WATER METER OR WATER CONNECTION
	WATER VALVE OR GAS VALVE OR AIRE RELEASE VALVE

PROPOSED SITE PLAN SYMBOLOGY

PROPOSED	DESCRIPTION
	INDICATES DIRECTION OF BANK SLOPE, BOTH EXISTING (E) AND PROPOSED (P)
CP–X	HORIZONTAL CONTROL POINT
	RC RETAINING WALL
	DESIGN WATER SURFACE ELEVATION
X X	FENCE
	V-DITCH FLOW LINE
22.04 (P)	SPOT GRADING
	(P) RIP RAP
	(P) AGGREGATE BASE
	(P) AGGREGATE SURFACING
	EROSION CONTROL SEEDING
	TEMPORARY FIBER ROLL
SF	SILT FENCE
	LIMITS OF WORK
	LIMITS OF GRADING
	LIMITS OF LEVEE DEGRADE
	GUARDRAIL
	STAGING/STOCKPILE AREA
	REMOVE PAVEMENT
	REMOVE AGGREGATE SURFACE COURSE
	HOT MIX ASPHALT
	REMOVE CONCRETE WALL

GENERAL SYMBOLOGY

#
PLAN
SCALE:

PLAN TITLE

ARROW INDICATES DIRECTION OF SECTION CUT
SECTION LETTER
X
XXX
SHEET WHERE SECTION IS LOCATED

SECTION CUT MARKER

SECTION LETTER
A
SECTION
SCALE:

SECTION TITLE

DETAIL NUMBER
#
XXX
SHEET WHERE DETAIL IS LOCATED

DETAIL MARKER

#
DETAIL
SCALE:

DETAIL TITLE

DETAIL NUMBER
ARROW INDICATES POINT OF VIEW
#
XXX
SHEET WHERE DETAIL IS LOCATED

SINGLE ELEVATION OR PHOTO MARKER

Y28+50
STATION
CONTROL LINE

STATIONING DESIGNATION

N
NORTH ARROW
ARROW INDICATES DIRECTION OF PLAN NORTH

NOTE

THESE LEGENDS & SYMBOLS APPLY TO THE ENTIRE SET OF CONTRACT DRAWINGS.

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

ISSUE DATE: NOVEMBER 2022
SOLICITATION NO.: XXXXXX-XX-X-XXXX
CONTRACT NO.:

DESIGNED BY: DMM / BFL
DRAWN BY: M. HARRINGTON
CHECKED BY: K. BRUSTAD
SUBMITTED BY: S. JIMENEZ
SIZE: ANSI D

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
1325 J ST
SACRAMENTO, CA 95814

PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

LOWER SAN JOAQUIN RIVER REACH
TS, SW LEVEE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

SYMBOLS AND LEGENDS

SHEET ID
G-003

FINAL SUBMITTAL

GENERAL NOTES

1. BASIS OF SURVEY DATA IS NAD83 (HORIZONTAL) AND NAVD88 (VERTICAL). TOPOGRAPHIC SURVEY WAS PROVIDED BY USACE DATED JULY 2020.

2. THE BASELINE INFORMATION SHOWN ON THE DRAWINGS IS A CONSTRUCTION REFERENCE LINE ESTABLISHED FOR THE PROJECT FACILITIES SHOWN. THE CONTRACTOR SHALL STAKE THE BASELINE AND ANY OFFSETS REQUIRED.

3. AERIAL PHOTOS, INCLUDED IN THE DRAWINGS ARE PROVIDED FOR REFERENCE ONLY.

4. UTILITY INFORMATION ON THE PROJECT DRAWINGS WAS COMPILED FROM DATA PROVIDED BY THE UTILITY OWNERS AND PRE-CONSTRUCTION POTHOLING. THE LOCATIONS SHOWN ARE APPROXIMATE. PRIOR TO COMMENCING FABRICATION OR CONSTRUCTION, THE ACTUAL DIMENSIONS, SIZES, MATERIALS, LOCATIONS, AND ELEVATIONS OF ALL EXISTING UTILITIES SHALL BE VERIFIED BY THE CONTRACTOR. THE CONTRACTOR IS CAUTIONED THAT ONLY ACTUAL EXCAVATION WILL REVEAL THE DIMENSIONS, SIZES, MATERIALS, LOCATIONS, AND DEPTH OF THE UNDERGROUND UTILITIES. ALL EXISTING UNDERGROUND AND OVERHEAD UTILITIES SHALL BE PROTECTED FROM DAMAGE BY CONSTRUCTION EQUIPMENT AND OPERATIONS. EXCAVATION WILL NOT BE ALLOWED PRIOR TO UTILITY POTHOLING WITHIN THE LIMITS OF CONSTRUCTION.

5. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE EXACT LOCATION OF ALL EXISTING UTILITIES AND FOR THE PROTECTION OF AND REPAIR OF DAMAGE TO THEM. CONTACT 811 (USA NORTH 811), 48 HOURS BEFORE WORK IS TO BEGIN.

6. PRIOR TO BEGINNING WORK, THE CONTRACTOR SHALL CONTACT ALL UTILITY COMPANIES WITH REGARD TO WORKING OVER, UNDER, OR AROUND EXISTING FACILITIES AND TO OBTAIN INFORMATION REGARDING RESTRICTIONS THAT ARE REQUIRED TO PREVENT DAMAGE TO THE FACILITIES.THE KNOWN UTILITIES THAT SHOULD BE CONTACTED ARE AS FOLLOWS:
   1-PG&E GAS: JEREMIAH CAMARENA (559) 355-6044
   2-PG&E ELECTRIC: BRAD JOAQUIN (209) 323-8106
   3-AT&T: DON SEELYE (209) 474-4364
   4-CITY OF STOCKTON: ALI GHAREGOZLOO (209) 937-8460

7. THE CONTRACTOR SHALL COMPLY WITH THE CORPS OF ENGINEERS SAFETY & HEALTH MANUAL (EM 385-1-1) AND OBTAIN A PERMIT FROM THE STATE DIVISION OF OCCUPATIONAL SAFETY AND HEALTH (2424 ARDEN WAY, SUITE 165, SACRAMENTO, CA; PHONE NO. (916) 263-2800 FOR ALL TRENCH EXCAVATION FIVE (5) FEET OR MORE IN DEPTH PRIOR TO BEGINNING ANY EXCAVATION. A COPY OF THIS PERMIT SHALL BE AVAILABLE AT THE SITE AT ALL TIMES.

8. THE CONTRACTOR SHALL PROVIDE TEMPORARY FENCING, GATES, OR BARRIERS WHENEVER EXISTING FENCING, GATES, OR BARRIERS ARE REMOVED BY THE END OF EACH WORK DAY ON WHICH FENCE REMOVAL OCCURS. GATES AND FENCES AT ALL ACCESS LOCATIONS SHALL BE PROTECTED AND LOCKED DURING NON-WORKING HOURS. PG&E REQUIRES A TEMPORARY FENCE TO BE PLACED AROUND THEIR POWER POLE(S) AND GUY CABLE(S).

9. EXISTING FENCING DESIGNATED ON THE DRAWINGS TO BE REMOVED MAY, IF SERVICEABLE, BE SALVAGED AND REINSTALLED OR REPLACED IN KIND. FENCING SHALL BE INSTALLED AS INDICATED ON THE PLANS OR AT OTHER LOCATIONS DESIGNATED BY THE CONTRACTING OFFICER. FENCING THAT IS NOT IN SERVICEABLE CONDITION SHALL BE DISPOSED OF BY THE CONTRACTOR IN ACCORDANCE WITH THE SPECIFICATIONS.

10. THE CONTRACTOR SHALL KEEP ROADWAYS CLEAR OF MUD AND DEBRIS AT ALL TIMES. MAINTAIN DUST CONTROL PER THE SPECIFICATIONS. CONTRACTOR SHALL PROVIDE DUST CONTROL ON ALL HAUL ROUTE ROADS AND LEVEE ROADS AT ALL TIMES DURING CONSTRUCTION.

11. A SILT FENCE OR OTHER APPROVED TEMPORARY EROSION CONTROL MEASURE SHALL BE INSTALLED AS REQUIRED BY THE STORM WATER POLLUTION PREVENTION PLAN (SWPPP) PREPARED BY THE CONTRACTOR.

12. EARTHEN MATERIAL FOR BACKFILL SHALL BE FROM SOURCE APPROVED BY THE CONTRACTING OFFICER PRIOR TO ACQUISITION OF MATERIAL.

13. THE PROJECT SCHEDULE AND WORK PLAN MUST BE APPROVED BY THE CONTRACTING OFFICER, PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. PHASE 1 ACTIVITIES DETAILED ON SHEET C-503 SHALL BE COMPLETED BEFORE PHASE 2 CONSTRUCTION ACTIVITIES CAN BEGIN. PHASE 1 ACTIVITIES MAY OCCUR, WITH CONTRACTING OFFICER APPROVAL, OUTSIDE OF THE CONSTRUCTION SEASON CONSTRAINTS IN ACCORDANCE WITH THE SPECIFICATIONS.

14. TIME OF WORK PERFORMED BY THE CONTRACTOR SHALL BE IN CONFORMANCE WITH THE HOURS IDENTIFIED IN THE SPECIFICATIONS.

15. ANY TEMPORARY EARTHWORK ASSOCIATED WITH CONSTRUCTION MUST BE APPROVED IN ADVANCE BY THE CONTRACTING OFFICER.

16. FINISHED SLOPE BANKS FROM STATION 4+50 TO 61+00 ARE 2.4H:1V WATERSIDE AND 2.9H:1V LANDSIDE UNLESS OTHERWISE NOTED.

17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR AND FURNISH, INSTALL, AND MAINTAIN TEMPORARY SIGNS, BRIDGES, BARRICADES, FLAGMEN, AND OTHER FACILITIES TO ADEQUATELY SAFEGUARD THE GENERAL PUBLIC AND WORK, AND TO PROVIDE FOR THE PROPER ROUTING OF VEHICULAR AND PEDESTRIAN TRAFFIC. CONSTRUCTION OPERATIONS SHALL COMPLY WITH THE WORK AREA AND THE CALIFORNIA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICE (CAMUTCD). THE CONTRACTOR SHALL PREPARE A TRAFFIC CONTROL PLAN IN ACCORDANCE WITH THE SPECIFICATIONS, ACQUIRING ALL PERMITS REQUIRED BY LOCAL AUTHORITIES. PUBLIC SAFETY AND TRAFFIC CONTROLS SHALL BE PROVIDED IN ACCORDANCE WITH THE CALTRANS STANDARD SPECIFICATIONS, SECTION 12, TEMPORARY TRAFFIC CONTROL, THE MANUAL ON TRAFFIC CONTROL DEVICES, CALIFORNIA EDITION, EM 385-1-1, AND ANY LOCAL TRAFFIC CONTROL REQUIREMENTS, AND AS DIRECTED BY THE CONTRACTING OFFICER. SAFE VEHICULAR AND PEDESTRIAN ACCESS SHALL BE PROVIDED AT ALL TIMES DURING CONSTRUCTION.

18. UNLESS OTHERWISE NOTED, NO TEMPORARY OR PERMANENT EXCAVATIONS ARE ALLOWED.

19. THE ENGINEER OF RECORD PREPARING THESE PLANS WILL NOT BE RESPONSIBLE FOR, OR LIABLE FOR, UNAUTHORIZED CHANGES TO OR USES OF THESE PLANS.

20. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING SURVEY MONUMENTS AND OTHER SURVEY MARKERS DURING CONSTRUCTION. CONTRACTORS LICENSED SURVEYOR SHALL TIE DOWN ANY EXISTING SURVEY MONUMENTS, PROPERTY PINS PRIOR TO START OF CONSTRUCTION AND FILE IT AT THE COUNTY RECORDERS OFFICE. ALL SUCH MONUMENTS OR MARKERS DESTROYED DURING CONSTRUCTION SHALL BE REPLACED AT THE CONTRACTORS EXPENSE, BY A CALIFORNIA LICENSED LAND SURVEYOR. ALL DAMAGED SURVEY MONUMENTS SHALL BE RESTORED BY A LICENSED SURVEYOR AND A FINAL RECORD OF SURVEY SHALL BE FILED AT THE COUNTY'S RECORDER'S OFFICE.

21. THE CONTRACTOR SHALL COMPLY WITH ALL STATE HISTORIC PRESERVATION OFFICE (SHPO) REQUIREMENTS IF ANY ARCHAEOLOGICAL ASSETS ARE UNCOVERED.

22. THE CONTRACTOR SHALL COMPLY WITH ALL FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

23. THE CONTRACTOR IS RESPONSIBLE FOR THE PROPER DISPOSAL OF ALL DEMOLISHED EQUIPMENT AND MATERIALS IN ACCORDANCE WITH LOCAL STATE AND FEDERAL LAWS.

24. THE CONTRACTOR MAY NOT ENTER ANY EXISTING BUILDINGS OR PROPERTY WITHOUT THE EXPRESS WRITTEN CONSENT OF THE OWNER. NOTIFY THE CONTRACTING OFFICER AND PROVIDE EVIDENCE OF CONSENT PRIOR TO ENTRANCE OF PRIVATE PROPERTY.

25. EXISTING PRIVATE FEATURES AND ENCROACHMENTS TO BE PROTECTED IN PLACE OR NOT DISTURBED ARE NOT PART OF THE FEDERAL FLOOD RISK REDUCTION PROJECT. EXISTING UTILITIES LOCATED OUTSIDE THE LIMITS OF GROUND DISTURBANCE ARE SHOWN FOR CONTRACTOR AWARENESS AND PROTECTION. THESE ITEMS HAVE NOT BEEN EVALUATED FOR CONFORMANCE WITH APPLICABLE STATE AND FEDERAL REQUIREMENTS REGARDING ASSESSMENT AND ACCEPTANCE OF LEVEE PENETRATIONS. THEIR INCLUSION IN THE DRAWINGS DOES NOT INDICATE BY REFERENCE THAT THEY ARE DETERMINE TO MEET STATE AND FEDERAL REQUIREMENTS.

US Army Corps of Engineers®

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CONTRACT NO.:

DESIGNED BY: DMM / BFL
DRAWN BY: M. HARRINGTON
CHECKED BY: K. BRUSTAD
SUBMITTED BY: S. JIMENEZ
SIZE: ANSI D

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
1325 J ST
SACRAMENTO, CA 95814

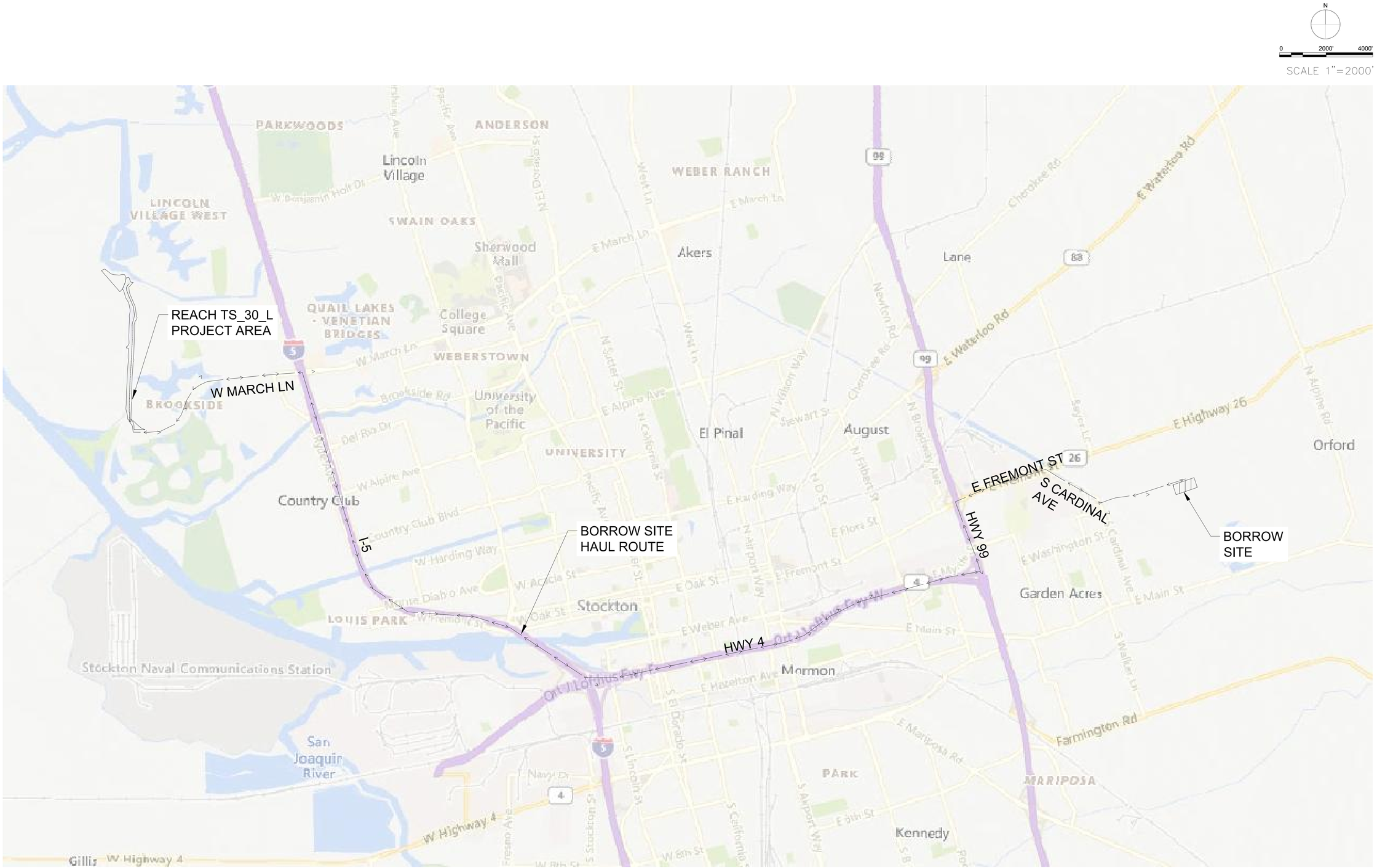
PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

LOWER SAN JOAQUIN RIVER REACH
TSI SAN JOE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

GENERAL NOTES

SHEET ID
G-004

FINAL SUBMITTAL



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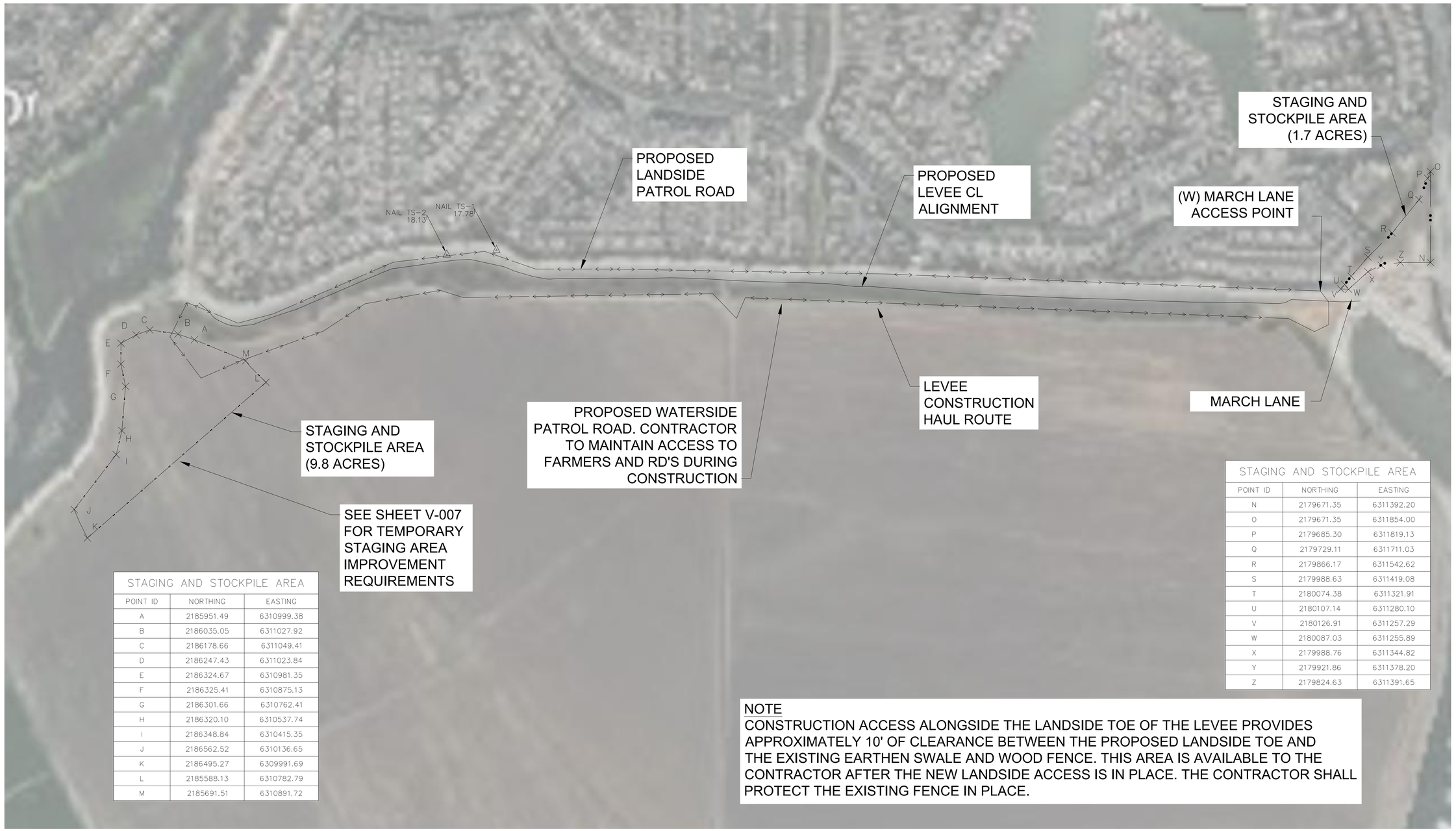
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

LOWER SAN JOAQUIN RIVER REACH
TS_30L LEVEE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

BORROW SITE AND HAUL ROUTES

SHEET ID
G-005

FINAL SUBMITTAL



N

0 125' 250'

SCALE 1"=250'

STAGING AND STOCKPILE AREA		
POINT ID	NORTHING	EASTING
A	2185951.49	6310999.38
B	2186035.05	6311027.92
C	2186178.66	6311049.41
D	2186247.43	6311023.84
E	2186324.67	6310981.35
F	2186325.41	6310875.13
G	2186301.66	6310762.41
H	2186320.10	6310537.74
I	2186348.84	6310415.35
J	2186562.52	6310136.65
K	2186495.27	6309991.69
L	2185588.13	6310782.79
M	2185691.51	6310891.72

STAGING AND STOCKPILE AREA		
POINT ID	NORTHING	EASTING
N	2179671.35	6311392.20
O	2179671.35	6311854.00
P	2179685.30	6311819.13
Q	2179729.11	6311711.03
R	2179866.17	6311542.62
S	2179988.63	6311419.08
T	2180074.38	6311321.91
U	2180107.14	6311280.10
V	2180126.91	6311257.29
W	2180087.03	6311255.89
X	2179988.76	6311344.82
Y	2179921.86	6311378.20
Z	2179824.63	6311391.65

NOTE

CONSTRUCTION ACCESS ALONGSIDE THE LANDSIDE TOE OF THE LEVEE PROVIDES APPROXIMATELY 10' OF CLEARANCE BETWEEN THE PROPOSED LANDSIDE TOE AND THE EXISTING EARTHEN SWALE AND WOOD FENCE. THIS AREA IS AVAILABLE TO THE CONTRACTOR AFTER THE NEW LANDSIDE ACCESS IS IN PLACE. THE CONTRACTOR SHALL PROTECT THE EXISTING FENCE IN PLACE.

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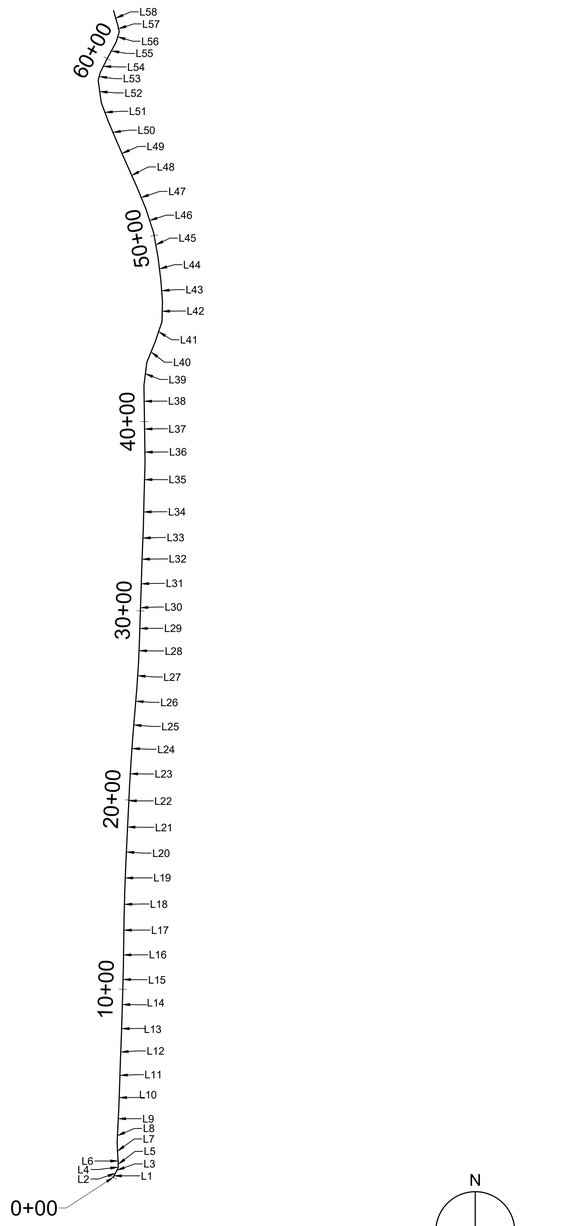
LOWER SAN JOAQUIN RIVER REACH
TSMA LEVEE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

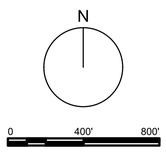
STAGING AND STOCKPILE AREA AND HAUL ROUTES

SHEET ID
G-006

FINAL SUBMITTAL



TS_30_L LEVEE
Y-LINE ALIGNMENT



TS_30_L ALIGNMENT Y-LINE TABLE

LINE TABLE: Y-LINE

LINE ID	STATION START	STATION END	LENGTH	BEARING	LINE STARTS (N,E)	LINE ENDS (N,E)
L1	-0+00.00	0+18.48	18.482	N28° 38' 53.62"E	(2179935.27,6311170.79)	(2179951.49,6311179.66)
L2	0+18.48	0+30.52	12.042	N28° 38' 53.62"E	(2179951.49,6311179.66)	(2179962.06,6311185.43)
L3	0+30.52	0+54.50	23.977	N26° 36' 07.14"E	(2179962.06,6311185.43)	(2179983.50,6311196.17)
L4	0+54.50	0+65.76	11.261	N08° 21' 53.54"E	(2179983.50,6311196.17)	(2179994.64,6311197.80)
L5	0+65.76	0+85.35	19.589	N02° 30' 21.33"W	(2179994.64,6311197.80)	(2180014.21,6311196.95)
L6	0+85.35	1+00.00	14.648	N03° 47' 06.70"W	(2180014.21,6311196.95)	(2180028.82,6311195.98)
L7	1+00.00	1+90.44	90.436	N02° 48' 33.43"W	(2180028.82,6311195.98)	(2180119.15,6311191.55)
L8	1+90.44	2+63.53	73.093	N02° 50' 54.60"E	(2180119.15,6311191.55)	(2180192.15,6311195.18)
L9	2+63.53	3+69.55	106.018	N02° 44' 13.85"E	(2180192.15,6311195.18)	(2180298.05,6311200.24)
L10	3+69.55	4+86.18	116.631	N02° 05' 31.81"E	(2180298.05,6311200.24)	(2180414.60,6311204.50)
L11	4+86.18	6+04.50	118.326	N01° 53' 46.98"E	(2180414.60,6311204.50)	(2180532.87,6311208.42)
L12	6+04.50	7+32.80	128.296	N02° 11' 54.72"E	(2180532.87,6311208.42)	(2180661.07,6311213.34)
L13	7+32.80	8+51.13	118.332	N01° 59' 03.87"E	(2180661.07,6311213.34)	(2180779.33,6311217.44)
L14	8+51.13	9+87.92	136.791	N01° 39' 47.84"E	(2180779.33,6311217.44)	(2180916.06,6311221.41)
L15	9+87.92	11+15.44	127.517	N01° 27' 30.91"E	(2180916.06,6311221.41)	(2181043.54,6311224.65)
L16	11+15.44	12+46.79	131.345	N00° 43' 57.25"E	(2181043.54,6311224.65)	(2181174.87,6311226.33)
L17	12+46.79	13+77.30	130.516	N00° 49' 53.41"E	(2181174.87,6311226.33)	(2181305.38,6311228.23)
L18	13+77.30	15+19.04	141.735	N01° 32' 20.82"E	(2181305.38,6311228.23)	(2181447.06,6311232.03)
L19	15+19.04	16+56.45	137.411	N02° 14' 16.04"E	(2181447.06,6311232.03)	(2181584.37,6311237.40)
L20	16+56.45	17+93.22	136.775	N02° 32' 38.80"E	(2181584.37,6311237.40)	(2181721.01,6311243.47)
L21	17+93.22	19+20.70	127.475	N02° 58' 29.86"E	(2181721.01,6311243.47)	(2181848.31,6311250.08)
L22	19+20.70	20+70.59	149.894	N02° 39' 36.65"E	(2181848.31,6311250.08)	(2181998.04,6311257.04)
L23	20+70.59	22+06.01	135.416	N03° 26' 42.59"E	(2181998.04,6311257.04)	(2182133.21,6311265.18)
L24	22+06.01	23+38.37	132.367	N04° 03' 37.19"E	(2182133.21,6311265.18)	(2182265.25,6311274.55)
L25	23+38.37	24+54.61	116.235	N04° 45' 01.39"E	(2182265.25,6311274.55)	(2182381.08,6311284.18)
L26	24+54.61	25+90.59	135.985	N04° 51' 03.46"E	(2182381.08,6311284.18)	(2182516.58,6311295.68)
L27	25+90.59	27+24.78	134.190	N03° 47' 41.14"E	(2182516.58,6311295.68)	(2182650.48,6311304.56)
L28	27+24.78	28+54.49	129.702	N02° 23' 37.41"E	(2182650.48,6311304.56)	(2182780.06,6311309.98)
L29	28+54.49	29+59.37	104.883	N01° 38' 17.40"E	(2182780.06,6311309.98)	(2182884.90,6311312.97)
L30	29+59.37	30+73.98	114.612	N02° 03' 59.84"E	(2182884.90,6311312.97)	(2182999.44,6311317.11)
L31	30+73.98	32+12.51	138.528	N01° 42' 55.90"E	(2182999.44,6311317.11)	(2183137.91,6311321.25)
L32	32+12.51	33+33.48	120.975	N02° 04' 40.87"E	(2183137.91,6311321.25)	(2183258.80,6311325.64)
L33	33+33.48	34+35.51	102.024	N02° 22' 50.69"E	(2183258.80,6311325.64)	(2183360.74,6311329.88)
L34	34+35.51	36+09.45	173.940	N01° 22' 35.69"E	(2183360.74,6311329.88)	(2183534.63,6311334.06)
L35	36+09.45	37+77.48	168.036	N01° 38' 32.19"E	(2183534.63,6311334.06)	(2183702.60,6311338.87)
L36	37+77.48	38+99.28	121.795	N00° 38' 07.66"W	(2183702.60,6311338.87)	(2183824.38,6311337.52)
L37	38+99.28	40+21.58	122.306	N00° 53' 45.62"W	(2183824.38,6311337.52)	(2183946.67,6311335.61)
L38	40+21.58	41+91.75	170.170	N00° 50' 29.23"W	(2183946.67,6311335.61)	(2184116.83,6311333.11)
L39	41+91.75	43+14.13	122.375	N07° 20' 44.33"E	(2184116.83,6311333.11)	(2184238.20,6311348.76)
L40	43+14.13	44+31.68	117.548	N21° 59' 40.28"E	(2184238.20,6311348.76)	(2184347.19,6311392.78)
L41	44+31.68	45+43.26	111.580	N18° 47' 28.62"E	(2184347.19,6311392.78)	(2184452.82,6311428.72)
L42	45+43.26	46+51.73	108.468	N01° 05' 42.39"E	(2184452.82,6311428.72)	(2184561.27,6311430.80)
L43	46+51.73	47+60.22	108.498	N04° 22' 07.21"W	(2184561.27,6311430.80)	(2184669.45,6311422.53)
L44	47+60.22	48+83.66	123.437	N07° 00' 56.86"W	(2184669.45,6311422.53)	(2184791.97,6311407.45)
L45	48+83.66	50+16.77	133.110	N10° 09' 47.07"W	(2184791.97,6311407.45)	(2184922.99,6311383.97)
L46	50+16.77	51+50.06	133.292	N18° 06' 53.38"W	(2184922.99,6311383.97)	(2185049.67,6311342.52)
L47	51+50.06	52+75.13	125.069	N22° 24' 07.10"W	(2185049.67,6311342.52)	(2185165.30,6311294.86)
L48	52+75.13	54+03.71	128.580	N24° 00' 40.29"W	(2185165.30,6311294.86)	(2185282.76,6311242.54)
L49	54+03.71	55+28.85	125.144	N23° 37' 19.85"W	(2185282.76,6311242.54)	(2185397.41,6311192.39)
L50	55+28.85	56+46.45	117.598	N22° 54' 22.82"W	(2185397.41,6311192.39)	(2185505.74,6311146.62)
L51	56+46.45	57+55.90	109.450	N20° 39' 05.80"W	(2185505.74,6311146.62)	(2185608.16,6311108.02)
L52	57+55.90	58+75.15	119.252	N07° 56' 14.71"W	(2185608.16,6311108.02)	(2185726.26,6311091.55)
L53	58+75.15	59+16.94	41.784	N14° 55' 24.61"E	(2185726.26,6311091.55)	(2185766.64,6311102.31)
L54	59+16.94	59+91.41	74.472	N26° 16' 49.20"E	(2185766.64,6311102.31)	(2185833.41,6311135.29)
L55	59+91.41	61+01.18	109.770	N28° 18' 28.57"E	(2185833.41,6311135.29)	(2185930.06,6311187.34)
L56	61+01.18	61+55.57	54.386	N16° 24' 28.29"E	(2185930.06,6311187.34)	(2185982.23,6311202.70)
L57	61+55.57	61+88.51	32.941	N12° 37' 46.28"W	(2185982.23,6311202.70)	(2186014.37,6311195.50)
L58	61+88.51	62+71.74	83.235	N15° 48' 02.91"W	(2186014.37,6311195.50)	(2186094.46,6311172.84)

SURVEY NOTES

1. GRID COORDINATES ARE IN U.S. SURVEY FEET AND REFER TO THE CALIFORNIA STATE COORDINATE ZONE 3, NAD 83 (2007), AND ARE BASED ON 'HS4763'.
2. ELEVATIONS ARE IN U.S. SURVEY FEET AND REFER TO NAVD 1988, GEOID 09 AND ARE BASED ON CP 'HS4763'.
3. TOPOGRAPHY BY TOTAL STATION & RTK SURVEY METHODS. FIELD SURVEY DATE: MARCH 28 THRU MAY 10th 2020.
4. CONTOUR INTERVAL IS 1FT.
5. SCALE FACTOR = 0.999937996, COMBINED FACTOR = 0.999942239.

SURVEY CONTROL TABULATION

STATION	NORTH	EAST	MON EL	DESCRIPTION
HS4763	2184704.25	6327979.96	15.26	NGS Disc
AA4257	2167471.32	6298381.34	1.08	NGS Disc
TS-1	2184417.11	6311453.94	17.78	NAIL
TS-2	2184669.58	6311431.33	18.13	NAIL

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

ISSUE DATE: NOVEMBER 2022
SOLICITATION NO.: XXXXXX-XX-X-XXXX
CONTRACT NO.:

DESIGNED BY: DMM / BFL
DRAWN BY: M. HARRINGTON
CHECKED BY: K. BRUSTAD
SUBMITTED BY: S. JIMENEZ
SIZE: ANSI D

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
1325 J ST.
SACRAMENTO, CA 95814

PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

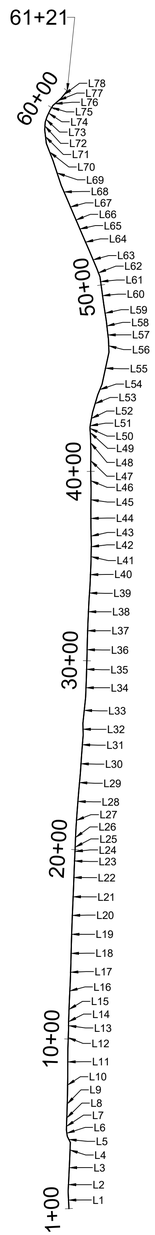
LOWER SAN JOAQUIN RIVER REACH
TSS LEVEE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA.

PROJECT SURVEY CONTROL AND CONTROL LINE PLAN AND TABLES

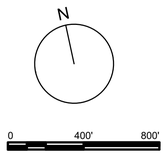
SHEET ID
V-001

FINAL SUBMITTAL

TS_30_L ALIGNMENT P-LINE TABLE



TS_30_L LEVEE
P-LINE ALIGNMENT



LINE TABLE: P-LINE						
LINE ID	STATION START	STATION END	LENGTH	BEARING	LINE STARTS (N,E)	LINE ENDS (N,E)
L1	1+00.00	1+90.44	90.436	N02° 48' 33.43"W	(2180028.82,6311195.98)	(2180119.15,6311191.55)
L2	1+90.44	2+63.53	73.093	N02° 50' 54.60"E	(2180119.15,6311191.55)	(2180192.15,6311195.18)
L3	2+63.53	3+69.55	106.018	N02° 44' 13.85"E	(2180192.15,6311195.18)	(2180298.05,6311200.24)
L4	3+69.55	4+49.93	80.380	N02° 05' 31.81"E	(2180298.05,6311200.24)	(2180378.38,6311203.18)
L5	4+49.93	4+85.43	35.508	N26° 22' 01.35"W	(2180378.38,6311203.18)	(2180410.19,6311187.41)
L6	4+85.43	5+19.01	33.578	N07° 56' 55.29"W	(2180410.19,6311187.41)	(2180443.45,6311182.76)
L7	5+19.01	5+58.38	39.369	N01° 23' 25.08"E	(2180443.45,6311182.76)	(2180482.80,6311183.72)
L8	5+58.38	6+07.74	49.359	N02° 15' 02.37"E	(2180482.80,6311183.72)	(2180532.13,6311185.66)
L9	6+07.74	7+06.11	98.368	N01° 26' 14.43"E	(2180532.13,6311185.66)	(2180630.46,6311188.13)
L10	7+06.11	8+07.93	101.822	N00° 51' 50.55"E	(2180630.46,6311188.13)	(2180732.27,6311189.66)
L11	8+07.93	9+50.12	142.187	N00° 17' 42.96"E	(2180732.27,6311189.66)	(2180874.46,6311190.39)
L12	9+50.12	10+64.41	114.288	N01° 54' 22.40"E	(2180874.46,6311190.39)	(2180988.68,6311194.20)
L13	10+64.41	10+77.14	12.734	N01° 21' 15.35"W	(2180988.68,6311194.20)	(2181001.41,6311193.89)
L14	10+77.14	11+05.78	28.636	N01° 17' 02.43"E	(2181001.41,6311193.89)	(2181030.04,6311194.54)
L15	11+05.78	12+06.13	100.349	N02° 02' 35.41"E	(2181030.04,6311194.54)	(2181130.33,6311198.11)
L16	12+06.13	13+01.67	95.546	N02° 57' 01.11"E	(2181130.33,6311198.11)	(2181225.75,6311203.03)
L17	13+01.67	14+03.22	101.549	N01° 54' 18.06"E	(2181225.75,6311203.03)	(2181327.24,6311206.41)
L18	14+03.22	15+01.04	97.815	N01° 18' 15.39"E	(2181327.24,6311206.41)	(2181425.03,6311208.63)
L19	15+01.04	16+05.14	104.100	N01° 47' 20.93"E	(2181425.03,6311208.63)	(2181529.08,6311211.88)
L20	16+05.14	17+00.24	95.108	N02° 30' 05.32"E	(2181529.08,6311211.88)	(2181624.10,6311216.03)
L21	17+00.24	18+01.93	101.685	N02° 19' 10.40"E	(2181624.10,6311216.03)	(2181725.70,6311220.15)
L22	18+01.93	19+04.00	102.075	N02° 09' 33.22"E	(2181725.70,6311220.15)	(2181827.70,6311224.00)
L23	19+04.00	19+76.80	72.797	N02° 32' 11.29"E	(2181827.70,6311224.00)	(2181900.43,6311227.22)
L24	19+76.80	20+03.85	27.053	N03° 15' 08.83"E	(2181900.43,6311227.22)	(2181927.44,6311228.75)
L25	20+03.85	20+22.91	19.057	N00° 37' 00.20"E	(2181927.44,6311228.75)	(2181946.49,6311228.96)
L26	20+22.91	21+05.77	82.859	N02° 24' 51.02"E	(2181946.49,6311228.96)	(2182029.28,6311232.45)
L27	21+05.77	22+04.51	98.741	N03° 56' 00.35"E	(2182029.28,6311232.45)	(2182127.79,6311239.22)
L28	22+04.51	23+05.63	101.120	N04° 34' 57.31"E	(2182127.79,6311239.22)	(2182228.58,6311247.30)
L29	23+05.63	24+04.87	99.241	N05° 08' 24.72"E	(2182228.58,6311247.30)	(2182327.42,6311256.19)
L30	24+04.87	25+04.72	99.853	N03° 49' 44.89"E	(2182327.42,6311256.19)	(2182427.05,6311262.86)
L31	25+04.72	26+06.15	101.422	N04° 34' 50.81"E	(2182427.05,6311262.86)	(2182528.15,6311270.96)
L32	26+06.15	26+68.85	62.705	N01° 13' 40.17"W	(2182528.15,6311270.96)	(2182590.84,6311269.62)
L33	26+68.85	28+06.31	137.456	N06° 02' 53.89"E	(2182590.84,6311269.62)	(2182727.53,6311284.10)
L34	28+06.31	29+08.23	101.924	N02° 11' 46.66"E	(2182727.53,6311284.10)	(2182829.38,6311288.01)
L35	29+08.23	30+01.03	92.795	N01° 31' 38.55"E	(2182829.38,6311288.01)	(2182922.14,6311290.48)
L36	30+01.03	31+15.52	114.492	N01° 25' 52.78"E	(2182922.14,6311290.48)	(2183036.60,6311293.34)
L37	31+15.52	32+01.43	85.911	N01° 52' 20.80"E	(2183036.60,6311293.34)	(2183122.47,6311296.15)
L38	32+01.43	33+16.01	114.580	N02° 44' 52.31"E	(2183122.47,6311296.15)	(2183236.91,6311301.64)
L39	33+16.01	33+99.33	83.323	N03° 46' 05.54"E	(2183236.91,6311301.64)	(2183320.06,6311307.12)
L40	33+99.33	35+10.40	111.070	N02° 29' 27.65"E	(2183320.06,6311307.12)	(2183431.02,6311311.94)
L41	35+10.40	35+89.65	79.247	N01° 13' 55.91"E	(2183431.02,6311311.94)	(2183510.25,6311313.65)
L42	35+89.65	36+14.62	24.971	N01° 15' 16.21"E	(2183510.25,6311313.65)	(2183535.22,6311314.19)
L43	36+14.62	37+01.69	87.073	N01° 23' 14.21"W	(2183535.22,6311314.19)	(2183622.26,6311312.09)
L44	37+01.69	38+01.57	99.877	N00° 15' 57.70"W	(2183622.26,6311312.09)	(2183722.14,6311311.62)
L45	38+01.57	38+99.75	98.180	N00° 34' 46.38"E	(2183722.14,6311311.62)	(2183820.31,6311312.61)
L46	38+99.75	40+01.60	101.852	N00° 54' 00.55"W	(2183820.31,6311312.61)	(2183922.15,6311311.01)
L47	40+01.60	41+11.64	110.043	N00° 13' 30.03"E	(2183922.15,6311311.01)	(2184032.19,6311311.45)
L48	41+11.64	41+91.08	79.435	N01° 21' 23.98"W	(2184032.19,6311311.45)	(2184111.61,6311309.57)
L49	41+91.08	42+20.31	29.230	N04° 15' 09.13"W	(2184111.61,6311309.57)	(2184140.76,6311307.40)
L50	42+20.31	42+33.99	13.684	N00° 06' 13.70"W	(2184140.76,6311307.40)	(2184154.44,6311307.37)

LINE TABLE: P-LINE						
LINE ID	STATION START	STATION END	LENGTH	BEARING	LINE STARTS (N,E)	LINE ENDS (N,E)
L51	42+33.99	42+47.88	13.888	N07° 09' 36.02"E	(2184154.44,6311307.37)	(2184168.22,6311309.10)
L52	42+47.88	43+12.60	64.725	N10° 18' 23.32"E	(2184168.22,6311309.10)	(2184231.90,6311320.68)
L53	43+12.60	44+09.25	96.649	N16° 16' 52.63"E	(2184231.90,6311320.68)	(2184324.67,6311347.78)
L54	44+09.25	44+69.22	59.962	N22° 16' 25.72"E	(2184324.67,6311347.78)	(2184380.16,6311370.51)
L55	44+69.22	46+42.75	173.535	N12° 11' 29.25"E	(2184380.16,6311370.51)	(2184549.78,6311407.16)
L56	46+42.75	47+10.21	67.459	N02° 14' 57.84"W	(2184549.78,6311407.16)	(2184617.19,6311404.51)
L57	47+10.21	47+57.51	47.305	N06° 49' 52.05"W	(2184617.19,6311404.51)	(2184664.16,6311398.88)
L58	47+57.51	48+06.11	48.595	N06° 19' 37.48"W	(2184664.16,6311398.88)	(2184712.46,6311393.53)
L59	48+06.11	48+93.27	87.158	N08° 45' 24.89"W	(2184712.46,6311393.53)	(2184798.60,6311380.26)
L60	48+93.27	49+93.42	100.154	N07° 53' 01.75"W	(2184798.60,6311380.26)	(2184897.81,6311366.52)
L61	49+93.42	50+43.23	49.811	N07° 38' 27.58"W	(2184897.81,6311366.52)	(2184947.18,6311359.90)
L62	50+43.23	50+88.98	45.747	N21° 00' 39.43"W	(2184947.18,6311359.90)	(2184989.88,6311343.49)
L63	50+88.98	51+91.89	102.907	N22° 54' 05.54"W	(2184989.88,6311343.49)	(2185084.68,6311303.45)
L64	51+91.89	52+92.13	100.241	N23° 23' 25.95"W	(2185084.68,6311303.45)	(2185176.68,6311263.65)
L65	52+92.13	53+43.51	51.386	N23° 03' 50.28"W	(2185176.68,6311263.65)	(2185223.96,6311243.52)
L66	53+43.51	53+94.96	51.445	N23° 13' 03.62"W	(2185223.96,6311243.52)	(2185271.24,6311223.24)
L67	53+94.96	54+93.29	98.336	N23° 05' 31.48"W	(2185271.24,6311223.24)	(2185361.69,6311184.67)
L68	54+93.29	55+67.52	74.229	N23° 26' 05.36"W	(2185361.69,6311184.67)	(2185429.80,6311155.15)
L69	55+67.52	57+06.19	138.666	N18° 17' 46.20"W	(2185429.80,6311155.15)	(2185561.46,6311111.62)
L70	57+06.19	58+03.12	96.926	N21° 06' 10.01"W	(2185561.46,6311111.62)	(2185651.88,6311076.72)
L71	58+03.12	58+75.68	72.569	N07° 04' 15.27"W	(2185651.88,6311076.72)	(2185723.90,6311067.79)
L72	58+75.68	59+15.85	40.162	N04° 07' 56.99"E	(2185723.90,6311067.79)	(2185763.96,6311070.68)
L73	59+15.85	59+46.75	30.908	N18° 04' 44.38"E	(2185763.96,6311070.68)	(2185793.34,6311080.27)
L74	59+46.75	59+87.26	40.510	N25° 16' 24.50"E	(2185793.34,6311080.27)	(2185829.97,6311097.57)
L75	59+87.26	60+14.31	27.048	N32° 20' 33.78"E	(2185829.97,6311097.57)	(2185852.82,6311112.04)
L76	60+14.31	60+38.63	24.316	N49° 28' 56.50"E	(2185852.82,6311112.04)	(2185868.62,6311130.53)
L77	60+38.63	60+70.00	31.373	N48° 50' 28.10"E	(2185868.62,6311130.53)	(2185889.27,6311154.15)
L78	60+70.00	61+21.43	51.427	N39° 22' 23.94"E	(2185889.27,6311154.15)	(2185929.02,6311186.77)

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: DMM / BFL
DRAWN BY: M. HARRINGTON
CHECKED BY: E. BRUSTAD
SUBMITTED BY: S. JIMENEZ
SIZE: ANSI D
ISSUE DATE: NOVEMBER 2022
SOLICITATION NO.: XXXXXXXX-XX-XXXX
CONTRACT NO.:

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
1325 J ST.
SACRAMENTO, CA 95814

PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

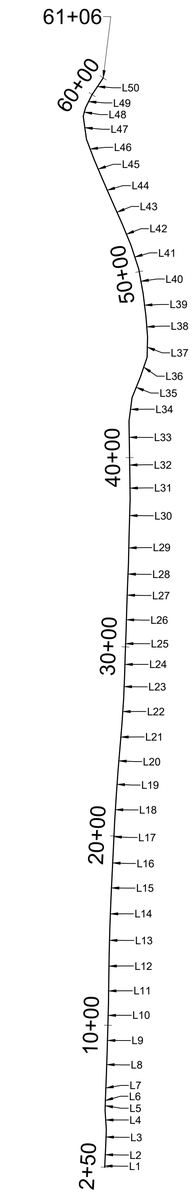
LOWER SAN JOAQUIN RIVER REACH
TS_30_L LEVEE IMPROVEMENTS
SAN JOAQUIN COUNTY, CALIFORNIA

PROPOSED LEVEE CENTERLINE
CONTROL LINE PLAN AND TABLES

SHEET ID
V-002

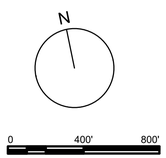
FINAL SUBMITTAL

TS_30_L ALIGNMENT C-LINE TABLE



TS_30_L LEVEE
C-LINE ALIGNMENT

LINE TABLE: C-LINE						
LINE ID	STATION START	STATION END	LENGTH	BEARING	LINE STARTS (N,E)	LINE ENDS (N,E)
L1	2+50.00	2+63.53	13.529	N02° 50' 54.60"E	(2180178.64,6311194.51)	(2180192.15,6311195.18)
L2	2+63.53	3+69.55	106.018	N02° 44' 13.85"E	(2180192.15,6311195.18)	(2180298.05,6311200.24)
L3	3+69.55	4+50.00	80.453	N02° 05' 31.81"E	(2180298.05,6311200.24)	(2180378.45,6311203.18)
L4	4+50.00	5+50.15	100.149	N03° 45' 47.23"W	(2180378.45,6311203.18)	(2180478.38,6311196.61)
L5	5+50.15	6+00.49	50.339	N01° 53' 46.98"E	(2180478.38,6311196.61)	(2180528.70,6311198.27)
L6	6+00.49	6+05.02	4.531	N01° 53' 46.98"E	(2180528.70,6311198.27)	(2180533.22,6311198.42)
L7	6+05.02	7+33.32	128.304	N02° 11' 54.72"E	(2180533.22,6311198.42)	(2180661.43,6311203.34)
L8	7+33.32	8+51.61	118.286	N01° 59' 03.87"E	(2180661.43,6311203.34)	(2180779.65,6311207.44)
L9	8+51.61	9+88.35	136.745	N01° 39' 47.84"E	(2180779.65,6311207.44)	(2180916.34,6311211.41)
L10	9+88.35	11+15.79	127.436	N01° 27' 30.91"E	(2180916.34,6311211.41)	(2181043.73,6311214.65)
L11	11+15.79	12+47.08	131.290	N00° 43' 57.25"E	(2181043.73,6311214.65)	(2181175.01,6311216.33)
L12	12+47.08	13+77.67	130.587	N00° 49' 53.41"E	(2181175.01,6311216.33)	(2181305.58,6311218.23)
L13	13+77.67	15+19.52	141.858	N01° 32' 20.82"E	(2181305.58,6311218.23)	(2181447.39,6311222.04)
L14	15+19.52	16+57.02	137.498	N02° 14' 16.04"E	(2181447.39,6311222.04)	(2181584.78,6311227.41)
L15	16+57.02	17+93.86	136.839	N02° 32' 38.80"E	(2181584.78,6311227.41)	(2181721.49,6311233.48)
L16	17+93.86	19+21.35	127.485	N02° 58' 29.86"E	(2181721.49,6311233.48)	(2181848.80,6311240.10)
L17	19+21.35	20+71.28	149.935	N02° 39' 36.65"E	(2181848.80,6311240.10)	(2181998.57,6311247.06)
L18	20+71.28	22+06.82	135.538	N03° 26' 42.59"E	(2181998.57,6311247.06)	(2182133.87,6311255.20)
L19	22+06.82	23+39.30	132.481	N04° 03' 37.19"E	(2182133.87,6311255.20)	(2182266.01,6311264.58)
L20	23+39.30	24+55.60	116.304	N04° 45' 01.39"E	(2182266.01,6311264.58)	(2182381.92,6311274.21)
L21	24+55.60	25+91.50	135.901	N04° 51' 03.46"E	(2182381.92,6311274.21)	(2182517.33,6311285.71)
L22	25+91.50	27+25.48	133.976	N03° 47' 41.14"E	(2182517.33,6311285.71)	(2182651.01,6311294.57)
L23	27+25.48	28+54.99	129.514	N02° 23' 37.41"E	(2182651.01,6311294.57)	(2182780.42,6311299.98)
L24	28+54.99	29+59.85	104.854	N01° 38' 17.40"E	(2182780.42,6311299.98)	(2182885.23,6311302.98)
L25	29+59.85	30+74.47	114.619	N02° 03' 59.84"E	(2182885.23,6311302.98)	(2182999.77,6311307.11)
L26	30+74.47	32+13.00	138.529	N01° 42' 55.90"E	(2182999.77,6311307.11)	(2183138.24,6311311.26)
L27	32+13.00	33+34.03	121.033	N02° 04' 40.87"E	(2183138.24,6311311.26)	(2183259.19,6311315.65)
L28	33+34.03	34+35.99	101.962	N02° 22' 50.69"E	(2183259.19,6311315.65)	(2183361.07,6311319.88)
L29	34+35.99	36+09.87	173.875	N01° 22' 35.69"E	(2183361.07,6311319.88)	(2183534.89,6311324.06)
L30	36+09.87	37+77.73	167.860	N01° 38' 32.19"E	(2183534.89,6311324.06)	(2183702.68,6311328.87)
L31	37+77.73	38+99.30	121.574	N00° 38' 07.66"W	(2183702.68,6311328.87)	(2183824.25,6311327.52)
L32	38+99.30	40+21.58	122.284	N00° 53' 45.62"W	(2183824.25,6311327.52)	(2183946.52,6311325.61)
L33	40+21.58	41+92.48	170.895	N00° 50' 29.24"W	(2183946.52,6311325.61)	(2184117.39,6311323.10)
L34	41+92.48	43+16.86	124.376	N07° 20' 44.33"E	(2184117.39,6311323.10)	(2184240.75,6311339.00)
L35	43+16.86	44+35.41	118.554	N21° 59' 40.28"E	(2184240.75,6311339.00)	(2184350.68,6311383.40)
L36	44+35.41	45+45.15	109.743	N18° 47' 28.62"E	(2184350.68,6311383.40)	(2184454.57,6311418.75)
L37	45+45.15	46+51.59	106.434	N01° 05' 42.39"E	(2184454.57,6311418.75)	(2184560.98,6311420.79)
L38	46+51.59	47+59.38	107.790	N04° 22' 07.21"W	(2184560.98,6311420.79)	(2184668.46,6311412.58)
L39	47+59.38	48+82.31	122.932	N07° 00' 56.86"W	(2184668.46,6311412.58)	(2184790.47,6311397.56)
L40	48+82.31	50+14.45	132.140	N10° 09' 47.07"W	(2184790.47,6311397.56)	(2184920.54,6311374.25)
L41	50+14.45	51+46.67	132.223	N18° 06' 53.38"W	(2184920.54,6311374.25)	(2185046.21,6311333.14)
L42	51+46.67	52+71.23	124.554	N22° 24' 07.10"W	(2185046.21,6311333.14)	(2185161.36,6311285.67)
L43	52+71.23	53+99.70	128.473	N24° 00' 40.29"W	(2185161.36,6311285.67)	(2185278.72,6311233.39)
L44	53+99.70	55+24.94	125.240	N23° 37' 19.85"W	(2185278.72,6311233.39)	(2185393.46,6311183.21)
L45	55+24.94	56+42.80	117.857	N22° 54' 22.82"W	(2185393.46,6311183.21)	(2185502.03,6311137.33)
L46	56+42.80	57+53.56	110.761	N20° 39' 05.80"W	(2185502.03,6311137.33)	(2185605.67,6311098.27)
L47	57+53.56	58+75.95	122.388	N07° 56' 14.71"W	(2185605.67,6311098.27)	(2185726.89,6311081.37)
L48	58+75.95	59+20.75	44.800	N14° 55' 24.61"E	(2185726.89,6311081.37)	(2185770.18,6311092.91)
L49	59+20.75	59+96.39	75.643	N26° 16' 49.20"E	(2185770.18,6311092.91)	(2185838.00,6311126.40)
L50	59+96.39	61+05.61	109.226	N33° 33' 39.34"E	(2185838.00,6311126.40)	(2185929.02,6311186.78)



US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: DMM / BFL
DRAWN BY: M. HARRINGTON
CHECKED BY: C. HUNTER
SUBMITTED BY: S. JIMENEZ
SIZE: ANSI D
ISSUE DATE: NOVEMBER 2022
SOLICITATION NO.: XXXXXX-XX-X-XXXX
CONTRACT NO.:

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
1325 J ST.
SACRAMENTO, CA 95814

PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

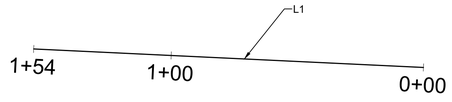
LOWER SAN JOAQUIN RIVER REACH
TS_30_L LEVEE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

PROPOSED CUTOFF WALL CONTROL LINE PLAN AND TABLES

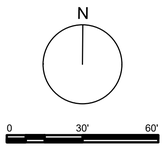
SHEET ID
V-003

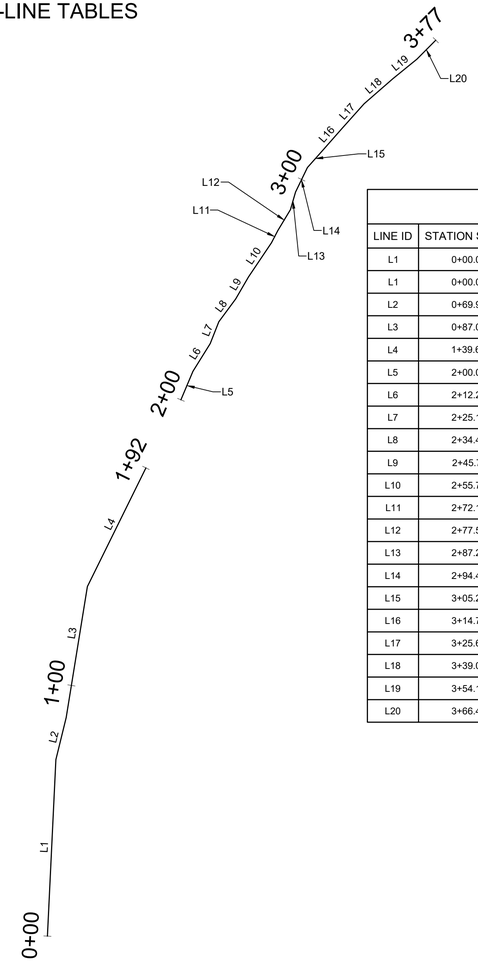
FINAL SUBMITTAL

TS_30_L ALIGNMENT R-LINE TABLES

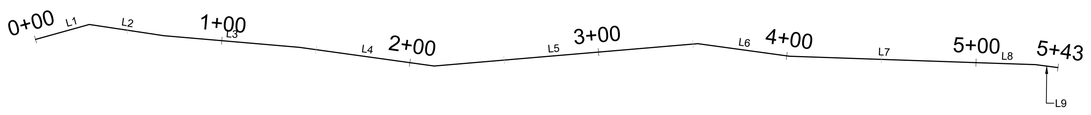


LINE TABLE: MIDDLE RAMP ALIGNMENT						
LINE ID	STATION START	STATION END	LENGTH	BEARING	LINE STARTS (N,E)	LINE ENDS (N,E)
L1	0+00.00	1+54.49	154.488	N87° 16' 52.13"W	(2183228.92,6311301.26)	(2183236.25,6311146.94)

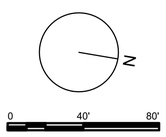


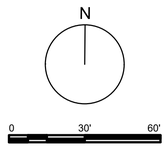


LINE TABLE: NORTHERN RAMP ALIGNMENT						
LINE ID	STATION START	STATION END	LENGTH	BEARING	LINE STARTS (N,E)	LINE ENDS (N,E)
L1	0+00.00	0+69.96	69.962	N02° 45' 26.13"E	(2185591.14,6311100.16)	(2185661.0257,6311103.5267)
L1	0+00.00	1+54.49	154.488	N87° 16' 52.13"W	(2183228.92,6311301.26)	(2183236.2516,6311146.9417)
L2	0+69.96	0+87.07	17.112	N13° 45' 59.56"E	(2185661.03,6311103.53)	(2185677.6462,6311107.5988)
L3	0+87.07	1+39.66	52.583	N09° 10' 56.61"E	(2185677.65,6311107.60)	(2185729.5551,6311115.9898)
L4	1+39.66	1+92.04	52.385	N26° 15' 50.67"E	(2185729.56,6311115.99)	(2185776.5318,6311139.1705)
L5	2+00.00	2+12.26	12.263	N22° 52' 51.37"E	(2185803.48,6311153.02)	(2185814.7754,6311157.7928)
L6	2+12.26	2+25.16	12.901	N31° 53' 09.81"E	(2185814.78,6311157.79)	(2185825.7296,6311164.6075)
L7	2+25.16	2+34.48	9.317	N21° 39' 27.59"E	(2185825.73,6311164.61)	(2185834.3885,6311168.0459)
L8	2+34.48	2+45.71	11.230	N36° 27' 46.22"E	(2185834.39,6311168.05)	(2185843.4198,6311174.7196)
L9	2+45.71	2+55.79	10.084	N30° 09' 47.98"E	(2185843.42,6311174.72)	(2185852.1383,6311179.7864)
L10	2+55.79	2+72.10	16.304	N33° 56' 06.90"E	(2185852.14,6311179.79)	(2185865.6649,6311188.8881)
L11	2+72.10	2+77.57	5.469	N27° 36' 40.22"E	(2185865.66,6311188.89)	(2185870.5111,6311191.4228)
L12	2+77.57	2+87.20	9.628	N31° 03' 44.25"E	(2185870.51,6311191.42)	(2185878.7588,6311196.3907)
L13	2+87.20	2+94.47	7.279	N16° 07' 34.68"E	(2185878.76,6311196.39)	(2185885.7517,6311198.4126)
L14	2+94.47	3+05.24	10.766	N25° 53' 07.00"E	(2185885.75,6311198.41)	(2185895.4376,6311203.1127)
L15	3+05.24	3+14.77	9.527	N41° 43' 11.02"E	(2185895.44,6311203.11)	(2185902.5483,6311209.4525)
L16	3+14.77	3+25.65	10.880	N41° 25' 09.67"E	(2185902.55,6311209.45)	(2185910.7070,6311216.6503)
L17	3+25.65	3+39.04	13.391	N41° 45' 02.52"E	(2185910.71,6311216.65)	(2185920.6976,6311225.5675)
L18	3+39.04	3+54.18	15.145	N48° 58' 13.78"E	(2185920.70,6311225.57)	(2185930.6394,6311236.9923)
L19	3+54.18	3+66.43	12.243	N50° 49' 09.23"E	(2185930.64,6311236.99)	(2185938.3742,6311246.4826)
L20	3+66.43	3+76.99	10.567	N44° 55' 27.85"E	(2185938.37,6311246.48)	(2185945.8561,6311253.9448)



LINE TABLE: MARCH LANE RAMP ALIGNMENT						
LINE ID	STATION START	STATION END	LENGTH	BEARING	LINE STARTS (N,E)	LINE ENDS (N,E)
L1	0+00.00	0+29.47	29.474	N21° 37' 00.77"W	(2180093.68,6311168.18)	(2180121.08,6311157.33)
L2	0+29.47	0+69.31	39.834	N02° 25' 20.84"E	(2180121.08,6311157.33)	(2180160.88,6311159.01)
L3	0+69.31	1+41.05	71.739	N01° 12' 09.75"W	(2180160.88,6311159.01)	(2180232.60,6311157.50)
L4	1+41.05	2+12.88	71.837	N01° 47' 22.42"E	(2180232.60,6311157.50)	(2180304.40,6311159.75)
L5	2+12.88	3+52.59	139.710	N10° 57' 27.13"W	(2180304.40,6311159.75)	(2180441.57,6311133.19)
L6	3+52.59	4+01.45	48.859	N01° 41' 42.50"E	(2180441.57,6311133.19)	(2180490.40,6311134.64)
L7	4+01.45	5+01.45	100.000	N04° 09' 46.72"W	(2180490.40,6311134.64)	(2180590.14,6311127.38)
L8	5+01.45	5+31.45	29.996	N04° 09' 46.72"W	(2180590.14,6311127.38)	(2180620.06,6311125.20)
L9	5+31.45	5+43.39	11.944	N01° 26' 14.43"E	(2180620.06,6311125.20)	(2180632.00,6311125.50)





US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: DMM / BFL
DRAWN BY: M. HARRINGTON
CHECKED BY: K. BRUSTAD
SUBMITTED BY: S. JIMENEZ
SIZE: ANSI D

ISSUE DATE: NOVEMBER 2022
SOLICITATION NO.: XXXXXX-XX-X-XXXX
CONTRACT NO.:

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
1325 J ST.
SACRAMENTO, CA 95814

PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

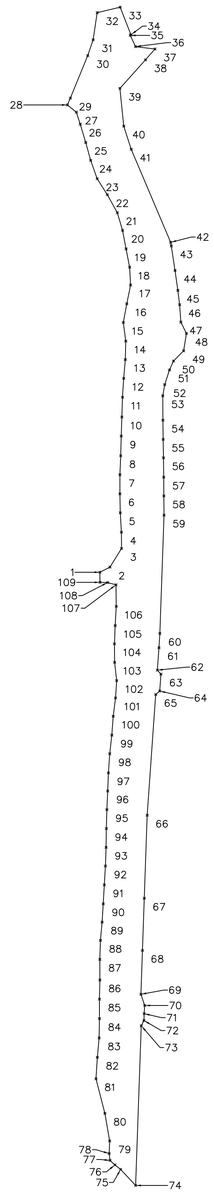
LOWER SAN JOAQUIN RIVER REACH
TS: SAN JOSE AIRPORT WEST
SAN JOAQUIN COUNTY, CALIFORNIA

PROPOSED RAMPS CONTROL LINES AND PLANS AND TABLES

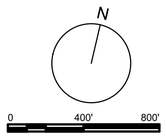
SHEET ID
V-004

FINAL SUBMITTAL

TS_30_L LEVEE LIMIT OF WORK TABLE



TS_30_L LEVEE
LIMITS OF WORK



LIMITS OF WORK POINTS TABLE		
NORTHING	EASTING	POINT ID
2183224.47	6311063.57	1
2183251.51	6311116.68	2
2183349.86	6311178.04	3
2183435.90	6311177.20	4
2183538.30	6311171.37	5
2183638.36	6311169.23	6
2183739.32	6311169.44	7
2183839.63	6311173.66	8
2183943.11	6311176.14	9
2184043.82	6311179.55	10
2184148.12	6311182.88	11
2184247.77	6311189.40	12
2184347.13	6311197.83	13
2184444.52	6311200.38	14
2184542.67	6311187.20	15
2184641.47	6311205.49	16
2184740.76	6311225.49	17
2184834.71	6311220.64	18
2184931.27	6311201.83	19
2185028.91	6311183.33	20
2185122.36	6311155.61	21
2185217.35	6311102.98	22
2185301.74	6311049.34	23
2185398.78	6311014.88	24
2185493.24	6310988.90	25
2185589.58	6310959.93	26
2185653.21	6310939.36	27
2185691.51	6310891.72	28
2185727.12	6310907.67	29
2185951.49	6310999.38	30
2186035.05	6311027.92	31
2186178.28	6311049.35	32
2186207.57	6311170.48	33
2186061.73	6311227.55	34
2186058.39	6311223.79	35
2185999.25	6311252.00	36
2185986.56	6311354.25	37
2185929.35	6311304.41	38
2185778.71	6311169.18	39
2185579.34	6311189.52	40
2185457.47	6311229.04	41
2184966.17	6311437.31	42
2184947.00	6311440.58	43
2184817.54	6311460.17	44
2184712.31	6311475.20	45
2184636.65	6311484.74	46
2184545.04	6311490.82	47
2184484.71	6311520.51	48
2184393.35	6311505.76	49
2184339.38	6311452.39	50

LIMITS OF WORK POINTS TABLE		
NORTHING	EASTING	POINT ID
2184292.33	6311431.01	51
2184214.83	6311405.83	52
2184155.94	6311395.48	53
2184026.99	6311396.39	54
2183925.69	6311397.60	55
2183828.40	6311399.27	56
2183726.25	6311400.56	57
2183627.26	6311401.39	58
2183525.63	6311402.15	59
2182901.38	6311380.24	60
2182826.27	6311375.62	61
2182707.92	6311366.86	62
2182686.38	6311385.78	63
2182597.54	6311379.68	64
2182578.80	6311358.17	65
2181941.56	6311313.41	66
2181503.39	6311297.99	67
2181227.97	6311288.22	68
2180996.72	6311280.24	69
2180937.69	6311300.41	70
2180894.46	6311297.26	71
2180858.28	6311296.16	72
2180830.37	6311282.06	73
2179987.65	6311252.39	74
2180072.23	6311173.26	75
2180096.00	6311142.88	76
2180119.68	6311117.27	77
2180155.93	6311112.50	78
2180222.47	6311115.29	79
2180368.20	6311089.93	80
2180550.78	6311042.87	81
2180664.02	6311050.17	82
2180766.18	6311059.56	83
2180868.12	6311061.39	84
2180971.13	6311061.39	85
2181072.06	6311063.55	86
2181180.68	6311063.20	87
2181281.09	6311066.53	88
2181377.56	6311075.15	89
2181474.11	6311081.21	90
2181574.28	6311086.80	91
2181673.44	6311092.83	92
2181772.30	6311096.37	93
2181871.35	6311097.66	94
2181971.28	6311100.50	95
2182069.84	6311104.91	96
2182165.33	6311108.64	97
2182266.22	6311115.74	98
2182364.52	6311126.49	99
2182464.23	6311134.02	100

LIMITS OF WORK POINTS TABLE		
NORTHING	EASTING	POINT ID
2182560.89	6311146.15	101
2182652.62	6311152.29	102
2182748.81	6311141.20	103
2182846.43	6311140.46	104
2182942.91	6311144.44	105
2183044.23	6311150.09	106
2183158.03	6311148.75	107
2183170.23	6311104.34	108
2183171.02	6311064.11	109

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: DMM / BFL
DRAWN BY: M. HARRINGTON
CHECKED BY: K. LEE
SUBMITTED BY: S. JIMENEZ
SIZE: ANSI D
ISSUE DATE: NOVEMBER 2022
SOLICITATION NO.: XXXXXX-XX-X-XXXX
CONTRACT NO.:

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
1325 J ST.
SACRAMENTO, CA 95814

PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

LOWER SAN JOAQUIN RIVER REACH
TS_30_L LEE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

PROPOSED LIMITS OF WORK POINT TABLE

SHEET ID
V-005

FINAL SUBMITTAL

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY:	
DMM / BFL	
DRAWN BY:	
M. HARRINGTON	
CHECKED BY:	
K. GOSTIC	
SUBMITTED BY:	
S. JIMENEZ	
SIZE:	
ANSI D	

ISSUE DATE:
NOVEMBER 2022
SOLICITATION NO.:
XXXXXX-XX-X-XXXX
CONTRACT NO.:

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
1325 J ST.
SACRAMENTO, CA 95814

PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

LOWER SAN JOAQUIN RIVER REACH
TSJ-SAL LEVEE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

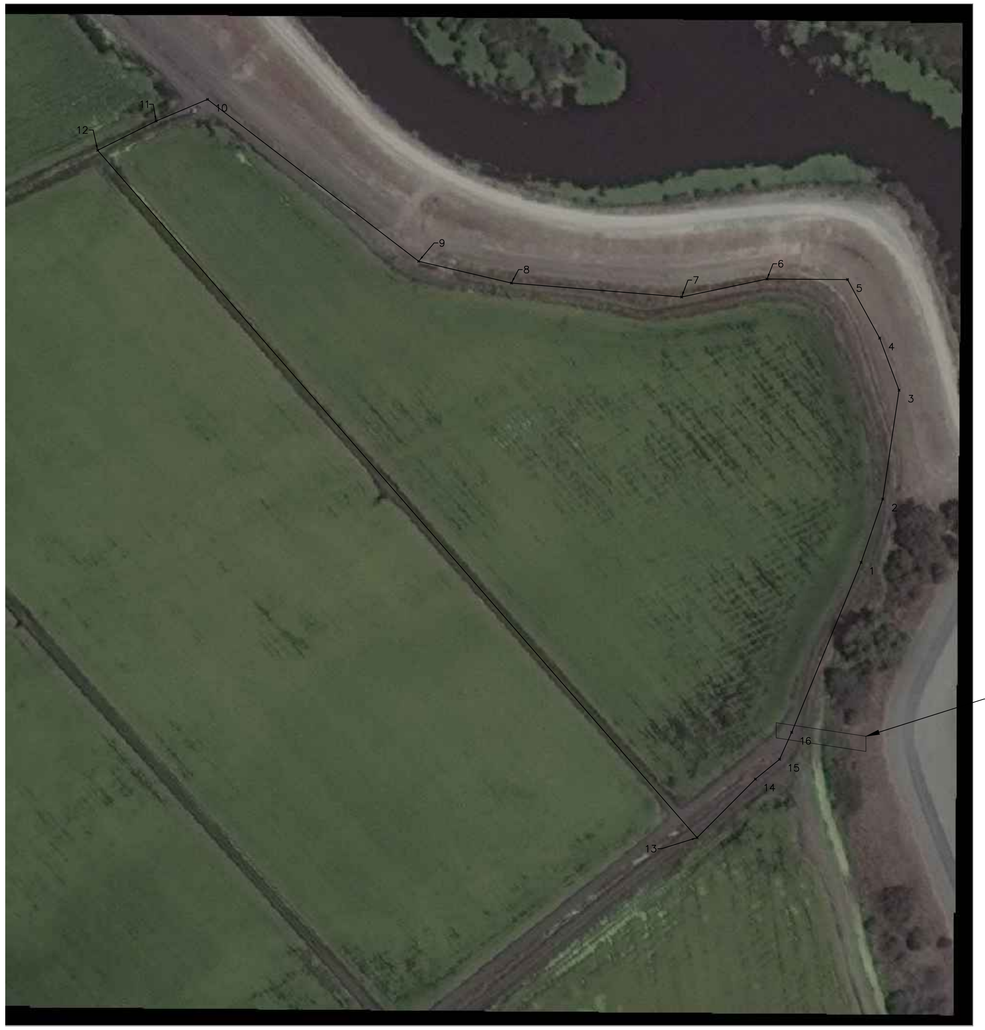
OVERALL SITE PLAN AND KEY MAP

SHEET ID
V-006

FINAL SUBMITTAL

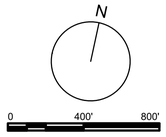
TS_30_L LEVEE STAGING AREA TABLE

STAGING AREA POINTS TABLE		
NORTHING	EASTING	POINT ID
2185951.49	6310999.38	1
2186035.05	6311027.92	2
2186178.66	6311049.41	3
2186247.43	6311023.84	4
2186324.67	6310981.35	5
2186325.41	6310875.13	6
2186301.66	6310762.41	7
2186320.10	6310537.74	8
2186348.84	6310415.35	9
2186562.52	6310136.65	10
2186533.87	6310068.82	11
2186495.27	6309991.69	12
2185588.13	6310782.79	13
2185665.42	6310859.77	14
2185691.51	6310891.72	15
2185727.12	6310907.67	16



TEMPORARY RAMP FROM LEVEE AND PATROL ROAD TO STAGING AREA. INSTALL CULVERT AT IRRIGATION DITCH TO MAINTAIN FLOW.

TS_30_L LEVEE
STAGING AREA



NOTES

1. THE CONTRACTOR SHALL PROVIDE THE TEMPORARY IMPROVEMENTS TO THE STAGING AREA INDICATED ON THIS SHEET. THE CONTRACTOR SHALL PREPARE A SUBMITTAL THAT INCLUDES ALL TEMPORARY IMPROVEMENTS FOR REVIEW AND APPROVAL BY CONTRACTING OFFICER. THESE TEMPORARY IMPROVEMENTS SHALL BE COMPLETED AND ACCEPTED BY THE CONTRACTING OFFICER BEFORE THE STAGING AREA CAN BE USED.

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: DMM / BFL
DRAWN BY: M. HARRINGTON
CHECKED BY: K. BERTRAM
SUBMITTED BY: S. JIMENEZ
SIZE: ANSI D
ISSUE DATE: NOVEMBER 2022
SOLICITATION NO.: XXXXXX-XX-X-XXXX
CONTRACT NO.:

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
1325 J ST.
SACRAMENTO, CA 95814

PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

LOWER SAN JOAQUIN RIVER REACH
TS_30_L LEVEE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

STAGING AREA TEMPORARY IMPROVEMENTS

SHEET ID
V-007

FINAL SUBMITTAL

PLAN LEGEND

- WDR CPT Boring
- WDR SPT Boring
- WDR Vane Shear Boring
- CPT Boring
- SPT Boring
- Historical Boring
- Levee Centerline w/ Station
- Subreach (A to C)

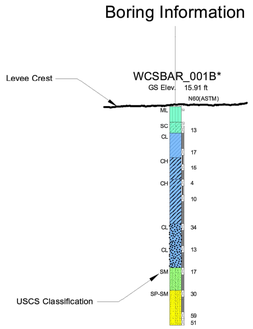
PROFILE LEGEND

- Top of Levee (Ground Surface)
- Cut-off Wall

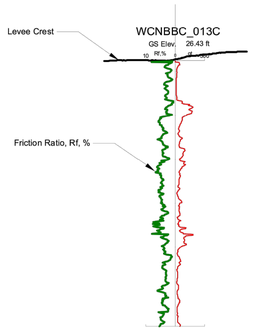
SAMPLER TYPES

- Standard Penetration Test
- Sonic Core
- Modified California
- Cont Core
- Punch Core
- Dry Core
- Standard California
- Bag Sample
- Shelby Tube
- Bulk/Grab Sample

Boring Information



CPT Information



SOIL CLASSIFICATIONS

- Asphalt
- Boulders and cobbles
- Concrete
- Fill
- Boulders and cobbles
- Fat Clay (CH)
- Fat Clay with Sand (CH)
- Fat Clay with Gravel (CH)
- Gravelly Fat Clay (CH)
- Gravelly Fat Clay with Sand (CH)
- Sandy Fat Clay (CH)
- Sandy Fat Clay with Gravel (CH)
- Lean Clay (CL)
- Lean Clay with Sand (CL)
- Silty Clay (CL-ML)
- Silty Clay with Sand (CL-ML)
- Silty Clay with Gravel (CL-ML)
- Gravelly Silty Clay (CL-ML)
- Gravelly Silty Clay with Sand (CL-ML)
- Sandy Silty Clay (CL-ML
- Sandy Silty Clay with Gravel (CL-ML)
- Lean to Fat Clay (CL/CH)
- Lean to Fat Clay with Sand (CL/CH)
- Lean to Fat Clay with Gravel (CL/CH)
- Gravelly Lean to Fat Cla (CL/CH)
- Gravelly Lean to Fat Clay with Sand (CL/CH)
- Sandy Lean to Fat Clay (CL/CH)
- Sandy Lean to Fat Clay with Gravel (CL/CH)
- Silty Clay to Clayey Silt (CL/ML)
- Silty Clay to Clayey Silt with Sand (CL/ML)
- Silty Clay to Clayey Silt with Gravel (CL/ML)
- Gravelly Silty Clay to Clayey Silt (CL/ML)
- Gravelly Silty Clay to Clayey Silt with Sand (CL/ML)
- Sandy Silty Clay to Clayey Silt (CL/ML)
- Sandy Silty Clay to Clay Silt with Gravel (CL/ML)
- Lean Clay with Gravel (CL)
- Gravelly Lean Clay (CL)
- Gravelly Lean Clay with Sand (CL)
- Sandy Lean Clay (CL)
- Sandy Lean Clay with Gravel (CL)
- Clayey Gravel (GC)
- Silty, Clayey Gravel (GC-GM)
- Silty, Clayey Gravel with Sand (GC-GM)
- Clayey Gravel with Sand (GC)
- Silty Gravel (GM)
- Silty Gravel with Sand (GM)
- Poorly Graded Gravel (GP)
- Poorly Graded Gravel with Clay (GP-GC)
- Poorly Graded Gravel with Clay and Sand (GP-GC)
- Poorly Graded Gravel with Silt (GP-GM)
- Poorly Graded Gravel with Silt and Sand (GP-GM)
- Poorly Graded Gravel with Sand (GP)
- Well-Graded Gravel (GW)
- Well-Graded Gravel with Clay (GW-GC)
- Well-Graded Gravel with Clay and Sand (GW-GC)
- Well-Graded Gravel with Silt (GW-GM)
- Well-Graded Gravel with Silt and Sand (GW-GM)
- Well-Graded Gravel with Sand (GW)
- Elastic Silt (MH)
- Elastic Silt with Sand (MH)
- Elastic Silt with Gravel (MH)
- Gravelly Elastic Silt (MH)
- Gravelly Elastic Silt with Sand (MH)
- Sandy Elastic Silt (MH)
- Sandy Elastic Silt with Gravel (MH)
- Silt (ML)
- Silt with Sand (ML)
- Clayey Silt (ML/CL)
- Clayey Silt with Sand (ML/CL)
- Clayey Silt with Gravel (ML/CL)
- Gravelly Clayey Silt (ML/CL)
- Gravelly Clayey Silt with Sand (ML/CL)
- Sandy Clayey Silt (ML/CL)
- Sandy Clayey Silt with Gravel (ML/CL)
- Silt with Gravel (ML)
- Gravelly Silt (ML)
- Gravelly Silt with Sand (ML)
- Sandy Silt (ML)
- Sandy Silt with Gravel (ML)
- Organic Fat Clay (OH)
- Organic Fat Clay with Sand (OH)
- Organic Fat Clay with Gravel (OH)
- Gravelly Organic Fat Clay (OH)
- Gravelly Organic Fat Clay with Sand (OH)
- Sandy Organic Fat Clay (OH)
- Sandy Organic Fat Clay with Gravel (OH)
- Organic Elastic Silt (OH)
- Organic Elastic Silt with Sand (OH)
- Organic Elastic Silt with Gravel (OH)
- Gravelly Organic Elastic Silt (OH)
- Gravelly Organic Elastic Silt with Sand (OH)
- Sandy Organic Elastic Silt (OH)
- Sandy Organic Elastic Silt with Gravel (OH)
- Organic Lean Clay (CL)
- Organic Lean Clay with Sand (OL)
- Organic Lean Clay with Gravel (OL)
- Gravelly Organic Lean Clay (OL)
- Gravelly Organic Lean Clay with Sand (OL)
- Sandy Organic Lean Clay (OL)
- Sandy Organic Lean Cla with Gravel (OL)
- Organic Silt (OL)
- Organic Silt with Sand (OL)
- Organic Silt with Gravel (OL)
- Gravelly Organic Silt (OL)
- Gravelly Organic Silt with Sand (OL)
- Sandy Organic Silt (OL)
- Sandy Organic Silt with Gravel (OL)
- Peat (PT)
- Clayey Sand (SC)
- Silty, Clayey Sand (SC-SM)
- Silty, Clayey Sand with Gravel (SC-SM)
- Clayey Sand with Gravel (SC)
- Silty Sand (SM)
- Silty Sand with Gravel (SM)
- Poorly Graded Sand (SF
- Poorly Graded Sand with Clay (SP-SC)
- Poorly Graded Sand with Clay and Gravel (SP-SC)
- Poorly Graded Sand with Silt (SP-SM)
- Poorly Graded Sand with Silt and Gravel (SP-SM)
- Poorly Graded Sand with Gravel (SP)
- Well-Graded Sand (SW)
- Well-Graded Sand with Clay (SW-SC)
- Well-Graded Sand with Clay and Gravel (SW-SC)
- Well-Graded Sand with Silt (SW-SM)
- Well-Graded Sand with Silt and Gravel (SW-SM)
- Well-Graded Sand with Gravel (SW)
- No Recovery

SURFICIAL GEOLOGY

Surficial Geology was mapped at 1:20,000.

- Geologic contact; dashed where approximate, dotted where concealed, queried where uncertain; solid contacts within 30' of line shown on map.
- W 1937 Water, circa 1937.
- W 1911 Water, circa 1911.
- W 1873 Water, circa 1873.
- W 1854 Water, circa 1854
- C Canal, circa 1937.
- BP BP, Borrow pits present in 1937
- VP Vernal pool; seasonally submerged or saturated depression usually indicative of an underying hardpan.

Geologic Units

- L Levee (made a artificial fill), circa1937.
- R Road embankment (made of artificial fill), circa 1937.
- RR Railroad embankment (made of artificial fill), circa 1937.
- ML Made land; fill material of local and exotic sources, sand, silt, organic, garbage, etc.
- AF Artificial fill, as mapped from 1937 photos.

Historical

- Rob Overbank deposits; sand, silt, and clay; deposited during high-stage water flow, overtopping channel banks.
- Rcs Crevasse splay deposits; fine to coarse sand, with minor lenses of clay deposited from breaching of natural or artifical levees.
- Rch Channel deposits; well sorted sands and fine gravels.
- Rch 1906 Channel deposits, circa 1906; well sorted sands and fine gravels.
- Rch 1873 Channel deposits, circa 1873; well sorted sands and fine gravels.
- Rch 1857 Channel deposits, circa 1857; well sorted sands and fine gravels.
- Rch 1854 Channel deposits, circa 1854; well sorted sands and fine gravels.
- Rb Channel bar deposits; fine gravel, sand, and silt deposited in or along channel lateral margins.
- Rcu Cut off channel (chute); occurs on insides of meander bends within the river channel; on flood plain – entrenchment of overflow channels into hydraulic mining debris.
- Rdc Distributary channel deposits; sand, silt, clay, and trace gravel; hannelized flow conducting sediment to floodplain.
- Rofc Overflow channel; vertically stratified sand, silt and clay in floodplain channels occupied primarily when high-stage water overtops channel banks.
- Rpb Point bar; well sorted sand with minor amounts of silt and clay.
- Rsl Slough deposits; sand, silt and clay, fining upward, low-energy channel deposits.
- Ra Alluvial deposits, undifferentiated; sand, silt, and minor lenses of fine gravel.
- Hfy Alluvial fan deposits; Well graded gravel, sand, silt and clay; volcanic lithologies

Holocene

- Hob Overbank deposits; sand, silt, and clay; deposited during high-stage water flow, overtopping channel banks.
- Hcs Crevasse splay deposits; fine to coarse sand, with minor lenses of gravel deposited from breaching of natural or artifical levees.
- Hdf Distributary fan deposits; sand, silt and clay
- Hofc Overflow channels; vertically stratified sand, silt and clay in channels occupied when high-stage water overtops channel banks.
- Hch Marsh deposits; Undifferentiated marsh deposits above channel deposits
- Hms Channel meander scroll deposits; sand, silt and clay from lateral channel migration
- Hpb Point bar; well sorted sand with minor amounts of silt and clay
- Hpm Basin Deposits
- Hdc Distributary channels; trace gravel, sand, silt, and clay; channelized flow conducting crevasse splay sediment to floodplain
- Hsl Slough deposits; Sand, silt and clay, fining upward, low-energy channel deposits.
- Hsb Slough basin deposits; sand, silt and clay; fining upward, ponded, low-energy channel deposits.
- Ha Alluvial deposits; undifferentiated; sand, silt, and minor lenses of gravel; commonly under cultivation in 1937.
- Ha (Agr) Alluvial deposits undifferentiated; sand, silt, and minor lenses of fine gravel, under cultivation in 1937
- Ha (Urb) Alluvial deposits; undifferentiated; sand, silt, and minor lenses of fine gravel, under urbanization in 1937
- Qch Channel deposits; sorted sands and silts; fining upward.
- Hn Basin deposits; fine sand, silt, and clay.
- Hs Marsh deposits; silt and clay, likely organic-rich; perennially or easonally submerged, as shown on 1937 photography.

Pleistocene

- Qmu Unconsolidated gravel, sand, silt, and clay.
- Qml Unconsolidated to semi-consolidated gravel, sand, silt and clay.
- Qru Semi-consolidated to consolidated gravel, sand, silt and minor clay.
- Qrl Consolidated gravel, sand, silt, and clay, generally associated with strong duripan horizon.
- Qtl Chiefly well consolidated sand with some silt and minor gravel.

Legend

Lower San Joaquin River, Stockton, CA

US Army Corps of Engineers®
SACRAMENTO DISTRICT

FIGURE A-1

DRAFT

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: DMM / BFL
DRAWN BY: M. HARRINGTON
CHECKED BY: K. BRUSTAD
SUBMITTED BY: S. JIMENEZ
SIZE: ANSI D

ISSUE DATE: NOVEMBER 2022
SOLICITATION NO.: XXXXXX-XX-X-XXXX
CONTRACT NO.:

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
1325 J ST.
SACRAMENTO, CA 95814

PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

LOWER SAN JOAQUIN RIVER REACH
FS, SOL LEVEE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

BORING LOG LEGEND

SHEET ID
B-001

FINAL SUBMITTAL

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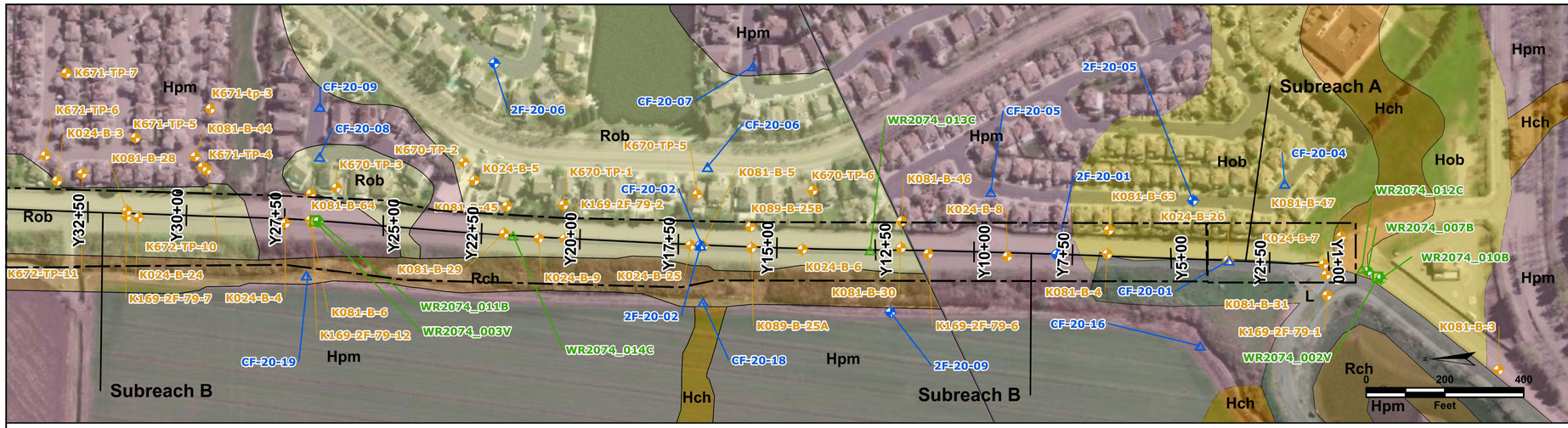

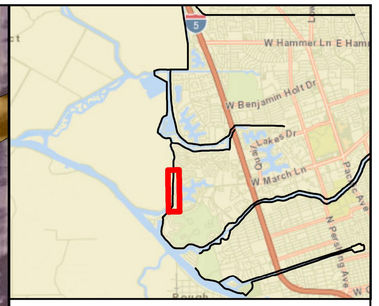

PLAN & PROFILE NOTES:

1. Stratigraphy shown is approximate based on available exploration data. Actual subsurface conditions may vary.
2. Blow Counts are displayed for SPT, MCAL and CAL sampler types, where information is available.
3. Due to data variety "refusal" is represented by an "R" on some sticks and by "Blows/inch" on others.
4. Geotechnical Data compiled from multiple sources through the use of gINT software.
5. Where %f were not present, due to missing data, the symbol was removed from map view.
6. Data Source: Geomorphic units for the American River Urban Project Levee system, William Lettis & Associates, 2008. Geotechnical Data: USACE and URS See Fig. A-1 for Legend.

DISCLAIMER:

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B) HEM differential resistivity data is superimposed on the stick logs using the landside toe as an approximate reference point.

PREVIOUS EXPLORATION SOURCE LEGEND:

K169 - Kleinfelder, 04/26/1979,19790426_Drilling Logs, 10-14 Mile Sloughs - Stockton

K081 - Kleinfelder, 09/29/1989; 19890926_Levee Evaluation for Segment 3, Along 10-Mile & 14-Mile Sloughs & South Buckley Cove, Brookside Project, Stockton, California

K024 - Kleinfelder, 09/29/2006; 20060929_Geotechnical Services, Seepage Evaluation, Levee Along 10-Mile Slough, Brookside Development, Stockton, California

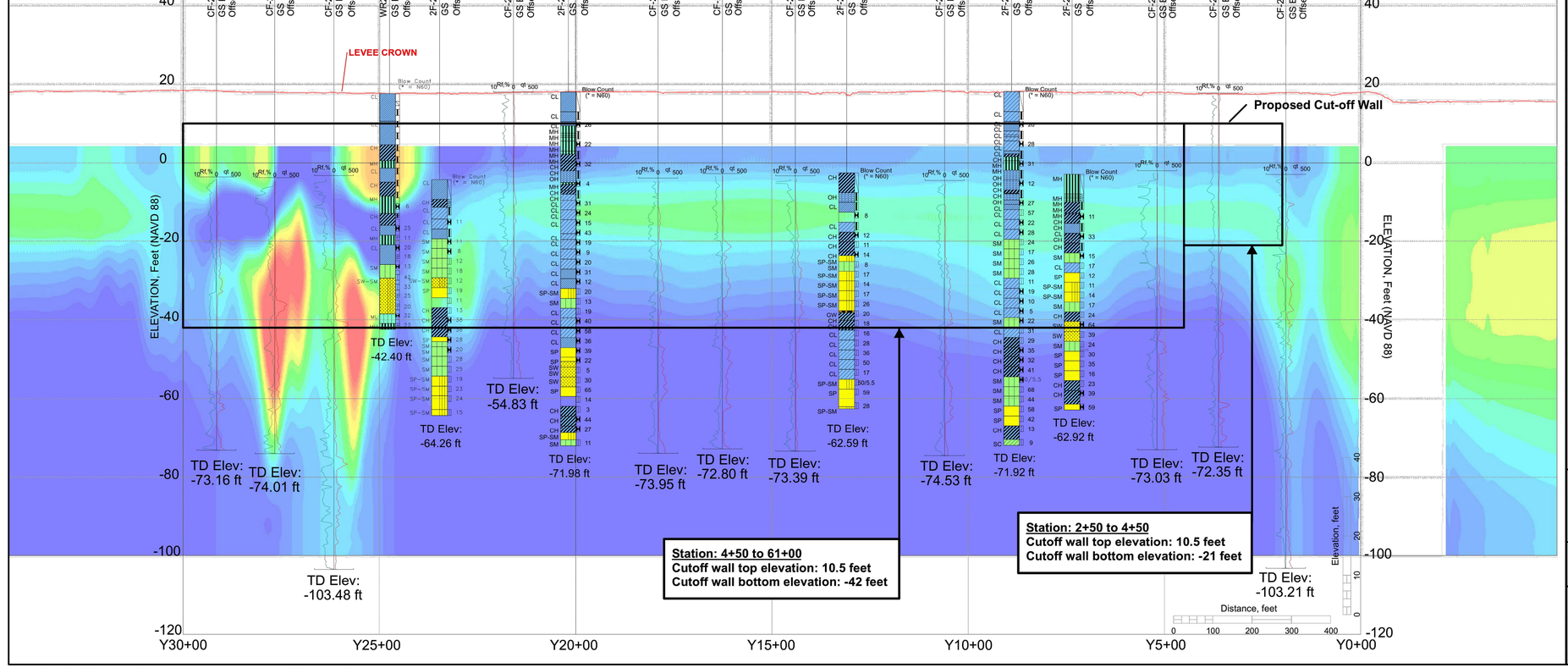
K670 - Kleinfelder, 07/12/1996; 19960712_Report, Geotechnical Investigation, Proposed Unit 30, Brookside Development, Stockton, California

K671 - Kleinfelder, 01/12/2000;20000112_Geotechnical Investigation, Unit 35 Subdivision, Brookside Development, Stockton, California

K672 - Kleinfelder, 01/15/1996;19960115_General Recommendations for Foundations, Unit 18 Subdivision, Brookside Development, Stockton, California

K673 - Kleinfelder, 07/02/1999;19990702_Report, Geotechnical Investigation, Unit 39 Subdivision, Brookside Development, Stockton, California

K089 - Kleinfelder, 09/26/1989;19891211 Summary of Additional Test Drilling Near Boring 25, 10-Mile Slough Levee, Brookside Project, Stockton, California



Differential Resistivity [ohm-m]

5.6 6.3 7.1 7.9 8.9 10.0 11.2 12.6 14.1 15.8 17.7 19.9 22.3 25.1 28.1 31.5 35.4 39.7 44.6 50.0

Plan and Profile (Sta. 30+00 - 0+00)
South Reach
Sheet 1

Lower San Joaquin River

US Army Corps of Engineers
Sacramento District

Reach TS-30-L

DRAFT

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US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: DMM / BFL
DRAWN BY:
CHECKED BY: M. HARRINGTON
APPROVED BY: K. BRUSTAD
SUBMITTED BY: S. JIMENEZ
SIZE: ANSI D

ISSUE DATE: NOVEMBER 2022
SOLICITATION NO.: XXXXXX-XX-X-XXXX
CONTRACT NO.:

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
1325 J ST.
SACRAMENTO, CA 95814

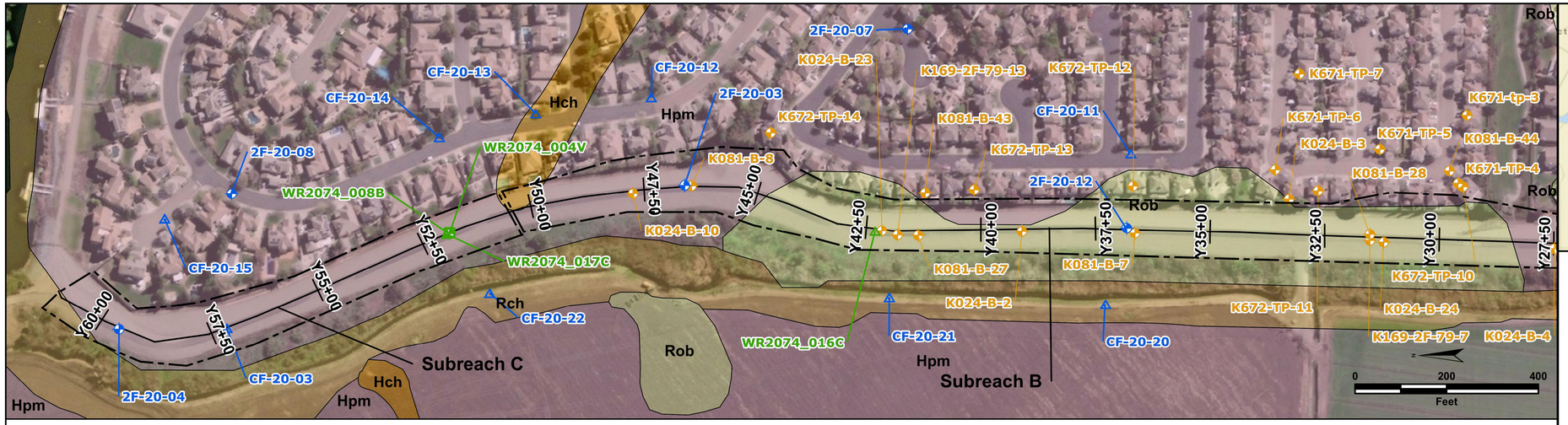
PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

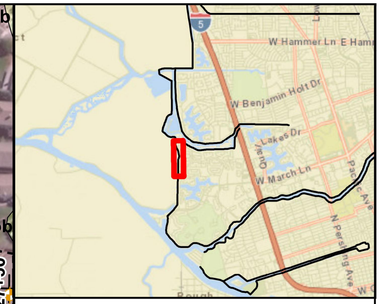
LOWER SAN JOAQUIN RIVER REACH
TS_30 LEVEE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

BORING LOG PLAN AND PROFILE STA 1+00 TO 30+00

SHEET ID
B-201

FINAL SUBMITTAL





PLAN & PROFILE NOTES:

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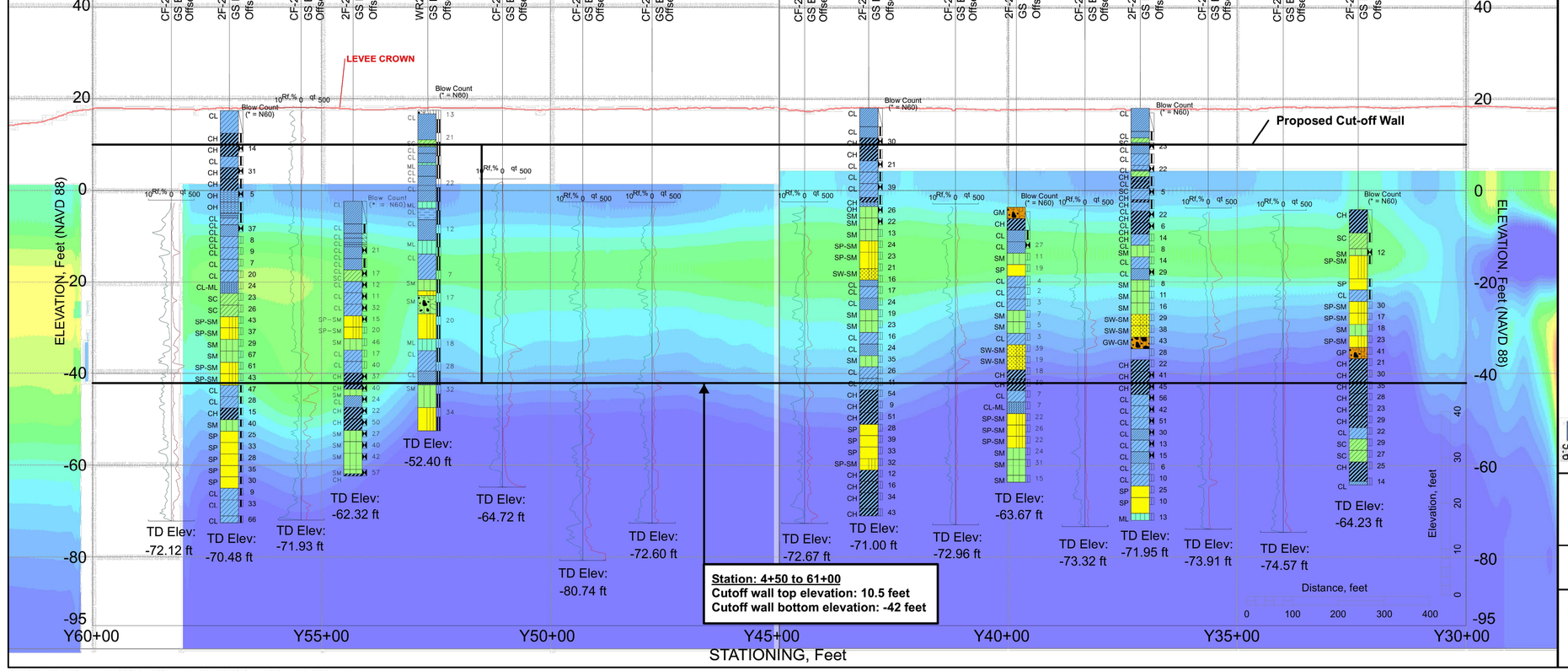

Differential Resistivity [ohm-m]

5.6 6.3 7.1 7.9 8.9 10.0 11.2 12.6 14.1 15.8 17.7 19.9 22.3 25.1 28.1 31.5 35.4 39.7 44.6 50.0

Plan and Profile (Sta. 60+00 - 30+00)
North Reach
Sheet 2

Lower San Joaquin River

Reach TS-30-L

US Army Corps of Engineers
Sacramento District

DRAFT

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: DMM / BFL
DRAWN BY: M. HARRINGTON
CHECKED BY: K. BRUSTAD
SUBMITTED BY: S. JIMENEZ
SIZE: ANSI D

ISSUE DATE: NOVEMBER 2022
SOLICITATION NO.: XXXXXX-XX-X-XXXX
CONTRACT NO.:

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
1325 J STREET
SACRAMENTO, CA 95814

PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

LOWER SAN JOAQUIN RIVER REACH
TS_30 LEVEE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

BORING LOG PLAN AND PROFILE STA 30+00 TO 60+00

SHEET ID
B-202

FINAL SUBMITTAL



N

0 40' 80'

SCALE: 1"=40'

NOTES

1. AERIAL IMAGE HAS NOT BEEN ORTHORECTIFIED

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: DMM / BFL
DRAWN BY: M. HARRINGTON
CHECKED BY: K. BRUSTAD
QA/QC PERFORMED BY: S. JIMENEZ
SIZE: ANSI D

ISSUE DATE: NOVEMBER 2022
SOLICITATION NO.: XXXXXX-XX-X-XXXX
CONTRACT NO.:

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
1325 J. ST.
SACRAMENTO, CA 95814

PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

LOWER SAN JOAQUIN RIVER REACH
SOUTH LEVEE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

AERIAL PLAN STA 1+00 TO 10+00

SHEET ID
V-100

FINAL SUBMITTAL



N

0 40' 80'

SCALE: 1"=40'

NOTES

1. AERIAL IMAGE HAS NOT BEEN ORTHORECTIFIED

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: DMM / BFL
DRAWN BY: M. HARRINGTON
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U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
1325 J ST.
SACRAMENTO, CA 95814

PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

LOWER SAN JOAQUIN RIVER REACH
SAN JOAQUIN RIVER FLOOD
SAN JOAQUIN COUNTY, CALIFORNIA

AERIAL PLAN STA 10+00 TO 20+50

SHEET ID
V-101

FINAL SUBMITTAL



N

0 40' 80'

SCALE: 1"=40'

NOTES

1. AERIAL IMAGE HAS NOT BEEN ORTHORECTIFIED

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY:	ISSUE DATE:
DMM / BFL	NOVEMBER 2022
DRAWN BY:	SOLICITATION NO.:
M. HARRINGTON	XXXXXX-XX-X-XXXX
CHECKED BY:	CONTRACT NO.:
K. BRUSTAD	
QA/QC REVIEWED BY:	
S. JIMENEZ	
SIZE:	
ANSI D	

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
1325 J ST.
SACRAMENTO, CA 95814

PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

LOWER SAN JOAQUIN RIVER REACH
WS LEVEE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

AERIAL PLAN STA 20+50 TO 31+00

SHEET ID
V-102

FINAL SUBMITTAL



N

0 40' 80'

SCALE: 1"=40'

NOTES

1. AERIAL IMAGE HAS NOT BEEN ORTHORECTIFIED

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

ISSUE DATE:	NOVEMBER 2022
SOLICITATION NO.:	XXXXXX-XX-X-XXXX
CONTRACT NO.:	
DESIGNED BY:	DMM / BFL
DRAWN BY:	M. HARRINGTON
CHECKED BY:	K. BRUSTAD
APPROVED BY:	S. JIMENEZ
SIZE:	ANSI D

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
1325 J ST.
SACRAMENTO, CA 95814

PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

LOWER SAN JOAQUIN RIVER REACH
SOUTH LEVEE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

AERIAL PLAN STA 31+00 TO 41+50

SHEET ID
V-103

FINAL SUBMITTAL



N

0 40' 80'

SCALE: 1"=40'

NOTES

1. AERIAL IMAGE HAS NOT BEEN ORTHORECTIFIED

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY:	
DMM / BFL	
DRAWN BY:	
M. HARRINGTON	
CHECKED BY:	
K. BRUSTAD	
SUBMITTED BY:	
S. JIMENEZ	
SIZE:	
ANSI D	

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U.S. ARMY CORPS OF ENGINEERS
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1325 J ST.
SACRAMENTO, CA 95814

PETERSON BRUSTAD INC.
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FOLSOM, CA 95630

LOWER SAN JOAQUIN RIVER REACH
SAN JOAQUIN RIVER FLOOD
SAN JOAQUIN COUNTY, CALIFORNIA

AERIAL PLAN STA 41+50 TO 52+00

SHEET ID
V-104

FINAL SUBMITTAL



N

0 40' 80'

SCALE: 1"=40'

NOTES

1. AERIAL IMAGE HAS NOT BEEN ORTHORECTIFIED

US Army Corps of Engineers®

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QA/QC BY: S. JIMENEZ
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SACRAMENTO DISTRICT
1325 J ST.
SACRAMENTO, CA 95814

PETERSON BRUSTAD INC.
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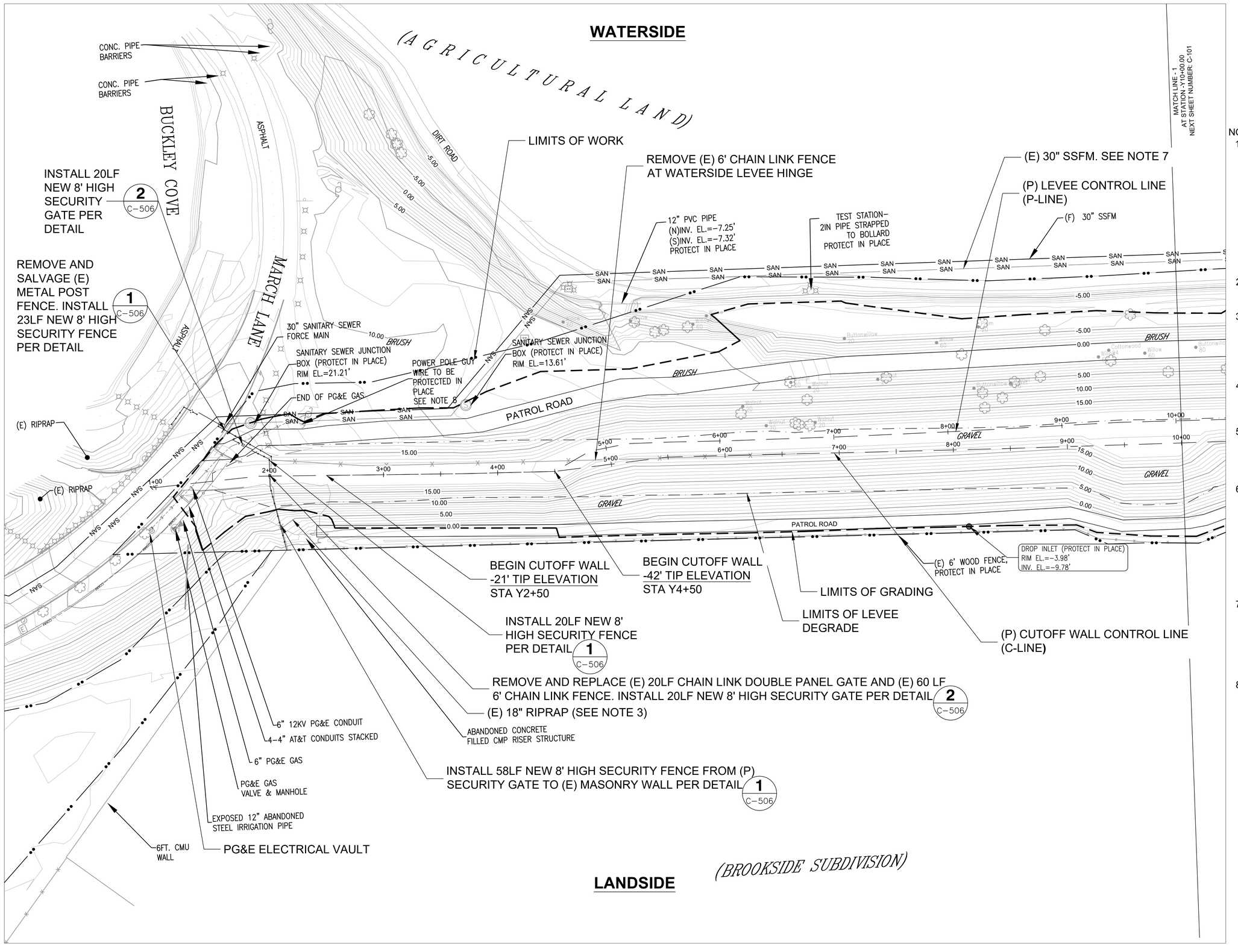
FOLSOM, CA 95630

LOWER SAN JOAQUIN RIVER REACH
LEVEE REHABILITATION
SAN JOAQUIN COUNTY, CALIFORNIA

AERIAL PLAN STA 52+00 TO 62+00

SHEET ID
V-105

FINAL SUBMITTAL



N

0 40' 80'

SCALE: 1"=40'

NOTE:

1. CONTOURS WITHIN LIMITS OF GRADING REFLECT THE PROPOSED LEVEE SURFACE. THE CONTOURS THAT CONTINUE OUTSIDE OF THE LIMITS OF GRADING REFLECT THE EXISTING LEVEE SURFACE.
2. PROTECT IN PLACE ALL UTILITIES.
3. 4. EXISTING 18" RIP RAP (36" THICK) TO BE REMOVED AND REINSTALLED PER SHEET CG-100.
4. TOPSOIL SHALL NOT BE USED ON FINAL LEVEE SLOPES.
5. VIBRATORY ROLLERS SHALL NOT BE USED OVER UTILITIES.
6. WHERE LEVEE GRADING ENCROACHES ON DRAINAGE SWALE, RECONSTRUCT PER DETAIL 4 ON C-507. REFERENCE SHEETS C-311 TO C-317 FOR LIMITS
7. NO EQUIPMENT SHALL GO OVER THE ALIGNMENT OF THE (E) 30" SSFM, AS INDICATED ON THE DRAWINGS.
8. CONTRACTOR MUST PLACE CAUTION TAPE COMPLETELY AROUND PG&E POWER POLE AND GUY WIRE

US Army Corps of Engineers®

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DRAWN BY: M. HARRINGTON
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SUBMITTED BY: S. JIMENEZ
SIZE: ANSI D

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
1325 J ST.
SACRAMENTO, CA 95814

PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

LOWER SAN JOAQUIN RIVER REACH
TS_30L LEVEE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

LEVEE PLAN STA 1+00 TO 10+00

SHEET ID
C-100

FINAL SUBMITTAL

WATERSIDE

MATCH LINE - 1
AT STATION - Y10+00.00
PREVIOUS SHEET NUMBER: C-100

MATCH LINE - 2
AT STATION - Y20+50.00
NEXT SHEET NUMBER: C-102

END PARTIAL DITCH RELOCATION
STA Y16+67 (169') PER DETAIL 1/C-507

BEGIN PARTIAL DITCH RELOCATION
STA Y14+98 PER DETAIL 1/C-507

(AGRICULTURAL LAND)

(P) LEVEE CONTROL LINE
(P-LINE)

TOP OF CHANNEL

LIMITS OF WORK

(E) 30" SSFM

(F) 30" SSFM

TEST STATION–
2IN PIPE STRAPPED
TO BOLLARD
PROTECT IN PLACE

(P) TOP

(P) INVERT

DIRT ROAD

PATROL ROAD

BRUSH

GRAVEL

ELDERBERRY
(SEE NOTE 1)

LIMITS OF GRADING

LIMITS OF LEVEE
DEGRADE

DROP INLET (PROTECT IN PLACE)
RIM EL.=-2.94'
INV. EL.=-8.04'

(E) 6' WOOD FENCE,
PROTECT IN PLACE

(P) CUTOFF WALL CONTROL LINE
(C-LINE)

(BROOKSIDE SUBDIVISION)

LANDSIDE

N

0 40' 80'

SCALE: 1"=40'

NOTES

1. ELDERBERRY BUSH TO BE RELOCATED BY OTHERS PRIOR TO CONSTRUCTION
2. CONTOURS WITHIN LIMITS OF GRADING REFLECT THE PROPOSED LEVEE SURFACE. THE CONTOURS THAT CONTINUE OUTSIDE OF THE LIMITS OF GRADING REFLECT THE EXISTING LEVEE SURFACE.
3. PROTECT IN PLACE ALL UTILITIES
4. WHERE LEVEE GRADING ENCROACHES ON DRAINAGE SWALE, RECONSTRUCT PER DETAIL 4 ON C-507. REFERENCE SHEETS C-311 TO C-317 FOR LIMITS

US Army Corps of Engineers®

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A/E PM: T. TOLLEFSON
S. JIMENEZ
SIZE: ANSI D

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FOLSOM, CA 95630

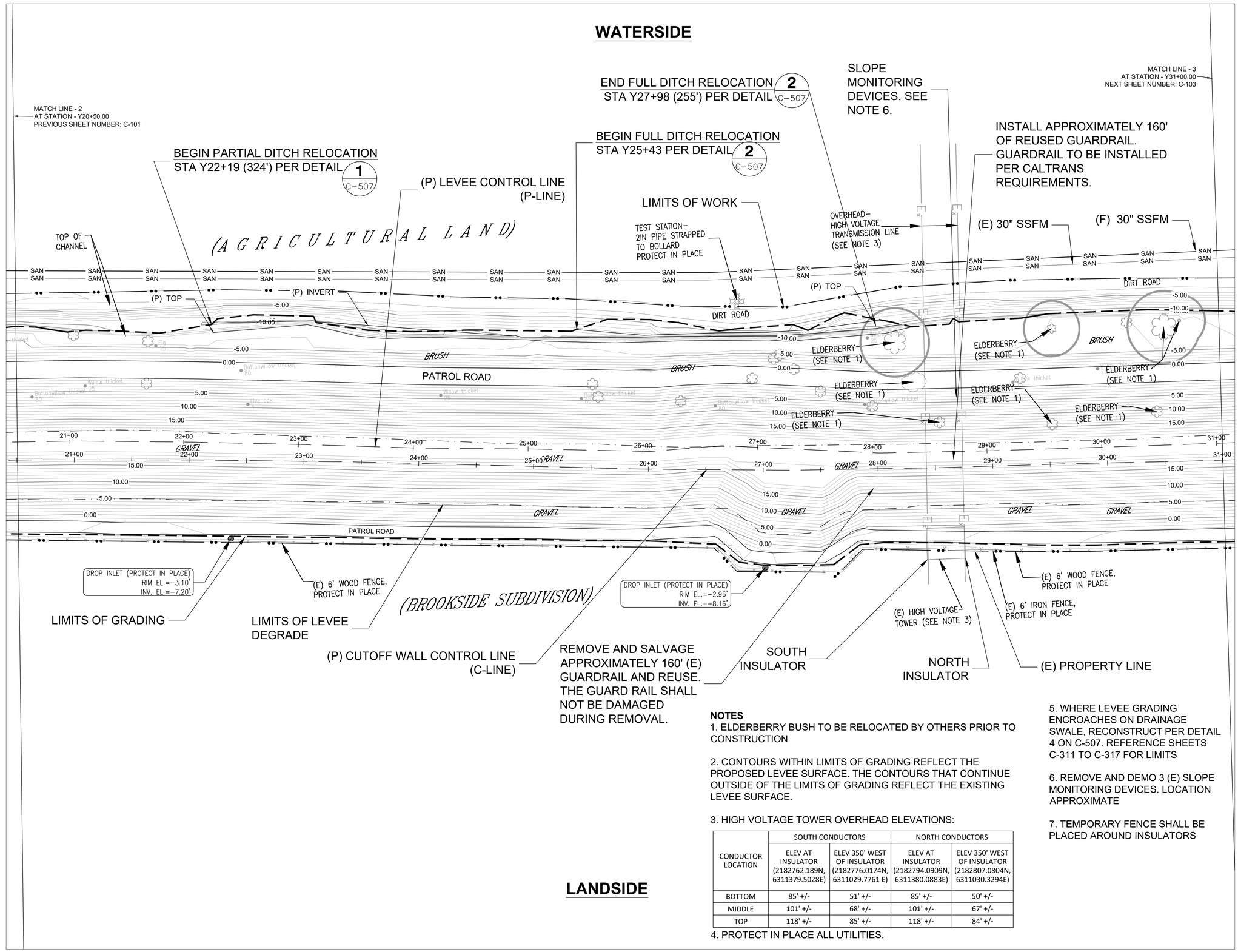
LOWER SAN JOAQUIN RIVER REACH
SW LEVEE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

LEVEE PLAN STA 10+00 TO 20+50

SHEET ID
C-101

FINAL SUBMITTAL

WATERSIDE



N

SCALE: 1"=40'

LANDSIDE

NOTES

1. ELDERBERRY BUSH TO BE RELOCATED BY OTHERS PRIOR TO CONSTRUCTION

2. CONTOURS WITHIN LIMITS OF GRADING REFLECT THE PROPOSED LEVEE SURFACE. THE CONTOURS THAT CONTINUE OUTSIDE OF THE LIMITS OF GRADING REFLECT THE EXISTING LEVEE SURFACE.

3. HIGH VOLTAGE TOWER OVERHEAD ELEVATIONS:

CONDUCTOR LOCATION	SOUTH CONDUCTORS		NORTH CONDUCTORS	
	ELEV AT INSULATOR (2182762.189N, 6311379.5028E)	ELEV 350' WEST OF INSULATOR (2182776.0174N, 6311029.7761 E)	ELEV AT INSULATOR (2182794.0909N, 6311380.0883E)	ELEV 350' WEST OF INSULATOR (2182807.0804N, 6311030.3294E)
BOTTOM	85' +/-	51' +/-	85' +/-	50' +/-
MIDDLE	101' +/-	68' +/-	101' +/-	67' +/-
TOP	118' +/-	85' +/-	118' +/-	84' +/-

4. PROTECT IN PLACE ALL UTILITIES.

5. WHERE LEVEE GRADING ENCROACHES ON DRAINAGE SWALE, RECONSTRUCT PER DETAIL 4 ON C-507. REFERENCE SHEETS C-311 TO C-317 FOR LIMITS

6. REMOVE AND DEMO 3 (E) SLOPE MONITORING DEVICES. LOCATION APPROXIMATE

7. TEMPORARY FENCE SHALL BE PLACED AROUND INSULATORS

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

ISSUE DATE: NOVEMBER 2022
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CONTRACT NO.:

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DRAWN BY: M. HARRINGTON
CHECKED BY: K. BRUSTAD
SUBMITTED BY: S. JIMENEZ
SIZE: ANSI D

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1325 J ST.
SACRAMENTO, CA 95814

PETERSON BRUSTAD INC.
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FOLSOM, CA 95630

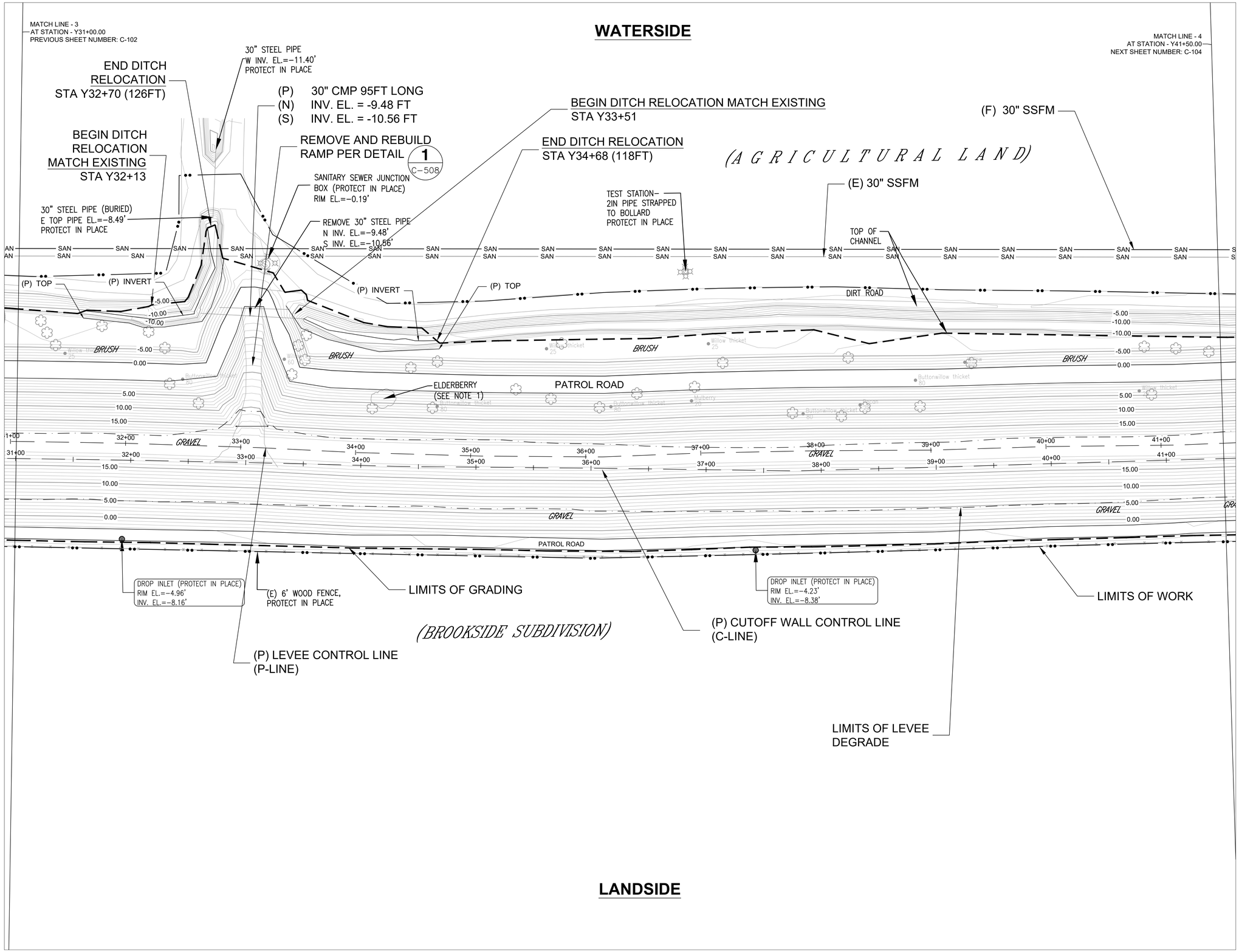
LOWER SAN JOAQUIN RIVER REACH
TS: SAN JOAQUIN COUNTY
SAN JOAQUIN COUNTY, CALIFORNIA

LEVEE PLAN STA 20+50 TO 31+00

SHEET ID
C-102

FINAL SUBMITTAL

WATERSIDE



LANDSIDE

N

0 40' 80'

SCALE: 1"=40'

NOTES

1. ELDERBERRY BUSH TO BE RELOCATED BY OTHERS PRIOR TO CONSTRUCTION
2. CONTOURS WITHIN LIMITS OF GRADING REFLECT THE PROPOSED LEVEE SURFACE. THE CONTOURS THAT CONTINUE OUTSIDE OF THE LIMITS OF GRADING REFLECT THE EXISTING LEVEE SURFACE.
3. PROTECT IN PLACE ALL UTILITIES.
4. SEE CROSS SECTION AT STA Y33+00 ON SHEET C-314. SURFACE OF RAMP TO HAVE 4" AGGREGATE SURFACING COMPACT TO 100%
5. CONTRACTOR MUST COORDINATE USE OF WATERSIDE RAMP AT STA Y33+00 WITH THE PROPERTY OWNER
6. WHERE LEVEE GRADING ENCROACHES ON DRAINAGE SWALE, RECONSTRUCT PER DETAIL 4 ON C-507. REFERENCE SHEETS C-311 TO C-317 FOR LIMITS

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1325 J ST
SACRAMENTO, CA 95814

PETERSON BRUSTAD INC.
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FOLSOM, CA 95630

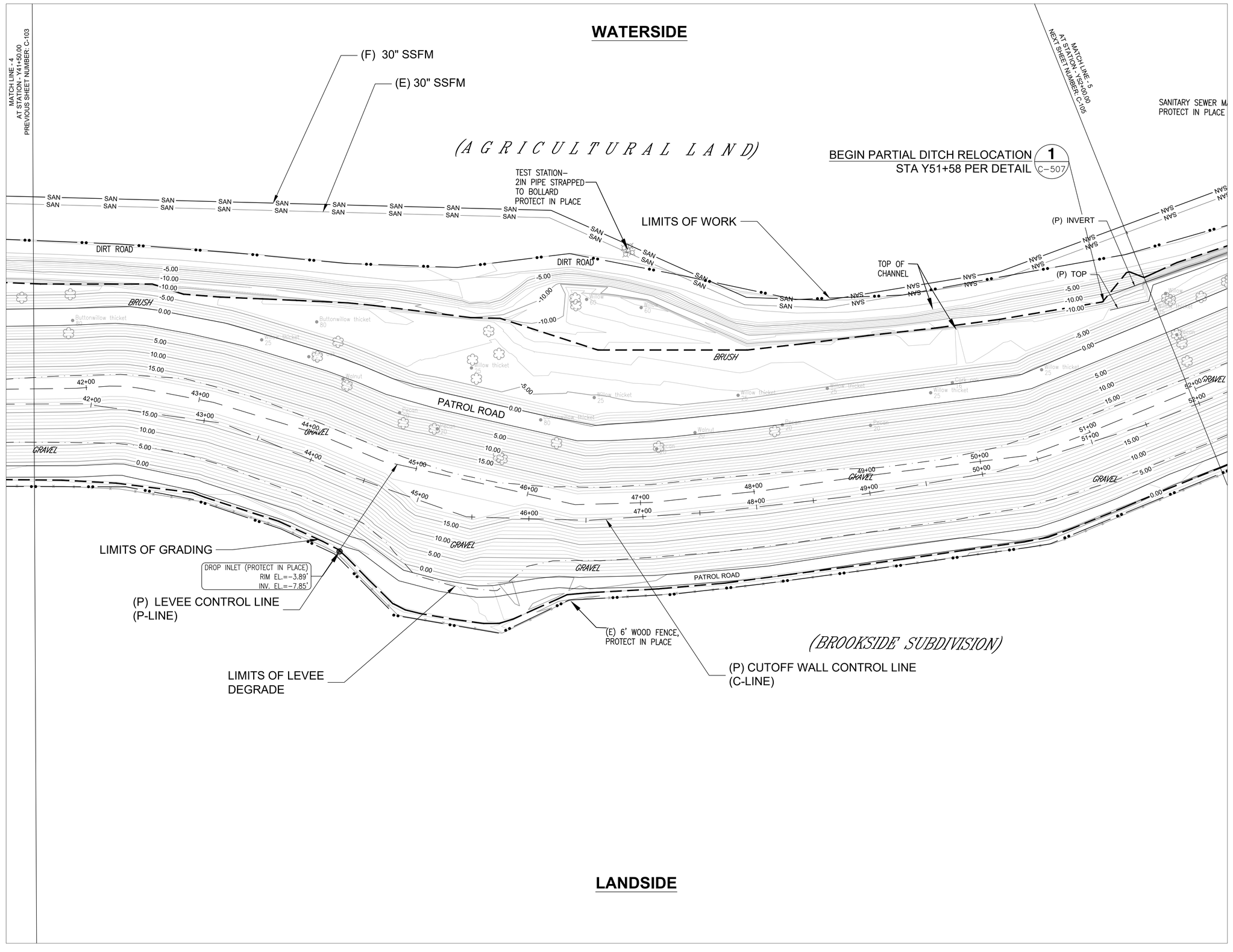
LOWER SAN JOAQUIN RIVER REACH
'S' BEND LEVEE IMPROVEMENT PROJECT
SAN JOAQUIN COUNTY, CALIFORNIA

LEVEE PLAN STA 31+00 TO 41+50

SHEET ID
C-103

FINAL SUBMITTAL

WATERSIDE



LANDSIDE

N

0 40' 80'

SCALE: 1"=40'

NOTE:

1. CONTOURS WITHIN LIMITS OF GRADING REFLECT THE PROPOSED LEVEE SURFACE. THE CONTOURS THAT CONTINUE OUTSIDE OF THE LIMITS OF GRADING REFLECT THE EXISTING LEVEE SURFACE.
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3. WHERE LEVEE GRADING ENCROACHES ON DRAINAGE SWALE, RECONSTRUCT PER DETAIL 4 ON C-507. REFERENCE SHEETS C-311 TO C-317 FOR LIMITS

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U.S. ARMY CORPS OF ENGINEERS
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1325 J ST.
SACRAMENTO, CA 95814

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80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

LOWER SAN JOAQUIN RIVER REACH
TSMP LEVEE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

LEVEE PLAN STA 41+50 TO 52+00

SHEET ID
C-104

FINAL SUBMITTAL

WATERSIDE

~ TEMPORARY STAGING AND STOCKPILE AREA~
(SEE SHEET V-007)

N

0 40' 80'

SCALE: 1"=40'

NOTE:
1. CONTOURS WITHIN LIMITS OF GRADING REFLECT THE PROPOSED LEVEE SURFACE. THE CONTOURS THAT CONTINUE OUTSIDE OF THE LIMITS OF GRADING REFLECT THE EXISTING LEVEE SURFACE.
2. PROTECT IN PLACE ALL UTILITIES
3. WHERE LEVEE GRADING ENCROACHES ON DRAINAGE SWALE, RECONSTRUCT PER DETAIL 4 ON C-507. REFERENCE SHEETS C-311 TO C-317 FOR LIMITS

BEGIN FULL DITCH RELOCATION
STA Y58+73 PER DETAIL 2 C-507

END FULL DITCH RELOCATION
STA Y60+52 (179') PER DETAIL 2 C-507

END PARTIAL DITCH RELOCATION
STA Y54+22 (264') PER DETAIL 1 C-507

(E) 30" SSFM

24" CMP PIPE PROTECT IN PLACE INV. EL.=-9.38'

24" CMP PIPE PROTECT IN PLACE INV. EL.=-10.28'

(F) 30" SSFM

12" PVC PIPE PROTECT IN PLACE N INV. EL.=-8.29' S INV. EL.=-8.15'

TEST STATION- 2IN PIPE STRAPPED TO BOLLARD PROTECT IN PLACE

TOP OF CHANNEL

LIMITS OF WORK

SANITARY SEWER MANHOLE PROTECT IN PLACE

(P) INVERT

(P) TOP

DIRT ROAD

PATROL ROAD

BRUSH

GRAVEL

DROP INLET (PROTECT IN PLACE)
RIM EL.=-0.98'
INV. EL.=-4.53'

DROP INLET (PROTECT IN PLACE)
RIM EL.=-0.66'
INV. EL.=-6.83'

(E) 6' WOOD FENCE, PROTECT IN PLACE

END CUTOFF WALL
-42' TIP ELEVATION
STA Y61+00

(E) 6' IRON FENCE, PROTECT IN PLACE

(E) SPLIT SWING GATE-IRON, PROTECT IN PLACE

(E) RIPRAP

WATER EDGE

TOP OF LEVEE

(E) CONC. SLAB FOR DOCK

MATCH EXISTING GRADE

FOURTEEN MILE SLOUGH

(AGRICULTURAL LAND)

(BROOKSIDE SUBDIVISION)

LIMITS OF LEVEE DEGRADE

(P) LEVEE CONTROL LINE (P-LINE)

LIMITS OF GRADING

(P) CUTOFF WALL CONTROL LINE (C-LINE)

MATCH LINE - S
AT STATION - Y52+00.00
PREVIOUS SHEET NUMBER: C-104

LANDSIDE

US Army Corps of Engineers®

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DRAWN BY: M. HARRINGTON
CHECKED BY: K. BRUSTAD
SUBMITTED BY: J. JIMENEZ
SIZE: ANSI D
ISSUE DATE: NOVEMBER 2022
SOLICITATION NO.: XXXXXX-XX-X-XXXX
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U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
1325 J ST.
SACRAMENTO, CA 95814

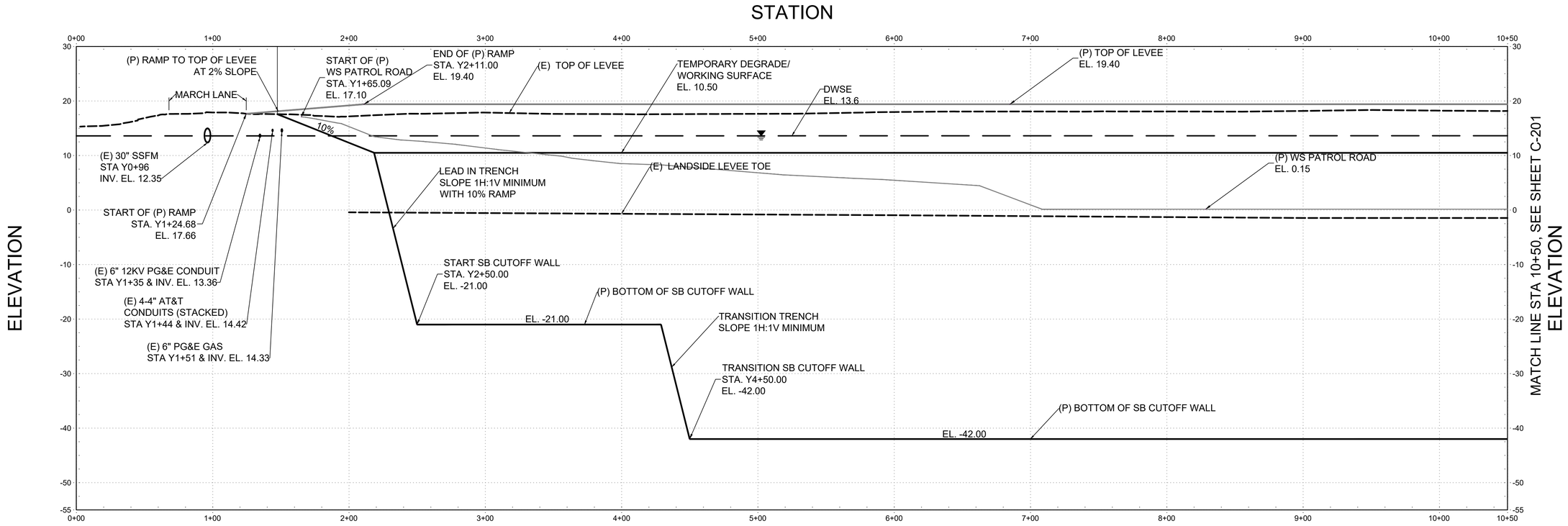
PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

LOWER SAN JOAQUIN RIVER REACH
TS_30L LEVEE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

LEVEE PLAN STA 52+00 TO 62+00

SHEET ID
C-105

FINAL SUBMITTAL



STATION ALONG EXISTING LEVEE CENTERLINE (Y-LINE)

NOTES:

1. DWSE IS THE MAXIMUM DESIGN WATER LEVEL AT THE PROJECT AREA SHOULD THE AGRICULTURAL LEVEES FAIL.
2. (E) PG&E GAS MAIN HAS 33" OF COVER. NO VIBRATORY EQUIPMENT MAY BE USED WITHIN 12" OF THIS GAS MAIN OR OTHER SHALLOW UTILITIES. CONTRACTOR MUST MAINTAIN 2' OF COVER ABOVE EXISITNG 6" GAS MAIN.

0 40' 80'

SCALE: 1"=40' HORIZONTAL
1"=10' VERTICAL

US Army Corps of Engineers®

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SACRAMENTO, CA 95814

PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

LOWER SAN JOAQUIN RIVER REACH
FS SAN JOE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

LEVEE PROFILE STA 1+00 TO 10+50

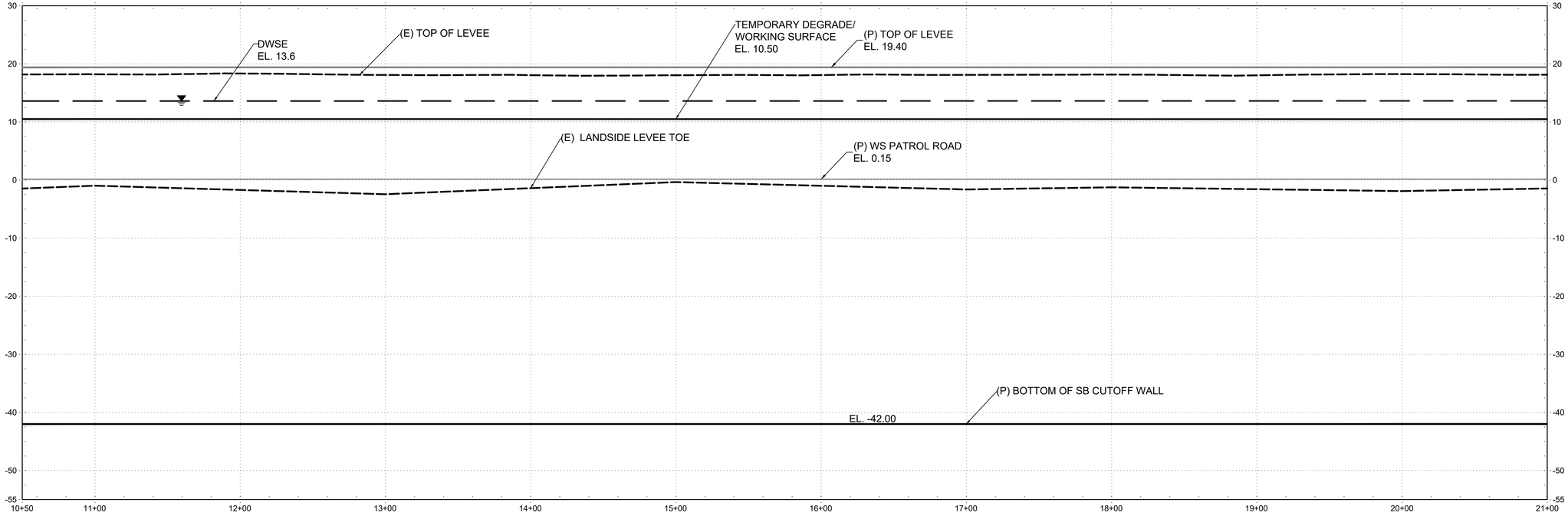
SHEET ID
C-200

FINAL SUBMITTAL

STATION

ELEVATION

MATCH LINE STA 10+50, SEE SHEET C-200



MATCH LINE STA 21+00, SEE SHEET C-202

ELEVATION

STATION ALONG EXISTING LEVEE CENTERLINE (Y-LINE)

NOTES:

1. DWSE IS THE MAXIMUM DESIGN WATER LEVEL AT THE PROJECT AREA SHOULD THE AGRICULTURAL LEVEES FAIL.

0 40' 80'

SCALE: 1"=40' HORIZONTAL
1"=10' VERTICAL

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SUBMITTED BY: S. JIMENEZ
SIZE: ANSI D

ISSUE DATE: NOVEMBER 2022
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U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
1325 J ST
SACRAMENTO, CA 95814

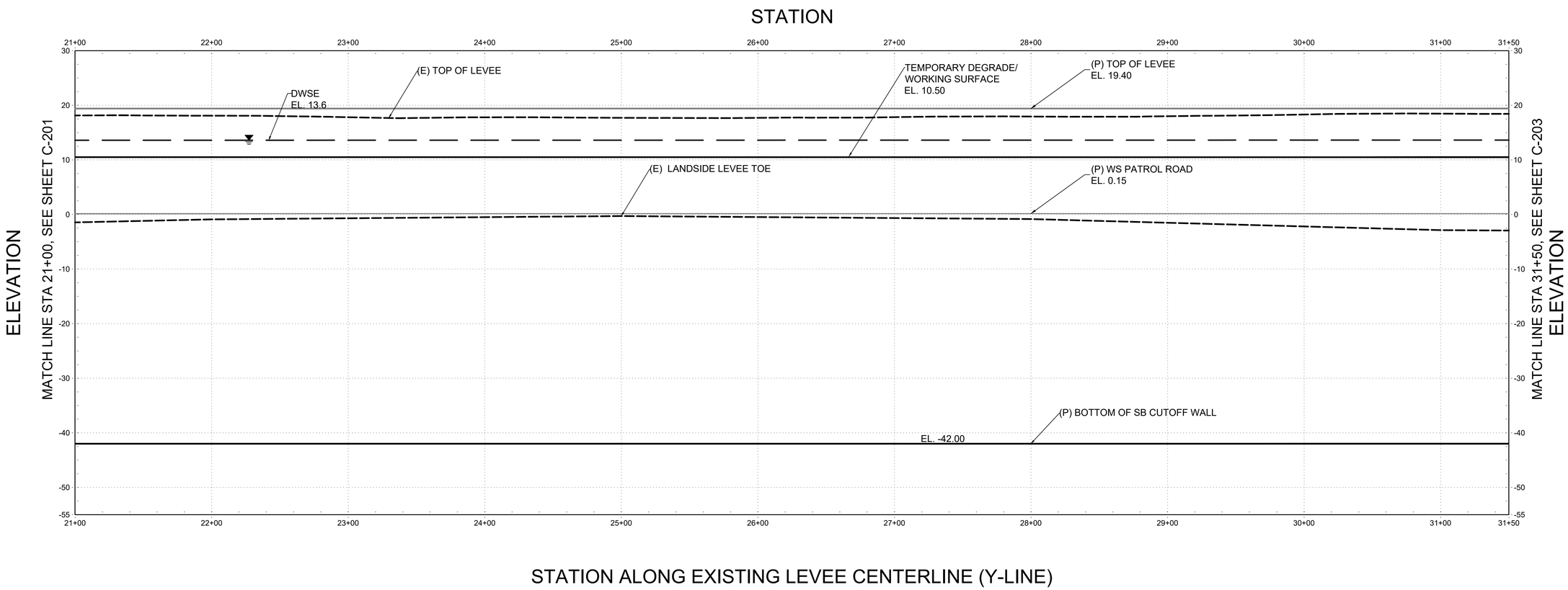
PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

LOWER SAN JOAQUIN RIVER REACH
LEVEE REHABILITATION PROJECT
SAN JOAQUIN COUNTY, CALIFORNIA

LEVEE PROFILE STA 10+50 TO 21+00

SHEET ID
C-201

FINAL SUBMITTAL



NOTES:

1. DWSE IS THE MAXIMUM DESIGN WATER LEVEL AT THE PROJECT AREA SHOULD THE AGRICULTURAL LEVEES FAIL.

0 40' 80'

SCALE: 1"=40' HORIZONTAL
1"=10' VERTICAL

US Army Corps of Engineers®

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SUBMITTED BY: S. JIMENEZ
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U.S. ARMY CORPS OF ENGINEERS
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PETERSON BRUSTAD INC.
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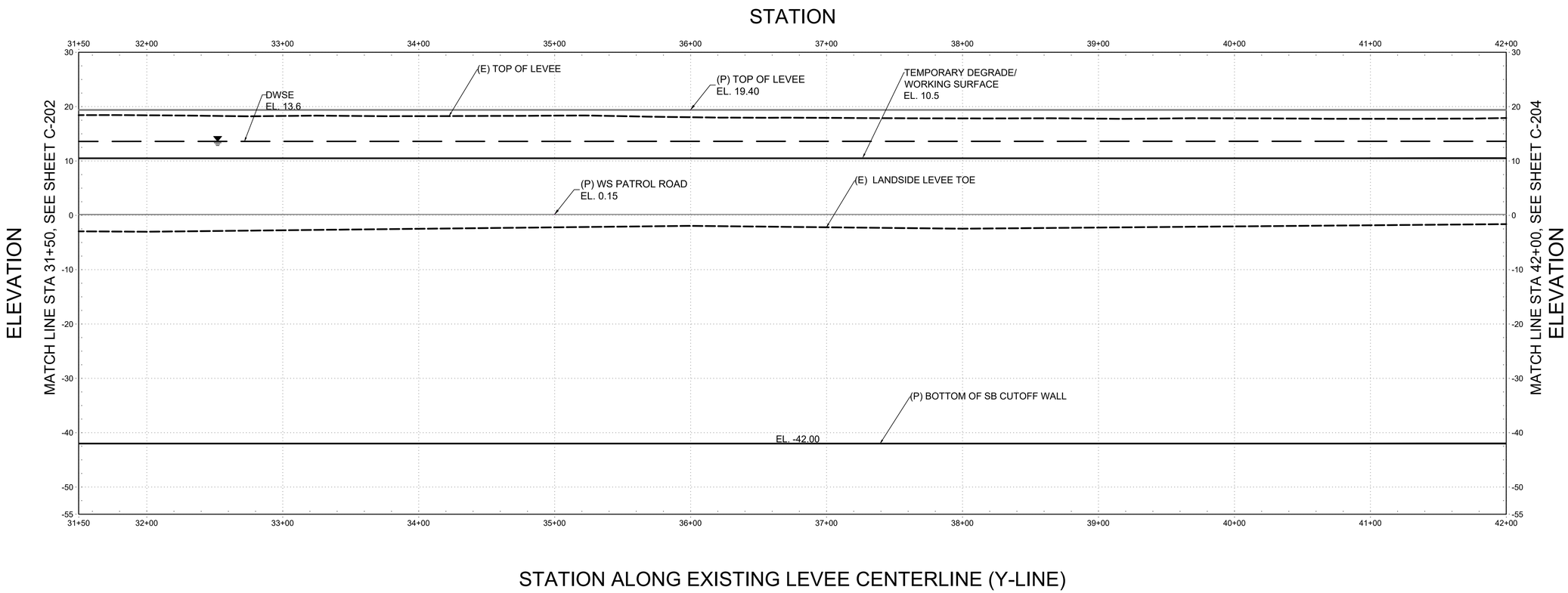
LOWER SAN JOAQUIN RIVER REACH
TS_30L LEVEE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

LEVEE PROFILE STA 21+00 TO 31+50

SHEET ID
C-202

FINAL SUBMITTAL



NOTES:

1. DWSE IS THE MAXIMUM DESIGN WATER LEVEL AT THE PROJECT AREA SHOULD THE AGRICULTURAL LEVEES FAIL.

0 40' 80'

SCALE: 1"=40' HORIZONTAL
1"=10' VERTICAL

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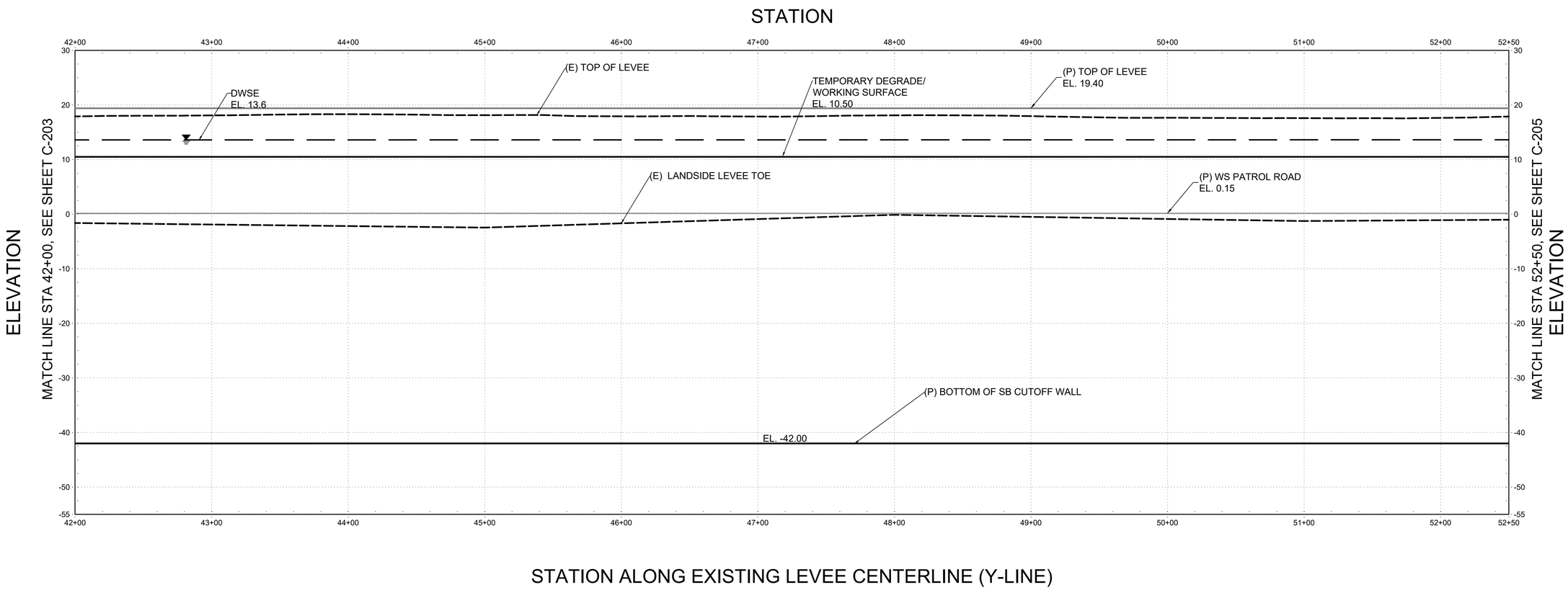
LOWER SAN JOAQUIN RIVER REACH
TS_30L LEVEE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

LEVEE PROFILE STA 31+50 TO 42+00

SHEET ID
C-203

FINAL SUBMITTAL



NOTES:

1. DWSE IS THE MAXIMUM DESIGN WATER LEVEL AT THE PROJECT AREA SHOULD THE AGRICULTURAL LEVEES FAIL.

0 40' 80'

SCALE: 1"=40' HORIZONTAL
1"=10' VERTICAL

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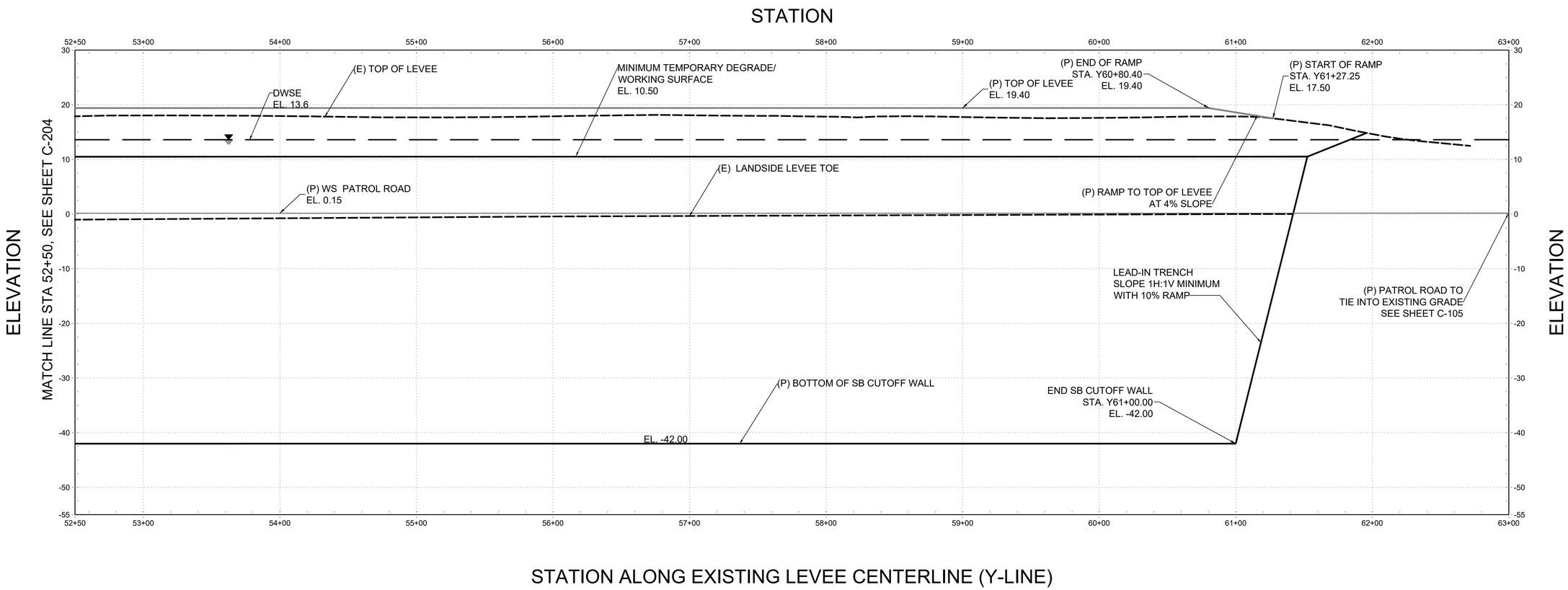
PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

LOWER SAN JOAQUIN RIVER REACH
TS_30L LEVEE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

LEVEE PROFILE STA 42+00 TO 52+50

SHEET ID
C-204

FINAL SUBMITTAL



STATION ALONG EXISTING LEVEE CENTERLINE (Y-LINE)

NOTES:

1. DWSE IS THE MAXIMUM DESIGN WATER LEVEL AT THE PROJECT AREA SHOULD THE AGRICULTURAL LEVEES FAIL.

0 40' 80'

SCALE: 1"=40' HORIZONTAL
1"=10' VERTICAL

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SACRAMENTO, CA 95814

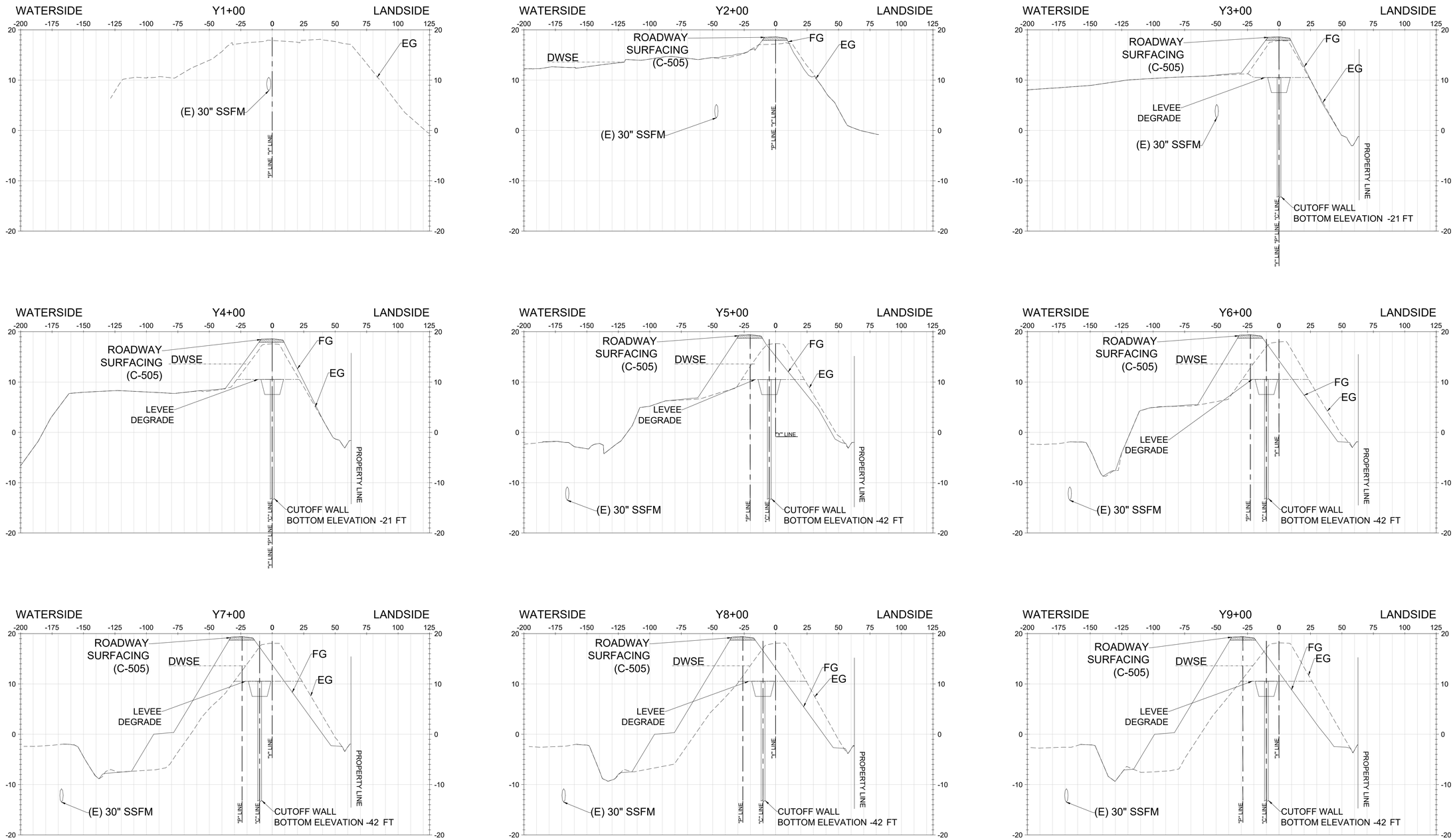
PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

LOWER SAN JOAQUIN RIVER REACH
TS_30L LEVEE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

LEVEE PROFILE STA 52+50 TO 63+00

SHEET ID
C-205

FINAL SUBMITTAL



SCALE: 1"=40' HORIZONTAL
1"=10' VERTICAL

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: DMM / BFL
DRAWN BY: M. HARRINGTON
CHECKED BY: K. BRUSTAD
SUBMITTED BY: S. JIMENEZ
SIZE: ANSI D

ISSUE DATE: NOVEMBER 2022
SOLICITATION NO.: XXXXXX-XX-X-XXXX
CONTRACT NO.:

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
1325 J ST.
SACRAMENTO, CA 95814

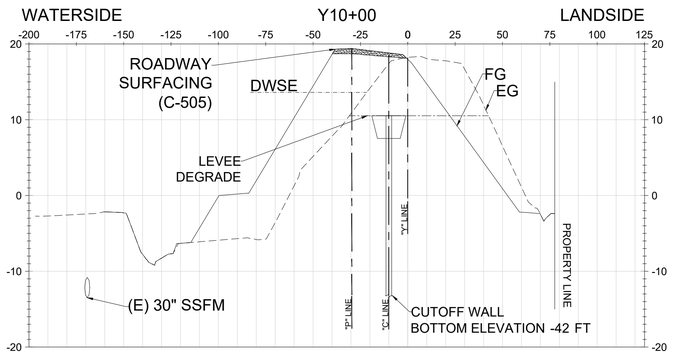
PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

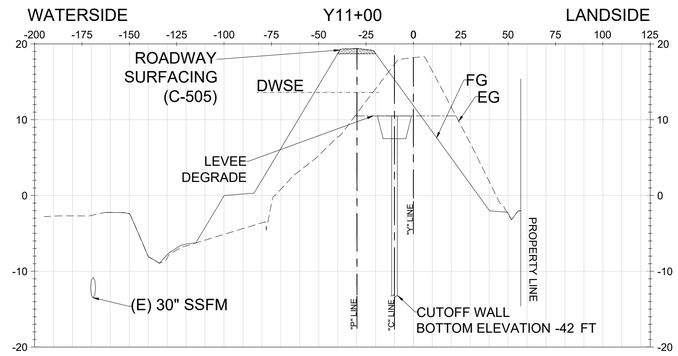
LOWER SAN JOAQUIN RIVER REACH
TS_30L LEVEE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

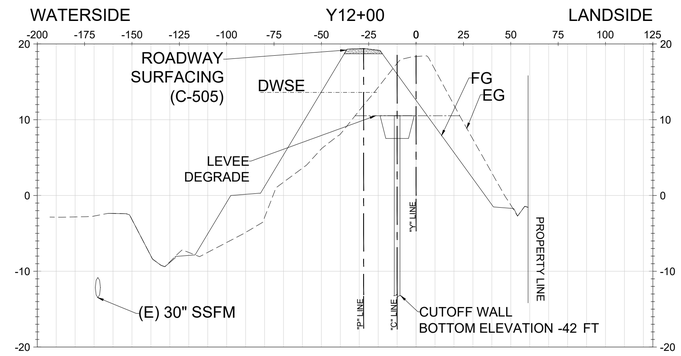
CROSS SECTIONS STA 1+00 TO 9+00

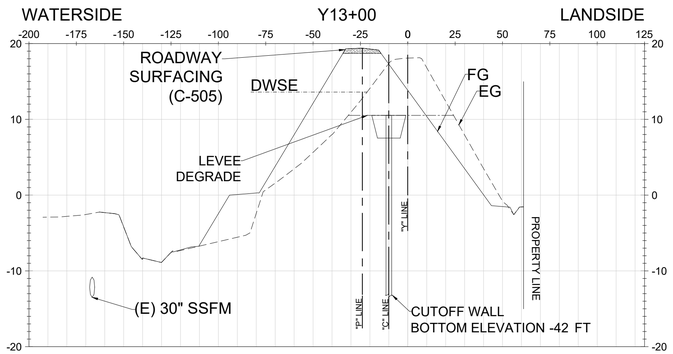
SHEET ID
C-311

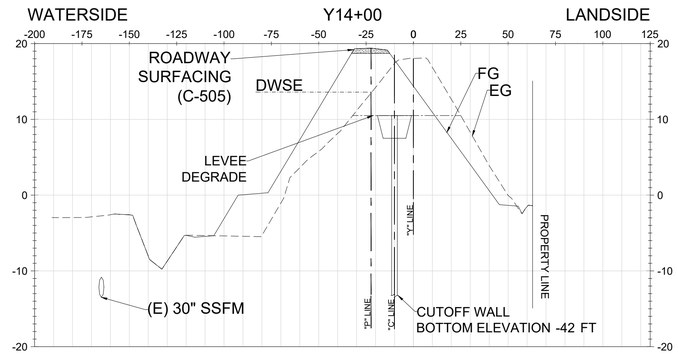
FINAL SUBMITTAL

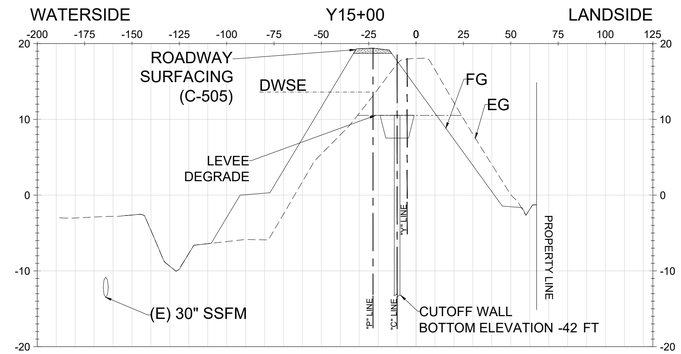


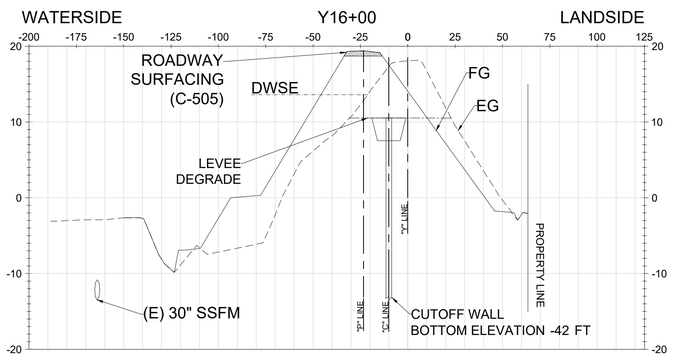


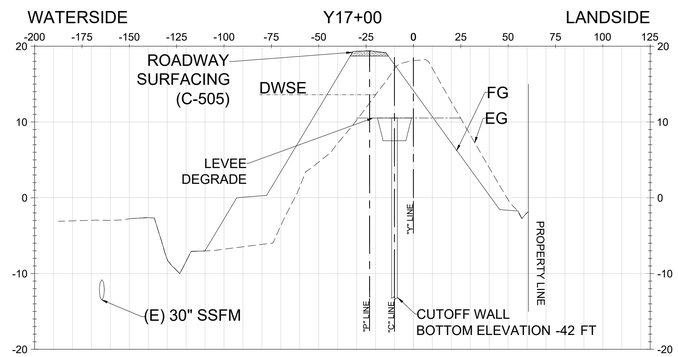


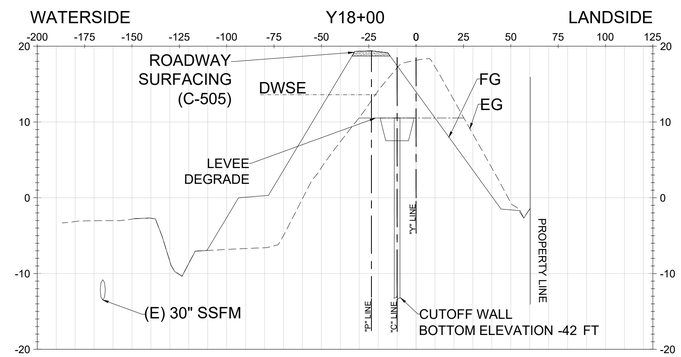












0 40' 80'

SCALE: 1"=40' HORIZONTAL
1"=10' VERTICAL

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: DMM / BFL
DRAWN BY: M. HARRINGTON
CHECKED BY: K. BRUSTAD
QA/QC BY: S. JIMENEZ
SIZE: ANSI D

ISSUE DATE: NOVEMBER 2022
SOLICITATION NO.: XXXXXX-XX-X-XXXX
CONTRACT NO.:

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
1325 J ST
SACRAMENTO, CA 95814

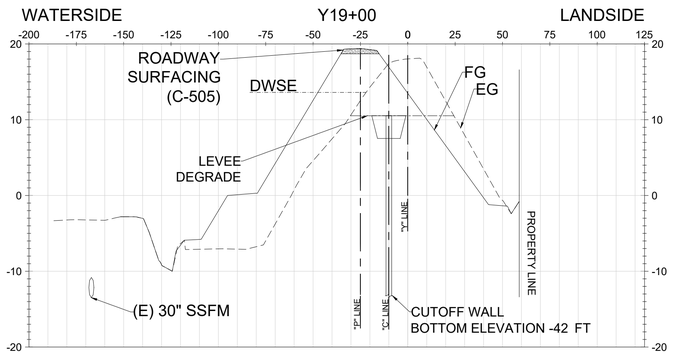
PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

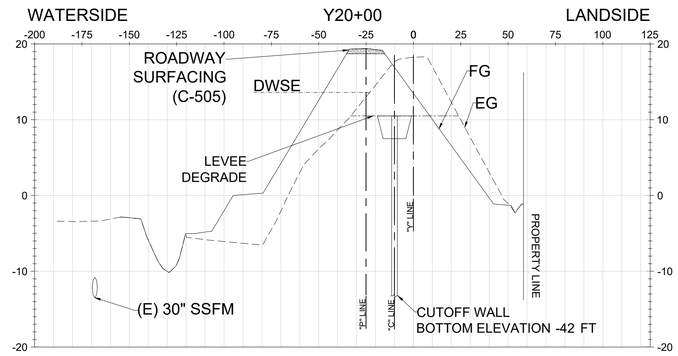
LOWER SAN JOAQUIN RIVER REACH
FS, SAN JOAQUIN RIVER
SAN JOAQUIN COUNTY, CALIFORNIA

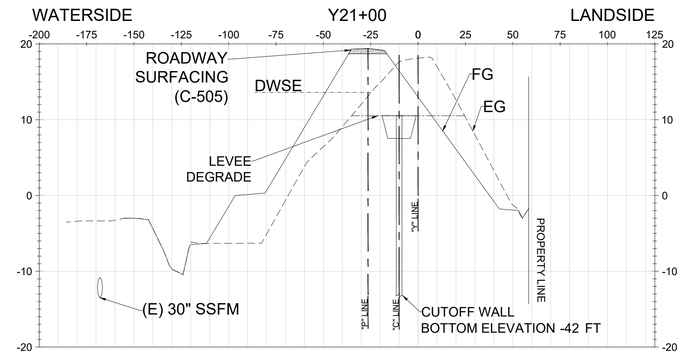
CROSS SECTIONS STA 10+00 TO 18+00

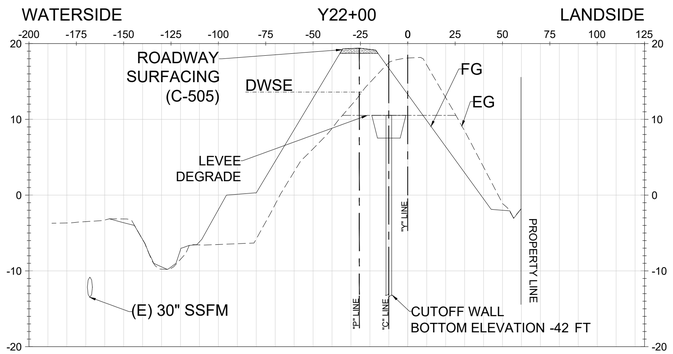
SHEET ID
C-312

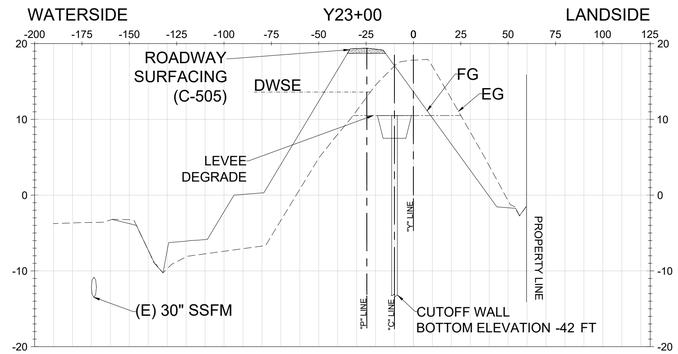
FINAL SUBMITTAL

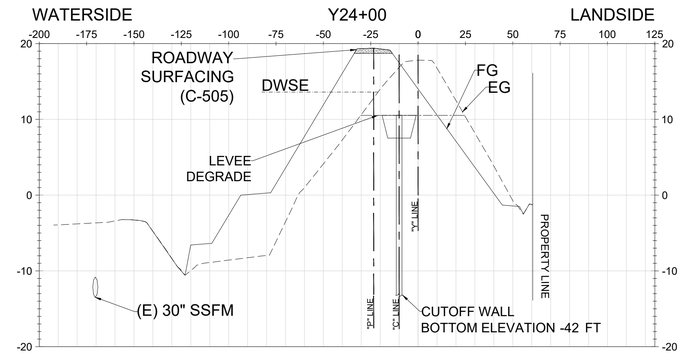


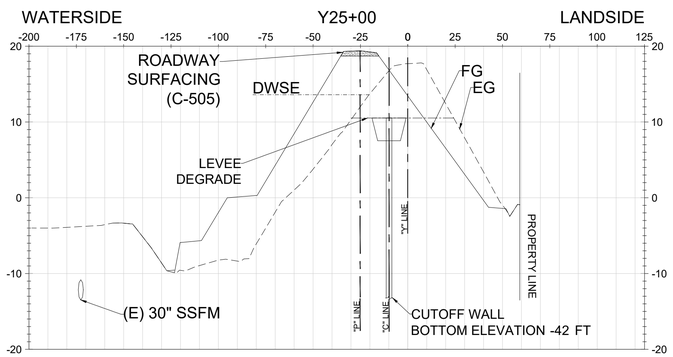


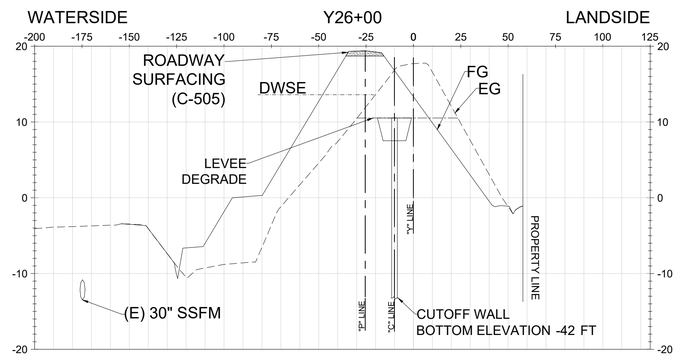


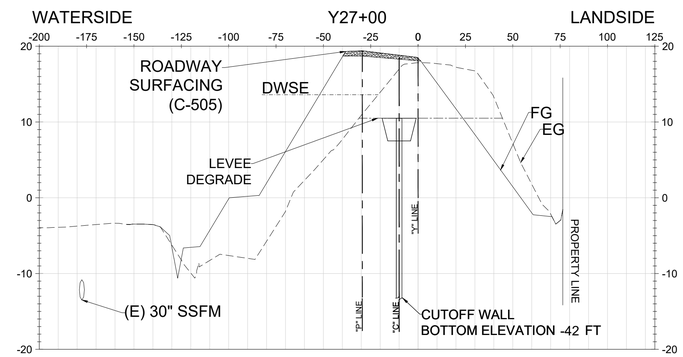












0 40' 80'

SCALE: 1"=40' HORIZONTAL
1"=10' VERTICAL

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: DMM / BFL
DRAWN BY: M. HARRINGTON
CHECKED BY: K. BRUSTAD
SUBMITTED BY: S. JIMENEZ
SIZE: ANSI D

ISSUE DATE: NOVEMBER 2022
SOLICITATION NO.: XXXXXX-XX-X-XXXX
CONTRACT NO.:

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
1325 J ST.
SACRAMENTO, CA 95814

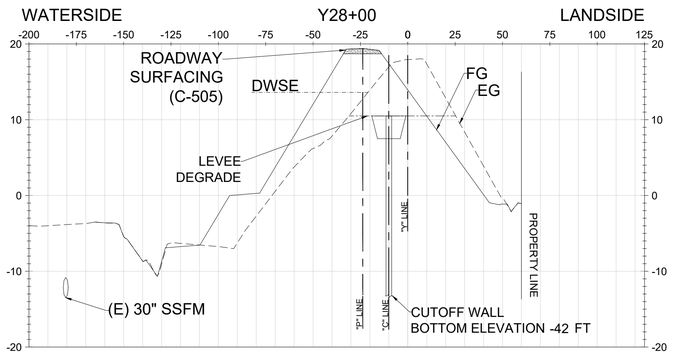
PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

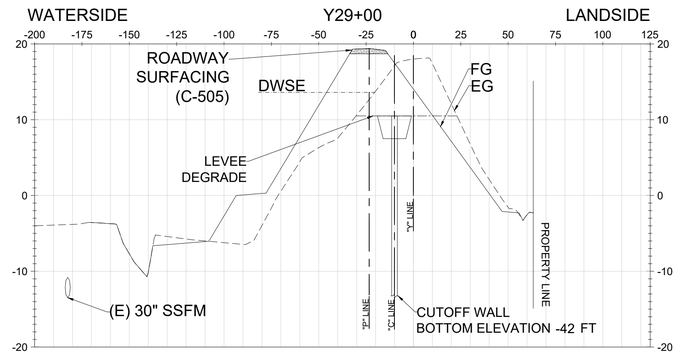
LOWER SAN JOAQUIN RIVER REACH
TS_30L LEVEE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

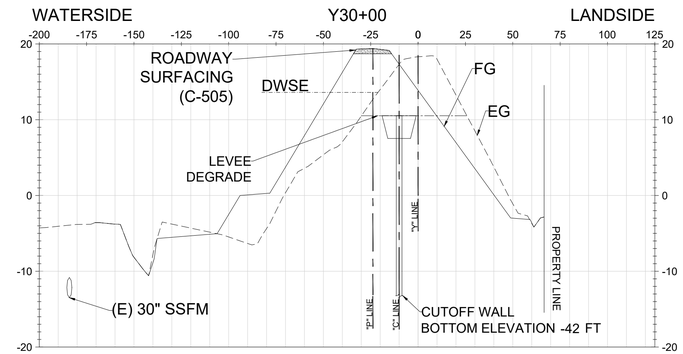
CROSS SECTIONS STA 19+00 TO 27+00

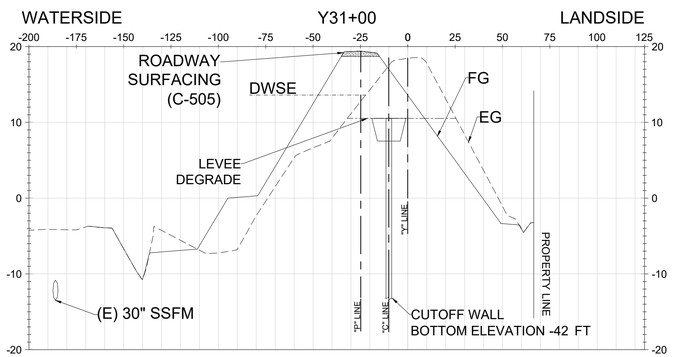
SHEET ID
C-313

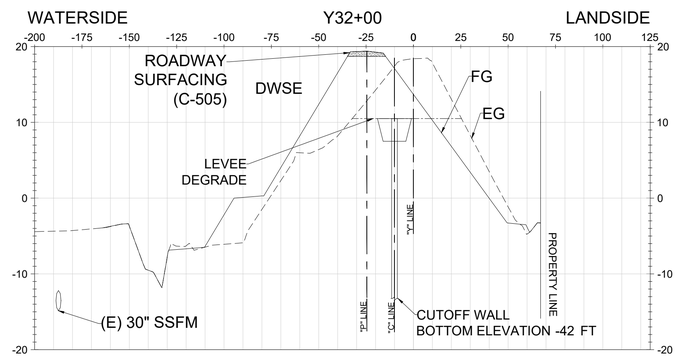
FINAL SUBMITTAL

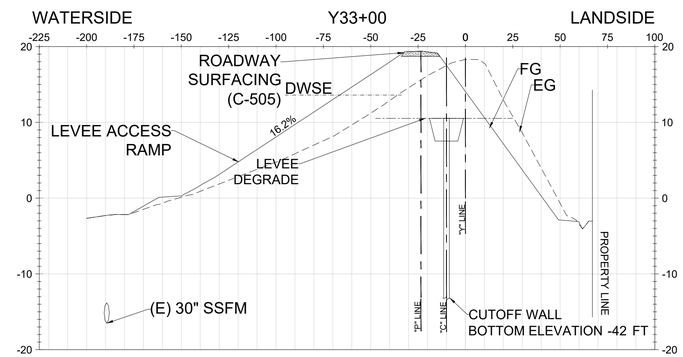


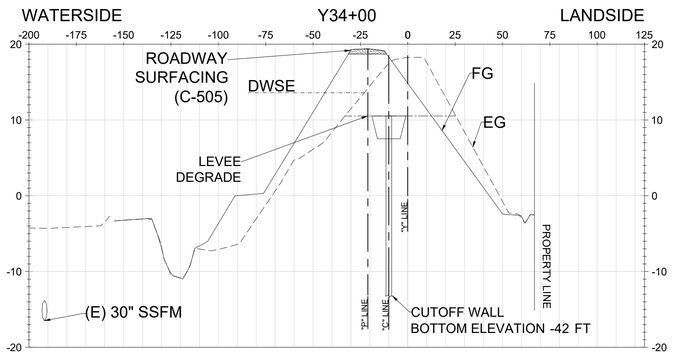


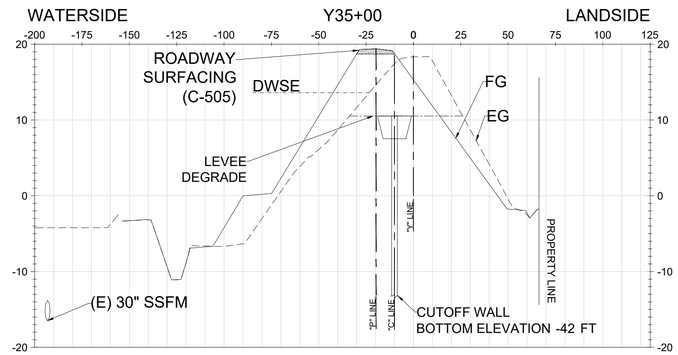


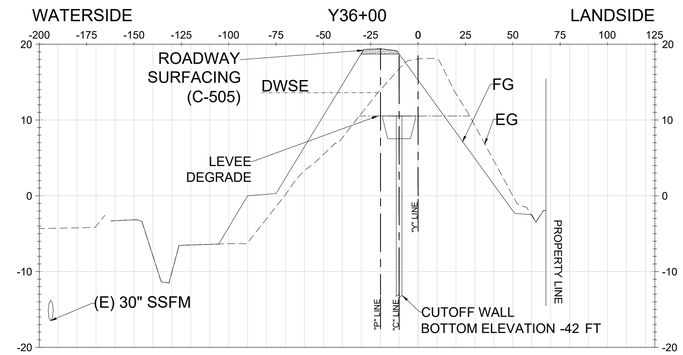












0 40' 80'

SCALE: 1"=40' HORIZONTAL
1"=10' VERTICAL

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

ISSUE DATE: NOVEMBER 2022
SOLICITATION NO.: XXXXXX-XX-X-XXXX
CONTRACT NO.:

DESIGNED BY: DMM / BFL
DRAWN BY: M. HARRINGTON
CHECKED BY: K. BRUSTAD
SUBMITTED BY: S. JIMENEZ
SIZE: ANSI D

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
1325 J ST.
SACRAMENTO, CA 95814

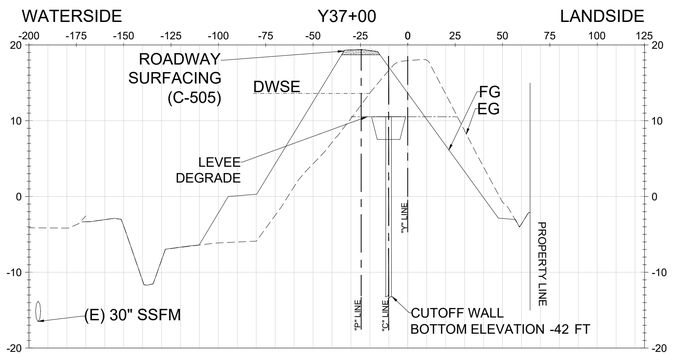
PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

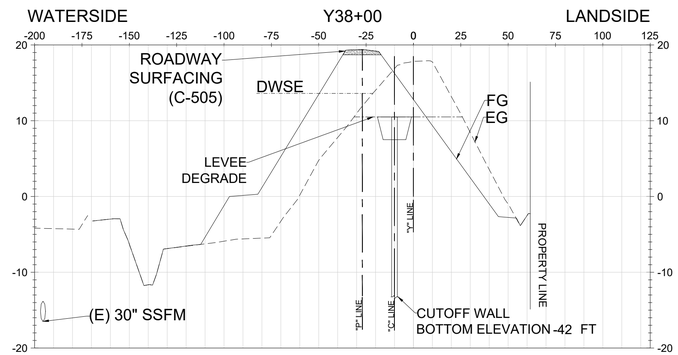
LOWER SAN JOAQUIN RIVER REACH
TS_30L LEVEE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

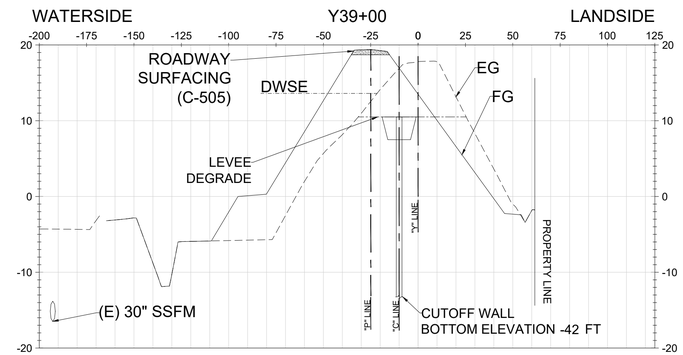
CROSS SECTIONS STA 28+00 TO 36+00

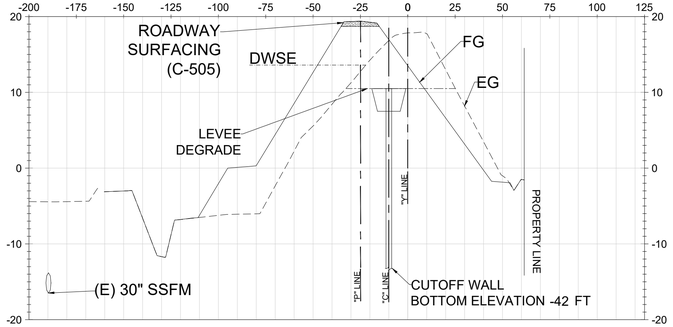
SHEET ID
C-314

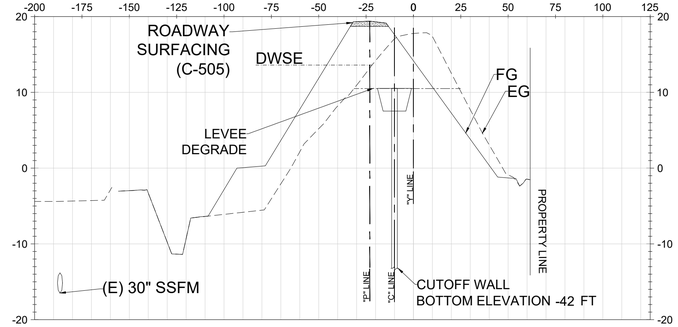
FINAL SUBMITTAL

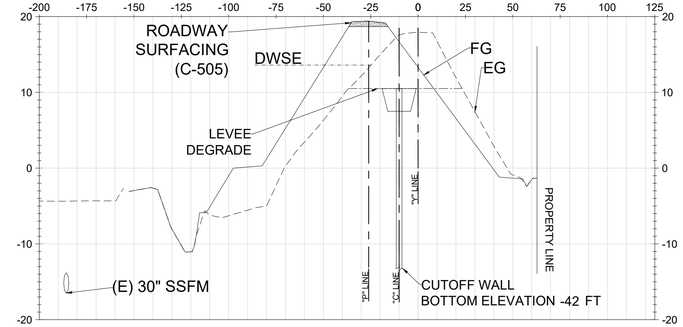


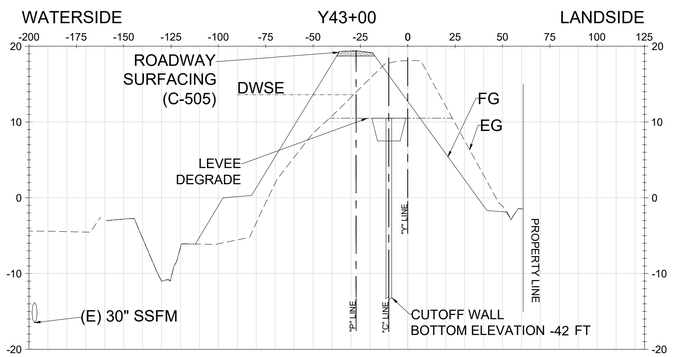


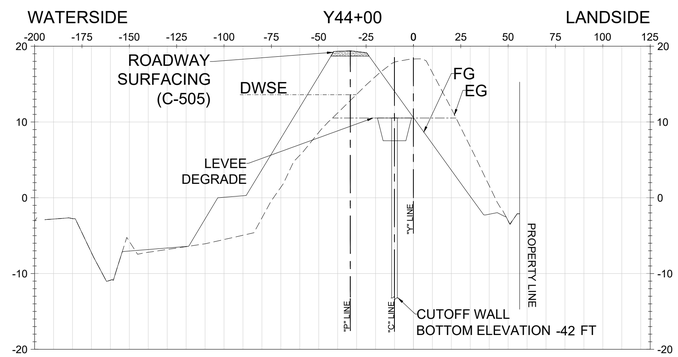


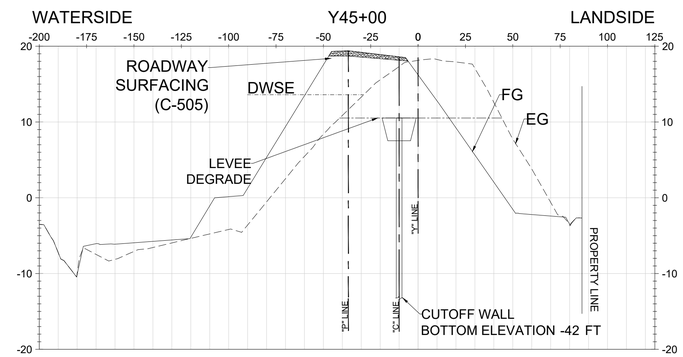












0 40' 80'

SCALE: 1"=40' HORIZONTAL
1"=10' VERTICAL

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: DMM / BFL
DRAWN BY: M. HARRINGTON
CHECKED BY: K. BRUSTAD
QUALITY CONTROL BY: S. JIMENEZ
SIZE: ANSI D
ISSUE DATE: NOVEMBER 2022
SOLICITATION NO.: XXXXXX-XX-X-XXXX
CONTRACT NO.:

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
1325 J ST.
SACRAMENTO, CA 95814

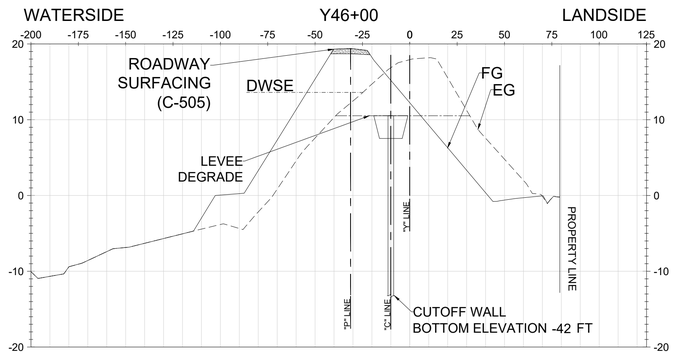
PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

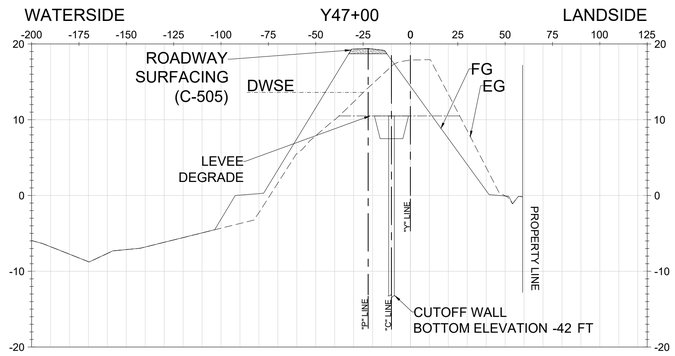
LOWER SAN JOAQUIN RIVER REACH
LEVEE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

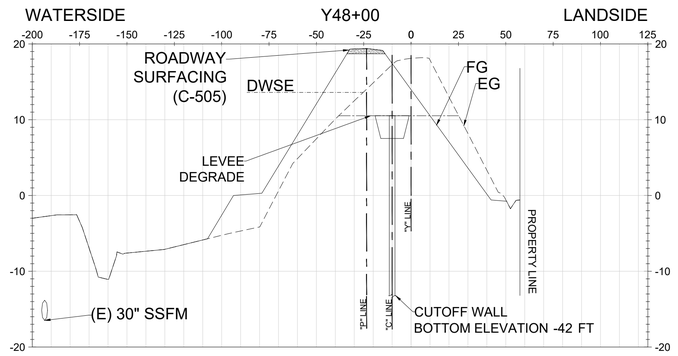
CROSS SECTIONS STA 37+00 TO 45+00

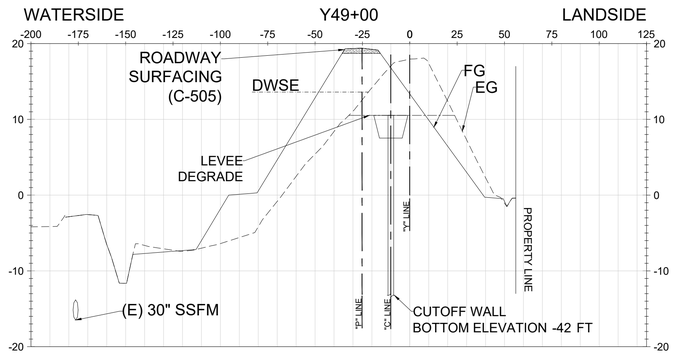
SHEET ID
C-315

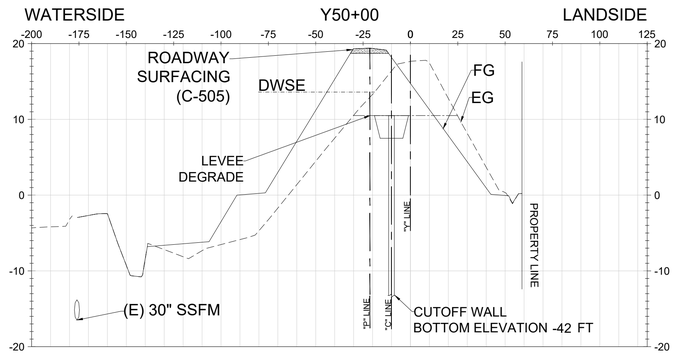
FINAL SUBMITTAL

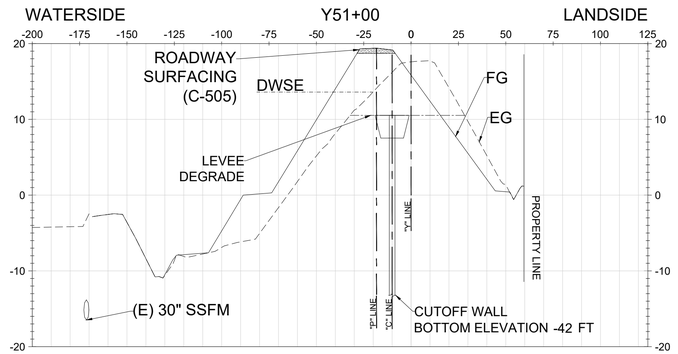


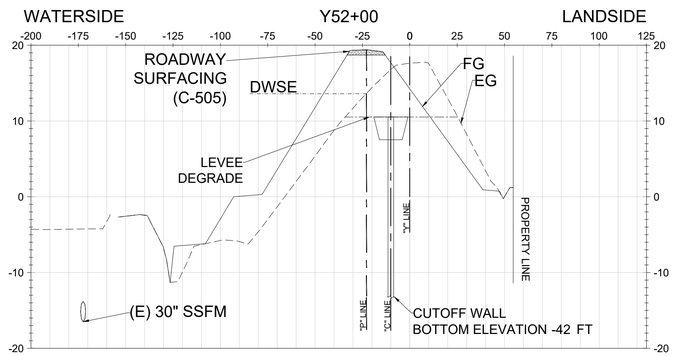


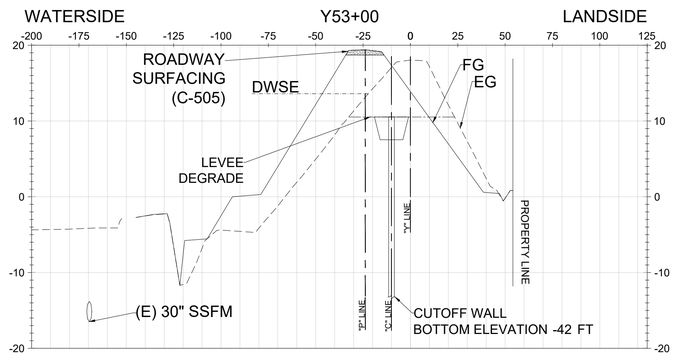


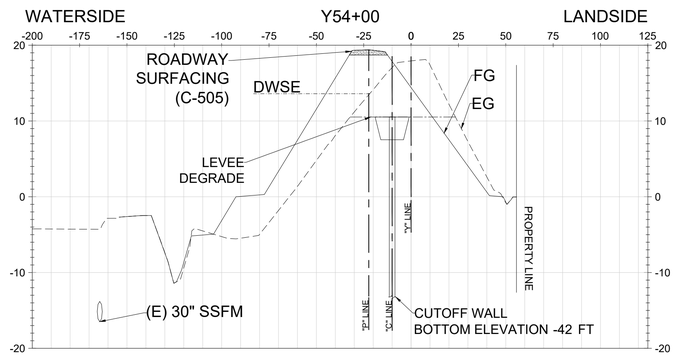












0 40' 80'

SCALE: 1"=40' HORIZONTAL
1"=10' VERTICAL

US Army Corps of Engineers®

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DRAWN BY: M. HARRINGTON
CHECKED BY: K. BRUSTAD
SUBMITTED BY: S. JIMENEZ
SIZE: ANSI D

ISSUE DATE: NOVEMBER 2022
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SACRAMENTO DISTRICT
1325 J ST.
SACRAMENTO, CA 95814

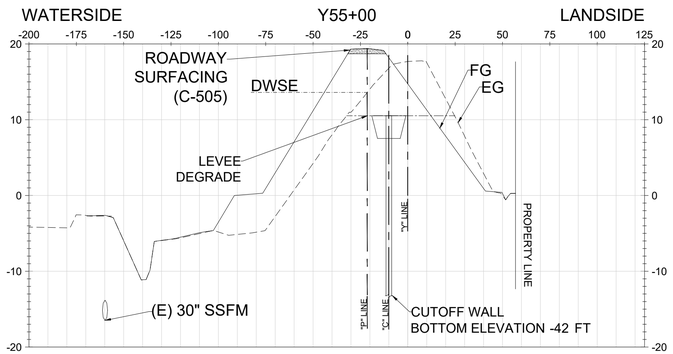
PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

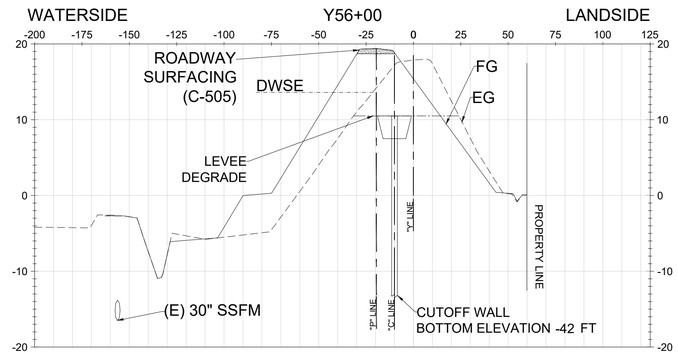
LOWER SAN JOAQUIN RIVER REACH
TS_30L LEVEE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

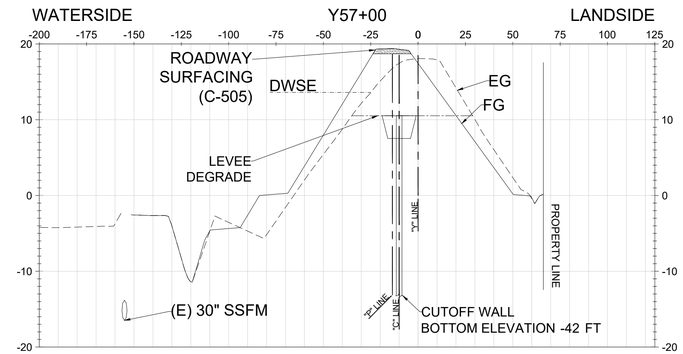
CROSS SECTIONS STA 46+00 TO 54+00

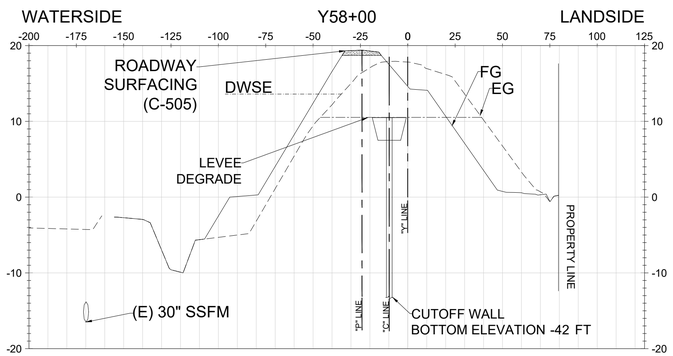
SHEET ID
C-316

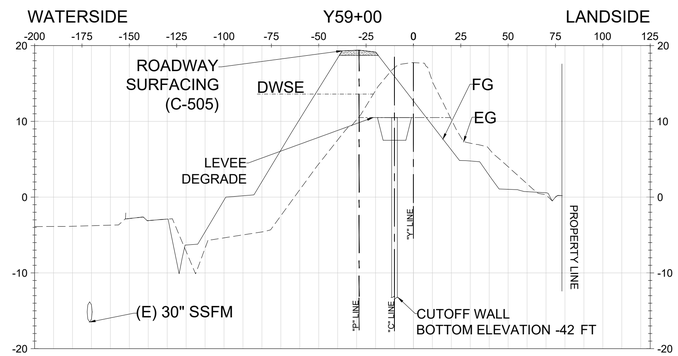
FINAL SUBMITTAL

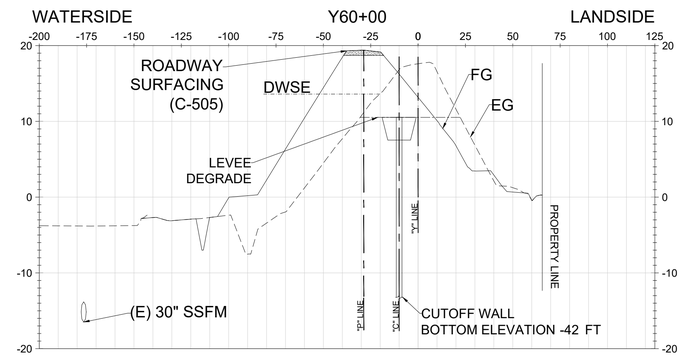


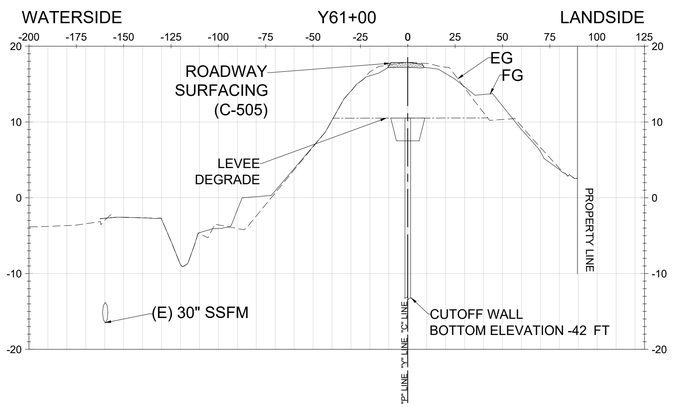












0 40' 80'

SCALE: 1"=40' HORIZONTAL
1"=10' VERTICAL

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY:	ISSUE DATE:
DMM / BFL	NOVEMBER 2022
DRAWN BY:	SOLICITATION NO.:
M. HARRINGTON	XXXXXX-XX-X-XXXX
CHECKED BY:	CONTRACT NO.:
K. BRUSTAD	
QA/QC PERFORMED BY:	
S. JIMENEZ	
SIZE:	
ANSI D	

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
1325 J ST
SACRAMENTO, CA 95814

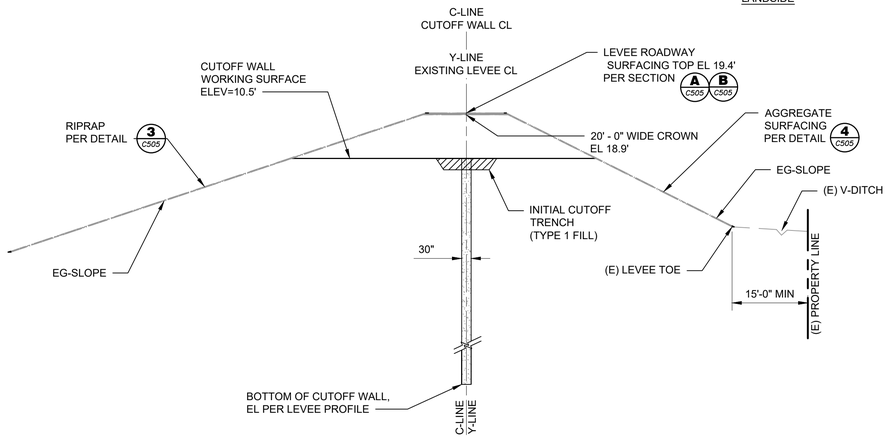
PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

LOWER SAN JOAQUIN RIVER REACH
SJ_LSJRF_MRP PROJECT
SAN JOAQUIN COUNTY, CALIFORNIA

CROSS SECTIONS STA 55+00 TO 61+00

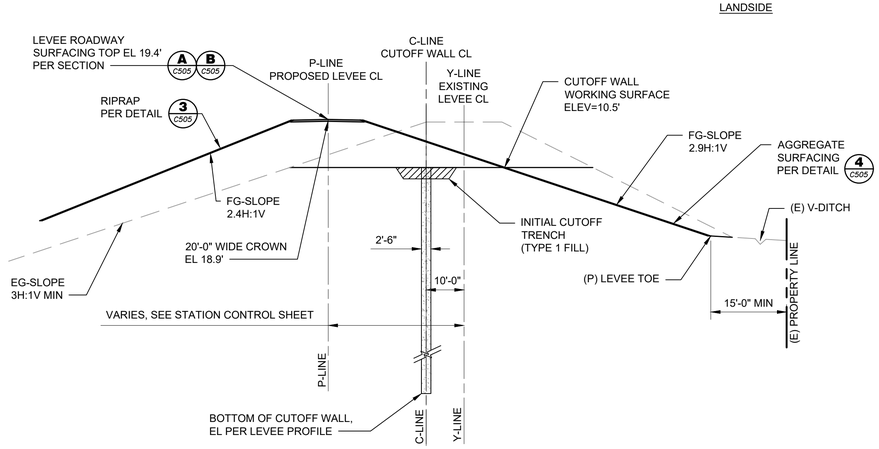
SHEET ID
C-317

FINAL SUBMITTAL



CUTOFF WALL - TYPICAL SECTION (STA 2+50 TO STA 4+50)

SCALE: 1"=20'



CUTOFF WALL - TYPICAL SECTION (STA 4+50 TO STA 61+00)

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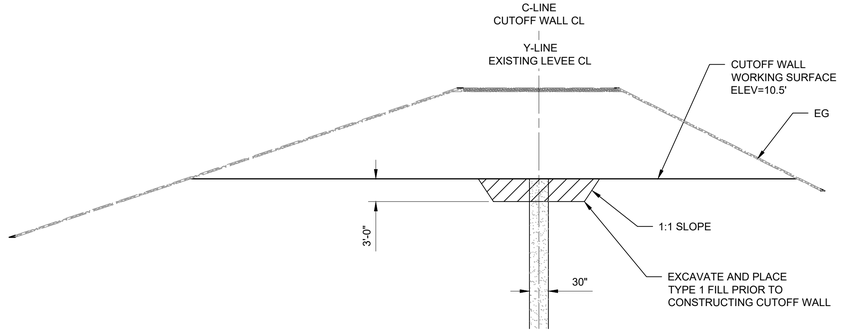
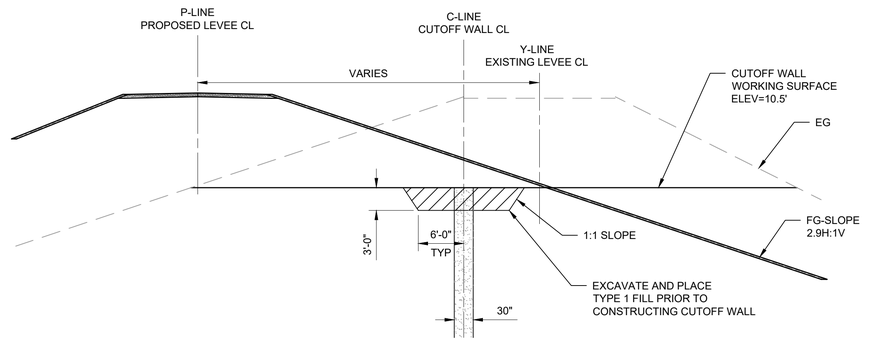


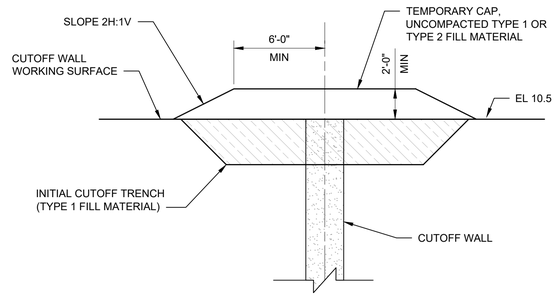
CUTOFF WALL - TYPICAL DETAIL (STA 2+50 TO STA 4+50)

SCALE: 1"=10'



CUTOFF WALL - TYPICAL DETAIL (STA 4+50 TO STA 61+00)

SCALE: 1"=10'



CUTOFF WALL TEMPORARY CAP DETAIL

NTS

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: DMM / BFL
DRAWN BY: M. HARRINGTON
CHECKED BY: K. BRUSTAD
QUALITY CONTROL BY: S. JIMENEZ
SIZE: ANSI D

ISSUE DATE: NOVEMBER 2022
SOLICITATION NO.: XXXXXX-XX-X-XXXX
CONTRACT NO.:

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
1325 J ST.
SACRAMENTO, CA 95814

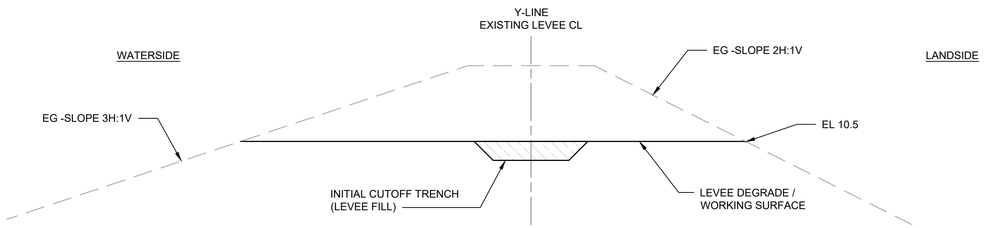
PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

LOWER SAN JOAQUIN RIVER REACH
TS_3&L LEVEE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

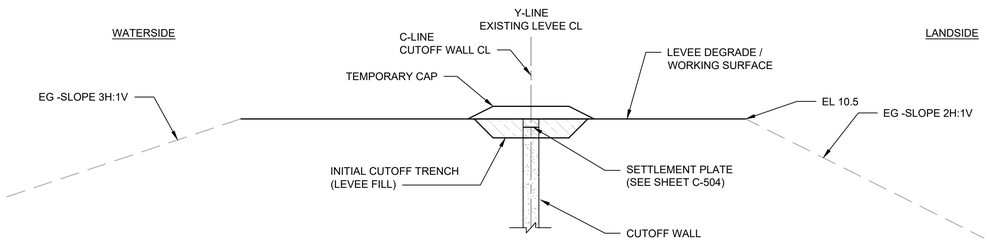
LEVEE CUTOFF WALL SECTION AND DETAIL

SHEET ID
C-501

FINAL SUBMITTAL



STEP 1



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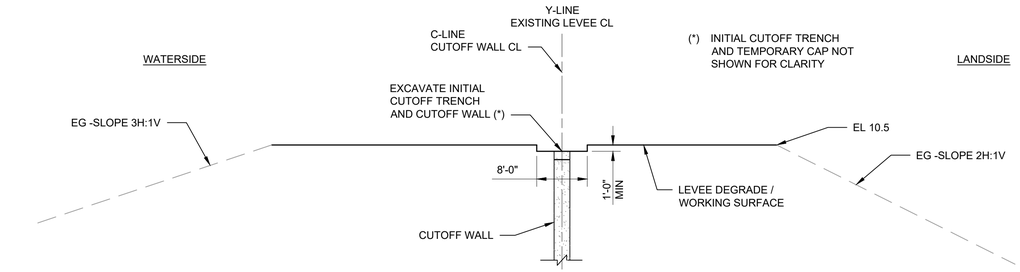
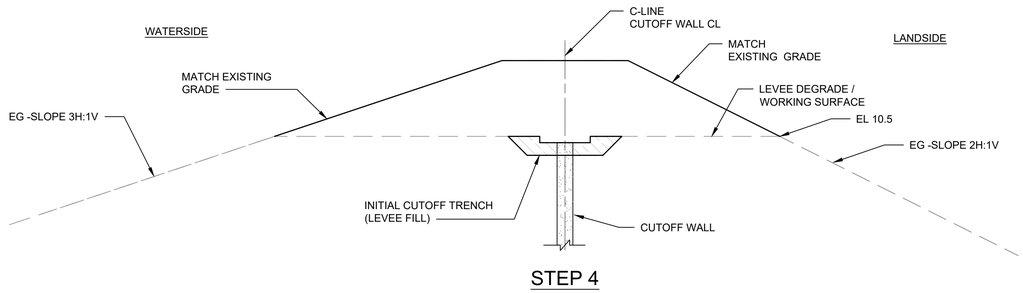


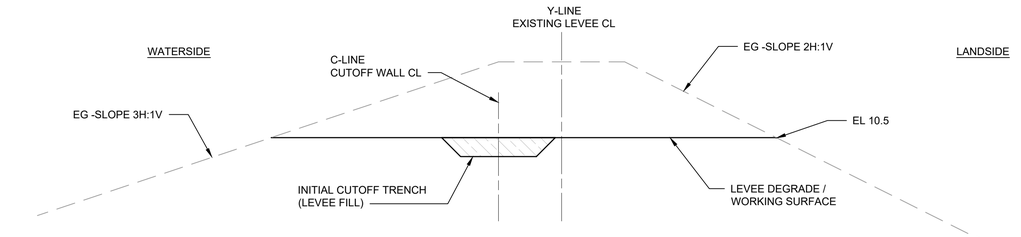
STEP 3



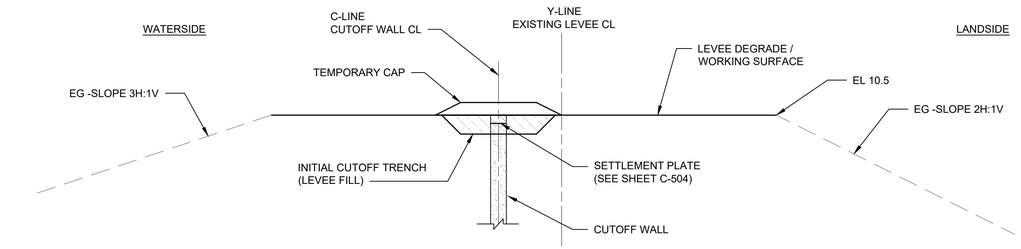
STEP 4

CUTOFF WALL - TYPICAL CONSTRUCTION SEQUENCE (STA 2+50 TO STA 4+50)

NTS



STEP 1



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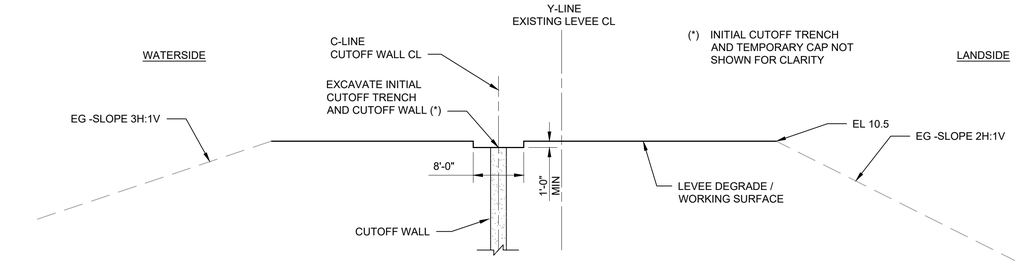
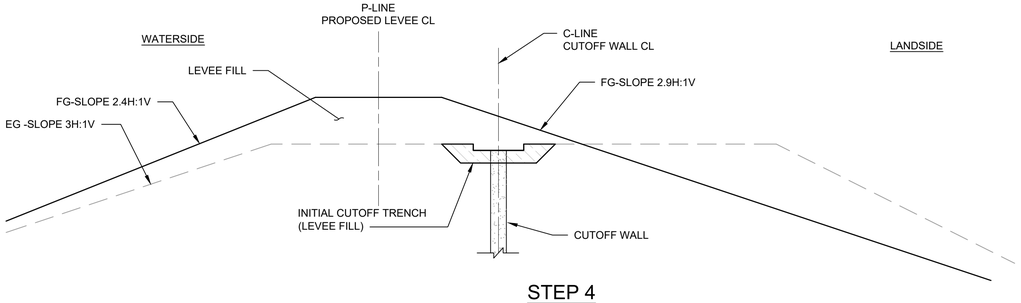


STEP 3



STEP 4

CUTOFF WALL - TYPICAL CONSTRUCTION SEQUENCE (STA 4+50 TO STA 61+00)

NTS

LEGEND

- INITIAL CUTOFF TRENCH
- CUTOFF WALL

CONSTRUCTION SEQUENCE:

STEP 1: DEGRADE LEVEE TO ESTABLISH WORKING SURFACE THEN EXCAVATE INITIAL CUTOFF TRENCH AND FILL WITH TYPE 1 FILL MATERIAL

STEP 2: CONSTRUCT CUTOFF WALL
- INSTALL SETTLEMENT PLATES IN ACCORDANCE WITH THE SPECIFICATIONS
- PLACE TEMPORARY CAP WITH UNCOMPACTED TYPE 1 OR TYPE 2 FILL
- MONITOR SETTLEMENT PLATE IN ACCORDANCE WITH THE SPECIFICATIONS

STEP 3: AFTER APPROVAL BY THE CONTRACTING OFFICER, REMOVE TEMPORARY CAP AND EXCAVATE CUTOFF WALL TO A MINIMUM DEPTH OF 1.0 FT BELOW WORKING SURFACE
- REMOVE SETTLEMENT PLATE
- CONFIRM THAT EXCAVATION EXTENDS INTO ACCEPTABLE CUTOFF WALL MATERIAL AS DETERMINED BY THE CONTRACTING OFFICER
- PLACE SOIL TYPE 1 FILL MATERIAL IN THE EXCAVATION IN ACCORDANCE WITH THE SPECIFICATIONS

STEP 4: RESHAPE AND RECONSTRUCT LEVEE EMBANKMENT
- PLACE LEVEE FILL MATERIAL IN THE EXCAVATION IN ACCORDANCE WITH THE SPECIFICATIONS
- BENCH FILL MATERIAL ON WATERSIDE SLOPE PER SHEET C-503 (STA 4+50 TO STA 61+00 ONLY)

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: DMM / BFL
DRAWN BY: M. HARRINGTON
CHECKED BY: K. DAVID
SUBMITTED BY: S. JIMENEZ
SIZE: ANSI D

ISSUE DATE: NOVEMBER 2022
SOLICITATION NO.: XXXXXX-XX-X-XXXX
CONTRACT NO.:

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
1325 J ST.
SACRAMENTO, CA 95814

PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

LOWER SAN JOAQUIN RIVER REACH
TS_3(N), LEVEE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

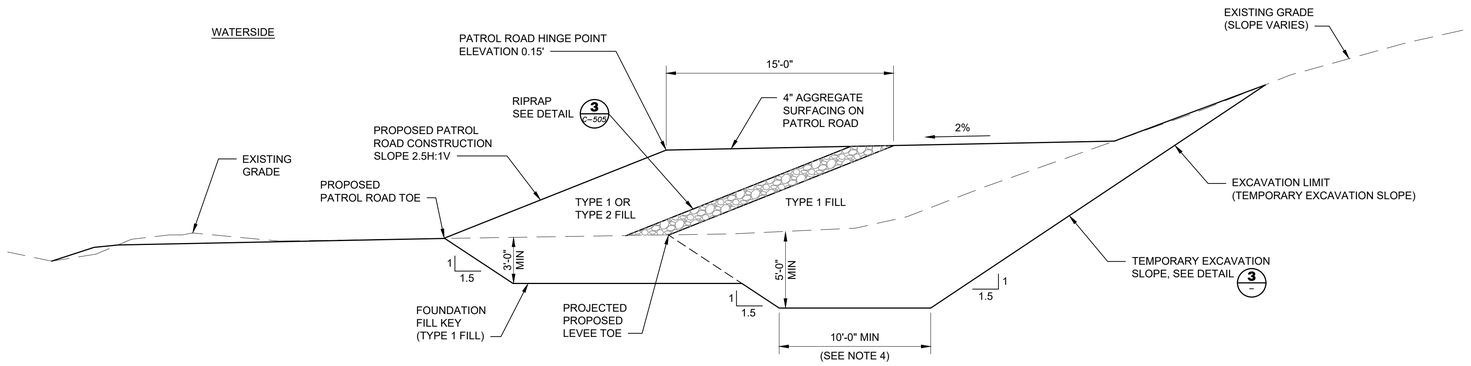
TYPICAL CUTOFF WALL CONSTRUCTION SEQUENCE AND DETAILS

SHEET ID
C-502

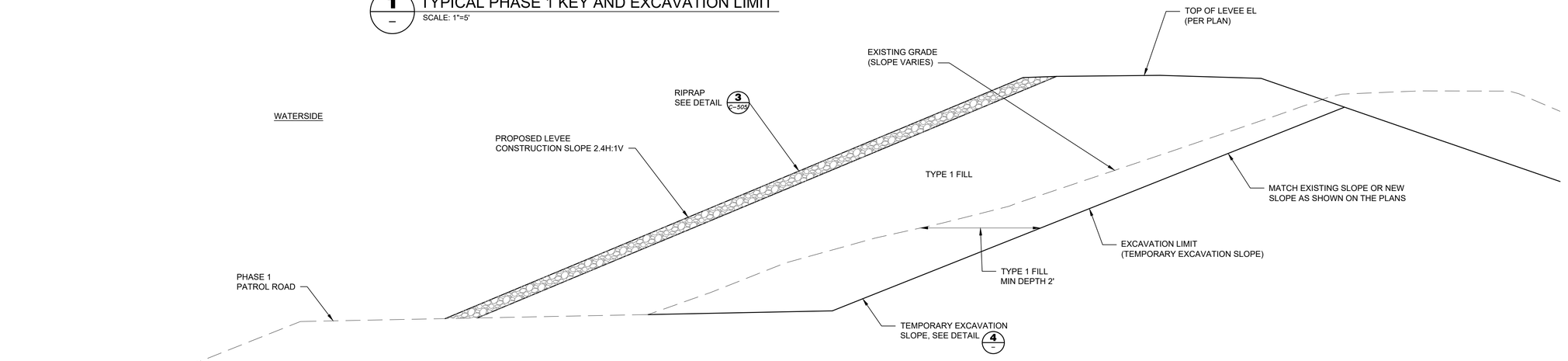
FINAL SUBMITTAL

TYPICAL KEY & BENCHING NOTES:

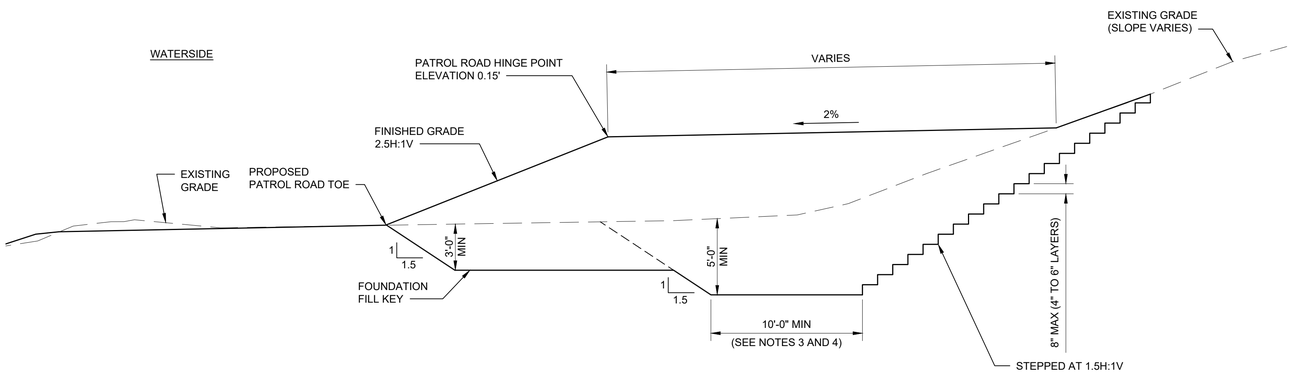
1. PHASE 1 INCLUDES CONSTRUCTION OF THE ELEVATED PATROL ROAD, PATROL ROAD AGGREGATE SURFACING, RIPRAP BELOW THE TOP OF PATROL ROAD ELEVATION, AND ANY IMPROVEMENTS ON THE WATERSIDE OF THE PATROL ROAD. PHASE 2 CONSTRUCTION INCLUDES THE REMAINDER OF THE PROJECT. PHASE 1 ELEMENTS MUST BE CONSTRUCTED AND APPROVED BY CONTRACTING OFFICER PRIOR TO BUILDING PHASE 2 ELEMENTS.
2. PLACE FILL IN HORIZONTAL LIFTS AGAINST VERTICAL FACES CUT INTO EXISTING LEVEE MATERIAL.. EACH LAYER OF FILL SHALL BE 4" TO 6" UNCOMPACTED LAYERS.
3. THE LEVEE KEY TRENCH SHALL BE INSPECTED BY THE GOVERNMENT'S GEOTECHNICAL ENGINEER BEFORE PLACEMENT OF FILL. THE KEY SHALL BE EXTENDED INTO COMPETENT MATERIAL AS DETERMINED BY THE GOVERNMENT'S GEOTECHNICAL ENGINEER.
4. IN NO CASE SHALL THE FOUNDATION KEY WIDTH BE LESS THAN 10'
5. THE BOTTOM OF THE KEY TRENCH SHALL BE SCARIFIED TO A DEPTH OF 8 INCHES AND RECOMPACTED TO 97% MAXIMUM DENSITY PER ASTM 698.
6. NON-STRUCTURAL FILL AND SUBGRADE TO RECEIVE ENGINEERED FILL (INCLUDING KEY) SHALL BE COMPACTED TO 95% MAXIMUM DENSITY PER ASTM 698.
7. LEVEE EMBANKMENT SHALL BE COMPACTED TO 97% MAXIMUM DENSITY PER ASTM 698.
8. 12 INCHES BENEATH AB SHALL BE COMPACTED TO 100% MAXIMUM DENSITY PER ASTM 698.
9. BENCHING IS NOT REQUIRED FOR PLACEMENT OF AGGREGATE SURFACING OR AGGREGATE BASE ON FINAL SUBGRADES.



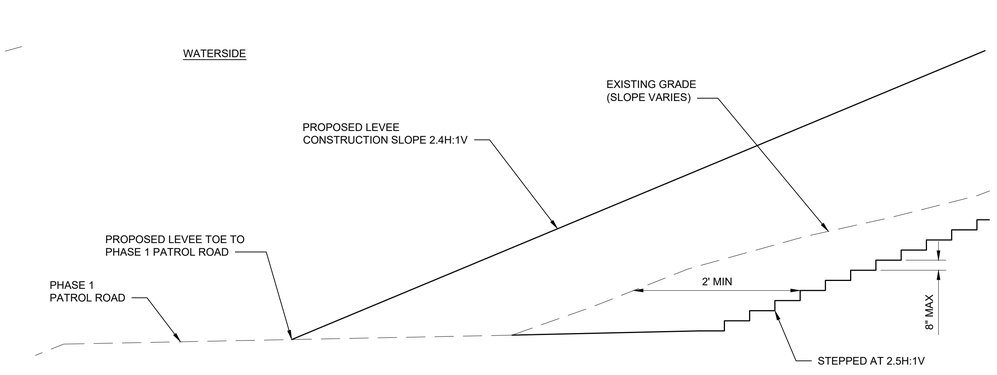
1/– TYPICAL PHASE 1 KEY AND EXCAVATION LIMIT
SCALE: 1"=5'



2/– TYPICAL PHASE 2 KEY AND EXCAVATION LIMIT DETAIL
SCALE: 1"=5'



3/– TYPICAL PHASE 1 KEY AND BENCHING DETAIL
SCALE: 1"=5'



4/– TYPICAL PHASE 2 KEY AND BENCHING DETAIL
SCALE: 1"=5'

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: DMM / BFL
DRAWN BY: M. HARRINGTON
CHECKED BY: K. BRUSTAD
SUBMITTED BY: S. JIMENEZ
SIZE: ANSI D
ISSUE DATE: NOVEMBER 2022
SOLICITATION NO.: XXXXXX-XX-X-XXXX
CONTRACT NO.:

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
1325 J ST.
SACRAMENTO, CA 95814

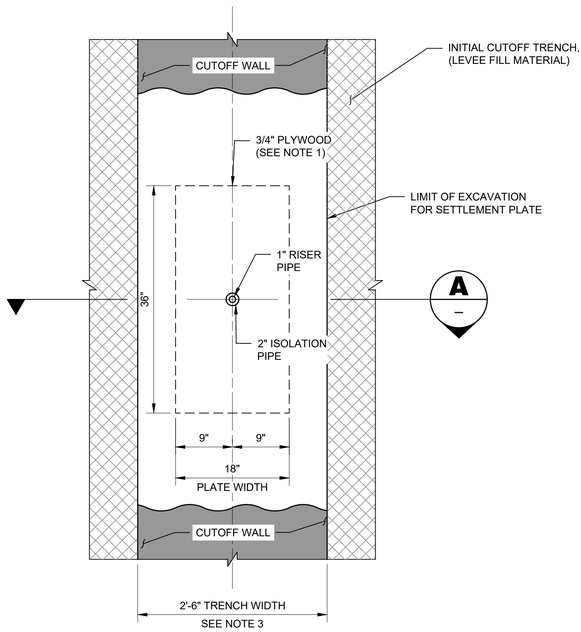
PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

LOWER SAN JOAQUIN RIVER REACH
TS_30L LEVEE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

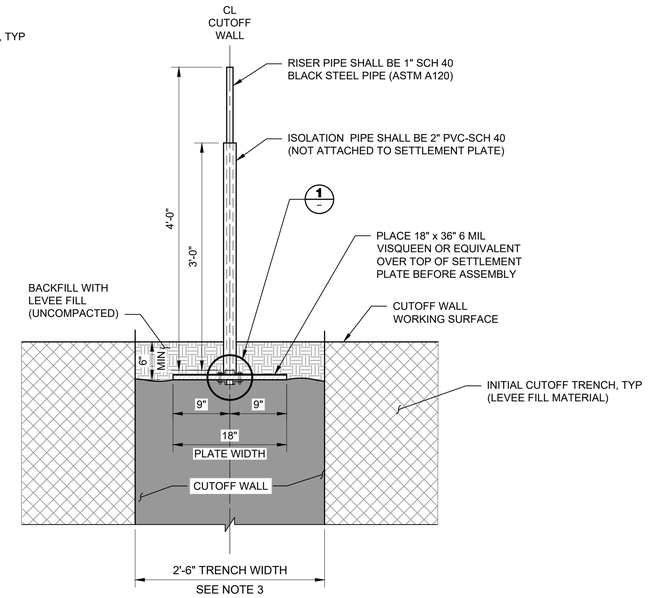
TYPICAL KEY AND BENCHING DETAILS

SHEET ID
C-503

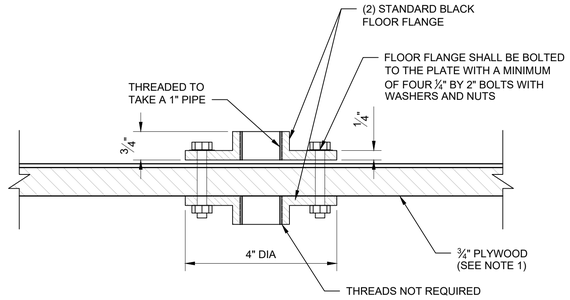
FINAL SUBMITTAL



PLAN
SCALE:



A
–
SECTION
SCALE:



1
–
DETAIL
NTS

NOTES:

1. SETTLEMENT PLATE SHALL BE CONSTRUCTED OF 3/4" PLYWOOD (EXTERIOR) - COATED WITH WATERPROOF SEALANT.
2. SETTLEMENT PLATE INSTALLATION IN ACCORDANCE WITH THE SPECIFICATIONS.
3. WALL WIDTH IN ACCORDANCE WITH THE SPECIFICATIONS.

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY:	ISSUE DATE:
DMM / BFL	NOVEMBER 2022
DRAWN BY:	SOLICITATION NO.:
M. HARRINGTON	XXXXXX-XX-X-XXXX
CHECKED BY:	CONTRACT NO.:
K. BRUSTAD	
SUBMITTED BY:	
S. JIMENEZ	
SIZE:	
ANSI D	

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
1325 J ST.
SACRAMENTO, CA 95814

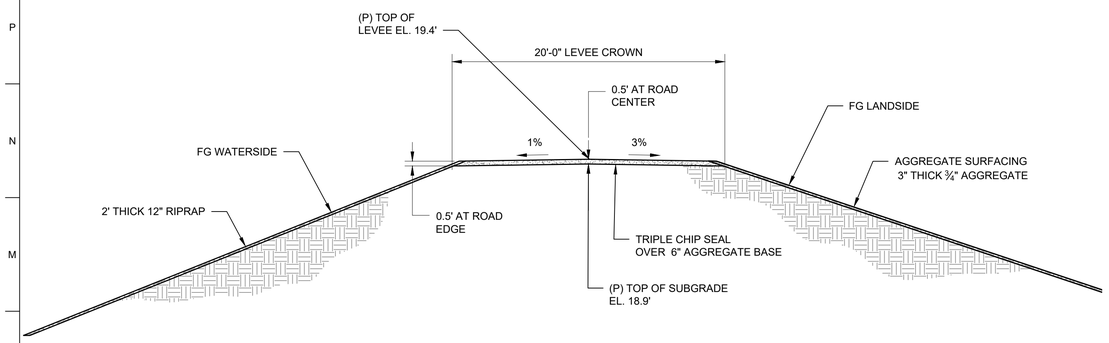
PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

LOWER SAN JOAQUIN RIVER REACH
TS_30L LEVEE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

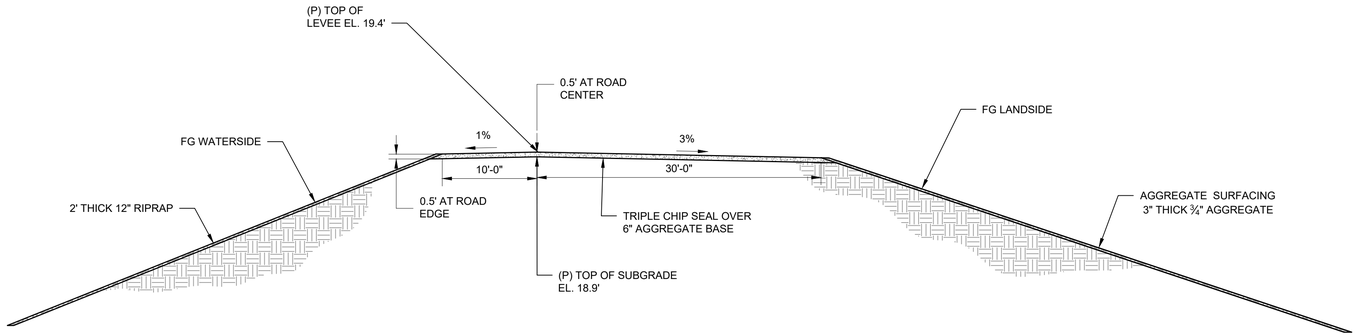
SETTLEMENT PLATE INSTALLATION

SHEET ID
C-504

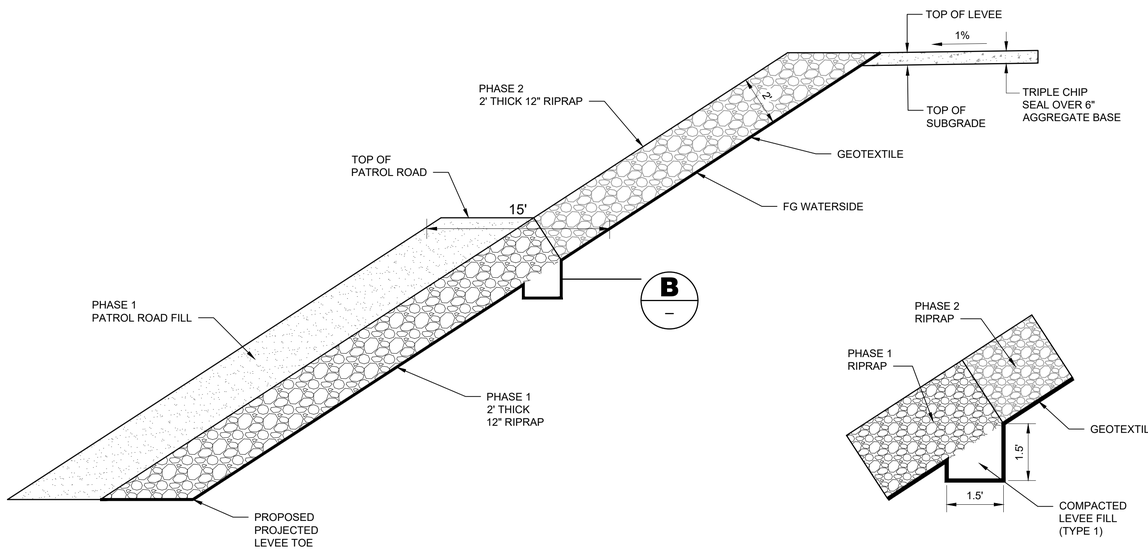
FINAL SUBMITTAL



A – TYPICAL LEVEE CROWN ROADWAY SECTION
NTS

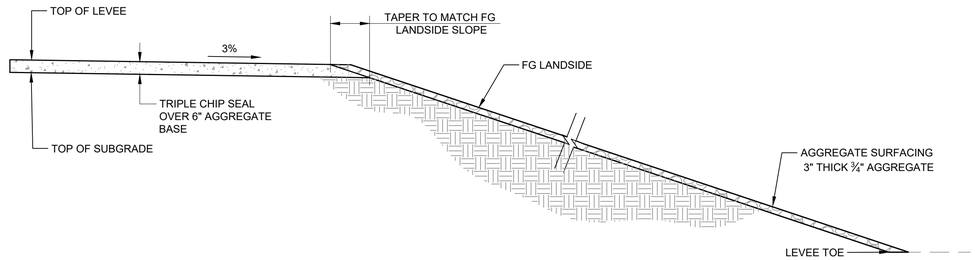


B – TYPICAL LEVEE CROWN ROADWAY WITH TURNOUT SECTION
NTS



3 – TYPICAL WATERSIDE RIPRAP PLACEMENT DETAIL
NTS

B – GEOTEXTILE ANCHOR
NTS



4 – TYPICAL LANDSLIDE AGGREGATE SURFACE DETAIL
NTS

NOTES

1. PHASE 1 INCLUDES CONSTRUCTION OF THE ELEVATED PATROL ROAD, PATROL ROAD AGGREGATE SURFACING, RIPRAP BELOW THE TOP OF THE PATROL ROAD ELEVATION, AND ANY IMPROVEMENT ON THE WATERSIDE OF THE PATROL ROAD. PHASE 2 CONSTRUCTION INCLUDES THE REMAINDER OF THE CONTRACT. PHASE 1 ELEMENTS MUST BE CONSTRUCTED AND APPROVED BY THE CONTRACTING OFFICER PRIOR TO BUILDING PHASE 2 ELEMENTS.

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: DMM / BFL
DRAWN BY: M. HARRINGTON
CHECKED BY: K. BRUSTAD
SUBMITTED BY: S. JIMENEZ
SIZE: ANSI D
ISSUE DATE: NOVEMBER 2022
SOLICITATION NO.: XXXXXX-XX-X-XXXX
CONTRACT NO.:

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
1325 J ST.
SACRAMENTO, CA 95814

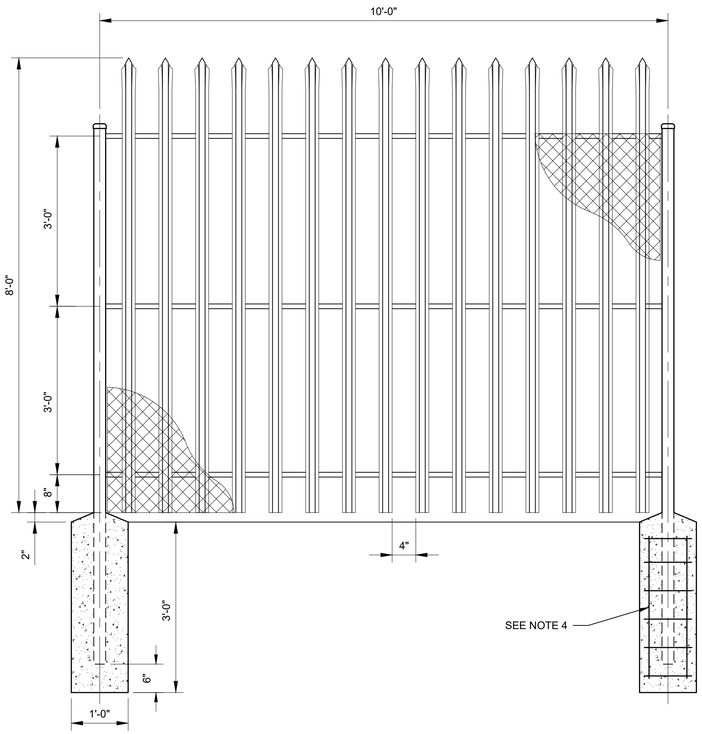
PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

LOWER SAN JOAQUIN RIVER REACH
TS_30L LEVEE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

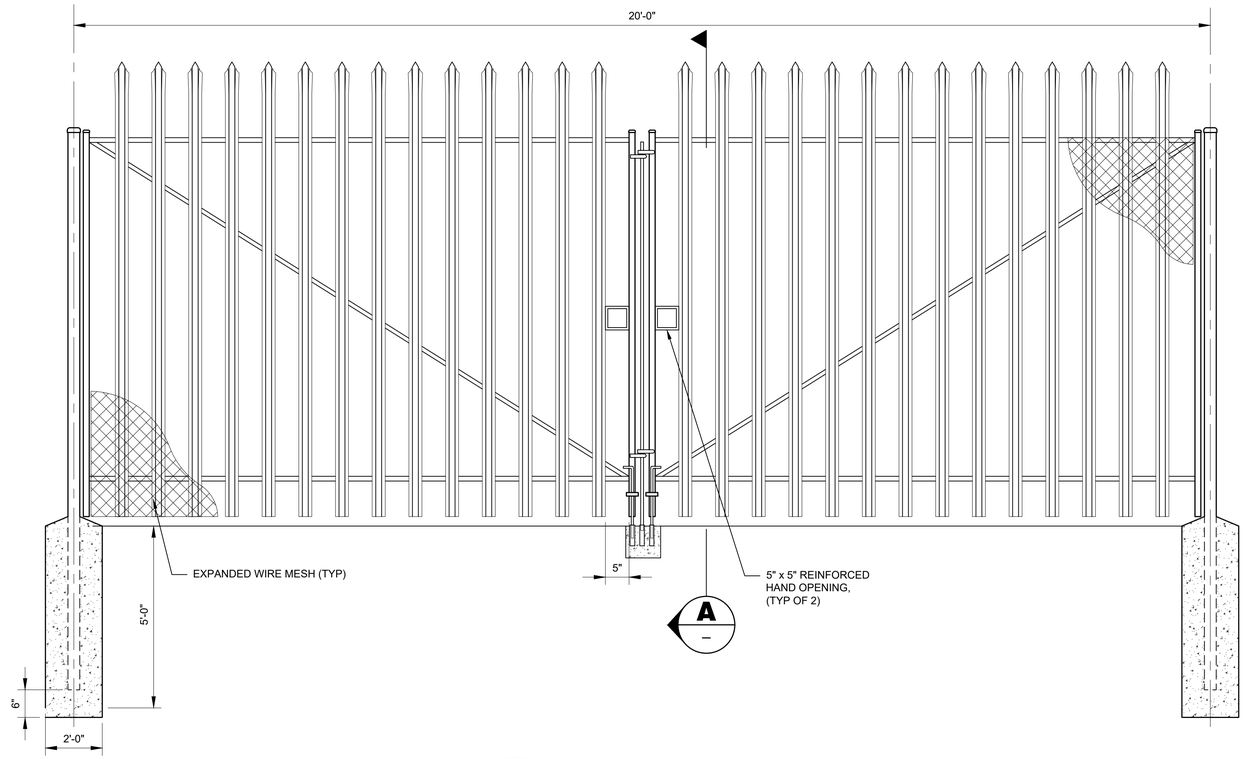
TYPICAL ROADWAY DETAILS

SHEET ID
C-505

FINAL SUBMITTAL



1 — 8' HIGH SECURITY FENCE DETAIL
NTS



2 — 8' HIGH SECURITY GATE DETAIL
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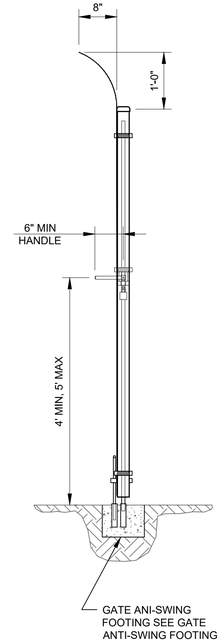
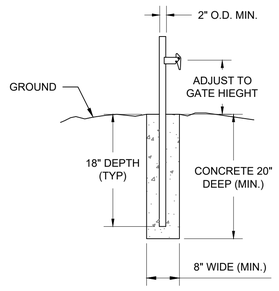


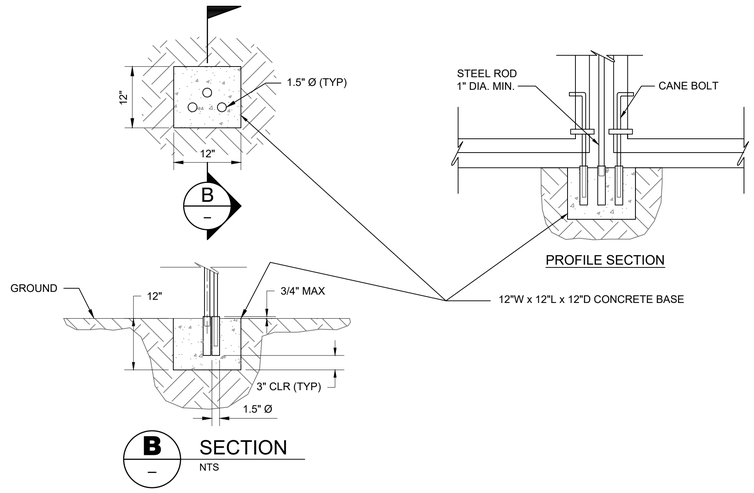
A — SECTION
NTS

NOTES:

1. 8'-0" HIGH COMMERCIAL GRADE CURVED TOP FENCE WITH DOUBLE SWING GATES.
2. SENTRY STYLE FENCE AND GATE SPECIFICATIONS:
   A. RAILS: 1 ½" x 1 ½"x11 GAUGE.
   B. PICKETS: 1"x1"x15 GAUGE @ 5" O.C.
   C. POSTS: 2 ½"x 2 ½"x11 GAUGE @ 10'-0" O.C.
   D. GATE POSTS: 4"x4"x11 GAUGE
3. ALL WELDED STEEL CONSTRUCTION.
4. 4-#4 VERTICAL WITH #3 HOOPS AT 12" O.C. (TYPICAL).
5. WELD CAPS ON ALL POST TUBING.
6. ALL FABRICATIONS SHALL BE POWDER COATED HUNTER GREEN.
7. ALL FIELD WELDS SHALL BE RE-GALVANIZED AND PROPERLY COATED. TWO COATS SHALL BE APPLIED TO PROVIDE A TOTAL DRY FILM THICKNESS OF 4-6 MILS.



GATE KEEPER
NTS



B — SECTION
NTS

GATE ANTI-SWING FOOTING DETAIL
NTS

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MARK	DESCRIPTION	DATE

DESIGNED BY: DMM, BFL
DRAWN BY: M. HARRINGTON
CHECKED BY: K. BRUSTAD
SUBMITTED BY: S. JIMENEZ
ISSUE DATE: NOVEMBER 2022
SOLICITATION NO.: XXXXXX-XX-X-XXXX
CONTRACT NO.:
SIZE: ANSI D

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
1325 J ST.
SACRAMENTO, CA 95814

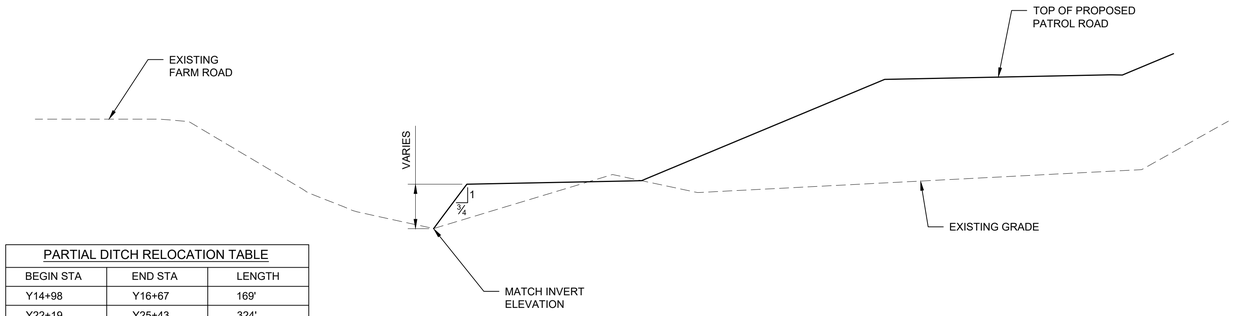
PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

LOWER SAN JOAQUIN RIVER REACH
TS_30L LEVEE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

SECURITY FENCE DETAILS

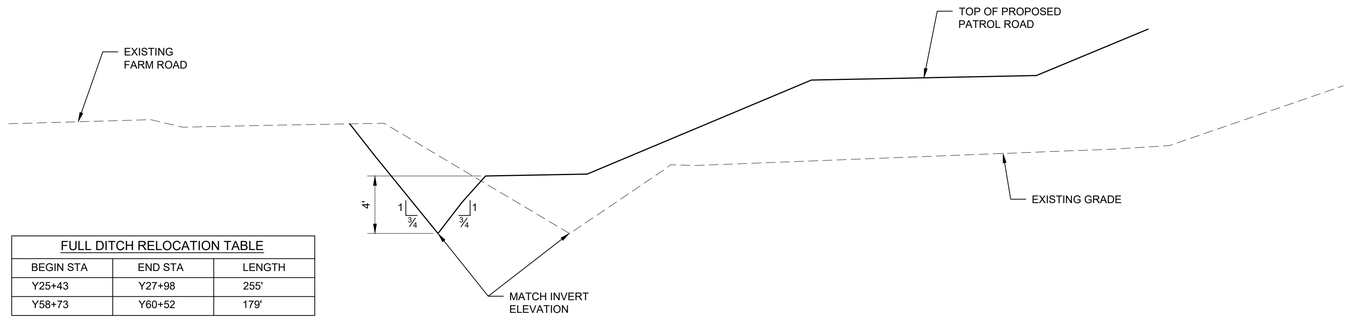
SHEET ID
C-506

FINAL SUBMITTAL



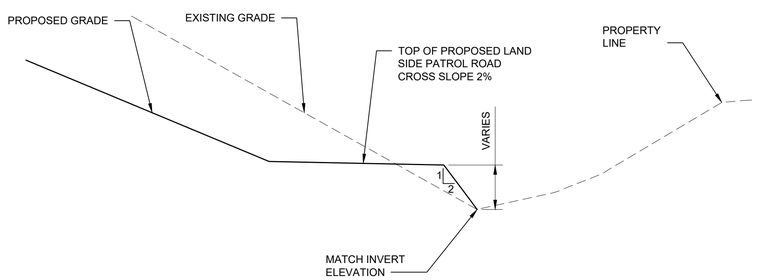
PARTIAL DITCH RELOCATION TABLE		
BEGIN STA	END STA	LENGTH
Y14+98	Y16+67	169'
Y22+19	Y25+43	324'
Y51+58	Y54+22	264'

1 PARTIAL DITCH RELOCATION DETAIL
SCALE: 1"=5'



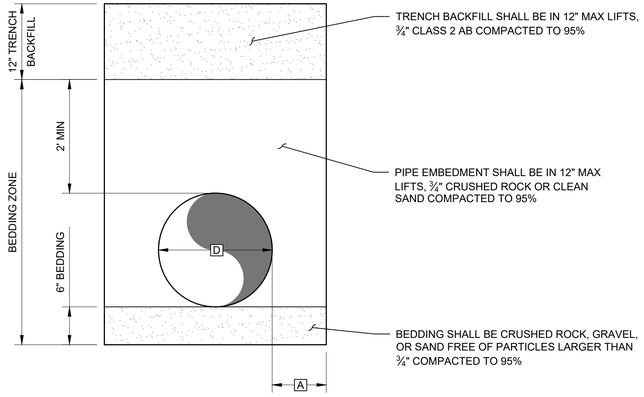
FULL DITCH RELOCATION TABLE		
BEGIN STA	END STA	LENGTH
Y25+43	Y27+98	255'
Y58+73	Y60+52	179'

2 FULL DITCH RELOCATION DETAIL
SCALE: 1"=5'



4 LANDSIDE DITCH SWALE ENCROACHMENT DETAIL
SCALE: 1"=5'

D	A
< 36"	6" MIN
≥ 36"	12" MIN



NOTES:

1. CERTIFICATION OF TRENCH BACKFILL COMPACTION IS REQUIRED PRIOR TO PLACING AB ON FINISHED SUBGRADE.
2. ALL TRENCH WORK 5 FT AND DEEPER SHALL CONFORM TO CAL OSHA STANDARDS.
3. MIN COVER OVER UTILITIES SHALL BE 3' BELOW FINAL GRADE.
4. CONTRACTOR SHALL REMOVE MATERIAL NOT MEETING COMPACTION REQUIREMENTS AND HAVE A GEOTECH ENGINEER PROVIDE RECOMMENDATION ON AN ALTERNATIVE BACKFILL TO BE APPROVED BY THE GOVERNMENT'S GEOTECHNICAL ENGINEER.

3 PIPE TRENCH DETAIL
1" = 1' - 0"

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ISSUE DATE: NOVEMBER 2022
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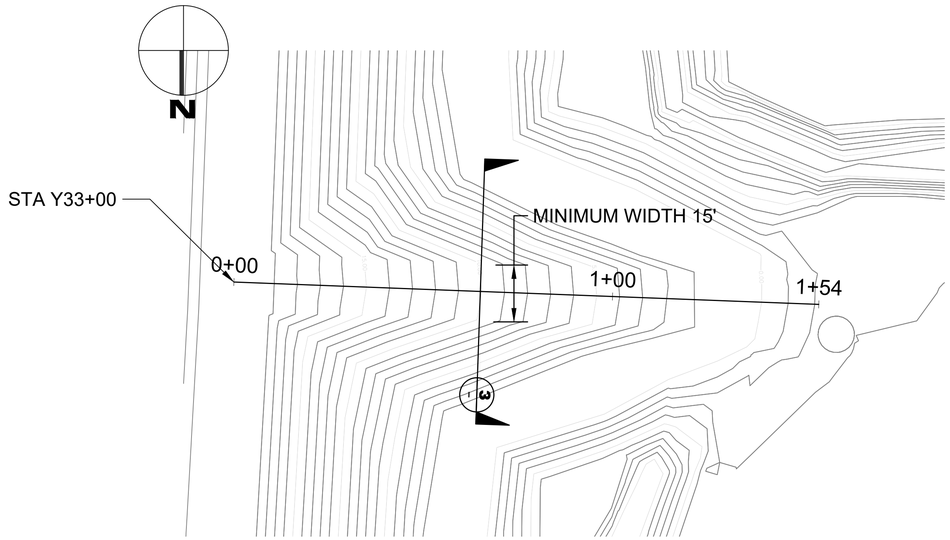
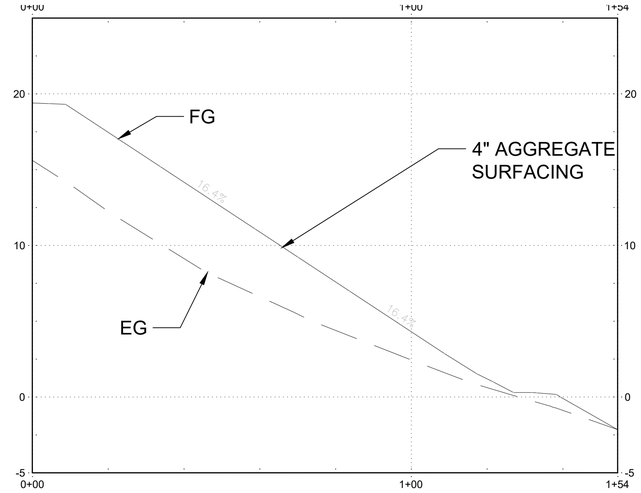
IRRIGATION DITCH RELOCATION

SHEET ID
C-507

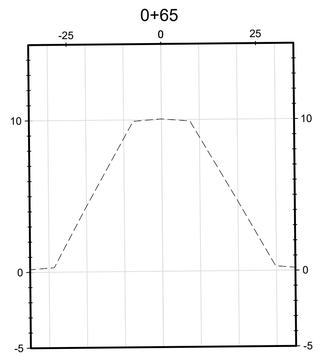
FINAL SUBMITTAL



1 WATERSIDE ACCESS RAMP PLAN DETAIL
SCALE: 1"=20'



2 WATERSIDE ACCESS RAMP PROFILE DETAIL
SCALE: 1"=20'



3 WATERSIDE ACCESS RAMP CROSS SECTION DETAIL
SCALE: 1"=20'

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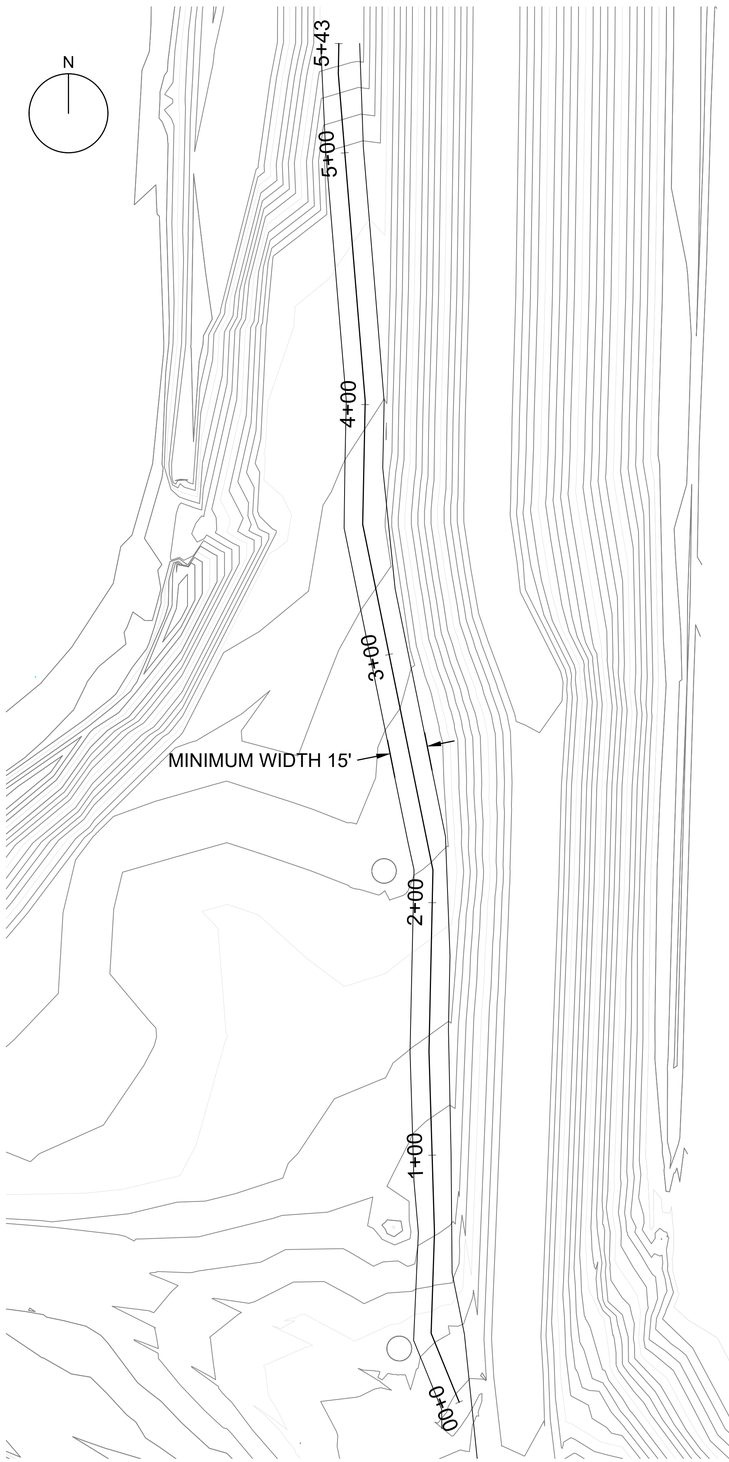
LOWER SAN JOAQUIN RIVER REACH
TS_30L LEVEE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

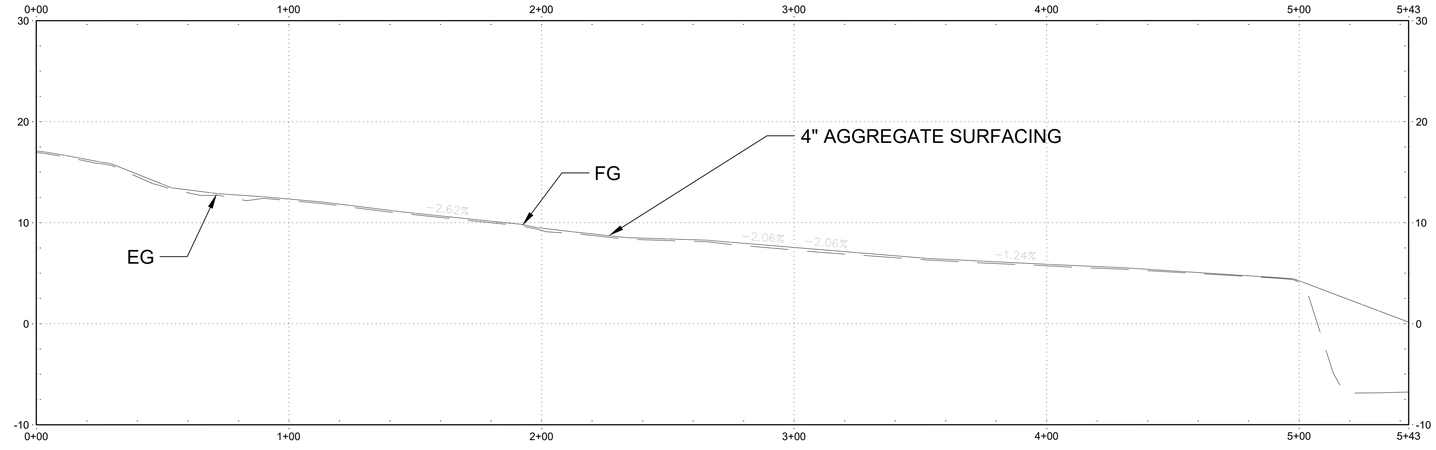
WATERSIDE ACCESS RAMP STA Y33+00
PLAN AND PROFILE

SHEET ID
C-508

FINAL SUBMITTAL



1 MARCH LANE ACCESS RAMP PLAN DETAIL
SCALE: 1"=30'



2 MARCH LANE ACCESS RAMP PROFILE DETAIL
SCALE: 1"=30'

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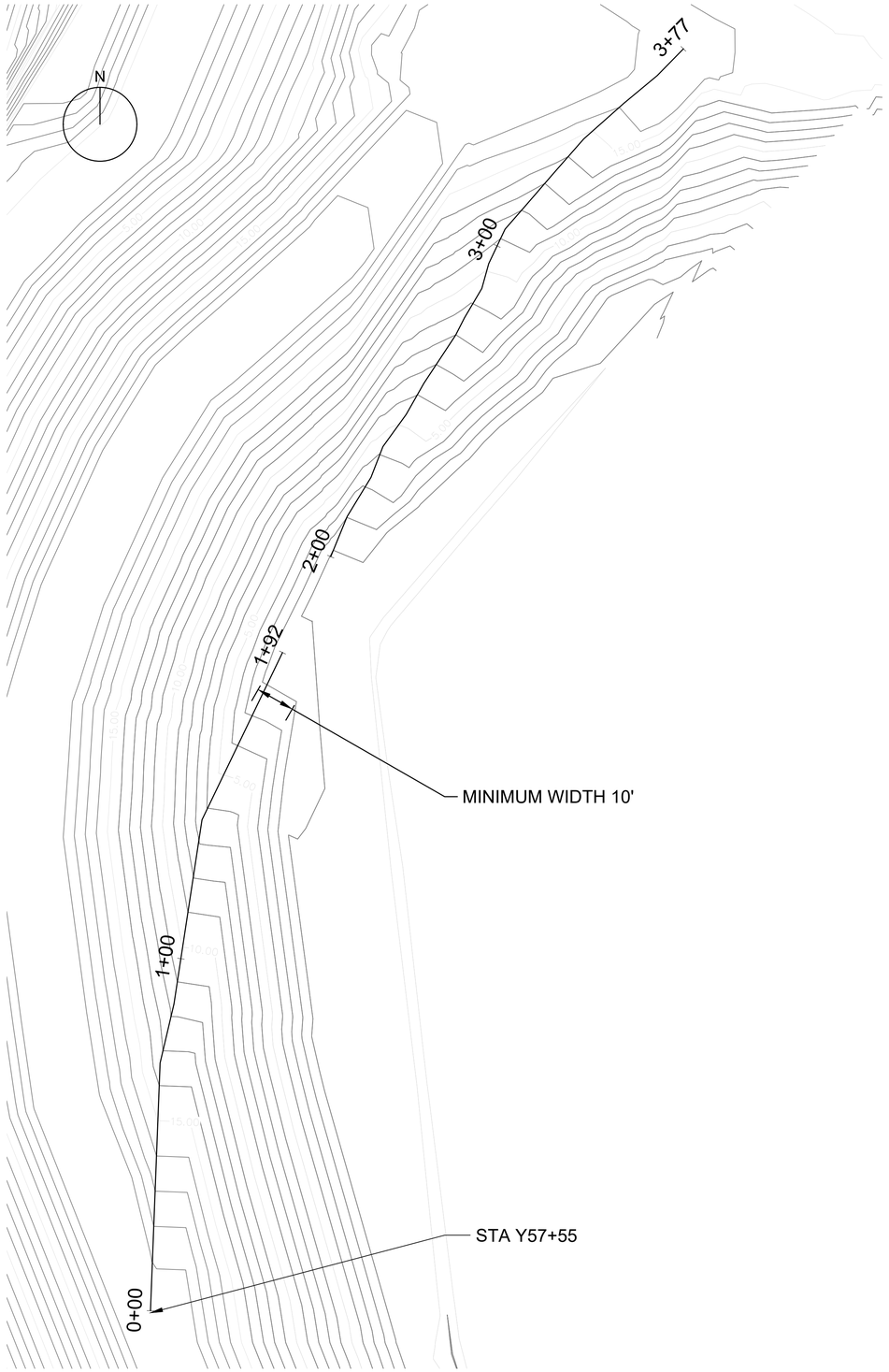
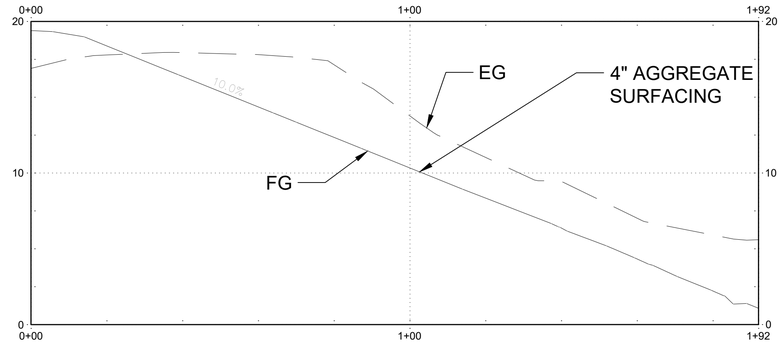
MARCH LANE ACCESS RAMP PLAN AND PROFILE

SHEET ID
C-509

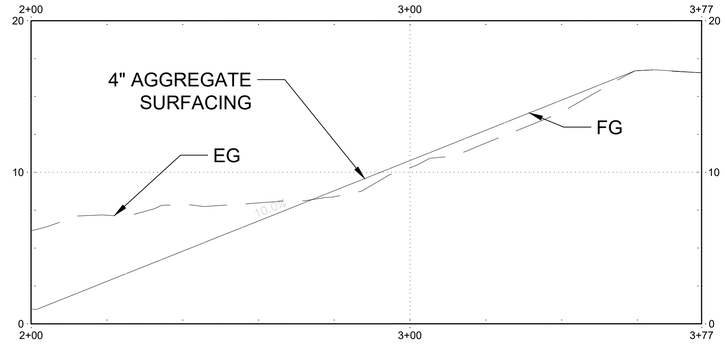
FINAL SUBMITTAL



1 NORTHERN ACCESS RAMP PLAN DETAIL
SCALE: 1"=20'



2A NORTHERN ACCESS RAMP PROFILE DETAIL
SCALE: 1"=20'



2B NORTHERN ACCESS RAMP PROFILE DETAIL
SCALE: 1"=20'

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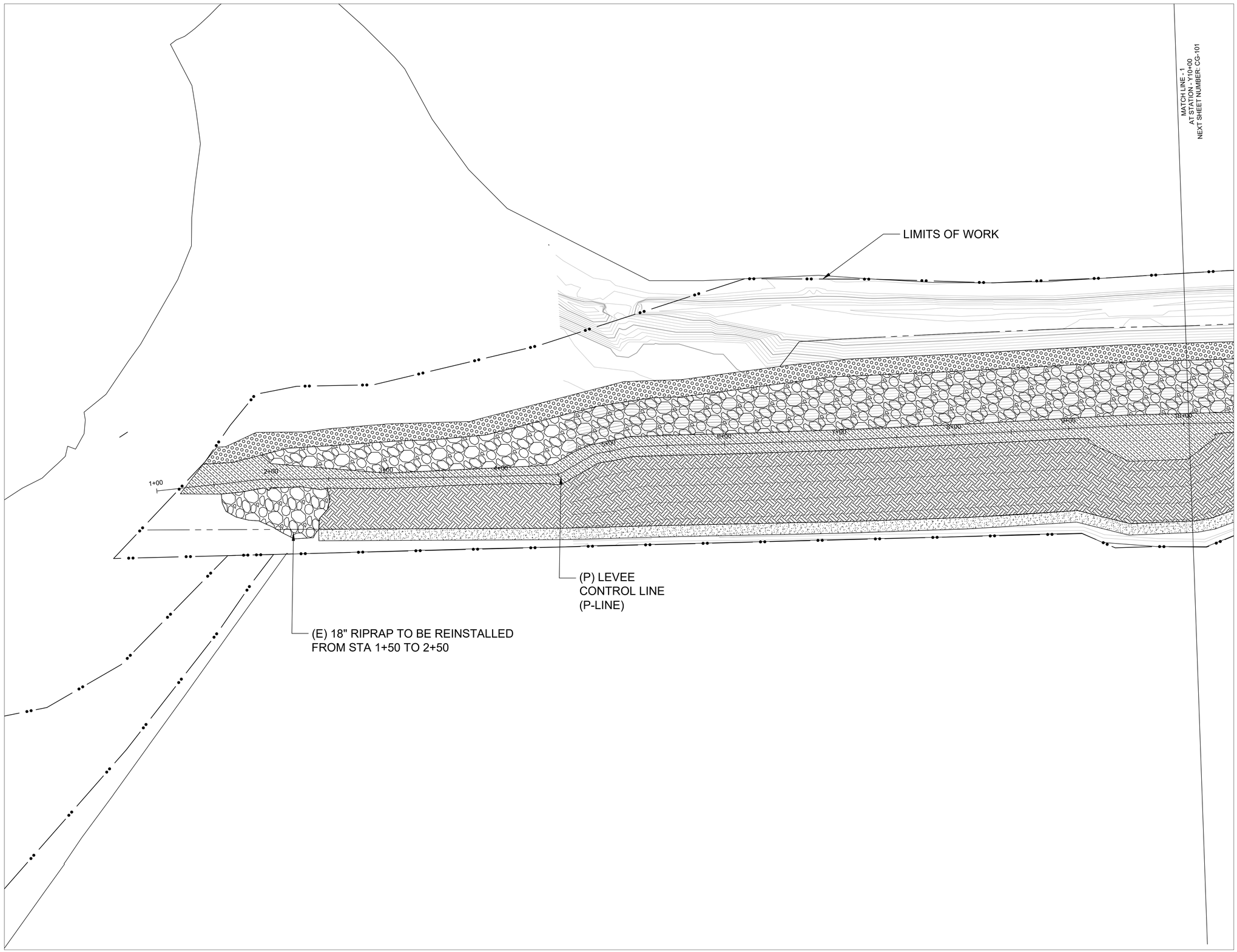
SAN JOAQUIN COUNTY, CALIFORNIA

NORTHERN ACCESS RAMP PLAN AND PROFILE

SHEET ID
C-510

FINAL SUBMITTAL



N

0 40' 80'

SCALE: 1"=40'

RIPRAP

6" AB WITH TRIPLE CHIP SEAL

4" AGGREGATE SURFACING

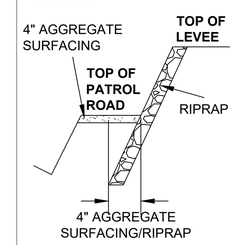
3" AGGREGATE SURFACING

4" AGGREGATE SURFACING/RIPRAP (SEE DETAIL 1)

NOTES

1. **PER SPECIFICATIONS, DISTURBED AREAS WITHOUT ROCK OR GRAVEL SURFACING SHALL BE SEEDED.**
2. **TEMPORARY EROSION CONTROL FEATURES SHALL BE PLACED AROUND ALL EXISTING LANDSIDE CATCH BASINS. SEE SHEETS C-100 THROUGH C-105 FOR LOCATIONS.**
3. **CONTRACTOR TO PROVIDE SILT FENCE ALONG EXISTING WATERSIDE DITCH. SEE SHEETS C-100 THROUGH C-105 FOR LOCATIONS.**

DETAIL 1



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SUBMITTED BY: S. JIMENEZ
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SACRAMENTO, CA 95814

PETERSON BRUSTAD INC.
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FOLSOM, CA 95630

LOWER SAN JOAQUIN RIVER REACH
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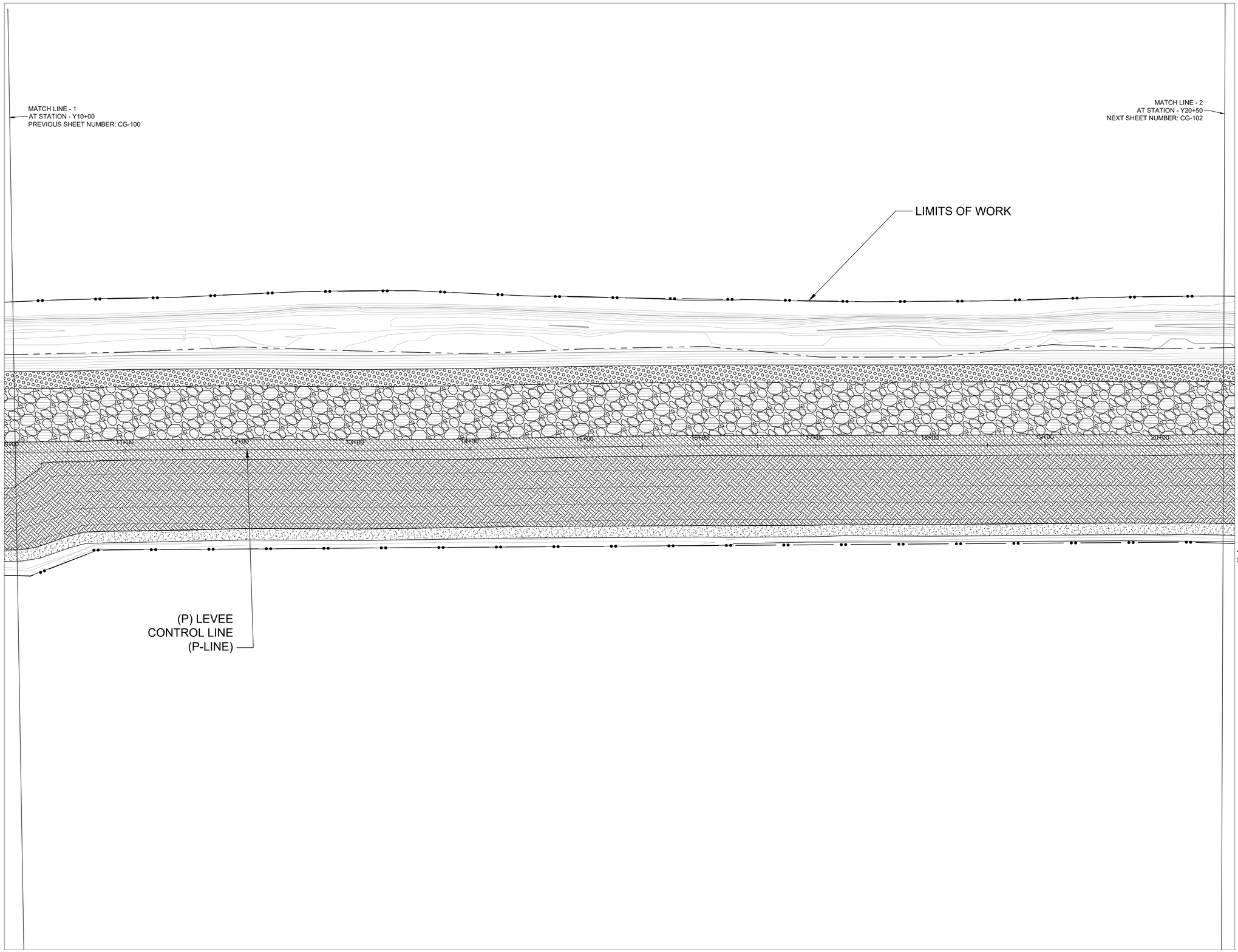
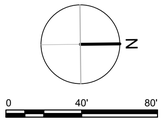
SAN JOAQUIN COUNTY, CALIFORNIA

EROSION CONTROL PLAN STA 1+00 TO 10+00

SHEET ID
CG-100

FINAL SUBMITTAL





SCALE: 1"=40'

RIPRAP

6" AB WITH TRIPLE CHIP SEAL

4" AGGREGATE SURFACING

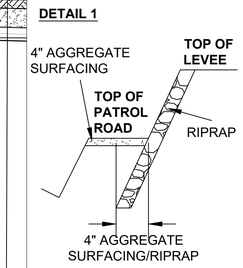
3" AGGREGATE SURFACING

4" AGGREGATE SURFACING/RIPRAP (SEE DETAIL 1)

NOTES

1. **PER SPECIFICATIONS, DISTURBED AREAS WITHOUT ROCK OR GRAVEL SURFACING SHALL BE SEEDED.**
2. **TEMPORARY EROSION CONTROL FEATURES SHALL BE PLACED AROUND ALL EXISTING LANDSIDE CATCH BASINS. SEE SHEETS C-100 THROUGH C-105 FOR LOCATIONS.**
3. **CONTRACTOR TO PROVIDE SILT FENCE ALONG EXISTING WATERSIDE DITCH. SEE SHEETS C-100 THROUGH C-105 FOR LOCATIONS.**

DETAIL 1



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CHECKED BY: K. BRUSTAD
SUBMITTED BY: S. JIMENEZ
SIZE: ANSI D

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1325 J ST.
SACRAMENTO, CA 95814

PETERSON BRUSTAD INC.
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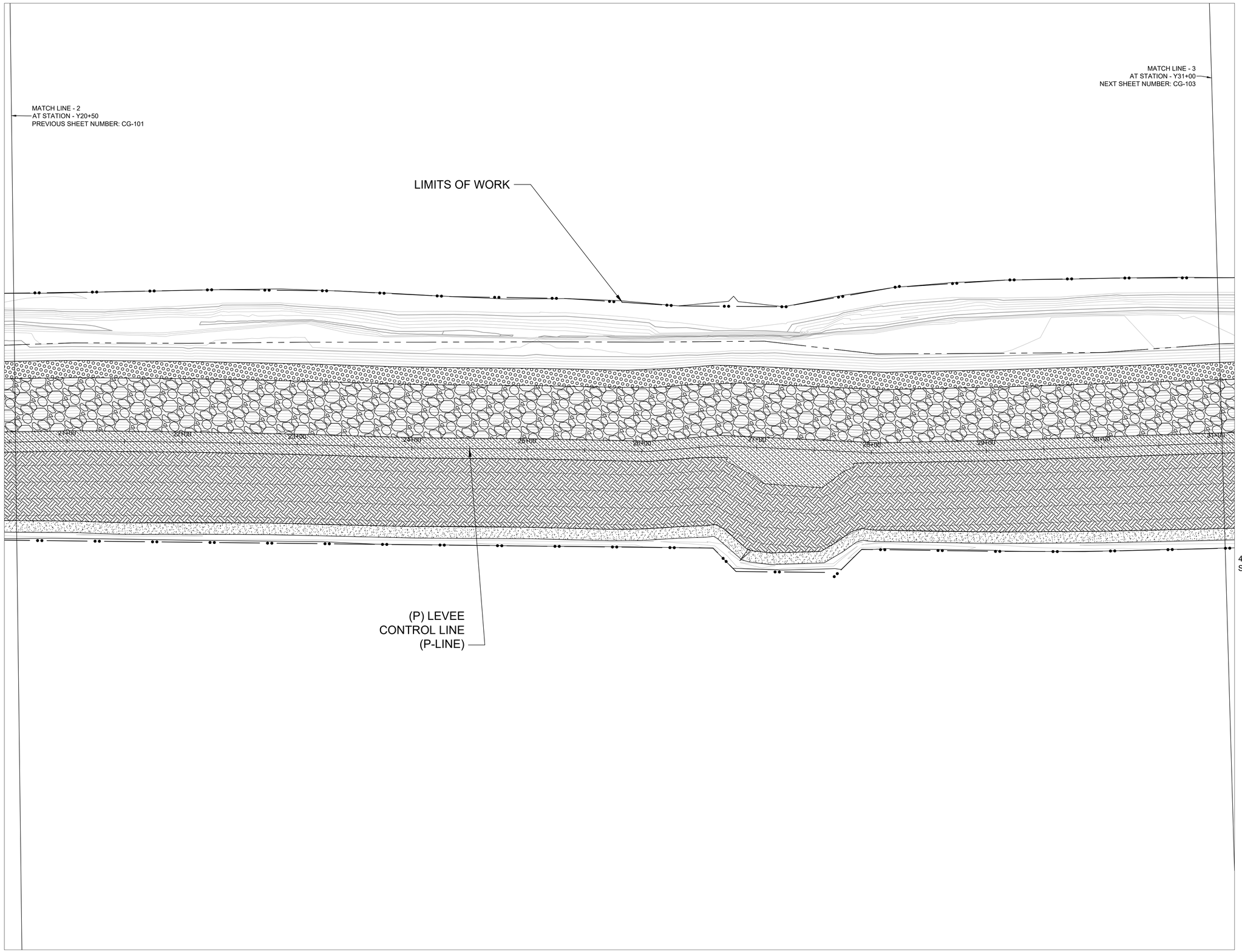
FOLSOM, CA 95630

LOWER SAN JOAQUIN RIVER REACH
TS_30L LEVEE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

EROSION CONTROL PLAN STA 10+00 TO 20+50

SHEET ID
CG-101

FINAL SUBMITTAL



N

0 40' 80'

SCALE: 1"=40'

RIPRAP

6" AB WITH TRIPLE CHIP SEAL

4" AGGREGATE SURFACING

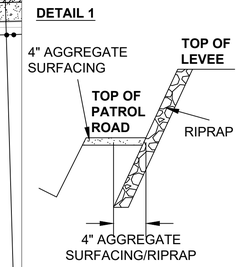
3" AGGREGATE SURFACING

4" AGGREGATE SURFACING/RIPRAP (SEE DETAIL 1)

NOTES

1. **PER SPECIFICATIONS, DISTURBED AREAS WITHOUT ROCK OR GRAVEL SURFACING SHALL BE SEEDED.**
2. **TEMPORARY EROSION CONTROL FEATURES SHALL BE PLACED AROUND ALL EXISTING LANDSIDE CATCH BASINS. SEE SHEETS C-100 THROUGH C-105 FOR LOCATIONS.**
3. **CONTRACTOR TO PROVIDE SILT FENCE ALONG EXISTING WATERSIDE DITCH. SEE SHEETS C-100 THROUGH C-105 FOR LOCATIONS.**

DETAIL 1



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SUBMITTED BY: S. JIMENEZ
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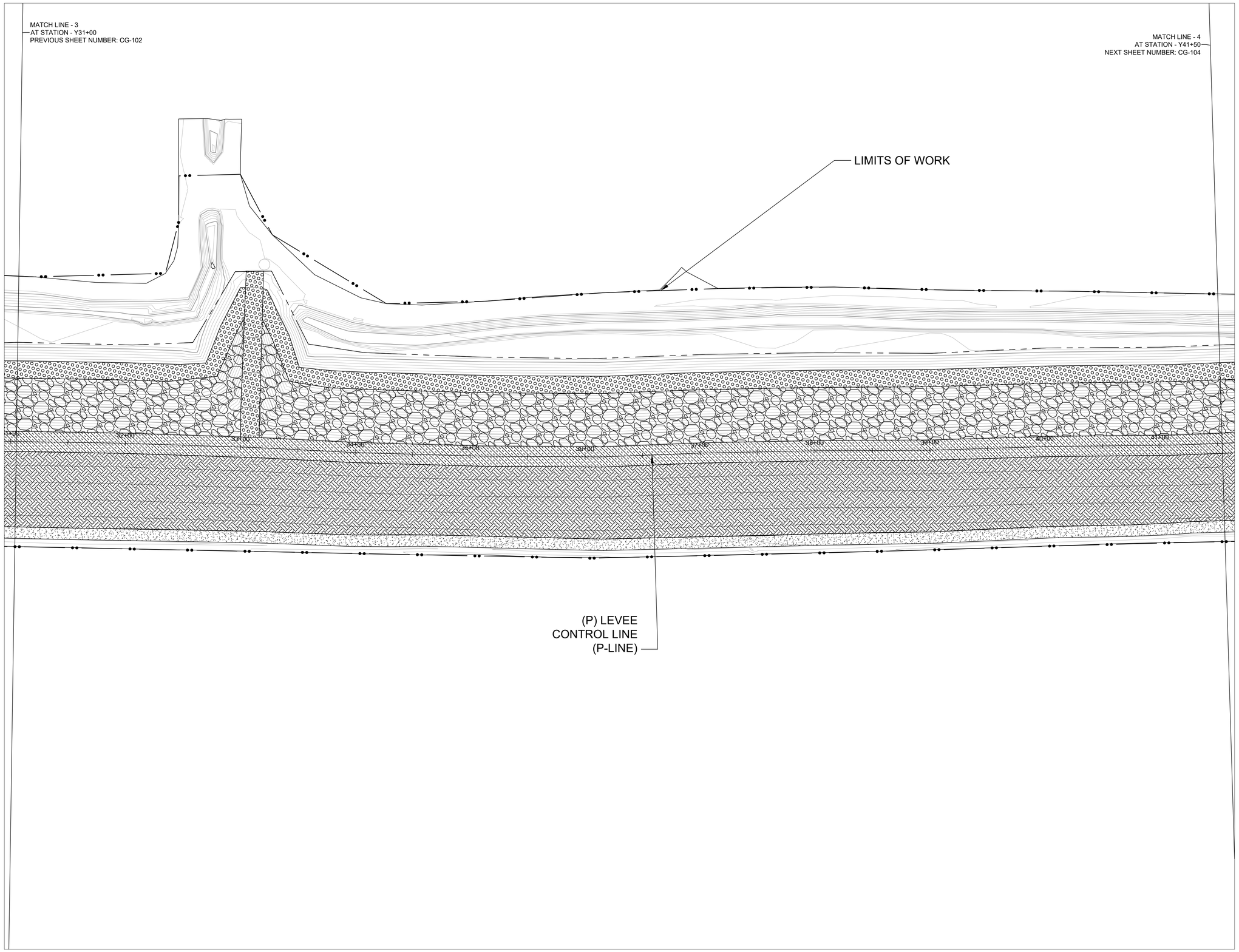
SAN JOAQUIN COUNTY, CALIFORNIA

EROSION CONTROL PLAN STA 20+50 TO 31+00

SHEET ID
CG-102

FINAL SUBMITTAL



N

0 40' 80'

SCALE: 1"=40'

RIPRAP

6" AB WITH TRIPLE CHIP SEAL

4" AGGREGATE SURFACING

3" AGGREGATE SURFACING

4" AGGREGATE SURFACING/RIPRAP (SEE DETAIL 1)

NOTES

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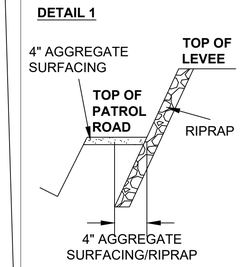
DETAIL 1



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SACRAMENTO, CA 95814

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TS_30L LEVEE IMPROVEMENT
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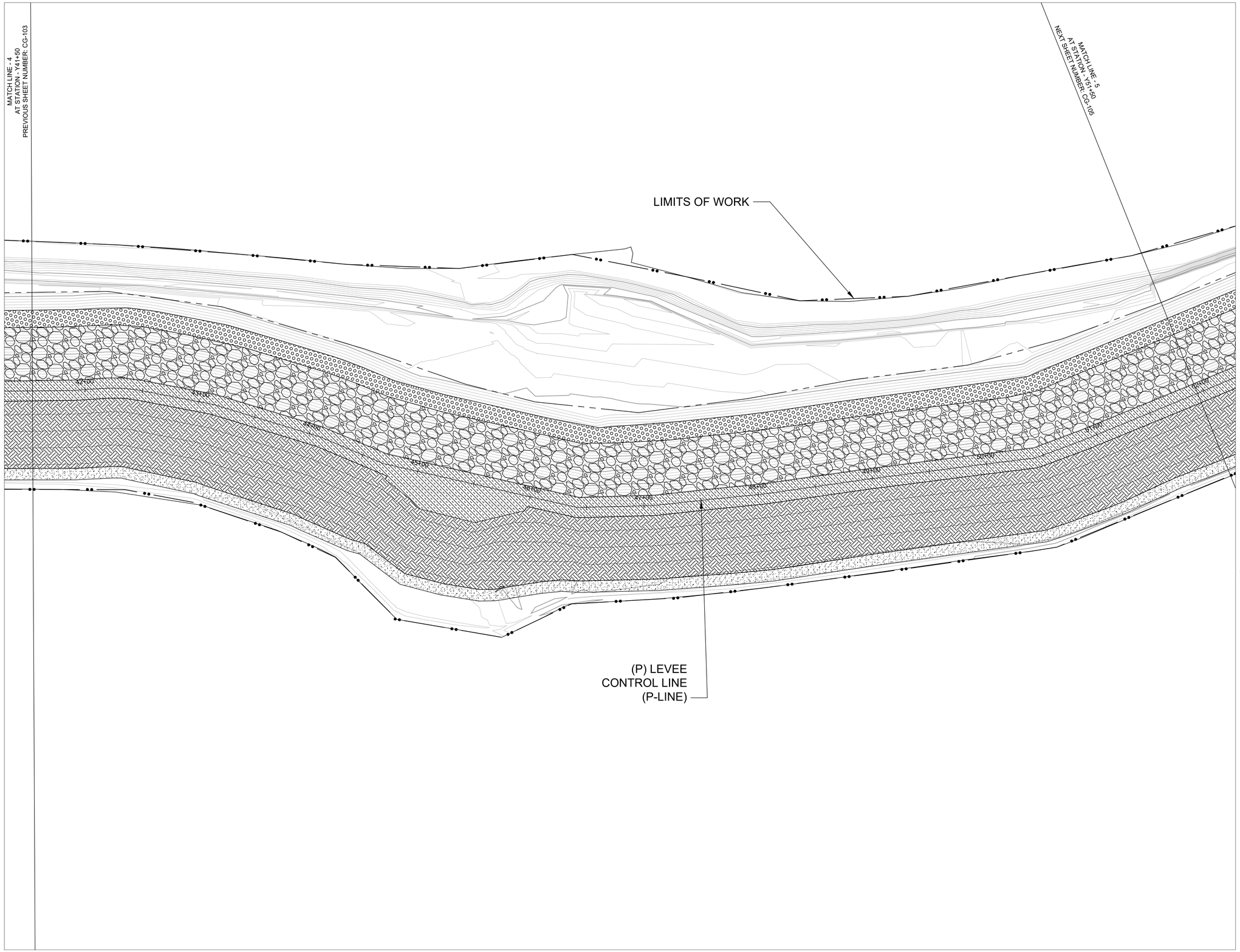
EROSION CONTROL PLAN STA 31+00 TO 41+50

SHEET ID
CG-103

FINAL SUBMITTAL



N

0 40' 80'

SCALE: 1"=40'

RIPRAP

6" AB WITH TRIPLE CHIP SEAL

4" AGGREGATE SURFACING

3" AGGREGATE SURFACING

4" AGGREGATE SURFACING/RIPRAP (SEE DETAIL 1)

NOTES

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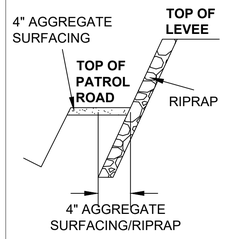

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TS_30L LEVEE IMPROVEMENT
SAN JOAQUIN COUNTY, CALIFORNIA

EROSION CONTROL PLAN STA 41+50 TO 51+50

SHEET ID
CG-104

FINAL SUBMITTAL

LIMITS OF WORK

(P) LEVEE
CONTROL LINE
(P-LINE)

MATCH LINE -5
AT STATION: X+51+50
PREVIOUS SHEET NUMBER: CG-104

61+21

N

0 40' 80'

SCALE: 1"=40'

RIPRAP

6" AB WITH TRIPLE CHIP SEAL

4" AGGREGATE SURFACING

3" AGGREGATE SURFACING

4" AGGREGATE SURFACING/RIPRAP (SEE DETAIL 1)

NOTES

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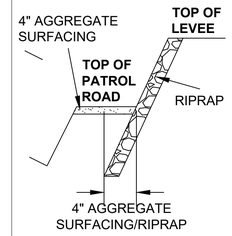
DETAIL 1



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DRAWN BY:	SOLICITATION NO.:
M. HARRINGTON	XXXXXX-XX-X-XXXX
CHECKED BY:	CONTRACT NO.:
K. BRUSTAD	
QUALITY CONTROL BY:	
S. JIMENEZ	
SIZE:	
ANSI D	

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
1325 J ST.
SACRAMENTO, CA 95814

PETERSON BRUSTAD INC.
80 BLUE RAVINE RD SUITE 280
FOLSOM, CA 95630

LOWER SAN JOAQUIN RIVER REACH
TS, LEVEE IMPROVEMENTS
SAN JOAQUIN COUNTY, CALIFORNIA

EROSION CONTROL PLAN STA 51+50 TO 61+00

SHEET ID

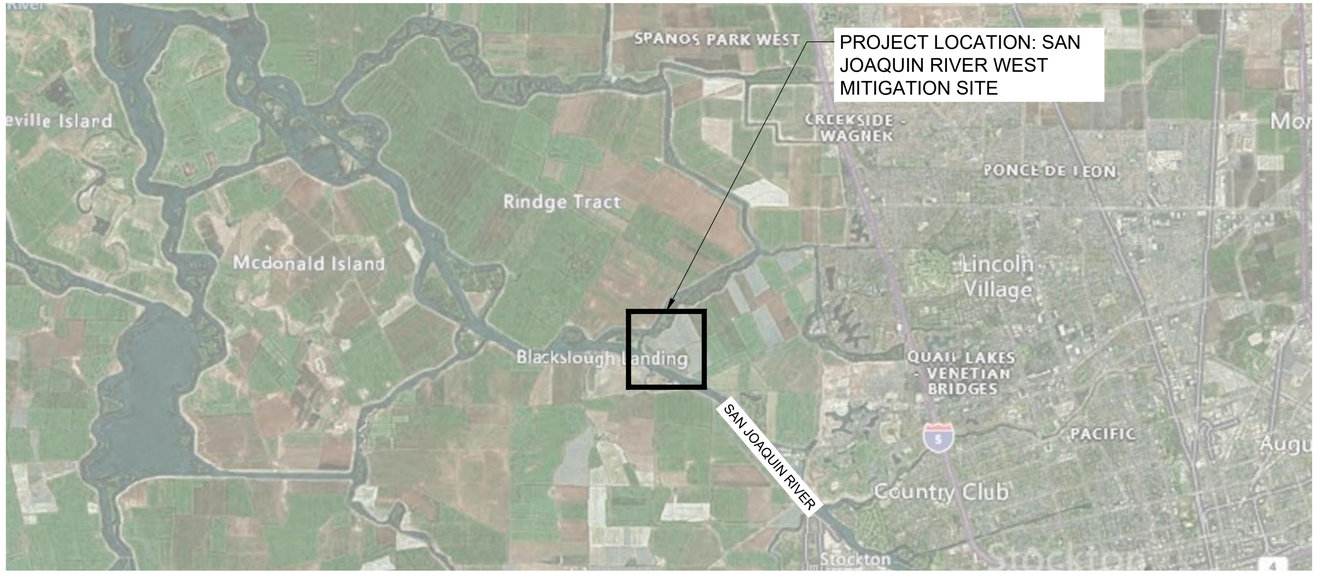
CG-105

FINAL SUBMITTAL

Appendix C-
10% Designs for San Joaquin River West Compensation Site

US Army Corps
of Engineers®
SACRAMENTO DISTRICT

EXHIBIT A, MITIGATION PLANTING AND ESTABLISHMENT PROJECT AT THE SAN JOAQUIN RIVER WEST SITE ON WRIGHT TRACT IN SAN JOAQUIN COUNTY, CA.



SITE MAP

ELEVATION DATUM (VERTICAL CONTROL): NAVD 88
GEOID 12B

ELEVATION DATUM (HORIZONTAL CONTROL): NAD 83 (2011)
CA SPCS ZONE 5
COMBINED FACTOR (CF): X.XXXXXXXXX

%PRODUCTION DATA 1%
%PRODUCTION DATA 2% %PRODUCTION DATA 3% %PRODUCTION DATA 4%

DRAFT 10% SUBMITTAL

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MARK	DESCRIPTION	DATE

DESIGNED BY: B.J.
DRAWN BY: B.J.
CHECKED BY: T.S.
SUBMITTED BY: B.J.
SIZE: ANSI D
ISSUE DATE: XX/XX/2023
SOLICITATION NO.:
CONTRACT NO.:

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
SACRAMENTO, CALIFORNIA

IN-HOUSE DESIGN
1325 J STREET
SACRAMENTO, CA 95814

EXHIBIT A, LOWER SAN JOAQUIN RIVER PROJECT
LONGITUDINAL MITIGATION SITE
WRIGHT TRACT, SAN JOAQUIN COUNTY, CA

COVER SHEET

SHEET ID
G-000

SHEET INDEX

G-000	COVER SHEET
G-001	SHEET INDEX AND GENERAL NOTES
G-002	ABBREVIATIONS
G-003	ACCESS PLAN AND EXTERNAL HAUL ROUTES
L-110	EXISTING CONDITIONS AND DEMOLITION PLAN
L-120	LAYOUT PLAN
L-130	GRADING PLAN
L-140	DETAIL REFERENCE
L-150	IRRIGATION PLAN
L-160	PLANTING PLAN
L-161 TO 162	PLANT SCHEDULE
L-170	EROSION CONTROL PLAN
L-171	EROSION CONTROL LEGEND
L-500 TO 505	CONSTRUCTION DETAILS

ABBREVIATIONS

AB	ANCHOR BOLT
ADDM	ADDENDUM
ADJ	ADJACENT, ADJOINING, ADJUSTABLE
APPROX	APPROXIMATE
ASPH	ASPHALT
AUTO	AUTOMATIC
AVG	AVERAGE
BDRY	BOUNDARY
BLDG	BUILDING
BRK	BRICK
BRKT	BRACKET
BTWN	BETWEEN
CB	CATCH BASIN
CF	CUBIC FEET
CI	CURB INLET
CIP	CAST-IN-PLACE
CJ	CONTROL JOINT
CJ	CONSTRUCTION JOINT
CL	CENTER LINE
CLR	CLEAR(ANCE)
CNR	CORNER
CO	CLEANOUT
CNC	CONCRETE
CONN	CONNECT
CONSTR	CONSTRUCTION
CONT	CONTINUE
COR	CONTRACTING OFFICER REPRESENTATIVE
CRCMF	CIRCUMFERENCE
CTR	CENTER
CU FT	CUBIC FEET
CU YD	CUBIC YARDS
CY	CUBIC YARDS
DAT	DATUM
DBL	DOUBLE
DEG	DEGREE
DEMO	DEMOLITION
DIA	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DIV	DIVISION
DWG	DRAWING
E	EAST
(E)	EXISTING
EA	EACH
EJ	EXPANSION JOINT
EPY	EPOXY COATING
EQ	EQUAL
EQUIP	EQUIPMENT
EXST	EXISTING
EXT	EXTERIOR
F	FAHRENHEIT
FT	FEET
FTG	FOOTING
GA	GAGE
GAL	GALLON(S)
GALV	GALVANIZED
GALV STL	GALVANIZED STEEL
GEN	GENERAL
ZHDR	HEADER
HP	HIGH POINT
HR	HOUR
HT	HEIGHT
IN	INCH
INT	INTERIOR
LB	POUND
LBL	LABEL
LG	LENGTH
LIN	LINEAR
LONG	LONGITUDINAL
LP	LOW POINT
LT	LIGHT
MAS	MASONRY
MAX	MAXIMUM
MED	MEDIUM
MFR	MANUFACTURER
MH	MANHOLE
MIN	MINIMUM
MISC	MISCELLANEOUS
mm	MILLIMETER(S)
MOD.	MODIFIED
MTL	METAL
N	NORTH
(N)	NEW
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER
OHWM	ORDINARY HIGH WATER MARK
PCF	POUNDS PER CUBIC FOOT
PED	PEDESTRIAN
PERIM	PERIMETER
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PT.	POINT
R	RADIUS
REV	REVISION
ROW	RIGHT OF WAY
S	SOUTH
SECT	SECTION
SHT	SHEET
SHTHG	SHEATHING
SIM	SIMILAR
SLV	SLEEVE
SPEC	SPECIFICATION
SQ	SQUARE
STA	STATION
STD	STANDARD
TYP	TYPICAL
UTIL	UTILITY
UON	UNLESS OTHERWISE NOTED
W	WEST
W/	WITH
W/O	WITHOUT
WT	WEIGHT
WTH	WIDTH
YD	YARD

GENERAL NOTES

1. CONTRACTOR MUST CONFINE OPERATIONS WITHIN THE LIMITS OF WORK DEPICTED ON THE PLANS. IF AREAS OR FEATURES OUTSIDE DESIGNATED CONSTRUCTION ZONES SUSTAIN IMPACT FROM CONTRACTOR ACTIVITIES, CONTRACTOR SHALL RESTORE TO PRE-WORK CONDITION AT NO COST.
2. ALL EXISTING UTILITY LOCATIONS AND DESCRIPTIONS SHOWN ON PLANS HAVE BEEN COMPILED FROM AVAILABLE RECORDS AND/OR SURVEY. THE GOVERNMENT CANNOT GUARANTEE THE ACCURACY OR COMPLETENESS OF THIS INFORMATION. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF LOCATION AND DEPTH (POTHOLE) OF ALL UTILITIES WITHIN THE WORK ZONE PRIOR TO BEGINNING WORK. CONTRACTOR SHALL PROMPTLY NOTIFY THE GOVERNMENT OF POTENTIAL CONFLICTS. IF CONTRACTOR FAILS TO LOCATE ANY KNOWN UTILITY WITHIN THE WORK ZONE THAT CONFLICTS WITH WORK, CONTRACTOR SHALL CORRECT THE CONFLICT AT THEIR OWN COST. ANY COSTS TO THE CONTRACTOR ARISING FROM COORDINATION WITH UTILITY COMPANY TO RELOCATE UTILITIES SHALL BE CONSIDERED INCIDENTAL TO COST OF THE PROJECT AND NO ADDITIONAL COMPENSATION SHALL BE DUE TO THE CONTRACTOR.
3. CONTRACTOR MUST PROTECT ALL EXISTING SURVEY MONUMENTS AND CONSTRUCTION STAKING. CONTRACTOR SHALL NOTIFY THE GOVERNMENT PRIOR TO DISTURBANCE OR REMOVAL OF ANY PERMANENT MONUMENTS AND COORDINATE RESETTING WITH A LICENSED LAND SURVEYOR.
4. CONTRACTOR MUST RESTORE ALL STREET, ACCESS ROUTE, AND SITE FEATURES IMPACTED BY WORK UNDER CONTRACT PER THE PERFORMANCE WORK STATEMENT (PWS) REQUIREMENTS.
5. CONTRACTOR MUST VERIFY ACCURATE LOCATIONS OF THE LIMITS OF WORK BEFORE THE COMMENCENT OF ANY WORK. RESTORE ALL AREAS AS STIPULATED IN THE CONTRACT DOCUMENTS.
6. THE SAN JOAQUIN RIVER EXPERIENCES VARIATIONS IN FLOW AND RIVER STAGE THAT SHOULD BE EXPECTED DURING THE PROJECT CONSTRUCTION PERIOD. THE CONTRACTOR SHOULD CONSULT RIVER FLOW AND STAGE INFORMATION DURING THE BIDDING, PLANNING, AND EXECUTION OF THE WORK.
7. THE FOLLOWING LINK CAN BE USED TO ACCESS CURRENT FLOW AND STAGE DATA FOR THE SAN JOAQUIN RIVER IN THE PROJECT AREA AT: https://water.weather.gov/ahps/forecasts.php
8. CONTRACTOR OPERATIONS DURING THE CONSTRUCTION PERIOD MAY BE IMPACTED BY EXTREME HIGH OR LOW RIVER LEVELS, FLOODING, DROUGHT, AND/OR OPERATION OF UPSTREAM DAM RELEASES. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MONITOR RIVER FLOW CONDITIONS ON A DAILY BASIS AND TO IMPLEMENT PROCEDURES TO PROTECT THE WORK, EQUIPMENT, AND MATERIALS.
9. THE REFERENCES PROVIDED ON THIS SHEET ARE SOLELY FOR THE INFORMATION OF THE CONTRACTOR IN TIMING CONSTRUCTION OPERATIONS TO PREPARE FOR FLOOD EVENTS AND IN MAKING PROVISIONS FOR PROTECTING THE WORK. USACE DOES NOT GUARANTEE THE RELIABILITY OR ACCURACY OF ANY OF THE DATA AND ASSUMES NO RESPONSIBILITY FOR ANY DEDUCTIONS, INTERPRETATIONS, OR CONCLUSIONS WHICH MAY BE DERIVED FROM THE DATA.
10. CONTRACTOR TO PRODUCE AND INSTALL (2) CONSTRUCTION PROJECT SIGNS. SIGNS TO BE LOCATED WITHIN THE SITE BOUNDARY PER DIRECTION OF THE COR. CONTRACTOR TO SUBMIT SHOP DRAWINGS FOR COR APPROVAL BEFORE FABRICATION AND INSTILLATION. BACK OF SIGN TO BE NON-REFLECTIVE. LOCATE PER DIRECTION OF THE COR.
11. CONTRACTOR TO VERIFY ACCURATE LOCATIONS OF EASEMENTS AND RIGHTS OF WAY BEFORE THE COMMENCEMENT OF ANY WORK. CONTRACTOR SHALL RESTORE ALL PROJECT-RELATED EASEMENT AREAS AS STIPULATED IN THE EASEMENT AND CONTRACT DOCUMENTS.
12. CONTRACTOR TO VERIFY SITE CONDITIONS BEFORE THE COMMENCEMENT OF ANY WORK. NOTIFY COR IMMEDIATELY OF ANY DISCREPANCIES FROM THE CONDITIONS SHOWN ON THE PLANS OR DESCRIBED IN THE PWS.
13. ALL WORK TO BE PERFORMED SHALL CONFORM TO ALL APPLICABLE CODES AND ORDINANCES OF GOVERNMENTAL AGENCIES HAVING JURISDICTION OVER THE PROJECT.
14. COORDINATE ALL WORK TO PREVENT CONFLICTS BETWEEN TRADES AND REPORT CONFLICTS OR INCONGRUITIES BETWEEN NEW IMPROVEMENTS AND/OR EXISTING FACILITIES TO THE COR IMMEDIATELY.
15. ALL DEBRIS, RUBBISH, AND/OR OTHER ITEMS SCHEDULED FOR REMOVAL FROM WITHIN THE LIMIT OF WORK MUST BE DISPOSED OF IN A LEGAL MANNER AS CONTRACTOR'S PROPERTY.
16. IN ADDITION TO THESE DRAWINGS, REFER TO THE SPECIFICATIONS AND PERFORMANCE WORK STATEMENT.
17. THE COORDINATE SYSTEM USED IN THIS DRAWING SET IS: CALIFORNIA STATE PLANE COORDINATE SYSTEM ZONE 3, NAD83 (2007), US SURVEY FEET.
18. AERIAL IMAGERY ON PLANS FROM BING MAPS 2021.

RESTORATION OF EXISTING LANDSCAPE AREAS TO REMAIN

1. RESTORE ALL LANDSCAPE AREAS DISTURBED BY CONSTRUCTION ACTIVITIES AS FOLLOWS: DISTURBED LANDSCAPE AREAS SHALL BE WEEDED, CULTIVATED, FINE GRADED FLUSH TO ADJACENT GRADE WITH NO VOIDS, DEPRESSIONS, OR MOUNDS; THE TOP 6" OF SOIL DECOMPACTED, PROVIDED WITH EROSION CONTROL (MUST INCLUDE DRY SEED, DRILL SEED, AND/OR HYDROSEED) AND MAINTAINED THROUGHOUT THE INSTALLATION PERIOD.

SITE PREPARATION NOTES

1. PROTECT ALL SITE ELEMENTS TO REMAIN.
2. PROVIDE FENCING AT LIMIT OF WORK LINE THROUGHOUT THE INSTALLATION PERIOD.
3. ALL MATERIALS SHALL BE DISPOSED OF IN A LEGAL MANNER AS CONTRACTOR'S PROPERTY.
4. VERIFY ALL ITEMS TO BE REMOVED IN THE FIELD WITH THE KO PRIOR TO START OF WORK.

LAYOUT NOTES

1. VERIFY ALL DIMENSIONS IN THE FIELD PRIOR TO BEGINNING CONSTRUCTION AND REPORT ANY DISCREPANCIES TO THE CITY REPRESENTATIVE PRIOR TO PROCEEDING.
2. WRITTEN DIMENSIONS ON DRAWINGS SUPERSEDE SCALE DIMENSIONS.
3. ALL DIMENSIONS ARE TO BE MEASURED HORIZONTALLY.
4. VERIFY THE LOCATIONS OF ALL UTILITIES AND UTILITY COVERS. REPORT ANY DISCREPANCIES TO THE KO.
5. THE CONTRACTOR SHALL STAKE ALL LAYOUTS AND FOOTINGS FOR REVIEW BY THE KO BEFORE FINAL CONSTRUCTION.

GRADING NOTES

1. VERIFY ALL GRADES IN THE FIELD BEFORE PROCEEDING WITH WORK. REPORT ANY DISCREPANCIES TO THE COR IMMEDIATELY.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR POSITIVE SURFACE DRAINAGE IN AND AROUND WETLAND AREAS. MAINTENANCE PATHS AROUND WETLAND AREAS SHALL BE FINISHED TO A SMOOTH AND CONTINUOUS GRADE, DRAINING, AND FREE OF STANDING WATER.
3. PROVIDE SMOOTH TRANSITIONS BETWEEN EXISTING AND NEW GRADES IN PLANTING AREAS.
4. THE COR RESERVES THE RIGHT TO MAKE ADJUSTMENTS IN THE FINISHED GRADES AS THE WORK PROGRESSES.
5. ELEVATIONS ARE BASED ON SURVEY DATA UNLESS OTHERWISE NOTED.

PLANTING NOTES

1. CONTRACTOR MUST REVIEW ALL PLANT MATERIAL ON SITE WITH THE KO AND SHALL INSTALL MATERIAL ONLY AFTER OBTAINING APPROVAL FROM THE KO.
2. THE KO RESERVES THE RIGHT TO MAKE SUBSTITUTIONS, ADDITIONS, LAYOUT CHANGES, AND DELETIONS IN THE PLANTING SCHEME AS THE WORK PROGRESSES.
3. ALL NEWLY PLANTED PLANT PITS TO RECEIVE MULCH, SEE PROJECT WORK STATEMENT.

SITE METALWORK NOTES

1. SUBMIT SHOP DRAWINGS FOR ALL METAL WORK FOR KO APPROVAL BEFORE FABRICATING AND INSTALLING..
2. ALL MEMBERS TO BE STRUCTURAL STEEL GALVANIZED SIZE AND TYPE AS INDICATED ON DETAIL DRAWINGS
3. SHOP ASSEMBLY, FULL DEPTH WELDS, TYPE "FILLET WELD" CONTINUOUS, GRIND SMOOTH.
4. HOT DIP GALVANIZE AND POWDER COAT ALL MEMBERS PER SPECIFICATIONS.

ELEVATION DATUM (VERTICAL CONTROL):
NAVD 88
GEOID 12B

ELEVATION DATUM (HORIZONTAL CONTROL):
NAD 83 (2007)
CA SPCS ZONE 5
COMBINED FACTOR (CF): X.XXXXXXXXX

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: B.J.
DRAWN BY: B.J.
CHECKED BY: T.S.
SUBMITTED BY: B.J.
SIZE: ANSI D
ISSUE DATE: XX/XX/2023
SOLICITATION NO.:
CONTRACT NO.:

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
SACRAMENTO, CALIFORNIA

IN-HOUSE DESIGN
1325 J STREET
SACRAMENTO, CA 95814

EXHIBIT A, LOWER SAN JOAQUIN RIVER PROJECT
LONGITUDINAL MITIGATION SITE
WRIGHT TRACT, SAN JOAQUIN COUNTY, CA

SHEET INDEX & NOTES

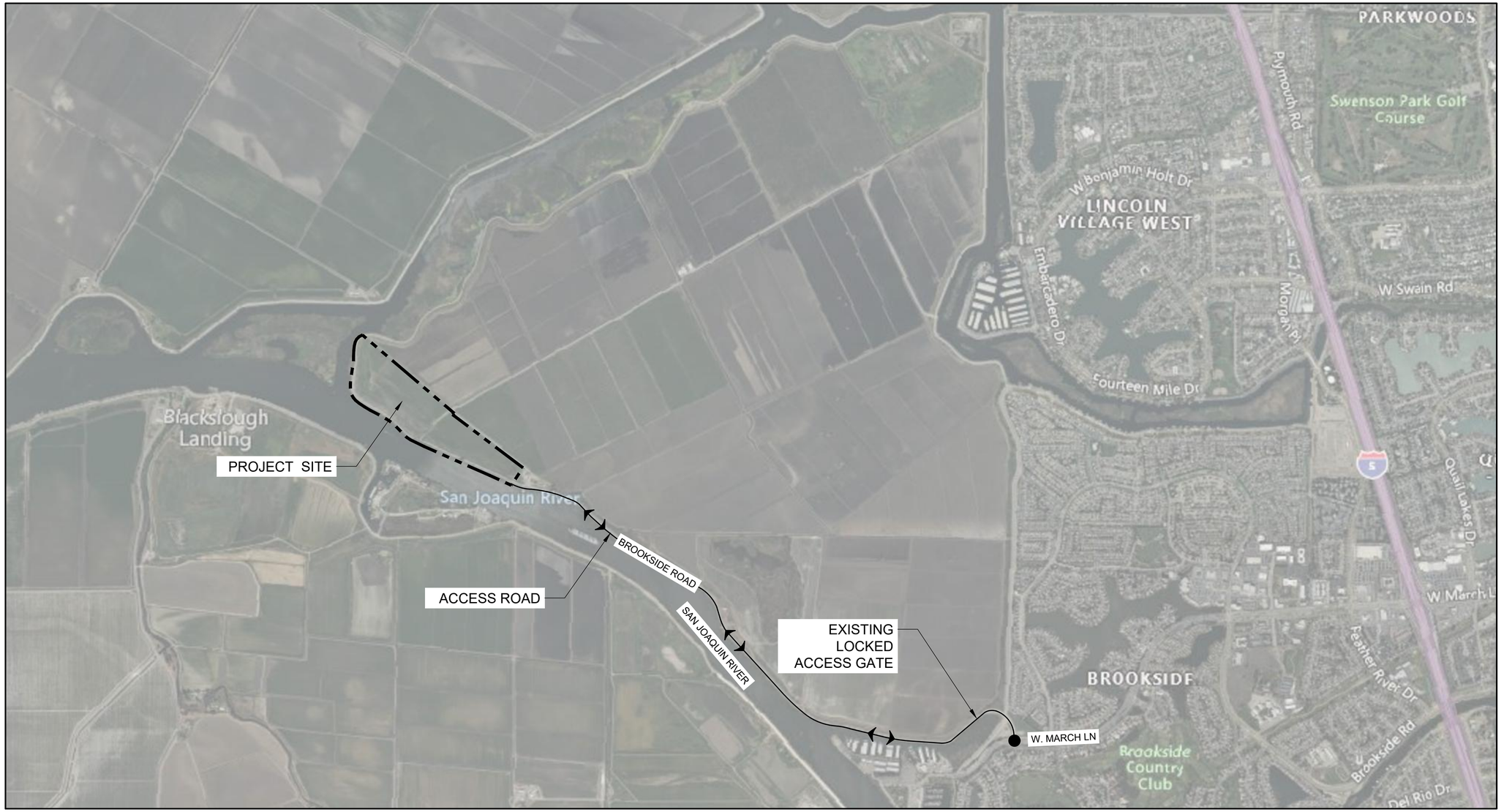
SHEET ID
G-001

%PRODUCTION DATA 1%
%PRODUCTION DATA 2% %PRODUCTION DATA 3% %PRODUCTION DATA 4%

DRAFT 10% SUBMITTAL

NOTES

1. CONTRACTOR'S EXTERNAL HAUL ROUTES AND INGRESS/EGRESS LOCATIONS FOR HAULING MATERIALS, EQUIPMENT DELIVERY, AND ALL LARGE TRANSPORTS SHALL BE LIMITED TO THE ROUTES SHOWN ON THIS SHEET.
2. SUBMIT A TRAFFIC CONTROL PLAN THAT DEFINES INGRESS/EGRESS ROUTES USED TO ACCESS THE SITE. TRAFFIC CONTROL PLAN SHALL INCLUDE CONTRACTOR'S APPROACH TO MEETING THE TRAVEL REQUIREMENTS LISTED BELOW AND SHALL DEMONSTRATE CONFORMANCE WITH ALL REQUIREMENTS IN THE PWS. VERIFY THE LOCATION OF NEW ACCESS ROADS IN THE FILED WITH KO.
3. CONTRACTOR TO MAINTAIN NEW AND EXISTING UNPAVED MAINTENANCE ROUTES TO PROJECT AREA(S).



ELEVATION DATUM (VERTICAL CONTROL): NAVD 88
GEOID 12B

ELEVATION DATUM (HORIZONTAL CONTROL): NAVD 83 (2007)
CA STATE PLANE ZONE 2
COMBINED FACTOR (CF): X.XXXXXXXXX

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SUBMITTED BY: B.J.
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U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
SACRAMENTO, CALIFORNIA

IN-HOUSE DESIGN
1325 J STREET
SACRAMENTO, CA 95814

EXHIBIT A, LOWER SAN JOAQUIN RIVER PROJECT
LONGITUDINAL MITIGATION SITE
WRIGHT TRACT, SAN JOAQUIN COUNTY, CA

ACCESS PLAN AND EXTERNAL HAUL ROUTES

SHEET ID
G-002

%PRODUCTION DATA 1%
%PRODUCTION DATA 2% %PRODUCTION DATA 3% %PRODUCTION DATA 4%

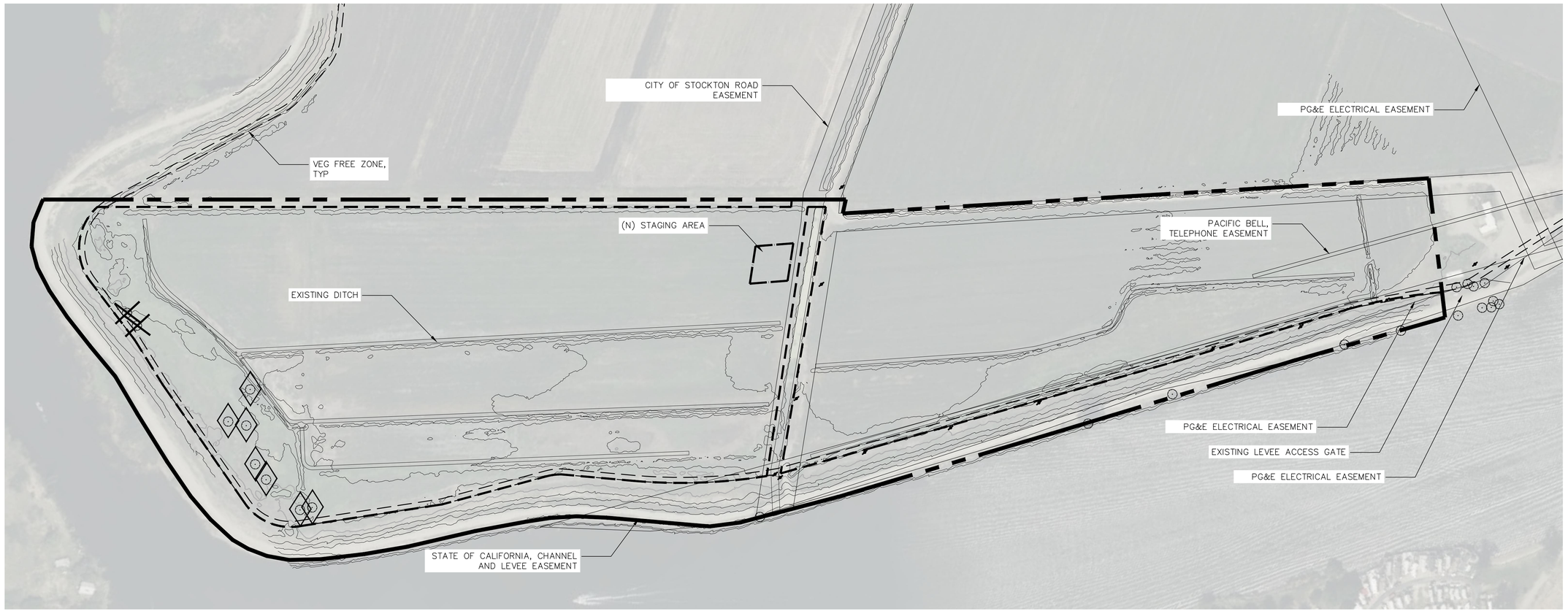
DRAFT 10% SUBMITTAL

LEGEND

- PROPERTY LINE
- LIMIT OF WORK
- STAGING AREA
- (E) UTILITY POLE
- (E) TREE AND/OR STUMP TO BE REMOVED.
- PROTECT (E) TREE TO REMAIN. SEE X/L-X.X.

NOTES

1. PROTECT AND IRRIGATE ALL (E) TREES TO REMAIN.
2. (E) UTILITIES, UTILITY BOXES, AND DITCHES TO REMAIN, UON.
3. FIELD VERIFY ALL ITEMS TO BE REMOVED WITH THE KO
4. STUMP GRIND TO 24" BELOW GRADE. AT STUMP GRINDING LOCATIONS, REMOVE ALL ROOTS 2" DIA OR LARGER TO A DEPTH OF 12" BELOW. BACKFILL HOLES RESULTING FROM STUMP AND ROOT REMOVAL TO BE FLUSH WITH ADJACENT GRADES. COMPACT BACKFILL IN 6" LIFTS TO 85% UON.
5. ANY DAMAGE AS A RESULT OF CONSTRUCTION ACTIVITIES OR STAGING is TO BE RESTORED TO THEIR PREVIOUS CONDITION OR BETTER.



Feet

SCALE: 1" = 150'-0"

1 PLAN: LONGITUDINAL MITIGATION SITE
SCALE: 1" = 150'-0"

ELEVATION DATUM (VERTICAL CONTROL): NAVD 88 GEOID 12B

ELEVATION DATUM (HORIZONTAL CONTROL): NAD 83 2011 CA SPCS ZONE 5 COMBINED FACTOR (CF): X.XXXXXXXXX

US Army Corps of Engineers®

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CONTRACT NO.:

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U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
SACRAMENTO, CALIFORNIA

IN-HOUSE DESIGN
1325 J STREET
SACRAMENTO, CA 95814

EXHIBIT A, LOWER SAN JOAQUIN RIVIER PROJECT
LONGITUDINAL MITIGATION SITE
WRIGHT TRACT- SAN JOAQUIN COUNTY, CA

EXISTING CONDITIONS AND DEMOLITION PLAN

SHEET ID

L-110

DRAFT 10% SUBMITTAL

LINE TABLE					
Line #	Length	START NORTHING	START EASTING	END NORTHING	END EASTING
L1	247.00	2184487.68	6302447.05	2184282.33	6302309.77
L2	1828.05	2184393.37	6302655.56	2185492.41	6301194.79
L3	38.72	2185484.90	6301202.69	2185508.30	6301233.54
L4	2175.34	2185508.30	6301233.54	2186919.69	6299578.22
L5	1880.71	2185589.25	6301107.76	2186809.49	6299676.64
L6	192.89	2186668.18	6299531.08	2186475.61	6299519.98
L7	134.63	2186462.23	6299518.60	2186329.06	6299498.84
L8	392.11	2186329.06	6299498.84	2185938.93	6299459.49
L9	393.54	2185796.31	6299529.82	2185589.28	6299864.50
L10	393.54	2185796.31	6299529.82	2185589.28	6299864.50
L11	293.31	2185589.28	6299864.50	2185463.46	6300129.46
L12	200.99	2185442.02	6300162.55	2185298.48	6300303.25
L15	738.19	2185076.91	6300583.93	2185559.92	6301142.16
L16	407.11	2185528.27	6301179.29	2185266.96	6300867.11
L17	48.79	2185559.92	6301142.16	2185528.27	6301179.29
L18	54.67	2185048.77	6300616.95	2185004.11	6300585.42
L19	62.61	2185045.93	6300634.97	2184988.40	6300610.26
L20	849.91	2184954.84	6300876.44	2184601.42	6301649.38
L21	850.07	2184941.21	6300870.18	2184587.73	6301643.26
L22	479.66	2184587.73	6301643.26	2184395.88	6302082.89
L23	479.53	2184409.63	6302088.89	2184601.42	6301649.38
L25	235.90	2184282.33	6302309.77	2184401.00	6302105.90
L27	108.95	2185225.24	6300854.66	2185155.31	6300771.11
L28	192.71	2185383.52	6301025.05	2185259.82	6300877.28
L29	1801.49	2185457.44	6301158.11	2184374.36	6302597.66
L30	759.19	2184963.69	6300581.40	2185457.44	6301158.11
L31	1385.96	2185382.75	6301091.04	2184549.50	6302198.55
L32	1422.60	2185425.43	6300907.35	2186291.21	6299778.55
L33	184.09	2186313.40	6299765.30	2186495.13	6299735.94
L34	71.47	2186584.34	6299746.55	2186643.62	6299786.47
L35	1091.86	2185311.46	6300774.98	2185986.64	6299916.91
L36	1094.08	2185202.73	6300649.32	2185879.28	6299789.50
L37	23.23	2185576.82	6301079.11	2185553.59	6301079.31
L38	102.68	2185510.36	6301048.21	2185570.74	6300965.16
L39	102.68	2185570.74	6300965.16	2185503.56	6300887.51
L40	102.68	2185503.56	6300887.51	2185443.18	6300970.56
L41	30.99	2185139.13	6300733.09	2185119.24	6300709.32
L42	13.43	2185382.83	6301070.97	2185374.76	6301081.70
L44	89.01	2185763.12	6300037.63	2185833.75	6300091.81
L45	94.64	2185843.27	6300099.11	2185918.36	6300156.70
L46	1169.13	2184907.26	6301044.97	2184427.33	6302111.04
L47	69.42	2184441.04	6302155.31	2184500.33	6302191.41

Curve Table						
Curve #	Length	Radius	START NORTHING	START EASTING	END NORTHING	END EASTING
C1	216.94	150.00	2186809.21	6299670.80	2186668.18	6299531.08
C4	167.60	150.00	2185938.93	6299459.49	2185796.31	6299529.82
C9	358.50	1460.54	2185298.48	6300303.25	2185076.91	6300583.93
C10	358.50	1460.54	2185298.48	6300303.25	2185076.91	6300583.93
C12	252.53	1358.00	2184395.88	6302082.89	2184268.36	6302300.44
C17	13.20	35.00	2185382.75	6301091.04	2185392.47	6301082.22

1 LINE AND CURVE TABLES
SCALE: N/A

ELEVATION DATUM (VERTICAL CONTROL):
NAVD 88
GEOID 12B

ELEVATION DATUM (HORIZONTAL CONTROL):
NAD 83 (2011)
CA SPCS ZONE 5
COMBINED FACTOR (CF): X.XXXXXXXXX

US Army Corps of Engineers®

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U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
SACRAMENTO, CALIFORNIA

IN-HOUSE DESIGN
1325 J STREET
SACRAMENTO, CA 95814

EXHIBIT A, LOWER SAN JOAQUIN RIVER PROJECT
LONGITUDINAL MITIGATION SITE
WRIGHT TRACT: SAN JOAQUIN COUNTY, CA

LAYOUT PLAN

SHEET ID
L-121

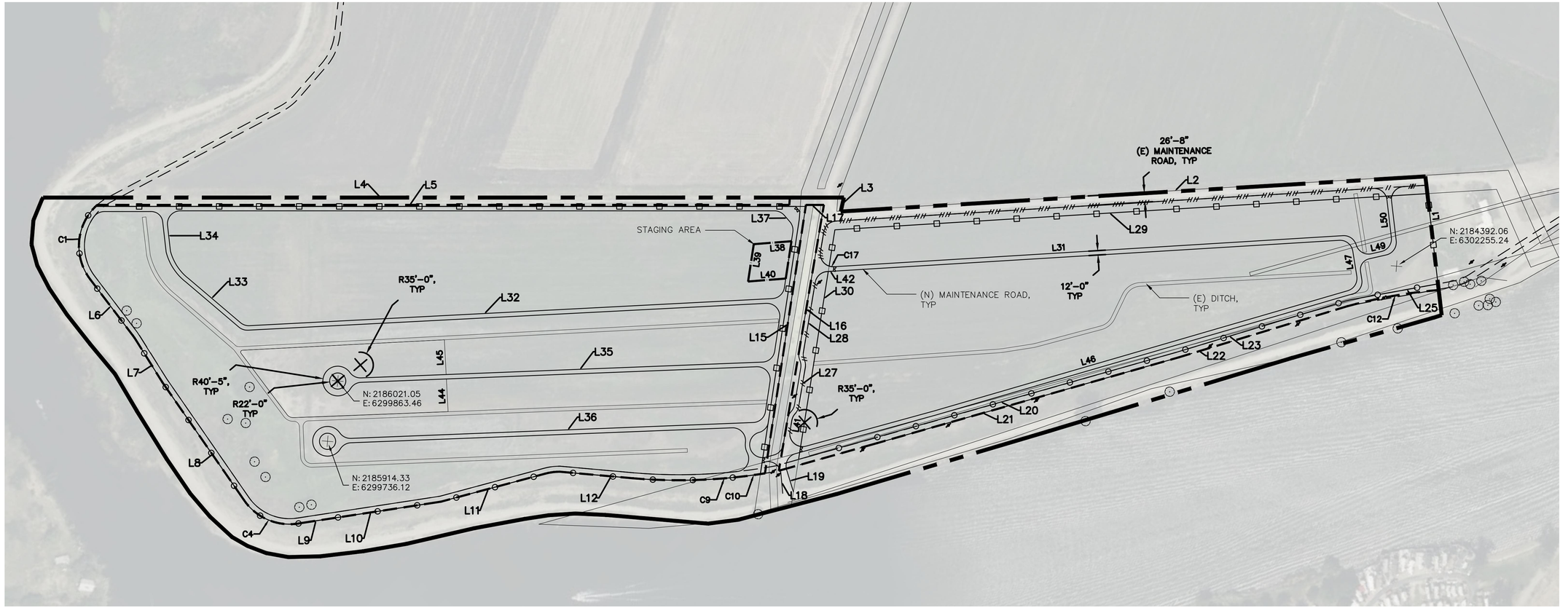
DRAFT 10% SUBMITTAL

LEGEND

- BEAVER FENCE
- DEER FRIENDLY FENCE
- TEMPORARY ROPE FENCE BARRIER

NOTES

1. FINAL LAYOUT TO BE FIELD APPROVED BY KO.
2. SEE SHEET G-001 FOR ADDITIONAL LAYOUT NOTES
3. FIELD ADJUST MAINTENANCE PATHS TO AVOID EXISTING FEATURES TO REMAIN
4. SEE L-121 FOR LINE AND CURVE TABLE



Feet

SCALE: 1" = 150'-0"

1 PLAN: LONGITUDINAL MITIGATION SITE

SCALE: 1" = 150'-0"

ELEVATION DATUM (VERTICAL CONTROL): NAVD 88
GEOID 12B

ELEVATION DATUM (HORIZONTAL CONTROL):
NAD 83 (2011)
CA SPCS ZONE 5,
COMBINED FACTOR (CF): X.XXXXXXXXX

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: B.J
DRAWN BY: B.J
CHECKED BY: T.S.
SUBMITTED BY: T.S.
SIZE: ANSI D

ISSUE DATE: XX/XX/2023
SOLICITATION NO.:
CONTRACT NO.:

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
SACRAMENTO, CALIFORNIA

IN-HOUSE DESIGN
1325 J STREET
SACRAMENTO, CA 95814

EXHIBIT A, LOWER SAN JOAQUIN RIVER PROJECT
LONGITUDINAL MITIGATION SITE
WRIGHT TRACT: SAN JOAQUIN COUNTY, CA

LAYOUT PLAN

SHEET ID
L-120

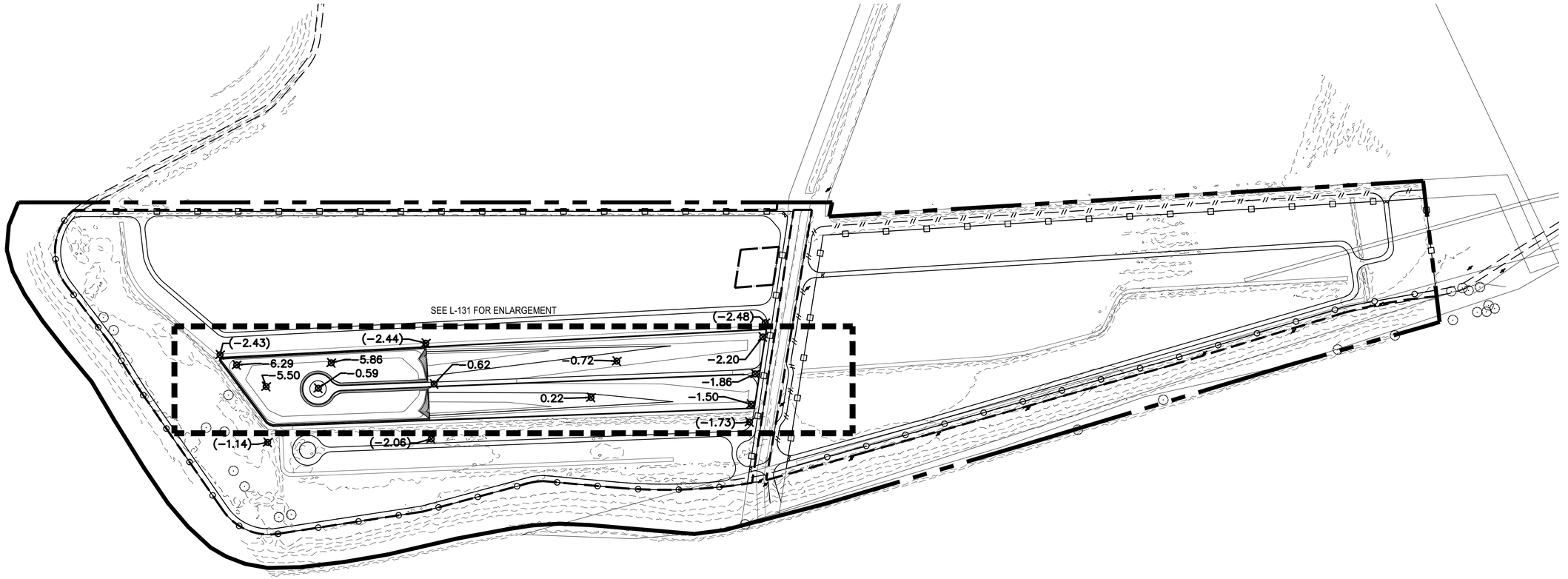
DRAFT 10% SUBMITTAL

LEGEND

+ (0.00)	EXISTING ELEVATION
+ 0.00	PROPOSED ELEVATION
69	PROPOSED CONTOUR
69	EXISTING CONTOUR
	FLUSH
FG	FINISH GRADE @ PLANTING
TS	TOP OF STEP
BC	BOTTOM OF STEP
TC	TOP OF CURB
BC	BOTTOM OF CURB
TW	TOP OF WALL
BW	BOTTOM OF WALL
LP	LOW POINT
	SLOPE
	GRADE BREAK

NOTE

1. ALL EARTHWORK ON SITE TO BE BALANCED, NO IMPORT OR OFF-HAUL REQUIRED.
2. SEE SHT. L-0.0 FOR ADDITIONAL GRADING NOTES.
3. CURRENT SURFACE IS USGS DEM FILE, SURVEY SURFACE EXPECTED SUMMER 2023.



Feet

SCALE: 1" = 150'-0"

1 PLAN: LONGITUDINAL MITIGATION SITE
SCALE: 1" = 150'-0"

ELEVATION DATUM (VERTICAL CONTROL): ELEVATION DATUM (HORIZONTAL CONTROL):
NAVD 88 NAD 83 (2011)
GEOID 12B CA SPCS ZONE 2
COMBINED FACTOR (CF): X.XXXXXXXXX

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U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
SACRAMENTO, CALIFORNIA

IN-HOUSE DESIGN
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SACRAMENTO, CA 95814

EXHIBIT A, LOWER SAN JOAQUIN RIVER PROJECT
LONGITUDINAL MITIGATION SITE
WRIGHT TRACT: SAN JOAQUIN COUNTY, CA

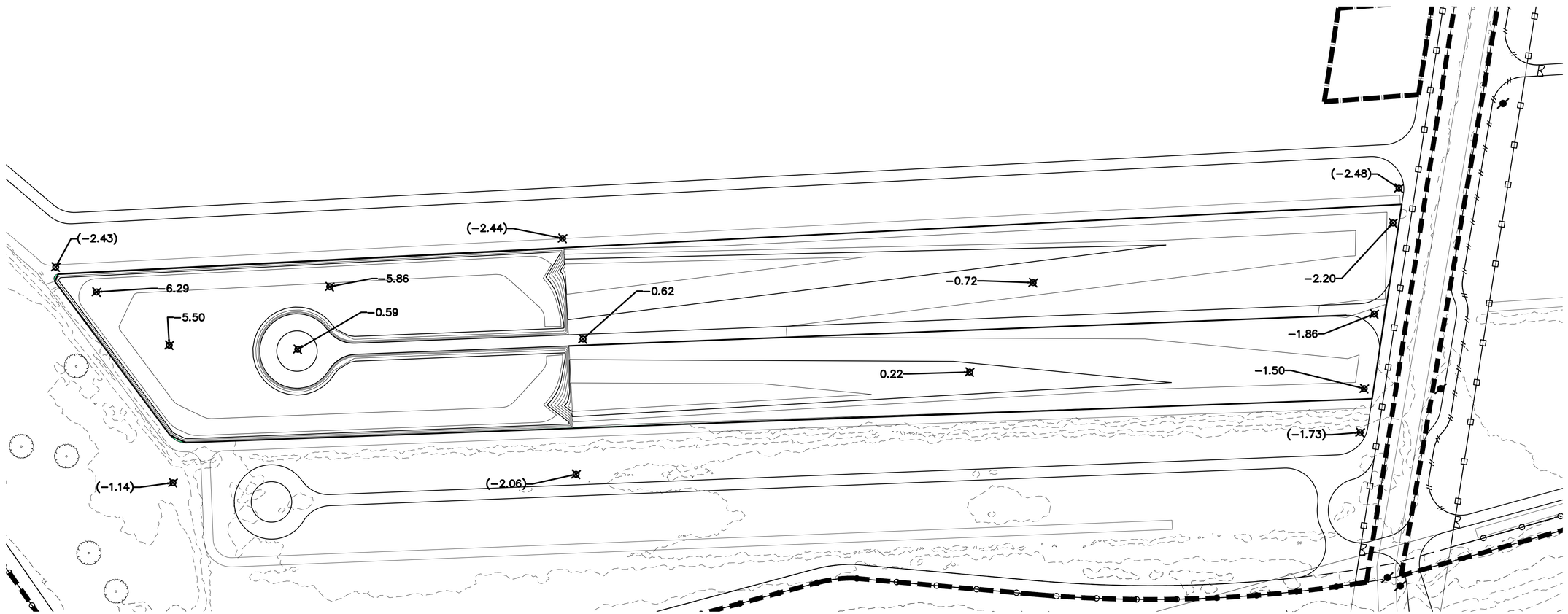
GRADING PLAN

SHEET ID
L-130

DRAFT 10% SUBMITTAL

NOTE

SEE L-131 FOR LEGEND AND NOTES



1 WETLAND ENLARGEMENT
SCALE: 1" = 150'-0"

SCALE: 1" = 60'-0"

ELEVATION DATUM (VERTICAL CONTROL): NAVD 88 GEOID 12B

ELEVATION DATUM (HORIZONTAL CONTROL): NAD 83 (2011) NAD83 ZONE 5 COMBINED FACTOR (CF): X.XXXXXXXXX

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SUBMITTED BY: J. J.
SIZE: ANSI D

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
SACRAMENTO, CALIFORNIA

IN-HOUSE DESIGN
1325 J STREET
SACRAMENTO, CA 95814

EXHIBIT A, LOWER SAN JOAQUIN RIVER PROJECT
LONGITUDINAL MITIGATION SITE
WRIGHT TRACT, SAN JOAQUIN COUNTY, CA

GRADING PLAN

SHEET ID
L-130

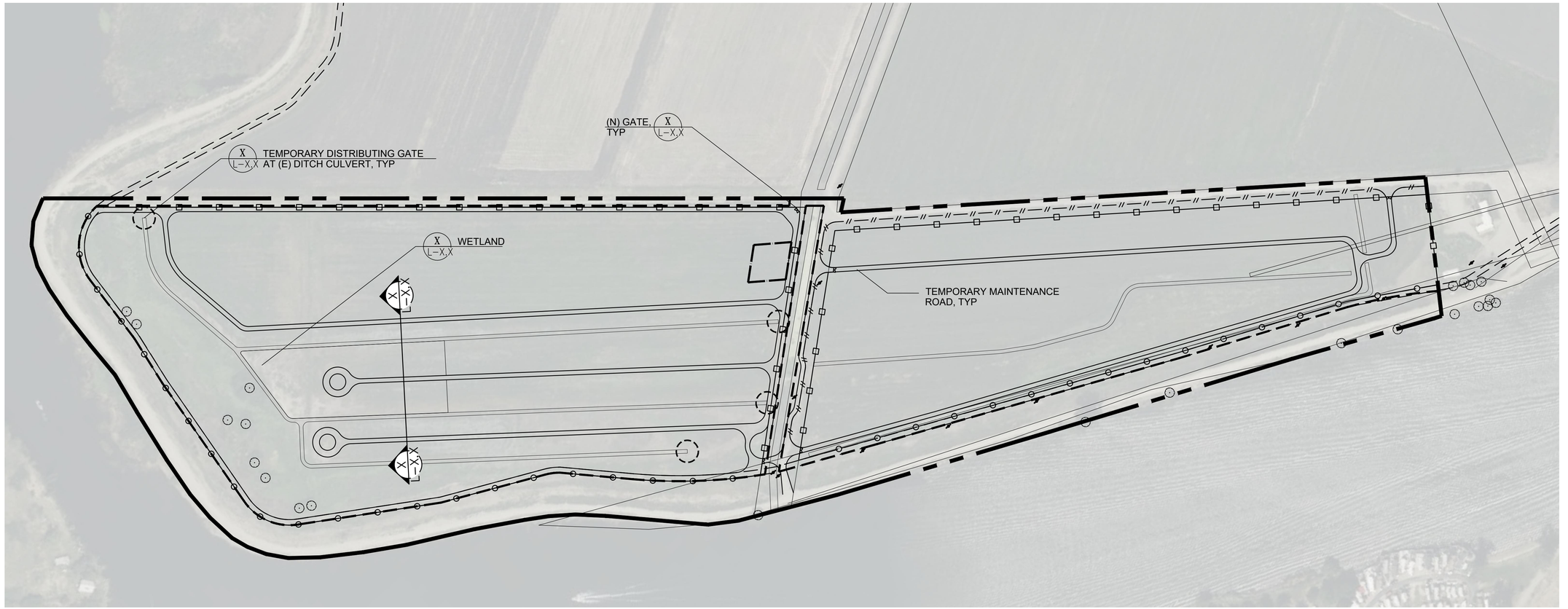
DRAFT 10% SUBMITTAL

NOTES

1. EXACT LOCATION OF ALL SITE FURNISHINGS AND EQUIPMENT TO BE FIELD APPROVED BY THE KO
2. CONTRACTOR TO REPLACE PERIMETER BEAVER FENCE WITH DEER FRIENDLY FENCE AT END OF PLANT ESTABLISHMENT PERIOD

LEGEND

- BEAVER FENCE — X / L–X.X
- DEER FRIENDLY FENCE — X / L–X.X
- TEMPORARY ROPE FENCE BARRIER — X / L–X.X



Feet

SCALE: 1" = 150'-0"

1 PLAN: LONGITUDINAL MITIGATION SITE
SCALE: 1" = 150'-0"

ELEVATION DATUM (VERTICAL CONTROL): NAVD 88 GEOID 12B
ELEVATION DATUM (HORIZONTAL CONTROL): NAD 83 (2011) CA SPCS ZONE 5 COMBINED FACTOR (CF): X.XXXXXXXXX

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SUBMITTED BY: R.
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U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
SACRAMENTO, CALIFORNIA

IN-HOUSE DESIGN
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SACRAMENTO, CA 95814

EXHIBIT A: LOWER SAN JOAQUIN RIVIER PROJECT
LONGITUDINAL MITIGATION SITE
WRIGHT TRACT: SAN JOAQUIN COUNTY, CA

DETAIL REFERENCE PLAN

SHEET ID
L-140

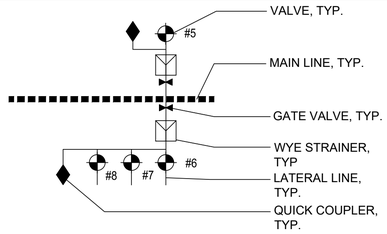
DRAFT 10% SUBMITTAL

LATERAL PIPING SIZE SCHEDULE

GPM	PIPE SIZE (NOMINAL SCH 40 PVC)
8 OR LESS	3/4" Ø
13	1" Ø
23	1 1/4" Ø
32	1 1/2" Ø
53	2" Ø
74	2 1/2" Ø
116 OR MORE	3" Ø

NOTE:
IRRIGATION PIPING DOWNSTREAM OF THE REMOTE CONTROL UNIT SHALL BE SIZED PER THE CHART ABOVE AND NOT INDICATED ON THE PLAN DRAWINGS. REFER TO THE IRRIGATION LEGEND FOR SPRINKLER FLOW RATES (GPM). NO PIPING DOWNSTREAM OF THE REMOTE CONTROL VALVE TO THE SPRINKLER SHALL BE SIZED SMALLER THAN THE SPRINKLER THREADED INLET SIZE.

TYPICAL VALVE DIAGRAM



LATERAL REMOTE CONTROL VALVE SIZING

GPM (MAX)	RCV SIZE
25	1"
60	1 1/2"
90	2"
175	3"

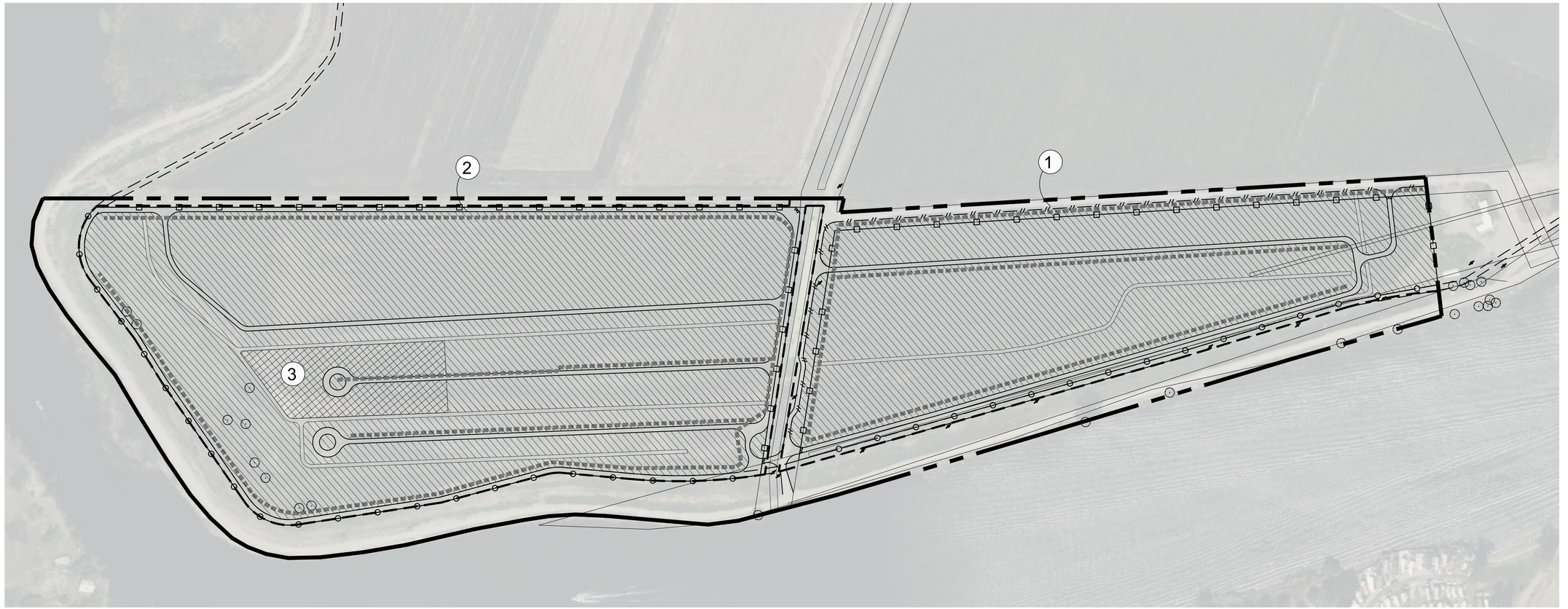
NOTE:
THE LATERAL RCV SIZES ARE BASED ON THE CHART BELOW FOR APPROX LOSS OF 3.5 PSI THROUGH THE REMOTE CONTROL VALVE (GLOBE PATTERN)

LEGEND

- MAINLINE
- WETLAND IRRIGATION
- RIPARIAN IRRIGATION
- (X) FIELD NUMBER

NOTE

1. IRRIGATION SYSTEM SHALL MEET THE PERFORMANCE SPECIFICATIONS REQUIRED, REFER TO PERFORMANCE WORK STATEMENT.
2. AREA WITH PLANTINGS REQUIRING IRRIGATION ARE SHOWN HATCHED.
3. UTILITY INFORMATION PROVIDED IS MEANT AS A GUIDE AND NOT MEANT TO BE A SUBSTITUTE FOR ACCURATE UTILITY LOCATION DATA. CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGE TO EXISTING INFRASTRUCTURE AS A RESULT OF WORK DONE DURING THE LENGTH OF THE CONTRACT.
4. CONTRACTOR TO PROVIDE TEMPORARY POWER SOURCE FOR THE IRRIGATION SYSTEM.
5. SEE PWS FOR FURTHER INFORMATION CONCERNING THE IRRIGATION SYSTEM. THIS INFORMATION IS PROVIDED FOR THE CONVENIENCE OF THE CONTRACTOR. CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL INFORMATION CONCERNING EXISTING IRRIGATION AND UTILITIES.
6. NEW IRRIGATION SYSTEM SHOWN ON PLANS IS DIAGRAMMATIC AND DOES NOT SHOW EXACT LOCATIONS OF NEW FACILITIES. EXCLUDING THE POC, SUPPLY. INSTALL SYSTEM COMPONENTS (MAIN LINES, VALVES, ETC) PARALLEL TO AND AS CLOSELY AS POSSIBLE TO CURBS, HEADERS, OR PAVING EDGES WITHIN PLANTED AREAS, UON.
7. PROVIDE IRRIGATION CROSSOVERS FOR ALL WORK THAT GOES BENEATH OR THROUGH ANY BUILT FEATURES OR PATHS OF TRAVEL (ROADS, SIDEWALKS, WALLS, DITCHES, GUTTERS, AND OTHER BARRIERS), U.O.N. CROSSOVERS TO BE 8" (MIN.) HDPE, BURIED 40-50" BELOW FG/EG, TO INCLUDE MAIN LINE STUB UPS IN #5 PULL BOXES AT BOTH ENDS OF THE CROSSOVER, TO BE ANCHORED TO REINFORCED CONCRETE THRUST BLOCKS (MIN 2 CF) AT TURNS, AND EXTEND A MIN. OF 24" INTO PLANTING AREAS.



Feet

SCALE: 1" = 150'-0"

1 PLAN: LONGITUDINAL MITIGATION SITE
SCALE: 1" = 150'-0"

ELEVATION DATUM (VERTICAL CONTROL): NAVD 88
GEOID 12B

ELEVATION DATUM (HORIZONTAL CONTROL):
NAD 83 (2011)
CA SPCS ZONE 5,
COMBINED FACTOR (CF): X.XXXXXXXXX

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

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SUBMITTED BY: T.S.
SIZE: ANSI D

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
SACRAMENTO, CALIFORNIA

IN-HOUSE DESIGN
1325 J STREET
SACRAMENTO, CA 95814

EXHIBIT A, LOWER SAN JOAQUIN RIVER PROJECT
LONGITUDINAL MITIGATION SITE
WRIGHT TRACT, SAN JOAQUIN COUNTY, CA

IRRIGATION PLAN

SHEET ID
L-150

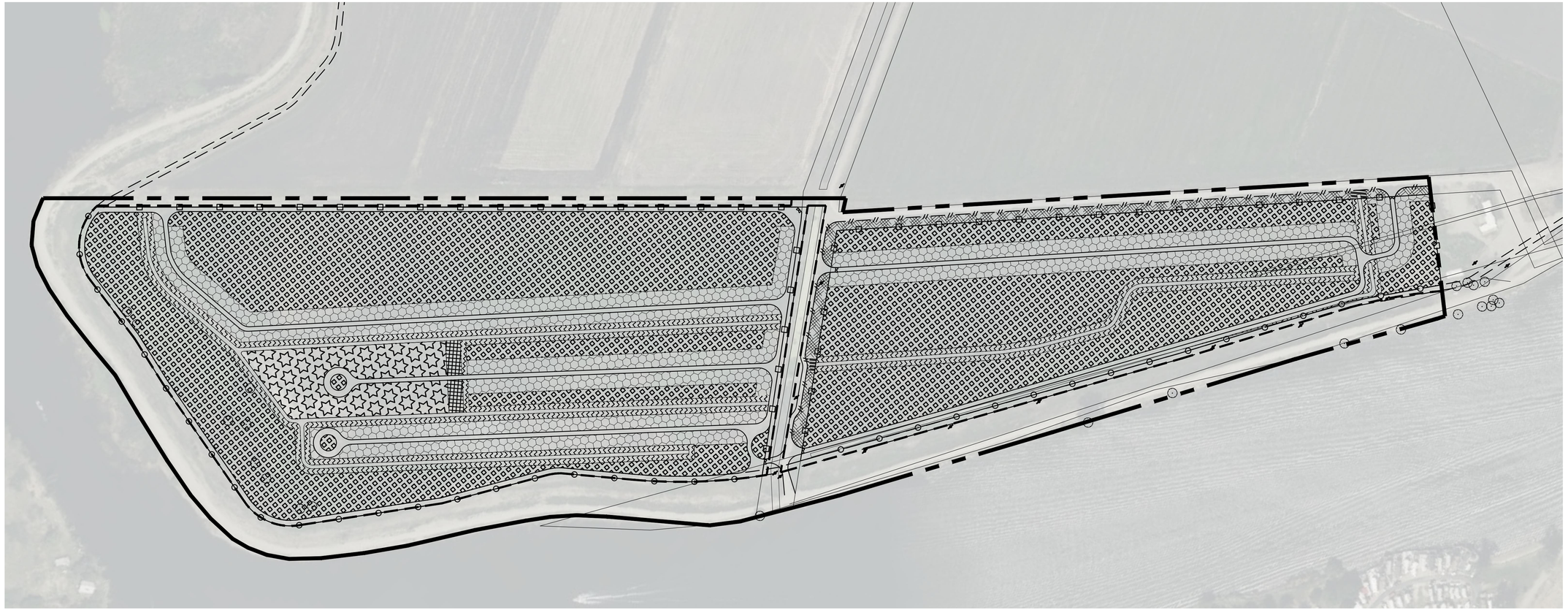
DRAFT 10% SUBMITTAL

LEGEND

- RIPARIAN INTERIOR
- RIPARIAN PERIMITER
- RIPARIAN DITCH PERIMETER
- WETLAND EDGE
- RIPARIAN SCRUB EASEMENT
- RIPARIAN SCRUB, DITCH EDGE
- WETLAND

NOTES

1. SEE L-152 FOR PLANTING SCHEDULE
2. EXACT LOCATION OF PLANTS TO BE FIELD APPROVED BY THE KO.
3. PLANT GROUP BOUNDARIES TO BE MARKED AND STAKED BY CONTRACTOR, IN COORDINATION WITH AND APPROVED BY THE KO.
4. SET BACK CENTER OF PLANTS A MIN OF 2'-0" MIN WHERE ADJACENT TO UNPLANTED AREAS, U.O.N.
5. LAYOUT PLANT SPECIES IN GROUPS OF 3 MIN, 9 MAX. ALTERNATE SPECIES GROUPINGS IN LONGITUDINAL AND LATITUDINAL DIRECTIONS. AT GROUPINGS LARGER THAN 3, GROUP IN FACTORS OF 3.



Feet

SCALE: 1" = 150'-0"

1 PLAN: LONGITUDINAL MITIGATION SITE
SCALE: 1" = 150'-0"

ELEVATION DATUM (VERTICAL CONTROL): NAVD 88
GEOID 12B

ELEVATION DATUM (HORIZONTAL CONTROL):
NAD 83 (2011)
CA SPCS ZONE 5,
COMBINED FACTOR (CF): X.XXXXXXXXX

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SIZE: ANSI D

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
SACRAMENTO, CALIFORNIA

IN-HOUSE DESIGN
1325 J STREET
SACRAMENTO, CA 95814

EXHIBIT A, LOWER SAN JOAQUIN RIVER PROJECT
LONGITUDINAL MITIGATION SITE
WRIGHT TRACT, SAN JOAQUIN COUNTY, CA

PLANTING PLAN

SHEET ID
L-160

DRAFT 10% SUBMITTAL

				Zone Name	Quantity	Zone Name	Quantity	Zone Name	Quantity	Zone Name	Quantity	Zone Name	Quantity	
	Scientific Name	**Common Name**	**Size/Type**	Riparian Interior		Riparian Perimeter		Riparian Ditch Perimeter		Riparian Scrub (Easement)		Riparian Scrub, Ditch Edge (Easement)		**TOTALS**
Canopy			Acreage	27.170		9.620		4.075		1.186		0.032		42.084
			spacing, feet OC (15'-0" rows)	15		15		5		15		15		
			density, plants/acre	250		250		250		250		250		
	Acer negundo	Box elder	Treepot 4	9%	612	2%	48		-		-		-	660
	Alnus rhombifolia	White alder	Treepot 4	3%	204	2%	48		-		-		-	252
	Cercis occidentalis	Western Redbud	Treepot 4	3%	204	7%	168		-		-		-	372
	Fraxinus latifolia	Oregon ash	Treepot 4	9%	612	8%	192		-		-		-	804
	Juglans californica	S. California Black Walnut	Treepot 4	3%	204	7%	168		-		-		-	372
	Juglans hindsii	N. California Black Walnut	Treepot 4	3%	204	2%	48		-		-		-	252
	Platanus racemosa	Sycamore	Treepot 4	5%	339	8%	192		-		-		-	531
	Populus fremontii	Cottonwood	Treepot 4	5%	339	2%	48		-		-		-	387
	Quercus lobata	Valley oak	Treepot 4	5%	339	2%	48		-		-		-	387
	Salix exigua	Sandbar willow	Treepot 4		-		-	10%	102		-		-	102
	Salix gooddingii	Goodding's willow	Treepot 4	5%	339	10%	240	10%	102		-		-	681
	Salix laevigata	Red willow	Treepot 4		-		-	10%	102		-		-	102
	Salix lasiolepis	Arroyo willow	Treepot 4		-		-	10%	102		-		-	102
	Salix lucida	Shining willow	Treepot 4		-		-	10%	102		-		-	102
			totals	50%		50%		50%		0%		0%		5,106
			spacing, feet OC (15'-0" rows)	6		6		5		6		6		
			density, plants/acre	490		490		490		490		490		
Midstory	*Atriplex lentiformis*	Big Saltbush	Deepot 40	6%	798	6%	282		-	6%	36		-	1,116
	Baccharis pilularis	Coyote brush	Deepot 40	6%	798	6%	282		-	6%	36		-	1,116
	Baccharis salicifolia	Mule fat	Deepot 40	6%	798	6%	282	10%	201	6%	36	10%	3	1,320
	Cephalanthus occidentalis	Buttonbush	Deepot 40	6%	798	6%	282	10%	201	6%	36	10%	3	1,320
	Frangula californica	Coffeeberry	Deepot 40	6%	798	6%	282		-	6%	36		-	1,116
	Rosa californica	Rose	Deepot 40	5%	666	5%	237		-	5%	30		-	933
	Rubus ursinus	Blackberry	Deepot 40	8%	1,065	8%	378	10%	201	8%	45	10%	3	1,692
	Sambucus mexicana	Elderberry	Deepot 40	10%	1,332	10%	471		-	10%	57		-	1,860
	Toxicondendron diversilobum	Poison oak	Deepot 40	2%	267	2%	93		-	2%	12		-	372
Understory	*Artemesia douglassiana*	Mugwort	Deepot 40	10%	1,332	10%	471	24%	480	10%	57	24%	3	2,343
	Carex barbarae	Santa Barbara sedge	Deepot 40	5%	666	5%	237	20%	399	5%	30	20%	3	1,335
	Diplacus aurantiacus	Sticky Monkeyflower	Deepot 40	2%	267	2%	93	10%	201	2%	12	10%	3	576
	Epilobium canum	California Fuchsia	Deepot 40	3%	399	3%	141		-	3%	18		-	558
	Epilobium ciliatum	Northern Willow Herb	Deepot 40	2%	267	2%	93	10%	201	2%	12	10%	3	576
	Euthamia occidentalis	Western Goldenrod	Deepot 40	5%	666	5%	237		-	5%	30		-	933
	Helenium puberulum	Sneezeweed	Deepot 40	2%	267	2%	93		-	2%	12		-	372
	Helianthus californicus	California Sunflower	Deepot 40	2%	267	2%	93		-	2%	12		-	372
	Oenothera hookerii	Evening primrose	Deepot 40	5%	666	5%	237		-	5%	30		-	933
Vines	*Clematis lingustifolia*	Clematis	Deepot 40	3%	399	3%	141	2%	39	3%	18	2%	-	597
	Lonicera hispidula	California Honeysuckle	Deepot 40	3%	399	3%	141	2%	39	3%	18	2%	-	597
	Vitis californica	Grape	Deepot 40	3%	399	3%	141	2%	39	3%	18	2%	-	597
			totals	100%		100%		100%		100%		100%		20,634
														25,740

1 RIPARIAN PLANTING SCHEDULE
SCALE: N/A

ELEVATION DATUM (VERTICAL CONTROL): NAVD 88 GEOID 12B

ELEVATION DATUM (HORIZONTAL CONTROL): NAD 83 (2007) CA SPCS ZONE 2 COMBINED FACTOR (CF): X.XXXXXXXXX

US Army Corps of Engineers®

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SACRAMENTO DISTRICT
SACRAMENTO, CALIFORNIA

IN-HOUSE DESIGN
1325 J STREET
SACRAMENTO, CA 95814

EXHIBIT A, LOWER SAN JOAQUIN RIVER PROJECT
LONGITUDINAL MITIGATION SITE
WRIGHT TRACT: SAN JOAQUIN COUNTY, CA

PLANTING PLAN

SHEET ID
L-160

DRAFT 10% SUBMITTAL

Scientific Name	Common Name	Size/Type	Zone Name	Quantity	Zone Name	Quantity	TOTALS
			Wetland		Wetland Edge		
		Acreage	1.995		0.168		2.163
		spacing, feet OC (6'-0" rows)	6		6		
		density, plants/acre	1210		1210		
Carex aquatilis	Water sedge	Treeband	5%	120		-	120
Baccharis glutinosa	Salt Marsh Baccharis	Deepot 40		-	15%	30	30
Baccharis salicifolia	Mulefat	Deepot 40		-	15%	30	30
Bolboschoenus maritimus	Alkali Bulrush	Treeband	5%	120		-	120
Bolboschoenus robustus	Sturdy bullrush	Treeband	5%	120		-	120
Cyperus eragrostis	Umbrella Sedge	Treeband		-	15%	30	30
Eleocharis macrostachya	Common Spikerush	Treeband	5%	120		-	120
Hydrocotyle umbellata	Marsh pennywort	Treeband	5%	120		-	120
Hydrocotyle verticillata	Whorled marsh pennywort	Treeband	5%	120		-	120
Juncus acuminatus	Sharp-fruited Rush	Treeband	10%	240	5%	9	249
Juncus effusus	Soft rush	Treeband	10%	240	5%	9	249
Juncus balticus	Baltic Rush	Treeband	10%	240	5%	9	249
Juncus patens	Gray Rush	Treeband	10%	240	5%	9	249
Juncus xiphioides	Iris Leaf Rush	Treeband	7%	168		-	168
Sagittaria montevidensis ssp. Calycina	Montevideo arrowhead	Treeband	2%	48		-	48
Sagittaria latifolia	Wappato	Treeband	2%	48		-	48
Sagittaria montevidensis	Montevideo arrowhead	Treeband	2%	48		-	48
Sagittaria sanfordii	Valley arrowhead	Treeband	2%	48		-	48
Schoenoplectus acutus	Hardstem bulrush	Treeband	3%	72		-	72
Schoenoplectus americanus	Chairmaker's Bulrush	Treeband	3%	72		-	72
Schoenoplectus californicus	California bulrush	Treeband	3%	72		-	72
Sparganium erectum	Simplestem bur reed	Treeband	3%	72		-	72
Sparganium eurycarpum	Broadfruit bur reed	Treeband	3%	72		-	72
		totals	100%		65%		2,526
							2,526

1 WETLAND PLANTING SCHEDULE
SCALE: N/A

ELEVATION DATUM (VERTICAL CONTROL): NAVD 88 GEOID 12B

ELEVATION DATUM (HORIZONTAL CONTROL): NAD 83 (2007) CA SPCS ZONE 2 COMBINED FACTOR (CF): X.XXXXXXXXX

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SACRAMENTO DISTRICT
SACRAMENTO, CALIFORNIA

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SACRAMENTO, CA 95814

EXHIBIT A, LOWER SAN JOAQUIN RIVER PROJECT
LONGITUDINAL MITIGATION SITE
WRIGHT TRACT, SAN JOAQUIN COUNTY, CA

PLANTING PLAN

SHEET ID
L-160

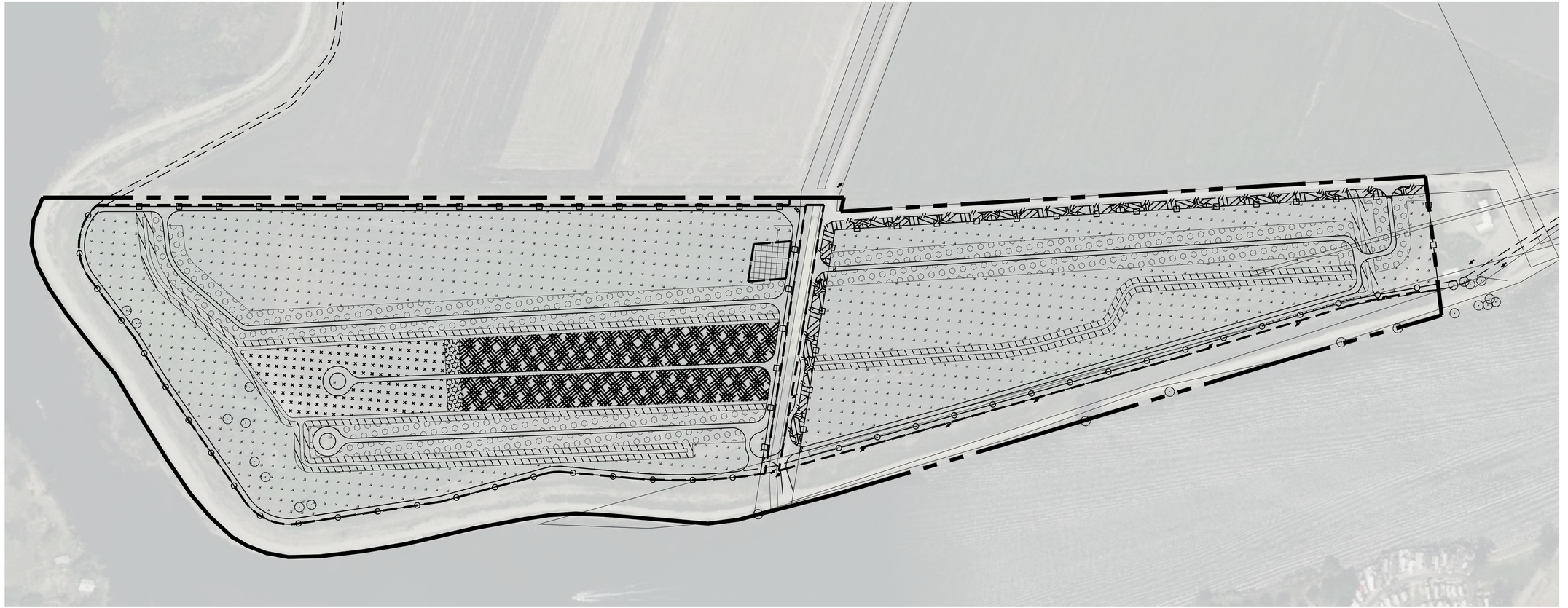
DRAFT 10% SUBMITTAL

LEGEND

- EROSION CONTROL TYPE (2) SEED MIX 5
- EROSION CONTROL TYPE (4) SEED MIX 3
- EROSION CONTROL TYPE (4) SEED MIX 2
- EROSION CONTROL TYPE (4) SEED MIX 3
- EROSION CONTROL TYPE (3) SEED MIX 1
- EROSION CONTROL TYPE (3) SEED MIX 3
- EROSION CONTROL TYPE (2) SEED MIX 4
- EROSION CONTROL TYPE (1) SEED MIX 2
- EROSION CONTROL TYPE (2) SEED MIX 5

NOTES

SEE L-171 FOR EROSION CONTROL LEGEND AND NOTES



Feet

SCALE: 1" = 150'-0"

1 PLAN: LONGITUDINAL MITIGATION SITE

SCALE: 1" = 150'-0"

ELEVATION DATUM (VERTICAL CONTROL): NAVD 88
GEOID 12B

ELEVATION DATUM (HORIZONTAL CONTROL):
NAD 83 (2011)
CA SPCS ZONE 5,
COMBINED FACTOR (CF): X.XXXXXXXXX

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

ISSUE DATE: XX/XX/2023
SOLICITATION NO.:
CONTRACT NO.:

DESIGNED BY: B.J
DRAWN BY: B.J
CHECKED BY: T.S.
SUBMITTED BY:
SIZE: ANSI D

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
SACRAMENTO, CALIFORNIA

IN-HOUSE DESIGN
1325 J STREET
SACRAMENTO, CA 95814

EXHIBIT A, LOWER SAN JOAQUIN RIVER PROJECT
LONGITUDINAL MITIGATION SITE
WRIGHT TRACT, SAN JOAQUIN COUNTY, CA

EROSION CONTROL PLAN

SHEET ID

L-170

DRAFT 10% SUBMITTAL

EROSION CONTROL TYPE (1)

ITEM	MATERIAL	MATERIAL TYPE	APPLICATION RATE	DEPTH	REMARKS
DRILL SEED	SEED	SEE LEGEND	SEE SEED TABLE		
HYDROMULCH	FIBER	ALTERNATE	2000 LB/ACRE	-	
	TACKIFIER	PSYLLIUM	200 LB/ACRE	-	
COMPOST SOCK	COTTON, JUTE, BURLAP, OR COIR	8" TO 10" DIA			SEE NOTES

EROSION CONTROL TYPE (2)

ITEM	MATERIAL	MATERIAL TYPE	APPLICATION RATE	DEPTH	REMARKS
DECOMPACT	EXISTING GRADE	DECOMPACT		6"-8"	
ROUGHENING	TRACK-WALK				
DRILL SEED	SEED	SEED MIX 6	SEE SEED TABLE		
HYDROMULCH	FIBER	ALTERNATE	2000 LB/ACRE	-	
	TACKIFIER	PSYLLIUM	200 LB/ACRE	-	

EROSION CONTROL TYPE (3)

ITEM	MATERIAL	MATERIAL TYPE	APPLICATION RATE	DEPTH	REMARKS
DECOMPACT	EXISTING GRADE	DECOMPACT		6"-8"	
ROUGHENING	TRACK-WALK				
DRILL SEED	SEED	SEED MIX 2	SEE SEED TABLE		
HYDROMULCH	FIBER	ALTERNATE	2000 LB/ACRE	-	
	TACKIFIER	PSYLLIUM	200 LB/ACRE	-	
COMPOST SOCK	COTTON, JUTE, BURLAP, OR COIR	8" TO 10" DIA			SEE NOTES

EROSION CONTROL TYPE (4)

ITEM	MATERIAL	MATERIAL TYPE	APPLICATION RATE	DEPTH	REMARKS
DRILL SEED	SEED	SEED MIX 2	SEE SEED TABLE		

SEED MIX TYPE (1): RIPARIAN, DITCH PERIMETER

SCIENTIFIC NAME	COMMON NAME	PERCENT GERMINATION (MINIMUM)	POUNDS PURE LIVE SEED PER ACRE (SLOPE MEASUREMENT)
Achillea millefolium	Western Yarrow	56%	0.1
Artemesia douglasiana	Mugwort	33%	0.0
Carex praegracilis	California Field Sedge	86%	0.3
Elymus glaucus	Blue Wild Rye	50%	3.1
Elymus triticoides	Creeping Wildrye	43%	2.8
Epilobium ciliatum	Northern Willow Herb	39%	0.02
Euthamia occidentalis	Western Goldentop - Goldenrod	37%	0.2
Festuca microstachys	Small Fescue	53%	2.0
Grindelia camporum	Gum Plant	46%	0.9
Hordeum brachyantherum	Meadow Barley	60%	4.4
Trifolium wormskioldii	Cows Clover	88%	0.4

SEED MIX TYPE (2): RIPARIAN, INTERIOR

SCIENTIFIC NAME	COMMON NAME	PERCENT GERMINATION (MINIMUM)	POUNDS PURE LIVE SEED PER ACRE (SLOPE MEASUREMENT)
Artemesia douglasiana	Mugwort	33%	0.2
Carex barbarae	Valley Sedge	33%	0.6
Elymus glaucus	Blue Wild Rye	50%	3.1
Elymus triticoides	Creeping Wildrye	43%	2.8
Festuca microstachys	Small Fescue	53%	2.9
Lupinus albifrons	Silver Lupine	XX%	2.4
Lupinus arboreus	Bush Lupine	53%	2.8
Trifolium wormskioldii	Cows Clover	88%	1.3

SEED MIX TYPE (3): RIPARIAN, PERIMETER

SCIENTIFIC NAME	COMMON NAME	PERCENT GERMINATION (MINIMUM)	POUNDS PURE LIVE SEED PER ACRE (SLOPE MEASUREMENT)
Achillea millefolium	Western Yarrow	56%	0.1
Asclepias fascicularis	Narrow Leaf Milkweed	50%	2.3
Asclepias speciosa	Showy Milkweed	50%	2.2
Clarkia purpurea	Purple Clarkia	60%	0.1
Clarkia unguiculata	Elegant Clarkia	40%	0.1
Elymus glaucus	Blue Wild Rye	50%	3.1
Festuca microstachys	Small Fescue	53%	4.1
Lupinus bicolor	Miniature Lupine	56%	1.5
Lupinus formosus	Summer Lupine	51%	3.1
Trifolium wormskioldii	Cows Clover	88%	0.9

SEED MIX TYPE (4): WETLAND

SCIENTIFIC NAME	COMMON NAME	PERCENT GERMINATION (MINIMUM)	POUNDS PURE LIVE SEED PER ACRE (SLOPE MEASUREMENT)
Bolboschoenus maritimus	Alkali Bulrush	70%	2.7
Bolboschoenus robustus	Sturdy bullrush	95%	3.0
Eleocharis macrostachya	Common Spikerush	46%	0.4
Juncus balticus	Artic Rush	40%	0.03
Juncus effusus	Soft Rush	40%	0.02
Juncus patens	Gray Rush	XX%	0.02
Juncus xiphioides	Iris Leaf Rush	40%	0.03
Schoenoplectus acutus	Hardstem bulrush	40%	0.9
Schoenoplectus americanus	Chairmaker's Bulrush	40%	1.2
Schoenoplectus californicus	California bulrush	30%	0.8

SEED MIX TYPE (5): WETLAND EDGE

SCIENTIFIC NAME	COMMON NAME	PERCENT GERMINATION (MINIMUM)	POUNDS PURE LIVE SEED PER ACRE (SLOPE MEASUREMENT)
Carex praegracilis	California Field Sedge	86%	0.3
Erythranthe guttata	Seep Monkey Flower	90%	0.01
Heliotropium curassavicum	Wild Heliotrope	40%	0.5
Lasthenia fremontii	Fremont's goldfields	91%	0.2
Sisyrinchium bellum	Blue-Eyed Grass	50%	1.5
Grindelia camporum	Gum Plant	46%	0.9
Festuca microstachys	Small Fescue	53%	2.0

NOTES

1. FINAL LAYOUT TO BE FIELD APPROVED BY KO.
3. DECOMPACTION OF SOIL SURFACES INVOLVES LOOSENING COMPACTED SOILS BY PULLING SUBSOILING EQUIPMENT IN SUCCESSIVE PASSES IN APPROXIMATELY PERPENDICULAR DIRECTIONS. DECOMPACT TO THE DEPTH AND LOCATIONS INDICATED ON DRAWINGS.
4. DO NOT DECOMPACT SLOPES GREATER THAN 3:1 (HORIZONTAL:VERTICAL). FOR SLOPES GREATER THAN 3:1, SCARIFY TO A DEPTH OF 2", U.O.N
5. INSTALL FIBER ROLLS AT: NEW MAINTENANCE ROADS, THE SITE PERIMETER, THE TOP OF SLOPES, THE TOE OF SLOPES (EXCLUDING DITCHES AND WETLANDS), GRADE BREAKS, THE BORDERS OF PLANTED AREAS, AND AT ALL DISTURBED SOIL AREAS (PER DIRECTION OF THE KO). FOR FIBER ROLLS TO BE PLACED PARALLEL WITH CONTOURS, INSTALL AT EQUAL INTERVALS FOR THE FOLLOWING SLOPE CONDITIONS:
   (A) 10 FEET APART FOR SLOPES GREATER THAN 2:1 (HORIZONTAL:VERTICAL)
   (B) 15 FEET APART FOR SLOPES GRATER THAN 2:1 TO 4:1 (HORIZONTAL:VERTICAL)
   (C) 20 FEET APART FOR SLOPES GREATER THAN 4:1 TO 10:1 (HORIZONTAL:VERTICAL)
   (D) 50 FEET APART FOR SLOPES FLATTER THAN 10:1 (HORIZONTAL:VERTICAL)

ELEVATION DATUM (VERTICAL CONTROL): NAVD 88
GEOID 12B

ELEVATION DATUM (HORIZONTAL CONTROL): NAD 83
NAVD83 2011
CA ZONE 5
COMBINED FACTOR (CF): X.XXXXXXXXX

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SACRAMENTO DISTRICT
SACRAMENTO, CALIFORNIA

IN-HOUSE DESIGN
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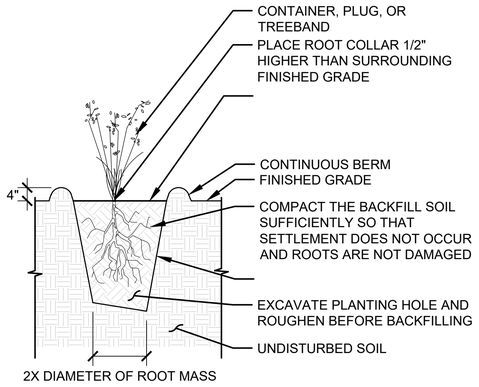
SACRAMENTO, CA 95814

EXHIBIT A, LOWER SAN JOAQUIN RIVIER PROJECT
LONGITUDINAL MITIGATION SITE
WRIGHT TRACT- SAN JOAQUIN COUNTY, CA

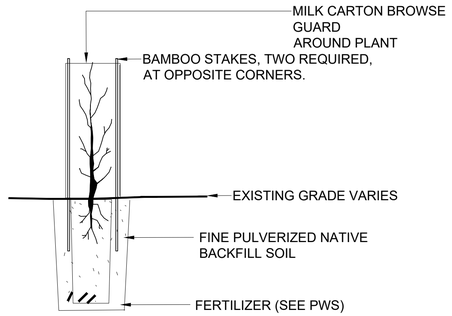
EROSION CONTROL LEGEND

SHEET ID
L-171

DRAFT 10% SUBMITTAL



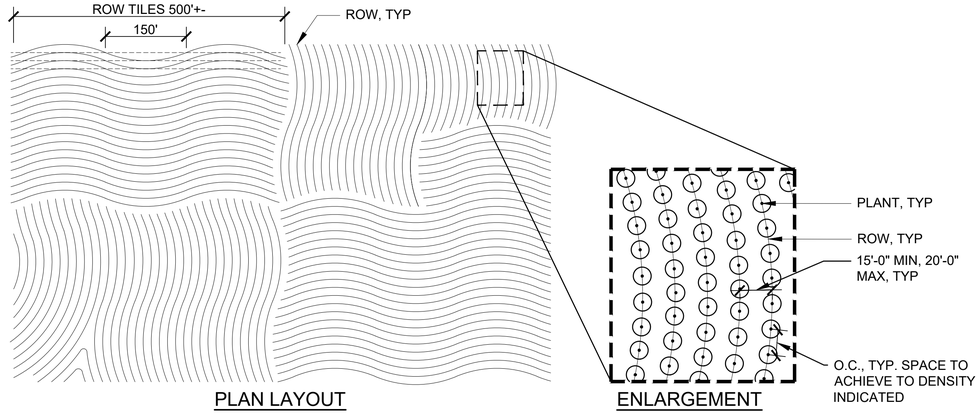
1E CONTAINER PLANTING
SCALE: NTS



NOTES:

1. SET PLANTS ROOT CROWN 1/4" ABOVE EXISTING GRADE.
2. PLANTING STOCK, TREEBAND AND DEEPOT 40
3. PLANTING PIT A MINIMUM OF TWO TIMES DIAMETER OF ROOTBALL. SCARIFY EDGES AND BOTTOM.

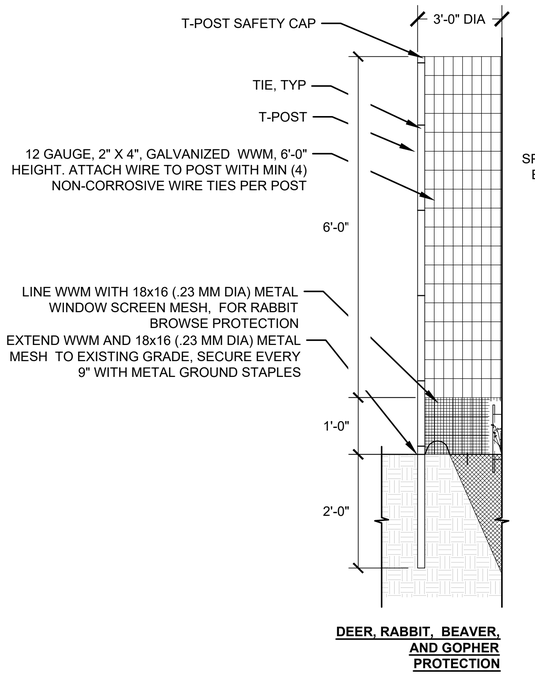
8E MILK CARTON BROWSE GUARD
SCALE: NTS

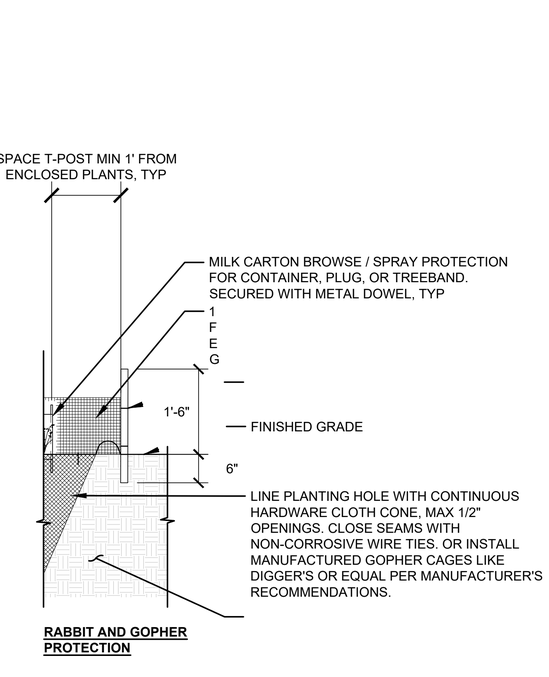


NOTES:

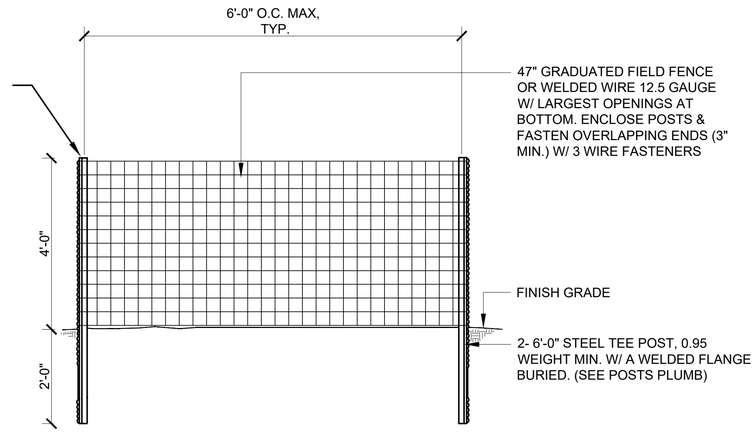
1. LAYOUT THE PLANTS IN CURVILINEAR ROWS. THE CURVES MUST BE SUFFICIENT SO THAT THE LINE OF SIGHT IS BLOCKED AT 150 FEET.
2. IN LARGE UNINTERRUPTED EXPANSES, ROTATE ROW TILES SO THAT THE ROWS DON'T EXTEND BEYOND 500 FEET IN LENGTH.
3. COORDINATE ROW LAYOUT WITH IRRIGATION SYSTEM.
4. EDGE OF PLANT PITS TO BE 24" MIN FROM EDGE OF SITE BOUNDARIES AND MAINTENANCE ROADS. KEEP TREE AND ELDERBERRY PLANT SPECIES A MINIMUM OF 20 FEET AWAY FROM BOUNDARY LINES AND MAINTENANCE ROADS.
5. SEE PLANT SCHEDULE FOR ROW SPACING. PLANTS MUST BE SPACED IN EACH ROW AT A DENSITY TO ACCOMMODATE PLANTS PER ACRE AS INDICATED IN THE SCOPE.
6. FLAG AND LAYOUT PLANT SPECIES IN THE FIELD PRIOR TO INSTILLATION. EXACT LOCATION OF PLANTS TO BE FIELD APPROVED BY KO PRIOR TO INSTILLATION.

1 PLANT LAYOUT - CURVILINEAR ROWS
SCALE: NTS





1A BROWSE GUARD
SCALE: NTS



7A BEAVER FENCE
SCALE: NTS

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SACRAMENTO DISTRICT
SACRAMENTO, CALIFORNIA

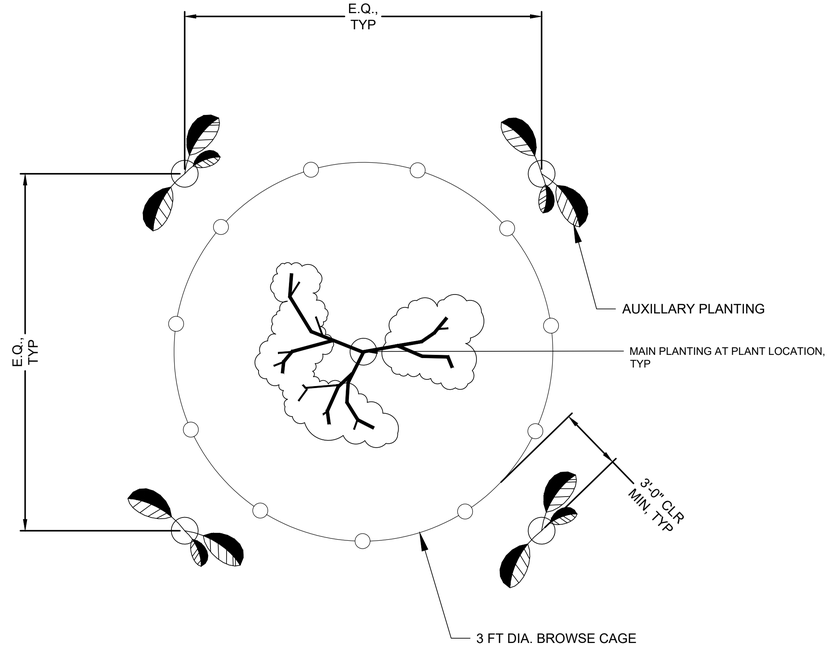
IN-HOUSE DESIGN
1325 J STREET
SACRAMENTO, CA 95814

EXHIBIT A, LOWER SAN JOAQUIN RIVER PROJECT
LONGITUDINAL MITIGATION SITE
WRIGHT TRACT: SAN JOAQUIN COUNTY, CA

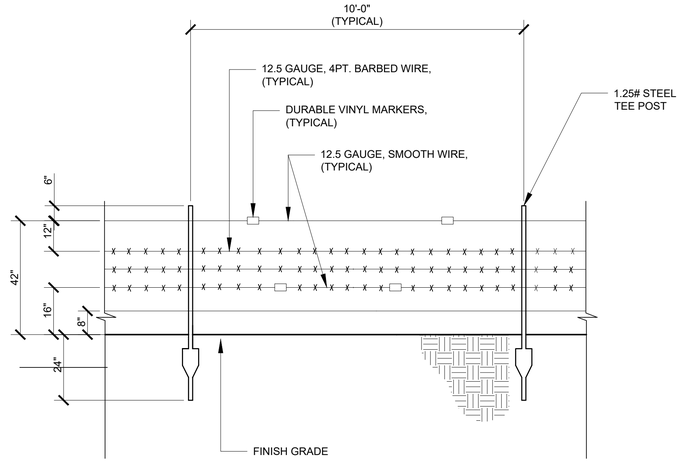
PLANTING AND EROSION CONTROL DETAILS

SHEET ID
L-500

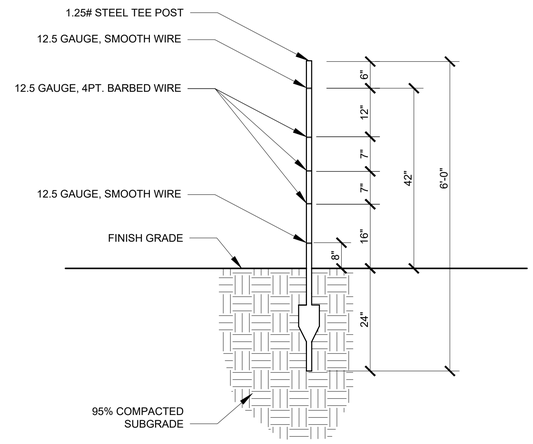
DRAFT 10% SUBMITTAL



B4 AUXILARY PLANTING
SCALE: NTS



ELEVATION

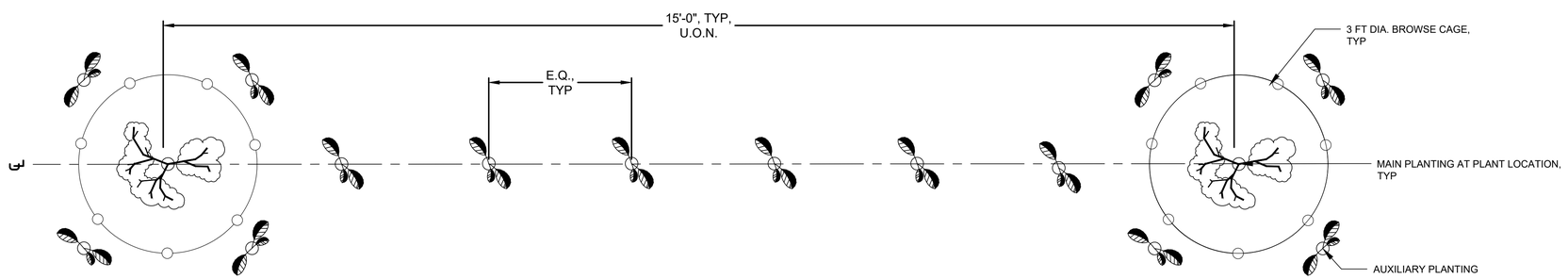


SECTION

NOTE:

MARKERS ARE TO BE MADE FROM WHITE "UNDERSILL" VINYL SIDING. CUT SIDING INTO 3" PIECES AND SNAP PIECES ONTO WIRE FENCING. FOR MARKERS ON SMOOTH FENCING, PREVENT MARKERS FROM SLIDING BY CRIMPING A FERRULE ONO EACH SIDE OF THE MARKER.

3 DEER FRIENDLY LIVESTOCK FENCE
SCALE: NTS



NOTE

FOR MORE INFORMATION, SEE AUXILIARY PLANTING DETAIL

A4 AUXILARY PLANTING AT BANK
SCALE: NTS

US Army Corps of Engineers®

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U.S. ARMY CORPS OF ENGINEERS
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SACRAMENTO, CALIFORNIA

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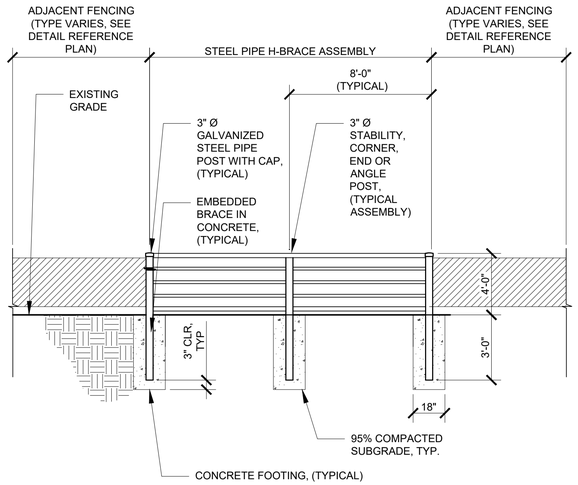
EXHIBIT A, LOWER SAN JOAQUIN RIVER PROJECT
LONGITUDINAL MITIGATION SITE
WRIGHT TRACT: SAN JOAQUIN COUNTY, CA

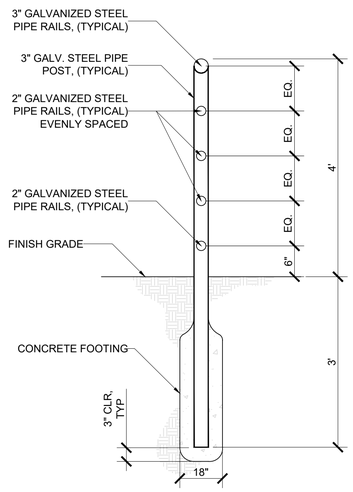
PLANTING AND EROSION CONTROL DETAILS

SHEET ID
L-501

DRAFT 10% SUBMITTAL



ELEVATION



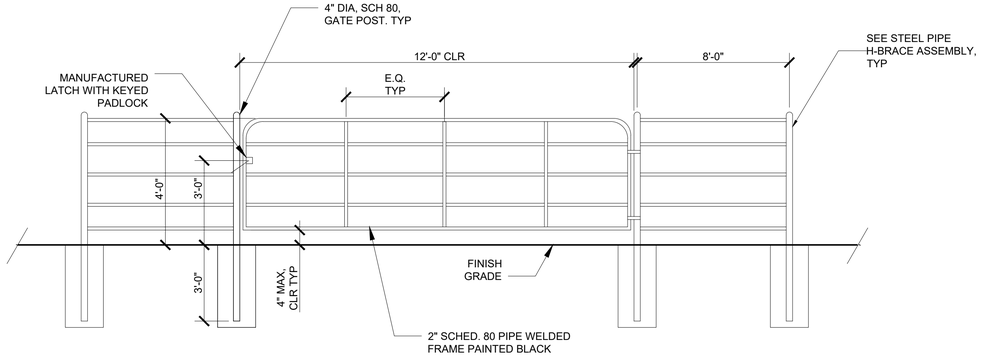
SECTION

NOTES:

1. PROVIDE HOT DIPPED GALVANIZED AND POWDER COATED SIGN POST, HARDWARE, AND ACCESSORIES. POWDER COAT COLOR: FOREST GREEN.
2. GRIND ALL JOINTS TO A SMOOTH FINISH. PREPARE AND FIELD PAINT WELDS AND ALL AREAS REQUIRING TOUCH UPS. COLOR TO MATCH POWDER COAT (PRIME AND PAINT 2 COATS MIN).
3. PROVIDE A STABILITY POST ASSEMBLY EVERY 200', IN CORNERS, IN OFFSET ALIGNMENTS WITH MORE THAN A 10 DEGREE CHANGE OF DIRECTION, AND AT GATE/END LOCATIONS.
4. POST ARE TO HAVE A 1" LEAN AGAINST THE DIRECTION OF FENCE PULL.
5. CAP ALL EXPOSED PIPE ENDS

1 STEEL PIPE H-BRACE ASSEMBLY WITH ADJACENT FENCING

SCALE: NTS

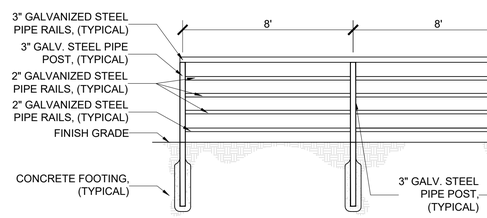


NOTES:

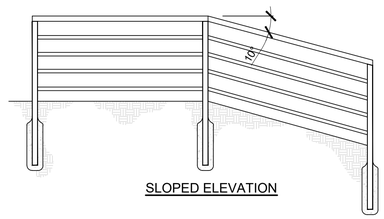
1. PROVIDE HOT DIPPED GALVANIZED AND POWDER COATED SIGN POST, HARDWARE, AND ACCESSORIES. POWDER COAT COLOR: FOREST GREEN.
2. GRIND ALL JOINTS TO A SMOOTH FINISH. PREPARE AND FIELD PAINT WELDS AND ALL AREAS REQUIRING TOUCH UPS. COLOR TO MATCH POWDER COAT (PRIME AND PAINT 2 COATS MIN).
3. PROVIDE A STABILITY POST ASSEMBLY EVERY 200', IN CORNERS, IN OFFSET ALIGNMENTS WITH MORE THAN A 10 DEGREE CHANGE OF DIRECTION, AND AT GATE/END LOCATIONS.
4. FILL GATE HINGE POST AND GATE STRIKE POST WITH CONCRETE.
5. GATE OPENING IS 12 FEET STANDARD, U.O.N.
6. CAP ALL EXPOSED PIPE ENDS.

2 STEEL PIPE LIVESTOCK GATE

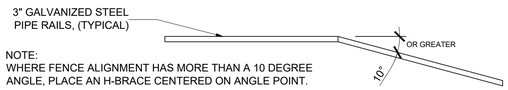
SCALE: NTS



ELEVATION



SLOPED ELEVATION



NOTE:
WHERE FENCE ALIGNMENT HAS MORE THAN A 10 DEGREE ANGLE, PLACE AN H-BRACE CENTERED ON ANGLE POINT.

PLAN VIEW

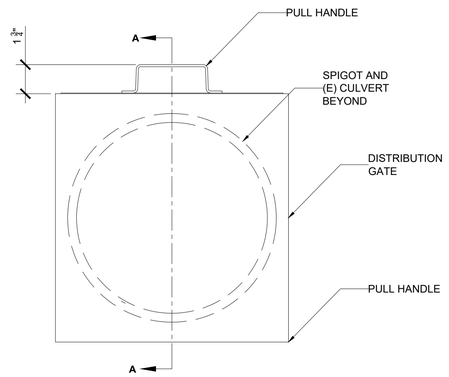
NOTE:
1. WHERE GROUND LEVEL HAS MORE THAN A 10 DEGREE DEFLECTION, PLACE AN H-BRACE CENTERED ON ANGLE POINT.
2. WELD AND GRIND ALL JOINTS, SANDBLAST, PRIME, AND PAINT ALL METAL OLIVE GREEN

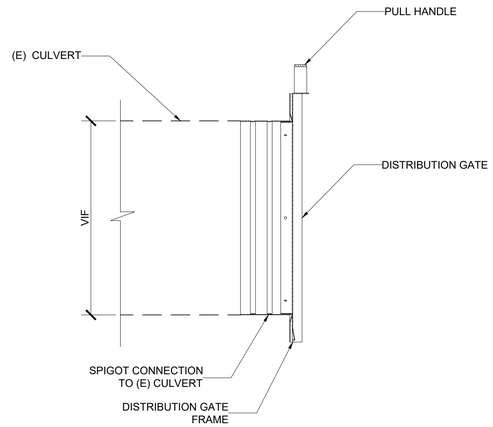
NOTES:

1. WHERE FENCE ALIGNMENT HAS MORE THAN A 10 DEGREE ANGLE, PLACE AN H-BRACE CENTERED ON ANGLE POINT.
2. WHERE GROUND LEVEL HAS MORE THAN A 10 DEGREE DEFLECTION, PLACE AN H-BRACE CENTERED ON ANGLE POINT.
3. GRIND ALL JOINTS TO A SMOOTH FINISH. PREPARE AND FIELD PAINT WELDS AND ALL AREAS REQUIRING TOUCH UPS. COLOR TO MATCH POWDER COAT (PRIME AND PAINT 2 COATS MIN).

3 STEEL PIPE H-BRACE ASSEMBLY AT SLOPES AND DEFLECTIONS

SCALE: NTS





NOTE:

ALL METAL WORK TO BE HOT DIPPED GALVANIZED, SEE PWS

4 DISTRIBUTION GATE AT (E) CULVERT

SCALE: NTS

US Army Corps of Engineers®

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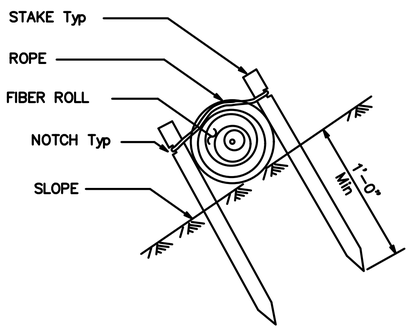
EXHIBIT A, LOWER SAN JOAQUIN RIVER PROJECT
LONGITUDINAL MITIGATION SITE
WRIGHT TRACT, SAN JOAQUIN COUNTY, CA

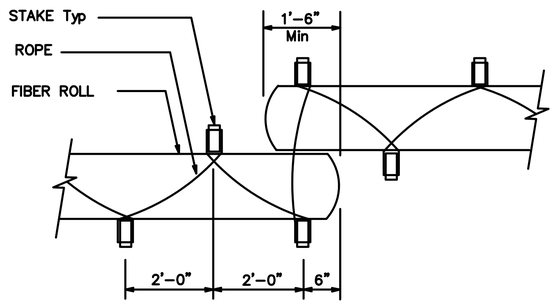
GATES AND H-BRACE DETAILS

SHEET ID
L-502

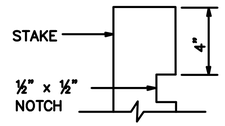
DRAFT 10% SUBMITTAL



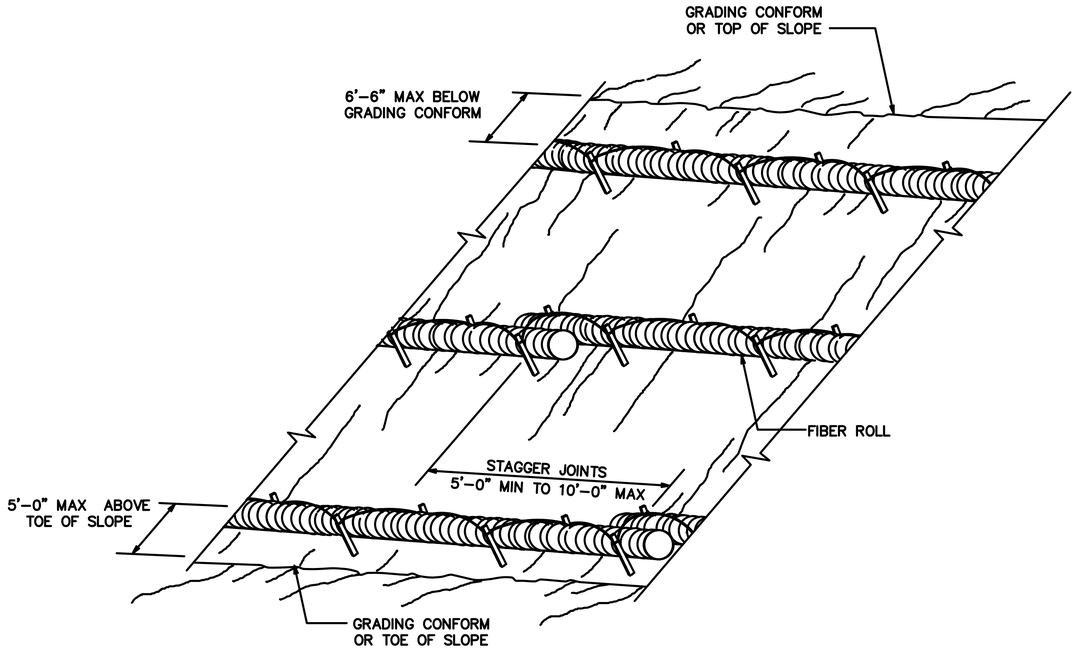
F1 FIBER ROLL SECTION
SCALE: NTS



F5 FIBER ROLL OVERLAP PLAN
SCALE: NTS



F8 FIBER ROLL, STAKE NOTCH ENLARGEMENT
SCALE: NTS

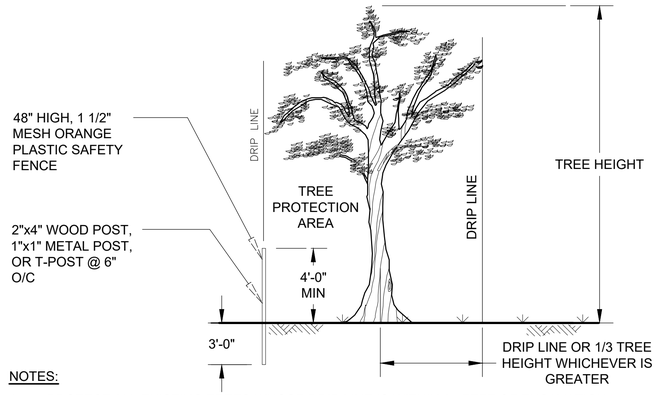


NOTE:

1. INSTALL FIBER ROLLS AT: THE SITE PERIMETER AND THE EDGE OF ALL WORK AREAS; THE TOP OF SLOPES, THE TOE OF SLOPES (EXCLUDING DITCHES), GRADE BREAKS, THE BORDERS OF LANDSCAPE AREAS, AND WITHIN LANDSCAPE AREAS AT EQUAL INTERVALS (PERPENDICULAR TO THE DIRECTION OF SLOPE) FOR THE FOLLOWING SLOPE CONDITIONS, U.O.N:

(A) 10 FEET APART FOR SLOPES GREATER THAN 2:1 (HORIZONTAL:VERTICAL)
(B) 15 FEET APART FOR SLOPES GRATER THAN 2:1 TO 4:1 (HORIZONTAL:VERTICAL)
(C) 20 FEET APART FOR SLOPES GREATER THAN 4:1 TO 10:1 (HORIZONTAL:VERTICAL)
(D) 50 FEET APART FOR SLOPES FLATTER THAN 10:1 (HORIZONTAL:VERTICAL)

5A FIBER ROLLS TYPICAL LAYOUT
SCALE: NTS



NOTES:

1. PROTECT ALL EXISTING TREES WHOSE DRIP LINE IS WITHIN 25 FEET OF EXCAVATION, TRENCHING, GRADING, OR PATHWAY WORK, AGAINST INJURY OR DAMAGE FROM CONSTRUCTION OPERATIONS WITHIN THE LIMITS OF WORK.
2. FOR THOSE TREES NOTED ON DEMOLITION OR TREE REMOVAL PLANS, PROTECT PRIOR TO COMMENCING WORK BY ERECTING A TEMPORARY SAFETY FENCE PER DETAIL ABOVE ON SIDE(S) ADJACENT TO CONSTRUCTION, WITHIN THE LIMITS OF WORK.
3. FOR TREES NOTED ON DEMOLITION OR TREE REMOVAL PLANS, EXCEPT WHEN ON CONCRETE OR ASPHALT PAVEMENT, NO VEHICLES OR MECHANICAL EQUIPMENT LARGER THAN A DITCHWITCH OR BOBCAT CLASS MACHINE ARE PERMITTED ANY CLOSER TO A TREE THAN THE TREE DRIP LINE, WHICHEVER DISTANCE IS GREATER. SHOULD VEHICLES OR EQUIPMENT (OTHER THAN MECHANICAL TRENCHING) BE NECESSARY WITHIN THIS PROXIMITY OF A TREE, USE ROOT PROTECTION MATTING OVER THE AREA TO BE USED BY SUCH VEHICLES OR EQUIPMENT.

1 TYPICAL EXISTING TREE PROTECTION
SCALE: NTS

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: B.J.
DRAWN BY: B.J.
CHECKED BY: T.S.
SUBMITTED BY: B.J.
SIZE: ANSI D
ISSUE DATE: XX/XX/2023
SOLICITATION NO.:
CONTRACT NO.:

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
SACRAMENTO, CALIFORNIA

IN-HOUSE DESIGN
1325 J STREET
SACRAMENTO, CA 95814

EXHIBIT A, LOWER SAN JOAQUIN RIVER PROJECT
LONGITUDINAL MITIGATION SITE
WRIGHT TRACT: SAN JOAQUIN COUNTY, CA

FENCE AND SIGN DETAILS

SHEET ID
L-503

DRAFT 10% SUBMITTAL

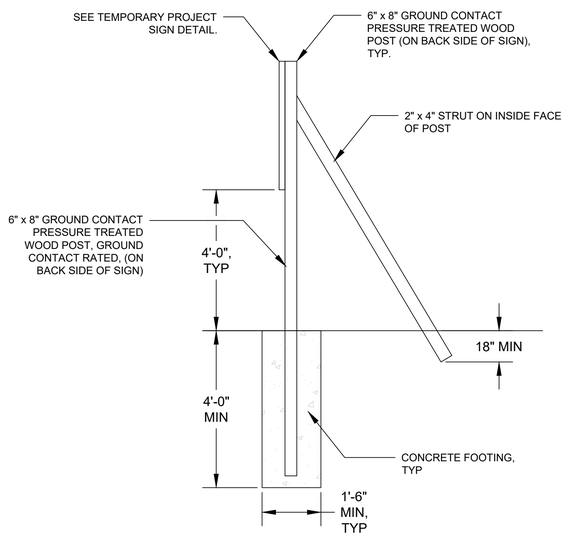


NOTES:

1. A DIGITAL FILE WITH EXACT TEXT AND LOGOS WILL BE PROVIDED BY THE COR AT THE TIME OF FABRICATION.
2. CONTRACTOR TO PROVIDE FINAL TEMPLATE FOR APPROVAL BY THE COR.
3. TEXT FORMAT TO FOLLOW USACE SIGN STANDARDS MANUAL.
4. PROVIDE ANTI-GRAFFITI COATING FOR SIGN GRAPHIC

1 TEMPORARY PROJECT SIGN

SCALE: NTS

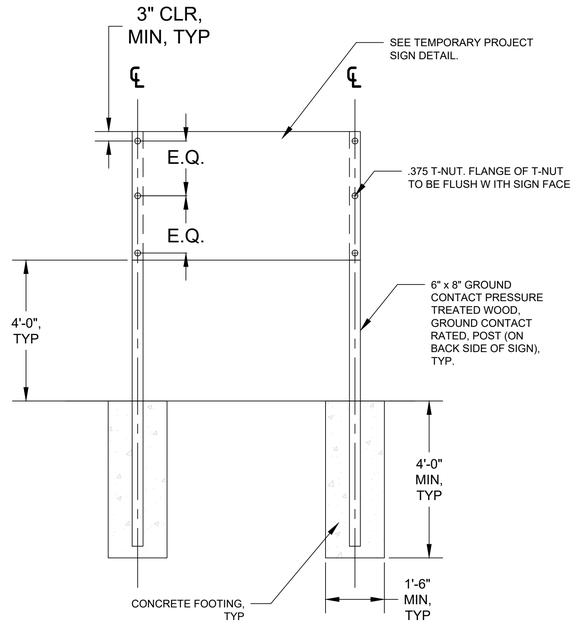


NOTE:

CONTRACTOR TO REMOVE TEMPORARY PROJECT SIGN AT THE END OF CONTRACT

3 PROFILE: TEMPORARY PROJECT SIGN, FLAT AREA

SCALE: NTS

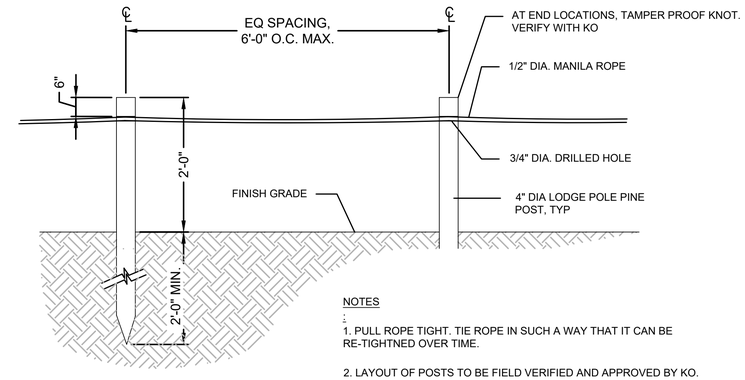


NOTE:

CONTRACTOR TO REMOVE TEMPORARY PROJECT SIGN AT THE END OF CONTRACT

2 SECTION: TEMPORARY PROJECT SIGN, FLAT AREA

SCALE: NTS

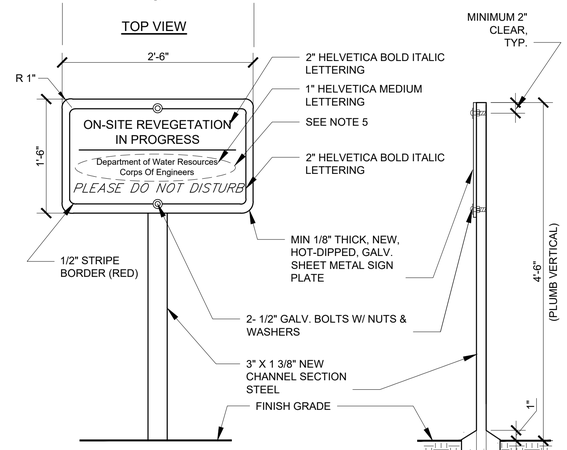


NOTES

1. PULL ROPE TIGHT. TIE ROPE IN SUCH A WAY THAT IT CAN BE RE-TIGHTNED OVER TIME.
2. LAYOUT OF POSTS TO BE FIELD VERIFIED AND APPROVED BY KO.

6E TEMPORARY ROPE FENCE BARRIER

SCALE: NTS



NOTES:

1. PROVIDE HOT DIPPED GALVANIZED AND POWDER COATED SIGN POST, HARDWARE, AND ACCSSORIES. POWDER COAT COLOR: FOREST GREEN. BACK OF SIGN TO BE NON-REFLECTIVE.
2. GRIND ALL JOINTS TO A SMOOTH FINISH. PREPARE AND FIELD PAINT WELDS AND ALL AREAS REQUIRING TOUCH UPS. COLOR TO MATCH POWDER COAT (PRIME AND PAINT 2 COATS MIN).
3. SIGN SHALL BE 1/8" BAKED ENAMEL, SCREEN PRINT IMAGES.
4. IMAGES, LINEWORK, AND TEXT SHALL BE RED WITH A WHITE BACKGROUND.
5. SEE SPECS FOR AGENCY NAMES TO BE IDENTIFIED. NAMES SEEN ON SIGN ABOVE ARE FOR EXAMPLE ONLY.
6. ALL TEXT TO BE MIN 1" IN HEIGHT, U.O.N.
7. ALL EXPOSED BOLT THREADS EXTENDING BEYOND NUT SHALL BE STRIPPED AFTER INSTALLATION.
8. PROVIDE ANTI-GRAFFITI COATING FOR FACE AND BACK OF SIGN

2 ON-SITE REVEGETATION SIGN

SCALE: NTS

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

ISSUE DATE: XX/XX/2023
SOLICITATION NO.:
CONTRACT NO.:

DESIGNED BY: B.J.
DRAWN BY: B.J.
CHECKED BY: T.S.
SUBMITTED BY: B.J.
SIZE: ANSI D

U.S. ARMY CORPS OF ENGINEERS SACRAMENTO DISTRICT SACRAMENTO, CALIFORNIA

IN-HOUSE DESIGN 1325 J STREET SACRAMENTO, CA 95814

EXHIBIT A, LOWER SAN JOAQUIN RIVER PROJECT LONGITUDINAL MITIGATION SITE WRIGHT TRACT, SAN JOAQUIN COUNTY, CA

FENCE AND SIGN DETAILS

SHEET ID

L-504

DRAFT 10% SUBMITTAL

Appendix D-
Habitat Surveys

ESA

2600 Capitol Avenue
Suite 200
Sacramento, CA 95816
916.564.4500 phone
916.564.4501 fax

esassoc.com

memorandum

date	October 12, 2021
to	Mr. Chris Elias, Executive Director, San Joaquin Area Flood Control Agency
cc	Mr. Omar Al-Hindi, Executive Project Manager, San Joaquin Area Flood Control Agency
from	Kelly Bayne, Senior Biologist, Environmental Science Associates
subject	Preconstruction Swainson's Hawk Nest Tree Surveys within the Access Road to the SEWD Borrow Area and Giant Garter Snake Habitat Assessment and Special-Status Plant Surveys within the Project Site for the Lower San Joaquin River Project – Phase 1, TS_30_L P

Dear Mr. Elias,

An Environmental Science Associates (ESA) qualified biologist conducted biological surveys for the Lower San Joaquin River Project-Phase 1, TS_30_L (Project), located in unincorporated San Joaquin County, California. Proposed activities include transplanting the elderberry (*Sambucus* sp.) shrubs from the project site to a USFWS approved conservation bank or onsite mitigation area, and pruning woody vegetation that overhangs the access road associated with the Stockton East Water District (SEWD) Borrow Area (**Figure 1**).

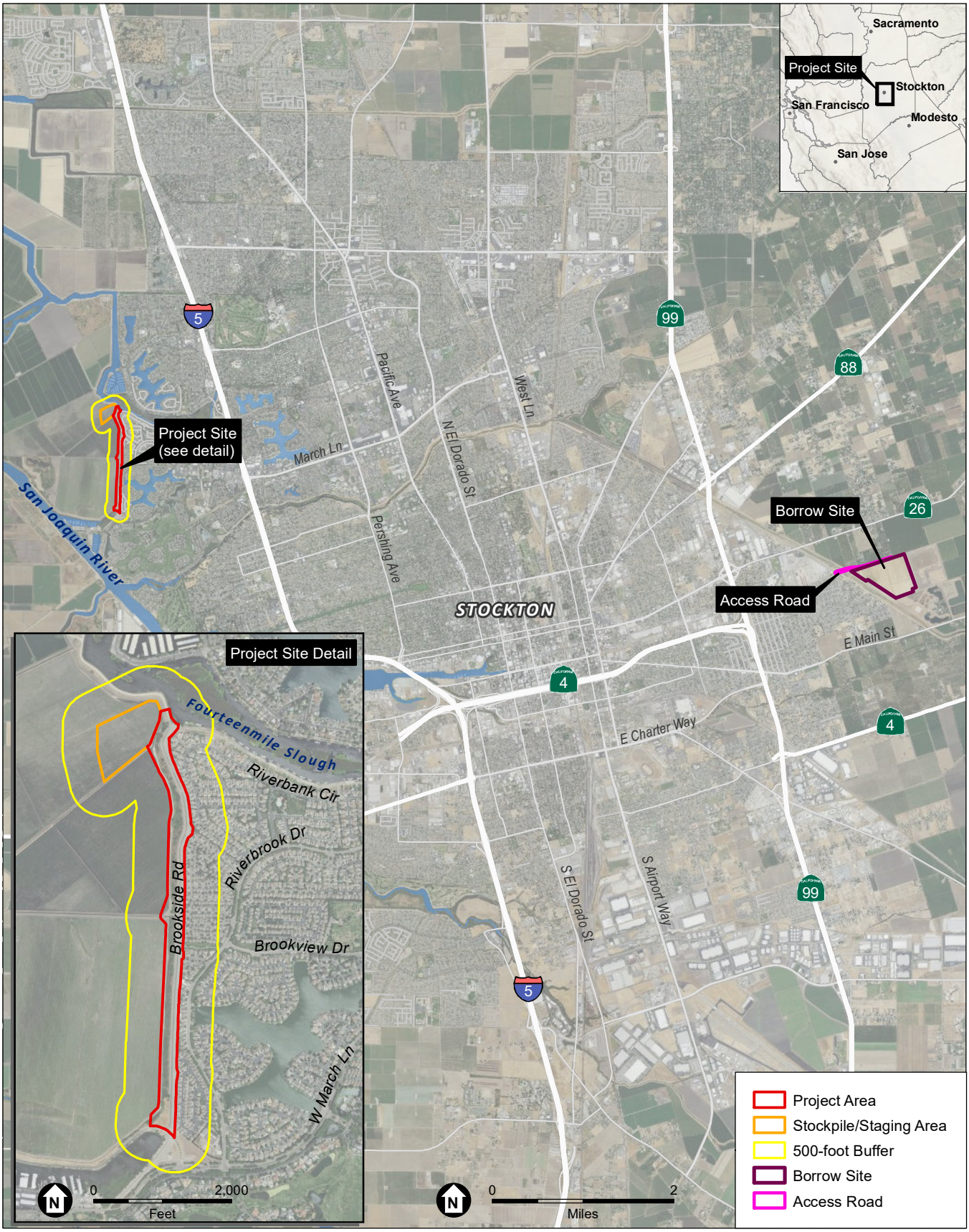
Surveys were conducted consistent with the measures outlined in the Lower San Joaquin River Integrated Interim Feasibility Report/Environmental Impact Statement/Environmental Impact Report (SJAFCA, CVFPB, and USACE 2018; herein referred to as 2018 LSJR FR/EIS/EIR) and the U.S. Fish and Wildlife Service (USFWS) Biological Opinion (BO) (USFWS 2016) prepared for the Project.

Biological surveys included:

- A preconstruction survey for suitable Swainson's hawk (*Buteo swainsoni*) nest trees along the access road located just north of the SEWD Borrow Area, in accordance with the mitigation measure on page 5-195 of the 2018 LSJR FR/EIS/EIR and the San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (SJMSCP).

- A preconstruction special-status plant survey within the project site for potentially occurring plants, in accordance with the mitigation measure on page 5-197 of the 2018 LSJR FR/EIS/EIR. **Table 1** identifies the 6 plants considered to have potential for occurrence based on Table 5-35 and the discussion in the 2018 LSJR FR/EIS/EIR.

- A habitat assessment for giant garter snake within the project site to determine which avoidance and minimization measures would be applicable to work within the project site, as outlined on page 11 of the USFWS BO.



SOURCE: Esri, 2021; SJAFCA, 2021; ESA, 2021

Lower San Joaquin River Reach TS_30_L Levee Improvement Project

Figure 1
Project Area

ESA

TABLE 1
PLANTS WITH THE POTENTIAL TO OCCUR WITHIN THE PROJECT SITE

Plants	Status	Potential to Occur
Alkali milkvetch *Astragalus tener* var. *tener*	CNPS: 1B.2	**May occur**; 2 accounts – one on project site, the other within 100-500 feet of the project site within Central Stockton. Recorded as extirpated.
Slough thistle *Cirsium crassicaule*	CNPS: 1B.1	**May occur**; 3 on site accounts in RD 17. Chenopod scrub, marshes and swamps (sloughs), riparian scrub.
Big tarplant *Blepharizonia plumosa*	CNPS: 1B.1	**May occur**; Big tarplant occurs in annual grassland on clay to clay-loam soils, usually on slopes and often in burned areas, below 1,500 feet 2 accounts – one on project site, the other within 100-500 feet of the project site at Old Mormon Slough. Recorded as extirpated.
Rose mallow *Hibiscus lasiocarpos*	CNPS: 1B.2	**May occur**; 2 accounts in Delta Front/North Stockton, one in Central Stockton. Native to riparian areas around the Sacramento River in California and can also be found in other states. Grows in moist soil near the river, often in riprap on sides of levees.
Delta tule pea *Lathyrus jepsonii* var. *jepsonii*	CNPS: 1B.2	**May occur**; 3 accounts in Central Stockton within 100 to 500 feet of project area. Freshwater and brackish marshes and swamps.
Mason's lilaeopsis *Lilaeopsis masonii*	CNPS: 1B.1 State: R	**May occur**; 3 accounts in Delta Front/North Stockton Riparian scrub, brackish or freshwater marshes and swamps.

Source: Information in this table was obtained from Table 5-35 of the 2018 LSJR FR/EIS/EIR

Location

The approximately 51.05-acre project site includes the 36.79-acre project footprint and the 14.27-acre stockpile/staging area. The coordinates of the southern portion of the project site are 37º 58′ 43.80″ North, 121º 22′ 08.47″ West.

The approximately 8.2-acre access road includes a 20-foot buffer around a raised farm road. The farm road occurs to the north of the approximately 115.8-acre SEWD Borrow Area. The coordinates of the western portion of the access road are 37º 58′ 14.69″ North, 121º 13′ 19.98″ West.

Methodology

Prior to conducting the biological surveys, ESA senior biologist Kelly Bayne reviewed California Natural Diversity Database (CNDDB) records of active Swainson's hawk nests within 0.5 miles of the access road and giant garter snake and special-status plant occurrences within 5 miles of the project site.

Ms. Bayne conducted the Swainson's hawk nest tree survey within the access road and a giant garter snake habitat assessment and a special-status plant survey within the project site on August 18, 2021. Representative photographs of the project site and access road are provided in **Attachment 1**.

Ms. Bayne conducted a pedestrian level survey of the access road to look for potentially suitable Swainson's hawk nest trees along the access road and vicinity. Periodic stops were made to scan the area with binoculars. Where feasible, the biologist conducted a windshield level survey for potential Swainson's hawk nests within 0.5 miles of the access road. Ms. Bayne used a spotting scope and binoculars to determine whether remnant raptor nests, which may have been occupied by Swainson's hawk, occur within the trees within 0.5 miles of the project site.

The special-status plant survey was conducted in accordance with CDFW's (2018) *Protocols for Surveying and Evaluating Impacts to Special-Status Native Plant Populations and Natural Communities*. The special-status

plant survey was floristic in nature; specifically, every plant taxon that was observed within the project site was identified to the taxonomic level necessary to determine rarity and listing status. A list of plants observed within the project site is provided in **Attachment 2**.

The habitat assessment for giant garter snake was conducted to determine whether suitable habitat required for the species is present within and in the vicinity of the project site.

Existing Conditions

SEWD Borrow Access Road

The access road is surrounded by orchard trees to the north and south, a levee road followed by an irrigation canal to the west, and by a graded farm road to the east.

The access road consists of a graded levee road comprised of gravel, bare ground, and herbaceous species including wild oat (*Avena fatua*), ripgut grass (*Bromus diandrus*), and soft chess (*Bromus hordeaceus*). Overstory woody vegetation including valley oak (*Quercus lobata*), interior live oak (*Quercus wislizeni*), walnut (*Juglans* sp.), and ornamental trees occurs along both sides of the access road. The trees are approximately 20 to 35 feet tall, with diameters at breast height (DBH) from between 7 inches and 24 inches. The canopies of the overstory woody vegetation overhang several areas of the access road (Photographs 1-4 in Attachment 1).

TS_30_L Project Site

The project site is surrounded by high density residential development to the east, Buckley Cove to the south, Fourteen Mile Slough to the north, and agricultural land to the west. The residential development includes ornamental landscape trees including coast redwood (*Sequoia sempervirens*) and Italian cypress (*Cupressus sempervirens*).

At the time of the August 18, 2021 survey, the southern half of the agricultural land to the west of the project site was fallow and contained scattered weedy species including alfalfa (*Medicago* sp.), wild oat (*Avena fatua*), Johnson grass (*Sorghum halepense*), and Bermuda grass (*Cynodon dactylon*). The northern half of the agricultural land to the west of the project site was planted with rice fields (Photograph 5 in Attachment 1). The rice fields were growing in approximately one foot of standing water at the time of the August 18, 2021.

Habitat types within the project site include riparian woodland, agricultural, irrigation ditch, and developed/disturbed. Developed/disturbed includes the graded levee road and gravel slopes, dirt farm roads, and a graded area comprised of weedy vegetation. The eastern levee slope is completely devoid of vegetation.

Riparian woodland occurs along the western levee slope and includes densely growing vegetation with an overstory canopy comprised of willow (*Salix* sp.), valley oak (*Quercus lobata*), interior live oak (*Quercus wislizeni*), English walnut (*Juglans regia*), northern California black walnut (*Juglans hindsii*), cork oak (*Quercus suber*), pecan (*Carya illinoinensis*), and ailanthus (*Ailanthus altissima*). Understory trees and shrubs include black elderberry (*Sambucus nigra* ssp. *caerulea*), sandbar willow (*Salix exigua* var. *hindiana*), edible fig (*Ficus carica*), giant reed (*Arundo donax*), rose (*Rosa* sp.), Himalayan blackberry (*Rubus armeniacus*), tobacco (*Nicotiana acuminata*), and common buttonbush (*Cephalanthus occidentalis*). Understory herbaceous vegetation includes Johnson grass (*Sorghum halepense*), Bermuda grass (*Cynodon dactylon*), wild oat (*Avena fatua*), radish (*Raphanus sativus*), and soft chess (*Bromus hordeaceus*).

Agricultural land occurs within the northwestern portion of the site and consists of rice fields.

The irrigation ditch extends north to south to the west of the riparian woodland within the project site. The entire length of the irrigation ditch contained standing water at the time of the July 27, 2021 survey. While the northern half of the irrigation ditch still contained ponded water during the August 18, 2021 survey, the southern half only contained saturated soils, but no ponded water was present. Dominant vegetation within or along the banks of the irrigation ditch includes tule (*Schoenoplectus* sp.), barnyard grass (*Echinochloa crus-galli*), broadleaf cattail (*Typha latifolia*), and Johnson grass.

Results and Discussion

Access Road – Swainson's Hawk Survey

No Swainson's hawk occurrences are documented in the CNDDB within 0.5 miles of the access road and no Swainson's hawk nests or raptor nests suitable for Swainson's hawk were observed within 0.5 miles of the access road during the windshield level survey.

Swainson's hawk most often nest in trees ranging in height from 41 to 82 feet. Swainson's hawks typically nest in a solitary tree, bush, small grove, or line of trees in or near riparian habitat. Nest trees include willows (*Salix* spp.), black locusts (*Robinia pseudoacacia*), box elders (*Acer negundo*), junipers (*Juniperus* spp.), oaks (*Quercus* spp.), aspens (e.g., *Populus* spp.), and cottonwoods (*Populus deltoides*) (Bechard, et al. 2010). Swainson's hawks favor nesting near agricultural areas, including irrigated alfalfa fields, wheat fields, and fields planted with row crops (Bechard, et al. 2010, Bradbury 2014).

No active Swainson's hawk nest trees were found and no active or remnant raptor nests were observed along the access road or in the vicinity. A single Swainson's hawk was observed soaring overhead approximately 0.25 mile southeast of the access road. The trees along the access road provide low quality nesting habitat due to their small size (Photographs 1-4 in Attachment 1).

TS_30_L Project Site – Special-Status Plant Survey

No special-status plants were observed within the project site. The survey was conducted during the evident and identifiable period of all special-status plants with potential to occur, except alkali milkvetch which is an annual herb that blooms March through June. Alkali milkvetch typically occurs on alkaline soils in playas, adobe clay valley and foothill grassland, and vernal pools. There are no playas, vernal pools, or alkaline soils in the project site. Due to the marginal habitat present, this species is unlikely to occur in the project site but if present, it would not have been detected due to survey timing outside the blooming window.

TS_30_L Project Site –Giant Garter Snake Habitat Assessment

There are two giant garter snake CNDDB occurrences documented within 5 miles of the project site. One occurrence (351) is from 1880 and is approximately 1.7 miles southeast of the project site. This occurrence states that the record was mapped in a general location in Stockton; however, much of the area has been developed since then. The other occurrence (425) is from 2018 and is approximately 2.5 miles west of the project site. This occurrence states that two individuals were observed foraging within Himalayan blackberries on the waterside bank of the San Joaquin River.

Giant garter snake inhabit agricultural wetlands including irrigation and drainage canals, sloughs, ponds, small lakes, low gradient streams, and adjacent uplands in the Central Valley. Giant garter snake are often found within these aquatic features especially when emergent vegetation including cattails and bulrushes are present. Because most of its natural habitat has been lost, giant garter snake also live in rice fields (USFWS 2017). Rice fields provide surface water during the summer when the snakes are active and marsh-like conditions provide the cover,

habitat, and prey required for giant garter snake to survive (Halstead et al. 2010). The active season extends from April 1 to October 1. Giant garter snake inhabit small mammal burrows and other soil crevices above flood elevations during this inactive period (USFWS 2017).

The irrigation ditch along the western edge of the project site provides suitable habitat for giant garter snake due to the presence of ponded water and emergent vegetation. The rice fields to west provide suitable refuge and foraging habitat. The small mammal burrows present on the sides of the irrigation ditches within the project site and on the graded farm road to the west of the project site provide suitable upland habitat.

Discussion

General avoidance and minimization measures outlined in the 2018 LSJR FR/EIS/EIR include the following:

- Install Exclusion fencing along the construction work area perimeter and implement general measures to avoid effect on sensitive natural communities and special-status species, as identified on page 5-126 of the 2018 LSJR FR/EIS/EIR.
- Conduct mandatory contractor/worker awareness training for construction personnel, as identified on page 5-127 of the 2018 LSJR FR/EIS/EIR.
- Retain a biological monitor to monitor all sensitive biological resources, as identified on page 5-127 of the 2018 LSJR FR/EIS/EIR.

The trees along the access road provide low quality nesting habitat for Swainson's hawk and there is no evidence of past raptor nesting in these trees. Therefore, pruning of the overhanging tree limbs for vehicle access is permitted so long as the work occurs outside of the season for all nesting birds including Swainson's hawk (September 16 through January 31). The generally accepted nesting season that encompasses all birds extends from February 1 through September 15. It is recommended that a certified arborist prune the limbs in accordance with ANSI standards. Any work during the nesting season would require surveys be conducted according to the conservation measures identified on page 5-195 of the 2018 LSJR FR/EIS/EIR.

No special-status plants were observed within the project site. The survey was conducted outside the evident and identifiable period alkali milkvetch. An additional survey for alkali milkvetch should be conducted during the evident and identified if work is scheduled to occur in suitable habitat.

The project site provides suitable habitat for giant garter snake. Based on pages 5-192 and 5-193 of the 2018 LSJR FR/EIS/EIR, the following avoidance and minimization measures are required for giant garter snake, one of which prohibits work outside of the active season.

- For each discrete reach affecting snake habitat, construction will be initiated during the snake active period (May 1‑October 1) and prior to September 15, but may continue beyond the active period provided that work is continuous (lapses shall be no greater than 24 hours).
- All construction personnel, including workers and contractors, will participate in a worker environmental awareness training program conducted by a USFWS-approved biologist prior to commencement of construction activities.
- Reach specific monitoring and inspection will be conducted appropriate to the potential for snake presence as indicated by the proximity to and quality of habitat. This will include one or more of the following measures as specified in Appendix A: (a) a pre-work inspection sufficient to detect active snakes before any construction, to occur no sooner than 24 hours prior to initial construction in potential habitat; (b) a morning

inspection before each work day, including the work site, and any parked equipment; (c) an additional second inspection of habitat during construction for each work day; (d) continuous monitoring during all work; and/or (e) a choice of either exclusionary fencing in those reaches where it is possible (i.e., Calaveras River from North Pershing to El Dorado St.; Duck Creek work) or continuous monitoring. Should there be any interruption in work for greater than two weeks, a biologist will survey the project area again no later than 24 hours prior to the restart of work.

- If the USACE elects to use exclusionary fencing in lieu of continuous monitoring, it will be buried at least six inches below the ground to prevent snakes from burrowing and moving under the fence, and will be inspected daily.

- Giant garter snake encountered during construction activities would be allowed to move away from construction activities on their own.

- Movement of heavy equipment to and from the construction site would be restricted to established roadways. Stockpiling of construction materials would be restricted to designated staging areas, which would be located more than 200 feet away from giant garter snake aquatic habitat.

- Giant garter snake habitat within 200 feet of construction activities would be designated as an environmentally sensitive area and delineated with signs and high visibility fencing. Fencing will be inspected and maintained as needed daily until completion of each work section of the project. This area would be avoided by all construction personnel.

- Project-related vehicles will observe a 20-mile-per-hour speed limit within construction areas, except on existing paved roads where they will adhere to the posted speed limits.

- Aquatic habitat for the snake that would be affected by construction will be inspected for the snake, then dewatered and maintained dry and absent of aquatic prey for 5 days before initiation of construction activities. This measure applies primarily to the ditches to be relocated west of the Delta front levee sections. If complete dewatering is not possible, USFWS will be contacted to determine what if any additional measures may be necessary to minimize effects to the snake.

It is recommended that the USACE re-initiate formal consultation with the USFWS and consult with CDFW prior to the elderberry shrub removal/transplantation from the project site scheduled to commence in January 2022.

Please let me know if you have any questions or comments.

Sincerely,



Kelly Bayne
Senior Biologist
978.987.1620
kbayne@esassoc.com

References

Bechard, M.J., C.S. Houston, J.H. Saransola, and A.S. England. 2010. Swainson's Hawk (*Buteo swainsoni*), version 2.0. In The Birds of North America (A.F. Poole, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bna.265.

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Halstead, B.J., Wylie G.D., and Casazza M.L. 2010. Habitat suitability and conservation of the Giant Gartersnake (*Thamnophis gigas*) in the Sacramento Valley of California. *Copeia* 2010: 591–599.

Swainson's Hawk Technical Advisory Committee (TAC). 2000. Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley. May 31, 2000.

SJAFCA, CVFPB, and USACE. 2018. Lower San Joaquin River Integrated Interim Feasibility Report/ Environmental Impact Statement/Environmental Impact Report.

U.S. Fish and Wildlife Service (USFWS). 2016. Formal Consultation on the Lower San Joaquin River Feasibility Study, San Joaquin County, California. June 13, 2016.

Attachment 1

Photographs of the Project Site and Vicinity including the SEWD Borrow Site



Photograph 1: View east from the east side of the access road of oak trees with overhanging canopies within the SEWD Borrow Site.



Photograph 2: View of the valley oak and Northern California walnut trees overhanging the access road associated with the SEWD Borrow Site.



Photograph 3: View of valley oak and interior live oak along the access road associated with the SEWD Borrow Site.



Photograph 4: View west of access road from the central portion of the access road associated with the SEWD Borrow Site.



Photograph 5: View north of the agricultural field comprised of rice from the central-western side of the project site.



Photograph 6: View north of the dry irrigation ditch within the southern half of the project site. While the irrigation ditch did not contain water during the August 18, 2021 survey, it contained standing water during a July 27, 2021 survey.



Photograph 7: View south of the irrigation ditch comprised of emergent vegetation and disturbed/developed area associated with the dirt farm road from the central portion of the project site.



Photograph 8: View north of the disturbed/developed area associated with the dirt farm road, the irrigation ditch, and the riparian woodland from the central portion of the project site.

Attachment 2

Plants Observed during the July 2021 and August 18, 2021 Surveys

Family	Scientific Name	Common Name	Native/Introduced
Adoxaceae	*Sambucus nigra* ssp. *caerulea*	Blue elderberry	N
Amaranthaceae	*Amaranthus albus*	Tumbleweed	I
Amaranthaceae	*Amaranthus deflexus*	Amaranth, pigweed	I
Amaranthaceae	*Amaranthus retroflexus*	Redroot pigweed	I
Anacardiaceae	*Toxicodendron diversilobum*	Western poison oak	N
Apiaceae	*Foeniculum vulgare*	Fennel	I
Araceae	*Lemna* sp.	Duckweed	N
Asteraceae	*Baccharis pilularis*	Coyote brush	N
Asteraceae	*Helminthotheca echioides*	Bristly ox-tongue	I
Asteraceae	*Heterotheca grandiflora*	Telegraph weed	N
Asteraceae	*Lactuca serriola*	Prickly lettuce	I
Asteraceae	*Senecio vulgaris*	Common groundsel	I
Asteraceae	*Silybum marianum*	Milk thistle	I
Asteraceae	*Sonchus* sp.	Sow thistle	I
Brassicaceae	*Brassica* sp.	Mustard	I
Brassicaceae	*Raphanus sativus*	Radish	I
Chenopodiaceae	*Chenopodium album*	Lamb's quarters	I
Convolvulaceae	*Convolvulus arvensis*	Bindweed, orchard morning-glory	I
Cyperaceae	*Cyperus eragrostis*	Nutsedge	N
Cyperaceae	*Cyperus esculentus*	Nutsedge	N
Cyperaceae	*Eleocharis macrostachya*	Spikerush	N
Cyperaceae	*Schoenoplectus* sp.	Naked-stemmed bulrush	--
Equisetaceae	Equisetum sp.	Horsetail, scouring rush	N
Fagaceae	*Quercus suber*	Cork oak	I
Fagaceae	*Quercus lobata*	Valley oak, roble	N
Fagaceae	*Quercus wislizeni*	Interior live oak	N
Juglandaceae	*Carya illinoinensis*	Pecan	I
Juglandaceae	*Juglans hindsii*	Northern California black walnut	N
Juglandaceae	*Juglans regia*	Persian or English walnut	I
Juncaceae	*Juncus effusus*	Soft or lamp rush	N
Malvaceae	*Malva parviflora*	Cheeseweed, little mallow	I
Moraceae	*Ficus carica*	Edible fig	I
Oleaceae	*Fraxinus latifolia*	Oregon ash	N
Poaceae	*Arundo donax*	Giant reed	I
Poaceae	*Avena fatua*	Wild oat	I
Poaceae	*Avena sativa*	Cultivated oat	I
Poaceae	*Bromus hordeaceus*	Soft chess	I

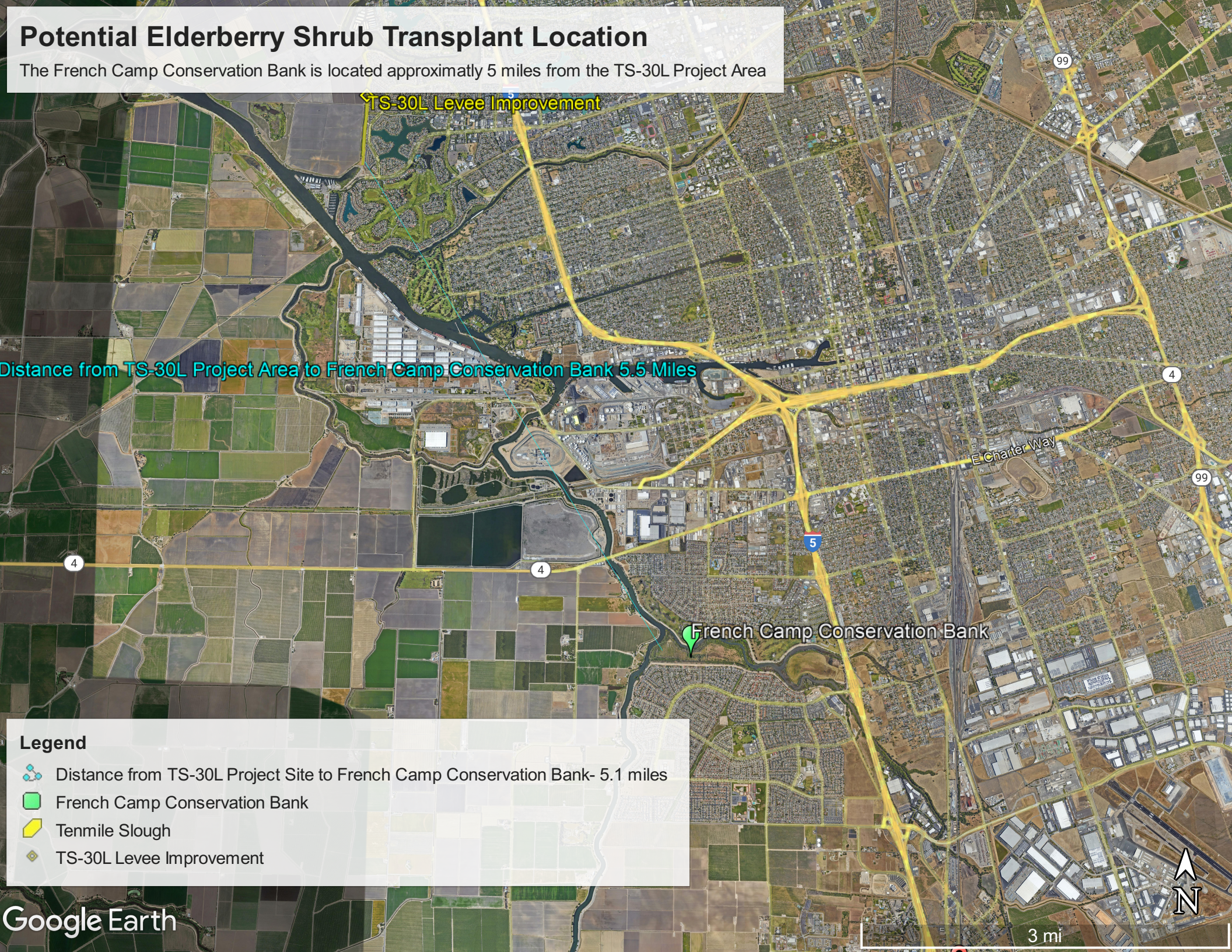
Family	Scientific Name	Common Name	Native/Introduced
Poaceae	*Bromus madritensis*	Brome, chess	I
Poaceae	*Cynodon dactylon*	Bermuda grass	I
Poaceae	*Dactylis glomerata*	Orchard grass	I
Poaceae	*Echinochloa crus-galli*	Barnyard grass	I
Poaceae	*Phalaris aquatica*	Harding grass	I
Poaceae	*Sorghum halepense*	Johnson grass	I
Rosaceae	*Rosa* sp.	Rose	--
Rosaceae	*Rubus armeniacus*	Himalayan blackberry	I
Rubiaceae	*Cephalanthus occidentalis*	California button willow	N
Salicaceae	*Salix exigua*	Willow	N
Salicaceae	*Salix gooddingii*	Goodding's black willow	N
Salicaceae	*Salix lasiolepis*	Arroyo willow	N
Salicaceae	*Salix* sp.	Willow	--
Sapindaceae	*Acer negundo*	Box elder	N
Scrophulariaceae	*Verbascum blattaria*	Moth mullein	I
Simaroubaceae	*Ailanthus altissima*	Tree of heaven	I
Solanaceae	*Nicotiana acuminata*	Tobacco	I
Typhaceae	*Typha latifolia*	Broad-leaved cattail	N

Appendix E- Conservation Banks in the Service Area with Space for Transplants

Includes French Camp Conservation Bank and River Ranch Conservation Bank

Potential Elderberry Shrub Transplant Location

The French Camp Conservation Bank is located approximatly 5 miles from the TS-30L Project Area





Phase III
French Camp Conservation Bank
City of Stockton, CA
October 2011

Exhibit C. Service Area Boundary

SYCAMORE Environmental Consultants, Inc.

Note: VELB range eastern boundary based on 3000' elevation, western boundary based on Central Valley watershed. VELB Range;http://www.fws.gov/pacific/sacramento/images/velb_range.jpg
Basemap: World Physical Map, ESRI Data Resource Center

I0044FCCB_AddtlVELB_ExhibitC_ServiceArea.mxd

From: Darryl Foreman
To: Guerrero, Lorena G CIV USARMY CESPK (USA)
Cc: Darryl Foreman; Johnson, Bradley C CIV USARMY CESPK (USA)
Subject: [Non-DoD Source] Re: EB Transpant to FCCB (10 Elderberry shrubs) - Off March Lane - Stockton TS30L
Date: Thursday, April 6, 2023 1:06:02 PM

Lorena,
Very nice to hear from you today regarding your **10 Elderberry Shrub Transplants** to the French Camp EB Conservation Bank.
I look forward to meeting you on site to firm up the project and provide you with a firm contract cost. Let me know when
you would like to meet on site (most any Thursday works for me) and discuss the Transplant process.

Please Email **(darryl@deltahabitatllc.com)** any mapping you can let me have that I can use to develop a firm cost.

Best Regards
Darryl

Darryl Foreman - 415-309-0646
Delta Habitat LLC / Strata Habitat Foundation

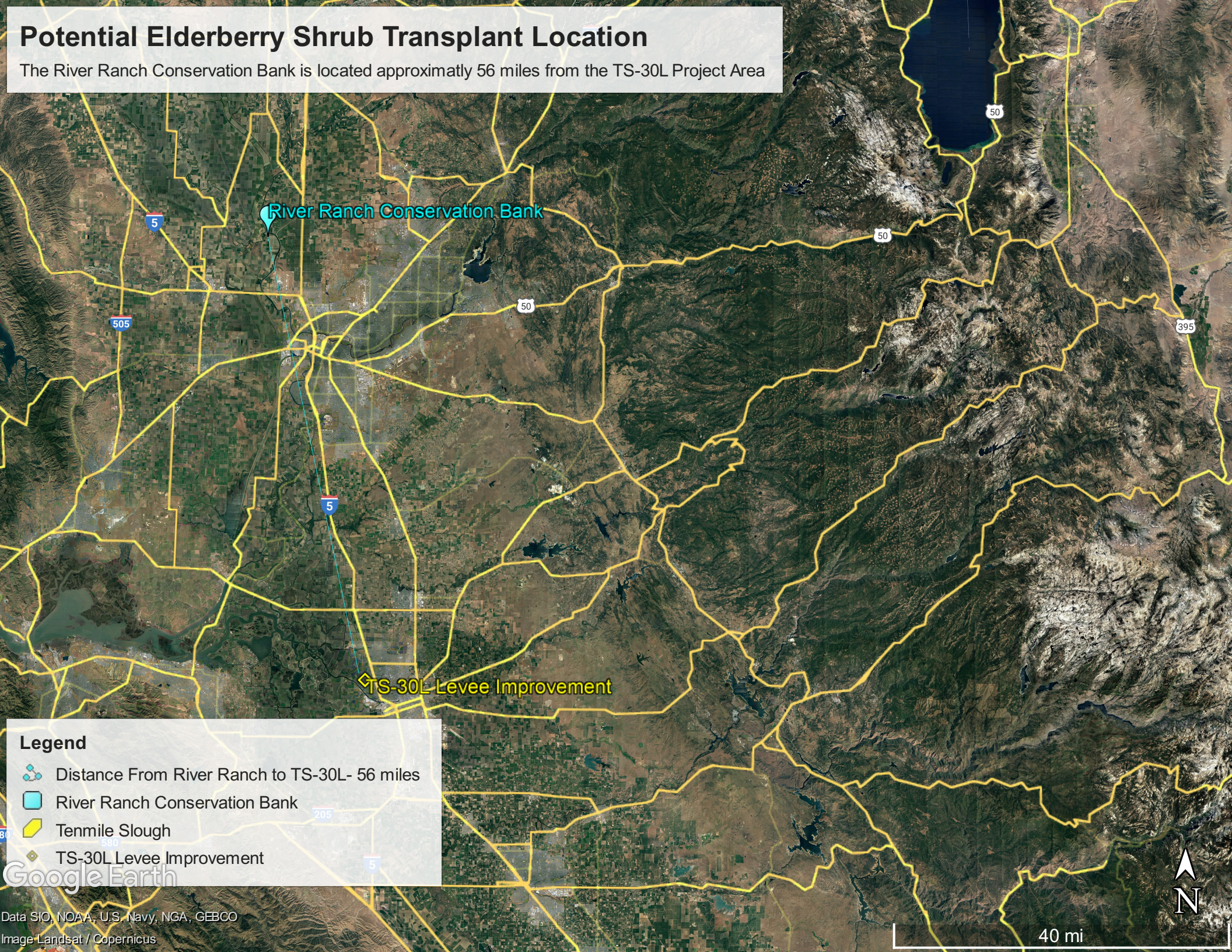
darryl@deltahabitatllc.com

> On Apr 6, 2023, at 10:14 AM, Guerrero, Lorena G CIV USARMY CESPK (USA) <Lorena.G.Guerrero@usace.army.mil> wrote:
>
> Good Morning Mr. Foreman,
>
> We are moving towards construction on one of our projects and have 10 elderberry shrubs which are in need of transplanting. I saw on the web that there may be availability at your bank to accept transplants.
>
> Is there currently any space at the French Camp Conservation Bank?
>
> Thank you,
>
> Lorena G. Guerrero
> Biologist
> Planning Division
> USACE Sacramento District
> 1325 J Street
> Sacramento, CA 95814
> Office: (916) 557-7134

Lorena.G.Guerrero@USACE.ARMY.MIL
Pronouns: she, her, hers

Potential Elderberry Shrub Transplant Location

The River Ranch Conservation Bank is located approximatly 56 miles from the TS-30L Project Area



- Riversidean Alluvial Fan Sage Scrub
- Salmonids
- Salt Marsh Harvest Mouse
- San Bernardino Kangaroo Rat
- San Joaquin Kit Fox
- Santa Ana River Woollystar
- Swainson's Hawk
- Valley Elderberry Longhorn Beetle
- Vernal Pool Creation
- Vernal Pool Preservation
- Waters of the State
- Wetland/Waters of the U.S.

SEARCH BY STATE(S)

- California
- Oregon
- Washington

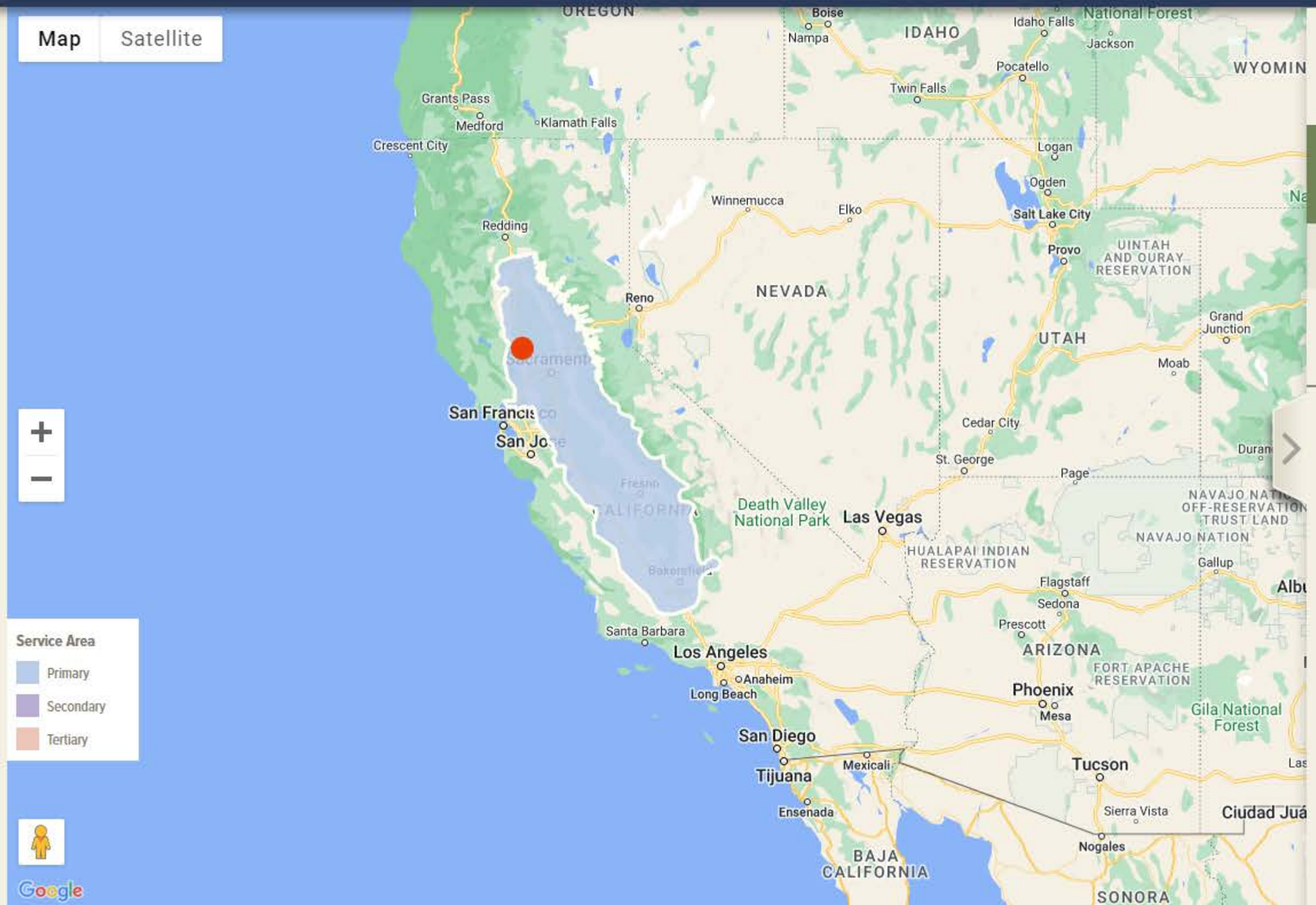
OR SEARCH BY COUNTY

County

OR PHYSICAL ADDRESS

Address, City, State or Zip

See Results >



BANKS AND PRESERVES

Wildlands is continuing to identify new mitigation properties. If you require a habitat type or location not identified on the map, please call us to discuss.

RIVER RANCH VELB CONSERVATION BANK

Valley Elderberry Longhorn Beetle — Service Area

Property Detail >

River Ranch VELB Conservation Bank

From: Julie Maddox
To: Guerrero, Lorena G CIV USARMY CESPK (USA)
Subject: [URL Verdict: Neutral][Non-DoD Source] RE: Checking availability for elderberry shrub transplants
Date: Thursday, April 6, 2023 4:17:44 PM
Attachments: image001.png
image002.png

Hi Lorena,

The Bank is sold-out of VELB credits, but we do have space for incoming elderberry shrub transplants.

Let me know if you have any questions.

Thank you,
Julie Maddox
Wildlands | Director of Sales
6558 Lonetree Blvd. | Rocklin, CA 95765
p: 916.435.3555 | f: 916.435.3556 | d: 916.625.3829

From: Guerrero, Lorena G CIV USARMY CESPK (USA) <Lorena.G.Guerrero@usace.army.mil>
Sent: Thursday, April 6, 2023 10:12 AM
To: Julie Maddox <jmaddox@heronpacific.com>
Subject: Checking availability for elderberry shrub transplants

Good Morning Ms. Maddox,

We are moving towards construction on one of our projects and have 10 elderberry shrubs which are in need of transplanting. I saw on the web that there may be availability at your bank to accept transplants.

Is there currently any space at the River Ranch VELB Conservation Bank?

Thank you,

Lorena G. Guerrero
Biologist
Planning Division
USACE Sacramento District
1325 J Street
Sacramento, CA 95814
Office: (916) 557-7134
Lorena.G.Guerrero@USACE.ARMY.MIL
Pronouns: she, her, hers

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