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Initial Study/Mitigated Negative Declaration for the Bouldin Island Levee Rehabilitation Project

PREPARED FOR

Reclamation District No. 756
(Bouldin Island)
343 East Main Street, Suite 815
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Cover photo: Bouldin Island levee and State Route 12, April 2021.

PROJECT SUMMARY

Bouldin Island Levee Rehabilitation Project, South Mokelumne River Corridor	
CEQA lead agency name and address	Reclamation District No. 756 343 East Main Street, Suite 815 Stockton, CA 95202
CEQA responsible agencies and other public agencies whose approval may be required	• California Department of Water Resources (funding) • Metropolitan Water District of Southern California (landowner) • California Department of Fish and Wildlife (Lake and Streambed Alteration Agreement) • San Joaquin County (Demolition Permit) • San Joaquin Valley Air Pollution Control District (Approval for Demolition Permit)
Contact person and phone number	Michael N. Kynett, PE Project Engineer MBK Engineers 455 University Avenue, Suite 100 Sacramento, CA 95825 kynett@mbkengineers.com Office: (916) 437-7553 Cell: (916) 799-0641
Project location	Bouldin Island levee stations 665–726 and 781–947 along the South Mokelumne River, San Joaquin County
Project sponsor's name and address	Reclamation District No. 756 343 E. Main Street, Suite 815 Stockton, CA 95202
Zoning	Agriculture
Description of Project	Rehabilitate approximately 22,677 linear feet of levee on Bouldin Island along the South Mokelumne and Mokelumne river corridors
Surrounding land uses and setting	The Project levee is on the northern portion of Bouldin Island along the South Mokelumne and Mokelumne river corridors, and the potential borrow sites are on agricultural land in the interior of the island.

PROPOSED MITIGATED NEGATIVE DECLARATION

Project: Bouldin Island Levee Rehabilitation Project

Lead Agency: Reclamation District No. 756

Project Location: The Project levee is located on the north end of Bouldin Island along the South Mokelumne and Mokelumne rivers in San Joaquin County. The potential borrow sites are on agricultural land on the interior of the island. The Project Area is approximately 10 miles northwest of the City of Stockton and immediately adjacent to the western border of the town of Terminous, California.

Project Description: Reclamation District No. 756 plans to rehabilitate approximately 22,677 linear feet of levee along the South Mokelumne and Mokelumne river corridors on Bouldin Island to sustainably meet California Department of Water Resources Bulletin 192-82 standards. Levee rehabilitation consists of widening and raising the levee crest, armoring the raised portion of the levee crest, flattening the landside levee slope, and placing an all-weather surface on the finished levee crest. Soil fill material may be sourced from within Bouldin Island (on-site borrow) or as import from regional off-site commercial locations. Existing levee encroachments or penetrations such as siphon pipes, drain pipes, and unused structures or remnants of structures may be removed or relocated to facilitate the levee rehabilitation.

Findings: An Initial Study has been prepared to assess the potential effects of the Project on the environment and the significance of those effects. Based on the Initial Study, Reclamation District No. 756 has determined that the Project, including conservation measures that are part of the Project design, will not have significant effects on the environment. This conclusion is supported by the following findings:

- The Project will have no impacts on the following: mineral resources, population and housing, public services, recreation, transportation, utilities/service systems, and wildfire.
- The Project will result in less than significant impacts on the following: aesthetics, agricultural and forest resources, air quality, energy, geology and soils, greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, land use and planning, and noise.
- Mitigation is included to reduce potentially significant impacts to less than significant levels for: biological, cultural, and tribal cultural resources.

Mandatory Findings of Significance:

- The Project will not substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory.
- The Project will not have environmental effects that are individually limited, but cumulatively considerable.
- The Project will not have environmental effects which would cause substantial adverse effects on human beings, either directly or indirectly.

- The Project will not achieve short-term environmental goals to the disadvantage of long-term environmental goals.
- No substantial evidence exists that the Project will have a negative or adverse effect on the environment.

Proposed Mitigation Measures: Mitigation measures included in the Project to avoid or minimize potential environmental impacts are included in the attached Initial Study, which is hereby incorporated and fully made part of this Mitigated Negative Declaration. Implementation of these mitigation measures will ensure that the potential environmental impacts of the Project are less than significant. Reclamation District No. 756 has agreed to implement each of the identified mitigation measures, which will be adopted as part of the Mitigation Monitoring and Reporting Program.

Determination
In accordance with Section 21082.1 of the California Environmental Quality Act (CEQA), Reclamation District No. 756 has independently reviewed and analyzed the Initial Study and proposed Mitigated Negative Declaration for the Project and finds that the Initial Study and proposed Mitigated Negative Declaration reflects the independent judgment of Reclamation District No. 756. The lead agency further finds that the Project mitigation measures will be implemented as stated in the Initial Study and Mitigated Negative Declaration. This Mitigated Negative Declaration is filed in accordance with CEQA and the State CEQA guidelines.

I hereby approve this Project:

_____ _____
Reclamation District No. 756 Date

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1 INTRODUCTION

Bouldin Island is owned by the Metropolitan Water District of Southern California, and its levees are maintained by Reclamation District No. 756 (District). The District was formed in October 1904 to protect from flooding and manage drainage of approximately 6,000 acres of agricultural land, local infrastructure and other assets on Bouldin Island through levee maintenance. The District plans to rehabilitate 22,677 linear feet (4.3 miles) of the north side of Bouldin Island's levee system along the South Mokelumne River, Mokelumne River, and Little Potato Slough corridors (Project) to sustainably achieve the minimum requirements of Bulletin 192-82.[1] This Initial Study/Mitigated Negative Declaration (IS/MND) has been prepared in compliance with the California Environmental Quality Act (CEQA) to address the potential environmental effects of levee rehabilitation on Bouldin Island. Other relevant federal and state legislation that may pertain to the Project is summarized in Section 6.

1.1 Project Location

Bouldin Island is located in the Sacramento-San Joaquin River Delta (Delta), approximately 10 miles northwest of Stockton and adjacent to the western border of the town of Terminous, in San Joaquin County, California (Figure 1-1). The approximately 6,000-acre island is bounded by the South Mokelumne River to the north, Little Potato Slough to the south and east, and the Mokelumne and San Joaquin rivers to the west (Figure 1-2). Project activities will occur on the northern levee of the island along the South Mokelumne River, Mokelumne River, and Little Potato Slough. The island is accessible from State Route 12, which runs east to west for 4.6 miles across the island. There are several residences on the island, but it is predominantly used for agricultural crop production, including corn (*Zea mays*), alfalfa (*Medicago sativa*), and sunflower (*Helianthus annuus*) (SWSD 2021). Vegetation on the crown and slopes of the Bouldin Island levees is regularly controlled by herbicides and/or sheep grazing.

1.2 Project Area

The Project Area includes: (1) the levee crown and the area extending landside to varying distances up to 150 feet (ft) from the landside levee crest hinge point, from levee stations 665+00 to 726+00 and 781+00 to 946+77 along the north side of the island (Project levee); (2) the associated top of the bank along the waterside perimeter of the Project levee above the High Tide Line (HTL) and Mean High Water (MHW); and (3) a total of four potential borrow sites, two located north of State Route 12 and two located south of State Route 12 (Figure 1-2).

[1] Bulletin 192-82 standards are levee standards established by Bulletin 192 published by California Department of Water Resources (DWR)in December 1982. Minimum standards include (1) levees shall have 1.5 ft of freeboard above the 300-year flood frequency elevation, as provided by the U.S. Army Corps of Engineers; (2) the minimum crown width shall be at least 16 ft; (3) waterside slopes shall be at least 2 horizontal to 1 vertical with revetment in areas where erosion has been a problem; (4) landside slopes shall be at least 3 horizontal to 1 vertical, with flatter slopes in the lower portion of the levee in areas where soil stability and seepage have been problems; and (5) the levees shall have all-weather access roads.

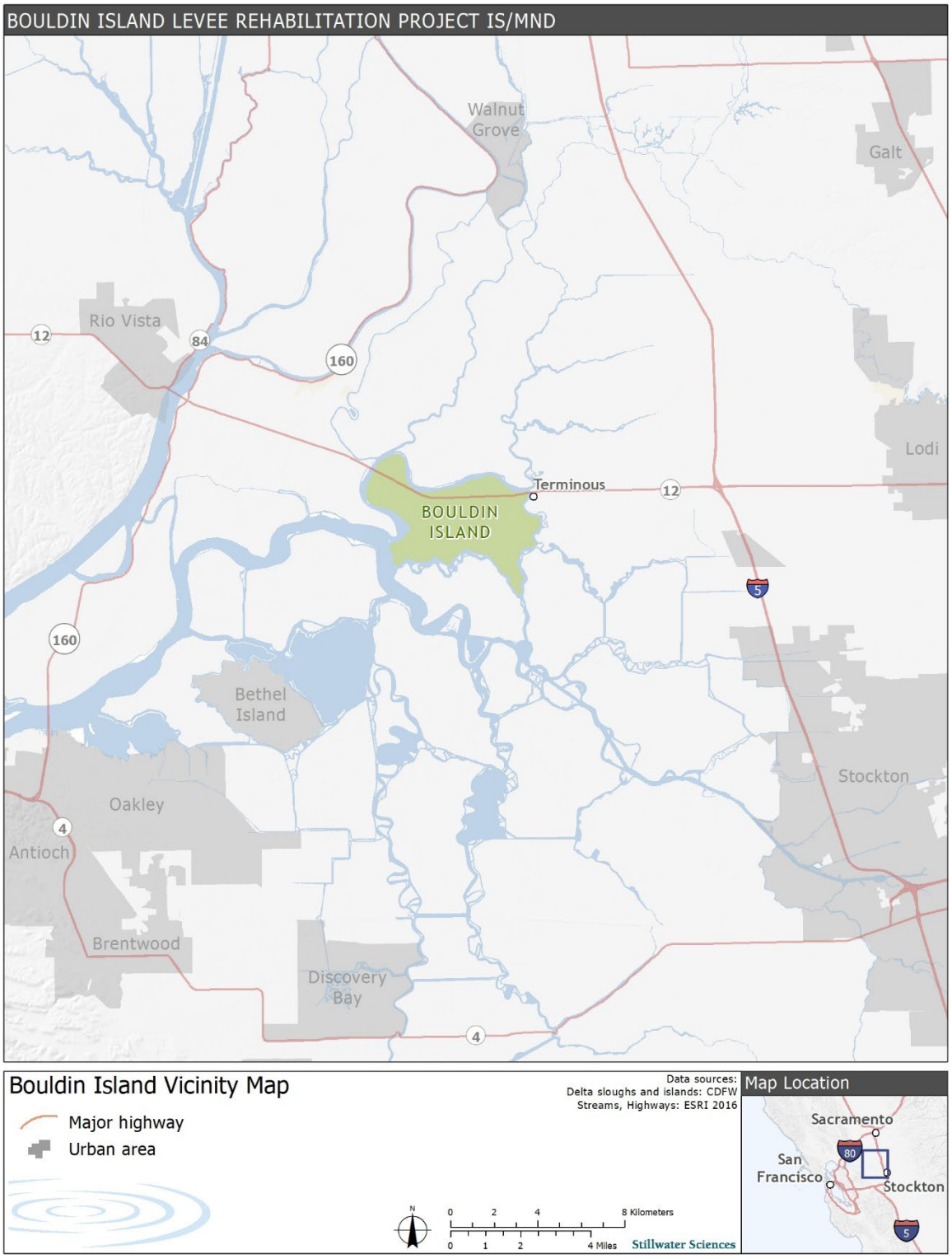

Figure 1-1. Bouldin Island location and surrounding vicinity.

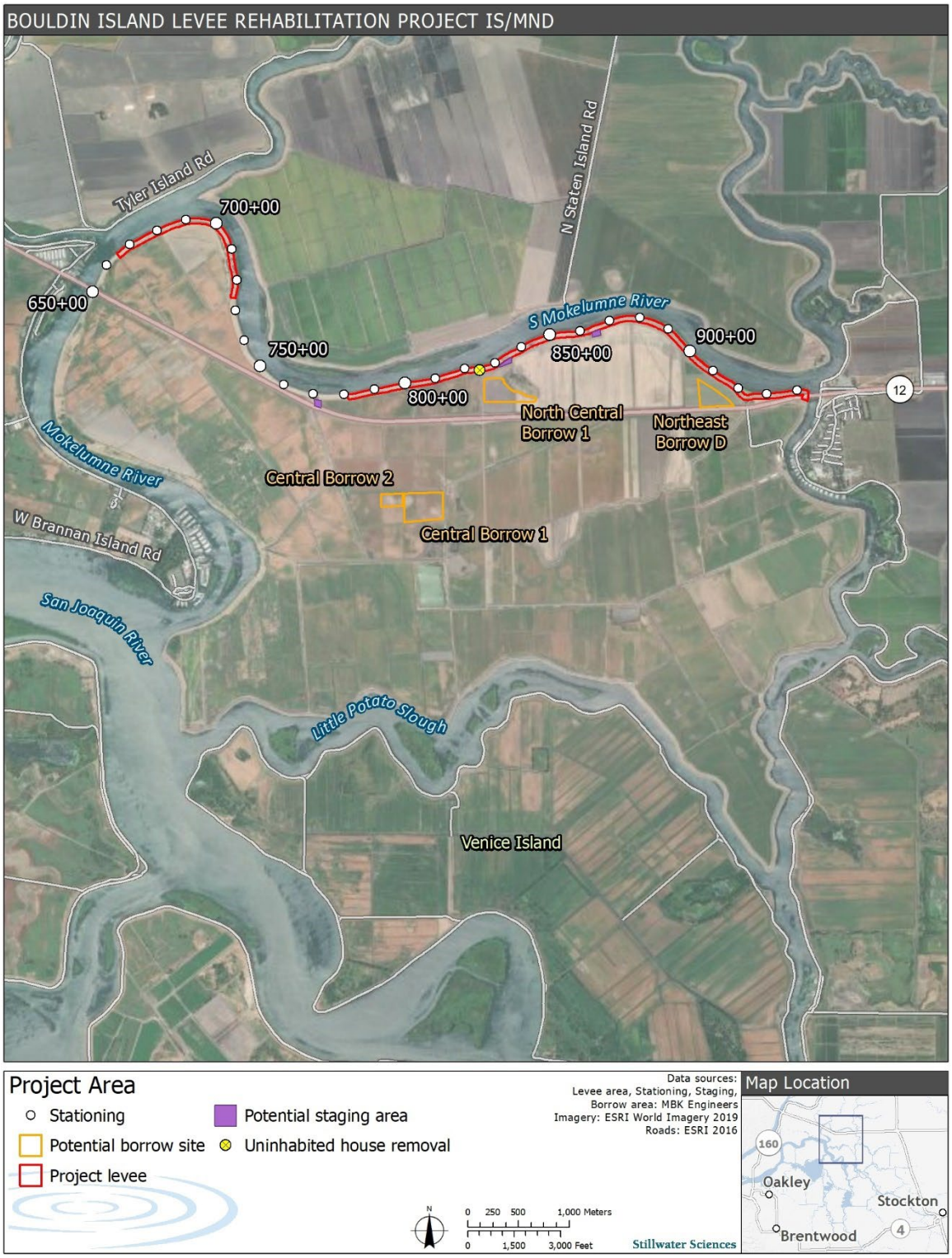

Figure 1-2. Bouldin Island Levee Rehabilitation Project Area.

1.3 Project Purpose and Benefits

The Project levee is generally narrow with over-steepened slopes susceptible to erosion, seepage, and slope instability. Additionally, the levee proposed for rehabilitation sustained heavy damage during a flood in 2017, requiring several emergency flood prevention actions such as backfilling. The emergency flood response temporarily saved the island, but the geometry of the Project levee remains deficient and requires rehabilitation to meet the minimum standards of Bulletin 192-82. Bulletin 192-82, produced by California Department of Water Resources (DWR) in 1982, examined several potential levee improvement alternatives for Delta islands and recommended construction of levees to heights sufficient to protect against water levels with an average recurrence interval of 300 years (DWR 1982). To meet these levee design standards, decrease the potential for levee failure and associated flooding, and improve emergency access, the Project levee will be widened and raised, a toe berm constructed, and revetments installed on waterside slopes.

The District has concluded that rehabilitating the Project levee is a high priority in order to lower the overall flood risk for the island. The Project is identified in Phase 5 of the District's 2012 Five Year Plan (FYP), which was developed to facilitate rehabilitation of District levees to meet Bulletin 192-82 levee standards. The Project is funded by DWR's Delta Levees Special Projects Program (Project Funding Agreement BO-19-1.1-SP). Authorized under the California Water Code, this program provides funding to safeguard public benefits—including roads, utilities, water quality, recreation, navigation, and fish and wildlife—from flood hazards.

Project benefits also include improving the reliability of local and regional water supply and conveyance. The Project levee protects channel integrity along the South Mokelumne and Mokelumne rivers, which convey water to California State Water Project and federal Central Valley Project pumping facilities in the south Delta. The Project will reduce the risk of levee failure, thus reducing associated risks to the water supply (e.g., the potential for salinity intrusion) for local and export interests.

The Project will also increase the protection of infrastructure on Bouldin Island. State Route 12 is one of the main transportation corridors through the Delta, accommodating approximately 20,000 vehicles per day while functioning as a critical emergency deployment, access, and evacuation route for the Delta and surrounding communities. As of 2007, Bouldin Island has 43,282 ft of minor roads, 1,505 ft of major roads, 24,159 ft of highway (State Route 12), a gas well, multiple utility corridors, one uninhabited house (Figure 1-2), and four inhabited residences with up to 20 occupants at any given time (URS Corporation and J.R. Benjamin & Associates, Inc. 2007). State Route 12 has since been widened, but no other changes have been made to this infrastructure.

In addition to agriculture, the Project levee also protects a variety of other land cover and vegetation types on Bouldin Island including riparian, marsh, herbaceous upland, and open water habitats (i.e., canals, ditches, and permanent ponds) are located on the island. Approximately 5,000 acres on Bouldin Island are typically in agricultural production including for corn, alfalfa, and sunflower. Much of this agricultural land is seasonally flooded, adding to the available habitat for migratory waterfowl during the fall and winter.

1.4 Project Description

1.4.1 Levee configuration

Project implementation will result in a new levee configuration that will increase stability and thereby decrease the potential for failure (Figure 1-3). The Project levee crown will be widened to a minimum width of 21 ft, and aggregate base will be placed along its surface to create an all-weather roadway. Fill material will be placed along the landside levee slope to a minimum slope of 3:1 (horizontal to vertical) and on the waterside to a minimum slope of 2:1 (horizontal to vertical). Newly placed fill along the upper waterside slope will be armored with clean quarry stone (i.e., riprap). To accommodate initial settling under the weight of new fill and continued settling as the underlying peat creeps, the Project levee will be built 12 inches higher and 5 ft wider than the planned final crest dimensions (Hultgren-Tillis Engineers 2021a). In compliance with California Water Code Section 12316(g), a stability berm will be constructed along the landside toe of the Project levee to raise the elevation of the land immediately adjacent to the levee and to cover exposed peat that could otherwise oxidize over time.

The width of the rehabilitation footprint will vary along the approximately 4.3 miles of Project levee depending on site-specific conditions such as the height, width, slope, and elevation of the existing levee. Project activities will be limited to the levee crown, landside levee slope extending landside to varying distances up to 150 ft from the landside levee crest hinge point, and the waterside levee slope above HTL and MHW, which are encompassed within the Project Area.

1.4.2 Site preparation

Site preparation activities include clearing vegetation on the landside slope, the vast majority of which is ruderal herbaceous and is anticipated to return following construction. Additionally, 34 trees on the landside of the Project levee are designated for removal; however, several ornamental trees near levee stations 718, 833, 844, and 863, and mature northern California black walnuts (*Juglans hindsii*) near levee stations 718 and 800 will be protected in place. Tree removal will typically include the removal of the root ball and roots greater than 1.5 inches in diameter. See Section 2.4 for a description of vegetation types in the Project Area and potential impacts to these habitats.

There is very little vegetation on the waterside slope requiring removal, and all trees or shrubs on the waterside with diameters at breast height (DBH) greater than 2 inches will be protected in place.

Existing siphons, pipes, and other encroachments will be raised above the floodplain to facilitate levee rehabilitation.

1.4.3 Removal of uninhabited structure

Project activities will generally avoid inhabited residences and other structures; however, a shed near levee station 813 and an uninhabited residence along the landside levee toe near levee station 824+50 will be removed during Project construction (Figures 1-2 and 1-4). Demolition of the residence will include removal of any underground utilities, foundations, and the aboveground structure. A San Joaquin County demolition permit will be obtained, as will approval of the San Joaquin Valley Air Pollution Control District (SJVAPCD) and Environmental Health Department following inspections for asbestos-containing material and lead-based paint. All demolished materials will be loaded into haul trucks, covered, and disposed of off site at an appropriate

facility (e.g., the North County Recycling Center and Sanitary Landfill in Lodi). Other debris, remnants of structures, and general refuse within the Project Area will be demolished and disposed of off site.

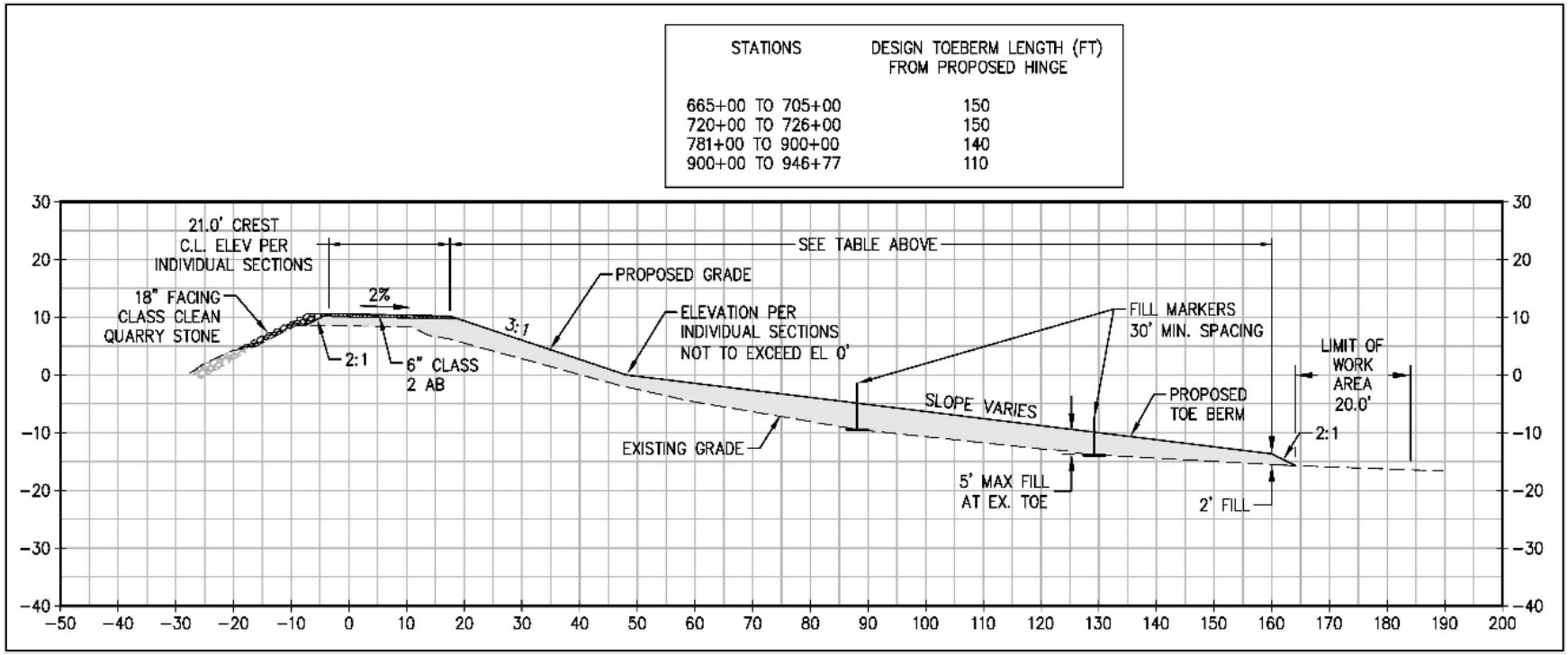

Figure 1-3. Typical levee cross-section for the Bouldin Island Levee Rehabilitation Project.

Figure 1-4. Uninhabited residence at levee station 824+50 to be demolished as part of the Bouldin Island Levee Rehabilitation Project.

1.4.4 Fill material

The Project levee rehabilitation will require an estimated 450,000 cubic yards of fill obtained from borrow sites located on Bouldin Island and an additional 56,000 cubic yards of imported fill. Approximately 10,000 cubic yards of Class 2 aggregate base will be used in construction of the levee crown road, and 12,000 cubic yards of clean quarry stone will be used to armor newly placed fill on the upper waterside slope. Sources for imported materials will be surrounding areas (e.g., Lodi, Stockton) and will be determined when the Project commences. Materials sourced off island will be imported using existing public roads (e.g., State Route 12). On-island haul routes for all material, including fill from the borrow sites, will utilize private roads on the island (i.e., dirt roads currently used for agricultural equipment).

1.4.5 Emergency stockpiles

The Project will also incorporate stockpiled material located strategically along the length of the levee, likely near levee stations 15 and 770. Stockpiles will include pre-deployed caches of rock slope protection (riprap) material for use during a flood fight and will be designed in accordance with the geotechnical engineer's recommendations. Typically, stockpiles are no more than 4 to 6 ft in height.

1.4.6 Erosion control

Appropriate best management practices (BMPs) (e.g., working only during dry periods) and a Stormwater Pollution Prevention Plan (SWPPP) will be implemented during construction in order to prevent and control potential impacts on waters from erosion during Project construction (Section 1.4.9). All erosion control measures will be implemented in accordance with the California Department of Transportation (Caltrans) Construction Site BMP Manual (Caltrans 2017).

Following Project levee construction, the landside slope will be seeded with a California Department of Fish and Wildlife (CDFW) approved native grass seed mix for erosion control and ecosystem enhancement. CDFW will be consulted to determine an appropriate seed mixture and BMPs to ensure establishment of native grasses. The levee crown will not be vegetated but will be covered with compacted aggregate base to provide all-weather access; the roadway will be constructed with a 2% landside slope to minimize runoff into the adjacent waterway.

1.4.7 Equipment and materials

Table 1-1 provides a list of equipment anticipated to be used for the Project. All construction equipment will be compliant with SJVAPCD requirements.

Table 1-1. Equipment anticipated to be used for the Bouldin Island Levee Rehabilitation Project.

Equipment type	Number of rigs (or loads, if specified)
Excavators	2–3
Bulldozers	2
Blades	2
Compactors	2
Water trucks	2–3
Skip loader	1
Crew Pickups	2
Semi-bottom dump trucks, onsite	10–30 looping trucks
Semi-bottom dump trucks, import fill and aggregate	50–150 loads per day
Side dump trucks, import quarry stone	~50 loads per day
Pumps (water truck)	2
Pumps (borrow sites)	2
Planting equipment	To be determined

Construction equipment and materials (e.g., fill) will be transported to Bouldin Island via trucks. Dump trucks will move fill material to the Project levee. Aggregate base will be transported to the site via semi-bottom dump trucks. Equipment to place and compact fill material will likely include excavators, blades, bulldozers, water trucks, and compactors. Semi-bottom dump trucks will remain on site and deliver fill from the borrow sites to the Project levee in a looping pattern. Haul routes will be restricted to existing roads.

Pumps will run as needed at the borrow sites to control water levels or to fill water trucks. Water trucks will be used to control dust throughout Project construction.

Construction equipment will operate from the levee crown or on the landside slope, starting with the initial lift of the toe berm and working up toward the levee crown to construct the phased improvements.

1.4.8 Construction schedule

Project construction is expected to take 14 months between May and November over a 2-year period. A typical workday is assumed to be 8 hours per day, during daylight hours, 6 days per week. Construction work will not occur prior to 6:00 a.m. or after 6:00 p.m. An estimated 400 working days will be necessary to complete the Project. Work is expected to occur Monday through Saturday with light work (e.g., maintenance of equipment) on Sundays if needed.

1.4.9 Conservation measures

The conservation measures described below will be implemented as part of the Project. The measures are based on standard practices to avoid, minimize, or reduce potential impacts on environmental resources and comply with existing regulations and/or requirements pertaining to air quality, hazards/hazardous materials, and hydrology/water quality.

AIR-1

The following are measures to prevent, control, and minimize emissions during Project construction:

a) All construction vehicles will be model year 2010 or newer.
b) All construction equipment will be properly tuned and maintained prior to and for the duration of on-site operation.
c) Diesel-powered construction equipment idling time will be limited to less than five minutes.
d) A traffic plan will be developed to minimize traffic flow interference from construction activities.
e) An operational water truck will be available at all times. Water will be applied as needed to control dust and to prevent visible emissions violations and off-site dust impacts.
f) On-site dirt piles or stockpiled materials will be covered, and water or soil stabilizers will be employed to reduce wind-blown dust emissions.
g) Traffic speeds on all unpaved surfaces will be reduced to 20 miles per hour or less. Appropriate training, enforcement, and signage will be provided.
h) Ground cover will be re-established in the Project Area as soon as possible after construction.

HAZ-1

Prior to Project construction, a SWPPP will be developed that will include, but not be limited to, the following list of BMPs to avoid and minimize potential effects from hazards and hazardous materials:

a) No potentially hazardous materials will be stored in a location where there is potential to enter any waterway and/or contaminate aquatic resources.
b) All construction materials with the potential to pollute runoff will be handled with care and stored under cover and/or surrounded by berms during wet weather or when rain is forecast.

c) An effort will be made to store only the amount of a potentially hazardous product necessary to complete the job.
d) Materials, fuels, liquids and lubricants, and equipment supplies stored on site will be stored in a neat, orderly manner, in their appropriate containers, with the original manufacturer's label, and, if possible, in an enclosure.
e) Any hazardous materials will be stored and labeled according to local, state, and federal regulations.
f) If drums must be stored without overhead cover, they will be stored at a slight angle to reduce corrosion and ponding of rainwater on the lids.
g) Substances will not be mixed with one another unless recommended by the manufacturer.
h) Manufacturer's recommendations for proper use and disposal of a product will be followed.
i) Whenever possible, all of a product will be used before disposal of its container.
j) If surplus product must be disposed of, the manufacturer's or the local and state recommended methods for proper disposal will be followed.

HAZ-2

The SWPPP developed for the Project will include, but not be limited to, the following measures to prevent, control, and minimize impacts from a spill of a hazardous, toxic, or petroleum substance during construction of the Project:

a) Minor spills are those that can be controlled by on-site personnel. The following actions will occur upon discovery of a minor spill:
    - The spread of the spill will be contained.
    - If the spill occurs on impermeable surfaces, such as any temporary surfaces installed for pollution prevention during construction, it will be cleaned up using "dry" methods (e.g., absorbent materials, cat litter, and/or rags).
    - If the spill occurs in permeable substrate areas, it will be immediately contained by constructing an earthen dike. The contaminated soil will be excavated and properly disposed of.
    - If the spill occurs during rain, the impacted area will be covered to avoid runoff, and appropriate cleanup steps will be taken after precipitation has ceased.
    - All steps taken to report and contain the spill will be recorded.
b) On-site personnel should not attempt to control major spills until the appropriate and qualified emergency response staff have arrived at the site. Failure to report major spills can result in significant fines and penalties.
    - If a major spill occurs, the Governor's Office of Emergency Services Warning Center will be notified at (800) 852-7550 in addition to local authorities.
    - For spills of federal reportable quantities, the National Response Center will also be notified at (800) 424-8802. The federal reportable spill quantity for petroleum products is any oil spill that: (1) violates applicable water quality standards, (2) causes a film or sheen upon or discoloration of a water surface or adjoining shoreline, or (3) causes a sludge or emulsion to be deposited beneath the surface of the water or adjoining shorelines.
    - A written report will be sent to all notified authorities.

c) Diesel fuel, oil, gasoline, and lubricants are considered petroleum products. These materials will be handled carefully to minimize their exposure to storm water. The risks in using petroleum products will be reduced by following these steps:
   - Waste oil and other petroleum products will not be discharged into the ground or other water bodies.
   - Petroleum products will be stored in tightly sealed containers that are clearly labeled, in a covered area, and within prefabricated spill containment devices, earthen berms, or similar secondary containment features.
   - On-site vehicles will be monitored for fluid leaks and receive regular preventative maintenance to reduce the chance of leakage (e.g., check for and fix fuel oil leaks in construction vehicles on a regular basis).
   - Bulk storage tanks having a capacity of more than 55 gallons will be provided with a secondary containment measure. Containment can be provided by a prefabricated temporary containment mat, a temporary earthen berm, or other, equally effective containment measure.
   - Bulk fuel or lubricating oil dispensers will have a valve that must be held open to allow the flow of fuel into construction vehicles. During fueling operations, the contractor will have personnel present to detect and contain spills.

d) The following additional spill control and cleanup practices will be followed:
   - Spills will be contained and cleaned up immediately after discovery.
   - Manufacturer's methods for spill cleanup of a material will be followed as described on the material safety data sheets (kept with product containers).
   - Materials and equipment needed for cleanup procedures will be kept readily available on site, either at an equipment storage facility or on the contractor's trucks. Equipment to be kept on site will include, but not be limited to, brooms, dust pans, shovels, granular absorbents, sand, sawdust, absorbent pads and booms, plastic and metal trash containers, gloves, and goggles.
   - On-site personnel will be made aware of cleanup procedures, the location of spill cleanup equipment, and proper disposal procedures.
   - Toxic, hazardous, or petroleum product spills required to be reported by regulations will be documented and a record of the spills will be kept with Project documents.
   - If a spill occurs that is reportable to the federal, state, or local agencies, the contractor is responsible for making and recording the reports.

HAZ-3

The Project will comply with the National Emission Standards for Hazardous Air Pollutants (NESHAP) and California Division of Occupational Safety and Health (Cal/OSHA) requirements as part of demolition of the residence at levee station 824+50 (Figure 1-4). A San Joaquin County demolition permit will be obtained, as will approval of the SJVAPCD and Environmental Health Department following inspections for hazardous building materials (e.g., asbestos-containing materials, lead-based paints) by a qualified and licensed professional (e.g., a Certified Asbestos Consultant) in the structure proposed for demolition. Any asbestos-containing materials or peeling lead-based paint will be abated in accordance with local, state, and federal requirements.

HAZ-4

The following are measures to reduce the potential for fire:

a) Smoking will be permitted only in designated smoking areas.
b) Every fuel truck will carry a large fire extinguisher with a minimum rating of 40 B:C, and all flammable materials will be removed from equipment parking and storage areas.

HYD-1

The SWPPP developed for the Project will include, but not be limited to, the following BMPs to avoid and minimize potential impacts on waters from erosion:

a) Construction will occur only during dry periods.
b) Prior to storm events, all construction activities shall cease, and appropriate erosion control measures will be implemented.
c) Soil, silt, or other organic materials will not be placed, stockpiled, or stored where such materials could pass into surface water or surface water drainage courses during unexpected rain events.
d) All areas disturbed by Project activities will be protected from washout or erosion prior to the onset of the rainy season.
e) All temporarily affected areas will be restored to pre-construction contours and conditions upon completion of construction activities.
f) Prior to initiation of any waterside work, erosion control measures will be utilized throughout all phases of operation where silt and/or earthen fill threaten to enter waters of the U.S. and/or state.

1.4.10 Mitigation measures

Mitigation measures have been added to the Project to reduce potential effects on biological, cultural, and tribal cultural resources to a less than significant level. Pre-construction surveys will be conducted for each year of Project implementation, if applicable. Results from all pre-construction surveys described in the following mitigation measures will be provided to CDFW staff for review prior to the initiation of construction.

BIO-1

All contractors and equipment operators will be provided Worker Environmental Awareness Program (WEAP) training to educate them on the environmental resources of the Project Area and required protection measures. Training will include information about the federal and California Endangered Species Acts (ESA and CESA, respectively) (Section 6) and the consequences of noncompliance with these acts. Workers will be informed about the presence, life history, and habitat requirements of all special-status species that may be affected in the Project Area. Training will also include information on state and federal laws protecting water resources and migratory birds as well as their nests and eggs. This training will be conducted prior to construction for each year of Project implementation, if applicable, and will be provided to any new staff/contractors added during the Project.

BIO-2

If required based on results of pre-construction surveys (see **BIO-4** through **BIO-8**), a qualified biologist with appropriate knowledge and experience in the biology, life history, and

identification characteristics of special-status species that have the potential to be encountered during the proposed activities will be present during construction activities that have the potential to adversely affect these resources. This monitor will be given the authority to halt any work they deem may be a cause for concern of endangering special-status species or resources.

BIO-3

The following measures will ensure that adverse effects on special-status plants are avoided or minimized:

a) Surveys for special-status plants will be conducted in accordance with the *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants* (USFWS 2000) and *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFW 2018) and will be comprehensive for vascular plants.
b) Areas with special-status plants will be flagged or otherwise marked (e.g., staked, fenced) for avoidance prior to construction, including the incorporation of a clearly marked 10-ft buffer, and all employees will be notified of the plant locations. If work must be conducted within the 10-ft buffer area, CDFW will be consulted to determine appropriate methods to avoid impacts to rare plants.
c) If avoidance is not possible, the need for mitigation will be determined on a case-by-case basis in consultation with CDFW, prior to construction. For impacts that are determined by CDFW to be potentially significant, mitigation will be provided in a manner and at a location that is acceptable to CDFW. If impacts are mitigated at a location other than a mitigation bank, the new plantings will be documented using a California Natural Diversity Database (CNDDB) form and completed forms shall be submitted to CNDDB following establishment.

BIO-4

A survey for western pond turtles (*Actinemys marmorata*) and any active pond turtle nests (during the nesting and hatchling emergence season, April 1 through November 30) will be conducted in suitable habitat (e.g., ditches and ponds) located within a 100-ft buffer of the Project Area by a qualified biologist within seven days prior to onset of staging or construction activities. If a western pond turtle nest is found, a 100-ft no-disturbance buffer zone will be established around the nest using flagging, fencing, and/or signage as appropriate. No construction activities will occur within the buffer zone until a qualified biologist has determined that the nest is not in use. If an active western pond turtle nest is found, CDFW will be notified to determine the appropriate course of action. If a western pond turtle is observed at any time before or during construction, it will be left alone to move out of the area on its own or may be relocated by a qualified biologist to suitable aquatic habitat outside of the Project Area; translocation of turtles will only be performed in consultation with CDFW and by an individual possessing a valid scientific collecting permit.

BIO-5

The following measures will be implemented to minimize effects on giant garter snakes (*Thamnophis gigas*) or their habitat. They are based on the U.S. Fish and Wildlife Service's (USFWS) *Standard Avoidance and Minimization Measures During Construction Activities in Giant Garter Snake Habitat, from Programmatic Formal Consultation for U.S. Army Corps of Engineers 404 Permitted Projects with Relatively Small Effects on the Giant Garter Snake within*

Butte, Colusa, Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, Sutter and Yolo Counties, California (USFWS 1997).

a) If a snake is encountered during construction, activities will cease until appropriate corrective measures have been completed or it has been determined that the snake will not be harmed. Any sightings and/or any incidental take will be reported to CDFW and the USFWS.

b) Construction activity within giant garter snake habitat (e.g., aquatic habitat and upland habitat within 200 ft of aquatic margins) will be conducted between May 1 and October 1. This is the active period for the snake; direct mortality is lessened because snakes are expected to actively move and avoid danger. Initiation of construction activities within 200 ft of the banks of snake aquatic habitat will be avoided during the snake's inactive season (October 2–April 30). With permission from relevant agencies (i.e., USFWS and CDFW), ground-disturbing activities that were initiated prior to October 1 may continue into the snake's inactive season.

c) If dewatering of suitable aquatic habitat is necessary, it will occur prior to the initiation of construction activities. Any dewatered habitat will remain dry for at least 15 consecutive days after April 15 and prior to excavating or filling of the dewatered habitat.

d) The Project Area will be surveyed for giant garter snake by a qualified biologist 24 hours prior to the start of construction activities and again if there is a lapse in construction activity of two weeks or more.

e) The Project will prohibit use of erosion control materials potentially harmful to giant garter snake and other species, such as mono-filament netting (erosion control matting) or similar material. Tightly woven fiber netting or similar material will be used for erosion control to ensure that giant garter snakes do not get trapped and become entangled.

f) During construction operations, the number of access routes, number and size of staging areas, and the total area of the proposed construction activity will be limited to the minimum necessary. Routes and boundaries will be clearly demarcated. Movement of heavy equipment to and from the Project Area will be restricted to established roadways to minimize habitat disturbance. Project-related vehicles will observe a 20-mile-per-hour speed limit within construction areas.

g) All Project-related parking, storage areas, laydown sites, equipment storage, and any other surface-disturbing activities will be confined to the Project Area using previously disturbed areas to the extent possible.

BIO-6

Fish and Game Code Sections 3503, 3503.5 and 3513 protect avian species (including raptors), their nests, and eggs and prohibit take as defined in Fish and Game Code Section 86. For Project activities conducted during the typical avian breeding season (February 1–August 15), a pre-construction nest survey will be conducted. If the project is delayed longer than 2 weeks during the breeding season, an additional survey will be conducted. Pre-construction surveys will include areas suitable for ground-nesting birds and raptors as well as trees, shrubs, buildings, or other structures suitable for nesting within 500 ft of the Project Area. Species-specific surveys will be conducted as described below in measures **BIO-7** and **BIO-8**. If active nests (nests containing eggs or young) are identified, a no-disturbance buffer zone will be established around the nest using flagging, fencing, and/or signage as appropriate. No construction activities will occur within the buffer zone until a qualified biologist has determined that the young have fledged or that construction activities within the buffer zone are not disturbing the nesting birds. The width of the buffer zone will be determined by a qualified biologist in coordination with CDFW;

recommended buffers are 700 ft for California black rail (*Laterallus jamaicensis coturniculus*), 500 ft for raptors, and 100 ft for other birds.

BIO-7

Western burrowing owl (*Athene cunicularia hypugaea*) may be present in the work area. No more than 14 days prior to the start of construction, a qualified biologist will conduct a pre-construction survey for active burrowing owl burrows using methods recommended by CDFW in the Staff Report on Burrowing Owl Mitigation (CDFG 2012). Occupied habitat includes areas burrowing owls may use for breeding/nesting (February 1 to August 31), wintering (September 1 to January 31), foraging, and/or migration stopovers. Occupancy of suitable burrowing owl habitat can typically be verified by an observation of at least one burrowing owl or, alternatively, its molted feathers, cast pellets, prey remains, eggshell fragments, or excrement, and/or loose soil near the burrow entrance. If burrowing owl presence is demonstrated, an appropriate buffer of up to 1,600 ft (as recommended in the Staff Report on Burrowing Owl Mitigation) will be established by a qualified biologist in consideration of surrounding waterways. Project-related activities necessary within the buffer will be monitored by a qualified biologist to ensure the owls are not detrimentally affected by Project construction. The on-site biologist will have the authority to stop work if the owls are exhibiting agitated behavior.

BIO-8

The following measures will be implemented for Project activities conducted between March 1 and August 15 to minimize effects on Swainson's hawk (*Buteo swainsoni*) and other protected raptors:

a) In order to avoid take (Fish and Game Code Section 86) of protected raptors (Fish and Game Code Section 3503.5), including Swainson's hawk, three pre-construction raptor nest surveys will be conducted within a 0.25-mile buffer of the Project Area by a CDFW-approved biologist in order to identify active nests. At least one survey will be conducted no more than 15 days prior to the initiation of construction activities following methods described in the Swainson's Hawk Technical Advisory Committee's (2000) *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley*. The results of the surveys will be submitted to the District and CDFW.

b) If active nests are found, an initial temporary nest disturbance buffer of 0.25 miles will be established. If Project-related activities within the temporary nest disturbance buffer are determined to be necessary during the nesting season, then an on-site biologist/monitor experienced with raptor behavior will be retained by the Project proponent to monitor the nest. The monitor and the Project proponent will consult with CDFW to determine the best course of action necessary to avoid nest abandonment or take of individuals.

c) Work may only be allowed to proceed within the temporary nest disturbance buffer if raptors are not exhibiting agitated behavior such as defensive flights at intruders, getting up from a brooding position, or flying off the nest, and only with the agreement of CDFW. Based on the behavior observed, the buffer may be reduced if the birds are tolerant of construction activities. A designated on-site biologist/monitor will be on site daily while construction-related activities are taking place within the 0.25-mile buffer and will have the authority to stop work if raptors are exhibiting agitated behavior.

d) If the project is delayed longer than 2 weeks during breeding season, an additional survey will be necessary.

BIO-9

A Mitigation and Monitoring Plan will be developed for Project impacts on Freshwater Marsh,[2] Scrub-shrub,[3] and Riparian Forest[4] habitats as defined by Assembly Bill (AB) 360 (Section 6.2) and/or protected by San Joaquin County Development Title Section 9-1510. The plan will describe in detail mitigation for these habitat types on island and/or at a mitigation bank off island. Mitigation site(s) will be approved by CDFW.

CUL-1

As part of WEAP training (see **BIO-1** above), information about the potential for cultural resources in the Project Area and the measures in place to protect them will be provided to all contractors and equipment operators. Training will include information about the federal and state laws protecting cultural resources, identification of potential cultural resources, and procedures to follow (e.g., protective buffers, personnel to contact) in the event of an inadvertent find. This training will be conducted prior to construction for each year of Project implementation, if applicable, and will be provided to any new staff/contractors added during the Project.

CUL-2

The following measures will be implemented during the Project to mitigate the inadvertent finds of archaeological resources, cultural resources, tribal cultural resources, or human remains:

a) If a cultural resource (e.g., prehistoric stone tool, milling stone, historic glass bottle, foundation, cellar, privy pit) is inadvertently discovered during Project activities, work must be halted within 30 ft of the find and a qualified archaeologist notified immediately so that an assessment of its potential significance can be undertaken. Construction activities may continue in other areas but may not resume in the area of the find until the District provides written permission. If the discovery proves to be significant, additional work, such as data recovery excavation, may be warranted and would be discussed in consultation with the District, affiliated tribal organizations, and any other relevant regulatory agencies or invested parties, as appropriate.

b) If human remains are inadvertently discovered during Project activities, no further disturbance may occur until the County Coroner has made a determination of origin and disposition of the remains pursuant to the California Health and Safety Code (CHSC), Section 7050.5, and the Public Resources Code Section 5097.98. The County Coroner must be notified of the find immediately upon discovery. If the human remains are determined to be of Native American origin, the County Coroner will notify the Native American Heritage Commission (NAHC), which will determine and notify a Most Likely Descendent (MLD). The MLD must complete an inspection of the site within 48 hours of notification and may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials.

[2] The Assembly Bill (AB) 360 definition for Freshwater Marsh habitat includes tidal and non-tidal areas near levees, either on the waterside or landside where there are seeps or toe ditches. Common plant species include cattails (*Typha* spp.) and tules (*Schoenoplectus acutus* var. *occidentalis*).

[3] The AB 360 definition for Scrub-shrub habitat includes stands of woody vegetation predominantly less than 20 ft in height.

[4] The AB 360 definition for Riparian Forest habitat includes woody vegetation (including isolated trees or shrubs) greater than 20 ft in height. Often there is a dense, shrubby understory.

2 ENVIRONMENTAL SETTING AND IMPACTS

Each of the following resource sections includes a completed checklist (from Appendix G of the CEQA Guidelines) of environmental factors potentially affected and identifies potential Project impacts by significance level (i.e., no impact, less than significant impact, less than significant impact with mitigation incorporated, and potentially significant impact). The environmental factors checked in Table 2-1 would potentially be affected by this Project; mitigation measures will be implemented to ensure potential impacts are reduced to less than significant levels.

Table 2-1. Summary of environmental factors potentially affected by the Project.

❑ Aesthetics	❑ Agricultural and Forest Resources	❑ Air Quality
✓ Biological Resources	✓ Cultural Resources	❑ Energy
❑ Geology and Soils	❑ Greenhouse Gas Emissions	❑ Hazards and Hazardous Materials
❑ Hydrology and Water Quality	❑ Land Use and Planning	❑ Mineral Resources
❑ Noise	❑ Population and Housing	❑ Public Services
❑ Recreation	❑ Transportation	✓ Tribal Cultural Resources
❑ Utilities and Service Systems	❑ Wildfire	❑ Mandatory Findings of Significance

2.1 Aesthetics

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Except as provided in Public Resources Code Section 21099, would the Project:				
a) Have a substantial adverse effect on a scenic vista?	❑	❑	❑	✓
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	❑	❑	❑	✓
c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings?	❑	❑	✓	❑
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	❑	❑	❑	✓

2.1.1 Environmental setting

The term "aesthetics" typically refers to the perceived visual character of an area, such as of a scenic view, open space, or architectural facade. The aesthetic value of an area is a measure of its visual character and visual quality combined with viewer response (FHWA 1983). This combination may be affected by the components of a project (e.g., buildings constructed at heights that obstruct views, hillsides cut and graded, open space changed to an urban setting), as

well as the length and frequency of viewer exposure to the setting. Aesthetic impacts are changes in viewer response as a result of Project construction and operation.

The Project levee provides scenic views of the Sacramento-San Joaquin Delta, including the South Mokelumne River, Mokelumne River, and Little Potato Slough. Views of the island interior are largely agricultural and include ruderal vegetation, managed agricultural fields, and small patches of riparian forest and marshland. While Bouldin Island is accessible by vehicle via State Route 12, the levee road in the Project Area is behind locked gates located at several access points, and views of the South Mokelumne River are blocked to vehicular traffic by the existing levee. The levee road is only used to access agricultural fields and the few residences on the island and for levee patrol and maintenance.

People boating in waterways surrounding the island are not generally able to see the interior part of the island because of the existing levee. Viewers include the people inhabiting the few residences on the island, District employees who maintain the island, and farmers who manage the agricultural fields on the island.

2.1.2 Findings

a) Would the Project have a substantial adverse effect on a scenic vista?

Levee rehabilitation associated with the Project will not alter the scenic views of the South Mokelumne River, Mokelumne River, or Little Potato Slough from Bouldin Island. Views of the island interior are not scenic as described above. There will be no impact.

b) Would the Project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

State Route 12 is not a state scenic highway. There will be no impact.

c) In non-urbanized areas, would the Project substantially degrade the existing visual character or quality of public views of the site and its surroundings?

Construction activities will temporarily disrupt the visual character of the Project Area. During Project construction, vegetation along the levee slopes, including 34 trees, will be removed (see Section 2.4 for additional information), an uninhabited residence (Figures 1-2 and 1-4) will be demolished, and material will be excavated from the borrow sites, which will temporarily degrade the visual quality of the site. Construction equipment may be visible to boaters using the nearby South Mokelumne River, Mokelumne River, or Little Potato Slough; motorists on State Route 12; or the limited number of visitors to the island. These impacts will occur for a short period of time (i.e., 14 months). After Project completion, construction equipment will be removed, the slopes will be revegetated with a native grass mix, and up to two excavated borrow sites are anticipated to passively establish freshwater pond, marsh, and/or scrub-shrub habitat which will add heterogeneity to the landscape. Removal of trees and the dilapidated residence along the levee slopes will improve the visibility of the surrounding waterways described in Section 2.1.1 and the quality of the views from the Project levee. For these reasons, the rehabilitation of the levee will not permanently degrade the visual character or aesthetic quality of the Project Area or surrounding areas. Effects are considered less than significant.

d) Would the Project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

There will be no nighttime construction or creation of a new source of substantial light or glare as a result of the Project. There will be no impact.

2.2 Agricultural and Forest Resources

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural land?	❑	❑	✓	❑
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	❑	❑	✓	❑
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	❑	❑	❑	✓
d) Result in the loss of forest land or conversion of forest land to non-forest use?	❑	❑	❑	✓
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	❑	❑	❑	✓

2.2.1 Environmental setting

The Project's location in the San Joaquin Valley near the South Mokelumne River, Mokelumne River, and Little Potato Slough has allowed for the development of deep, rich agricultural soils over time. These rich soils combined with a climate allowing for a lengthy growing season promote extensive agricultural production in San Joaquin County. The County contains approximately 920,000 acres of level, agriculturally productive lands, with fruit and nut crops, field crops, livestock, and poultry acting as the backbones of a dominant agricultural economy (San Joaquin County 2016). Bouldin Island contains approximately 5,000 acres of agricultural fields operated under short-term leases and typically used for corn, alfalfa, and/or sunflower (SWSD 2021). In 2021 Central Borrow 1, Central Borrow 2, and North Central Borrow 1 were cultivated for corn, and Northeast Borrow D was used to grow alfalfa.

2.2.1.1 Farmland

The California Farmland Mapping and Monitoring Program (FMMP), administered by the State Division of Land Resource Protection, is responsible for producing agricultural resource maps based on soil quality and land use. The purpose of the FMMP is to provide information to be used in planning for current and future use of the state's agricultural lands. The FMMP designates land

into the following categories: Prime Farmland, Farmland of Statewide Importance, Unique Farmland, Farmland of Local Importance, Grazing Land, Urban or Built-up Land, Other Land, and Water. Descriptions of these categories are detailed in the FMMP (California DOC 2021).

The majority of Bouldin Island is designated as Prime Farmland (5,388 acres) (CFMMP 2016). An additional 4.4 acres in the interior of the island are designated as Farmland of Statewide importance, and 272.9 acres along the western edge of the island are designated as Farmland of Local Importance. A total of 62.1 acres of Prime Farmland is located in the potential borrow sites as follows: Central Borrow 1 (24.9 acres), Central Borrow 2 (6.4 acres), North Central Borrow 1 (18.3 acres), and Northeast Borrow D (12.5 acres). Additionally, the northeastern corner of Central Borrow 1 contains 0.6 acres of Farmland of Statewide Importance.

2.2.2 Findings

a) Would the Project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural land?

The four potential borrow sites cover approximately 62.1 acres of land designated as Prime Farmland and 0.6 acres of land designated as Farmland of Statewide Importance. Borrow sites used as sources of fill material may be excavated to maximum depths of 35 ft, which could reach the existing water table, causing water to seep into the bottom of the pits and form ponds. It is likely that only the two potential borrow sites most proximal to the Project levee will be used; however, depending on the amount and quality of material available at these sites, use of additional borrow sites may be necessary (Figure 1-2). The excavated borrow sites will not be returned to agricultural use and are anticipated to provide wildlife habitat in the form of freshwater ponds, marsh, and scrub-shrub resulting from rainwater and/or groundwater filling the depressions created and natural recruitment of associated vegetation. Potential borrow sites that are not used for the Project will continue to be used for agricultural production. Therefore, the Project will result in conversion of up to, and likely less than, 62.1 acres of Prime Farmland and 0.6 acres of Farmland of Statewide Importance to non-agricultural use. The maximum conversion would represent approximately 0.01% of the total Farmland, 0.02% of the total Prime Farmland, and less than 0.01% of the total Farmland of Statewide Importance in San Joaquin County (CFMMP 2016). This alternation in land use would not substantially affect overall Farmland acreage or agricultural productivity in San Joaquin County. Moreover, the flood control improvements provided by the Project will protect the remaining Farmland (approximately 5,600 acres) on Bouldin Island from future flood damage (CFMMP 2016). Therefore, the Project will have a cumulative benefit to agricultural resources.

For the abovementioned reasons, conversion of Farmland in the Project Area is considered less than significant.

b) Would the Project conflict with existing zoning for agricultural use, or a Williamson Act contract?

The San Joaquin County General Plan establishes General Agriculture (A/G) Zones to preserve agricultural lands for the continuation of commercial agricultural enterprises (San Joaquin County 2016). The entire Project Area, including the Project levee and four potential borrow sites, is zoned AG-40, meaning it is zoned for general agriculture with parcels at least 40 acres in size. The four potential borrow sites are the only portions of the Project Area where a change in land

use may occur. After the Project, up to two borrow sites would not be returned to agricultural use and are anticipated to passively establish freshwater pond, marsh, and/or scrub-shrub habitat. These habitats will create small pockets of open space that do not substantially conflict with existing zoning for agricultural use on the island. Agriculture will continue to be the primary land use on Bouldin Island, and the levee rehabilitation will add protection to this resource.

Bouldin Island is not under a Williamson Act contract (San Joaquin County Assessor 2015).

The Project will have a less than significant impact.

c) Would the Project conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?

No portion of the Project Area is zoned for forest land, timberland, or Timberland Production. There will be no impact.

d) Would the Project result in the loss of forest land or conversion of forest land to non-forest use?

Forest land does not exist within the Project Area; therefore, the Project will not result in the loss of forest land or conversion of forest land to non-forest use. There will be no impact.

e) Would the Project involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?

The Project will not involve other changes to the existing environment, beyond those discussed in (a) above, that could result in additional conversion of Farmland to non-agricultural use or any conversion of forest land to non-forest use. Conversion of Project borrow sites to non-agricultural use will not interrupt or preclude ongoing agricultural operations elsewhere on Bouldin Island or result in additional conversion of farmed or forested land beyond the borrow sites themselves. Agriculture will continue to be the primary land use on Bouldin Island, and the levee rehabilitation will add protection to this resource. There will be no impact.

2.3 Air Quality

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	❑	❑	✓	❑
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or state ambient air quality standard?	❑	❑	✓	❑
c) Expose sensitive receptors to substantial pollutant concentrations?	❑	❑	✓	❑
d) Result in other emissions such as those leading to odors adversely affecting a substantial number of people?	❑	❑	❑	✓

2.3.1 Environmental setting

The Project is in the northern region of the San Joaquin Valley Air Basin (SJVAB), which includes Fresno, Kern (western and central), Kings, Madera, Merced, San Joaquin, Stanislaus, and Tulare counties, and is administered by the SJVAPCD. The SJVAB is bounded by mountainous areas to the east, west, and south, with an opening to the north into the Sacramento Valley. The region experiences relatively long summers with generally hot and dry conditions, and short winters with cool, wet conditions. Subtropical high air pressure events can occur year-round and result in the formation of strong atmospheric inversion layers. The combination of these topographical and meteorological factors can prevent the dispersion of pollutants and is particularly conducive to poor air quality.

2.3.1.1 Criteria air pollutants

The federal Clean Air Act of 1970 (Section 6.1) and California Air Resources Board (CARB) have established air quality standards for several common pollutants: carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter, sulfur dioxide, sulfates, and hydrogen sulfide (CARB 2021a). Air quality data for the SJVAB from 2015 to 2020 are summarized in Table 2-2 and describe the existing conditions for some criteria air pollutants in the SJVAB.

Table 2-2. Summary statistics for air quality data in the SJVAB from 2015 to 2020 (Source: CARB 2021b).

Year	Pollutant (averaging time)	Maximum concentration	No. of days exceeding federal standards	No. of days exceeding state standards
2015	Ozone (1-hour)	0.135 ppm	n/a	47
	Ozone (8-hour)	0.110 ppm	97	99
	$PM_{2.5}$ (daily)	107.8 µg/m^3	38	n/a
	PM_{10} (daily)	140.3 µg/m^3	0	121
2016	Ozone (1-hour)	0.131 ppm	n/a	51
	Ozone (8-hour)	0.101 ppm	112	113
	$PM_{2.5}$ (daily)	66.4 µg/m^3	26	n/a
	PM_{10} (daily)	132.5 µg/m^3	0	158
2017	Ozone (1-hour)	0.143 ppm	n/a	48
	Ozone (8-hour)	0.113 ppm	122	126
	$PM_{2.5}$ (daily)	113.4 µg/m^3	34	n/a
	PM_{10} (daily)	210.0 µg/m^3	8	146
2018	Ozone (1-hour)	0.129 ppm	n/a	42
	Ozone (8-hour)	0.102 ppm	111	112
	$PM_{2.5}$ (daily)	189.8 µg/m^3	42	n/a
	PM_{10} (daily)	250.4 µg/m^3	10	164
2019	Ozone (1-hour)	0.110 ppm	n/a	24
	Ozone (8-hour)	0.094 ppm	96	100
	$PM_{2.5}$ (daily)	83.7 µg/m^3	21	n/a
	PM_{10} (daily)	664.2 µg/m^3	16	130
2020	Ozone (1-hour)	0.142 ppm	n/a	50
	Ozone (8-hour)	0.114 ppm	119	121
	$PM_{2.5}$ (daily)	199.7 µg/m^3	52	n/a
	PM_{10} (daily)	359.0 µg/m^3	39	157

n/a = not applicable
$PM_{2.5}$ = respirable particulate matter (less than 2.5 microns in diameter)
PM_{10} = respirable particulate matter (less than 10 microns in diameter)
ppm = parts per million
µg/m^3 = micrograms per cubic meter of air

The SJVAB does not consistently meet all applicable air quality standards (CARB 2021c). The SJVAB is currently designated as nonattainment for state ozone, $PM_{2.5}$,[5] and PM_{10}[6] standards (CARB 2021c) and for federal ozone and $PM_{2.5}$ standards (USEPA 2021a). Otherwise, the Project Area is designated as attainment for carbon monoxide, nitrogen dioxide, and sulfur dioxide standards.

SJVAPCD criteria air pollutants and precursors of primary concern for construction activity in California include ozone precursors (e.g., nitrogen oxides, reactive organic gases), carbon monoxide, sulfur oxides, fugitive/exhaust dust particulate matter (PM_{10} and $PM_{2.5}$) (SJVAPCD 2015).

[5] Respirable particulate matter less than 2.5 microns in diameter
[6] Respirable particulate matter less than 10 microns in diameter

The SJVAPCD has established particulate matter, ozone, and carbon monoxide plans to aid in the attainment of federal and state air quality standards largely through emissions reductions (SJVAPCD 2012a). In accordance with these plans, the SJVAPCD has developed emissions thresholds for criteria pollutants to be used in determining the significance of Project-related air quality effects. Since the SJVAPCD thresholds are more stringent than the U.S. Environmental Protection Agency (USEPA) thresholds, emissions would be considered significant if they exceeded the local thresholds established by the SJVAPCD for construction activities. Thresholds established by the SJVAPCD are:

- 100 tons per year of carbon monoxide
- 10 tons per year of nitrogen oxides
- 15 tons per year of $PM_{2.5}$
- 15 tons per year of PM_{10}
- 10 tons per year of reactive organic gases
- 27 tons per year of sulfur oxides

2.3.1.2 Sensitive receptors

Some individuals have heightened health risks associated with exposure to air pollution, and for some air quality constituents, impacts are determined based on the distance to the closest sensitive receptor. Sensitive receptors include but are not limited to residential areas, schools, and hospitals. The nearest sensitive receptors to the Project Area are the four rural residences immediately adjacent to the Project levee, residences in the town of Terminous east of Bouldin Island (beginning approximately 350 ft from the Project Area), and the small marinas in Terminous and on Andrus Island to the west (approximately 600 ft and 750 ft from the Project Area, respectively).

2.3.2 Findings

This section describes the potential air quality effects of the Project, including exhaust emissions from construction equipment, fugitive dust generated by construction activities, and vehicle travel over unpaved roads. To complete the air quality analysis, information was collected on Project construction activities, duration, timing, and equipment use for the anticipated construction period and used to run the Road Construction Emissions Model Version 9.0.0 to estimate Project emissions. Operational emissions were not analyzed because there will be no change in levee maintenance or agricultural activity following construction. The Road Construction Emissions Model data entry and emissions summary sheet is included as Appendix A.

The modeling was based on the material amounts and construction equipment assumptions described in Table 2-3, and the following: (1) a total of 78.2 acres of Project levee to be rehabilitated with imported material; (2) a 5.0-acre maximum daily disturbance; (3) a total of 3,214 cubic yards of on-site fill per day; (4) a total of 537 cubic yards of imported fill/aggregate per day; (5) a round-trip distance of 50 miles for imported material; and (6) an equipment operational estimate of 6-day work weeks with 8 hours per day over 336 days between May 1 and November 30 of 2022 and 2023.

Additional model assumptions include all feasible SJVAPCD best available control technology (BACT) and use of on-road vehicles limited to model year 2010 or newer (**AIR-1**, Section 1.4.9).

Table 2-3. Project emission sources and assumptions used to determine air emissions.

Emission source	Project assumptions
On-site material used for cut/fill	450,000 cubic yards
Imported material used for cut/fill	55,556 cubic yards
Imported material used for paving	21,818 cubic yards
Fuel-fired construction equipment	Excavator (2) Bulldozer (2) Grader (2) Skip loader (1) Compactor (2) Water truck (2) Pumps (4) Planting equipment (1) Material handling equipment (1)
Employee commute trips	4–6 employee trips/day 25 miles one way

Model results for total anticipated Project emissions are shown in Table 2-4.

Table 2-4. Total anticipated Project construction emission estimates (tons).

	CO	NO_X	$PM_{2.5}$	PM_{10}	ROG	SO_X
Project emissions (tons)[1]	5.90	8.58	1.94	8.17	0.73	0.02
SJVAPCD annual threshold	100	10	15	15	10	27

[1] Although the Project is anticipated to be implemented over two years (Section 1.4.8), the values reported conservatively assume all construction occurs in one year; annual thresholds for criteria pollutants would not be exceeded under either scenario.

Notes:
CO = carbon monoxide
NO_x = nitrogen oxides
$PM_{2.5}$ = respirable particulate matter (less than 2.5 microns in diameter)
PM_{10} = respirable particulate matter (less than 10 microns in diameter)
ROG = reactive organic gases
SO_x = sulfur oxides

a) Would the Project conflict with or obstruct implementation of the applicable air quality plan?

Based on the air quality modeling, Project construction is expected to result in temporary emissions that are below SJVAPCD standards and therefore do not conflict with emissions reductions goals outlined in SJVAPCD air quality attainment plans for particulate matter, ozone, and carbon monoxide (SJVAPCD 2012a). BMPs will be implemented as part of conservation measure **AIR-1** (Section 1.4.9) to ensure emissions are minimized. There will be no change in long-term operational emissions. The impact will therefore be less than significant.

b) Would the Project result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or state ambient air quality standard?

The model results summarized in Table 2-4 demonstrate that Project construction emissions are not expected to exceed annual thresholds for criteria air pollutants for which the SJVAB is

currently designated as nonattainment (including $PM_{2.5}$, PM_{10}, and ozone precursors [e.g., nitrogen oxides, reactive organic gases, and carbon monoxide]), and implementation of BMPs in **AIR-1** (Section 1.4.9) will ensure emissions are minimized. There will be no change in long-term operational emissions as a result of the Project. Although Project construction will result in some emissions for which the SJVAB is not in attainment, the minimal amount and temporary nature of these emissions will not result in a cumulatively considerable net increase of these pollutants. Therefore, the impact will be less than significant.

c) Would the Project expose sensitive receptors to substantial pollutant concentrations?

The nearest sensitive receptors to the Project are four inhabited residences immediately adjacent to the Project levee, residences in the town of Terminous (beginning approximately 350 ft from the Project Area), and the small marinas in Terminous and on Andrus Island to the west (approximately 600 ft and 750 ft from the Project Area, respectively).

The Project will not result in substantial diesel particulate emissions; maximum exhaust emissions are 2.47 pounds per day PM_{10} and 2.10 pounds per day $PM_{2.5}$ (Appendix A). Implementation of BMPs included in **AIR-1** (Section 1.4.9) will minimize diesel emissions, and Project construction will be temporary, only resulting in increased diesel exhaust for 14 months over the course of two years.

If present, microscopic asbestos fibers could become airborne during demolition of the residence at levee station 824+50 (Figures 1-2 and 1-4) and cause significant health problems if inhaled (USEPA 2021b). Therefore, a thorough inspection for asbestos will be performed on the residence by a Certified Asbestos Consultant prior to its removal, and results will be submitted to SJVAPCD for approval (**HAZ-3**, Section 1.4.9) (SJVAPCD 2012b). If asbestos-containing materials are identified in the residence, the Project will comply with NESHAP and Cal/OSHA requirements for proper removal and disposal methods.

For these reasons, the Project's impact on exposing sensitive receptors to substantial pollutant concentrations will be less than significant.

d) Would the Project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

Project construction is not expected to result in other emissions adversely affecting a substantial number of people, such as those leading to objectionable odors. Post-construction, the Project will not result in any change to current operation or maintenance of the levee that would result in additional emissions. The Project will have no impact.

2.4 Biological Resources

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	❑	✓	❑	❑
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	❑	✓	❑	❑
c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	❑	✓	❑	❑
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	❑	❑	❑	✓
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	❑	✓	❑	❑
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	❑	❑	❑	✓

2.4.1 Environmental setting

The Project Area includes the existing levee along the north side of Bouldin Island and agricultural land under cultivation for corn and alfalfa at the four potential borrow sites (Figure 1-2). Several resource evaluations were performed in 2021 to identify sensitive natural resources that may occur within or near the Project Area and to inform the development of appropriate avoidance, minimization, and mitigation measures. These evaluations included land cover classification and vegetation mapping, surveys for special-status plants, and a habitat assessment for special-status wildlife species. Methods and key findings from these evaluations were used to inform the impacts determinations in Section 2.4.2 and are detailed in subsequent sections.

2.4.1.1 Methods

Definitions

Special-status species are defined as those:

- listed, proposed, or under review (e.g., candidate) as endangered or threatened under the ESA (Section 6.1) or CESA (Section 6.2);
- designated by CDFW as a Species of Special Concern;
- designated by CDFW as Fully Protected under the California Fish and Game Code (Sections 3511, 4700, 5050, and 5515) (Section 6.2);
- protected under the federal Bald and Golden Eagle Protection Act (BGEPA, Section 6.1);
- designated as rare under the California Native Plant Protection Act (NPPA, Section 6.2); and/or
- included on CDFW's most recent *Special Vascular Plants, Bryophytes, and Lichens List* (CDFW 2021a) with a California Rare Plant Rank of 1, 2, 3, or 4.

In addition, sensitive natural communities are defined as:

- vegetation communities identified as critically imperiled (S1), imperiled (S2), or vulnerable (S3) on the most recent California Sensitive Natural Communities List (CDFW 2020).

Desktop review

The special-status plant and wildlife species and sensitive natural communities with the potential to occur within or near the Project Area were identified through a query of the following agency resources:

- CDFW's CNDDB (CDFW 2021b),
- USFWS's Information for Planning and Conservation (IPaC) portal (USFWS 2021), and
- California Native Plant Society's (CNPS) online Inventory of Rare and Endangered Vascular Plants of California (CNPS 2021).

The CNDDB and CNPS queries were based on a search of the Project region, which is defined as the U.S. Geological Survey (USGS) 7.5-minute quadrangles in which the Project is located (Bouldin Island, Isleton, and Terminous), and the surrounding twelve quadrangles (Liberty Island, Courtland, Bruceville, Thornton, Lodi North, Lodi South, Stockton West, Holt, Woodward Island, Brentwood, Jersey Island, and Rio Vista). The USFWS IPaC query was based on the extent of the Project Area. The eBird online database of bird distribution and abundance was also referenced for special-status bird occurrences in the Project vicinity[7] (eBird 2021). Database query results are presented in Appendix B (for special-status plants and sensitive natural communities) and Appendix C (for special-status wildlife species). Fish species are not included, as there will be no in-water work or work affecting Shaded Riverine Aquatic cover.

Botanical field surveys

Special-status plant surveys of the Project Area were conducted on April 22–23, 2021 for early-blooming species and on July 1, 2021, for late-blooming species by two Stillwater Sciences biologists (R. Thoms and E. Applequist) with: (1) experience conducting floristic surveys; (2) knowledge of plant taxonomy and plant community ecology and classification; (3) familiarity with the plant species of the area; and (4) familiarity with appropriate state and federal statutes related to plants and plant collecting.

[7] Herein, Project vicinity refers to the area within approximately 0.5 miles of the Project Area.

Surveys for special-status plant species were conducted in accordance with the *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants* (USFWS 2000) and *Protocols for Surveying and Evaluating Impacts to Special-Status Native Plant Populations and Natural Communities* (CDFW 2018). Specifically, surveys were comprehensive for vascular plants and bryophytes such that "every plant taxon that occurs on site [was] identified to the taxonomic level necessary to determine rarity and listing status" (CDFW 2018). If identification was not possible in the field, the plants were collected for identification in the laboratory in accordance with government collecting regulations (using the "1 in 20" rule, Wagner 1995) or, if potentially a special-status plant, according to the botanists' current CDFW plant voucher collection permit guidelines (e.g., not more than five individuals or 2% of the population, whichever is less, for one voucher sheet). Vascular plants were identified following the taxonomy of the *Jepson eFlora* (Jepson Flora Project 2021). CNDDB forms were completed for any documented special-status plant populations.

Mapping of the vegetated and non-vegetated habitats in the Project Area was also performed concurrently with special-status plant surveys. Vegetation types were assessed to the extent necessary to determine where there was suitable habitat for special-status wildlife species and to document sensitive natural communities. If a sensitive natural community was identified in the field, the location and population boundaries were digitally mapped on a GPS-enabled tablet, and a CNPS vegetation assessment field data form was completed using the CDFW/CNPS standards and protocols for vegetation sampling and mapping (CDFW-CNPS 2018). During mapping, surveys for blue elderberry (*Sambucus nigra* subsp. *caerulea*) were conducted following USFWS (2017) guidelines for assessing habitat for the federally listed valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*).

Habitat assessment

On April 22–23, 2021, a site reconnaissance visit—including habitat mapping and a habitat assessment for special-status wildlife and plant species—was conducted by two Stillwater Sciences biologists (R. Thoms and E. Applequist) throughout the Project Area. Additionally, Stillwater biologist (K. Orr) conducted a brief assessment of the Project levee and North Central Borrow 1 on May 18, 2021.

The habitat assessment for special-status wildlife species identified by the database queries applied one of the following categories of likelihood of occurrence for each special-status species identified in the desktop queries based on the current known range and habitat requirements of the species in comparison with habitat elements present in or near the Project Area: None (no potential to occur), Low (not expected to occur), Moderate (may occur), or High (previously documented and/or highly suitable habitat).

2.4.1.2 Land cover and vegetation types

Most of Bouldin Island, including all four potential borrow sites, is in agricultural production. North Central Borrow 1 also includes ruderal vegetation along a small section of former irrigation ditch. The Project levee is primarily composed of non-native ruderal herbaceous vegetation, which provides relatively low habitat value. Vegetation on the crown and slopes of the Project levee is regularly mowed and sprayed with herbicide. There are occasional patches of Riparian Forest and Scrub-shrub along the levee slopes, and patches of Riparian Forest, Scrub-shrub, and Freshwater Marsh are present along the landside toe of the Project levee. Shaded Riverine

Aquatic[8] habitat is present in small patches in the waterways adjacent to the Project Area, primarily under white alder (*Alnus rhombifolia*) along the waterside of the Project levee. Small patches of native vegetation are sparsely distributed throughout the Project Area, providing minimal wildlife habitat value. Land cover types in the Project Area are depicted in Figures 2-1a through 2-1l and summarized in Table 2-5.

[8] The AB 360 definition for Shaded Riverine Aquatic habitat includes areas along the shoreline where Riparian Forest and/or Scrub-shrub overhang the water's edge and is measured in linear feet.

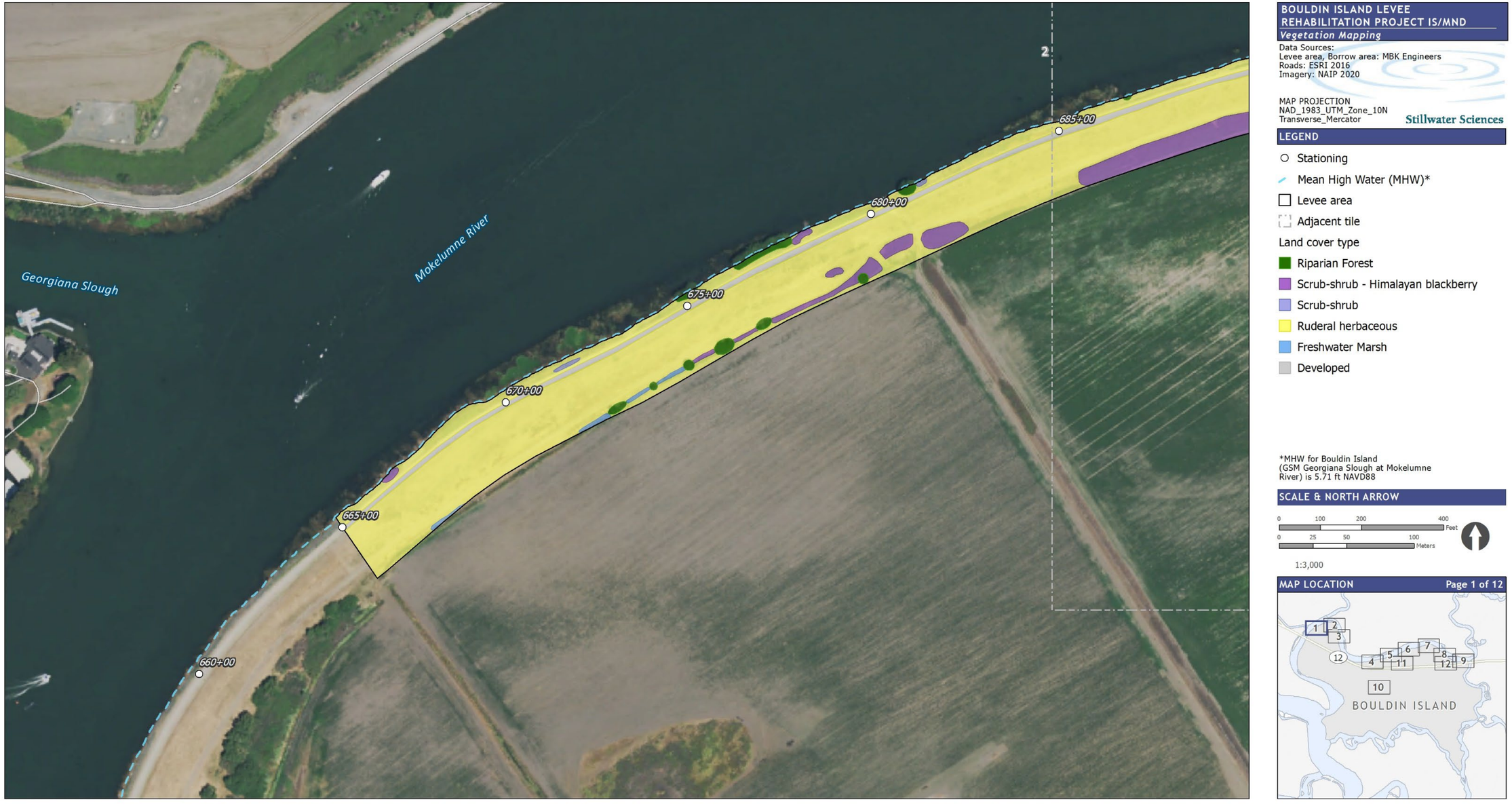

Figure 2-1a. Land cover and vegetation types in the Project Area.

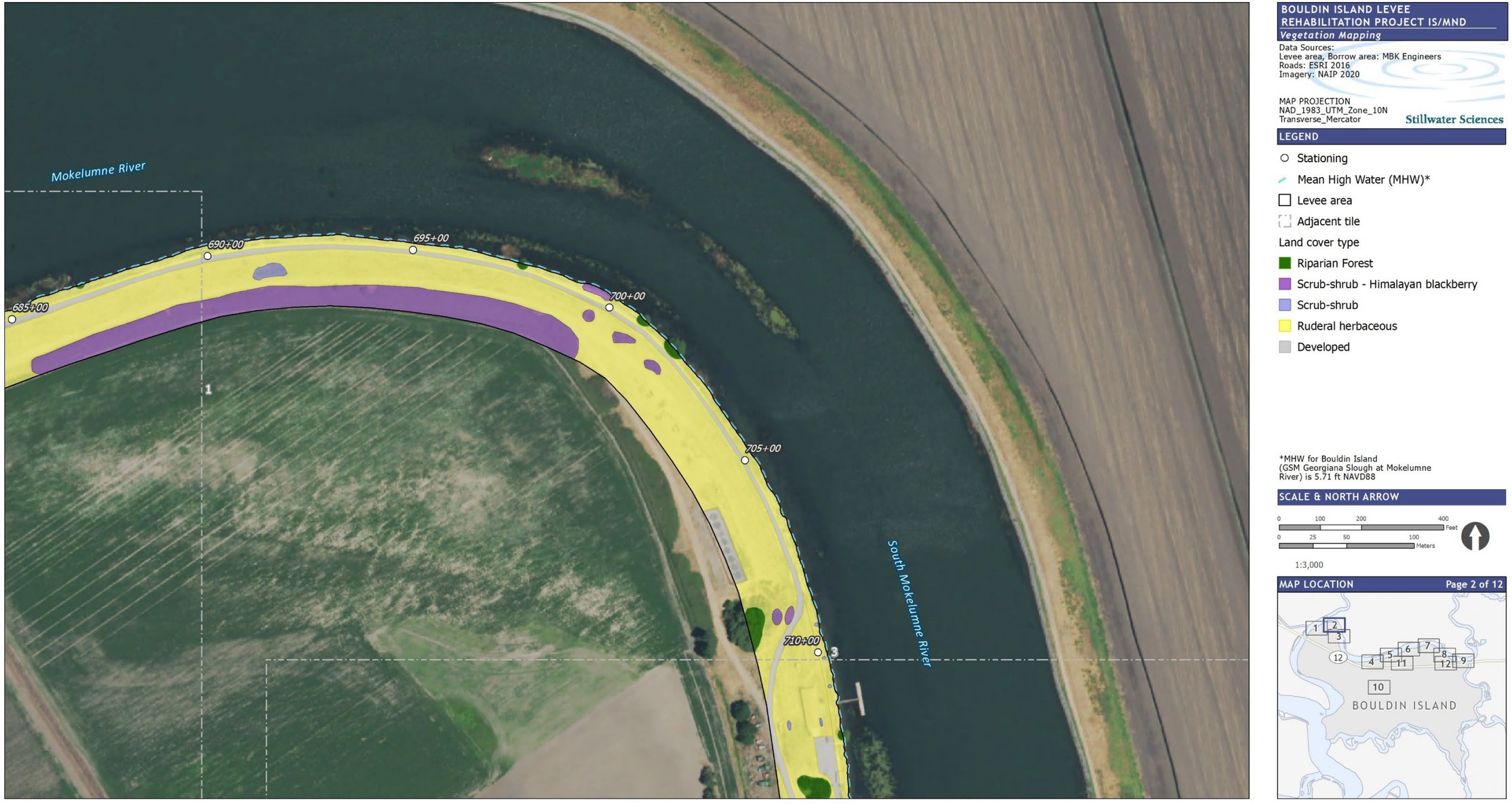

Figure 2-1b. Land cover and vegetation types in the Project Area.

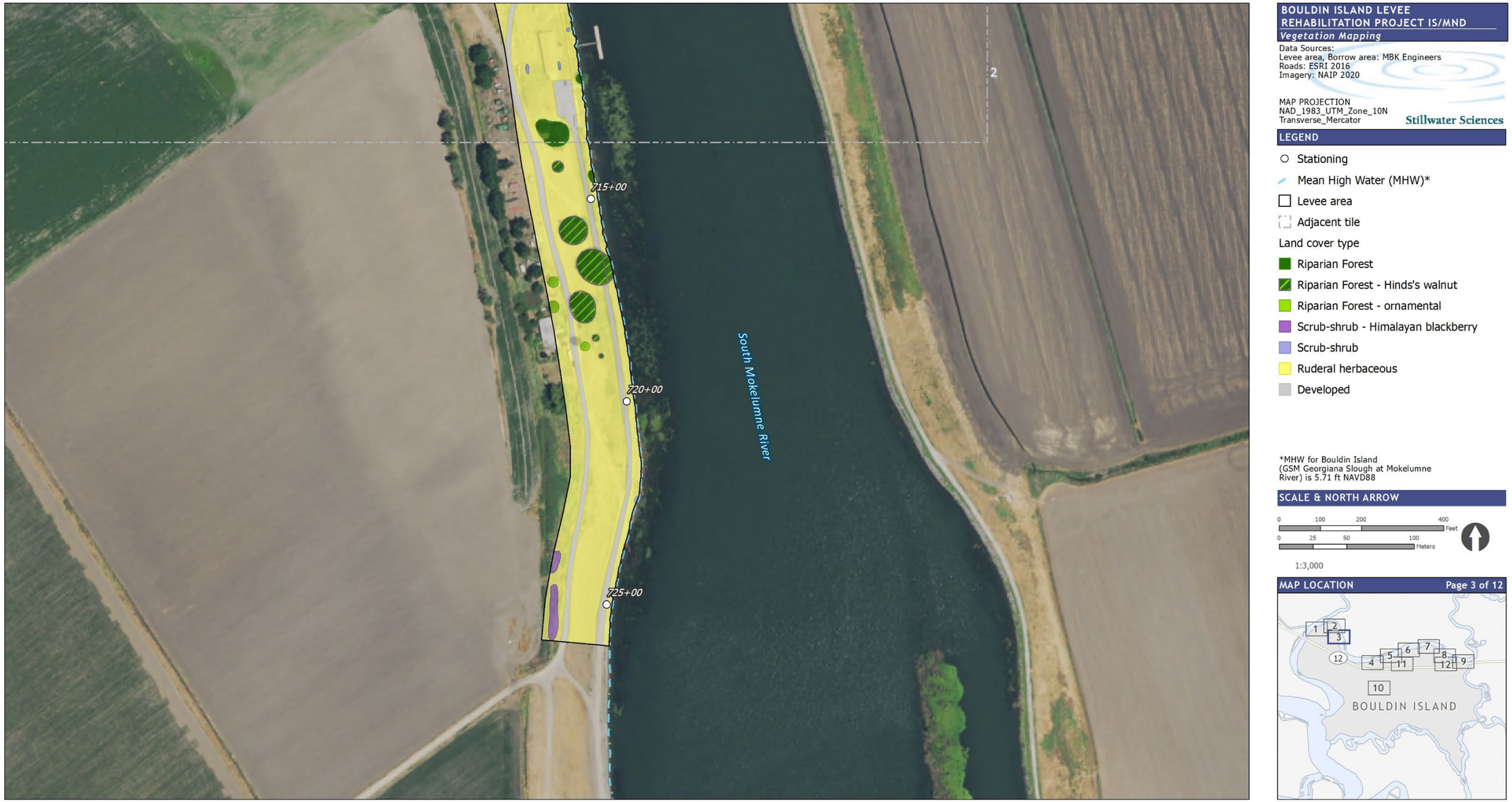

Figure 2-1c. Land cover and vegetation types in the Project Area.

Figure 2-1d. Land cover and vegetation types in the Project Area.

Figure 2-1e. Land cover and vegetation types in the Project Area.

Figure 2-1f. Land cover and vegetation types in the Project Area.

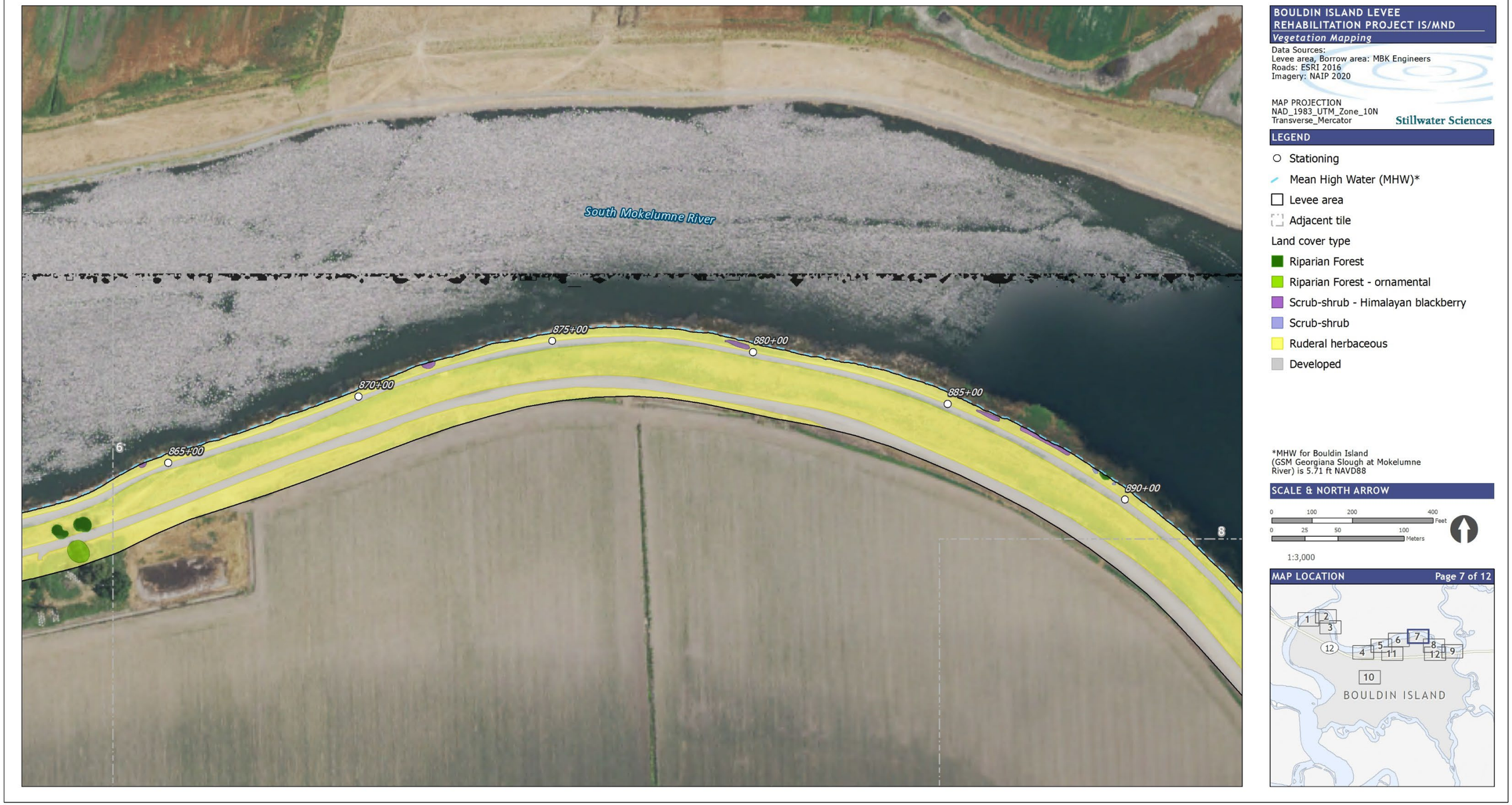

Figure 2-1g. Land cover and vegetation types in the Project Area.

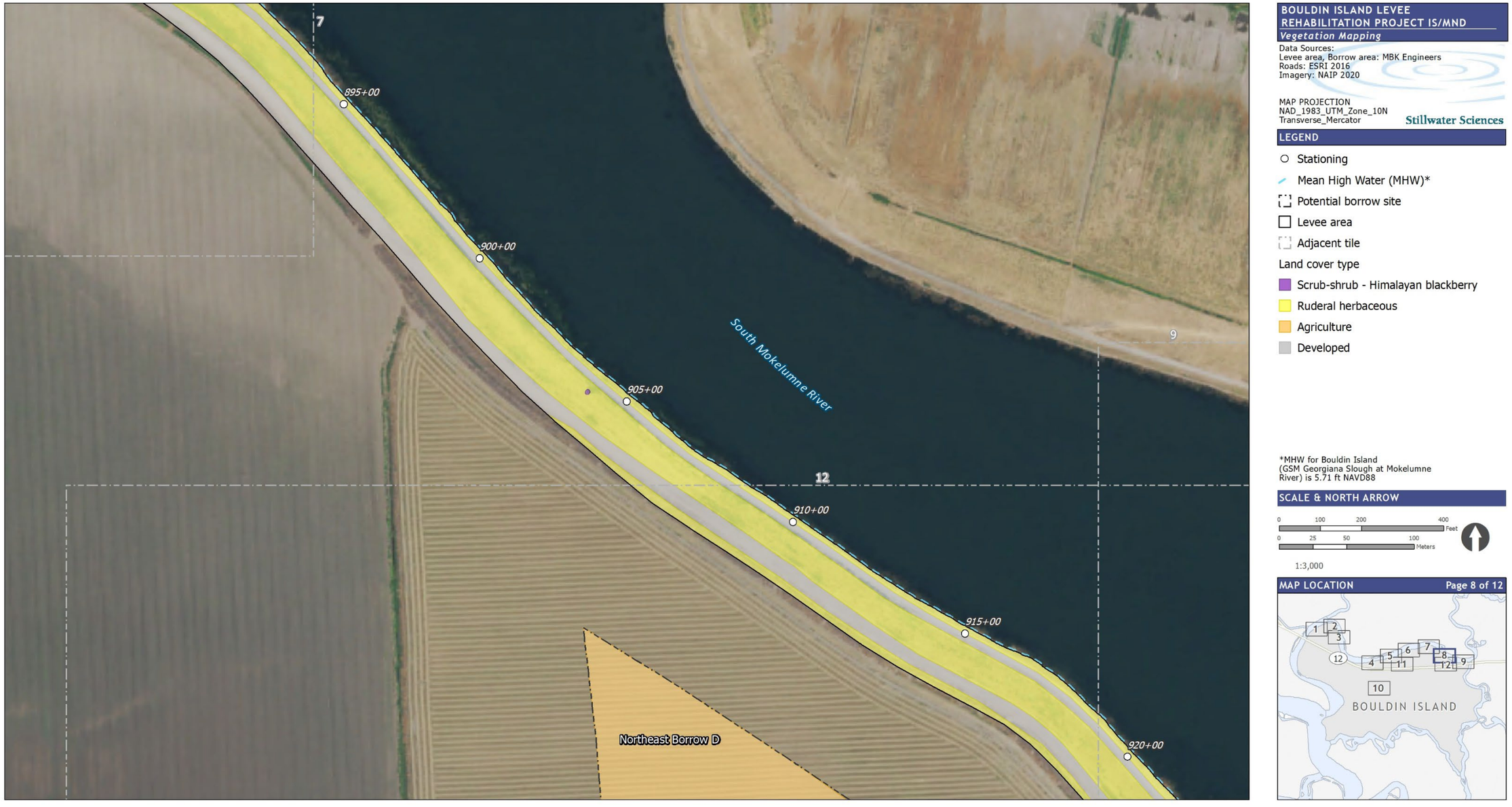

Figure 2-1h. Land cover and vegetation types in the Project Area.

Figure 2-1i. Land cover and vegetation types in the Project Area.

Figure 2-1j. Land cover and vegetation types in the Project Area.

Figure 2-1k. Land cover and vegetation types in the Project Area.

Figure 2-1l. Land cover and vegetation types in the Project Area.

Table 2-5. Land cover and vegetation types in the Project Area (in acres).

Land cover type	Project levee	Central Borrow 1	Central Borrow 2	North Central Borrow 1	Northeast Borrow D	Total
Agriculture	–	25.52	6.42	18.14	12.47	**62.55**
Developed	19.84	–	–	–	–	**19.84**
Freshwater Marsh	0.15	–	–	–	–	**0.15**
Riparian Forest[1]	0.71	–	–	–	–	**0.71**
Riparian Forest (Hinds's walnut stands)	0.47	–	–	–	–	**0.47**
Riparian Forest (Ornamental)	0.84	–	–	–	–	**0.84**
Riparian Forest subtotal	***2.02***	**–**	**–**	**–**	**–**	***2.02***
Ruderal herbaceous	61.50	–	–	0.19	–	**61.69**
Scrub-shrub	0.23	–	–	–	–	**0.23**
Scrub-shrub (Himalayan blackberry)	2.93	–	–	–	–	**2.93**
Scrub-shrub subtotal	***3.16***	**–**	**–**	**–**	**–**	***3.16***
Total	**86.67**	**25.52**	**6.42**	**18.33**	**12.47**	**149.41**

[1] Includes all woody vegetation that meets the AB 360 definition of Riparian Forest (see mitigation measure **BIO-9** in Section 1.4.10) except Hinds's walnut stands and ornamental/non-native as quantified below.

Agriculture

Most of Bouldin Island's interior is used for agriculture. Annual crops are typically grown within all four potential borrow sites (Figures 2-1j through 2-1l). Central Borrow 1 and 2 and North Central Borrow 1 are currently under cultivation for corn, and Northeast Borrow D is currently under cultivation for alfalfa. Agricultural lands have typically replaced areas that were historically dominated by Delta wetlands. Depending on crop type, agricultural fields may provide some form of habitat for native birds (e.g., foraging for raptors). A total of 62.55 acres (41.9%) of the Project Area is agriculture (Table 2-5).

Developed

Developed areas include improved and unimproved driving surfaces, primarily the gravel road along the levee crown (Figures 2-1a through 2-1i and 2-1k). A total of 19.84 acres (13.3%) of the Project Area is developed (Table 2-5).

Freshwater Marsh

Patches of Freshwater Marsh dominated by common tule (*Schoenoplectus acutus* var. *occidentalis*) and cattails (*Typha* spp.) are located along the landside of the Project levee (Figures 2-1a, 2-1d, and 2-1e). Freshwater Marsh can provide nesting, foraging, roosting, and cover for a variety of species. A total of 0.15 acres (0.1%) of the Project Area is Freshwater Marsh (Table 2-5).

Riparian Forest

Riparian Forest vegetation in the Project Area occurs as isolated trees along the waterside of the Project levee and in small patches distributed intermittently, often near residences, along the landside of the Project levee (Figures 2-1a through 2-1g and 2-1i). On the waterside of the Project levee, Riparian Forest vegetation is predominantly white alder. On the landside of the Project levee, Riparian Forest vegetation is predominantly non-native ornamental plantings near

residences such as weeping willow (*Salix babylonica*), avocado (*Persea americana*), and white mulberry (*Morus alba*), of which weeping willow is most common. There are also isolated patches of Fremont cottonwood (*Populus fremontii* subsp. *fremontii*) and Goodding's black willow (*Salix gooddingii*) on the landside of the Project levee. Two Hinds's walnut stands, a sensitive natural community (Section 2.4.1.3), are also present on the landside of the Project levee near residences located at levee stations 718 and 800. The mature trees in Riparian Forest vegetation in the Project Area (particularly native Fremont cottonwoods and willows) likely provide several forms of habitat (e.g., roosting or nesting) for a variety of birds. Riparian Forest in the Project Area that overhangs the water's edge also provides Shaded Riverine Aquatic habitat for fish. Riparian Forest covers a total of 2.02 acres (1.4%) of the Project Area; within this, 0.47 acres (0.3%) of the Project Area is Hinds's walnut stands and 0.84 acres (0.6%) of the Project Area is non-native ornamental plantings (Table 2-5).

Ruderal herbaceous

Vegetation on the levee crown, the landside levee slope, the riprapped waterside slope, and the small section of former agricultural ditch in North Central Borrow 1 is dominated by non-native ruderal herbaceous vegetation (Figures 2-1a through 2-1i and 2-1k). Dominant plant species include a mix of non-native grasses such as Bermuda grass (*Cynodon dactylon*), Mediterranean barley (*Hordeum murinum*), and Johnson grass (*Sorghum halepense*), as well as herbaceous non-native species such as perennial pepperweed (*Lepidium latifolium*), radish (*Raphanus sativus*), and mallow (*Malva* spp.). While ruderal herbaceous vegetation provides foraging and perching opportunities for some songbirds and raptors, these areas do not provide high-quality wildlife habitat, particularly for special-status species (see Section 2.4.1.4). A total of 61.69 acres (41.3%) of the Project Area is ruderal herbaceous (Table 2-5).

Scrub-shrub

Scrub-shrub vegetation is patchily distributed along the Project levee (Figures 2-1a through 2-1e, 2-1g through 2-1i, and 2-1k). Native Scrub-shrub is limited in the Project Area, and species include California blackberry (*Rubus ursinus*) and California button willow (*Cephalanthus occidentalis*) on the waterside of the Project levee, and California rose (*Rosa californica*), red willow (*Salix laevigata*), and arroyo willow (*Salix lasiolepis*) on the landside of the Project levee. Much of the Scrub-shrub vegetation in the Project Area consists of dense thickets of Himalayan blackberry (*Rubus armeniacus*) located on the landside of the Project levee. Although Himalayan blackberry provides foraging opportunity and refugia for some wildlife, it is a non-native and highly invasive plant species and often outcompetes and replaces native habitat. A total of 3.16 acres (2.1%) of the Project Area is Scrub-shrub; within this, 2.93 acres (2.0%) is Himalayan blackberry (Table 2-5).

2.4.1.3 Special-status plant species and sensitive natural communities

No special-status plant species were observed in the Project Area. Of the 35 special-status plant species identified by the database queries (Appendix B), one rare plant species, Suisun Marsh aster (*Symphyotrichum lentum*), was observed adjacent to the Project Area. One sensitive natural community, Hinds's walnut and related stands (*Juglans hindsii* and Hybrids Forest and Woodland Special Stands and Semi-Natural Alliance), was documented in the Project Area. Appendix D provides a comprehensive list of plants documented in the Project Area during botanical surveys.

Suisun Marsh aster. Suisun Marsh aster is a perennial rhizomatous herb in the Asteraceae family that has a California Rare Plant Ranking (CRPR) of 1B.2 (i.e., rare, threatened, or endangered in California and elsewhere; moderately threatened in California) and is threatened by habitat loss (Jepson Flora Project 2021). It is endemic to California, occurring below 10 ft in

elevation within the southern Sacramento Valley, the Delta, and San Francisco Bay, as well as in Contra Costa, Napa, Sacramento, San Joaquin, Solano, and Yolo counties (CNPS 2021). Suisun Marsh aster typically occurs in brackish and freshwater marshes and swamps and blooms May to November (CNPS 2021). One occurrence of Suisun Marsh aster was documented on the landside of the Project levee adjacent to the Project Area along an agricultural field near levee station 684. Another 15 occurrences of Suisun Marsh aster were documented on the waterside of the Project levee adjacent to the Project Area below MHW.

Hinds's walnut and related stands. Hinds's walnut and related stands have a sensitive natural community rank of S1 (i.e., critically imperiled).[9] Two Hinds's walnut stands (0.47 acres) with walnut trees varying in maturity from saplings to mature trees with a DBH greater than 2 ft were documented within the Project Area on the landside levee slope near residences at levee stations 718 and 800 (Figures 2-1c and 2-1d). The understory of each stand is dominated by non-native herbaceous species such as Bermuda grass and Mediterranean barley.

2.4.1.4 Special-status wildlife species

Thirty-five special-status wildlife species were identified from database queries as potentially occurring in the Project region (Appendix C). Of these, 22 species have no or low potential to occur in or near the Project Area because habitat is either not present or is marginally suitable, and/or the Project Area is outside of the current known range for the species. The following 13 special-status wildlife species have moderate to high potential to occur within or near the Project Area:

a) western pond turtle (*Actinemys marmorata*)
b) giant garter snake (*Thamnophis gigas*)
c) California black rail (*Laterallus jamaicensis coturniculus*)
d) greater/lesser sandhill crane (*Antigone canadensis tabida/Antigone canadensis canadensis*)
e) American white pelican (*Pelecanus erythrorhyncos*)
f) white-tailed kite (*Elanus leucurus*)
g) northern harrier (*Circus hudsonius*)
h) bald eagle (*Haliaeetus leucocephalus*)
i) Swainson's hawk (*Buteo swainsoni*)
j) western burrowing owl (*Athene cunicularia hypugaea*)
k) loggerhead shrike (*Lanius ludovicianus*)
l) song sparrow ("Modesto" population) (*Melospiza melodia*)
m) tricolored blackbird (*Agelaius tricolor*)

These species are discussed in detail below, including listing status, habitat associations, and notable life history requirements. Unless otherwise noted in the discussions below, these species were not observed during the habitat assessments conducted in 2021. In addition to the species

[9] The standardly accepted common name for *Juglans hindsii* is northern California black walnut; however, the sensitive natural community dominated by this species (*Juglans hindsii* and Hybrids Forest and Woodland Special Stands and Semi-Natural Alliance) is commonly referred to as Hinds's walnut and related stands. Northern California black walnut was previously listed as a special-status species with a CRPR of 1B.1 (i.e., rare, threatened, or endangered in California and elsewhere; seriously threatened in California), but this listing status was removed in 2019 based on data indicating that genetically pure individuals of the species are common throughout California (Potter et al. 2018).

described below, other common and special-status amphibians, reptiles, birds, and mammals may use the Project Area for foraging, cover, dispersal, and breeding.

Western pond turtle. Western pond turtle, a CDFW Species of Special Concern, inhabits fresh or brackish water characterized by areas of deep water, low flow velocities, moderate amounts of riparian vegetation, warm water and/or ample basking sites, and underwater cover elements, such as large woody debris and rocks (Jennings and Hayes 1994). Along major rivers, western pond turtles are often concentrated in side channels and backwater areas. Turtles may move to off-channel habitats, such as oxbows, during periods of high flows (Holland 1994). Although adults are habitat generalists, hatchlings and juveniles require specialized habitat for survival through their first few years. Hatchlings spend much of their time feeding in shallow water with dense submerged or short emergent vegetation (Jennings and Hayes 1994). Although an aquatic reptile, western pond turtles require upland habitats for basking, overwintering, and nesting, typically within 0.6 miles from aquatic habitats (Holland 1994).

Western pond turtles are likely present along the waterside of the Project Area, and potentially present in ponded areas within and near the Project Area. Western pond turtles may also migrate overland through the Project Area. In 2016 Stillwater Sciences biologists observed 29 western pond turtles using aquatic habitat along Bouldin Island (Stillwater Sciences 2016). The western pond turtles were observed basking on logs, irrigation pipes, and on broken posts emerging from the water. There are additional records of the species utilizing the waterways along the northern and eastern sides of Bouldin Island in the South Mokelumne River and Little Potato Slough (CDFW 2021b). There is suitable aquatic and basking habitat in the waterways surrounding the island, along with suitable upland nesting habitat on the interior of the island beyond the levee toe. Agricultural ditches that seasonally contain water on the island provide specialized habitat and feeding opportunities for young-of-year or juvenile western pond turtles. Western pond turtles do not likely nest on the levee slope because of the compact soils and active levee vegetation management, and riprap on the waterside of the island.

Giant garter snake. Giant garter snake, state and federally listed as threatened, is highly aquatic, inhabiting marshes, sloughs, ponds, low-gradient streams, agricultural wetlands (predominantly rice fields) and associated waterways (e.g., irrigation and drainage canals and ditches), and adjacent uplands. The three main habitat components required by giant garter snakes are: (1) adequate water and emergent, herbaceous wetland vegetation—such as bulrush (*Schoenoplectus* spp.) or cattails—for foraging and escape cover during their active season; (2) grassy banks and openings in waterside vegetation for basking; and (3) higher elevation uplands with terrestrial burrows or crevices for cover, hibernation, and refugia from seasonal floods (USFWS 1999, Fisher et al. 1994). The active season for giant garter snake is generally May through early October (USFWS 1999).

There is high potential for giant garter snake to use the Project Area for dispersal or foraging. An adult giant garter snake was observed by Stillwater Sciences biologists in 2016 on Bouldin Island near levee station 485+90 (Stillwater Sciences 2016). There is an additional record from 2010 of four individuals on Empire Tract adjacent to Little Connection Slough, approximately 4 miles south of the Project Area (CDFW 2021b). Areas in the interior of Bouldin Island with emergent vegetation and water present between May and mid-September, such as the ponded area near North Central Borrow 1 (Figure 2-1k), may provide suitable aquatic habitat for giant garter snake. There is no known resident breeding population on Bouldin Island, and the extent of the available suitable aquatic habitat is likely not large enough to support a sustainable on-site population.

California black rail. California black rail, state listed as threatened and a CDFW Fully Protected species, is a very secretive bird associated with emergent tidal wetlands, especially where pickleweed (*Salicornia* spp.) and cordgrass (*Spartina* spp.) dominate. Black rails are typically found in the immediate vicinity of tidal sloughs, at higher zones at the upper limit of tidal flooding where effects from tidal fluctuations are minimal (Zeiner et al. 1990). During high flows, black rails may rely on adjacent upland areas for cover (Zeiner et al. 1990).

There is no potential for black rails to occur in the Project Area; however, there is moderate potential for black rails to occur on the small islands within the South Mokelumne River adjacent to the Project Area. There is one documented occurrence from 1989 of a black rail call response near Devils Isle in Little Potato Slough, approximately 1.5 miles from the Project Area (CDFW 2021b).

Greater/Lesser sandhill crane. Greater sandhill crane is a state threatened and CDFW Fully Protected species, while the lesser sandhill crane is a CDFW Species of Special Concern. Both subspecies of sandhill crane roost and forage in the Delta and Central Valley during winter months. In California, both subspecies of sandhill cranes are associated with freshwater marshes and grasslands and also forage in harvested rice fields, corn stubble, barley (*Hordeum vulgare*), and newly planted grain fields (Littlefield and Ivey 2000, 2002; Ivey et al. 2003). Lesser sandhill cranes breed in the arctic. Greater sandhill cranes nest in high elevation meadows in the northern Sierra Nevada and Cascade Ranges and high-desert meadows in the northeastern corner of California.

Sandhill cranes were observed foraging on Bouldin Island in the winter of 2021 (eBird 2021). There are no CNDDB records of greater or lesser sandhill crane occurrences within 5 miles of the Project Area (CDFW 2021b). Although there is suitable foraging habitat in the Project vicinity, there is no potential for nesting activity because the Project Area is outside of the breeding range for both subspecies.

American white pelican. American white pelican, a CDFW Species of Special Concern, inhabits a variety of aquatic landscapes throughout the year during migration, breeding, and overwintering. This species nests on isolated islands in freshwater lakes away from their foraging areas. This species historically nested in California on Lower Klamath Lake, Tule Lake, and Honey Lake (Boellstorff et al. 1988, Tait et al. 1978); however, with low site fidelity and decreasing water levels, nesting in California is becoming less common. During migration American white pelicans forage along inland river valleys and, in some areas, increasingly in aquaculture ponds. The species overwinters primarily in shallow coastal bays, inlets, and estuaries, with an inland exception of the Salton Sea (Shuford et al. 2002). The American white pelican is an opportunistic forager, feeding on fish, aquatic amphibians, and occasionally crayfish in open aquatic areas including marshes, lakes, or rivers of varying size (Findholt and Anderson 1995a,b).

American white pelicans were observed on the interior of Bouldin Island during the April 22–23, 2021 site visit by Stillwater Sciences; they were also documented on Bouldin Island in 2019 (eBird 2021). There are no CNDDB records of American white pelican occurrences within 5 miles of the Project Area (CDFW 2021b). While the species has been observed on Bouldin Island, there is no suitable nesting habitat in the Project Area or vicinity.

White-tailed kite. White-tailed kite, a CDFW Fully Protected species, is a resident (breeding and wintering) species throughout central and coastal California, up to the western edge of the foothills of the Sierra Nevada; California constitutes the stronghold of its North American

breeding range (Zeiner et al. 1990). White-tailed kites are not migratory but may make slight seasonal range shifts in coastal areas during winter (Zeiner et al. 1990). They breed in lowland grasslands, oak woodlands or savannah, and wetlands with open areas. Riparian corridors represent a preferred landscape characteristic for kites in both the breeding and non-breeding seasons (Erichsen 1995). Groves of trees are required for perching and nesting, though kites do not seem to associate with particular tree species (Dunk 1995). Preferred foraging sites include open and ungrazed grasslands, agricultural fields, wetlands, and meadows that support large populations of small mammals. White-tailed kites feed primarily on small mammals (Erichsen 1995), but prey may also include birds, insects, and reptiles. White-tailed kites breed between February and October, with peak breeding in May through August (Zeiner et al. 1990).

This species was documented on Bouldin Island in 2014 (eBird 2021). There are no CNDDB records of white-tailed kite occurrences within 5 miles of the Project Area (CDFW 2021b). There is suitable foraging habitat for white-tailed kite in the vegetation along the landside of the levee and in the agricultural fields in the interior of the island. White-tailed kites may nest in isolated trees or groups of trees in the Project Area and vicinity.

Northern harrier. Northern harrier, a CDFW Species of Special Concern, is a fairly common winter visitor to California, with small numbers remaining to breed. In California, breeding occurs in north coastal lowlands, the central coast, the northern Central Valley, Klamath Basin, and Great Basin (MacWhirter et al. 1996, Davis and Niemela 2008). Meadows, marshes, and wetlands are optimal habitat types; other suitable habitats include grasslands, ungrazed or lightly grazed pastures, and grain fields (Davis and Niemela 2008). Northern harriers nest on the ground in shrubby vegetation, usually along the edge of marshes. Nests are constructed of larger plants (e.g., willows, cattails) at the base with grasses and sedges lining the interior. Northern harriers feed primarily on voles or other small mammals; birds, frogs, reptiles, and invertebrates comprise the rest of their diet (MacWhirter et al.1996). Northern harriers are highly territorial and breed from April through September, with peak breeding occurring during June and July (Zeiner et al. 1990).

Northern harriers have been observed foraging on Bouldin Island and in the Project vicinity (eBird 2021), including during the site visit by Stillwater Sciences conducted on April 22–23, 2021. There are no CNDDB records of northern harrier occurrences within 5 miles of the Project Area (CDFW 2021b). There is potentially suitable nesting habitat in the Project vicinity on small islands within the waterways surrounding Bouldin Island and the freshwater marsh adjacent to North Central Borrow 1.

Bald eagle. Bald eagle is federally delisted, protected by the federal BGEPA (Section 6.1), state listed as endangered, and state Fully Protected. This species is a year-round resident and uncommon winter migrant in California (Zeiner et al. 1990). Breeding occurrences have been rebounding in the state during the last few decades; recent records document nesting in 41 of California's 58 counties (CDFW 2021c). Bald eagles breed along coastal areas, rivers, lakes, and reservoirs with forested shorelines or cliffs in northern California. They winter at low and middle elevations throughout most of California, with large concentrations in the Klamath Basin (Zeiner et al. 1990). Wintering bald eagles are associated with aquatic areas containing some open water for foraging. Bald eagles forage and scavenge within large bodies of water containing abundant fish, such as estuaries, coastal waters, rivers, large lakes, and reservoirs. High snags, trees, and open rocky slopes provide hunting perches (Call 1978); open, easily approached feeding areas are preferred.

There is suitable foraging habitat for the bald eagle adjacent to the Project Area, most notably in the channels surrounding Bouldin Island. While Bouldin Island has marginally suitable breeding habitat for bald eagle, a bald eagle has reportedly been observed nesting on the island (exact location unknown) (M. Tucker, pers. comm., March 17, 2021). There are no CNDDB records of bald eagle occurrences within 5 miles of the Project Area (CDFW 2021b).

Swainson's hawk. Swainson's hawk, state listed as threatened, is a migratory raptor that is a spring and summer resident in California's Central Valley. Migrating Swainson's hawks first arrive in the Central Valley in mid-March through May and migrate south in September and October (Zeiner et al. 1990). Breeding occurs from late March to late August, with peak activity from late May through July (Zeiner et al. 1990). Most clutches are completed by mid-April, with fledging occurring from July to mid-August (Estep 1989). Swainson's hawks typically nest in only a few species of trees, such as oaks, cottonwoods, sycamores, or willows (CDFG 1994) near large, sparsely vegetated flatlands characterized by valleys, plateaus, broad floodplains, or open expanses (Bloom 1980). Although Swainson's hawk is not an obligate riparian species, the availability of nesting trees is closely tied to riparian areas, usually associated with main river channels (Bloom 1980, Estep 1989). Nesting sites tend to be adjacent or close to suitable foraging grounds, which may include recently harvested alfalfa, wheat, or hay crops; low-growing crops, such as beets or tomatoes; open pasture; non-flooded rice fields; or post-harvest cereal grain crops (Bloom 1980; CDFG 1992, 1994). Swainson's hawks forage in open areas with low vegetative cover that provide good visibility of prey, such as voles (*Microtus californicus*), ground squirrels (*Spermophilus beecheyi*), pocket gophers (*Thomomys bottae*), and deer mice (*Peromyscus* spp.). They avoid foraging in fields with tall crops that grow much higher than native grasses, making prey more difficult to find (CDFG 1994).

A pair of Swainson's hawks were documented nesting in the riparian trees along Little Potato Slough in 2009, less than 1 mile from the Project Area (CDFW 2021b). Additionally, Swainson's hawks were observed perching and foraging within the Project Area by Stillwater Sciences biologists during April and May 2021 site visits. There is suitable nesting habitat for Swainson's hawk in and near the Project Area in the riparian trees along the Project levee and near North Central Borrow 1. Many of the trees along the Project levee are non-native ornamental species located adjacent to residences, decreasing the likelihood that they would be utilized for nesting by Swainson's hawk.

Western burrowing owl. Western burrowing owl, a CDFW Species of Special Concern, is a year-round resident throughout much of California. Western burrowing owl is widely distributed in suitable habitats throughout the lowlands of California, including in the Central Valley and southeast deserts, and is rare along the coast north of Marin County and east of the Sierra Nevada crest (Small 1994, Gervais et al. 2008). Local distributions of western burrowing owl have changed considerably because of urbanization and agriculture (Gervais et al. 2008). Western burrowing owls are found primarily in sparse, open grasslands or shrublands characterized by low-growing vegetation but may also be found in areas highly altered by human activity, including airports, golf courses, and cemeteries (Haug et al. 1993). Burrows are essential habitat and are used for nesting and roosting. Individuals primarily use burrows made by ground squirrels but may also use those excavated by other fossorial (ground-denning) mammals, including badger (*Taxidea taxus*) and coyote (*Canis latrans*) (Gervais et al. 2008), or may excavate their own (Haug et al. 1993, Gervais et al. 2008). Western burrowing owls occupy human-made structures, such as levees, culverts, pipes, or debris piles (California Burrowing Owl Consortium 1993, Gervais et al. 2008), and have been found on the edges of drains and canals that border agricultural fields (Rosenberg and Haley 2004). Burrowing owls are monogamous and breed from March through August, with peak activity occurring in April and May, although

breeding can begin as early as February and end as late as December (Zeiner et al. 1990, Rosenberg and Haley 2004).

Western burrowing owls have been observed in 2020 and 2021 near Woodbridge Ecological Reserve, approximately 3 miles northeast of the Project Area (eBird 2021). There are no CNDDB records of greater or lesser sandhill crane occurrences within 5 miles of the Project Area (CDFW 2021b). The Project Area has marginally suitable nesting habitat for the species, limited to areas with suitable burrows. Although burrows were not noted in grasslands or agricultural fields within the Project Area during the site reconnaissance, they could become established in the future. Additionally, burrowing owls are known to use human-made structures such as pipes and culverts, which may be present in agricultural areas within and adjacent to the Project Area. The Project Area might also be utilized for foraging or dispersal of the species.

Loggerhead shrike. Loggerhead shrike, a CDFW Species of Special Concern, prefers open areas with scattered trees or shrubs, short vegetation, or bare ground for hunting. This species is highly territorial and aggressive during the breeding season. Loggerhead shrikes prefer tall perches such as trees, tall shrubs, fences, posts, or power lines for hunting, territory observation, and breeding defense (Zeiner et al. 1990, Humple 2008). Nest sites are typically in isolated trees or large shrubs with dense foliage (Yosef 1996).

There is moderate potential for loggerhead shrikes to occur in or near the Project Area. Loggerhead shrikes are commonly observed in the Delta and may nest in isolated trees or large shrubs in the Project Area. A loggerhead shrike was observed on Bouldin Island in 2015 (eBird 2021). There are no CNDDB records of loggerhead shrike occurrences within 5 miles of the Project Area (CDFW 2021b).

Modesto song sparrow. The "Modesto" population of song sparrow, a CDFW Species of Special Concern, (hereafter referred to as Modesto song sparrow) is a year-round resident of California endemic to the north-central portion of the Central Valley and locally abundant in the Sacramento-San Joaquin River Delta and Butte Sink areas. The Modesto song sparrow occupies freshwater marsh, riparian woodland, and riparian scrub habitats, as well as vegetated irrigation canals and levees (Gardali 2008). Emergent marsh and riparian scrub may provide the primary nesting habitat. Modesto song sparrows breed from mid-March to early August (Gardali 2008).

There are records of Modesto song sparrow nesting along the South Mokelumne River and Little Potato Slough adjacent to the Project Area in 2009 (CDFW 2021b), and they have also been documented on Bouldin Island (eBird 2021). The Modesto song sparrow may nest in emergent tule marshes on the waterside of the Project levee, or emergent marsh or riparian scrub near irrigation canals or ponds found near the landside toe of the Project levee or four potential borrow sites, most notably near North Central Borrow 1.

Tricolored blackbird. Tricolored blackbird, a state threatened species and CDFW Species of Special Concern, is largely endemic to California. It nests in large colonies, typically between February 1 and August 31, in protected stands of cattails, tules, blackberry brambles, or willows within 1,600 ft of open, accessible water (Beedy and Hamilton 1997). Tricolored blackbirds forage in a variety of habitats, including agricultural fields (e.g., cut grain, rice, alfalfa), dairies and feedlots, irrigated pastures, annual grasslands, ephemeral pools and ponds, wetlands, scrub-shrub, and freshwater marsh (Beedy and Hamilton 1997).

A tricolored blackbird was documented on Bouldin Island in 1980 (eBird 2021); more recently, in 2021, the species was observed approximately 0.5 miles from the Project Area near Islemouth

Slough (eBird 2021). There are no CNDDB records of tricolored blackbird occurrences within 5 miles of the Project Area (CDFW 2021b). There is moderate potential for tricolored blackbird to forage in agricultural areas in and adjacent to the Project Area, or nest in emergent tule marsh adjacent to the Project Area on the waterside of the Project levee or in the marsh near North Central Borrow 1.

Other migratory birds. Other non-listed but otherwise protected migratory bird species could establish nests in suitable trees or other nesting habitat in or near the Project Area. Several trees along the Project levee or near North Central Borrow 1 provide potential nesting opportunities. Protection of migratory birds, their occupied nests, and their eggs is required by the Migratory Bird Treaty Act (Section 6.1) and state Fish and Game Code Sections 3503 and 3513 (Section 6.2). Nesting season for migratory birds is generally February 1 through August 15.

2.4.1.5 Waters and wetlands

The Mokelumne River, South Mokelumne River, and Little Potato Slough are adjacent to the Project Area (Figure 1-2). In these waterways, water movement is bi-directional and influenced by westward river flow toward the San Joaquin River, tidal action, and water-supply pumping at the State Water Project intakes in the south Delta.

Although a formal delineation of jurisdictional waters and wetlands has not been conducted for the Project Area, the boundaries of such features can be reasonably approximated based on the river stage information, vegetation, and land cover type (Figures 2-1a through 2-1l). On the waterside of the levee, all features below HTL are subject to Sections 404 and 401 of the Clean Water Act and are considered jurisdictional waters/wetlands by the U.S. Army Corps of Engineers (USACE); features below MHW are also subject to Section 10 of the Rivers and Harbors Act (see Section 6.1). The Sacramento District of the USACE (regulatory branch) does not typically take jurisdiction over wetlands on the landside of levees (e.g., Freshwater Marsh) associated with ditches and/or levee seepage for levee repair projects in the Delta (USACE 1995). Any work on the waterside of the levee, from the hinge point down, falls under the regulatory purview of CDFW under Section 1600 of the Fish and Game Code (see Section 6.2).

2.4.2 Findings

a) Would the Project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

Special-status plant species

Sixteen occurrences of Suisun Marsh aster were documented adjacent to the Project Area. In accordance with mitigation measure **BIO-3,** special-status plants within or adjacent to the Project Area will be flagged or otherwise marked (e.g., staked) for avoidance prior to Project construction (Section 1.4.10). Additionally, construction personnel will be informed of the presence of these special-status plants and the avoidance measures required to protect them (**BIO-1**, Section 1.4.10). Project-related impacts on special-status plants will be less than significant with implementation of mitigation measures **BIO-1** and **BIO-3**.

Special-status fish and wildlife species

Fish. The Project Area does not include adjacent waterways, and no in-water work will occur during Project implementation. As such, special-status fish species will not be directly impacted

by construction activities. Furthermore, implementation of conservation measures **HAZ-1**, **HAZ-2**, and **HYD-1** (Section 1.4.10) will ensure that there are no indirect impacts on adjacent aquatic habitat as a result of hazardous material spills, soil erosion, and/or stormwater runoff during construction.

Western pond turtle. Turtles that may be migrating overland through the Project Area could be injured or killed by Project vehicles or construction equipment. **BIO-1** includes training construction personnel about western pond turtle and what to do in the event one is encountered (Section 1.4.10). Additionally, measure **BIO-4**, which includes preconstruction surveys, will be implemented to minimize the potential for western pond turtle to be adversely affected by the Project (Section 1.4.10). Impacts on western pond turtle will be less than significant with mitigation measures **BIO-1** and **BIO-4** incorporated.

Giant garter snake. Although aquatic habitat will be avoided during Project construction, giant garter snakes may occur in the Project Area when basking or dispersing to suitable aquatic habitat. Construction activities, including grading, clearing, or equipment staging, have the potential to result in disturbance, displacement, injury, or mortality of individual giant garter snakes. After vegetation clearing during the initial phase of construction, visibility will be enhanced, facilitating avoidance of giant garter snakes. Measure **BIO-5** (Section 1.4.10) includes implementation of several measures (e.g., preconstruction surveys, protective buffers, vehicle speed limits) to ensure that giant garter snakes are not adversely affected by the Project. In addition, **BIO-1** (Section 1.4.10) includes training construction personnel about what to do in the event a giant garter snake is encountered. While giant garter snake may disperse through or bask in the Project Area, implementation of measures **BIO-1** and **BIO-5** will limit potential impacts to a less than significant level.

Special-status and migratory birds. Project activities may affect special-status and/or other migratory birds that nest on or near (i.e., in low vegetation) the ground (e.g., western burrowing owl, northern harrier, Modesto song sparrow) if disturbance occurs to or near active nest sites during the breeding season. Direct impacts may occur with vegetation removal or ground impact (e.g., foot traffic or excavation).

Mature riparian trees located in or near the Project Area could potentially support nesting white-tailed kite, Swainson's hawk, or bald eagle. Thirty-four trees on the landside of the Project levee will be removed during Project construction. Preconstruction nesting bird surveys (**BIO-6** and **BIO-8**; Section 1.4.10) will be conducted prior to removal to avoid direct impacts to nesting birds. Additionally, loss of Riparian Forest habitat will be mitigated for as described in (b) below and in mitigation measure **BIO-9** (Section 1.4.10).

Impacts to nesting birds may also occur from construction noise (e.g., from heavy equipment, vehicles, generators, human presence) or vibration near nests on the ground or in nearby trees or structures, which could lead to nest abandonment or premature fledging.

Impacts on nesting birds and raptors will be less than significant with incorporation of mitigation measures **BIO-1**, **BIO-2**, and **BIO-6** through **BIO-9**, which include WEAP training, biological monitors, pre-construction nesting bird surveys, nest disturbance buffers, and mitigation for habitat loss (Section 1.4.10).

Several special-status and migratory bird species (e.g., the aforementioned nesting birds, American white pelican, sandhill crane) may occasionally forage in or near the Project Area.

Foraging birds can easily disperse away from temporary Project construction noise and vibration; therefore, Project-related adverse effects on these bird species are not anticipated.

b) Would the Project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

In accordance with the requirements of AB 360 (Section 6.2) and DWR's Delta Flood Protection Program requirement for net aquatic habitat improvement, this discussion is focused on Freshwater Marsh, Riparian Forest, Scrub-shrub, and Shaded Riverine Aquatic habitats, and divided by potential waterside, landside, and borrow site impacts. Riparian habitat is also protected by San Joaquin County Development Title Section 9-1510.

Waterside. Preparation of the waterside of the Project levee for armoring the newly placed fill along the levee crown may require removal of ruderal weeds and non-native annual plants. The Project will avoid impacts on Freshwater Marsh on the waterside. Preparation of the waterside of the levee may impact Scrub-shrub habitat (0.21 acres, including 0.18 acres of Himalayan blackberry) where waterside rock revetment will need to be placed. These impacts will be less than significant with mitigation as described in **BIO-9** (Section 1.4.10). The Project will retain all waterside trees; therefore, there are no anticipated impacts to Riparian Forest or Shaded Riverine Aquatic habitat on the waterside.

Landside. Levee rehabilitation will require the removal of Riparian Forest (1.20 acres, including 0.22 acres of Hinds's walnut stands [sensitive natural community rank S1.1] and 0.50 acres of non-native ornamental plantings), Scrub-shrub (2.95 acres, including 2.75 acres of Himalayan blackberry), and Freshwater Marsh (0.15 acres) habitats on the landside levee slope and toe. Native trees to be removed include ten northern California black walnuts, ten Fremont cottonwoods, and five Goodding's black willow; non-native ornamental trees to be removed include four weeping willow, two avocado, one white mulberry, one catalpa (*Catalpa* sp.), and one Italian cypress (*Cupressus sempervirens*). A total of 0.65 acres of Riparian Forest habitat, including 0.25 acres of Hinds's walnut stands and 0.33 acres of ornamental plantings, will be protected in place near levee stations 718, 800, 833, 844, and 863. Removal of vegetation on the landside levee slopes is necessary for stable levee slope construction and protection against levee failure. Woody vegetation, especially trees with deep or extensive root systems, can weaken levee integrity and threaten levee structure. Impacts to Riparian Forest, Scrub-shrub, and Freshwater Marsh habitats will be mitigated as described in **BIO-9**; therefore, effects on riparian habitat or other sensitive natural communities will be less than significant with mitigation incorporated.

Borrow Sites. The four potential borrow sites contain no Freshwater Marsh, Riparian Forest, or Scrub-shrub habitat. There will be no impact.

c) Would the Project have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

Waters and wetlands on the waterside of the Project levee that fall under the regulatory purview of USACE and the Regional Water Quality Control Board (RWQCB) will be avoided by the Project since no work will occur below HTL or MHW. Some areas of Freshwater Marsh along the landside levee toe resulting from levee seepage may be impacted by vegetation clearing and placement of fill. The Sacramento District of the USACE (regulatory branch) does not typically take jurisdiction over wetlands on the landside of levees associated with ditches and/or levee

seepage for levee repair projects in the Delta (USACE 1995); however, Freshwater Marsh habitat is protected under AB 360 as described in (b) above and any impacts will be mitigated for through development of a Mitigation and Monitoring Plan in consultation with CDFW (**BIO-9).** Therefore, impacts will be less than significant with mitigation.

d) Would the Project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

The four potential borrow sites and the haul route using existing agricultural roads provide little to no habitat value for fish or wildlife. The habitat on the Project levee is more likely to be utilized by wildlife, but it does not serve as a significant migratory corridor or nursery site. Moreover, modifications to existing levee infrastructure will not include construction of any features that will block wildlife movement. Therefore, the Project will not interfere substantially with the movement of any native resident wildlife species, nor impede the use of any wildlife nursery sites. There will be no impact.

e) Would the Project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

San Joaquin County has a tree ordinance to protect native oak trees, heritage trees, and historical trees (Development Title Section 9-1505.3). Native oak trees include valley oak (*Quercus lobata*), interior live oak (*Quercus wislizeni*), coast live oak (*Quercus agrifolia*), and blue oak (*Quercus douglasii*). Heritage oak trees are defined as native oak trees that have a single trunk diameter of 32 inches or greater measured at 4.5 ft above the ground. Historical trees include any tree or group of trees designated by the Planning Commission because of size, age, location, or history. No oak trees or historical trees were documented within the Project Area.

San Joaquin County also has an ordinance to protect riparian habitat (Development Title Section 9-1510). Loss of riparian habitat, as described in (b) above, will be mitigated for through development of a Mitigation and Monitoring Plan (**BIO-9**); therefore, the impact will be less than significant with the incorporation of mitigation.

f) Would the Project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

The Project Area is located within the Primary Zone of the Delta covered by the San Joaquin Multispecies Habitat Conservation Plan (SJCOG 2000). The Project does not conflict with provisions of this plan because it does not convert open space to a non-open space use. There are no other Habitat Conservation Plans or Natural Community Conservation Plans applicable to the Project. There will be no impact.

2.5 Cultural Resources

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?	❑	✓	❑	❑
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	❑	✓	❑	❑
c) Disturb any human remains, including those interred outside of dedicated cemeteries?	❑	✓	❑	❑

2.5.1 Environmental setting

The Project is located in the Sacramento-San Joaquin River Delta, part of the Great Valley geomorphic province. The Project Area is underlain by late Holocene to present Delta mud deposits (Qhdm) (Graymer et al. 2002, Meyer and Rosenthal 2004), which extend to depths of approximately 30 ft below the surface and are underlain by Pleistocene-aged sediments. The Project Area is underlain by soils of the Rindge and Ryde series. Both soils are estimated to be of late Holocene to present age. Recent geoarchaeological studies in San Joaquin County found that Qhdm deposits and Rindge and Ryde series soils have variable sensitivity for buried archaeological deposits (Meyer and Rosenthal 2004, 2007, 2008).

Prehistoric and ethnographic habitation sites in the Delta are primarily found near major water sources on elevated sandy islands and natural embankments (Natural Investigations Company 2021). Surface elevations on Bouldin Island range from 0 to 20 ft below sea level, and the island was inundated prior to reclamation for agriculture in the early twentieth century (Whipple et al. 2012). While the Project Area is near the Mokelumne River, its low elevation and history of inundation would have precluded human occupation for much of prehistory (Moratto 2004, Meyer and Rosenthal 2008.

The Natural Investigations Company conducted a cultural and paleontological resources assessment for the Project, which included a search of records for known cultural resources in the Project Area and vicinity, and an intensive pedestrian survey of the Project Area (Natural Investigations Company 2021). Results of the assessment are synthesized in this section, including summaries of pre-contact historic, ethnographic, and post-contact historic context of the region. The full report contains confidential information (e.g., Sacred Lands File [SLF] search results) and is available to relevant agencies upon request.

2.5.1.1 Records searches

The Central California Information Center (CCIC) conducted a California Historical Resources Information System (CHRIS) records search. The results of the CHRIS search were returned on March 5, 2021. CHRIS records indicate that 13 prior cultural resource studies have been completed within the Project Area, and six additional studies have been completed within the 0.25-mile record search radius. CHRIS records also indicate that two cultural resources have been

previously recorded within the Project Area, and 21 additional resources have been previously recorded within the search radius (Natural Investigations Company 2021). All previously recorded cultural resources within 0.25 miles of the Project Area are historic; no prehistoric cultural resources have been previously recorded.

The NAHC returned the results of a SLF records search on March 30, 2021. The SLF results were negative for Native American resources in the vicinity of the Project (Natural Investigations Company 2021).

The Natural Investigations Company conducted a search of paleontological records maintained by the University of California Museum of Paleontology (UCMP). The records indicate no unique geologic features, fossil-bearing strata, or paleontological sites within 1 mile of the Project Area. None of the geologic units known to contain fossils in San Joaquin County, including the Franciscan, Mehrten, Modesto, or San Pablo formations, are present within the Project Area (Natural Investigations Company 2021).

2.5.1.2 Native American outreach

The Natural Investigations Company sent Project information letters to each of 17 tribal individuals or organizations provided by NAHC (Natural Investigations Company 2021). To date, no additional information indicates the potential presence of tribal cultural resources in the Project Area.

2.5.1.3 Pedestrian survey

On March 26, 2021, two Natural Investigations Company archaeologists (P. Hanes, MA, RPA and D. Stapleton, MA, RPA) conducted an intensive pedestrian survey of the Project Area (Natural Investigations Company 2021). Surveys were conducted along transects spaced no more than 50 ft apart and included transects along the Project levee and three borrow sites. North Central Borrow 1 was not surveyed in entirety because its footprint changed following the field visit. Three previously unrecorded cultural resources were identified and documented during the field survey:

a) NIC-2021-Bouldin-01, a historical irrigation ditch network
b) NIC-2021-Bouldin-02, Bouldin Island Levee
c) NIC-2021-Bouldin-03, a minor historic segment of State Route 12

In addition, two previously recorded cultural resources within the Project Area (P-39-000322 and P-39-000324) were revisited, and their present condition was assessed. P-39-000322 is a historic (circa 1920s) trash scatter associated with a former agricultural labor camp occupied predominantly by Asian-American workers. Given the ethnic specificity and age of the diagnostic constituents of the site, it likely relates to the activities of crews working under direction of George Shima, though the camp is not among those on the island that have been formally named. P-39-000324 includes concrete foundation elements, a fenced corral, sheds, and historic refuse likely associated with George Shima's Work Camp No. 16, which was established in 1916. Both resources have been substantially altered by plowing and other disturbances. None of these sites appear to be eligible for listing in the National Register of Historic Places (NRHP) or the California Register of Historical Resources (CRHR) (Natural Investigations Company 2021).

The uninhabited residence that will be removed during Project construction was observed during the field survey (Figures 1-2 and 1-4). This residence does not constitute an historical resource

because it is modern in age. Review of aerial photography and topographic maps confirmed that the structure dates to the mid-1970s (NETR 2021).

2.5.2 Findings

a) Would the Project cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?

The two cultural resources identified within the Project Area during the pedestrian survey (NIC-2021-Bouldin-01 and NIC-2021-Bouldin-02) have been significantly altered or destroyed such that neither resource appears to be eligible for listing under NRHP or CRHR. Likewise, the two previously recorded sites in the Project Area (P-39-000322 and P-39-000324) do not appear to be eligible for NRHP or CRHR listing because they have been subject to extensive and severe impacts which have significantly reduced their informational potential. The minor historic segment of State Route 12 (NIC-2021-Bouldin-03) lacks the historical associations and informational value required for NRHP or CRHR eligibility. Additionally, the uninhabited residence that will be removed during Project construction does not constitute an historical resource because it dates to the mid-1970s. For these reasons, no cultural resources qualifying as historical resources under CEQA are known to exist within the Project Area (Natural Investigations Company 2021). Per mitigation measure **CUL-2a**, if a cultural resource is inadvertently discovered during Project activities, work must be halted within 30 ft of the find and a qualified archaeologist notified immediately so that an assessment of its potential significance can be undertaken and proper data recovery and/or preservation procedures can be implemented, if necessary. All contractors and equipment operators will be instructed on proper compliance with this measure as part of annual WEAP training (mitigation measure **CUL-1**). Impacts to historical resources will be less than significant with the adoption of mitigation measures **CUL-1** and **CUL-2a.**

b) Would the Project cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?

The two previously recorded archaeological sites in the Project Area (P-39-000322 and P-39-000324) do not appear to be eligible for NRHP or CRHR listing because they have been subject to extensive and severe impacts which have significantly reduced their information potential. Additionally, better examples of archaeological sites associated with early twentieth-century farming in the reclaimed Delta are well-documented and reflected in the NRHP and CRHR (Mainery 1993), so the known archaeological sites in the Project Area do not constitute unique archaeological resources (Natural Investigations Company 2021). Similarly, the two cultural resources identified within the Project Area during the pedestrian survey (NIC-2021-Bouldin-01 and NIC-2021-Bouldin-02) have been significantly altered or destroyed, and the minor historic segment of State Route 12 (NIC-2021-Bouldin-03) lacks the historical associations and informational value required for NRHP or CRHR eligibility. As such, none of these previously unrecorded resources appear to be eligible for listing under NRHP or CRHR.

Furthermore, inundation of the Project Area would have precluded human occupation for most of prehistory. No prehistoric sites of any kind have been recorded within 0.25 miles of the Project Area. Ground disturbances across the Project Area reduce the potential for intact archaeological features. No indication of subgrade cultural materials was observed during the pedestrian survey. The potential for archaeological resources in the Project Area is low (Natural Investigations Company 2021). Per mitigation measure **CUL-2a**, if a cultural resource is unexpectedly discovered during Project activities, work must be halted within 30 ft of the find and a qualified

archaeologist notified immediately so that an assessment of its potential significance can be undertaken and proper data recovery and/or preservation procedures can be implemented, if necessary. All contractors and equipment operators will be instructed on proper compliance with this measure as part of annual WEAP training (mitigation measure **CUL-1**). Impacts to cultural resources will be less than significant with the adoption of mitigation measures **CUL-1** and **CUL-2a**.

c) Would the Project disturb any human remains, including those interred outside of dedicated cemeteries?

The results of background research, geoarchaeological analysis, Native American outreach, and field survey suggest that the potential of the Project to disturb human remains is very low (Natural Investigations Company 2021). Per mitigation measure **CUL-2b**, work will be halted and the County Coroner notified immediately should human remains be encountered during construction. If the human remains are determined to be of Native American origin, the County Coroner will notify the NAHC, which will determine and notify an MLD. The MLD must complete an inspection of the site within 48 hours of notification and may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials. All contractors and equipment operators will be instructed on proper compliance with this measure as part of annual WEAP training (mitigation measure **CUL-1**). Impacts to cultural resources will be less than significant with the adoption of mitigation measures **CUL-1** and **CUL-2b**.

2.6 Energy

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during Project construction or operation?	❑	❑	✓	❑
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	❑	❑	❑	✓

2.6.1 Environmental setting

Energy sources are either renewable (e.g., solar, wind) or nonrenewable (e.g., fossil fuels) and can be combusted to power vehicles and equipment or converted to electricity as a secondary energy source.

In 2018, California consumed more energy than all other states except Texas, but its per capita consumption of 202 million British thermal units (Btu) was the fourth lowest in the nation (USEIA 2021). The California Energy Commission (CEC), established by the Warren-Alquist Act in 1975, has been instrumental in limiting California's energy consumption, particularly via energy efficiency standards that are updated every three years in Title 24 (CEC 2021).

2.6.2 Findings

a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during Project construction or operation?

Project construction equipment will use fossil fuels for power. The use of such equipment is necessary to rehabilitate the Project levee for flood protection. BMPs included in conservation measure **AIR-1** will ensure construction equipment will be used as efficiently as feasible (e.g., by reducing idling) (Section 1.4.9). Fossil fuel consumption will be on a short-term basis during construction and will not persist upon Project completion. No electricity consumption will be associated with the Project. The impact will therefore be less than significant.

b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

Current state and local plans such as California Title 24 Building Energy Efficiency Standards and the San Joaquin County General Plan establish energy efficiency standards for actions (e.g., new building construction, retrofitting existing developments) that are not associated with the Project. As such, the Project will not conflict with or obstruct a state or local plan for renewable energy or energy efficiency. There will be no impact.

2.7 Geology and Soils

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?	❑	❑	❑	✓
ii) Strong seismic ground shaking?	❑	❑	❑	✓
iii) Seismic-related ground failure, including liquefaction?	❑	❑	❑	✓
iv) Landslides?	❑	❑	❑	✓
b) Result in substantial soil erosion or the loss of topsoil?	❑	❑	✓	❑
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	❑	❑	❑	✓
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	❑	❑	✓	❑

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	❑	❑	❑	✓
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	❑	❑	❑	✓

2.7.1 Environmental setting

The Project Area lies within the Great Valley geomorphic province, which is crossed by few faults; however, it is bordered by the Coast Range province, which contains several active fault zones that predominately exhibit right-lateral, strike-slip motion. The Hayward Fault Zone lies about 35 miles to the southwest of the Project Area. The closest active faults[10] designated by the California Geological Survey (CGS) are the Greenville Fault Zone and Green Valley-Concord fault zones, located about 25 and 28 miles to the southwest, respectively (ESA 2014, CGS 2018a–c). The closest potentially active fault is the Midland Fault Zone, which runs north-south through the Delta about 4 miles west of the Project Area (Unruh and Hitchcock 2009, CGS 2018b). The most recent displacement along this fault is estimated to be mid- to early-Quaternary (0.7–2.6 million years before present) (CGS 2010).

The Greenville and Green Valley-Concord faults both have estimated slip rates of 1–5 millimeters per year (Bryant and Cluett 2002a,b). The USGS estimates a 16% probability of an earthquake of magnitude 6.7 or greater occurring on either of these fault systems by the year 2043 (Aagaard et al. 2016). Peak ground motion[11] in the Project Area is estimated by the CGS to be a moderately low value of 0.31–0.35 for alluvial materials (CGS 2018b). In general, ground rupture hazards do not affect San Joaquin County. Delta islands are, however, susceptible to liquefaction because of shallow groundwater depths and the presence of sandy-peaty soils with low cohesive strength (CGS 2018b, San Joaquin County 1992). Liquefaction or seismically induced waves in Delta channels may damage levees on Delta islands (San Joaquin County 1992).

Bouldin Island is composed predominately of marsh muds and peats that accumulated throughout the Holocene (<11,000 years before present) atop sand and eolian deposits from the Pleistocene-age Modesto Formation (Atwater 1982a,b; Helley and Graymer 1997). This process of tidal marshland formation occurred throughout the Delta region until land reclamation began in the late 1800s during Euro-American settlement (Whipple et al. 2012). By the 1930s, draining of marshes and wetlands and extensive levee construction transformed the Delta into an agricultural landscape. These changes in land use allowed for microbial oxidation and depletion of peat, resulting in land-surface subsidence of up to 26 ft below sea level on Delta islands (Drexler et al. 2009). Based on Light Detection and Ranging (LiDAR) data from 2007 and 2015, Bouldin Island levees subsided at an average rate of approximately 1 centimeter per year (Brooks et al. 2018).

[10] An "active fault" is defined by the California Geological Survey as a fault having surface displacement within the Holocene epoch, or the past 11,700 years (CGS 2018c).

[11] Peak ground motion (10% probability of being exceeded in 50 years) is expressed as a percent of the acceleration due to gravity.

The land surface elevation on Bouldin Island ranges from approximately 5 ft below sea level near the levee toes (Hultgren-Tillis Engineers 2021a) to approximately 25 ft below sea level in the interior (Brooks et al. 2018).

Bouldin Island soils are typically poorly drained mucks and silty-clayey loams (NRCS and UC Davis 2019). In general, Delta island soils have a relatively high potential for shrink-swell behavior, a primary characteristic of expansive soils[12] (ESA 2014). A recent geotechnical study performed at the potential borrow sites in the interior of Bouldin Island, which will supply fill material for the Project, confirmed that the borrow site soils included peat and mineral soils (lean clay, silt, silty and clayey sand, and poorly graded sand with silt) (Hultgren-Tillis Engineers 2021b). Soil samples collected during the geotechnical investigation typically had plasticity indices greater than 15% and more than 10% of soil particles passed a No. 200 sieve, indicative of expansive soils. The other two provisions that help characterize expansive soils—presence of >10% soil particles <0.005 millimeter and soils having an expansion index of >20—were not analyzed. The study investigators concluded that the peat should not be used for levee or toe berm fill.

Groundwater was encountered within 4.5 ft of the ground surface in all four potential borrow sites. Groundwater levels are artificially maintained below the island interior by pumping, as well as evapotranspiration from farmed crops (Hultgren-Tillis Engineers 2021b).

2.7.2 Findings

a) Would the Project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?

The Project Area is not located near a delineated Alquist-Priolo fault zone, and ground rupture hazards are unlikely to affect the Project Area. The Project levee rehabilitation will result in no operational or land use change that will cause substantial adverse effects due to potential rupture of an earthquake fault. Therefore, the Project will have no impact.

ii) Strong seismic ground shaking?

The Project Area is not located near active faults and, accordingly, lies in a zone with low potential for strong seismic ground shaking. The purpose of the Project is to rehabilitate the levee. A geotechnical investigation has been performed to ensure that appropriate material will be used to improve levee stability (Hultgren-Tillis Engineers 2021b). The Project will not increase the potential for direct or indirect adverse effects related to seismic ground shaking. Therefore, the Project will have no impact.

[12] Expansive soils are characterized by the ability to undergo significant volume change as a result of varying soil-moisture content. The 2010 California Building Code, Title 24, Part 2, Section 1803.5.3: Geotechnical Investigations defines an expansive soil as meeting the following provisions: (1) plasticity index of ≥15; (2) >10% soil particles pass a No. 200 sieve (0.075 millimeters); (3) >10% soil particles are <0.005 millimeters; and (4) expansion index of >20.

iii) Seismic-related ground failure, including liquefaction?

The Project Area lies in the Delta, which is potentially susceptible to seismically induced liquefaction that could result in levee failure and flooding. The purpose of the Project is to rehabilitate the levee. A geotechnical investigation has been performed to ensure that appropriate material will be used to improve levee stability (Hultgren-Tillis Engineers 2021b). The Project will not increase the potential for direct or indirect adverse effects due to seismic-related ground failure. Therefore, the Project will have no impact.

iv) Landslides?

Except for the levees surrounding the island, the Project Area has a flat topography and is not susceptible to landslides. The Project will rehabilitate and enhance the slope stability of the Project levee that currently does not meet the minimum levee geometry requirements of Bulletin 192-82. The Project levee rehabilitation will not increase the potential for direct or indirect adverse effects related to landslides. Therefore, the Project will have no impact.

b) Would the Project result in substantial soil erosion or the loss of topsoil?

The Project will remove topsoil during excavation of borrow material from up to four potential borrow sites (Figure 1-2). Due to the flat topography of Project Area, removal of this material will not result in substantial potential for erosion. During active construction, there will be a minor and temporary increase in the potential for stormwater-related erosion of surficial soil. To minimize the risk of soil erosion during construction, the Project will implement conservation measure **HYD-1** (Section 1.4.9). Construction will only occur during dry periods. Upon completion of levee rehabilitation, the landside slope will be hydroseeded with a CDFW-approved native grass seed mix for erosion control and ecosystem enhancement. The levee crown and roadway will be constructed with a compacted aggregate base and 2% landside slope to minimize runoff into the adjacent waterway. In the long term, these measures will stabilize the levee slope. Impacts of the Project on soil erosion and loss of topsoil will be less than significant.

c) Would the Project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?

The existing levees surrounding Bouldin Island overlie potentially unstable geologic units comprised of peat and silt-clay loams. The levees themselves may include high-permeability materials such as sand or gravel, animal burrows, voids from tree roots, and other inclusions that facilitate seepage through the levee. A geotechnical investigation has been performed to ensure that appropriate fill material from the borrow sites will be used to improve levee stability (Hultgren-Tillis Engineers 2021b). To accommodate initial settling under the weight of new fill and continued settling as the underlying peat creeps, the Project levee will be built 12 inches higher and 5 ft wider than the planned final crest dimensions (Hultgren-Tillis Engineers 2021a). As the soil consolidates, levee foundation materials will gain strength. Slope stability analyses indicate factors of safety will increase over the long term. The Project also includes construction of a stability berm along the landside toe of the levee. In compliance with California Water Code Section 12316(g), this toe berm will raise the elevation of the land immediately adjacent to the levee and provide a cap over exposed peat that could otherwise oxidize over time, thereby reducing the potential for subsidence. A shallow trench will also be excavated along the levee axis to explore conditions at shallow depths and to find and remove high-permeability material.

Levee rehabilitation will improve levee stability; therefore, the Project will not result in increased potential for on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse. There will be no impact.

d) Would the Project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?

The area surrounding the Project levee has expansive soils (i.e., peat and organic materials). The Project has, however, been designed to address the potential for expansive soil. Expansive soils will not be used to rehabilitate the levee or construct the toe berm. The Project levee will be built 12 inches above the final crest elevation and 5 ft wider than the final width to accommodate long-term deformation (Hultgren-Tillis Engineers 2021a). Ongoing deformation and cracking are unavoidable due to the underlying expansive soils (Hultgren-Tillis Engineers 2021a), but the Project will not increase long-term deformation or risks to life and property compared to existing conditions. Therefore, potential effects from the Project being located on and/or utilizing expansive soils will be less than significant.

e) Would the Project have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

Areas surrounding the Project are primarily agricultural, and the domestic residences on Bouldin Island are expected to use septic tanks. The Project will not include installation or disturbance to any existing septic tanks or alternative wastewater disposal system. Therefore, the Project will have no impact.

f) Would the Project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

No unique paleontological resources or geologic features are documented on Bouldin Island. Due to their relatively young age, the Holocene muds and peats that cover much of the island are generally considered to have low potential for the presence of fossils. None of the geologic units known to contain fossils in San Joaquin County, including the Franciscan, Mehrten, Modesto, or San Pablo formations, have been mapped within the Project Area (see Section 2.5). Fill from the borrow sites will be drawn primarily from Holocene deposits with low potential for paleontological resources. Aside from the borrow sites, the Project will only affect existing levee areas. Haul routes will be restricted to existing roads. Therefore, the Project will have no impact.

2.8 Greenhouse Gas Emissions

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	❑	❑	✓	❑
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	❑	❑	❑	✓

2.8.1 Environmental setting

Greenhouse gases (GHGs) can absorb and emit infrared radiation, trapping energy in the atmosphere and causing it to warm. GHGs have impacts that are more global than regional and are different from air pollutants that impact only the general area near where they are released. GHGs can occur naturally or as a direct result of human activities. State law defines GHGs to include the following emissions: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride (Health and Safety Code, § 38505(g)). The most common GHG resulting from human activity is carbon dioxide, followed by methane and nitrous oxide.

California GHG emissions decreased 15% from their 2004 peak to 418.4 million metric tons of carbon dioxide equivalent (CO_2e) in 2019, while statewide per capita emissions decreased by 25% from their peak in 2001 to 2019 (14.0 metric tons per person to 10.5 metric tons per person) (CARB 2021d). The transportation sector consistently emits more GHG than any other sector, accounting for almost 40% of state GHG emissions in 2019.

2.8.1.1 Local regulatory setting

The SJVAPCD has developed guidance for performance-based standards, or Best Performance Standards (BPS), to assess significance of GHG emission totals for stationary sources and land use development projects; for these types of projects adherence to BPS or a demonstration of a 29% reduction from business-as-usual emissions would be required to demonstrate less than significant GHG emission impacts (SJVAPCD 2009). For construction projects, the SJVAPCD has not established such guidance or quantitative significance thresholds for GHG emissions.

The San Joaquin County General Plan aims to reduce GHG emissions primarily through changes in land use patterns (e.g., alternative transportation systems, sustainable building practices) (San Joaquin County 2016).

2.8.2 Findings

a) Would the Project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Project construction is expected to generate 1,856 metric tons of CO_2e during May–November of 2022 and 2023, as indicated by the results from the Road Construction Emissions model (Appendix A). The Project will not result in changes to long-term GHG emissions following construction. Therefore, short-term construction-related impacts involving the generation of GHG emissions from the Project are expected to be less than significant.

b) Would the Project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Emissions associated with Project construction will be temporary and will not inhibit attainment of the statewide GHG emissions limit established by Senate Bill 32, as described in Section 6.2. The SJVAPCD has not established GHG emissions guidance or quantitative significance thresholds for GHG emissions from construction projects, and construction projects are not a mechanism by which the San Joaquin County General Plan aims to reduce GHG emissions (see Section 2.8.1.2). The Project will not result in changes to long-term GHG emissions following construction. The Project will therefore not conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the GHG emissions; there will be no impact.

2.9 Hazards and Hazardous Materials

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	❑	❑	✓	❑
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	❑	❑	✓	❑
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	❑	❑	❑	✓
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	❑	❑	❑	✓
e) For a Project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project result in a safety hazard or excessive noise for people residing or working in the Project Area?	❑	❑	❑	✓
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	❑	❑	❑	✓

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?	❑	❑	❑	✓

2.9.1 Environmental setting

Land uses surrounding the Project Area are predominantly agricultural and open space, along with some residential uses. These lands have the potential to contain hazardous substances. Petroleum products and pesticides are the most likely materials that may have been stored or released into the surrounding environment. Older gas wells and underground storage tanks used to store petroleum products and other hazardous materials may develop leaks. These leaks can lead to the contamination of soils and groundwater. A query of the California Department of Toxic Substances Control's (CDTSC's) database reveals that there are no known sites in the Project Area having cleanup, permitted, or other hazardous materials status (CDTSC 2021).

A single uninhabited residence located near levee station 824+50 will be demolished during Project construction (Figures 1-2 and 1-4). Demolition of the residence will include removal of any underground utilities, foundations, and the aboveground structure. Other debris, remnants of structures, and general refuse within the Project Area will be demolished and disposed of off site.

Groundwater at Bouldin Island is hydraulically connected to the surrounding waterways (CGS 2018b). Groundwater levels are expected to be within a few feet of the ground surface in the interior of the island and near mean tide level within the levees (Hultgren-Tillis Engineers 2021b). Because the interior of the island is below sea level, it is likely that water flows from the surrounding waterways into storage beneath Bouldin Island; therefore, there is potential for any water that becomes contaminated to be transported to the soils within and near the levees. Potential sources of contamination on the surface of the levees may include trash and debris from litter and illegal dumping, contaminant-laden sediment transported and deposited by the surrounding waterways, and surficial application of herbicides commonly used for weed control. Recent geotechnical studies did not encounter any hazardous materials in either the Project levee or the borrow sites (Hultgren-Tillis Engineers 2021a,b).

2.9.2 Findings

a) Would the Project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

The Project has the potential to accidentally spill diesel fuel and other hazardous materials used by construction equipment. To minimize the risk of a hazardous-materials release during construction, the Project will implement hazardous materials BMPs as part of the Project, as outlined in conservation measures **HAZ-1** and **HAZ-2** (Section 1.4.9). All fuels and other hazardous materials will be handled and stored according to the manufacturer's specifications. A containment area will be established for construction equipment staging, and the ground will be protected from potential contamination within the containment area. In the event of a spill, crew

personnel will stop the spillage at its source, contain the spilled material, and notify Project supervisors and appropriate agency representatives.

Demolition of the uninhabited residence, including removal of any underground utilities, foundations, and the aboveground structure presents additional potential hazards to the environment through improper transport or disposal of hazardous materials (e.g., asbestos-containing materials, lead-based paint). The Project will comply with all NESHAP and San Joaquin County Demolition Permit requirements, including receiving SJVAPCD and Environmental Health Department approval prior to demolition. As part of this approval process, surveys for hazardous building materials (e.g., asbestos-containing materials, lead-based paints) will be conducted by a qualified and licensed professional in all structures proposed for demolition (**HAZ-3**). Any asbestos-containing materials or peeling lead-based paint will be abated in accordance with local, state, and federal requirements. Any other hazardous materials (e.g., fuel, chemicals) will be identified, separated, packaged for disposal, and transported to a permitted disposal facility (e.g., the North County Recycling Center and Sanitary Landfill in Lodi) in accordance with the BMPs outlined in **HAZ-1** and **HAZ-2** (Section 1.4.9).

Impacts related to the transport, use, or disposal of hazardous materials will be less than significant with compliance with applicable demolition and disposal regulations and incorporation of **HAZ-1** and **HAZ-2**.

b) Would the Project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

As stated above, implementation of hazardous materials management BMPs as outlined in **HAZ-1** and **HAZ-2** (Section 1.4.9) will occur during construction; therefore, there will be a less than significant impact.

c) Would the Project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

There are no schools located within one-quarter mile of the Project Area. The closest school is Isleton Elementary School, located over 3 miles northwest of the Project Area in Sacramento County. The Project will have no impact.

d) Would the Project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

No portion of the Project Area is included on a list of hazardous materials sites (CDTSC 2021). The Project will have no impact.

e) For a Project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project result in a safety hazard or excessive noise for people residing or working in the Project Area?

There are no public-use airports within 2 miles of the Project Area. The Project will therefore have no impact.

f) Would the Project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

There are four inhabited residences on Bouldin Island near the Project Area. There will be no road closures as part of the Project, thus there will be no disruption to emergency evacuation routes for residents of the island. The Project will not include the use of barges and will therefore not alter or impact navigation on adjacent waterways. All roadway traffic supporting the Project will adhere to all applicable laws for motor vehicles and with the county's Office of Emergency Services. The construction contractor will comply with local fire, police, and medical responders during any emergency. For these reasons, there will be no impact.

g) Would the Project expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?

Bouldin Island has been designated by the Department of Forestry and Fire Protection (CalFire) as an unzoned local responsibility area[13] with no moderate, high, or very high fire hazard severity zones (CalFire 2020). Accordingly, the Project will not expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands. In addition, the Project will implement **HAZ-4** (Section 1.4.9) to reduce the potential for a grass fire. Therefore, the Project will have no impact.

2.10 Hydrology and Water Quality

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	❑	❑	✓	❑
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the Project may impede sustainable groundwater management of the basin?	❑	❑	❑	✓
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:				
i) result in substantial erosion or siltation on- or off-site;	❑	❑	✓	❑
ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;	❑	❑	❑	✓

[13] Local responsibility areas are lands on which neither the state nor the federal government has any legal responsibility for providing fire protection.

	Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
	(iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	❑	❑	❑	✓
	(iv) impede or redirect flood flows?	❑	❑	❑	✓
d)	In flood hazard, tsunami, or seiche zones, risk release of pollutants due to Project inundation?	❑	❑	❑	✓
e)	Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	❑	❑	❑	✓

2.10.1 Environmental setting

Bouldin Island is surrounded by navigable waterways and encircled by a flood control levee maintained by the District. Waterways adjacent to the Project Area include the South Mokelumne River, Mokelumne River, and Little Potato Slough (Figure 1-2). This area is within Hydrologic Unit Code (HUC) 180400121106 (USGS and USDA-NRCS 2014). Project activities along the Project levee will be limited to the levee crown, landside levee slope extending landside to varying distances up to 150 ft, and the waterside levee slope above HTL and MHW; no in-water construction activities will occur.

The Project Area experiences a Mediterranean climate which is characterized by hot, dry summers and cool, wet winters. Mean annual rainfall at the Project Area between 1981 and 2020 was 17 inches (PRISM 2021). Rainfall typically occurs between October and April (PRISM 2021). Water levels in the adjacent waterways fluctuate daily with tidal action and episodically during flood events that typically occur in winter and spring. In this part of the Delta, water movement is bi-directional and influenced by westward river flow toward the Mokelumne-San Joaquin confluence, tidal action, and water-supply pumping at the State Water Project intakes in the south Delta. Bouldin Island is currently mapped within Federal Emergency Management Agency's (FEMA's) 100-year recurrence floodplain designation (DWR 2021). There are no tsunami risks in the Project Area or vicinity according to the State of California's tsunami inundation map (State of California 2021).

Water quality objectives and beneficial uses for surface water and groundwater are in the Water Quality Control Plan for the Central Valley (Basin Plan) (Central Valley RWQCB 2018). The water quality objectives apply to all surface waters in the Sacramento and San Joaquin River basins within the San Joaquin Delta hydrologic unit, including the waterways surrounding Bouldin Island (i.e., South Mokelumne River and Mokelumne River). Existing and potential beneficial uses for the San Joaquin Delta include municipal and domestic supply, agriculture supply (irrigation and stock watering), industry supply (process and service), recreation (contact and other noncontact), freshwater fish habitat (warm and cold), migration (warm and cold), spawning (warm), wildlife habitat, and navigation. In accordance with Section 303(d) of the Clean Water Act, the Delta waterways (central portion), including the waterways surrounding Bouldin Island, have been classified as *impaired* by the State Water Resources Control Board (SWRCB) (SWRCB 2012). This designation, as specified in the Basin Plan, is assigned to waterbodies where established water quality objectives are not being met or where beneficial uses

are not protected. The SWRCB has classified the Delta waterways (central portion) as *impaired* for metals (mercury), pesticides (chlorpyrifos, Dichlorodiphenyltrichloroethane [DDT], diazinon, group A pesticides), toxicity (unknown), and invasive aquatic species (SWRCB 2012). Classification of a waterbody as *impaired* on the 303(d) list triggers the development of a pollution control plan, called a Total Maximum Daily Load (TMDL). The TMDL for each water body and associated pollutant serves as the means to attain and maintain water quality standards for the *impaired* water body.

2.10.2 Findings

a) Would the Project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?

There will be no in-water work associated with the Project. Project-related ground disturbance, however, could temporarily increase the potential for localized erosion and sediment-laden stormwater runoff. The Project will implement a SWPPP during construction to mitigate potential pollution associated with stormwater runoff. The SWPPP will include BMPs to minimize the risk of soil erosion and stormwater runoff during construction (conservation measure **HYD-1**) and hazardous materials BMPs (conservation measures **HAZ-1** and **HAZ-2**) to minimize the potential for accidental spills of hazardous materials to enter waterways and groundwater (Section 1.4.9). To reduce erosion upon completion of the levee construction, the landside slope will be hydroseeded with a native grass seed mix and the levee crown will be covered with compacted aggregate base placed along its surface to create an all-weather roadway. The roadway will be constructed with a 2% landside slope to minimize the potential for runoff into the adjacent waterway. The topography of the potential borrow sites is flat; drainage patterns or erosion in the surrounding areas will not be affected by excavation. Over the long term, the Project will decrease the potential for erosion and sediment-laden runoff through the rehabilitation of the levee, construction of a toe berm, and installation of revetment on the waterside slope, which will reduce flood risk and decrease erosion susceptibility. With implementation of conservation measures **HYD-1**, **HAZ-1**, and **HAZ-2,** impacts to surface or ground water quality will be less than significant.

b) Would the Project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the Project may impede sustainable groundwater management of the basin?

Groundwater may seep into the excavated borrow sites. As necessary, pumps will be used to collect ponded water and reuse it for fugitive dust control during Project construction. There will be no long-term decrease in ground water supply or effect on natural recharge potential and the Project would not impede sustainable groundwater management. There will be no impact.

c) Would the Project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

i) result in substantial erosion or siltation on- or off-site?

Movement of earth and fill material using large equipment and removal of vegetation during construction could temporarily disturb surficial soils and alter runoff potential at low levels during construction. Appropriate BMPs included in the Project SWPPP will be implemented during construction to minimize potential temporary impacts on waters

from erosion during Project construction (conservation measure **HYD-1**, Section 1.4.9). To reduce erosion upon completion of the levee construction, the landside slope will be hydroseeded with a native grass seed mix, and the levee crown will be covered with a compacted aggregate base to create an all-weather roadway. The roadway will be constructed with a 2% landside slope to minimize runoff into the adjacent waterway. The topography surrounding the potential borrow sites is flat; drainage patterns or erosion in the surrounding areas will not be affected by excavation. Over the long term, rehabilitation of the levee will decrease erosion during flood events, thereby reducing siltation in adjacent waterways. The Project will, therefore, have a less than significant impact.

ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite?

The Project will rehabilitate the existing Project levee and will not substantially alter drainage patterns following construction. Earth-moving activities during construction have the potential to cause minor alterations to the existing drainage patterns in a manner that would not result in an increased risk of flooding. The Project will therefore have no impact.

(iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

The Project does not involve alteration of a stormwater drainage system and will not create or contribute runoff water or provide additional sources of polluted runoff. The Project will therefore have no impact.

(iv) impede or redirect flood flows?

Construction activities on the waterside of the levee, including placement of rock along the levee crown, will be completed above HTL and MHW and outside of the winter/spring flood season (see Section 1.4.8) and will therefore not impede or redirect flood flows within adjacent waterways. The rehabilitated levee will ensure flood flows are contained within these waterways and, thereby, protect the landside of the levee. There will be no impact.

d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to Project inundation?

Bouldin Island is not at risk from tsunamis or mudflows (State of California 2021). Bouldin Island is classified as a Special Flood Hazard Area Zone AE by the Federal Emergency Management Agency, which indicates it is subject to inundation by a 1-percent-annual-chance flood event (FEMA 2021). Although seismically induced earth movements, seiches, and flooding are possible in the Delta, the Project will increase the ability of the levee to protect the landside of the island from such events. As such, the Project will reduce the risk of pollutant release associated with unanticipated inundations. The Project will therefore have no impact.

e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

The Project will not conflict with or obstruct the implementation of the Basin Plan (Central Valley RWQCB 2018) or sustainable groundwater management plan. There will be no impact.

2.11 Land Use and Planning

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Physically divide an established community?	❑	❑	❑	✓
b) Cause a significant environmental impact due to a conflict with any applicable land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	❑	❑	✓	❑

2.11.1 Environmental setting

The zone designation for Bouldin Island is agriculture (ESA 2014). Bouldin Island is also part of the Delta Primary Zone, as defined by the Delta Protection Act of 1992, which includes approximately 500,000 acres of waterways, levees, and farmed lands throughout five counties (DPC 2010). The Land Use and Resource Management Plan for the Primary Zone of the Delta guides planning for the conservation and enhancement of the natural resources of the Delta, while sustaining agriculture and meeting increased recreational demand (DPC 2010).

Bouldin Island is located within the boundary covered by the Delta Plan, a comprehensive, long-term management plan for the Delta and Suisun Marsh mandated by the 2009 Delta Reform Act (Section 6.2). The Delta Reform Act also included the creation of The Delta Stewardship Council in 2010, the state agency responsible for developing and implementing the Delta Plan which includes recommendations for achieving the coequal goals of protecting and enhancing the Delta ecosystem and its unique agricultural, cultural, and recreational characteristics, while providing for a more reliable water supply for California.

Additionally, the San Joaquin County General Plan (San Joaquin County 2016) includes the following goals and policies that are applicable to the Project as it pertains to land use:

Goal LU 7. Provide for the long-term preservation of productive farmland and to accommodate agricultural services and related activities that support the continued viability of the County's agricultural industry.

Policy LU 7.1 Protect Agricultural Land
The County shall protect agricultural lands needed for the continuation of viable commercial agricultural production and other agricultural enterprises.

In January 2016, the County of San Joaquin adopted Interim Urgency Ordinance 4472, which provides, in relevant part:

> 9-605.7. PROHIBITED USES. All uses, including, but not limited to flooding inconsistent with generally accepted agricultural practices or which presents or could

present a threat to the physical integrity of Delta levees, on land with a general plan designation of AG and located within the Primary Zone of the Sacramento-San Joaquin Delta are prohibited, except:

a. Allowed uses as identified in Tables 9-605.2, 9-605.3 and 9-605.4 of the San Joaquin County Development Title;
b. The Delta Wetlands Project as defined in the 2011 Delta Wetlands Project Place of Use Environmental Impact Report and reflected in the Protest Dismissal and Settlement Agreement reached in the matter of Central Delta Water Agency et al. v. Semitropic Water Storage District et al., San Francisco County Superior Court Case No. CPF-II-51175; and
c. Easements obtained under the San Joaquin Multispecies Habitat Conservation Plan, but not greater than 80 cumulative acres by a single entity.

Interim Urgency Ordinance 4472 has since been codified under the Development Title of the San Joaquin County Code (San Joaquin County 2021).

2.11.2 Findings

a) Would the Project physically divide an established community?

The Project will not physically divide any established community and will therefore have no impact.

b) Would the Project cause a significant environmental impact due to a conflict with any applicable land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?

The Project is not in conflict with any applicable land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

Although all four potential borrow sites are zoned for agriculture, it is unlikely the borrow sites used as the primary source of fill material will be returned to agricultural use after Project completion. Despite the potential for loss of some agricultural land (approximately 30 acres), the Project is consistent with the San Joaquin County goals and policies to protect agricultural land because rehabilitation of the Project levee will decrease the potential for levee failure and associated flooding of over 3,800 acres of the remaining, active agricultural land on Bouldin Island.

Additionally, the Project does not conflict with Interim Urgency Ordinance 4472, as this ordinance allows for the use of on-site borrow pits including excavation that reaches the water table for levee maintenance projects that are carried out as part of routine maintenance of Delta levees to protect agricultural lands from inundation as the result of levee overtopping or failure.

The Project is also consistent with the Delta Plan's coequal goals of protecting and enhancing the Delta ecosystem and its unique agricultural, cultural, and recreational characteristics, while providing for a more reliable water supply for California.

For these reasons, the impact will be less than significant.

2.12 Mineral Resources

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	❑	❑	❑	✓
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	❑	❑	❑	✓

2.12.1 Environmental setting

There are few mineral resources of economic value found in the Delta. Extraction of peat and sand-gravel occurs on some Delta islands. There are no mineral extraction activities currently occurring on Bouldin Island; however, the Project will extract fill material (i.e., surface mining) consisting of peat and mineral soils (lean clay, silt, silty and clayey sand, and poorly graded sand with silt) (Hultgren-Tillis Engineers 2021b) from some of the potential borrow sites on this island (Figure 1-2). To date, land on Bouldin Island has not been classified into mineral resource zones, as pursuant to the California Surface Mining and Reclamation Act of 1975 (SMARA; Section 6.2) (CGS 2015, 2020).

2.12.2 Findings

a) Would the Project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

There are no known mineral resources in the Project Area. The Project will have no impact.

b) Would the Project result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?

There are no known mineral resources in the Project Area. The Project does not conflict with a local plan and will have no impact.

2.13 Noise

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project result in:				
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	❑	❑	❑	✓
b) Generation of excessive groundborne vibration or groundborne noise levels?	❑	❑	✓	❑
c) For a Project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project expose people residing or working in the Project Area to excessive noise levels?	❑	❑	❑	✓

2.13.1 Environmental setting

2.13.1.1 Noise

Noise can be defined as unwanted sound and is generally measured in decibels (dB). A whisper is about 30 dB; normal speaking is roughly 60 dB; and a shout is approximately 110 dB (CDC 2019). Long-term exposure to noises exceeding a level of 70 dB can cause negative effects, including hearing loss.

Typical construction equipment noise emissions for the Project are estimated between 77 and 85 dB, 50 ft from the source equipment (Table 2-6). Noise generally decreases by 10 dB with every 100 ft from the source (Solano County Planning Department 1977).

Table 2-6. Typical construction equipment noise levels.

Equipment description	Typical noise level (dB) from 50 ft
Excavator	85
Bulldozer	85
Blades	85
Compactor	80
Water trucks	84
Dump Truck	84
Pumps	77

Source: U.S. Department of Transportation 2006

Noise in the Project Area is primarily caused by boat traffic along adjacent waterways, vehicular traffic on State Route 12, and/or routine agricultural and maintenance activities on Bouldin Island. The noise-sensitive receptors nearest to the Project Area are the four residences on Bouldin Island (immediately adjacent to the Project levee portion of the Project Area), and the town of Terminous and Tower Park Marina (located across Little Potato Slough approximately 350 ft and 600 ft, respectively, from the easternmost extent of the Project Area).

The San Joaquin County Development Title (Section 9-1025.9(c)) states that noise sources associated with construction are exempt from noise level regulations on all days, provided that construction activities take place between 6:00 a.m. and 9:00 p.m.

2.13.1.2 Vibration

Vibrations are periodic oscillations of a medium, including groundborne vibrations caused by machinery or construction equipment. Groundborne noise is produced by the vibration of other objects, such as room surfaces, resulting from groundborne vibrations. Vibrations are typically measured by their root mean squared velocity expressed as vibration decibels (VdB). Vibrations begin to be perceptible at approximately 65 VdB, become distinctly perceptible around 75 VdB, and become bothersome around 85 VdB (FTA 2018).

Existing vibration levels are relatively low near the Project Area. Vibrations in the vicinity are primarily produced by routine agricultural and maintenance vehicles and equipment, and by vehicular traffic along State Route 12; however, it is unusual for vibration from trucks or from traffic on smooth roads like State Route 12 to be perceptible, even at adjacent properties (FTA 2018).

Vibration levels for heavy equipment and loaded haul trucks to be used during Project construction are not expected to exceed 87 VdB, 25 feet from the source (FTA 2018).

The San Joaquin County Development Title (Section 9-1025.5(c)) states that vibration sources associated with construction or demolition of structures or infrastructure are exempt from vibration level regulations.

2.13.2 Findings

a) Would the Project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

San Joaquin County noise level regulations exempt construction activities from noise level regulations, provided that construction activities take place between 6:00 a.m. and 9:00 p.m. Project construction activities will take place between 6:00 a.m. and 6:00 p.m. (Section 1.4.8); therefore, there will be no impact.

b) Would the Project result in generation of excessive groundborne vibration or groundborne noise levels?

The nearest sensitive receptors to the Project Area are the town of Terminous and the Tower Park Marina, located on the Terminous Tract across Little Potato Slough, approximately 350 ft and 600 ft, respectively, from the easternmost extent of the Project Area, and four residences on Bouldin Island. Because the town of Terminous and Tower Park Marina are 350 ft or greater

from the Project Area, construction vibration levels will not be perceptible, and noise levels (e.g., from construction equipment, vehicles, or pumps) will be diminished by at least 35 dB to levels below those that cause negative effects or hearing loss (i.e., below 70 dB) before reaching these sensitive receptors. Four residences on Bouldin Island are immediately adjacent to the Project levee, so people occupying these residences may experience minor increases in groundborne vibration and/or noise during Project activities. Groundborne vibration and noise levels will vary depending on the source location in the Project Area. Vibration levels will likely only be distinctly perceptible (i.e., greater than 75 VdB) when heavy equipment (e.g., large bulldozers, loaded haul trucks) is within approximately 30 ft of residences (FTA 2018); noise levels will only exceed 70 dB when heavy equipment is within approximately 200 ft of residences. Construction work will generally occur during weekday daytime hours (between 6:00 a.m. and 6:00 p.m.) when many residents are expected to be away from their homes or less sensitive to noise, though there will be construction work one day each weekend. In addition, the construction areas and haul routes in the Project Area are regularly travelled, and often have equipment and noise associated with farming activities (e.g., disking, harvesting, ground/aerial pesticide application). Vibration and noise produced by Project construction activities during daytime hours are also exempt from San Joaquin County regulations, and there will be no increase in operational vibration or noise levels following Project construction. For these reasons, the potential exposure of persons to increased groundborne vibration or noise from the Project will be less than significant.

c) For a Project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project expose people residing or working in the Project Area to excessive noise levels?

The Project is not located within the vicinity of a private airstrip or within two miles of a public airport or public use airport; therefore, there will be no impact.

2.14 Population and Housing

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	❑	❑	❑	✓
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	❑	❑	❑	✓

2.14.1 Environmental setting

The Project is located within San Joaquin County in a rural area with a generally low population density (Figure 1-1). The nearby town of Terminous, on the opposite shore of Little Potato

Slough, has a population of 381 according to the 2010 United States census. Areas surrounding the Project are primarily agricultural with a few domestic residences. The Project will not displace inhabitants of residences, including the four inhabited residences on Bouldin Island adjacent to the Project levee. An uninhabited residence at levee station 824+50 will be removed as part of the Project (Figures 1-2 and 1-4).

2.14.2 Findings

a) Would the Project induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

Although the levee rehabilitation is an infrastructure improvement, this Project does not include any elements that would induce population growth. There will be no impact.

b) Would the Project displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?

The Project includes demolition of a single uninhabited residence and therefore will not displace substantial numbers of people or necessitate the construction of replacement housing elsewhere. There will be no impact.

2.15 Public Services

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
a) Would the Project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:	❑	❑	❑	✓
Fire protection?	❑	❑	❑	✓
Police protection?	❑	❑	❑	✓
Schools?	❑	❑	❑	✓
Parks?	❑	❑	❑	✓
Other public facilities?	❑	❑	❑	✓

2.15.1 Environmental setting

Bouldin Island is owned by the Metropolitan Water District of Southern California, and its levees are maintained by Reclamation District No. 756. The island is managed for agriculture, and there are no government facilities, public resources, or services on the island. The Project Area is bordered by the South Mokelumne River to the north and by agricultural land to the south. North

Central Borrow 1 and Northeast Borrow D are located north of State Route 12, and Central Borrow 1 and 2 are located south of State Route 12 (Figure 1-2).

2.15.2 Findings

a) Would the Project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

Fire protection?
Police protection?
Schools?
Parks?
Other public facilities?

The Project will not affect public services including fire protection, police protection, schools, parks, or other public facilities. None of these services currently exist on Bouldin Island, and access routes will be maintained to allow fire and police protection services to reach residences near the Project Area. There will be no impact.

2.16 Recreation

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
a) Would the Project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	❑	❑	❑	✓
b) Does the Project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	❑	❑	❑	✓

2.16.1 Environmental setting

The Sacramento-San Joaquin Delta waterways surrounding Bouldin Island are a recreational resource for boating, fishing, wildlife viewing, and hunting. Bouldin Island is a privately owned island, and although local homeowners use the island for private access to surrounding waterways, it is not specifically designated by San Joaquin County for recreational use.

2.16.2 Findings

a) Would the Project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

The Project will not change the current use of waterways or recreational facilities near Bouldin Island. There will be no impact.

b) Does the Project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

The Project does not include public recreational facilities or require the construction or expansion of recreational facilities. There will be no impact.

2.17 Transportation

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?	❑	❑	❑	✓
b) Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?	❑	❑	❑	✓
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	❑	❑	❑	✓
d) Result in inadequate emergency access?	❑	❑	❑	✓

2.17.1 Environmental setting

The Project Area is accessible from State Route 12, which runs from east to west across Bouldin Island. The existing levee also has a road along its crown that is used for levee maintenance, which will be replaced on the crown of the rehabilitated levee. During construction, employees will use State Route 12 to access the work site. Haul routes between on-island borrow sites and the Project levee will avoid State Route 12. The Project will not use adjacent waterways for construction access or navigation. The Project will temporarily increase traffic in the Project vicinity during construction but will not result in long-term changes to any traffic or transportation circulation system.

2.17.2 Findings

a) Would the Project conflict with a program plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?

The Project will not conflict with a program plan, ordinance, or policy addressing the circulation system, including transit roadway, bicycle, and pedestrian facilities. There will be no impact.

b) Would the Project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?

Automobile vehicle miles traveled are not expected to change due to the Project since there will be no detours during construction and no change to a transportation system. There will be no impact.

c) Would the Project substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

The design features of the improved levee road will be similar to the existing road and will be compatible with existing uses of the island. There will be no impact.

d) Would the Project result in inadequate emergency access?

Emergency services may access Bouldin Island via State Route 12. Haul routes between on-island borrow sites and the Project levee will avoid the highway. Additionally, the improvements to the Project levee will reduce the likelihood of a catastrophic flood or levee breach that could potentially impact emergency access to areas accessed via State Route 12. The Project will not result in inadequate emergency access; therefore, there will be no impact.

2.18 Tribal Cultural Resources

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or	❑	✓	❑	❑
ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resource Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	❑	✓	❑	❑

2.18.1 Environmental setting

The Project Area is located within in the ethnographic territory of the Plains Miwok, who occupied the lower reaches of the Mokelumne and Cosumnes rivers and both banks of the Sacramento River from Rio Vista to Freeport. The Plains Miwok are one of five Eastern Miwok tribes (Bay, Plains, Northern Sierra, Central Sierra, and Southern Sierra). Neighboring groups included the Ohlone to the southwest, the Northern Valley Yokuts to the southeast, the Washoe to the east, and the Patwin to the north (Kroeber 1925, Levy 1978, Natural Investigations Company 2021).

Like other California Native American groups, the Eastern Miwok employed a variety of tools, implements, and enclosures for hunting and collecting natural resources. The bow and arrow, snares, traps, nets, and enclosures or blinds were used for hunting land mammals and birds. For fishing, they made canoes from tule, balsa, or logs, and used harpoons, hooks, nets, and basketry traps. To collect plant resources, they used sharpened digging sticks, long poles for dislodging acorns and pinecones, and a variety of woven tools (seed beaters, burden baskets, and carrying nets) (Levy 1978). Foods were processed with a variety of tools, such as bedrock mortars, cobblestone pestles, anvils, and portable stone or wooden mortars that were used to grind or mill acorns and seeds. Additional tools and implements included knives, anvils, leaching baskets and bowls, woven parching trays, and woven strainers and winnowers. Prior to processing, the acorns were stored in the village granaries. Earth ovens were used by the Eastern Miwok to bake acorn bread. The Miwok participated in an extensive east-west trade network between the coast and the Great Basin. From coastal groups marine shell (*Olivella* and abalone) and steatite moved eastward, while salt and obsidian traveled westward from the Sierras and Great Basin. Basketry, an important trade item, moved in both directions (Levy 1978).

In 1769, the Spanish established the first significant European settlement in California (Natural Investigations Company 2021). By 1794, the Eastern Miwok began to be missionized at Mission San Francisco. Many Bay and Plains Miwok died or relocated as a result of encroachment, conversion, and epidemic disease. The discovery in 1848 of gold in the western Sierra Nevada foothills and the ensuing Gold Rush led to a flood of non-indigenous peoples into Miwok territory. Their reliance on cash income increased as the availability of natural resources declined with the growth of non-Miwok communities and towns in their traditional territory (Levy 1978).

During the first half of the 1900s, the federal government acquired lands and established reservations, or rancherias, for the Eastern Miwok (Levy 1978). The U.S. Bureau of Indian Affairs terminated relations with most of these rancherias between 1934 and 1972, but status has been restored to the majority of the rancherias, beginning in 1984. No reservations were established in Southern Miwok territory, and rancherias there, as well as in other parts of Eastern Miwok territory, received no official recognition by the federal government (Natural Investigations Company 2021).

Surface elevation on Bouldin Island ranges from 0 to 20 ft below sea level, and the island was inundated prior to reclamation for agriculture in the early twentieth century (Whipple et al. 2012). This precluded human occupation for much of prehistory (Natural Investigations Company 2021).

The Natural Investigations Company conducted a cultural and paleontological resources assessment for the Project, which included a SLF search by the NAHC. The NAHC provided a list of 17 tribal individuals or organizations to be contacted for more information on the potential for indigenous resources, including tribal cultural resources, within or near the Project Area. Natural Investigations sent Project information letters to each of the tribes included on the NAHC

list on March 31, 2021. If no replies were received, follow-up phone calls were made on April 14, 2021. To date, two responses have been received.

Ms. Anna M. Starkey, Cultural Regulatory Specialist of the United Auburn Indian Community (UAIC), responded via email on April 20, 2021, stating that tribal records do not show any previously recorded tribal cultural resources in the Project Area. She further stated that she suspects the Project location was uninhabitable marsh land. The consultation department of the Ione Band of Miwok Indians also responded via email on May 1, 2021. They requested additional information on cultural resource findings but did not comment on the potential for tribal cultural resources within the Project Area. Tribal outreach efforts undertaken in support of the Project give no indication that tribal cultural resources are present within the Project Area, but rather suggest strongly that their presence is unlikely (Natural Investigations Company 2021).

2.18.2 Findings

a) Would the Project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k)?

Native American outreach efforts undertaken in support of the Project give no indication that tribal cultural resources are present within the Project Area, but rather suggest strongly that their presence is unlikely. Project information letters were sent to 17 tribes listed by the NAHC as affiliated with the area. Letters requested information on the potential for tribal cultural resources in the vicinity. The only tribal respondent to comment directly on the question of tribal cultural resources was the UAIC, who stated that their records show no tribal cultural resources in the area. Consistent with the findings of geoarchaeological research in the Delta (Meyer and Rosenthal 2004, Moratto 2004, Meyer and Rosenthal 2008), the tribe also emphasized that the Project Area was likely uninhabitable marsh land for much of prehistory. These inhospitable conditions significantly reduce the likelihood that tribal cultural resources are present within the Project Area.

Mitigation measures **CUL-1 and CUL-2** describe WEAP training on tribal cultural resources for construction personnel and the process to mitigate the inadvertent find of a tribal cultural resource during excavation in the unlikely event one is found. The impact will be less than significant with incorporation of mitigation.

ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?

Native American outreach, SLF records, and the Natural Investigations Company survey indicate that there are no tribal cultural resources listed or eligible for listing in the CRHR

within or near the Project Area. Furthermore, inundation of the Project Area would have precluded human occupation prior to twentieth-century reclamation for agriculture.

Mitigation measures **CUL-1** and **CUL-2** describe WEAP training on tribal cultural resources for construction personnel and the process to mitigate the inadvertent find of a tribal cultural resource during excavation in the unlikely event one is found. The impact will be less than significant with mitigation incorporated.

2.19 Utilities and Service Systems

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment, or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	❑	❑	❑	✓
b) Have sufficient water supplies available to serve the Project and reasonably foreseeable future development during normal, dry, and multiple dry years?	❑	❑	❑	✓
c) Result in a determination by the wastewater treatment provider which serves or may serve the Project that it has adequate capacity to serve the Project's projected demand in addition to the provider's existing commitments?	❑	❑	❑	✓
d) Generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	❑	❑	❑	✓
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	❑	❑	❑	✓

2.19.1 Environmental setting

There are no public wastewater treatment facilities, stormwater drainage facilities, or other public utilities or service systems located on Bouldin Island. Wastewater is managed by private septic systems. Solid waste can be disposed of at landfills and recycling facilities in nearby cities (e.g., Lodi, Stockton). Pacific Gas and Electric Company (PG&E) provides electricity to Bouldin Island via local distribution lines.

The San Joaquin County General Plan includes goals to reduce solid waste totals 75% from 1990 levels by 2020, and 90% by 2035 (San Joaquin County 2016). To achieve these goals, San Joaquin County Ordinance 4370 requires applicable projects to divert 50% of construction and

demolition debris, and 90% of inert and organic materials from the landfill through reuse and recycling.

2.19.2 Findings

a) Would the Project require or result in the relocation or construction of new or expanded water, wastewater treatment, or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?

The Project will not require or result in relocation, construction, or expansion of facilities including water, wastewater treatment, stormwater drainage, power, gas, or telecommunications facilities. There will be no impact.

b) Would the Project have sufficient water supplies available to serve the Project and reasonably foreseeable future development during normal, dry, and multiple dry years?

The Project will utilize water trucks for dust control as referenced in Section 1.4.7 and Section 1.4.9. Sufficient water for dust control is expected to be available on site (e.g., pumped from the borrow sites) during construction. The Project will not result in a need for increased water supply for continued agricultural operations. There will be no impact.

c) Would the Project result in a determination by the wastewater treatment provider which serves or may serve the Project that it has adequate capacity to serve the Project's projected demand in addition to the provider's existing commitments?

The Project will not create a need for increased wastewater treatment capacity. There will be no impact.

d) Would the Project generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?

A single uninhabited residence will be removed during Project construction (Figures 1-2 and 1-4). Because the residence is larger than 1,200 square feet, an approved Debris Diversion Permit outlining steps the Project will take to divert demolition debris (e.g., concrete, untreated wood) from landfills in accordance with Ordinance 4370 will be obtained from the San Joaquin County Public Works Solid Waste Division. Through compliance with specifications in the Debris Diversion Permit, the Project will not generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals. There will be no impact.

e) Would the Project comply with federal, state, and local management and reduction statutes and regulations related to solid waste?

The Project will obtain a Debris Diversion Permit from the San Joaquin County Public Works Solid Waste Division as required by San Joaquin County Ordinance 4370 (see above). The Project will therefore comply with federal, state, and local management and reduction statutes and regulations related to solid waste. There will be no impact.

2.20 Wildfire

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the Project:				
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	❑	❑	❑	✓
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose Project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	❑	❑	❑	✓
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines, or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	❑	❑	❑	✓
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes.	❑	❑	❑	✓

2.20.1 Environmental setting

Within San Joaquin County, the highest wildfire risk is in the southern portion of the county where foothill or mountain areas have potentially large fuel loads. The Project Area has generally flat topography and primarily includes agricultural land surrounded by waterways. The Project Area is in an unzoned state responsibility area and does not contain lands classified as moderate, high, or very high fire hazard severity zones (CalFire 2020).

2.20.2 Findings

a) If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the Project substantially impair an adopted emergency response plan or emergency evacuation plan?

The Project Area is not located in or near a state responsibility area or on land classified as a very high fire hazard severity zone. State Route 12 through Bouldin Island is not designated by San Joaquin County for emergency evacuation (San Joaquin County 2019). There will be no impact.

b) If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the Project due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose Project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?

The Project is not located in or near a state responsibility area or on land classified as a very high fire hazard severity zone. The Project will reduce the slope of the levee and will not exacerbate wildfire risk. There will be no impact.

c) If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the Project require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines, or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?

The Project is not located in or near a state responsibility area or on land classified as a very high fire hazard severity zone and does not require the installation of associated infrastructure. There will be no impact.

d) If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the Project expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?

The Project is not located in or near a state responsibility area or on land classified as a very high fire hazard severity zone. The topography in the Project Area is generally flat and will not result in increased runoff or slope instability, and the levee rehabilitation will provide increased flood protection to Bouldin Island. There will be no impact.

2.21 Mandatory Findings of Significance

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Does the Project have the potential to degrade the quality of the environment; substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community; substantially reduce the number or restrict the range of a rare or endangered plant or animal; or eliminate important examples of the major periods of California history or prehistory?	❑	✓	❑	❑
b) Does the Project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a Project are considerable when viewed in connection with the effects of past Projects, the effects of other current Projects, and the effects of probable future Projects.)	❑	❑	✓	❑
c) Does the Project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	❑	❑	✓	❑

a) Does the Project have the potential to degrade the quality of the environment; substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community; substantially reduce the number or restrict the range of a rare or endangered plant or animal; or eliminate important examples of the major periods of California history or prehistory?

As discussed in Section 2.4, *Biological Resources*, the Project has the potential to impact special-status plant, fish, and wildlife species as well as their habitats within the Project Area. Impacts on these biological resources will be limited to a less than significant level with the incorporation of mitigation measures **BIO-1** through **BIO-9**.

As discussed in Section 2.5, *Cultural Resources*, and Section 2.6, *Tribal Cultural Resources*, the potential for cultural or tribal cultural resources to be located in the Project Area is low; however, mitigation measures **CUL-1** and **CUL-2** describe the process to mitigate the inadvertent find of a cultural or tribal cultural resource during excavation in the unlikely event one is found.

Therefore, the Project will not substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory. Potential impacts on biological and cultural resources will be less than significant with incorporation of the mitigation measures described above.

b) Does the Project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a Project are considerable when viewed in connection with the effects of past Projects, the effects of other current Projects, and the effects of probable future Projects.)

The Project has been determined to have no impact on mineral resources, population and housing, public services, recreation, transportation, utilities/service systems, and wildfire. As such, there is no potential for cumulatively considerable impacts on these resources.

The Project has been determined to have the potential for less than significant impacts on aesthetics, air quality, energy, geology and soils, GHG emissions, hazards and hazardous materials, hydrology and water quality, and noise temporarily during construction. There are no other construction projects planned for 2022 on Bouldin Island that also have the potential to contribute to impacts on these resources. Additionally, the Project does not exceed the air quality and GHG thresholds that were determined by SJVAPCD in consideration of the potential for cumulative effects attributable to emissions from multiple projects occurring simultaneously. The potential for cumulatively considerable hydrology and water quality impacts would be minimized by implementation of a SWPPP during construction; any nearby projects with the potential to impact surrounding waterways would also implement a SWPPP, as required by Clean Water Act Section 402. For these reasons, the Project will not have a cumulatively considerable impact on aesthetics, air quality, energy, geology and soils, GHG emissions, hazards and hazardous materials, hydrology and water quality, or noise.

While the Project will result in the conversion of up to, and likely less than, 62.1 acres of farmland to non-agricultural use, the Project will protect over 5,500 acres of farmland on Bouldin

Island. Due to this protection, there is little potential for the project to contribute to cumulatively considerable adverse impacts on agricultural resources and land use.

The Project will also result in a minor loss of Freshwater Marsh, Riparian Forest, and Scrub-shrub habitats, as defined by AB 360 (Section 6.2). This loss will be mitigated for such that there is a net increase in these habitat types. A Mitigation and Monitoring Plan will be developed in consultation with CDFW who oversees compliance with the AB 360 program, which was established to protect these components of the Delta ecosystem. Additionally, the excavated borrow sites are anticipated to create wildlife habitat as water fills the depressions and vegetation naturally recruits, forming freshwater pond, marsh, and scrub-shrub habitat. The net increase in these habitats will not result in adverse impacts that will be cumulatively considerable.

In addition, and as described in (a) above, implementation of mitigation measures during construction (e.g., WEAP training, preconstruction surveys) will prevent impacts to biological, cultural, or tribal cultural resources that have the potential to be cumulatively considerable.

For the reasons described above, the Project will not have environmental effects that are individually limited but cumulatively considerable; cumulative effects will be less than significant.

c) Does the Project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

As discussed in this IS/MND, the Project, including conservation measures that are incorporated into its design, will have no impact or a less than significant impact on aesthetics, agriculture, air quality, energy, geologic hazards, GHG emissions, hazards or hazardous materials, hydrology or water quality, land use and planning, noise, population and housing, public services, recreation, transportation, utilities and services, and wildfire. As such, the Project's environmental effects will not cause substantial adverse effects on humans, either directly or indirectly; impacts will be less than significant.

3 DETERMINATION

On the basis of this evaluation:

I find that the Project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.	❑
I find that although the Project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the Project have been made by or agreed to by the Project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.	✓
I find that the Project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.	❑
I find that the Project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect (1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and (2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.	❑
I find that although the Project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the Project, nothing further is required.	❑

4 LIST OF PREPARERS

The table below lists the preparers of this IS/MND and participants in the related planning, data gathering, and analytical tasks.

Name	Title	Affiliation	Project role
Tina Anderson	Senior Project Manager	MBK Engineers	Project management and support
Mike Kynett	Supervising Engineer	MBK Engineers	Engineering, Project design
Krista Orr	Senior Ecologist	Stillwater Sciences	Project management, environmental analysis, document preparation, and senior review
Emily Applequist	Environmental Scientist	Stillwater Sciences	Environmental analysis, document preparation
Esther Adelstein	Environmental Scientist	Stillwater Sciences	Environmental analysis, document preparation
Eric Sommerauer	Biologist	Stillwater Sciences	Environmental analysis, document preparation
Marissa Montjoy	Biologist	Stillwater Sciences	Environmental analysis, document preparation: wildlife resources
Christina Buck	Aquatic Biologist	Stillwater Sciences	Environmental analysis, document preparation: hydrology and water quality
Wayne Swaney	Senior Environmental Scientist	Stillwater Sciences	Environmental analysis: air quality, greenhouse gases
Rob Thoms	Botanist & Plant Ecologist	Stillwater Sciences	Environmental analysis: biological resources
Holly Burger	Senior Wildlife Biologist	Stillwater Sciences	Environmental analysis oversight
Anna Ballasiotes	GIS Analyst	Stillwater Sciences	GIS support, map production
Kevin Ha	Biologist	Stillwater Sciences	Editorial assistance
Kelli Wheat Dawson	Document Production	Stillwater Sciences	Document production
Claire Carter	Technical Editor	Stillwater Sciences	Editorial assistance
Tim Spillane, MA	Registered Professional Archaeologist	Natural Investigations Company	Cultural resources, tribal cultural resources
Phil Hanes, MA	Registered Professional Archaeologist	Natural Investigations Company	Cultural resources, tribal cultural resources
Alicia Hedges, MA	Registered Professional Archaeologist	Natural Investigations Company	Cultural resources, tribal cultural resources

5 CONSULTATION AND COORDINATION

The Draft IS/MND was circulated to agencies, individuals, and/or organizations known to have a special interest in the proposed Project and was made available to the public for a 30-day review period. The public was notified as follows:

a) A Notice of Intent (NOI) to adopt an MND was posted for publication in a local newspaper and filed with the San Joaquin County Clerk.

b) The proposed IS/MND, NOI, and Notice of Completion (NOC), were electronically submitted to the State Clearinghouse via the CEQAnet Web Portal for distribution.

c) The proposed IS/MND was distributed electronically by the State Clearinghouse to interested parties.

d) Copies of the proposed IS/MND were made available for public review at MBK Engineers offices in Sacramento.

6 COMPLIANCE WITH FEDERAL AND STATE ENVIRONMENTAL LAWS AND REGULATIONS

6.1 Federal

Bald and Golden Eagle Protection Act. The BGEPA prohibits unauthorized take, possession, and sale of bald eagles or golden eagles (*Aquila chrysaetos*), as well as their feathers, nests, and eggs. Mitigation measures incorporated into the Project will ensure the protection of eagles potentially affected by the Project and compliance with the BGEPA.

Clean Air Act. Section 176(c) of this act prohibits federal action or support of activities that do not conform to a State Implementation Plan. The Project is not expected to violate any air quality standard, increase air quality violations in the Project region, exceed the USEPA's general conformity *de minimis* threshold, or hinder the attainment of air quality objectives in the local air basin. The Project will have no adverse effect on the future air quality of the Project Area and is compliant with this act.

Clean Water Act (Sections 401 and 404). Section 404 of this act requires that a permit be obtained from USACE for fill of waters of the U.S., including wetlands, prior to Project implementation. In compliance with Section 401 of the Act, a water quality certification or a waiver of water quality certification needs to be obtained from the Central Valley RWQCB. This Project does not require 404 or 401 permits since there will be no waterside work below HTL or MHW. If it is determined that the Project may impact waters of the U.S., then Section 404 and 401 permits will be secured prior to Project implementation, in compliance with this act.

Endangered Species Act. The ESA prohibits unauthorized take of species listed or proposed for listing as threatened or endangered. The ESA also ensures that the actions of federal agencies do not jeopardize the continued existence of threatened and endangered species. The mitigation measures incorporated into the Project will assure compliance with the ESA.

Migratory Bird Treaty Act. Protection of migratory birds, their occupied nests, and their eggs is required by the Migratory Bird Treaty Act (MBTA) (16 USC 703 et seq.), Title 50 Code of Federal Regulations (part 10), and CDFG Code Sections 3503 and 3513. The full list of the species protected under the MBTA appears in Title 50, Section 10.13, of the Code of Federal Regulations (50 CFR 10.13) and includes federally and state-listed migratory birds as well as other non-listed migratory birds. Mitigation measures incorporated into the Project will assure compliance with the MBTA.

Rivers and Harbors Act (Section 10). Section 10 of the Rivers and Harbors Act prohibits the unauthorized obstruction or alteration of any navigable water of the United States. All features below MHW are subject to Section 10 of the Rivers and Harbors Act and are considered navigable waters by USACE. This Project does not require a Section 10 permit since there will be no waterside work below MHW. If it is determined that the Project may impact navigable waters, then a Section 10 permit will be secured prior to Project implementation.

6.2 State

Assembly Bill 32 and Senate Bill 32. AB 32 required CARB to develop regulations to address global climate change due to GHG emissions. The bill also required attainment of a statewide

GHG emissions limit, equal to the 1990 level, by December 31, 2020. As of 2019, statewide GHG emissions (418.4 million metric tons of CO_2e) (CARB 2021d) were below the 2020 GHG emissions limit (431 million metric tons of CO_2e) (CARB 2018). Signed into law in 2016, Senate Bill 32 expanded upon AB 32 by specifying an emissions limit which further requires California to reduce statewide GHG emissions to 40% below the 1990 level by the year 2030 (CARB 2018). Emissions associated with Project construction will be temporary and will not inhibit attainment of the statewide GHG emissions limits established by these bills.

Assembly Bill 52. AB 52 provides a method for incorporation of Native American tribal knowledge into the CEQA review process via formal consultation. In compliance with AB 52, 17 tribal individuals or organizations, provided by the NAHC, were contacted for information on the potential for indigenous resources in or near the Project Area. Results of tribal outreach efforts undertaken in support of the Project gave no indication that tribal cultural resources are present within the Project Area and strongly suggest that their presence is unlikely

Assembly Bill 360. AB 360 established provisions, including mitigation requirements, for the protection of fish and wildlife habitat in the Delta (i.e., Freshwater Marsh, Scrub-shrub, Riparian Forest, and Shaded Riverine Aquatic habitats). Mitigation measures incorporated into the Project will assure compliance with AB 360.

California Environmental Quality Act. This Initial Study/Mitigated Negative Declaration has been prepared to comply with CEQA.

California Endangered Species Act. Generally, CDFW administers the state laws providing protection of fish and wildlife resources, including the CESA. CESA parallels the ESA and was written to protect state endangered and threatened species. Mitigation measures incorporated into the Project will assure compliance with CESA.

Delta Protection Act. The Delta Protection Act was established in recognition of the increasing threats to the resources of the Primary Zone of the Delta from urban and suburban encroachment which have the potential to impact agriculture, wildlife habitat, and recreational uses. Pursuant to the Delta Protection Act, the Land Use and Resource Management Plan for the Primary Zone of the Delta was completed and adopted by the Delta Protection Commission in 1995 (updated in 2002). The Project will not result in urban or suburban encroachment and is, therefore, in compliance with this act.

Delta Reform Act. The Delta Reform Act created the Delta Stewardship Council to oversee the management of water and environmental resources in the Delta through the development and implementation of the Delta Plan. Bouldin Island is located within the boundary covered by the Delta Plan, and if it is determined that the Project is a covered action, a consistency determination will be obtained from the Delta Stewardship Council.

Fish and Game Code Section 1600 et seq. California Fish and Game Code Section 1600 et seq. gives authority to CDFW to regulate activities that would interfere with the natural flow of, or substantially alter the channel, bed, or bank of a lake, river, or stream. Because the Project includes work on the waterside levee below the hinge point or waterside crest, the District is required to notify CDFW. If CDFW determines that the Project will have potential adverse effects on fish and wildlife resources, they will issue a Lake and Streambed Alteration Agreement (LSAA) that includes conditions to protect these resources. The Project will therefore comply with this Fish and Game Code section.

Fish and Game Code Sections 86, 3503, and 3513. California Fish and Game Code Section 86 defines take as hunting, pursuing, catching, capturing, or killing, or attempting to hunt, pursue, catch, capture, or kill. Under Fish and Game Code Section 3503 it is unlawful to take, possess, or needlessly destroy the nests or eggs of any bird, except as otherwise provided. Fish and Game Code Section 3503.5 protects all birds-of-prey (raptors) and their eggs and nests, and under Section 3513 it is unlawful to take or possess any migratory non-game bird designated under the MBTA. Mitigation measures incorporated into the Project will assure compliance with these Fish and Game Code sections.

Fish and Game Code Sections 3511, 4700, 5050, and 5515. California Fish and Game Code Sections 3511, 4700, 5050, and 5515 designated rare fish and wildlife species as Fully Protected in California. This designation provides additional protection to these species from unauthorized take or possession. Mitigation measures incorporated into the Project will assure compliance with these sections.

Native Plant Protection Act. The NPPA directed CDFW to preserve, protect, and enhance native plants. It gave CDFW the authority to designate native plants as endangered or rare and require that landowners who have been notified of state-listed species on their property, and who wish to destroy those plants and their habitat, to provide CDFW with notice to salvage the plants no less than 10 days before destruction occurs. Many of the species designated under the NPPA were subsumed by CESA, but there is a subset of species, subspecies, and varieties of plants that were not and are protected as rare under the NPPA. Mitigation measures incorporated into the Project, which include NPPA rare plants that may be impacted, will assure compliance with NPPA.

Porter-Cologne Water Quality Control Act. The Porter-Cologne Water Quality Control Act was established to protect water quality and beneficial uses of water in California. This act requires that National Pollutant Discharge Elimination System (NPDES) and Waste Discharge Requirement (WDR) permits for point and nonpoint source discharges, respectively, be obtained from the RWQCB to protect water quality in surface waters, groundwater, and wetlands. If it is determined that the Project may impact waters of the U.S., then NPDES and WDR permits will be secured prior to Project implementation, in compliance with this act.

Surface Mining and Reclamation Act. SMARA includes policies for the regulation of surface mining operations to balance production of state mineral resources with minimization of adverse environmental impacts associated with these activities. In support of these goals, state lands are classified into mineral resource zones based on known or inferred mineral resources. No land on Bouldin Island has been classified into mineral resource zones, so the Project will not conflict with the policies in this act.

Williamson Act (also known as the California Land Conservation Act). The Williamson Act allows for the formation of contracts between local governments and private landowners to restrict use of specific parcels to agricultural or related open space land uses. The Project Area is not covered by a Williamson Act contract.

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Appendices

Appendix A

Road Construction Emissions Model Data Entry and Emissions Summary Sheets

Road Construction Emissions Model **Version 9.0.0**
Data Entry Worksheet

Note: Required data input sections have a yellow background.
Optional data input sections have a blue background. Only areas with a yellow or blue background can be modified. Program defaults have a white background.
The user is required to enter information in cells D10 through D24, E28 through G35, and D38 through D41 for all project types.
Please use "Clear Data Input & User Overrides" button first before changing the Project Type or begin a new project.

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Input Type

Project Name	Bouldin Island	
Construction Start Year	2022	Enter a Year between 2014 and 2040 (inclusive)
Project Type For 4: Other Linear Project Type, please provide project specific off-road equipment population and vehicle trip data	4	1) New Road Construction : Project to build a roadway from bare ground, which generally requires more site preparation than widening an existing roadway 2) Road Widening : Project to add a new lane to an existing roadway 3) Bridge/Overpass Construction : Project to build an elevated roadway, which generally requires some different equipment than a new roadway, such as a crane 4) Other Linear Project Type: Non-roadway project such as a pipeline, transmission line, or levee construction
Project Construction Time	14.00	months
Working Days per Month	24.00	days (assume 22 if unknown)
Predominant Soil/Site Type: Enter 1, 2, or 3 (for project within "Sacramento County", follow soil type selection instructions in cells E18 to E20 otherwise see instructions provided in cells J18 to J22)	1	1) Sand Gravel : Use for quaternary deposits (Delta/West County) 2) Weathered Rock-Earth : Use for Laguna formation (Jackson Highway area) or the lone formation (Scott Road, Rancho Murieta) 3) Blasted Rock : Use for Salt Springs Slate or Copper Hill Volcanics (Folsom South of Highway 50, Rancho Murieta)
Project Length	4.30	miles
Total Project Area	78.20	acres
Maximum Area Disturbed/Day	5.00	acres
Water Trucks Used?	1	1. Yes 2. No

Please note that the soil type instructions provided in cells E18 to E20 are specific to Sacramento County. Maps available from the California Geologic Survey (see weblink below) can be used to determine soil type outside Sacramento County.

http://www.conservation.ca.gov/cgs/information/geologic_mapping/Pages/googlemaps.aspx#regionalseries

Material Hauling Quantity Input

Material Type	Phase	Haul Truck Capacity (yd^3) (assume 20 if unknown)	Import Volume (yd^3/day)	Export Volume (yd^3/day)
Soil	Grubbing/Land Clearing			
	Grading/Excavation	20.00	3214.00	0.00
	Drainage/Utilities/Sub-Grade	20.00	537.00	0.00
	Paving			
Asphalt	Grubbing/Land Clearing			
	Grading/Excavation			
	Drainage/Utilities/Sub-Grade			
	Paving			

Mitigation Options

On-road Fleet Emissions Mitigation	2010 and Newer On-road Vehicles Fleet	Select "2010 and Newer On-road Vehicles Fleet" option when the on-road heavy-duty truck fleet for the project will be limited to vehicles of model year 2010 or newer
Off-road Equipment Emissions Mitigation	No Mitigation	Select "20% NOx and 45% Exhaust PM reduction" option if the project will be required to use a lower emitting off-road construction fleet. The SMAQMD Construction Mitigation Calculator can be used to confirm compliance with this mitigation measure (http://www.airquality.org/Businesses/CEQA-Land-Use-Planning/Mitigation). Select "Tier 4 Equipment" option if some or all off-road equipment used for the project meets CARB Tier 4 Standard

The remaining sections of this sheet contain areas that require modification when 'Other Project Type' is selected.

Note: The program's estimates of construction period phase length can be overridden in cells D50 through D53, and F50 through F53.

Construction Periods	User Override of Construction Months	Program Calculated Months	User Override of Phase Starting Date	Program Default Phase Starting Date
Grubbing/Land Clearing	1.20	1.40	5/1/2022	1/1/2022
Grading/Excavation	5.80	5.60	6/7/2022	2/7/2022
Drainage/Utilities/Sub-Grade	6.00	4.90	5/1/2023	8/3/2022
Paving	1.00	2.10	11/1/2023	2/2/2023
Totals (Months)	14			

Note: Soil Hauling emission default values can be overridden in cells D61 through D64, and F61 through F64.

Soil Hauling Emissions User Input	User Override of Miles/Round Trip	Program Estimate of Miles/Round Trip	User Override of Truck Round Trips/Day	Default Values Round Trips/Day	Calculated Daily VMT
Miles/round trip: Grubbing/Land Clearing				0	0.00
Miles/round trip: Grading/Excavation	10.00			161	1610.00
Miles/round trip: Drainage/Utilities/Sub-Grade	50.00			27	1350.00
Miles/round trip: Paving				0	0.00

2010+ Model Year Mitigation Option Emission Rates	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Grubbing/Land Clearing (grams/mile)	0.04	0.42	3.08	0.11	0.05	0.02	1,748.57	0.00	0.27	1,830.52
Grading/Excavation (grams/mile)	0.04	0.42	3.08	0.11	0.05	0.02	1,748.57	0.00	0.27	1,830.52
Draining/Utilities/Sub-Grade (grams/mile)	0.03	0.40	2.98	0.11	0.05	0.02	1,714.99	0.00	0.27	1,795.36
Paving (grams/mile)	0.03	0.40	2.98	0.11	0.05	0.02	1,714.99	0.00	0.27	1,795.36
Grubbing/Land Clearing (grams/trip)	0.00	0.00	3.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation (grams/trip)	0.00	0.00	3.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Draining/Utilities/Sub-Grade (grams/trip)	0.00	0.00	4.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving (grams/trip)	0.00	0.00	4.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling Emissions	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Pounds per day - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Grading/Excavation	0.14	1.50	12.34	0.40	0.17	0.06	6,206.46	0.01	0.98	6,497.34
Tons per const. Period - Grading/Excavation	0.01	0.10	0.86	0.03	0.01	0.00	431.97	0.00	0.07	452.22
Pounds per day - Drainage/Utilities/Sub-Grade	0.09	1.20	9.14	0.33	0.14	0.05	5,104.23	0.00	0.80	5,343.42
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.01	0.09	0.66	0.02	0.01	0.00	367.50	0.00	0.06	384.73
Pounds per day - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons per construction project	0.02	0.19	1.52	0.05	0.02	0.01	799.47	0.00	0.13	836.94

Note: Asphalt Hauling emission default values can be overridden in cells D91 through D94, and F91 through F94.

Asphalt Hauling Emissions User Input	User Override of Miles/Round Trip	Program Estimate of Miles/Round Trip	User Override of Truck Round Trips/Day	Default Values Round Trips/Day	Calculated Daily VMT
Miles/round trip: Grubbing/Land Clearing				0	0.00
Miles/round trip: Grading/Excavation				0	0.00
Miles/round trip: Drainage/Utilities/Sub-Grade				0	0.00
Miles/round trip: Paving				0	0.00

2010+ Model Year Mitigation Option Emission Rates	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Grubbing/Land Clearing (grams/mile)	0.04	0.42	3.08	0.11	0.05	0.02	1,748.57	0.00	0.27	1,830.52
Grading/Excavation (grams/mile)	0.04	0.42	3.08	0.11	0.05	0.02	1,748.57	0.00	0.27	1,830.52
Draining/Utilities/Sub-Grade (grams/mile)	0.03	0.40	2.98	0.11	0.05	0.02	1,714.99	0.00	0.27	1,795.36
Paving (grams/mile)	0.03	0.40	2.98	0.11	0.05	0.02	1,714.99	0.00	0.27	1,795.36
Grubbing/Land Clearing (grams/trip)	0.00	0.00	3.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation (grams/trip)	0.00	0.00	3.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Draining/Utilities/Sub-Grade (grams/trip)	0.00	0.00	4.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving (grams/trip)	0.00	0.00	4.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Emissions	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Pounds per day - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons per construction project	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note: Worker commute default values can be overridden in cells D121 through D126.

Worker Commute Emissions User Input	User Override of Worker Commute Default Values	Default Values	Calculated Daily Trips	Calculated Daily VMT
Miles/ one-way trip	25			
One-way trips/day	2			
No. of employees: Grubbing/Land Clearing	4		8	200.00
No. of employees: Grading/Excavation	6		12	300.00
No. of employees: Drainage/Utilities/Sub-Grade	6		12	300.00
No. of employees: Paving	4		8	200.00

Emission Rates	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Grubbing/Land Clearing (grams/mile)	0.02	1.00	0.08	0.05	0.02	0.00	328.72	0.00	0.01	330.96
Grading/Excavation (grams/mile)	0.02	1.00	0.08	0.05	0.02	0.00	328.72	0.00	0.01	330.96
Draining/Utilities/Sub-Grade (grams/mile)	0.02	0.91	0.07	0.05	0.02	0.00	317.66	0.00	0.01	319.68
Paving (grams/mile)	0.02	0.91	0.07	0.05	0.02	0.00	317.66	0.00	0.01	319.68
Grubbing/Land Clearing (grams/trip)	1.11	2.85	0.32	0.00	0.00	0.00	70.54	0.08	0.03	82.43
Grading/Excavation (grams/trip)	1.11	2.85	0.32	0.00	0.00	0.00	70.54	0.08	0.03	82.43
Draining/Utilities/Sub-Grade (grams/trip)	1.04	2.75	0.29	0.00	0.00	0.00	68.26	0.07	0.03	79.50
Paving (grams/trip)	1.04	2.75	0.29	0.00	0.00	0.00	68.26	0.07	0.03	79.50

Emissions	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Pounds per day - Grubbing/Land Clearing	0.03	0.49	0.04	0.02	0.01	0.00	146.19	0.00	0.00	147.38
Tons per const. Period - Grubbing/Land Clearing	0.00	0.01	0.00	0.00	0.00	0.00	2.11	0.00	0.00	2.12
Pounds per day - Grading/Excavation	0.04	0.74	0.06	0.03	0.01	0.00	219.28	0.00	0.01	221.07
Tons per const. Period - Grading/Excavation	0.00	0.05	0.00	0.00	0.00	0.00	15.26	0.00	0.00	15.39
Pounds per day - Drainage/Utilities/Sub-Grade	0.04	0.68	0.06	0.03	0.01	0.00	211.90	0.00	0.01	213.54
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.05	0.00	0.00	0.00	0.00	15.26	0.00	0.00	15.37
Pounds per day - Paving	0.03	0.45	0.04	0.02	0.01	0.00	141.27	0.00	0.00	142.36
Tons per const. Period - Paving	0.00	0.01	0.00	0.00	0.00	0.00	1.70	0.00	0.00	1.71
Total tons per construction project	0.01	0.11	0.01	0.00	0.00	0.00	34.32	0.00	0.00	34.59

Note: Water Truck default values can be overridden in cells D153 through D156, I153 through I156, and F153 through F156.

Water Truck Emissions User Input	User Override of Default # Water Trucks	Program Estimate of Number of Water Trucks	User Override of Truck Round Trips/Vehicle/Day	Default Values Round Trips/Vehicle/Day	Calculated Trips/day	User Override of Miles/Round Trip	Default Values Miles/Round Trip	Calculated Daily VMT
Grubbing/Land Clearing - Exhaust	2		1.00			40.00		80.00
Grading/Excavation - Exhaust	2		1.00			40.00		80.00
Drainage/Utilities/Subgrade	2		1.00			40.00		80.00
Paving	2		1.00			40.00		80.00

2010+ Model Year Mitigation Option Emission Rates	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Grubbing/Land Clearing (grams/mile)	0.04	0.42	3.08	0.11	0.05	0.02	1,748.57	0.00	0.27	1,830.52
Grading/Excavation (grams/mile)	0.04	0.42	3.08	0.11	0.05	0.02	1,748.57	0.00	0.27	1,830.52
Draining/Utilities/Sub-Grade (grams/mile)	0.03	0.40	2.98	0.11	0.05	0.02	1,714.99	0.00	0.27	1,795.36
Paving (grams/mile)	0.03	0.40	2.98	0.11	0.05	0.02	1,714.99	0.00	0.27	1,795.36
Grubbing/Land Clearing (grams/trip)	0.00	0.00	3.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation (grams/trip)	0.00	0.00	3.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Draining/Utilities/Sub-Grade (grams/trip)	0.00	0.00	4.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving (grams/trip)	0.00	0.00	4.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Emissions	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Pounds per day - Grubbing/Land Clearing	0.01	0.07	0.56	0.02	0.01	0.00	308.40	0.00	0.05	322.85
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.01	0.00	0.00	0.00	4.44	0.00	0.00	4.65
Pounds per day - Grading/Excavation	0.01	0.07	0.56	0.02	0.01	0.00	308.40	0.00	0.05	322.85
Tons per const. Period - Grading/Excavation	0.00	0.01	0.04	0.00	0.00	0.00	21.46	0.00	0.00	22.47
Pounds per day - Drainage/Utilities/Sub-Grade	0.01	0.07	0.55	0.02	0.01	0.00	302.47	0.00	0.05	316.65
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.01	0.04	0.00	0.00	0.00	21.78	0.00	0.00	22.80
Pounds per day - Paving	0.01	0.07	0.55	0.02	0.01	0.00	302.47	0.00	0.05	316.65
Tons per const. Period - Paving	0.00	0.00	0.01	0.00	0.00	0.00	3.63	0.00	0.00	3.80
Total tons per construction project	0.00	0.01	0.09	0.00	0.00	0.00	51.31	0.00	0.01	53.72

Note: Fugitive dust default values can be overridden in cells D183 through D185.

Fugitive Dust	User Override of Max Acreage Disturbed/Day	Default Maximum Acreage/Day	PM10 pounds/day	PM10 tons/per period	PM2.5 pounds/day	PM2.5 tons/per period
Fugitive Dust - Grubbing/Land Clearing	5.00		50.00	0.72	10.40	0.15
Fugitive Dust - Grading/Excavation	5.00		50.00	3.48	10.40	0.72
Fugitive Dust - Drainage/Utilities/Subgrade	5.00		50.00	3.60	10.40	0.75

Values in cells D195 through D228, D246 through D279, D297 through D330, and D348 through D381 are required when 'Other Project Type' is selected.

Off-Road Equipment Emissions

Grubbing/Land Clearing Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Mitigation Option Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Default Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Excavators	0.20	3.26	1.78	0.09	0.08	0.01	500.02	0.16	0.00	505.41
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Graders	0.83	3.44	10.52	0.33	0.31	0.01	1,282.56	0.41	0.01	1,296.37
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other General Industrial Equipn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Other Material Handling Equipm	0.27	3.76	2.24	0.12	0.11	0.01	559.68	0.18	0.01	565.71
			Model Default Tier	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Plate Compactors	0.08	0.42	0.50	0.02	0.02	0.00	68.96	0.01	0.00	69.31
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4.00			Model Default Tier	Pumps	1.41	14.93	11.88	0.62	0.62	0.03	2,492.14	0.13	0.02	2,500.90
			Model Default Tier	Rollers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Rubber Tired Dozers	1.67	7.16	17.59	0.83	0.77	0.02	1,654.07	0.53	0.01	1,671.88
			Model Default Tier	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Skid Steer Loaders	0.07	1.39	0.93	0.03	0.03	0.00	200.39	0.06	0.00	202.55
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

User-Defined Off-road Equipment If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

Number of Vehicles	Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

		ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Grubbing/Land Clearing	pounds per day	4.53	34.36	45.43	2.05	1.94	0.07	6,757.81	1.49	0.06	6,812.14
Grubbing/Land Clearing	tons per phase	0.07	0.49	0.65	0.03	0.03	0.00	97.31	0.02	0.00	98.09

Grading/Excavation Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Mitigation Option Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Default Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Excavators	0.40	6.51	3.55	0.17	0.16	0.01	1,000.03	0.32	0.01	1,010.81
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Graders	0.83	3.44	10.52	0.33	0.31	0.01	1,282.56	0.41	0.01	1,296.37
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other General Industrial Equipn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equipm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Plate Compactors	0.08	0.42	0.50	0.02	0.02	0.00	68.96	0.01	0.00	69.31
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4.00			Model Default Tier	Pumps	1.41	14.93	11.88	0.62	0.62	0.03	2,492.14	0.13	0.02	2,500.90
			Model Default Tier	Rollers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Rubber Tired Dozers	1.67	7.16	17.59	0.83	0.77	0.02	1,654.07	0.53	0.01	1,671.88
			Model Default Tier	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Skid Steer Loaders	0.07	1.39	0.93	0.03	0.03	0.00	200.39	0.06	0.00	202.55
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

User-Defined Off-road Equipment If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

Number of Vehicles	Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation		pounds per day	4.47	33.85	44.96	2.02	1.91	0.07	6,698.15	1.47	0.06	6,751.84
Grading/Excavation		tons per phase	0.31	2.36	3.13	0.14	0.13	0.00	466.19	0.10	0.00	469.93

Drainage/Utilities/Subgrade

Override of Default Number of Vehicles	Default Number of Vehicles Program-estimate	Mitigation Option Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Default Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Excavators	0.38	6.52	3.10	0.15	0.14	0.01	1,000.21	0.32	0.01	1,010.99
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Graders	0.77	3.39	9.31	0.30	0.28	0.01	1,281.71	0.41	0.01	1,295.52
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other General Industrial Equipn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equipm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Plate Compactors	0.08	0.42	0.50	0.02	0.02	0.00	68.96	0.01	0.00	69.31
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4.00			Model Default Tier	Pumps	1.31	14.90	11.01	0.54	0.54	0.03	2,492.14	0.11	0.02	2,500.58
			Model Default Tier	Rollers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Rubber Tired Dozers	1.37	6.21	14.25	0.64	0.59	0.02	1,654.00	0.53	0.01	1,671.82
			Model Default Tier	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Skid Steer Loaders	0.07	1.39	0.86	0.03	0.03	0.00	200.49	0.06	0.00	202.65
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

User-Defined Off-road Equipment If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

Number of Vehicles	Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Drainage/Utilities/Sub-Grade		pounds per day	3.97	32.82	39.04	1.68	1.59	0.07	6,697.51	1.46	0.06	6,750.86
Drainage/Utilities/Sub-Grade		tons per phase	0.29	2.36	2.81	0.12	0.11	0.01	482.22	0.11	0.00	486.06

Paving

Override of Default Number of Vehicles	Default Number of Vehicles Program-estimate	Mitigation Option Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Default Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Excavators	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Graders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other General Industrial Equipn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Other Material Handling Equipm	0.51	7.52	4.19	0.23	0.21	0.01	1,119.35	0.36	0.01	1,131.42
			Model Default Tier	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Plate Compactors	0.08	0.42	0.50	0.02	0.02	0.00	68.96	0.01	0.00	69.31
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4.00			Model Default Tier	Pumps	1.31	14.90	11.01	0.54	0.54	0.03	2,492.14	0.11	0.02	2,500.58
			Model Default Tier	Rollers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Rubber Tired Dozers	1.37	6.21	14.25	0.64	0.59	0.02	1,654.00	0.53	0.01	1,671.82
			Model Default Tier	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

			Model Default Tier	Scrapers		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Signal Boards		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Skid Steer Loaders		0.07	1.39	0.86	0.03	0.03	0.00	200.49	0.06	0.00	202.65
			Model Default Tier	Surfacing Equipment		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Sweepers/Scrubbers		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Tractors/Loaders/Backhoes		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Trenchers		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
User-Defined Off-road Equipment	If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab					ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Number of Vehicles			Equipment Tier	Type		pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
0.00			N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00			N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00			N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00			N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00			N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00			N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00			N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Paving			pounds per day		3.34	30.44	30.83	1.46	1.39	0.06	5,534.94	1.08	0.05	5,575.77
	Paving			tons per phase		0.04	0.37	0.37	0.02	0.02	0.00	66.42	0.01	0.00	66.91
Total Emissions all Phases (tons per construction period) =>						0.70	5.58	6.96	0.31	0.29	0.01	1,112.14	0.24	0.01	1,120.99

Equipment default values for horsepower and hours/day can be overridden in cells D403 through D436 and F403 through F436.

Equipment	User Override of Horsepower	Default Values Horsepower	User Override of Hours/day	Default Values Hours/day
Aerial Lifts		63		8
Air Compressors		78		8
Bore/Drill Rigs		221		8
Cement and Mortar Mixers		9		8
Concrete/Industrial Saws		81		8
Cranes		231		8
Crawler Tractors		212		8
Crushing/Proc. Equipment		85		8
Excavators		158		8
Forklifts		89		8
Generator Sets		84		8
Graders		187		8
Off-Highway Tractors		124		8
Off-Highway Trucks		402		8
Other Construction Equipment		172		8
Other General Industrial Equipment		88		8
Other Material Handling Equipment		168		8
Pavers		130		8
Paving Equipment		132		8
Plate Compactors		8		8
Pressure Washers		13		8
Pumps		84		8
Rollers		80		8
Rough Terrain Forklifts		100		8
Rubber Tired Dozers		247		8
Rubber Tired Loaders		203		8
Scrapers		367		8
Signal Boards		6		8
Skid Steer Loaders		65		8
Surfacing Equipment		263		8
Sweepers/Scrubbers		64		8
Tractors/Loaders/Backhoes		97		8
Trenchers		78		8
Welders		46		8

END OF DATA ENTRY SHEET

Road Construction Emissions Model, Version 9.0.0

Daily Emission Estimates for -> Bouldin Island														
Project Phases (Pounds)	**ROG (lbs/day)**	**CO (lbs/day)**	**NOx (lbs/day)**	**Total PM10 (lbs/day)**	**Exhaust PM10 (lbs/day)**	**Fugitive Dust PM10 (lbs/day)**	**Total PM2.5 (lbs/day)**	**Exhaust PM2.5 (lbs/day)**	**Fugitive Dust PM2.5 (lbs/day)**	**SOx (lbs/day)**	**CO2 (lbs/day)**	**CH4 (lbs/day)**	**N2O (lbs/day)**	**CO2e (lbs/day)**
Grubbing/Land Clearing	4.57	34.93	46.03	52.09	2.09	50.00	12.36	1.96	10.40	0.08	7,212.40	1.50	0.11	7,282.37
Grading/Excavation	4.66	36.17	57.93	52.47	2.47	50.00	12.50	2.10	10.40	0.13	13,432.28	1.48	1.09	13,793.10
Drainage/Utilities/Sub-Grade	4.10	34.77	48.78	52.06	2.06	50.00	12.16	1.76	10.40	0.12	12,316.11	1.47	0.91	12,624.46
Paving	3.37	30.96	31.41	1.50	1.50	0.00	1.40	1.40	0.00	0.06	5,978.68	1.09	0.10	6,034.78
Maximum (pounds/day)	4.66	36.17	57.93	52.47	2.47	50.00	12.50	2.10	10.40	0.13	13,432.28	1.50	1.09	13,793.10
Total (tons/construction project)	0.73	5.90	8.58	8.17	0.37	7.80	1.94	0.32	1.62	0.02	1,997.25	0.24	0.14	2,046.24

Notes:

Project Start Year ->	2022
Project Length (months) ->	14
Total Project Area (acres) ->	78
Maximum Area Disturbed/Day (acres) ->	5
Water Truck Used? ->	Yes

	Total Material Imported/Exported Volume (yd^3/day)		Daily VMT (miles/day)			
Phase	Soil	Asphalt	Soil Hauling	Asphalt Hauling	Worker Commute	Water Truck
Grubbing/Land Clearing	0	0	0	0	200	80
Grading/Excavation	3,214	0	1,610	0	300	80
Drainage/Utilities/Sub-Grade	537	0	1,350	0	300	80
Paving	0	0	0	0	200	80

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

Total Emission Estimates by Phase for -> Bouldin Island														
Project Phases (Tons for all except CO2e. Metric tonnes for CO2e)	**ROG (tons/phase)**	**CO (tons/phase)**	**NOx (tons/phase)**	**Total PM10 (tons/phase)**	**Exhaust PM10 (tons/phase)**	**Fugitive Dust PM10 (tons/phase)**	**Total PM2.5 (tons/phase)**	**Exhaust PM2.5 (tons/phase)**	**Fugitive Dust PM2.5 (tons/phase)**	**SOx (tons/phase)**	**CO2 (tons/phase)**	**CH4 (tons/phase)**	**N2O (tons/phase)**	**CO2e (MT/phase)**
Grubbing/Land Clearing	0.07	0.50	0.66	0.75	0.03	0.72	0.18	0.03	0.15	0.00	103.86	0.02	0.00	95.13
Grading/Excavation	0.32	2.52	4.03	3.65	0.17	3.48	0.87	0.15	0.72	0.01	934.89	0.10	0.08	870.91
Drainage/Utilities/Sub-Grade	0.30	2.50	3.51	3.75	0.15	3.60	0.88	0.13	0.75	0.01	886.76	0.11	0.07	824.60
Paving	0.04	0.37	0.38	0.02	0.02	0.00	0.02	0.02	0.00	0.00	71.74	0.01	0.00	65.70
Maximum (tons/phase)	0.32	2.52	4.03	3.75	0.17	3.60	0.88	0.15	0.75	0.01	934.89	0.11	0.08	870.91
Total (tons/construction project)	0.73	5.90	8.58	8.17	0.37	7.80	1.94	0.32	1.62	0.02	1997.25	0.24	0.14	1,856.34

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

The CO2e emissions are reported as metric tons per phase.

Appendix B

Database Query Results for Special-status Plant Species in the Bouldin Island Levee Rehabilitation Project Region

Table B-1. Database query results for special-status plant species documented in the Bouldin Island Levee Rehabilitation Project region.

Scientific name	Common name	Status[1] CRPR/State/ Federal	Query source	Blooming period	Habitat associations	Elevation range (feet)	Potential to occur in the Project Area?
Amsinckia grandiflora	large-flowered fiddleneck	1B.1/CE/FE	USFWS	(March) April–May	Cismontane woodland, and valley and foothill grassland	886–1,804	No; outside of elevation range
Astragalus tener var. *ferrisiae*	Ferris' milk-vetch	1B.1/–/–	CNPS	April–May	Subalkaline flats of valley and foothill grassland, vernally mesic meadows and seeps	5–245	Yes; suitable habitat may be present
Astragalus tener var. *tener*	alkali milk-vetch	1B.2/–/–	CNPS, CNDDB	March–June	Alkaline areas in playas, valley and foothill grassland with adobe clay soils, and vernal poils	0–195	No; suitable habitat not present
Atriplex cordulata var. *cordulata*	heartscale	1B.2/–/–	CNPS, CNDDB	April–October	Saline or alkaline areas in chenopod scrub, meadows and seeps, and sandy areas in valley and foothill grassland	0–1,835	Yes; suitable habitat may be present
Atriplex coronata var. *coronata*	crownscale	4.2/–/–	CNPS	March–October	Alkaline, often clay, areas in chenopod scrub, valley and foothill grassland, and vernal pools	0–1,935	Yes; suitable habitat may be present
Blepharizonia plumosa	big tarplant	1B.1/–/–	CNPS, CNDDB	July–October	Usually clay areas in valley and foothill grassland	95–1,655	Yes; suitable habitat may be present
Brasenia schreberi	watershield	2B.3/–/–	CNPS, CNDDB	June–September	Freshwater marshes and swamps	95–7,220	Yes; suitable habitat may be present
Carex comosa	bristly sedge	2B.1/–/–	CNPS, CNDDB	May–September	Coastal prairie, lake margins of marshes and swamps, and valley and foothill grassland	0–2,050	Yes; suitable habitat may be present
Centromadia parryi subsp. *congdonii*	Congdon's tarplant	1B.1/–/–	CNPS, CNDDB	May–October (November)	Alkaline areas in valley and foothill grassland	0–755	Yes; suitable habitat may be present

Scientific name	Common name	Status[1] CRPR/State/ Federal	Query source	Blooming period	Habitat associations	Elevation range (feet)	Potential to occur in the Project Area?
Centromadia parryi subsp. *parryi*	pappose tarplant	1B.2/–/–	CNPS, CNDDB	May–November	Often alkaline areas in chaparral, coastal prairie, meadows and seeps, coastal salt marshes and swamps, and vernally mesic valley and foothill grassland	0–1,380	Yes; suitable habitat may be present
Centromadia parryi subsp. *rudis*	Parry's rough tarplant	4.2/–/–	CNPS	May–October	Alkaline and vernally mesic areas, seeps, sometimes roadsides, in valley and foothill grassland, and vernal pools	0–330	Yes; suitable habitat may be present
Chloropyron molle subsp. *molle*	soft bird's-beak	1B.2/CR/FE	CNPS, CNDDB	June–November	Coastal salt marshes and swamps	0–10	Yes; suitable habitat may be present
Chloropyron palmatum	palmate-bracted bird's-beak	1B.1/CE/FE	CNPS, CNDDB	May–October	Alkaline areas in chenopod scrub, and valley and foothill grassland	15–510	Yes; suitable habitat may be present
Cicuta maculata var. *bolanderi*	Bolander's water-hemlock	2B.1/–/–	CNPS, CNDDB	July–September	Marshes and swamps, and coastal, fresh or brackish water	0–655	Yes; suitable habitat may be present
Downingia pusilla	dwarf downingia	2B.2/–/–	CNPS	March–May	Mesic valley and foothill grassland, and vernal pools	0–1,460	Yes; suitable habitat may be present
Eryngium racemosum	Delta button-celery	1B.1/CE/–	CNPS, CNDDB	June–October	Vernally mesic clay depressions in riparian scrub	5–100	Yes; suitable habitat may be present
Extriplex joaquinana	San Joaquin spearscale	1B.2/–/–	CNPS, CNDDB	April–October	Alkaline areas in chenopod scrub, meadows and seeps, playas, and valley and foothill grassland	0–2,740	Yes; suitable habitat may be present
Fritillaria agrestis	stinkbells	4.2/–/–	CNPS, CNDDB	March–June	Clay, sometimes serpentinite, areas in chaparral, cismontane woodland, pinyon and juniper woodland, and valley and foothill grassland	30–5,100	Yes; suitable habitat may be present

Scientific name	Common name	Status[1] CRPR/State/ Federal	Query source	Blooming period	Habitat associations	Elevation range (feet)	Potential to occur in the Project Area?
Hesperevax caulescens	hogwallow starfish	4.2/–/–	CNPS	March–June	Sometimes alkaline areas in mesic valley and foothill grassland with clay soils, and shallow vernal pools	0–1,655	Yes; suitable habitat may be present
Hesperolinon breweri	Brewer's western flax	1B.2/–/–	CNPS, CNDDB	May–July	Usually serpentinite areas in chaparral, cismontane woodland, and valley and foothill grassland	95–3,100	Yes; suitable habitat may be present
Hibiscus lasiocarpos var. *occidentalis*	woolly rose-mallow	1B.2/–/–	CNPS, CNDDB	June–September	Often in riprap on sides of levees of freshwater marshes and swamps	0–395	Yes; suitable habitat may be present
Juglans hindsii	northern California black walnut	CBR[2]/–/–	CNPS	April–May	Riparian forest and riparian woodland	0–1,445	Yes; suitable habitat may be present
Lasthenia ferrisiae	Ferris' goldfields	4.2/–/–	CNPS	February–May	Alkaline and clay areas in vernal pools	65–2,295	No; suitable habitat not present
Lathyrus jepsonii var. *jepsonii*	Delta tule pea	1B.2/–/–	CNPS, CNDDB	May–July (August–September)	Freshwater and brackish marshes and swamps	0–15	Yes; suitable habitat may be present
Legenere limosa	legenere	1B.1/–/–	CNPS, CNDDB	April–June	Vernal pools	0–2,885	No; suitable habitat not present
Lepidium latipes var. *heckardii*	Heckard's pepper-grass	1B.2/–/–	CNPS, CNDDB	March–May	Alkaline flats in valley and foothill grassland	5–655	Yes; suitable habitat may be present
Lilaeopsis masonii	Mason's lilaeopsis	1B.1/CR/–	CNPS, CNDDB	April–November	Brackish or freshwater marshes and swamps, and riparian scrub	0–35	Yes; suitable habitat may be present
Limosella australis	Delta mudwort	2B.1/–/–	CNPS, CNDDB	May–August	Usually mud banks in freshwater or brackish marshes and swamps, and riparian scrub	0–10	Yes; suitable habitat may be present
Oenothera deltoides subsp. *howellii*	Antioch Dunes evening-primrose	1B.1/CE/FE	CNPS, CNDDB	March–September	Inland dunes	0–100	No; suitable habitat not present
Potamogeton zosteriformis	eel-grass pondweed	2B.2/–/–	CNPS, CNDDB	June–July	Assorted freshwater marshes and swamps	0–6,100	Yes; suitable habitat may be present

Scientific name	Common name	Status[1] CRPR/State/ Federal	Query source	Blooming period	Habitat associations	Elevation range (feet)	Potential to occur in the Project Area?
Sagittaria sanfordii	Sanford's arrowhead	1B.2/–/–	CNPS, CNDDB	May–October (November)	Assorted shallow freshwater marshes and swamps	0–2,135	Yes; suitable habitat may be present
Scutellaria galericulata	marsh skullcap	2B.2/–/–	CNPS, CNDDB	June–September	Lower montane coniferous forest, mesic meadows and seeps, and marshes and swamps	0–6,890	Yes; suitable habitat may be present
Scutellaria lateriflora	side-flowering skullcap	2B.2/–/–	CNPS, CNDDB	July–September	Mesic meadows and seeps, marshes and swamps	0–1,640	Yes; suitable habitat may be present
Symphyotrichum lentum	Suisun Marsh aster	1B.2/–/–	CNPS, CNDDB	(April) May–November	Brackish and freshwater marshes and swamps	0–10	Yes; suitable habitat may be present
Trifolium hydrophilum	saline clover	1B.2/–/–	CNPS, CNDDB	April–June	Marshes and swamps, mesic and alkaline areas in valley and foothill grassland, and vernal pools	0–985	Yes; suitable habitat may be present
Tropidocarpum capparideum	caper-fruited tropidocarpum	1B.1/–/–	CNPS, CNDDB	March–April	Alkaline hills in valley and foothill grassland	0–1,495	Yes; suitable habitat may be present

[1] Status:

Federal
- FE Federally listed endangered
- – No federal status

State
- CE State listed endangered
- CR State listed rare
- – No state status

California Rare Plant Rank (CRPR)
- 1B Plants rare, threatened, or endangered in California and elsewhere
- 2B Plants rare, threatened, or endangered in California, but more common elsewhere
- 4 Plants of limited distribution, a watch list
- 0.1 Seriously threatened in California (high degree/immediacy of threat)
- 0.2 Moderately threatened in California (moderate degree/immediacy of threat)
- 0.3 Not very threatened in California (low degree/immediacy of threats or no current threats known)
- CBR Considered but rejected

[2] The CRPR of northern California black walnut was changed from 1B.1 to CBR in 2019 based on data in Potter et al. (2018) indicating that genetically pure representatives of the species are common throughout California.

Table B-2. CNDDB query results for sensitive natural communities previously documented in the Project region.

Natural community (Holland 1986)	Status[1]	Distribution[2]	Habitat description[2]	Potential to occur in the Project Area
Alkali Meadow	S2.1	Occurs in valley bottoms and on the lower portions of alluvial slopes east of the Cascades and Sierra Nevada, around Alkali Seeps from Kern to Placer counties, and the salty grasslands of the western Sacramento Valley from San Joaquin to Glenn and Colusa counties at elevations of 3,500 to 7,000 feet	On fine-textured, more or less permanently moist, alkaline soils	No; neither characteristic species nor habitat present
Alkali Seep	S2.1	Scattered throughout the desert regions of California; less common in other areas	Temporarily exposed to permanently flooded alkali marshes	No; neither characteristic species nor habitat present
Cismontane Alkali Marsh	S1.1	Occurs in lake beds and other areas on the floodplains of the Sacramento and San Joaquin rivers, and low-lying areas of Kings and Kern counties at elevations below 1,000 feet	Standing water or saturated alkaline soil	No; neither characteristic species nor habitat present
Coastal and Valley Freshwater Marsh	S2.1	Remnant stands are most extensive in the upper portion of the Sacramento-San Joaquin River Delta, in river oxbows and other areas on the floodplain. Occurs occasionally along the coast, in coastal valleys near river mouths, and around the margins of lakes and springs	Quiet sites (lacking significant current) permanently flooded by fresh water (rather than brackish, alkaline, or variable)	Yes; characteristic species occur adjacent to (but not within) the Project Area below mean high water
Northern Hardpan Vernal Pool	S3.1	Primarily on old alluvial terraces on the east side of the Great Valley from Tulare or Fresno County north to Shasta County	Old, very acidic, Fe-Si cemented hardpan soils	No; neither characteristic species nor habitat present
Valley Oak Woodland	S2.1	In Sacramento and San Joaquin valleys adjacent to the Sierra Nevada foothills and valleys of the Coast Ranges from Lake County to western Los Angeles County, usually below 2,000 feet	An open, grassy-understoried savanna dominated by valley oak (*Quercus lobata*). Valley oak is usually the only tree present; its canopy seldom exceeds 30–40% absolute cover	No; neither characteristic species nor habitat present

[1] **State ranks for sensitive natural communities**
S1 Fewer than six viable occurrences statewide
S2 6–20 viable occurrences statewide
S3 21–80 viable occurrences statewide
0.1 Very threatened

[2] Source: Holland (1986).

Appendix C

Database Query Results for Special-status Wildlife Species in the Bouldin Island Levee Rehabilitation Project Region

Table C-1. Database query results for special-status wildlife species documented in the Project region.

Common name *Scientific name*	Query sources	Status[1] Federal/State	Distribution in California	Habitat association	Likelihood to occur in Project Area
Invertebrates					
Conservancy fairy shrimp *Branchinecta conservatio*	USFWS	FE/–	Disjunct occurrences in Tehama, Glenn, Butte, Yolo, Solano, Stanislaus, Merced, and Ventura counties	Large, deep vernal pools in annual grasslands	None; no suitable habitat present
Vernal pool fairy shrimp *Branchinecta lynchi*	CNDDB, USFWS	FT/–	Central Valley, central and south Coast Ranges from Tehama County to Santa Barbara County; isolated populations also in Riverside County	Vernal pools; also found in sandstone rock outcrop pools	None; no suitable habitat present
Vernal pool tadpole shrimp *Lepidurus packardi*	CNDDB, USFWS	FE/–	Shasta County south to Merced County	Vernal pools and ephemeral stock ponds	None; no suitable habitat present
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	CNDDB, USFWS	FT/–	Streamside habitats throughout the Central Valley; below 3,000 feet	Riparian and oak savanna habitats with host plant *Sambucus* sp. (blue elderberry)	None; no suitable elderberry habitat present
Delta green ground beetle *Elaphrus viridus*	USFWS	FT/–	Only known to occur in Solano County	Grassland habitat interspersed with vernal pools	None; no suitable habitat present, and outside of species' range
San Bruno elfin butterfly *Callophrys mossii bayensis*	USFWS	FE/–	Largest population on San Bruno Mountain in San Mateo County; smaller populations may occur in Contra Costa and Marin counties	Coastal scrub; host plant is Pacific stonecrop (*Sedum spathulifolium*)	None; no suitable habitat present, and outside of species' range
Amphibians					
California tiger salamander *Ambystoma californiense* Central California Distinct Population Segment	CNDDB, USFWS	FT/ST	Very fragmented; along the coast from Sonoma County to Santa Barbara County, in the Central Valley and Sierra foothills from Sacramento County to Tulare County	Grassland, oak savannah, or edges of woodland that provide subterranean refuge (typically mammal burrows); breeds in nearby temporary ponds, vernal pools, or slow-moving parts of streams	None; no suitable habitat present
Western spadefoot *Spea hammondii*	CNDDB	–/SSC	Near Redding, south throughout the Central Valley and nearby foothills; Coast Ranges south of Monterey Bay; and coastal southern California south of the Transverse Mountains and west of the Peninsular Mountains	Areas with sparse vegetation and/or short grasses in sandy or gravelly soils; primarily in washes, river floodplains, alluvial fans, playas, alkali flats, among grasslands, chaparral, or pine-oak woodlands; breeds in ephemeral rain pools with no predators	None; no suitable habitat present
California red-legged frog *Rana draytonii*	USFWS	FT/SSC	Largely restricted to coastal drainages on the central coast from Mendocino County to Baja California; in the Sierra foothills south to Tulare and possibly Kern counties	Breeds in still or slow-moving water with emergent and overhanging vegetation, including wetlands, wet meadows, ponds, lakes, and low-gradient, slow moving stream reaches with permanent pools; uses adjacent uplands for dispersal and summer retreat	None; outside of species' range
Foothill yellow-legged frog *Rana boylii*	CNDDB	–/SE[2], SSC	From the Oregon border along the coast to the Transverse Ranges, and south along the western side of the Sierra Nevada Mountains to Kern County; a possible isolated population in Baja California	Shallow tributaries and mainstems of perennial streams and rivers, typically associated with cobble or boulder substrate	None; no suitable habitat present, and outside of species' range

Common name *Scientific name*	Query sources	Status[1] Federal/State	Distribution in California	Habitat association	Likelihood to occur in Project Area
Reptiles					
Western pond turtle *Actinemys marmorata*	CNDDB	–/SSC	From the Oregon border along the coast ranges to the Mexican border, and west of the crest of the Cascades and Sierras	Permanent, slow-moving fresh or brackish water with available basking sites and adjacent open habitats or forest for nesting	High; suitable aquatic and upland nesting habitat in Project vicinity; species documented in 2001 and 2016 in the South Mokelumne River and Little Potato Slough adjacent to the Project Area (CDFW 2021b, Stillwater Sciences 2016)
California legless lizard *Anniella pulchra*	CNDDB	–/SSC	Northern Contra Costa County south to northwestern Baja California; scattered occurrences in San Joaquin Valley, along the southern Sierra Nevada mountains, and in the western Mojave Desert	Sparsely vegetated areas of beach dunes, chaparral, pine-oak woodlands, desert scrub, sandy washes, and stream terraces; warm, moist, loose soil for burrowing	None; no suitable habitat present
Giant garter snake *Thamnophis gigas*	CNDDB, USFWS	FT/ST	Central Valley from the vicinity of Burrel in Fresno County north to near Chico in Butte County; has been extirpated from areas south of Fresno	Sloughs, canals, low- gradient streams and freshwater marsh habitats where there is a prey base of small fish and amphibians; also found in irrigation ditches and rice fields; requires grassy banks and emergent vegetation for basking and areas of high ground protected from flooding during winter	High; marginally suitable habitat present in Project Area, however, species observed near levee station 485+90 in 2016, approximately 2 miles from the Project Area (Stillwater Sciences 2016); additional record of four individuals from 2010 on Empire Tract and Little Connection Slough, approximately 4 miles from Project Area (CDFW 2021b)
Birds					
Western yellow-billed cuckoo *Coccyzus americanus*	CNDDB	FT/SE	Breeds in limited portions of the Sacramento River and the South Fork Kern River; small populations may nest in Butte, Yuba, Sutter, San Bernardino, Riverside, Inyo, Los Angeles, and Imperial counties	Summer resident of valley foothill and desert riparian habitats; nests in open woodland with clearings and low, dense, scrubby vegetation	Low; documented occurrence from 2009 near Walnut Grove, approximately 9 miles from the Project Area (CDFW 2021b); Project vicinity contains marginally suitable foraging habitat, and riparian woodland on the island is likely not contiguous enough for nesting
California Ridgway's rail *Rallus obsoletus obsoletus*	USFWS	FE/SE, SFP	Predominantly in the marshes of the San Francisco estuary: South San Francisco Bay, North San Francisco Bay, San Pablo Bay, and sporadically throughout the Suisun Marsh area east to Browns Island	Salt and brackish water marshes, typically dominated by pickleweed (*Salicornia virginica*) and Pacific cordgrass (*Spartina foliosa*)	None; outside of the species' range
California black rail *Laterallus jamaicensis coturniculus*	CNDDB	–/ST, SFP	Northern San Francisco Bay area (primarily San Pablo and Suisun bays) and Sacramento-San Joaquin Delta	Large tidally-influenced marshes with saline to brackish water, typically with a high proportion of pickleweed (*Salicornia virginica*); also can be associated with bulrush (*Schoenoplectus* spp.), cattail (*Typha* spp.), or rushes (*Juncus* spp.); peripheral vegetation at and above mean high higher water necessary to protect nesting birds during extremely high tides	Moderate; may nest in nearby marsh habitats in the Project vicinity; call response documented in 1989 along Little Potato Slough, approximately 1.5 miles from the Project Area (CDFW 2021b)
Greater sandhill crane/lesser sandhill crane *Antigone canadensis tabida/Antigone canadensis canadensis*	eBird	–/ST, SFP (greater), SSC (lesser)	Winter visitor and migrant; scattered locations in the Central Valley; Greaters breed in high elevation meadows of the Sierra Nevada and high elevation deserts in the northeastern corner of California	Forages in freshwater marshes and grasslands as well as harvested rice fields, corn stubble, barley, and newly planted grain fields	Moderate (foraging only); species observed foraging in agricultural fields on Bouldin Island in the winter of 2021(eBird 2021)
American white pelican *Pelecanus erythrorhyncos*	eBird	–/SSC	Breeds on lakes in the Klamath Basin, winters along the Pacific coast from Sonoma County south to Baja California and in the Central Valley	Salt ponds, large lakes, and estuaries; loafs on open water during the day; roosts along water's edge at night	Moderate (foraging only); documented on Bouldin Island in 2019 (eBird 2021) and during April 2021 habitat assessment by Stillwater Sciences biologists
White-tailed kite *Elanus leucurus*	CNDDB	–/SFP	Year-round resident; found in nearly all lowlands of California west of the Sierra Nevada mountains and the southeast deserts	Lowland grasslands and wetlands with open areas; nests in trees near open foraging area	Moderate; may forage or nest in the Project vicinity; documented observation from 2014 on Bouldin Island (eBird 2021)

Common name ***Scientific name***	**Query sources**	**Status[1]** **Federal/State**	**Distribution in California**	**Habitat association**	**Likelihood to occur in Project Area**
Northern harrier *Circus hudsonius*	eBird	–/SSC	Year-round resident; scattered throughout California; in the northwest, nests largely within coastal lowlands from Del Norte County south to Bodega Head in Sonoma County, inland to Napa County	Nests, forages, and roosts in wetlands or along rivers or lakes, but also in grasslands, meadows, or grain fields	Moderate; may forage or nest in the Project vicinity; documented on Bouldin Island in 2016 (eBird 2021) and during April 2021 habitat assessment by Stillwater Sciences biologists
Bald eagle *Haliaeetus leucocephalus*	eBird	FD, BGEPA/ SE, SFP	Permanent resident and uncommon winter migrant, found nesting primarily in Butte, Lake, Lassen, Modoc, Plumas, Shasta, Siskiyou, and Trinity counties	Large bodies of water or rivers with abundant fish; uses snags or other perches; nests in advanced-successional conifer forest near open water	High; documented observations on Bouldin Island in 2020 (juvenile) and 2016 (adult) (eBird 2021); nesting observed by Mel Tucker on Bouldin Island (M. Tucker, personal communication, March 17, 2021)
Swainson's hawk *Buteo swainsoni*	CNDDB	–/ST	Summer resident; breeds in lower Sacramento and San Joaquin valleys, the Klamath Basin, and Butte Valley; highest nesting densities occur near Davis and Woodland, Yolo County	Nests in oaks or cottonwoods in or near riparian habitats; forages in grasslands, irrigated pastures, and grain fields	High; documented nest in 2009 in Little Potato Slough, approximately 1 mile from Project Area (CDFW 2021b); additional documented observations on Bouldin Island in 2021 (eBird 2021), including observations by Stillwater Sciences biologists during April and May 2021 habitat assessments
Western burrowing owl *Athene cunicularia hypugaea*	CNDDB	–/SSC	Year-round resident throughout much of the state; Central Valley, northeastern plateau, southeastern deserts, and coastal areas; rare along south coast	Level, open, dry, heavily grazed or low- stature grassland or desert vegetation with available burrows	Low/Moderate; no suitable burrows identified in Project Area; documented occurrences from 2020 and 2021 near Woodbridge Ecological Reserve (near S. Mokelumne River), approximately 3 miles from the Project Area (eBird 2021)
American peregrine falcon *Falco peregrinus anatum*	CNDDB	FD/SD, SFP	Most of California during migrations and in winter; nests primarily in the Coast Ranges, northern Sierra Nevada Mountains, and other mountainous areas of northern California	Wetlands, woodlands, cities, agricultural lands, and coastal area with cliffs (and rarely broken-top, predominant trees) for nesting; often forages near water	Low (foraging only); marginally suitable foraging habitat present; documented observation on Bouldin Island in 2016 (eBird 2021)
Least Bell's vireo *Vireo bellii pusillus*	CNDDB	FE/SE	Summer resident; breeds in scattered locations around southern California	Nests in dense vegetative cover of riparian areas; often nests in willow or mulefat; forages in dense, stratified canopy	None; outside of species' range; historical occurrence documented in 1878 near Stockton, approximately 16 miles from the Project Area (CDFW 2021b)
Loggerhead shrike *Lanius ludovicianus*	CNDDB	–/SSC	Year-round resident in most of California except for the forested coastal slope and the high elevations of the Sierra Nevada, southern Cascade, and Transverse Ranges	Open shrubland or woodlands with short vegetation and and/or bare ground for hunting; some tall shrubs, trees, fences, or power lines for perching; typically nest in isolated trees or large shrubs	Moderate; may forage or nest in Project vicinity; observations documented in 2014 on Bouldin Island (eBird 2021)
Bank swallow *Riparia riparia*	CNDDB	–/ST	Summer resident; occurs along the Sacramento River from Tehama County to Sacramento County, along the Feather and lower American rivers; and in the plains east of the Cascade Range in Modoc, Lassen, and northern Siskiyou counties; small populations near the coast from San Francisco County to Monterey County	Nests in vertical bluffs or banks, usually adjacent to water, where the soil consists of sand or sandy loam	Low; no suitable nesting habitat in Project vicinity; occurrence documented in 2000 near Twitchell Island, approximately 6 miles from the Project Area (CDFW 2021b)
Song sparrow ("Modesto" population) *Melospiza melodia*	CNDDB	–/SSC	Year-round resident; north-central portion of the Central Valley	Emergent freshwater marshes, riparian willow thickets, and riparian forests	High; may nest in Project vicinity; nesting documented along South Mokelumne River in 2009, adjacent to the Project Area (CDFW 2021b)
Tricolored blackbird *Agelaius tricolor*	CNDDB	–/ST, SSC	Permanent resident, but makes extensive migrations both in breeding season and winter; common locally throughout Central Valley and in coastal areas from Sonoma County south	Feeds in grasslands and agriculture fields; nesting habitat components include open accessible water, a protected nesting substrate (including flooded or thorny vegetation), and a suitable nearby foraging space with adequate insect prey	Moderate; may nest or forage in Project vicinity; historical occurrence documented on Bouldin Island from 1980, but more recently documented in 2021 near Islemouth Slough, approximately 0.5 miles from the Project Area (eBird 2021)

Common name *Scientific name*	Query sources	Status[1] Federal/State	Distribution in California	Habitat association	Likelihood to occur in Project Area
Mammals					
Riparian brush rabbit *Sylvilagus bachmani riparius*	CNDDB, USFWS	FE/SE	Restricted to two broad regions in California: the San Joaquin and Stanislaus rivers in the San Joaquin River National Wildlife Refuge and Caswell Memorial State Park, and disjunct local populations scattered throughout the South Delta	Brushy understory of valley riparian forests	None; outside species' range
Western red bat *Lasiurus blossevillii*	CNDDB	–/SSC	Near the Pacific Coast, Central Valley, and the Sierra Nevada	Riparian forests, woodlands near streams, fields, and orchards	Low; may nest in nearby trees and/or riparian habitat
San Joaquin kit fox *Vulpes macrotis mutica*	CNDDB	FE/ST	San Joaquin Valley floor and surrounding foothills of the coastal ranges, Sierra Nevada, and Tehachapi mountains	Annual grasslands or open areas dominated by scattered brush, shrubs, and scrub	None; no suitable habitat present
American badger *Taxidea taxus*	CNDDB	–/SSC	Throughout the state except in the humid coastal forests of Del Norte County and the northwest portion of Humboldt County	Shrubland, open grasslands, fields, and alpine meadows with friable soils	None; no suitable habitat present

[1] Status codes:

Federal
BGEPA = Federally protected under the Bald and Golden Eagle Protection Act
FD = Federally delisted
FE = Listed as endangered under the federal Endangered Species Act
FT = Listed as threatened under the federal Endangered Species Act

State
SD = State Delisted
SE = Listed as Endangered under the California Endangered Species Act
SFP = CDFW Fully Protected species
SSC = CDFW Species of Special Concern
ST = Listed as Threatened under the California Endangered Species Act

[2] Southern Sierra, Central Coast, and South Coast clades of foothill yellow-legged frog are listed as endangered under the California Endangered Species Act. Bouldin Island is located within the historical range of the Southern Sierra clade, although foothill yellow-legged frogs have since been extirpated from this area.

Appendix D

Comprehensive List of Plant Species Documented during Special-status Plant Surveys for the Bouldin Island Levee Rehabilitation Project

Table D-1. Comprehensive list of plant species documented during special-status plant surveys for the Bouldin Island Levee Rehabilitation Project.

Scientific name	Common name	Family	Native status	Cal-IPC rating[1]
Abutilon theophrasti	velvet-leaf	Malvaceae	Naturalized	–
Acer negundo	box elder	Sapindaceae	Native	–
Acer saccharinum (cultivated)	silver maple	Sapindaceae	Naturalized	–
Agrostis avenacea	Pacific bent grass	Poaceae	Naturalized	Limited
Alnus rhombifolia	white alder	Betulaceae	Native	–
Amaranthus albus	tumbleweed	Amaranthaceae	Naturalized	–
Amaranthus blitoides	procumbent pigweed	Amaranthaceae	Native	–
Amaranthus retroflexus	redroot pigweed	Amaranthaceae	Naturalized	–
Amsinckia menziesii	common fiddleneck	Boraginaceae	Native	–
Anthriscus caucalis	bur-chervil	Apiaceae	Naturalized	–
Artemisia douglasiana	mugwort	Asteraceae	Native	–
Asparagus officinalis subsp. *officinalis*	garden asparagus	Asparagaceae	Naturalized	–
Atriplex prostrata	fat-hen	Chenopodiaceae	Naturalized	–
Avena fatua	wild oat	Poaceae	Naturalized	Moderate
Baccharis salicifolia subsp. *salicifolia*	mule fat	Asteraceae	Native	–
Brassica rapa	field mustard	Brassicaceae	Naturalized	Limited
Bromus catharticus	rescuegrass	Poaceae	Naturalized	–
Bromus diandrus	ripgut grass	Poaceae	Naturalized	Moderate
Bromus hordeaceus	soft chess	Poaceae	Naturalized	Limited
Capsella bursa-pastoris	shepherd's purse	Brassicaceae	Naturalized	–
Carduus pycnocephalus subsp. *pycnocephalus*	Italian thistle	Asteraceae	Naturalized	Moderate
Carpobrotus edulis	freeway iceplant	Aizoaceae	Naturalized	High

Scientific name	Common name	Family	Native status	Cal-IPC rating[1]
Catalpa sp. (cultivated)	catalpa	Bignoniaceae	Naturalized	–
Cephalanthus occidentalis	California button willow	Rubiaceae	Native	–
Chenopodium album	lamb's quarters	Chenopodiaceae	Naturalized	–
Claytonia perfoliata	miner's lettuce	Montiaceae	Native	–
Conium maculatum	poison hemlock	Apiaceae	Naturalized	Moderate
Convolvulus arvensis	orchard morning-glory	Convolvulaceae	Naturalized	–
Cordyline australis (cultivated)	New Zealand cabbage tree	Laxmanniaceae	Naturalized	Limited
Cornus sericea	American dogwood	Cornaceae	Native	–
Cortaderia sp.	pampas grass	Poaceae	Naturalized	High
Cupressus sempervirens	Italian cypress	Cupressaceae	Naturalized	–
Cynara cardunculus	cardoon	Asteraceae	Naturalized	Moderate
Cynodon dactylon	Bermuda grass	Poaceae	Naturalized	Moderate
Cyperus eragrostis	tall flatsedge	Cyperaceae	Native	–
Dactylis glomerata	orchardgrass	Poaceae	Naturalized	Limited
Deschampsia cespitosa subsp. *cespitosa*	tufted hairgrass	Poaceae	Native	–
Dysphania ambrosioides	Mexican tea	Chenopodiaceae	Naturalized	–
Echinochloa crus-galli	barnyardgrass	Poaceae	Naturalized	–
Elodea canadensis	common water weed	Hydrocharitaceae	Native	–
Epilobium brachycarpum	tall annual willowherb	Onagraceae	Native	–
Epilobium ciliatum	fringed willowherb	Onagraceae	Native	–
Equisetum hyemale subsp. *affine*	common scouring rush	Equisetaceae	Native	–
Erigeron bonariensis	flax-leaved horseweed	Asteraceae	Naturalized	–
Erigeron canadensis	horseweed	Asteraceae	Native	–
Erodium cicutarium	redstem filaree	Geraniaceae	Naturalized	Limited
Erythranthe guttata	seep monkeyflower	Phrymaceae	Native	–

Scientific name	Common name	Family	Native status	Cal-IPC rating[1]
Euphorbia serpyllifolia	thyme-leafed spurge	Euphorbiaceae	Native	–
Euthamia occidentalis	western goldenrod	Asteraceae	Native	–
Festuca myuros	rattail sixweeks grass	Poaceae	Naturalized	Moderate
Festuca perennis	rye grass	Poaceae	Naturalized	Moderate
Foeniculum vulgare	fennel	Apiaceae	Naturalized	Moderate
Fraxinus latifolia	Oregon ash	Oleaceae	Native	–
Galium aparine	goose grass	Rubiaceae	Native	–
Heliotropium curassavicum var. *oculatum*	alkali heliotrope	Boraginaceae	Native	–
Helminthotheca echioides	bristly ox-tongue	Asteraceae	Naturalized	Limited
Hirschfeldia incana	shortpod mustard	Brassicaceae	Naturalized	Moderate
Hordeum murinum	wall barley	Poaceae	Naturalized	Moderate
Iris pseudacorus	paleyellow iris	Iridaceae	Naturalized	Limited
Juglans hindsii	northern California black walnut	Juglandaceae	Native	–
Lactuca serriola	prickly lettuce	Asteraceae	Naturalized	–
Lathyrus jepsonii var. *californicus*	California pea	Fabaceae	Native	–
Lepidium didymum	lesser swine cress	Brassicaceae	Naturalized	–
Lepidium latifolium	perennial pepperweed	Brassicaceae	Naturalized	High
Ligustrum sp.	privet	Oleaceae	Naturalized	–
Lotus corniculatus	bird's-foot trefoil	Fabaceae	Naturalized	–
Ludwigia hexapetala	Uruguayan primrose-willow	Onagraceae	Naturalized	High
Malva nicaeensis	bull mallow	Malvaceae	Naturalized	–
Malva parviflora	cheeseweed	Malvaceae	Naturalized	–
Malvella leprosa	alkali-mallow	Malvaceae	Native	–
Marrubium vulgare	horehound	Lamiaceae	Naturalized	Limited

Scientific name	Common name	Family	Native status	Cal-IPC rating[1]
Matricaria chamomilla	german chamomile	Asteraceae	Naturalized	–
Matricaria discoidea	pineapple weed	Asteraceae	Native	–
Matricaria occidentalis	valley mayweed	Asteraceae	Native	–
Medicago sativa	alfalfa	Fabaceae	Naturalized	–
Melaleuca citrina	crimson bottlebrush	Myrtaceae	Naturalized	–
Melilotus albus	white sweetclover	Fabaceae	Naturalized	–
Mirabilis jalapa var. *jalapa*	wishbone bush	Nyctaginaceae	Naturalized	–
Morus alba (cultivated)	white mulberry	Moraceae	Naturalized	–
Nerium oleander	common oleander	Apocynaceae	Naturalized	–
Opuntia sp. (cultivated)	prickly pear	Cactaceae	Naturalized	–
Paspalum dilatatum	dallis grass	Poaceae	Naturalized	–
Persea americana (cultivated)	avocado	Lauraceae	Waif	–
Persicaria hydropiperoides	false waterpepper	Polygonaceae	Native	–
Persicaria maculosa	lady's thumb	Polygonaceae	Naturalized	–
Persicaria punctata	dotted smartweed	Polygonaceae	Native	–
Phalaris minor	little-seeded canary grass	Poaceae	Naturalized	–
Phragmites australis	common reed	Poaceae	Native	–
Phytolacca americana var. *americana*	pokeweed	Phytolaccaceae	Naturalized	Limited
Poa annua	annual blue grass	Poaceae	Naturalized	–
Polygonum aviculare	knotweed	Polygonaceae	Naturalized	–
Polygonum aviculare subsp. *neglectum*	narrowleaf knotweed	Polygonaceae	Waif	–
Polypogon monspeliensis	rabbitfoot grass	Poaceae	Naturalized	Limited
Populus fremontii subsp. *fremontii*	Fremont cottonwood	Salicaceae	Native	–
Portulaca oleracea	purslane	Portulacaceae	Naturalized	–

Scientific name	Common name	Family	Native status	Cal-IPC rating[1]
Potentilla rivalis	river cinquefoil	Rosaceae	Native	–
Prunus sp. (cultivated)	plum	Rosaceae	Naturalized	–
Pseudognaphalium luteoalbum	Jersey cudweed	Asteraceae	Naturalized	–
Raphanus sativus	radish	Brassicaceae	Naturalized	Limited
Rorippa curvisiliqua	curvepod yellowcress	Brassicaceae	Native	–
Rosa californica	California rose	Rosaceae	Native	–
Rubus armeniacus	Himalayan blackberry	Rosaceae	Naturalized	High
Rubus ursinus	California blackberry	Rosaceae	Native	–
Rumex conglomeratus	clustered dock	Polygonaceae	Naturalized	–
Rumex crispus	curly dock	Polygonaceae	Naturalized	Limited
Salix babylonica (cultivated)	weeping willow	Salicaceae	Naturalized	–
Salix gooddingii	Goodding's black willow	Salicaceae	Native	–
Salix laevigata	red willow	Salicaceae	Native	–
Salix lasiolepis	arroyo willow	Salicaceae	Native	–
Salsola tragus	Russian thistle	Chenopodiaceae	Naturalized	Limited
Schoenoplectus acutus var. *occidentalis*	common tule	Cyperaceae	Native	–
Senecio vulgaris	common groundsel	Asteraceae	Naturalized	–
Silybum marianum	blessed milkthistle	Asteraceae	Naturalized	Limited
Solanum americanum	American black nightshade	Solanaceae	Native	–
Sonchus asper subsp. *asper*	prickly sow thistle	Asteraceae	Naturalized	–
Sonchus oleraceus	common sow thistle	Asteraceae	Naturalized	–
Sorghum halepense	Johnson grass	Poaceae	Naturalized	–
Spergularia rubra	red sand-spurrey	Caryophyllaceae	Naturalized	–
Stellaria media	common chickweed	Caryophyllaceae	Naturalized	–
Symphyotrichum lentum	Suisun Marsh aster	Asteraceae	Native	–

Scientific name	Common name	Family	Native status	Cal-IPC rating[1]
Symphyotrichum subulatum	annual saltmarsh aster	Asteraceae	Native	–
Taraxacum officinale	common dandelion	Asteraceae	Naturalized	–
Tribulus terrestris	puncturevine	Zygophyllaceae	Naturalized	Limited
Triticum aestivum	common wheat	Poaceae	Naturalized	–
Typha angustifolia	narrow-leaved cattail	Typhaceae	Native or Naturalized	–
Typha domingensis	southern cattail	Typhaceae	Native	–
Typha latifolia	broad-leaved cattail	Typhaceae	Native	–
Urtica dioica	stinging nettle	Urticaceae	Native	–
Urtica urens	dwarf nettle	Urticaceae	Naturalized	–
Verbena litoralis	seashore vervain	Verbenaceae	Naturalized	–
Veronica peregrina subsp. *xalapensis*	purslane speedwell	Plantaginaceae	Native	–
Vicia villosa subsp. *villosa*	winter vetch	Fabaceae	Naturalized	–
Vitis californica	California wild grape	Vitaceae	Native	–
Washingtonia robusta	Mexican fan palm	Arecaceae	Naturalized	Moderate
Xanthium strumarium	cocklebur	Asteraceae	Native	–
Zantedeschia aethiopica	calla-lily	Araceae	Naturalized	Limited

[1] Cal-IPC ratings:
High Species having severe ecological impacts on physical processes, plant and animal communities, and vegetation structure.
Moderate Species having substantial and apparent—but generally not severe—ecological impacts on physical processes, plant and animal communities, and vegetation structure.
Limited Species having minor ecological impacts on a statewide level of for which there is not enough information to justify a higher score