APPENDIX A

Abridged List of Major Federal and State Laws, Regulations, and Policies Potentially Applicable to the PG&E R-687 L-215 San Joaquin River Crossing Replacement Project

Frequently Used Abbreviations

(see also List of Abbreviations and Acronyms in Table of Contents)

§	Section
AB	Assembly Bill
Cal. Code Regs.	California Code of Regulations
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CO_2; CO_2e	Carbon Dioxide; Carbon Dioxide Equivalent
CSLC	California State Lands Commission
EO	Executive Order
Fed. Reg.	Federal Register
GHG	Greenhouse Gas
MOU	Memorandum of Understanding
NMFS	National Marine Fisheries Service
NOx	Nitrogen Oxide
NPDES	National Pollutant Discharge Elimination System
P.L.	Public Law
Pub. Resources Code	Public Resources Code
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SWRCB	State Water Resources Control Board
U.S.C.	United States Code
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service

APPENDIX A

Appendix A identifies major federal and state laws, regulations and policies (local or regional are presented in each issue area chapter) potentially applicable to the PG&E R-687 L-215 San Joaquin River Crossing Replacement Project.[1]

MULTIPLE ENVIRONMENTAL ISSUES

Multiple Environmental Issues (State)
California Environmental Quality Act (CEQA; Pub. Resources Code, § 21000 et seq.)
CEQA requires state and local agencies to identify significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible. A public agency must comply with CEQA when it undertakes an activity defined by CEQA as a "project" that must receive some discretionary approval (i.e., the agency has authority to deny the requested permit or approval) which may cause either a direct physical change, or a reasonably foreseeable indirect change, in the environment.
California State Lands Commission (CSLC) and the Common Law Public Trust
The CSLC has jurisdiction and management authority over all ungranted tidelands, submerged lands, and the beds of navigable lakes and waterways, as well as certain residual and review authority for tidelands and submerged lands legislatively granted in trust to local jurisdictions (Pub. Resources Code, §§ 6301, 6306). All tidelands and submerged lands, granted or ungranted, as well as navigable lakes and waterways, are subject to the protections of the Common Law Public Trust. As general background, the State of California acquired sovereign ownership of all tidelands and submerged lands and beds of navigable lakes and waterways upon its admission to the U.S. in 1850. The State holds these lands for the benefit of all people of the State for statewide Public Trust purposes, which include but are not limited to waterborne commerce, navigation, fisheries, water-related recreation, habitat preservation, and open space. On tidal waterways, the State's sovereign fee ownership extends landward to the ordinary high-water mark as generally shown by the mean high tide line, except for areas of fill or artificial accretion. The CSLC’s jurisdiction also includes a section of tidal and submerged land 3 nautical miles wide adjacent to the coast and offshore islands, including bays, estuaries, and lagoons; the waters and underlying beds of more than 120 rivers, lakes, streams, and sloughs; and 1.3 million acres of “school lands" granted to the State by the Federal government to support public education. The CSLC also has leasing jurisdiction, subject to certain conditions, over mineral extraction from State property owned and managed by other State agencies (Pub. Resources Code, § 68910, subd. (b)), and is responsible for implementing a variety of State regulations for activities affecting these State Trust Lands, including implementation of CEQA.

[1] Environmental issue areas are found in State California Environmental Quality Act Guidelines Appendix G (https://www.opr.ca.gov/docs/Appendix_G_AB_52_Update_2016.pdf).

AESTHETICS

There are no major federal laws, regulations, and policies potentially applicable to this project

Aesthetics (State)
California Scenic Highway Program (Sts. & Hy. Code, § 260 et seq.) The purpose of California's Scenic Highway Program, which was created by the Legislature in 1963 and is managed by the California Department of Transportation (Caltrans), is to preserve and protect scenic highway corridors from change which would diminish the aesthetic value of lands adjacent to highways. State highways identified as scenic, or eligible for designation, are listed in Streets and Highways Code section 260 et seq. A highway's status changes from eligible to officially designated when a local governmental agency has implemented a corridor protection program for an eligible highway that meets the standards of an official scenic highway (Caltrans 2008).

AGRICULTURE AND FORESTRY RESOURCES

There are no major federal laws, regulations, and policies potentially applicable to this project

Agriculture and Forestry Resources (State)
Williamson Act (Gov. Code, §§ 51200-51207) The California Land Conservation Act of 1965 (Gov. Code, § 51200, et seq.), also known as the Williamson Act, protects farmland from conversion to other uses by offering owners of agricultural land a property tax incentive to maintain their land in agricultural use. Under the Williamson Act, the landowner contracts with the county (or city) in which their property is located, promising to maintain the land in agricultural or a compatible use for a minimum period of 10 years. In return, the property tax on the land is based on its productive value rather than its assessed value. A Williamson Act contract automatically self-renews each year so that it is always 10 years in duration. Enrollment in a Williamson Act contract is completely voluntary. Williamson Act participation can help to insulate agricultural land from increases in property taxes linked to improvements. The Williamson Act and Farmland Security Zone Act programs are administered locally. Stanislaus County is a party to and enforces the contracts on lands within its unincorporated area. The California Department of Conservation has a limited oversight role that focuses primarily on the cancellation of contracts. In 2015, the County reported that it held 575,549 acres of land under Williamson Act contracts and 156 acres of land under an ACE.
Farmland Security Zone Act (Gov. Code § 51296, et seq.) This Act works similarly to the Williamson Act; however, it applies to contracted land for a term of no less than 20 years. Separate from the Williamson Act, landowners may voluntarily enter into a form of deed restriction known as an Agricultural Conservation Easement (ACE) that effectively removes in perpetuity the land's potential for development. ACEs are held by either land trusts or local governments. Those entities are responsible for ensuring that the terms of the easement are upheld. The landowner can donate the easement to the easement holder, sell it to them at a mutually agreeable price, or a combination of the two.
Farmland Mapping and Monitoring Program The Farmland Mapping and Monitoring Program (FMMP) is a non-regulatory program of the California Department of Conservation that inventories the state's important farmlands and tracks the conversion of farmland to other land uses. The FMMP publishes reports of mapped farmland and conversions every 2 years. The FMMP categorizes farmland according to its soil quality, availability of irrigation water, current use, slope, and other criteria. The categories of

Agriculture and Forestry Resources (State)

farmland identified in the FMMP are listed below. The FMMP considers the following categories to be Important Farmland:

- Prime Farmland: farmland with the best combination of physical and chemical features and able to sustain long-term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for irrigated agricultural production at some time during the 4 years prior to the mapping date.
- Farmland of Statewide Importance: farmland similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture. Land must have been used for irrigated agricultural production at some time during the 4 years prior to the mapping date.
- Unique Farmland: farmland with lesser quality soils but still useful for the production of the state's leading agricultural crops. This land is usually irrigated but may include the non-irrigated orchards or vineyards found in some climatic zones of California. Land must have been cropped at some time during the 4 years prior to the mapping date.
- Farmland of Local Importance: land of importance to the local agricultural economy, as determined by each county's board of supervisors and a local advisory committee.

AIR QUALITY

Air Quality (Federal)

Federal Clean Air Act (FCAA) (42 U.S.C. § 7401 et seq.)

The FCAA requires the USEPA to identify National Ambient Air Quality Standards (NAAQS) to protect public health and welfare. National standards are established for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter (PM10 and PM2.5), and lead. The FCAA mandates that states submit and implement a State Implementation Plan (SIP) for local areas not meeting those standards; plans must include pollution control measures that demonstrate how the standards would be met. Pursuant to the 1990 FCAA amendments, the USEPA also regulates hazardous air pollutants (HAPs), which are pollutants that result in harmful health effects, but are not specifically addressed through the establishment of NAAQS. HAPs require the use of the maximum or best available control technology to limit emissions. USEPA classifies air basins (or portions thereof) as in "attainment" or "nonattainment" for each criteria air pollutant by comparing monitoring data with State and Federal standards to determine if the NAAQS are achieved. Areas are classified for a pollutant as follows:

- "Attainment" – the pollutant concentration is lower than the standard.
- "Nonattainment" – the pollutant concentration exceeds the standard.
- "Unclassified" – there are not enough data available for comparisons.

In 2007, the U.S. Supreme Court ruled that carbon dioxide (CO_2) is an air pollutant as defined under the FCAA, and that the USEPA has authority to regulate greenhouse gas (GHG) emissions.

The FCAA allows delegation of the enforcement of many of the federal air quality regulations to the states. In California, the California Air Resources Board (CARB) is responsible for enforcing air pollution regulations in concert with regional air pollution control districts.

Marine Diesel Engine Emission Standards.

In March 2008, the USEPA adopted more stringent emission standards for locomotives and marine compression-ignition engines (73 Fed.Reg. 37096 (USEPA 2008a)). To reduce emissions from Category 1 (at least 50 horsepower [hp] but less than 7 liters per cylinder displacement) and Category 2 (7 to 30 liters per cylinder displacement) marine diesel engines,

Air Quality (Federal)
the USEPA has established emission standards for new engines, referred to as Tier 2 marine engine standards. The Tier 2 standards were phased in from 2004 to 2007 (year of manufacture), depending on the engine size (USEPA 1999). The 2008 final rule includes the first-ever national emission standards for existing marine diesel engines, applying to engines larger than 600 kilowatts (kW) when they are remanufactured. The rule also sets Tier 3 emissions standards for newly built engines that began implementation phase-in in 2009. Finally, the rule establishes Tier 4 standards for newly built commercial marine diesel engines above 600 kW, based on the application of high-efficiency catalytic after-treatment technology that began implementation in 2014. The new diesel marine engine standards will reduce emissions of diesel particulate matter by 90 percent and emissions of NOx by 80 percent for engines meeting Tier 4 standards, in comparison with engines meeting the current Tier 2 standards. The USEPA's three-part program: (1) tightened standards for existing marine diesel engines when they are remanufactured, taking effect as certified remanufacture systems are available starting in 2008; (2) sets near-term emission standards, referred to as Tier 3 standards, for newly built locomotive and diesel marine engines, which reflect the application of currently available technologies to reduce engine-out PM and NOx emissions and phase-in starting in 2009; and (3) applies the final long-term Tier 4 emissions standards to marine diesel engines. These standards are based on the application of high-efficiency catalytic after-treatment technology and would be phased in beginning in 2014 for marine diesel engines. These marine Tier 4 engine standards apply only to commercial marine diesel engines above 600 kW (800 hp) (USEPA 2008b).
Non-Road Diesel Engine Emission Standards. The USEPA has established a series of cleaner emission standards for new off-road diesel engines culminating in the Tier 4 Final Rule of June 2004 (USEPA 2004a). The Tier 1, Tier 2, Tier 3, and Tier 4 standards require compliance with progressively more stringent emission standards. Tier 1 standards were phased in from 1996 to 2000 (year of manufacture), depending on the engine horsepower category. Tier 2 standards were phased in from 2001 to 2006, and the Tier 3 standards were phased in from 2006 to 2008. The Tier 4 standards complement the latest 2007 and later on-road heavy-duty engine standards by requiring 90 percent reductions in diesel particulate matter and NOx when compared against current emission levels. The Tier 4 standards were phased in starting with smaller engines in 2008 until all but the very largest diesel engines were to meet NOx and particulate matter (PM) standards in 2015.
On-Road Trucks Emission Standards. To reduce emissions from on-road, heavy-duty diesel trucks, the USEPA established a series of cleaner emission standards for new engines, starting in 1988. These emission standards regulations have been revised over time. The latest effective regulation, the 2007 Heavy-Duty Highway Rule, provides for reductions in PM, NOx, and non-methane hydrocarbon emissions that were phased in during the model years 2007 through 2010 (USEPA 2000).

Air Quality (State)

California Clean Air Act of 1988 (CCAA)

The CCAA requires all air districts in the State to endeavor to achieve and maintain State ambient air quality standards for ozone, carbon monoxide, sulfur dioxide, nitrogen dioxide, and particulate matter. CARB sets air quality standards for the State at levels to protect public health and welfare with an adequate margin of safety. The California Ambient Air Quality Standards (CAAQS) are generally stricter than national standards for the same pollutants; California also has standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. The CAAQS describe adverse conditions (i.e., pollution levels must be below these standards before a basin can attain the standard). Air quality is considered in "attainment" if pollutant levels are continuously below or equal to the standards and violate the standards no more than once each year. The 1992 CCAA Amendments divide ozone nonattainment areas into four categories of pollutant levels (moderate, serious, severe, and extreme) to which progressively more stringent requirements apply. CARB also regulates toxic air contaminants (pollutants that result in harmful health effects, but are not specifically addressed by air quality standards) using air toxic control measures.

California Air Resources Board Programs, Regulations, and Standards

- **California Diesel Fuel Regulations** (Cal. Code Regs., tit. 13, §§ 2281-2285; Cal. Code Regs., tit. 17, § 93114). In 2004, the CARB set limits on the sulfur content of diesel fuel sold in California for use in on-road and off-road motor vehicles. Harbor craft and intrastate locomotives were later included by a 2004 rule amendment (CARB 2005a). Under this rule, diesel fuel used in motor vehicles except harbor craft and intrastate locomotives has been limited to 500 ppm sulfur since 1993. The sulfur limit was reduced to 15 ppm beginning on September 1, 2006. Diesel fuel used in harbor craft in the SCAB also was limited to 500 ppm sulfur starting January 1, 2006, and was lowered to 15 ppm sulfur on September 1, 2006. Diesel fuel used in intrastate locomotives (switch locomotives) was limited to 15 ppm sulfur starting on January 1, 2007.
- **California Diesel Risk Reduction Plan.** CARB has adopted several regulations that are meant to reduce the health risk associated with on- and off-road and stationary diesel engine operation. This plan recommends many control measures with the goal of an 85 percent reduction in diesel particulate matter emissions by 2020. The regulations noted below, which may also serve to significantly reduce other pollutant emissions, are all part of this risk reduction plan.
- **Commercial Harbor Craft Regulation** requires upgrades to Tier 2 or Tier 3 standards to reduce diesel particulate matter and NOx emissions from diesel engines used on commercial harbor craft (e.g., tugboats, crew and supply vessels, work boats, barges, dredges) operated in California Regulated Waters (internal waters, estuarine waters, ports and coastal waters within 24 nautical miles of the coast)
- **Emission Standards for On-Road and Off-Road Diesel Engines.** Similar to the USEPA for on-road and off-road emissions described above, the CARB has established emission standards for new on-road and off-road diesel engines. These regulations have model year based emissions standards for NOx, hydrocarbons, CO, and PM.
- **Heavy Duty Diesel Truck Idling Rule – Heavy Duty Diesel Truck Idling Regulation.** This CARB rule became effective February 1, 2005, and prohibits heavy-duty diesel trucks from idling for longer than 5 minutes at a time, unless they are queuing and provided the queue is located beyond 100 feet from any homes or schools (CARB 2006).
- **In-Use Off-Road Vehicle Regulation** (Cal. Code Regs., tit. 13, § 2449). The State has also enacted a regulation to reduce diesel particulate matter and criteria pollutant emissions from in-use off-road diesel-fueled vehicles. This regulation provides target emission rates for PM and NOx emissions from owners of fleets of diesel-fueled off-road vehicles, and applies to off-road equipment fleets of three specific sizes, as follows:

Air Quality (State)

- Small Fleet – Fleet or municipality with equipment totaling less than or equal to 2,500 hp, or municipal fleet in lower population area, captive attainment fleet, or non-profit training center regardless of horsepower.
- Medium Fleet – Fleet with equipment totaling 2,501 to 5,000 hp.
- Large Fleet – Fleet with equipment totaling more than 5,000 hp, or all State and federal government fleets regardless of total hp.

The target emission rates for these fleets are reduced over time. Specific regulation requirements:

- Limit on idling, requiring a written idling policy, and disclosure when selling vehicles;
- Require all vehicles to be reported to CARB (using the Diesel Off-Road Online Reporting System, DOORS) and labeled;
- Restrict the adding of older vehicles into fleets starting on January 1, 2014; and
- Require fleets to reduce their emissions by retiring, replacing, or repowering older engines, or installing Verified Diesel Emission Control Strategies (i.e., exhaust retrofits). (CARB 2014)

- **Off-Road Mobile Sources Emission Reduction Program.** The CCAA mandates that CARB achieve the maximum degree of emission reductions from all off-road mobile sources (e.g., construction equipment, marine vessels, and harbor craft) to attain state ambient air quality standards. Tier 2, Tier 3, and Tier 4 exhaust emissions standards apply to off-road equipment. In addition, CARB fleet requirements specify how equipment that is already in use can be retrofitted to achieve lower emissions using the CARB-verified retrofit technologies. U.S. Environmental Protection Agency (USEPA) standards for marine compression-ignition engines address NOx and diesel particulate matter emissions, depending on engine size and year of manufacture. Tier 2 standards for marine engines were phased in for model years 2004 to 2007, and Tier 3 standards were phased in for currently available technologies to reduce NOx and PM, starting in 2009.
- **Statewide Portable Equipment Registration Program (PERP)**. The PERP establishes a uniform program to regulate portable engines and portable engine-driven equipment units (CARB 2005b). Once registered in the PERP, engines and equipment units may operate throughout California without the need to obtain individual permits from local air districts, if the equipment is located at a single location for no more than 12 months.

Health and Safety Code

- **Sections 25531-25543** set forth changes in four areas: (1) provides guidelines to identify a more realistic health risk; (2) requires high-risk facilities to submit an air toxic emission reduction plan; (3) holds air pollution control districts accountable for ensuring that plans achieve objectives; and (4) requires high-risk facilities to achieve their planned emission reductions
- **The Air Toxics Hot Spots Information and Assessment Act (§ 44300 et seq.)** provides for the regulation of over 200 toxic air contaminants. Under the act, local air districts may request that a facility account for its toxic air contaminant emissions. Local air districts then prioritize facilities based on emissions; high priority designated facilities must submit a health risk assessment.

BIOLOGICAL RESOURCES

Biological Resources (Federal)

Federal Endangered Species Act (FESA) (7 U.S.C. § 136, 16 U.S.C. § 1531 et seq.)

The FESA, which is administered in California by the USFWS and National Marine Fisheries Service (NMFS), provides protection to species listed as threatened or endangered, or proposed for listing as threatened or endangered. When applicants propose projects with a federal nexus that "may affect" a federally listed or proposed species, the federal agency must (1) consult with the USFWS or NMFS, as appropriate, under Section 7, and (2) ensure that any actions authorized, funded, or carried out by the agency are not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of areas determined to be critical habitat. Section 9 prohibits the "take" of any member of a listed species.

- **Take –** To harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct
- **Harass –** An intentional or negligent act or omission that creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavior patterns that include, but are not limited to, breeding, feeding, or sheltering
- **Harm –** Significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering

Fish and Wildlife Coordination Act of 1958

This Act requires that whenever a body of water is proposed to be controlled or modified, the lead agency must consult with the state and federal agencies responsible for fish and wildlife management (e.g., USFWS, CDFW, and National Oceanic and Atmospheric Administration). The Act allows for recommendations addressing adverse impacts associated with a proposed project, and for mitigating or compensating for impacts on fish and wildlife.

Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. § 1801 et seq.)

The MSA governs marine fisheries management in Federal waters. The MSA was first enacted in 1976 and amended by the Sustainable Fisheries Act of 1996 and the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act in 2007. Amendments require the identification of Essential Fish Habitat (EFH) for federally managed species and the implementation of measures to conserve and enhance this habitat. Any project requiring Federal authorization, such as a U.S. Army Corps of Engineers permit, is required to complete and submit an EFH Assessment with the application and either show that no significant impacts to the essential habitat of managed species are expected or identify mitigations to reduce those impacts. Under the MSA, Congress defined EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 U.S.C. § 1802(10)). The EFH provisions of the MSA offer resource managers a means to heighten consideration of fish habitat in resource management. Federal agencies shall consult with the NMFS regarding any action they authorize, fund, or undertake that might adversely affect EFH (§ 305(b)(2)).

Migratory Bird Treaty Act (MBTA) (16 U.S.C. §§ 703-712)

The MBTA prohibits the take, possession, import, export, transport, selling, purchase, barter, or offering for sale, purchase, or barter, of any migratory bird, their eggs, parts, and nests, except as authorized under a valid permit (50 CFR 21.11). The USFWS issues permits for take of migratory birds for activities such as scientific research, education, and depredation control, but does not issue permits for incidental take of migratory birds.

National Invasive Species Act (NISA) (33 CFR, Part 151, Subpart D)

NISA was originally passed in 1990 as the Nonindigenous Aquatic Nuisance Prevention and Control Act (16 U.S.C. §§ 4701-4751) and reauthorized, renamed and expanded in 1996.

Biological Resources (Federal)

Under its provisions, the U.S. Coast Guard requires ballast water management (i.e., exchange) for vessels entering U.S. waters from outside the 200-nautical-mile U.S. Exclusive Economic Zone. The original Act was established to: (1) prevent unintentional introduction and dispersal of nonindigenous species into Waters of the U.S. through ballast water management and other requirements; (2) coordinate and disseminate information on federally conducted, funded, or authorized research, on the prevention and control of the zebra mussel and other aquatic nuisance species; (3) develop and carry out control methods to prevent, monitor, and control unintentional introductions of nonindigenous species from pathways other than ballast water exchange; (4) understand and minimize economic and ecological impacts of established nonindigenous aquatic nuisance species; and (5) establish a program of research and technology development and assistance to states in the management and removal of zebra mussels.

Executive Orders (EO)

- **EO 11990** requires federal agencies to provide leadership and take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands. Each agency, to the extent permitted by law, must (1) avoid undertaking or providing assistance for new construction located in wetlands unless the head of the agency finds there is no practical alternative to such construction or the proposed action includes all practical measures to minimize harm to wetlands that may result from such use; (2) take into account economic, environmental and other pertinent factors in making this finding; and (3) provide opportunity for early public review of any plans or proposals for new construction in wetlands.
- **EO 13112** requires federal agencies to use authorities to prevent introduction of invasive species, respond to and control invasions, and provide for restoration of native species and habitat conditions in invaded ecosystems; also established the Invasive Species Council, which prepares a National Invasive Species Management Plan that details and recommends performance-oriented goals and objectives and measures of success for federal agencies
- **EO 13158** requires federal agencies to (1) identify actions that affect natural or cultural resources that are within an MPA; and (2) in taking such actions, to avoid harm to the natural and cultural resources that are protected by an MPA.
- **EO 13186** sets forth responsibilities of federal agencies to protect migratory birds.

Other

- **Bald and Golden Eagle Protection Act** makes it illegal to import, export, take, sell, purchase or barter any bald eagle or golden eagle or parts thereof.
- **Clean Water Act and Rivers and Harbors Act** (*see Hydrology and Water Quality section*)

Biological Resources (State)

California Endangered Species Act (CESA) (Fish & G. Code, § 2050 et seq.)

The CESA provides for the protection of rare, threatened, and endangered plants and animals, as recognized by the CDFW, and prohibits the taking of such species without its authorization. Furthermore, the CESA provides protection for those species that are designated as candidates for threatened or endangered listings. Under the CESA, the CDFW has the responsibility for maintaining a list of threatened species and endangered species (Fish & G. Code, § 2070). The CDFW also maintains a list of candidate species, which are species that the CDFW has formally noticed as under review for addition to the threatened or endangered species lists. The CDFW also maintains lists of Species of Special Concern that serve as watch lists. Pursuant to CESA requirements, an agency reviewing a proposed project within its jurisdiction must determine whether any State-listed endangered or threatened species may be

Biological Resources (State)

present in the project site and determine whether the proposed project will have a significant impact on such species. The CDFW encourages informal consultation on any proposed project that may affect a candidate species. The CESA also requires a permit to take a State-listed species through incidental or otherwise lawful activities (§ 2081, subd. (b))

Lake and Streambed Alteration Program (Fish & G. Code, §§ 1600-1616)

These regulations require that the CDFW: be notified of activities that would interfere with the natural flow of, or substantially alter, the channel, bed, or bank of a lake, river, or stream; determines if the activity may substantially adversely affect an existing fish and wildlife resource; and issue a Streambed Alteration Agreement if applicable.

Other relevant California Fish and Game Code sections and Programs/Plans

- **Section 1900 et seq.** (California Native Plant Protection Act) is intended to preserve, protect, and enhance endangered or rare native plants in California. Under section 1901, a species is endangered when its prospects for survival and reproduction are in immediate jeopardy from one or more causes. A species is rare when, although not threatened with immediate extinction, it is in such small numbers throughout its range that it may become endangered. The Act includes provisions that prohibit taking of listed rare or endangered plants from the wild and a salvage requirement for landowners.
- **Sections 3503 & 3503.5** prohibit take and possession of native birds' nests and eggs from all forms of needless take and provide that it is unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) or to take, possess, or destroy the nests or eggs of any such bird except as otherwise provided by this Code or any regulation adopted pursuant thereto.
- **Sections 3511** (birds), **4700** (mammals), **5050** (reptiles and amphibians), & **5515** (fish) designate certain species as "fully protected;" such species, or parts thereof, may not be taken or possessed at any time without permission by the CDFW.
- **Section 3513** does not include statutory or regulatory mechanism for obtaining an incidental take permit for the loss of non-game, migratory birds.
- **California Aquatic Invasive Species Management Plan** provides a framework for agency coordination and identifies actions to minimize harmful effects of aquatic invasive species.

Other

- California Department of Food and Agriculture's California Noxious and Invasive Weed Action Plan seeks to prevent and control noxious and invasive weeds.
- Lempert-Keene-Seastrand Oil Spill Prevention and Response Act (*see Hazards and Hazardous Materials section*)
- **McAteer-Petris Act** (see Multiple Environmental Issues)
- **Wetlands Conservation Policy** – no net loss of wetland acreage; long-term gain in the quantity, quality, and permanence of California's wetlands.

CULTURAL RESOURCES

Cultural Resources (Federal)

Archaeological and Historic Preservation Act (AHPA)

The AHPA provides for the preservation of historical and archaeological data that might be irreparably lost or destroyed as a result of (1) flooding, the building of access roads, the erection of workmen's communities, the relocation of railroads and highways, and other alterations of terrain caused by the construction of a dam by an agency of the U.S. or by any private person or corporation holding a license issued by any such agency; or (2) any alteration of the terrain caused as a result of a federal construction project or federally licensed project, activity, or program. This Act requires federal agencies to notify the Secretary of the Interior when they find that any federally permitted activity or program may cause irreparable loss or destruction of significant scientific, prehistoric, historical, or archaeological data. The AHPA built upon national policy, set out in the Historic Sites Act of 1935, "...to provide for the preservation of historic American sites, buildings, objects, and antiquities of national significance...."

Archaeological Resources Protection Act of 1979 (ARPA) (P.L. 96-95; 93 Stat. 712)

The ARPA states that archaeological resources on public or Indian lands are an accessible and irreplaceable part of the nation's heritage and:

- Establishes protection for archaeological resources to prevent loss and destruction due to uncontrolled excavations and pillaging;
- Encourages increased cooperation and exchange of information between government authorities, the professional archaeological community, and private individuals having collections of archaeological resources prior to the enactment of this Act;
- Establishes permit procedures to permit excavation or removal of archaeological resources (and associated activities) located on public or Indian land; and
- Defines excavation, removal, damage, or other alteration or defacing of archaeological resources as a "prohibited act" and provides for criminal and monetary rewards to be paid to individuals furnishing information leading to the finding of a civil violation or conviction of a criminal violator.

An anti-trafficking provision prohibits interstate or international sale, purchase, or transport of any archaeological resource excavated or removed in violation of a state or local law, ordinance, or regulation. ARPA's enforcement provision provides for criminal and civil penalties against violators of the Act. The ARPA's permitting component allows for recovery of certain artifacts consistent with NPS Federal Archeology Program standards and requirements.

National Historic Preservation Act of 1966 (NHPA) (16 U.S.C. § 470 et seq.) and implementing regulations (Protection of Historic Properties; 36 CFR 800) (applies only to federal undertakings)

Archaeological resources are protected through the NHPA and its implementing regulation (Protection of Historic Properties; 36 CFR 800), the AHPA, and the ARPA. This Act presents a general policy of supporting and encouraging the preservation of prehistoric and historic resources for present and future generations by directing federal agencies to assume responsibility for considering the historic resources in their activities. The State implements the NHPA through its statewide comprehensive cultural resource surveys and preservation programs coordinated by the California Office of Historic Preservation (OHP) in the State Department of Parks and Recreation, which also advises federal agencies regarding potential effects on historic properties.

The OHP also maintains the California Historic Resources Inventory. The State Historic Preservation Officer (SHPO) is an appointed official who implements historic preservation programs within the State's jurisdictions, including commenting on Federal undertakings. Under

Cultural Resources (Federal)

the NHPA, historic properties include "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places" (16 U.S.C. § 470w [5]).

Executive Order (EO) 13158

EO 13158 requires federal agencies to (1) identify actions that affect natural or cultural resources that are within an MPA; and (2) in taking such actions, to avoid harm to the natural and cultural resources that are protected by an MPA.

Cultural Resources (State)

California Register of Historical Resources (CRHR)

The CRHR is "an authoritative listing and guide to be used by state and local agencies, private groups, and citizens in identifying the existing historical resources of the State and to indicate which resources deserve to be protected, to the extent prudent and feasible, from substantial adverse change" (Pub. Resources Code, § 5024.1, subd. (a)). CRHR eligibility criteria are modeled after National Register of Historic Places (NRHP) criteria but focus on resources of statewide significance. Certain resources are determined by the statute to be automatically included in the CRHR, including California properties formally determined to be eligible for, or listed in, the NRHP. To be eligible for the CRHR, a prehistoric or historical period property must be significant at the local, state, or federal level under one or more of the following criteria (State CEQA Guidelines, § 15064.5, subd. (a)(3)):

- Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage
- Is associated with the lives of persons important in California's past
- Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values
- Has yielded, or may be likely to yield, information important in prehistory or history

A resource eligible for the CRHR must meet one of the criteria of significance above, and retain enough of its historic character or appearance (integrity) to be recognizable as an historical resource and to convey the reason for its significance. An historic resource that may not retain sufficient integrity to meet the criteria for listing in the NRHP, may still be eligible for listing in the CRHR. Properties listed, or formally designated as eligible for listing, on the National Register are automatically listed on the CRHR, as are certain State Landmarks and Points of Interest. A lead agency is not precluded from determining that the resource may be an historical resource as defined in Public Resources Code sections 5020.1, subdivision (j), or 5024.1 (State CEQA Guidelines, § 15064.5, subd. (a)(4)).

CEQA (Pub. Resources Code, § 21000 et seq.)

CEQA section 21084.1 provides that a project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment. An "historical resource" includes: (1) a resource listed in, or eligible for listing in, the California Register of Historic Resources; (2) a resource included in a local register of historical or identified as significant in an historical resource surveys; and (3) any resource that a lead agency determines to be historically significant for the purposes of CEQA, when supported by substantial evidence in light of the whole record. Historical resources may include archaeological resources. Mitigation measures for significant impacts to historical resources must be identified and implemented if feasible.

CULTURAL RESOURCES – TRIBAL

Tribal Cultural Resources (Federal)
Native American Graves Protection and Repatriation Act of 1990 (P.L. 101-601; 104 Stat. 3049) • Assigns ownership or control of Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony that are excavated or discovered on federal lands or tribal lands after passage of the act to lineal descendants or affiliated Indian tribes or Native Hawaiian organizations; establishes criminal penalties for trafficking in human remains or cultural objects; requires federal agencies and museums that receive federal funding to inventory Native American human remains and associated funerary objects in their possession or control and identify their cultural and geographical affiliations within 5 years, and prepare summaries of information about Native American unassociated funerary objects, sacred objects, or objects of cultural patrimony. This is to provide for repatriation of such items when lineal descendants, Indian tribes, or Native Hawaiian organizations request it.
Executive Order (EO) 13007, Indian Sacred Sites EO 13007 requires federal agencies with administrative or legal responsibility to manage federal lands to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and avoid adversely affecting the physical integrity of such sites (to the extent practicable permitted by law and not clearly inconsistent with essential agency functions)

Tribal Cultural Resources (State)
CEQA (Pub. Resources Code, §§ 21073, 21074, 21080.3.1, 21080.3.2, 21082.3, 21083.09, 21084.2, and 21084.3) [AB 52 (Gatto, Stats. 2014, ch. 532)] The AB 52 (effective July 1, 2015) amendments to CEQA relate to consultation with California Native American tribes, consideration of tribal cultural resources, and confidentiality. The definition of tribal cultural resources considers tribal cultural values in addition to scientific and archaeological values when determining impacts and mitigation. AB 52 provides procedural and substantive requirements for lead agency consultation with California Native American tribes and consideration of effects on tribal cultural resources, as well as examples of mitigation measures to avoid or minimize impacts to tribal cultural resources. AB 52 establishes that if a project may cause a substantial adverse change in the significance of a tribal cultural resource, that project may have a significant effect on the environment. Lead agencies must avoid damaging effects to tribal cultural resources, when feasible, and shall keep information submitted by tribes confidential.
Health and Safety Code section 7050.5 This section provides for treatment of human remains exposed during construction; no further disturbance may occur until the County Coroner makes findings as to origin and disposition pursuant to Public Resources Code section 5097.98. The Coroner has 24 hours to notify the Native American Heritage Commission (NAHC) if the remains are determined to be of Native American descent. The NAHC contacts most likely descendants about how to proceed.
Public Resources Code section 5097.98 This section provides (1) a protocol for notifying the most likely descendent from the deceased if human remains are determined to be Native American in origin and (2) mandated measures for appropriate treatment and disposition of exhumed remains.

Tribal Cultural Resources (State)

Executive Order B-10-11

EO B-10-11 establishes as state policy that all agencies and departments shall encourage communication and consultation with California Indian Tribes and allow tribal governments to provide meaningful input into proposed decisions and policies that may affect tribal communities.

ENERGY

There are no major federal laws, regulations, and policies potentially applicable to this project.

Energy (State)

Legislative Requirements for Energy Efficiency Savings

In response to the energy crisis of 2000-2001, the Energy Commission, the California Public Utilities Commission (CPUC), and the California Power Authority developed "the loading order" as a joint policy vision articulated in the Energy Action Plan. The state would invest in:

1.cost-effective energy efficiency and demand-side resources

2.renewable resources and

3.clean conventional electricity supply

The CPUC adopts energy efficiency goals, conducts various potential studies, and performs evaluation, measurement and verification (EM&V) for investor owned utilities (IOUs). Publicly owned utilities (POUs) are not regulated by the CPUC and are not subject to the same energy efficiency mandates as the IOUs. California Code of Regulations, title 20, § 1311 requires each POU to report to the Energy Commission its annual investments in energy efficiency and demand reduction programs. Public Utilities Code §9505(d) requires each POU to provide to its customers and the Energy Commission the results of evaluation that measures and verifies their claimed energy savings and demand reduction. Since the early 1990s, the Energy Policy Act requires POUs to file Integrated Resource Plans (IRP) every five years with annual progress reports to the Western Area Power Administration (WAPA). In the IRP, each POU is required to evaluate energy efficiency as an energy supply alternative.

Senate Bill 1037 (Kehoe, Stats. 2005, ch. 366) requires the CPUC, in consultation with the Energy Commission, to identify all potentially achievable cost-effective electric and natural gas energy efficiency measures for the IOUs, set targets for achieving this potential, review the energy procurement plans of IOUs, and consider cost-effective supply alternatives such as energy efficiency. In addition to these IOU requirements, SB 1037 requires that all POUs, regardless of size, report investments in energy efficiency programs annually to their customers and to the Energy Commission.

Assembly Bill 2021 (Levine, Stats. 2006, ch. 734) requires the Energy Commission to develop statewide energy efficiency potential estimates and savings targets. AB 2021 mandates the Energy Commission to report statewide energy efficiency potential estimates and savings targets as part of its Integrated Energy Policy Report (IEPR) proceeding.

Senate Bill 488 (Pavley, Stats. 2009, ch.352) requires the Energy Commission to evaluate the effectiveness of POU "comparative energy usage disclosure programs" and include POU

Energy (State)

energy savings potential in the triennial assessment of utility energy efficiency potential and targets.

Assembly Bill 2227 (Bradford, Stats. 2012, ch. 606) consolidates reporting requirements into a single section of the Public Utilities Code, making compliance easier and more cost-effective for POUs, and amends the reporting timeline under AB 2021 to align more closely with the IEPR timeline. Rather than providing new 10-year targets every third year, POUs will provide updated targets every fourth year.

GEOLOGY, SOILS, AND PALEONTOLOGICAL RESOURCES

Geology and Soils (Federal/International)

Building Codes

The **Uniform Building Code** designates and ranks regions of the U.S., according to their seismic hazard potential, as Seismic Zones 1 through 4, with Zone 1 having the least seismic potential and Zone 4 having the highest seismic potential. The **International Building Code** sets design standards to accommodate a maximum considered earthquake (MCE), based on a project's regional location, site characteristics, and other factors.

Paleontological Resources Preservation Act (16 U.S.C. § 470)

Enacted to preserve paleontological resources for current and future generations on federal lands under the jurisdiction of the National Park Service, Bureau of Land Management, Bureau of Reclamation, and USFWS, this Act identifies management requirements, collection requirements, curation requirements, authorizes criminal and civil penalties, rewards and forfeiture.

Omnibus Public Land Management Act of 2009 - Public Law 111-11 (123 Stat. 991)

Public Law 111-011 at Title VI, subtitle D lays out statutory requirements for Paleontological Resources Preservation (PRP). PRP provides definitions but requires the definition of some terms, and uses other terms and concepts that need further definition or details to clarify intent or enforcement. PRP identifies management requirements, collection requirements, curation requirements, need for both criminal and civil penalties, rewards and forfeiture, and the need for confidentiality of some significant resource locations.

Other

- **Public Resources Code section 5097.5** prohibits excavation or removal of any "vertebrate paleontological site or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands"
- **Penal Code section 623** provides for the protection of caves, including their natural, cultural, and paleontological contents. It specifies that no "material" (including all or any part of any paleontological item) will be removed from any natural geologically formed cavity or cave

Geology and Soils (State)

Alquist-Priolo Earthquake Fault Zoning Act (Pub. Resources Code, §§ 2621-2630)

This Act requires that "sufficiently active" and "well-defined" earthquake fault zones be delineated by the State Geologist and prohibits locating structures for human occupancy on active and potentially active surface faults. (Note that since only those potentially active faults that have a relatively high potential for ground rupture are identified as fault zones, not all potentially active faults are zoned under the Alquist-Priolo Earthquake Fault Zone, as designated by the State of California.)

Geology and Soils (State)
California Building Code (Cal. Code Regs., tit. 23) The California Building Code provides a minimum standard for building design, which is based on the UBC, but is modified for conditions unique to California. The Code, which is selectively adopted by local jurisdictions, based on local conditions, contains requirements pertaining to multiple activities, including: excavation, site demolition, foundations and retaining walls, grading activities including drainage and erosion control, and construction of pipelines alongside existing structures. For example, sections 3301.2 and 3301.3 contain provisions requiring protection of adjacent properties during excavations and require a 10-day written notice and access agreements with adjacent property owners. California's Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS), which are implemented by the California State Lands Commission, are codified in Chapter 31F—Marine Oil Terminals (Cal. Code Regs., tit. 24, § 3101F et seq.).
Seismic Hazards Mapping Act & Mapping Regs (Pub. Resources Code, § 2690; Cal. Code Regs., tit. 14, div. 2, ch. 8, art. 10). These regulations were promulgated to promote public safety by protecting against the effects of strong ground shaking, liquefaction, landslides, other ground failures, or other hazards caused by earthquakes. The Act requires that site-specific geotechnical investigations be conducted identifying the hazard and formulating mitigation measures prior to permitting most developments designed for human occupancy. California Division of Mines and Geology Special Publication 117, *Guidelines for Evaluating and Mitigating Seismic Hazards in California* (1997), constitutes the guidelines for evaluating seismic hazards other than surface fault-rupture, and for recommending mitigation measures as required by Public Resources Code section 2695, subdivision (a). The Act does not apply offshore as the California Geological Survey has not zoned offshore California under the Act.

GREENHOUSE GAS EMISSIONS

Greenhouse Gas Emissions (Federal & International)
Federal Clean Air Act (FCAA) (42 U.S.C. § 7401 et seq.) In 2007, the U.S. Supreme Court ruled that carbon dioxide (CO_2) is an air pollutant as defined under the FCAA, and that the USEPA has authority to regulate GHG emissions.
Mandatory Greenhouse Gas Reporting (74 Fed. Reg. 56260) On September 22, 2009, the USEPA issued the Mandatory Reporting of Greenhouse Gases Rule, which requires reporting of GHG data and other relevant information from large sources (industrial facilities and power plants that emit more than 25,000 metric tons of carbon dioxide–equivalent ($MTCO_2e$) emissions per year) in the U.S. The purpose of the Rule is to collect accurate and timely GHG data to inform future policy decisions. The Rule is referred to as 40 CFR Part 98 (Part 98). Gases covered by implementation of Part 98 (GHG Reporting Program) are: CO_2, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and other fluorinated gases including nitrogen trifluoride and hydrofluorinated ethers.
Kyoto Protocol and Paris Climate Agreement On March 21, 1994, the Kyoto Protocol, the first international agreement to regulate GHG emissions, was signed. The Kyoto Protocol was a treaty made under the United Nations Framework Convention on Climate Change. If the commitments outlined in the Kyoto Protocol are met, global GHG emissions would be reduced by 5 percent from 1990 levels during the commitment period of 2008 to 2012. The U.S. was a signatory to the Kyoto Protocol; however, Congress has not ratified it and the U.S. is not bound by the Protocol's commitments. In December 2015, the Paris Climate Agreement was endorsed and adopted by 195 countries including the U.S. (which has since withdrawn from the Agreement). The overarching goal was

Greenhouse Gas Emissions (Federal & International)
to reduce pollution levels so that the rise in global temperatures is limited to no more than 2° Celsius (3.6° Fahrenheit). The Agreement included voluntary commitments to cut or limit the growth of their GHG emissions and provide regular and transparent reporting of every country's carbon reductions.

Greenhouse Gas Emissions (State)
California Global Warming Solutions Act of 2006 (AB 32, Stats. 2006, ch. 488)
Under AB 32, CARB is responsible for monitoring and reducing GHG emissions in the State and for establishing a statewide GHG emissions cap for 2020 based on 1990 emissions levels. CARB has adopted the AB 32 Climate Change Scoping Plan (Scoping Plan), initially approved in 2008 and updated in 2014, which contains the main strategies for California to implement to reduce CO_2e emissions by 169 million metric tons (MMT) from the State's projected 2020 emissions level of 596 MMT CO_2e under a business-as-usual scenario. The Scoping Plan breaks down the amount of GHG emissions reductions CARB recommends for each emissions sector of the State's GHG inventory, but does not directly discuss GHG emissions generated by construction activities.
California Global Warming Solutions Act of 2006: emissions limit (SB 32, Stats. 2016, ch. 249)
The update made by SB 32 requires a reduction in statewide GHG emissions to 40 percent below 1990 levels by 2030 to meet the target set in EO B-30-15. The 2017 Climate Change Scoping Plan provides a path to meet the SB 32 GHG emissions reduction goals and provides several GHG emissions reduction strategies to meet the 2030 interim GHG emissions reduction target including implementation of the Sustainable Freight Action Plan, Diesel Risk Reduction Plan, Renewable Portfolio Standard (50 percent by 2030), Advanced Clean Cars policy, and Low Carbon Fuel Standard
Clean Energy and Pollution Reduction Act (SB 350; Stats. 2015, ch. 547)
This Act requires that the amount of electricity generated and sold to retail customers from renewable energy resources be increased to 50 percent by December 31, 2030, and that statewide energy efficiency savings in electricity and natural gas by retail customers be doubled by January 1, 2030.
SB 97 (Stats. 2007, ch. 185)
Pursuant to SB 97, the State Office of Planning and Research prepared, and the Natural Resources Agency adopted amendments to the State CEQA Guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions. Effective as of March 2010, the revisions to the CEQA Environmental Checklist Form (Appendix G) and the Energy Conservation Appendix (Appendix F) provide a framework to address global climate change impacts in the CEQA process; State CEQA Guidelines section 15064.4 was also added to provide an approach to assessing impacts from GHGs. As discussed in State CEQA Guidelines section 15064.4, the determination of the significance of GHG emissions calls for a careful judgment by the lead agency, consistent with the provisions in section 15064. Section 15064.4 further provides that a lead agency should make a good-faith effort, to the extent possible, on scientific and factual data, to describe, calculate, or estimate the amount of GHG emissions resulting from a project. A lead agency shall have discretion to determine, in the context of a particular project, whether to: • Use a model or methodology to quantify GHG emissions resulting from a project, and determine which model or methodology to use. The lead agency has discretion to select the model or methodology it considers most appropriate provided it supports its decision with

Greenhouse Gas Emissions (State)

substantial evidence. The lead agency should explain the limitations of the particular model or methodology selected for use; and/or

- Rely on a qualitative analysis or performance-based standards.
- Section 15064.4 also advises a lead agency to consider the following factors, among others, when assessing the significance of impacts from GHG emissions on the environment: the extent to which the project may increase or reduce GHG emissions as compared to the existing environmental setting; whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project; and the extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions

Other Legislation

- **AB 1493** (Stats. 2002, ch. 200) required CARB to develop and implement regulations (stricter emissions standards) to reduce automobile and light truck GHG emissions beginning with model year 2009
- **AB 2800** (Stats. 2016, ch. 580) requires, in part, that state agencies, until 2020, take into account current and future climate change impacts when planning, designing, building, operating, maintaining, and investing in infrastructure
- **SB 375** (Stats. 2008, ch. 728; effective 2009) required CARB to develop regional GHG emission reduction targets in regions covered by California's 18 metropolitan planning organizations (MPOs) and required the 18 MPOs to develop regional land use and transportation plans and demonstrate an ability to attain the proposed reduction targets by 2020 and 2035
- **SB 1383** (Stats. 2016, ch. 395) requires CARB to approve and begin implementing its Short-Lived Climate Pollutant Reduction Strategy by January 1, 2018, to achieve a 40 percent reduction in methane, 40 percent reduction in hydrofluorocarbon gases, and 50 percent reduction in anthropogenic black carbon by 2030, relative to 2013 levels
- **SB 1425** (Stats. 2016, ch. 596) requires the California Environmental Protection Agency to oversee the development of a registry of GHG emissions resulting from the use of water, such as pumping, treatment, heating, and conveyance (the water-energy nexus), using the best available data

Executive Orders (EOs)

- **EO B-30-15** (Governor Brown, 2015) established a new interim statewide GHG emission reduction target to reduce GHG emissions to 40 percent below 1990 levels by 2030 to ensure California meets its target to reduce GHG emissions to 80 percent below 1990 levels by 2050. State agencies with jurisdiction over sources of GHG emissions to implement measures were also directed pursuant to statutory authority, to achieve GHG emissions reductions to meet the 2030 and 2050 targets.
- **EO S-21-09** (Governor Schwarzenegger, 2009) directed CARB to adopt a regulation consistent with the goal of EO S-14-08
- **EO S-14-08** (Governor Schwarzenegger, 2008) required all retail suppliers of electricity in California to serve 33 percent of their load with renewable energy by 2020.
- **EO S-13-08** (Governor Schwarzenegger, 2008) directed state agencies to take specified actions to assess and plan for impacts of global climate change, particularly sea-level rise
- **EO S-01-07** (Governor Schwarzenegger, 2007) set a low carbon fuel standard for California, and directed the carbon intensity of California's transportations fuels to be reduced by at least 10 percent by 2020
- **EO S-3-05** (Governor Schwarzenegger, 2005) directed reductions in GHG emissions to 2000 levels by 2010, 1990 levels by 2020, and 80 percent below 1990 levels by 2050

HAZARDS AND HAZARDOUS MATERIALS

Hazards and Hazardous Materials (Federal)
California Toxics Rule (40 CFR 131) In 2000, the USEPA promulgated numeric water quality criteria for priority toxic pollutants and other water quality standards provisions to be applied to waters in California to protect human health and the environment. Under Clean Water Act section 303(c)(2)(B), the USEPA requires states to adopt numeric water quality criteria for priority toxic pollutants for which the USEPA has issued criteria guidance, and the presence or discharge of which could reasonably be expected to interfere with maintaining designated uses. These federal criteria are legally applicable in California for inland surface waters, enclosed bays, and estuaries.
Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 U.S.C., Ch. 103) CERCLA, commonly known as Superfund, provides broad federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment. CERCLA establishes requirements concerning closed and abandoned hazardous waste sites, provides for liability of persons responsible for releases of hazardous waste at these sites, and establishes a trust fund to provide for cleanup when no responsible party could be identified. CERCLA was amended by the Superfund Amendments and Reauthorization Act on October 17, 1986.
National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 CFR 300) Authorized under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA: 42 U.S.C. § 9605), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA: Pub. L. 99-499); and by Clean Water Act section 311(d), as amended by the Oil Pollution Act (Pub. L. 101-380), the NCP outlines requirements for responding to oil spills and hazardous substance releases. It specifies compliance, but does not require preparation of a written plan, and provides a comprehensive system for reporting, spill containment, and cleanup. Per 40 CFR 300.175 and 40 CFR 300.120, the U.S. Coast Guard has responsibility for oversight of regional response for oil spills in "coastal zones."
Occupational Safety and Health Act of 1970 Congress created the Occupational Safety and Health Administration (OSHA) to assure safe and healthful working conditions for working men and women by setting and enforcing standards and by providing training, outreach, education and assistance. OSHA has entered into an agreement with California under which California regulations covers all private sector places of employment within the state with certain exceptions; however, the safe decommissioning of nuclear power plants is covered. OSHA has authority to regulate employee exposures from all radiation sources not regulated by the NRC.
Oil Pollution Act (OPA) of 1990 (33 U.S.C. § 2712) The OPA requires owners and operators of facilities that could cause substantial harm to the environment to prepare and submit, and maintain up-to-date, plans for responding to worst-case discharges of oil and hazardous substances and for facilities and vessels to demonstrate that they have sufficient response equipment under contract to respond to and clean up a worst-case spill. The passage of the OPA motivated California to pass a more stringent spill response and recovery regulation and the creation of the Office of Spill Prevention and Response to review and regulate oil spill plans and contracts. The OPA includes provisions to expand prevention and preparedness activities, improve response capabilities, provide funding for natural resource damage assessments, ensure that shippers and oil companies pay the costs of spills that do occur, and establish an expanded research and development program. Pursuant to a Memorandum of Understanding established to divide areas of responsibility, the U.S. Coast Guard is responsible for tank vessels and marine terminals, the USEPA for tank farms, and the Research and Special Programs Administration for pipelines; each of these

Hazards and Hazardous Materials (Federal)

agencies has developed regulations for its area of responsibility. In addition, the Secretary of Interior is responsible for spill prevention, oil-spill contingency plans, oil-spill containment and clean-up equipment, financial responsibility certification, and civil penalties for offshore facilities and associated pipelines in all federal and state waters.

Resource Conservation and Recovery Act (RCRA) (42 U.S.C. § 6901 et seq.)

The RCRA authorizes the USEPA to control hazardous waste from "cradle-to-grave" (generation, transportation, treatment, storage, and disposal). RCRA Hazardous and Solid Waste Amendments from 1984 include waste minimization, phasing out land disposal of hazardous waste, and corrective action for releases. The Department of Toxic Substances Control is the lead state agency for corrective action associated with RCRA facility investigations and remediation.

Toxic Substances Control Act (TSCA) (15 U.S.C. § 2601–2692)

The TSCA authorizes the USEPA to require reporting, record-keeping, testing requirements, and restrictions related to chemical substances and/or mixtures. It also addresses production, importation, use, and disposal of specific chemicals, such as polychlorinated biphenyls (PCBs), asbestos-containing materials, lead-based paint, and petroleum.

Other Relevant Laws, Regulations, and Recognized National Codes and Standards

- **33 CFR, Navigation and Navigable Waters** regulates aids to navigation, vessel operations, anchorages, bridges, security of vessels, waterfront facilities, marine pollution financial responsibility and compensation, prevention and control of releases of materials (including oil spills) from vessels, ports and waterways safety, boating safety, and deep-water ports
- **40 CFR Parts 109, 110, 112, 113, and 114** – The Spill Prevention Countermeasures and Control (SPCC) plans covered in these regulatory programs apply to oil storage and transportation facilities and terminals, tank farms, bulk plants, oil refineries, and production facilities, and bulk oil consumers (e.g., apartment houses, office buildings, schools, hospitals, government facilities). These regulations include minimum criteria for developing oil-removal contingency plans, prohibit discharge of oil such that applicable water quality standards would be violated, and address oil spill prevention and preparation of SPCC plans. They also establish financial liability limits and provide civil penalties for violations of the oil spill regulations.
- **46 CFR parts 1 through 599 and Inspection and Regulation of Vessels (46 U.S.C. Subtitle II Part B)** provide that all commercial (e.g., passengers for hire, transport of cargoes, hazardous materials, and bulk solids) vessels operating offshore on specified routes (inland, near coastal, and oceans), including those under foreign registration, are subject to requirements applicable to vessel construction, condition, and operation. These regulations also allow for inspections to verify that vessels comply with applicable international conventions and U.S. laws and regulations.
- **Clean Water Act** (see Hydrology and Water Quality section)
- **Convention on the International Regulations for Preventing Collisions at Sea** establishes "rules of the road" such as rights-of-way, safe speed, actions to avoid collision, and procedures to observe in narrow channels and restricted visibility
- Hazardous Materials Transportation Act (*see Transportation/Traffic section*)
- **Safety and Corrosion Prevention Requirements** — ASME, National Association of Corrosion Engineers (NACE), ANSI

Hazards and Hazardous Materials (State)

California Occupational Safety and Health Act of 1973 and California Code of Regulations, title 8

Hazards and Hazardous Materials (State)

California employers have many different responsibilities under the Cal/OSHA Regulations. The following represents several requirements**:**

- Establish, implement and maintain an Injury and Illness Prevention Program and update it periodically to keep employees safe.
- Inspect workplace(s) to identify and correct unsafe and hazardous conditions.
- Make sure employees have and use safe tools and equipment and properly maintain this equipment.
- Provide and pay for personal protective equipment.
- Use color codes, posters, labels or signs to warn employees of potential hazards.

Elder California Pipeline Safety Act of 1981 (Gov. Code, §§ 51010-51018; & Cal. Code Regs., tit. 19, Public Safety)

The California Pipeline Safety Act gives regulatory jurisdiction to the California State Fire Marshal (CSFM) for the safety of all intrastate hazardous liquid pipelines and all interstate pipelines used for the transportation of hazardous or highly volatile liquid substances. The law establishes the governing rules for interstate pipelines to be the Federal Hazardous Liquid Pipeline Safety Act and federal pipeline safety regulations. Government Code sections 51010 through 51018 provide specific safety requirements that are more stringent than the federal rules, including periodic hydrostatic testing of pipelines, pipeline leak detection, and a requirement that all leaks be reported. Amendments to the Act require that pipelines include leak prevention and cathodic protection, with acceptability to be determined by the CSFM. All new pipelines must be designed to accommodate the passage of instrumented inspection devices (i.e., smart pigs). Under California Code of Regulations, title 19, Public Safety, the CSFM develops regulations relating to fire and life safety. These regulations have been prepared and adopted to establish minimum standards for the prevention of fire and for protection of life and property against fire, explosion, and panic. The CSFM also adopts and administers the regulations and standards considered necessary under the California Health and Safety Code to protect life and property.

Other

- **Hazardous Waste Control Act (Health & Saf. Code, ch. 6.5 & Cal. Code Regs., tit. 22 and 26)** establishes criteria for defining hazardous waste and its safe handling, storage, treatment, and disposal (law is designed to provide cradle-to-grave management of hazardous wastes and reduce the occurrence and severity of hazardous materials releases)
- **Hazardous Material Release Response Plans and Inventory Law** (Health & Saf. Code, ch. 6.95) is designed to reduce the occurrence and severity of hazardous materials releases. This State law requires businesses to develop a Release Response Plan for hazardous materials emergencies if they handle more than 500 pounds, 55 gallons, or 200 cubic feet of hazardous materials. In addition, the business must prepare a Hazardous Materials Inventory of all hazardous materials stored or handled at the facility over the above thresholds, and all hazardous materials must be stored in a safe manner.
- **California Code of Regulations, title 8, division 1** sets forth the Permissible Exposure Limit, the exposure, inhalation or dermal permissible exposure limit for numerous chemicals. Included are chemicals, mixture of chemicals, or pathogens for which there is statistically significant evidence, based on at least one study conducted in accordance with established scientific principles, that acute or chronic health effects may occur in exposed employees. Title 8 sections 5191 and 5194 require a Hazard Communication Plan to ensure both employers and employees understand how to identify potentially hazardous substances in the workplace, understand the associated health hazards, and follow safe work practices.
- **California Code of Regulations, title 19, division 2** establishes minimum statewide standards for Hazardous Materials Business Plans.

Hazards and Hazardous Materials (State)

- **California Code of Regulations, title 22, division 4.5** regulates hazardous wastes and materials by implementation of a Unified Program to ensure consistency throughout the state in administration requirements, permits, inspections, and enforcement by Certified Unified Program Agencies (CUPAs)
- **California Code of Regulations, title 24, part 9 (Fire Code regulations)** – state hazardous materials should be used and storage in compliance with the state fire codes
- **Oil Pipeline Environmental Responsibility Act** (**AB 1868**; Stats. 1995, ch. 979) requires every pipeline corporation qualifying as a public utility and transporting crude oil in a public utility oil pipeline system to be held strictly liable for any damages incurred by "any injured party which arise out of, or caused by, the discharge or leaking of crude oil or any fraction thereof...." The law applies only to public utility pipelines for which construction would be completed after January 1, 1996, or that part of an existing utility pipeline that is being relocated after the above date and is more than 3 miles in length.
- **Porter-Cologne Water Quality Control Act** (*see Hydrology and Water Quality section)*
- Seismic Hazards Mapping Act/Regulations (*see Geology and Soils section)*

California Executive Order (EO) D-62-02

EO D-62-02 (Governor Davis, September 2002) requires that the Water Boards shall, as soon as possible, take all steps necessary to impose a moratorium on the disposal of decommissioned materials into Class III landfills and unclassified waste management units, as described in title 27, sections 20260 and 20230, of the California Code of Regulations. Decommissioned materials are defined as materials with low residual levels of radioactivity that, upon decommissioning of a licensed site, may presently be released with no restrictions upon their use.

HYDROLOGY AND WATER QUALITY

Hydrology and Water Quality (Federal)

Federal Clean Water Act (CWA) (33 U.S.C. § 1251 et seq.)

The CWA is comprehensive legislation (it generally includes the Federal Water Pollution Control Act of 1972, its supplementation by the CWA of 1977, and amendments in 1981, 1987, and 1993) that seeks to protect the nation's water from pollution by setting water quality standards for surface water and by limiting the discharge of effluents into waters of the U.S. These water quality standards are promulgated by the USEPA and enforced in California by the State Water Resources Control Board (SWRCB) and nine Regional Water Quality Control Boards (RWQCBs). CWA sections include:

- **Section 303(d) (33 U.S.C. § 1313)** requires states to list waters that are not attaining water quality standards, which is known as the 303(d) List of impaired waters. These requirements have led to the development of total maximum daily load (TMDL) guidance at the state level through the SWRCB and various RWQCBs.
- **Section 305(b) (33 U.S.C. § 1315)** requires states to assess and report on the water quality status of waters within the states.
- **Section 316(b) (33 U.S.C. § 1326)** was implemented by the SWRCB regulating the entrainment and impingement of marine life related to power generating facility intake structures. The policy establishes technology-based standards to reduce the harmful effects associated with ocean cooling water intake structures on marine and estuarine life. The policy applies to existing power plants that can withdraw from State coastal and estuarine waters using a single-pass system ("once-through cooling"). Closed-cycle wet cooling has been selected as best technology available. Permittees must either reduce intake flow and velocity or reduce impacts to aquatic life comparably by other means.

Hydrology and Water Quality (Federal)

- **Section 401 (33 U.S.C. § 1341)** specifies that any applicant for a federal permit or license to conduct any activity which may result in any discharge into the navigable waters of the U.S. to obtain a certification or waiver thereof from the state in which the discharge originates that such a discharge will comply with established state effluent limitations and water quality standards. U.S. Army Corps of Engineers projects are required to obtain this certification.
- **Section 402 (33 U.S.C. § 1342)** establishes conditions and permitting for discharges of pollutants under the National Pollutant Discharge Elimination System) (NPDES). Under the NPDES Program, states establish standards specific to water bodies and designate the types of pollutants to be regulated, including total suspended solids and oil; all point sources that discharge directly into waterways are required to obtain a permit regulating their discharge. NPDES permits fall under the jurisdiction of the SWRCB or RWQCBs when the discharge occurs within state waters (out to 3 nautical miles).
- **Section 403 (33 U.S.C. § 1343)** provides permit issuance guidelines for ocean discharge. Section 403 provides that point source discharges to the territorial seas, contiguous zone, and oceans are subject to regulatory requirements in addition to the technology – or water quality-based requirements applicable to typical discharges. These requirements are intended to ensure that no unreasonable degradation of the marine environment will occur as a result of the discharge and to ensure that sensitive ecological communities are protected.
- **Section 404 (33 U.S.C. § 1344)** authorizes the U.S. Army Corps of Engineers to issue permits for the discharge of dredged or fill material into waters of the U.S., including wetlands, streams, rivers, lakes, coastal waters or other water bodies or aquatic areas that qualify as waters of the U.S.

Rivers and Harbors Act (33 U.S.C. § 401)

This Act governs specified activities in "navigable waters" (waters subject to the ebb and flow of the tide or that are presently used, have been used in the past, or may be susceptible for use to transport interstate or foreign commerce). Section 10 provides that construction of any structure in or over any navigable water of the U.S., or the accomplishment of any other work affecting the course, location, condition, or physical capacity of such waters, is unlawful unless the U.S. Army Corps of Engineers approves the work and issues a Rivers and Harbors Act section 10 Permit (which may occur concurrently with Clean Water Act section 404 permits).

Other

- **Navigation and Navigable Waters (33 CFR) regulations** include requirements pertaining to prevention and control of releases of materials from vessels (e.g., oil spills), traffic control, and restricted areas, and general ports and waterways safety
- **Oil Pollution Act (OPA)** (see *Hazards and Hazardous Materials* section)

Hydrology and Water Quality (State)

Porter-Cologne Water Quality Control Act (Wat. Code, § 13000 et seq.) (Porter-Cologne)

Porter-Cologne is the principal law governing water quality in California. The Act established the SWRCB and nine RWQCBs, which have primary responsibility for protecting water quality and beneficial uses of state waters. Porter-Cologne also implements many provisions of the federal Clean Water Act, such as the NPDES permitting program. Pursuant to Clean Water Act section 401, applicants for a federal license or permit for activities that may result in any discharge to waters of the U.S. must seek a Water Quality Certification from the state in which the discharge originates; such Certification is based on a finding that the discharge will meet water quality standards and other appropriate requirements of state law. In California, RWQCBs issue or deny certification for discharges within their jurisdiction. The SWRCB has this responsibility where projects or activities affect waters in more than one RWQCB's jurisdiction. If the SWRCB or a RWQCB imposes a condition on its Certification, those

Hydrology and Water Quality (State)

conditions must be included in the federal permit or license. Plans that contain enforceable standards for the various waters they address include the following:

- Basin Plan. Porter-Cologne (see § 13240) requires each RWQCB to formulate and adopt a Basin Plan for all areas within the region. Each RWQCB must establish water quality objectives to ensure the reasonable protection of beneficial uses, and an implementation program for achieving water quality objectives within the basin plan. In California, the beneficial uses and water quality objectives are the state's water quality standards.
- California Ocean Plan (see § 13170.2) establishes water quality objectives for California's ocean waters and provides the basis for regulating wastes discharged into ocean and coastal waters. The plan applies to point and non-point sources. In addition, the Ocean Plan identifies applicable beneficial uses of marine waters and sets narrative and numerical water quality objectives to protect beneficial uses. The SWRCB first adopted this plan in 1972, and it reviews the plan at least every 3 years to ensure that current standards are adequate and are not allowing degradation to indigenous marine species or posing a threat to human health.
- Other: Water Quality Control Plan for Enclosed Bays and Estuaries of California; Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California (Thermal Plan); and San Francisco Bay/Sacramento-San Joaquin Delta Estuary Water Quality Control Plan.

RWQCBs also oversee on-site treatment of "California Designated, Non-Hazardous Waste" and enforces water quality thresholds and standards set forth in the Basin Plan. Applicants may be required to obtain a General Construction Activities Storm Water Permit under the NPDES program, and develop and implement a Storm Water Pollution Prevention Plan (SWPPP) that includes best management practices to control erosion, siltation, turbidity, and other contaminants associated with construction activities. The SWPPP would include best management practices to control or prevent the release of non-storm water discharges, such as crude oil, in storm water runoff.

Other sections

- Lake and Streambed Alteration Program (Fish & G. Code, §§ 1600-1616) (see *Biological Resources* section)
- Water Code section 8710 requires that a reclamation board permit be obtained prior to the start of any work, including excavation and construction activities, if projects are located within floodways or levee sections. Structures for human habitation are not permitted within designated floodways
- Water Code section 13142.5 provides marine water quality policies stating that wastewater discharges shall be treated to protect present and future beneficial uses, and, where feasible, to restore past beneficial uses of the receiving waters. The highest priority is given to improving or eliminating discharges that adversely affect wetlands, estuaries, and other biologically sensitive sites; areas important for water contact sports; areas that produce shellfish for human consumption; and ocean areas subject to massive waste discharge.

LAND USE AND PLANNING

There are no major federal or state laws, regulations, and policies potentially applicable to this project

MINERAL RESOURCES

Mineral Resources (Federal)

CFR, Titles 10, 18, and 30

- 10 CFR addresses energy consumption and the Department of Energy
- 18 CFR addresses the Federal Energy Regulatory Commission (FERC)
- 30 CFR establishes the Bureau of Ocean Energy Management, which manages energy resources in the Outer Continental Shelf

Mineral Resources (State)

Surface Mining and Reclamation Act (SMARA) (Pub. Resources Code, §§ 2710-2796).

The California Department of Conservation is the primary agency with regard to mineral resource protection. The Department, which is charged with conserving earth resources (Pub. Resources Code, §§ 600-690), has five program divisions: California Geological Survey (CGS); Division of Oil, Gas, and Geothermal Resources; Division of Land Resource Protection; State Mining and Geology Board (SMGB); and Division of Mine Reclamation. SMGB develops policy direction regarding the development and conservation of mineral resources and reclamation of mined lands. In accordance with SMARA, CGS classifies the regional significance of mineral resources and assists in designating lands containing significant aggregate resources. Four Mineral Resource Zones (MRZs) are designated to indicate the significance of mineral deposits.

- MRZ-1 – Areas where adequate information indicates that no significant mineral deposits are present or where it is judged that little likelihood exists for their presence
- MRZ-2 – Areas where adequate information indicates significant mineral deposits are present, or where it is judged that a high likelihood exists for their presence
- MRZ-3 – Areas containing mineral deposits the significance of which cannot be evaluated from available data
- MRZ-4 – Areas where available information is inadequate for assignment to any other MRZ

The Warren-Alquist Act

This act was adopted in 1974 to encourage conservation of non-renewable energy resources.

NOISE

Noise (Federal)

Noise Control Act (42 U.S.C. § 4910) and NTIS 550\9-74-004, 1974

The Noise Control Act required the USEPA to establish noise emission criteria and noise testing methods (40 CFR Chapter 1, Subpart Q). These criteria generally apply to interstate rail carriers and to some types of construction and transportation equipment. In 1974, the USEPA provided guidance in NTIS 550\9-74-004 ("Information on Levels of Environmental Noise Requisite to Protect Health and Welfare with an Adequate Margin of Safety;" referenced as the "Levels Document") that established an L_{dn} of 55 dBA as the requisite level, with an adequate margin of safety, for areas of outdoor uses including residences and recreation areas. The recommendations do not consider technical or economic feasibility (i.e., the document identifies safe levels of environmental noise exposure without consideration for achieving these levels or other potentially relevant considerations), and therefore should not be construed as standards or regulations.

NTIS 550\9-74-004, 1974

In response to a Federal mandate, the USEPA provided guidance in NTIS 550\9-74-004, 1974 ("Information on Levels of Environmental Noise Requisite to Protect Health and Welfare with an Adequate Margin of Safety"), commonly referenced as the "Levels Document" that establishes

Noise (Federal)

an Ldn of 55 dBA as the requisite level, with an adequate margin of safety, for areas of outdoor uses including residences and recreation areas. The USEPA recommendations contain a factor of safety and do not consider technical or economic feasibility (i.e., the document identifies safe levels of environmental noise exposure without consideration for achieving these levels or other potentially relevant considerations), and therefore should not be construed as standards or regulations.

Noise (State)

Land Use Compatibility Guidelines from the now defunct California Office of Noise Control

State regulations for limiting population exposure to physically and/or psychologically significant noise levels include established guidelines and ordinances for roadway and aviation noise under the California Department of Transportation and the now defunct California Office of Noise Control. Office of Noise Control land use compatibility guidelines provided the following:

- For residences, an exterior noise level of 60 to 65 dBA Community Noise Equivalent Level (CNEL) is considered "normally acceptable;" a noise level of greater than 75 dBA CNEL is considered "clearly unacceptable."
- A noise level of 70 dBA CNEL is considered "conditionally acceptable" (i.e., the upper limit of "normally acceptable" for sensitive uses [schools, libraries, hospitals, nursing homes, churches, parks, offices, commercial/professional businesses]).

Other

- **California Code of Regulations, title 24** establishes CNEL 45 dBA as the maximum allowable indoor noise level resulting from exterior noise sources for multi-family residences

POPULATION AND HOUSING

There are no major federal or state laws, regulations, and policies potentially applicable to this project

PUBLIC SERVICES

Public Services (Federal)

CFR Title 29

- **29 CFR 1910.38** requires an employer, when required by an Occupational Safety and Health Administration (OSHA) standard, to have an Emergency Action Plan that must be in writing, kept in the workplace, and available to employees for review
- **29 CFR 1910.39** requires an employer to have a Fire Prevention Plan (FPP)
- **29 CFR 1910.155, Subpart L, Fire Protection** requires employers to place and keep in proper working order fire safety equipment within facilities

Public Services (State)

California Code of Regulations, title 19 (Public Safety)

California State Fire Marshal regulations establish minimum standards for the prevention of fire and for protection of life and property against fire, explosion, and panic.

RECREATION

There are no major federal laws, regulations, and policies potentially applicable to this project.

TRANSPORTATION / TRAFFIC

Transportation / Traffic (Federal)
Hazardous Materials Transportation Act (HMTA) (49 U.S.C. § 5901) The HMTA delegates authority to the U.S. Department of Transportation to develop and implement regulations pertaining to the transport of hazardous materials and hazardous wastes by all modes of transportation. The USEPA's Hazardous Waste Manifest System is a set of forms, reports, and procedures for tracking hazardous waste from a generator's site to the disposal site. Applicable regulations are contained primarily in CFR Titles 40 and 49.
American with Disabilities Act (ADA) The ADA (1990) is a wide-ranging civil rights law that prohibits, under certain circumstances, discrimination based on disability. Pedestrian facility design must comply with the accessibility standards identified in the ADA, which applies to all projects involving new or altered pedestrian facilities. The scoping and technical provisions for new construction and alterations identified in the ADA Accessibility Guidelines (Sections 4.3, 4.7 and 4.8) can be used to help design pedestrian facilities that are ADA compliant. For example, Title II-6.600 of the Technical Assistance Manual states, "When streets, roads, or highways are newly built or altered, they must have ramps or sloped areas whenever there are curbs or other barriers to entry from a sidewalk or path." Certain facilities, such as historic buildings, may be exempt from ADA requirements.
Title 23 (Highways), CFR, Section 450.220 Requires each state to carry out a continuing, comprehensive, and intermodal statewide transportation planning process. This planning process must include the development of a statewide transportation plan and transportation improvement program that facilitates the efficient, economic movement of people and goods in all areas of the state.

Transportation / Traffic (State)
California Vehicle Code Chapter 2, article 3 defines the powers and duties of the California Highway Patrol, which enforces vehicle operation and highway use in the State. The California Department of Transportation is responsible for the design, construction, maintenance, and operation of the California State Highway System and the portion of the Interstate Highway System within State boundaries. Caltrans has the discretionary authority to issue special permits for the use of California State highways for other than normal transportation purposes. Caltrans also reviews all requests from utility companies, developers, volunteers, nonprofit organizations, and others desiring to conduct various activities within the California Highway right of way. The Caltrans Highway Design Manual, prepared by the Office of Geometric Design Standards (Caltrans 2012), establishes uniform policies and procedures to carry out the highway design functions of Caltrans. Caltrans has also prepared a Guide for the Preparation of Traffic Impact Studies (Caltrans 2002). Objectives for the preparation of this guide include providing consistency and uniformity in the identification of traffic impacts generated by local land use proposals.
SB 730 (Stats. 2015, ch. 283) Prohibits a freight train from operating in California unless it has a crew of at least two individuals.

UTILITIES AND SERVICE SYSTEMS

Utilities and Service Systems (Federal)
CFR Title 29 (see *Public Services*)

Utilities and Service Systems (State)
California Integrated Waste Management Act (AB 939; Stats. 1989, ch. 1095) AB 939 mandates management of non-hazardous solid waste throughout California. Its purpose includes: reduce, recycle, and reuse solid waste generated in the state to the maximum extent feasible; improve regulation of existing solid waste landfills; ensure that new solid waste landfills are environmentally sound; streamline permitting procedures for solid waste management facilities; and specify local government responsibilities to develop and implement integrated waste management programs. AB 939 policies preferred waste management practices include the following. The highest priority is to reduce the amount of waste generated at its source (source reduction). Second is to reuse, by extending the life of existing products and recycling those wastes that can be reused as components or feed stock for the manufacture of new products, and by composting organic materials. Source reduction, reuse, recycling and composting are jointly referred to as waste diversion methods because they divert waste from disposal. Third is disposal by environmentally safe transformation in a landfill. All local jurisdictions, cities, and counties must divert 50 percent of the total waste stream from landfill disposal by the year 2000 and each year thereafter (with 1990 as the base year).
California Code of Regulations, title 19 (Public Safety) Title 19 sets standards for the prevention of fire and protection of property and life by the Seismic Safety Commission, Office of Emergency Services, and Office of the Fire Marshall. It also contains guidelines and standards for general fire, construction, explosives, emergency management, earthquakes, and fire.

WILDFIRE

Wildfire (State)
State Responsibility Area (SRA) The California Public Resources Code (Section 4101 et seq.) includes fire safety requirements for which the Department of Forestry and Fire Protection (CAL FIRE) has adopted regulations (for example, Chapters 6 and 7 of Chapter 1.5 of title 14, Cal. Code Regs.) that apply to state responsibility areas (SRAs). As the name implies, SRAs are areas where CAL FIRE has primary responsibility for fire protection. During the fire hazard season, these regulations: (a) restrict the use of equipment that may produce a spark, flame, or fire; (b) require the use of spark arrestors on equipment that has an internal combustion engine; (c) specify requirements for the safe use of gasoline-powered tools in fire hazard areas; and (d) specify fire-suppression equipment that must be provided onsite for various types of work in fire-prone areas.
Very High Fire Hazard Severity Zones (AB337) As a result of the Oakland Hills Fire (Tunnel Fire) of 1991, the Bates Bill (337) was passed in 1992 requiring CAL FIRE to work with local governments to identify high fire hazard severity zones within local responsibility areas throughout each county in the state. Over the years CAL FIRE has updated the maps and provided new recommendations to local governments. Following the Bill, CAL FIRE periodically gathers new data and updates the mapping. This is a massive project requiring policy and procedure staff, prevention and planning staff, and the technical GIS skills of CAL FIRE's Fire and Resource Assessment Program

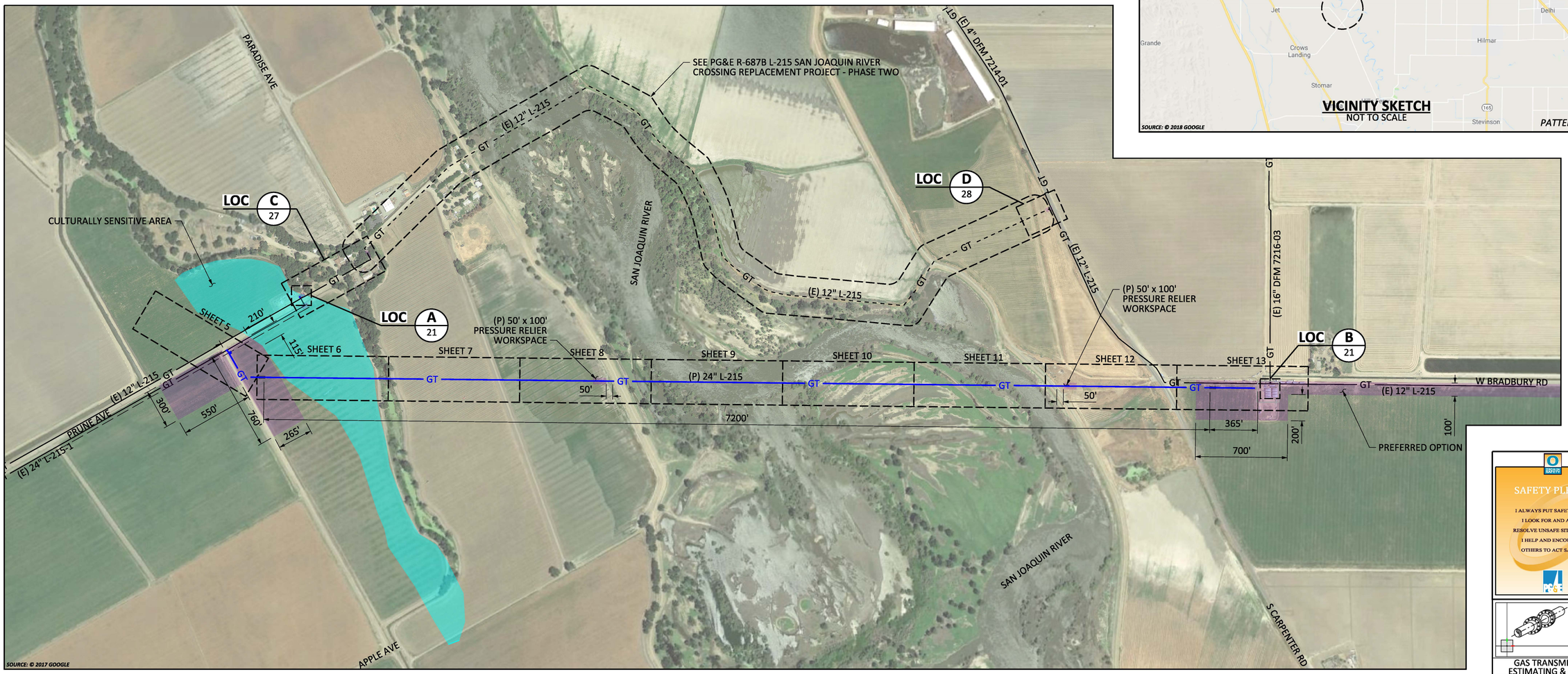
APPENDIX B

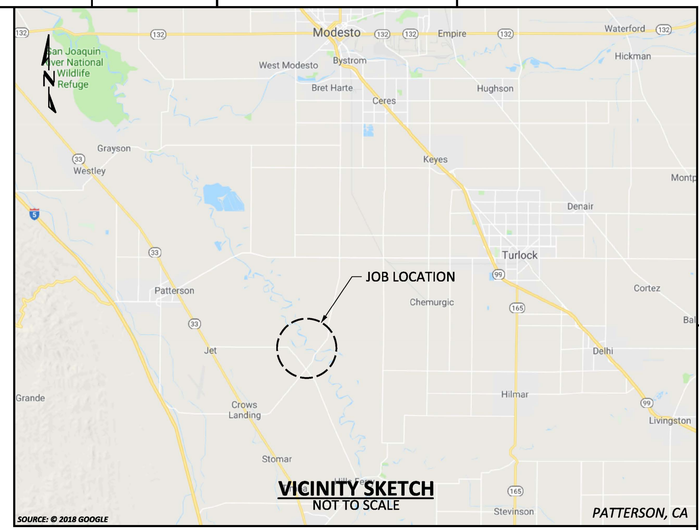
Project Plans

APPENDIX B1

Phase 1 Project Plans

L-215 SAN JOAQUIN RIVER XING REPLACEMENT
L-215-1 MP 6.92 - 8.43, INSTALL 24" PIPE
PATTERSON, STANISLAUS COUNTY





SCHEDULE OF SHEETS

SHEET 1	-- TITLE & INDEX
SHEET 2	-- CONSTRUCTION NOTES
SHEET 3	-- LEGEND & STAMPS
SHEET 4-12	-- PLAN & PROFILE
SHEET 13-16	-- HDD PROFILE
SHEET 17-25	-- DETAILS
SHEET 26	-- BILL OF MATERIALS
SHEET 27, 28	-- RETIREMENT DETAILS

KEY MAP
SCALE: 1" = 400'

SAFETY PLEDGE

I ALWAYS PUT SAFETY FIRST.
I LOOK FOR AND ACT TO RESOLVE UNSAFE SITUATIONS.
I HELP AND ENCOURAGE OTHERS TO ACT SAFELY.

GAS TRANSMISSION ESTIMATING & DESIGN

IMPACTED RECORD DRAWINGS:
[X] YES, JT02 ACTIVATED [ ] NO

CAP # 118729556

90% DESIGN REVIEW

PACIFIC GAS AND ELECTRIC COMPANY

WARNING:
THIS DOCUMENT CONTAINS CONFIDENTIAL, PROPRIETARY INFORMATION THAT IS THE SOLE PROPERTY OF PACIFIC GAS AND ELECTRIC COMPANY AND IS INTENDED FOR USE ONLY BY AUTHORIZED PACIFIC GAS AND ELECTRIC COMPANY EMPLOYEES AND ITS AGENTS.
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811 Know what's below. Call before you dig.

ZERO IN ON SAFETY

NO.	DATE	DESCRIPTION	PM/SPEC	DWN	CHKD	SUPV	APVD BY
A		90% DESIGN REVIEW	74004060	E1A4	MDGR		

REVISIONS

APPROVED BY	
	PSRS
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	DWN E1A4
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	SCALES

PIPELINE - TITLE & INDEX
L-215 SAN JOAQUIN RIVER XING REPLACEMENT
L-215-1 MP 6.92 - 8.43, INSTALL 24" PIPE
PATTERSON, STANISLAUS COUNTY

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

BILL OF MATL	SHEET 26
DWG LIST	SHEET 2
TRACKING NUMBER	R-687
SHEET NO.	1 OF 28 SHEETS
74004060	A

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Estimating.pen

SUMMARY OF PROPOSED WORK:

1. INSTALL VALVE SET (DET. 1, SHT #18).
2. INSTALL APPROX. 775' OF 24" STEEL PIPE L-215-1 (OPEN TRENCH).
3. INSTALL APPROX. 7215' OF 24" STEEL PIPE L-215-1 (DIRECTIONAL BORE AT SAN JOAQUIN RIVER CROSSING).
4. HYDROTEST NEW MAIN LINE.
5. RETIRE APPROX. 6800' OF 12" STEEL PIPE L-215 (SEE PROJECT R-687B).
6. RETIRE APPROX. 690' OF 24" STEEL PIPE L-215-1.
7. REMOVE (1) 24" MAIN LINE VALVE.
8. INSTALL (14) PIPELINE MARKERS.

SEQUENCE OF OPERATIONS:

1. WELD AND PRE-TEST HDD PIPE STRING.
2. INSTALL 7215' OF PIPE BY HORIZONTAL DIRECTIONAL DRILL.
3. INSTALL 775' OF PIPE BY OPEN TRENCH.
4. FABRICATE TIE-IN PIECES AND MLV 6.93 ASSEMBLY.
5. HYDROTEST TO A MINIMUM OF 1.5 TIMES MAOP WITH A MINIMUM DURATION OF 8 HOURS, DE-WATER, AND DRY NEW 24"PIPE, TIE-IN PIECES, AND MLV ASSEMBLY.
6. PRIOR TO TAKING PIPELINE CLEARANCE, THE FOLLOWING MUST BE PERFORMED:
   - A. PG&E GPOM TO CHECK ANY DRIPS IN SHUT-IN SEGMENT FOR PRESENCE OF PIPELINE LIQUIDS.
   - B. REMOVE PIPE WRAP FROM CUT OUT SECTIONS EXTENDING 1' BEYOND EACH END OF THE CUT-OUT AND SANDBLAST TO NEAR WHITE.
   - C. COMPLETE A-FORMS IN ALL EXPOSED PIPE AND INCLUDE IN AS-BUILT PACKAGE. IF UT WT MEASUREMENTS DO NOT MATCH EXISTING PIPE SPECIFICATIONS AS SHOWN ON DRAWINGS, IMMEDIATELY NOTIFY PROJECT ENGINEER (PED).
   - D. INSTALL SAVE-A-VALVES FOR OIL TESTING AND SNIFF HOLES WHERE DESIGNATED. CONFIRM LOCATION AND NUMBER OF SAVE-A-VALVES AND ENSURE WELD PROCEDURE CALCULATIONS ARE PROVIDED BY ENGINEERING PRIOR TO WELDING SAVE-A-VALVES ON PIPELINE.
   - E. STRENGTH TEST, DEWATER, AND DRY TIE-IN PIECES PER UTILITY PROCEDURE TD-4137S.
7. COMPLETE CLEARANCE PER APPROVED CLEARANCE PROCEDURE.
8. REMOVE RETIRED PIPE AND FITTINGS AS NECESSARY AS PER DRAWING.
9. TIE IN NEW 24" PIPE AND MLV ASSEMBLY.
10. COMPLETE RETIREMENT/REMOVAL OF L-215 AND L-215-1 AS PER THE DRAWINGS.
11. BACKFILL AND RESTORE CONSTRUCTION CORRIDORS.

HORIZONTAL DATUM

THE BEARINGS AND DISTANCES ARE BASED ON THE CALIFORNIA COORDINATE SYSTEM, ZONE 3.

VERTICAL DATUM

ALL ELEVATIONS SHOWN ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), US SURVEY FEET AS PROVIDED BY THE CALIFORNIA SURVEY AND DRAFTING SUPPLY SURVEY NETWORK
TO CONVERT TO NGVD29 SUBTRACT 2.4 FEET FROM ALL SHOWN ELEVATIONS.

SURVEY CONTROL TABLE

POINT NAME	NORTHING	EASTING	ELEVATION	DESCRIPTION
5000GPS	1986413.47	6423397.23	63.06	1X2 HUB
5001GPS	1986441.17	6420756.00	60.80	BRASS DISC
5002GPS	1986469.02	6418114.99	58.83	METAL ROD
5003GPS	1986524.67	6412834.97	57.24	2" IRON PIPE
5004GPS	1986561.63	6409444.07	58.05	REBAR AND BAP, NO TAG
5005GPS	1986689.67	6409273.45	59.36	IRON PIPE, LS 7823
GCP5179	1987874.82	6408555.94	58.83	NAIL AND SHINER
5006GPS	1986219.17	6409552.49	58.87	IRON PIPE, LS 7823
GCP5176	1981619.74	6393060.00	91.76	NAIL AND SHINER
5007GPS	1986514.22	6396333.27	62.78	NAIL AND SHINER
5008GPS	1988810.46	6395029.25	60.30	BRASS DISC
5009GPS	1984217.86	6397637.07	65.70	BRASS DISC
5010GPS	1986824.78	6402231.17	57.45	IRON PIPE, LS 5443
5011GPS	1991936.07	6407575.29	56.98	2 " IRON PIPE W/ DISC
5012GPS	1991882.83	6410211.88	57.25	2" ALUMINUM DISC, LS 5837

CONSTRUCTION NOTES:

GENERAL REQUIREMENTS:

1. UNDERGROUND SERVICE ALERT:
   CALL 811 (1-800-227-2600) A MINIMUM OF 2 BUSINESS DAYS (NOT INCLUDING INITIAL DAY OF CONTACT) IN ADVANCE FOR THE MARKING OF UNDERGROUND UTILITIES, INCLUDING ALL NON-UTILITIES BEFORE YOU DIG, GRADE, OR EXCAVATE.

2. UTILITY NOTES:
   - A. DIMENSIONS SHOWN ON THESE DRAWINGS ARE BASED ON THE BEST AVAILABLE INFORMATION FROM SEVERAL SOURCES, AND SHALL BE VERIFIED IN THE FIELD BY CONSTRUCTION PERSONNEL PRIOR TO FABRICATION.
   - B. THE INFORMATION SHOWN ON THESE DRAWINGS CONCERNING TYPE AND LOCATION OF UNDERGROUND UTILITIES, PROPERTY LINES, AND OTHER SUBSTRUCTURES IS NOT GUARANTEED TO BE ACCURATE OR ALL-INCLUSIVE, UNLESS OTHERWISE NOTED. CONSTRUCTION PERSONNEL ARE RESPONSIBLE FOR MAKING ALL DETERMINATIONS AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES AND OTHER SUBSTRUCTURES AS NECESSARY TO AVOID DAMAGE OR ENCROACHMENTS.
   - C. PROSPECTING IS REQUIRED AHEAD OF WORK. ALL OFFSETS OR ROPING WILL NEED TO BE APPROVED BY THE PG&E PROJECT ENGINEER (PED), AND REDLINED DETAILS SHOWN ON PROFILE AND CONSTRUCTION DETAIL SHEETS OF EACH ADDITIONAL SUBSTRUCTURE.
   - D. ALL EXCAVATIONS WITHIN EXISTING STATIONS SHALL BE HAND DUG OR EXCAVATED USING SOFT DIG METHODS (e.g. VACUUM EXCAVATIONS OR SIMILAR).

3. ELBOWS AND FIELD BENDS:
   - A. ALL BENDS ARE SMOOTH FIELD BENDS, EXCEPT WHERE ELBOWS ARE SHOWN. FIELD BENDS SHALL BE MADE IN ACCORDANCE WITH A-36, SECTION 4D. FIELD BENDS MAY BE USED IN LIEU OF ELBOWS WHEN PREAPPROVED BY THE PG&E PROJECT ENGINEER (PED).
   - B. IN ORDER TO AVOID EXCESSIVE STRAIN ON THE PIPELINE, THERE SHALL BE A MINIMUM SEPARATION OF 5 FEET BETWEEN A ROPED SECTION OF PIPELINE AND ANY ELBOWS OR FIELD BENDS.
   - C. ALL ANGLES SHOWN IN THE PLAN AND PROFILE ARE APPROXIMATE AND SHALL BE CUT TO SUIT FIELD CONDITIONS.

4. SEPARATION FROM OTHER STRUCTURES:
   - A. CROSSING UNDERGROUND FACILITIES: PG&E PIPELINE MUST BE INSTALLED WITH AT LEAST 24 INCHES OF CLEARANCE FROM ANY OTHER SUBSTRUCTURE/UTILITY NOT ASSOCIATED WITH THE PIPELINE UNLESS NOTED ON THE DRAWINGS.
   - B. PARALLELING UNDERGROUND FACILITIES: THIS PIPELINE MUST BE INSTALLED WITH AT LEAST 5 FEET OF CLEARANCE FROM ANY OTHER UNDERGROUND STRUCTURE/UTILITY NOT ASSOCIATED WITH THE PIPELINE UNLESS NOTED ON THE DRAWINGS.

5. RESTORATION AND CLEAN UP:
   - A. RESTORATION OF PUBLIC STREETS, SIDEWALKS, CURBS, ETC. ABOVE PIPE BEDDING SHALL BE IN ACCORDANCE WITH THE LATEST CITY, COUNTY, OR AGENCY STANDARDS.
   - B. WHERE EVER THERE ARE ROW CROPS, THE TOPSOIL SHALL BE REMOVED TO A DEPTH OF 12" AND STORED ON SITE. UPON COMPLETION OF CONSTRUCTION, THE TOPSOIL SHALL BE RESTORED. TAKE CARE TO PREVENT MIXING OF TOPSOIL AND SUBSOIL.

6. DESIGN NOTES:
   A.THIS DRAWING HAS BEEN CREATED BY REVIEW OF THE AS-BUILT DRAWINGS & RECORDS. ACCURACY IS DEPENDENT UPON THE SOURCE DOCUMENT LISTED ON THE REFERENCE DRAWINGS.

7. WELDING REQUIREMENTS:
   - A. ALL ARC WELDING IS TO BE PERFORMED IN ACCORDANCE WITH THE GAS WELDING CONTROL MANUAL TD-4160M. ALL CANS OR SPOOLS SHALL BE A MINIMUM LENGTH OF ONE PIPE DIAMETER, WHENEVER POSSIBLE.
   - B. INSTALL TEST STATIONS WITH THERMITE WELD CONNECTION IN ACCORDANCE WITH GAS T & D CORROSION CONTROL MANUAL O-10, O-10.1 AND O-10.2.

8. WELDING:
   WHEN INTERNAL MISALIGNMENT EXCEEDS 0.094", BACKWELD ANY GIRTH WELD WHERE THERE IS ACCESS TO THE INSIDE OF THE WELD. WHERE THERE IS NO ACCESS TO THE INSIDE OF THE WELD, MACHINE BORING OR GRINDING IS REQUIRED. BACKWELDING, GRINDING, OR BORING MUST BE DONE IN ACCORDANCE WITH THE APPROPRIATE UTILITY PROCEDURE IN THE GAS WELDING CONTROL MANUAL TD-4160M.

9. STRENGTH TEST REQUIREMENTS
   - A. STRENGTH TESTING SHALL MEET PRESSURE AND DURATION REQUIREMENTS OF GAS STANDARD A-34 AND SHALL BE CONDUCTED IN ACCORDANCE WITH UTILITY PROCEDURE TD-4137S.
   - B. ALL WELDS THAT HAVE NOT BEEN STRENGTH TESTED AND ALL FITTINGS SHALL BE SOAP TESTED AT 100 PSI AND AT OPERATING PRESSURE BEFORE COATING CAN OCCUR.

10. COATING REQUIREMENTS:
    - A. ALL EXPOSED PIPE AND FITTINGS ARE TO BE COATED IN ACCORDANCE WITH GAS STANDARD E-30. ALL COATING ON BURIED PIPE AND FITTINGS ARE TO BE APPLIED IN ACCORDANCE WITH GAS STANDARD E-35.
    - B. FOR COATING SELECTIONS ON BURIED PIPE, SEE DIRECT BURIAL COATING SELECTIONS TABLE.
    - C. CONTACT THE PROJECT ENGINEER (PED) TO REQUEST VARIANCE FROM THE APPROVED COATING PRODUCTS.

11. INSPECTION OF EXISTING PIPELINE:
    - A. WHENEVER EXISTING BURIED GAS FACILITIES ARE EXCAVATED DURING ENGINEERING OR DURING CONSTRUCTION, FOLLOW TD-5100P-01 TO DOCUMENT PIPE INSPECTION. THIS APPLIES TO EXISTING AND TO BE RETIRED FACILITIES.
    - B. EXISTING GIRTH WELDS, AT TIE-IN LOCATIONS, SHALL BE IDENTIFIED AND REMOVED IF PRACTICAL.
    - C. PRIOR TO TIE-IN, INSPECT COATING AND PIPE FOR DEFECTS. IF DEFECTS ARE FOUND, CONTACT PROJECT ENGINEER (PED) FOR GUIDANCE.

12. TIE-IN AND CLEARANCE PROCEDURE TO BE PREPARED AND PERFORMED IN ACCORDANCE WITH THE FOLLOWING WORK PROCEDURES:
    - A. TD-4100P-01, HOT AND COLD WORK METHODS FOR NATURAL GAS TRANSMISSION PIPELINE SHUTDOWN AND TIE-IN.
    - B. TD-4441S, GAS CLEARANCE PROCEDURES FOR FACILITIES OPERATING OVER 60 PSIG.

13. COATING REMOVAL:
    - A. PERFORM THE FOLLOWING STEPS, IN ACCORDANCE WITH TD-4711P-01, BEFORE REMOVING ASPHALTIC PIPE WRAP ON PIPELINES INSTALLED PRIOR TO 1972 (BASED ON PG&E ANALYSIS, PIPE INSTALLED IN 1972 OR LATER DOES NOT HAVE PIPE WRAP THAT CONTAINS ASBESTOS):
      1. REFER TO THE "EXISTING PIPE SPECS (PRE-1972)" STAMP TO DETERMINE IF A SAMPLE HAS BEEN COLLECTED OR IF A SAMPLE IS REQUIRED:
         - a. "YES" REPRESENTS HISTORICAL RESULTS ARE AVAILABLE SHOWING THAT PIPE WRAP CONTAINS ASBESTOS. NO SAMPLE IS REQUIRED.
         - b. "NO" REPRESENTS HISTORICAL RESULTS ARE AVAILABLE AND THE PIPE WRAP DOES NOT CONTAIN ASBESTOS (CONTENT WAS NON DETECT). NO SAMPLE IS REQUIRED.
         - c. "UNKNOWN" REPRESENTS NO HISTORICAL RESULTS ARE AVAILABLE. A SAMPLE IS REQUIRED IF THE PIPE INSTALLATION DATE IS PRIOR TO 1972.
      2. WHEN A PIPE WRAP SAMPLE IS REQUIRED TO BE ANALYZED FOR ASBESTOS:
         - a. COLLECT SAMPLE PER TD-4711P-01 AND COMPLETE CHAIN OF CUSTODY FORM TD-4711P-01-F01.
         - b. FILE PINK COPY OF THE CHAIN OF CUSTODY FORM AND FINAL LABORATORY RESULTS WITH THE AS-BUILTS.
      3. WHEN REMOVING PIPE WRAP THAT CONTAINS ASBESTOS, OR FOR EMERGENCY WORK, FOLLOW TD-4711P-01 "PIPE WRAP REMOVAL, HANDLING AND DISPOSAL".

CATHODIC PROTECTION NOTES:

1. FOLLOW TD-5100P-01 TO DOCUMENT INTERNAL CORROSION AND EXTERNAL CORROSION INSPECTION OF THE PIPELINE.
2. UPON COMPLETION OF BORINGS, CONTACT THE CORROSION SUPERVISOR FOR THE LOCAL AREA/DIVISION TO PERFORM CURRENT DRAIN TESTS ON THE PIPELINE SEGMENT THAT WAS INSTALLED IN THE BORE. THE CURRENT DRAIN TEST MUST BE PERFORMED PRIOR TO WELDING PIPE ON EITHER SIDE OF THE BORE.
3. FOR THE INSTALLATION OF THE WATCHDOG RECTIFIER REMOTE MONITOR, CONTACT THE CORROSION SUPERVISOR FOR THE LOCAL AREA/DIVISION.
4. BONDING CABLES TO BE INSTALLED ACROSS PIPELINE CUT-OUTS AT ALL LOCATIONS THE PIPELINE IS SEVERED PRIOR TO REMOVAL. CHAIN CLAMPS, MAGNETIC CLAMPS, OR OTHER CONSTRUCTION MANAGEMENT APPROVED CLAMPS AND #6 (MIN) STRANDED CABLE SHALL BE UTILIZED. CLAMPS TO REMAIN IN PLACE UNTIL PIPELINE IS TIED IN.

RETIREMENT PROCEDURE FOR EXISTING PIPE:

1. GT&D UTILITY WORK PROCEDURE TD 9500P-16, "DEACTIVATION AND/OR RETIREMENT OF UNDERGROUND GAS FACILITIES," SHALL BE FOLLOWED.
2. THE EXISTING PIPE SECTIONS SHALL HAVE FREE LIQUIDS REMOVED AND BE 100% PURGED PER GAS DESIGN STANDARD A-38, "PROCEDURES FOR PURGING GAS FACILITIES."
3. THE PIPE SHALL BE SECTIONALIZED AT INTERVALS AS SPECIFIED IN THE RETIREMENT PLAN. THE LOCATIONS CALLED OUT ARE APPROXIMATE AND ARE SUBJECT TO FIELD VERIFICATION TO IDENTIFY THE MOST OPTIMUM LOCATION IN THAT VICINITY. ACCURATE SURVEY DATA MAY NOT BE AVAILABLE FOR THESE LOCATIONS SO USE CAUTION DURING EXCAVATION AND WHEN IDENTIFYING THE PIPELINE TO BE RETIRED. OTHER ACTIVE PIPELINES MAY BE IN THE AREA.
4. AT EACH SUCH LOCATION NOTED ABOVE, A PIECE OF PIPE AT LEAST 24" LONG SHALL BE REMOVED. INSTALL A 1" HIGH PRESSURE SAVE-A-VALVE (H-17491, M022287) TO CHECK FOR PRODUCT AND PRESSURE PRIOR TO CUTTING INTO THE PIPELINE. THE OPEN ENDS OF THE RETIRED PIPE SHALL BE SEALED BY THE MOST APPROPRIATE METHOD OUTLINED IN GT&D UTILITY WORK PROCEDURE TD-9500P-16. BACKFILL MUST BE THOROUGHLY COMPACTED IN PLACE OF THE REMOVED SECTION OF PIPE.

DESIGN CHANGE PROCEDURE

MAINTENANCE AND CONSTRUCTION PERSONNEL MUST OBTAIN APPROVAL FROM THE PROJECT ENGINEER (PED) BEFORE MAKING ANY DESIGN CHANGE TO GAS FACILITIES PER TD-4014P-01.

HDD MIN. RADIUS/OPEN TRENCH ROPING

ROPING TABLE			
MIN ROPING RADIUS=			1400 FT
YY (FT)	XX (FT)	YY (FT)	XX (FT)
		5.5	175
1	75	6	183
1.5	92	6.5	191
2	106	7	198
2.5	118	7.5	205
3	130	8	212
3.5	140	8.5	218
4	150	9	224
4.5	159	9.5	230
5	167	10	236

HDD DESIGN RADIUS

ROPING TABLE			
MIN ROPING RADIUS=			2400 FT
YY (FT)	XX (FT)	YY (FT)	XX (FT)
		5.5	230
1	98	6	240
1.5	120	6.5	250
2	139	7	259
2.5	155	7.5	268
3	170	8	277
3.5	183	8.5	286
4	196	9	294
4.5	208	9.5	302
5	219	10	310

HDD/ 0 PSI

ROPING TABLE			
MIN ROPING RADIUS=			600 FT
YY (FT)	XX (FT)	YY (FT)	XX (FT)
		5.5	115
1	49	6	120
1.5	60	6.5	125
2	69	7	129
2.5	77	7.5	134
3	85	8	138
3.5	92	8.5	143
4	98	9	147
4.5	104	9.5	151
5	109	10	155

CONTACT INFORMATION:

PROJECT MANAGER	----	ANGELA WANG	925-244-3035
PROJECT ENGINEER (PED)	----	ALEX LI	925-244-3732
PIPELINE ENGINEER (PLE)	----	CARLOS CABRERA	925-789-0509
DESIGN ESTIMATOR	----	ERNEST AMIRIAN	209-384-4916
COST ESTIMATOR	----	RAY WONG	925-244-3873
CONSTRUCTION MANAGER	----	PAUL NELSON	209-300-4837
LAND PLANNER	----	JASON HIGGINBOTHAM	559-263-7459
CULTURAL MONITOR	----	STARLA LANE	925-328-5033
ENVIRONMENTAL	----	NATHAN CHRISTMAN	925-328-5119
BIOLOGIST	----	BENJAMIN HART	559-770-0027
CORROSION ENGINEER	----	EDDIE COLLYER	925-596-3639
DISTRIBUTION PLANNER	----	KENNETH MORSHEAD	209-576-6530
TRANSMISSION PLANNER	----	CHRISTOPHER GONZALES	408-502-0385
LOCAL MAINTENANCE SUPERVISOR	----	GREGORY ADAMS	209-247-6571
LOCAL CORROSION MECHANIC	----	LOUIE FANTIN	209-576-6665

REFERENCE DRAWINGS:

OPERATING MAPS	----	385171 REV45
PLAT SHEETS	----	3365 A6
		3365 A7
		3365 A8
		3366 A1
		3366 A2
		3366 A3
		3366 B1
		3366 B2
AS-BUILTS	----	31086127, 2015
		30697065, 2011
		176347, 1972

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REVISIONS

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	PSRS
	SUPV
	DSGN E1A4
	DWN E1A4
	CHKD MDGR
	OK
	DATE
	SCALES

PIPELINE - CONSTRUCTION NOTES
L-215 SAN JOAQUIN RIVER XING REPLACEMENT
L-215-1 MP 6.92 - 8.43, INSTALL 24" PIPE
PATTERSON, STANISLAUS COUNTY

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

GAS TRANSMISSION ESTIMATING & DESIGN

90% DESIGN REVIEW

PACIFIC GAS AND ELECTRIC COMPANY

BILL OF MATL	SHEET 26
DWG LIST	SHEET 2
TRACKING NUMBER	R-687
SHEET NO.	3 OF 28 SHEETS

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DIRECT BURIAL COATING SELECTIONS	
MAIN LINE COATING	FBE (E-35.4)
MINOR REPAIRS	LIQUID EPOXY (E-35.3)
TIE-IN WELDS	LIQUID EPOXY (E-35.1)
GIRTH WELDS	LIQUID EPOXY (E-35.1)
BUTT WELDED FITTINGS	LIQUID EPOXY (E-35.1)
VALVE ASSEMBLIES	LIQUID EPOXY (E-35.7), WAX TAPE (E-35.7)
SHORT SEGMENTS OF PIPE	LIQUID EPOXY (E-35.1)
AIR-TO-SOIL TRANSITIONS	LIQUID EPOXY/PSX 700 (E-35.8)
PRESSURE CONTROL FITTINGS	LIQUID EPOXY (E-35.7), WAX TAPE (E-35.7)
TIE-INS/COATING TRANSITIONS	LIQUID EPOXY (E-35.3)
BORED COATING SELECTIONS	
MAIN LINE COATING	ARO APPLIED OVER FBE (E-35.4)
MINOR REPAIRS	LIQUID EPOXIES (E-35.2)
TIE-IN WELDS	LIQUID EPOXIES (E-35.2)

NOTES:
1) REFERENCE CONSTRUCTION NOTE 10, COATING REQUIREMENTS.

INTERNAL CORROSION (IC) DESIGN & CONSTRUCTION REVIEW		
IC THREAT (PER TD-4810P-16)	YES	NO
	X	
IC REVIEW COMPLETED BY (CORROSION ENGINEER OR DESIGNATE)	LAN ID	DATE
CORROSION ENGINEERING HAS REVIEWED THIS DESIGN AND INCORPORATED ANY NECESSARY IC DESIGN AND CONSTRUCTION CONSIDERATIONS. DOCUMENTATION OF THE REVIEW AND ACTIONS TAKEN ARE IN THE JOB PACKAGE AND INCORPORATED IN THIS DESIGN.	E1CJ	7-26-18
EDRS ROUTING NUMBER:	2018-54662	

INSTALLATION TESTED OR INSPECTED AND NOTED ON DRAWING.
ALL CORROSION LEVELS SATISFACTORY PER PG&E GAS UTILITY STANDARD TD-4181S.

QUALIFIED EMPLOYEE DATE

CORROSION MECHANIC'S SIGNATURE IS REQUIRED WHEN A CPA BOUNDARY IS WITHIN THE SCOPE OF THE PROJECT.

DEPTH OF COVER (FT)	MAXIMUM CONSTRUCTION PER HALF AXLE (LBS) EXISTING PIPE - 24.000"OD, 0.500"WT, X65
8	310,790
7	246,475
6	187,686
5	136,809
4	95,125
3	61,331
2	30,883
0.5	11,638

DEPTH OF COVER (FT)	MAXIMUM CONSTRUCTION PER HALF AXLE (LBS) EXISTING PIPE - 24.000"OD, 0.500"WT, X60
8	281,392
7	223,580
6	170,600
5	124,628
4	86,859
3	56,142
2	28,345
0.5	10,726

DEPTH OF COVER (FT)	MAXIMUM CONSTRUCTION PER HALF AXLE (LBS) EXISTING PIPE - 24.000"OD, 0.375"WT, X60
8	125,999
7	102,563
6	80,284
5	60,240
4	43,168
3	28,712
2	14,927
0.5	5,906

DEPTH OF COVER (FT)	MAXIMUM CONSTRUCTION PER HALF AXLE (LBS) EXISTING PIPE - 12.750"OD, 0.219"WT, X52
8	21,854
7	25,858
6	28,750
5	28,554
4	23,085
3	16,844
2	9,181
0.5	2,880

DEPTH OF COVER (FT)	MAXIMUM CONSTRUCTION PER HALF AXLE (LBS) EXISTING PIPE - 12.750"OD, 0.500"WT, GRB
8	213,989
7	197,142
6	177,709
5	147,347
4	101,717
3	64,533
2	31,047
0.5	8,270

LEGEND:

- GT — GAS TRANSMISSION LINE (PROPOSED)
- GT (T) — GAS TRANSMISSION LINE (TO BE TESTED)
- GT — GAS TRANSMISSION LINE (EXISTING)
- GD — GAS DISTRIBUTION LINE (EXISTING)
- GS — GAS SERVICE LINE (EXISTING)
- GT — GAS TRANSMISSION LINE (RETIRED)
- GD — GAS DISTRIBUTION LINE (RETIRED)
- GS — GAS SERVICE LINE (RETIRED)
- OWNER — FOREIGN GAS LINE
- JT — JOINT TRENCH
- ET — ELECTRIC TRANSMISSION LINE
- ED — ELECTRIC DISTRIBUTION LINE
- ES — ELECTRIC SERVICE LINE
- ETOH — ELECTRIC TRANSMISSION OVERHEAD
- EDOH — ELECTRIC DISTRIBUTION OVERHEAD
- T — TELEPHONE LINE
- FO — FIBER OPTIC LINE
- TV — CABLE TV LINE
- SD — STORM DRAIN LINE
- SS — SEWER LINE
- W — WATER LINE
- UNK — UNKNOWN UTILITIES
- CASING
- PROPERTY BOUNDARY
- PG&E EASEMENT
- TEMPORARY EASEMENT
- R/W — FOREIGN RIGHT-OF-WAY
- CALTRANS RIGHT-OF-WAY

- FENCE
- WALLTYPE — WALL
- BARRIER
- TEMPORARY BARRIER (TYPE K)
- GUARD RAIL
- TOE OF SLOPE
- TOP OF SLOPE
- EP — EDGE OF PAVEMENT
- FC — FACE OF CURB
- BW — BACK OF WALK
- DASHED PAVEMENT MARKINGS
- UNPAVED ROAD
- RAILROAD
- ACCESS ROAD
- LAYDOWN / STAGING / CONSTRUCTION IMPACT AREA
- EXCAVATION / BELL HOLE
- SAFETY ZONE LIMITS
- ENVIRONMENTALLY SENSITIVE AREAS

- GAS LINE MARKER (OTHER)
- INSULATION JOINT
- PRESSURE CONTROL FITTING
- GAS BOX
- GAS HIGH PRESSURE REGULATOR
- GAS METER
- GAS DISTRICT REGULATOR
- PG&E GAS MANHOLE
- GAS VAULT
- GAS VENT
- GAS VALVE
- PG&E ELECTRIC MANHOLE
- ELECTRIC VAULT
- UTILITY POLE (ELECTRIC)
- UTILITY POLE (OTHER)
- JOINT POLE
- EXISTING ELECTRIC TOWER
- STORM DRAIN INLET
- UTILITY MANHOLE
- WATER METER

- WATER VALVE
- CABLE TV BOX
- TELECOMM BOX
- TELECOMM VAULT
- STREET LIGHT BOX
- TREE
- ANODE
- DEEPWELL ANODE
- COMPUTER AUTOMATED TEST STATION
- COUPON TEST STATION
- ELECTROLYSIS TEST STATION
- POLE-MOUNTED RECTIFIER
- DCIM — DCI MITIGATION CABINET
- POTHOLE
- CITY/COUNTY MONUMENT
- MONUMENT, SEE DESCRIPTION
- SURVEY CONTROL POINT
- CENTERLINE
- MONITORING WELL
- BORING

DETAIL LEGEND:

- PROPOSED GAS TRANSMISSION LINE
- EXISTING GAS TRANSMISSION LINE
- TEMPORARY GAS TRANSMISSION LINE (OWNED BY PG&E)
- TEMPORARY GAS TRANSMISSION LINE (OWNED BY OTHERS)
- RETIRED GAS TRANSMISSION LINE
- GAS TRANSMISSION LINE (TO BE REMOVED)
- CUT LINE (TO BE REMOVED)
- EXISTING GAS DISTRIBUTION LINE
- PROPOSED GAS DISTRIBUTION LINE
- TOP OF GRADE
- GAS VALVE
- PIPE END CUT (SIDE)
- PIPE END CUT
- FLOW — FLOW ARROW
- TIE-IN WELD
- 25 — MATERIAL OF RECORD ASSET
- 16 — BILL OF MATERIALS ASSET

Acronym	Definition
(E)	Existing
(P)	Proposed
AB	Aggregate Base
ABN	Abandon
AC	Asphalt Concrete
API	American Petroleum Institute
APN	Assessor's Parcel Number
APPROX	Approximate
AVE	Avenue
ARC	Abrasion Resistant Coating
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing Materials
BBCL	Bell Bell Chill Ring
BC	Begin Curve
BD	Blowdown
BEG	Begin
BKF	Backfill
BLDG	Building
BLVD	Boulevard
BM	Bench Mark
BMP	Best Management Practice
BOM	Bill of Materials
BR	Bridge
BTU	British Thermal Units
BV	Ball Valve
BW	Back of Walk
CATS	Computer Automated Test Station
CCV	Corrosion Control Volume
CI	Cast Iron
CL	Centerline
CMP	Corrugated Metal Pipe
CNG	Compressed Natural Gas
CO	County
CONC	Concrete
COND	Conduit
CP	Cathodic Protection
CPT	Catch Point
CROP	Conditional Reduction of Pressure
CTS	Coupon Test Station
CU	Copper
CULV	Culvert
D	Depth
DE	Dead End
DCUST	Distribution Customer
DEG	Degree
DET	Detail
DFM	Distribution Feeder Main
DI	Drainage Inlet
DIA	Diameter
DIST	Distribution
DPV	Damage Prevention Volume
DR	Distribution Regulator
DREG	District Regulator
DSAW	Double Submerged Arc-Welded
DWA	Deep Well Anode
DWY	Driveway
E	East
EASE	Easement
EC	End Curve
EL	Elbow
ELECT	Electric
ELEV	Elevation
EM	Electronic Marker
EMS	Engineering Material Specification
ENGR	Engineer
EP	Edge of Pavement
EQ	Equation
ERW	Electric Resistance Welded
ESA	Environmentally Sensitive Area
ETS	Electrolysis Test Station
ETW	Edge of Traveled Way
F	Filter
F & C	Frame and Cover
FBE	Fusion Bonded Epoxy
FC	Face of Curb
FDP	Future Design Pressure
FG	Finished Grade
FH	Fire Hydrant
FIG	Figure
FL	Flow Line
FLG	Flange
FWY	Freeway
GS	Natural Gas Service
GS&S	Gas Standards and Specifications
GV	Gate Valve
GW	Natural Gas Well
H	Horizontal
HDD	Horizontal Directional Drill
HFW	High Frequency Weld
HPR	High Pressure Regulator
HWY	Highway
ID	Inside Diameter
ILI	In-Line Inspection
INV	Invert
IRR	Irrigation
JN	Job Number
JP	Joint Pole
JT	Joint Trench
L	Line Number
LAT	Latitude
LN	Lane
LNG	Liquid Natural Gas
LOC	Location
LONG	Longitude
LT	Left
M	Monitor
MAOP	Maximum Allowable Operating Pressure
MAX	Maximum
MH	Manhole
MIN	Minimum
MISC	Miscellaneous
MLV	Main Line Valve
MOI	Method of Installation
MON	Monument
MOP	Maximum Operating Pressure
MP	Mile Point
MSP	Maximum Stopping Pressure
MTR	Meter
MW	Working Monitor
MWP	Maximum Working Pressure
N	North
NDE	Non-Destructive Examination
NOP	Normal Operating Pressure
NPC	Non-Protected/Native Coupon
NTS	Not to Scale
OD	Outside Pipe Diameter
OG	Original Ground
OH	Overhead
P	Pipeline
P/L	Property Line
PC	Point of Curvature
PCF	Pressure Control Fitting
PKWY	Parkway
PL	Plastic
PLC	Pregrammagle Logic Controllers
PRUPF	Procedure for the Resolution of Unknown Pipeline Features
PSI	Pounds per Square Inch
PV	Plug Valve
PVMT	Pavement
QTY	Quantity
R	Radius
RCP	Reinforced Concrete Pipe
RD	Road
RDWY	Roadway
REG	Regulator
REL	Relocate
REPL	Replace
REV	Revision
RR	Railroad
RT	Right
RTE	Route
R/W	Right of Way
S	South
SAWH	Submerged Arc-Welded Helical
SAWL	Submerged Arc-Welded Longitudinal
SCADA	Supervisory Control and Data Acquisition
SD	Storm Drain
SG	Subgrade
SHT	Sheet
SMLS	Seamless
SMYS	Specified Minimum Yield Strength
SPEC	Specification
SS	Sanitary Sewer
SSAW	Single Submerged Arc-Welded
ST	Street
STA	Station
STD	Standard
STL	Steel
STPR	Strength Test Pressure Report
T	Tied (Connected to System)
TCE	Temporary Construction Easement
TCP	Traffic Control Plan
TD	Technical Document
TDW	T. D. Williamson
TEL	Telephone
TEMP	Temporary
TG	Top of Grade
TT	Top Tap
TSP	Transmission System Planning
TYP	Typical
UG	Underground
USA	Underground Service Alert
UT	Ultra-Sonic Test
V	Valve
VIF	Verify in Field
VOL	Volume
W	Water
WT	Wall Thickness
WV	Water Valve
W/	With
W/O	Without
WP	Work Procedure

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REVISIONS

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	PSRS
	SUPV
	DSGN E1A4
	DWN E1A4
	CHKD MDGR
	OK
	DATE
	SCALES

GAS TRANSMISSION ESTIMATING & DESIGN

90% DESIGN REVIEW

PACIFIC GAS AND ELECTRIC COMPANY

PIPELINE - LEGEND & STAMPS
L-215 SAN JOAQUIN RIVER XING REPLACEMENT
L-215-1 MP 6.92 - 8.43, INSTALL 24" PIPE
PATTERSON, STANISLAUS COUNTY

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

BILL OF MATL	SHEET 26
DWG LIST	SHEET 2
TRACKING NUMBER	R-687
SHEET NO.	3 OF 28 SHEETS

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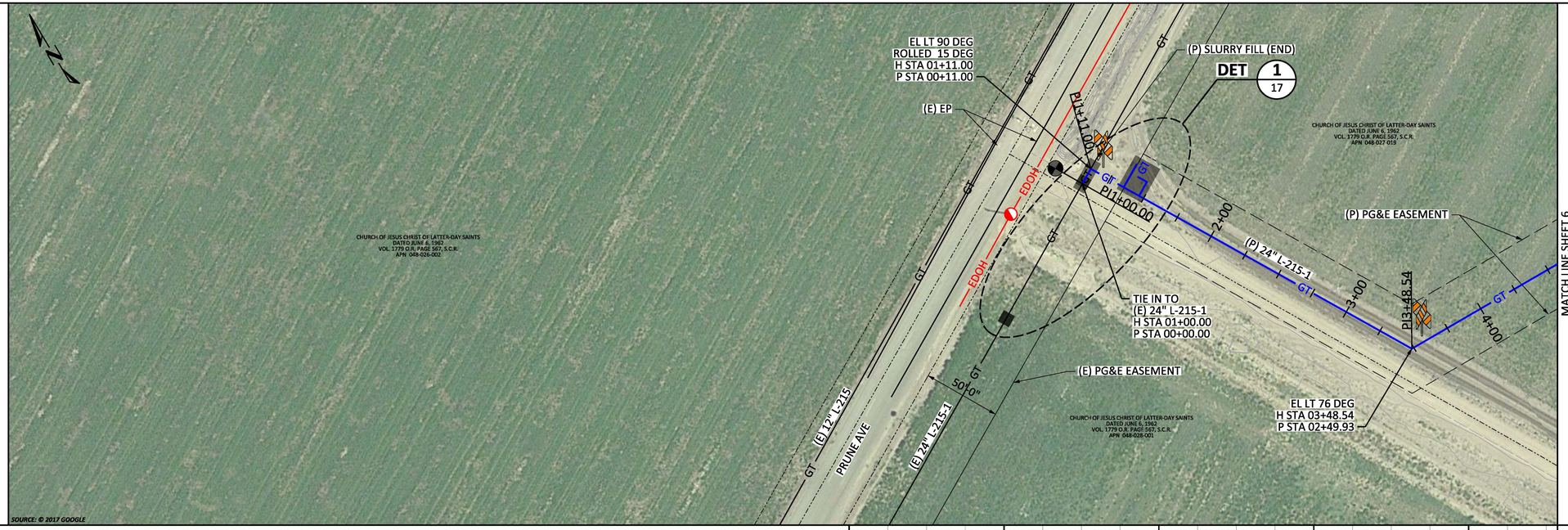
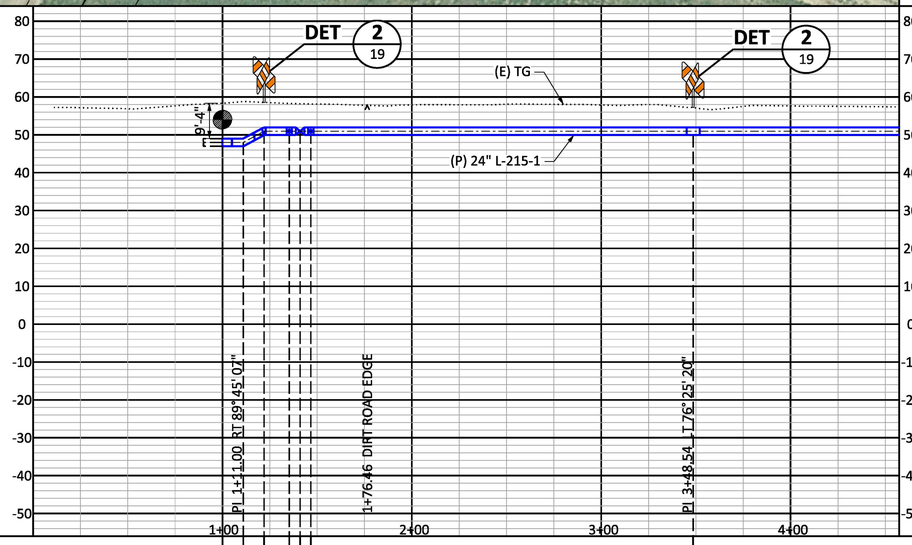
R/W	
OWNER/AGENCY	CHURCH OF JESUS CHRIST OF LATTER-DAY SAINTS
APN	048-027-019
LD#	
H STA	01+00.00 - 04+57.38

SURVEY PLAN SCALE: 1"=40'



SURVEY PROFILE HORIZONTAL SCALE: 1"=40' VERTICAL SCALE: 1"=20'

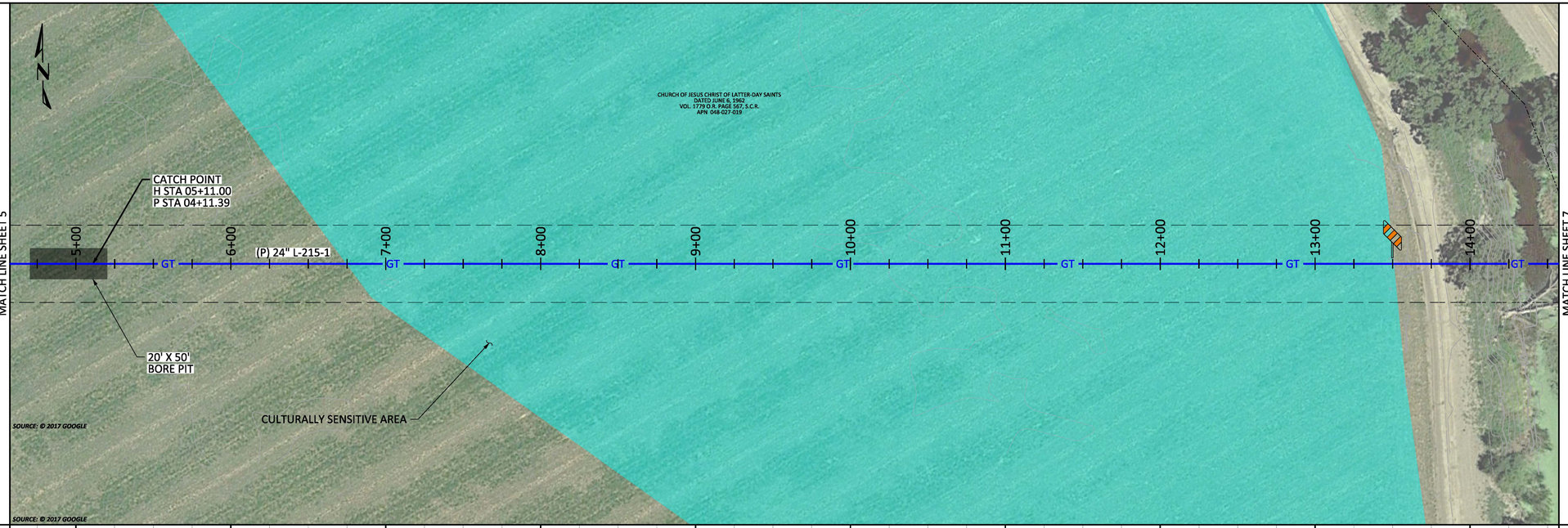


PIPELINE STATIONING

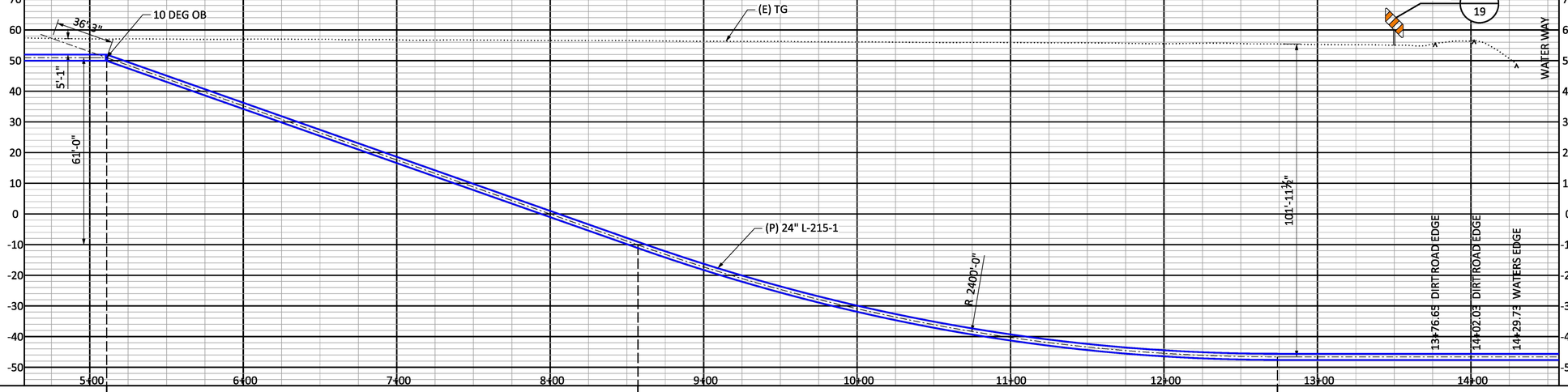
| | | |

R/W	
OWNER/AGENCY	CHURCH OF JESUS CHRIST OF LATTER-DAY SAINTS
APN	048-027-019
LD#	
H STA	04+57.38 - 14+57.38

SURVEY PLAN
SCALE: 1"=40'



SURVEY PROFILE
HORIZONTAL SCALE: 1"=40'
VERTICAL SCALE: 1"=20'



PIPELINE STATIONING

CATCH POINT EL OB 10 DEG H STA 05+11.00 P STA 04+11.39	BEG RADIUS H STA 08+57.18 P STA 07+62.91	END RADIUS H STA 12+73.94 P STA 11+81.79	
BOM# 2	8	1	
MOI OPEN CUT		HDD	

SAFETY PLEDGE

I ALWAYS PUT SAFETY FIRST.
I LOOK FOR AND ACT TO RESOLVE UNSAFE SITUATIONS.
I HELP AND ENCOURAGE OTHERS TO ACT SAFELY.

GAS TRANSMISSION ESTIMATING & DESIGN

90% DESIGN REVIEW

PACIFIC GAS AND ELECTRIC COMPANY

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NO.	DATE	DESCRIPTION	PM/SPEC	DWN	CHKD	SUPV	APVD BY
A		90% DESIGN REVIEW	74004060	E1A4	MDGR		

REVISIONS

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	SUPV
	DSGN E1A4
	DWN E1A4
	CHKD MDGR
	OK
	DATE
	SCALES

PIPELINE - PLAN & PROFILE
L-215 SAN JOAQUIN RIVER XING REPLACEMENT
L-215-1 MP 6.92 - 8.43, INSTALL 24" PIPE
PATTERSON, STANISLAUS COUNTY

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

BILL OF MATL	SHEET 26
DWG LIST	SHEET 2
TRACKING NUMBER	R-687
SHEET NO.	5 OF 28 SHEETS

74004060 A

74004060-S021-PP.dgn
01-APR-2020 09:45AM
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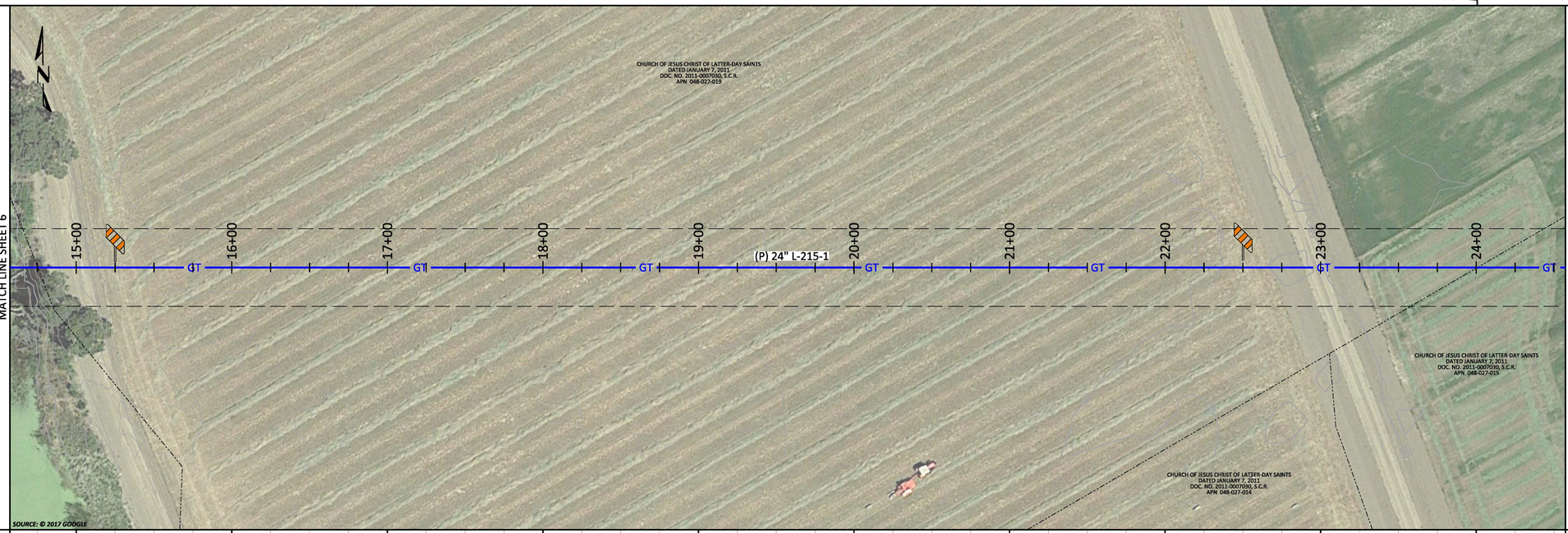
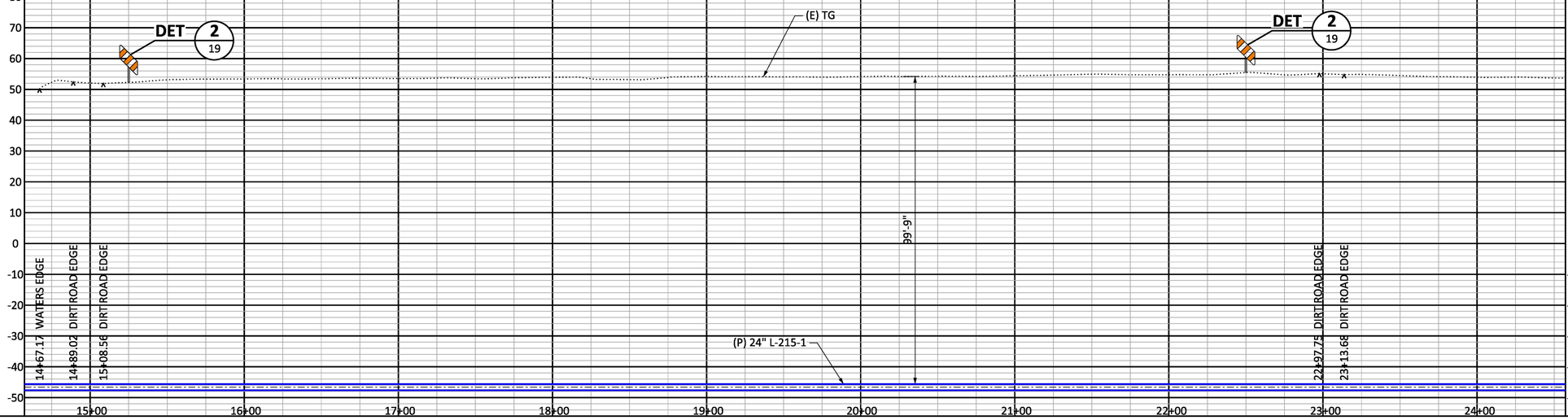
R/W		
	OWNER/AGENCY	CHURCH OF JESUS CHRIST OF LATTER-DAY SAINTS / CHURCH OF JESUS CHRIST OF LATTER-DAY SAINTS
	APN	048-027-019 / 048-027-015
	LD#	
	H STA	14+57.38 - 24+00.71 / 24+00.71 - 24+57.38

SURVEY PLAN SCALE: 1"=40'



SURVEY PROFILE HORIZONTAL SCALE: 1"=40' / VERTICAL SCALE: 1"=20'



PIPELINE STATIONING

BOM#	1
MOI	HDD

SAFETY PLEDGE

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GAS TRANSMISSION ESTIMATING & DESIGN

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	SCALES

PIPELINE - PLAN & PROFILE
L-215 SAN JOAQUIN RIVER XING REPLACEMENT
L-215-1 MP 6.92 - 8.43, INSTALL 24" PIPE
PATTERSON, STANISLAUS COUNTY

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

BILL OF MATL	SHEET 26
DWG LIST	SHEET 2
TRACKING NUMBER	R-687
SHEET NO.	6 OF 28 SHEETS

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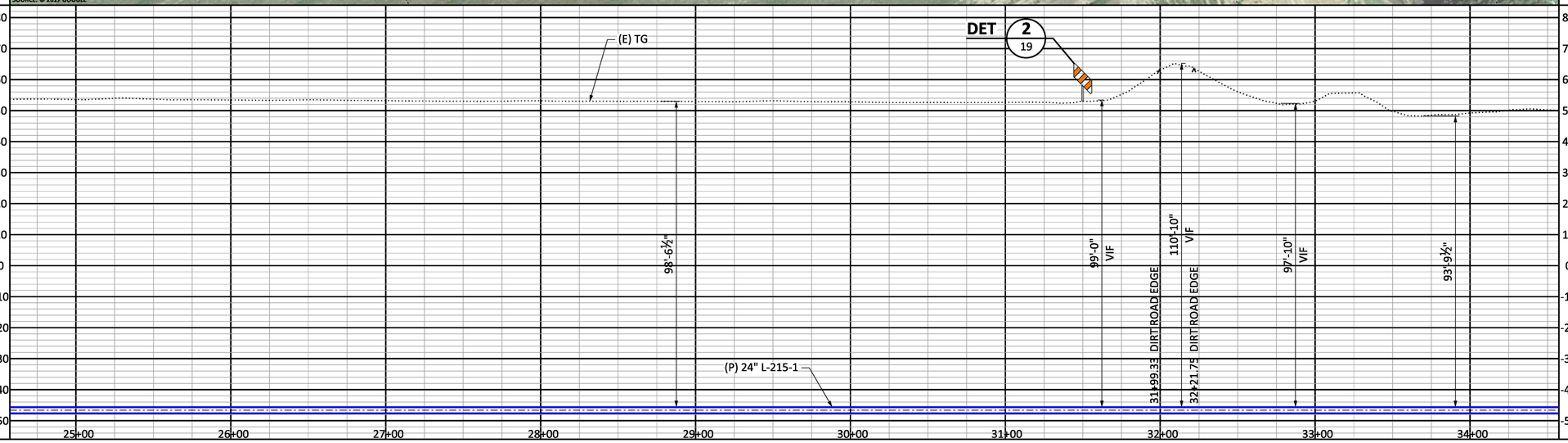
R/W				
OWNER/AGENCY	CHURCH OF JESUS CHRIST OF LATTER-DAY SAINTS	CHURCH OF JESUS CHRIST OF LATTER-DAY SAINTS	TWIN OAKS IRRIGATION COMPANY	WESTSIDE PROPERTY MANAGEMENT
APN	048-027-015	048-027-016	048-027-004	048-027-006
LD#				
H STA	24+57.38 - 26+17.26	26+17.26 - 31+66.94	31+66.94 - 33+34.38	33+34.38 - 34+57.38

SURVEY PLAN SCALE: 1"=40'



SURVEY PROFILE HORIZONTAL SCALE: 1"=40' VERTICAL SCALE: 1"=20'



PIPELINE STATIONING

BOM#	1
MOI	HDD

SAFETY PLEDGE

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GAS TRANSMISSION ESTIMATING & DESIGN

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PIPELINE - PLAN & PROFILE
L-215 SAN JOAQUIN RIVER XING REPLACEMENT
L-215-1 MP 6.92 - 8.43, INSTALL 24" PIPE
PATTERSON, STANISLAUS COUNTY

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

BILL OF MATL	SHEET 26
DWG LIST	SHEET 2
TRACKING NUMBER	R-687
SHEET NO.	7 OF 28 SHEETS

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01-APR-2020 09:45AM
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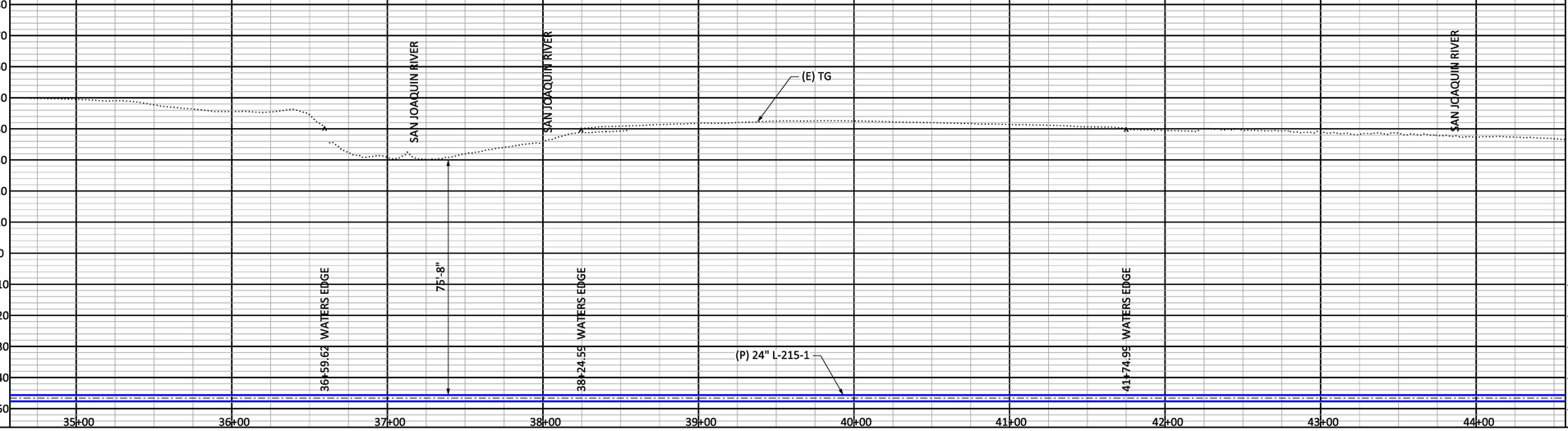
R/W		
OWNER/AGENCY	WESTSIDE PROPERTY MANAGEMENT	FRANK A.S. MENDONCA, ET. AL.
APN	048-027-006	058-002-011
LD#		
H STA	34+57.38 - 39+53.71	39+53.71 - 44+57.38

SURVEY PLAN SCALE: 1"=40'



SURVEY PROFILE
HORIZONTAL SCALE: 1"=40'
VERTICAL SCALE: 1"=20'



PIPELINE STATIONING

BOM# 1
MOI HDD

SAFETY PLEDGE

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GAS TRANSMISSION ESTIMATING & DESIGN

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	DWN E1A4
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PIPELINE - PLAN & PROFILE
L-215 SAN JOAQUIN RIVER XING REPLACEMENT
L-215-1 MP 6.92 - 8.43, INSTALL 24" PIPE
PATTERSON, STANISLAUS COUNTY

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

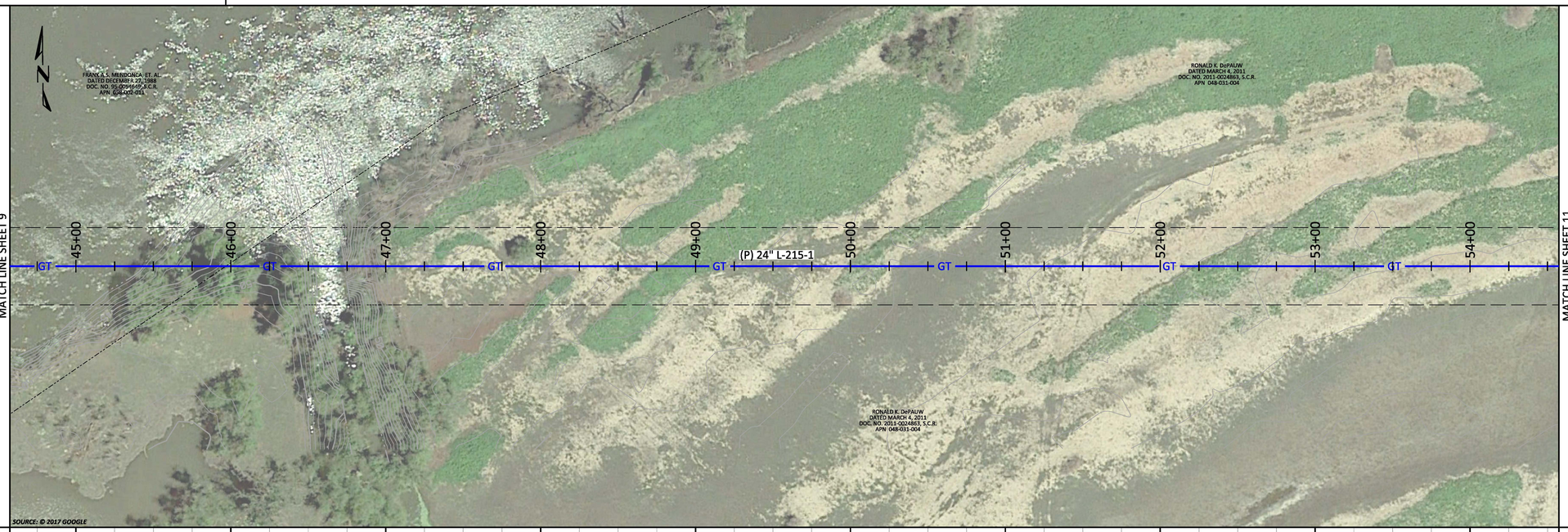
BILL OF MATL	SHEET 26
DWG LIST	SHEET 2
TRACKING NUMBER	R-687
SHEET NO.	8 OF 28 SHEETS

74004060 A

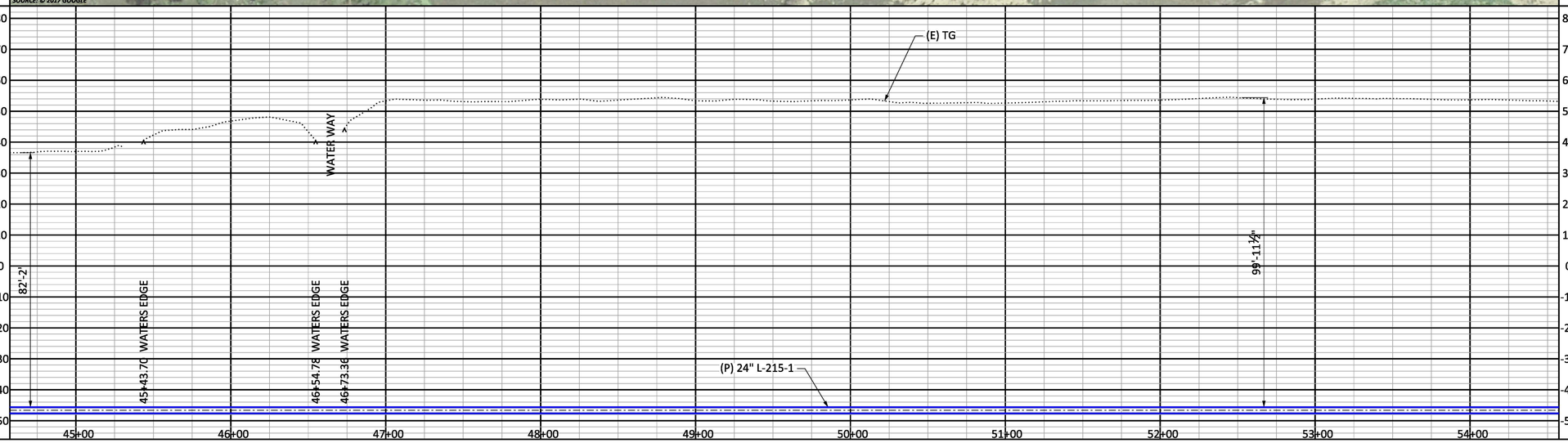
74004060-S024-PP.dgn
01-APR-2020 09:46AM
Estimating.pen

R/W			
	OWNER/AGENCY	FRANK A.S. MENDONCA, ET. AL.	RONALD K. DePAUW
	APN	058-002-011	048-031-004
	LD#		
	H STA	44+57.38 - 45+96.75	45+96.75 - 54+57.38

SURVEY PLAN SCALE: 1"=40'



SURVEY PROFILE HORIZONTAL SCALE: 1"=40' VERTICAL SCALE: 1"=20'



PIPELINE STATIONING

BOM#	1
MOI	HDD

SAFETY PLEDGE

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GAS TRANSMISSION ESTIMATING & DESIGN

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	SUPV
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	SCALES

PIPELINE - PLAN & PROFILE
L-215 SAN JOAQUIN RIVER XING REPLACEMENT
L-215-1 MP 6.92 - 8.43, INSTALL 24" PIPE
PATTERSON, STANISLAUS COUNTY

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

BILL OF MATL	SHEET 26
DWG LIST	SHEET 2
TRACKING NUMBER	R-687
SHEET NO.	9 OF 28 SHEETS

74004060 A

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01-APR-2020 09:50AM
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R/W				
OWNER/AGENCY	RONALD K. DePAUW	STATE OF CALIFORNIA	BENITO VELASQUEZ, ET. AL.
APN	048-031-004		057-001-002
LD#			
H STA	54+57.38 - 60+06.27	60+06.27 - 62+91.88	62+91.88 - 64+57.38

SAFETY PLEDGE

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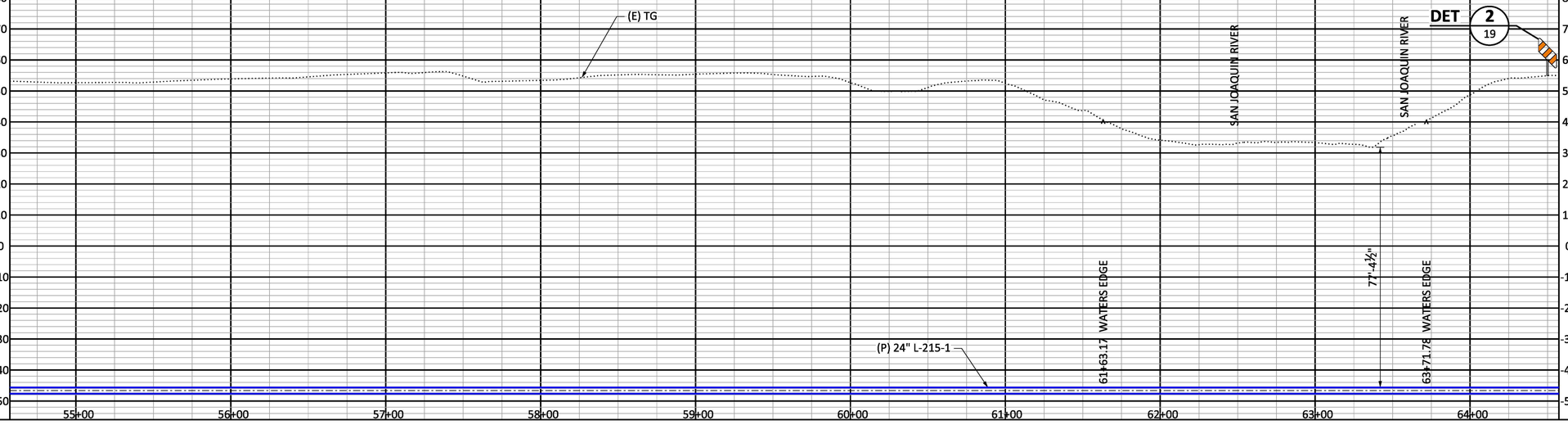
SURVEY PLAN SCALE: 1"=40'



SURVEY PROFILE HORIZONTAL SCALE: 1"=40' VERTICAL SCALE: 1"=20'



PIPELINE STATIONING

BOM#	1
MOI	HDD

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	DSGN E1A4
	DWN E1A4
	CHKD MDGR
	OK
	DATE
	SCALES

GAS TRANSMISSION ESTIMATING & DESIGN

90% DESIGN REVIEW

PACIFIC GAS AND ELECTRIC COMPANY

PIPELINE - PLAN & PROFILE
L-215 SAN JOAQUIN RIVER XING REPLACEMENT
L-215-1 MP 6.92 - 8.43, INSTALL 24" PIPE
PATTERSON, STANISLAUS COUNTY

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

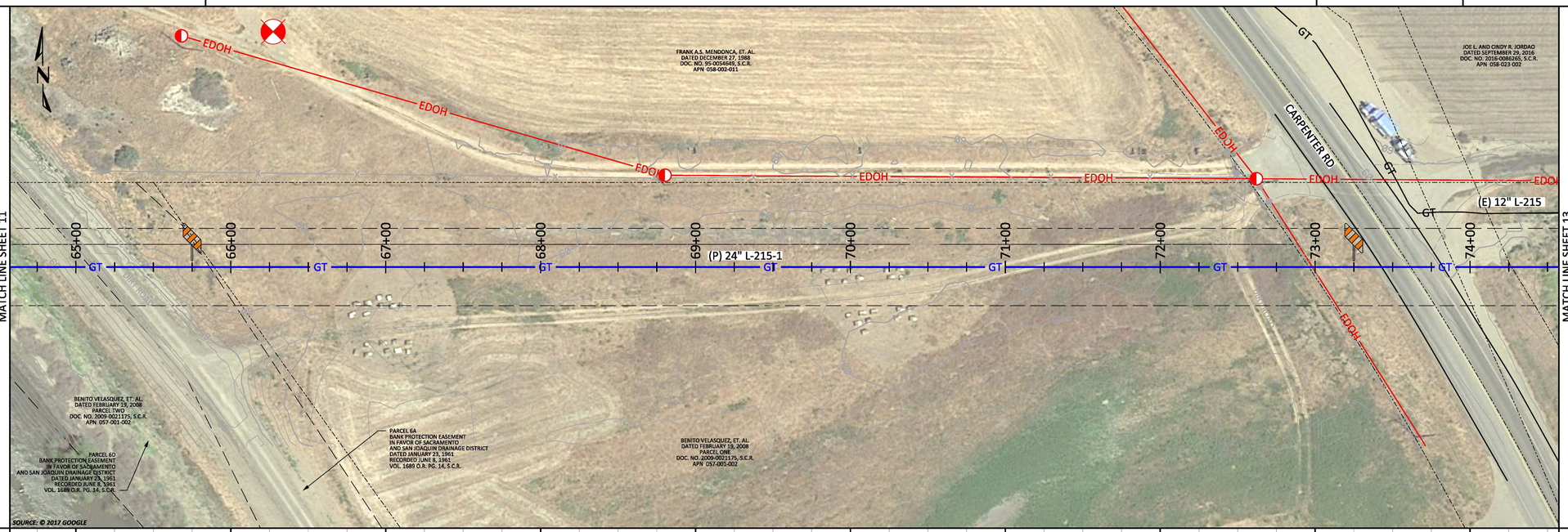
BILL OF MATL	SHEET 26
DWG LIST	SHEET 2
TRACKING NUMBER	R-687
SHEET NO.	10 OF 28 SHEETS

74004060 A

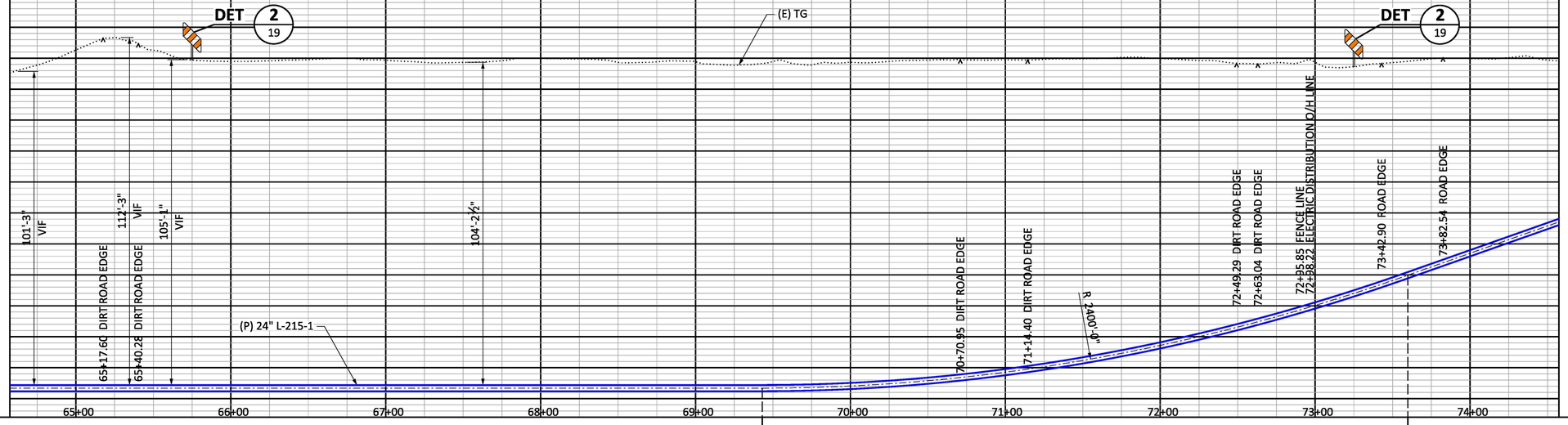
74004060-S026-PP.dgn 01-APR-2020 09:49AM Estimating.pen

R/W					
OWNER/AGENCY	BENITO VELASQUEZ, ET. AL.	BENITO VELASQUEZ, ET. AL.		(E) CALTRANS R/W	JOE L. AND CINDY R. JORDAO
APN	057-001-002	057-001-002			058-023-002
LD#					
H STA	64+57.38 - 65+89.18	65+89.18 - 72+95.91		72+95.91 - 74+26.73	74+26.73 - 74+57.38

SURVEY PLAN SCALE: 1"=40'



SURVEY PROFILE HORIZONTAL SCALE: 1"=40'
VERTICAL SCALE: 1"=20'



PIPELINE STATIONING

BEG RADIUS
H STA 69+43.06
P STA 68+50.91

END RADIUS
H STA 73+59.81
P STA 72+69.79

BOM#	1
MOI	HDD

SAFETY PLEDGE

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GAS TRANSMISSION ESTIMATING & DESIGN

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	OK
	DATE
	SCALES

PIPELINE - PLAN & PROFILE
L-215 SAN JOAQUIN RIVER XING REPLACEMENT
L-215-1 MP 6.92 - 8.43, INSTALL 24" PIPE
PATTERSON, STANISLAUS COUNTY

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

BILL OF MATL	SHEET 26
DWG LIST	SHEET 2
TRACKING NUMBER	R-687
SHEET NO.	11 OF 28 SHEETS

74004060 A

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01-APR-2020 09:48AM
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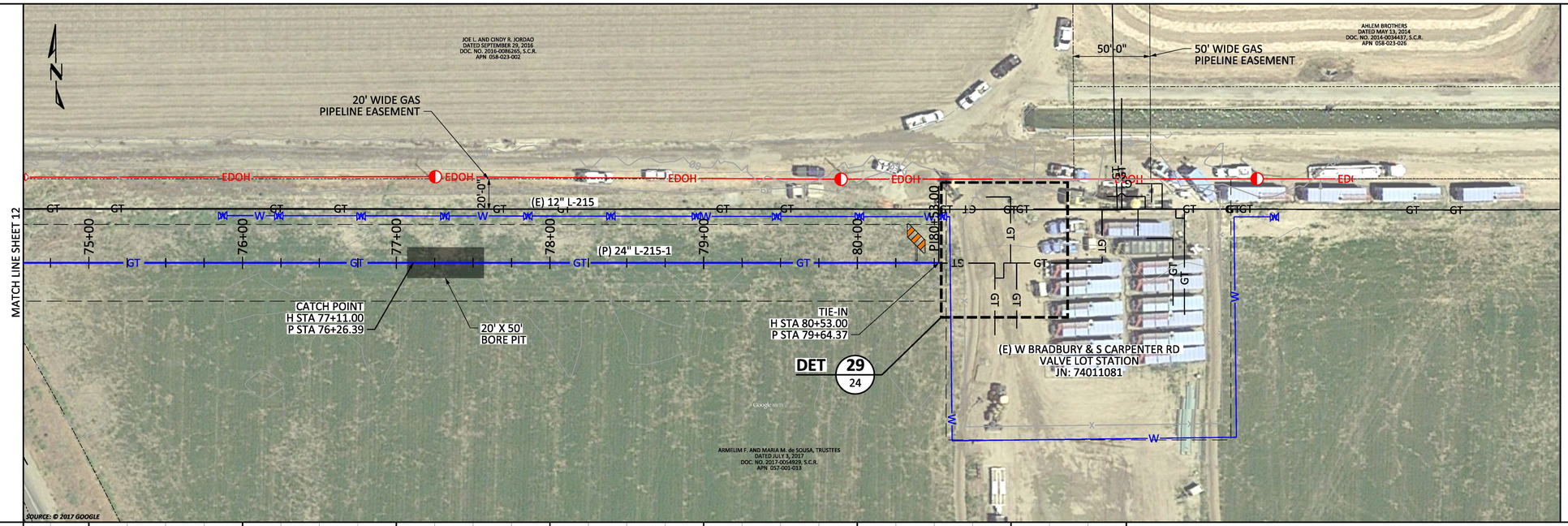
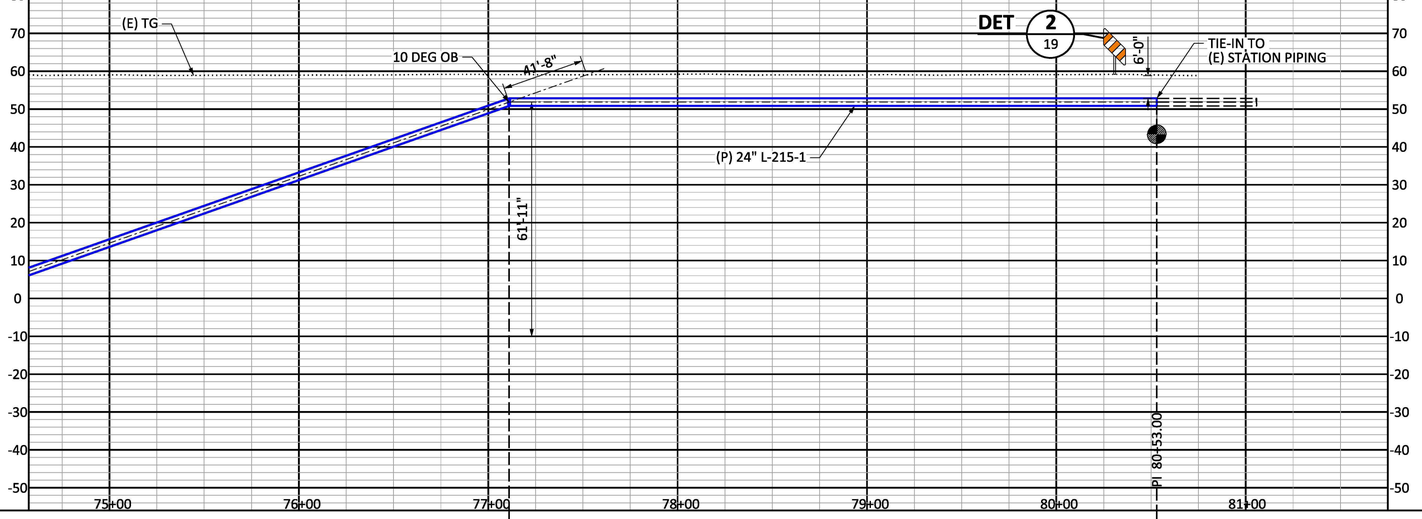
R/W OWNER/AGENCY	ARMELIM F. AND MARIA M. de SOUSA, TRUSTEES
APN	057-001-013
LD#	
H STA	74+57.38 - 80+75.60

SURVEY PLAN SCALE: 1"=40'



SURVEY PROFILE HORIZONTAL SCALE: 1"=40' VERTICAL SCALE: 1"=20'



PIPELINE STATIONING

CATCH POINT
EL OB 10 DEG
H STA 77+11.00
P STA 76+26.39

TIE-IN TO
(E) STATION
H STA 80+53.00
P STA 79+64.37

BOM#	1	8	2
MOI	HDD		OPEN CUT

SAFETY PLEDGE

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GAS TRANSMISSION ESTIMATING & DESIGN

90% DESIGN REVIEW

PACIFIC GAS AND ELECTRIC COMPANY

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	DSGN E1A4
	DWN E1A4
	CHKD MDGR
	OK
	DATE
	SCALES

PIPELINE - PLAN & PROFILE
L-215 SAN JOAQUIN RIVER XING REPLACEMENT
L-215-1 MP 6.92 - 8.43, INSTALL 24" PIPE
PATTERSON, STANISLAUS COUNTY

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

BILL OF MATL	SHEET 26
DWG LIST	SHEET 2
TRACKING NUMBER	R-687
SHEET NO.	12 OF 28 SHEETS

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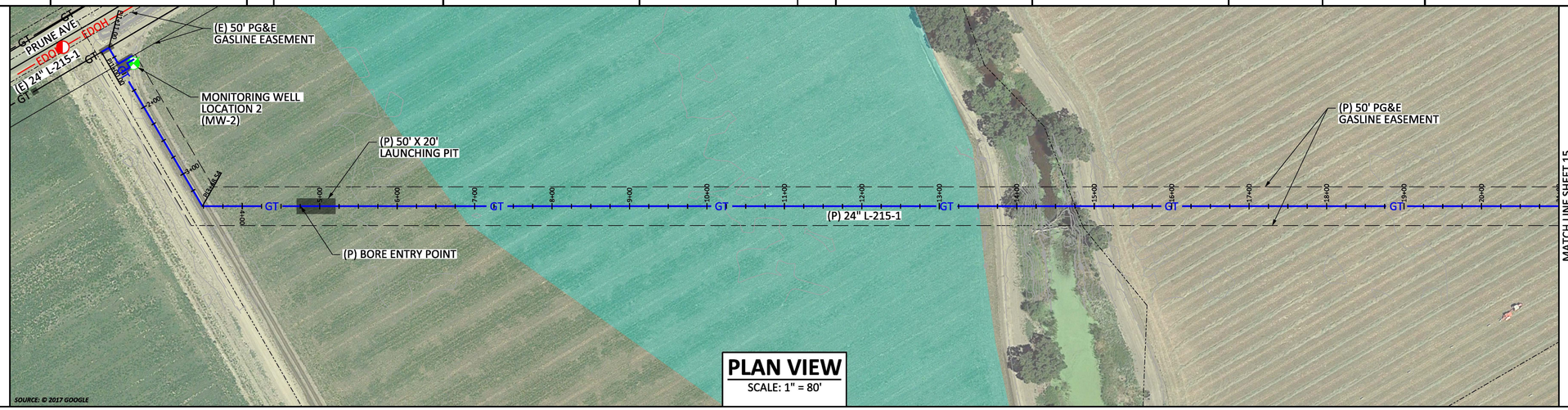
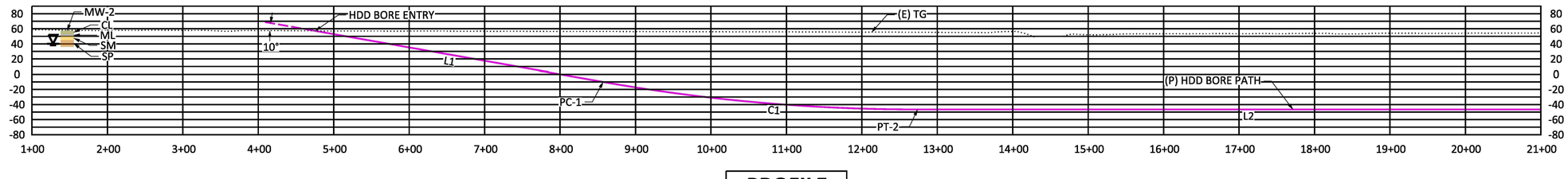


PLAN VIEW
SCALE: 1" = 80'



PROFILE
SCALE: 1" = 80'

HDD NOTES:

1. WHEN BALLAST WATER IS REQUIRED DURING PRODUCT PIPE PULLBACK, CONTRACTOR TO FURNISH TWO (2) TREMMIE PIPES DURING FILL (ONE FOR FILL OPERATIONS, ONE AS REDUNDANT BACKUP). TREMMIE PIPE TO BE CONSTRUCTED OF NEW MATERIAL.
2. DOWNHOLE PRESSURE SUBASSEMBLIES WILL BE REQUIRED ON ALL HDD PROJECTS. CONTRACTOR MUST KEEP LOG OF MUD PRESSURE AND SUBMIT TO PG&E PROJECT ENGINEER DAILY DURING PILOT DRILLING.
3. CONTRACTOR IS RESPONSIBLE FOR MITIGATING INTERFERENCE OF TRACKING EQUIPMENT AND FURNISHING STEERING TOOLS AND SURFACE COILS CAPABLE OF PROVIDING ACCURATE STEERING INFORMATION.
   A. IF INTERFERENCE IS ENCOUNTERED, CONTRACTOR TO COMMUNICATE ISSUE TO PG&E PROJECT ENGINEER WITHIN 24 BUSINESS HOURS.
4. CONTRACTOR MUST PROVIDE PG&E PROJECT ENGINEER PILOT BORE STEERING AND TRACKING DATA DAILY UNTIL BORE COMPLETION. CONTRACTOR MUST FURNISH BOTH RAW AND PLUGGED AZIMUTH DATA WITH A WRITTEN EXPLANATION FOR ANY PLUGGED DATA. REAMING MAY NOT PROCEED UNTIL PG&E ACCEPTS PILOT BORE DATA.
5. IF PLANNED DRILLING PROFILE DEVIATES FROM DESIGN, CONTRACTOR TO PROVIDE PROPOSED DRILLING PROFILE AT LEAST 5 BUSINESS DAYS PRIOR TO BEGINNING PILOT DRILLING FOR PG&E PROJECT ENGINEER REVIEW AND APPROVAL.
6. ANY INADVERTENT RETURN EVENTS WILL BE COMMUNICATED TO PG&E PROJECT ENGINEER, CONSTRUCTION MANAGER/FIELD ENGINEER, AND ENVIRONMENTAL FIELD SPECIALIST IMMEDIATELY. CONTRACTOR TO COMPLETE MUD RELEASE FORM AND SUBMIT TO UNIFIER WITHIN 24 BUSINESS HOURS. MUD RELEASE FORM WILL BE SUPPLIED BY PROJECT ENGINEER.
7. CONTRACTOR TO SUBMIT PICK PLAN TO PG&E PROJECT ENGINEER AT LEAST ONE(1) WEEK PRIOR TO PULLBACK. PULLBACK MAY NOT PROCEED UNTIL ACCEPTED BY PG&E PROJECT ENGINEER.
   A. PICK PLAN TO INCLUDE, AT A MINIMUM, SPACING BETWEEN PIPE ROLLERS AND PICK POINTS, HEIGHT OF PIPE AT EACH PICK LOCATION AND MINIMUM COMPOUND RADIUS OF PIPE.
8. BORE PIPE TO BE PRE-TESTED PER PROVIDED STPR.
9. MONITORING: THE RIGHT AND LEFT LEVEE EMBANKMENTS CROSSING THE BOREHOLE PATH MUST BE MONITORED BY A LICENSED PROFESSIONAL ENGINEER, P.E. OR PROFESSIONAL GEOLOGIST, P.G. DURING THE HDD PIPELINE INSTALLATION FOR VERTICAL AND/OR HORIZONTAL DISPLACEMENTS AT BOTH THE EMBANKMENT CROWN AND TOES.
10. SEAL BOREHOLE ENTRY/EXIT BY DISPLACING THE DRILLING FLUID WITH A CEMENTITIOUS GROUT ALONG THE ANNULUS OF THE BOREHOLE PATH OVER A VERTICAL DISTANCE OF 10 FEET AS MEASURED FROM THE GROUND SURFACE INTO THE SUBSURFACE.

LINE / CURVE DATA			
SEGMENT	LENGTH	RADIUS	DELTA
L1	387.7'		
C1	418.9'	2,400'	10°
L2	5669.1'		
C2	418.9'	2,400'	10°
L3	398.3'		

DRILL DATA				
POINT	LATITUDE	LONGITUDE	H STATION	ELEVATION
ENTRY	37.4494	-121.0481	04+75.33	57.22'
PC-1	37.4494	-121.0469	08+57.18	-10.11'
PT-2	37.4494	-121.0455	12+73.94	-46.57'
PC-3	37.4494	-121.0260	69+43.06	-46.57'
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EXIT	37.4493	-121.0233	77+52.03	59.05'

DESIGN RADIUS: 2,400'
MIN. COMPOUND RADIUS: 1,400'
ALLOWABLE HORIZONTAL DRIFT +/- 10'

NOTE: REFER TO GEOTECHNICAL REPORT PREPARED BY KLEINFELDER, DATED 05-29-2018.

BORE PROFILE LEGEND (FOR REFERENCE ONLY)

CL	LEAN CLAY	SP	POORLY GRADED SAND
SM	SILTY SAND	ML	SANDY MOLD
SP-SM	POORLY GRADED SAND WITH SILT		

BORING LOCATIONS			
BORING #	LATITUDE	LONGITIDE	DEPTH
MW-2	37.44993	-121.04901	23'
-			'
-			'

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ZERO IN ON SAFETY

NO.	DATE	DESCRIPTION	PM/SPEC	DWN	CHKD	SUPV	APVD BY
A		90% DESIGN REVIEW	74004060	E1A4	MDGR		

REVISIONS

APPROVED BY	
	PSRS
	SUPV
	DSGN E1A4
	DWN E1A4
	CHKD MDGR
	OK
	DATE
	SCALES

PIPELINE - HDD PROFILE
L-215 SAN JOAQUIN RIVER XING REPLACEMENT
L-215-1 MP 6.92 - 8.43, INSTALL 24" PIPE
PATTERSON, STANISLAUS COUNTY

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

BILL OF MATL	SHEET 26
DWG LIST	SHEET 2
TRACKING NUMBER	R-687
SHEET NO.	13 OF 28 SHEETS
	74004060 A

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GAS TRANSMISSION ESTIMATING & DESIGN

90% DESIGN REVIEW

PACIFIC GAS AND ELECTRIC COMPANY

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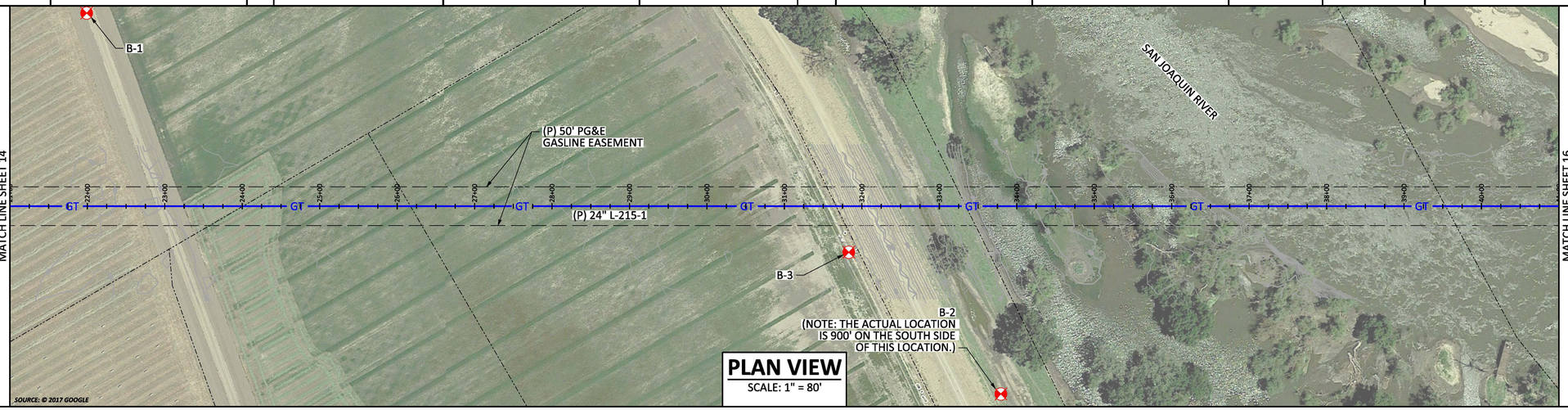
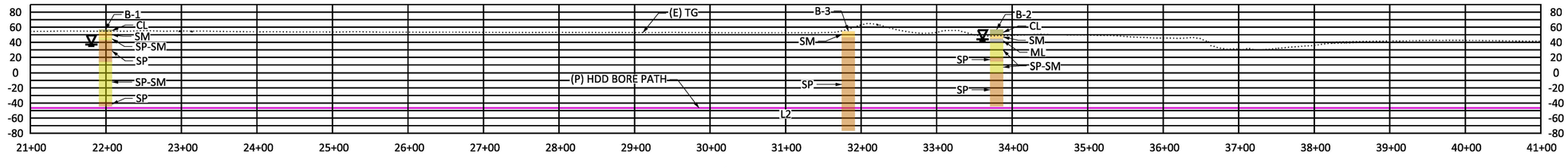


PLAN VIEW
SCALE: 1" = 80'



PROFILE
SCALE: 1" = 80'

HDD NOTES:

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DESIGN RADIUS: 2,400'
MIN. COMPOUND RADIUS: 1,400'
ALLOWABLE HORIZONTAL DRIFT +/- 10'

NOTE: REFER TO GEOTECHNICAL REPORT PREPARED BY KLEINFELDER, DATED 05-29-2018.

DRILL DATA				
POINT	LATITUDE	LONGITUDE	H STATION	ELEVATION
ENTRY	37.4494	-121.0481	04+75.33	57.22'
PC-1	37.4494	-121.0469	08+57.18	-10.11'
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PC-3	37.4494	-121.0260	69+43.06	-46.57'
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CL	LEAN CLAY	SP	POORLY GRADED SAND
SM	SILTY SAND	ML	SANDY SILT
SP-SM	POORLY GRADED SAND WITH SILT		

BORING LOCATIONS			
BORING #	LATITUDE	LONGITIDE	DEPTH
B-1	37.45009	-121.04231	101.5'
B-2	37.44629	-121.03825	101.5'
B-3	37.44921	-121.03891	131.5'

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REVISIONS

APPROVED BY	PSRS
	SUPV
	DSGN E1A4
	DWN E1A4
	CHKD MDGR
	OK
	DATE
	SCALES

PIPELINE - HDD PROFILE
L-215 SAN JOAQUIN RIVER XING REPLACEMENT
L-215-1 MP 6.92 - 8.43, INSTALL 24" PIPE
PATTERSON, STANISLAUS COUNTY

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

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GAS TRANSMISSION ESTIMATING & DESIGN

90% DESIGN REVIEW

PACIFIC GAS AND ELECTRIC COMPANY

BILL OF MATL	SHEET 26
DWG LIST	SHEET 2
TRACKING NUMBER	R-687
SHEET NO.	14 OF 28 SHEETS

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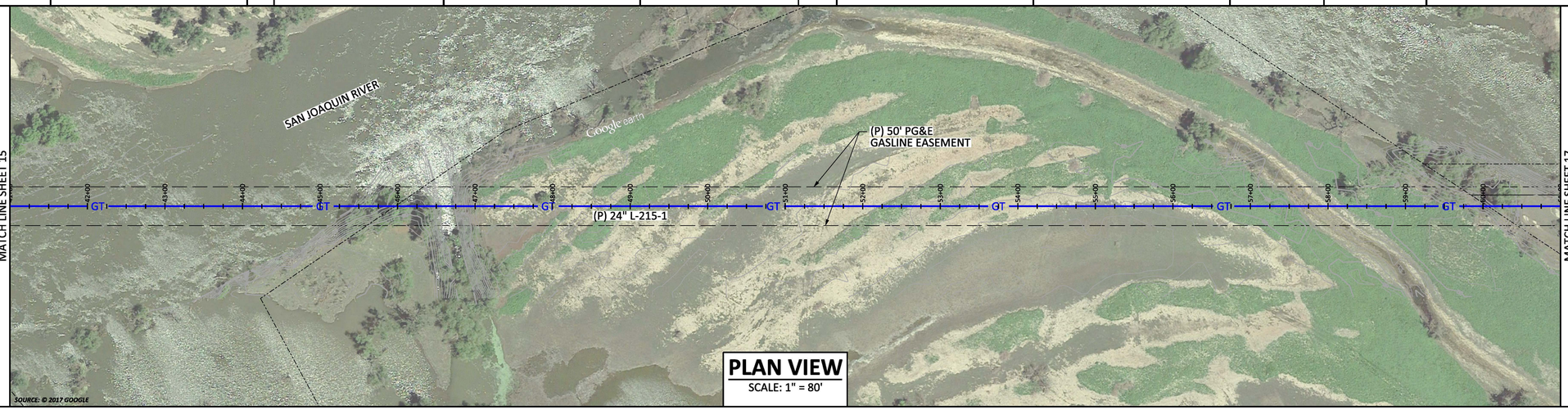
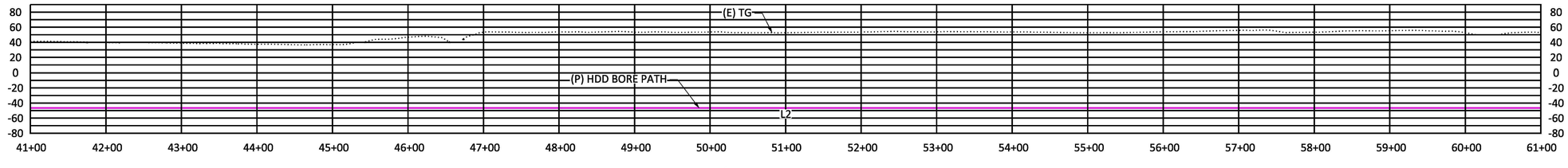


PLAN VIEW
SCALE: 1" = 80'



PROFILE
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LINE / CURVE DATA			
SEGMENT	LENGTH	RADIUS	DELTA
L1	387.7'		
C1	418.9'	2,400'	10°
L2	5669.1'		
C2	418.9'	2,400'	10°
L3	398.3'		

DRILL DATA				
POINT	LATITUDE	LONGITUDE	H STATION	ELEVATION
ENTRY	37.4494	-121.0481	04+75.33	57.22'
PC-1	37.4494	-121.0469	08+57.18	-10.11'
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PC-3	37.4494	-121.0260	69+43.06	-46.57'
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DESIGN RADIUS: 2,400'
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BORE PROFILE LEGEND (FOR REFERENCE ONLY)

CL	LEAN CLAY	SP	POORLY GRADED SAND
SM	SILTY SAND	ML	SANDY MILT
SP-SM	POORLY GRADED SAND WITH SILT		

BORING LOCATIONS			
BORING #	LATITUDE	LONGITIDE	DEPTH
-			'
-			'
-			'

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REVISIONS

APPROVED BY	
	PSRS
	SUPV
	DSGN E1A4
	DWN E1A4
	CHKD MDGR
	OK
	DATE
	SCALES

PIPELINE - HDD PROFILE
L-215 SAN JOAQUIN RIVER XING REPLACEMENT
L-215-1 MP 6.92 - 8.43, INSTALL 24" PIPE
PATTERSON, STANISLAUS COUNTY

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

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GAS TRANSMISSION ESTIMATING & DESIGN

90% DESIGN REVIEW

PACIFIC GAS AND ELECTRIC COMPANY

BILL OF MATL	SHEET 26
DWG LIST	SHEET 2
TRACKING NUMBER	R-687
SHEET NO.	15 OF 28 SHEETS

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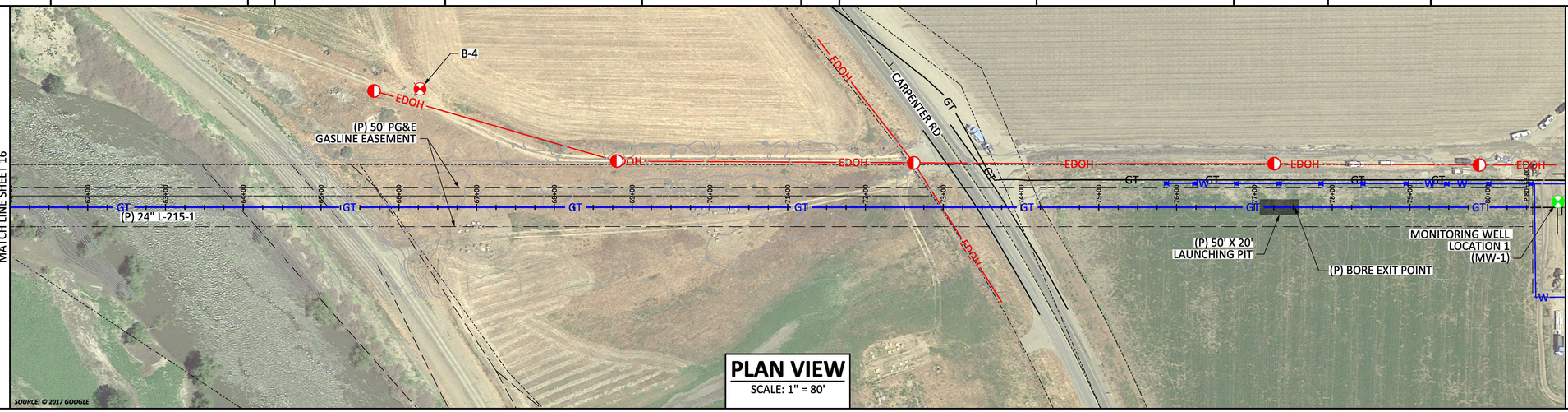
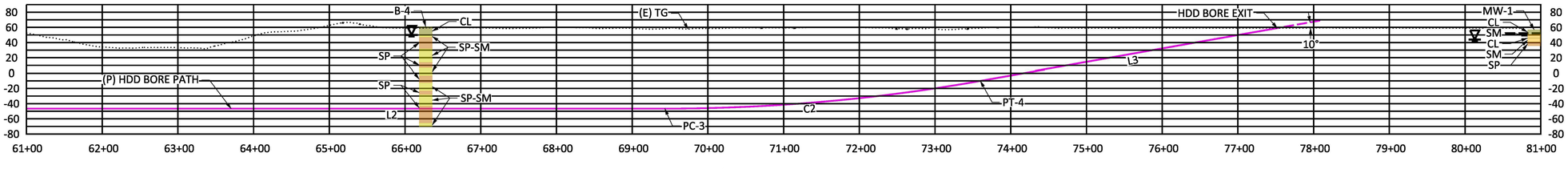


PLAN VIEW
SCALE: 1" = 80'



PROFILE
SCALE: 1" = 80'

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MIN. COMPOUND RADIUS: 1,400'
ALLOWABLE HORIZONTAL DRIFT +/- 10'

NOTE: REFER TO GEOTECHNICAL REPORT PREPARED BY KLEINFELDER, DATED 05-29-2018.

BORE PROFILE LEGEND (FOR REFERENCE ONLY)

CL	LEAN CLAY	SP	POORLY GRADED SAND
SM	SILTY SAND	ML	SANDY MIXED
SP-SM	POORLY GRADED SAND WITH SILT		

BORING LOCATIONS			
BORING #	LATITUDE	LONGITIDE	DEPTH
B-4	37.44977	-121.02705	131.5'
MW-1	37.44936	-121.02200	21.5'
-			'

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A		90% DESIGN REVIEW	74004060	E1A4	MDGR		

REVISIONS

APPROVED BY	PSRS
	SUPV
	DSGN E1A4
	DWN E1A4
	CHKD MDGR
	OK
	DATE
	SCALES

PIPELINE - HDD PROFILE
L-215 SAN JOAQUIN RIVER XING REPLACEMENT
L-215-1 MP 6.92 - 8.43, INSTALL 24" PIPE
PATTERSON, STANISLAUS COUNTY

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

BILL OF MATL	SHEET 26
DWG LIST	SHEET 2
TRACKING NUMBER	R-687
SHEET NO.	16 OF 28 SHEETS

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90% DESIGN REVIEW

PACIFIC GAS AND ELECTRIC COMPANY

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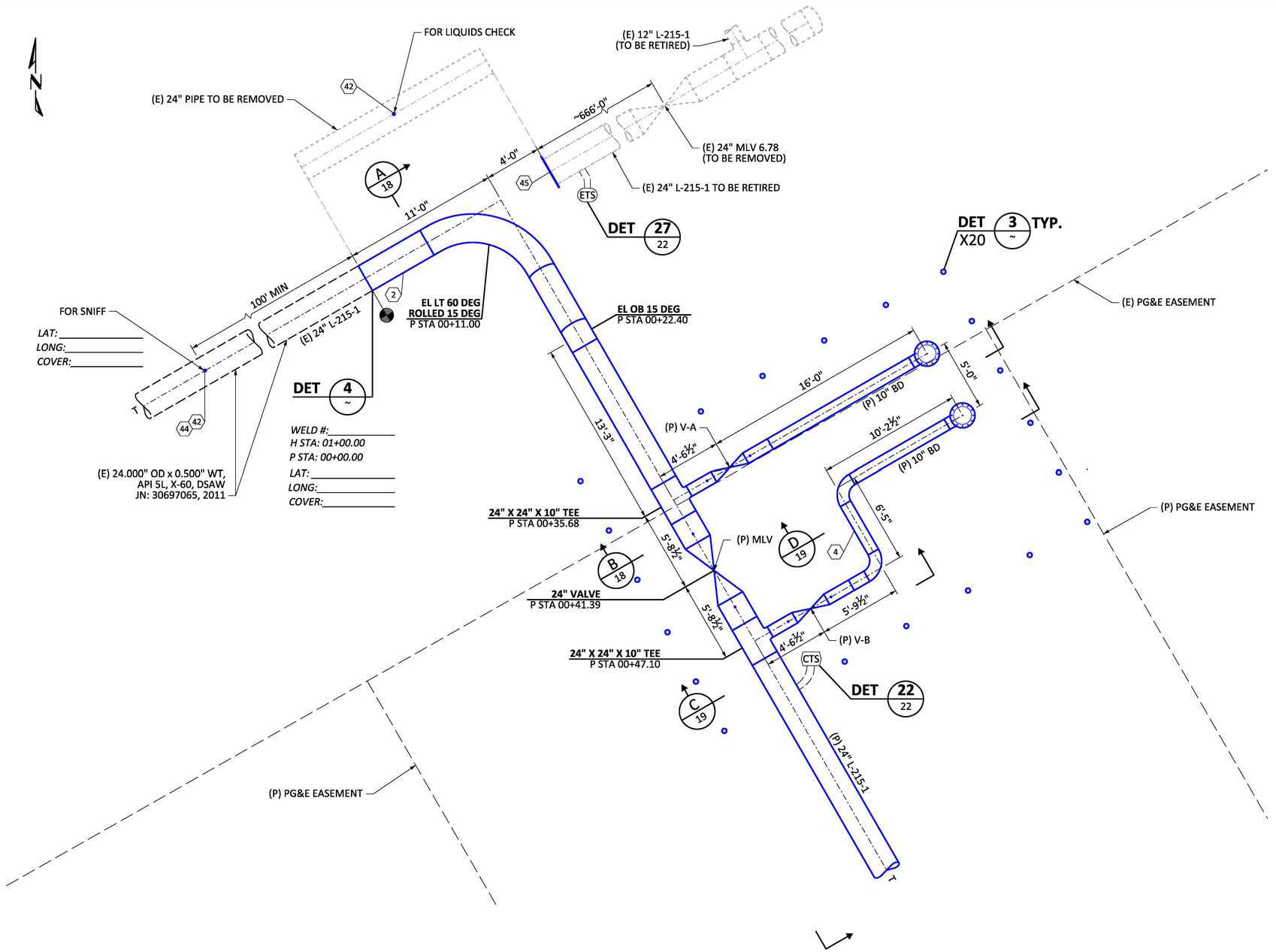
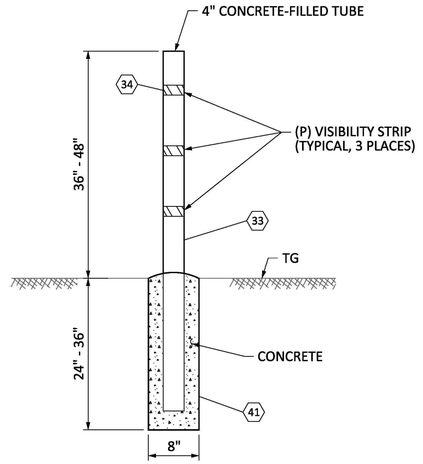
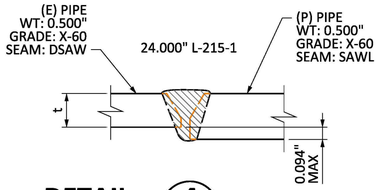


DETAIL 1 SCALE: 1/4" = 1'-0" — WEST TIE-IN & VALVE ASSEMBLY



DETAIL 3 ~ SCALE: NTS — BOLLARD, TYPE 2, GDS J-95



DETAIL 4 ~ SCALE: NTS — WELD (TD-4160P-20) FIGURE 1

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PIPELINE - DETAILS
L-215 SAN JOAQUIN RIVER XING REPLACEMENT
L-215-1 MP 6.92 - 8.43, INSTALL 24" PIPE
PATTERSON, STANISLAUS COUNTY

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

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SHEET NO.	17 OF 28 SHEETS

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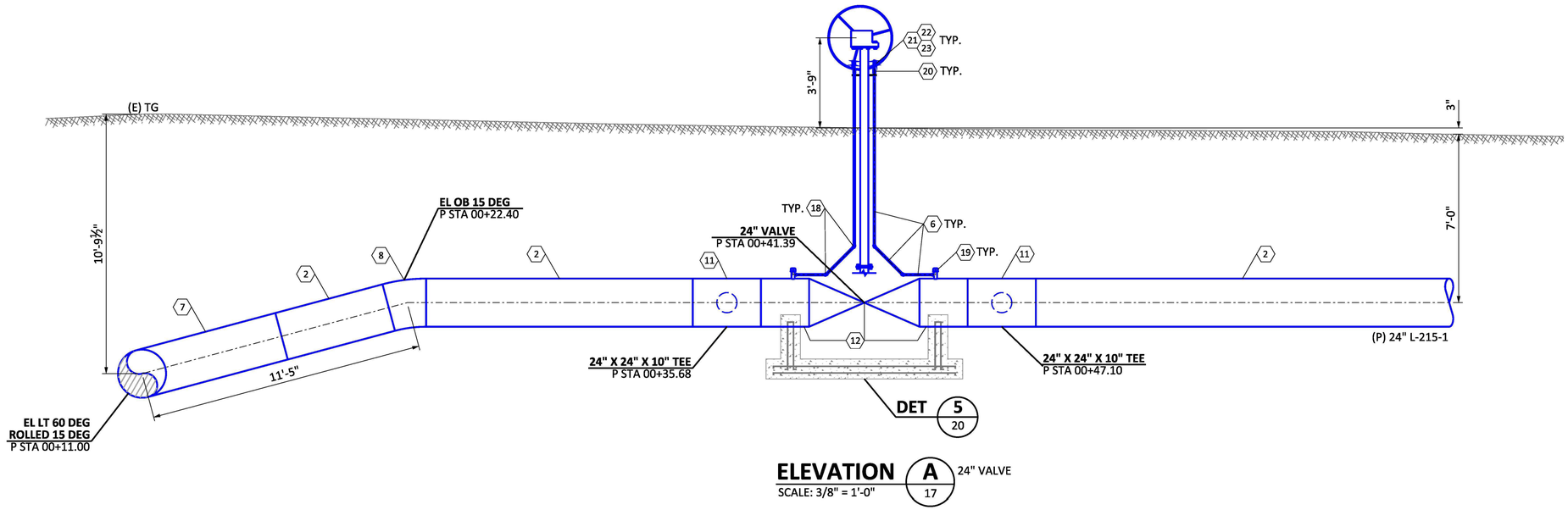


ELEVATION A 24" VALVE
SCALE: 3/8" = 1'-0" (17)

VALVE DATA STAMP

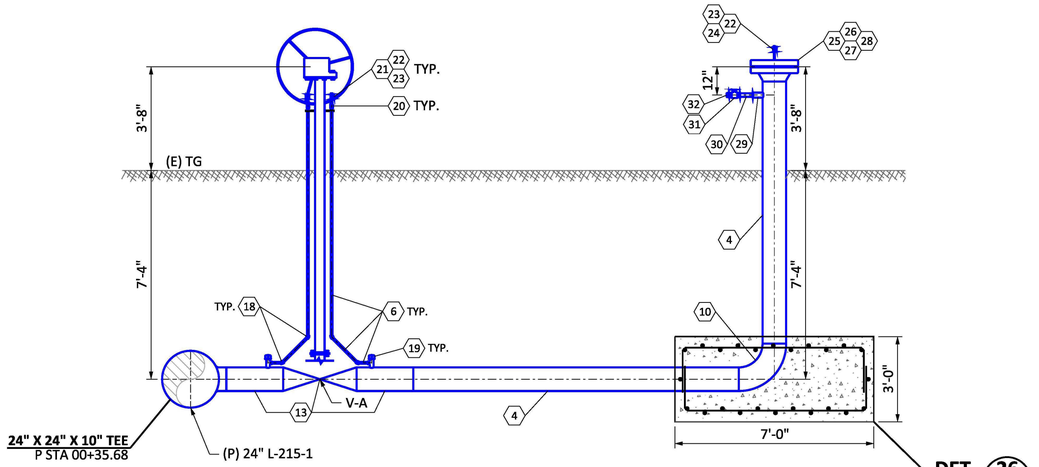
BOM# 12 VALVE SIZE 24"
TECH ID (VALVE #) _____
VALVE TYPE BALL, ANSI 600
MANUFACTURER _____
MODEL/FIGURE # _____
SERIAL# _____
CRITICAL VALVE ☒ YES ☐ NO
CRITICAL VALVES ARE TO BE COMMISIONED PER TD-4520P-01

COMMISSIONING

VALVE TO BE COMMISSIONED BY GAS PIPELINE OPERATION & MAINTAINENCE (GPO&M) AND DIVISION OR DISTRICT PERSONNEL PRIOR TO PLACING VALVE IN SERVICE.

COMMISSIONED BY:

LAN ID _____
DATE _____
NUMBER OF TURNS OF HANDWHEEL (IF APPROPRIATE) _____



ELEVATION B 10" VALVE & BD
SCALE: 3/8" = 1'-0" (17)

VALVE DATA STAMP

BOM# 13 VALVE SIZE 10"
TECH ID (VALVE #) V-A
VALVE TYPE BALL, ANSI 600
MANUFACTURER _____
MODEL/FIGURE # _____
SERIAL# _____
CRITICAL VALVE ☒ YES ☐ NO
CRITICAL VALVES ARE TO BE COMMISIONED PER TD-4520P-01

COMMISSIONING

VALVE TO BE COMMISSIONED BY GAS PIPELINE OPERATION & MAINTAINENCE (GPO&M) AND DIVISION OR DISTRICT PERSONNEL PRIOR TO PLACING VALVE IN SERVICE.

COMMISSIONED BY:

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DATE _____
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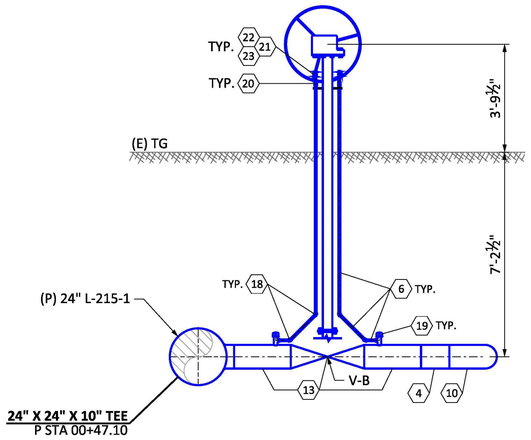
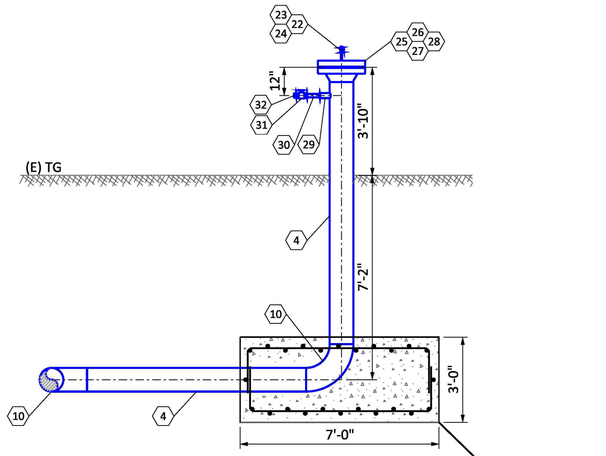


ELEVATION C 10" VALVE V-B
SCALE: 3/8" = 1'-0" — 17



ELEVATION D 10" BD
SCALE: 3/8" = 1'-0" — 17

VALVE DATA STAMP

BOM# 13 VALVE SIZE 10"
TECH ID (VALVE #) V-B
VALVE TYPE BALL, ANSI 600
MANUFACTURER
MODEL/FIGURE #
SERIAL#
CRITICAL VALVE ☒ YES ☐ NO
CRITICAL VALVES ARE TO BE COMMISIONED PER TD-4520P-01

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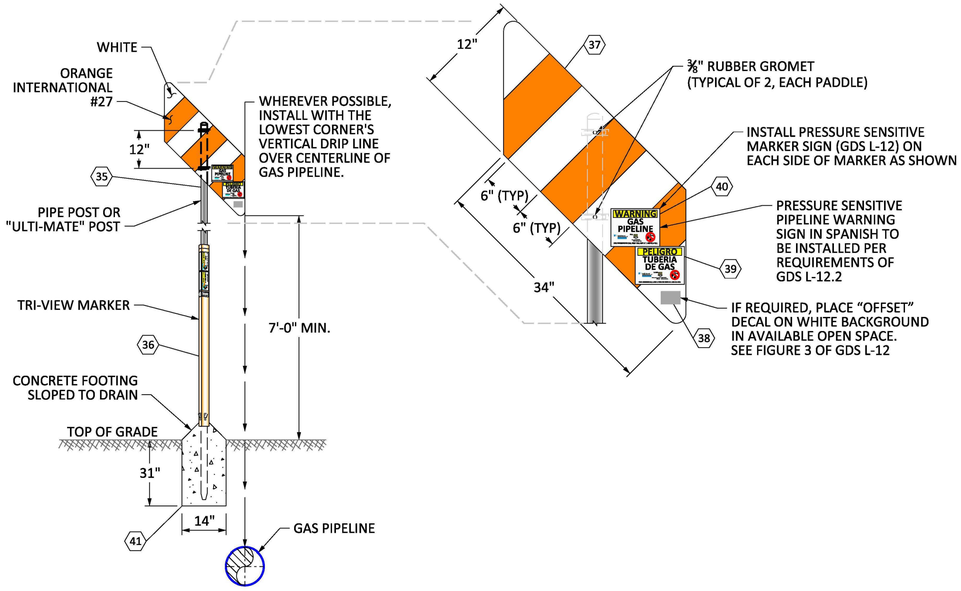
LAN ID
DATE
NUMBER OF TURNS OF HANDWHEEL (IF APPROPRIATE)



DETAIL 2 PIPELINE PADDLE MARKER INSTALL PER GDS L-11.1 AND TD-4412P-09
SCALE: NTS — 4-7 10-12

PIPELINE MARKER TABLE

LOCATION	TYPE	OTHER INFO	LINE/DFM	SHEET
H STA 01+11.00	PADDLE	DUAL PADDLE	L-215-1	5
H STA 03+48.54	PADDLE	DUAL PADDLE	L-215-1	5
H STA 13+50.00	PADDLE	SINGLE PADDLE	L-215-1	6
H STA 15+25.00	PADDLE	SINGLE PADDLE	L-215-1	7
H STA 22+50.00	PADDLE	SINGLE PADDLE	L-215-1	7
H STA 31+50.00	PADDLE	SINGLE PADDLE	L-215-1	8
H STA 64+50.00	PADDLE	SINGLE PADDLE	L-215-1	11
H STA 65+75.00	PADDLE	SINGLE PADDLE	L-215-1	12
H STA 73+25.00	PADDLE	SINGLE PADDLE	L-215-1	12
H STA 80+50.00	PADDLE	SINGLE PADDLE	L-215-1	13

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L-215-1 MP 6.92 - 8.43, INSTALL 24" PIPE
PATTERSON, STANISLAUS COUNTY

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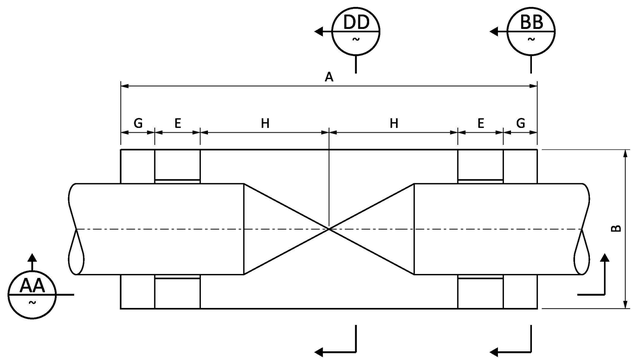
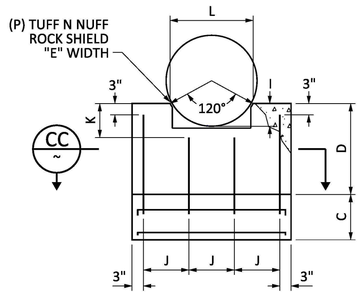
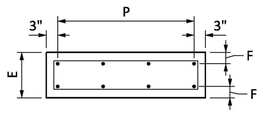


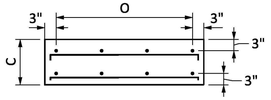
DETAIL 5 (18) BURIED VALVE SUPPORT PER GDS F-12
SCALE: NONE



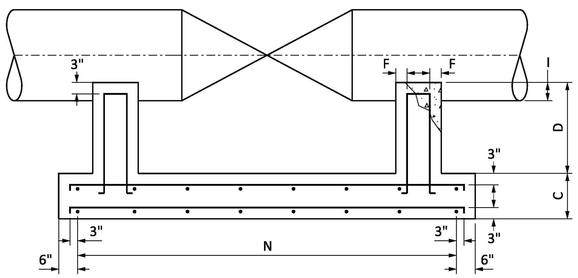
SECTION BB
SCALE: NONE



SECTION CC
SCALE: NONE



SECTION DD
SCALE: NONE



SECTION AA
SCALE: NONE

VALVE SIZE	CONCRETE FOUNDATION DIMENSION													REBARS, EQUALLY SPACED		
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
42"	14'-0"	5'-0"	1'-0"	3'-0"	1'-3"	0'-3"	1'-0"	4'-9"	0'-10 1/2"	1'-6"	1'-2"	3'-0 3/8"	1'-9"	12 #6	8 #6	5 #6
36"	12'-3"	4'-6"	1'-0"	3'-0"	1'-3"	0'-3"	0'-10 1/2"	4'-0"	0'-9"	1'-4"	1'-0"	3'-0 3/8"	1'-6"	12 #6	7 #6	4 #6
32"	11'-3"	4'-3"	1'-0"	2'-9"	1'-3"	0'-3"	0'-10 1/2"	3'-6"	0'-8"	1'-3"	1'-0"	3'-0 3/8"	1'-4"	8 #6	6 #6	4 #6
30"	10'-9"	4'-0"	1'-0"	2'-7"	1'-3"	0'-3"	0'-10 1/2"	3'-3"	0'-7 1/2"	1'-2"	1'-0"	3'-0 3/8"	1'-3"	8 #6	5 #6	4 #6
24"	9'-2"	3'-6"	1'-0"	2'-4"	1'-0"	0'-3"	0'-9"	2'-10"	0'-6"	1'-0"	0'-9"	3'-0 3/8"	1'-0"	8 #4	5 #4	4 #4
20"	7'-11"	3'-0"	1'-0"	2'-0"	0'-9"	0'-3"	0'-8 1/2"	2'-6"	0'-5"	0'-10"	0'-8"	3'-0 3/8"	0'-10"	8 #4	4 #4	4 #4
16"	6'-8"	2'-6"	0'-9"	1'-8"	0'-8"	0'-2 1/2"	0'-6"	2'-2"	0'-4"	0'-8"	0'-6"	3'-0 3/8"	0'-8"	6 #5	3 #5	4 #5

GENERAL INFORMATION

1. THE VALVE SUPPORTS SHOWN IN THIS DOCUMENT MUST BE USED FOR BURIED PLUG, BALL AND CHECK VALVE INSTALLATIONS

2. CONCRETE WORK SHALL BE PERFOMED IN ACCORDANCE WITH ACI 318-83.

3. CONCRETE SHALL DEVELOP AN $f'_c \geq 4{,}000$ psi IN 28 DAYS.

4. REINFORCING BARS SHALL BE ASTM A-615 GRADE 40.

5. SOIL UNDER THE FOUNDATION SHALL BE COMPACTED TO A MINIMUM RELATIVE DENSITY OF 95% OF MAXIMUM DENSITY. SOFT MATERIAL IN ORIGINAL GROUND THAT WILL NOT COMPACT TO THIS MINIMUM SHALL BE REMOVED AND REPLACED WITH SUITABLE COMPACTIBLE MATERIAL. BACKFILL SHALL BE PLACED IN LAYERS NOT TO EXCEED 8" IN THICKNESS BEFORE COMPACTION.

6. CHAMFER ALL EXPOSED EDGES OF CONCRETE TO 3/4".

NOTES:

THE SPACING FOR PEDASTALS (SECTION C) IS #4 REBAR AT 12" WITH AN EXTRA TIE AT THE TOP OF THE PEDASTAL, 3" DOWN FROM THE TOP TIE.

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PIPELINE - DETAILS
L-215 SAN JOAQUIN RIVER XING REPLACEMENT
L-215-1 MP 6.92 - 8.43, INSTALL 24" PIPE
PATTERSON, STANISLAUS COUNTY

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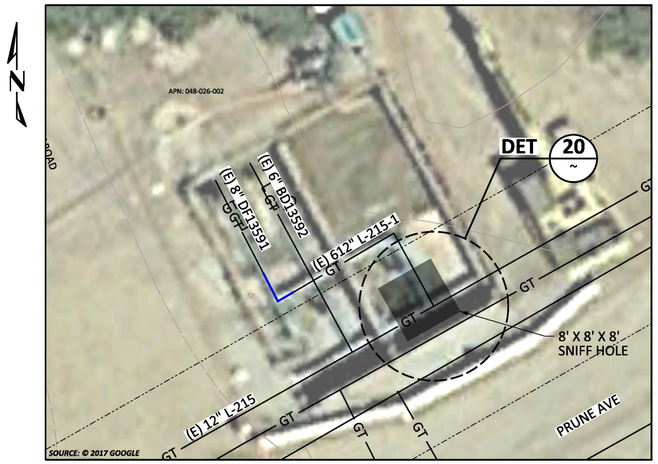
LOCATION A

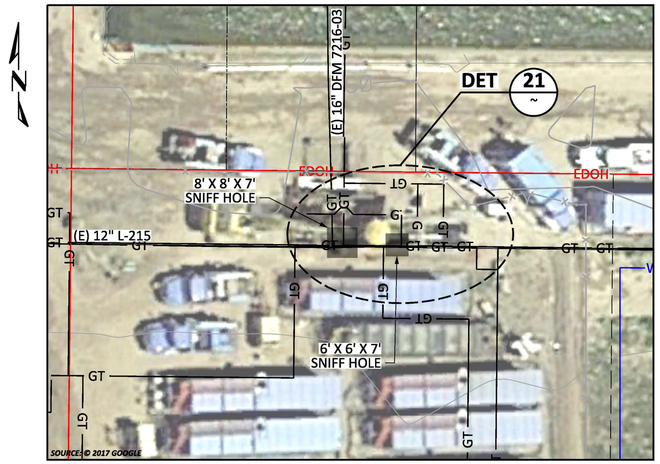
2951-3159 PRUNE AVE
WALL MAP - 3365; PLAT - A7; L - 215; MP - 6.65
(SCALE: 1" = 10')

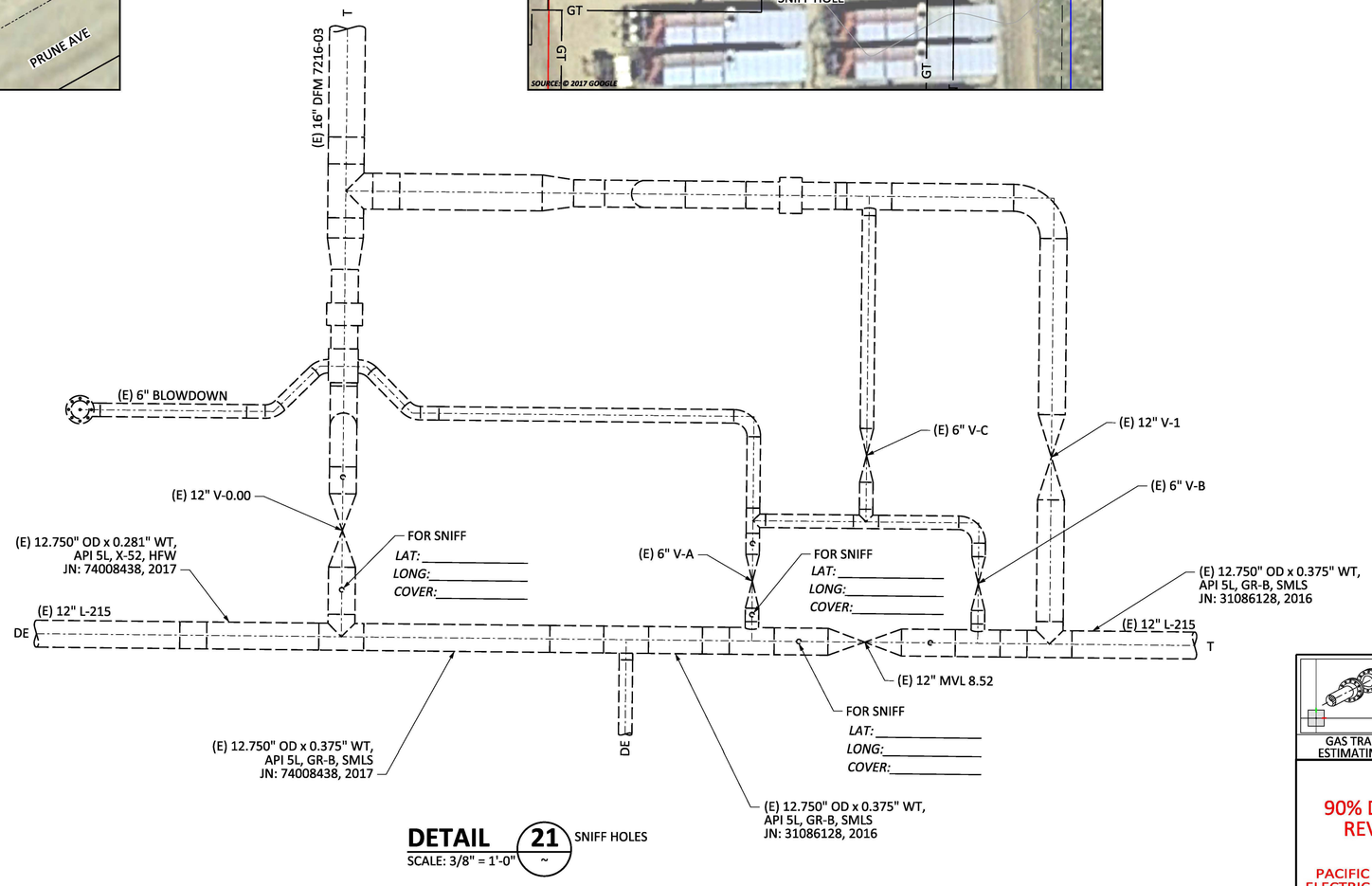


DETAIL 20 SNIFF HOLE
SCALE: 3/8" = 1'-0"

LOCATION B

1098 W BRADBURY RD
WALL MAP - 3366; PLAT - B2; L - 215; MP - 8.52
(SCALE: 1" = 20')





DETAIL 21 SNIFF HOLES
SCALE: 3/8" = 1'-0"

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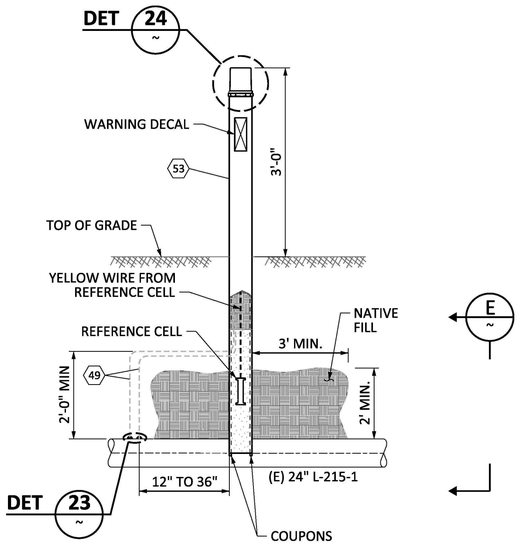
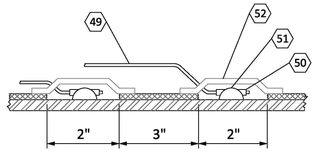
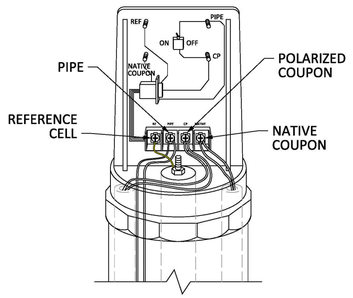


NOTE: INSTALL COUPONS PARALLEL TO PIPE A DISTANCE OF 8" TO 12". COUPONS MUST BE INSTALLED IN NATIVE SOIL WITHIN 18" OF ELECTRODE. TAMP NATIVE AND ADD IMPORT TO ACHIEVE A MINIMUM 95% COMPACTION.

DETAIL 22 (17) — COUPON TEST STATION INSTALLATION PER CCV O-10.2, FIGURE 2
SCALE: NONE

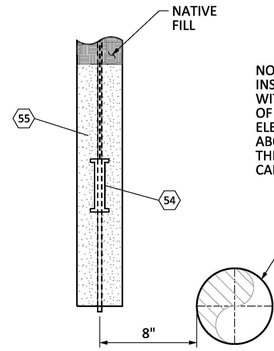


DETAIL 23 (~) — ATTACHING THE WIRES TO THE GAS MAIN CCV O-10, FIGURE 1
SCALE: NTS



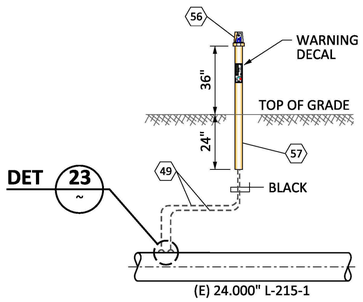
NOTE: 7 WIRES TO UNIT NPC (BLACK X 2), WIRE PC (WHITE X2), WIRE REF CELL (YELLOW), PIPE #10 (BLACK X 2) GAUGE SOLID WIRES

DETAIL 24 (~) — COUPON TEST STATION HEAD PER CCV O-10.2, FIGURE 1
SCALE: NTS



NOTE:
INSTALL REFERENCE ELECTRODE WITHIN 12"FROM THE BOTTOM OF THE TUBE. FILL TUBING WITH ELECTRIC MUD TO AT LEAST 12" ABOVE REFERENCE ELECTRODE. THE REMAINDER OF THE TUBE CAN BE FILLED WITH NATIVE SOIL.

SECTION E (~)
SCALE: NTS



DETAIL 27 (17) — ETS TYPE A CCV 0-10
SCALE: NONE

CATHODIC PROTECTION LOCATION TABLE					
LOCATION	CP TYPE	OTHER INFO	LINE/DFM	SHEET	S/N (RECORD IN FIELD)
H 00+50.00	CTS	ABOVE GROUND	L-215-1	18	

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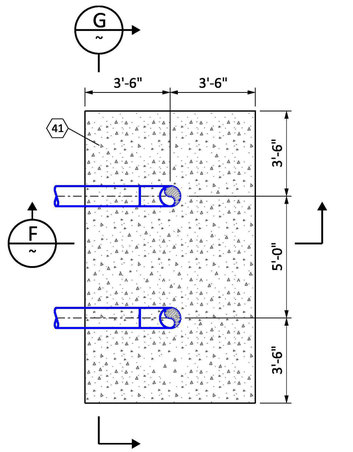
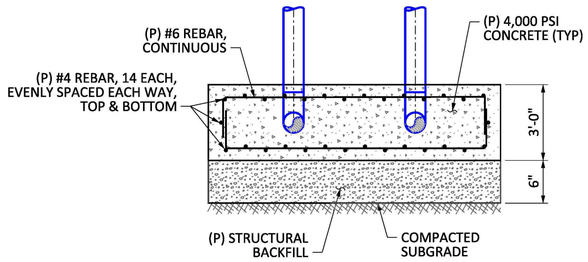
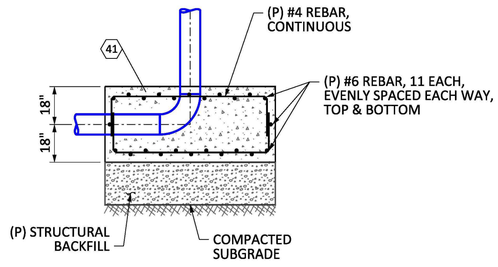


DETAIL 26 THRUST BLOCK
SCALE: NTS 18,19



SECTION G
SCALE: NTS



SECTION F
SCALE: NTS

PG&E GENERAL GUIDELINES FOR CONCRETE WORK REVISION:

PURPOSE AND SCOPE

THE REQUIREMENTS SET FORTH IN THIS DOCUMENT ARE INTENDED FOR CAST-IN-PLACE CONCRETE WORK FOR THE FOLLOWING PG&E FACILITIES:
THRUST BLOCKS
BURIED VALVE SUPPORTS,
SHALLOW FOOTINGS FOR GAS PIPELINE SUPPORTS (ISOLATED/SPREAD FOOTINGS, STRIP FOOTINGS, COMBINED FOOTINGS AND PAD/MAT FOUNDATIONS FOR SMALL NON ROTATING EQUIPMENT).

FOR OTHER PROJECT SPECIFIC CONCRETE WORK, THIS GUIDELINE DOCUMENT MAY BE USED IN CONJUNCTION WITH ADDITIONAL REQUIREMENTS SET BY THE ENGINEER-OF-RECORD OR AS REQUIRED BY A JURISDICTIONAL AGENCY IN A SPECIFIC BUILDING PERMIT.

ACRONYMS

CBC CALIFORNIA BUILDING CODE
ACI AMERICAN CONCRETE INSTITUTE
OSHA OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION
ASTM AMERICAN SOCIETY FOR TESTING AND MATERIALS
CALTRANS CALIFORNIA DEPARTMENT OF TRANSPORTATION

GENERAL REQUIREMENTS

1. ALL EXCAVATION WORK AND SHORING MUST BE CONDUCTED IN COMPLIANCE WITH TD-4621M, EXCAVATION SAFETY MANUAL.
2. ALL WORK PLATFORMS SHALL BE ADEQUATELY SHORED, BRACED AND SUPPORTED IN COMPLIANCE WITH LATEST OSHA STANDARDS AND REGULATIONS.
3. PRIOR TO PLACEMENT OF CONCRETE, ALL EXCAVATIONS SHALL BE CLEANED OF ALL FOREIGN MATERIALS, DEWATERED AND COMPACTED.
4. EXCAVATED SUBGRADE SHALL BE COMPACTED TO MINIMUM 90% OF MAXIMUM DRY DENSITY IN ACCORDANCE WITH ASTM D1557, PRIOR TO STRUCTURAL OR COMMON BACKFILL. MINIMUM 1 (ONE) IN-SITU DENSITY TEST SHALL BE CONDUCTED PER CONCRETE STRUCTURE, UNLESS DEEMED OTHERWISE BY THE FIELD GEOTECHNICAL PROFESSIONAL.
5. REQUIREMENT FOR COMPACTING EXCAVATED SUBGRADE MAY BE WAIVED IF FIELD TESTING DEMONSTRATES THAT THE IN-SITU DENSITY OF SUBGRADE IS ABOVE 90% OF MAXIMUM DRY DENSITY.
6. STRUCTURAL BACKFILL AND COMMON BACKFILL SHALL BE COMPACTED IN 6"TO 9" LIFTS TO ACHIEVE MINIMUM 90% DENSITY IN ACCORDANCE WITH ASTM D1557. STRUCTURAL BACKFILL SHALL CONFORM TO CALTRANS CLASS II AGGREGATE BASE.
7. PROJECT ENGINEER SHALL BE NOTIFIED IF UNEXPECTED SOIL CONDITIONS ARE ENCOUNTERED.
8. ALL CONCRETE WORK SHALL CONFORM TO LATEST EDITION OF ACI-318.
9. READY-MIXED CONCRETE SHALL CONFORM TO ASTM C94.
10. ALL CONCRETE WORK SHALL CONSIST OF REINFORCED CONCRETE, UNLESS SPECIFIED OTHERWISE BY THE ENGINEER.
11. ALL DIMENSIONS SHALL BE VERIFIED PRIOR TO COMMENCEMENT OF WORK. ANY DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.
12. ALL CONCRETE SHALL DEVELOP COMPRESSIVE STRENGTH OF MINIMUM 4,000 PSI AT 28 DAYS, UNLESS SPECIFIED OTHERWISE.
13. TYPE II PORTLAND CEMENT SHALL BE USED IN MANUFACTURING OF CONCRETE. TYPE II PORTLAND CEMENT SHALL CONFORM TO ASTM C150.
14. REINFORCING REBAR AND TIES SHALL BE OF GRADE 60 CONFORMING TO ASTM A615 OR ASTM A706.
15. HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH ACI 318 IN CONJUNCTION WITH REBAR ARRANGEMENT SHOWN ON THE CONSTRUCTION DRAWINGS.
16. REINFORCING REBAR SHALL BE FABRICATED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DEVIATIONS FROM CONSTRUCTION DRAWINGS, IN REINFORCING REBAR ARRANGEMENT, SHALL BE APPROVED BY THE ENGINEER. SKETCH SHOWING SUCH DEVIATIONS SHALL BE MAINTAINED AS A PART OF AS-BUILT RECORD FOR THE PROJECT.
17. CONCRETE PRODUCTION FACILITY SHALL PROVIDE CONCRETE DESIGN MIX WITH AT LEAST 30 CONSECUTIVE TESTS RECORDS (NO MORE THAN 24 MONTHS OLD) DEMONSTRATING MINIMUM COMPRESSING STRENGTH REQUIREMENTS, IN ACCORDANCE WITH CHAPTER 5 OF ACI-318. THIS DOCUMENT SHALL BE MAINTAINED AS A PART OF AS-BUILT RECORD FOR THE PROJECT.
18. ADMIXTURES SUCH AS ACCELERATORS AND PLASTICIZERS SHALL NOT BE USED WITHOUT PRIOR APPROVAL FROM THE ENGINEER.
19. CONCRETE SLUMP SHALL NOT BE MORE THAN 4 INCHES.
20. CONCRETE SHALL BE CONSOLIDATED BY MEANS OF MECHANICAL VIBRATING EQUIPMENT, UNLESS APPROVED OTHERWISE BY THE ENGINEER.
21. CONCRETE SHALL BE PLACED MONOLITHICALLY, UNLESS SPECIFIED OTHERWISE.
22. MINIMUM CLEAR COVER OF 3 INCHES SHALL BE MAINTAINED FOR ALL REBAR, UNLESS SPECIFIED OTHERWISE.
23. WHEN CONCRETE IS DIRECTLY PLACED AGAINST GAS PIPELINE, A MINIMUM CLEAR SPACING OF 6 INCHES SHALL BE MAINTAINED BETWEEN REBAR AND GAS PIPELINE, ALL AROUND THE PIPE. REBAR SHALL BE CUT AND BENT ACCORDINGLY TO ACHIEVE THIS CLEAR SPACING.
24. WHERE FBE COATED GAS PIPELINE IS BURIED AND IS ENCASED IN CONCRETE (I.E. THRUST BLOCKS, ANCHOR BLOCKS, ETC.); AN ABRASION-RESISTANT COATING (PROTAL 7200, POWERCETE J OR DEVGRIP 238) SHALL BE APPLIED OVER THE FBE COATED PIPE WHICH WILL BE IN DIRECT CONTACT WITH CONCRETE.
25. WHERE GAS PIPELINE IS ABOVE GROUND AND SUPPORTED OVER CONCRETE SUPPORTS, A NON-ABRASIVE DIELECTRIC MATERIAL (FRP, DELRIN OR APPROVED OTHER) SHALL BE PLACED BETWEEN THE CONCRETE SUPPORT AND GAS PIPELINE.
26. IF REINFORCEMENT SPLICES ARE USED, THE MINIMUM LAP FOR THE SPLICES SHALL BE 50 TIMES THE DIAMETER OF THE REBAR.
27. ALL EXTERNALLY EXPOSED EDGES OF CONCRETE SHALL HAVE A CHAMFER OF 0.75 INCH, UNLESS SPECIFIED OTHERWISE.
28. CEMENT BASED GROUT SHALL BE NON-SHRINK AND NON-METALLIC. CEMENT BASED GROUT SHALL DEVELOP MINIMUM COMPRESSIVE STRENGTH OF 5,000 PSI AT 28 DAYS, UNLESS SPECIFIED OTHERWISE.
29. FOR UNDERGROUND PORTION OF THE CONCRETE WORK THE REQUIREMENT FOR HAVING FORMWORK MAY BE WAIVED BASED ON AREA OF EXCAVATION. THIS WAIVER SHALL BE APPROVED BY THE ENGINEER PRIOR TO COMMENCEMENT OF THE CONCRETE WORK. IN SUCH CASES, A SKETCH SHOWING THE FINAL PLACEMENT OF CONCRETE SHALL BE MAINTAINED AS A PART OF AS-BUILT.
30. FORMWORK FOR CONCRETE SHALL NOT BE REMOVED BEFORE 3 DAYS (72 HOURS) OF PLACING OF CONCRETE, UNLESS SPECIFIED OTHERWISE.
31. CONCRETE SHALL BE CURED, BY KEEPING ALL CONCRETE SURFACES MOIST WITH WATER, FOR A MINIMUM OF 10 DAYS AFTER PLACING OF CONCRETE. DURING ENTIRE CURING PERIOD USING WATER, CONCRETE SURFACES CAN BE KEPT MOIST BY PONDING OR BY USING WATER ABSORBENT MATERIALS LIKE BURLAPS/COTTON MATS.
32. REQUIREMENT FOR DURATION OF CURING WITH WATER MAY BE RELIVED IN CASE OF WET SOIL CONDITIONS DUE TO HIGH WATER TABLE OR MOIST CONDITIONS DUE TO RAIN, UPON APPROVAL OF THE ENGINEER.
33. WATER-BASED, ACRYLIC CONCRETE CURING COMPOUNDS MAY BE USED FOR CURING IN LIEU OF CURING WITH WATER. CURING COMPOUNDS SHALL CONFORM TO ASTM C309. VOCOMP®WATER-BASED, ACRYLIC CONCRETE CURING COMPOUND FROM W.R. MEADOWS OR EQUAL SHALL BE USED. CURING COMPOUND SHALL BE APPLIED UNIFORMLY OVER ALL EXPOSED CONCRETE SURFACES, IMMEDIATELY AFTER FINAL FINISHING AND IMMEDIATELY AFTER REMOVAL OF FORMWORK FOR VERTICAL SURFACES. PRIOR TO REMOVING FORMWORK FROM VERTICAL SURFACES AND APPLYING A CURING COMPOUND TO THESE SURFACES, FORMWORK SHALL BE KEPT MOIST WITH WATER. MANUFACTURERS' RECOMMENDATION FOR PREPARATION, MIXING, APPLICATION METHOD, COVERAGE, DRYING TIME AND CLEANING OF THE CURING COMPOUNDS SHALL BE FOLLOWED.
34. WHETHER CONCRETE IS CURED UTILIZING WATER OR A CURING COMPOUND, THE CONCRETE STRUCTURE SHALL NOT BE LOADED UNTIL A MINIMUM OF 10 DAYS AFTER CONCRETE PLACEMENT, UNLESS SPECIFIED OTHERWISE IN THE DRAWINGS OR BY THE RESPONSIBLE ENGINEER.
35. ALL CONCRETE SHALL BE PROTECTED DURING CURING FROM DAMAGE DUE TO WEATHER AND CONSTRUCTION ACTIVITIES.

DOCUMENTATION REQUIREMENTS

1. DOCUMENTATION/SKETCH/REDLINED DRAWINGS SHOWING ANY DEVIATIONS FROM CONSTRUCTION DRAWINGS/DOCUMENTS (AS APPLICABLE);
2. DOCUMENTATION CONFIRMING MINIMUM COMPRESSIVE STRENGTH (CONCRETE MIX DESIGN DOCUMENT AND TICKETS FROM BATCH PLANT) OF CONCRETE DESIGN MIX;
3. IN-SITU SOIL DENSITY TEST RESULTS FOR FOUNDATION SUBGRADE COMPACTION (AS APPLICABLE)

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GAS TRANSMISSION ESTIMATING & DESIGN

90% DESIGN REVIEW

PACIFIC GAS AND ELECTRIC COMPANY

PIPELINE - DETAILS
L-215 SAN JOAQUIN RIVER XING REPLACEMENT
L-215-1 MP 6.92 - 8.43, INSTALL 24" PIPE
PATTERSON, STANISLAUS COUNTY

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

BILL OF MATL	SHEET 26
DWG LIST	SHEET 2
TRACKING NUMBER	R-687
SHEET NO.	23 OF 28 SHEETS

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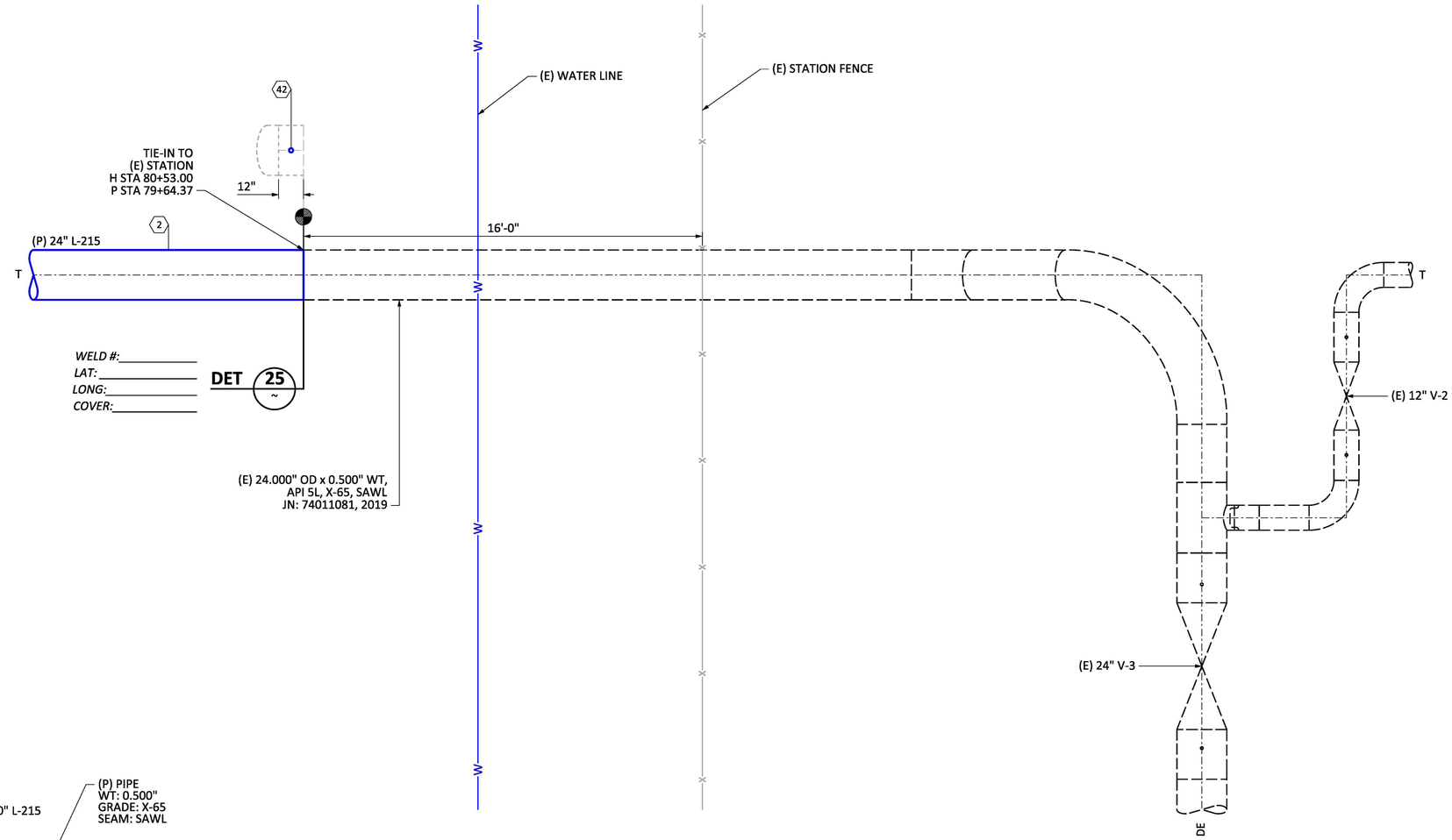

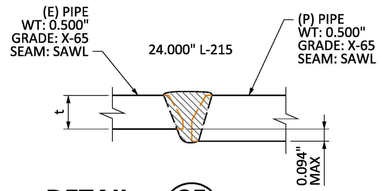

DETAIL 25 (~) WELD (TD-4160P-20)
SCALE: NTS FIGURE 1

DETAIL 29 (12)
SCALE: 3/8" = 1'-0"

GAS TRANSMISSION
ESTIMATING & DESIGN

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PIPELINE - DETAILS
L-215 SAN JOAQUIN RIVER XING REPLACEMENT
L-215-1 MP 6.92 - 8.43, INSTALL 24" PIPE
PATTERSON, STANISLAUS COUNTY

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

BILL OF MATL	SHEET 26
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TRACKING NUMBER	R-687
SHEET NO.	24 OF 28 SHEETS

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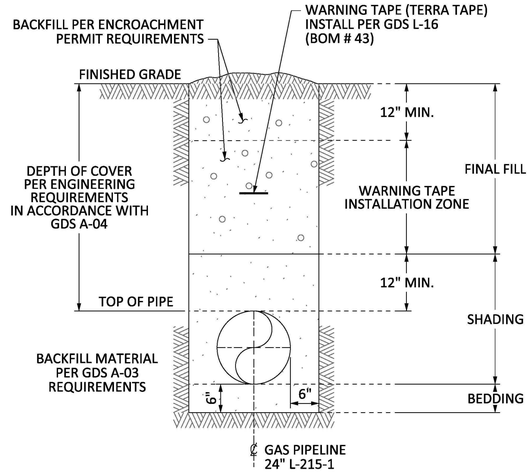
PIPE INSPECTION TABLE

UNIQUE IDENTIFIER									EXISTING PIPE SPECIFICATIONS (* = ASSUMED)						INSPECTIONS REQUIRED					PIPE WRAP		
TASK # *(1A)*	JOB # (1B)	LINE # *(1C)*	MILE POINT *(1D)*	DIG SITE # *(1E)*	COC UNIQUE IDENTIFIER		DRAWING SHEET *(1H)*	DRAWING P STATION *(1I)*	INSTALL JOB # *(2A)*	INSTALL YEAR *(2B)*	OD (in.) (2C)	WT (in.) (2D)	PIPE GRADE (2E)	PIPE SEAM TYPE (2F)	H-FORM *(3A)*	LSC (3B)	CUT-OUT *(3C)*	DESTRUCTIVE TEST Coupon *(3D)*	PIPE TO SOIL READ *(3E)*	TEST REQUIRED *(4A)*	RESULTS *(4B)*	COMMENTS
					SAMPLE *(1F)*	CUT TEST SAMPLE																
1	74004060	L-215-1	6.92	A			5, 18	0+00.0	30697065.000	7/3/1905	24"	0.500	X60	DSAW	FULL	Yes	No	No	Yes			

NOTES:
1. PERFORM PIPE TO SOIL READING ON ALL EXCAVATIONS SITES ONCE TOP OF PIPE IS EXPOSE AND IS SAFE TO ENTER THE EXCAVATION. CONSTRUCTION MANAGER OR FIELD ENGINEER TO COORDINATE AHEAD OF TIME (2-3 WEEKS) WITH CORROSION MECHANICS SUPERVISOR OF THE AREA TO SCHEDULE PIPE TO SOIL READS. THIS IS A TEMPORARY PROCESS.
2. IF A LOW READ (LESS THAN -1600 MV) OR HIGH READ (GREATER THAN -850 MV) IS TAKEN, CONSTRUCTION MANAGER/LEAD INSPECTOR TO CONTACT THE LOCAL CORROSION SUPERVISOR TO HAVE A CORROSION MECHANIC ON SITE AND DETERMINE WHAT THE ISSUE IS.
3. IF NEITHER THE LEAD INSPECTOR (OQ) NOR CORROSION MECHANIC IS AVAILABLE, THEN THE READ WILL BE TAKEN LATER WHEN THE H-FORM IS PERFORMED OR THE BELL HOLE IS FULLY EXCAVATED.DOCUMENT ON BOTH THE A-FORM AND H-FORM WHEN THE READ(S) ARE TAKEN.
4. COMPARE ANY INFORMATION ON A-FORM WITH INFORMATION ON H-FORM AND LONG SEAM CHARACTERIZATION.
5. CHECK WALL THICKNESS AT LOCATIONS PERFORMING HOT WELDING, CUTS, AND INSTALLING SAVE-A-VALVE ON MAINLINE PIPE. IF WALL THICKNESS IS DIFFERENT FROM DESIGN PIPE SPECIFICATIONS, CONTACT THE ENGINEER TO SCHEDULE A LONG SEAM CHARACTERIZATION.
6. ALL ASPHALTIC PIPE WRAP CONTAINS POLYNUCLEAR AROMATIC HYDROCARBONS (PAHS), WHICH ARE ALSO HAZARDOUS. FOR MORE INFORMATION REFERRED TO TD-4711P-01
7. IF PIPE WRAP SAMPLE IS REQUIRE TO BE SEND FOR TESTING AND/OR HAS TO VERIFIED IN THE FIELD ("VIF"), THEN FIELD ENGINEER/LEAD INSPECTOR/CONSTRUCTION MANAGEMENT RESPONSIBLE TO OBTAIN A SAMPLE OF THE PIPE WRAP AND SENT FOR TESTING PRIOR TO REMOVING THE COATING AND RECORD THE TEST RESULTS ON THE PIPE INSPECTION TABLE.

-FOR MORE INFORMATION REFER TO TD-4711P-01



SEE TD-4621M FOR SHORING REQUIREMENTS

DETAIL SCALE: NTS — TYP ~ TRENCH NON-PAVED AREA

GAS TRANSMISSION ESTIMATING & DESIGN

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PIPELINE - DETAILS
L-215 SAN JOAQUIN RIVER XING REPLACEMENT
L-215-1 MP 6.92 - 8.43, INSTALL 24" PIPE
PATTERSON, STANISLAUS COUNTY

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

BILL OF MATL	SHEET 26
DWG LIST	SHEET 2
TRACKING NUMBER	R-687
SHEET NO.	25 OF 28 SHEETS

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BILL OF MATERIALS (CAPITAL ORDER # 74004060)

BOM #	MATERIAL DESCRIPTION	MATERIAL CODE #	UNIT	QTY	STANDARD	NOTES
1	PIPE, STEEL, 24", 0.500" WT, API 5L, GRADE X65, SAWL, FBE/ARC	M011765	FT	7240	GS&S A-15	
2	PIPE, STEEL, 24", 0.500" WT, API 5L, GRADE X65, SAWL, FBE	M011762	FT	800	GS&S A-15	
3	PIPE, STEEL, 12", 0.375" WT, API 5L, GRADE B, SEAMLESS, FBE	M010037	FT	10	GS&S A-15	
4	PIPE, STEEL, 10", 0.365" WT, API 5L, GRADE B, SEAMLESS, FBE	M010034	FT	80	GS&S A-15	
5	PIPE, STEEL, 8", 0.322" WT, API 5L, GRADE B, SEAMLESS, FBE	M010029	FT	5	GS&S A-15	
6	PIPE, STEEL, 3/4", 0.154" WT, API 5L, GRADE B, SEAMLESS, PLAIN ENDS, BARE	M011951	FT	80	GS&S A-15	
7	ELBOW, 24", 90 DEG, 0.500" WT, STANDARD, 3R RADIUS, CARBON STEEL, GRADE Y60	M022261	EA	2	GS&S B-20.2	
8	ELBOW, 24", 45 DEG, 0.500" WT, STANDARD, 3R RADIUS, CARBON STEEL, GRADE Y60	M023984	EA	3	GS&S B-20.2	
9	ELBOW, 12", 90 DEG, 0.375" WT, LONG RADIUS, BUTT WELD, CARBON STEEL, SCH 40, ASTM A234, GRADE B	M022104	EA	1	GS&S B-20	
10	ELBOW, 10", 90 DEG, 0.365" WT, LONG RADIUS, BUTT WELD, CARBON STEEL, SCH 40, ASTM A234, GRADE B	M022041	EA	4	GS&S B-20	
11	TEE, REDUCING, 24" X 24" X 10", 0.500" WT X 0.365 WT	M024988	EA	2	GS&S B-20.2	
12	VALVE BALL, 24" ANSI 600, WELD END, 24" PUP LENGTH X60 SAWL, 0.500" WT, BEVEL TO MATCH ASME B16.25 FIG 5, SPEC API 6D FOR BURIED SERVICE, PER EMS 4125 EFFECTIVE 7/3/17 (REFERENCE F-21.1 REV 7, PRIOR TO 7/3/17 FOR HISTORICAL REQ), FIG 1 STUB UP (SU)	M038121	EA	1	GS&S F-21.1	
13	VALVE BALL, 10" ANSI 600, WELD END, 24" PUP LENGTH X42 SMLS, 0.365" WT, BEVEL TO MATCH ASME B16.25 FIG 4	M037112	EA	2	GS&S F-21.1	
14	CAP METAL PIPE 24", 0.500" WALL THICKNESS, GRADE Y-60	M022207	EA	8	GS&S B-20.2	
15	CAP, CARBON STEEL, 12", BUTT WELD, 0.375" WT, ASTM A-234, GRADE B	M022081	EA	2	GS&S B-20	FOR HYDROTEST
16	CAP, CARBON STEEL, 10", BUTT WELD, 0.365" WT, ASTM A-234, GRADE B	M022120	EA	4	GS&S B-20	FOR HYDROTEST
17	CAP, CARBON STEEL, 8", BUTT WELD, 0.322" WT, ASTM A-234, GRADE B	M022080	EA	1	GS&S B-20	FOR HYDROTEST
18	ELBOW, SOCKET WELD, VOGT # SW-2000 OR EQUAL, FORGED STEEL, 3/4", 45 DEG, 3000 PSI	M022587	EA	12	GS&S B-21	
19	VALVE TEE, WELDING INLET, 1", MUELLER # H-17656, 1440 PSI	M022445	EA	6	GS&S C-11	
20	COUPLING, FORGED STEEL, SOCKET WELD, VOGT # SW-2324 OR EQUAL, 3/4", 3000 PSI	M022553	EA	6	GS&S B-21	
21	NIPPLE, CONCENTRIC, 3/4" X 1/2", BUTT WELD X THREAD, EXTRA HEAVY, BLACK, FORGED STEEL, 2160 PSI, ASTM A234, GRADE WPB	M022616	EA	6	GS&S B-13.3	
22	VALVE, BALL, 1/2", CARBON STEEL, APOLLO # 72-103-19P, 1000 PSI, TEFLON SEAL/SEAT, FPT ENDS, WITH LOCKING DEVICE	M034638	EA	8	GS&S F-20	
23	PLUG, 1/2", HEX HEAD, VOGT # 2580 OR EQUAL, THREADED, FORGED STEEL, 6000 PSI	M021249	EA	8	GS&S B-10.1	
24	NIPPLE, 1/2" X 4", THREADED, BLACK STEEL, SEAMLESS, EXTRA HEAVY	M020681	EA	2	GS&S B-13.1	
25	FLANGE, WELD NECK, 10", ANSI CLASS 600, FORGED STEEL, 1/4" RAISED FACE, ID TO BE SPECIFIED	M024018	EA	2	GS&S B-43	
26	GASKET, PYROX, ANSI CLASS 600, 10", PSI LINEBACKER, TYPE F, NITRILE SEALING ELEMENT, RING GASKET	M016654	EA	4	GS&S B-45.1	
27	FLANGE, BLIND, 10", ANSI CLASS 600, FORGED STEEL, 1/4" RAISED FACE, TAP FOR 1/2" NPT	M020897	EA	2	GS&S B-43.2	
28	BOLT, STUD, 1-1/4" X 8-1/2", WITH 2 NUTS, STEEL, ALL THREAD, ASTM A193-B7 HEX NUTS A194-2H, ASSEMBLED	M192828	EA	32	GS&S B-46	
29	THREDOLET, 1-1/2", BONNEY FORGE OR EQUAL, USE ON 8" - 12" PIPE, 3000 PSI, CARBON STEEL, ASTM A105	M014813	EA	2	GS&S B-23	
30	NIPPLE, 1-1/2" X 6", THREADED, BLACK STEEL, SEAMLESS, EXTRA HEAVY	M020718	EA	2	GS&S B-13.1	
31	VALVE, BALL, 1-1/2", CARBON STEEL, WKM # B136-CS-03-CS, 2500 PSI, DELRIN OR HYDRIN SEAT, FPT, WITH LOCKING DEVICE	M034456	EA	2	GS&S F-20	
32	PLUG, 1-1/2", HEX HEAD, VOGT # 2580 OR EQUAL, THREADED, FORGED STEEL, 6000 PSI	M021265	EA	2	GS&S B-10.1	
33	POST PIPE REMOVABLE GALVANIZED STEEL 4" X 80" WITH 5" X 3' GALVANIZED SLEEVE WITH CAP 15-5120, ES 051122 TBL 2	M155105	EA	24	-	
34	VISIBILITY STRIP, REFLECTIVE YELLOW ADHESIVE SHEET, 2" X 12",	M013163	EA	72	GS&S J-95	
35	MARKER, SIGN, PIPELINE, COMPLETE ASSEMBLY, ULTI-MATE ASSEMBLY, COMES WITH: M018294 COATED ALUMINUM MARKER SIGN M376892 ULTI-MATE SQ. POST # 8UM2002204HG4 10' LONG M376893 PENETRATOR ANCHOR # 8UM225-30250-12 WITH FOUR UM-38A RIVETS AND ONE CORNER BOLT UM-SQCBL	M377179	EA	10	GS&S L-11.1	
36	MARKER, TRIVIEW, 6' X 3"	M379965	EA	10	GS&S L-10	
37	SIGN, PADDLE MARKER ONLY, COATED ALUMINUM, NO HARDWARE OR POST, 0.08" THICK ALUMINUM W/2 MIL CORROSION RESISTANT WHITE COATING FOR PIPELINE MARKER POST	M379959	EA	2	GS&S L-11.1	
38	DECAL, OFFSET ARROW, PRESSURE SENSITIVE, SELF-ADHESIVE	M379960	EA	24	GS&S L-12	
39	SIGN, "WARNING GAS PIPELINE", IN SPANISH, PELIGRO TUBERIA DE GAS (800) 811-4111, SELF-ADHESIVE DECAL STYLE	M379961	EA	24	GS&S L-12	
40	SIGN, "WARNING GAS PIPELINE", IN ENGLISH, (800) 811-4111, SELF-ADHESIVE, DECAL STYLE	M379962	EA	24	GS&S L-12	
41	CONCRETE, 4000 PSIG	N/A	CU FT	100	N/A	
42	NIPPLE, SAVE-A-VALVE, 2", WELD, STEEL, MUELLER # H-17491, STEEL CAP, DRILLING 1200 PSI MAXIMUM, 1440 PSI MAXIMUM	M022289	EA	20	GS&S C-14	
43	TAPE, WARNING, PIPELINE, GAS UNDERGROUND, REEF INDUSTRIES # 42-0084, YELLOW WITH BLACK WRITING, "CAUTION GAS LINE BURIED BELOW", 8 MILS THICK, 6" WIDE X 1000' LONG	M379947	EA	1	GS&S L-16	
44	MARKER, EXTENDED RANGE BALL, EMS TYPE, YELLOW, 3M # 1405-XR, FOR MARKING BURIED GAS FACILITIES, MAXIMUM INSTALLED DEPTH IS 5'	M374944	EA	15	GS&S M-60	
45	STEEL PLATE	N/A	EA	20	-	
46	REDUCER, 12" (0.375" WT) X 8" (0.322" WT), BUTT WELD, STANDARD, CONCENTRIC, CARBON STEEL, ASTM A234, GRADE B	M022167	EA	1	GS&S B-20	
47	CAP, STEEL, 12", 0.281" WT, GRADE Y52	M022223	EA	2	GS&S B-20.2	
48	PIPE, STEEL, 12", 0.281" WT, API 5L, GRADE X52, HFW, FBE	M010935	FT	5	GS&S A-15	
49	WIRE, ELECTRICAL, INSULATED, COPPER, 10 AWG, 600 V, 47 MIL PVC, SOLID 1 CONDUCTOR, BLACK	M294991	FT	50	CCV O-10	
50	SLEEVE, COPPER SPLICING, #14 TO #10, CADWELD # CAB-133-1H, THERMOWELD # A-200	M303755	EA	2	CCV O-10	
51	CARTRIDGE, BRAZING, CADWELD # CA-15, THERMOWELD # 15P	M159260	EA	1	CCV O-10	
52	TAPE, HANDY CAP, 4" X 4", ROYSTON W/ INTEGRATED PRIMER	M562324	EA	2	GS&S E-27	
53	STATION, TEST COUPON, CC TECHNOLOGIES # CS3100, SMALL PLASTIC CONDUIT AND TERMINAL TEST HEAD CONSTRUCTION, 3" OD X 10' LONG	M560691	EA	1	CCV O-10.2	
54	ELECTRODE, REFERENCE, STEALTH 2, COPPER-COPPER SULFATE, BORIN MANUFACTURING # SRE-007-CUY, WITH 50' OF WIRE	M241423	EA	1	CCV O-71	
55	ELECTRODE, REFERENCE, GELATIN, BACKFILL, BORIN MANUFACTURING # EMB-001-CUS, ELECTRIC MUD, GELATIN BACKFILL, CUCUSO4, SINGLE UNIT, FOR ONE INSTALLATION	M041192	EA	1	CCV O-71	
56	STATION, TEST, CATHODIC PROTECTION, COTT MFG # 300S5, ORANGE, BIG FINK, 5 TERMINALS, WITHOUT CONDENSER	M569390	EA	1	CCV O-10.1	
57	PIPE, PVC, 3" IPS , 0.300" WT, SCH 80	M016071	FT	1	0	
58	BODY, CONCRETE, VALVE FRAME, CHRISTY # G05, W/O COVER, 10-3/8" DIA X 12" HIGH	M043271	EA	5	GS&S K-41	
59	COVER, VALVE, CAST IRON, YELLOW, CHRISTY # G05CY, FULL TRAFFIC, 11-1/8", TRAFFIC YELLOW WITH EXPOXY CLEAR COAT, MARKED "PG&E GAS"	M446213	EA	5	GS&S K-41	
60	VALVE BOX, EXTENSION, PLASTIC, 8" IPS, BRANDON SUPPLY # 851, BLACK ABS, CORRUGATED, 10 FT LENGTH	M016063	EA	5	GS&S K-41	
61	RING, GRADE, CAST IRON, 2" HIGH, CHRISTY # G05-2333	M043274	EA	5	GS&S K-41	

DESIGN CRITERIA

BOM #	OD (IN)	WT (IN)	SMYS (PSI)	CURRENT CLASS LOCATION	DESIGN FACTOR	FDP (PSIG)	FDP (% SMYS)	MAOP (PSIG)	MAOP (% SMYS)	PSIG @ 90% SMYS
1,2	24.000	0.500	65000	3	0.50	890	32.86	890	32.86	2438
7,8,11,12,14	24.000	0.500	60000	3	0.50	890	35.60	890	35.60	2250
3,9,15,46	12.750	0.375	35000	3	0.50	890	43.23	890	43.23	1853
4,10,11,16	10.750	0.365	35000	3	0.50	890	37.45	890	37.45	2140
5,17,46	8.625	0.322	35000	3	0.50	890	34.06	890	34.06	2352
47,48	8.625	0.281	52000	3	0.50	890	26.27	890	26.27	3050
6	1.050	0.154	35000	3	0.50	890	8.67	890	8.67	9240

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NO.	DATE	DESCRIPTION	PM/SPEC	DWN	CHKD	SUPV	APVD BY
A		90% DESIGN REVIEW	74004060	E1A4	MDGR		

REVISIONS

APPROVED BY	
	PSRS
	SUPV
	DSGN E1A4
	DWN E1A4
	CHKD MDGR
	OK
	DATE
	SCALES

GAS TRANSMISSION ESTIMATING & DESIGN

90% DESIGN REVIEW

PACIFIC GAS AND ELECTRIC COMPANY

PIPELINE - BILL OF MATERIALS
L-215 SAN JOAQUIN RIVER XING REPLACEMENT
L-215-1 MP 6.92 - 8.43, INSTALL 24" PIPE
PATTERSON, STANISLAUS COUNTY

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

BILL OF MATL	SHEET 26
DWG LIST	SHEET 2
TRACKING NUMBER	R-687
SHEET NO.	26 OF 28 SHEETS

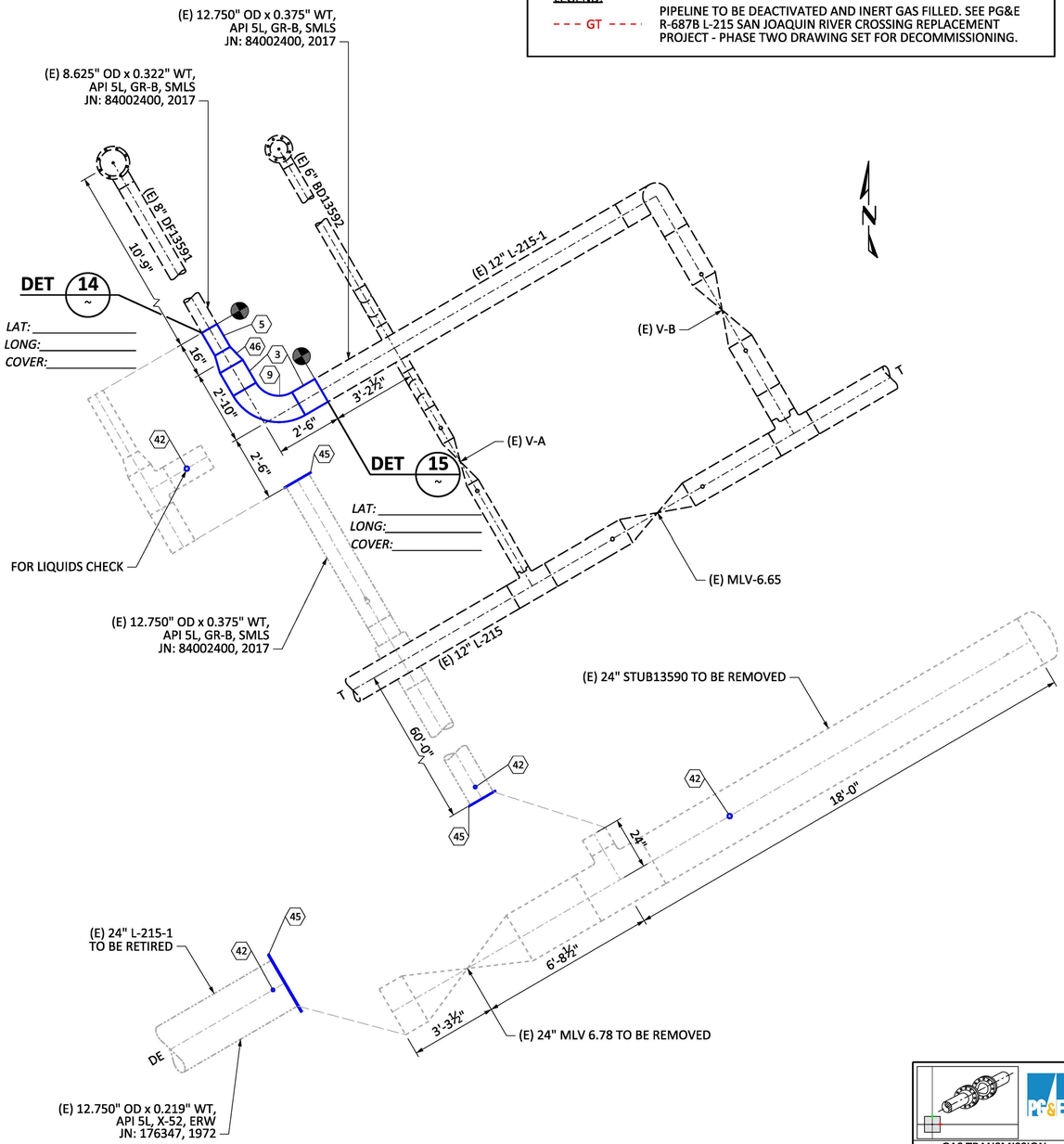
74004060 A

74004060-S047-BM.dgn
01-APR-2020 09:41AM
Estimating.pen

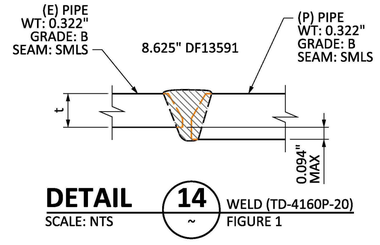
LOCATION C

PRUNE AVE & PARADISE AVE
WALL MAP - 3365; PLAT - A7; L - 215; MP - 6.65
(SCALE: 1" = 50')

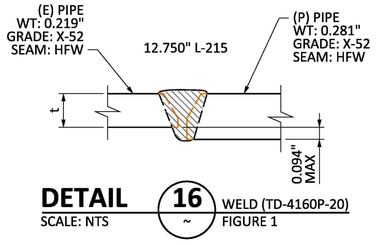




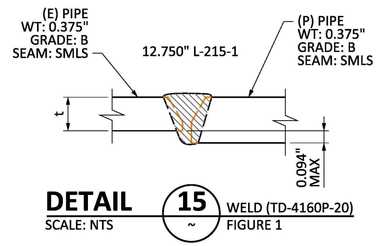
LEGEND:
GT — PIPELINE TO BE DEACTIVATED AND INERT GAS FILLED. SEE PG&E R-687B L-215 SAN JOAQUIN RIVER CROSSING REPLACEMENT PROJECT - PHASE TWO DRAWING SET FOR DECOMMISSIONING.



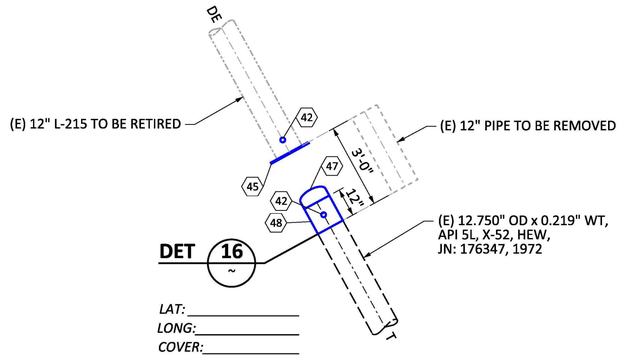
DETAIL 14 SCALE: NTS — WELD (TD-4160P-20) FIGURE 1



DETAIL 16 SCALE: NTS — WELD (TD-4160P-20) FIGURE 1



DETAIL 15 SCALE: NTS — WELD (TD-4160P-20) FIGURE 1



DETAIL 12 SCALE: 3/8" = 1'-0"

DETAIL 11 SCALE: 3/8" = 1'-0"

DEACTIVATION PROCEDURE FOR EXISTING PIPE:

1. GT&D UTILITY WORK PROCEDURE TD 9500P-16, "DEACTIVATION AND/OR RETIREMENT OF UNDERGROUND GAS FACILITIES," SHALL BE FOLLOWED.
2. THE EXISTING PIPE SECTIONS SHALL HAVE FREE LIQUIDS REMOVED AND BE 100% PURGED PER GAS DESIGN STANDARD A-38, "PROCEDURES FOR PURGING GAS FACILITIES."
3. THE PIPE SHALL BE SECTIONALIZED AT INTERVALS AS SPECIFIED IN THE RETIREMENT PLAN. THE LOCATIONS CALLED OUT ARE APPROXIMATE AND ARE SUBJECT TO FIELD VERIFICATION TO IDENTIFY THE MOST OPTIMUM LOCATION IN THAT VICINITY. ACCURATE SURVEY DATA MAY NOT BE AVAILABLE FOR THESE LOCATIONS SO USE CAUTION DURING EXCAVATION AND WHEN IDENTIFYING THE PIPELINE TO BE RETIRED. OTHER ACTIVE PIPELINES MAY BE IN THE AREA.
4. AT EACH SUCH LOCATION NOTED ABOVE, A PIECE OF PIPE AT LEAST 24" LONG SHALL BE REMOVED. INSTALL A 1" HIGH PRESSURE SAVE-A-VALVE (H-17491, M022287) TO CHECK FOR PRODUCT AND PRESSURE PRIOR TO CUTTING INTO THE PIPELINE. THE OPEN ENDS OF THE RETIRED PIPE SHALL BE SEALED BY THE MOST APPROPRIATE METHOD OUTLINED IN GT&D UTILITY WORK PROCEDURE TD-9500P-16. BACKFILL MUST BE THOROUGHLY COMPACTED IN PLACE OF THE REMOVED SECTION OF PIPE.

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A		90% DESIGN REVIEW	74004060	E1A4	MDGR		

REVISIONS

APPROVED BY: PSRS; SUPV; DSGN E1A4; DWN E1A4; CHKD MDGR; OK; DATE; SCALES

PIPELINE - RETIREMENT DETAILS
L-215 SAN JOAQUIN RIVER XING REPLACEMENT
L-215-1 MP 6.92 - 8.43, INSTALL 24" PIPE
PATTERSON, STANISLAUS COUNTY

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

GAS TRANSMISSION ESTIMATING & DESIGN

90% DESIGN REVIEW

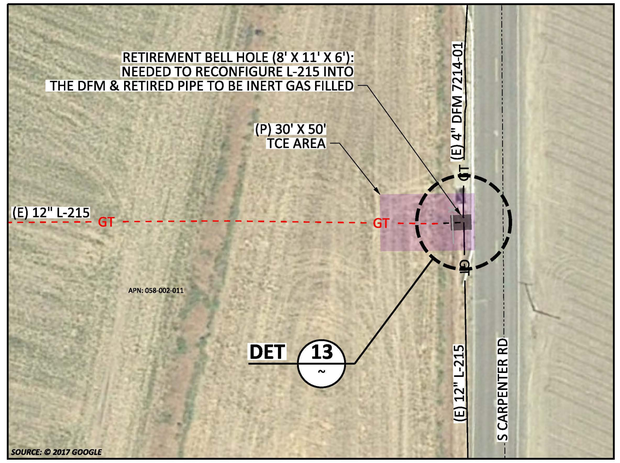
PACIFIC GAS AND ELECTRIC COMPANY

BILL OF MATL SHEET 26
DWG LIST SHEET 2
TRACKING NUMBER R-687
SHEET NO. 27 OF 28 SHEETS
74004060 A

74004060-S052-DA.dgn
01-APR-2020 09:40AM
Estimating.pen

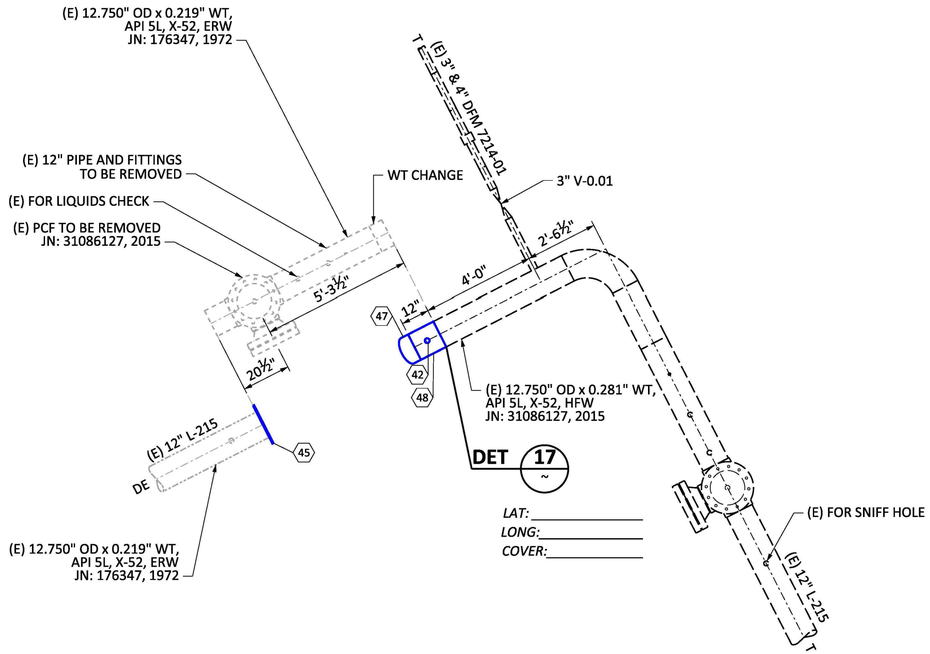
LOCATION D

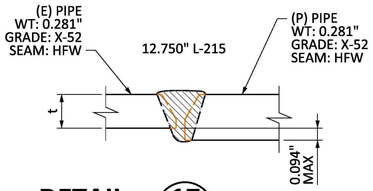
LAT: 37.453075, LONG: -121.027528
WALL MAP - 3366; PLAT - B2; L - 215; MP - 8.31
(SCALE: 1" = 40')



LEGEND:

--- GT --- PIPELINE TO BE DEACTIVATED AND INERT GAS FILLED. SEE PG&E R-687B L-215 SAN JOAQUIN RIVER CROSSING REPLACEMENT PROJECT - PHASE TWO DRAWING SET FOR DECOMMISSIONING.





DETAIL 17 WELD (TD-4160P-20)
SCALE: NTS FIGURE 1

DETAIL 13
SCALE: 3/8" = 1'-0"

DEACTIVATION PROCEDURE FOR EXISTING PIPE:

1. GT&D UTILITY WORK PROCEDURE TD 9500P-16, "DEACTIVATION AND/OR RETIREMENT OF UNDERGROUND GAS FACILITIES," SHALL BE FOLLOWED.
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4. AT EACH SUCH LOCATION NOTED ABOVE, A PIECE OF PIPE AT LEAST 24" LONG SHALL BE REMOVED. INSTALL A 1" HIGH PRESSURE SAVE-A-VALVE (H-17491, M022287) TO CHECK FOR PRODUCT AND PRESSURE PRIOR TO CUTTING INTO THE PIPELINE. THE OPEN ENDS OF THE RETIRED PIPE SHALL BE SEALED BY THE MOST APPROPRIATE METHOD OUTLINED IN GT&D UTILITY WORK PROCEDURE TD-9500P-16. BACKFILL MUST BE THOROUGHLY COMPACTED IN PLACE OF THE REMOVED SECTION OF PIPE.

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NO.	DATE	DESCRIPTION	PM/SPEC	DWN	CHKD	SUPV	APVD BY
A		90% DESIGN REVIEW	74004060	E1A4	MDGR		

REVISIONS

APPROVED BY: PSRS, SUPV, DSGN E1A4, DWN E1A4, CHKD MDGR, OK, DATE, SCALES

PIPELINE - RETIREMENT DETAILS
L-215 SAN JOAQUIN RIVER XING REPLACEMENT
L-215-1 MP 6.92 - 8.43, INSTALL 24" PIPE
PATTERSON, STANISLAUS COUNTY

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

GAS TRANSMISSION
ESTIMATING & DESIGN

90% DESIGN REVIEW

PACIFIC GAS AND ELECTRIC COMPANY

BILL OF MATL	SHEET 26
DWG LIST	SHEET 2
TRACKING NUMBER	R-687
SHEET NO.	28 OF 28 SHEETS

74004060 A

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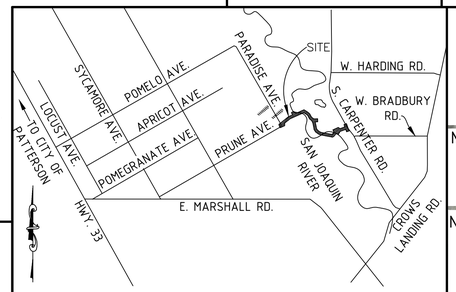
01-APR-2020 09:43AM
Estimating.pen

APPENDIX B2

Phase 2 Project Plans

30% DESIGN



VICINITY MAP – N.T.S

SURVEYOR'S STATEMENT:

THIS MAP CORRECTLY REPRESENTS A SURVEY MADE BY NELMS SURVEYING INC./eTrac INC. THIS SURVEY REPRESENTS THE CONDITIONS AS OF OCTOBER 2019.

NOTE: NO TITLE REPORT WAS SUPPLIED FOR THIS SURVEY; THEREFORE, IT IS NOT KNOWN IF ANY EXCEPTIONS, EASEMENTS OR LEASES ENCUMBER THIS PROPERTY.

NOTE: THIS MAP DOES NOT ATTEMPT TO IDENTIFY ALL UNDERGROUND FACILITIES. IT IS RECOMMENDED THAT UTILITY COMPANIES BE CONTACTED PRIOR TO CONSTRUCTION, IN REGARDS TO LOCATION.

BENCHMARK USED:

CONTROL POINT #50

1" IRON PIPE WITH COTTON PICKER SPINDLE ON THE EAST SIDE OF THE LEVEE AND THE ENTRANCE TO THE SAN JOAQUIN RIVER.

ELEVATION = 64.47' (NAVD 88)

LEGEND:

12" PIPELINE SLURRY FILLED AND ABANDONED IN PLACE

12" PIPELINE REMOVED IN ENTIRETY

SAN JOAQUIN RIVER
AGRICULTURE LEVEE
PRIVATE AGRICULTURE ROAD
PARADISE AVE
ASPHALT ROAD
ACOE LEVEE
AGRICULTURE LEVEE
PRIVATE AGRICULTURE ROAD
ACOE LEVEE
AGRICULTURE LEVEE
SAN JOAQUIN RIVER
S Carpenter Rd

GRAPHIC SCALE
0 100 200 600
50 150 400
SCALE: 1"=200'

Know what's below. Call 811 before you dig.

LONGITUDE 123, INC.
California Marine Project Planning, Permitting and Performance
2100 VALLEY MEADOW DRIVE OAK VIEW, CA 93022
TEL: 805.649.9364 EMAIL: MSTEFFY@LONGITUDE123.NET

YCE INCORPORATED
Civil Engineering & Land Surveying
1587 Morse Avenue, Suite A – Ventura, CA 93003
19033 Gledhill Street – Northridge, CA 91324
(805) 650-6995 (818) 701-5512
Fax: (805) 677-4721 Email: yce-mya@sbcbell.net

REV	DATE	DESCRIPTION	JOB NO	DWN	CHKD	APVD BY
1	2/20/20	EXTENDED EXCAVATION LENGTH FOR WEST AND EAST BANK				

REVISIONS

APVD BY	X
DEPT	X
SUPV	X
DWN	X
CHKD	X
OK	X
DATE	121219
SCALE	1"=200'

PG&E

DECOMMISSIONING PIPELINE L-215 PHASE 2 REPLACEMENT PROJECT

DIV	1019-01
X	
SUPERSEDES	
SUPERSEDED BY	
SHEET	1 OF 14 SHEETS
DRAWING NUMBER	L-215
REV	1

30% DESIGN

LEGEND:

SLURRY FILLED AND ABANDONED IN PLACE

12" PIPELINE REMOVED IN ENTIRETY

SAN JOAQUIN RIVER
AGRICULTURE LEVEE
EAST LANDING SEGMENT
PRIVATE AGRICULTURE ROAD
ACOE LEVEE
SEE SHEET 9
TEMPORARY IMPACT AREA
SEE SHEET 7
SEE SHEET 8
SEE SHEET 6
SUBMERGED RIVERBED CROSSING SEGMENT
AGRICULTURE LEVEE SEGMENT
TEMPORARY IMPACT AREA
PRIVATE AGRICULTURE ROAD
PARADISE AVE
SEE SHEET 5
WEST LANDING SEGMENT
TEMPORARY IMPACT AREA
ASPHALT ROAD
SEE SHEET 4
ACOE WEST LEVEE SEGMENT
ACOE LEVEE
SAN JOAQUIN RIVER
SEE SHEET 10
EAST AGRICULTURAL FIELD SEGMENT
TEMPORARY IMPACT AREA
ACOE EAST LEE /E SEGMENT
S Carpenter Rd
WEST ROAD SEGMENT
SEE SHEET 3
PRUNE AVE
TEMPORARY IMPACT AREA
SEE SHEET 11
PHASE 1 L-215-1 MP 6.92-8.43, INSTALL 7991' OF 24" L-215 MP 7.16-8.08, RETIRE 6800' OF 12" L-215, STANISLAUS COUNTY

COLOR BAR (FT ABOVE MLLW)
40
25

GRAPHIC SCALE
0 100 200 600
50 150 400
SCALE: 1"=200'

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REV	DATE	DESCRIPTION	JOB NO	DWN	CHKD	APVD BY
1	2/2020	EXTENDED EXCAVATION LENGTH FOR WEST AND EAST BANK				

REVISIONS

APVD BY	X
DEPT	X
SUPV	X
DWN	X
CHKD	X
OK	X
DATE	121219
SCALE	

PG&E

DECOMMISSIONING PIPELINE L-215 PHASE 2 REPLACEMENT PROJECT

DIV	1019-01
X	
SUPERSEDES	
SUPERSEDED BY	
SHEET	2 OF 14 SHEETS
DRAWING NUMBER	L-215
REV	1

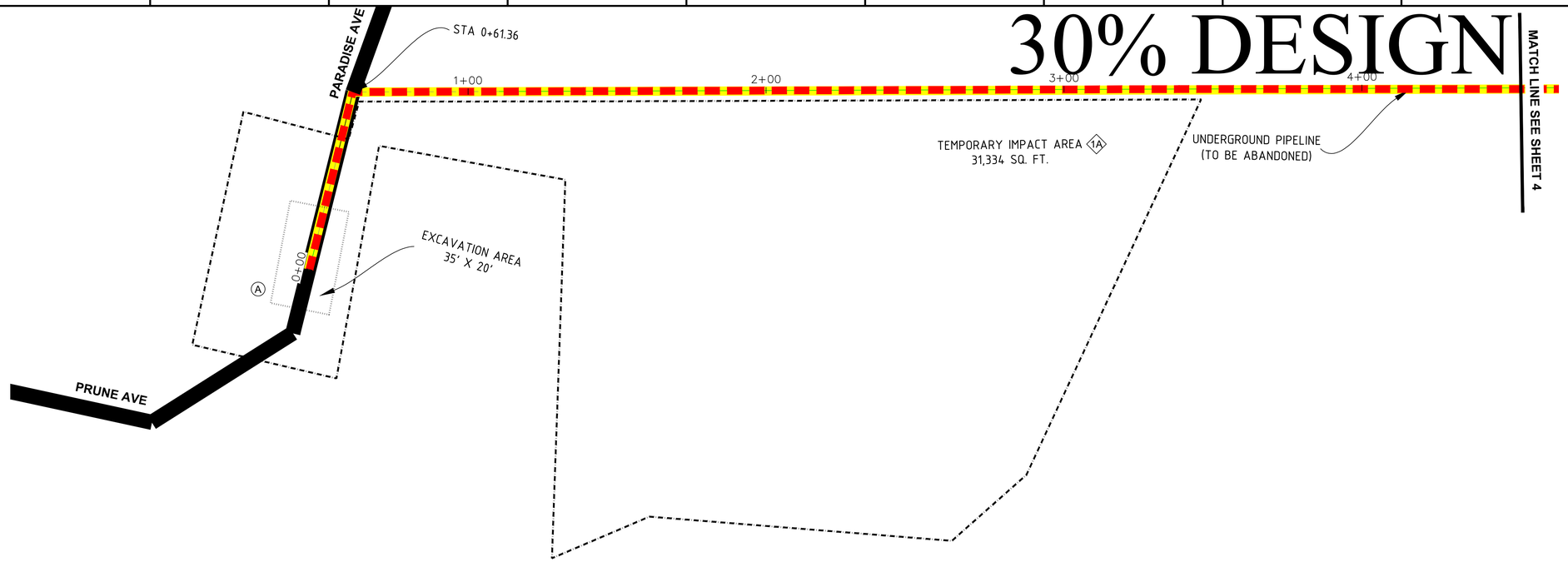
30% DESIGN

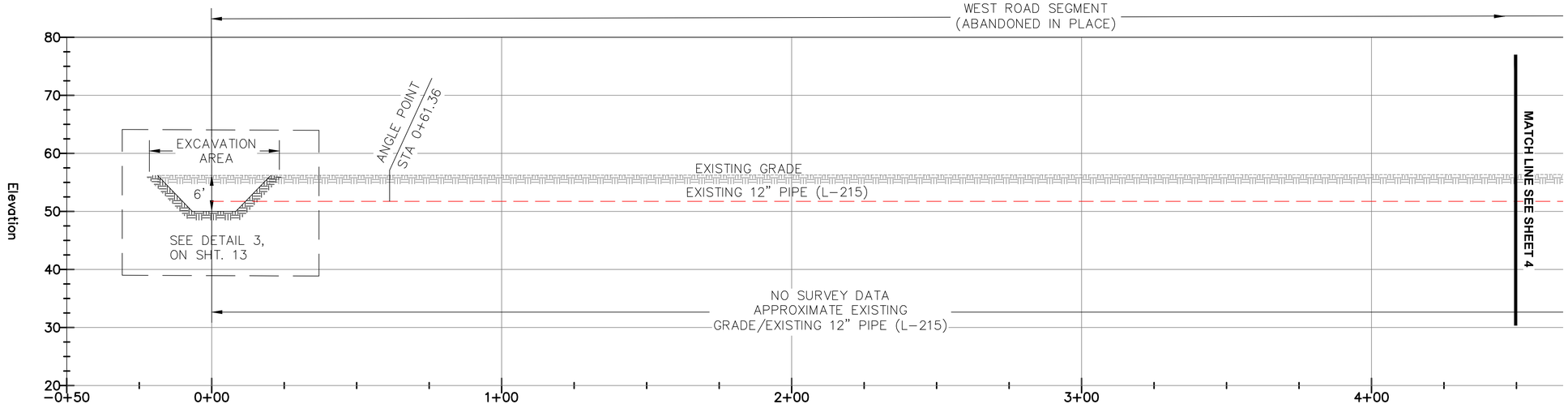
LEGEND:

UNDERGROUND PIPE

12" PIPELINE SLURRY FILLED AND ABANDONED IN PLACE

EXCAVATION AREA DATA		
ID	AREA	VOLUME
(A)	701 SQ. FT.	88 CU. YD.





VERTICAL SCALE 1"=10'
HORIZONTAL SCALE 1"=20'

GRAPHIC SCALE
0 10 20 60
5 15 40
SCALE: 1"=20'

Know what's below. Call 811 before you dig.

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2100 VALLEY MEADOW DRIVE OAK VIEW, CA 93022
TEL: 805.649.9364 EMAIL: MSTEFFY@LONGITUDE123.NET

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REV	DATE	DESCRIPTION	JOB NO	DWN	CHKD	APVD BY
1	2/20/20	EXTENDED EXCAVATION LENGTH FOR WEST AND EAST BANK				

REVISIONS

APVD BY	X
DEPT	X
SUPV	X
DWN	X
CHKD	X
OK	X
DATE	121219
SCALE	

PG&E

DECOMMISSIONING PIPELINE L-215 PHASE 2 REPLACEMENT PROJECT

DIV	1019-01
	X
SUPERSEDES	
SUPERSEDED BY	
SHEET	3 OF 14 SHEETS
DRAWING NUMBER	L-215
REV	1

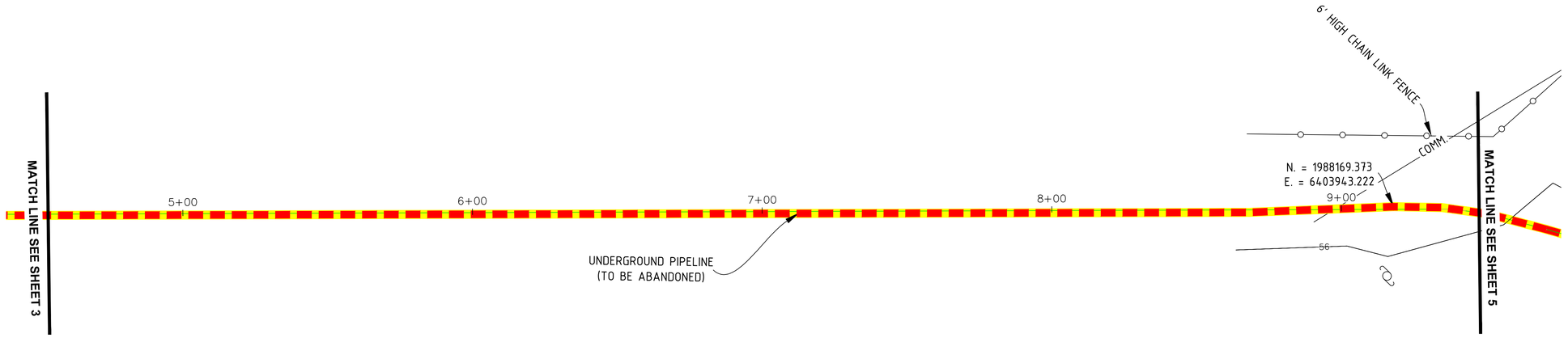
30% DESIGN

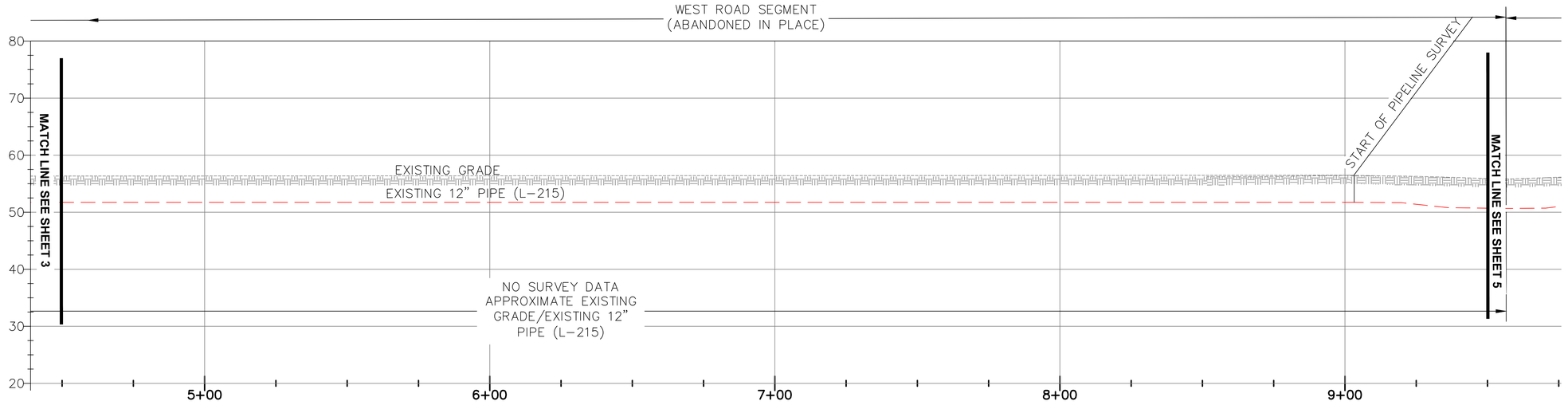
LEGEND:

UNDERGROUND PIPE

12" PIPELINE SLURRY FILLED AND ABANDONED IN PLACE

CHAIN LINK FENCE





VERTICAL SCALE 1"=10'
HORIZONTAL SCALE 1"=20'

GRAPHIC SCALE
0 10 20 60
5 15 40
SCALE: 1"=20'

Know what's below. Call 811 before you dig.

LONGITUDE 123, INC. California Marine Project Planning, Permitting and Performance
2100 VALLEY MEADOW DRIVE OAK VIEW, CA 93022
TEL: 805.649.9364 EMAIL: MSTEFFY@LONGITUDE123.NET

YCE INCORPORATED
Civil Engineering & Land Surveying
1587 Morse Avenue, Suite A – Ventura, CA 93003
19033 Gledhill Street – Northridge, CA 91324
(805) 650-6995 (818) 701-5512
Fax: (805) 677-4721 Email: yce-myo@pacbell.net

REV	DATE	DESCRIPTION	JOB NO	DWN	CHKD	APVD BY
1	2/20/20	EXTENDED EXCAVATION LENGTH FOR WEST AND EAST BANK				

REVISIONS

APVD BY	X
DEPT	X
SUPV	X
DWN	X
CHKD	X
OK	X
DATE	121219
SCALE	

PG&E

DECOMMISSIONING PIPELINE L-215 PHASE 2 REPLACEMENT PROJECT

DIV	1019-01
X	
SUPERSEDES	
SUPERSEDED BY	
SHEET	4 OF 14 SHEETS
DRAWING NUMBER	L-215
REV	1

30% DESIGN

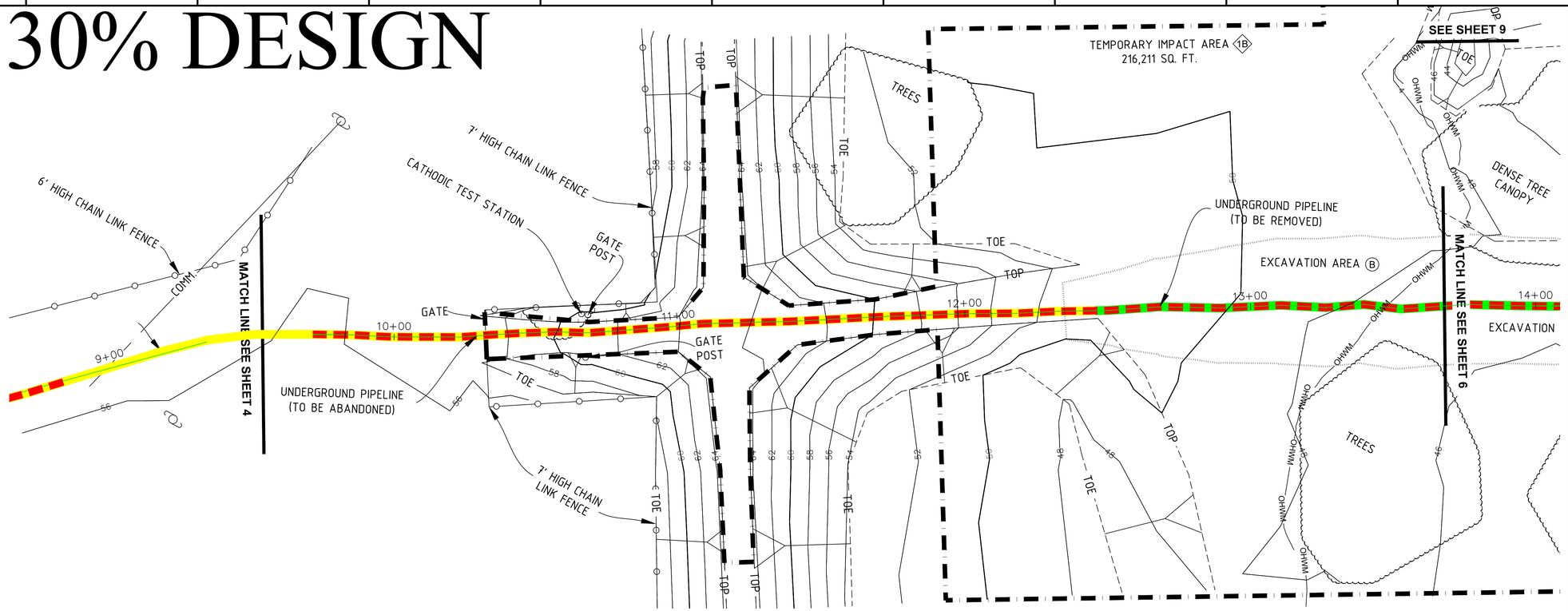
LEGEND:

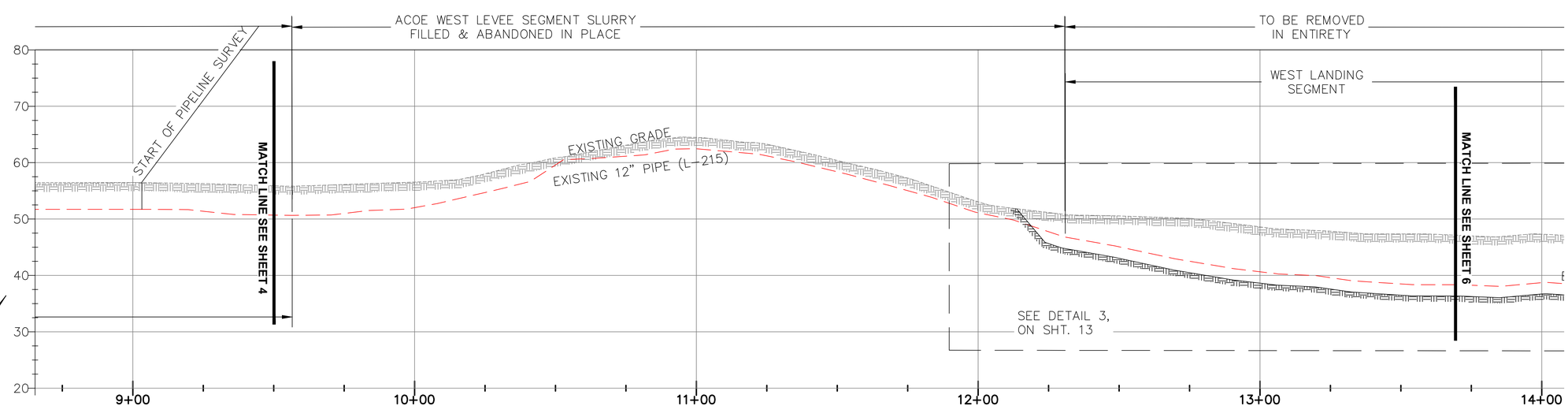
- WATER LINE
- CHAIN LINK FENCE
- BARBED WIRE FENCE
- TREES
- UNDERGROUND PIPE
- 12" PIPELINE SLURRY FILLED AND ABANDONED IN PLACE
- 12" PIPELINE REMOVED IN ENTIRETY
- TEMPORARY IMPACT AREA
- ORDINARY HIGH WATER MARK — OHWM — OHWM —

EXCAVATION AREA DATA		
ID	AREA	VOLUME
(B)	18,663 SQ. FT.	3,361 CU. YD.

GENERAL NOTES:

PER PADRE ASSOCIATES, INC. THE ORDINARY HIGH WATER MARK IS BASED ON FIELD INDICATORS OBSERVED DURING DELINEATION SURVEYS AND CROSS REFERENCED WITH STREAM GAGE DATA AT DIFFERENT FLOOD STAGES.





VERTICAL SCALE 1"=10'
HORIZONTAL SCALE 1"=20'

GRAPHIC SCALE
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5 15 40
SCALE: 1"=20'

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1	2/20/20	EXTENDED EXCAVATION LENGTH FOR WEST AND EAST BANK				

REVISIONS

APVD BY	X
DEPT	X
SUPV	X
DWN	X
CHKD	X
OK	X
DATE	121219
SCALE	

PG&E

DECOMMISSIONING PIPELINE L-215 PHASE 2 REPLACEMENT PROJECT

DIV	1019-01
X	
SUPERSEDES	
SUPERSEDED BY	
SHEET	5 OF 14 SHEETS
DRAWING NUMBER	L-215
REV	1

30% DESIGN

LEGEND:

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- CHAIN LINK FENCE
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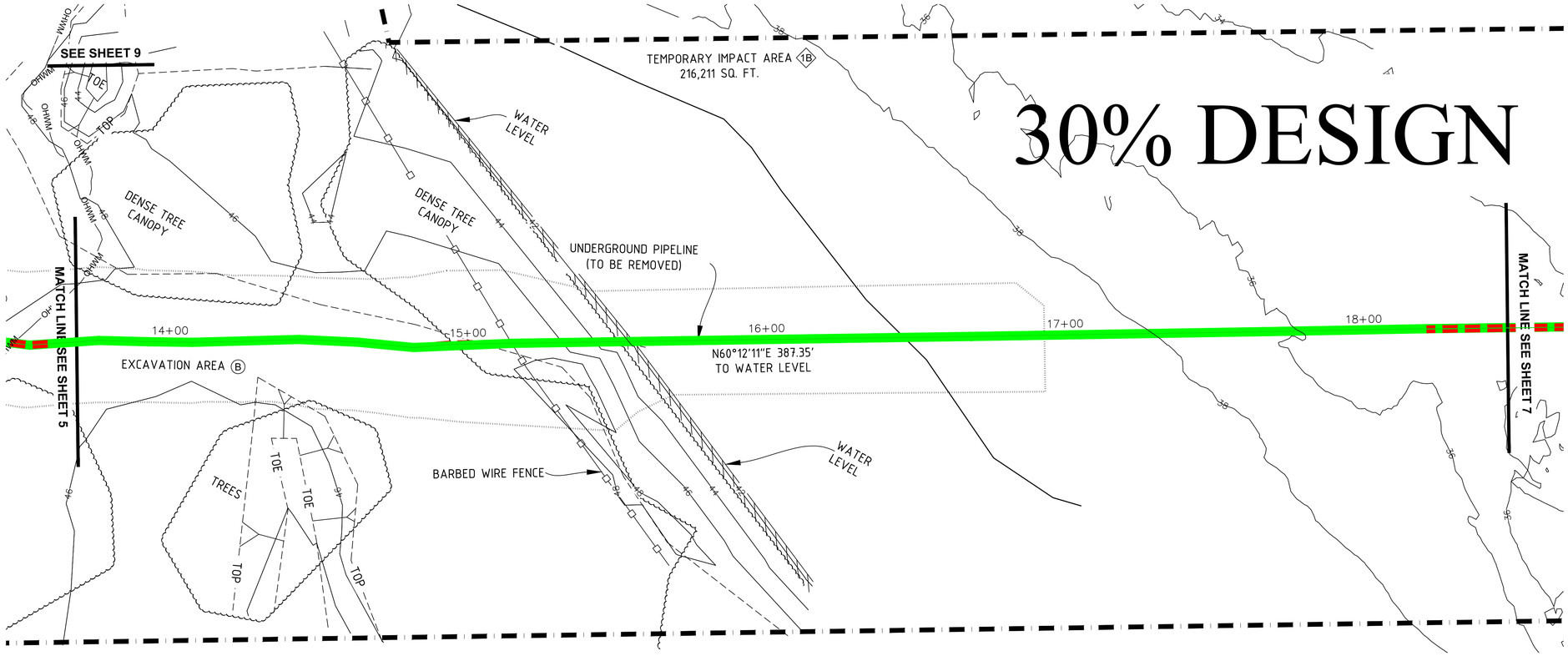
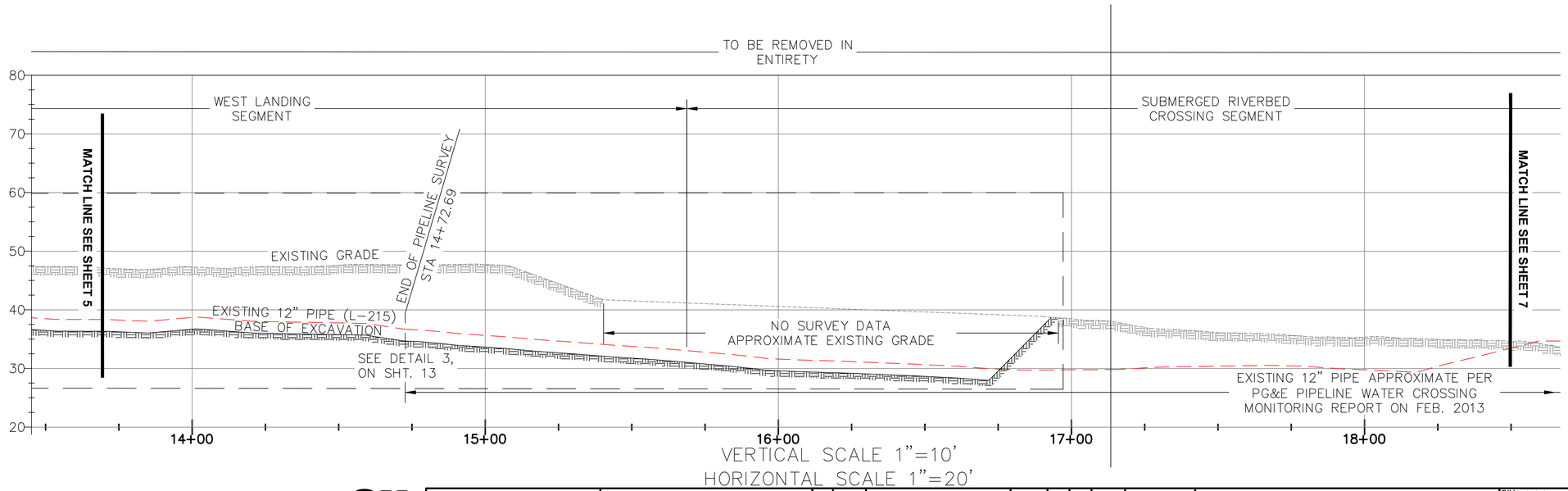
- TREES
- UNDERGROUND PIPE
- 12" PIPELINE SLURRY FILLED AND ABANDONED IN PLACE
- 12" PIPELINE REMOVED IN ENTIRETY
- TEMPORARY IMPACT AREA
- ORDINARY HIGH WATER MARK — OHWM — OHWM

EXCAVATION AREA DATA		
ID	AREA	VOLUME
(B)	18,663 SQ. FT.	3,361 CU. YD.

GENERAL NOTES:

PER PADRE ASSOCIATES, INC. THE ORDINARY HIGH WATER MARK IS BASED ON FIELD INDICATORS OBSERVED DURING DELINEATION SURVEYS AND CROSS REFERENCED WITH STREAM GAGE DATA AT DIFFERENT FLOOD STAGES.





GRAPHIC SCALE
0 5 10 15 20 40 60
SCALE: 1"=20'

811 Know what's below. Call 811 before you dig.

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REV	DATE	DESCRIPTION	JOB NO	DWN	CHKD	APVD BY
1	2/20/20	EXTENDED EXCAVATION LENGTH FOR WEST AND EAST BANK				

REVISIONS

APVD BY X
DEPT X
SUPV X
DWN X
CHKD X
OK X
DATE 121219
SCALE

PG&E

DECOMMISSIONING PIPELINE L-215 PHASE 2 REPLACEMENT PROJECT

DIV 1019-01
X
SUPERSEDES
SUPERSEDED BY
SHEET 6 OF 14 SHEETS
DRAWING NUMBER L-215
REV 1

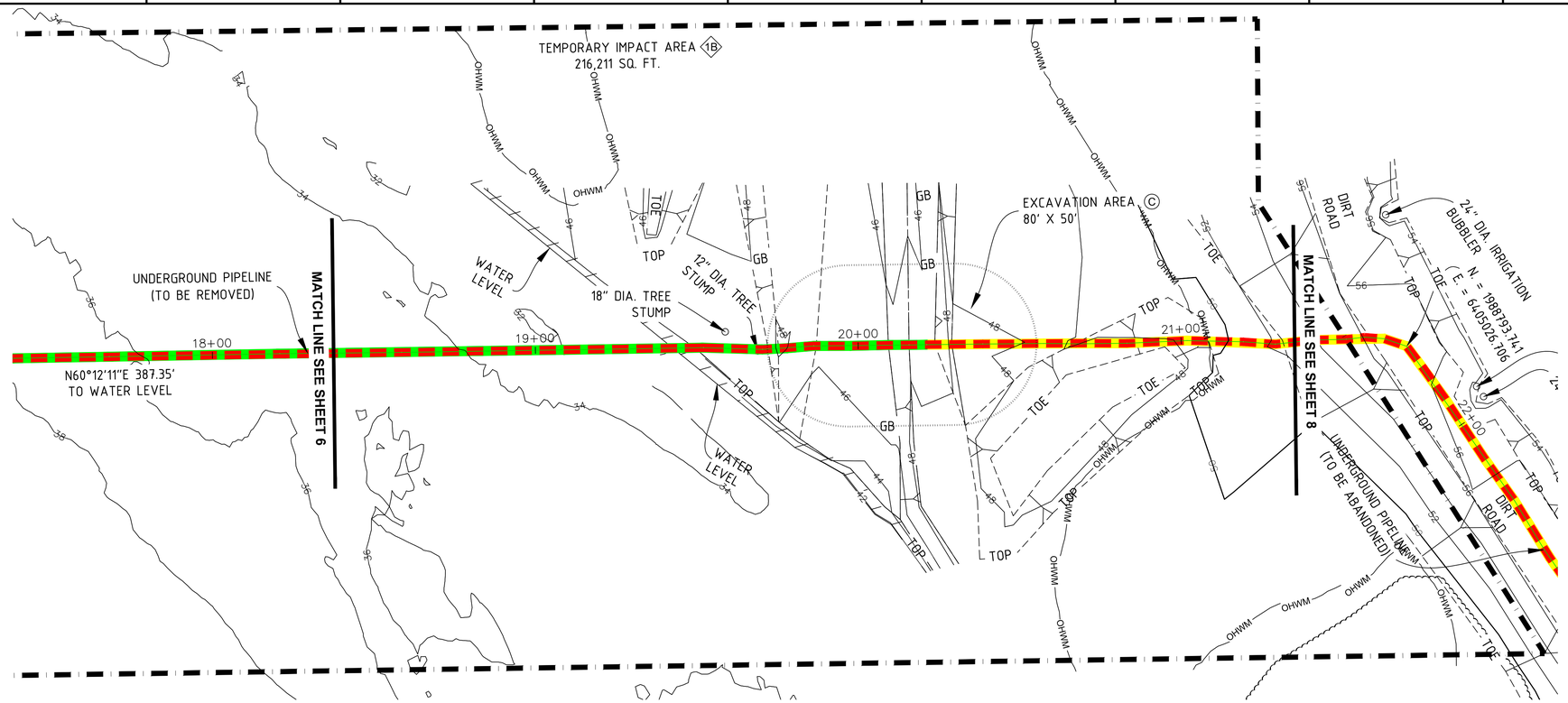
LEGEND:

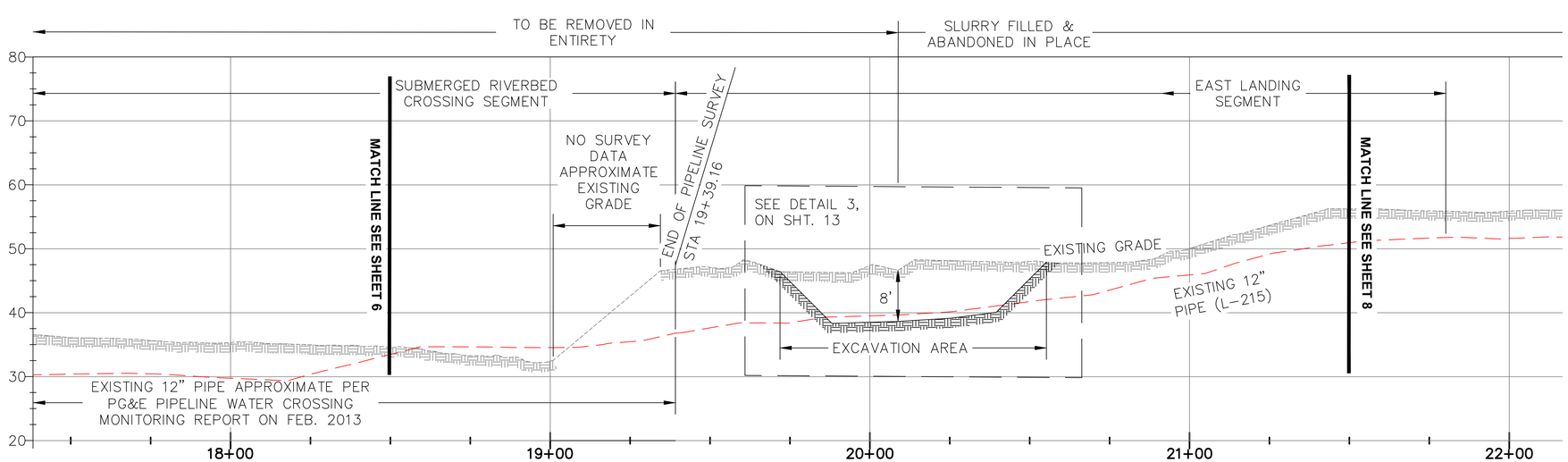
- WATER LINE
- CHAIN LINK FENCE
- BARBED WIRE FENCE
- TREES
- UNDERGROUND PIPE
- 12" PIPELINE SLURRY FILLED AND ABANDONED IN PLACE
- 12" PIPELINE REMOVED IN ENTIRETY
- TEMPORARY IMPACT AREA
- ORDINARY HIGH WATER MARK — OHWM — OHWM —
- GB — GROUND BREAK

EXCAVATION AREA DATA		
ID	AREA	VOLUME
Ⓒ	3,629 SQ. FT.	398 CU. YD.

GENERAL NOTES:

PER PADRE ASSOCIATES, INC. THE ORDINARY HIGH WATER MARK IS BASED ON FIELD INDICATORS OBSERVED DURING DELINEATION SURVEYS AND CROSS REFERENCED WITH STREAM GAGE DATA AT DIFFERENT FLOOD STAGES.





VERTICAL SCALE 1"=10'
HORIZONTAL SCALE 1"=20'

30% DESIGN

GRAPHIC SCALE
0 10 20 60
5 15 40
SCALE: 1"=20'

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1	2/20/20	EXTENDED EXCAVATION LENGTH FOR WEST AND EAST BANK				

REVISIONS

APVD BY	X
DEPT	X
SUPV	X
DWN	X
CHKD	X
OK	X
DATE	121219
SCALE	

PG&E

DECOMMISSIONING PIPELINE L-215 PHASE 2 REPLACEMENT PROJECT

DIV	1019-01
X	
SUPERSEDES	
SUPERSEDED BY	
SHEET	7 OF 14 SHEETS
DRAWING NUMBER	L-215
REV	1

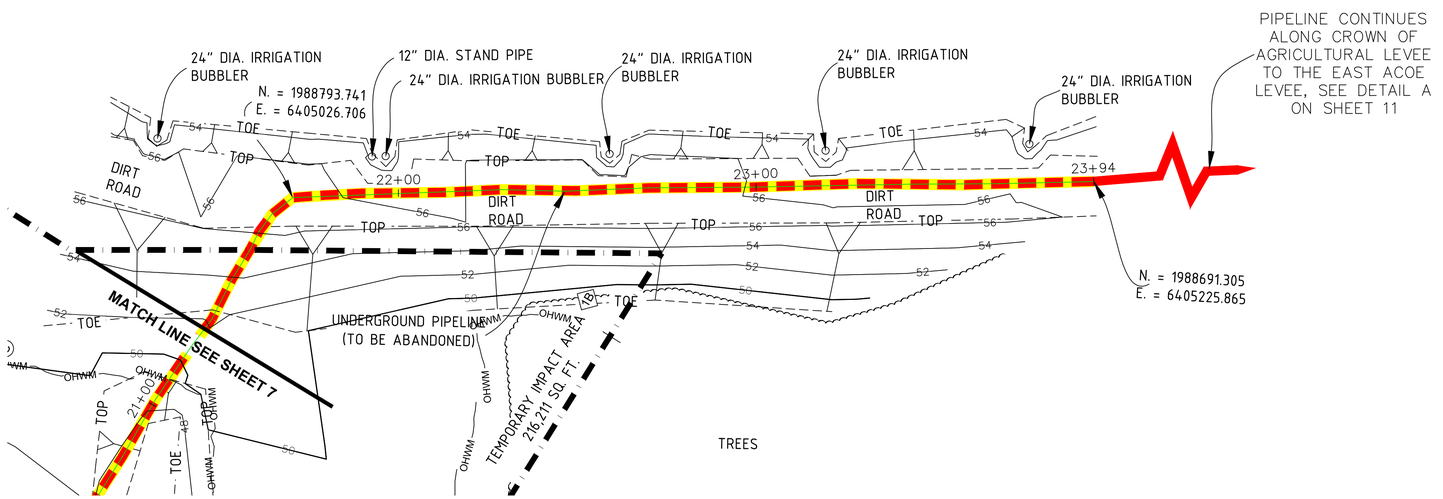
30% DESIGN

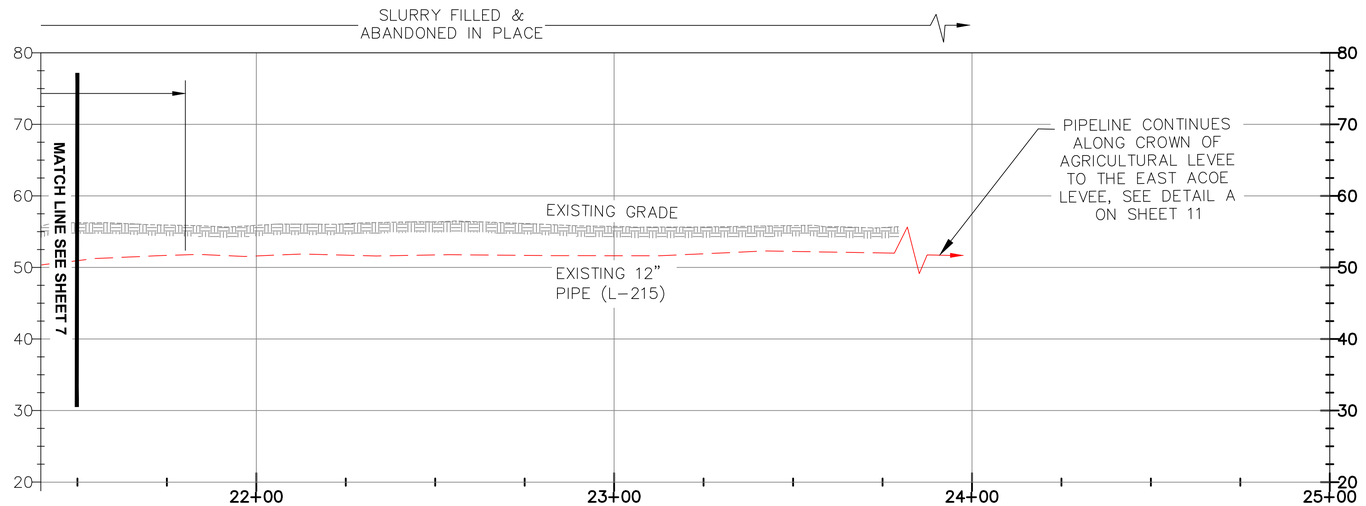
LEGEND:

- WATER LINE
- CHAIN LINK FENCE
- BARBED WIRE FENCE
- TREES
- UNDERGROUND PIPE
- 12" PIPELINE SLURRY FILLED AND ABANDONED IN PLACE
- 12" PIPELINE REMOVED IN ENTIRETY
- TEMPORARY IMPACT AREA
- ORDINARY HIGH WATER MARK — OHWM — OHWM

GENERAL NOTES:

PER PADRE ASSOCIATES, INC. THE ORDINARY HIGH WATER MARK IS BASED ON FIELD INDICATORS OBSERVED DURING DELINEATION SURVEYS AND CROSS REFERENCED WITH STREAM GAGE DATA AT DIFFERENT FLOOD STAGES.





VERTICAL SCALE 1"=10'
HORIZONTAL SCALE 1"=20'

GRAPHIC SCALE
0 5 10 15 20 40 60
SCALE: 1"=20'

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REV	DATE	DESCRIPTION	JOB NO	DWN	CHKD	APVD BY
1	2/20/20	EXTENDED EXCAVATION LENGTH FOR WEST AND EAST BANK				

REVISIONS

APVD BY	X
DEPT	X
SUPV	X
DWN	X
CHKD	X
OK	X
DATE	121219
SCALE	

PG&E

DECOMMISSIONING PIPELINE L-215 PHASE 2 REPLACEMENT PROJECT

DIV	1019-01
X	
SUPERSEDES	
SUPERSEDED BY	
SHEET	8 OF 14 SHEETS
DRAWING NUMBER	L-215
REV	1

30% DESIGN

LEGEND:

- WATER LINE
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- TREES
- UNDERGROUND PIPE
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- 12" PIPELINE REMOVED IN ENTIRETY
- TEMPORARY IMPACT AREA



GRAPHIC SCALE

0 10 20 30 60 90

SCALE: 1"=30'

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REV	DATE	DESCRIPTION	JOB NO	DWN	CHKD	APVD BY
1	2/20/20	EXTENDED EXCAVATION LENGTH FOR WEST AND EAST BANK				

REVISIONS

APVD BY	X
DEPT	X
SUPV	X
DWN	X
CHKD	X
OK	X
DATE	121219
SCALE	

PG&E

DECOMMISSIONING PIPELINE L-215 PHASE 2 REPLACEMENT PROJECT

DIV	1019-01
X	
SUPERSEDES	
SUPERSEDED BY	
SHEET	9 OF 14 SHEETS
DRAWING NUMBER	L-215
REV	1

30% DESIGN

LEGEND:

- WATER LINE
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- TREES
- UNDERGROUND PIPE
- 12" PIPELINE SLURRY FILLED AND ABANDONED IN PLACE
- 12" PIPELINE REMOVED IN ENTIRETY
- TEMPORARY IMPACT AREA
- EXCAVATION AREA

EXCAVATION AREA DATA		
ID	AREA	VOLUME
(D)	576 SQ. FT.	43 CU. YD.
(E)	576 SQ. FT.	43 CU. YD.



GRAPHIC SCALE

0 20 40 100

10 30 50 150

SCALE: 1"=50'

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REV	DATE	DESCRIPTION	JOB NO	DWN	CHKD	APVD BY
1	2/20/20	EXTENDED EXCAVATION LENGTH FOR WEST AND EAST BANK				

REVISIONS

APVD BY	X
DEPT	X
SUPV	X
DWN	X
CHKD	X
OK	X
DATE	121219
SCALE	

PG&E

DECOMMISSIONING PIPELINE L-215 PHASE 2 REPLACEMENT PROJECT

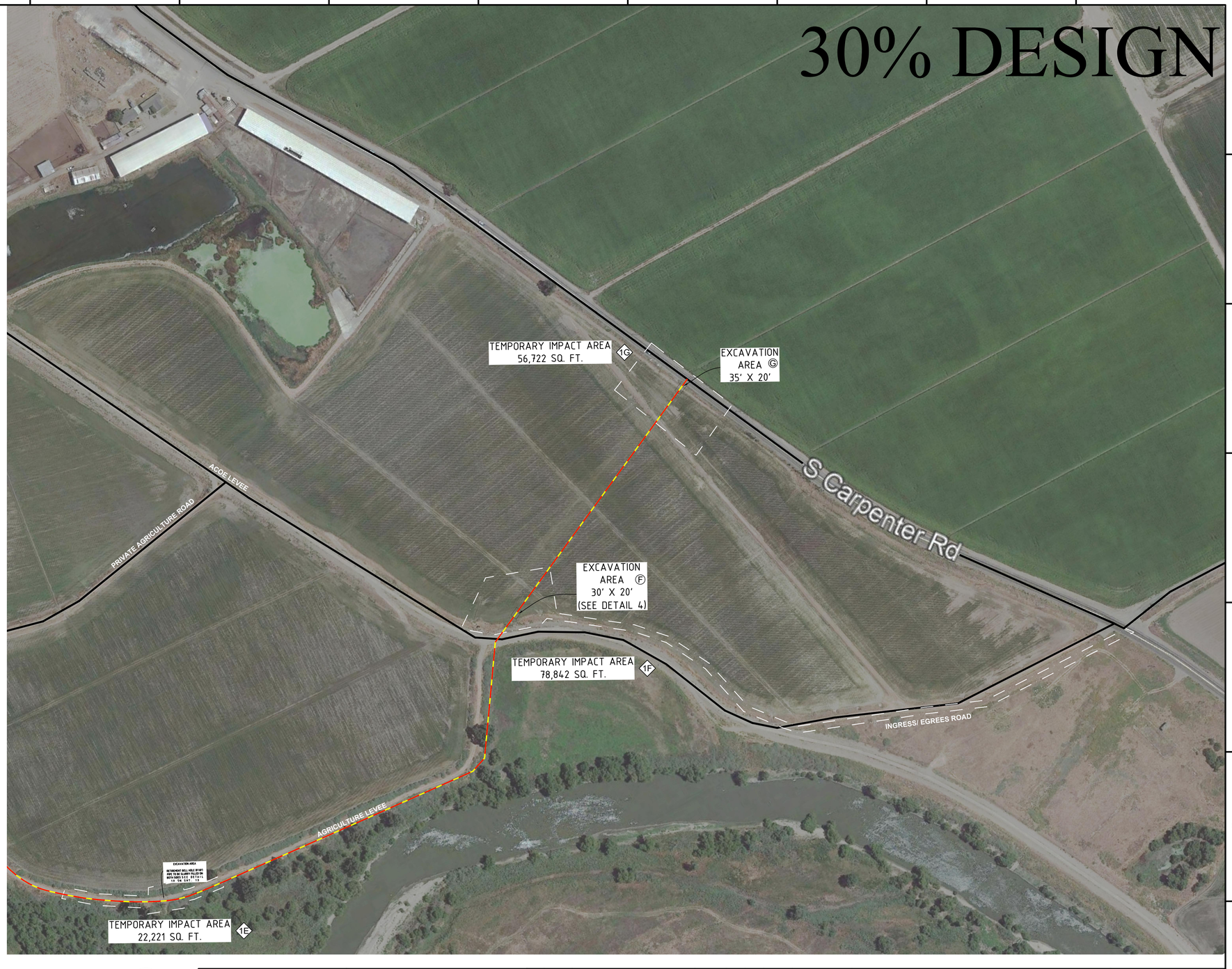
DIV	1019-01
X	
SUPERSEDES	
SUPERSEDED BY	
SHEET	10 OF 14 SHEETS
DRAWING NUMBER	L-215
REV	1

30% DESIGN

LEGEND:

- WATER LINE
- CHAIN LINK FENCE
- BARBED WIRE FENCE
- TREES
- UNDERGROUND PIPE
- 12" PIPELINE SLURRY FILLED AND ABANDONED IN PLACE
- 12" PIPELINE REMOVED IN ENTIRETY
- TEMPORARY IMPACT AREA
- EXCAVATION AREA

EXCAVATION AREA DATA		
ID	AREA	VOLUME
(F)	600 SQ. FT.	44 CU. YD.
(G)	700 SQ. FT.	51 CU. YD.



GRAPHIC SCALE

0 100 300

50 150 450

SCALE: 1"=150'

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REV	DATE	DESCRIPTION	JOB NO	DWN	CHKD	APVD BY
1	2/20/20	EXTENDED EXCAVATION LENGTH FOR WEST AND EAST BANK				

REVISIONS

APVD BY	X
DEPT	X
SUPV	X
DWN	X
CHKD	X
OK	X
DATE	121219
SCALE	

PG&E

DECOMMISSIONING PIPELINE L-215 PHASE 2 REPLACEMENT PROJECT

DIV	1019-01
X	
SUPERSEDES	
SUPERSEDED BY	
SHEET	11 OF 14 SHEETS
DRAWING NUMBER	L-215
REV	1

30% DESIGN

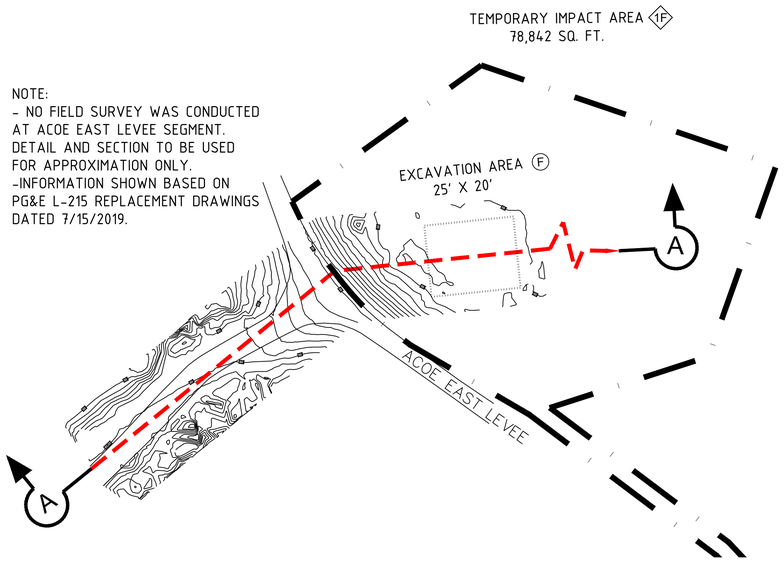
LEGEND:

UNDERGROUND PIPE

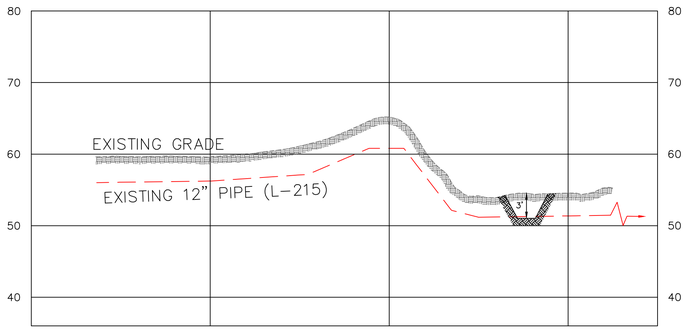
TEMPORARY IMPACT AREA

EXCAVATION AREA DATA		
ID	AREA	VOLUME
(F)	500 SQ. FT.	37 CU. YD.

NOTE:
- NO FIELD SURVEY WAS CONDUCTED AT ACOE EAST LEVEE SEGMENT. DETAIL AND SECTION TO BE USED FOR APPROXIMATION ONLY.
-INFORMATION SHOWN BASED ON PG&E L-215 REPLACEMENT DRAWINGS DATED 7/15/2019.



DETAIL A
ACOE EAST LEVEE SEGMENT – N.T.S.



SECTION A–A
ACOE EAST LEEVE SEGMENT PIPELINE – N.T.S.

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REV	DATE	DESCRIPTION	JOB NO	DWN	CHKD	APVD BY
1	2/20/20	EXTENDED EXCAVATION LENGTH FOR WEST AND EAST BANK				

REVISIONS

APVD BY X
DEPT X
SUPV X
DWN X
CHKD X
OK X
DATE 121219
SCALE

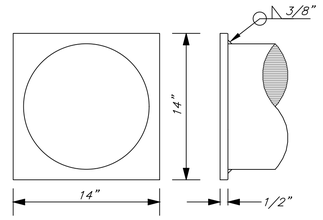
PG&E

DECOMMISSIONING PIPELINE L-215 PHASE 2 REPLACEMENT PROJECT

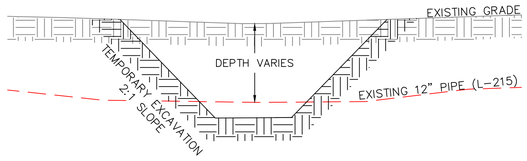
DIV 1019-01
X
SUPERSEDES
SUPERSEDED BY
SHEET 12 OF 14 SHEETS
DRAWING NUMBER L-215
REV 1

30% DESIGN

1 L-215 PIPELINE TERMINATION N.T.S.

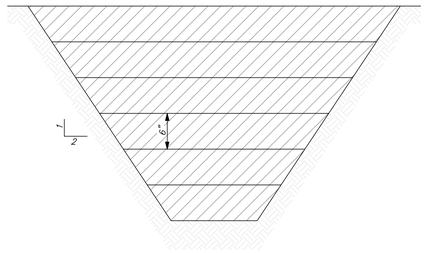


1/2" A36 STEEL PLATE NOTES:
1): WELDED STEEL CAPS ON ALL TERRESTRIAL PIPE ENDS TO BE ABANDONED IN PLACE.
2): PIPE CAP MATERIALS 1/2" A36 STEEL PLATE, 14" X 14"
3): ALL WELDING E7018



1. EXCAVATION NOTES:
   a. EXCAVATE 1 FT BELOW EXISTING PIPE

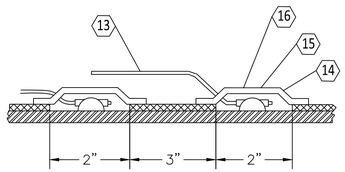
3 TYPICAL EXCAVATION DETAIL
SCALE: N.T.S.



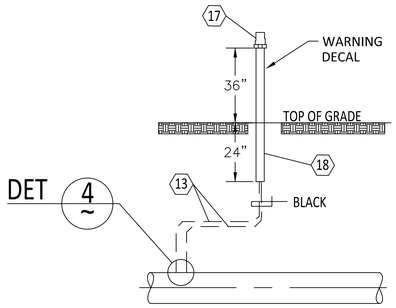
1. EXCAVATION NOTES:
   a. ASSUME TYPE 3 SOIL
   b. OSHA OPTION 1 – MINIMUM TRENCH WALL SLOPE 2:1

2. BACKFILL NOTES:
   a. BACKFILL ALL EXCAVATIONS, EXCEPT THE LEVEE CROWN ROAD, WITH NATIVE BACKFILL (SPOILS & IMPORTED AS NEEDED)
   b. BACKFILL LEVEE CROWN ROAD EXCAVATION WITH CLASS II ROAD BASE.
   d. ALL BACKFILL PLACED IN MAXIMUM 6" LIFTS.
   c. ALL BACKFILL TO BE COMPACTED AND VERIFIED BY CERTIFIED SOILS LABORATORY TO A RELATIVE COMPACTION OF NOT LESS THAN 90% PER ASTM D1557-91.

2 ALL EXCAVATION AND BACKFILL DESIGN (TYPICAL)
SCALE: N.T.S.

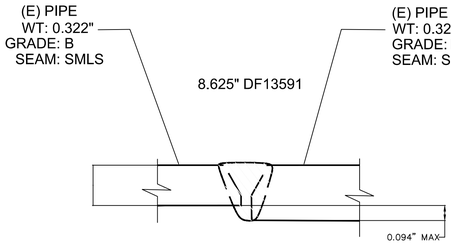


DETAIL 4 ATTACHING THE WIRE TO THE GAS MAIN CCV 0-10, FIGURE 1
SCALE: NTS

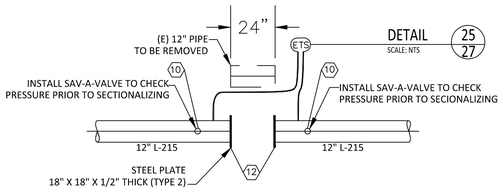


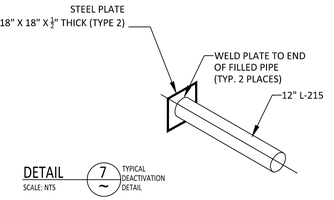
(E) 24.000" L-215-1

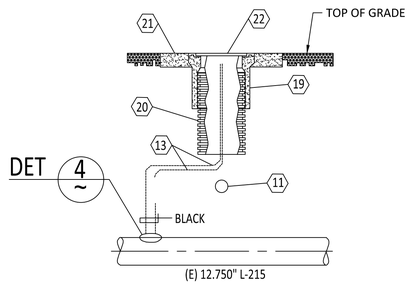
DETAIL 5/26 ETS TYPE A CCV 0-10
SCALE: NONE



DETAIL 6 WELD (TD-4160P-20) FIGURE 1
SCALE: NTS







DETAIL 8/23-25 ETS TYPE A CCV 0-10
SCALE: NONE

Know what's below. Call 811 before you dig.

LONGITUDE 123, INC.
California Marine Project Planning, Permitting and Performance
2100 VALLEY MEADOW DRIVE OAK VIEW, CA 93022
TEL: 805.649.9364 EMAIL: MSTEFFY@LONGITUDE123.NET

YCE INCORPORATED
Civil Engineering & Land Surveying
1587 Morse Avenue, Suite A – Ventura, CA 93003
19033 Gledhill Street – Northridge, CA 91324
(805) 650-6995 (818) 701-5512
Fax: (805) 677-4721 Email: yce-mya@pacbell.net

REV	DATE	DESCRIPTION	JOB NO	DWN	CHKD	APVD BY
1	2/20/20	EXTENDED EXCAVATION LENGTH FOR WEST AND EAST BANK				

REVISIONS

APVD BY	X
DEPT	X
SUPV	X
DWN	X
CHKD	X
OK	X
DATE	121219
SCALE	

PG&E

DECOMMISSIONING PIPELINE L-215 PHASE 2 REPLACEMENT PROJECT

DIV	1019-01
SAN JOAQUIN RIVER	
SUPERSEDES	
SUPERSEDED BY	
SHEET	13 OF 14 SHEETS
DRAWING NUMBER	L-215
REV	1

BOM #	MATERIAL DESCRIPTION	MATERIAL CODE #	UNIT	QTY	STANDARD
10	NIPPLE, SAVE-A-VALVE, 2", WELD, STEEL, MUELLER # H-17491, STEEL CAP, DRILLING L-161200 PSI MAXIMUM, 1440 PSI MAXIMUM	M022289	EA	20	GS&S C-14
11	MARKER, EXTENDED RANGE BALL, EMS TYPE, YELLOW, 3M # 1405-XR, FOR MARKING BURIED GAS FACILITIES, MAXIMUM INSTALLED DEPTH IS 5'	M374944	EA	15	GS&S M-60
12	STEEL PLATE	N/A	EA	20	-
13	WIRE ELECTRICAL, INSULTED, COPPER, 10 AWG, 600 V, 47MIL PVC, SOLID 1 CONDUCTOR, BLACK	M294991	FT	50	CCV 0-10
14	SLEEVE, COPPER SPICING, #14 TO #10 CADWELD # CAB-133-1H, THERMOWELD # A-200	M303755	EA	2	CCV 0-10
15	CARTRIDGE, BRAZING, CADWELD # CA-15, THERMOWELD # 15P	M159260	EA	1	CCV 0-10
16	TAPE, HANDY CAP, 4"X4", ROYSTON W/ INTEGRATED PRIMER	M294991	FT	50	CCV 0-10
17	STATION, TEST, CATHODIC PROTECTION, COTT MFG# 300S5, ORANGE, BIG FINK, 5 TERMINALS, WITHOUT CONDENSER	M569390	EA	1	CCV 0-10.1
18	PIPE, PVC, 3" IPS, 0.300" WT, SCH 80	M016071	FT	1	0
19	BODY, CONCRETE, VALVE FRAME, CHRISTY # G05, W/O COVER, 10-3/8" DIA X 12" HIGH	M043271	EA	5	GS&S K-41
20	VALVE BOX, EXTENSION, PLASTIC, 8" IPS, BRANDON SUPPLY # 851, BLACK ABS, CORRUGATED, 10 FT LENGTH	M016063	EA	5	GS&S K-41
21	RING, GRADE, CAST IRON, 2" HIGH, CHRISTY # G05-2333	M043274	EA	5	GS&S K-41
22	COVER, VALVE, CAST IRON, YELLOW, CHRISTY # G05CY, FULL TRAFFIC, 11-1/8", TRAFFIC YELLOW WITH EPOXY CLEAR COAT, MARKED "PG&E GAS"	M446213	EA	5	GS&S K-41
23	GASKET, PYROX, ANSI CLASS 600, 10", PSI LINEBACKER, TYPE F, NITRILE SEALING ELEMENT, RING GASKET	M016654	EA	4	GS&S B-45.1
24	FLANGE, BLIND, 10" , ANSI CALSSS 600, FORGED STEEL, 1/4" RAISED FACE, TAP FOR 1/2" NPT	M020897	EA	2	GS&S B-43.2
25	BOLT, STUD, 1-1/4" X 8-1/2", WITH 2 NUTS, STEEL, ALL THREAD, ASTM A193-B7 HEX NUTS A194-2H, ASSEMBLED	M192828	EA	32	GS&S B-46
26	ELBOW, SOCKET WELD, VOGT # SW-2000 OR EQUAL, FORGED STEEL, 3/4", 45 DEGREE, 3000 PSI	M022587	EA	12	GS&S B-21
27	PLUG, 1/2", HEX HEAD, VOGT #2580 OR EQUAL, THREADED, FORGED STEEL, 6000 PSI	M021249	EA	8	GS&S B-10.1

30% DESIGN

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REV	DATE	DESCRIPTION	JOB NO	DWN	CHKD	APVD BY
1	2/20/20	EXTENDED EXCAVATION LENGTH FOR WEST AND EAST BMW.				

REVISIONS

APVD BY X
DEPT X
SUPV X
DWN X
CHKD X
OK X
DATE 121219
SCALE

PG&E

DECOMMISSIONING
PIPELINE L-215 PHASE 2
REPLACEMENT PROJECT

DIV 1019-01
SAN JOAQUIN RIVER
SUPERSEDES
SUPERSEDED BY
SHEET 14 OF 14 SHEETS
DRAWING NUMBER L-215
REV 1

APPENDIX C

Air Quality and Greenhouse Gas Emissions Calculations

PG&E R-687 L-215 San Joaquin River Crossing Replacement Project
Phase 1: Site Support/Project Management

OFF-ROAD SOURCES

					Emission Factors: pounds/BHP-hr [1]								Total English Tons							
Source	Fuel	BHP	Number	Total Hours per Source	NO_x	ROG	PM10	PM2.5	CO	CO2	CH4	N2O	NO_x	ROG	PM10	PM2.5	CO	CO2	CH4	N2O
Excavator	Diesel	310	0	0	0.00173	0.00015	0.00005	0.00005	0.00096	0.44473	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Light plant	Diesel	20	4	672	0.00742	0.00093	0.00035	0.00032	0.00482	0.92723	0.000023	0.000010	0.20	0.02	0.01	0.01	0.13	24.92	0.001	0.000
Generator (40 KW)	Diesel	60	1	672	0.00033	0.00033	0.00003	0.00003	0.00389	0.37887	0.000023	0.000010	0.01	0.01	0.00	0.00	0.08	7.64	0.000	0.000
Air compressor	Diesel	50	1	672	0.00259	0.00018	0.00008	0.00007	0.00277	0.37887	0.000023	0.000010	0.04	0.00	0.00	0.00	0.05	6.37	0.000	0.000
Welding machine	Diesel	20	0	0	0.00453	0.00062	0.00022	0.00020	0.00287	0.56374	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Side-boom pipelayer	Diesel	260	0	0	0.00488	0.00039	0.00020	0.00018	0.00207	0.49875	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Skid-steer loader	Diesel	75	0	0	0.00202	0.00015	0.00009	0.00008	0.00266	0.42879	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Backhoe	Diesel	75	0	0	0.01026	0.00131	0.00082	0.00076	0.00435	0.42882	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Dozer (D6)	Diesel	215	0	0	0.00488	0.00039	0.00020	0.00018	0.00207	0.49875	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
HDD drill rig	Diesel	700	0	0	0.00136	0.00012	0.00005	0.00004	0.00109	0.59053	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Mud pump	Diesel	600	0	0	0.00124	0.00008	0.00005	0.00005	0.00063	0.34080	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Fill pump	Gasoline	10	0	0	0.00710	0.00948	0.00407	0.00307	0.34576	0.65330	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Pipe flush pump	Gasoline	20	0	0	0.00710	0.00948	0.00407	0.00307	0.34576	0.65330	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Concrete pump	Diesel	300	0	0	0.00097	0.00008	0.00003	0.00003	0.00065	0.34080	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
													0.25	**0.03**	**0.01**	**0.01**	**0.25**	**38.93**	**0.001**	**0.001**

ON-ROAD SOURCES

			Emission Factors, grams/mile [3]								Total English Tons							
On Road Sources	Miles/Trip[2]	Total Trips	NOx	ROG	PM10	PM2.5	CO	CO2	CH4	N2O	NOx	ROG	PM10	PM2.5	CO	CO2	CH4	N2O
Light-duty truck (LDT2)	40	168	0.12375	0.02129	0.00139	0.00128	1.29305	331.5704	0.00496	0.00908	0.0009	0.0002	0.0000	0.0000	0.0096	2.4561	0.0000	0.0001
Medium-duty truck (MDV)	40	84	0.07819	0.01228	0.00647	0.00619	0.18535	346.6425	0.00057	0.05449	0.0003	0.0000	0.0000	0.0000	0.0007	1.2839	0.0000	0.0002
Heavy-duty truck (T6 instate)	0	0	3.88892	0.15147	0.08338	0.07977	0.55408	973.1576	0.00704	0.15297	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water Truck (on-site)[4]	20	84	3.88892	0.15147	0.08338	0.07977	0.55408	973.1576	0.00704	0.15297	0.0072	0.0003	0.0002	0.0001	0.0010	1.8021	0.0000	0.0003
										Totals =>	**0.0084**	**0.0005**	**0.0002**	**0.0002**	**0.0113**	**5.5421**	**0.0001**	**0.0006**
										Off-Road & On-Road Source Totals	**0.258**	**0.035**	**0.012**	**0.011**	**0.266**	**44.469**	**0.002**	**0.001**

Notes:
[1] Emission factors from OFFROAD 2017 (ver 1.0.1) for the San Joaquin Valley Air Basin
[2] Round trip distance to Modesto
[3] Emission factors from EMFAC 2017 for Stanislaus County year 2020 annual emissions
[4] Assumes 20 miles per day cycling though work areas, total trips=work days

Greenhouse Gas Emissions Summary

Metric Tons	39.705	0.001	0.001
CO2E	39.705	0.039	0.282
Total CO2E			**40.0**

PG&E R-687 L-215 San Joaquin River Crossing Replacement Project
Phase 1: Pipe/Materials Procurement

OFF-ROAD SOURCES

					Emission Factors: pounds/BHP-hr [1]								Total English Tons							
Source	Fuel	BHP	Number	Total Hours per Source	NO_x	ROG	PM10	PM2.5	CO	CO2	CH4	N2O	NO_x	ROG	PM10	PM2.5	CO	CO2	CH4	N2O
Excavator	Diesel	310	2	48	0.00173	0.00015	0.00005	0.00005	0.00096	0.44473	0.000023	0.000010	0.03	0.00	0.00	0.00	0.01	6.62	0.000	0.000
Light plant	Diesel	20	0	0	0.00742	0.00093	0.00035	0.00032	0.00482	0.92723	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Generator (40 KW)	Diesel	60	0	0	0.00033	0.00033	0.00003	0.00003	0.00389	0.37887	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Air compressor (185 cfm)	Diesel	50	0	0	0.00259	0.00018	0.00008	0.00007	0.00277	0.37887	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Welding machine	Diesel	20	0	0	0.00453	0.00062	0.00022	0.00020	0.00287	0.56374	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Side-boom pipelayer	Diesel	260	0	0	0.00488	0.00039	0.00020	0.00018	0.00207	0.49875	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Skid-steer loader	Diesel	75	0	0	0.00202	0.00015	0.00009	0.00008	0.00266	0.42879	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Backhoe	Diesel	75	0	0	0.01026	0.00131	0.00082	0.00076	0.00435	0.42882	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Dozer (D6)	Diesel	215	0	0	0.00488	0.00039	0.00020	0.00018	0.00207	0.49875	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
HDD drill rig	Diesel	700	0	0	0.00136	0.00012	0.00005	0.00004	0.00109	0.59053	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Mud pump	Diesel	600	0	0	0.00124	0.00008	0.00005	0.00005	0.00063	0.34080	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Fill pump	Gasoline	10	0	0	0.00710	0.00948	0.00407	0.00307	0.34576	0.65330	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Pipe flush pump	Gasoline	20	0	0	0.00710	0.00948	0.00407	0.00307	0.34576	0.65330	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Concrete pump	Diesel	300	0	0	0.00097	0.00008	0.00003	0.00003	0.00065	0.34080	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
													0.026	**0.002**	**0.001**	**0.001**	**0.014**	**6.618**	**0.0003**	**0.0001**

ON-ROAD SOURCES

			Emission Factors, grams/mile [3]								Total English Tons							
On Road Sources	Miles/Trip	Total Trips	NOx	ROG	PM10	PM2.5	CO	CO2	CH4	N2O	NOx	ROG	PM10	PM2.5	CO	CO2	CH4	N2O
Light-duty truck (LDT2) [2,4]	40	24	0.12375	0.02129	0.00139	0.00128	1.29305	331.5704	0.00496	0.00908	0.0001	0.0000	0.0000	0.0000	0.0014	0.3509	0.0000	0.0000
Medium-duty truck (MDV)	0	0	0.07819	0.01228	0.00647	0.00619	0.18535	346.6425	0.00057	0.05449	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Heavy-duty truck (T6 instate)[5]	100	30	3.88892	0.15147	0.08338	0.07977	0.55408	973.1576	0.00704	0.15297	0.0129	0.0005	0.0003	0.0003	0.0018	3.2181	0.0000	0.0005
Water Truck (on-site) [6]	0	0	3.88892	0.15147	0.08338	0.07977	0.55408	973.1576	0.00704	0.15297	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
									Totals =>		**0.0130**	**0.0005**	**0.0003**	**0.0003**	**0.0032**	**3.5690**	**0.0000**	**0.0005**
									Off-Road & On-Road Source Totals		**0.039**	**0.003**	**0.001**	**0.001**	**0.017**	**10.187**	**0.0004**	**0.0007**

Notes:
[1] Emission factors from OFFROAD 2017 (ver 1.0.1) for the San Joaquin Valley Air Basin
[2] Round trip distance to Modesto
[3] Emission factors from EMFAC 2017 for Stanislaus County year 2020 annual emissions
[4] Assumes two workers per truck, one round trip per day
[5] Materials delivery

Greenhouse Gas Emissions Summary

Metric Tons	9.095	0.000	0.001
CO2E	9.095	0.009	0.157
Total CO2E			**9.3**

PG&E R-687 L-215 San Joaquin River Crossing Replacement Project
Phase 1: Excavation

OFF-ROAD SOURCES

					Emission Factors: pounds/BHP-hr [1]								Total English Tons							
Source	Fuel	BHP	Number	Total Hours per Source	NO_x	ROG	PM10	PM2.5	CO	CO2	CH4	N2O	NO_x	ROG	PM10	PM2.5	CO	CO2	CH4	N2O
Excavator	Diesel	310	2	144	0.00173	0.00015	0.00005	0.00005	0.00096	0.44473	0.000023	0.000010	0.08	0.01	0.00	0.00	0.04	19.85	0.001	0.000
Light plant	Diesel	20	0	0	0.00742	0.00093	0.00035	0.00032	0.00482	0.92723	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Generator (40 KW)	Diesel	60	0	0	0.00033	0.00033	0.00003	0.00003	0.00389	0.37887	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Air compressor (185 cfm)	Diesel	50	1	144	0.00259	0.00018	0.00008	0.00007	0.00277	0.37887	0.000023	0.000010	0.01	0.00	0.00	0.00	0.01	1.36	0.000	0.000
Welding machine	Diesel	20	0	0	0.00453	0.00062	0.00022	0.00020	0.00287	0.56374	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Side-boom pipelayer	Diesel	260	0	0	0.00488	0.00039	0.00020	0.00018	0.00207	0.49875	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Skid-steer loader	Diesel	75	0	0	0.00202	0.00015	0.00009	0.00008	0.00266	0.42879	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Backhoe	Diesel	75	0	0	0.01026	0.00131	0.00082	0.00076	0.00435	0.42882	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Dozer (D6)	Diesel	215	0	0	0.00488	0.00039	0.00020	0.00018	0.00207	0.49875	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
HDD drill rig	Diesel	700	0	0	0.00136	0.00012	0.00005	0.00004	0.00109	0.59053	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Mud pump	Diesel	600	0	0	0.00124	0.00008	0.00005	0.00005	0.00063	0.34080	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Fill pump	Gasoline	10	0	0	0.00710	0.00948	0.00407	0.00307	0.34576	0.65330	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Pipe flush pump	Gasoline	20	0	0	0.00710	0.00948	0.00407	0.00307	0.34576	0.65330	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Concrete pump	Diesel	300	0	0	0.00097	0.00008	0.00003	0.00003	0.00065	0.34080	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
													0.087	**0.007**	**0.003**	**0.002**	**0.053**	**21.217**	**0.0011**	**0.0005**

ON-ROAD SOURCES

			Emission Factors, grams/mile [3]								Total English Tons							
On Road Sources	Miles/Trip	Total Trips	NOx	ROG	PM10	PM2.5	CO	CO2	CH4	N2O	NOx	ROG	PM10	PM2.5	CO	CO2	CH4	N2O
Light-duty truck (LDT2) [2,4]	40	72	0.12375	0.02129	0.00139	0.00128	1.29305	331.5704	0.00496	0.00908	0.0004	0.0001	0.0000	0.0000	0.0041	1.0526	0.0000	0.0000
Medium-duty truck (MDV)	0	0	0.07819	0.01228	0.00647	0.00619	0.18535	346.6425	0.00057	0.05449	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Heavy-duty truck (T6 instate)	0	0	3.88892	0.15147	0.08338	0.07977	0.55408	973.1576	0.00704	0.15297	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water Truck (on-site) [5]	0	0	3.88892	0.15147	0.08338	0.07977	0.55408	973.1576	0.00704	0.15297	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
									Totals =>		**0.0004**	**0.0001**	**0.0000**	**0.0000**	**0.0041**	**1.0526**	**0.0000**	**0.0000**

Off-Road & On-Road Source Totals											**0.087**	**0.007**	**0.003**	**0.002**	**0.057**	**22.269**	**0.0011**	**0.0005**

Notes:
[1] Emission factors from OFFROAD 2017 (ver 1.0.1) for the San Joaquin Valley Air Basin
[2] Round trip distance to Modesto
[3] Emission factors from EMFAC 2017 for Stanislaus County year 2020 annual emissions
[4] Assumes two workers per truck, one round trip per day
[5] Assumes 20 miles per day cycling though work areas, total trips=work days

Greenhouse Gas Emissions Summary

Metric Tons	19.883	0.001	0.000
CO2E	19.883	0.029	0.121
Total CO2E			**20.0**

PG&E R-687 L-215 San Joaquin River Crossing Replacement Project
Phase 1: Pipe String Welding

OFF-ROAD SOURCES

					Emission Factors: pounds/BHP-hr [1]								Total English Tons							
Source	Fuel	BHP	Number	Total Hours per Source	NO_x	ROG	PM10	PM2.5	CO	CO2	CH4	N2O	NO_x	ROG	PM10	PM2.5	CO	CO2	CH4	N2O
Excavator	Diesel	310	2	304	0.00173	0.00015	0.00005	0.00005	0.00096	0.44473	0.000023	0.000010	0.16	0.01	0.00	0.00	0.09	41.91	0.002	0.001
Light plant	Diesel	20	0	0	0.00742	0.00093	0.00035	0.00032	0.00482	0.92723	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Generator (40 KW)	Diesel	60	0	0	0.00033	0.00033	0.00003	0.00003	0.00389	0.37887	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Air compressor (185 cfm)	Diesel	50	0	0	0.00259	0.00018	0.00008	0.00007	0.00277	0.37887	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Welding machine	Diesel	20	6	304	0.00453	0.00062	0.00022	0.00020	0.00287	0.56374	0.000023	0.000010	0.08	0.01	0.00	0.00	0.05	10.28	0.000	0.000
Side-boom pipelayer	Diesel	260	1	304	0.00488	0.00039	0.00020	0.00018	0.00207	0.49875	0.000023	0.000010	0.19	0.02	0.01	0.01	0.08	19.71	0.001	0.000
Skid-steer loader	Diesel	75	0	0	0.00202	0.00015	0.00009	0.00008	0.00266	0.42879	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Backhoe	Diesel	75	0	0	0.01026	0.00131	0.00082	0.00076	0.00435	0.42882	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Dozer (D6)	Diesel	215	0	0	0.00488	0.00039	0.00020	0.00018	0.00207	0.49875	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
HDD drill rig	Diesel	700	0	0	0.00136	0.00012	0.00005	0.00004	0.00109	0.59053	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Mud pump	Diesel	600	0	0	0.00124	0.00008	0.00005	0.00005	0.00063	0.34080	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Fill pump	Gasoline	10	0	0	0.00710	0.00948	0.00407	0.00307	0.34576	0.65330	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Pipe flush pump	Gasoline	20	0	0	0.00710	0.00948	0.00407	0.00307	0.34576	0.65330	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Concrete pump	Diesel	300	0	0	0.00097	0.00008	0.00003	0.00003	0.00065	0.34080	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
													0.439	**0.041**	**0.017**	**0.015**	**0.225**	**71.905**	**0.0036**	**0.0015**

ON-ROAD SOURCES

			Emission Factors, grams/mile [3]								Total English Tons							
On Road Sources	Miles/Trip [2]	Total Trips	NOx	ROG	PM10	PM2.5	CO	CO2	CH4	N2O	NOx	ROG	PM10	PM2.5	CO	CO2	CH4	N2O
Light-duty truck (LDT2) [4]	40	380	0.12375	0.02129	0.00139	0.00128	1.29305	331.5704	0.00496	0.00908	0.0021	0.0004	0.0000	0.0000	0.0217	5.5554	0.0001	0.0002
Medium-duty truck (MDV)	40	266	0.07819	0.01228	0.00647	0.00619	0.18535	346.6425	0.00057	0.05449	0.0009	0.0001	0.0001	0.0001	0.0022	4.0656	0.0000	0.0006
Heavy-duty truck (T6 instate)	0	0	3.88892	0.15147	0.08338	0.07977	0.55408	973.1576	0.00704	0.15297	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water Truck (on-site) [5]	0	0	3.88892	0.15147	0.08338	0.07977	0.55408	973.1576	0.00704	0.15297	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
									Totals =>		**0.0030**	**0.0005**	**0.0001**	**0.0001**	**0.0238**	**9.6210**	**0.0001**	**0.0008**

Off-Road & On-Road Source Totals	**0.442**	**0.041**	**0.017**	**0.016**	**0.248**	**81.526**	**0.0036**	**0.0023**

Notes:
[1] Emission factors from OFFROAD 2017 (ver 1.0.1) for the San Joaquin Valley Air Basin
[2] Round trip distance to Modesto
[3] Emission factors from EMFAC 2017 for Stanislaus County year 2020 annual emissions
[4] Assumes two workers per truck, one round trip per day
[5] Assumes 20 miles per day cycling though work areas, total trips=work days

Greenhouse Gas Emissions Summary

Metric Tons	72.791	0.003	0.002
CO2E	72.791	0.091	0.547
Total CO2E			**73.4**

PG&E R-687 L-215 San Joaquin River Crossing Replacement Project
Phase 1: Pipe Installation

OFF-ROAD SOURCES

					Emission Factors: pounds/BHP-hr [1]								Total English Tons							
Source	Fuel	BHP	Number	Total Hours per Source	NO_x	ROG	PM10	PM2.5	CO	CO2	CH4	N2O	NO_x	ROG	PM10	PM2.5	CO	CO2	CH4	N2O
Excavator	Diesel	310	2	88	0.00173	0.00015	0.00005	0.00005	0.00096	0.44473	0.000023	0.000010	0.05	0.00	0.00	0.00	0.03	12.13	0.001	0.000
Light plant	Diesel	20	0	0	0.00742	0.00093	0.00035	0.00032	0.00482	0.92723	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Generator (40 KW)	Diesel	60	0	0	0.00033	0.00033	0.00003	0.00003	0.00389	0.37887	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Air compressor (185 cfm)	Diesel	50	1	88	0.00259	0.00018	0.00008	0.00007	0.00277	0.37887	0.000023	0.000010	0.01	0.00	0.00	0.00	0.01	0.83	0.000	0.000
Welding machine	Diesel	20	2	88	0.00453	0.00062	0.00022	0.00020	0.00287	0.56374	0.000023	0.000010	0.01	0.00	0.00	0.00	0.01	0.99	0.000	0.000
Side-boom pipelayer	Diesel	260	0	0	0.00488	0.00039	0.00020	0.00018	0.00207	0.49875	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Skid-steer loader	Diesel	75	0	0	0.00202	0.00015	0.00009	0.00008	0.00266	0.42879	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Backhoe	Diesel	75	0	0	0.01026	0.00131	0.00082	0.00076	0.00435	0.42882	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Dozer (D6)	Diesel	215	0	0	0.00488	0.00039	0.00020	0.00018	0.00207	0.49875	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
HDD drill rig	Diesel	700	0	0	0.00136	0.00012	0.00005	0.00004	0.00109	0.59053	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Mud pump	Diesel	600	0	0	0.00124	0.00008	0.00005	0.00005	0.00063	0.34080	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Fill pump	Gasoline	10	0	0	0.00710	0.00948	0.00407	0.00307	0.34576	0.65330	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Pipe flush pump	Gasoline	20	0	0	0.00710	0.00948	0.00407	0.00307	0.34576	0.65330	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Concrete pump	Diesel	300	0	0	0.00097	0.00008	0.00003	0.00003	0.00065	0.34080	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
													0.061	**0.006**	**0.002**	**0.002**	**0.037**	**13.958**	**0.0007**	**0.0003**

ON-ROAD SOURCES

			Emission Factors, grams/mile [3]								Total English Tons							
On Road Sources	Miles/Trip	Total Trips	NOx	ROG	PM10	PM2.5	CO	CO2	CH4	N2O	NOx	ROG	PM10	PM2.5	CO	CO2	CH4	N2O
Light-duty truck (LDT2) [2,4]	40	66	0.12375	0.02129	0.00139	0.00128	1.29305	331.5704	0.00496	0.00908	0.0004	0.0001	0.0000	0.0000	0.0038	0.9649	0.0000	0.0000
Medium-duty truck (MDV) [2]	40	33	0.07819	0.01228	0.00647	0.00619	0.18535	346.6425	0.00057	0.05449	0.0001	0.0000	0.0000	0.0000	0.0003	0.5044	0.0000	0.0001
Heavy-duty truck (T6 instate)	0	0	3.88892	0.15147	0.08338	0.07977	0.55408	973.1576	0.00704	0.15297	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water Truck (on-site) [5]	0	0	3.88892	0.15147	0.08338	0.07977	0.55408	973.1576	0.00704	0.15297	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
									Totals =>		**0.0005**	**0.0001**	**0.0000**	**0.0000**	**0.0040**	**1.4693**	**0.0000**	**0.0001**
									Off-Road & On-Road Source Totals		**0.061**	**0.006**	**0.002**	**0.002**	**0.041**	**15.427**	**0.0007**	**0.0004**

Notes:
[1] Emission factors from OFFROAD 2017 (ver 1.0.1) for the San Joaquin Valley Air Basin
[2] Round trip distance to Modesto
[3] Emission factors from EMFAC 2017 for Stanislaus County year 2020 annual emissions
[4] Assumes two workers per truck, one round trip per day
[5] Assumes 20 miles per day cycling though work areas, total trips=work days

Greenhouse Gas Emissions Summary

Metric Tons	13.774	0.001	0.000
CO2E	13.774	0.019	0.099
Total CO2E			**13.9**

PG&E R-687 L-215 San Joaquin River Crossing Replacement Project
Phase 1: HDD Operation

OFF-ROAD SOURCES

					Emission Factors: pounds/BHP-hr [1]								Total English Tons							
Source	Fuel	BHP	Number	Total Hours per Source	NO_x	ROG	PM10	PM2.5	CO	CO2	CH4	N2O	NO_x	ROG	PM10	PM2.5	CO	CO2	CH4	N2O
Excavator	Diesel	310	2	480	0.00173	0.00015	0.00005	0.00005	0.00096	0.44473	0.000023	0.000010	0.26	0.02	0.01	0.01	0.14	66.18	0.003	0.001
Light plant	Diesel	20	0	0	0.00742	0.00093	0.00035	0.00032	0.00482	0.92723	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Generator (40 KW)	Diesel	60	0	0	0.00033	0.00033	0.00003	0.00003	0.00389	0.37887	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Air compressor (185 cfm)	Diesel	50	0	0	0.00259	0.00018	0.00008	0.00007	0.00277	0.37887	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Welding machine	Diesel	20	0	0	0.00453	0.00062	0.00022	0.00020	0.00287	0.56374	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Side-boom pipelayer	Diesel	260	0	0	0.00488	0.00039	0.00020	0.00018	0.00207	0.49875	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Skid-steer loader	Diesel	75	2	480	0.00202	0.00015	0.00009	0.00008	0.00266	0.42879	0.000023	0.000010	0.07	0.01	0.00	0.00	0.10	15.44	0.001	0.000
Backhoe	Diesel	75	0	0	0.01026	0.00131	0.00082	0.00076	0.00435	0.42882	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Dozer (D6)	Diesel	215	1	480	0.00488	0.00039	0.00020	0.00018	0.00207	0.49875	0.000023	0.000010	0.25	0.02	0.01	0.01	0.11	25.74	0.001	0.001
HDD drill rig	Diesel	700	2	600	0.00136	0.00012	0.00005	0.00004	0.00109	0.59053	0.000023	0.000010	0.57	0.05	0.02	0.02	0.46	248.02	0.010	0.004
Mud pump	Diesel	600	2	600	0.00124	0.00008	0.00005	0.00005	0.00063	0.34080	0.000023	0.000010	0.45	0.03	0.02	0.02	0.23	122.69	0.008	0.004
Fill pump	Gasoline	10	0	0	0.00710	0.00948	0.00407	0.00307	0.34576	0.65330	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Pipe flush pump	Gasoline	20	0	0	0.00710	0.00948	0.00407	0.00307	0.34576	0.65330	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Concrete pump	Diesel	300	0	0	0.00097	0.00008	0.00003	0.00003	0.00065	0.34080	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
													1.600	**0.127**	**0.060**	**0.054**	**1.030**	**478.06**	**0.0238**	**0.0102**

ON-ROAD SOURCES

			Emission Factors, grams/mile [3]								Total English Tons							
On Road Sources	Miles/Trip	Total Trips	NOx	ROG	PM10	PM2.5	CO	CO2	CH4	N2O	NOx	ROG	PM10	PM2.5	CO	CO2	CH4	N2O
Light-duty truck (LDT2) [2,4]	40	630	0.12375	0.02129	0.00139	0.00128	1.29305	331.5704	0.00496	0.00908	0.0034	0.0006	0.0000	0.0000	0.0359	9.2103	0.0001	0.0003
Medium-duty truck (MDV)	0	0	0.07819	0.01228	0.00647	0.00619	0.18535	346.6425	0.00057	0.05449	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Heavy-duty truck (T6 instate)	40	120	3.88892	0.15147	0.08338	0.07977	0.55408	973.1576	0.00704	0.15297	0.0206	0.0008	0.0004	0.0004	0.0029	5.1490	0.0000	0.0008
Heavy-duty truck (T6 instate)[5]	40	260	3.88892	0.15147	0.08338	0.07977	0.55408	973.1576	0.00704	1.15297	0.0446	0.0017	0.0010	0.0009	0.0064	11.1561	0.0001	0.0132
Water Truck (on-site) [6]	0	0	3.88892	0.15147	0.08338	0.07977	0.55408	973.1576	0.00704	0.15297	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
									Totals =>		**0.0686**	**0.0031**	**0.0014**	**0.0014**	**0.0452**	**25.5154**	**0.0003**	**0.0143**

Off-Road & On-Road Source Totals	**1.668**	**0.130**	**0.061**	**0.056**	**1.075**	**503.574**	**0.0240**	**0.0244**

Notes:
[1] Emission factors from OFFROAD 2017 (ver 1.0.1) for the San Joaquin Valley Air Basin
[2] Round trip distance to Modesto
[3] Emission factors from EMFAC 2017 for Stanislaus County year 2020 annual emissions
[4] Assumes two workers per truck, one round trip per day
[5] Water import, assumes 40 miles round trip
[6] Assumes 20 miles per day cycling though work areas, total trips=work days

Greenhouse Gas Emissions Summary

Metric Tons	449.619	0.021	0.022
CO2E	449.619	0.601	5.783
Total CO2E			**456.0**

PG&E R-687 L-215 San Joaquin River Crossing Replacement Project
Phase 1: Pipe String Pull-back

OFF-ROAD SOURCES

					Emission Factors: pounds/BHP-hr [1]								Total English Tons							
Source	Fuel	BHP	Number	Total Hours per Source	NO_x	ROG	PM10	PM2.5	CO	CO2	CH4	N2O	NO_x	ROG	PM10	PM2.5	CO	CO2	CH4	N2O
Excavator	Diesel	310	4	16	0.00173	0.00015	0.00005	0.00005	0.00096	0.44473	0.000023	0.000010	0.02	0.00	0.00	0.00	0.01	4.41	0.000	0.000
Light plant	Diesel	20	8	8	0.00742	0.00093	0.00035	0.00032	0.00482	0.92723	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.59	0.000	0.000
Generator (40 KW)	Diesel	60	0	0	0.00033	0.00033	0.00003	0.00003	0.00389	0.37887	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Air compressor (185 cfm)	Diesel	50	0	0	0.00259	0.00018	0.00008	0.00007	0.00277	0.37887	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Welding machine	Diesel	20	2	16	0.00453	0.00062	0.00022	0.00020	0.00287	0.56374	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.18	0.000	0.000
Side-boom pipelayer	Diesel	260	3	16	0.00488	0.00039	0.00020	0.00018	0.00207	0.49875	0.000023	0.000010	0.03	0.00	0.00	0.00	0.01	3.11	0.000	0.000
Skid-steer loader	Diesel	75	0	0	0.00202	0.00015	0.00009	0.00008	0.00266	0.42879	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Backhoe	Diesel	75	1	16	0.01026	0.00131	0.00082	0.00076	0.00435	0.42882	0.000023	0.000010	0.01	0.00	0.00	0.00	0.00	0.26	0.000	0.000
Dozer (D6)	Diesel	215	0	0	0.00488	0.00039	0.00020	0.00018	0.00207	0.49875	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
HDD drill rig	Diesel	700	0	0	0.00136	0.00012	0.00005	0.00004	0.00109	0.59053	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Mud pump	Diesel	600	0	0	0.00124	0.00008	0.00005	0.00005	0.00063	0.34080	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Fill pump	Gasoline	10	0	0	0.00710	0.00948	0.00407	0.00307	0.34576	0.65330	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Pipe flush pump	Gasoline	20	0	0	0.00710	0.00948	0.00407	0.00307	0.34576	0.65330	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Concrete pump	Diesel	300	0	0	0.00097	0.00008	0.00003	0.00003	0.00065	0.34080	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
													0.060	**0.006**	**0.003**	**0.002**	**0.029**	**8.555**	**0.0004**	**0.0002**

ON-ROAD SOURCES

			Emission Factors, grams/mile [3]								Total English Tons							
On Road Sources	Miles/Trip [2]	Total Trips	NOx	ROG	PM10	PM2.5	CO	CO2	CH4	N2O	NOx	ROG	PM10	PM2.5	CO	CO2	CH4	N2O
Light-duty truck (LDT2) [4]	40	11	0.12375	0.02129	0.00139	0.00128	1.29305	331.5704	0.00496	0.00908	0.0001	0.0000	0.0000	0.0000	0.0006	0.1608	0.0000	0.0000
Medium-duty truck (MDV)	40	2	0.07819	0.01228	0.00647	0.00619	0.18535	346.6425	0.00057	0.05449	0.0000	0.0000	0.0000	0.0000	0.0000	0.0306	0.0000	0.0000
Heavy-duty truck (T6 instate)	0	0	3.88892	0.15147	0.08338	0.07977	0.55408	973.1576	0.00704	0.15297	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water Truck (on-site) [5]	0	0	3.88892	0.15147	0.08338	0.07977	0.55408	973.1576	0.00704	0.15297	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
									Totals =>		**0.0001**	**0.0000**	**0.0000**	**0.0000**	**0.0006**	**0.1914**	**0.0000**	**0.0000**
									Off-Road & On-Road Source Totals		**0.060**	**0.006**	**0.003**	**0.002**	**0.030**	**8.746**	**0.0004**	**0.0002**

Notes:
[1] Emission factors from OFFROAD 2017 (ver 1.0.1) for the San Joaquin Valley Air Basin
[2] Round trip distance to Modesto
[3] Emission factors from EMFAC 2017 for Stanislaus County year 2020 annual emissions
[4] Assumes two workers per truck, one round trip per day
[5] Assumes 20 miles per day cycling though work areas, total trips=work days

Greenhouse Gas Emissions Summary

Metric Tons	7.809	0.000	0.000
CO2E	7.809	0.010	0.044
Total CO2E			**7.9**

PG&E R-687 L-215 San Joaquin River Crossing Replacement Project
Phase 1: Strength Test and Caliper Pigging

OFF-ROAD SOURCES

					Emission Factors: pounds/BHP-hr [1]								Total English Tons							
Source	Fuel	BHP	Number	Total Hours per Source	NO_x	ROG	PM10	PM2.5	CO	CO2	CH4	N2O	NO_x	ROG	PM10	PM2.5	CO	CO2	CH4	N2O
Excavator	Diesel	310	1	48	0.00173	0.00015	0.00005	0.00005	0.00096	0.44473	0.000023	0.000010	0.01	0.00	0.00	0.00	0.01	3.31	0.000	0.000
Light plant	Diesel	20	0	0	0.00742	0.00093	0.00035	0.00032	0.00482	0.92723	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Generator (40 KW)	Diesel	60	0	0	0.00033	0.00033	0.00003	0.00003	0.00389	0.37887	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Air compressor (1600 cfm)	Diesel	580	2	48	0.00120	0.00009	0.00004	0.00004	0.00064	0.34080	0.000023	0.000010	0.03	0.00	0.00	0.00	0.02	9.49	0.001	0.000
Welding machine	Diesel	20	2	48	0.00453	0.00062	0.00022	0.00020	0.00287	0.56374	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.54	0.000	0.000
Side-boom pipelayer	Diesel	260	0	0	0.00488	0.00039	0.00020	0.00018	0.00207	0.49875	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Skid-steer loader	Diesel	75	0	0	0.00202	0.00015	0.00009	0.00008	0.00266	0.42879	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Backhoe	Diesel	75	0	0	0.01026	0.00131	0.00082	0.00076	0.00435	0.42882	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Dozer (D6)	Diesel	215	0	0	0.00488	0.00039	0.00020	0.00018	0.00207	0.49875	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
HDD drill rig	Diesel	700	0	0	0.00136	0.00012	0.00005	0.00004	0.00109	0.59053	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Mud pump	Diesel	600	0	0	0.00124	0.00008	0.00005	0.00005	0.00063	0.34080	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Fill pump	Gasoline	10	1	48	0.00710	0.00948	0.00407	0.00307	0.34576	0.65330	0.000023	0.000010	0.00	0.00	0.00	0.00	0.08	0.16	0.000	0.000
Pipe flush pump	Gasoline	20	0	0	0.00710	0.00948	0.00407	0.00307	0.34576	0.65330	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Concrete pump	Diesel	300	0	0	0.00097	0.00008	0.00003	0.00003	0.00065	0.34080	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
													0.052	**0.006**	**0.003**	**0.002**	**0.111**	**13.495**	**0.0009**	**0.0004**

ON-ROAD SOURCES

			Emission Factors, grams/mile [3]								Total English Tons							
On Road Sources	Miles/Trip[2]	Total Trips	NOx	ROG	PM10	PM2.5	CO	CO2	CH4	N2O	NOx	ROG	PM10	PM2.5	CO	CO2	CH4	N2O
Light-duty truck (LDT2) [4]	40	27	0.12375	0.02129	0.00139	0.00128	1.29305	331.5704	0.00496	0.00908	0.0001	0.0000	0.0000	0.0000	0.0015	0.3947	0.0000	0.0000
Medium-duty truck (MDV)	40	18	0.07819	0.01228	0.00647	0.00619	0.18535	346.6425	0.00057	0.05449	0.0001	0.0000	0.0000	0.0000	0.0001	0.2751	0.0000	0.0000
Heavy-duty truck (T6 instate)[5]	18	60	3.88892	0.15147	0.08338	0.07977	0.55408	973.1576	0.00704	0.15297	0.0046	0.0002	0.0001	0.0001	0.0007	1.1585	0.0000	0.0002
Water Truck (on-site)	0	0	3.88892	0.15147	0.08338	0.07977	0.55408	973.1576	0.00704	0.15297	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
									Totals =>		**0.0048**	**0.0002**	**0.0001**	**0.0001**	**0.0023**	**1.8284**	**0.0000**	**0.0002**
									Off-Road & On-Road Source Totals		**0.057**	**0.007**	**0.003**	**0.003**	**0.113**	**15.323**	**0.0009**	**0.0006**

Notes:
[1] Emission factors from OFFROAD 2017 (ver 1.0.1) for the San Joaquin Valley Air Basin
[2] Round trip distance to Modesto
[3] Emission factors from EMFAC 2017 for Stanislaus County year 2020 annual emissions
[4] Assumes two workers per truck, one round trip per day
[5] Trucking of 180,000 gallons of hydrostatic test water to Modesto WWTP

Greenhouse Gas Emissions Summary

Metric Tons	13.681	0.001	0.001
CO2E	13.681	0.022	0.142
Total CO2E			**13.8**

PG&E R-687 L-215 San Joaquin River Crossing Replacement Project
Phase 1: Backfill/Site Restoration

OFF-ROAD SOURCES

					Emission Factors: pounds/BHP-hr [1]								Total English Tons							
Source	Fuel	BHP	Number	Total Hours per Source	NO_x	ROG	PM10	PM2.5	CO	CO2	CH4	N2O	NO_x	ROG	PM10	PM2.5	CO	CO2	CH4	N2O
Excavator	Diesel	310	2	80	0.00173	0.00015	0.00005	0.00005	0.00096	0.44473	0.000023	0.000010	0.04	0.00	0.00	0.00	0.02	11.03	0.001	0.000
Light plant	Diesel	20	0	0	0.00742	0.00093	0.00035	0.00032	0.00482	0.92723	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Generator (40 KW)	Diesel	60	0	0	0.00033	0.00033	0.00003	0.00003	0.00389	0.37887	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Air compressor (185 cfm)	Diesel	50	1	80	0.00259	0.00018	0.00008	0.00007	0.00277	0.37887	0.000023	0.000010	0.01	0.00	0.00	0.00	0.01	0.76	0.000	0.000
Welding machine	Diesel	20	0	0	0.00453	0.00062	0.00022	0.00020	0.00287	0.56374	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Side-boom pipelayer	Diesel	260	0	0	0.00488	0.00039	0.00020	0.00018	0.00207	0.49875	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Skid-steer loader	Diesel	75	0	0	0.00202	0.00015	0.00009	0.00008	0.00266	0.42879	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Backhoe	Diesel	75	0	0	0.01026	0.00131	0.00082	0.00076	0.00435	0.42882	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Dozer (D6)	Diesel	215	0	0	0.00488	0.00039	0.00020	0.00018	0.00207	0.49875	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
HDD drill rig	Diesel	700	0	0	0.00136	0.00012	0.00005	0.00004	0.00109	0.59053	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Mud pump	Diesel	600	0	0	0.00124	0.00008	0.00005	0.00005	0.00063	0.34080	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Fill pump	Gasoline	10	0	0	0.00710	0.00948	0.00407	0.00307	0.34576	0.65330	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Pipe flush pump	Gasoline	20	0	0	0.00710	0.00948	0.00407	0.00307	0.34576	0.65330	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Concrete pump	Diesel	300	0	0	0.00097	0.00008	0.00003	0.00003	0.00065	0.34080	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
													0.048	**0.004**	**0.001**	**0.001**	**0.029**	**11.787**	**0.0006**	**0.0003**

ON-ROAD SOURCES

			Emission Factors, grams/mile [3]								Total English Tons							
On Road Sources	Miles/Trip[2]	Total Trips	NOx	ROG	PM10	PM2.5	CO	CO2	CH4	N2O	NOx	ROG	PM10	PM2.5	CO	CO2	CH4	N2O
Light-duty truck (LDT2) [4]	40	45	0.12375	0.02129	0.00139	0.00128	1.29305	331.5704	0.00496	0.00908	0.0002	0.0000	0.0000	0.0000	0.0026	0.6579	0.0000	0.0000
Medium-duty truck (MDV)	0	0	0.07819	0.01228	0.00647	0.00619	0.18535	346.6425	0.00057	0.05449	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Heavy-duty truck (T6 instate)[5]	40	60	3.88892	0.15147	0.08338	0.07977	0.55408	973.1576	0.00704	0.15297	0.0103	0.0004	0.0002	0.0002	0.0015	2.5745	0.0000	0.0004
Heavy-duty truck (T6 instate)[6]	100	89	3.88892	0.15147	0.08338	0.07977	0.55408	973.1576	0.00704	0.15297	0.0382	0.0015	0.0008	0.0008	0.0054	9.5471	0.0001	0.0015
Heavy-duty truck (T6 instate)	40	20	3.88892	0.15147	0.08338	0.07977	0.55408	973.1576	0.00704	0.15297	0.0034	0.0001	0.0001	0.0001	0.0005	0.8582	0.0000	0.0001
Water Truck (on-site) [7]	0	0	3.88892	0.15147	0.08338	0.07977	0.55408	973.1576	0.00704	0.15297	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
										Totals =>	**0.0521**	**0.0021**	**0.0011**	**0.0011**	**0.0100**	**13.6376**	**0.0001**	**0.0021**

Off-Road & On-Road Source Totals	**0.100**	**0.006**	**0.003**	**0.002**	**0.039**	**25.425**	**0.0007**	**0.0023**

Notes:
[1] Emission factors from OFFROAD 2017 (ver 1.0.1) for the San Joaquin Valley Air Basin
[2] Round trip distance to Modesto
[3] Emission factors from EMFAC 2017 for Stanislaus County year 2020 annual emissions
[4] Assumes two workers per truck, one round trip per day
[5] Hydrostatic test water disposal: 180,000 gallons
[6] Drill cuttings (1000 cy) and waste drilling fluid (10000 gallons) disposal
[7] Assumes 20 miles per day cycling though work areas, total trips=work days

Greenhouse Gas Emissions Summary

Metric Tons	22.701	0.001	0.002
CO2E	22.701	0.018	0.550
Total CO2E			**23.3**

PG&E R-687 L-215 San Joaquin River Crossing Replacement Project
Phase 1: Existing Pipeline Decommissioning

OFF-ROAD SOURCES

					Emission Factors: pounds/BHP-hr [1]								Total English Tons							
Source	Fuel	BHP	Number	Total Hours per Source	NO_x	ROG	PM10	PM2.5	CO	CO2	CH4	N2O	NO_x	ROG	PM10	PM2.5	CO	CO2	CH4	N2O
Excavator	Diesel	310	1	48	0.00173	0.00015	0.00005	0.00005	0.00096	0.44473	0.000023	0.000010	0.01	0.00	0.00	0.00	0.01	3.31	0.000	0.000
Light plant	Diesel	20	0	0	0.00742	0.00093	0.00035	0.00032	0.00482	0.92723	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Generator (40 KW)	Diesel	60	0	0	0.00033	0.00033	0.00003	0.00003	0.00389	0.37887	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Air compressor (185 cfm)	Diesel	50	1	8	0.00259	0.00018	0.00008	0.00007	0.00277	0.37887	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.08	0.000	0.000
Welding machine	Diesel	20	1	12	0.00453	0.00062	0.00022	0.00020	0.00287	0.56374	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.07	0.000	0.000
Side-boom pipelayer	Diesel	260	0	0	0.00488	0.00039	0.00020	0.00018	0.00207	0.49875	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Skid-steer loader	Diesel	75	0	0	0.00202	0.00015	0.00009	0.00008	0.00266	0.42879	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Backhoe	Diesel	75	0	0	0.01026	0.00131	0.00082	0.00076	0.00435	0.42882	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Dozer (D6)	Diesel	215	0	0	0.00488	0.00039	0.00020	0.00018	0.00207	0.49875	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
HDD drill rig	Diesel	700	0	0	0.00136	0.00012	0.00005	0.00004	0.00109	0.59053	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Mud pump	Diesel	600	0	0	0.00124	0.00008	0.00005	0.00005	0.00063	0.34080	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Fill pump	Gasoline	10	0	0	0.00710	0.00948	0.00407	0.00307	0.34576	0.65330	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Pipe flush pump	Gasoline	20	1	8	0.00710	0.00948	0.00407	0.00307	0.34576	0.65330	0.000023	0.000010	0.00	0.00	0.00	0.00	0.03	0.05	0.000	0.000
Concrete pump	Diesel	300	1	4	0.00097	0.00008	0.00003	0.00003	0.00065	0.34080	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.20	0.000	0.000
													0.015	**0.002**	**0.001**	**0.001**	**0.036**	**3.709**	**0.0002**	**0.0001**

ON-ROAD SOURCES

			Emission Factors, grams/mile [3]								Total English Tons							
On Road Sources	Miles/Trip[2]	Total Trips	NOx	ROG	PM10	PM2.5	CO	CO2	CH4	N2O	NOx	ROG	PM10	PM2.5	CO	CO2	CH4	N2O
Light-duty truck (LDT2) [4]	40	13	0.12375	0.02129	0.00139	0.00128	1.29305	331.5704	0.00496	0.00908	0.0001	0.0000	0.0000	0.0000	0.0007	0.1901	0.0000	0.0000
Medium-duty truck (MDV)	0	0	0.07819	0.01228	0.00647	0.00619	0.18535	346.6425	0.00057	0.05449	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Heavy-duty truck (T6 instate)	40	7	3.88892	0.15147	0.08338	0.07977	0.55408	973.1576	0.00704	0.15297	0.0012	0.0000	0.0000	0.0000	0.0002	0.3004	0.0000	0.0000
Water Truck (on-site) [5]	0	0	3.88892	0.15147	0.08338	0.07977	0.55408	973.1576	0.00704	0.15297	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
										Totals =>	**0.0013**	**0.0001**	**0.0000**	**0.0000**	**0.0009**	**0.4904**	**0.0000**	**0.0001**

Off-Road & On-Road Source Totals	**0.016**	**0.002**	**0.001**	**0.001**	**0.037**	**4.199**	**0.0002**	**0.0001**

Notes:
[1] Emission factors from OFFROAD 2017 (ver 1.0.1) for the San Joaquin Valley Air Basin
[2] Round trip distance to Modesto
[3] Emission factors from EMFAC 2017 for Stanislaus County year 2020 annual emissions
[4] Assumes two workers per truck, one round trip per day
[5] Assumes 20 miles per day cycling though work areas, total trips=work days

Greenhouse Gas Emissions Summary

Metric Tons	3.749	0.000	0.000
CO2E	3.749	0.005	0.032
Total CO2E			**3.8**

PG&E R-687 L-215 San Joaquin River Crossing Replacement Project
Phase 1: Air Pollutant and Greenhouse Gas Emissions Totals

	Total English Tons					Metric Tons			
Task	NOx	ROG	PM10	PM2.5	CO	CO2	CH4	N2O	CO2E
Site Support/Project Management	0.258	0.035	0.012	0.011	0.266	39.705	0.001	0.001	40.0
Pipe/Materials Procurement	0.039	0.003	0.001	0.001	0.017	9.095	0.000	0.001	9.3
Excavation	0.087	0.007	0.003	0.002	0.057	19.883	0.001	0.000	20.0
Pipe String Welding	0.442	0.041	0.017	0.016	0.248	72.791	0.003	0.002	73.4
Pipe Installation	0.061	0.006	0.002	0.002	0.041	13.774	0.001	0.000	13.9
HDD Operation	1.668	0.130	0.061	0.056	1.075	449.619	0.021	0.022	456.0
Pipe String Pull-back	0.060	0.006	0.003	0.002	0.030	7.809	0.000	0.000	7.9
Strength Test and Caliper Pigging	0.057	0.007	0.003	0.003	0.113	13.681	0.001	0.001	13.8
Backfill/Site Restoration	0.100	0.006	0.003	0.002	0.039	22.701	0.001	0.002	23.3
Existing Pipeline Decommissioning	0.016	0.002	0.001	0.001	0.037	3.749	0.000	0.000	3.8
Total	**2.788**	**0.243**	**0.104**	**0.095**	**1.924**	**652.808**	**0.030**	**0.029**	**661.4**

PG&E R-687 L-215 San Joaquin River Crossing Replacement Project
Phase 2: Mobilization

OFF-ROAD SOURCES

					Emission Factors: pounds/BHP-hr [1]								Total English Tons							
Source	Fuel	BHP	Number	Total Hours per Source	NO_x	ROG	PM10	PM2.5	CO	CO2	CH4	N2O	NO_x	ROG	PM10	PM2.5	CO	CO2	CH4	N2O
Excavator	Diesel	310	0	0	0.00173	0.00015	0.00005	0.00005	0.00096	0.44473	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Wheeled loader	Diesel	240	0	0	0.00224	0.00018	0.00007	0.00007	0.00101	0.42804	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Generator (60 KW)	Diesel	75	0	0	0.00033	0.00033	0.00003	0.00003	0.00389	0.37887	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Air compressor	Diesel	20	0	0	0.00485	0.00068	0.00023	0.00021	0.00287	0.60481	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Dive compressor	Diesel	50	0	0	0.00470	0.00092	0.00028	0.00026	0.00554	0.60125	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Welding machine	Diesel	20	0	0	0.00453	0.00062	0.00022	0.00020	0.00287	0.56374	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Crane (barge assembly)	Diesel	610	1	120	0.00231	0.00019	0.00009	0.00008	0.00153	0.33457	0.000023	0.000010	0.08	0.01	0.00	0.00	0.06	12.25	0.001	0.000
Crane (on barge)	Diesel	330	0	0	0.00286	0.00024	0.00012	0.00011	0.00112	0.33516	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Barge support vessel	Diesel	500	0	0	0.00201	0.00052	0.00042	0.00040	0.00181	0.35000	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Pipe flush pump	Gasoline	20	0	0	0.00710	0.00948	0.00407	0.00307	0.34576	0.65330	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Concrete pump	Diesel	300	0	0	0.00097	0.00008	0.00003	0.00003	0.00065	0.34080	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
													0.086	**0.007**	**0.003**	**0.003**	**0.056**	**12.245**	**0.0009**	**0.0004**

ON-ROAD SOURCES

			Emission Factors, grams/mile [3]								Total English Tons							
On Road Sources	Miles/Trip [2]	Total Trips	NOx	ROG	PM10	PM2.5	CO	CO2	CH4	N2O	NOx	ROG	PM10	PM2.5	CO	CO2	CH4	N2O
Light-duty truck (LDT2) [4]	40	40	0.12375	0.02129	0.00139	0.00128	1.29305	331.5704	0.00496	0.00908	0.0002	0.0000	0.0000	0.0000	0.0023	0.5848	0.0000	0.0000
Medium-duty truck (MDV)	0	0	0.07819	0.01228	0.00647	0.00619	0.18535	346.6425	0.00057	0.05449	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water truck (T6 instate) [5]	0	0	3.88892	0.15147	0.08338	0.07977	0.55408	973.1576	0.00704	0.15297	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Heavy-duty truck (T6 instate)	100	41	3.88892	0.15147	0.08338	0.07977	0.55408	973.1576	0.00704	0.15297	0.0176	0.0007	0.0004	0.0004	0.0025	4.3981	0.0000	0.0007
										Totals =>	**0.0178**	**0.0007**	**0.0004**	**0.0004**	**0.0048**	**4.9829**	**0.0000**	**0.0007**

Off-Road & On-Road Source Totals	**0.102**	**0.008**	**0.004**	**0.003**	**0.061**	**17.228**	**0.0009**	**0.0011**

Notes:
[1] Emission factors from OFFROAD 2017 (ver 1.0.1) for the San Joaquin Valley Air Basin, except vessel factors from San Pedro Bay Ports Emissions Inventory
[2] Round trip distance to Modesto (40 miles) for workers
[3] Emission factors from EMFAC 2017 for Stanislaus County year 2020 annual emissions
[4] Assumes two workers per truck, one round trip per day
[5] Assumes 20 miles per day cycling though work areas, total trips=work days

Greenhouse Gas Emissions Summary

Metric Tons	15.382	0.001	0.001
CO2E	15.382	0.022	0.254
Total CO2E			**15.7**

PG&E R-687 L-215 San Joaquin River Crossing Replacement Project
Phase 2: Pig and Flush Pipeline

OFF-ROAD SOURCES

					Emission Factors: pounds/BHP-hr [1]								Total English Tons							
Source	Fuel	BHP	Number	Total Hours per Source	NO_x	ROG	PM10	PM2.5	CO	CO2	CH4	N2O	NO_x	ROG	PM10	PM2.5	CO	CO2	CH4	N2O
Excavator	Diesel	310	2	32	0.00173	0.00015	0.00005	0.00005	0.00096	0.44473	0.000023	0.000010	0.02	0.00	0.00	0.00	0.01	4.41	0.000	0.000
Wheeled loader	Diesel	240	2	32	0.00224	0.00018	0.00007	0.00007	0.00101	0.42804	0.000023	0.000010	0.02	0.00	0.00	0.00	0.01	3.29	0.000	0.000
Generator (60 KW)	Diesel	75	0	0	0.00033	0.00033	0.00003	0.00003	0.00389	0.37887	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Air compressor	Diesel	20	1	4	0.00485	0.00068	0.00023	0.00021	0.00287	0.60481	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.02	0.000	0.000
Dive compressor	Diesel	50	0	0	0.00470	0.00092	0.00028	0.00026	0.00554	0.60125	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Welding machine	Diesel	20	1	4	0.00453	0.00062	0.00022	0.00020	0.00287	0.56374	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.02	0.000	0.000
Crane (barge assembly)	Diesel	610	0	0	0.00231	0.00019	0.00009	0.00008	0.00153	0.33457	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Crane (on barge)	Diesel	330	0	0	0.00286	0.00024	0.00012	0.00011	0.00112	0.33516	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Barge support vessel	Diesel	500	0	0	0.00201	0.00082	0.00042	0.00040	0.00181	0.35000	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Pipe flush pump	Gasoline	20	1	12	0.00710	0.00948	0.00407	0.00307	0.34576	0.65330	0.000023	0.000010	0.00	0.00	0.00	0.00	0.04	0.08	0.000	0.000
Concrete pump	Diesel	300	0	0	0.00097	0.00008	0.00003	0.00003	0.00065	0.34080	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
													0.036	**0.004**	**0.002**	**0.001**	**0.059**	**7.824**	**0.0004**	**0.0002**

ON-ROAD SOURCES

			Emission Factors, grams/mile [3]								Total English Tons							
On Road Sources	Miles/Trip	Total Trips	NOx	ROG	PM10	PM2.5	CO	CO2	CH4	N2O	NOx	ROG	PM10	PM2.5	CO	CO2	CH4	N2O
Light-duty truck (LDT2) [2,4]	40	25	0.12375	0.02129	0.00139	0.00128	1.29305	331.5704	0.00496	0.00908	0.0001	0.0000	0.0000	0.0000	0.0014	0.3655	0.0000	0.0000
Medium-duty truck (MDV)	0	0	0.07819	0.01228	0.00647	0.00619	0.18535	346.6425	0.00057	0.05449	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water truck (T6 instate) [5]	20	4	3.88892	0.15147	0.08338	0.07977	0.55408	973.1576	0.00704	0.15297	0.0003	0.0000	0.0000	0.0000	0.0000	0.0858	0.0000	0.0000
Heavy-duty truck (T6 instate)[6]	40	30	3.88892	0.15147	0.08338	0.07977	0.55408	973.1576	0.00704	1.15297	0.0051	0.0002	0.0001	0.0001	0.0007	1.2872	0.0000	0.0015
Heavy-duty truck (T6 instate)	40	10	3.88892	0.15147	0.08338	0.07977	0.55408	973.1576	0.00704	0.15297	0.0017	0.0001	0.0000	0.0000	0.0002	0.4291	0.0000	0.0001
										Totals =>	**0.0073**	**0.0003**	**0.0002**	**0.0001**	**0.0025**	**2.1676**	**0.0000**	**0.0016**
									Off-Road & On-Road Source Totals		**0.043**	**0.004**	**0.002**	**0.002**	**0.061**	**9.992**	**0.0004**	**0.0018**

Notes:
[1] Emission factors from OFFROAD 2017 (ver 1.0.1) for the San Joaquin Valley Air Basin, except vessel factors from San Pedro Bay Ports Emissions Inventory
[2] Round trip distance to Modesto (40 miles) for workers
[3] Emission factors from EMFAC 2017 for Stanislaus County year 2020 annual emissions
[4] Assumes two workers per truck, one round trip per day
[5] Assumes 20 miles per day cycling though work areas, total trips=work days
[6] Flush water import, assume 40 miles round trip

Greenhouse Gas Emissions Summary

Metric Tons	8.921	0.000	0.002
CO2E	8.921	0.011	0.424
Total CO2E			**9.4**

PG&E R-687 L-215 San Joaquin River Crossing Replacement Project
Phase 2: Cementing Pipeline

OFF-ROAD SOURCES

					Emission Factors: pounds/BHP-hr [1]								Total English Tons							
Source	Fuel	BHP	Number	Total Hours per Source	NO_x	ROG	PM10	PM2.5	CO	CO2	CH4	N2O	NO_x	ROG	PM10	PM2.5	CO	CO2	CH4	N2O
Excavator	Diesel	310	2	120	0.00173	0.00015	0.00005	0.00005	0.00096	0.44473	0.000023	0.000010	0.06	0.01	0.00	0.00	0.04	16.54	0.001	0.000
Wheeled loader	Diesel	240	2	120	0.00224	0.00018	0.00007	0.00007	0.00101	0.42804	0.000023	0.000010	0.06	0.01	0.00	0.00	0.03	12.33	0.001	0.000
Generator (60 KW)	Diesel	75	0	0	0.00033	0.00033	0.00003	0.00003	0.00389	0.37887	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Air compressor	Diesel	20	0	0	0.00485	0.00068	0.00023	0.00021	0.00287	0.60481	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Dive compressor	Diesel	50	0	0	0.00470	0.00092	0.00028	0.00026	0.00554	0.60125	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Welding machine	Diesel	20	1	12	0.00453	0.00062	0.00022	0.00020	0.00287	0.56374	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.07	0.000	0.000
Crane (barge assembly)	Diesel	610	0	0	0.00231	0.00019	0.00009	0.00008	0.00153	0.33457	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Crane (on barge)	Diesel	330	0	0	0.00286	0.00024	0.00012	0.00011	0.00112	0.33516	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Barge support vessel	Diesel	500	0	0	0.00201	0.00082	0.00042	0.00040	0.00181	0.35000	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Pipe flush pump	Gasoline	20	0	0	0.00710	0.00948	0.00407	0.00307	0.34576	0.65330	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Concrete pump	Diesel	300	1	24	0.00097	0.00008	0.00003	0.00003	0.00065	0.34080	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	1.23	0.000	0.000
													0.133	**0.011**	**0.004**	**0.004**	**0.067**	**30.166**	**0.0016**	**0.0007**

ON-ROAD SOURCES

			Emission Factors, grams/mile [3]								Total English Tons							
On Road Sources	Miles/Trip [2]	Total Trips	NOx	ROG	PM10	PM2.5	CO	CO2	CH4	N2O	NOx	ROG	PM10	PM2.5	CO	CO2	CH4	N2O
Light-duty truck (LDT2) [4]	40	40	0.12375	0.02129	0.00139	0.00128	1.29305	331.5704	0.00496	0.00908	0.0002	0.0000	0.0000	0.0000	0.0023	0.5848	0.0000	0.0000
Medium-duty truck (MDV)	0	0	0.07819	0.01228	0.00647	0.00619	0.18535	346.6425	0.00057	0.05449	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water truck (T6 instate) [5]	0	0	3.88892	0.15147	0.08338	0.07977	0.55408	973.1576	0.00704	0.15297	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Heavy-duty truck (T6 instate)	40	25	3.88892	0.15147	0.08338	0.07977	0.55408	973.1576	0.00704	0.15297	0.0043	0.0002	0.0001	0.0001	0.0006	1.0727	0.0000	0.0002
										Totals =>	**0.0045**	**0.0002**	**0.0001**	**0.0001**	**0.0029**	**1.6575**	**0.0000**	**0.0002**

Off-Road & On-Road Source Totals	**0.137**	**0.011**	**0.004**	**0.004**	**0.070**	**31.824**	**0.0016**	**0.0009**

Notes:
[1] Emission factors from OFFROAD 2017 (ver 1.0.1) for the San Joaquin Valley Air Basin, except vessel factors from San Pedro Bay Ports Emissions Inventory
[2] Round trip distance to Modesto (40 miles) for workers
[3] Emission factors from EMFAC 2017 for Stanislaus County year 2020 annual emissions
[4] Assumes two workers per truck, one round trip per day
[5] Assumes 20 miles per day cycling though work areas, total trips=work days

Greenhouse Gas Emissions Summary

Metric Tons	28.414	0.001	0.001
CO2E	28.414	0.041	0.209
Total CO2E			**28.7**

PG&E R-687 L-215 San Joaquin River Crossing Replacement Project
Phase 2: Onshore Pipeline Removal

OFF-ROAD SOURCES

					Emission Factors: pounds/BHP-hr [1]								Total English Tons							
Source	Fuel	BHP	Number	Total Hours per Source	NO_x	ROG	PM10	PM2.5	CO	CO2	CH4	N2O	NO_x	ROG	PM10	PM2.5	CO	CO2	CH4	N2O
Excavator	Diesel	310	2	80	0.00173	0.00015	0.00005	0.00005	0.00096	0.44473	0.000023	0.000010	0.04	0.00	0.00	0.00	0.02	11.03	0.001	0.000
Wheeled loader	Diesel	240	2	80	0.00224	0.00018	0.00007	0.00007	0.00101	0.42804	0.000023	0.000010	0.04	0.00	0.00	0.00	0.02	8.22	0.000	0.000
Generator (60 KW)	Diesel	75	0	0	0.00033	0.00033	0.00003	0.00003	0.00389	0.37887	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Air compressor	Diesel	20	0	0	0.00485	0.00068	0.00023	0.00021	0.00287	0.60481	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Dive compressor	Diesel	50	0	0	0.00470	0.00092	0.00028	0.00026	0.00554	0.60125	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Welding machine	Diesel	20	0	0	0.00453	0.00062	0.00022	0.00020	0.00287	0.56374	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Crane (barge assembly)	Diesel	610	0	0	0.00231	0.00019	0.00009	0.00008	0.00153	0.33457	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Crane (on barge)	Diesel	330	0	0	0.00286	0.00024	0.00012	0.00011	0.00112	0.33516	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Barge support vessel	Diesel	500	0	0	0.00201	0.00082	0.00042	0.00040	0.00181	0.35000	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Pipe flush pump	Gasoline	20	0	0	0.00710	0.00948	0.00407	0.00307	0.34576	0.65330	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Concrete pump	Diesel	300	0	0	0.00097	0.00008	0.00003	0.00003	0.00065	0.34080	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
													0.086	**0.007**	**0.003**	**0.003**	**0.043**	**19.248**	**0.0010**	**0.0004**

ON-ROAD SOURCES

			Emission Factors, grams/mile [3]								Total English Tons							
On Road Sources	Miles/Trip[2]	Total Trips	NOx	ROG	PM10	PM2.5	CO	CO2	CH4	N2O	NOx	ROG	PM10	PM2.5	CO	CO2	CH4	N2O
Light-duty truck (LDT2) [4]	40	25	0.12375	0.02129	0.00139	0.00128	1.29305	331.5704	0.00496	0.00908	0.0001	0.0000	0.0000	0.0000	0.0014	0.3655	0.0000	0.0000
Medium-duty truck (MDV)	0	0	0.07819	0.01228	0.00647	0.00619	0.18535	346.6425	0.00057	0.05449	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water truck (T6 instate) [5]	0	0	3.88892	0.15147	0.08338	0.07977	0.55408	973.1576	0.00704	0.15297	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Heavy-duty truck (T6 instate)	40	14	3.88892	0.15147	0.08338	0.07977	0.55408	973.1576	0.00704	0.15297	0.0024	0.0001	0.0001	0.0000	0.0003	0.6007	0.0000	0.0001
										Totals =>	**0.0025**	**0.0001**	**0.0001**	**0.0001**	**0.0018**	**0.9662**	**0.0000**	**0.0001**

Off-Road & On-Road Source Totals											**0.088**	**0.007**	**0.003**	**0.003**	**0.045**	**20.214**	**0.0010**	**0.0005**

Notes:
[1] Emission factors from OFFROAD 2017 (ver 1.0.1) for the San Joaquin Valley Air Basin, except vessel factors from San Pedro Bay Ports Emissions Inventory
[2] Round trip distance to Modesto (40 miles) for workers
[3] Emission factors from EMFAC 2017 for Stanislaus County year 2020 annual emissions
[4] Assumes two workers per truck, one round trip per day
[5] Assumes 20 miles per day cycling though work areas, total trips=work days

Greenhouse Gas Emissions Summary

Metric Tons	18.048	0.001	0.000
CO2E	18.048	0.026	0.129
Total CO2E			**18.2**

PG&E R-687 L-215 San Joaquin River Crossing Replacement Project
Phase 2: In-River Pipeline Removal

OFF-ROAD SOURCES

					Emission Factors: pounds/BHP-hr [1]								Total English Tons							
Source	Fuel	BHP	Number	Total Hours per Source	NO_x	ROG	PM10	PM2.5	CO	CO2	CH4	N2O	NO_x	ROG	PM10	PM2.5	CO	CO2	CH4	N2O
Excavator	Diesel	310	0	0	0.00173	0.00015	0.00005	0.00005	0.00096	0.44473	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Wheeled loader	Diesel	240	0	0	0.00224	0.00018	0.00007	0.00007	0.00101	0.42804	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Generator (60 KW)	Diesel	75	1	30	0.00033	0.00033	0.00003	0.00003	0.00389	0.37887	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.43	0.000	0.000
Air compressor	Diesel	20	0	0	0.00485	0.00068	0.00023	0.00021	0.00287	0.60481	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Dive compressor	Diesel	50	1	180	0.00470	0.00092	0.00028	0.00026	0.00554	0.60125	0.000023	0.000010	0.02	0.00	0.00	0.00	0.02	2.71	0.000	0.000
Welding machine	Diesel	20	0	0	0.00453	0.00062	0.00022	0.00020	0.00287	0.56374	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Crane (barge assembly)	Diesel	610	0	0	0.00231	0.00019	0.00009	0.00008	0.00153	0.33457	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Crane (on barge)	Diesel	330	1	180	0.00286	0.00024	0.00012	0.00011	0.00112	0.33516	0.000023	0.000010	0.08	0.01	0.00	0.00	0.03	9.95	0.001	0.000
Barge support vessel	Diesel	500	1	180	0.00201	0.00082	0.00042	0.00040	0.00181	0.35000	0.000023	0.000010	0.09	0.04	0.02	0.02	0.08	15.75	0.001	0.000
Pipe flush pump	Gasoline	20	0	0	0.00710	0.00948	0.00407	0.00307	0.34576	0.65330	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Concrete pump	Diesel	300	0	0	0.00097	0.00008	0.00003	0.00003	0.00065	0.34080	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
													0.197	**0.049**	**0.024**	**0.022**	**0.144**	**28.836**	**0.0019**	**0.0008**

ON-ROAD SOURCES

			Emission Factors, grams/mile [3]								Total English Tons							
On Road Sources	Miles/Trip [2]	Total Trips	NOx	ROG	PM10	PM2.5	CO	CO2	CH4	N2O	NOx	ROG	PM10	PM2.5	CO	CO2	CH4	N2O
Light-duty truck (LDT2) [4]	40	90	0.12375	0.02129	0.00139	0.00128	1.29305	331.5704	0.00496	0.00908	0.0005	0.0001	0.0000	0.0000	0.0051	1.3158	0.0000	0.0000
Medium-duty truck (MDV)	0	0	0.07819	0.01228	0.00647	0.00619	0.18535	346.6425	0.00057	0.05449	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water truck (T6 instate) [5]	0	0	3.88892	0.15147	0.08338	0.07977	0.55408	973.1576	0.00704	0.15297	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Heavy-duty truck (T6 instate)	40	4	3.88892	0.15147	0.08338	0.07977	0.55408	973.1576	0.00704	0.15297	0.0007	0.0000	0.0000	0.0000	0.0001	0.1716	0.0000	0.0000
									Totals =>		**0.0012**	**0.0001**	**0.0000**	**0.0000**	**0.0052**	**1.4874**	**0.0000**	**0.0001**
									Off-Road & On-Road Source Totals		**0.198**	**0.049**	**0.024**	**0.022**	**0.149**	**30.323**	**0.0019**	**0.0009**

Notes:
[1] Emission factors from OFFROAD 2017 (ver 1.0.1) for the San Joaquin Valley Air Basin, except vessel factors from San Pedro Bay Ports Emissions Inventory
[2] Round trip distance to Modesto (40 miles) for workers
[3] Emission factors from EMFAC 2017 for Stanislaus County year 2020 annual emissions
[4] Assumes two workers per truck, one round trip per day
[5] Assumes 20 miles per day cycling though work areas, total trips=work days

Greenhouse Gas Emissions Summary

Metric Tons	27.075	0.002	0.001
CO2E	27.075	0.047	0.205
Total CO2E			**27.3**

PG&E R-687 L-215 San Joaquin River Crossing Replacement Project
Phase 2: Demobilization

OFF-ROAD SOURCES

					Emission Factors: pounds/BHP-hr [1]								Total English Tons							
Source	Fuel	BHP	Number	Total Hours per Source	NO_x	ROG	PM10	PM2.5	CO	CO2	CH4	N2O	NO_x	ROG	PM10	PM2.5	CO	CO2	CH4	N2O
Excavator	Diesel	310	0	0	0.00173	0.00015	0.00005	0.00005	0.00096	0.44473	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Wheeled loader	Diesel	240	0	0	0.00224	0.00018	0.00007	0.00007	0.00101	0.42804	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Generator (60 KW)	Diesel	75	0	0	0.00033	0.00033	0.00003	0.00003	0.00389	0.37887	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Air compressor	Diesel	20	0	0	0.00485	0.00068	0.00023	0.00021	0.00287	0.60481	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Dive compressor	Diesel	50	0	0	0.00470	0.00092	0.00028	0.00026	0.00554	0.60125	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Welding machine	Diesel	20	0	0	0.00453	0.00062	0.00022	0.00020	0.00287	0.56374	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Crane (barge assembly)	Diesel	610	1	120	0.00231	0.00019	0.00009	0.00008	0.00153	0.33457	0.000023	0.000010	0.08	0.01	0.00	0.00	0.06	12.25	0.001	0.000
Crane (on barge)	Diesel	330	0	0	0.00286	0.00024	0.00012	0.00011	0.00112	0.33516	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Barge support vessel	Diesel	500	0	0	0.00201	0.00082	0.00042	0.00040	0.00181	0.35000	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Pipe flush pump	Gasoline	20	0	0	0.00710	0.00948	0.00407	0.00307	0.34576	0.65330	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
Concrete pump	Diesel	300	0	0	0.00097	0.00008	0.00003	0.00003	0.00065	0.34080	0.000023	0.000010	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
													0.085	**0.007**	**0.003**	**0.003**	**0.056**	**12.245**	**0.0009**	**0.0004**

ON-ROAD SOURCES

			Emission Factors, grams/mile [3]								Total English Tons							
On Road Sources	Miles/Trip [2]	Total Trips	NOx	ROG	PM10	PM2.5	CO	CO2	CH4	N2O	NOx	ROG	PM10	PM2.5	CO	CO2	CH4	N2O
Light-duty truck (LDT2) [4]	40	40	0.12375	0.02129	0.00139	0.00128	1.29305	331.5704	0.00496	0.00908	0.0002	0.0000	0.0000	0.0000	0.0023	0.5848	0.0000	0.0000
Medium-duty truck (MDV)	0	0	0.07819	0.01228	0.00647	0.00619	0.18535	346.6425	0.00057	0.05449	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water truck (T6 instate) [5]	0	0	3.88892	0.15147	0.08338	0.07977	0.55408	973.1576	0.00704	0.15297	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Heavy-duty truck (T6 instate) [5]	40	30	3.88892	0.15147	0.08338	0.07977	0.55408	973.1576	0.00704	0.15297	0.0051	0.0002	0.0001	0.0001	0.0007	1.2872	0.0000	0.0002
Heavy-duty truck (T6 instate)	100	55	3.88892	0.15147	0.08338	0.07977	0.55408	973.1576	0.00704	0.15297	0.0236	0.0009	0.0005	0.0005	0.0034	5.8999	0.0000	0.0009
										Totals =>	**0.0289**	**0.0012**	**0.0006**	**0.0006**	**0.0064**	**7.7719**	**0.0001**	**0.0011**
										Off-Road & On-Road Source Totals	**0.113**	**0.008**	**0.004**	**0.004**	**0.062**	**20.017**	**0.0009**	**0.0015**

Notes:
[1] Emission factors from OFFROAD 2017 (ver 1.0.1) for the San Joaquin Valley Air Basin, except vessel factors from San Pedro Bay Ports Emissions Inventory
[2] Round trip distance to Modesto (40 miles) for workers
[3] Emission factors from EMFAC 2017 for Stanislaus County year 2020 annual emissions
[4] Assumes two workers per truck, one round trip per day
[5] Assumes 20 miles per day cycling though work areas, total trips=work days

Greenhouse Gas Emissions Summary

Metric Tons	17.872	0.001	0.001
CO2E	17.872	0.023	0.358
Total CO2E			**18.3**

PG&E R-687 L-215 San Joaquin River Crossing Replacement Project
Phase 2: Air Pollutant and Greenhouse Gas Emissions Totals

	Total English Tons					Metric Tons			
Task	NOx	ROG	PM10	PM2.5	CO	CO2	CH4	N2O	CO2E
Mobilization	0.102	0.008	0.004	0.003	0.061	15.382	0.001	0.001	15.7
Pigging and Flushing Pipeline	0.043	0.004	0.002	0.002	0.061	8.921	0.000	0.002	9.4
Cementing Pipeline	0.137	0.011	0.004	0.004	0.070	28.414	0.001	0.001	28.7
Onshore Pipeline Removal	0.088	0.007	0.003	0.003	0.045	18.048	0.001	0.000	18.2
In-River Pipeline Removal	0.198	0.049	0.024	0.022	0.149	27.075	0.002	0.001	27.3
Demobilization	0.113	0.008	0.004	0.004	0.062	17.872	0.001	0.001	18.3
Total	**0.683**	**0.088**	**0.040**	**0.037**	**0.449**	**116.713**	**0.006**	**0.006**	**117.5**

APPENDIX D

Biological Technical Report

BIOLOGICAL TECHNICAL REPORT

PG&E R-687 L-215 SAN JOAQUIN RIVER CROSSING REPLACEMENT PROJECT – PHASE TWO STANISLAUS COUNTY, CALIFORNIA

Project No. 1902-3511

Prepared for:

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MARCH 2020

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1.0 INTRODUCTION

Pacific Gas & Electric Company (PG&E) proposes to install a new 24-inch pipeline (L-215-1) to replace the existing R-687 L-215 San Joaquin River crossing to address shallow depth of burial and exposures on the existing pipeline crossing. The PG&E R-687 L-215 San Joaquin River Crossing Replacement Project (Project) will be completed in two phases. Phase One consists of installing and commissioning the new 24-inch crossing using a Horizontal Directional Drill (HDD). Phase Two will address the decommissioning of the existing 12-inch pipeline (L-215) at the San Joaquin River crossing.

The purpose of this Biological Technical Report is to detail the findings of the biological reconnaissance surveys conducted for Phase Two of the proposed Project in Stanislaus County, California. This technical report includes a review of pertinent literature, a review of regulatory requirements, results of reconnaissance field surveys, and a preliminary analysis of general impacts of project implementation on biological resources.

Following this introduction, there is a description of the proposed Project, followed by the methodology section, which describes field studies and analytical methods used to assess the Project site. The methodology section includes a review of literature concerning special-status species, sensitive habitats, and general biological conditions; and, a description of field reconnaissance methods. The environmental setting describes abiotic and biotic conditions at the Project site including climate, soils, typical habitats and associated plant and wildlife species, and special-status species reported in or near the Project area. A review of regulatory requirements is then provided, and the final section summarizes the anticipated impacts of Project implementation along with suggested mitigation measures to reduce Project impacts to less than significant levels.

A Biological Resources Assessment Report was prepared by Stantec for Phase One of the Project (Stantec, 2019b). The contents of this report focus on the biological resource assessment for Phase Two of the Project.

2.0 BACKGROUND

PG&E is proposing to address the exposure of natural gas pipeline L-215 at its crossing of the San Joaquin River. The Project objective is to replace the affected pipeline segment at a new location using HDD methods and to decommission the existing pipeline crossing. The Project would be conducted in two phases.

- Phase One consists of installing and commissioning the new 24-inch HDD crossing.
- Phase Two involves the decommissioning of the existing 12-inch pipeline crossing.

2.1 LOCATION

The Project site is located approximately four miles southeast of Patterson, California (Figure 1) within the *Crows Landing, California* United States Geological Survey (USGS) 7.5-Minute Series topographic quadrangle map. The Project crosses through Sections 35 and 36 of Township 5 South, Range 8 East; Sections 31 and 32 of Township 5 South, Range 9 East; Sections 1, 2, and 3 of Township 6 South, Range 8 East; and, Section 5 and 6 of Township 6 South, Range 9 East in Stanislaus County, California. Access to the Project areas on the west riverbank is near the cross streets of Prune Avenue and Paradise Avenue. The cross streets nearest the east bank Project access are South Carpenter Road and West Bradbury Road.

2.2 PROJECT DESCRIPTION

Phase One involves the installation and commissioning of a 24-inch pipeline using an approximately 7,200-foot-long HDD under the San Joaquin River. During Phase One, two bore pits will be dug, each measuring approximately 20 feet by 40 feet, for the entry and exit of the drill. On the western side of the San Joaquin River the bore pit will be located along Prune Avenue and will be used as the entry pit. The eastern bore pit will be located near the end of West Bradbury Road and will be the exit pit. From the western pit an approximately 415-foot-long open trench will be used to tie the new L-215-1 crossing into the existing L-215 line. At the eastern pit an approximately 365-foot-long open trench will be constructed for the same purpose. After the new crossing has been successfully tied-in, the existing crossing will be purged with inert gas and capped in preparation for Phase Two of the Project. Figure 2 provides an overview of Phase One and Phase Two work areas. This description of Phase One activities is provided for Project context; however, Phase One activities are not discussed further in this document. Refer to the Biological Resource Assessment Report for Phase One of the Project for additional details (Stantec, 2019b).

Phase Two decommissioning involves pigging and flushing the pipeline to remove any potential contaminants, filling certain pipeline segments with concrete slurry, and removal of other pipeline segments. The existing River crossing to be decommissioned in Phase Two is approximately 6,800 feet long and extends through a developed roadway (West Road Segment), a U.S. Army Corps of Engineers levee (ACOE levee) on the west side of the San Joaquin River (ACOE West Levee Segment), the active floodplain of the San Joaquin River (West Landing Segment), the low water channel of the San Joaquin River (Submerged Riverbed Crossing Segment), the east bank of the San Joaquin River (East Landing Segment), an agricultural levee (Agricultural Levee Segment), an ACOE levee on the east side of the San Joaquin River (ACOE

East Levee Segment), and an agricultural field west of South Carpenter Road (East Agricultural Field Segment). For planning purposes, the crossing is described in eight segments that correspond with the varying conditions specific to each pipeline segment. Figure 3 identifies the pipeline segments and work areas and notes the final disposition of each pipeline segment.

The first operation to be performed as part of Phase Two will be pigging and flushing of the existing pipeline to remove contaminants. All eight affected pipeline segments will be pigged and flushed. In preparation for pigging and flushing, the pipeline will be excavated on the west end at the corner of Prune Avenue and Paradise Avenue, as well as at the east end adjacent to Carpenter Road. Staging areas (west staging area and east staging area) will accommodate temporary tanks, piping, pumps, and other water handling equipment and provide the work space for pigging and flushing operations. The existing pipeline will be pigged until the flush water has less than 15 parts per million (ppm) total petroleum hydrocarbon (TPH). The operation is expected to require two pig runs and a total of approximately 90,000 gallons of water. Flush water generated by pigging and flushing operations will be fully contained within piping, valves and temporary tanks.

The decommissioning of the existing 12-inch pipeline involves installing cement slurry and abandonment in place for the following pipeline segments: West Road Segment, ACOE West Levee Segment, East Landing Segment, Agricultural Levee Segment, ACOE East Levee Segment, and East Agricultural Field Segment. Placement of cement slurry into the pipeline segments to be abandoned in place involves excavation on both ends of the segment and placement of a pre-calculated volume of cement to ensure that the pipeline segment is filled. Once the cement slurry has cured sufficiently (approximately 48 hours), the pipeline ends will be cut off using an oxy-acetylene torch, the ends will be capped, and the pipeline segment abandoned in place. Excavations will be backfilled, compacted, and returned to pre-Project contours. Work areas and excavation footprints associated with installation of the cement slurry are depicted on Figure 3.

The West Landing Segment and Submerged Riverbed Crossing Segment of the decommissioned pipeline will be removed entirely due to shallow depth of burial in some portions of these pipeline segments. The West Landing Pipe Segment has a depth of burial ranging from 1.5-feet to ten feet deep. This pipe segment will be removed using conventional terrestrial excavation equipment to expose the pipe. The pipeline will be cut and extracted using a hydraulic shear and grapple. At the shoreline, after submerged pipeline has been exposed, a winch will be used to pull the remaining pipe out of the western riverbank up onto the west landing.

The pipeline segment under the submerged riverbed has depth of burial ranging from exposed to approximately six feet of burial. The portion of this pipeline segment with at least three feet of water depth will be removed using a portable “sectional” barge that will be trucked in and assembled on the west bank of the San Joaquin River (Work Area 1). The sectional barge will be equipped with a crane and diving spread and anchored with spuds. The crane will be equipped with a submersible excavation pump to surgically excavate the buried sections of the submerged pipeline to expose it in preparation for removal. Hand jetting by divers is not anticipated but may be used if site conditions warrant. Portions of the pipeline buried near the western riverbank that are too shallow for underwater excavation methodologies will be exposed using terrestrial excavation equipment.

The east landing pipeline segment will be filled with cement slurry and partially abandoned in place and partially removed. After the submerged pipeline has been removed from the riverbed as close to the shoreline as possible, terrestrial construction equipment will pull the remaining pipe out of the eastern riverbank from the excavation used to install slurry. The excavation footprint will be situated at least five feet from the existing bank to minimize the disturbance and reduce impacts to the integrity of the existing riverbank to the extent feasible.

All recovered pipe will be cut into sections and loaded onto trucks to be removed from the site. A total of seven excavation areas will be required for completion of the Phase Two work (Figure 3). Five of these excavations will occur in developed or disturbed areas or agricultural lands. These excavations are necessary to access the pipeline for pigging and flushing, and installation of the cement slurry. Two excavation areas are required within the active floodplain and the banks of the San Joaquin River (Excavation B and C). These excavation areas are required for removal of the pipeline from the river crossing. Table 1 outlines the excavation footprints within each of the defined work areas. Figure 3 depicts the excavation areas and work areas associated with Phase Two work.

Table 1. R-687 L-215 San Joaquin River Crossing Replacement Project - Phase Two Excavation Footprints

Work Area	Excavation	Excavation Dimensions (ft)	Impact Area (ft^2)
West Staging Area	Excavation A Prune and Paradise Avenue	35 x 20	700
Work Area 1	Excavation B San Joaquin River West Landing	45 x 450	20,250
	Underwater Excavation Area	4 x 280	1,118
	Excavation C San Joaquin River East Landing	80 x 50	3,629
Work Area 2	Excavation D Agricultural Levee	24 x 24	576
Work Area 3	Excavation E Agricultural Levee	24 x 24	576
Work Area 4	Excavation F Agricultural Field	30 x 20	600
East Staging Area	Excavation G Agricultural Field	35 x 20	700

All excavation areas will be backfilled with excavated spoils and restored to pre-Project contours. Phase Two activities will result in a total disturbance footprint of approximately 9.47 acres and a total excavation footprint of approximately 0.61-acre. There are no permanent impacts associated with this Project.

Phase Two activities are planned for implementation during late summer/fall of 2021. Total duration of Project activities is expected to take approximately 62 days, with approximately 25 days of work in the river or on the riverbanks. Work within the San Joaquin River will be limited to July 1 to September 30 to coincide with the period that is least favorable for special-status fish occurrence. Work activities will generally be conducted Monday through Friday (occasionally Saturday) with approximately 10-12 hours per workday. Weekend work may occur, if necessary, to complete the Project within the defined seasonal constraints.

3.0 METHODOLOGY

3.1 LITERATURE REVIEW

Padre biologists reviewed available Project design information, Stanislaus County soil survey maps, National Wetland Inventory (NWI) Maps, the U.S. Geological Survey (USGS) 7.5-minute topographic map for the Crows Landing quadrangle, and other environmental documents. The California Natural Diversity Database (CNDDB) was queried for records of special-status species reported within a five-mile radius surrounding the Project site (California Department of Fish and Wildlife [CDFW], 2020). A list of federally listed Threatened and Endangered species was obtained from the U.S. Fish and Wildlife Service (USFWS), and is included under Appendix A (USFWS, 2020a). Special-status taxa that are known to exist or have the potential to exist on the Project site were also identified through a review of relevant literature (California Native Plant Society [CNPS], 2020; Zeiner et al., 1988; 1990a, b).

3.2 FIELD RECONNAISSANCE SURVEY

Reconnaissance-level field surveys for the purposes of site characterization and preliminary aquatic resources delineation were conducted by Padre biologists on January 17 and 23, 2020. A biological resources study area (study area) was identified prior to beginning field surveys. The study area includes all temporary impact areas, staging areas, access routes, and the surrounding areas. Boundaries of the study area are depicted in Figures 4, 5, and 6. Surveys of the study area were conducted to assess the potential for biological resources and to determine the likelihood of occurrence for special-status species and/or sensitive and regulated habitats on the site. Detection methods included direct observation with binoculars; examination and identification of tracks, scats, previous years nests, burrows/diggings, and carcasses/skeletal remains; and identification of vocalizations (calls and songs). No trapping or netting was performed during surveys. Plants not identified in the field were collected and returned to the lab for identification using standard taxonomic references (Baldwin et al., 2012), when possible. Field surveys were conducted in January when many of plant species onsite were dormant or unidentifiable due to the plant growing stage. Prior to the field surveys, the CNDDB query was reviewed to identify occurrences of special-status plant and animal species in the Project vicinity (Appendix B). During the field surveys, vegetative cover types and significant habitat features, such as wetlands, potential nest trees, and potential dens or burrows, were noted. Lists of plants and wildlife associated with the various cover types were compiled and are included in Appendix C and Appendix D.

4.0 ENVIRONMENTAL SETTING

4.1 GEOLOGY/GEOMORPHOLOGY

The Project is located within the Caswell Basin subsection of the Great Valley ecological section of California (Miles and Goudey, 1997). The Caswell Basin subsection occurs on the San Joaquin River just upstream of the Delta. The geomorphology of this subsection is nearly level floodplain and basin floors with elevational ranges of 10 to 60 feet above mean sea level (msl). Fluvial erosion and deposition are the main geomorphic processes in the subsection. Seven soil types that have been mapped by the Natural Resources Conservation Service (NRCS) are distributed across the Project site as described in Section 4.3 below.

The Project is located within the San Joaquin Valley subregion of the Great Valley California floristic region (Baldwin et al., 2012). The western portion of the Project site is located within a rural residential area. The floodplain of the western portion of the San Joaquin River Crossing is used for cattle grazing. The western floodplain below the Ordinary High-Water Mark (OHWM) consists of sandy terraces. The floodplain on the eastern portion of the San Joaquin River is not utilized for grazing. However, work areas, excavations, and staging areas located outside the floodplain on the east side of the San Joaquin River are located in disturbed areas along the agricultural levee and within irrigated agricultural crop land.

4.2 CLIMATE

The Project site is situated in Climate Zone 8, which includes cold-air basins of California's Central Valley (Clark, 1985). The site has a climate that is strongly influenced by the Pacific Ocean. The climate is characterized by hot and sub-humid summers with low overnight temperatures with generally colder air flowing from adjacent zones in the coastal and Sierra foothills. Most of the rainfall occurs during the period from November through April.

In nearby Modesto, to the north, the average maximum temperature for the 110-year period between 1906 and 2016 was 74.6°F, with a range of 53.8° in January to 94.3° in July. The average minimum temperature was 48.4° with a range of 37.6° in January and 60.0° in July. The average annual precipitation is 12.21 inches with a range of 0.02 inch in July to 2.44 inches in January. No precipitation falls as snow within this area of California (Western Regional Climate Center, 2020).

4.3 SOILS

The soils in the Caswell Basin subsection soils are mostly poorly drained and some are moderately well and well drained. Soil temperature regimes are thermic. Soil moisture regimes are mostly aquic, and some are xeric.

Based on a review and analysis of the U.S. Department of Agriculture's Web Soil Survey for Stanislaus county (NRCS, 2020), the Project site is underlain by Dospalos-Bolfar complex (map unit symbol 170), Occidental, 0 to 2 percent slopes (map unit symbol 140), Weott, 0 to 2 percent slopes (map unit symbol 110), Bolfar-Columbia complex (246), Columbia loam, 0 to 1 percent slopes (CeA), Columbia soils, channeled, 0 to 8 percent slopes (CsB), Columbia fine sandy loam, channeled, partially drained, 0 to 2 percent slopes (153), Dinuba sandy loam, slightly

saline-alkali, 0 to 1 percent slopes (DwA), and Waukena sandy loam, slightly saline-alkali, 0 to 1 percent slopes (WdA). These soil mapping units are described below in Table 2.

Table 2. Soil Mapping Units and Characteristics at the PG&E R-687 L-215 San Joaquin River Crossing Replacement Project – Phase 2

Soil Mapping Unit (Taxonomic Class)	Location	Munsell Soil Color (by horizon)	Drainage Class[1]	PERM[2]	AWC[3]	Runoff[4]	ERD[5]	Hydric
Dospalos-Bolfar complex (170) (Fine, smectitic, calcareous, thermic Vertic Endoaquolls)	Western staging area	0-9" 10YR 4/1 dry 10YR 3/1 wet 9-24" 10YR8/1 dry 10YR 8/1 wet		2	3	4	1	Yes, in flood plains and basin floors
Bolfar-Columbia complex (246) (mixed, superactive, calcareous, thermic Cumulic Endoaquolls)	Western staging area	0-11" 10YR 4/1) dry 10YR 3/1 wet 11-25" 10YR 4/1 dry 10YR 2/1 wet 25-29" 5Y 4/2 dry 2.5Y 3/2 wet	6	3	4	3	1	Yes, in flood plains
Columbia loam, 0 to 1 percent slopes (CeA) (mixed, superactive, nonacid, thermic Oxyaquic Xerofluvents)	Excavation Area D Excavation Area E Eastern Staging Area	0-11" 10YR 6/3) dry 10YR 4/3) wet 11-16" 10YR 6/3) dry 10YR 4/3 wet 16-23" 10YR 6/3) dry 10YR 4/3) we	5	5	3	3	1	Yes, in flood plains, basin floors, and depressions
Columbia soils, channeled, 0 to 8 percent slopes (CsB) (mixed, superactive, nonacid, thermic Oxyaquic Xerofluvents)	SJ River Crossing Excavation Area D Eastern Staging Area Carpenter Road Staging Area	0-11" 10YR 6/3) dry 10YR 4/3) wet 11-16" 10YR 6/3) dry 10YR 4/3 wet 16-23" 10YR 6/3) dry 10YR 4/3) wet	5	5	3	5	1	Yes, in flood plains, and depressions
Columbia fine sandy loam, channeled, partially drained, o to 2 percent slopes (153) (mixed, superactive, nonacid, thermic Oxyaquic Xerofluvents)	SJ River Crossing	0-11" 10YR 6/3) dry 10YR 4/3) wet 11-16" 10YR 6/3) dry 10YR 4/3 wet 16-23" 10YR 6/3) dry 10YR 4/3) wet	5	5	3	2	1	Yes, in flood plains

Dinuba sandy loam, slightly saline-alkali, 0 to 1 percent slopes (DwA) (mixed, active, thermic Typic Haploxeralfs)	Carpenter Road Staging Area	0-8" 2.5Y 5/2 dry 2.5Y 3/2 wet 8-18" 10YR 6/2.5 dry 10YR 5/2.5 wet 18-28" 10YR 6/2.5 dry 10YR 5/2.5 wet	4	4-6	2	4	1	Yes, in depressions
Waukena sandy loam, slightly saline-alkali, 0 to 1 percent slopes (WdA) (mixed, superactive, thermic Typic Natrixeralfs)	Carpenter Road Staging Area	0-1" 10YR 6/1) dry 10YR 5/1 wet 1-10" 10YR 5/1 dry 10YR 4/1 wet 10-18" 2.5Y 6/4 dry 2.5Y 5/4 wet	4	1-2	3	5	1	Yes, in depressions

[1]Drainage Class
1 Excessively drained
2 Somewhat excessively drained
3 Well drained
4 Moderately well drained
5 Somewhat poorly drained
6 Poorly drained
7 Very poorly drained

[2]PERM (Permeability)
1 Very slow (< 0.06 inch)
2 Slow (0.06 to 0.2 inch)
3 Moderately slow (0.2 to 0.6 inch)
4 Moderate (0.6 to 2 inches)
5 Moderately rapid (2 to 6 inches)
6 Rapid (6 to 20 inches)
7 Very rapid (>20 inches)

[3]AWC (Available Water Capacity)
1 Very low (0 to 2.5 inches)
2 Low (2.5 to 5 inches)
3 Moderate (5 to 7.5 inches)
4 High (7.5 to 10 inches)
5 Very High (> 10 inches)

[4]Surface Runoff
1 Negligible
2 Very low
3 Low
4 Medium
5 High
6 Very high

[5]ERD (Effective Rooting Depth)
1 Very deep (> 60 inches)
2 Deep (40 to 60 inches)
3 Moderately deep (20 to 40 inches)
4 Shallow (10 to 20 inches)
5 Very shallow (< 10 inches)

4.4 WATER QUALITY

Water quality is an important factor in determining habitat suitability for special-status fish species, specifically salmonids. Water temperature in this portion of the San Joaquin River is typically too high to support salmonids during the late summer months, with water temperatures regularly exceeding 70° Fahrenheit (F) (21° Celsius [C]). Typically, salmonids prefer cool streams and rivers with a maximum temperature of 64° F (18°C). High water temperatures result in reduced levels of dissolved oxygen, which can impact growth and development of all life stages of salmonids. Salmon have been documented to have an avoidance response to unfavorable dissolved oxygen levels (Carter, 2005). Typical salmonid behavioral response when temperatures become too high is to go upstream to locations where conditions are more favorable.

Higher water temperatures routinely observed at the Crow's Landing station approximately 2.25 miles upstream of the Project site during summer months indicate inhospitable habitat conditions for salmonid species and a low likelihood of occurrence of salmonids at the Project location during summer months. These high water temperatures support the seasonal in-water work window of July 1 to September 30, intended for avoidance of listed fish species. Mean monthly water temperature data for the USGS Station on the San Joaquin River near Crows Landing is presented in Table 3.

Table 3. Water Temperature Data Recorded in the San Joaquin River Mean Monthly Water Temperature (1996-2019)

April	May	June	July	August	September	October
63.7°F (17.6°C)	68.7°F (20.4°C)	74.8°F (23.8°C)	78.6°F (25.9°C)	77°F (25°C)	72.5 °F (22.5°C)	64.2 °F (17.9°C)

Source: USGS San Joaquin River Near Crows Landing (Station #11274550)

4.5 HABITAT DESCRIPTIONS AND VEGETATION

The study area is located east of the town of Patterson. The surrounding area consists of agricultural land and rural residential development. A small rural residential development is located on the west side of the San Joaquin River and on the east side the land is predominantly agricultural row crops. An active flood plain is located along the San Joaquin River in the vicinity of the Project.

Six vegetation communities were identified onsite during field surveys (Figure 4). Along the San Joaquin River, Great Valley willow scrub is present in the lower terraces of the floodplain and Great Valley mixed riparian forests dominate the upper reaches of the floodplain. The portions of the study area along the agricultural levee between the excavation sites are primarily ruderal/disturbed communities created by human traffic and disturbance. The eastern reaches of the study area are dominated by agricultural land supporting annual crop species. At the staging area on the western side of the study area, a non-native grassland community was identified. Vegetation communities were determined based on species composition and the *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland, 1986), but were modified as needed to accurately describe the existing habitat observed onsite. Below is a brief description of each vegetation community identified. Plant species lists are provided for the

Project in Appendix C. Vegetation Communities mapped within the study area are shown on Figure 4.

4.5.1 Agriculture

This community is not described in the *Preliminary Descriptions of the Terrestrial Natural Communities of California* because it is not a natural community. Within the study area there are several locations that consist of fields used for agriculture. On the west side of the study area, east of Prune Avenue, the site borders a field that was in alfalfa production. On the east side of the San Joaquin River, the Project site occurs within and adjacent to fields used to grow corn and other row crops. No jurisdictional aquatic resources were mapped within this cover type.

4.5.2 Great Valley Mixed Riparian Forest

This community is dominated by broadleaved winter-deciduous trees that form in a fine-textured alluvium soil on the borders of river channels. These communities often receive flooding from the adjacent river but not so often or severe as to cause significant losses to tree cover. Species that are characteristic of this cover type within the study area include Goodding's black willow (*Salix gooddingii*), Fremont cottonwood (*Populus fremontii*), California box elder (*Acer negundo*), and California buttonwillow (*Cephalanthus occidentalis*). Within the study area, this community was present on the western floodplain of the San Joaquin River along reaches where the frequency of flooding was not so great as to prevent a mature forest from developing. For large portions of this community a sparse to dense herbaceous community was present beneath the canopy consisting of hydrophytes like cocklebur, rabbitsfoot grass (*Polypogon monspeliensis*), and curly dock (*Rumex crispus*). Within the Great Valley mixed riparian forest community, two different wetland types were mapped in the study area. Palustrine forested wetlands were present below the level of the OHWM and palustrine emergent wetlands were present in a depressional feature above the OHWM. The Great Valley mixed riparian forest was present both above and below the OHWM within the study area despite the species composition that was variable across the gradient.

4.5.3 Great Valley Willow Scrub

This cover type is a riparian community consisting of dense, broad-leafed, winter-deciduous riparian thickets dominated by several willow species (Holland 1986). The series is generally sub-mature, which is maintained by frequent heavy flooding and may transition into Great Valley riparian forests if undisturbed for several decades. Within the study area, this cover type was present along both the western and eastern banks of the San Joaquin River. On the west bank, the community was present on the lowest terrace of the active floodplain where it is most susceptible to flooding. This terrace was dominated by willow shrubs that were difficult to identify because they were dormant during winter surveys. Willow species commonly found within this cover type include arroyo willow (*Salix lasiolepis*), red willow (*Salix laevigata*), and Pacific willow (*Salix lasiandra* var. *lasiandra*). On the eastern bank of the San Joaquin River, the Project site is positioned in a transitional boundary between a Great Valley mixed riparian forest and a Great valley willow scrub community. Within the study area and on the eastern shore of the river, the river is at an inflection point between east and west meanders. The eastern bank is positioned at the beginning of an inside turn and therefore the Project site is located in an area that receives more frequent flooding and more rapidly flowing waters than immediately across the river on the

western shore. This causes the willow scrub vegetation cover on the eastern bank to be less dense even though it is part of the same vegetation community.

On both sides of the San Joaquin River, the majority of Great Valley willow scrub cover type is located below the ordinary high-water mark. This cover type was mapped as a palustrine shrub-scrub wetland.

4.5.4 Non-Native Grassland

Non-native grasses that were introduced during European settlement dominate the non-native grassland cover type. These grasslands are annual species and often mixed into the grasslands are annual forbs that bloom during the springtime. In the study area, this vegetation community was mapped on the Western Staging Area, east of Prune Avenue. Non-native annual grasses that were common in this field include Bermuda grass (*Cynodon dactylon*), meadow barley (*Hordeum marinum* ssp. *gussoneanum*), and hare barley (*Hordeum murinum* ssp. *leporinum*). Annual forb species found in the grassland include black mustard (*Brassica nigra*), California burclover (*Medicago polymorpha*), redstem filaree (*Erodium cicutarium*), and shepherd's purse (*Capsella bursa-pastoris*). The non-native annual grassland within the study area was mapped as an upland.

4.5.5 Riverine

This community is not described in the *Preliminary Descriptions of the Terrestrial Natural Communities of California* because it is an open water aquatic community with limited vegetation. Within the study area, the San Joaquin River traverses northwesterly through the Project site. Within the area mapped as riverine, the channel flows year-round and is devoid of any vegetation except for pioneer floating species like floating water primrose (*Ludwigia peploides*) and water hyacinth (*Eichhornia crassipes*) which will occasionally float by or be lodged on a piece of debris. The riverine cover type was mapped as a riverine lower perennial wetland and is classified as other waters of the U.S. below the OHWM.

4.5.6 Ruderal/Disturbed

This community is not described in the *Preliminary Descriptions of the Terrestrial Natural Communities of California* because it is not a natural community and is typically associated with human disturbance. In the study area, ruderal/disturbed vegetation was present in many locations, primarily along the levees and roadways. The species composition and cover density of this community varied significantly within the study area. On the western side of the San Joaquin River, this cover type was mapped along the roadway to the west of Work Area 1, on top of the ACOE West Levee, and intermixing slightly with the Great Valley mixed riparian forest where vehicle traffic has significantly disturbed the vegetative cover.

On the east side of the San Joaquin River, the ruderal/disturbed community was mapped along both the Agricultural Levee and the ACOE East Levee. On the Agricultural Levee, where Work Areas 2 and 3 are located, there are portions of the road that support dense patches of low growing annual grasses like soft chess (*Bromus hordeaceus*) and meadow barley. In the shoulder of the Agricultural Levee, there are linear sections of dense big saltbush (*Atriplex lentiformis*) growth. Big saltbush is a native shrub that provides valuable cover and foraging habitat to bird species but was mapped as part of the ruderal and disturbed cover type because of its occurrence along the roadway. The ACOE East Levee is much more barren than the Agricultural Levee with

no vegetation on the road's surface and disturbance-adapted species like cheeseweed (*Malva parviflora*) growing sparsely on the slopes.

This community was mapped as upland within all reaches of the study area.

4.6 WATERS AND WETLANDS

The Project site was examined for evidence of regulated habitats, such as waters and wetlands, under regulatory authority of the U.S. Army Corps of Engineers (ACOE) under Section 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act of 1899. A Preliminary Aquatic Resource Delineation was conducted during January 2020 for the Project site. The Preliminary Aquatic Resource Delineation identified and delineated the geographic extent of Federal jurisdictional waters of the U.S. and wetlands and aquatic features under state jurisdiction (Padre, 2020).

During field survey efforts conducted in January 2020, Padre identified a total of 4.36 acres of Federal jurisdictional waters and wetlands, 4.36 acres of waters of the State, and 7.30 acres of stream features within the 18.58-acre study area. Activities within these delineated areas are regulated by the Federal government and/or the State of California.

The San Joaquin River is a Navigable Waterway under Section 10 of the Rivers and Harbors Act of 1899 and a Water of the U.S. under Section 404 of the Clean Water Act (CWA) and is subject to ACOE jurisdiction. Adjacent lands meeting the three-parameter definition of a federal wetland are also ACOE jurisdictional under Section 404 of the CWA. The San Joaquin River and adjacent wetlands also meet the definition of waters of the State defined within the Porter-Cologne Water Quality Control Act to include any surface water or groundwater, including saline waters, within the boundaries of the State, and are regulated by the Regional Water Quality Control Board (RWQCB). The bed, bank, and riparian cover of the San Joaquin River is also regulated under Section 1600 of the California Fish and Game Code administered by the CDFW, and jurisdiction extends to the top of bank or limits of riparian vegetation, whichever is greater.

Within the study area there are several wetland types and other waters present that are subject to federal and state jurisdiction. These different wetland types are defined both by their abiotic features such as water regime and topography as well as biotic factors like vegetation communities. The three wetland types found within the study area include palustrine emergent wetlands, palustrine scrub-shrub wetlands, and palustrine forested wetlands. Other Waters of the U.S. present in the study area are classified as lower perennial riverine wetlands (the San Joaquin River low flow channel). Wetland types were determined by their abiotic and biotic factors and the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin, 1979). Below is a brief description of each wetland type and of the other waters present in the study area.

4.6.1 Lower Perennial Riverine (Waters of the U.S.)

Riverine waters are defined as aquatic resource features that are confined within a channel and lack a dominance of trees, shrubs, persistent emergent herbs, mosses, or lichens. Wetlands that occur on a river's floodplain are classified separately from the riverine system due to the presence of vegetation cover (Cowardin, 1979). Within the study area, the limits of the lower perennial riverine classification are therefore confined to just the low flow channel of the San Joaquin River. Within the riverine system classification there are four subsystems. These are tidal, lower perennial, upper perennial, and intermittent. Through the study area, the San Joaquin River

is a lower perennial channel. This subsystem is characterized by its low gradient, perennial water flow, lack of tidal influence, and typically has sandy to muddy substrate. The existence of a well-developed floodplain is also characteristic of lower perennial riverine wetlands.

In a riverine system, the limits of ACOE jurisdiction on waters of the U.S. are defined by the OHWM. See the Preliminary Federal Aquatic Resources Delineation Map (Figure 5) for the location of the OHWM on the San Joaquin River within the study area. A total of 1.01 acre of lower perennial riverine wetlands occur within the study area and are subject to ACOE, RWQCB, and CDFW jurisdiction (Figures 5 and 6).

4.6.2 Palustrine Emergent Wetland (Wetland)

The palustrine classification of wetlands includes a wide variety of different wetland types. Wetlands commonly called ponds, prairies, fens, bogs, marshes, and swamps are all types of palustrine wetlands. In most circumstances, palustrine wetlands are dominated by persistent emergent herbs, shrubs, or trees and are found in non-tidal areas. Palustrine wetlands can occur in tidal wetlands if the salinity derived from the ocean is below 0.5 ppt (Cowardin, 1979).

Within the study area, a palustrine emergent wetland was mapped within the Great valley mixed riparian forest vegetation community above the ordinary high-water line. This wetland was located in a depressional feature that would receive both groundwater and occasional flood water from the San Joaquin River, and likely collects rainfall from the levee drainage. This particular palustrine wetland is classified as an emergent wetland because it has greater than 30% aerial coverage of hydrophytic herbaceous plant species like cocklebur. Despite being mapped as part of the larger mosaic of a riparian forest vegetation community, the wetland feature itself was lacking growth and influence from trees or shrubs and is therefore an emergent wetland class. A total of 0.11 acre of palustrine emergent wetlands occur within the study area and are subject to ACOE, RWQCB, and CDFW jurisdiction (Figures 5 and 6).

4.6.3 Palustrine Scrub-Shrub Wetland (Wetland)

Palustrine scrub-shrub wetlands share the same characteristics of other palustrine systems as described above but have a dominance of woody plants that are less than 20 feet tall. Scrub-shrub wetlands often develop from adverse environmental conditions like flooding and erosion which prevent larger or older woody plants from developing. For this reason, a palustrine scrub-shrub wetland may be an early succession of a palustrine forested wetland and could develop into a forest given enough time to develop without adverse environmental conditions.

Within the study area, palustrine scrub-shrub wetlands were present on the lowest and most exposed terraces of the San Joaquin River's active floodplain. On the west side, the scrub-shrub wetland has developed on a terrace that is approximately one to two feet higher in elevation than the low flow channel. This low terrace is therefore flooded with relatively high frequency which likely prevents the development of a forested wetland. On the east side of the San Joaquin River, the palustrine scrub-shrub wetland is located on a higher terrace approximately six feet above the low flow channel. However, this wetland is positioned on an inside turn at an inflection point between the east and west meanders of the San Joaquin River. This causes the eastern shore to receive frequent flooding and more rapidly flowing waters than immediately across the river on the western shore. As a result of this more aggressive flooding regime, a scrub-shrub wetland has developed on the higher eastern terrace in the place of a more mature and

disturbance intolerant wetland like palustrine forested wetland, which is present at the same elevation on the western shore.

Palustrine scrub-shrub wetlands were mapped within the Great Valley willow scrub community and occurred both above and below the OHWM within the study area. A total of 1.76 acre of palustrine scrub-shrub wetlands occur within the study area and are subject to ACOE, RWQCB, and CDFW jurisdiction (Figures 5 and 6).

4.6.4 Palustrine Forested Wetland (Wetland)

Palustrine forested wetlands share the same characteristics of other palustrine systems as described above but have a dominance of woody plants that are greater than 20 feet tall (trees). In the western United States, this wetland type is common on the fringes of river systems where higher moisture is present but frequent and violent flooding does not occur. Within the study area, this wetland type was part of the Great Valley mixed riparian forest vegetation community and was located on the western side of the San Joaquin River in the second terrace of the active floodplain where violent and disruptive flooding is less common. A total of 1.49 acre of palustrine forested wetlands occur within the study area and are subject to ACOE, RWQCB, and CDFW jurisdiction (Figures 5 and 6).

4.7 WILDLIFE

Wildlife observed at the Project site was characteristic of the region and of the riverine and agricultural habitats. A comprehensive list of wildlife species observed during the surveys are included in Appendix D. Special-status wildlife species (i.e., endangered, threatened, rare, or other special-status species) occurring, or potentially occurring, within the Project site and surrounding area are discussed in Section 4.8 below.

The vegetation communities on the site and surrounding area provide habitat for resident and migratory wildlife species. The composition, density, distribution, and physical characteristics of vegetative communities determine the diversity and abundance of wildlife species residing in the Project areas. Wildlife species observed and expected within the vegetative cover types present on the site are discussed below.

The open agricultural landscape found surrounding the Project site provides forage and for passerine birds and small mammals, such as California vole (*Microtus californicus*). These species, in turn, provide the prey base that attracts raptors such as red-tailed hawk (*Buteo jamaicensis*), northern harrier (*Circus cyaneus*), and Swainson's hawk (*Buteo swainsoni)*. Agricultural production can increase insect populations that can also be prey for Swainson's hawk and egrets (*Ardea* sp*).* Within the Project site, potential nesting habitat is limited to sparse riparian tree cover along the San Joaquin River and street trees on the westside of the Project site; however, suitable nest trees that may support nesting Swainson's hawk or other raptors occur within 0.25-mile of the Project site.

4.8 SPECIAL-STATUS SPECIES

For the purposes of this Report, a special-status species is a plant or animal species that is:

- Listed as endangered, threatened, or a candidate species under the federal Endangered Species Act (FESA);
- Listed as endangered, threatened, or a candidate species under the California Endangered Species Act (CESA);
- Listed as a species of special concern by the California Department of Fish and Wildlife (CDFW);
- A plant species that is on the California Native Plant Society's (CNPS) Rare Plant Ranking System as List 1 or 2; and/or
- Considered rare, threatened, or endangered under CEQA Guidelines 15380(d) as the species' survival is in jeopardy due to loss or change in habitat.

In addition, species protected by specific federal or state regulation or local ordinances are considered special-status species.

Based on the literature review and species lists from USFWS (Consultation Code: 08ESMF00-2020-SLI-0837), a list of special-status species that have been reported within a five-mile radius surrounding the Project site has been compiled. Special-status species with occurrences within five miles of the site and that have the potential to occur in the vicinity of the Project site are listed in Table 4. Table 4 also includes rationale for why certain species were excluded from further analysis in this document. Special-status species occurring within five miles of the Project are depicted in Figure 7.

An analysis of the likelihood of occurrence for each species was conducted on the basis of species ranges, previous observations, contemporary sightings, and presence of suitable habitat elements. The Project may be located outside of the known range of some species, or within the geographic range for a certain species, but suitable habitat, such as annual grassland, or vernal pool is absent onsite. For the purpose of this analysis, potential special-status species that occur in the general area of the Project, and for which the Project may provide habitat, are discussed in greater detail in Sections 4.8.1 and 4.8.2 below.

Table 4. Special-Status Species Occurring Within Five Miles of the Site and Considered for Potential Occurrence in the Vicinity of the PG&E R-687 L-215 San Joaquin River Crossing Replacement Project – Phase 2

Scientific Name	Common Name	Status[1]	Habitat	Probability of Occurrence
PLANTS				
Astragalus tener var. *tener*	Alkali milk-vetch	1B.2	Alkaline environments, valley and foothill grassland, and vernal pools. Blooms from March to June. 1 to 196 ft.	**Absent.** No suitable habitat is present onsite or adjacent to the Project site for this species. Nearest recent occurrence (Occ. #5) is from 2002 and is approximately 1.5 miles southeast.
Atriplex cordulata var. *cordulata*	Heartscale	1B.2	Chenopod scrub, valley and foothill grassland, meadows, alkaline flats and scalds in the Central Valley. Sandy soils. Found regionally in alkali grassland. Blooms from April to October. 1 to 490 ft.	**Absent.** No suitable habitat is present onsite or adjacent to the Project site for this species. Nearest recent occurrence (Occ. #12) is from 1965 and is approximately 1.5 miles southeast.
Atriplex depressa	Brittlescale	1B.2	Chenopod scrubs, meadows, seeps, playas, and vernal pool in alkaline soils. Blooms from April to October. 1 to 1,050 ft.	**Absent.** No suitable habitat is present onsite or adjacent to the Project site for this species. Nearest recent occurrence (Occ. #14) is from 1965 and is approximately 16 miles southeast.
Atriplex minuscula	Lesser saltscale	1B.1	Chenopod scrub, playas, valley and foothill grassland. In alkali sink and grassland in sandy alkaline soils. Found locally in heavily alkaline grassland, with a white crust of soil salts. Blooms from May to October. 65 to 330 ft.	**Absent.** No suitable habitat is present onsite or adjacent to the Project site for this species. Nearest recent occurrence (Occ. #34) is from 1965 and is approximately 1.5 miles southeast.
Atriplex persistens	Vernal pool smallscale	1B.2	Alkaline vernal pools. Found regionally in northern claypan vernal pool. Blooms from June to October. 30 to 380 ft.	**Absent.** No suitable habitat is present onsite or adjacent to the Project site for this species. Nearest recent occurrence (Occ. #9) is from 1965 and is approximately 2 miles north.
Atriplex subtilis	Subtle orache	1B.2	Valley and foothill grassland. Blooms from June to September (sometimes into October). 130 to 330 ft.	**Absent.** The grasslands present in the study area are disturbed. No suitable habitat is present. Nearest recent occurrence (Occ. #29) is from 1936 and is approximately 9.5 miles east.

Blepharizonia plumosa	Big tarplant	1B.1	Usually in clayey soils in valley and foothill grasslands at elevations ranging from 100 to approximately 1,660 feet. Blooms from July to October.	**Absent.** No suitable habitat is present onsite or adjacent to the Project site for this species. Nearest recent occurrence (Occ. #37) is from 2000 and is approximately 9 miles west.
Caulanthus lemmonii	Lemmon's jewelflower	List 1B.2	Pinyon and juniper woodlands as well as valley and foothill grasslands. Blooms from February to May. 260 to 5,200 ft.	**Absent.** No suitable habitat is present onsite or adjacent to the Project site for this species. Nearest recent occurrence (Occ. #33) is from 1938 and is approximately 9.5 miles northwest.
Chloropyron molle ssp. *hispidium*	Hispid bird's-beak	1B.1	Meadows, playas, valley and foothill grassland. In damp alkaline soils, especially meadows and sinks. Found regionally in a wetland with salt grass. Blooms from June to September. 30 to 510 ft.	**Absent.** No suitable habitat is present onsite or adjacent to the Project site for this species. Nearest recent occurrence (Occ. #19) is from 1986 and is approximately 14 miles south.
Eryngium racemosum	Delta button-celery	SE, 1B.1	Riparian scrub in vernally mesic clay depressions. Blooms from June to October. 10 to 100 ft.	**Absent.** Riparian scrub present in the study area has sandy soils and is frequently flooded with flowing water. Nearest recent occurrence (Occ. #5) is from 1985 and is approximately 1.5 miles southeast.
Eryngium spinosepalum	Spiny-sepaled button-celery	1B.2	Valley and foothill woodlands and vernal pools. Blooms from April to June. 260 to 3,200 ft.	**Absent.** No suitable habitat is present onsite or adjacent to the Project site for this species. Nearest recent occurrence (Occ. #104) is from 2015 and is approximately 8.8 miles southwest.
Eschscholzia rhombipetala	Diamond-petaled poppy	1B.1	Valley and foothill grassland habitat typically on alkaline soils. Blooms from March to April. 0 to 3,300 feet.	**Low.** Grassland habitat within the study area is disturbed and low quality. Species was not observed during rare plant surveys conducted by Stantec in 2019. Nearest occurrence (Occ. #2) is from 1980 and is approximately 9 miles west.
Extriplex joaquinana	San Joaquin spearscale	1B.2	Alkaline environments, chenopod scrub, meadows and seeps, playas, and valley and foothill grasslands. Blooms from April to October. 1 to 2,740 ft.	**Absent.** No suitable habitat is present onsite or adjacent to the Project site for this species. Nearest recent occurrence (Occ. #52) is from 1989 and is approximately 13 miles south.

Lasthenia glabrata ssp. *coulteri*	Coulter's goldfields	1B.1	Coastal salt marshes and swamps, playas, and vernal pools. Blooms from February to June. 1 to 4,000 ft.	**Absent.** No suitable habitat is present onsite or adjacent to the Project site for this species. Nearest recent occurrence (Occ. #93) is from 2004 and is approximately 17 miles south.
Monardella leucocephala	Merced monardella	1A	Valley/foothill grasslands (sandy mesic soils). Blooms from May to August. 115 to 330 ft.	**Absent.** Grassland habitat within the study area is disturbed and poor quality. Species is believed to be extirpated from California. Nearest recent occurrence (Occ. #2) is from 1997 and is approximately 14 miles southeast
Navarretia prostrata	Prostrate vernal pool navarretia	1B.1	Mesic coastal scrub, meadows, seeps, valley/foothill grassland, vernal pools. Blooms from April to June. 50 to 3,940 ft.	**Absent.** No suitable habitat is present onsite or adjacent to the Project site for this species. Nearest recent occurrence (Occ. #25) is from 2002 and is approximately 14 miles south.
Navarretia nigelliformis ssp. *radians*	Shinning navarretia	List 1B.2	Cismontane woodlands, valley and foothill grasslands, and vernal pools. Blooms from April to July, sometimes as early as March. 210 to 3,280 ft.	**Absent.** No suitable habitat is present onsite or adjacent to the Project site for this species. Nearest recent occurrence (Occ. #82) is from 2015 and is approximately 8.5 miles southwest.
Orcuttia inaequalis	San Joaquin Valley Orcutt grass	FT, SE, 1B.1	Vernal pools. Blooms from April to September. 30 to 2,480 ft.	**Absent.** No suitable habitat is present onsite or adjacent to the Project site for this species. Nearest recent occurrence (Occ. #12) is from 1987 and is approximately 18 miles east.
Puccinellia simplex	California alkali grass	1B.2	Chenopod scrub, meadows and seeps, valley and foothill grasslands, and vernal pools. In alkaline and vernally mesic sinks, flats, and lake margins. Blooms from March to May. 1 to 3,050 ft.	**Absent.** No suitable habitat is present onsite or adjacent to the Project site for this species. Nearest recent occurrence (Occ. #38) is from 1935 and is approximately 2.8 miles east.
Sagittaria sanfordii	Sanford's arrowhead	1B.2	Marshes and swamps. In standing or slow-moving freshwater ponds, marshes and ditches. Blooms from May to October, sometimes into November. 0 to 2,000 ft.	**Absent.** The active floodplain of the San Joaquin River does not provide suitable habitat in the study area. Nearest recent occurrence (Occ. #53) is from 1948 and is approximately 9 miles south.

Sphenopholis obtusata	Prairie wedge grass	2B.2	Mesic cismontane woodlands as well as meadows and seeps. Blooms from April to July. 980 to 6,560 ft.	**Absent.** Poor quality habitat is present for this species within the study area. Species is not known to occur within the vicinity of the project. Nearest recent occurrence (Occ. #16) is from 1969 and is approximately 9.5 miles north.
INVERTEBRATES				
Branchinecta conservatio	Conservancy fairy shrimp	FE	Endemic to the grasslands of the northern two-thirds of the central valley; found in large, turbid pools. Regionally inhabits astatic pools located in swales formed by old, braided alluvium, filled by winter/spring rains and lasting until June.	**Absent.** No suitable habitat is present onsite or adjacent to the Project site for this species. Nearest recent occurrence (Occ. #8) is from 1994 and is approximately 12 miles south.
Brachinecta longiantenna	Longhorn fairy shrimp	FE	The habitat characteristics typical of the pools that support the longhorn fairy shrimp are clear to turbid pools often in alkaline soils. These include clear-water depressions in sandstone outcroppings, grass-bottomed pools, and claypan pools.	**Absent.** No suitable habitat is present onsite or adjacent to the Project site for this species. Nearest recent occurrence (Occ. #8) is from 2008 is approximately 9 miles south.
Branchinecta lynchi	Vernal pool fairy shrimp	FT	Endemic to the grasslands of the central valley, central coast mountains and south coast mountains, in astatic rain-filled pools. Regionally inhabits small, clear-water sandstone depression pools and grassed swale, earth slump or basalt-flow depression pools.	**Absent.** No suitable habitat is present onsite or adjacent to the Project site for this species. Nearest recent occurrence (Occ. #799) is from 1998 is approximately 11 miles north.
Desmocerus californicus dimorphus	Valley elderberry longhorn beetle	FT	Occurrences of the VELB are primarily in the vicinity of moist valley oak woodlands associated with riparian corridors in the lower Sacramento River and upper San Joaquin River drainages (U.S. Fish and Wildlife Service, 1984). Elderberry plants are obligate hosts for the VELB, providing a source of food and broodwood.	**Low.** No blue elderberry shrubs were observed within 165 feet from Project site during biological surveys; however, surveys were completed during January when deciduous trees and shrubs were dormant. Nearest recent occurrence (Occ. #47) is from 2006 is approximately 15 miles east.
Lepidurus packardi	Vernal pool tadpole shrimp	FE	Found in seasonally ponded habitats including vernal pools, swales, ephemeral drainages, stock ponds, reservoirs, ditches, and ruts caused from vehicular traffic.	**Absent.** No suitable habitat is present onsite or adjacent to the Project site for this species. Nearest recent occurrence (Occ. #52) is from 2008 is approximately 12 miles south.

FISH				
Hypomesus transpacificus	Delta smelt	FT, SE	Endemic to the upper Sacramento/San Joaquin Delta, it mainly inhabits the freshwater-saltwater mixing zone of the estuary, except during its spawning season, when in moves into freshwater during the early spring months from March until May.	**Absent.** The Project is outside of the species' range. Nearest recent occurrence (Occ. #16) is from 2008 is approximately 38 miles north.
Spirinchus thaleichthys	Longfin smelt	FC, CT, CSC	Occupies a variety of coastal waters including estuaries, bays, and rivers. During breeding, this species spawns in freshwater tributaries near the ocean.	**Absent.** The Project is outside of the species' range.
Oncorhynchus mykiss	Central Valley steelhead	FT	Sacramento and San Joaquin River systems, Sacramento-San Joaquin Delta, and San Francisco Bay	**High**. The species could be found in the vicinity of the Project site seasonally during migration to spawning habitat upstream of the site in the Merced River. Steelhead runs are less likely in the upper portion of the San Joaquin River above the Merced River. Additionally, habitat onsite is not suitable for spawning. Nearest recent occurrence (Occ. #25) is from 2013 is within the San Joaquin River.
Oncorhynchus tshawytscha	Central Valley fall-run Chinook salmon	CSC	Sacramento and San Joaquin River systems, Sacramento-San Joaquin Delta, and San Francisco Bay Preferred spawning grounds for Chinook salmon are in gravel areas of large rivers and tributaries	**High**. This population could be found in the vicinity of the Project site seasonally during migration to spawning habitat upstream of the site in the Merced River; however, Chinook salmon runs are less likely in the upper portion of the San Joaquin River. Aquatic habitat onsite is not suitable for spawning.
Oncorhynchus tshawytscha	Central Valley spring-run Chinook salmon	FT, CT	Sacramento and San Joaquin River systems, Sacramento-San Joaquin Delta, and San Francisco Bay Preferred spawning grounds for chinook salmon are in gravel areas of large rivers and tributaries	**High**. This is an experimental population and could be found in the vicinity of the Project site seasonally during migration to spawning habitat upstream of the site in the Merced River; however, Chinook salmon runs are less likely in the upper portion of the San Joaquin River. Habitat onsite is not suitable for spawning Nearest documented occurrence of the listed

				population is more than 50 miles north of the Project site. Designated as a non-essential experimental population pursuant to Section 10(j) of the FESA. Under 10(j) designation, a non-essential experimental population, both take prohibitions and consultation requirements are relaxed.
Mylopharodon conocephalus	Hardhead	CSC	Low to mid-elevation streams in the Sacramento-San Joaquin drainage.	**Low**. The Project is outside of the current range of the species. Nearest recent occurrence (Occ. #14) is from 2008 is approximately 9 miles north within the Tuolumne River. Species is also found within the Merced River that flows into the San Joaquin River upstream.
Lampetra ayresii	River lamprey	CSC	Need clean, gravelly riffles in permanent streams for spawning, while the ammocoetes require sandy backwaters or stream edges.	**Moderate**. The species could be found in the vicinity of the Project site; however, habitat onsite is not suitable for spawning.
Entosphenus tridentata	Pacific lamprey	CSC	The adults live at least one to two years in the ocean and then return to fresh water to spawn. Require gravel for spawning	**Moderate**. The species could be found in the vicinity of the Project site; however, habitat onsite is not suitable for spawning Nearest documented occurrence is more than 50 miles north of the project site.
Lavinia exilicauda exilicauda	Sacramento hitch	CSC	Hitch are most often found in slow warm water, including lakes and quiet stretches of rivers. Hitch are sometimes found in cool and clear, low-gradient streams, hiding among aquatic vegetation in sandy runs or pools.	**Moderate**. The species could be found in the vicinity of the Project site; however, habitat onsite is not suitable for spawning.
Lavinia symmetricus symmetricus	Central California roach	CSC	Found in small, warm streams, and are well adapted to intermittent waterways. May also be found in the main channels of some larger rivers.	**Low**. The species could be found in the vicinity of the Project site; however, the perennial nature of the river not preferred habitat for the species. Nearest recent occurrence (Occ. #1) is from 1999 is approximately 11 miles southwest within Crow Creek that flows into the San Joaquin River upstream of the Project.

Acipenser medirostris	Green sturgeon – Southern DPS	FT, CSC	Found in near shore marine and estuarine environments from Alaska to Baja California, Mexico. Southern DPS typically occurs south of the Eel River but has been documented in Humboldt Bay.	**Low.** The Project is outside of the species' s known range.
Acipenser transmontanus	White Sturgeon	CSC	Spend most of their time in estuary habitat and migrate up the San Joaquin River to spawn.	**Moderate.** This species has been documented in the San Joaquin River in the vicinity of the Project. Spawning has been documented downstream of the project site.
Pogonichthys macrolepidotus	Sacramento splittail	CSC	Sacramento splittail are freshwater species that are highly tolerant of brackish water. Shallow seasonally flooded vegetation is the preferred spawning substrate for the Sacramento splittail.	**Moderate**. The Project is outside of the species current range. A historic occurrence (Occ. #119) is from 1981 is approximately 2 miles upstream within the San Joaquin River.
AMPHIBIANS				
Ambystoma californiense	California tiger salamander	FT, ST	Needs underground refuges, especially ground squirrel burrows and vernal pools or other seasonal water sources for breeding.	**Absent.** No suitable habitat is present onsite or adjacent to the Project site for this species. Nearest recent occurrence (Occ. #119) is from 1992 is approximately 12 miles north.
Lithobates pipiens	Northern leopard frog	CSC	Inhabits grasslands, wet meadows, bogs, marshes, and reservoirs. Generally, prefers permanent water with abundant aquatic vegetation	**Absent.** No suitable habitat is present onsite or adjacent to the Project site for this species. Nearest recent occurrence (Occ. #6) is from 1976 is approximately 27 miles south.
Rana draytonii	California red-legged frog	FT CSC	Found in marshes, lakes, reservoirs, ponds, slow parts of streams, and other usually permanent water in lowlands, foothill woodlands and grasslands. Require areas with extensive emergent vegetation. High value habitats are deep-water ponds with dense stands of overhanging willows and a fringe of cattails.	**Absent.** No suitable habitat is present onsite or adjacent to the Project site for this species. Nearest recent occurrence (Occ. #61) is from 1993 is approximately 13 miles west.
Spea hammondii	Western spadefoot toad	CSC	Occurs primarily in grassland habitats; can be found in valley foothill hardwood woodlands. Vernal pools are essential for breeding and egg laying.	**Absent.** No suitable habitat is present onsite or adjacent to the Project site for this species. Nearest recent occurrence (Occ. #176) is from 1994 is approximately 8 miles west.

REPTILES				
Emys marmorata	Western pond turtle	CSC	Ponds, marshes, rivers, streams and irrigation ditches with aquatic vegetation. Needs basking sites and suitable upland habitat (sandy banks or grassy open fields) for egg laying.	**Moderate**. Habitat at the San Joaquin River crossing is not optimal habitat for resident western pond turtle; however, the species could disperse up and down river through the Project site. Nearest recent occurrence (Occ. #149) is from 1999 is approximately 4 miles east.
Gambelia sila	Blunt-nosed leopard lizard	FE SE, FP	Resident of sparsely vegetated alkali and desert scrub habitats, in areas of low topographic relief. Seeks cover in mammal burrows, under shrubs or structures.	**Absent.** There is no habitat to support this species on the Project site.
Thamnophis gigas	Giant garter snake	FT, ST	Freshwater marshes and streams. Has adapted to drainage canals and irrigation ditches.	**Low**. There is a lack of vegetated ditches with suitable upland habitat within and adjacent to the Project site. Nearest recent occurrence (Occ. #27) is from 1987 is approximately12 miles south.
BIRDS				
Accipiter cooperii	Cooper's hawk	WL	Breeds in forests and streamside trees where it can hunt its prey by ambush in the dense cover. Has also been known to forage in residential areas.	**Moderate.** This species could nest within trees within and adjacent to the Project site. Occurrences of this species are not typically reported within CNDDB.
Accipiter striatus	Sharp-shinned hawk	WL	Breeds in woodland habitat. Typically forages in areas of dense cover where it can ambush its prey.	**Moderate.** This species could nest within trees within and adjacent to the Project site. Occurrences of this species are not typically reported within CNDDB.
Agelaius tricolor	Tricolored blackbird	CT, CSC	Nesting colony requires open water, protected nesting substrate and foraging area with insect prey within a few km of the colony.	**Low** This species could forage in the vicinity of the Project site, but no nesting habitat occurs within or adjacent to the Project. There are 3 occurrences in the last 20 years within 5 miles of the Project site.

Buteo swainsoni	Swainson's hawk	ST, BCC	Breeds in stands with few trees in juniper-sage flats, riparian areas and in oak savannah. Requires adjacent suitable foraging areas such as grasslands, or alfalfa or grain fields supporting rodent populations.	**High** This species is likely to nest and forage within 0.5-mile of the Project site. There are 8 occurrences in the last 20 years within10 miles of the Project site. An active Swainson's hawk nest was observed along the ditch east of the west HDD work area in 2019 surveys (Stantec, 2019b).
Setophaga petechia	Yellow warbler	CSC, BCC	Usually found in riparian deciduous habitats of cottonwoods, willows, alders, and other small trees and shrubs typical of low, open-canopy riparian woodland. Gleans and hovers in upper canopy of deciduous trees and shrubs, feeding on insects and spiders.	**Moderate**. This species does not commonly nest in the San Joaquin Valley but is likely to occur during migration to nesting habitat in the coastal and sierra foothills. The species prefers riparian cover for nesting. Due to the relatively common nature of this species, occurrences are not typically reported within CNDDB.
Icteria virens	Yellow-breasted chat	CSC	Usually found in riparian deciduous habitats of cottonwoods, willows, alders, and other small trees and shrubs typical of low, open-canopy riparian woodland	**Moderate**. This is not a common San Joaquin Valley nesting bird; however, nesting has been documented along the San Joaquin River and the species prefers riparian cover for nesting. Occurrences of this species are reported within CNDDB.
Pandion haliaetus	Osprey	WL	Uses large trees, snags, and dead-topped trees in open forest habitats for cover and nesting	**Moderate.** This species could nest in trees within and adjacent to the Project site.
Elanus leucurus	White-tailed kite	FP	Rolling foothills / valley margins with scattered oaks and river bottomlands or marshes next to deciduous woodland. Forages over grasslands, marshes, and oak savannas close to isolated, dense-topped trees for nesting and perching.	**Moderate.** This species could nest within trees on and adjacent to the Project site. Due to the relatively common nature of this species, occurrences are not typically reported within CNDDB.
Melospiza melodia	Song sparrow ("Modesto" population)	CSC	Resident of the north-central portion of the Central Valley.	**Low.** This species is known to occur north of Modesto and is unlikely to occur in the vicinity of the Project Occurrences of this species are not typically reported within CNDDB.

Coccyzus americanus occidentalis	Western yellow-billed cuckoo	FT, SE, BCC	During the summer breeding season, it can be rarely found in valley foothill and desert riparian habitats in California. Typically breeds in dense deciduous riparian vegetation.	**Low.** This species could occur in the vicinity of the Project during migration and dispersal but is unlikely to nest within the San Joaquin River at the Project location due to the lack of dense riparian vegetation. Nearest occurrence (Occ. #141) is from 1977 is approximately18 miles downstream on the San Joaquin River.
Lanius ludovicianus	Loggerhead shrike	CSC BCC	Open habitats like prairies and grasslands, with sparse perches	**Moderate.** This species is relatively common in the area and could use the Project area for foraging but is unlikely to nest within or adjacent to Project impact areas. Occurrences of this species are not typically reported within CNDDB.
Phalacrocorax auritus	Double-crested cormorant	WL	Found in a variety of aquatic habitats including coasts, lakes, rivers, and bays. Often nests in trees over water in large colonies but also breeds on sea cliffs and on the ground. The species sensitive listing status is due to its colonial nesting behavior known as “rookeries”. Rookeries are protected	**Low** Species common in the Project Area; however, no suitable nesting habitat present onsite or adjacent to the Project.
Eremophila alpestris actia	California horned lark	WL	Breeds and forages primarily in open habitats including prairies, fields, airports, golf courses and lake flats. Nests are built on the ground in these open habitats.	**Low.** This species is likely to occur in the vicinity of the Project during migration and could nest in the area. The species is likely to be done nesting when Project activities occur. Occurrences of this species are not typically reported within CNDDB.
Baeolophus inornatus	Oak titmouse	BCC	Primarily associated with oak and riparian woodlands.	**High.** This species was observed during January surveys and is likely to nest within large valley oak trees adjacent to the Project site.
Athene cunicularia	burrowing owl	CSC, BCC	Uses burrow sites in open, dry annual or perennial grasslands, deserts and scrublands characterized by low-growing vegetation.	**Moderate.** There are suitable burrows present at the western staging area. No signs of burrowing owl were observed during January surveys. Nearest occurrence (Occ. #588) is from 2003 is approximately 6 miles west.

Circus cyaneus	Northern harrier	CSC	Frequents meadows, grasslands, open rangelands, desert sinks, fresh and saltwater emergent wetlands; seldom found in wooded areas. Nests on ground near marsh edge or grassland. Preys mostly on voles and other small mammals, birds, frogs, small reptiles, crustaceans, insects, and, rarely on fish.	**Moderate.** Agricultural fields adjacent to the staging areas may support both foraging and nesting habitat for this species. The nearest known occurrence (Occ. # 7) of this species is 13 miles south of the Project area.
Vireo bellii pusillus	Least Bell's vireo	FE, SE, CSC	Breeds in low dense growth and occasionally chaparral, woodland edges, or scrub oaks.	**Low** Nearest occurrence (Occ. #318) is from 2009 is approximately12.5 miles downstream on the San Joaquin River. This occurrence is the only occurrence within the last 20 years within 30 miles of the Project. Due to the absence of occurrences for a high breeding site-fidelity species and the lack of suitable riparian scrub habitat onsite, it is unlikely the species will occur onsite.
MAMMALS				
Dipodomys nitratoides exilis	Fresno kangaroo rat	FE, SE	Historically found in grassland and chenopod scrub communities on the San Joaquin Valley floor from the Merced River to the north and Tulare Lake to the south.	**Absent.** No habitat is present at the Project site. The nearest known occurrence is more than 50 miles south of the Project.
Antrozous pallidus	Pallid bat	CSC	Typically inhabits grasslands, shrublands, woodlands, and coniferous forests in open, dry habitats that contain rocky areas for roosting. They are a year-round resident in most of their range and hibernate in winter near their summer roost. Day roosts are usually rock crevices, tree hollows, mines, caves and a variety of human-made structures. Tree roosting occurs in conifer snags, hollows of redwoods, and cavities in oaks.	**Low.** Tree canopy is not suitable at the Project site to support a maternal roost of this species. Nearest occurrence (Occ. #318) from 2009 is approximately 8 miles south along the Merced River.
Lasiurus blossevillii	Western red bat	CSC	Found primarily in cities and forests. Typically roosts in the foliage of trees and bushes.	**Low.** Suitable habitat is present along the San Joaquin River; however, tree canopy is not suitable at the Project site to support a maternal roost of this species. Nearest occurrence (Occ. #80) is from 1999 is approximately

				8 miles south along the Merced River.
Taxidea taxus	American badger	CSC	Most abundant in drier open stages of most shrub, forest and herbaceous habitats, with friable soils. Need sufficient food, friable soils and open, uncultivated ground.	**Low.** An active ground squirrel colony was observed within the western staging area. Healthy ground squirrel colonies provide a prey base for American badger and indicate the presence of friable soil that badgers can burrow into. There was no sign (burrows, tracks, and scat) of badger observed. Nearest occurrence (Occ. #71) is from 1989 is approximately 9 miles west.
Vulpes macrotis mutica	San Joaquin kit fox	FE, ST	Annual grasslands or grassy open stages with scattered shrubby vegetation. Need loose-textured sandy soils for burrowing and suitable prey base.	**Low** Nearest occurrence (Occ. #206) is from 2004 is approximately 9 miles, just west of Interstate 5. Researchers have determined that the SJKF could be extirpated from the valley floor north of Santa Nella. This species or its sign (burrows, tracks, scat) were not observed during field surveys.

1 Status:
FE = Federal Endangered
FT = Federal Threatened
FC = Federal Candidate
SE = California State Endangered
ST = California State Threatened
SC = California State Candidate
FP = CDFW Fully Protected
CSC = California Species of Special Concern
BCC = USFWS Bird of Conservation Concern
CRPR 1B.1 = Threatened in California and elsewhere, seriously threatened in California
CRPR 1B.2 = Threatened in California and elsewhere, moderately threatened in California
CRPR 2B = Plants rare, threatened, or endangered in California but more common elsewhere
CRPR 3 = Plants about which more information is needed
CRPR 4 = Plants of limited distribution

4.8.1 Special-Status Plants

Habitat assessments and surveys for the Project were conducted on January 17 and 23, 2020 outside of the blooming season for most special-status plant species. Focused botanical surveys were conducted by Stantec in the same general area for Phase One of the Project (HDD component) on June 10 and 11, 2019 (Stantec 2019b). No special-status plant species were observed during these surveys and very limited suitable habitat was identified. Based on a lack of suitable habitat for most special-status species within the study area and negative results in the 2019 botanical surveys, no special-status plant species are expected to occur within the Project site.

4.8.2 Special-Status Wildlife

This section includes a discussion of special-status wildlife species that are known to occur or have potential to occur at the Project site based on habitat availability and known locations of species within the vicinity of the Project site. Certain species, such as vernal pool species, listed in Table 4 above, may occur within the quadrangle and/or within five miles of the Project site. Based upon a thorough analyses of the Project site, these species were determined to be absent due to a lack of suitable habitat and, therefore, are not included in this section. Other species may have been eliminated from consideration because the Project site is beyond the recorded geographic and/or elevational range for these species.

4.8.2.1 Pacific lamprey (*Entosphenus tridentatus*)

Pacific lamprey is a California species of concern that is found in nearly all California streams entering the Pacific Ocean, unless blocked by barriers or low flows. The adults often start their spawning migration from the ocean into freshwater in the fall and can be seen moving upstream throughout the winter and early spring except during high water. In some rivers these migrations continue into late spring. Pacific lampreys construct nests for spawning. They dig shallow depressions in stream riffles by moving stones with their suctorial mouth. The eggs are deposited in the crevices of the rocky nest area, after which the adults die. The eggs hatch and the young lampreys burrow into the stream bottom, where they remain in a larval stage for three or four years. During this time, they feed on material they filter from the water and gradually change into miniature adults. At a length of about six inches, they move into the stream and migrate to the ocean (Moyle et al., 2015). Pacific lamprey has the potential of occurring in the San Joaquin River at the Project site during migration but is unlikely to spawn in this area to the lack of suitable habitat. Species spawning season is from March through June, which is before planned in-water construction would occur. See Table 5 for migration and spawning periods for special-status fish species that may occur in the Project area.

Table 5. Migration and Spawning Periods of Special-Status Fish Species within the Project Area

Common Name			Migrating/Spawning Seasons											
Species	**Status**	**Occurrence Migration/ Spawning**	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**
Anadromous Species														
Fall-run Chinook Salmon	SSC	High/None									XXXX	XXXX		
Spring-run Chinook Salmon	SSC/FT	High/None					XXXX	XXXX						
CV Steelhead	SE/FT	High/None		XXXX	XXXX								XXXX	
White Sturgeon	SSC/FT	Moderate/None			XXXX	XXXX	XXXX	XXXX						
River Lamprey	SSC	Moderate/None												
Pacific Lamprey	SSC	Moderate/None			XXXX	XXXX	XXXX	XXXX						
Resident Species														
Sacramento hitch	SSC	Moderate/Low												
Sacramento Splittail	SSC, FT	Moderate/Low	XXXX	XXXX	XXXX									

Status
SE = State Endangered
ST = State Threatened
SSC = California Species of Concern
FE = Federally Endangered
FT = Federally Threatened

XXXX Migration period through Project Site
XXXX Peak migration period
Spawning period
XXXX Peak spawning period
Overlap of migration and spawning periods

4.8.2.2 River lamprey (*Lampetra ayresi*)

River lamprey is a federal and California species of special concern. Habitat requirements of spawning adults and ammocoetes have not been studied in California. Presumably, the adults need clean, gravelly riffles in permanent streams for spawning, while the ammocoetes require sandy backwaters or stream edges in which to bury themselves, where water quality is continuously high and temperatures do not exceed 77°F (25°C). In California, they have been recorded only from the lower Sacramento and San Joaquin rivers and from the Russian River. The river lamprey has become uncommon in California, and it is likely that the populations are declining because the Sacramento, San Joaquin, and Russian rivers and their tributaries have been severely altered by dams, diversions, pollution, and other factors (Moyle et al., 2015). River lamprey has the potential to occur in the San Joaquin River within the study area during migration but is unlikely to spawn in this area due to the lack of suitable habitat. The species spawns from February through May, which is before planned in-water construction would occur (see Table 5).

4.8.2.3 Sacramento splittail (*Pogonichthys macrolepidotus*).

The Sacramento splittail is a federally Threatened species and a California species of special concern. The Sacramento splittail is endemic to lakes and rivers of the Central Valley but can tolerate moderate levels of salinity. The loss of floodplain and wetlands used for spawning, rearing, barriers within the migration areas, and foraging habitat is the primary reason for splittail decline (Goals Project, 2000). High flows and floodplain inundation are key factors in increasing splittail abundance. Sacramento splittail are most common in the brackish waters of Suisun Bay, Suisun Marsh, and the Sacramento-San Joaquin Delta; however, in wet years they occur within San Pablo and San Francisco Bays (Goals Project, 2000). Upstream spawning migration occurs from November through May and spawning occurs from April to July (see Table 5). Preferred spawning substrate consists of freshwater areas that support submerged vegetation within inundated floodplains. Flooded banks and inundated areas used for spawning are also preferred habitat for rearing and foraging. After spawning, most juveniles move downstream into shallow, productive bay and estuarine water in response to increased water flows (Moyle, 2002). Non-breeding splittail are found in temperatures up to 75°F (Young and Cech, 1996); however, juveniles and adults have optimal growth at 68°F, with negative physical responses above 84°F (California Department of Water Resources [CDWR] and U.S. Department of Interior Bureau of Reclamation [USDIBR], 2017; Young and Cech, 1995).

Sacramento splittail spawn primarily downstream of the study area; however, spawning has been documented as far upstream as Salt Slough (25 miles upstream of the study area) where the presence of both adults and juveniles indicated successful spawning (Baxter, 2000). The San Joaquin River at the study area does not support submerged aquatic vegetation and the average water temperature of 76°F during summer months when in-water construction would occur is above the preferred temperature range of the species. Additionally, if the species does spawn upstream of the pipeline crossing, dispersing adults and young would likely have made their emigration downstream before planned in-water construction would occur.

4.8.2.4 Sacramento hitch (*Lavinia exilicauda exilicauda*)

The Sacramento hitch is a California species of special concern. Sacramento hitch are endemic to the Sacramento-San Joaquin River Basin (CDWR and USDIBR, 2017). Hitch occupy warm, low-elevation lakes, sloughs, and slow-moving stretches of rivers and clear, low-gradient

streams. Among native fishes, hitch have the highest temperature tolerances in the Central Valley. They can withstand water temperatures up to 100°F although they prefer temperatures of 81 to 84°F. Hitch also have moderate salinity tolerances and can be found in environments with salinities up to 9 parts per thousand (ppt) (Moyle, 2002). Hitch require clean, smaller gravel and temperatures of 57 to 64°F to spawn. Spawning migrations typically occur when water flows increase during spring, raising water levels in rivers, sloughs, ponds, reservoirs, watershed ditches, and riffles of lake tributaries. Hatching occurs within seven days between 59 to 72°F, and larvae take approximately four days to emerge. Soon after emergence they move into perennial water bodies where they grow within aquatic vegetation before moving into open water. This species could occur in the vicinity of the pipeline crossing throughout the year; however, suitable spawning and/or rearing habitat is not present within the study area.

4.8.2.5 White sturgeon (*Acipenser transmontanus*)

The white sturgeon is a California species of special concern. White sturgeon have a marine distribution spanning from the Gulf of Alaska south to Mexico but a spawning distribution ranging only north of the San Joaquin River (McCabe and Tracy, 1994, and Jackson et al., 2016). Currently, spawning populations are known to occur in the San Joaquin, Sacramento, Fraser, and Columbia Rivers. In California, primary abundance is in the San Francisco Bay, with spawning occurring mainly in the Sacramento and Feather Rivers (Klimley et al., 2015). White sturgeon spend most of their lives in estuaries of large rivers, only moving into freshwater to spawn (Moyle, 2002). Sturgeon migrate upstream when they are ready to spawn in response to flow increases. Male white sturgeon are at least 10 to 12 years old before sexual maturity (Moyle, 2002). Spawning takes place between late February and early June when water temperatures range from 46 to 66 degrees Fahrenheit (Table 5). Telemetry studies have documented adult white sturgeon occurrences as far upstream as Patterson (USFWS, 2015). White sturgeon have been documented spawning on March 20 and May 14, 2012, approximately 10 miles downstream of the study area, near the Grayson Road Bridge (Jackson et al. 2016). This species could be found in the Project area when the water temperatures are cooler; however, the species is unlikely to spawn at the study area and the species is not likely to occur onsite in late summer when construction would occur due to the elevated water temperatures.

4.8.2.6 Chinook salmon (*Oncorhynchus tshawyscha*)

The Chinook salmon is an anadromous species spending most of its adult life in the ocean and then returning to freshwater streams to spawn. They spend 3-6 years maturing in the ocean before they migrate upstream to spawn. Adult Chinook salmon die after spawning. Juveniles spend from several months to over a year rearing in their natal streams before emigrating to the ocean. Preferred spawning grounds for Chinook salmon are in gravel areas of large rivers and tributaries (Goals Project, 2000). Chinook salmon have been separated into 17 distinct groups or evolutionary significant units (ESU) based on similarity in life history, location, and genetic markers. The Central Valley spring-run and fall run ESU's have the potential to occur in and around the study area.

The Central Valley spring-run Chinook salmon is a federally Threatened species and California Threatened species. Central Valley spring-run Chinook salmon migration period occurs from March through July with a peak in May and June. The spawning period is late August through late October. (Goals Project, 2000). The juvenile downstream emergence period is between

November and March with a 3 to 15-month freshwater residency period between November and January (Year-2), concluding with an estuarine emigration period between November and June.

In the San Joaquin River, spring-run Chinook salmon historically spawned as far as Mammoth Pool Reservoir, located on the San Joaquin River northeast of Fresno, where their upstream migration historically was blocked by a natural velocity barrier. The construction of Friant Dam blocked significant spawning habitat between Millerton Lake and Mammoth Pool Reservoir (Yoshiyama et al. 1996; CDWR and USDIBR, 2017). Historically, spring-run Chinook salmon juveniles likely used the San Joaquin River as a migration corridor and a rearing area due to the extensive floodplain habitat present. Based on data collected at the Yolo Bypass and Cosumnes River Floodplain, it is understood that increased growth rate occurs within floodplain habitat due to the abundant invertebrate prey present compared to that of the Sacramento River (Sommer et al. 2001; CDWR and USDIBR, 2017). By the 1950s, the entire run of spring-run Chinook salmon was extirpated from the San Joaquin River (Fry, 1961).

Due to the severely decimated population of Central Valley spring-run Chinook salmon, the San Joaquin River Restoration Program (SJRRP) helped initiate a reintroduction program. Reintroduced individuals are classified as a 10(j) non-essential experimental population under the FESA, which means that the unintentional take of Central Valley spring-run Chinook salmon in the experimental population area that is caused by otherwise lawful activities is excepted from the take prohibitions under section 9 of FESA. Examples of otherwise lawful activities include, but are not limited to, recreation, agriculture, municipal usage, flood control, water management, and other similar activities which are carried out in accordance with Federal, state, and local laws and regulations (NMFS, 2013).

This species is likely to be present within the Project area; however, due to a lack of data on the distribution of the newly reintroduced species, the timing of their potential presence in the study area is unknown.

The Central Valley fall-run Chinook salmon are a California Species of Special Concern. The migration period for fall and late-fall run Chinook salmon is August through April with peaks in September through October and December, respectively. Their spawning period is late September through late April with peaks in late October and early February, respectively (Goals Project, 2000). The juvenile downstream emergence period is between December and June with freshwater residency periods of 4 to 7 months between December and June for fall-run and 7-13 months between April of year 1 and April of year-2 for late fall-run. The residency periods end with an estuarine emigration period between March and July for fall-run and between October and May for late fall-run (Goals Project, 2000).

Fall-run Chinook salmon generally spawn lower in the watersheds than spring-run Chinook salmon (CDFG, 1957). Fall-run Chinook salmon historically spawned in the main stem San Joaquin River upstream from the Merced River confluence near the town of Friant and in the main stem channels of the major tributaries (Yoshiyama et al. 1996). However, currently, they are limited to the Merced, Stanislaus, and Tuolumne Rivers where they spawn and rear downstream from mainstem dams (CDWR and USDIBR, 2017). Since the 1990's, CDFW has installed the Hills Ferry Barrier at the confluence of the Merced River and the San Joaquin River to prevent adult fall-run Chinook salmon from migrating farther up the mainstem of the San Joaquin River. The Hills Ferry Barrier is approximately seven miles upstream of the Project site. Water

temperatures during late summer months when in-water work would occur (July 1- September 30) are too warm for rearing fall run Chinook salmon and potential migrating Chinook are not likely to occur in the vicinity of the study area at the time of construction. The only tributary of the San Joaquin River that offers potential spawning habitat upstream of the study area is the Merced River. Other tributaries to the San Joaquin River, including the Tuolumne, Stanislaus, Calaveras, and Mokelumne Rivers offer potential spawning habitat downstream of the study area which would likely result in lower numbers of Chinook salmon migrating as far upstream as the Project site.

Based on guidance received from resource agency fish specialists in pre-application meetings, the in-water work associated with decommissioning and removal of the pipeline in the low flow channel of the San Joaquin River will occur during the in-water work window (July 1 to September 30). Based on recommendations from the National Marine Fisheries Service (NMFS), in-water construction will be prioritized for occurrence in the earlier part of the work window, and if feasible will be completed prior to September 15 (M. Gutierrez, pers. comm., 2019). This timeframe (July 1-September 15) corresponds to the warmest water temperatures of the year at the Project location and, therefore, the least favorable conditions for fish, particularly salmonids. The mean temperature during that timeframe is 76 degrees Fahrenheit, which is too warm for salmonids such as Chinook due to the reduction of dissolved oxygen (see Table 2 for mean monthly water temperature data near the Project site). Chinook smolts will likely have an avoidance response and will stay upstream of the Project where conditions are cooler and more favorable. Fall run Chinook adults migrating from the ocean will stay in nearshore waters until water temperatures become cooler before they start their journey upstream, typically beginning in October.

4.8.2.7 Central Valley steelhead (*Oncorhynchus mykiss irideus*)

Central Valley steelhead is a federally listed Threatened species. Steelhead have been separated into 14 ESUs. The California Central Valley ESU and the Central California Coast ESU could occur in the vicinity of the Project. Steelhead are an anadromous form of the rainbow trout native to the Pacific Ocean and coastal drainages. Steelhead and rainbow trout did not arise from two distinct evolutionary lines (Behnke, 1992). General factors influencing steelhead abundance include reduction in spawning, incubation, and rearing success due to barriers to passage, diversions, flow fluctuations, sub-optimal water temperature, and sedimentation of spawning habitat. Steelhead live the majority of their life cycle in the Pacific Ocean then migrate upstream to spawn between October and January. Spawning typically occurs between December and April. Steelhead are iteroparous and do not die after spawning and thus may spawn again the following year. Most naturally produced Central Valley steelhead rear in freshwater for 1-3 years before emigrating to the ocean. Steelhead eggs hatch in about 30 days at 51 degrees Fahrenheit (Leitritz and Lewis 1980). Studies of Central Valley steelhead have shown that the population is polymorphic, where two-year-old non-anadromous males are breeding with anadromous females. The polymorphism in the Central Valley population is due to the extreme variation in rainfall and climate which can result in flashfloods and/or droughts lasting years. The species flexibility has allowed it to persist in the Central Valley through the additions of dams and reduction of accessible spawning grounds.

Like Chinook salmon, steelhead were likely more widely distributed within the San Joaquin River and its tributaries but the presence of dams upstream restricted upstream travel. Currently the species is isolated to the San Joaquin River mainstem and/or larger tributaries. However, the mainstem of the river and other low gradient portions of the river provide juvenile rearing, including in the vicinity of the study area. Steelhead will be present in the San Joaquin river system during construction; however, they are unlikely to occur in the study area location during the summer months when in-water work will occur (July 1 to September 30) due high water temperature and low dissolved oxygen. It is likely smolts or non-anadromous individuals would be located upstream of the site where the water temperature is cooler and there is either vegetation, and/or structure for individuals to seek refuge or riffles to provide increased dissolved oxygen. Based on guidance received from resource agency fish specialists in pre-application meetings, the in-water work associated with decommissioning and removal of the pipeline in the low flow channel of the San Joaquin River will occur during the in-water work window (July 1 to September 30). Based on recommendations from the NMFS, in-water construction will be prioritized for occurrence in the earlier part of the work window, and if feasible will be completed prior to September 15 (M. Gutierrez, pers. comm., 2019). This timeframe (July 1-September 15) corresponds to the warmest water temperatures of the year at the Project location and, therefore, the least favorable conditions for fish, particularly salmonids. The mean temperature during that timeframe is 76 degrees Fahrenheit, which is too warm for salmonids such as steelhead due to the reduction of dissolved oxygen (see Table 2 for mean monthly water temperature data near the Project site). Steelhead will likely have an avoidance response and will stay upstream of the Project where conditions are cooler and more favorable. Adults migrating from the ocean will stay in nearshore waters until water temperatures become cooler before they start their journey upstream, typically beginning in October.

4.8.2.8 Western pond turtle (*Emys marmorata*)

Western pond turtle (WPT) is a California species of special concern. The WPT occurs in open water habitats throughout much of California, although at much lower numbers and fewer localities than historical populations, especially in urban areas. WPT prefer slack or slow water habitats with dense stands of submergent or emergent vegetation for food and cover, and with abundant basking habitat. WPT are a semi-aquatic species inhabiting streams, marshes, ponds, and irrigation ditches within woodland, grassland, and open forest communities, but they require upland sites for nesting and over-wintering. Presence of nearby nesting sites and lack of exotic predators are also good habitat components (Bury, 1986). The nearest occurrence (Occ. #149) of WPT is from 1999 and is approximately four miles east of the study area (CDFW, 2020). This species was not observed during surveys conducted for the Project. The WPT could migrate through the study area but habitat onsite is not suitable for year-round residency due to the fast-flowing water and the lack of basking sites.

4.8.2.9 Osprey (*Pandion haliaetus*)

The osprey is on the CDWF Watch List. It occurs throughout California except in the deserts and Great Basin. It nests in large trees, snags, dead-topped trees, and on man-made structures in open forest in northern California from the Cascade Range to Marin County along the coast, and to the southern Sierra Nevada range. Nests are situated near ocean shores, bays, lakes, rivers, and large streams, which are required for foraging, primarily on fish. Osprey will also forage on mammals, birds, reptiles, and amphibians on occasion. Osprey breed from March to September. Suitable foraging habitat is present in the San Joaquin river and suitable nest trees occur within 500 feet of the study area.

4.8.2.10 Northern harrier (*Circus cyaneus*)

The northern harrier is a California Species of Special Concern that inhabits meadows, grasslands, open rangelands, desert sinks, fresh and saltwater emergent wetlands, but is seldom found in wooded areas. It forages mostly on voles and other small mammals, birds, frogs, small reptiles, crustaceans, insects, and, rarely on fish. Breeding occurs between April and September, with peak nesting in June and July (Shuford and Gardali, 2008). Destruction of wetland habitat, native grassland, and wet meadows, and the burning and plowing of nesting areas during early stages of the breeding cycle are major reasons for the decline of this species (Remsen, 1978). A northern harrier was observed foraging within agricultural land immediately south of the San Joaquin River during field surveys. The nearest nesting occurrence (Occ. # 7) of this species is 13 miles south of the study area (CDFW, 2020). Suitable foraging and nesting habitat occurs in the vicinity of the study area.

4.8.2.11 White-tailed kite (*Elanus leucurus*)

The white-tailed kite is a California Fully Protected species. It is a small raptor with a total length of about 12 inches and is often identified from a distance by its hovering or “kiting” behavior while hunting. White-tailed kites predate mostly on voles and other diurnal mammals, but will occasionally prey on birds, insects, reptiles, and amphibians. It typically forages over open grasslands and emergent wetlands. White-tailed kites nest in dense foliage in treetops near grassy foothills, marshes, riparian woodland, savanna, and partially cleared fields. Preferred nesting trees include oak, willow, sycamores, or other tree stands. The white-tailed kite’s range

extends from western California and southwestern Oregon to southeastern Arizona, and along the Gulf Coast from Texas to Florida, and peninsular Florida (Wheeler and Clark, 1995). White-tailed kite were not observed during surveys; however, suitable nesting habitat occurs in the vicinity of the Project site.

4.8.2.12 Cooper's hawk (*Accipiter cooperii*)

Cooper's hawk was formerly a California Species of Special Concern; however, it was downgraded to the CDWF Watch List. This species typically breeds over much of California in forests, open woods, and streamside trees. They use additional habitats for hunting, including chaparral and other scrub communities (Shuford and Gardali, 2008). Cooper's hawks have been known to occur in residential or rural residential areas, where they can feed on passerine birds at bird feeders. Cooper's hawk was not observed during surveys; however, suitable nesting habitat occurs in the vicinity of the study area.

4.8.2.13 Sharp-shinned hawk (*Accipiter striatus*)

The sharp-shinned hawk is on the CDFW Watch List. This species typically builds nests within woodland habitat where they forage on small birds. Sharp-shinned hawks will also occasionally eat small mammals and insects. This species is a fairly common winter visitor and resident along coastal ridges foraging in woodland and semi-open habitats. Sharp-shinned hawk was not observed during surveys; however, suitable nesting habitat occurs in the vicinity of the study area.

4.8.2.14 Yellow warbler (*Setophaga petechia*)

The yellow warbler is a California Species of Special Concern and a Bird of Conservation Concern. This species is a common resident of riparian deciduous habitats of cottonwoods, willows, alders, and other small trees and shrubs typical of low, open-canopy riparian woodland. This bird gleans and hovers in upper canopy of deciduous trees and shrubs, feeding on insects and spiders (Shuford and Gardali, 2008). The breeding season for this species begins in mid-April and extends through early August with peak activity in June (Ficken and Ficken, 1966). This species is not a common San Joaquin Valley nesting bird; however, suitable nesting habitat is present along the San Joaquin River in the vicinity of the study area, and the species was observed within two miles of the site during the nesting season (Sullivan, et al. 2009).

4.8.2.15 Yellow-breasted chat (*Icteria virens*)

The yellow-breasted chat is a California Species of Special Concern. This species typically nests within low-mid elevation riparian streams and rivers of the coast and Sierra Nevada. The species is an uncommon breeder in the San Joaquin Valley but there have been recent nesting pairs recorded along riparian river corridors (Shuford and Gardali, 2008) The yellow-breasted chat inhabits riparian thickets of willow and other brushy tangles near watercourses for cover. The breeding season for this species begins in early May through early August with peak activity in June. Occurrences of the species are not typically recorded in the CNDDB. Riparian habitat at the pipeline removal location is suitable but not optimal.

4.8.2.16 Loggerhead shrike (*Lanius ludovicianus*)

The loggerhead shrike is a California Species of Special Concern and a Bird of Conservation Concern. The loggerhead shrike is a common resident and winter visitor in lowlands

and foothills throughout California. It prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches. Highest density occurs in open-canopied valley foothill hardwood, valley foothill hardwood-conifer, valley foothill riparian, pinyon/juniper, juniper, desert riparian, and Joshua tree habitats. It eats large insects, small birds, mammals, amphibians, reptiles, fish, carrion, and various other invertebrates. It often skewers prey on thorn, sharp twig, wire barb, or forces it into a crotch to feed on or to cache for feeding later. Loggerhead shrike nests are well concealed in shrubs or small trees (Shuford and Gardali, 2008). Suitable nesting habitat is present along the San Joaquin River in the vicinity of the study area and the species was observed within two miles of the study area during the nesting season (Sullivan, et al. 2009).

4.8.2.17 Oak titmouse (*Baeolophus inornatus*)

The oak titmouse is a Bird of Conservation Concern and a common resident of California primarily associated with oak and riparian woodlands. The species ranges from the Mexican border to Humboldt County. It roosts in cavities in trees or snags, and constructs nests in woodpecker holes and natural cavities. It eats insects and spiders, berries, acorns, and some seeds by foraging on twigs, branches, trunks, and occasionally on the ground. This species was observed during surveys in the species' non-breeding season. Suitable nesting habitat is present along the San Joaquin River in the vicinity of the study area and multiple observations of this species were made within two miles of the study area during the nesting season (Sullivan, et al. 2009).

4.8.2.18 Swainson's Hawk (*Buteo swainsoni*)

Swainson's Hawk is a California Threatened species and a Bird of Conservation Concern. This species breeds in open habitats in western North America from Alaska south to Mexico. In California, it breeds mainly in the Central Valley, Klamath Basin, Northeastern Plateau, and Mojave Desert (CDFG, 1994). It winters primarily on the pampas of southern South America, Mexico, though a few overwinter in California, the southwestern U.S., and Florida. It is absent from most of its former range in California, where its population declined by more than 90 percent during the 1900's (CDFG, 1994).

In California, it usually arrives in March and April and leaves in September or October. Loss of habitat is the major threat to this species in California. Residential and commercial development continues to replace Swainson's hawk habitat. Pesticides and herbicides are also a major threat, particularly on their wintering grounds. They are also sensitive to disturbance while nesting and may abandon nests if disturbed before the eggs hatch (CDFG, 2006).

This species forages in grassland or areas of sparse trees or shrubs, and often forages in agricultural areas in the Central Valley. It nests in the scattered trees within these habitats such as those along waterways. During the breeding season, it feeds primarily on small mammals and reptiles. During other seasons, large insects (especially grasshoppers) are the bulk of its diet.

An active Swainson's hawk nest was identified in riparian habitat along the ditch south of the Western Staging Area (and east of the Project's Phase One western HDD entry location) during surveys conducted by Stantec in 2019 for Phase One of the Project (Stantec, 2019b). The San Joaquin River riparian corridor offers plenty of suitable nesting trees for Swainson's hawks and adjacent agricultural land provides optimal foraging grounds. Surveys for decommissioning

and removal of the pipeline were conducted outside of breeding season; however, several previous years raptor nests were observed during surveys and locations recorded.

4.8.2.19 Burrowing owl (*Athene cuniculari*)

The burrowing owl is a California Species of Special Concern and a Bird of Conservation Concern. The burrowing owl is a small (9 to11 inches), long-legged owl that differs from other species of owls by its use of underground burrows and its diurnal activity pattern (Mallette and Gould, 1976). It is distributed from southern British Columbia to Tierra del Fuego in South America and occurs throughout California except in humid northwest coastal forests and high mountains (Zeiner et al., 1990). It's breeding range is dry, open short grass, treeless plains associated with burrowing mammals. Habitat often overlaps with human development, and the species can be found on golf courses, cemeteries, road rights-of-way, airports, vacant lots in residential areas, campuses, and fairgrounds (Haug et al., 1993).

Burrowing owls are semicolonial with five to six pairs per acre. The owls usually enlarge burrows excavated by ground squirrels or other fossorial species, but may excavate their own in soft, friable soils. The owls show a high level of site fidelity, and reuse burrows, but burrows may be used by different pairs in different years. Several burrows may be excavated with one used for nesting, while satellite burrows are used for escape, perching, and observation. They will also use pipes, culverts, debris piles, and nest boxes in areas where burrows are scarce. Burrows are generally surrounded by bare ground or short grass that affords unrestricted views. High perches and elevated areas with clear lines-of-sight, such as mounds, fences, or other structures, are used as for hunting and detecting predators including skunks, badgers, bobcats, coyotes, and barn owls.

The species was formerly common and locally abundant throughout much of California but has been in decline since the 1940's (Remsen, 1978). Reasons for their decline are related to habitat destruction through the conversion of grasslands and pasturelands to other agriculture crops, and the destruction of ground squirrel colonies by poisoning (Remsen, 1978). There is an extensive active ground squirrel colony with over 100 burrows present at the west staging area. No sign of burrowing owl was observed; however, dozens of burrows at this location would be suitable for burrowing owl inhabitation. Aside from the western staging area, very few burrows were observed within or adjacent to the study area. The nearest occurrence of burrowing owl (Occ. #588) from 2003 is approximately six miles west (CDFW, 2020).

4.9 WILDLIFE CORRIDORS

Wildlife migration corridors are generally defined as connections between fragmented habitat patches that allow for physical and genetic exchange between otherwise isolated wildlife populations. Migration corridors may be local, such as those between foraging and nesting or denning areas, or they may be regional in extent. Migration corridors are not unidirectional access routes; however, reference is usually made to source and receiver areas in discussions of wildlife movement networks. "Habitat linkages" are migration corridors that contain contiguous strips of native vegetation between source and receiver areas. Habitat linkages provide cover and forage sufficient for temporary inhabitation by a variety of ground-dwelling animal species. Wildlife migration corridors are essential to the regional fitness of an area as they provide avenues of

genetic exchange and allow animals to access alternative territories as fluctuating dispersal pressures dictate.

The San Joaquin River offers a seasonal and daily migrating corridor for mammals, reptiles, and birds. Mammals and reptiles present along the San Joaquin River likely use the riparian cover as a travel corridor regardless of the season. Birds such as warblers, hummingbirds, etc. migrate to higher elevations in the spring and lower elevations in the fall and the riparian habitat along the San Joaquin River offers shelter, forage, and water for migrating species traversing to the Sierra Nevada Range to nest. Additionally, Central Valley year-round residents make local migrations for foraging and/or nesting habitat along the San Joaquin River.

5.0 REGULATORY SETTING

5.1 FEDERAL

5.1.1 Special-Status Species

The federal Endangered Species Act (FESA), administered by the USFWS and the NMFS (collectively referred hereafter as the "Services"), provides protection to species listed as Threatened (FT) or Endangered (FE), or proposed for listing as Threatened (PFT) or Endangered (PFE). The Services maintain lists of species that are neither formally listed nor proposed but could be listed in the future. These federal candidate species (FC) include taxa for which substantial information on biological vulnerability and potential threats exists and are maintained in order to support the appropriateness of proposing to list the taxa as an endangered or threatened species.

Additionally, the FESA can protect a DPS of a species. The "Distinct Population Segment" is the smallest division of a taxonomic species that can be protected under the FESA. Three elements are considered in determining whether DPS is a factor as endangered or threatened under FESA. These elements are *discreteness* of the population segment in relation to the remainder of the species, the *significance* of the population segment to the species, and the population segment's *conservation status* in relation to FESA's standards for listing. If a DPS is determined to be discrete and significant, its evaluation for endangered or threatened status will be based on FESA's definitions of those terms and a review of the factors included in section 4(a) of the FESA.

With respect to salmonid DPS, the NMFS has developed a policy that applies only to species of salmonids native to the Pacific. Under the policy, Pacific salmon is considered a DPS if it represents an evolutionarily significant unit (ESU) of a biological species (NOAA, 1996). A species must meet two criteria to be considered a separate ESU: it must be substantially reproductively isolated from other conspecific population units; and it must represent an important component in the evolutionary legacy of the species.

Projects that will result in the "take" of a federally listed or proposed species (as defined by FESA Section 9) are required to consult with the Services. The objective of consultation is to determine whether the project will jeopardize the continued existence of a listed or proposed species, and to determine what mitigation measures will be required to avoid jeopardy. Consultations are conducted under Sections 7 or 10 of FESA depending on the involvement by the federal government.

Under Section 7, the Services are authorized to issue Incidental Take Permits (ITP) for the take of a listed species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by the federal agency. A Biological Assessment is usually required as part of the Section 7 consultation to provide sufficient information for the Services to fully determine the project's potential effect on listed species. The Services must make one of three possible findings for each species potentially affected:

No effect: The proposed action will not affect the listed species or critical habitat;

Not likely to adversely affect: Effects of construction on the listed species are expected to be discountable (extremely unlikely to occur), insignificant (minimal impact without take), or beneficial; and

Likely to adversely affect: An adverse effect may occur as a direct or indirect result of the proposed action, and the effect is not discountable, insignificant, or beneficial.

Section 10 consultation is conducted when there is no federal involvement in a project except compliance with FESA.

The USFWS administers the federal Migratory Bird Treaty Act (MBTA) of 1918 (16 USC 703-711) and the Bald Eagle and Golden Eagle Protection Act (16 USC 668-688). The MBTA prevents the removal of trees, shrubs, and other structures containing active nests of migratory bird species that may result in the loss of eggs or nestlings. Adherence to construction windows either before the initiation of breeding activities or after young birds have fledged is a typical step to protect migratory birds and comply with the MBTA. The Bald Eagle and Golden Eagle Protection Act prohibits the taking or possession of bald and golden eagles, their eggs, or their nests without a permit from the USFWS.

5.1.2 Waters and Wetlands

The ACOE and the U.S. Environmental Protection Agency (EPA) regulate the discharge of dredge and fill material into jurisdictional “waters of the United States” (WoUS) and wetlands under Section 404 of the Clean Water Act.

The ACOE is responsible for the issuance of permits for the placement of dredged or fill material into WoUS pursuant to Section 404 of the Clean Water Act (33 USC 1344). As defined by the ACOE at 33 CFR 328.3(a)(3), WoUS are those waters that are used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including waters which are subject to the ebb and flow of the tide; tributaries and impoundments to such waters; interstate waters including interstate wetlands; and, territorial seas.

The ACOE asserts jurisdiction over traditional navigable waters (TNW) and adjacent wetlands. Under ACOE and EPA regulations, wetlands are defined as: “those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.”

In non-tidal waters, the lateral extent of ACOE jurisdiction is determined by the OHWM which is defined as the: “…line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.” (33 CFR 328[e]).

On June 29, 2015, the ACOE and EPA issued new definitions for waters/wetlands (U.S. Army Corps of Engineers and U.S. Environmental Protection Agency, 2015), intended to become effective on August 28, 2015. These regulatory definitions are known as the 2015 Clean Water Rule.

Immediately subsequent to issuance, the 2015 Clean Water Rule (Rule) was challenged in federal courts, and in October 2015, the Sixth Circuit Court of Appeals put a nationwide hold on the new Rule, reverting to the 1987 regulations and subsequent guidance for Approved Jurisdictional Determinations. In 2017, the ACOE and EPA published their intent to "review and rescind or revise" the 2015 Clean Water Rule, and the EPA asked the courts to suspend the case while the Rule was under review. In 2018 the EPA delayed the effective date of the 2015 Clean Water Rule for two years, and the Sixth Circuit Court lifted its stay of the Rule. A federal judge then issued a nationwide injunction on the administrative delay of the Clean Water Rule for failure to comply with the Administrative Procedure Act. Pursuant to the Court order, the 2015 Clean Water Rule remained in effect in 22 states, including California (U.S. Army Corps of Engineers, 2018). On December 11, 2018 the ACOE and EPA proposed a revised definition of waters of the U.S. This proposal was published in the Federal Register and entered a public review period that ended on April 15, 2019. On October 22, 2019, the EPA and Department of the Army published a final rule to repeal the 2015 Clean Water Rule reverting regulation back to the 1987 regulations and subsequent guidance for Approved Jurisdictional Determinations. The final rule became effective on December 23, 2019. On January 23, 2020, the ACOE and EPA finalized the Navigable Waters Protection Rule to define Waters of the U.S. and streamline the definition so that it includes four categories of jurisdictional waters, provides clear exclusions for features not regulated, and defines terms in the regulatory text. The Navigable Waters Protection Rule fulfills Executive Order 13788 and will become effective 60 days after publication in the Federal Register. Once effective, it will replace the rule published on October 22, 2019.

5.1.3 Section 10 of the Rivers and Harbors Act of 1899 (33USC 403)

The ACOE is also responsible for authorizing work affecting navigable WoUS. Structures or work under or over a navigable WoUS is considered to have an impact on the navigable capacity of the waterbody (33 CFR 322.3[a]). The San Joaquin River is identified as a Section 10 waterway.

5.1.4 Section 14 of the Rivers and Harbors Act of 1899 (33USC 408)

The ACOE Civil Works Program is responsible for reviewing all Projects approvals that alter or occupy Civil Works projects. Section 408 provides that the ACOE may grant permission for another party to alter a Civil Works project upon a determination that the alternation proposed will not be injurious to the public interest and will not impair the usefulness of the Civil Works project. There are federal levees both east and west of the San Joaquin River (identified as ACOE West Levee and ACOE East Levee in Figures 2 through 6). A Section 408 review and permission is required for Phase One of the Project (HDD) but will not be required for Phase Two of the Project (decommissioning and removal) because the pipeline will be abandoned in place in the federal levees.

5.2 STATE

5.2.1 Special-Status Species

The CDFW administers a number of laws and programs designed to protect the state's fish and wildlife resources. Principal of these is the California Endangered Species Act of 1984 (CESA) (Fish and Game Code Section 2050), which regulates the listing and take of state

endangered (SE) and threatened species (ST). Under Section 2081 of CESA, CDFW may authorize an incidental take permit allowing the otherwise unlawful take of a SE or ST species.

CDFW maintains lists of Candidate-Endangered species (SCE) and Candidate-Threatened species (SCT). These candidate species are afforded the same level of protection as listed species. CDFW designates Species of Special Concern (SSC) that are species of limited distribution, declining populations, diminishing habitat, or unusual scientific, recreational, or educational value. These species do not have the same legal protection as listed species but may be added to official lists in the future. The SSC list is intended by CDFW as a management tool for consideration in future land use decisions.

Other state laws also protect wildlife and plants. Section 3511 of the California Fish and Game Code (F&G Code), for example, designates species that are afforded "Fully Protected" (FP) status. F&G Code Sections 4700 and 5515 assign the same status to specified mammals and fish. These statutes generally provide that specifically identified birds, mammals, and fish "or parts thereof may not be taken or possessed at any time and no provision of [the Fish and Game] code or any other law shall be construed to authorize the issuance of permits or licenses to take any fully protected [bird, mammal, or fish] and no permits or licenses heretofore issued shall have any force or effect" for any such purpose. For fully protected fish and mammals, the only exception to the take prohibition is that the Fish and Game Commission may authorize the collecting of such species "for necessary scientific research" (F&G Code, Sections 4700, 5515). With a proper permit, fully protected species may also be captured live and relocated "for the protection of livestock" (Section 3511). Section 3503.5 protects birds-of-prey (Falconiformes and Strigiformes), their eggs, and their nests. That statute provides that, "[I]t is unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto."

CDFW manages the California Native Plant Protection Act (CNPPA) of 1977 (F&G Code Section 1900, et seq.), which was enacted to identify, designate and protect rare plants. In accordance with CDFW guidelines, all California Rare Plant Rank (CRPR) 1 (A and B), Rank 2 (A and B), Rank 3, and some Rank 4 plants are considered "rare" under the Act, and meet the definition of Rare or Endangered under the CEQA Guidelines §15125 and/or §15380. Potential impacts to these species are considered during CEQA review of a proposed project. The CNPPA allows landowners, under most circumstances involving new development, to take rare plant species, provided that the owners first notify CDFW and give the agency at least 10 days to come and retrieve (and presumably replant) the plants before they are plowed under or otherwise destroyed (F&G Code Section 1913 exempts from "take" prohibition "the removal of endangered or rare native plants from a canal, lateral ditch, building site, or road, or other right of way").

5.2.2 Waters and Wetlands

Pursuant to Section 1602 of the Fish and Game Code, a Lake or Streambed Alteration Agreement (LSAA) between the CDFW and state or local governmental agency, public utility, or private citizen is required before the initiation of a construction project that will: (1) divert, obstruct, or change the natural flow or the bed, channel, or bank of a river, stream, or lake; (2) use materials from a streambed; or (3) result in the disposal or deposition of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into a river, stream, or lake.

Therefore, the CDFW claims jurisdiction over the bed, bank, and channel of drainage features with regard to activities regulated under Section 1602 of the California Fish and Game Code. The CDFW has adopted the same wetland definition as the USFWS, classified by the presence of only one parameter; however, CDFW does not specifically regulate wetlands.

The Porter-Cologne Water Quality Control Act (CA Water Code §§ 13000-13999.10) mandates that waters of the State of California shall be protected. Current policy in California is that activities that may affect waters of the State shall be regulated to attain the highest quality. Waters of the State include any surface water or groundwater, including saline waters, within the boundaries of the state. The Porter-Cologne Act establishes that the state assumes responsibility for implementing portions of the federal CWA, rather than operating separate state and Federal water pollution control programs in California. Consequently, the state is involved in activities such as setting water quality standards, issuing discharge permits, and operating grant programs. Pursuant to Section 401 of the Clean Water Act, the ACOE cannot issue a federal permit until the State of California first issues a water quality certification to ensure that a project will comply with state water quality standards. The authority to issue water quality certifications in the Project area is vested with the Central Valley Regional Water Quality Control Board (CVRWQCB).

In April 2019, the State Water Resources Control Board adopted the State Wetland Definition and Procedures for Discharges of Dredged or Fill Material (Procedures), for inclusion in the Water Quality Control Plan for Inland Surface Waters and Enclosed Bays and Estuaries and Ocean Waters of California. The Procedures consist of four major elements: 1) a wetland definition; 2) wetland delineation procedures; 3) a wetland jurisdictional framework; and 4) procedures for the submittal, review and approval of applications for Water Quality Certifications and Waste Discharge Requirements for dredge or fill activities. The Procedures were recently approved by the Office of Administrative Law. The Procedures will be implemented and will apply to all applications for discharge of dredged or fill material to waters of the state nine months after final approval by the Office of Administrative Law. The Procedures will take effect in May 2020.

5.3 LOCAL AND REGIONAL PLANS

5.3.1 Stanislaus County General Plan

The unincorporated lands of Stanislaus County fall under the jurisdiction of the County. The Conservation and Open Space Elements of the Stanislaus County General Plan contain goals and policies pertaining to biological resources of Stanislaus County (Stanislaus County, 2016). Goals and policies that are relevant to biological resources are included in this Section. Implementing Measures relevant to the Project are also included.

5.3.1.1 Goals: Encourage the protection and preservation of natural and scenic areas throughout the County.

Policy 1: Maintain the natural environment in areas dedicated as parks and open space.

Policy 2: Assure compatibility between natural areas and development.

IM -2. Review all development requests to ensure that sensitive areas (e.g., riparian habitats, vernal pools, rare plants) are left undisturbed or that mitigation measures

acceptable to appropriate state and federal agencies are included in the project. **Responsible Departments**: *Public Works, Planning, Planning Commission, Board of Supervisors*

Policy 3: Areas of sensitive wildlife habitat and plant life (e.g., vernal pools, riparian habitats, flyways and other waterfowl habitats, etc.) including those habitats and plant species listed by state or federal agencies shall be protected from development and/or disturbance.

IM-1. Review all development requests to ensure that sensitive areas (e.g., riparian habitats, vernal pools, rare plants, flyways, etc.) are left undisturbed or that mitigation measures acceptable to appropriate state and federal agencies are included in the project. **Responsible Departments**: *Planning, Planning Commission, Board of Supervisors capacity and aesthetics, consistent with state law.*

IM -2 In known sensitive areas, the State Department of Fish and Wildlife shall be notified as required by the California Native Plant Protection Act; the U.S. Fish and Wildlife Service also shall be notified. **Responsible Department**: *Planning*

IM -3. All discretionary projects that will potentially impact riparian habitat and/or vernal pools or other sensitive areas shall include mitigation measures for protecting that habitat. **Responsible Departments**: *Planning, Planning Commission, Board of Supervisors.*

Policy 4: Protect and enhance oak woodlands and other native hardwood habitat.

IM -1. Require all discretionary projects that will potentially impact oak woodlands and other native hardwood habitat, including but not limited to hardwood rangelands identified by the California Department of Forestry and Fire Protection, to include a management plan for the protection and enhancement of oak woodlands and other native hardwood habitat. **Responsible Departments**: *Planning, Planning Commission, Board of Supervisors*

IM -2. Consider adoption of a tree protection ordinance to promote conservation of native trees or trees with historic significance. **Responsible Departments**: *Planning, Planning Commission, Board of Supervisors*

5.3.1.2 Goal 2: Conserve water resources and protect water quality in the County.

Policy 6: Preserve natural vegetation to protect waterways from bank erosion and siltation.

IM -1. Development proposals and mining activities including, or in the vicinity of, waterways and/or wetlands shall be closely reviewed to ensure that destruction of riparian habitat and vegetation is minimized. This shall include referral to the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, State Department of Fish and Wildlife, and the State Department of Conservation. **Responsible Departments**: *Public Works, Planning, Planning Commission, Board of Supervisors*

5.3.1.3 Goal 10: Protect fish and wildlife species of the County.

Policy 29: Habitats of rare and endangered fish and wildlife species, including special status wildlife and plants, shall be protected.

IM -1. The County shall utilize the California Environmental Quality Act (CEQA) process to ensure that development does not occur that would be detrimental to fish, plant life, or wildlife species. **Responsible Departments**: *Planning, Planning Commission, Board of Supervisors*

IM -2. The County shall utilize the California State Department of Fish and Wildlife's California Natural Diversity Data Base and the California's Native Plant Society plant lists as the primary sources of information on special status wildlife and plants. **Responsible Department**: *Planning*

IM -3 In known sensitive areas, the State Department of Fish and Wildlife shall be notified as required by the California Native Plant Protection Act; the U.S. Fish and Wildlife Service also shall be notified. **Responsible Department**: *Planning*

6.0 SIGNIFICANCE CRITERIA

The impact of the Project on biological resources was evaluated in terms of mandatory findings of significance at Section 15065 of CEQA and Appendix G of the State CEQA Guidelines (Governor's Office of Planning and Research, 2018). The various components of the Project were considered in association with site conditions and were evaluated against CEQA criteria and County General Plan policies pertaining to biological issues. In accordance with these CEQA Guidelines, a project will normally result in a significant impact if any of the following conditions would result from project implementation:

- 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 CDFW, USFWS, or NMFS;
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulation, or by the CDFW, USFWS, or NMFS;
- 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;
- 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 site;
- Conflict with any local polices or ordinances protecting biological resources, such as a tree preservation policy or ordinance; and,
- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

Additionally, the CEQA Guidelines Initial Study Land Use and Planning checklist notes that conflicts with applicable land use plans, policies, or regulations of an agency with jurisdiction over the project should be considered during a project's environmental review.

7.0 PROJECT IMPACT ANALYSIS

Effects on biological resources at the Project site will be entirely temporary. There will be a temporary loss of potential fish and wildlife habitat during decommissioning and removal of the pipeline. General construction will temporarily alter the natural movement and behavior of wildlife in the area of the Project. Construction may also result in indirect impacts that affect the quality of habitat on the Project site and in the Project area. Potential indirect impacts include invasion of non-native plants into natural areas, noise disturbances, and temporary declines in air and water quality during construction.

7.1 IMPACT CATEGORIES

Short-term and long-term impacts are analyzed for the proposed Project. Each impact statement is classified as to the level of significance, based on the significance thresholds from Section 6.0, and the availability of measures to feasibly mitigate project effects. Impact categories include:

- **Significant Unavoidable Impact** is an adverse effect that cannot be mitigated. This category of impact is one for which a solution has not been formulated, either because of the limits of technical and/or scientific knowledge, or unfeasibility from a technical, economic, and/or political perspective. Under CEQA, a Significant Unavoidable impact would require a “finding of overriding consideration” by the Lead Agency to approve the project;
- **Significant Mitigable Impact** is an adverse environmental effect that can be mitigated to less than significant levels. Measures have been identified that can feasibly be implemented and will avoid the impact altogether by not taking a certain action or parts of an action; minimize impacts by limiting the degree or magnitude of the action and its implementation; rectify the impact by repairing, rehabilitating, or restoring the affected environment; or compensate for the impact by replacing or providing substitute resources or environments;
- **Less than Significant Impact** is an adverse environmental effect that is less than significant or has no identified impact. These impacts, while adverse, are not of a sufficient magnitude, intensity, or duration to disrupt the environment, and have no serious consequences. As a result, no mitigation is required; and
- **Beneficial Impacts** is an environment effect of the project that benefits or improves the environment and no mitigation is required.

7.2 IMPACTS TO BIOLOGICAL RESOURCES

Effects on biological resources include primarily temporary impacts associated with pipeline excavation for pigging and flushing of the existing pipeline, installation of concrete slurry into sections of pipeline designated to be retired in place, and excavation and removal of segments of pipeline designated for removal. There will be no permeant impact to habitat as part of the Project. Temporary impacts associated with the Project include habitat disturbance, localized turbidity, and tree removal. Indirect impacts include invasion of non-native plants into natural areas, noise disturbances, and temporary declines in air and water quality.

PG&E has an agency approved Habitat Conservation Plan (HCP) that provides a comprehensive framework for conserving sensitive habitats for protected species for PG&E Operations and Maintenance (O&M) activities in the San Joaquin Valley (Jones & Stokes, 2006). The PG&E San Joaquin Valley Habitat Conservation Plan (SJVHCP) was developed in collaboration with the USFWS and CDFW and was implemented in 2008. Special-status species-related impacts of the Project cannot be entirely covered by the SJVHCP because listed fish species that occur in the San Joaquin River at the Project site are not covered by the HCP and the need to conduct in-water work for successful completion of the Project will have the potential to impact those non-covered fish species. However, for consistency with the agency-approved PG&E SJVHCP, Avoidance and Minimization Measures (AMMs) outlined for species protection in the SJVHCP will be implemented by this Project to avoid and minimize impacts to special-status species that are covered by the SJVHCP. Consistent with implementation practices of the SJVHCP, AMM 1 through AMM 11 are implemented, where practicable, for all PG&E O&M Projects. These measures are considered to be practicable where physically possible and not conflicting with other regulatory obligations or safety considerations (Jones & Stokes, 2006). AMM 1 through AMM 11 from the PG&E SJVHCP will be implemented as part of the Project. Additional relevant species-specific AMMs from the SJVHCP are also included as part of the Project and are described individually below. The implementation of these measures was considered when analyzing the potential impacts of the Project and are outlined in Table 6.

Table 6. PG&E SJVHCP Avoidance and Minimization Measures 1 through 11 to be Implemented as part of the Project

Measure No.	Measure Description	Applicability for R-687 Project
AMM 1	Employees and contractors performing PG&E O&M activities will receive ongoing environmental education. Training will include review of environmental laws and guidelines that must be followed by all personnel to reduce or avoid effects on covered species during O&M activities.	Applicable
AMM 2	Vehicles and equipment will be parked on pavement, existing roads, and previously disturbed areas to the extent practicable.	Applicable
AMM 3	The development of new access and ROW roads by PG&E will be minimized and clearing vegetation and blading for temporary vehicle access will be avoided to the extent practicable.	N/A – No permanent new access roads will be necessary
AMM 4	Vehicles will not exceed a speed limit of 15 mph in the ROWs or on unpaved roads within sensitive land-cover types.	Applicable
AMM 5	Trash dumping, firearms, open fires (such as barbecues) not required by the PG&E O&M activity, hunting, and pets	Applicable

Measure No.	Measure Description	Applicability for R-687 Project
	(except for safety in remote locations) will be prohibited in O&M work activity sites.	
AMM 6	No vehicles will be refueled within 100 feet of a wetland, stream, or other waterway unless a bermed and lined refueling area is constructed.	Applicable
AMM 7	During any reconstruction of existing overhead electric facilities in areas with a high risk of wildlife electrocution (e.g., nut/fruit orchards, riparian corridors, areas along canal or creek banks, PG&E's raptor concentration zone [RCZ]), PG&E will use insulated jumper wires and bird/animal guards for equipment insulator bushings or will construct lines to conform to the latest revision of PG&E's Bird and Wildlife Protection Standards.	N/A – no overhead electrical work involved
AMM 8	During fire season in designated State Responsibility Areas (SRAs), all motorized equipment will have federal or state approved spark arrestors; a backpack pump filled with water and a shovel will be carried on all vehicles; and fire-resistant mats and/or windscreens will be used when welding. In addition, during fire "red flag" conditions as determined by California Department of Forestry (CDF), welding will be curtailed, each fuel truck will carry a large fire extinguisher with a minimum rating of 40 B:C, and all equipment parking and storage areas will be cleared of all flammable materials.	Applicable
AMM 9	Erosion control measures will be implemented where necessary to reduce erosion and sedimentation in wetlands, waters of the United States, and waters of the state, and habitat occupied by covered animal and plant species when PG&E O&M activities are the source of potential erosion problems.	Applicable

Measure No.	Measure Description	Applicability for R-687 Project
AMM 10	If an activity disturbs more than 0.25 acre in a grassland, and the landowner approves or it is within PG&E rights and standard practices, the area should be returned to pre-existing conditions and broadcast-seeded using a commercial seed mix. Seed mixtures/straw used for erosion control on projects of all sizes within grasslands will be certified weed-free. PG&E shall not broadcast-seed (or apply in other manner) any commercial seed or seed-mix to disturbance sites within other natural land-cover types, within any vernal pool community, or within occupied habitat for any plant covered-species.	Applicable
AMM 11	When routine PG&E O&M activities are conducted in an area of potential VELB habitat, a qualified individual will survey for the presence of elderberry plants within a minimum of 20 feet from the worksite. If elderberry plants have one or more stems measuring 1 inch or more in diameter at ground level are present, the qualified individual will flag those areas to avoid or minimize potential impacts on elderberry plants. If impacts (pruning/trimming, removal, ground disturbance or damage) are unavoidable or occur, then additional measures identified in the VELB conservation plan and compliance brochure will be implemented. The VELB compliance brochure must be carried in all vehicles performing PG&E O&M activities within the potential range of VELB.	Applicable

Note: When working in areas of natural vegetation, these avoidance and minimization measures (AMMs) will be implemented where practicable. SJVHCP AMM 1 through AMM 11 will be implemented for all PG&E O&M Activities.

The following analysis provides an assessment of potential impacts from the proposed Project components and includes the PG&E SJVHCP AMMs, Project-specific applicant proposed AMMs, and/or prescribed mitigation measures to reduce impacts to special-status species or other biological resources to a level of less than significant.

IMPACT BIO-1: The in-water portion of the decommissioning and removal of the R-687 pipeline crossing could impact special-status fish species if present at the Project site during construction. Construction will temporarily increase turbidity to the aquatic environment surrounding the pipeline removal location. Increases in turbidity can result in physical effects that adversely affect habitat and temporary suspension of sediments, organic matter, or contaminated constituents contained within the sediments could be introduced into the water column. Large-scale increases of organic matter within a water column, usually associated with fine sediments, such as silts and clays, can increase dissolved nutrient concentrations, resulting in increased algal blooms or decrease dissolved oxygen when the suspended sediments are anoxic or have a high chemical oxygen demand.

In-water work could temporarily deter fish movement in the area and preclude fish use of the river at the pipeline removal location for a short period of time.

PROJECT-SPECIFIC APPLICANT PROPOSED AMMs: The applicant has proposed Project-specific AMMs to reduce the potential for impact to special-status fish species and has incorporated them into the Project design. The following measures will be implemented during construction activities involving work in or on the banks of the San Joaquin River.

- An environmental training program will be developed and presented by a qualified biologist. All contractors and employees involved with the Project will be required to attend the training program. At a minimum the program will cover special-status species that could occur on the site, their distribution, identification characteristics, sensitivity to human activities, legal protection, penalties for violation of state and federal laws, reporting requirements, and required Project avoidance, minimization, and mitigation measures.
- Construction activities in surface water or on the banks of the San Joaquin River will be conducted within the agency approved aquatic work windows for avoidance of listed fish species (July 1 – September 30). This coincides with the timeframe when the aquatic work area is least likely to support listed fish species, specifically salmonids. At the recommendation of NMFS, in-water construction will be prioritized for occurrence in the earlier part of the work window, and if feasible, will be completed prior to September 15.
- A qualified biological monitor will be present to monitor project activities during all in-water work and initial ground disturbance that has the potential to impact special-status species.
- A Turbidity Monitoring Plan will be implemented during all in-water work to ensure that turbidity levels upstream and downstream of the Project site is compliant with regulatory requirements.

BIO-1 IMPACT CATEGORY: Less than Significant with implementation of Applicant Proposed AMMs.

IMPACT BIO-2: Construction activities within and adjacent to the San Joaquin River could potentially impact aquatic special-status species such as WPT.

DISCUSSION: Based on the review of pertinent literature, the proximity to known occurrences, and site surveys, WPT have a moderate potential to occur within the San Joaquin River at the Project site. The species is unlikely to be a year-round resident as the site offers limited terrestrial and/or basking habitat; however, there are WPT occurrences from within the San Joaquin River in the general region, so movement up and downstream through the Project site is possible. The nearest occurrence (Occ. #149) of WPT is from 1999 and is approximately four miles east of the Project site in an irrigation ditch, not within the San Joaquin River (CDFW, 2020).

SJVHCP SPECIES-SPECIFIC AMM-17: Consistent with the PG&E SJVHCP, the following measure will be implemented for construction activities within and adjacent to

the San Joaquin River for protection of WPT and to reduce Project impacts to less than significant levels:

SJVHCP AMM-17: If suitable habitat for covered amphibians and reptiles is present and protocol-level surveys have not been conducted, a qualified biologist will conduct preconstruction surveys prior to PG&E O&M activities involving excavation. If necessary, barrier fencing will be constructed around the worksite to prevent reentry by the covered amphibians and reptiles. A qualified biologist will stake and flag an exclusion zone of 50 feet around the potentially occupied habitat. No monofilament plastic will be used for erosion control in the vicinity of special-status amphibians and reptiles. Barrier fencing will be removed upon completion of work. Crews will also inspect trenches left open for more than 24 hours for trapped amphibians and reptiles. A qualified biologist will be contacted before trapped amphibians or reptiles (excluding blunt nosed leopard lizard and limestone salamander) are moved to nearby suitable habitat.

BIO-2 IMPACT CATEGORY: Less than Significant with implementation of SJVHCP AMM-17.

IMPACT BIO-3: Ground-clearing, equipment staging, and construction activities could impact nesting burrowing owl.

DISCUSSION: The burrowing owl, a California Species of Special Concern and USFWS Bird of Conservation Concern, may occur in the Project vicinity. There is a large active ground squirrel colony within the western staging area that could provide potential nesting or non-breeding burrow habitat for burrowing owls. Adjacent agricultural land also provides suitable foraging habitat. No sign of burrowing owl was observed during surveys conducted in January 2020 and the nearest recorded occurrence is approximately six miles west of the Project site (CDFW, 2020).

Due to the presence of suitable burrows and known occurrences of burrowing owl in the area, there is the potential that construction or staging of equipment at this location could disrupt nesting activities if burrowing owls occur.

SJVHCP SPECIES-SPECIFIC AMM-18. Consistent with the PG&E SJVHCP, the following measure is required to reduce Project impacts to nesting occurrences of raptors and other special-status bird species to less than significant levels:

SJVHCP AMM-18: If western burrowing owls are present at the site, a qualified biologist will work with PG&E O&M staff to determine whether an exclusion zone of 160 feet during the non-nesting season and 250 feet during the nesting season can be established. If it cannot, an experienced burrowing owl biologist will develop a site-specific plan (i.e., a plan that considers the type and extent of the proposed activity, the duration and timing of the activity, the sensitivity and habituation of the owls, and the dissimilarity of the proposed activity with background activities) to minimize the potential to affect the reproductive success of the owls.

BIO-3 IMPACT CATEGORY: Less than Significant with implementation of SJVHCP AMM-18.

IMPACT BIO-4: Ground-clearing and construction activities could impact nesting Swainson's hawk or white-tailed kite.

DISCUSSION: The state-threatened Swainson's hawk and CDFW fully protected white-tailed kite occurs in the Project vicinity and could nest in proximity to construction areas. There are two Swainson's hawk nesting occurrences within 0.5-mile of the Project site and two more within 1 mile of the site. Additionally, an active Swainson's hawk nest was identified along the ditch south of the Western Staging Area (and east of the Project's Phase One western HDD entry location) during surveys conducted by Stantec in 2019 for Phase One of the Project (Stantec, 2019b). Swainson's hawks generally forage within 10 miles of their nest tree, and more commonly within five miles; however, because the proposed Project is temporary in nature there would be no loss in foraging habitat. Due to the relatively common nature of this species, occurrences are not typically reported within CNDDB; however, this species could nest in proximity to the site because of the presence of suitable nesting habitat.

Because Swainson's hawk is a state-listed species and white-tailed kite is a fully protected species, and there are known nesting occurrences in the vicinity of the Project site, there is the potential that construction in proximity to Swainson's hawk and/or white-tailed kite nests could disrupt breeding activities. The following mitigation measure would reduce impacts to nesting Swainson's hawk or white-tailed kite resulting from Project construction.

SJVHCP SPECIES-SPECIFIC AMM-19. Consistent with the PG&E SJVHCP, the following measures are required to reduce Project impacts to nesting occurrences of Swainson's hawk or white-tailed kite to less than significant levels:

SJVHCP AMM-19: If a Swainson's hawk nest or white-tailed kite nest is known to be within 0.25 mile of a planned worksite, a qualified biologist will evaluate the effects of the planned PG&E O&M activity. If the biologist determines that the activity would disrupt nesting, a buffer and limited operation period (LOP) during the nesting season (March 15-June 30) will be implemented. Evaluations will be performed in consultation with the local CDFW representative.

BIO-4 IMPACT CATEGORY: Less than Significant with implementation of SJVHCP AMM-19.

IMPACT BIO-5. Tree removal or ground-clearing activities could impact bird species protected under the Migratory Bird Treaty Act (MBTA) or raptors or other special-status bird species such as northern harrier, white-tailed kite, osprey, Cooper's hawk, and sharp-shinned hawk.

DISCUSSION: There are trees present throughout the biological study area that could provide nesting habitat for bird species protected by the MBTA or raptors and other special-status bird species. Tree removal or ground-clearing activities could potentially impact nesting birds that are protected under the federal MBTA of 1918 (16 USC 703-711) and Fish and Game codes (Sections 3503, 3503.5, and 3800). The laws and regulations prohibit the take, possession, or destruction of birds, their nests, or eggs. Disturbance that causes nest abandonment and/or loss of reproductive effort could be considered a "take".

SJVHCP SPECIES-SPECIFIC AMM-22: Consistent with the PG&E SJVHCP, the following measures are required to reduce Project impacts to nesting occurrences of raptors and MBTA protected bird species to less than significant levels:

SJVHCP AMM-22: All vegetation management activities will implement the nest protection program to avoid and minimize effects on Swainson's hawk, white-tailed kite, golden eagle, bald eagle, and other nesting birds. Additionally, trained pre-inspectors will use current data from CDFW and CNDDB and professional judgment to determine whether active Swainson's hawk, golden eagle, or bald eagle nests are located near proposed work. If pre-inspectors identify an active nest near a proposed work area, they will prescribe measures to avoid nest abandonment and other adverse effects to these species, including working the line another time of year, maintaining a 500-foot setback, or if the line is in need of emergency pruning, contacting the HCP Administrator.

BIO-5 IMPACT CATEGORY: Less than Significant with implementation of SJVHCP AMM-22.

IMPACT BIO-6: The Project will result in temporary impacts to aquatic resources (waters of the U.S. and wetlands) regulated by the ACOE under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. The Project will also result in temporary impacts to aquatic resources regulated by the Central Valley RWQCB under Section 401 of the Clean Water Act and CDFW under Section 1600 of the California Fish and Game Code.

DISCUSSION: Preliminary Aquatic Resource Delineations have been conducted for the Project to determine the geographic extent of federal and state regulatory jurisdiction (Padre, 2020). A total of 4.17 acres of temporary impact to federally jurisdictional waters and wetlands will occur as a result of the equipment access necessary and excavation for removal of segments of the decommissioned pipeline at the San Joaquin River crossing location. A total of 4.17 acres of waters of the State and 5.43 acres of CDFW stream features will also be temporarily impacted by the Project. Figure 5 depicts temporary impacts to federally jurisdictional waters and wetlands and Figure 6 depicts temporary impacts to state jurisdictional aquatic resources.

BIO-6 IMPACT CATEGORY: Potentially Significant Impact with Mitigation Required.

RECOMMENDED MITIGATION MEASURE – BIO-6:

- PG&E shall obtain all necessary permits for impacts to jurisdictional aquatic resources from the ACOE, CVRWQCB, and CDFW prior to Project implementation. The Project must comply with all permit conditions. Compensatory mitigation must be consistent with the regulatory agency standards pertaining to mitigation type, location, and ratios. PG&E has a Master Streambed Alteration Agreement with CDFW for PG&E O&M Projects in the SJVHCP Plan Area. If determined to be appropriate, this may be used to cover streambed impacts associated with the Project.
- Standard best management practices, such as the use of silt fencing and straw wattle, will be implemented within the disturbed area on each Project site to minimize erosion, increased turbidity, and sedimentation to the San Joaquin River or associated jurisdictional wetlands.

- After decommissioning and removal activities are complete, the Project site and all disturbed areas will be seeded or hydroseeded with a native seed mix appropriate for the region. Restoration within agricultural lands will involve seeding or other restoration consistent with landowner right-of-way agreements.

IMPACT BIO-7: Construction of the Project will result in the removal of riparian habitat on the San Joaquin River.

DISCUSSION: An approximately 100-foot wide corridor within the active floodplain of the San Joaquin River will need to be cleared of vegetation for equipment access and removal of the decommissioned pipeline at the river crossing location. This will involve removal of riparian habitat, primarily consisting of willow and cottonwood trees. No oak trees are planned for removal.

Stanislaus County does not have a tree ordinance; however, the Stanislaus County General Plan has a policy that provides for protection and management of riparian habitat. Specifically, Policy 3, Implementing Measure 3 (IM-3) states that all discretionary Projects that will impact riparian habitat shall include mitigation measure for protecting the habitat.

BIO-7 IMPACT CATEGORY: Potentially Significant Impact with Mitigation Required.

RECOMMENDED MITIGATION MEASURE – BIO-9: The following recommended mitigation measures would further reduce Project impacts from riparian habitat removal at the Project site:

- A Site Restoration Plan will be developed that will include the replacement of riparian habitat removed for completion of the Project.

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8.2 PERSONAL COMMUNICATIONS

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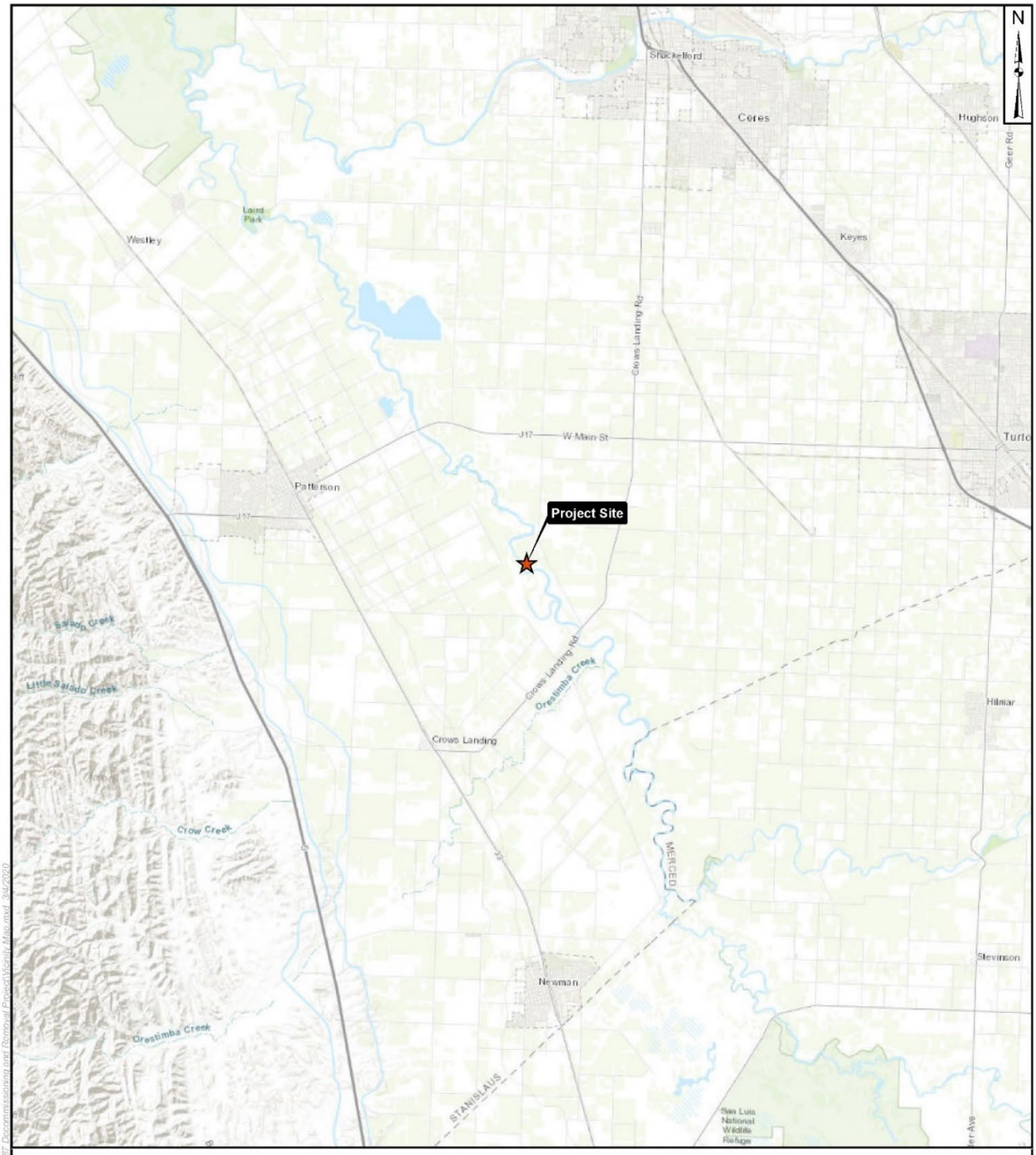
FIGURES



LEGEND:

★ Project Site Location

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MILES

Source: Esri Online Topo Basemap
Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
Notes: This map was created for informational and display purposes only.

padre associates, inc.
ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS

PROJECT NAME:
PG&E R-687 L-215 SAN JOAQUIN RIVER CROSSING REPLACEMENT PROJECT, PHASE 2
STANISLAUS COUNTY, CA

PROJECT NUMBER: 1902-3511

DATE: March 2020

VICINITY MAP

FIGURE 1

Z:\GIS Projects\GIS Maps\Map Projects\PG&E R-687 Decommissioning and Removal Project\Visio\ Mapmod_3/6/2020



LEGEND:

- Existing Pipeline to Remain as Customer Connection
- Existing Pipeline to be Decommissioned (Phase One)
- Replacement Pipeline Crossing (Phase One)
- Existing Pipeline to be Decommissioned (Phase Two)
- Horizontal Directional Drilling Work Area (Phase One)

0 500 1,000
FEET

Source: Esri Online Imagery Basemap, Stantec 2019, Longitude123 2020
Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
Notes: This map was created for informational and display purposes only.

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ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS

PROJECT NAME:
PG&E R-687 L-215 SAN JOAQUIN RIVER CROSSING REPLACEMENT PROJECT, PHASE 2
STANISLAUS COUNTY, CA

PROJECT NUMBER: 1902-3511

DATE: March 2020

PROJECT OVERVIEW

FIGURE 2

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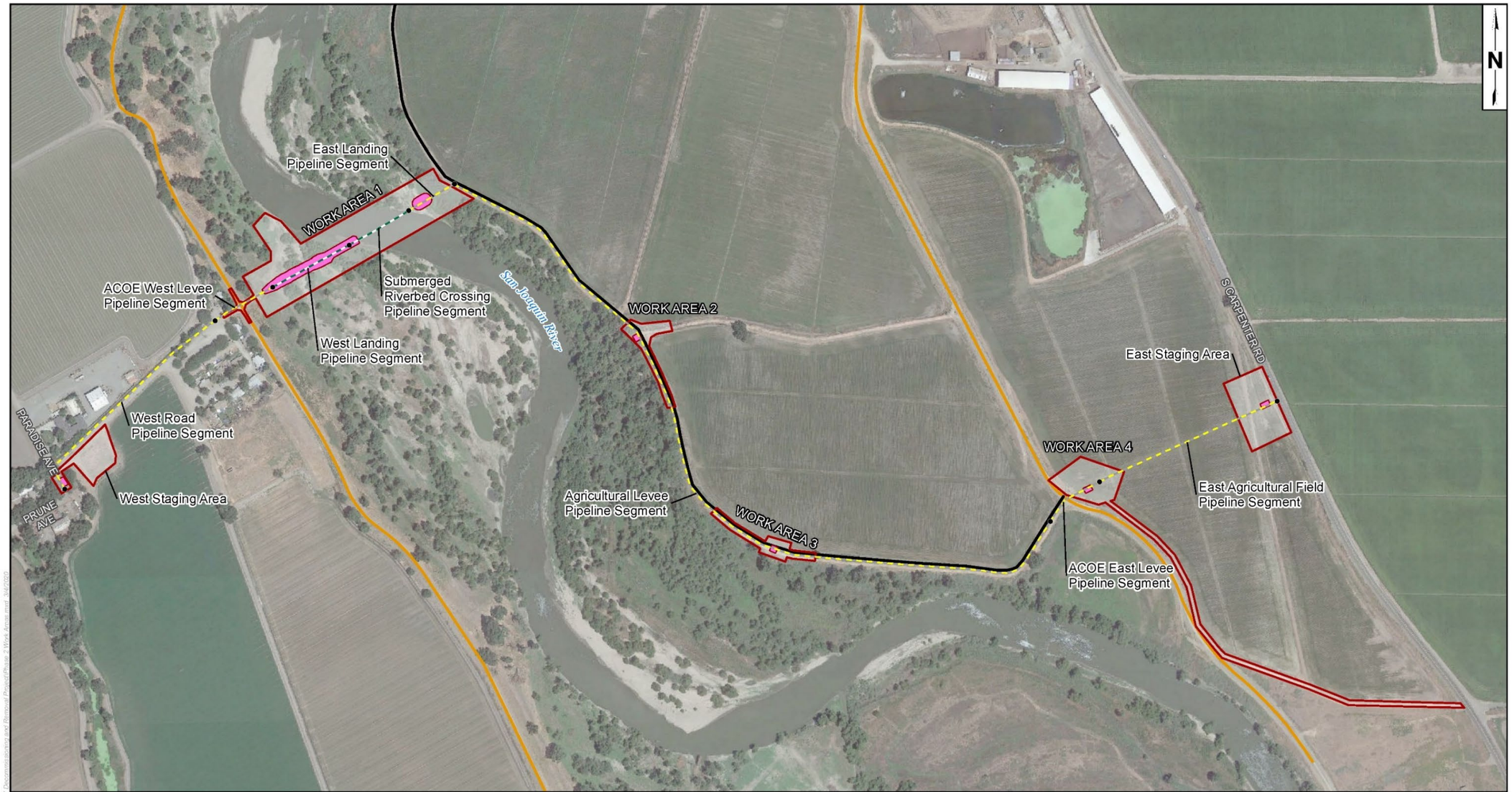
N
East Landing
Pipeline Segment
WORK AREA 1
ACOE West Levee
Pipeline Segment
Submerged
Riverbed Crossing
Pipeline Segment
West Landing
Pipeline Segment
San Joaquin River
WORK AREA 2
S CARPENTER RD
East Staging Area
PARADISE AVE
West Road
Pipeline Segment
WORK AREA 4
East Agricultural Field
Pipeline Segment
PRUNE AVE
West Staging Area
Agricultural Levee
Pipeline Segment
WORK AREA 3
ACOE East Levee
Pipeline Segment
LEGEND:
Pipe Segment Boundary
12-in Pipeline - Cement Filled and Abandonded in Place
12-in Pipeline Removed in Entirety
ACOE Levee
Agricultural Levee
Temporary Impact (Staging or Work) Area
Excavation Footprint
0
200
400
FEET
Source: Esri Online Imagery Basemap, Stantec 2019, Longitude123 2020
Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
Notes: This map was created for informational and display purposes only.
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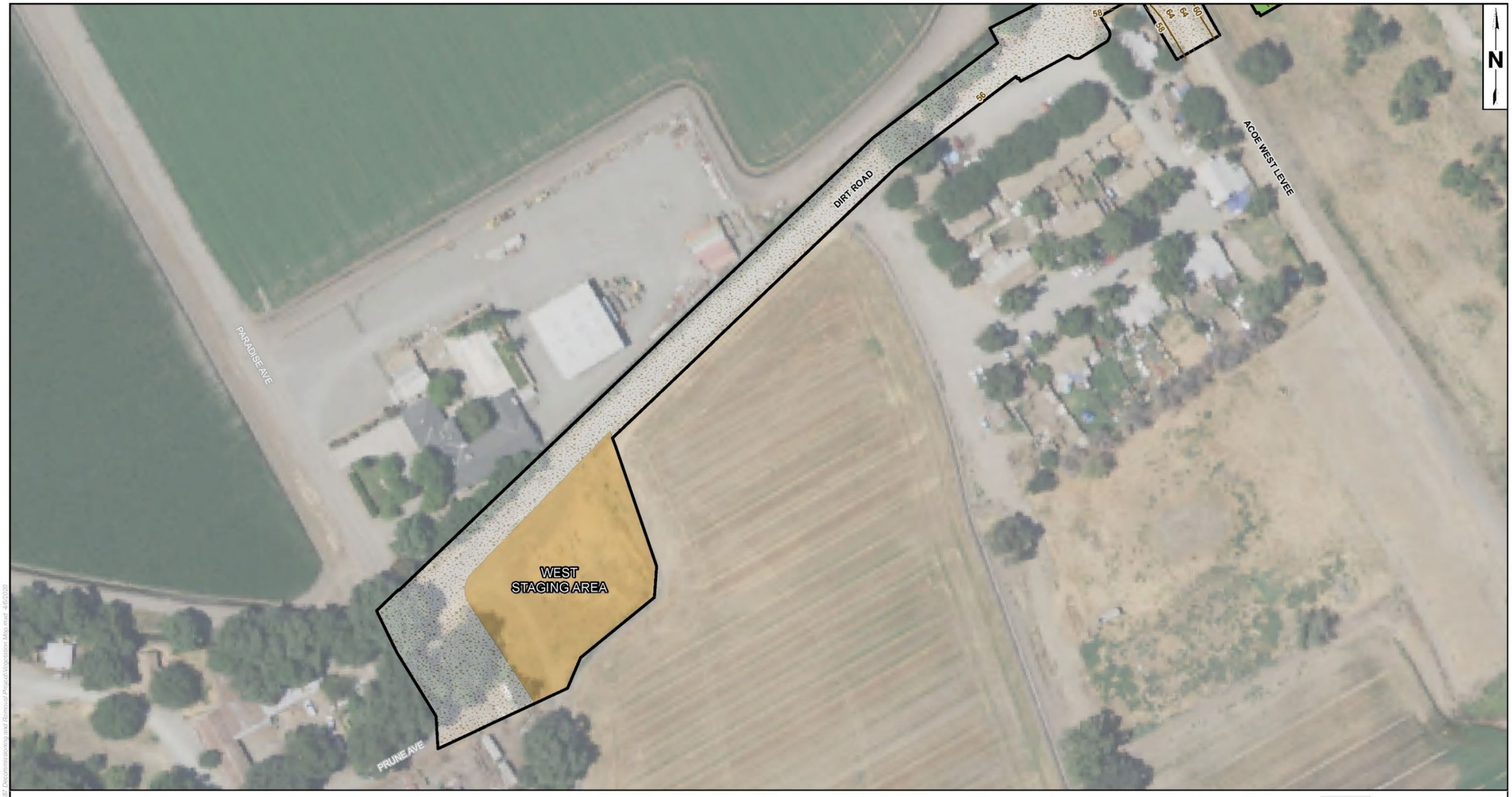
PROJECT NAME:
PG&E R-687 L-215 SAN JOAQUIN RIVER CROSSING REPLACEMENT PROJECT, PHASE 2
STANISLAUS COUNTY, CA
PROJECT NUMBER:
1902-3511
DATE:
March 2020
PHASE 2 WORK AREAS
FIGURE
3



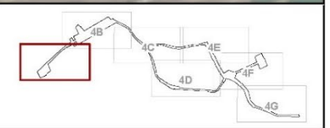
LEGEND:

- Contour Line (5 ft)
- Contour Line (1 ft)
- Study Area Boundary

Vegetation Communities

- Great Valley Mixed Riparian Forest
- Non-Native Grassland
- Ruderal / Disturbed

MAP EXTENT:



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Source: NAIP Imagery 2018, Stantec 2019, Longitude123 2020
Coordinate System: NAD 1983 CORS96 StatePlane California III FIPS 0403 Ft US
Notes: This map was created for informational and display purposes only.

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ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS

PROJECT NAME: PG&E R-687 L-215 SAN JOAQUIN RIVER CROSSING REPLACEMENT PROJECT, PHASE 2
STANISLAUS COUNTY, CA

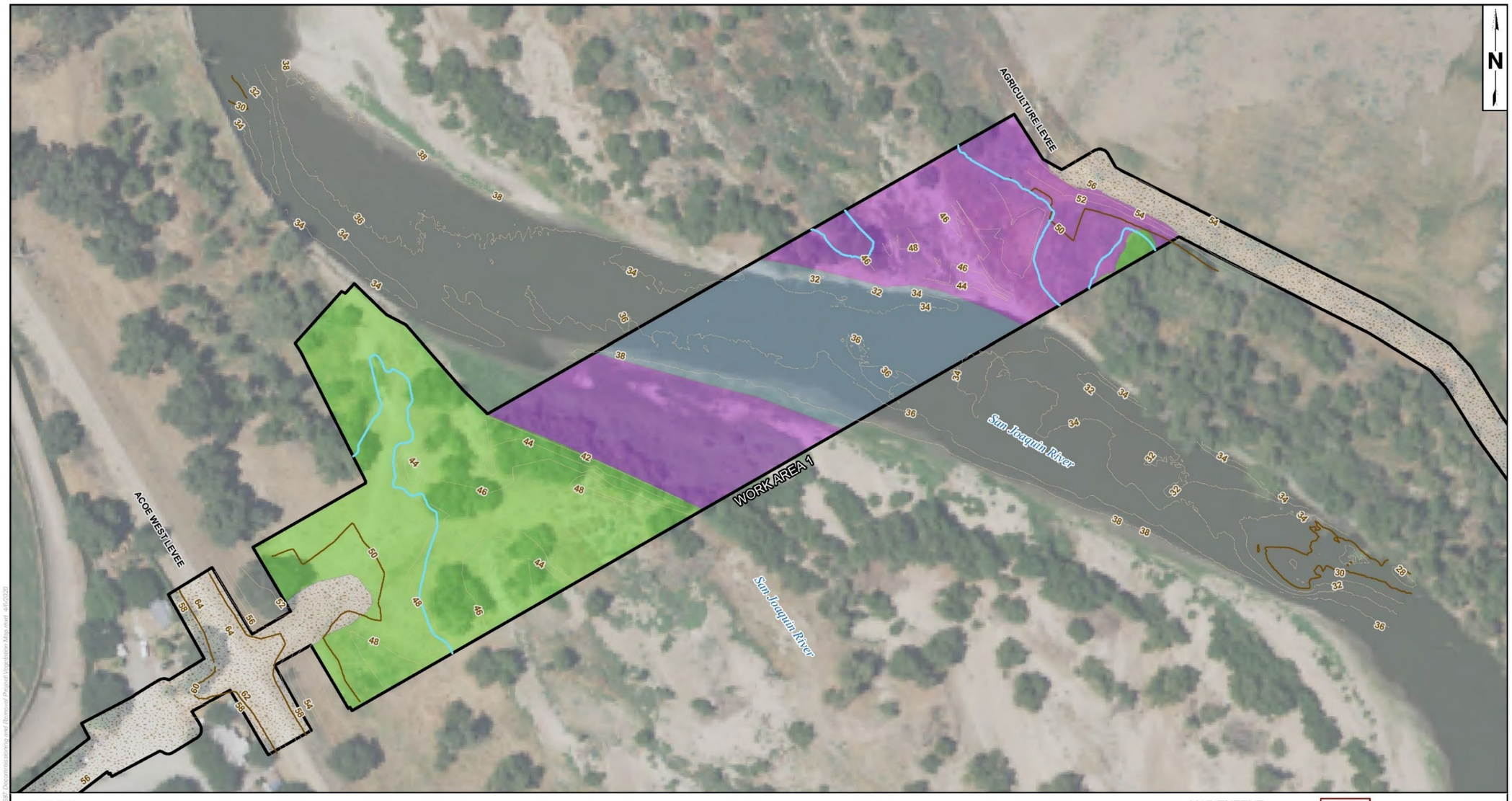
PROJECT NUMBER: 1902-3511

DATE: April 2020

VEGETATION MAP

FIGURE 4A

Z:\GIS Projects\GIS Maps\Map Project\PG&E R-687 Decommissioning and Removal Project\Vegetation Map.mxd 4/6/2020



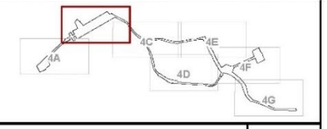
LEGEND:

- Ordinary High Water Mark
- Contour Line (5 ft)
- Contour Line (1 ft)
- Study Area Boundary

Vegetation Communities

- Great Valley Mixed Riparian Forest
- Great Valley Willow Scrub
- Riverine
- Ruderal / Disturbed

MAP EXTENT:



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FEET

Source: NAIP Imagery 2018, Stantec 2019, Longitude123 2020
Coordinate System: NAD 1983 CORS96 StatePlane California III FIPS 0403 Ft US
Notes: This map was created for informational and display purposes only.

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ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS

PROJECT NAME: PG&E R-687 L-215 SAN JOAQUIN RIVER CROSSING REPLACEMENT PROJECT, PHASE 2
STANISLAUS COUNTY, CA

PROJECT NUMBER: 1902-3511

DATE: April 2020

VEGETATION MAP

FIGURE 4B

Z:\GIS Projects\GIS Map Files\PG&E R-687 Decommissioning and Removal Project\Vegetation Map.mxd 4/6/2020



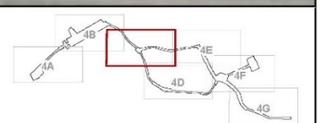
LEGEND:

- Contour Line (5 ft)
- Contour Line (1 ft)
- Study Area Boundary

Vegetation Communities

- Agriculture
- Great Valley Mixed Riparian Forest
- Ruderal / Disturbed

MAP EXTENT:



0 50 100
FEET

Source: NAIP Imagery 2018, Stantec 2019, Longitude123 2020
Coordinate System: NAD 1983 CORS96 StatePlane California III FIPS 0403 Ft US
Notes: This map was created for informational and display purposes only.

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PROJECT NAME: PG&E R-687 L-215 SAN JOAQUIN RIVER CROSSING REPLACEMENT PROJECT, PHASE 2
STANISLAUS COUNTY, CA

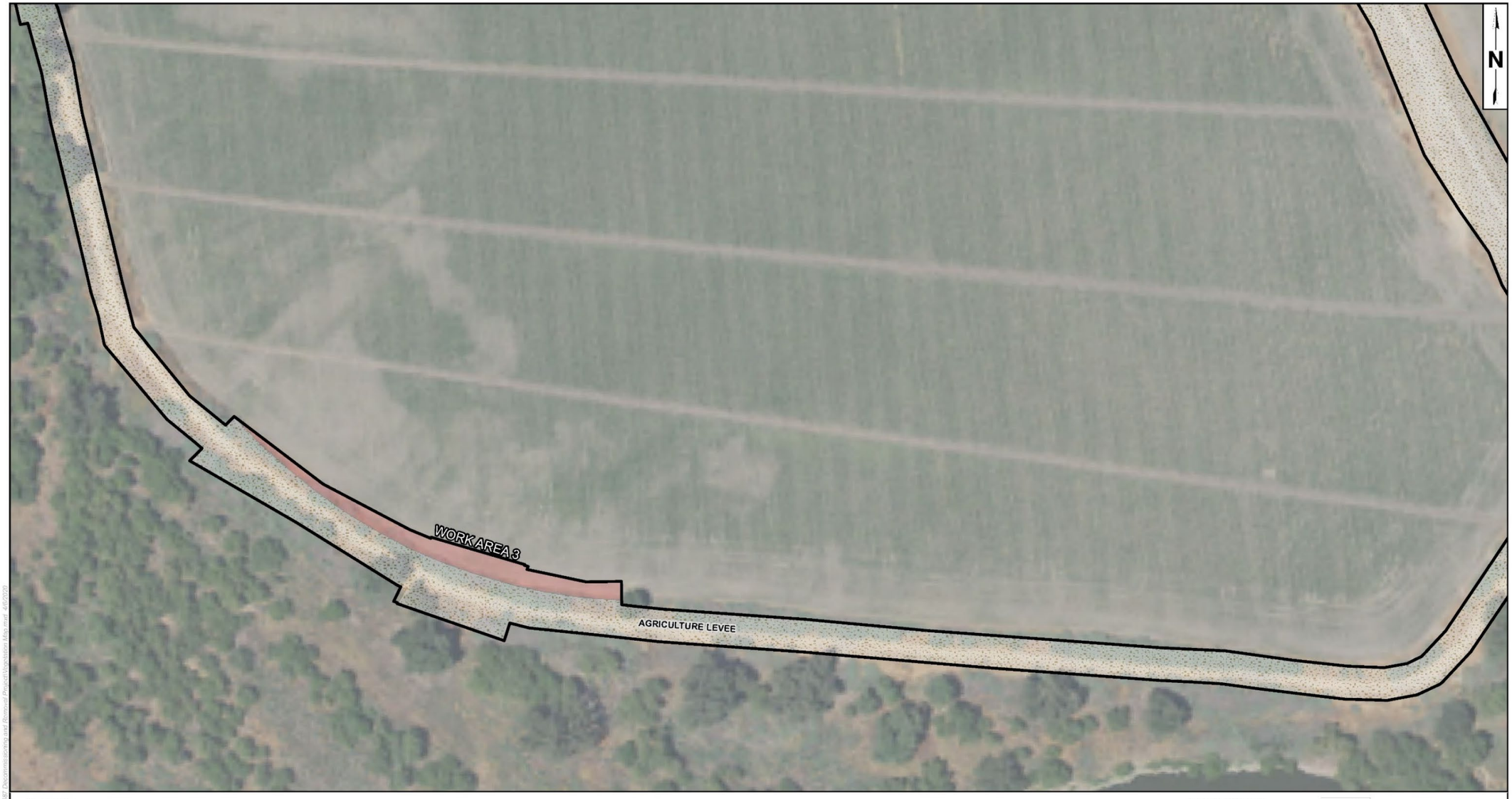
PROJECT NUMBER: 1902-3511

DATE: April 2020

VEGETATION MAP

FIGURE 4C

P:\GIS Projects\PG&E Valley Projects\PGE R-687 Crossing Lyr Replace Project\Mapping\Layout\Fig4C.mxd



LEGEND:

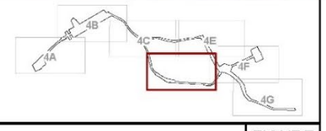
Study Area Boundary

Vegetation Communities

Agriculture

Ruderal / Disturbed

MAP EXTENT:



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FEET

Source: NAIP Imagery 2018, Stantec 2019, Longitude123 2020
Coordinate System: NAD 1983 CORS96 StatePlane California III FIPS 0403 Ft US
Notes: This map was created for informational and display purposes only.

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PROJECT NAME: PG&E R-687 L-215 SAN JOAQUIN RIVER CROSSING REPLACEMENT PROJECT, PHASE 2
STANISLAUS COUNTY, CA

PROJECT NUMBER: 1902-3511

DATE: April 2020

VEGETATION MAP

FIGURE 4D

Z:\GIS Projects\GIS Maps\Maps Project\PG&E R687 Decommissioning and Removal Project\Vegetation Map.mxd 4/6/2020



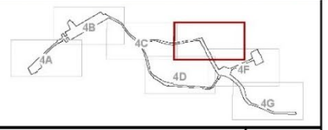
LEGEND:

Study Area Boundary

Vegetation Communities

Ruderal / Disturbed

MAP EXTENT:



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FEET

Source: NAIP Imagery 2018, Stantec 2019, Longitude123 2020
Coordinate System: NAD 1983 CORS96 StatePlane California III FIPS 0403 Ft US
Notes: This map was created for informational and display purposes only.

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PROJECT NAME:
PG&E R-687 L-215 SAN JOAQUIN RIVER CROSSING REPLACEMENT PROJECT, PHASE 2
STANISLAUS COUNTY, CA

PROJECT NUMBER: 1902-3511

DATE: April 2020

VEGETATION MAP

FIGURE 4E

Z:\GIS Projects\GIS Maps\Map Projects\PG&E R-687 Decommissioning and Removal Project\Vegetation Map.mxd 4/6/2020



LEGEND:

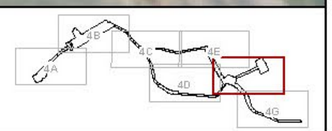
Study Area Boundary

Vegetation Communities

Agriculture

Ruderal / Disturbed

MAP EXTENT:



0 50 100

FEET

Source: NAIP Imagery 2018, Station 2019, Longitude123 2020
Coordinate System: NAD 1983 CORS96 StatePlane California III FIPS 0403 Ft US
Notes: This map was created for informational and display purposes only.

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PROJECT NAME:
PG&E R-687 L-215 SAN JOAQUIN RIVER CROSSING REPLACEMENT PROJECT, PHASE 2
STANISLAUS COUNTY, CA

PROJECT NUMBER: 1902-3511

DATE: April 2020

VEGETATION MAP

FIGURE 4F

E:\GIS Projects\GIS Maps\Map Projects\PG&E R-687 Documentation and Planning Project\Projects Maps.mxd 4/6/2020



LEGEND:

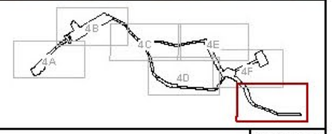
Study Area Boundary

Vegetation Communities

Agriculture

Ruderal / Disturbed

MAP EXTENT:



0 50 100

FEET

Source: NAIP Imagery 2016, Station 2014, Longitude 123 2020
Coordinate System: NAD 1983 CORS96 StatePlane California III FIPS 0403 Ft US
Notes: This map was created for informational and display purposes only.

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PROJECT NAME:
PG&E R-687 L-215 SAN JOAQUIN RIVER CROSSING REPLACEMENT PROJECT, PHASE 2
STANISLAUS COUNTY, CA

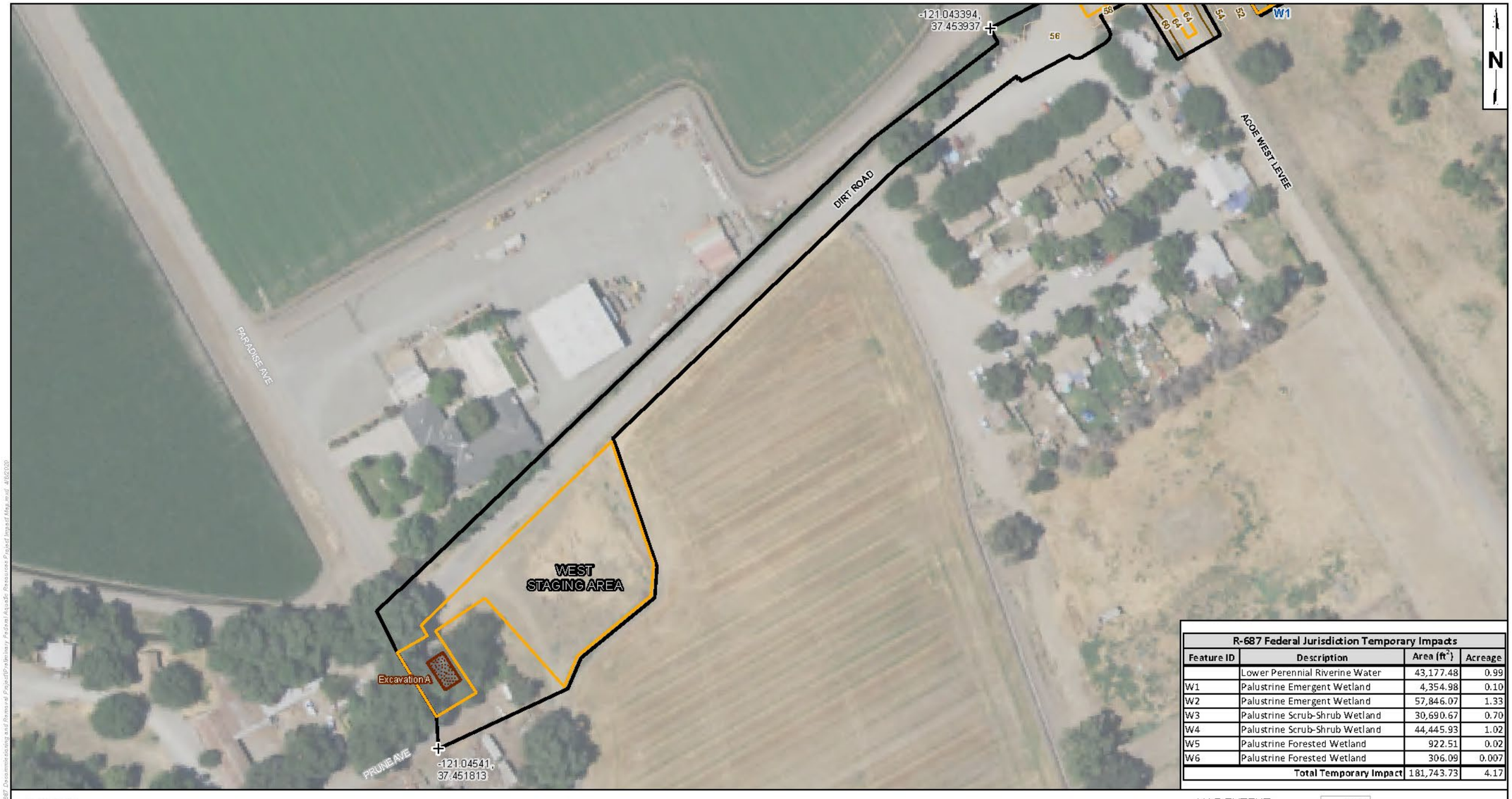
PROJECT NUMBER: 1902-3511

DATE: April 2020

VEGETATION MAP

FIGURE 4G

Z:\GIS Projects\GIS Maps\Maps Projects\PG&E R-687 Decommissioning and Removal Project\Vegs\5x5\Veg_Map.mxd 4/6/2020



R-687 Federal Jurisdiction Temporary Impacts			
Feature ID	Description	Area (ft^2)	Acreage
	Lower Perennial Riverine Water	43,177.48	0.99
W1	Palustrine Emergent Wetland	4,354.98	0.10
W2	Palustrine Emergent Wetland	57,846.07	1.33
W3	Palustrine Scrub-Shrub Wetland	30,690.67	0.70
W4	Palustrine Scrub-Shrub Wetland	44,445.93	1.02
W5	Palustrine Forested Wetland	922.51	0.02
W6	Palustrine Forested Wetland	306.09	0.007
	Total Temporary Impact	181,743.73	4.17

LEGEND:

- Control Point
- Upland Sample Plot Location
- Wetland Sample Plot Location
- Ordinary High Water Mark
- Total Excavation Area (0.61 ac)
- Total Temporary Impact Area (9.47 ac)
- Study Area Boundary (18.58 ac)

Waters of the U.S. (4.36 ac)

- Lower Perennial Riverine Water (1.01 ac)
- Palustrine Emergent Wetland (0.11 ac)
- Palustrine Forested Wetland (1.49 ac)
- Palustrine Scrub-Shrub Wetland (1.76 ac)

MAP EXTENT:



0 50 100
FEET
1 inch = 100 feet

Source: Esri Online Imagery Basemap, Sitelinc 2019, Longitude123 2020
Coordinate System: NAD 1983 CORS96 State Plane California III FIPS 0403 Ft US
Notes: This map was created for informational and display purposes only.

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PROJECT NAME: PG&E R-687 L-215 SAN JOAQUIN RIVER CROSSING REPLACEMENT PROJECT, PHASE 2
STANISLAUS COUNTY, CA

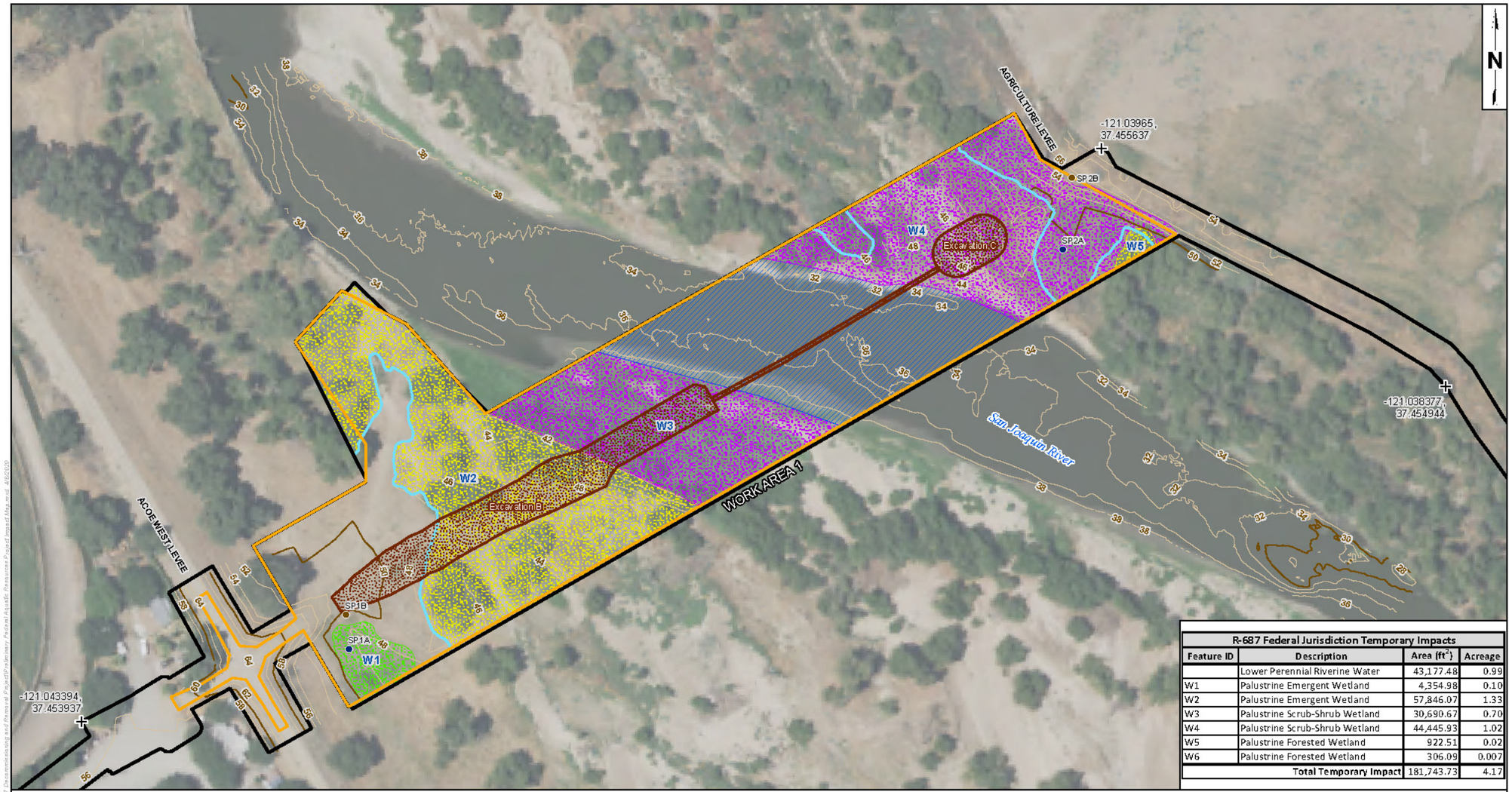
PROJECT NUMBER: 1902-3511

DATE: April 2020

PRELIMINARY FEDERAL AQUATIC RESOURCES PROJECT IMPACT MAP

FIGURE 5A

Z:\GIS Projects\GIS MapFiles Projects\PG&E R-687 Decommissioning and Removal Project\Preliminary Federal Aquatic Resources Project Impact Map.mxd, 4/6/2020



R-687 Federal Jurisdiction Temporary Impacts			
Feature ID	Description	Area (ft^2)	Acreage
	Lower Perennial Riverine Water	43,177.48	0.99
W1	Palustrine Emergent Wetland	4,354.98	0.10
W2	Palustrine Emergent Wetland	57,846.07	1.33
W3	Palustrine Scrub-Shrub Wetland	30,690.67	0.70
W4	Palustrine Scrub-Shrub Wetland	44,445.93	1.02
W5	Palustrine Forested Wetland	922.51	0.02
W6	Palustrine Forested Wetland	306.09	0.007
	Total Temporary Impact	181,743.73	4.17

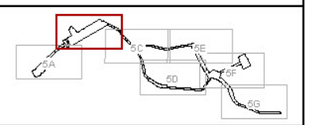
LEGEND:

- Control Point
- Upland Sample Plot Location
- Wetland Sample Plot Location
- Ordinary High Water Mark
- Total Excavation Area (0.61 ac)
- Total Temporary Impact Area (9.47 ac)
- Study Area Boundary (18.58 ac)

Waters of the U.S. (4.36 ac)

- Lower Perennial Riverine Water (1.01 ac)
- Palustrine Emergent Wetland (0.11 ac)
- Palustrine Forested Wetland (1.49 ac)
- Palustrine Scrub-Shrub Wetland (1.76 ac)

MAP EXTENT:



0 50 100
FEET
1 inch = 100 feet

Source: Esri Cantre Imagery Basemap, Sirs Rec 2019, Longitude/123 2020
Coordinate System: NAD 1983 CORS96 State Plane California III FIPS 0403 Ft US
Notes: This map was created for informational and display purposes only.

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PROJECT NAME: PG&E R-687 L-215 SAN JOAQUIN RIVER CROSSING REPLACEMENT PROJECT, PHASE 2 STANISLAUS COUNTY, CA

PROJECT NUMBER: 1902-3511

DATE: April 2020

PRELIMINARY FEDERAL AQUATIC RESOURCES PROJECT IMPACT MAP

FIGURE 5B

Z:\GIS Projects\GIS Maps\Map Projects\PG&E R-687 Decommissioning and Removal Project\Preliminary Federal Aquatic Resources Project Impact Map.mxd 4/8/2020



R-687 Federal Jurisdiction Temporary Impacts			
Feature ID	Description	Area (ft^2)	Acreage
	Lower Perennial Riverine Water	43,177.48	0.99
W1	Palustrine Emergent Wetland	4,354.98	0.10
W2	Palustrine Emergent Wetland	57,846.07	1.33
W3	Palustrine Scrub-Shrub Wetland	30,690.67	0.70
W4	Palustrine Scrub-Shrub Wetland	44,445.93	1.02
W5	Palustrine Forested Wetland	922.51	0.02
W6	Palustrine Forested Wetland	306.09	0.007
	Total Temporary Impact	181,743.73	4.17

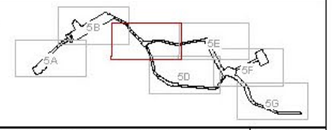
LEGEND:

- Control Point
- Upland Sample Plot Location
- Wetland Sample Plot Location
- Ordinary High Water Mark
- Total Excavation Area (0.61 ac)
- Total Temporary Impact Area (9.47 ac)
- Study Area Boundary (18.58 ac)

Waters of the U.S. (4.36 ac)

- Lower Perennial Riverine Water (1.01 ac)
- Palustrine Emergent Wetland (0.11 ac)
- Palustrine Forested Wetland (1.49 ac)
- Palustrine Scrub-Shrub Wetland (1.76 ac)

MAP EXTENT:



0 50 100
FEET
1 inch = 100 feet

Source: Esri Online Imagery Basemap, Sinclair 2019, Longitude123 2020
Coordinate System: NAD 1983 CORS96 StatePlane California III FIPS 0403 Ft US
Notes: This map was created for informational and display purposes only.

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PROJECT NAME: PG&E R-687 L-215 SAN JOAQUIN RIVER CROSSING REPLACEMENT PROJECT, PHASE 2
STANISLAUS COUNTY, CA

PROJECT NUMBER: 1902-3511

DATE: April 2020

PRELIMINARY FEDERAL AQUATIC RESOURCES PROJECT IMPACT MAP

FIGURE 5C

2105 Projects\105 Maps\Map Projects\PG&E R-687 Documents\Jurisdictional Reports\Project\Project Aquatic Resources Project Impact Map.mxd 4/6/2020



R-687 Federal Jurisdiction Temporary Impacts			
Feature ID	Description	Area (ft^2)	Acreage
	Lower Perennial Riverine Water	43,177.48	0.99
W1	Palustrine Emergent Wetland	4,354.98	0.10
W2	Palustrine Emergent Wetland	57,846.07	1.33
W3	Palustrine Scrub-Shrub Wetland	30,690.67	0.70
W4	Palustrine Scrub-Shrub Wetland	44,445.93	1.02
W5	Palustrine Forested Wetland	922.51	0.02
W6	Palustrine Forested Wetland	306.09	0.007
	Total Temporary Impact	181,743.73	4.17

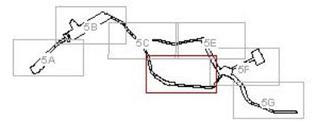
LEGEND:

- Control Point
- Upland Sample Plot Location
- Wetland Sample Plot Location
- Ordinary High Water Mark
- Total Excavation Area (0.61 ac)
- Total Temporary Impact Area (9.47 ac)
- Study Area Boundary (18.58 ac)

Waters of the U.S. (4.36 ac)

- Lower Perennial Riverine Water (1.01 ac)
- Palustrine Emergent Wetland (0.11 ac)
- Palustrine Forested Wetland (1.49 ac)
- Palustrine Scrub-Shrub Wetland (1.76 ac)

MAP EXTENT:



0 50 100
FEET
1 inch = 100 feet

Source: Esri Online Imagery Basemap, Sinclair 2019, Longitude123 2020
Coordinate System: NAD 1983 CORS96 State Plane California III FIPS 0403 Ft US
Notes: This map was created for informational and display purposes only.

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ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS

PROJECT NAME: PG&E R-687 L-215 SAN JOAQUIN RIVER CROSSING REPLACEMENT PROJECT, PHASE 2
STANISLAUS COUNTY, CA

PROJECT NUMBER: 1902-3511

DATE: April 2020

PRELIMINARY FEDERAL AQUATIC RESOURCES PROJECT IMPACT MAP

FIGURE 5D

Z:\GIS Projects\GIS Maps\Maps Prepared\PG&E R-687 Decommissioning and Removal Projects\Preliminary Federal Aquatic Resources Project Impact Map.mxd 4/8/2020



R-687 Federal Jurisdiction Temporary Impacts			
Feature ID	Description	Area (ft^2)	Acreage
	Lower Perennial Riverine Water	43,177.48	0.99
W1	Palustrine Emergent Wetland	4,354.98	0.10
W2	Palustrine Emergent Wetland	57,846.07	1.33
W3	Palustrine Scrub-Shrub Wetland	30,690.67	0.70
W4	Palustrine Scrub-Shrub Wetland	44,445.93	1.02
W5	Palustrine Forested Wetland	922.51	0.02
W6	Palustrine Forested Wetland	306.09	0.007
	Total Temporary Impact	181,743.73	4.17

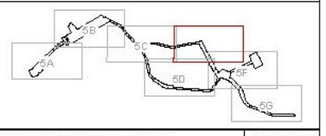
LEGEND:

- Control Point
- Upland Sample Plot Location
- Wetland Sample Plot Location
- Ordinary High Water Mark
- Total Excavation Area (0.61 ac)
- Total Temporary Impact Area (9.47 ac)
- Study Area Boundary (18.58 ac)

Waters of the U.S. (4.36 ac)

- Lower Perennial Riverine Water (1.01 ac)
- Palustrine Emergent Wetland (0.11 ac)
- Palustrine Forested Wetland (1.49 ac)
- Palustrine Scrub-Shrub Wetland (1.76 ac)

MAP EXTENT:



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FEET
1 inch = 100 feet

Source: Esri Online Imagery Basemap, Sinclair 2019, Longitude123 2020
Coordinate System: NAD 1983 CORS96 StatePlane California III FIPS 0403 Ft US
Notes: This map was created for informational and display purposes only.

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PROJECT NAME: PG&E R-687 L-215 SAN JOAQUIN RIVER CROSSING REPLACEMENT PROJECT, PHASE 2
STANISLAUS COUNTY, CA

PROJECT NUMBER: 1902-3511

DATE: April 2020

PRELIMINARY FEDERAL AQUATIC RESOURCES PROJECT IMPACT MAP

FIGURE 5E

Z:\GIS Projects\GIS Maps\Map Packet\PG&E R-687 Decommissioning and Removal Project\Preliminary Federal Aquatic Resources Project Impact Map.mxd 4/8/2020



R-687 Federal Jurisdiction Temporary Impacts			
Feature ID	Description	Area (ft^2)	Acreage
	Lower Perennial Riverine Water	43,177.48	0.99
W1	Palustrine Emergent Wetland	4,354.98	0.10
W2	Palustrine Emergent Wetland	57,846.07	1.33
W3	Palustrine Scrub-Shrub Wetland	30,690.67	0.70
W4	Palustrine Scrub-Shrub Wetland	44,445.93	1.02
W5	Palustrine Forested Wetland	922.51	0.02
W6	Palustrine Forested Wetland	306.09	0.007
	Total Temporary Impact	181,743.73	4.17

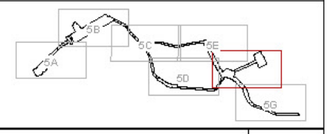
LEGEND:

- Control Point
- Upland Sample Plot Location
- Wetland Sample Plot Location
- Ordinary High Water Mark
- Total Excavation Area (0.61 ac)
- Total Temporary Impact Area (9.47 ac)
- Study Area Boundary (18.58 ac)

Waters of the U.S. (4.36 ac)

- Lower Perennial Riverine Water (1.01 ac)
- Palustrine Emergent Wetland (0.11 ac)
- Palustrine Forested Wetland (1.49 ac)
- Palustrine Scrub-Shrub Wetland (1.76 ac)

MAP EXTENT:



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FEET
1 inch = 100 feet

Source: Esri Online Imagery Basemap, Sitelec 2019, Longitude123 2020
Coordinate System: NAD 1983 CORS96 StatePlane California III FIPS 0403 Ft US
Notes: This map was created for informational and display purposes only.

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PROJECT NAME: PG&E R-687 L-215 SAN JOAQUIN RIVER CROSSING REPLACEMENT PROJECT, PHASE 2
STANISLAUS COUNTY, CA

PROJECT NUMBER: 1902-3511

DATE: April 2020

PRELIMINARY FEDERAL AQUATIC RESOURCES PROJECT IMPACT MAP

FIGURE 5F

Z:\GIS Projects\GIS Maps\Map Projects\PG&E R-687 Decommissioning and Removal Project\Preliminary Federal Aquatic Resources Project Impact Map.mxd 4/8/2020



R-687 Federal Jurisdiction Temporary Impacts			
Feature ID	Description	Area (ft^2)	Acreage
	Lower Perennial Riverine Water	43,177.48	0.99
W1	Palustrine Emergent Wetland	4,354.98	0.10
W2	Palustrine Emergent Wetland	57,846.07	1.33
W3	Palustrine Scrub-Shrub Wetland	30,690.67	0.70
W4	Palustrine Scrub-Shrub Wetland	44,445.93	1.02
W5	Palustrine Forested Wetland	922.51	0.02
W6	Palustrine Forested Wetland	306.09	0.007
	Total Temporary Impact	181,743.73	4.17

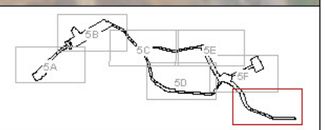
LEGEND:

- Control Point
- Upland Sample Plot Location
- Wetland Sample Plot Location
- Ordinary High Water Mark
- Total Excavation Area (0.61 ac)
- Total Temporary Impact Area (9.47 ac)
- Study Area Boundary (18.58 ac)

Waters of the U.S. (4.36 ac)

- Lower Perennial Riverine Water (1.01 ac)
- Palustrine Emergent Wetland (0.11 ac)
- Palustrine Forested Wetland (1.49 ac)
- Palustrine Scrub-Shrub Wetland (1.76 ac)

MAP EXTENT:



0 50 100
FEET
1 inch = 100 feet

Source: Esri Online Imagery Basemap, Sitelec 2019, Longitude123 2020
Coordinate System: NAD 1983 CORS96 StatePlane California III FIPS 0403 Ft US
Notes: This map was created for informational and display purposes only.

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PROJECT NAME: PG&E R-687 L-215 SAN JOAQUIN RIVER CROSSING REPLACEMENT PROJECT, PHASE 2
STANISLAUS COUNTY, CA

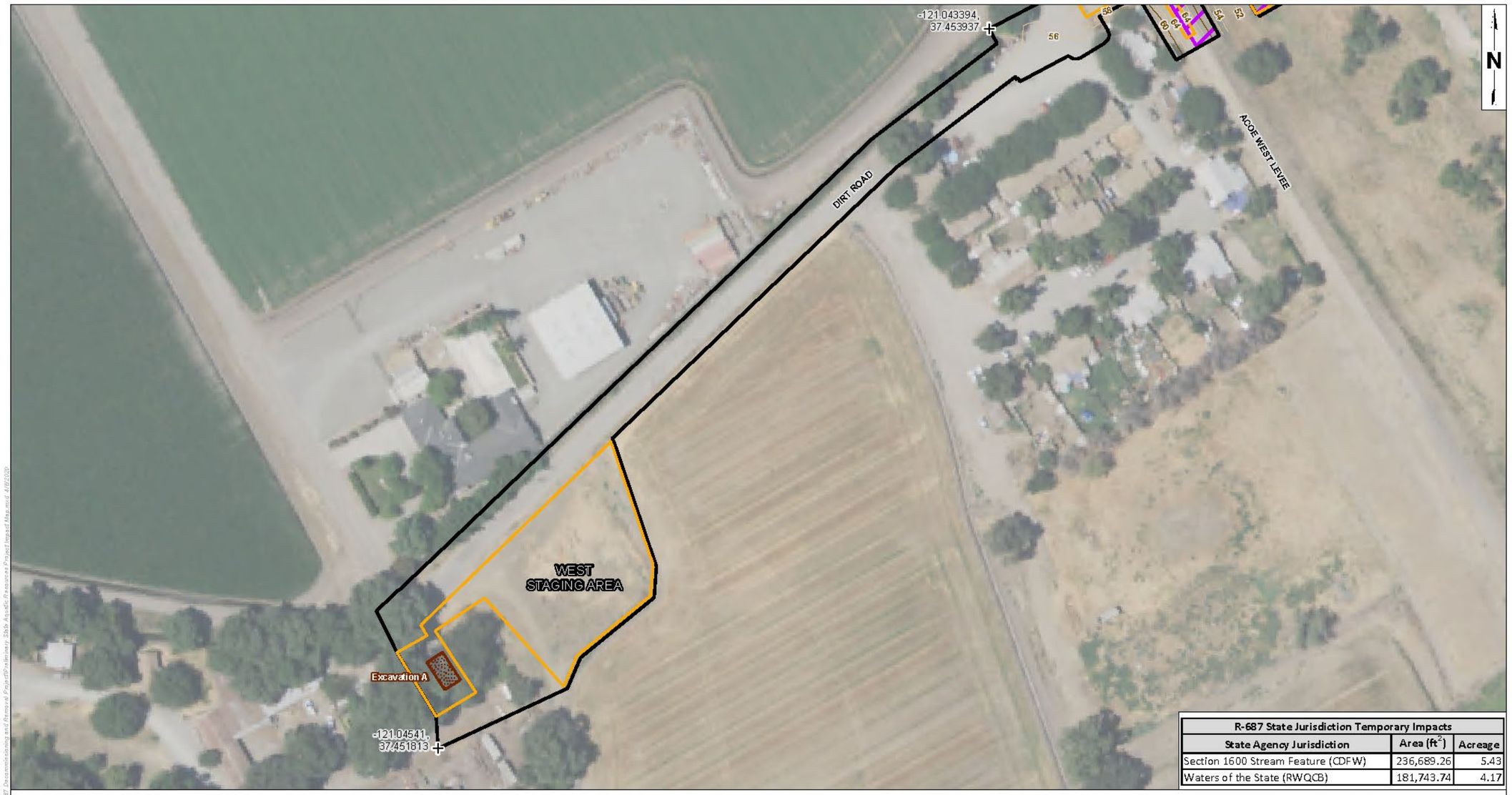
PROJECT NUMBER: 1902-3511

DATE: April 2020

PRELIMINARY FEDERAL AQUATIC RESOURCES PROJECT IMPACT MAP

FIGURE 5G

Z:\GIS Projects\GIS Maps\May Projects\PG&E R-687 Documentation and Report\ Corps\Baseline Report\ ArcGIS Resources Project\ Impact Map.mxd 4/6/2020

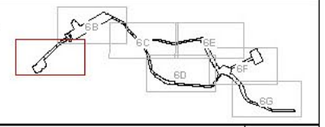


R-687 State Jurisdiction Temporary Impacts		
State Agency Jurisdiction	Area (ft^2)	Acreage
Section 1600 Stream Feature (CDFW)	236,689.26	5.43
Waters of the State (RWQCB)	181,743.74	4.17

LEGEND:

- Control Point
- Upland Sample Plot Location
- Wetland Sample Plot Location
- Ordinary High Water Mark
- Total Excavation Area (0.61 ac)
- Total Temporary Impact Area (9.47 ac)
- Study Area Boundary (18.58 ac)
- Section 1600 Stream Feature - California Department of Fish & Wildlife (7.30 ac)
- Waters of the State - Regional Water Quality Control Board (4.36 ac)

MAP EXTENT:



0 50 100
FEET
1 inch = 100 feet

Source: Esri Online Imagery Basemap, Sitinc 2019, Longitude1 23 2020
Coordinate System: NAD 1983 CORS96 StatePlane California III FIPS 0403 Ft US
Notes: This map was created for informational and display purposes only.

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ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS

PROJECT NAME: PG&E R-687 L-215 SAN JOAQUIN RIVER CROSSING REPLACEMENT PROJECT, PHASE 2
STANISLAUS COUNTY, CA

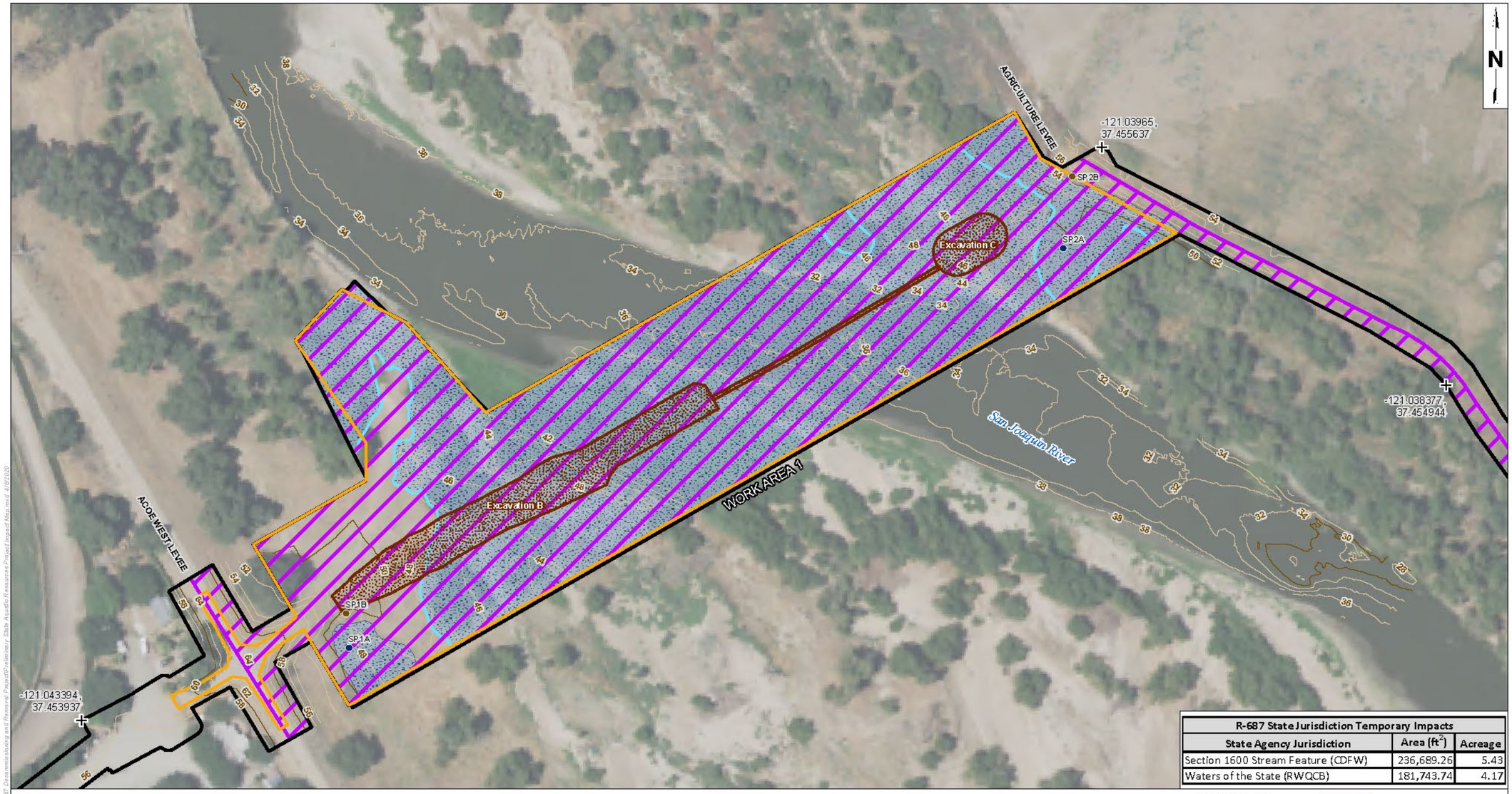
PROJECT NUMBER: 1902-3511

DATE: April 2020

PRELIMINARY STATE AQUATIC RESOURCES PROJECT IMPACT MAP

FIGURE 6A

Z:\GIS Projects\1902-3511\Mxd\Map Projects\PG&E R-687 Documentation and Permit Project\Preliminary State Aquatic Resources Project Impact Map.mxd 4/9/2020

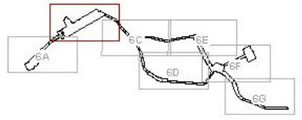


R-687 State Jurisdiction Temporary Impacts		
State Agency Jurisdiction	Area (ft^2)	Acreage
Section 1600 Stream Feature (CDFW)	236,689.26	5.43
Waters of the State (RWQCB)	181,743.74	4.17

LEGEND:

- Control Point
- Upland Sample Plot Location
- Wetland Sample Plot Location
- Ordinary High Water Mark
- Total Excavation Area (0.61 ac)
- Total Temporary Impact Area (9.47 ac)
- Study Area Boundary (18.58 ac)
- Section 1600 Stream Feature - California Department of Fish & Wildlife (7.30 ac)
- Waters of the State - Regional Water Quality Control Board (4.36 ac)

MAP EXTENT:



0 50 100
FEET
1 inch = 100 feet

Source: Esri Online Imagery Basemap, Sinclair 2016, Longitude123 2020
Coordinate System: NAD 1983 CORS 96 StatePlane California III FIPS 0403 Ft US
Notes: This map was created for informational and display purposes only.

padre associates, inc.
ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS

PROJECT NAME: PG&E R-687 L-215 SAN JOAQUIN RIVER CROSSING REPLACEMENT PROJECT, PHASE 2
STANISLAUS COUNTY, CA

PROJECT NUMBER: 1902-3511

DATE: April 2020

PRELIMINARY STATE AQUATIC RESOURCES PROJECT IMPACT MAP

FIGURE 6B

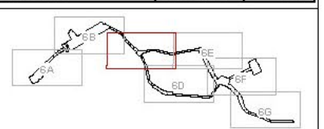


R-687 State Jurisdiction Temporary Impacts		
State Agency Jurisdiction	Area (ft^2)	Acreage
Section 1600 Stream Feature (CDFW)	236,689.26	5.43
Waters of the State (RWQCB)	181,743.74	4.17

LEGEND:

- Control Point
- Upland Sample Plot Location
- Wetland Sample Plot Location
- Ordinary High Water Mark
- Total Excavation Area (0.61 ac)
- Total Temporary Impact Area (9.47 ac)
- Study Area Boundary (18.58 ac)
- Section 1600 Stream Feature - California Department of Fish & Wildlife (7.30 ac)
- Waters of the State - Regional Water Quality Control Board (4.36 ac)

MAP EXTENT:



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FEET
1 inch = 100 feet

Source: Esri Online Imagery Basemap, Sitelec 2019, Longitude123 2020
Coordinate System: NAD 1983 CORS96 StatePlane California III FIPS 0403 Ft US
Notes: This map was created for informational and display purposes only.

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ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS

PROJECT NAME: PG&E R-687 L-215 SAN JOAQUIN RIVER CROSSING REPLACEMENT PROJECT, PHASE 2
STANISLAUS COUNTY, CA

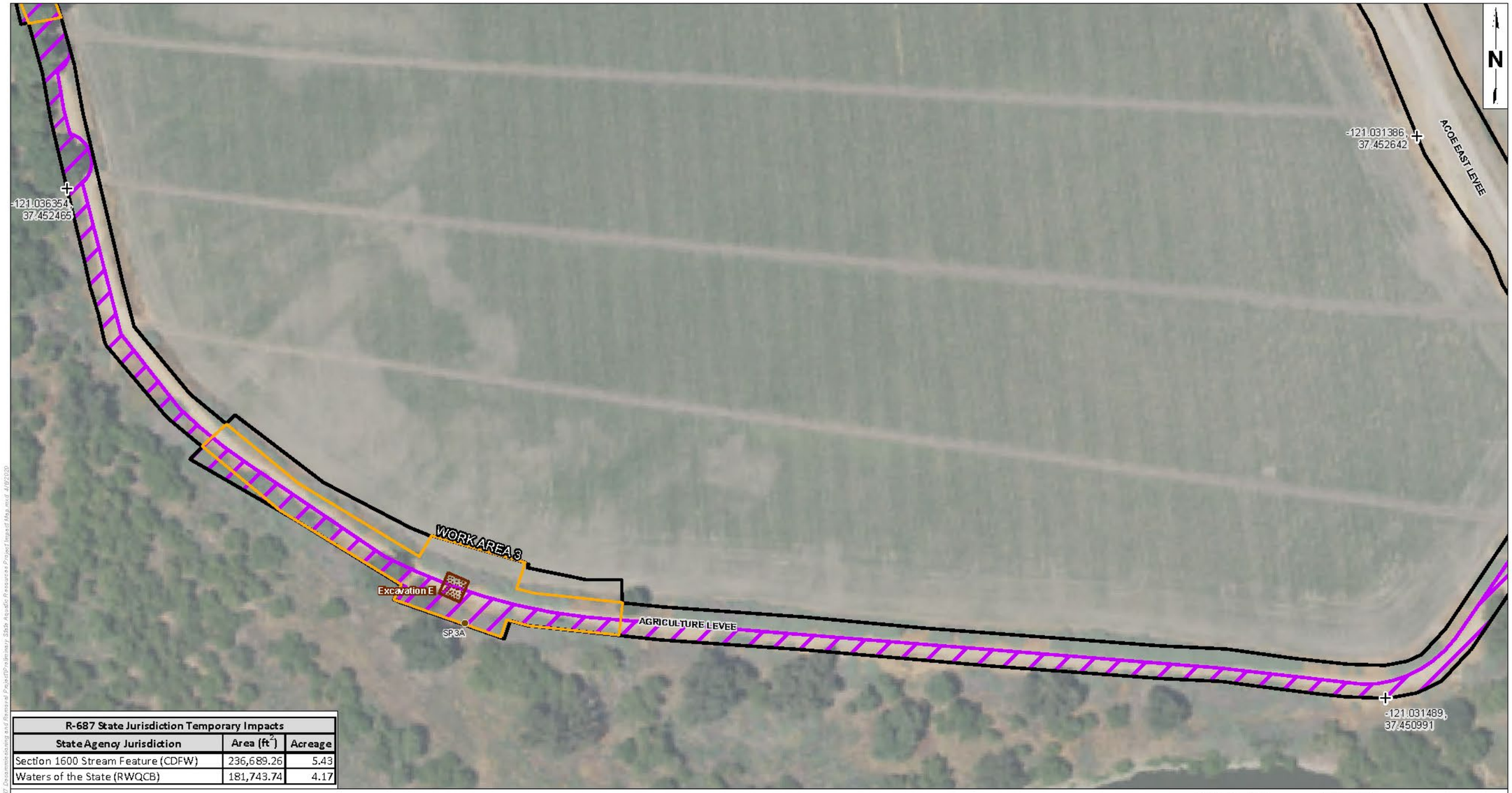
PROJECT NUMBER: 1902-3511

DATE: April 2020

PRELIMINARY STATE AQUATIC RESOURCES PROJECT IMPACT MAP

FIGURE 6C

Z:\GIS Projects\GIS Maps\Map Projects\PG&E R-687 Decommissioning and Removal Project\Preliminary State Aquatic Resources Project Impact Map.mxd 4/8/2020



R-687 State Jurisdiction Temporary Impacts		
State Agency Jurisdiction	Area (ft²)	Acreage
Section 1600 Stream Feature (CDFW)	236,689.26	5.43
Waters of the State (RWQCB)	181,743.74	4.17

LEGEND:

- Control Point
- Upland Sample Plot Location
- Wetland Sample Plot Location
- Ordinary High Water Mark
- Total Excavation Area (0.61 ac)
- Total Temporary Impact Area (9.47 ac)
- Study Area Boundary (18.58 ac)
- Section 1600 Stream Feature - California Department of Fish & Wildlife (7.30 ac)
- Waters of the State - Regional Water Quality Control Board (4.36 ac)

MAP EXTENT:



0 50 100
FEET
1 inch = 100 feet

Source: Esri Online Imagery Basemap, Site Inc 2019, Longitude123 2020
Coordinate System: NAD 1983 CORS96 StatePlane California III FIPS 0403 Ft US
Notes: This map was created for informational and display purposes only.

padre associates, inc.
ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS

PROJECT NAME: PG&E R-687 L-215 SAN JOAQUIN RIVER CROSSING REPLACEMENT PROJECT, PHASE 2
STANISLAUS COUNTY, CA

PROJECT NUMBER: 1902-3511

DATE: April 2020

PRELIMINARY STATE AQUATIC RESOURCES PROJECT IMPACT MAP

FIGURE 6D

ESRI Prepared/GIS/MapMap Prepared/PG&E R-687 Documents/Planning and Permits/Prepared Prep/Preliminary State Aquatic Resources Project Impact Map.mxd 4/9/2020

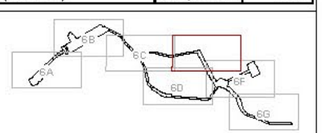


R-687 State Jurisdiction Temporary Impacts		
State Agency Jurisdiction	Area (ft^2)	Acreage
Section 1600 Stream Feature (CDFW)	236,689.26	5.43
Waters of the State (RWQCB)	181,743.74	4.17

LEGEND:

- Control Point
- Upland Sample Plot Location
- Wetland Sample Plot Location
- Ordinary High Water Mark
- Total Excavation Area (0.61 ac)
- Total Temporary Impact Area (9.47 ac)
- Study Area Boundary (18.58 ac)
- Section 1600 Stream Feature - California Department of Fish & Wildlife (7.30 ac)
- Waters of the State - Regional Water Quality Control Board (4.36 ac)

MAP EXTENT:



0 50 100
FEET
1 inch = 100 feet

Source: Esri Online Imagery Basemap, Stantec 2019, Longitude13 2020
Coordinate System: NAD 1983 CORS96 StatePlane California III FIPS 0403 Ft US
Notes: This map was created for informational and display purposes only.

padre associates, inc.
ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS

PROJECT NAME: PG&E R-687 L-215 SAN JOAQUIN RIVER CROSSING REPLACEMENT PROJECT, PHASE 2
STANISLAUS COUNTY, CA

PROJECT NUMBER: 1902-3511

DATE: April 2020

PRELIMINARY STATE AQUATIC RESOURCES PROJECT IMPACT MAP

FIGURE 6E

G:\GIS Projects\GIS Maps\Maps Folder\PG&E R-687 Documents\Regional Board Permits\Preliminary 30% Aquatic Resource Project Impact Map.mxd 4/6/2020

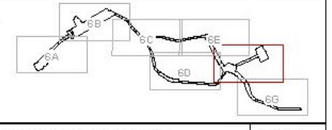


R-687 State Jurisdiction Temporary Impacts		
State Agency Jurisdiction	Area (ft^2)	Acreage
Section 1600 Stream Feature (CDFW)	236,689.26	5.43
Waters of the State (RWQCB)	181,743.74	4.17

LEGEND:

- Control Point
- Upland Sample Plot Location
- Wetland Sample Plot Location
- Ordinary High Water Mark
- Total Excavation Area (0.61 ac)
- Total Temporary Impact Area (9.47 ac)
- Study Area Boundary (18.58 ac)
- Section 1600 Stream Feature - California Department of Fish & Wildlife (7.30 ac)
- Waters of the State - Regional Water Quality Control Board (4.36 ac)

MAP EXTENT:



0 50 100
FEET
1 inch = 100 feet

Source: Esri Online Imagery Basemap, Sitelec 2019, Longitude123 2020
Coordinate System: NAD 1983 CORS96 StatePlane California III FIPS 0403 Ft US
Notes: This map was created for informational and display purposes only.

padre associates, inc.
ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS

PROJECT NAME: PG&E R-687 L-215 SAN JOAQUIN RIVER CROSSING REPLACEMENT PROJECT, PHASE 2
STANISLAUS COUNTY, CA

PROJECT NUMBER: 1902-3511

DATE: April 2020

PRELIMINARY STATE AQUATIC RESOURCES PROJECT IMPACT MAP

FIGURE 6F

Z:\GIS Projects\GIS Maps\Map Projects\PG&E R-687 Documents\Jurisdictional Review of Project\Pre-Refinery State Aquatic Resources Project Impact Map.mxd 4/9/2020

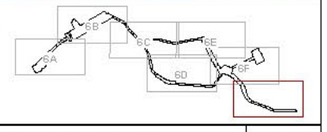


R-687 State Jurisdiction Temporary Impacts		
State Agency Jurisdiction	Area (ft^2)	Acreage
Section 1600 Stream Feature (CDFW)	236,689.26	5.43
Waters of the State (RWQCB)	181,743.74	4.17

LEGEND:

- Control Point
- Upland Sample Plot Location
- Wetland Sample Plot Location
- Ordinary High Water Mark
- Total Excavation Area (0.61 ac)
- Total Temporary Impact Area (9.47 ac)
- Study Area Boundary (18.58 ac)
- Section 1600 Stream Feature - California Department of Fish & Wildlife (7.30 ac)
- Waters of the State - Regional Water Quality Control Board (4.36 ac)

MAP EXTENT:



0 50 100
FEET
1 inch = 100 feet

Source: Esri Online Imagery Basemap, Sitelec 2019, Longitude123 2020
Coordinate System: NAD 1983 CORS96 StatePlane California III FIPS 0403 Ft US
Notes: This map was created for informational and display purposes only.

padre associates, inc.
ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS

PROJECT NAME:
PG&E R-687 L-215 SAN JOAQUIN RIVER CROSSING REPLACEMENT PROJECT, PHASE 2
STANISLAUS COUNTY, CA

PROJECT NUMBER: 1902-3511

DATE: April 2020

PRELIMINARY STATE AQUATIC RESOURCES PROJECT IMPACT MAP

FIGURE 6G

Z:\GIS Projects\GIS Maps\Maps\Projects\PGE R-687 Decommissioning and Removal Project\Preliminary State Aquatic Resources Project Impact Map.mxd 4/8/2020

Figure 7 – Special Status Species Occurrences:

CNDDB Geospatial Data is Confidential - Figure available upon request.

Photograph A. View of large ground squirrel burrow colony at the West Staging (Northwest view). Photograph taken 1/17/20.	
Photograph B. View of old raptor nest located on the eastern side of the San Joaquin River (South view). Photograph taken 1/17/20.	

Figure 8
Site Photographs
PG&E R-687 L-215 San Joaquin River Crossing Replacement Project – Phase Two

Photograph C. View of the non-native grassland located at the West Staging Area (West view). Photograph taken 1/17/20.	
Photograph D. View of the Great Valley mixed riparian forest community located on the west shore of the San Joaquin River in Work Area 1 (West view). Photograph taken 1/17/20.	

Photograph E. View of the Great Valley willow scrub vegetation community located on the west bank of the San Joaquin River in Work Area 1 (Southeast view). Photograph taken 1/23/20.	
Photograph F. View of the San Joaquin River water crossing in Work Area 1 looking from the west shore to the east (Northeast view). Photograph taken 1/23/20.	

Photograph G. View of the San Joaquin River water crossing in Work Area 1 looking from the east shore to the west (Southwest view). Photograph taken 1/23/20.	
Photograph H. View of the Great Valley willow scrub vegetation community located on the east shore of the San Joaquin River in Work Area 1 (West view). Photograph taken 1/23/20.	

Photograph I. View of the ruderal/disturbed community located at Work Area 2 (West view). Photograph taken 1/23/20.	
Photograph J. View of the ruderal/disturbed community located at Work Area 3 (West view). Photograph taken 1/23/20.	

Photograph K. View of the agriculture community located at Work Area 4 (West view). Photograph taken 1/23/20.	
Photograph L. View of the agriculture community located at the East Staging Area (North view). Photograph taken 1/23/20.	

APPENDIX A

USFWS SPECIES LIST

United States Department of the Interior

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

In Reply Refer To:
Consultation Code: 08ESMF00-2020-SLI-0837
Event Code: 08ESMF00-2020-E-02637
Project Name: PG&E R-687 Decommissioning Project

January 22, 2020

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

To Whom It May Concern:

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

Please follow the link below to see if your proposed project has the potential to affect other species or their habitats under the jurisdiction of the National Marine Fisheries Service:

http://www.nwr.noaa.gov/protected_species/species_list/species_lists.html

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

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

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

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

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

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

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

Attachment(s):

- Official Species List

Official Species List

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

This species list is provided by:

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

Project Summary

Consultation Code: 08ESMF00-2020-SLI-0837

Event Code: 08ESMF00-2020-E-02637

Project Name: PG&E R-687 Decommissioning Project

Project Type: OIL OR GAS

Project Description: Decommissioning will include pigging and flushing of the pipeline to remove contaminants, filling specific
pipeline segments with concrete slurry and removal of pipeline segments.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/37.45377284480257N121.04390906550378W



Counties: Stanislaus, CA

Endangered Species Act Species

There is a total of 9 threatened, endangered, or candidate species on this species list.

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

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

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

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

Mammals

NAME	STATUS
San Joaquin Kit Fox *Vulpes macrotis mutica* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2873	Endangered

Reptiles

NAME	STATUS
Blunt-nosed Leopard Lizard *Gambelia silus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/625	Endangered
Giant Garter Snake *Thamnophis gigas* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4482	Threatened

Amphibians

NAME	STATUS
California Red-legged Frog *Rana draytonii* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2891 Species survey guidelines: https://ecos.fws.gov/ipac/guideline/survey/population/205/office/11420.pdf	Threatened
California Tiger Salamander *Ambystoma californiense* Population: U.S.A. (Central CA DPS) There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2076	Threatened

Fishes

NAME	STATUS
Delta Smelt *Hypomesus transpacificus* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/321	Threatened

Insects

NAME	STATUS
Valley Elderberry Longhorn Beetle *Desmocerus californicus dimorphus* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7850 Habitat assessment guidelines: https://ecos.fws.gov/ipac/guideline/assessment/population/436/office/11420.pdf	Threatened

Crustaceans

NAME	STATUS
Vernal Pool Fairy Shrimp *Branchinecta lynchi* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/498	Threatened
Vernal Pool Tadpole Shrimp *Lepidurus packardi* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2246	Endangered

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

APPENDIX B

CNDDB QUERY RESULTS

Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: BIOS selection

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Agelaius tricolor tricolored blackbird	G2G3 S1S2	None Threatened	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_EN-Endangered NABCI_RWL-Red Watch List USFWS_BCC-Birds of Conservation Concern	40 190	955 S:9	0	0	0	0	3	6	6	3	6	3	0
Astragalus tener var. tener alkali milk-vetch	G2T1 S1	None None	Rare Plant Rank - 1B.2	55 55	65 S:1	0	0	0	0	1	0	1	0	0	0	1
Atriplex cordulata var. cordulata heartscale	G3T2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive	50 50	66 S:1	0	0	0	0	1	0	1	0	0	0	1
Atriplex minuscula lesser saltscale	G2 S2	None None	Rare Plant Rank - 1B.1		52 S:1	0	0	0	0	0	1	1	0	1	0	0
Atriplex persistens vernal pool smallscale	G2 S2	None None	Rare Plant Rank - 1B.2	55 55	41 S:1	0	0	0	0	1	0	1	0	0	1	0
Bombus crotchii Crotch bumble bee	G3G4 S1S2	None Candidate Endangered		100 100	234 S:1	0	0	0	0	0	1	1	0	1	0	0
Branta hutchinsii leucopareia cackling (=Aleutian Canada) goose	G5T3 S3	Delisted None	CDFW_WL-Watch List	50 50	19 S:2	0	0	0	0	0	2	2	0	2	0	0
Buteo swainsoni Swainson's hawk	G5 S3	None Threatened	BLM_S-Sensitive IUCN_LC-Least Concern USFWS_BCC-Birds of Conservation Concern	35 55	2518 S:6	1	0	0	0	0	5	6	0	6	0	0
Emys marmorata western pond turtle	G3G4 S3	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_VU-Vulnerable USFS_S-Sensitive	60 60	1385 S:1	0	1	0	0	0	0	1	0	1	0	0
Eryngium racemosum Delta button-celery	G1 S1	None Endangered	Rare Plant Rank - 1B.1	50 50	26 S:1	0	0	0	0	1	0	1	0	0	1	0

Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Falco mexicanus	G5	None	CDFW_WL-Watch List	1,000	460	1	0	0	0	0	0	1	0	1	0	0
prairie falcon	S4	None	IUCN_LC-Least Concern USFWS_BCC-Birds of Conservation Concern	1,000	S:1											
Oncorhynchus mykiss irideus pop. 11	G5T2Q	Threatened	AFS_TH-Threatened		31	0	0	0	1	0	0	0	1	1	0	0
steelhead - Central Valley DPS	S2	None			S:1											
Pogonichthys macrolepidotus	GNR	None	AFS_VU-Vulnerable CDFW_SSC-Species of Special Concern IUCN_EN-Endangered	40	15	0	0	0	0	0	1	1	0	1	0	0
Sacramento splittail	S3	None		40	S:1											
Puccinellia simplex	G3	None	Rare Plant Rank - 1B.2	60	80	0	0	0	0	1	0	1	0	0	0	1
California alkali grass	S2	None		60	S:1											

APPENDIX C

PLANT SPECIES OBSERVED AT THE PG&E R-687 PROJECT SITE

Plant Species Observed at the R-687 L-215 San Joaquin River Crossing Replacement – Phase Two Project Site

Common Name/Family	*Scientific Name*	Growth Habit[1]	Wetland Indicator Status[2]	Native Status[3]	Source[4]	Sensitivity / Listing Status[4]
ANACARDIACEAE (Sumac or Cashew Family)						
Pistache	*Pistacia* sp.	T	NL	I	2	
Poison oak	*Toxicodendron diversilobum*	S	FACU	N	2	
APIACEAE (Carrot Family)						
Poison hemlock	*Conium maculatum*	H	FACW	I	1, 2	
APOCYNACEAE (Dogbane Family)						
Oleander	*Nerium oleander*	S	NL	I	2	
ASTERACEAE (Sunflower Family)						
Mugwort	*Artemisia douglasiana*	H	FAC	N	1	
Italian thistle	*Carduus pycnocephalus* ssp. *pycnocephalus*	H	NL	I	2	
Slender flowered thistle	*Carduus tenuiflorus*	H	NL	I	1, 2	
Yellow star-thistle	*Centaurea solstitialis*	H	NL	I	2	
Common spikeweed	*Centromadia pungens*	H	FAC	N	2	
Chicory	*Cichorium intybus*	H	FACU	I	2	
Canada thistle	*Cirsium arvense*	H	FACU	I	1	
Flax-leaved horseweed	*Erigeron bonariensis*	H	FACU	I	1, 2	
Gumplant	*Grindelia camporum*	H	FACW	N	1	
Common sunflower	*Helianthus annuus*	H	FACU	N	1	
Bristly ox-tongue	*Helminthotheca echioides*	H	FAC	I	1	
Telegraph weed	*Heterotheca grandiflora*	H	NL	N	1	
Prickly lettuce	*Lactuca serriola*	H	FACU	I	1, 2	
Valley mayweed	*Matricaria occidentalis*	H	FACW	N	2	
Milk thistle	*Silybum marianum*	H	NL	I	1, 2	
Common sow thistle	*Sonchus oleraceus*	H	UPL	I	1	
Common dandelion	*Taraxacum officinale*	H	FACU	I	2	
Spiny cocklebur	*Xanthium spinosum*	H	FACU	I	1	
Cocklebur	*Xanthium strumarium*	H	FAC	N	1	
BORAGINACEAE (Borage Family)						
Common phacelia	*Phacelia distans*	H	NL	N	2	
BRASSICACEAE (Mustard Family)						
Black mustard	*Brassica nigra*	H	NL	I	1, 2	
Field mustard	*Brassica rapa*	H	FUPL	I	2	
Shepard's purse	*Capsella bursa-pastoris*	H	FACU	I	1	
Mediterranean mustard	*Hirschfeldia incana*	H	NL	I	1, 2	
Bog yellow-cress	*Rorippa palustris* ssp. *palustris*	H	OBL	N	1	
CHENOPODIACEAE (Goosefoot Family)						
Big saltbush	*Atriplex lentiforis*	S	FAC	N	1, 2	
Lamb's quarters	*Chenopodium album*	H	FACU	I	1, 2	
Russian thistle	*Salsola tragus*	H	FACU	I	1	

Common Name/Family	*Scientific Name*	Growth Habit[1]	Wetland Indicator Status[2]	Native Status[3]	Source[4]	Sensitivity / Listing Status[4]
CONVOLVULACEAE (Morning-Glory Family)						
Bindweed	*Convolvulus arvensis*	H	NL	I	2	
EUPHORBIACEAE (Spurge Family)						
Turkey mullein	*Croton setiger*	H	NL	N	1, 2	
FABACEAE (Legume Family)						
Perennial sweet pea	*Lathyrus latifolius*	H	NL	I	2	
California burclover	*Medicago polymorpha*	H	FACU	I	1, 2	
Alfalfa	*Medicago sativa*	H	UPL	I	2	
Vetch	*Vicia* sp.	H			1	
FAGACEAE (Oak Family)						
Valley oak	*Quercus lobata*	T	FACU	N	1, 2	
GERANIACEAE (Geranium Family)						
Redstem filaree	*Erodium cicutarium*	H	NL	I	1, 2	
Dove's-foot geranium	*Geranium molle*	H	NL	I	1	
MALVACEAE (Mallow Family)						
Cheeseweed	*Malva parviflora*	H	NL	I	1, 2	
MYRSINACEAE (Myrsine Family)						
Scarlet pimpernel	*Lysimachia arvensis*	H	FAC	I	1, 2	
MYRTACEAE (Myrtle Family)						
Blue gum	*Eucalyptus globulus*	T	NL	I	2	
OLEACEAE (Olive Family)						
Oregon ash	*Fraxinus latifolia*	T	FACW	N	2	
ONAGRACEAE (Evening Primrose Family)						
Floating water primrose	*Ludwigia peploides*	H	OBL	I	1, 2	
POLYGONACEAE (Buckwheat Family)						
Willow weed	*Persicaria lapathifolia*	H	FACW	N	1	
Curly dock	*Rumex crispus*	H	FAC	I	1, 2	
PORTULACACEAE (Purslane Family)						
Common purslane	*Portulaca oleracea*	H	FAC	I	2	
ROSACEAE (Rose Family)						
Almond	*Prunus dulcis*	T	NL	I	1, 2	
Himalayan blackberry	*Rubus armeniacus*	V	FAC	I	2	
California blackberry	*Rubus ursinus*	V	FAC	N	1, 2	
RUBIACEAE (Madder Family)						
Bedstraw	*Galium* sp.	H			1	
California button willow	*Cephalanthus occidentalis*	S	OBL	N	1, 2	
SALICACEAE (Willow Family)						
Fremont cottonwood	*Populus fremontii* ssp. *fremontii*	T	NL	N	1, 2	
Willow	*Salix* sp.	T	OBL		1, 2	
Gooding's black willow	*Salix goodingii*	T	FACW	N	1	
SAPINDACEAE (Soapberry Family)						

Common Name/Family	*Scientific Name*	Growth Habit[1]	Wetland Indicator Status[2]	Native Status[3]	Source[4]	Sensitivity / Listing Status[4]
California box-elder	*Acer negundo*	T	FACW	N	1, 2	
SOLANACEAE (Nightshade Family)						
Jimsonweed	*Datura wrightii*	H	UPL	N	1, 2	
Many flowered tobacco	*Nicotiana acuminata* var. *multiflora*	H	NL	I	1, 2	
Tree tobacco	*Nicotiana glauca*	T	FAC	I	1, 2	
Common nightshade	*Solanum americanum*	H	FACU	N	1	
URTICACEAE (Nettle Family)						
Stinging nettle	*Urtica dioica*	H	FACW	N	1, 2	
Dwarf nettle	*Urtica urens*	H	NL	I	1	
VISCACEAE (Mistletoe Family)						
American mistletoe	*Phoradendron leucarpum*	H	NL	N	1	
ARACEAE (Arum Family)						
Least duckweed	*Lemna minuta*	H	OBL	N	2	
ARECACEAE (Palm Family)						
California fan palm	*Washingtonia filifera*	T	FAC	N	1, 2	
CYPERACEAE (Sedge Family)						
Variable flatsedge	*Cyperus difformis*	H	OBL	I	1, 2	
Tall cyperus	*Cyperus eragrostis*	H	FACW	N	1	
JUNCACEAE (Rush Family)						
Lamp rush	*Juncus effusus*	H	FACW	N	2	
POACEAE (Grass Family)						
Ripgut grass	*Bromus diandrus*	G	NL	I	1, 2	
Soft chess	*Bromus hordeaceus*	G	FACU	I	1, 2	
Bermuda grass	*Cynodon dactylon*	G	FACU	I	1, 2	
Hairy crab grass	*Digitaria sanguinalis*	G	FACU	I	2	
Medusa head	*Elymus caput-medusae*	G	NL	I	2	
Squirreltail	*Elymus elymoides*	G	FACU	N	2	
Quack grass	*Elymus repens*	G	FAC	I	2	
Rattail sixweeks grass	*Festuca myuros*	G	FACU	I	2	
Foxtail barley	*Hordeum jubatum* ssp. *jubatum*	G	FAC	N	2	
Mediterranean barley	*Hordeum marinum* ssp. *gussoneanum*	G	FAC	I	1, 2	
Hare barley	*Hordeum murinum* ssp. *leporinum*	G	FACU	I	1, 2	
Dallis grass	*Paspalum dilatatum*	G	FAC	I	2	
Lemmon's canary grass	*Phalaris lemmonii*	G	FACW	N	2	
Annual blue grass	*Poa annua*	G	FAC	I	1	
Rabbitfoot grass	*Polypogon monspeliensis*	G	FACW	I	1	
Rye	*Secale cereale*	G	NL	I	1, 2	
Johnson grass	*Sorghum halepense*	G	FACU	I	1, 2	
Cultivated corn	*Zea mays*	G	NL	I	1, 2	
PONTEDERIACEAE (Pickerel-Weed Family)						
Water hyacinth	*Eichhornia crassipes*	H	OBL	I	1	
TYPHACEAE (Cattail Family)						
Narrow-leaved cattail	*Typha angustifolia*	H	OBL	I	2	

Wetland Indicator Status[2]
OBL = Obligate wetland species, occurs almost always in wetlands (>99% probability) FACW = Facultative wetland species, usually found in wetlands (67-99% probability) FAC = Facultative species, equally likely to occur in wetland and non-wetlands (34-66% probability) FACU = Facultative upland species, not usually found in wetlands (1-33% probability) UPL = Upland species, almost never found in wetlands (<1% probability) NI = No indicator has been assigned due to a lack of information to determine indicator status NL = Not listed, assumed upland species

Sensitivity / Listing Status[4]

FE = Federal Endangered FT = Federal Threatened FC = Federal Candidate SE = California State Endangered ST = California State Threatened	1B.1 = Threatened in California and elsewhere, seriously threatened in California 1B.2 = Threatened in California and elsewhere, moderately threatened in California 2B = Plants rare, threatened, or endangered in California but more common elsewhere 3 = Plants about which more information is needed 4 = Plants of limited distribution

Source[4]	Growth Habit[1]	Native Status[3]
1 = Padre Observed (January 2020 Surveys) 2 = Stantec Observed (June 2019 Surveys)	G = Grass H = Herb S = Shrub T = Tree	N = Native I = Introduced

APPENDIX D

WILDLIFE SPECIES OBSERVED AT THE PG&E R-687 PROJECT SITE

Wildlife Species Observed at the R-687 L-215 San Joaquin River Crossing Replacement Project – Phase Two Site

Common Name/ Family	*Scientific Name*	Sensitivity / Listing Status[1]
	FISH	
CYPRINIDAE (Minnows and Carp)		
Carp	*Cyprinus carpio*	
POECILIIDAE (Poeciliids)		
Western Mosquitofish	*Gambusia affinis*	
	AMPHIBIANS	
RANIDAE (True Frogs)		
American Bullfrog	*Lithobates catesbeianus*	
	BIRDS	
ANATIDAE (Ducks, Geese, and Swans)		
Greater White-fronted Goose	*Anser albifrons*	M
Snow Goose	*Chen caerulescens*	M
Canada Goose	*Branta canadensis*	M
ODONTOPHORIDAE (New World Quail)		
California Quail	*Callipepla californica*	
COLUMBIDAE (Pigeons and Doves)		
Eurasian Collared-Dove	*Streptopelia decaocto*	M
Mourning Dove	*Zenaida macroura*	M
TROCHILIDAE (Hummingbirds)		
Black-chinned Hummingbird	*Archilochus alexandri*	M
GRUIDAE (Cranes)		
Sandhill Crane	*Antigone canadensis*	M
CHARADRIIDAE (Lapwings and Plovers)		
Killdeer	*Charadrius vociferus*	M
PHALACROCORACIDAE (Cormorants)		
Double-crested Cormorant	*Phalacrocorax auritus*	M, WL
ARDEIDAE (Bitterns, Herons, and Allies)		M
Great Blue Heron	*Ardea herodias*	M
Great Egret	*Ardea alba*	M
Snowy Egret	*Egretta thula*	M
CATHARTIDAE (New World Vultures)		
Turkey Vulture	*Cathartes aura*	M
ACCIPITRIDAE (Hawks, Kites, Eagles, and Allies)		
Northern Harrier	*Circus cyaneus*	M, CSC
Red-shouldered Hawk	*Buteo lineatus*	M
Red-tailed Hawk	*Buteo jamaicensis*	M
ALCEDINIDAE (Kingfishers)		
Belted Kingfisher	*Megaceryle alcyon*	M
PICIDAE (Woodpeckers and Allies)		
Acorn Woodpecker	*Melanerpes formicivorus*	M
Hairy Woodpecker	*Picoides villosus*	M
Northern Flicker	*Colaptes auratus*	M
FALCONIDAE (Caracaras and Falcons)		
American Kestrel	*Falco sparverius*	M
TYRANNIDAE (Tyrant Flycatchers)		
Black Phoebe	*Sayornis nigricans*	M

Common Name/ Family	*Scientific Name*	Sensitivity / Listing Status[1]
CORVIDAE (Jays and Crows)		
Western Scrub-Jay	*Aphelocoma californica*	M
American Crow	*Corvus brachyrhynchos*	M
PARIDAE (Chickadees and Titmice)		
Oak Titmouse	*Baeolophus inornatus*	M, BCC
AEGITHALIDAE (Bushtits)		
Bushtit	*Psaltriparus minimus*	M
TROGLODYTIDAE (Wrens)		
Pacific Wren	*Troglodytes pacificus*	M
REGULIDAE (Kinglets)		
Ruby-crowned Kinglet	*Regulus calendula*	M
TURDIDAE (Thrushes)		
Western Bluebird	*Sialia mexicana*	M
American Robin	*Turdus migratorius*	M
MIMIDAE (Mockingbirds and Thrashers)		
Northern Mockingbird	*Mimus polyglottos*	M
STURNIDAE (Starlings)		
European Starling	*Sturnus vulgaris*	
FRINGILLIDAE (Fringilline and Cardueline Finches and Allies)		
House Finch	*Haemorhous mexicanus*	M
Lesser Goldfinch	*Spinus psaltria*	M
American Goldfinch	*Spinus tristis*	M
PARULIDAE (Wood-Warblers)		
Yellow-rumped Warbler	*Setophaga coronata*	M
EMBERIZIDAE (Emberizids)		
Spotted Towhee	*Pipilo maculatus*	M
Savannah Sparrow	*Passerculus sandwichensis*	M
White-crowned Sparrow	*Zonotrichia leucophrys*	M
Dark-eyed Junco	*Junco hyemalis*	M
ICTERIDAE (Blackbirds)		
Western Meadowlark	*Sturnella neglecta*	M
	MAMMALS	
SCIURIDAE (Chipmunks, Squirrels, and Marmots)		
California Ground Squirrel	*Spermophilus beecheyi*	
GEOMYIDAE (Pocket Gophers)		
Botta's Pocket Gopher	*Thomomys bottae*	
CASTORIDAE (Beavers)		
American Beaver	*Castor canadensis*	
CRICETIDAE (Deer Mice, Voles, and Relatives)		
Vole	*Microtus* sp.	
CANIDAE (Foxes, Wolves, and Relatives)		
Coyote	*Canis latrans*	
PROCYONIDAE (Raccoons and Relatives)		
Raccoon	*Procyon lotor*	
MUSTELIDAE (Weasels, Badgers, and Relatives)		

Common Name/ Family	*Scientific Name*	Sensitivity / Listing Status[1]
North American River Otter	*Lontra canadensis*	
CERVIDAE (Deer, Elk, and Relatives)		
Black-tailed Deer	*Odocoileus hemionus*	

Sensitivity / Listing Status[1]

M = Protected under the federal Migratory Bird Treaty Act (MBTA)
FE = Federally Endangered
FT = Federally Threatened
FDL = Federally Delisted
FSS = Forest Service Sensitive
SE = California State Endangered
ST = California State Threatened
CSC = California Species of Special Concern
FP = California Fully Protected Species
BCC = USFWS Birds of Conservation Concern
WL = CDFW Watch List

APPENDIX E

Noise Modeling Results and Vibration Calculations

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 02/21/2020
Case Description: PG&E R-687 HDD

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest residence	Commercial	55.0	45.0	45.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Horizontal Boring Hydr. Jack	No	25		82.0	1200.0	0.0
Front End Loader	No	40		79.1	1200.0	0.0
Dozer	No	40		81.7	1100.0	0.0
Excavator	No	40		80.7	1200.0	0.0
Pumps	No	50		80.9	1200.0	0.0
Boring Jack Power Unit	No	50		83.0	1100.0	0.0
Vacuum Excavator (Vac-truck)	No	40		85.3	1200.0	0.0

Results

			Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
	Calculated (dBA)		Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Horizontal Boring Hydr. Jack	54.4	48.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	51.5	47.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	54.8	50.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	53.1	49.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	53.3	50.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Boring Jack Power Unit	56.2	53.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vacuum Excavator (Vac-truck)	57.7	53.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	**57.7**	**59.4**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 02/21/2020
Case Description: PG&E R-786 Pipe removal

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest residence	Commercial	55.0	45.0	45.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	200.0	0.0
Excavator	No	40		80.7	400.0	0.0
Front End Loader	No	40		79.1	250.0	0.0
Front End Loader	No	40		79.1	350.0	0.0
Pickup Truck	No	40		75.0	150.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator	68.7	64.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	62.6	58.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	65.1	61.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	62.2	58.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	65.5	61.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	**68.7**	**68.5**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Caltrans Transportation and Construction Vibration Guidance Manual

Project Name: PG&E R-687 L-215 San Joaquin River Crossing Replacement

Scenario: HDD operations

Receptor: Nearest residence (Prune Ave/Paradise Ave intersection)

Select Input Values

Source Levels (PPV)	
Vibratory roller	0.210
Large bulldozer	0.089
Caisson drilling	0.089
Loaded trucks	0.076
Jackhammer	0.035
Small bulldozer	0.003
Crack & seat operations	2.4

Soil Material Values	
Weak, soft, loose soil	1.4
Competent soils	1.3
Hard compacted soils	1.1
Hard competent bedrock	1.0

Damage Criteria (Lv)	
Human: continous, frequent intermittent sources	
Barely perceptible	0.01
Distinctly perceptible	0.04
Strongly perceptible	0.1
Severe	0.4
Structures: continous, frequent intermittent sources	
Fragile buildings	0.1
Historic & some old buildings	0.25
Older residential	0.3
New residential	0.5
Modern commecial & industrial	0.5

Project Data

Source Level	0.089
Soil material (n):	1.3
Distance to receptor(feet)	1100

Results

PPV at receptor	0.00065

Caltrans Transportation and Construction Vibration Guidance Manual

Project Name: PG&E R-687 L-215 San Joaquin River Crossing Replacement

Scenario: Pipe removal at West Landing Segment

Receptor: Nearest residence (near west ACOE levee)

Select Input Values

Source Levels (PPV)	
Vibratory roller	0.210
Large bulldozer	0.089
Caisson drilling	0.089
Loaded trucks	0.076
Jackhammer	0.035
Small bulldozer	0.003
Crack & seat operations	2.4

Soil Material Values	
Weak, soft, loose soil	1.4
Competent soils	1.3
Hard compacted soils	1.1
Hard competent bedrock	1.0

Damage Criteria (Lv)	
Human: continous, frequent intermittent sources	
Barely perceptible	0.01
Distinctly perceptible	0.04
Strongly perceptible	0.1
Severe	0.4
Structures: continous, frequent intermittent sources	
Fragile buildings	0.1
Historic & some old buildings	0.25
Older residential	0.3
New residential	0.5
Modern commecial & industrial	0.5

Project Data

Source Level	0.089
Soil material (n):	1.3
Distance to receptor(feet)	200

Results

PPV at receptor	0.00596

APPENDIX F

Inadvertent Release Contingency Plan

Inadvertent Release Contingency Plan for Pacific Gas and Electric Line 215 Replacement at the San Joaquin River, Patterson, CA

Overview

The proposed HDD alignment is currently approximately 7,280 feet long with a maximum cover depth of approximately 110 feet below the ground surface, as shown on the proposed HDD Profile. It is Kleinfelder's professional opinion that the current cover depth is feasible based on the hydraulic fracturing analysis of the proposed bore path if intersect bore methods are implemented. If conventional HDD techniques are used, hydraulic fracturing could become a concern within the San Joaquin River and beyond.

In general, all borings along the alignment encountered similar soil conditions. Approximately 3 to 12 feet of silts and clays was encountered at the surface of each exploration location and was underlain by sands with varying fines contents to boring termination depths ranging from 21½ feet to 131½ feet. The consistencies of the silts and clays ranged from stiff to hard and the relative densities of the sands ranged from medium dense to very dense, generally increasing with depth.

The density and consistency of soils encountered within the HDD alignments in the exploratory borings do not vary greatly. The soil units within the proposed bore path appear to consist primarily of medium dense to very dense sands except at the entry and exit points. These variations in density/consistency are not severe but could cause some difficulty steering along the bore path at the transitions.

The clean sands that were encountered in the borings along the alignment may be prone to instability in the HDD borehole. When such soils are encountered during drilling, proper drilling fluid makeup or use of conductor casing can reduce the potential for borehole caving and stuck pipe during pullback.

Hydraulic fracturing occurs when borehole pressure causes plastic deformation of the soil surrounding the borehole, initiating and propagating fractures in the soil mass. The resistance to plastic deformation and fracturing is a function of soil strength, overburden pressure, and pore water pressure. Hydraulic fracturing can result in drilling fluid inadvertently returning to the ground surface or running horizontally away from the borehole. Allowable borehole pressure was evaluated using the Delft Geotechnics equation as published in "Recommended Guidelines for Installation of Pipelines Beneath Levees Using Horizontal Directional Drilling, Appendix B, CPAR-GL-98-1," published by the Pipeline Research Council International (PRCI) and the U.S. Army Corps of Engineers, dated April 1998. The estimated allowable borehole pressure was compared to predicted borehole pressure in our analyses.

For hydraulic fracturing analysis, we assumed a pilot-hole diameter of 12 inches, a drill rod diameter of 6½ inches, and a mud pump output of up to 450 gallons per minute. Target uphole fluid velocities in the analyses range from about 100 to 125 feet per minute in our analysis. The drilling fluid density was estimated to be about 10 to 11 pounds per gallon. Changes in the drilling fluid properties and drilling equipment affect the analysis results.

Borehole instability issues and/or the contactor not maintaining a clean borehole can result in poor drilling returns and partial or complete plugging of the borehole. This will result in higher fluid pressures within the bore and can lead to hydraulic fracturing and inadvertent fluid returns to the ground surface. Depending on the contractor's means and methods, a minimum cover depth of 35 feet below the San Joaquin River should be maintained to minimize the risk of hydraulic fracturing where a relatively clean borehole is maintained with good drilling returns. A deeper bore path should be considered if the contractor determines that borehole plugging and/or poor drilling returns are likely.

This evaluation considered the intersect method of drilling from both ends with the intersect point near the middle of the alignment. If intersect drilling is not performed, the drilling fluid pressures will likely exceed the allowable value before reaching the exit point.

This drilling fluid contingency plan is in place to deal with inadvertent fluid migrations (frac-outs). A properly designed drilling fluid program can substantially reduce losses due to frac-out, stuck product pipe, or loss of tooling. This drilling fluid program considers anticipated soil conditions, fluid selection, drill bit and reamer selection, and volume calculations.

Objectives

The inadvertent release contingency plan outlined below has been developed and will be employed to meet the following objectives:

• To ensure Contractor has specific measures in place in the event of an inadvertent mud release and that potential impacts are minimized; and

• To ensure corrective action processes are in place to properly manage inadvertent releases of drilling mud.

The Rig Manager is responsible for implementing and maintaining all mitigation measures unless otherwise specified. The Rig Manager for this project will be Matt Brotherton.

Source Information

The geotechnical investigation for the proposed pipeline and extension and replacement project was conducted by Kleinfelder between April 26th and June 19th, 2018 and included a field investigation, laboratory testing, and a review of surface topography. The purpose of this study was to evaluate the subsurface conditions near the proposed trenchless crossing alignment in order to characterize the subsurface materials likely to be encountered during trenchless activities. The findings of the geotechnical investigation, including recommendations regarding the geotechnical aspects of the proposed project's design and construction are provided in Appendix B (Geotechnical Investigation Report) to this Drilling Program Plan.

An overview of the horizontal directional drilling (HDD) procedure to be implemented for the proposed project, as well as the execution plan for the proposed project, and considerations for environmental management including monitoring and direction drill mud release are included in, "|HDD Execution Plan for Barnard Pacific Gas and Electric Company Patterson, California" dated July 10, 2019, and is provided as Appendix C to this Drilling Program Plan.

Project Overview

The project consists of extending the existing 24-inch diameter pipeline to retire an existing, exposed 12-inch diameter pipeline that currently crosses the San Joaquin River using HDD trenchless technology with a maximum cover depth of approximately 110 feet below the ground surface. The proposed HDD will use an intersect method with two bores, one on the west side and one on the east side of the San Joaquin River. The proposed entrance for the HDD section is located approximately 90 feet southeast of Prune Avenue and 1,250 feet southwest of Paradise Avenue in Patterson, California. The HDD alignment runs east for approximately 7,303 feet, running underneath the San Joaquin River, before exiting approximately 745 feet east of S. Carpenter Road and 65 feet south of W. Bradbury Road.

A primary staging area will be used to string, weld and coat the pipeline before pull through. The primary staging area will be located near the exit side of the crossing and will be contained within the existing right-of-way limits or temporary workspace. Typically, an area 250 feet by 150 feet (or approximately 37,500 square feet) is sufficient in size but may vary depending on the requirements of the selected drilling contractor. The drill rig location will initially setup at this location and complete the pilot drill and reaming process.

The secondary staging area, which is to be located on the entry side of the crossing will be utilized to setup and install the drilling rig as per the drilling contractor's site plan. Typically, an area 250 feet by 150 feet (or approximately 37,500 square feet) is sufficient in size but may vary depending on the requirements of the selected drilling contractor. The drilling rig is used to pull back the inspected and tested pipe pull section from the exit side of the crossing back to the entrance side.

Risks Associated with HDD

Loss of Drilling Fluid Returns

Loss of drilling fluid returns typically occurs when the drill bit encounters large interstitial pore spaces in coarse soil materials (i.e. gravels and cobbles). Loss of returns is recognized by a decrease of drilling fluid returns, or a drop in drilling fluid pressure.

If interstitial pore spaces are small or discontinuous, they may fill with solids contained in the drilling fluid returns as drilling progresses beyond them. Once the pore spaces are filled, fluid will return up the bore hole again and fluid pressure will increase until another gravel layer is encountered. If gravel/cobble layers are continuous to the surface, drilling fluid may inadvertently return to the surface. Based on the soil conditions encountered in the borings, drilling fluid losses due to fractures or interstitial pore spaces is minimal.

Drilling Fluid Program

Borehole Slurry Density

The density of the slurry in the borehole directly affects the buoyancy force and therefore the normal force between the pipe rand the wall of the borehole. The density of drilling returns is a function of ground conditions, penetration rate, mud flow rate, drilling fluid composition, and efficiency of the mud cleaning system. In general, drilling return density varies between 9 and 11 pounds per gallon. In coarse gravel and cobbles, drilling fluid densities may approach 13 pounds per gallon.

For this project we anticipate drilling fluid return density will be on the order of 10 to 11 pounds per gallon where good returns are achieved, and drilling is performed in accordance with the HDD Good Practices Guidelines (2008).

Soil Conditions for Drilling Fluid Design

For the purpose of drilling fluid design, earth materials are divided into two categories: Inert, including sand and gravel; and reactive, including clay. Information regarding subsurface conditions likely to be encountered at the site is provided in the Subsurface Conditions section of the project's Geotechnical Investigation Report, as well as in the boring logs contained in Appendix A and Laboratory Testing contained in Appendix B of that report, which is provided as Appendix B to this Drilling Program Plan.

Drilling Fluid Selection

Drilling fluid program base fluid should be designed for site specific soil conditions. The base fluid may consist of either a bentonite or polymer and water, with additives to achieve specific fluid properties.

The drilling contractor should submit a base fluid design with a list of additives, loss of circulation materials, and grouting materials that may be used on the project and MSD sheets for approval at least two weeks prior to mobilization. Assistance with drilling fluid selection can be obtained from reputable drilling fluid suppliers.

Drilling Fluid System

During the drilling operations, Brotherton will have a Vermeer 9x12T Reclaimer at the entry and exit side of the bore location. These Vermeer shakers will support the reclaiming of drilling fluid to be recirculated downhole during the pilot, reaming and swabbing passes. The entry and exit pits will be excavated to an approximate dimension of 10'W x 20'L x 5'D. This will allow sufficient room for the 36" reamer to enter and exit each pit location. A mixture of bentonite and water will be pumped through the reclaimer at a rate 450 GPM and 150 PSI downhole.

Drill Bit and Reamer Selection

Drill bits and reamers should be selected based on anticipated subsurface conditions and experience. The drilling contractor should be prepared with a variety of bits and reamers that have worked well in similar soil conditions.

Soil and Fluid Volume

The volume of soil to be removed can be estimated as follows:

$(\text{Hole Diameter in Inches})^2 / 25 = \text{Volume in Gallons per Foot}$

Enough fluid should be pumped during drilling and reaming operations to maintain flow. Drilling rates and drilling fluid flow rates may be adjusted in the field to match varying site conditions. However, an estimate of drilling fluid demand is useful when sizing drilling equipment, mud pumps, and solids removal systems, and can be particularly helpful in determining realistic drilling rates. Drilling fluid demand can be estimated based on the bore hole volume and the following ratios:

Fluid Volume: Soil Volume	Ratio
Sand, Gravel, Cobble, Rock	1:1
Above, mixed with Clay	2:1
Clay or reactive Shale	3-5:1

Drilling rates can be estimated based on the drilling fluid demand and the pump output at the design base fluid viscosity.

Solids Separation Plant

Fine grained silts and clays are generally the most difficult to remove from drilling fluids. Depending on their extent, the presence of these soils along the proposed bore path may require use of desilters/centrifuge in order to remove the fine soils from the drilling fluids.

Fluidic Drag Coefficient

A fluidic drag coefficient of 0.050 psi (345 Pa) was recommended in the original Pipeline Research Council International (PRCI) design guidelines and is still routinely used by pipeline designers. Recently it has been suggested the coefficient could be decreased to 0.025 psi (172 Pa) for a stable borehole with good solids removal (Puckett, 2003). The higher value (0.050 psi) is recommended for routine calculations. The lower value (0.025 psi) may be appropriate for long bores in stable formations where significant cost saving could be realized by using a lower grade of steel or thinner pipe wall.

Borehole Friction Factor and Abrasion

A large portion of the pullback load is generated from friction between the pipe and the wall of the borehole. The pipe rubs against the borehole as it goes around sharp curves and is pushed against the top of the borehole by buoyancy and capstan forces. The friction factor is an expression of the ratio of the normal force between the pipe and the borehole wall and the axial force needed to drag the pipe along the wall. The PRCI Guidelines recommend friction factors of 0.2 to 0.3 for steel pipe. ASTM Standard F1962-99 recommends a friction factor of 0.3. Due to the presence of gravels, an abrasion resistant coating is recommended for steel pipes and generally required for natural gas pipelines. Recommended friction factors for abrasion resistant polymer concrete coating were not found in the above literature. The coating material is similar in texture to smooth, formed concrete. NAVFAC DM 7.02, Chapter 3, Table 1 reports friction factors for formed concrete against various soils types as presented in Table 1, below. The friction factors reported below do not account for the presence of a drilling fluid filter cake.

Table 1: Ultimate Friction Factors

Interface Material	Friction Factor (tanδ)	Friction Angle δ(deg.)
Clean gravel, sandy gravel, coarse sand	0.55 to 0.60	29 to 31
Clean fine to medium sand, silty medium to coarse sand, silty or clayey gravel	0.45 to 0.55	24 to 29
Clean fine sand, silty or clayey fine to medium sand	0.35 to 0.45	19 to 24
Very stiff and hard residual or pre-consolidated clay	0.40 to 0.50	22 to 26
Medium stiff and stiff clay and silty clay	0.30 to 0.35	17 to 19

Drill Pad Support

Surface soils in the vicinity of our exploratory boring near the HDD entry points may consist of clays and are not likely to provide adequate support for HDD drilling equipment. When these soils become wet, they may be slippery and unstable. Soil stabilization is likely to be required to provide a stable platform for the HDD drill rig and surrounding area. Use of a gravel surface course underlain by a geotextile is recommended where heavy truck and equipment traffic is planned. This may also be needed for a storm water pollution prevention plan (SWPPP).

Drill Continuance Plan

In the event of a frac-out Brotherton Pipeline along with the consultant and designated contact will determine an appropriate drill continuance plan, which will include the following.

1. Fracture Plugging (Bridging) Agents

In certain types of formations or conditions, fracture plugging agents (non-toxic) have been utilized with limited success. These agents shall be approved by the Environmental Field Specialist and include MAGMA-FIBER, MULTI-SEAL and MACRO-FILL. Walnut husks, sealant or other commercially available products. These are pumped down the drill hole left undisturbed for a predetermined length of time where upon drilling is restarted. If positive circulation is restored, drilling is continued using the same principles and contingency plans, if not drilling is halted.

2. Down Hole Cementing

If the fracture zone is determined to be too large for the use of plugging agents, the drill string may be inserted to a predetermined depth to allow a quick setting cement or thermal resin (nontoxic - See CETCO SDS Sheets) to be pumped down-hole in sufficient quantities to seal off the problem zone. If no further fracturing occurs, drilling is continued using the same principles and contingency plans; if, not drilling is halted.

3. Contain and Control

If the inadvertent release is on land, determined not to be causing an adverse effect, and the surface migration of the drilling mud can be adequately contained and controlled, then drilling can continue with the following conditions:

- There are no impacts to the environment or other adverse effects (i.e. no potential to contaminate surface or ground water, third party property damage or safety risks to the landowner, public or animals.)
- The area affected by the inadvertent release is minor and limited to only one location.
- The surface migration of the drilling mud is adequately contained (bermed with subsoil or a catch pit excavated).
- The contained free drilling mud is adequately controlled (any free drilling mud migrating to the surface is immediately and continually removed for the duration of the remaining drilling phase.
- The site is monitored at appropriate periods during the drilling cycle and the drilling contractor reduces pump/hole pressure accordingly in order to maintain control of the amount of mud being contained.

• The affected landowner is notified and permission for continued drilling is granted.

• The plan is discussed with appropriate regulatory agencies and their approval is obtained; and

• The affected site is remediated and reclaimed to meet approved criteria.

4. Relief Well Installation

In the event of a frac-out, if the above procedures are unsuccessful, a relief hole will be installed along the bore path to relieve drilling pressure and allow for drilling fluid to be contained at specific locations. A vertical well will be installed directly over the bore path, and outside of the waterway. This relief well will need to be at a location that is accessible to vacuum trucks and\or pumping equipment. Drilling fluids shall be extracted and re-circulated back to the entry pit. The relief well will require a secondary containment source to prevent any possibility of drilling fluids exiting the relief well.

5. Partial Hole Recovery

If of the above procedures are unsuccessful, down-hole cementing could be used to seal off a substantial portion of the existing hole back to a point where a "kick-off" can take place. The drilling would then be advanced along a different bore path, usually at a lower elevation. Again, careful monitoring of drilling fluids and drill path will be carried out using the same principles and contingency plans, if not drilling is halted.

In the event that none of the above procedures are successful or considered feasible, the hole will be abandoned and filled with cement, which will be batched on site using best management practices. A re-drill will be considered at a second location. Prior to determining the location of a second bore path, a geotechnical evaluation would be conducted to thoroughly evaluate subsurface conditions. All permissions, lease obligations, and the necessity for a subsurface utility investigation would be determined as part of the location selection for a second bore path.

6. Post-Construction Frac-Out Report

Following any frac-out event, a post construction report will be developed to document the event for submittal to USACE. The post-construction frac-out report would include, but not limited to the following information:

- A map that shows the frac-out locations
- Date and time of frac-out events
- Details of mitigation measures taken
- The "Before" and "After" photographs confirming the clean-up.

Directional Drill Mud Release Contingency Plan

Cleanup Plan

The Brotherton drill rig manager will report to the PG&E staffed Construction Manager, who will report directly to USACE. In addition to USACE, all applicable agencies shall be immediately notified of any frac-out incident. Please refer to Table 2: Agency Contact Information, which includes the agencies and agency contact information for the agencies pertinent to this project. Table 3: Exploration Team, includes the project team's names, titles, and affiliations as they relate to the project.

Agency Contact Information

Table 2: Agency Contact Information

Agency	Contact
California State Lands Commission (CSLC)	(562) 590-5201
California Governor's Office of Emergency Services (Cal-OES)	(800) 852-7550
US Army Corps of Engineers – Sacramento District - Emergency Management	(916) 557-6911

Exploration Team Information

Table 3: Exploration Team

Name	Organization	Title	Registration	Years of Experience
Alex Li, PE	PG&E	Pipeline Engineering and Design, Senior Gas Engineer	Professional Engineer (PE) Mechanical, No. 35578	11
Kelvin Qiu	PG&E	Gas Transmission Project Manager	N/A	9
Tyler S. DeSouza, PE	Kleinfelder	Trenchless Engineer/ Field Inspector	Professional Engineer (PE) Civil, No. 88355	6
Romeo Shiplee, PE	Kleinfelder	Lead Trenchless Engineer/ Field Inspector	Professional Engineer (PE) Civil, No. 81127	14
Vanessa Welsh	Kleinfelder	Project Manager	N/A	15
Jim Brotherton	Brotherton Pipeline	President and Owner	N/A	56
Matt Brotherton	Brotherton Pipeline	Rig Manager	N/A	28

Specific Measures for Directional Drill Mud Release - TO BE IMPLEMENTED WITH AN IMMEDIATE RESPONSE

• Shut down the drilling operations and access the significance of the frac-out area with visual monitoring.

• Mobilize a vacuum truck or 3" trash pump (with leak free hose) to the frac-out area if necessary. A pump would be required every 300' back to the entry pit.

• Frac-out area will be cleaned up using brooms, shovels, or mechanized equipment (skid steer) if possible.

• With Owner permission, a small hole may be excavated over the frac-out area to install a 3" trash pump for expediting the cleanup of the inadvertent fluid release.

• Filter fencing will be installed around the affected area to isolate, contain and prevent any further spreading.

• Drilling fluid will be evaluated for the possible implementation of lost circulation material.

• A swabbing pass may be required to clean the drill hole prior to the resumption of the pilot\reaming pass.

• An approved cleanup plan will be a necessity prior to resuming drilling operations.

Surface Casing

Surface Casing will only be used if the entry location cannot provide a stable geological formation for fluid to return to the pit. The casing would help minimize the risk of inadvertent returns near the entry location with the assumption of the bore eventually entering a solid or satisfactory formation.

3. Install surface casing at the entry point to a depth that extends beyond the coarsest material, if warranted.

4. Install surface casing at the exit point, after completion of the pilot hole if coarse textured near surface deposits could interfere with drilling mud circulation.

Mud Composition

5. The composition of drilling fluid will be limited to fresh water and high yield bentonite conforming to or exceeding American Petroleum Institute specifications. Other additives or substitutes will require approval from the project Planner/EFS/Biologist before being used in the drilling fluid.

Drilling Sumps

6. Construct subsoil berm(s) or sump(s) down slope from the entry point and proposed exit point with a capacity adequate to capture anticipated volumes of drilling mud that could be release during pullback and other drilling operations.

Contingency Plan Equipment and Supplies

7. Certain equipment will be required onsite in sufficient quantities during drilling operations to contain any inadvertent drilling mud releases. This equipment and supplies may include:

• (20) Sandbags;

• (100') filter cloth (e.g., silt fence);

• (12)T-bar posts;

• (4) shovels;

• (1) 55 Gallon Barrel;

• (2) 6 mil rolls polyethylene or equivalent; and

• (2) 3” trash pumps c/w sufficient lengths of leak free hose and suction heads.

All of the HDD equipment on site is available to affect an emergency containment of seepage of drilling fluid, and will be directed by the Rig Manager.

Manpower

8. All of the HDD contractor manpower are available to affect an emergency containment of seepage of drilling fluid, and will be directed by the Rig Manager.

Monitoring

9. Supervisory personnel will be onsite during drilling, reaming and pullback operations to ensure that contingency plan measures will be implemented immediately and effectively.

10. Monitor and record the amount of fluid return to the mud tank/pit and the amount of makeup drilling fluid required in the mixing tanks during drilling of the pilot hole and reaming.

Water Quality Monitoring (by others)

11. Ensure the water quality sampling program is in place before drilling and includes the following information:

- Sample locations (both an upstream control site as well as appropriate downstream sites).
- Frequency of sampling; and
- Sampling procedures.

12. Increase the sampling frequency if monitoring of drilling mud returns indicate that a release may have occurred.

Response

13. Where seepage of drilling fluid into a water body or riparian area is detected as possibly occurring, all drilling operations must stop. Rig Manager will initiate emergency response plan if seepage of drilling fluid into a water body or riparian area is confirmed.

14. The observation of a reduction in flow of drilling fluid will constitute a detection of a possible occurrence of seepage, and thus, if a reduction in the return flow of drilling fluid should occur, the Rig Manager will:

• Stop the advancement of the drilling assembly, pull the drive carriage to the top of the derrick, and shut off the drilling fluid pumps

• Conduct a survey of the ground surface and water body for evidence of seepage of drilling fluid to surface.

• The Brotherton drill rig manager will report to the PG&E staffed Construction Manager, who will report directly to USACE. Any incident will be reported immediately to USACE, and the relevant agencies listed in Table 2 of this plan.

• Assemble measurement data such as annular and/or standpipe pressure, forward thrust pressure, and observations such as the behavior of the return flow. Evaluate the measurement data and observations with the drill rig manager and PG&E staffed Construction Manager, who will report directly to USACE, if warranted.

Seepage

15. If seepage of drilling fluid to surface does occur, the Rig Manager will:

• Stop all drilling operations.

• Contain the seepage by erecting a sandbag and polyethylene berm (or other fit- for-purpose material), or by digging a pit, or a combination of both.

• The Brotherton drill rig manager will report to the PG&E staffed Construction Manager, who will report directly to USACE. Any incident will be reported immediately to USACE, and the relevant agencies listed in Table 2 of this plan.

• Assemble measurement data such as annular and/or standpipe pressure, forward thrust pressure, and

observations such as the behavior of the return flow.

• Evaluate the measurement data and observations with the Owner Representative.

• Document the incident according to company procedures.

Pilot Hole Deviation

16. If the pilot bore encounters conditions that interfere with steering accuracy, the drill rig manager will report to the PG&E staffed Construction Manager, who will report directly to USACE. Any incident will be reported immediately to USACE, and the relevant agencies listed in Table 2 of this plan. The Rig Manager will then take the appropriate action to complete the crossing.

These actions could include:

• Accepting the new drill path; and/or

• Adjusting the depth of the borehole path so the drill can avoid the problematic stratum; or

• Pulling out, moving over and drilling a new pilot hole

Loss of Circulation

17. If loss of circulation is encountered during the HDD, then the drill rig manager will report to the PG&E staffed Construction Manager, who will report directly to USACE. Any incident will be reported immediately to USACE, and the relevant agencies listed in Table 2 of this plan. The rig manager will need to assess the extent of fluid loss, determine its likely cause and take the best remedial action. These actions may include:

• Determining the fluid loss acceptable and continuing to drill/ream/pull; or

• Stopping the operation, re-establishing circulation and restarting the operation; or

• Abandoning the hole, moving over, and boring a new crossing path

Given that there are many factors to consider in determining if the HDD fails, a full evaluation of all relevant data will be made, and all reasonable options will be considered prior to seeking approval to use the contingency plan.

Waste Management

18. The Contractor and the Rig Manager will put in place the following measures in place to maintain the cleanliness of the work site.

• Store deleterious substances used in the operation and maintenance of equipment in approved containers, and store containers in a location and in a manner that protects them from being punctured, crushed and leaked into the watercourse.

• Provide segregated waste disposal containers for all general waste and dispose of such waste.

• Provide sanitary facilities for crew.

• Backfill and stabilize any pits excavated for anchoring or containment.

• Dispose of all waste drilling fluid and drilled solids according to and in conformance with regulatory requirements.

Waterway Inadvertent Return Management

If an Inadvertent Return would occur in the waterway, the following procedures will be implemented for mitigation.

• Immediately shut down of drilling operations and pull out pilot bore stem.

• Install turbidity curtain to assist in containment of any drilling fluids that may be released into the waterway (see Turbidity Curtain Specifications, below).

• In the rare event that drilling fluids reach the waterway, they will be removed as soon as feasible with the use of a Vactor truck by a contracted Vactor truck operator, or by using a boat and vacuum equipment, which would be staffed by the selected contractor.

• Forward ream down to enlarge the bore hole. By enlarging the bore hole diameter, it will assist in relieving the pressure as the drilling advances to a more suitable shoreline location.

• Continue advancing across the river until reaching a suitable location to install a vertical well that will relieve the pressure of the bore hole.

• Continue drilling operations while using a vacuum truck or pump system to remove the excess drilling fluids from vertical relief well location.

Turbidity Curtain Specifications

ACF Type I Silt Curtain effectively isolates silts and sediments in standing water. Protecting the environment from the harmful effects of turbid pollutants produced by disturbance of soils in and around bodies of water.

Flotation: 4”x4” marine grade expanded polystyrene foam, with 5.13 lb./ft lifting capacity (5:1 overall buoyancy factor). Foam is encased in RB88-X reinforced, hydrocarbon resistant High-Density Polyethylene with fold points 6’oc for ease of storage and deployment.

Curtain: 315 lb. tensile strength woven polypropylene fabric, Propex Geotex 315ST, provides superior strength and UV resistance. Standard depth of 7’, custom depths available.

Ballast: 1⁄4" galvanized steel chain in double stitched hem of curtain. Provides 0.70 lbs./ft ballast to maintain vertical orientation of curtain.

Groundwater Intrusion Management

• Over-excavate entry pit to dimensions of 8'x 8' by 5' deep pit.

• Collect Groundwater flowing into bore pit and pump out into 20,000 gallon frac tank using 6" pump.

• Hauled off and dispose of excess groundwater at approved dump site with vacuum trucks.

Fluid Flush Management Plan

• Over-excavate entry pit to dimensions of 8'x 8' by 5' deep pit.

• Collect drilling fluid flowing into bore pit and pump out into 20,000 gallon frac tank using 6" pump.

• Hauled off and dispose of excess groundwater at approved dump site with vacuum trucks.

Environmental Considerations

Planning

Brotherton Pipeline will adhere to all acts, regulations, Codes of Practice and best management practices that will guide the HDD process to ensure that there are no adverse environmental impacts as a result of the proposed intersect bore procedure. The HDD management plan has been developed to avoid any harmful alteration, disruption, or destruction of fish and fish habitat due to the possibility of any drilling fluids and additives entering a water body. The following mitigation measures will be implemented during the HDD crossing:

Monitoring

• The HDD contractor will monitor, by visual and electronic means:

• The return flow of drilling fluid from the borehole. A reduction in return flow shall be taken as indicating a possible seepage of drilling fluid.

• The annular and / or standpipe pressure. An unplanned reduction in pressure shall be taken as indicating a possible seepage of drilling fluid.

• The tank and pit volumes.

Any unplanned losses or gains will be reported, and increased diligence of upland and in-stream monitoring will be conducted.

• The HDD contractor will inspect all HDD equipment once every 12-hour shift to prevent the deposition of hydrocarbons onto the ground, or into a water body.

• Water Quality Monitoring is not part of Brotherton's scope of work.

• Monitoring during drilling via transect walk or other means of continuous mobility. Monitors may not be stationed in one location only, unless it can be demonstrated that the monitors can see frac-outs as they occur in the entire vulnerable area of the riverbed from each monitor's locations. This type of monitoring will be provided by the Client.

• The number of monitors will be determined by the Client's ability to monitor the vulnerable are of the riverbed. A minimum of one with a maximum of two monitors would be adequate to have onsite depending upon drilling and site conditions.

• All drilling will take place during daylight hours unless there is an unlikely event or unforeseen circumstance that may arise. This event will be communicated immediately to the Client and Owner for assurance that proper monitoring is available during evening\early morning hours.

Response

• The Rig Manager is the on-site authority for the HDD contractor. The Rig Manager has the authority to direct the rig crew, and the materials and equipment towards the protection of the environment.

Brotherton Pipeline will adhere to all acts, regulations, Codes of Practice and best management practices that will guide the HDD process to ensure that there are no adverse environmental impacts as a result of the water crossings. The HDD management plan has been developed to avoid any harmful alteration, disruption, or destruction of fish and fish habitat due to drilling fluids and additives entering a water body. The following mitigation measures will be implemented during the HDD crossing.

General Provisions

• The HDD contractor will comply with the plan prepared for the works, except where measures must be taken to deal with an emergency.

Deleterious Materials

The site prep subcontractor will:

• Provide the HDD contractor with a level work pad, and will construct a dirt berm around the work pad no less than1 foot in height.

• Be responsible for managing any dewatering procedures.

• Ensure that effective sediment and erosion control measures are in place along the HDD work-space access route, right-of-way and appurtenances and that they are functioning properly and are maintained and upgraded as required to prevent sediment from entering fish habitat.

• Limit use of hazardous materials.

• MSDS for fuel, lubricants, and mud products will be onsite.

Equipment

• All HDD equipment arriving on location is free from engine oil, hydraulic oil, fuel, and coolant leaks.

• All HDD equipment arriving on location is free from dirt, mud, vegetative debris, and other substances that may impact the water quality or the fish or fish habitat values of the water or land productivity.

• All equipment is maintained and serviced at least 100 feet from a water body. If it is not possible to conduct such activities greater than 100 feet from the watercourse, these activities will occur within a containment area that is capable of preventing the accidental release of a deleterious substance from entering a water body or contamination of soils or vegetation.

• Restrict all equipment to the cleared Right-of Way and work space.

• All portable equipment using fuels, hydrocarbon lubricants, coolants such as electrical generators and pumps used off of the bermed entry or exit work pad will be positioned inside of a sandbag berm (or equivalent) lined with leak free polyethylene or other containment structure that serves to prevent deleterious substances such as fuel from entering the soil or aquatic environment or contamination of soils or vegetation;

• All fuels, lubricants, coolant, and other substances are contained, controlled, and handled according to Occupational Health Safety regulations and Brotherton Pipeline's safety policy and procedures.

Work Areas

• All spoil materials from construction activities will be deposited, whether temporarily or permanently, above the high-water mark of the water body and in such a manner that does not allow its entry into the riparian zone or the channel of the water body.

• All work areas used by HDD crews have adequate run-off control structures in place to prevent wash materials or exposed or disturbed sediment from entering a water body.

Aquatic Resources

• All water intakes shall be screened in accordance with the Freshwater Intake End-of-Pipe Fish Screen Guideline published by the federal Department of Fisheries and Oceans and screens shall be maintained clear of debris.

• Ensure generators and pumps used for water intake have secondary containment, when stationed, operated or refueled within 100 ft of a watercourse. Additionally, no vehicle or equipment re-fueling shall occur with 250 ft from the edge of vernal pools, and 100 feet froth edge of other wetlands, streams or waterways.

Waste Management

• The composition of the drilling fluid will be limited to fresh water and high yield bentonite conforming to or exceeding American Petroleum Institute specifications. Other additives or substitutions will be submitted for approval before being used in the drilling fluid.

• An MSDS sheet is maintained on the work location for all drilling fluid additives.