

RECLAMATION

Managing Water in the West

Environmental Assessment

Henry Miller Reclamation District #2131 Island Canal System Modernization Project

**WaterSMART: Water and Energy Efficiency Grant
Grant No. R13SF80003**



**U.S. Department of the Interior
Bureau of Reclamation
Mid-Pacific Regional Office
Sacramento, CA**

January 2014

Mission Statements

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

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List of Acronyms and Abbreviations

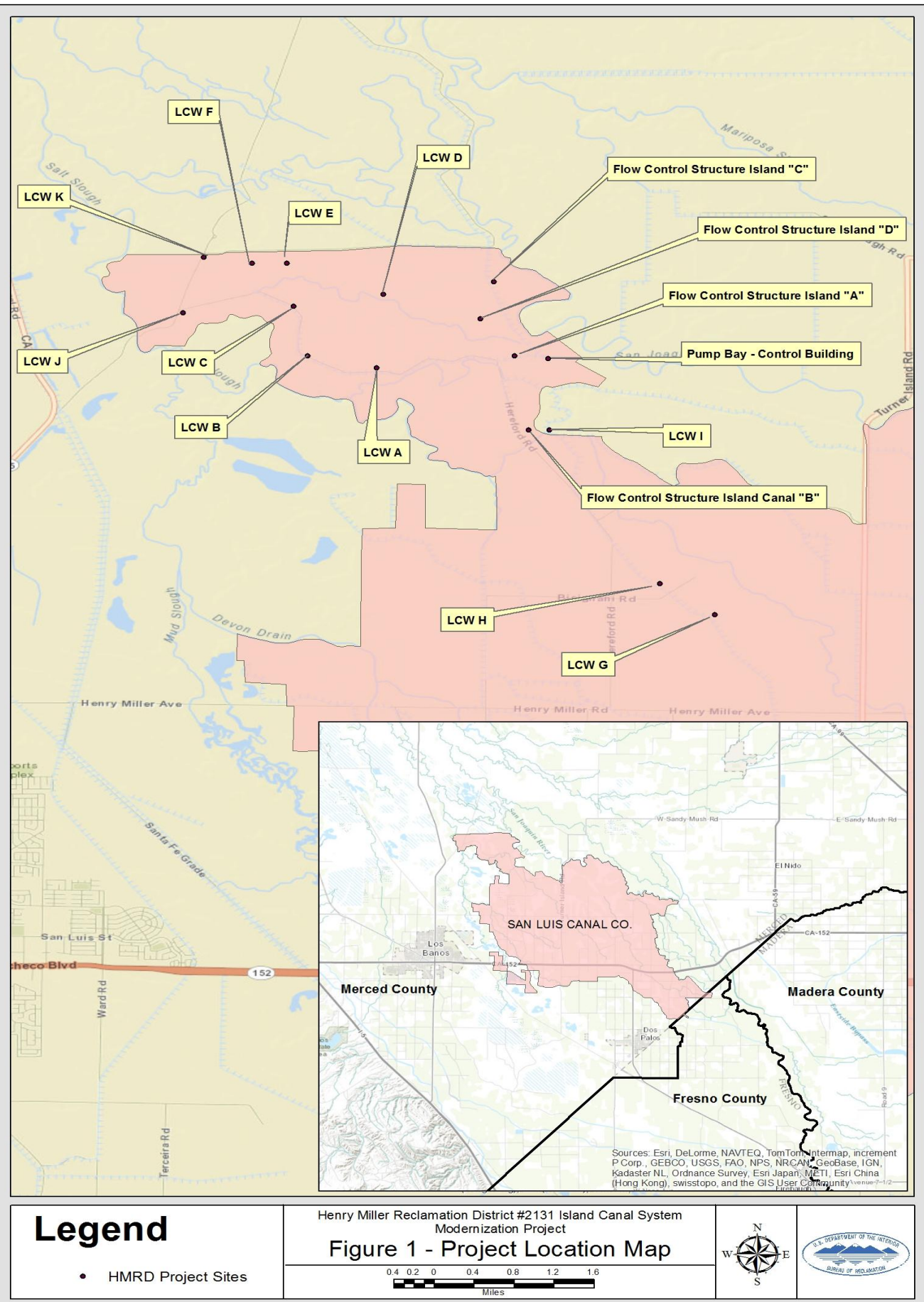
AF	acre-feet
afy	acre-feet/year
APE	Area of Potential Effect
CAAQS	California Ambient Air Quality Standards
CFR	Code of Federal Regulations
CO	Carbon monoxide
cu-yrds	cubic yards
DOI	Department of the Interior
EA	Environmental Assessment
GGs	Giant garter snake
HMRD	Henry Miller Reclamation District No. 2131
LCW	long-crested weir
NAAQS	National Ambient Air Quality Standards
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
NO _x	Nitrogen oxides
O ₃	Ozone
PM ₁₀	Particulate matter between 2.5 and 10 microns in diameter
PM _{2.5}	Particulate matter less than 2.5 microns in diameter
Project	Island Canal System Modernization Project
Reclamation	Bureau of Reclamation
ROG	reactive organic gases
Service	U.S. Fish and Wildlife Service
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SJKF	San Joaquin kit fox
SJVAB	San Joaquin Valley Air Basin
SJVAPCD	San Joaquin Valley Air Pollution Control District
SLCC	San Luis Canal Company
SO ₂	Sulfur dioxide
sq-ft	square-feet
VOC	volatile organic compounds

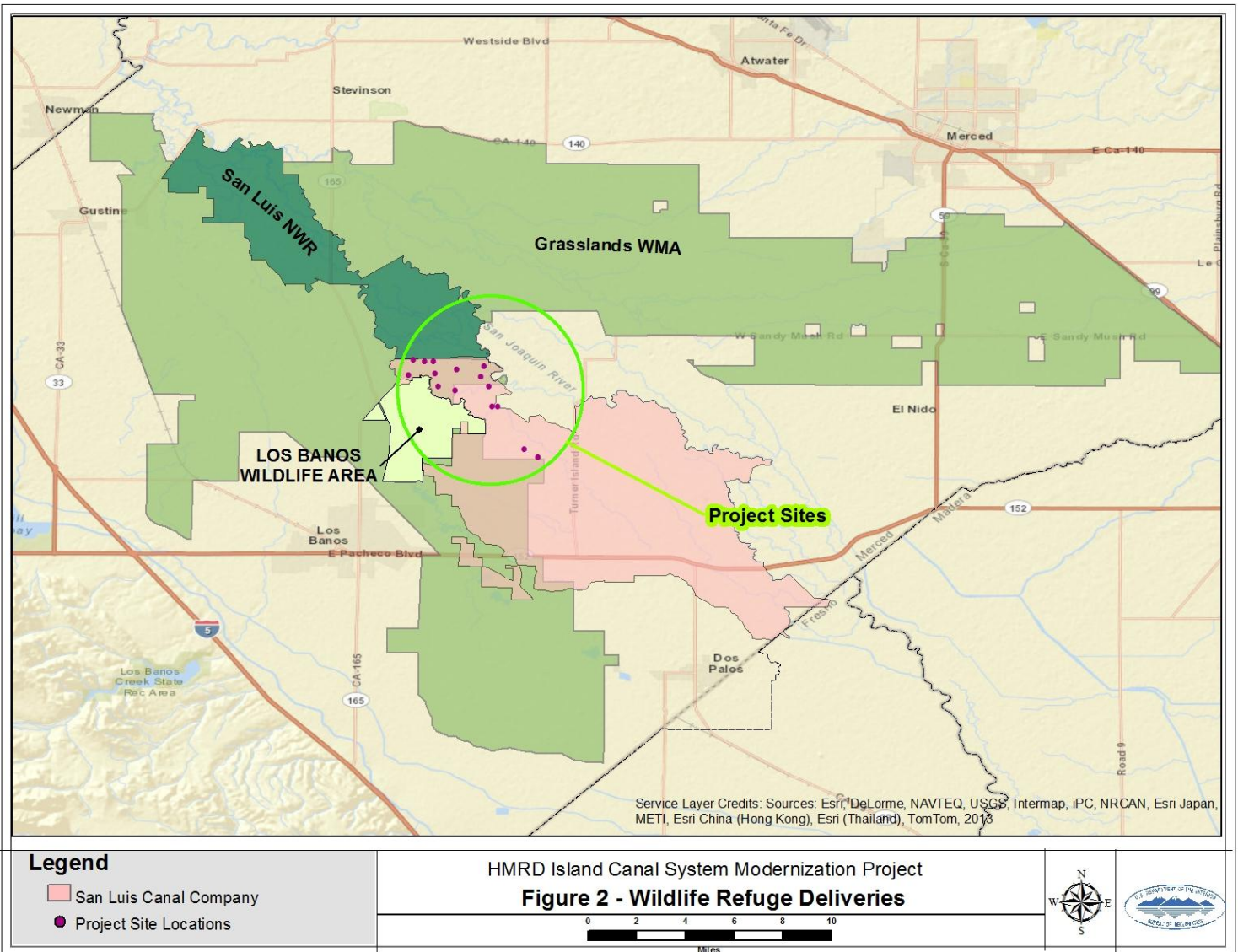
Section 1 Introduction

This Environmental Assessment (EA) has been prepared by the Bureau of Reclamation (Reclamation) to examine the potential direct, indirect, and cumulative impacts to the affected environment associated with providing a federal grant to Henry Miller Reclamation District No. 2131 (HMRD) to partially fund its Island Canal System Modernization Project (Project). HMRD's water system was first installed by Miller and Lux over 100 years ago and is a completely gravity-fed system, consisting of 59 miles of unlined main canals, 98 miles of lateral canals, 113 miles of surface ditches, and a few recirculation pumps. HMRD is an agricultural district encompassing 47,285 gross acres with crops consisting of cotton, alfalfa, tomatoes, corn, winter crops, pasture, safflower, and sugar beets. The water use within the District boundaries is entirely for agricultural irrigation.

HMRD was formed in FY2000 and operates and maintains canals and drains in the San Luis Canal Company (SLCC) within Merced County, California. HMRD works in conjunction with the SLCC to deliver irrigation water and provide drainage service to SLCC customers. As a member of the San Joaquin River Exchange Contractors, the SLCC has an annual contractual entitlement of 163,000 acre-feet (AF) in most years, and 123,000 AF during critical years as measured by the Shasta Index. The actual deliveries to farmers average 130,000 acre-feet per year (afy). HMRD also "wheels" 28,000 AF of water to the U.S. Fish and Wildlife Service (Service), 8,200 AF to the California Department of Fish and Wildlife, and 8,800 AF to Grasslands Resource Conservation District.

The Island Canal system is located at the northern end of HMRD's irrigation system in Merced County, California (see Figure 1). It serves farmland along the north edge of the District and delivers water to the San Luis National Wildlife Refuge, Los Banos Wildlife Area, and North Grasslands Wildlife Area (see Figure 2). The Island Canal system is the continuation of the Delta Canal which conveys San Joaquin River water from the Arroyo Canal. All these canals are operated under upstream control with regular flashboard check structures, and the District recently installed a Supervisory Control and Data Acquisition system to control a central regulating reservoir and several flow control structures.





1.1 Need for the Proposal

During previous years, unnecessary canal spill within HMRD was measured and totaled approximately 1,700 AF. Also, approximately 1,000 AF of water in the Island Canal system is from deep well pumping and is high in salinity, which could be replaced with water conserved by the Project. The HMRD needs to reduce unwanted operational spill, improve its water management and service to water users, and reduce its dependence on the Delta and groundwater.

Modifications to the Island Canals (“A”, “B”, “C”, “D” – Figure 3) would allow the system to respond to unexpected variation in inflows from the upstream Delta Canal system, while maintaining constant flows to local turnouts.

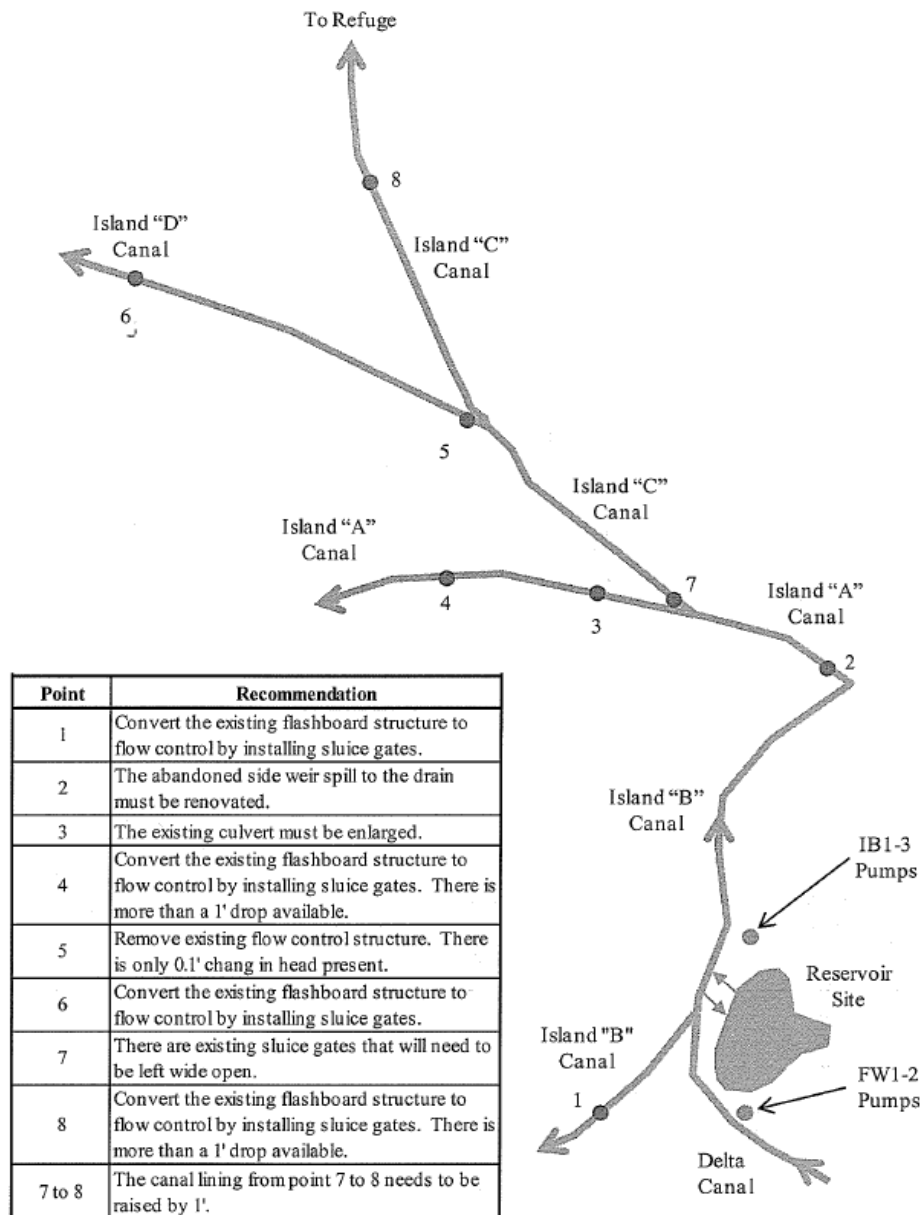


Figure 3: Island Canal System Modification Points

1.2 Resources Analyzed in Detail

The range of potential impacts assesses whether constructing a pump bay control building and retrofitting 15 existing check structures into four modern automatic flow control structures and 11 long-crested weirs (LCWs) might cause potentially adverse effects on the human environment. This EA will analyze the affected environment of the Proposed Action and No Action Alternative in order to determine the potential impacts and cumulative effects to the following environmental resources:

- Water Resources
- Air Quality

- Biological Resources
- Cultural Resources

Impacts to the following resources were considered and found to be minor or absent. Brief explanations for their elimination from further considerations are provided below:

- **Indian Sacred Sites:** The Proposed Action is not on federal lands, and will neither affect nor prohibit access to and ceremonial use of Indian sacred sites.
- **Indian Trust Assets:** There are no Indian reservations, rancherias, or allotments in the Project area. The nearest Indian Trust Asset is Public Domain Allotment approximately 42 miles southwest of the Project location. The Proposed Action does not have the potential to affect Indian Trust Assets.
- **Environmental Justice:** No significant changes in agricultural communities or practices would result from the Proposed Action, other than potential changes to individual irrigation structures. These changes are not likely to have affects to any individuals or populations within the action area. Accordingly, the Proposed Action would not have disproportionately negative impacts on low-income or minority individuals or populations.

Section 2 Proposed Action and Alternatives

2.1 No Action Alternative

The No Action Alternative would consist of Reclamation not providing grant funding to facilitate water conservation measures at HMRD. Although it is possible that HMRD may find alternative sources of funding for the Proposed Action, for the purposes of this EA, the consequence of Reclamation not funding the Proposed Action would be no construction of the Proposed Action. The irrigation system currently in place would continue to operate and HMRD would continue to provide irrigation service to its users via the Island Canal system.

2.2 Proposed Action

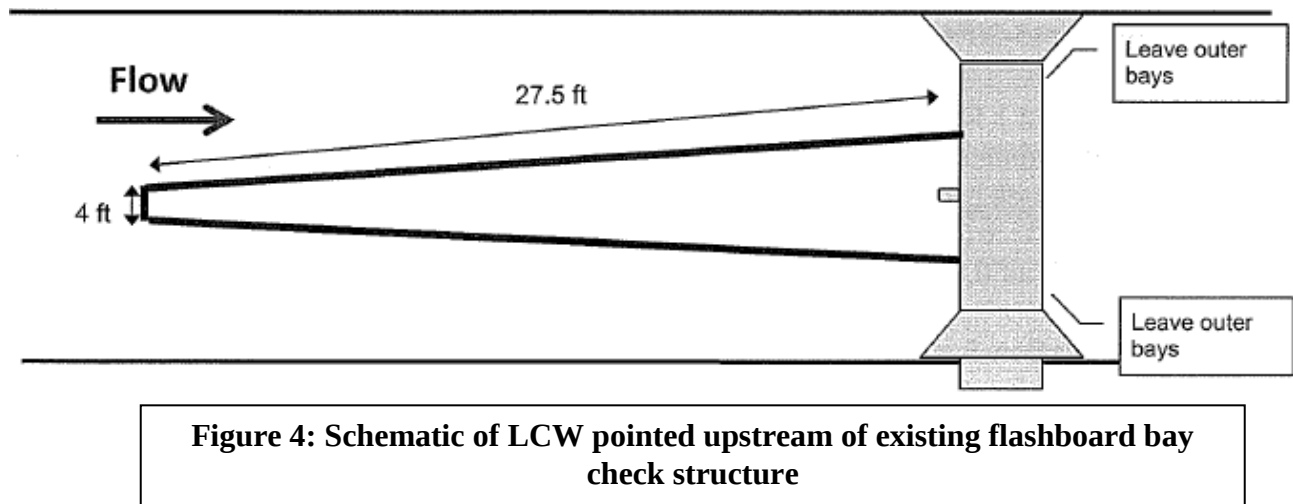
Reclamation proposes to award a Department of the Interior (DOI) WaterSMART Water and Energy Efficiency grant to HMRD to fund a portion of the Project. The Project would involve constructing a pump bay control building, retrofitting 15 existing check structures into four modern automatic flow control structures and 11 LCWs, and extending the height of the concrete canal liner by five inches on both sides of the Island “C” Canal from the head of the canal for a distance of approximately 1,100 feet to the head of Island “D” Canal.

Construction Activities would include (see Appendix A for engineering drawings):

- **Pre-Project Work:** Prior to construction work the Island Canals, Delta Canal, and Noble Ditch would be dewatered, and cleaned only at the proposed construction sites. HMRD does not expect to clean and dredge the canals of silt and debris as this maintenance task was

carried out between one and two years ago. One excavator would be used to move the material dredged at each construction site, which would be stored inside the channel prism right upstream of the sites, leaving the canal roads accessible.

- **Retrofitting Existing Check Structures into LCWs “A” – “K”:** The new LCWs would be built by taking up the middle flashboard bays in each check structure, reconfiguring the remaining portion of the bays (refer to the sketch in Figure 4). The bottom of the canal would be prepared for placement of a 12” concrete slab floor where the LCW structures would be placed, and to which the steel frame would be attached. Eight LCWs (A, B, C, D, E, F, J, and K) on Island “A” and “D” Canals and Noble Ditch would be 18.3’-long x 3’-wide. Construction of these eight LCWs is expected to take 1 ½ weeks each to complete with a total of 12 weeks. The remaining three LCWs (G, H, and I) would be 50’-long x 10’-wide. Construction of these three LCWs is expected to take three weeks each to complete with a total of nine weeks. Construction activities would be performed with one dump truck, one excavator, one concrete pump, and one cement truck at each site.



- **Retrofitting Existing Check Structures into Flow Control Structures at Island “A”, “B”, “C”, and “D” Canals:** A base of 12” of rock (volume of 6.5 cu-yds per site) would be placed on the bottom of the new 20’-long x 10’-wide flow control structures. At each new structure sluice gates would be fitted, four concrete stilling wells would be constructed, and a total of 290 sq-ft of concrete would be placed along the canal banks and bottom on the downstream side of the structures for erosion control. These construction activities would be performed with one dump truck, one excavator, one concrete pump, and one cement truck. Either a boom truck or backhoe would be used for gate and SCADA enclosure installation at each site. Construction of the flow control structures is expected to take three weeks to complete per site with a total of 12 weeks. See Figures 5 and 6 for an example of a flow control structure built on Temple Santa Rita Canal with concrete aprons for erosion control.



Figure 5: Example Automated Flow Control Structure



Figure 6: Flow Control Concrete Apron (Downstream)

- Extending Island "C" Canal Liner Height by Five Inches: Prior to construction of the Island "C" Canal flow control structure, the height of the concrete canal liner from the head of Island "C" Canal towards the head of Island "D" Canal would be extended by five inches on both sides of the canal for a distance of approximately 1,100 feet. This would be accomplished by placing concrete on top of the liner extending five inches over the canal bank. The extension would be held in place by excavating behind the existing liner to a depth of five inches and placing a concrete anchor. Construction activities would be performed with shovels, one dump truck, one concrete pump, and one cement truck. The extension would take approximately three weeks to complete.



Figure 7 - Island "C" Canal Liner Extension Location

- Pump Bay Control Building Construction:** A brick pump bay control building would be constructed to house the SCADA equipment that would control the pumps. It would be located on the south side of the head of Island “A” Canal (see Figure 7). The site would be excavated approximately 6” deep for the building, and two feet deep for the building’s concrete anchors. The building would be approximately 20’ x 10’ x 8’ with a shingled roof and solar panels, and a 6” thick reinforced concrete floor over a 3” layer of sand fill and 6-mm polyethylene vapor barrier. The building walls would be anchored with reinforced concrete extended two feet into the ground. A 4’ x 4’ x 4” thick concrete pad leading to the metal door of the building would be poured. Construction of the pump bay control building is expected to take four weeks to complete. The pumps, meter, and solar panel installation is also expected to take half a week to complete. Pump bay control building construction activities would be accomplished with one dump truck, one excavator, one concrete pump, and one cement truck. Either one boom truck or backhoe would be used to install the pumps, meter, and solar panels. Engineer drawings of a pump bay control building constructed in 2011 that exemplify the building of this Project may be found in Appendix A.

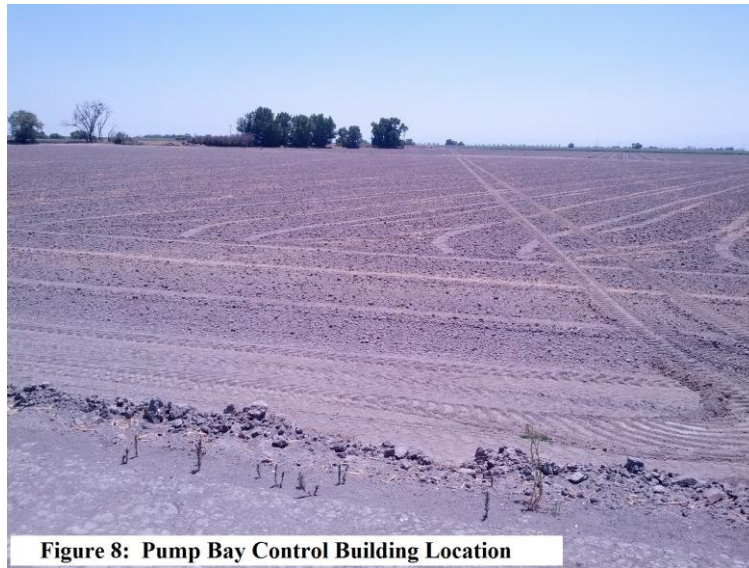


Figure 8: Pump Bay Control Building Location

Ground disturbance for the modernization of HMRD’s check structures into LCWs and flow control structures, and construction of the pump bay control building would be minimal. The Island Canals, Noble Ditch, and Delta Canal would be cleaned of silt and debris only at the specific Project sites. Approximately 382 cu-ft of material would be excavated (1,100’ x 5” x 5” per canal bank) immediately behind the existing Island “C” Canal concrete liner to raise the liner height five inches. Excavated material at these sites would be stored upstream in the channel prism during construction and later used as an additional layer around the bottom of the structures for erosion protection, and as compacted backfill to narrow the width of the channel prism by approximately 7’ at the flow control structure sites. 120 cu-ft of earth would be excavated at the pump bay control building site and either used as additional backfill and erosion protection or brought to the District’s storage yard. All of the work involved with the Project would be performed in previously disturbed contexts such as canal roads, canal banks, regularly-maintained canal infrastructure, and previously cultivated farmland. Construction activities would begin as soon as permitted and be completed in approximately three years by 2015, two to three months at a time from November up to the end of

January. After the construction is finalized, all the SCADA programming for the alarming, control algorithms, testing and field verification would take place.

Section 3 Affected Environment and Environmental Consequences

3.1 Water Resources

3.1.1 Affected Environment

HMRD obtains its surface water supply from the Delta-Mendota Canal through its work in conjunction with the SLCC. This water is conveyed through the Arroyo Canal and Delta Canal for crop irrigation. HMRD diverts an average of 130,000 afy, with approximately 40,000 afy pumped from deep wells and approximately 90,000 afy recirculated by 33 “low-lift” pumping plants. The Island Canal system diverts approximately 35,000 afy through the flume from Delta Canal and pumps approximately 1,000 afy from deep wells.

HMRD water is currently leaving the irrigation system as unnecessary operational spill at the end of the Island “A” Canal and the Noble Ditch at the rate of approximately 1,700 afy and is not recoverable by the District.

3.1.2 Environmental Consequences

No Action

Under the No Action Alternative, no changes would occur to existing operations or the HMRD’s water supply.

Proposed Action

The water level variation (0.5 feet) over the weir crest would be reduced by approximately 75 percent with LCWs installed as water level control structures. Installing flow control structures on Island “A, B, C, and D” Canals with acoustic flow meters would allow the District to constantly regulate the flow downstream of the structures on these canals to minimize spill out of the District. The Island Canal system would be able to respond more easily to unexpected variation in inflows from the upstream Delta Canal system, and manage changes in flow rate in the canals to avoid negatively impacting water deliveries to growers’ turnouts or to the headworks of other canal systems. Retrofitting the existing flashboard structures could directly improve the reliability and flexibility of deliveries to approximately 2,900 acres in the District.

The District estimates that the unnecessary spill of 1,700 AF could be reduced by 95 percent with the modernization proposal bringing the operational spill down to less than 200 AF, conserving approximately 1,500 afy. The District also anticipates reducing the deep well pumping (1,000 AF in this canal system) by 75 percent, providing 750 AF in savings. The total of these savings is 2,250 AF. Looking at the Island Canal System in particular, approximately 35,000 afy are diverted through the flume, so the 2,250 AF of savings would represent approximately 6 percent of water conserved. The Proposed Action could also lead to an improvement in flexibility to order and shut

off the water being delivered to the farmer's fields, resulting in less water lost to deep percolation and runoff, and improving on-farm irrigation efficiency.

The reduction in deep well pumping would also improve water quality since the water produced from these deep wells is high in salinity. These savings could contribute to future solutions for regional water quality and drainage issues in the San Joaquin River. Currently, there are pumping restrictions from the Delta and many users south of the Delta need more water. Water that is conserved in HMRD through the Project could reduce diversion needs from the Delta-Mendota Canal, providing additional water for potential transfers south of the Delta.

3.2 Air Quality

Section 176(c) of the Clean Air Act (42 U.S.C. 7506(c)) requires that any entity of the federal government that engages in, supports, or in any way provided financial support for, licenses or permits, or approves any activity to demonstrate that the action conforms to the applicable State Implementation Plan (SIP) required under Section 110(a) of the Clean Air Act (42 U.S.C. 7401(a)) before the action is otherwise approved. In this context, conformity means that such federal actions must be consistent with a SIP's purpose of eliminating or reducing the severity and number of violations of the National Ambient Air Quality Standards (NAAQS) and achieving expeditious attainment of those standards. Each federal agency must determine that any action that is proposed by the agency and that is subject to the regulations implementing the conformity requirements will, in fact, conform to the applicable SIP before the action is taken.

3.2.1 Affected Environment

The Proposed Action lies within the San Joaquin Valley Air Basin (SJVAB), the second largest air basin in the State. Air basins share a common "air shed", the boundaries of which are defined by surrounding topography. Although mixing between adjacent air basins inevitably occurs, air quality conditions are relatively uniform within a given air basin. The SJVAB experiences episodes of poor atmospheric mixing caused by inversion layers formed when temperature increases with elevation above ground, or when a mass of warm, dry air settles over a mass of cooler air near the ground.

The SJVAB lies within the management area of the San Joaquin Valley Air Pollution Control District (SJVAPCD). Despite years of improvements, the SJVAB does not meet all State and Federal health-based air quality standards. NAAQS and California Ambient Air Quality Standards (CAAQS) have been established for the following criteria pollutants: carbon monoxide (CO), ozone (O₃), sulfur dioxide (SO₂), nitrogen dioxide, inhalable particulate matter between 2.5 and 10 microns in diameter (PM₁₀), particulate matter less than 2.5 microns in diameter (PM_{2.5}), and lead. The CAAQS also set standards for sulfates, hydrogen sulfide and visibility.

The SJVAB has reached NAAQS and CAAQS attainment status for all criteria pollutants except for O₃, PM₁₀ (CAAQS only), and PM_{2.5}. As a result, the emissions of most concern are O₃ (which includes precursors such as volatile organic compounds [VOC] and nitrogen oxides [NO_x]), PM₁₀ and PM_{2.5}. Table 1 below shows the attainment status and *de minimis* threshold for general conformity for the criteria pollutants of most concern.

Table 1. SJVAB Attainment Status and <i>De Minimis</i> Thresholds for Federal Conformity Determinations		
Pollutant	Attainment Status ^a	(tons/year)
VOC (as ozone precursor)	Nonattainment ^d	10 ^b
NO _x (as an ozone precursor)	Nonattainment ^d	10 ^b
PM ₁₀	Nonattainment (CAAQS) Attainment (NAAQS)	15 ^c
PM _{2.5}	Nonattainment	100 15 ^c
^a Source: http://www.arb.ca.gov/desig/adm/adm.htm ^b 40 CFR 93.153 ^c SJVAPCD Threshold ^d The SJVAB is designated as Extreme for O ₃ NAAQS		

3.2.2 Environmental Consequences

No Action

Under the No Action Alternative there would be no effect on conditions and trend in air quality within the SJVAB.

Proposed Action

Construction emissions would vary from day to day and by activity, depending on the timing and intensity of construction, and wind speed and direction. Generally, air quality impacts from the Proposed Action would be localized in nature and decrease with distance. Ground disturbing activities would result in the temporary emissions of fugitive dust and vehicle combustion pollutants during the following activities:

- Earthwork (site preparation, structure removal, compacting backfill and stockpiling)
- Construction equipment and haul truck engine emissions

Construction workers would also arrive to and from the sites in two pickup trucks. Standard best management practices, such as road-watering and vehicle maintenance will be employed to minimize these impacts. All construction work would occur on an existing facility which is surrounded by irrigated agriculture. Calculated emissions from the Proposed Action were estimated using the 2013 CalEEMOD software (version 2013.2.1), which incorporates emission factors for reactive organic gases (ROG), NO_x, CO, SO₂, and both fugitive and exhaust PM₁₀, and PM_{2.5}. Total project emissions are presented in Table 2 below.

Table 2. Estimated Project Emissions ^a	
Pollutant	Construction (tons/year)
ROG/VOC	0.10
NO _x	0.77
PM ₁₀	2.62
PM _{2.5}	0.29
Carbon dioxide equivalent	93.80 (MT/year)

^a Source: CalEEMOD version 2013.2.1

As shown in Table 2, the Proposed Action has been estimated to emit less than the *de minimus* thresholds for NO_x and ROG/VOC as O₃ precursors, PM_{2.5}, and PM₁₀; therefore, a Federal general conformity analysis report is not required. Notwithstanding this observation, the Proposed Action would comply with the SJVAPCD's Regulation VIII (SJVAPCD 2012) control measures for construction emissions of PM₁₀. One of these control measures includes the use of water with all "land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities" for fugitive dust suppression. However, if dust suppression measures are not implemented, the estimated emissions for PM_{2.5} (0.67 tons/year) and PM₁₀ (6.40 tons/year) would still be below the respective thresholds.

3.3 Biological Resources

3.3.1 Affected Environment

For the purpose of this EA, biological resources include vegetation, wildlife, and waters of the United States. The HMRD encompasses 47,285 gross acres with the majority of the crops consisting of cotton, alfalfa, tomatoes, corn, winter crops, wetland vegetation, pasture, safflower, and sugar beets. Development of land to irrigate crops has been the historic land use within the HMRD. Currently the Proposed Action area is annually excavated, graded, and sprayed for maintenance. In addition, irrigation, maintenance and harvesting occur throughout the surrounding area on an annual basis.

Potential Federally Listed Species in the Proposed Action Area

On July 25, 2013, a list of federally listed, proposed and candidate species potentially occurring within the Proposed Action area and surrounding areas was obtained from the Service website. The following Table 3 includes federally listed species potentially occurring within the San Luis Ranch and its surrounding Turner Ranch, Delta Ranch, Los Banos, Volta, Ingomar, Gustine, Stevinson, Arena, Atwater, Sandy Mush, Santa Rita Bridge, Oxalis, Dos Palos, Charleston School, and Ortigalita Peak NW USGS 7.5-minute Quadrangles. Also included is a brief of their status, determination of effects from the Proposed Action, and summary of the rationale supporting the determination.

Table 3: Federally-Listed Species Identified as Potentially Occurring in the Delta Ranch and Immediate Surrounding USGS 7.5-minute Quadrangles

Scientific Name	Common Name	Federal Status	Effects	Potential habitat utilized by species in Proposed Action Area
INVERTEBRATES				
<i>Lepidurus packardii</i>	Vernal pool tadpole shrimp	E	NE	Absent. There are historic records of vernal pool habitat in the nearby San Luis National Wildlife Refuge, but none in the Proposed Action area. No vernal pool habitat would be disturbed. Water quality of vernal pools would not be affected.

Scientific Name	Common Name	Federal Status	Effects	Potential habitat utilized by species in Proposed Action Area
<i>Desmocerus californicus dimorphus</i>	Valley elderberry longhorn beetle	T	NE	Absent. No suitable habitat in the Proposed Action area. No elderberry shrubs would be disturbed.
<i>Branchinecta lynchi</i>	Vernal pool fairy shrimp	T	NE	Absent. There are historic records of vernal pool habitat in the nearby San Luis National Wildlife Refuge, but none in the Proposed Action area. No vernal pool habitat would be disturbed. Water quality of vernal pools would not be affected.
<i>Branchinecta conservatio</i>	Conservancy fairy shrimp	E	NE	Absent. There are historic records of vernal pool habitat in the nearby Grasslands Wildlife Management Area, but none in the Proposed Action area. No vernal pool habitat would be disturbed. Water quality of vernal pools would not be affected.
<i>Branchinecta longiantenna</i>	Longhorn fairy shrimp	E	NE	Absent. There are historic records of vernal pool habitat in the nearby San Luis National Wildlife Refuge, but none in the Proposed Action area. No vernal pool habitat would be disturbed. Water quality of vernal pools would not be affected.
AMPHIBIANS				
<i>Ambystoma californiense</i>	California tiger salamander	T	NE	Absent. There are historic records of vernal pool habitat in the nearby San Luis National Wildlife Refuge, but none in the Proposed Action area. No disturbance to wetland habitat or change to water quality of their habitat.
<i>Rana draytonii</i>	California red-legged frog	T	NE	Absent. Species absent from San Joaquin Valley floor and from vicinity of the Proposed Action area. No suitable habitat in the Proposed Action area. No change to wetland or riparian habitat.
REPTILES				
<i>Gambelia sila</i>	Blunt-nosed leopard lizard	E	NE	Absent. No suitable habitat in the Proposed Action area. No suitable habitat would be disturbed.
<i>Thamnophis gigas</i>	Giant garter snake (GGS)	T	NLAA	Potential Upland Denning Habitat. Salt Slough and drainage ditches filled with water year-round are adjacent to three Project sites. Although there would be some canal bank disturbance at two of these sites, no work would occur outside of the canal

Scientific Name	Common Name	Federal Status	Effects	Potential habitat utilized by species in Proposed Action Area
				prisms, there are no sufficient rodent burrows in the adjacent drainage ditches for GGS to den in. There are historic records of GGS within four to 10 miles away from the Proposed Action area. No disturbance to aquatic habitat would occur. Considering that construction activity and storage would remain within five inches of the canal prism, its isolation from extant GGS populations, its marginal to poor suitability as foraging habitat, and dated sightings, the probability that GGS is resident within the action area is low. Avoidance measures would be implemented during construction to avoid potential effects.
MAMMALS				
<i>Dipodomys ingens</i>	Giant kangaroo rat	E	NE	Absent. No suitable habitat in the Proposed Action area. No suitable habitat would be disturbed.
<i>Dipodomys nitratooides exillis</i>	Fresno kangaroo rat	E	NE	Absent. No suitable habitat in the Proposed Action area. No suitable habitat would be disturbed.
<i>Vulpes macrotis mutica</i>	San Joaquin kit fox (SJKF)	E	NLAA	Potential Migratory Corridor. There have been more recent historic records of SJKF three – 11 miles away from the Proposed Action area. Surrounding cultivated farmland presents unsuitable foraging and denning habitat, but the action area may be used as a migratory corridor. Avoidance measures would be implemented during construction to avoid potential effects.

Key:

- (PE) Proposed Endangered – Proposed in the Federal Register as being in danger of extinction
- (PT) Proposed Threatened – Proposed as likely to become endangered within the foreseeable future
- (E) Endangered– Listed in the Federal Register as being in danger of extinction
- (T) Threatened – Listed as likely to become endangered within the foreseeable future
- (C) Candidate – Candidate which may become a proposed species
- (NE) No Effect – Proposed Action will have no effect on the species
- (NLAA) Not Likely to Adversely Affect – Proposed Action may affect the species, but is not likely to adversely affect.

Giant Garter Snake

GGS inhabits agricultural wetlands and other waterways such as irrigation and drainage canals, sloughs, ponds, small lakes, low gradient streams, and adjacent uplands in the Central Valley (USFWS 1999). Habitat requirements for GGS consist of (1) adequate water during the snake's

active season (early-spring through mid-fall) to provide food and cover; (2) emergent, herbaceous wetland vegetation, such as cattails and bulrushes, for escape cover and foraging habitat during the active season; (3) grassy banks and openings in waterside vegetation for basking; and (4) higher elevation uplands for cover and refuge from flood waters during the snake's inactive season in the winter (USFWS 2009).

San Joaquin Kit Fox

Kit fox are an arid land-adapted species and typically occur in desert-like habitats in North America. Such areas have been characterized by sparse or absent shrub cover, sparse ground cover, and short vegetative structure. The subspecies historically ranged in alkali scrub/shrub and arid grasslands throughout the level terrain of the San Joaquin Valley floor from southern Kern County north to Tracy in San Joaquin County, and up into more gradual slopes of the surrounding foothills and adjoining valleys of the interior Coast Range. Within this range, the kit fox has been associated with areas having open, level, sandy ground that is relatively stone-free to depths of about 3 to 4.5 feet. The SJKF utilizes subsurface dens, which may extend to six feet or more below ground surface, for shelter and for reproduction. SJKF subspecies are absent or scarce in areas where soils are shallow due to high water tables, impenetrable hardpans, or proximity to parent material, such as bedrock. The SJKF also does not den in saturated soils or in areas subjected to periodic flooding. Reproductive success appears to be correlated with prey abundance.

3.3.2 Environmental Consequences

No Action

Under the No Action Alternative, there would be no impacts to wildlife and special-status species as no new construction would occur and historical operation and maintenance practices would continue.

Proposed Action

Under the Proposed Action, the potential for impacts to wildlife and special-status species would be limited, since the Project would be constructed within the existing annually excavated, graded, and sprayed Island Canal prism. Also, lands surrounding the Proposed Action are either actively farmed or contain farm support facilities (such as shops and farm houses), resulting in the absence of sufficient habitat required to support special-status species that historically might have utilized or inhabited the Proposed Action area. Based on the habitat requirements of the listed species that could potentially occur within the Proposed Action area, the Proposed Action does not provide suitable habitat for the Vernal pool tadpole shrimp, Valley elderberry longhorn beetle, Vernal pool fairy shrimp, Conservancy fairy shrimp, Longhorn fairy shrimp, California tiger salamander, California red-legged frog, Blunt-nosed leopard lizard, Giant kangaroo rat, and the Fresno kangaroo rat. Therefore, these species are not discussed in this section.

Though occurrences of neither listed sensitive species have been observed during the implementation of previous projects within the HMRD area, an analysis of potential impacts and associated avoidance measures for both GGS and SJKF are discussed below due to the Proposed Action area providing a potential migratory corridor and denning area that could conceivably be utilized by these species.

Giant Garter Snake

Construction activities would entail the temporary and permanent earth disturbance and periodic maintenance of the facilities listed above that could result in potential effects to GGS. Based on the

distribution of GGS occurrences in the vicinity, the action area may be used as a migratory corridor or upland habitat for denning of individual GGS from known populations, as close as approximately four to 10 miles to a site location. The most recent record of GGS dates back to July 2008, with 29 captures in the Volta Wildlife Area approximately four miles west of the Project area.

An individual GGS may pass through the annual drainage ditch and/or Salt Slough near the project area for food or denning from time to time during regular dispersal movements; however, the likelihood that any GGS might move across unsuitable agricultural fields to forage or to use drainage ditch slopes for denning in the action area is low. Construction activities will occur from November through December, during the inactive period for GGS. Out of the 15 total check structures to be modernized, the following three sites contain potential upland habitat in drainage ditches adjacent to the canal and in the nearby Salt Slough:

1. Delta Canal LCW "I" (concrete-lined canal) - Construction activities would include preparing the bottom of the canal for placement of a 12" concrete slab where the LCW would be placed. The 50'-long x 10'-wide LCW would then be constructed on top of this floor by pouring concrete into wooden forms. The work would take two pick-up trucks, one concrete pump, one cement truck, and 1 ½ weeks to complete. The staging and construction activities would all remain within the canal prism and cause no canal bank disturbance.
2. Island "D" Flow Control Structure (unlined canal) – There would be minimal canal bank disturbance at this site as 290 cu-yds of concrete would be for a concrete apron on the downstream side of the structure for erosion control. Additional construction activities would include placing a base of 12" of rock on the bottom of the flow control structure that would be 20'-long x 10'-wide, fitting sluice gates, and constructing a concrete stilling well. The work would take two pick-up trucks, one concrete pump, one cement truck, one excavator, one boom-truck, and three weeks to complete. All staging and construction activities would remain within the canal prism.
3. Island "C" Flow Control Structure (concrete-lined canal) – Construction activities, equipment, and timeframe would be the same as those for the Island "D" Flow Control Structure at the Island "C" Flow Control Structure. All staging and construction activities would remain within the canal prism. In addition, HMRD would be extending the height of the canal by five inches from the head of the Island "C" Canal to the head of the Island "D" Canal (approximately 1,100 feet per canal bank; 2,200 feet total). This would be accomplished by placing concrete on top of the liner extending five inches over the canal bank. This extension would be held in place by excavating behind the existing liner to a depth of five inches.

Potential upland habitats near the Delta Canal LCW "I" site occur in the adjacent drainage ditch and in the rip rap of the banks of Salt Slough approximately 40 yards westward. Potential upland habitat near the Island "D" and "C" Flow Control Structure sites are adjacent drainage ditches. These drainage ditches may contain rodent burrows suitable for denning; however, it is unlikely that these rodent burrows would extend under the road and into the wetted canal prism. If deep rodent burrows were present, then a breach in the canal may have occurred. Although there would be some canal bank disturbance at two of these sites, the only work that would occur outside of the canal prisms is the five-inch canal liner extension from the head of the Island "C" Canal to the head of the Island "D" Canal. In addition, there are no sufficient rodent burrows in the adjacent drainage ditches for

GGs to den in, and rip rap on the banks of Salt Slough would not be impacted by work at the LCW “I” site.

Considering that construction activity and storage would remain within five inches of the canal prism, its isolation from extant GGS populations, its marginal to poor suitability as foraging habitat, and dated sightings, the probability that GGS is resident within the action area is low. If a snake is encountered during construction, activities shall cease until appropriate corrective measures have been completed or it has been determined that the snake would not be harmed. Avoidance and minimization measures as described below would be implemented by HMRD to further avoid and minimize any potential Project impacts to GGS. Reclamation has determined that the Proposed Action may affect, but is not likely to adversely affect the GGS.

Avoidance and Minimization Measures for GGS

Since GGS habitat is not being directly impacted, there are no mitigation or conservation measures, or compensation/set-asides proposed. The following Avoidance and Minimization Measures would be applied for GGS:

- Confine clearing to the minimal area necessary to facilitate construction activities. Flag and designate avoided giant garter snake habitat within or adjacent to the project area as Environmentally Sensitive Areas. This area should be avoided by all construction personnel.
- Confine movement of heavy equipment to existing roadways.
- Clearing of vegetation will not occur under the Proposed Action.
- After completion of construction activities, removal of any temporary fill and construction debris will be completed.
- Construction personnel will receive environmental awareness training that instructs workers to recognize GGS and its habitat(s)

San Joaquin Kit Fox

Construction activities would entail temporary and permanent earth disturbance, in addition to periodic maintenance of the facilities that could result in potential effects to SJKF. In addition to construction activities of the Proposed Action, temporary effects would also include additional vehicular traffic, construction noise, and worker activities.

Based on the distribution of SJKF occurrences in the vicinity, the action area may be used as a migratory corridor of individual SJKF from known populations as close as approximately 0.9 miles south of a site location within the Project area. However, the sighting on record is of road kill dated back to 1971. The remaining historical sightings between three and 11 miles away from the Project location consist of an individual that was most recently sighted in 2000, adults, and both active and inactive dens. An individual SJKF may pass through and possibly forage within the action area from time to time during regular dispersal movements; however, the likelihood that any SJKF might move across intensive agricultural fields to forage or den in the action area is low. In addition, construction activities will not occur during night time hours (30 minutes before sunset to 30 minutes after sunrise) when SJKF are more active. Avoidance and minimization measures as described below would be implemented by HMRD to further avoid and minimize any potential Project impacts to SJKF. Considering the highly disturbed condition of the action, its isolation from extant SJKF populations, marginal to poor suitability as foraging habitat, and dated sightings, the

probability that SJKF is resident within the action area is low. Reclamation has determined that the Proposed Action may affect, but is not likely to adversely affect the SJKF.

Avoidance and Minimization Measures for SJKF

As part of the Proposed Action, preconstruction surveys for SJKF will be completed per the Service's 2011 *Standardized Recommendations* no less than 14 days and no more than 30 days prior to the onset of any ground or vegetation-disturbing activity during the life of the project. Service-approved biologists will survey the areas subject to surface disturbance for the presence of kit fox dens. In addition, the following measures (derived in part from the Service's 2011 *Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox Prior to or During Ground Disturbance*) will be implemented by the HMRD to avoid or minimize potential affects to SJKF:

- All project-related vehicle traffic will be restricted to established roads, construction areas, and other designated areas. In order to reduce impacts by project-related vehicles, workers will observe the following:
 - Maintain a daytime speed of 20-mph throughout the site;
 - Construction is limited to daytime hours, defined as no earlier than 30 minutes after sunrise and no later than 30 minutes before sunset.
- Inadvertent entrapment will be prevented via the following activities:
 - Cover all excavated, steep-walled holes or trenches more than two feet deep with plywood or similar materials at the close of each working day;
 - Construct one or more escape ramps of earthen-fill or wooden planks if the trenches cannot be closed;
 - Thoroughly inspect all construction pipes, culverts, or similar structures with a diameter of four inches or greater that are stored at a construction site for one or more overnight periods before the pipe is subsequently buried, capped or otherwise used or moved in any way. If a kit fox is discovered inside a pipe, the kit fox shall not be harassed and that section of the pipe shall not be moved until the kit fox has vacated the pipe and left the area.

An employee education program will be conducted by a qualified biologist consisting of a brief presentation in kit fox biology and legislative protection to explain endangered species concerns to contractors, their employees, and agency personnel involved in the project. The program will include a description of the SJKF and its habitat needs, an explanation of the status of the species and its protection under the Endangered Species Act, and a list of measures being implemented to avoid and minimize the chance of impacts to the species during project construction and implementation. A fact sheet conveying this information will be provided to Project personnel.

3.4 Cultural Resources

3.4.1 Affected Environment

The National Historic Preservation Act (NHPA) of 1966 is the primary Federal legislation that outlines the Federal Government's responsibility to cultural resources. Section 106 of the NHPA is outlined in the Federal regulations at 36 Code of Federal Regulations Part 800, which describes the process that the Federal Government takes to identify cultural resources listed on or eligible for

inclusion in the National Register of Historic Places (NRHP) and the level of effect that the proposed undertaking would have on such historic properties.

In summary, Reclamation must first determine if the action is the type of action that has the potential to affect historic properties. If the action is the type of action to affect historic properties, Reclamation must identify the area of potential effects (APE), determine if historic properties are present within that APE, determine the effect that the undertaking would have on historic properties, and consult with the State Historic Preservation Officer (SHPO), to seek concurrence on Reclamation's findings. In addition, Reclamation is required through the Section 106 process to consult with Indian Tribes concerning the identification of sites of religious or cultural significance, and consult with individuals or groups who are entitled to be consulting parties or have requested to be consulting parties.

3.4.2 Environmental Consequences

No Action

Under the No Action Alternative, there would not be an undertaking as defined by Section 301 of the NHPA. The condition of cultural resources would be the same as under the existing conditions. No impacts to cultural resources are associated with this No Action Alternative.

Proposed Action

The Proposed Action would allow the expenditure of Federal funds to HMRD. The Proposed Action would occur within previously identified disturbed contexts. Actions to the canals and laterals, including the installation of SCADA equipment, would occur within existing facilities. Actions for the pump bay control building would occur within previously cultivated farmland. For the purposes of this Project, Reclamation assumed that the HMRD water delivery system was eligible for inclusion in the National Register of Historic Places.

Reclamation identified historic properties through a survey report conducted by PAR Environmental Services. HMRD was the only cultural resources identified in the area of potential effects. For purposes of this Project and the NHPA Section 106 consultations, Reclamation assumed that HMRD is eligible for listing on the NRHP. Reclamation found no adverse effects to historic properties pursuant to 36 CFR §800.5(b). Reclamation prepared a cultural resources report and consulted with the SHPO on the assumed eligibility of the HMRD water delivery system and the finding of no adverse effect to historic properties pursuant to 36 CFR 800.5(b).

In the unlikely event that cultural resources or human remains are identified during the implementation of this project there may be additional considerations pursuant to Section 106 of the NHPA. If inadvertent discoveries of cultural resources or human remains occur during project implementation, work shall temporarily stop and Reclamation cultural resources staff shall be contacted immediately.

3.5 Cumulative Impacts

According to CEQ regulations for implementing the procedural provisions of NEPA, a cumulative impact is defined as *the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions*. Cumulative effects

can result from individually minor but collectively significant actions taking place over a period of time.

Air Quality

The Proposed Action has the potential to impact air quality through emissions of the criteria pollutants of most concern from ground disturbance and construction equipment. As described earlier, HMRD lies within the SJVAB which currently does not meet all State and Federal health-based air quality standards. As a federally funded Project, the Proposed Action must conform with the SIP's purpose, part of which is to maintain emissions below the *de minimus* threshold for general conformity of the four remaining criteria pollutants that the SJVAB has not yet reached NAAQS and CAAQS attainment status for (refer to Table 1). Because the SJVAB encompasses seven counties in addition to the Merced County, emissions from projects occurring in those counties at the same time as the Proposed Action could lead to a cumulative impact. Additional projects undergoing construction at the same time as the Proposed Action in the SJVAB include:

- Firebaugh Canal Water District 1st Lift Canal Lining Project – Phase II & Check 2 Modernization Project: Firebaugh Canal Water District is lining approximately two miles of its 1st Lift Canal with concrete from Shaw Avenue crossing to the Delta-Mendota crossing. Check 2 on the 1st Lift Canal is also being replaced and relocated with an automated check structure to just upstream of the Shaw Avenue crossing and connected to the SCADA system at the same time, although it is a separate project. Construction is currently underway through January 2014. Emissions from this project were calculated with the 2013 CalEEMOD software and are presented in Table 4 below.
- Central California Irrigation District East Ditch and Poso Canal Reservoirs Project: Central California Irrigation District plans to construct two separate regulating reservoirs complete with inlet and outlet pump stations with piped discharges and SCADA integrated controls. The East Ditch Reservoir is expected to occupy no more than 37.5 acres. The Poso Canal Reservoir is expected occupy approximately 48 acres. Diversion facilities would be constructed at each reservoir as well. Construction is expected to start as soon as permitted and most likely occur during the winter when agricultural activities have ceased and irrigation canals are dry. Construction activities would take approximately 12 months to complete. Emissions from this project were calculated with the 2013 CalEEMOD software and are presented in Table 4 below.

Table 4. Estimated Cumulative Project Emissions^a				
Pollutant	HMRD tons/year	FCWD tons/year	CCID tons/year	Total tons/year
ROG/VOC	0.10	0.07	0.80	0.97
NO _x	0.77	0.64	9.40	10.81
PM ₁₀	2.62	2.06	4.80	9.48
PM _{2.5}	0.29	0.23	1.20	1.72
Carbon dioxide equivalents	93.80 mt/year	70.18 mt/year	887.90 mt/year	1051.88 mt/year

^a Source: CalEEMod Version 2013.2.1

As shown in Table 4, the FCWD and CCID projects have been estimated to individually emit less than the *de minimus* thresholds for NO_x and ROG/VOC as O₃ precursors, PM_{2.5}, and PM₁₀. In combination with HMRD's Project emissions, the total for these criteria pollutants are still below

the *de minimus* thresholds, with the exception of NO_x. Cumulatively, there would be an additional 10.81 tons/year of NO_x emissions added to the SJVAB. The baseline emissions trend for NO_x in the SJVAB is 144,832 tons/year; therefore, the additional NO_x emissions from the conservation projects are discountable (Ramalingam 2004).

Greenhouse gas (GHG) impacts are also considered to be cumulative impacts since any increase in GHG emissions would add to the existing inventory of gases that could contribute to climate change. The estimated GHG emission due to temporary construction activities for all three of these projects in the SJVAB is 1,051.88 metric tons of carbon dioxide equivalents. There are no on-going operational emissions from these projects.

Surface Water Resources

The Proposed Action also has the potential to impact surface water availability in the San Joaquin River due to additional water conservation projects on connected waterways.

The Merced, Tuolumne, and Stanislaus rivers are the largest tributaries to the San Joaquin River. San Joaquin River experiences high flows in the winter/spring period and low flows in summer.

The San Joaquin River Exchange Contractors historically diverted their water from the San Joaquin River to 240,000 acres of irrigated land in the San Joaquin Valley. In 1939, they entered into contracts with Reclamation to exchange their river water for Central Valley Project water delivered from the Delta-Mendota Canal and/or other works or sources of supply (called substitute water). Water for the Delta-Mendota Canal is diverted from the Delta at the federal C.W. “Bill” Jones Pumping Plant. The Exchange Contractors, of which SLCC is a member, divert water from the Delta-Mendota Canal and the Mendota Pool, and from the San Joaquin River downstream of the Mendota Pool. Water is delivered to customer turnouts, and wheeling is provided to the wildlife refuges.

The Firebaugh Canal Water District and Central California Irrigation District are member districts of the Exchange Contractors and their conservation projects in combination with the Proposed Action could lead to cumulative impacts. In the year following the completion of the Proposed Action, HMRD also plans to construct a regulating reservoir for the Island Canal system. The project description includes:

- A 19 acre regulating reservoir would be constructed with two sluice gates for gravity operation to serve as a buffer for the daily operational spill from the Island Canal system by collecting water from the drip systems shut off and saving approximately 1,900 AF that would otherwise be lost to Salt Slough and the San Joaquin River. The reservoir would also have two inlet and outlet pumps with respective discharge pipes and flow meters integrated to the SCADA system. HMRD is currently negotiating with landowners over the particular farmland that the reservoir would be located at. The design of the reservoir is site specific and has been proposed but not finalized, although work is anticipated to begin in 2015.

Water delivered through Firebaugh Canal Water District’s 1st Lift Canal is diverted from the Mendota Pool through Fresno Slough, and drains further north back into wetland channels that meander through agricultural operations, including HMRD, and wildlife areas north to the San Joaquin River. The canal lining and check modernization projects on this canal would conserve

approximately 278 afy and reduce water diversions from Mendota Pool by that amount. The 278 afy conserved in the Mendota Pool could remain part of the San Joaquin River system and be used by a different Exchange Contractor or offset some of the water that would not return to the San Joaquin River due to the water conserved by HMRD's Project.

Central California Irrigation District diverts its water from the Delta-Mendota Canal through the Main Canal, Outside Canal, Helm Ditch and other facilities. CCID drain water flows through various channels in agricultural areas and wildlife areas back to the San Joaquin River. The East Ditch and Poso Canal Reservoirs Project is expected to conserve an estimated 12,000 afy of operational spill and drain water that would otherwise have been returned to channels that meander through agricultural operations and wildlife areas to the San Joaquin River.

HMRD receives its water from the Delta-Mendota Canal via the San Joaquin River where it is diverted to the Arroyo Canal and Delta Canal at Sack Dam. Water that is lost to use by HMRD also drains to Salt Slough and back to the San Joaquin River and wildlife refuges. The Proposed Action would conserve 1,700 afy, and the proposed regulating reservoir is anticipated to conserve approximately 1,900 AF, which would further reduce returns to the San Joaquin River by those amounts. The amount of return flow that would no longer reach Salt Slough and various other channels on its way to the San Joaquin River from these conservation projects is approximately 15,300 AF.

Section 4 Consultation and Coordination

4.1 Public Review Period

Reclamation intends to sign a Finding of No Significant Impact for this Project, and will make the EA available for a one week period beginning December 16, 2013. All comments will be addressed in the FONSI. Additional analysis will be prepared if substantive comments identify impacts that were not previously analyzed or considered.

4.2 Endangered Species Act (16 USC § 1531 et seq.)

Section 7 of the ESA requires Federal agencies, in consultation with the Secretary of the Interior, to ensure that their actions do not jeopardize the continued existence of endangered or threatened species, or result in the destruction or adverse modification of the critical habitat of these species.

In a memo dated September 5, 2013, Reclamation requested written concurrence from the Service that the Proposed Action is not likely to adversely affect the GGS and the SJKF. The Service concurred with Reclamation's determination in a memo dated November 18, 2013.

4.3 National Historic Preservation Act (16 USC § 470 et seq.)

The NHPA of 1966, as amended (16 USC 470 et seq.), requires that federal agencies give the Advisory Council on Historic Preservation an opportunity to comment on the effects of an undertaking on historic properties, properties that are eligible for inclusion in the NRHP.

PAR Environmental Services requested a Sacred Lands file search from the Native American Heritage Commission on August 19, 2013 for HMRD. The Native American Heritage Commission responded in a letter dated August 26, 2013 stating that no Native American traditional cultural places or properties were identified by the Sacred Lands File search.

Reclamation initiated consultation with the California State Historic Preservation Office (SHPO) by letter hand-delivered on December 11, 2013. Letters were also sent to the Big Sandy Rancheria of Mono Indians, the Cold Springs Rancheria of Mono Indians, the Table Mountain Rancheria, the North Fork Rancheria of Mono Indians, the Picayune Rancheria of Chukchansi Indians, and the Santa Rosa Rancheria Tachi-Yokuts Tribe, pursuant to 36 CFR §800.4(a)(4). No responses were received from the tribes.

Under 36 CFR §800.3(c)(4), if SHPO fails to respond to a receipt of a request for review of a finding or determination within 30 days of receipt of the submission, the agency may move forward to their next step in consultations. As the SHPO did not respond within the period of time provided to them for review, Reclamation concluded the Section 106 process on January 14, 2014.

Section 5 References

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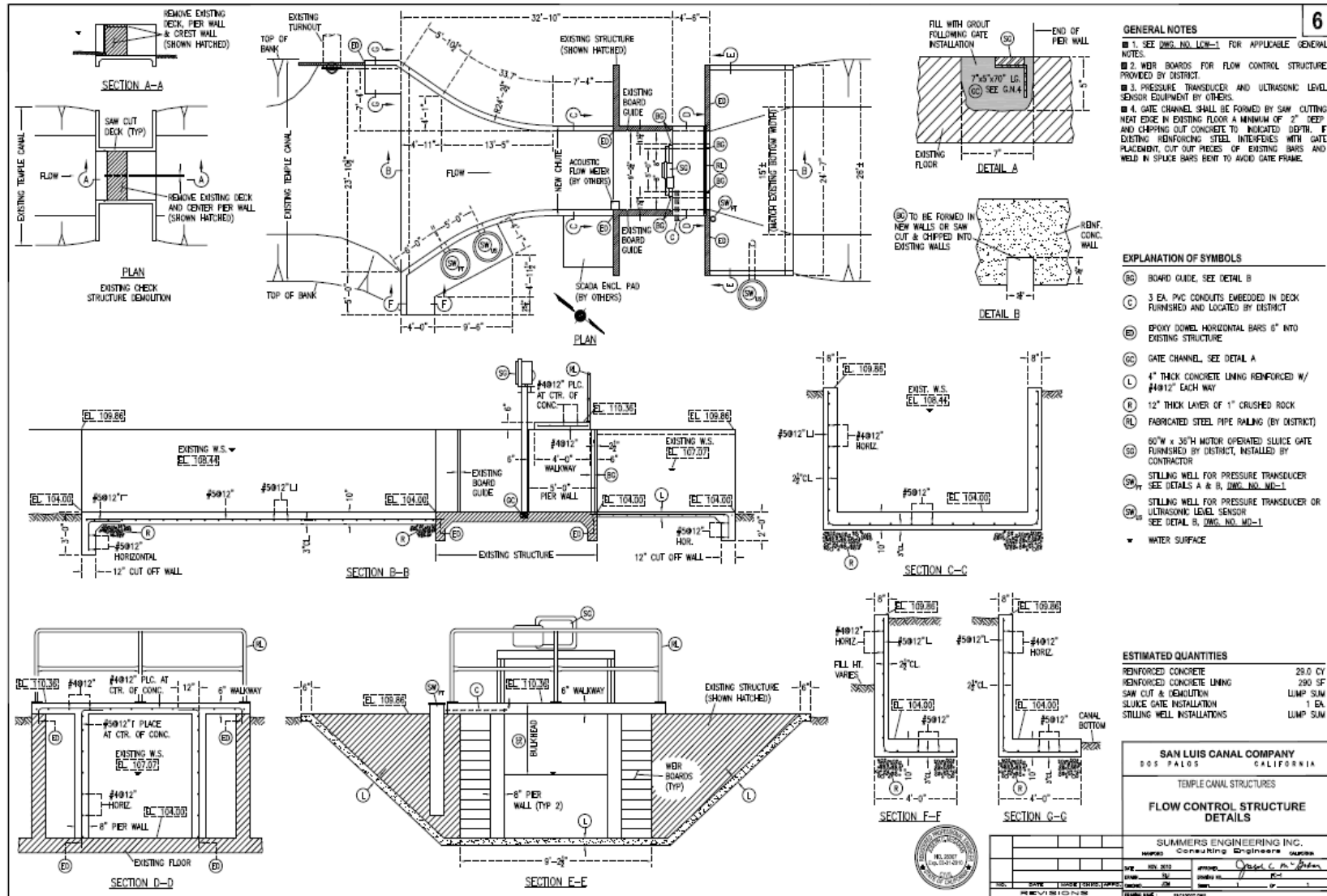
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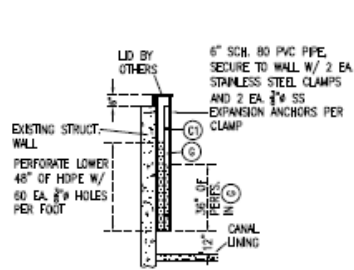
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USFWS. List of Species that Potentially Occur within USGS 7.5-minute Firebaugh Quadrangle. Accessed: July 2013.

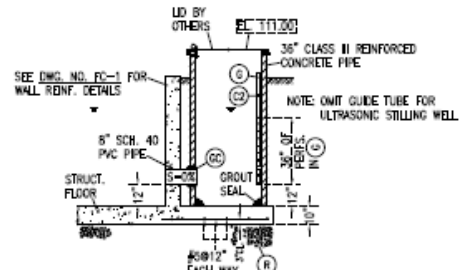
Appendix A – Engineer Drawings

Flow Control Structure Details

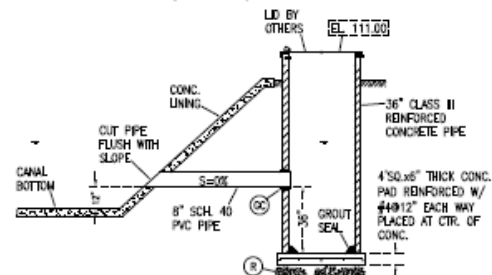




DETAIL A
DOWNSTREAM PRESSURE TRANSDUCER STILLING WELL
(TYPICAL OF 1)



UPSTREAM PRESSURE TRANSDUCER & ULTRASONIC STILLING WELL
(TYPICAL OF 2)



DETAIL B

GENERAL NOTES

1. SEE DWG. NO. LCM-1 FOR APPLICABLE GENERAL NOTES.
2. ULTRASONIC STILLING WELLS SHALL BE SMOOTH ON THE INSIDE AND FREE FROM LUMPS OF MORTAR OR OTHER IRREGULARITIES IN THE SURFACE.

EXPLANATION OF SYMBOLS

- (C1) SECURE GUIDE TUBE TO PVC W/ STAINLESS STEEL CLAMPS AT TOP & BOTTOM AND 2 EA. 1/4\"/>



SAN LUIS CANAL COMPANY
POS PALOS CALIFORNIA
TEMPLE CANAL STRUCTURES
MISCELLANEOUS DETAILS

SUMMERS ENGINEERING INC. Consulting Engineers			
DATE	REV.	BY	CHK.
01/11/2013	1	JM	JK
01/11/2013	2	JM	JK
01/11/2013	3	JM	JK
01/11/2013	4	JM	JK
01/11/2013	5	JM	JK
01/11/2013	6	JM	JK
01/11/2013	7	JM	JK
01/11/2013	8	JM	JK
01/11/2013	9	JM	JK
01/11/2013	10	JM	JK

Long Crested Weir Details

