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# *JAMES IRRIGATION DISTRICT*
# *WATER BANKING PROJECT*
# FRESNO COUNTY, CA

## APPLICATION SUBMITTED TO
## UNITED STATES BUREAU OF RECLAMATION
## FOR A
## WaterSMART: WATER AND ENERGY EFFICIENCY GRANT

**(FUNDING OPPORTUNITY ANNOUNCEMENT NO. R14AS00001)**


## James Irrigation District

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## January 2014

*DELIVER TO: Bureau of Reclamation*
*Attn: Ms. Michelle Maher*
*Mail Code: 84-27810*
*Denver Federal Center, Building 67, Room 152*
*6th Avenue and Kipling Street*
*Denver, CO 80225*
*Phone: 303-445-2025*
*Deliver January 23, 2014 by 11:00 a.m.*

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# TECHNICAL PROPOSAL & EVALUATION CRITERIA

## 1 . Executive Summary

### (A) General Project Information

**Proposal Name:** James Irrigation District Water Banking Project
**Date:** January 22, 2014
**Applicant Name: James** Irrigation District
**City, County, State:** San Joaquin, Fresno County, California

### (B) Project Summary

The James Irrigation District (JID, James ID or District) Water Banking Project is principally a Task A project (Water Conservation), and secondarily a Task B (Energy-Water Nexus) and Task D project (Water Markets). It also includes components of a Task C project (Benefits to Endangered Species). The ultimate purpose of this project is to reduce local and regional water conflicts by helping to eliminate the District's dependency on Central Valley Project (CVP) water. The project proposes to expand an existing (non operational) 50 acre-foot (AF) recharge basin to a storage and recharge basin (Basin 3) of 240 AF. It also includes increased diversion capacity (120 cfs) from the JID Main Canal to serve Basin 2 for groundwater recharge and Basin 3 for recharge and re-regulation, as well as new extraction capacity from Basin 3. This diversion and extraction capacity will be achieved through the construction of a new turnout structure at the JID Main Canal connected to two 15 cfs pumps (two at Basin 3) through two new 60-inch diameter pipeline siphons. Additionally, improved water management will be achieved through better facilities for storage and re-regulating flows, and improved water measurement with the installation of an ultrasonic flowmeter. The expanded capacity and operational capabilities of these basins will allow for several benefits, including: 1) groundwater banking, 2) groundwater recharge, 3) floodwater storage, 4) regulation storage, 4) operational flexibility, 5) spillwater capture, and 6) environmental benefits. Regulation storage in the basins will reduce the District's dependency on CVP surface water during peak demand periods. The CVP surface water estimated to be available to be marketed to other uses is 1,250 AF/year. This project is one of the steps in a larger plan for the District to eliminate their dependency on CVP water and market it to other water users, as well as capture and put to beneficial use additional floodwater. *Due to the extensive work (environmental and design) already completed by the District on this project, the project will be **"shovel ready"** by the anticipated contract date of October 1, 2014.*

The project applied for and was awarded a 2008 WaterSMART grant, but due to regulatory and permitting delays, Reclamation Mid-Pacific Region staff indicated that the grant will be cancelled since construction cannot be complete by June 30, 2014. It was recommended that application for funding be completed again since the project is nearly ready to begin construction. In 2010, the District applied for and was awarded an additional WaterSMART grant for the separate but adjoining proposed groundwater recharge area, to be constructed from the earth excavated from the proposed Basin 3. Due to the close proximity of the projects and similar funding source, environmental compliance and permitting for both projects has been completed together.

### (C) Project Length and Estimated Completion Date

Planning and design work on the project began in 2008, preliminary (50% level) design was

complete in August 2011, and final design is estimated to be completed by September 2014. Regulatory, environmental compliance and permitting on the project is nearly finished and estimated to complete during the summer of 2014. The project duration after contract award (assumed to be October 2014) would be approximately 24 months for all phase of construction. Certain portions of construction can only be completed outside of the normal irrigation season. However, the actual construction of the project is anticipated to take a total time of about 11 to 12 months. The entire project would be completed by the end of September 2016.

## 2 . Background Data

### (A) Location

The James Irrigation District was organized in 1920 under the California Water Code. The District covers approximately 26,400 acres wholly within Fresno County, California, and is situated in the central San Joaquin Valley, approximately thirty miles southwest of the City of Fresno. The City of San Joaquin lies near the middle of the District, but is excluded from the District's boundary. Located adjacent to the Fresno Slough, lands within the District boundaries are at the trough of the valley floor. State Highways 145, 180, and 33 are in close proximity. Adjacent agricultural water agencies include the Tranquillity Irrigation District, Westlands Water District, Stinson Canal and Irrigation Company, Mid Valley Water District, and the Raisin City Water District. A location map for the District is included as **Figure 1**.

### (B) Water Supply Source

The District receives water supplies from several sources, as detailed in **Table 1**. The District serves agricultural water supply to about 362 turnouts. No municipal or industrial water supply is provided.

**Table 1. Annual Agricultural Water Supply Sources**

| Water Source | Total (AF) |
|---|---|
| Federal agricultural water (CVP) | up to 35,300 |
| Local/other- Kings River High Flow & FresnoID Spillwater | Varies 0 - 40,000 |
| San Joaquin River Riparian water<br>(Schedule 2 CVP) | 9,700 normal/wet<br>7,600 dry years |
| District ground water | 6,000 to 57,000 |
| Total | Typically 75,500 |

The District does not receive nor deliver urban water, State water, upslope drain water, transferred water or reclaimed water. As detailed above, the District relies on both surface and groundwater for irrigation demands. **Table 2** shows surface and groundwater usage from 2000-2012.

**Table 2** shows that for typical years, groundwater constitutes over 50% of the District's water use. In almost all years the District's surface water supply has been fully utilized, and groundwater is pumped to supplement the surface water. Typically, groundwater pumping

begins in the middle of the irrigation season and groundwater is often the only water source available at the end of the irrigation season (August to October). Ideally, the CVP allocation percentage would match the percentage of average precipitation for any given year. However, due to issues such as Delta pumping restrictions, endangered species, CVPIA, etc. Actual CVP supplies available to CVP contractors have historically been low relative to precipitation amounts. These potential water shortages are a major impetus for this application. The years with the least groundwater pumping (2005, 2006 and 2011) were when high flows occurred on the North Fork of the Kings River and were used in-lieu of pumping groundwater, in addition to groundwater recharge.

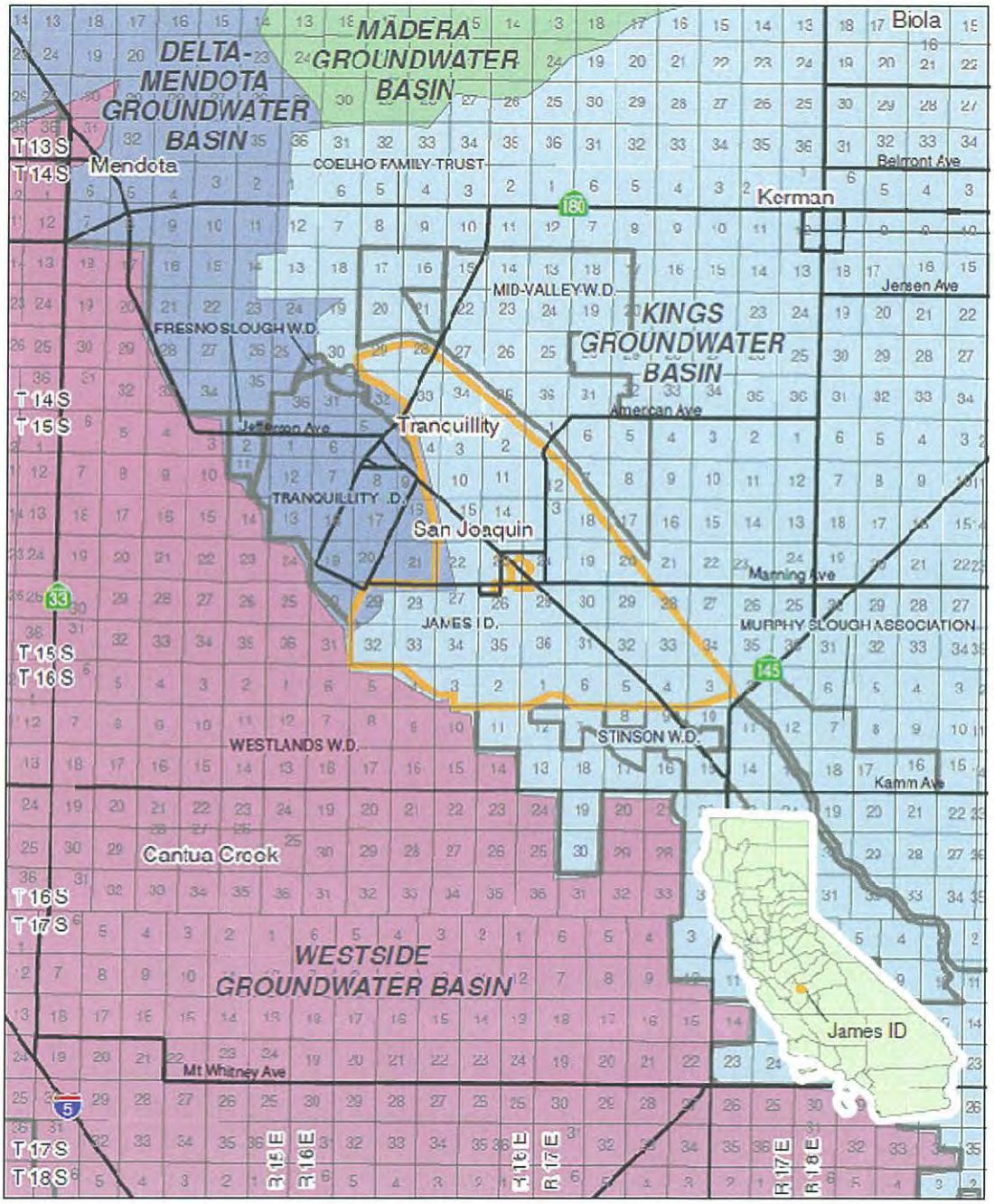



**Figure 1. District Location Map**

**Table 2. Surface and Groundwater Use (2000-2012)**

| Year | Surface Water | | Groundwater | | Total Water Use |
|---|---|---|---|---|---|
| | Volume (AF) | % | Volume (AF) | % | Volume (AF) |
| 2012 | 28,000 | 39 | 44,300 | 61 | 72,300 |
| 2011 | 74,000 | 95 | 3,900 | 5 | 77,900 |
| 2010 | 27,400 | 44 | 34,400 | 56 | 61,800 |
| 2009 | 15,000 | 21 | 55,100 | 79 | 70,100 |
| 2008 | 21,300 | 27 | 56,900 | 73 | 78,200 |
| 2007 | 39,500 | 45 | 48,700 | 55 | 88,200 |
| 2006 | 67,400 | 91 | 6,300 | 9 | 73,700 |
| 2005 | 50,300 | 69 | 22,500 | 31 | 72,800 |
| 2004 | 38,600 | 47 | 43,000 | 53 | 81,600 |
| 2003 | 39,000 | 51 | 37,400 | 49 | 76,400 |
| 2002 | 37,400 | 46 | 44,500 | 54 | 81,900 |
| 2001 | 26,400 | 35 | 48,600 | 65 | 75,000 |
| 2000 | 35,500 | 49 | 36,400 | 51 | 71,900 |
| **Rounded Average** | **38,500** | **51** | **37,100** | **49** | **75,500** |

Groundwater Supplies

The JID owns and operates about 65 irrigation wells. Thirty of these are within the District boundary and thirty-five are east of the District boundary within their deeded groundwater easement area. The estimated capacity of all the wells is about 180 to 195 cfs (average of 3 cfs per well) depending on how dry the year is and the associated groundwater levels. Most of JID's wells are between 500 and 600 feet deep, and extend to the top of the Corcoran Clay, a widespread clay confining layer. A few of JID's older wells are 700 to 900 feet deep and penetrate the confined aquifer.

An enormous aquifer system lies beneath the Kings Basin and extends the length and breadth of the San Joaquin Valley. The valley is a broad structural trough, with the Sierra Nevada Mountains on the east and the Coast Range Mountains on the west.

Surface Water Supply

Riparian water (Schedule 2 CVP), Contract 14-06-200-700A is delivered without charge as a settlement of the District's water rights claims in Fresno Slough; during normal and wet years 9,700 acre-feet is available, during dry years 7,600 acre-feet is available. The contract requires that the District take delivery of this water according to a predetermined schedule. In practice, the United States Bureau of Reclamation has allowed some flexibility on when this water is taken.

In addition, the District has a Central Valley Project contract (No. 14-06-200-700A-LTR1) for up to 35,300 acre-feet of water each year. Other water used by the District includes spillwater from the Fresno Irrigation District and Kings River high flows.

In the past, during wet years, the USBR has made surplus water available to JID, which is above

its normal contract deliveries. The source of this water may be either imports from the Delta via the Delta Mendota Canal, or San Joaquin River high flow releases (called Section 215 water by the USBR). There are also high flow releases made on the Kings River from Pine Flat Lake, which is this projects main intention to recharge.

The District's groundwater pumping capacity is about 195 cfs (65 wells at typical 3 cfs yield), which is not enough to meet peak demands. As a result, groundwater and surface water are normally blended to meet water demands. In the past, during dry years, JID began pumping early into Mendota Pool and pulled out the water later when the surface water supplies diminished. However, the JID is now only permitted to store water in the Mendota Pool for a maximum of 60 days and is subjected to 5 percent storage losses.

Projected Water Supply Shortfall

In 2010, the District analyzed their available water supply sources, compared to 2007, 2008 and 2009 demand to determine if were possible to sustain operations without a CVP surface water supply. The District is concerned about the long term viability of south of the delta CVP supplies due to Delta pumping restrictions, endangered species, CVPIA, etc. They were and are also considering an annual lease, permanent sale, or water banking agreement with their CVP supply, and investigated what infrastructure improvements might be needed if they did not have their CVP supply. Peak demand was similar in magnitude for all three years. However, the investigation focused on the 2007 data as it was the highest year of water use (demand) since 2000 (see **Table 2** above). 2007 is also a water year since the conversion to permanent crops has been occurring, which in theory should lessen peak demands.

**Figure 2** shows the 2007 demand data compared to the District's secured water sources: 9,700 AF of Schedule 2 entitlement, and well capacity for 70 wells at 3 cfs per well (210 cfs total). Utilizing the water sources described, multiple peak deficits still existed (green peaks on the graph). The peaks were filled in 2007 by the use of CVP contract water. To meet the deficit shown in green, the improvements proposed by this project are being pursued including the following: expand Basins 2 and 3 and create a recharge area in the Fresno Slough Bypass, install an automated flow control gate at E-Booster, construct the Main Canal control structure, construct two siphons across the Bypass, construct distribution structure and pipelines on the project site, construct booster pumping plant extraction capability in Basin 3 to re-regulate storage from that basin, and install new wells in the District. The District had 58 wells in 2008 and now has 65 wells of the total estimated need. It was estimated that the District needs approximately 100 cfs of peaking capacity to meet the 2007 demand, of which existing regulation basins and booster throughout the District can produce about 70 cfs. Therefore an additional 30 cfs is needed from the Water Banking Project.

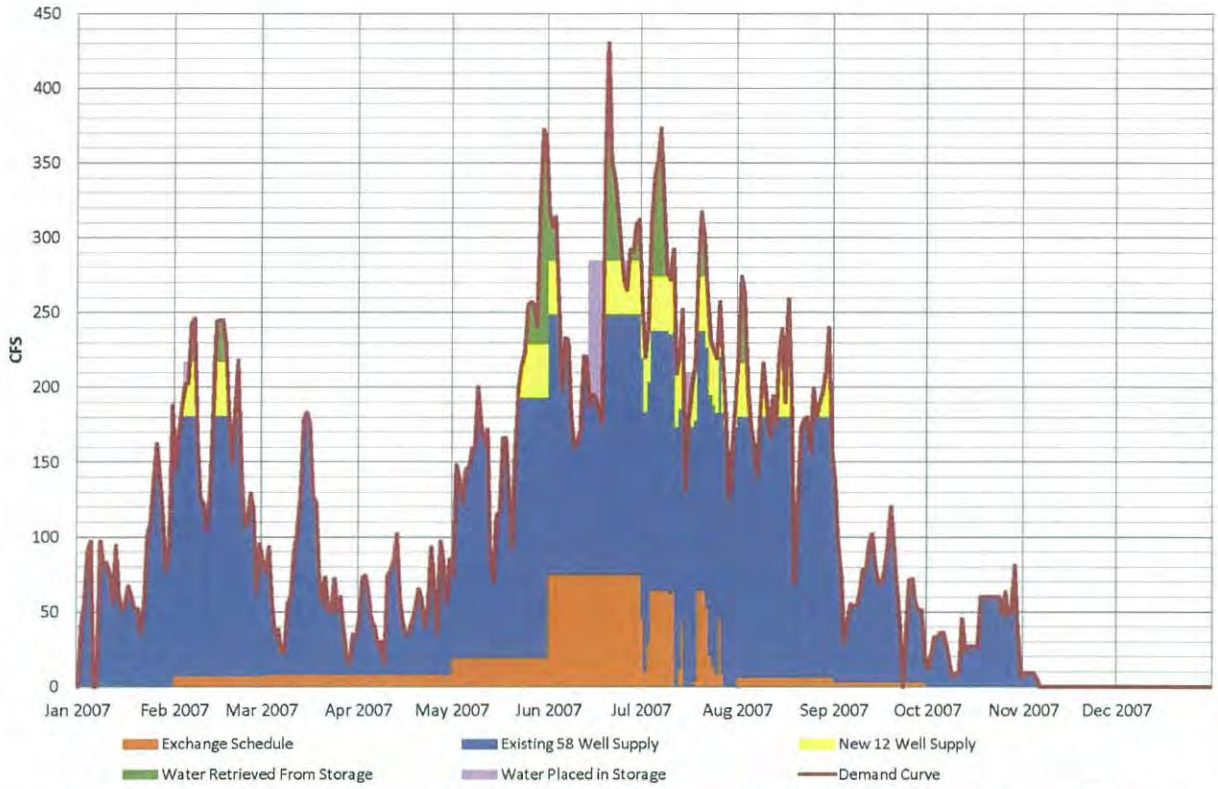



**Figure 2. 2007 JID Water Supply and Demand with Proposed Operations**

## (C) WATER SUPPLY SYSTEM

Conveyance System

JID's conveyance system consists of three major components. These are the Eastside Canals, the James Irrigation District Main Canal, and the Lateral Canals. The Eastside Canals consist of two canals, the Kerman Line Pump Canal (a.k.a. Lassen Canal) and the Coalinga Line Pump Canal (a.k.a. McMullin Grade Canal). These canals collect and convey groundwater pumped from 35 JID wells, which lie outside of the District's boundaries, into the District. The Eastside Canals merge together and connect into the south end of the Main Canal by flowing through twin 60-inch diameter reinforced concrete pipelines that cross under the Fresno Slough Bypass Channel (James Bypass).

The JID Main Canal operates as a lift canal for surface water that is pumped from the Mendota Pool (flows from the north and flow southeasterly). Groundwater and diverted Kings River high flow releases are fed by gravity into the Main Canal from the south and flow northwesterly. The system also includes 17 lateral canals that are mostly unlined earthen ditches. The conveyance system includes a combined total of 91.2 miles of unlined canals, 14.5 miles of lined canals, and 6.25 miles of pipe. The District has three regulation reservoirs within the conveyance system: Fresno Bypass Regulation Basin (a.k.a. Regulation Basin No. 1, 95 acre-feet over 10 acres), Regulation Reservoir C (10 acre-feet over 3 acres), and Regulation Reservoir E (45 acre-feet over 20 acres). These reservoirs capture spillwater and provide reserve storage for use during peak demand periods. The proposed project will increase the re-regulation capacity of the District by allowing Basin #2 (620 acre-feet over 15 acres) and Basin #3 (235 acre-feet over 26 acres) to be utilized.

Land Use

The JID is experiencing a trend of conversion of field crops to permanent crops. This trend is expected to continue at a gradual rate. In 2003 major crops included cotton (12,766 acres), wheat grain (3,029 acres), and alfalfa seed (1,772 acres). Irrigation methods in 2003 included micro-sprinkler (2%), drip (1%), and flooding (96%). However, in 2009 major crops included alfalfa seed (5,969 acres), cotton (5,748 acres), tomatoes (2,938 acres) and almonds (2,428 acres). The trend of conversion to permanent crops continues. Irrigation methods in 2009, included micro-sprinkler for 5%, drip for 20% and flood for 75%. This conversion to permanent corps and non-flood irrigation has caused the District to need more regulation and storage basins.

## (D) Energy Efficiency

The District currently receives electric power from Pacific Gas and Electric (PG&E) and also the Western Area Power Administration (WAPA). A majority of the energy used by the District is to power the 65 deep well turbine pumps. The District typically tests the pumping plant efficiency of the deep well pumps every other year to understand their energy use and identify if wells are in need of repair or replacement.

## (E) Past Working Relationships with Reclamation

The James Irrigation District and its consulting engineer, Provost & Pritchard Consulting Group, have demonstrated that they can undertake a grant project, perform high quality work, manage funds, and meet deadlines. Following is a summary of Reclamation grant projects that the District has been awarded and has, or will, successfully complete on time and within budget since 2002:

System Water Management Improvements

In 2008, The USBR provided a grant of $50,000 to the District to install a sump pump to recover spill water, expand a regulation basin, and install flow meters. This money was provided through the Water Conservation Field Services Program (#08SF200007). This project allowed the District to better manage their water and reduce spills.

Water Banking Project

Through the 2008 Water 2025 Challenge Grant Program (Agreement R10AP20563, formerly #08FG200151), the District was awarded $300,000 to begin the development of their regulation, recharge and banking site, the project proposed in this grant application. There have been significant delays beyond the control of James Irrigation District due to regulatory requirements, which have now almost been finalized. However, on December 16, 2013, Reclamation staff at the Mid-Pacific Region office indicated that the grant would not be extended beyond the June 30, 2014 completion deadline, and suggested that an application be made for new project funding. Regulatory obligations and authorizations are anticipated to be complete Summer 2014, but it is not possible to complete the proposed construction by June 30, 2014. Therefore, JID is applying for new funding for the Water Banking Project.

Water Banking Expansion Project

As part of the Water Banking Project (2008 grant), the soil excavated from Basin #3 was to be stockpiled for future use. Through the 2010 WaterSMART Grant Program (Agreement RA10AP20117), the District was awarded $300,000 to begin the development of their dedicated recharge and banking site (no re-regulation capacity), using the soil from the Water Banking

Project. Because of the federal involved, the environmental process and permitting was combined for the Water Banking Project and the Water Banking Expansion Project. The environmental and permitting requirements is almost complete and is anticipated to be completed in early 2014.

Hand Held Data Loggers and Water Accounting Software Grant

The USBR provided a grant of $15,000 in August 2002 through their Field Services Program for Hand Held Data Loggers and the Water Accounting Software $H_2O$ Pro (Grant No. 01FG210017). The program implemented and supported automatic water meter reading and invoicing. The District purchased the data loggers and software, attended training sessions, and has integrated the technology into their daily operations and water accounting.

Turnout Flowmeter Grants

Through The USBR's Water Conservation Field Service Program, JID has entered into a 50/50 cost share to install propeller flowmeters at all turnouts. Over three years (2005, 2006, and 2007) the District purchased and installed 72 flowmeters through this program. These grants (Grant No.'s 05FG210002, 06FG204071, 07FG200031), have allowed for better water management resulting in less spills, which corresponds to less pumping of groundwater during the high demand periods of the irrigation season. The grants were completed within budget and on schedule.

Mendota Pool / Fresno Slough Monitoring

Tranquillity Irrigation District (TID) obtained a grant for telemetry and SCADA equipment through the USBR's Water Conservation Field Service Program (Grant No. 07FG200028). As part of the overall program, JID provided additional funds to TID for the SCADA system that would allow remote monitoring at Tranquillity's Fresno Slough Lift #2. JID's contribution will allow them to better manage their water supply from the Fresno Slough.

Lateral K Groundwater Recharge and Banking Project

In addition, JID has successfully completed a large groundwater recharge project funded with a loan from the California Department of Water Resources (DWR). The project includes a 220-acre basin dedicated to intentional recharge. A pilot basin was constructed to estimate likely recharge rates for the project. A construction loan for $1.58 million was granted from Proposition 13 funds. Construction began at the end of 2002. The project has significantly increased the District's knowledge of the local hydrogeology. The project was completed within budget in late 2004. In 2005, 2006 and 2011, the District recharged Kings River high flows on this site. Since the initial construction, the District has also installed recovery wells on-site and used the facility for short-term banking agreements.

## 3 . Technical Project Description

The JID Water Banking Project proposes to expand an existing (non operational) 50 acre-foot (AF) recharge basin to a storage/regulation and recharge basin (Basin 3) of 240 AF. It also includes increased diversion capacity (120 cfs) from the JID Main Canal to serve Basin 2 for recharge and Basin 3 for recharge and re-regulation, as well as new extraction capacity from Basin 3. This diversion and extraction capacity will be achieved through the construction of a new turnout structure at the JID Main Canal through two new 60-inch diameter pipeline siphons, with return capacity from Basin 3 from two 15 cfs booster pumps. Additionally, improved water management will be achieved through better facilities for storage and re-regulating flows, and automated canal gates tied to flow or water levels. The water control structure in the auxiliary channel will provide a

secondary route for water to enter Basin 3 and allow recharge within the auxiliary channel. The work proposed at E-check on the Main Canal will provide flow control downstream of that point be tied to the automation at the Main Canal control structure and booster pumps in Basin 3 to maintain consistent flows in the Main Canal. The expanded capacity and operational capabilities of these basins will allow for several benefits, including: 1) groundwater banking, 2) groundwater recharge, 3) floodwater storage, 4) regulation storage, 4) operational flexibility, 5) spillwater capture, and 6) environmental benefits. Regulation storage in the basins will reduce the District's dependency on CVP surface water during peak demand periods. The CVP surface water estimated to be available to be marketed to other uses is 2,070 AF/year.

**Figure 3** is a simplified map showing the project and surrounding facilities and boundaries for the Water Banking Project (Basin 2, Basin 3 and appurtenances) and Water Banking Expansion Project (recharge area). **Appendix A** contains an aerial plan view of the projects and the improvements.

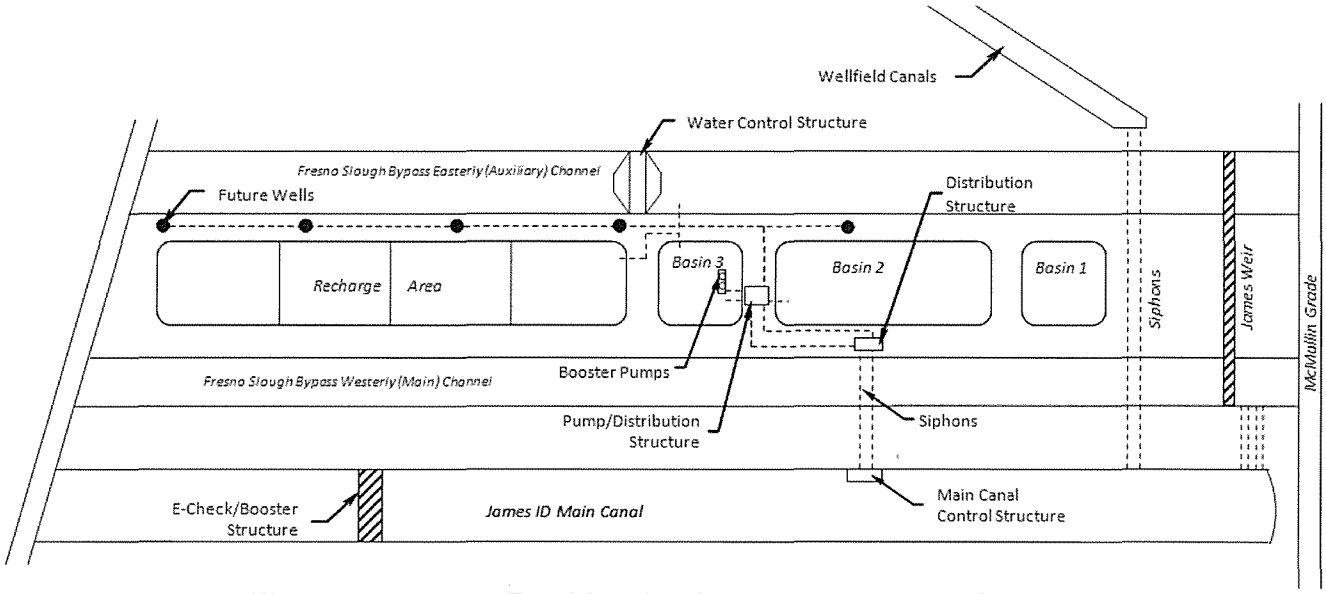



**Figure 3 – Water Banking Project Infrastructure Layout**

Tasks

The JID Water Banking Project will be broken into five major tasks:

*Task 1 – Project Administration:* This task involves overall project coordination, communication, contract management with USBR, budget requests, and contract revisions, if needed. This task will also include the organizing and attendance of progress meetings with USBR and stakeholders, and preparation of required progress reports and a draft and final report. It is anticipated that 4 semi-annual reports will also be required.

*Task 2 – Environmental/Permitting:* This task includes working with Reclamation and USFWS staff for finalizing compliance with NEPA and the Section 7 Consultation for endangered species. Relevant biological surveys, cultural resources surveys, and local permit applications have already been completed. The Kit Fox Preserve Management Plan will be prepared for USFWS approval and application for power to the booster pumps and moving an electric line

through Basin 3 will be initiated. The task will be complete by Summer 2014, and project will be "shovel ready" by anticipated contract award date of October 1, 2014. Significant work (see **Appendix B** for a timeline and work already completed) has already been completed to limit what is to be done in this task.

*Task 3 – Engineering Design:* This task include preparation of the final plans, specifications and bidding documents for the siphons, pipelines, pump station, automation and appurtenant structures. A 50% design has already been completed (see **Appendix C**). Remaining design work will be completed in stages (90% and final design). This task also includes preparing an engineer's cost estimate. The task will be complete by September 2014, and project will be "shovel ready" by anticipated contract award date of October 1, 2014.

*Task 4 – Construction Management:* This task includes the bidding process which will comprise public bid advertisements and process, pre-bid meetings, answering questions during the bidding process, and evaluating submitted bids. This task also includes construction management activities consisting of construction administration, construction staking, review/observation and related reporting, reviewing material testing results, review of submittals, contractor progress payment processing and change order review. This task will conclude with the preparation of final record drawings for the project.

*Task 5 – Construction:* This task includes construction of all of the facilities for the Water Banking Project, including control/distribution structures, siphons, pipelines, booster pumps and automated irrigation canal gates by a qualified contractor. Included is the Kit Fox pupping and escape den construction in the Water Banking Project, Water Banking Expansion Project and Kit Fox Preserve areas.

A breakdown of subtasks for each task is shown on the Project Schedule (see **Appendix D**).

Project Schedule

A tentative project schedule is included in **Appendix D**. It is assumed that JID receives a signed contract for the award by October 1, 2014. JID believes that they can complete the work within the two year contract period. It is estimated that the proposed environmental compliance, permitting, and final design can be completed prior to assumed contract award date.

Engineering

Planning and design efforts to date (**Appendix B**) have included site visits, topographic surveying, and a 50% design (refer to **Appendix C**). The plans include the components proposed for the Water Banking Project (proposed 2014 grant) and portions of the Water Banking Expansion Project (2010 WaterSMART grant). Most of the plan sheets pertaining to the 2010 grant have been removed due to the page limitation in this application. Said plan sheets are available upon request.

Water Summary

| ITEM | QUANTITY (AF/YR) |
|---|---|
| Average Annual Water Supply | 77,500 |
| Estimated Water Conserved after Project | 2,195 |
| Estimated Water Better Managed (regulation) | 2,170 |
| Water Marketed after Project | 2,195 |

Project Benefits Summary
Project benefits will include the following:

- Groundwater recharge (2,070 AF/year)
- Kings River high flow water capture (2,070 AF/year)
- Increase in groundwater levels
- Improvement in groundwater quality
- Preservation of groundwater resources (2,070 AF/year)
- Improved water reliability (2,070 AF/year)
- Improved water management (2,170 AF/year)
- Increased energy efficiency at recovery wells
- Groundwater banking
- Water marketing
- Water conservation (2,195 AF/year)
- Improved water supply reliability (important with recent and potential future CVP allocation reductions due to Delta issues)
- Water marketing (could allow additional water supplies to be sold to other CVP contractors)
- Wildlife habitat enhancement (including kit fox dens and raptor perches on power poles)
- Spill Reduction (125 AF/year)

Funding
JID will fund the dollars not contributed by federal funds by way of in-kind contributions and money available in the District's general fund (reserves). The District will provide a 69.2% cost share.

## 4 . Evaluation Criteria

### (A) Water Conservation

***Subcriteria No. A.1: Water Conservation***
The project would result in both Water Conservation and Improved Water Management.

***Subcriterion No. A.1(a) – Quantifiable Water Savings: Describe the amount of water saved.***
Summary
The District's annual average water supply (surface and groundwater) is approximately 75,500 AF. This is the average water use between 2000 and 2012 (see **Table 2** for more details). The project is estimated to conserve 2,195 AF/year, by irrigation flow measurement, automation (125 AF/year) and groundwater recharge (2,070 AF/year).

(3) Irrigation Flow Measurement

The booster pumps to be installed for returning water from Basin 3 will have flow meters installed on them, which will show the District how much they are in fact being used.

(4) SCADA and Automation

With the complexity of this system, adding a few simple automated systems will make managing the Main Canal easier. Automation will occur primarily in three different areas:

1. A Langemann Gate and flow meter at the E-Check/Booster (page 20 of the plans in **Appendix C**). Since the Langemann Gate is submerged, a Sontek Argonaut SL flow meter (a side looking acoustic doppler measurement device for water velocity and level in open channels) is proposed to be used to measure the flow downstream of the gate. This will need to be integrated with the gate, so that the ditchtender can input a required flow downstream, and have the gate handle the flow fluctuations.
2. Basin 3 pumps with flowmeters and level control with the Main Canal. The pumps lifting water from Basin 3 will be based on the level of the Main Canal. When water drops below the level of the flap gate set point in the Main Canal Control Structure, the pump(s) will turn on. There will be 2 pumps with 1 pump on a VFD. Once the VFD pump is maxed out, the fixed drive pump will turn on.
3. Gate movement at the Main Canal Control Structure to the siphon and distribution structure will be based on water level and flow direction in the siphon. The gates within the Main Canal control structure (page 15 of the plans in **Appendix C**) will need to be opened or closed depending on the operation of the siphon. When the water is spilling into the siphon, the ITRC flap gates will want to be operated in such a way that water will flow into Basin 3. A water level sensor will be placed in Basin 3 and the Main Canal Control Structure for gates to base their movement off of.

Operational spills leaving the JID service area are small compared to water use, at approximately 324 AF for years 2003 to 2012. Based on the location of the historical spills, it is estimated that no more than 50% of the total spills or 168 AF/year could be reduced by the automation improvements that are proposed. Some spills in those locations will likely still occur, so total spill reduction from the improvements is estimated at 125 AF/year (three-fourths of the 168 AF/year). The primary benefit to the automation will be ease of system operation and reduced travel for the ditchtenders and less wear and tear on the wellfield pumping plants due to less on-off cycling (wells can remain on and automatically fill Basin 3).

(5) Groundwater Recharge

The average annual 2,070 AF per year expected to be recharged will all be better managed. Without this project, the Kings River high flow water would continue down the river unused. By placing the water in the ground for storage it can be retrieved when needed most, or left in the aquifer to raise groundwater levels, and is not subject to evaporation losses. If needed, the water can be pumped and stored in regulation reservoirs to handle peak irrigation demands within the District, all a quantifiable savings. Details on the available of Kings River high or flood flows and the calculations quantifying the recharge are included in **Appendix E**. Recharge can occur in Basin 2, Basin 3, and due to the water control structure being placed in the auxiliary/easterly channel, recharge will also occur in the channel.

***Subcriterion No. A.1(b) – Improved Water Management***

The proposed Water Banking Project will offer many improvements to water management. The project will improve flexibility and provide system redundancy. Specific water management improvements are as follows:

1. Periodic peaks in irrigation demand, primarily caused by periods of abnormally high temperatures, often result in irrigation demands that exceed the combined flow rate capacity of the District's wells. When this occurs, the District would operate their booster from Mendota Pool to supplement groundwater supplies to satisfy demands, or wells could be turned on to supplement CVP surface supplies. In the absence or reduction in CVP supplied, the regulation storage capacity will prevent temporary water shortages to the distribution system.

   Based on the 2007 demand data shown in **Figure 2**, the District had a total of 10 peaking periods over 44 days when storage would be needed if there were no CVP supplies available to the District. Of those peak demand times, there were 16 days when flows 30 cfs or greater were needed, and 28 days with lesser flows, which on average were 22 cfs. Since Basin 3 is at the head of the JID system, it will be the first regulation basin that is used. Therefore, all of the storage demand peak days are assumed for calculating the volume of water better managed.

   16 days x 30 cfs x 1.98347 AF/cfs-day = 950 AF
   28 days x 22 cfs x 1.98247 AF/cfs-day = 1,220 AF
   Quantifiable Improved Water Management = 2,170 AF

2. Having a regulation reservoir at the head of the JID system will help the District to better satisfy peak demands, and growers could experience less lead time when ordering water, and have greater flexibility in when they can turn off water.
3. As previously discussed in Subcriteria No. A.1: Water Conservation, SCADA and Automation, this will provide improved water management in the area served, allow automated operation, provide real time data, prevent over deliveries, and better ability to respond to unanticipated events.
4. Water quality from surface water and groundwater varies. The new facilities will provide greater ability to blend water supplies or deliver the best quality water.
5. The ability to automate the spill of the Main Canal to Basin #3 could help reduce the potential for spills or canal overtopping in the upper portion of the distribution system by providing an outlet for extra water.
6. The Water Banking Project will provide a steadier and reliable water supply, and facilitate development of drip- and micro-irrigation systems in the area.

***Subcriteria No. A.2: Percentage of Total Supply.***

The water savings were estimated to be 2,195 AF/year (see Subcriteria A.1(a) above) from recharge and spill reduction

$$\text{Percentage of Total Supply Conserved} = \frac{2{,}195 \text{ AF}}{75{,}500 \text{ AF}} = 3\%$$

The water better managed was estimated to be 2,170 AF/year (see Subcriteria A.1(b) above) from re-regulated flows

$$\text{Percentage of Total Supply Better Managed} = \frac{2{,}170 \text{ AF}}{75{,}500 \text{ AF}} = 3\%$$

***Subcriteria No. A.3: Reasonableness of Cost:***

The facilities proposed in this project include concrete structures, concrete pipelines. a pump station, and earthen embankments which have service life of varying time. Life expectancies were determined with a combination of JID experience, manufacturer's information, and life expectancies listed for various facilities in *Design and Operation of Farm Irrigation Systems*, ASAE Monograph No. 3, 1981 (pg 58). Pumping plants, concrete structures, concrete and PVC pipelines are estimated up to 40 years in ASAE Monograph No. 3, where earthwork is estimated at 50 years or more. With proper maintenance, structure life can easily be extended, as many structures in the District are much older than 50 years. Since the majority of the construction materials are earthwork or concrete, the overall expected life is 50 years or more.

The estimated project cost per acre-foot conserved over the life of the project is estimated to be $19, as shown in the calculation below.

$$\frac{\$3{,}244{,}794}{(2{,}195 \text{ AF Conserved} + 2{,}170 \text{ AF Better Managed} = 4{,}365 \text{ AF}) \times 50 \text{ years}} = \$14.87/\text{AF}$$

Details of project costs are included in **Appendix F**. $14.87 per acre-foot is a very good value in today's water market. In the 2012-2013 irrigation season, JID effectively charged their growers $84 to $89 per acre-foot, measured at the field turnout. The 2010 publication *The Economic value of Water for Agricultural, Domestic and industrial Uses: A Global Compilation of Economic Studies and Market Prices* by Ecosystem Economics reviewed data for water transfers in the Central Valley. For 392 short term leases from 2000 to 2009, they found that the lease rate averaged $148/AF, and ranged from $12 to $555/AF for 20 to 160,000 AF.

During the same time period, short-term leases transferring water to municipal/industrial purposes averaged $197/AF and on average, water lease prices have increased by about 6% annually. On the other hand, permanent water supply purchases in the Central Valley averaged $2,344/AF. (Ecosystem Economics, 2010). More recent sales will be higher, but are difficult to document. There are two very public recent permanent State Water Project sales from Dudley Ridge Water District to municipalities, one at $5,200/AF for a 14,000 AF contract (2009) and another at $5,850/AF for a 1,993 AF contract (2010).

## (B) ENERGY WATER-NEXUS

***Criterion No. B – Energy-Water Nexus***

***Subcriteria No. B.1: Implementing Renewable Energy Projects Related to Water Management and Delivery***

The two existing wells (D-48 and D-54) that are along the JID Main Canal across from the regulation and recharge basins (Basins 2 and 3) are capable of retrieving banked water from this site, and receive power from the Power and Water Resources Pooling Authority (PWRPA). PWRPA is a Joint Powers Authority comprised of 9 irrigation districts organized to collectively

manage individual power assets and load. PWRPA's generation portfolio includes electric generation from landfill gas to energy, a co-generation plant, photo-voltaic solar generation, high efficiency natural gas power plant, and renewable hydroelectric power from federal water projects. These wells will be responsible for retrieving the recharged/banked water; and use PWRPA power. PWRPA's December rate for on-peak power was $0.1333/kWh where the local energy provider, PG&E, Ag-5B summer peak rate is $0.18246/kWh (see **Appendix G**), a savings of $0.04916/kWh during peak hours since PWRPA power is being used on these wells.

Additionally, a water control structure has been added to the design and placed in the auxiliary channel to harness the energy, under gravity, available to deliver water as an alternative delivery point to Basin 3 (from the Auxiliary Channel instead of from the Main Canal). This will enable the facility to perform recharge operations without requiring any new energy use. If this control structure were absent, the project would require a lift pump to divert water, if delivery was taken from the Easterly or Auxiliary Channel. Normal delivery operations to Basin 3 will be off of the Main Canal, which is also by gravity, but if capacity from the Main Canal could not be diverted to Basin 3, then delivery will be made off of the Auxiliary Channel by gravity methods due to the construction of the Water Control Structure. An estimated energy savings was not quantified, as this is the secondary delivery point.

***Subcriteria No. B.2. - Increasing Energy Efficiency in Water Management.***
In addition to decreasing energy demand due to raising groundwater levels from recharge operations, this project will also reduce the pumping of groundwater wells during peak energy demand periods. The booster pumps at Basin 3 have a total capacity of 30 cfs, and based on a lift of 40 feet versus lifting groundwater 275 feet, they are less costly to operate during peak hours than the wells. JID would normally operate 10 wells to obtain the flow of 30 cfs.

JID wells are typically pumped 100 days per year during the summer. During peak electrical time of use periods (Monday through Friday, from Noon to 6:00 pm) the wells will be turned off and the water supply be made up by running the boosters at Basin 3. The cost of operating ten wells 24 hours per day for 100 days is estimated to be $230,829. Where the cost of operating 13 wells 18 hours per day for 100 days and the Basin 3 boosters for 6 hours per day for 100 days is $196,267, a savings of $34,563. More wells have to be run to obtain the same water volume as they are operating for less time. Detailed calculations are included in **Appendix D.** During the 100 day period, 5,950 AF would be pumped. This amounts to an electrical savings of $5.81/AF if using the boosters instead of the wells during peak electrical periods.

Some secondary energy efficiency benefits include:

- The booster pump station will be automated, and therefore reduce the times needed to drive to the site to monitor and adjust equipment.
- One of the new booster pumps will use a high efficiency variable-frequency-drive (VFD) pump, so that demand can be matched with flow. These have a higher efficiency than other pumps in the District which have a standard design.

## (C) BENEFITS TO ENDANGERED SPECIES

***Criterion No. C – Benefits to Endangered Species***
In 2009, JID prepared a California Environmental Quality Act Initial Study/Mitigated Negative

Declaration for the proposed project. The study addressed biological issues and determined that the general project area is potential habitat for the Burrowing Owl, the Kangaroo Rat, the American Badger, foraging habitat to the federally endangered San Joaquin Kit Fox, and various raptors as identified by the biological site investigations. The project will provide food, water, and habitat to these and potentially other sensitive species. During Protocol Kangaroo Rat surveys, there were no rats trapped of the listed species, but only the non-endangered species. Burrowing owls, foraging San Joaquin Kit Fox and an American Badger were observed on at least one of the project sites during the extensive biological surveys that were conducted. The project will also likely be occupied by non-sensitive species, and thereby reduce competition for food, water and habitat with threatened species in surrounding areas, providing the endangered species a chance to thrive. Below are a few of the environmental benefits the District will implement, and which were outlined in the Initial Study/Mitigated Negative Declaration and other documents listing preventative and mitigative measures:

- To avoid the take of kit fox habitat by embankment fill in potential foraging areas, the sides of the embankment will be allowed to naturally re-vegetate to provide habitat for kit fox and its prey.

- To offset the loss of potential kit fox and burrowing owl dens due to proposed earthwork and construction and operations activity in the project area, five escape dens will be installed in the upland area of the bypass near the existing recharge/regulation basins. The artificial dens will be located just outside of the project area, within the upland area of the bypass, along the northeasterly side of the project.

- For the grass areas along the auxiliary channel that are being filled, acreage in the proposed Kit Fox Preserve will be increased one to one for mitigation for the take of foraging habitat. Since the foraging habitat is deemed of poor quality, it is hoped that a set aside preserve will improve the foraging quality.

James Irrigation District hopes that features included in the design will have positive effects for the local wildlife; such as providing a food sources, a local water supply, areas to nest, and favorable living conditions. These design features include the following:

- Flat Levee Slopes to promote the growth of native wetland and upland vegetation to provide wildlife habitat and allow easier access to the water surface by animals.
- Varying Water Depths. Typical water depths in the each basin will vary, providing a variety of habitat environments for different species, including foraging areas for waterfowl, shorebirds, and other wildlife.
- Water Level Control. Pipelines connections will permit the movement and control of water among basins to increase wildlife values.

These features are expected to improve habitat for wildlife in the area. The basins will be periodically flooded and an interruption of water supply may impact these species. However, water will likely be recharged over extended periods, and during flood years recharge will probably occur for several months

The primary benefits to endangered species from the intertie project will be: 1)more frequent

wetting of a Water of the US; 2) raptor protection on new power poles; and 3) reduced reliance in Delta Water Supplies. These benefits are described below in addition to previous biological surveys in the area.

**Biological Studies.** Biological studies and environmental documents prepared have included biological surveys for the project site, including the following:

- 2008-06. Biological Reconnaissance Survey for Sensitive Species and Habitats for the JID's Water Augmentation Project
- 2008-08. Fresno Kangaroo Rat Trapping Survey for the JID 's Water Augmentation Project
- 2008-08. Burrowing Owl Survey for the JID's Water Augmentation Project
- 2008-08. San Joaquin Kit Fox Survey for the JID's Water Augmentation Project
- 2008-08. Fresno Kangaroo Rat Trapping Survey for the JID's Water Augmentation Project
- 2008-11. Sensitive Plant Survey for the JID's Water Augmentation Project
- 2009-02. Wetland & Waters Evaluation for the JID's Water Augmentation Project
- 2009-05. Sensitive Plant Survey (Phase2) for Munz's Tidy-Tips and Recurved Larkspur for the JID's Water Augmentation Project
- 2009-07. Adoption of Water Augmentation Project, Initial Study/Mitigated Negative Declaration and Mitigation Monitoring and Reporting Program
- 2009-11. Avoidance of Vernal Pools and Justification for Vernal Pool Buffer Zones, JID's Water Augmentation Project
- 2010-03. Survey & Count of Potential San Joaquin Kit Fox Dens for the JID's Water Augmentation Project
- 2013-03. San Joaquin Kit Fox Preserve Evaluation Memo
- 2013-12. Biological Assessment - JID's Water Banking Expansion Project, EA-08-081

Raptors appear to be common in some parts of region based on a Protocol Swainson's Hawk Survey conducted in May 2011 by the project biologist for a project in a nearby District. During the survey, biologists observed raptors nesting, migrating, flying and foraging in the region. In one field, several hundred Swainsons Hawks were found. Other raptors observed in the region included the Great Horned Owl, Red Tailed Hawk, Northern Harrier, and Merlin.

Sensitive Species Database

A search of the California Department of Fish and Game Natural Diversity Database showed a variety of sensitive birds and habitats in the general region of the project. Some birds near the project include Swainson's hawk (threatened), burrowing owl (species of concern), and mountain plover (species of concern). When there is water in the Fresno Slough Bypass, many birds will appear that are not normally around when the area is dry. Increasing the frequency, duration and area wetted will increase the numbers of birds.

Furthermore, a search of the California Department of Fish and Game Natural Diversity Database showed a variety of sensitive raptors could potentially be in the region, as shown in **Table 3**.

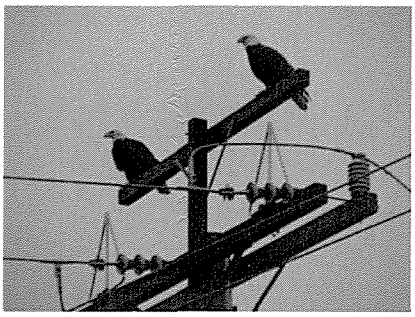
**Table 3 – Potential Sensitive Raptors in James Irrigation District**

| Species | Federal | State |
|---|---|---|
| Western Burrowing Owl | Species of concern | Species of concern |
| Bald Eagle | Threatened | Endangered/Fully protected |
| American Peregrine Falcon | - | Endangered |
| Swainson's Hawk | - | Threatened |
| Short-eared Owl | Species of concern | Species of concern |

Based on the results of these studies, some project features were added to enhance habitat for several bird species including a habitat island and raptor protection on power poles.

**Upland Area Wetting.** By constructing additional recharge and storage basins in the upland area of the Fresno Slough Bypass, a Army Corps identified Water of the US will be wetted more frequently than has occurred in the past. This will create improved wetland and upland habitat in the region similar to that of the nearby California Department of Fish and Wildlife Mendota Wildlife Area. The nearby Wildlife Area, consists of approximately 11,825 acres of a combination of wetland and upland habitat. Migratory bird species, including waterfowl, along the Pacific Flyway utilize the Wildlife Area during their migration. The Wildlife Area is open for upland game hunting. However, the project's basins would provide wetted habitat for these bird species that is protected from hunting and other activities that occur at the Wildlife Area.

**Raptor Perches.** The project will include the relocation of an existing power line of approximately 1,000 feet that goes through Basin #3. The extension will include 4 or 5 new power poles. Power poles can benefit raptor species by providing a high spot to rest and survey for prey. However, power lines can be also be a danger and cause electrocution or death.



As a result, the power poles will include several features to protect raptors including: 1) Raptor frames, 2) 60-inch phase to phase clearance; and 3) covered wire bird guarding. The District's consulting engineer spoke with the local power company, Pacific Gas & Electric, who confirmed that these features can be added to the power poles.

**Reduced Reliance on Delta Water Supplies.** JID has rights to 35,300 AF of Federal agricultural CVP water, and 9,700 AF of Schedule 2 CVP water. These waters are usually delivered from the Sacramento-San Joaquin River Delta. Due to concerns for endangered species, especially the Delta smelt, pumping from the Delta has been severely curtailed in recent years. The proposed project will benefit endangered species in the Delta in two ways:

1. The project will conserve up to 2,195 AF/year, and allow a potential CVP sales or transfer to another contractor. This will reduce reliance on Delta water supplies.
2. By creating an additional 30 cfs of capacity with booster pumps at the head of the JID system, additional land could be planted in permanent crops and/or drip irrigation systems can be installed. This will modify water demands so there is less peak demand in the summer, and demands will be spread more evenly throughout the year. This will reduce demands on Delta water during critical low-flow periods in the summer.

The proposed measures (increased wetting periods, raptor protection, and reduced reliance on Delta supplies) will have tangible benefits and make a small contribution to improving the status of several sensitive species.

## (D) WATER MARKETING

***Criterion No. D – Water Marketing***

Briefly describe any water marketing elements included in the proposed project.

The proposed project will achieve water marketing and water banking goals by developing basins that can capture and recharge Kings River high flow water, and provide a location for other agencies to bank water. The overall project is schematically shown in **Figure 4** below, and has been described throughout this application.

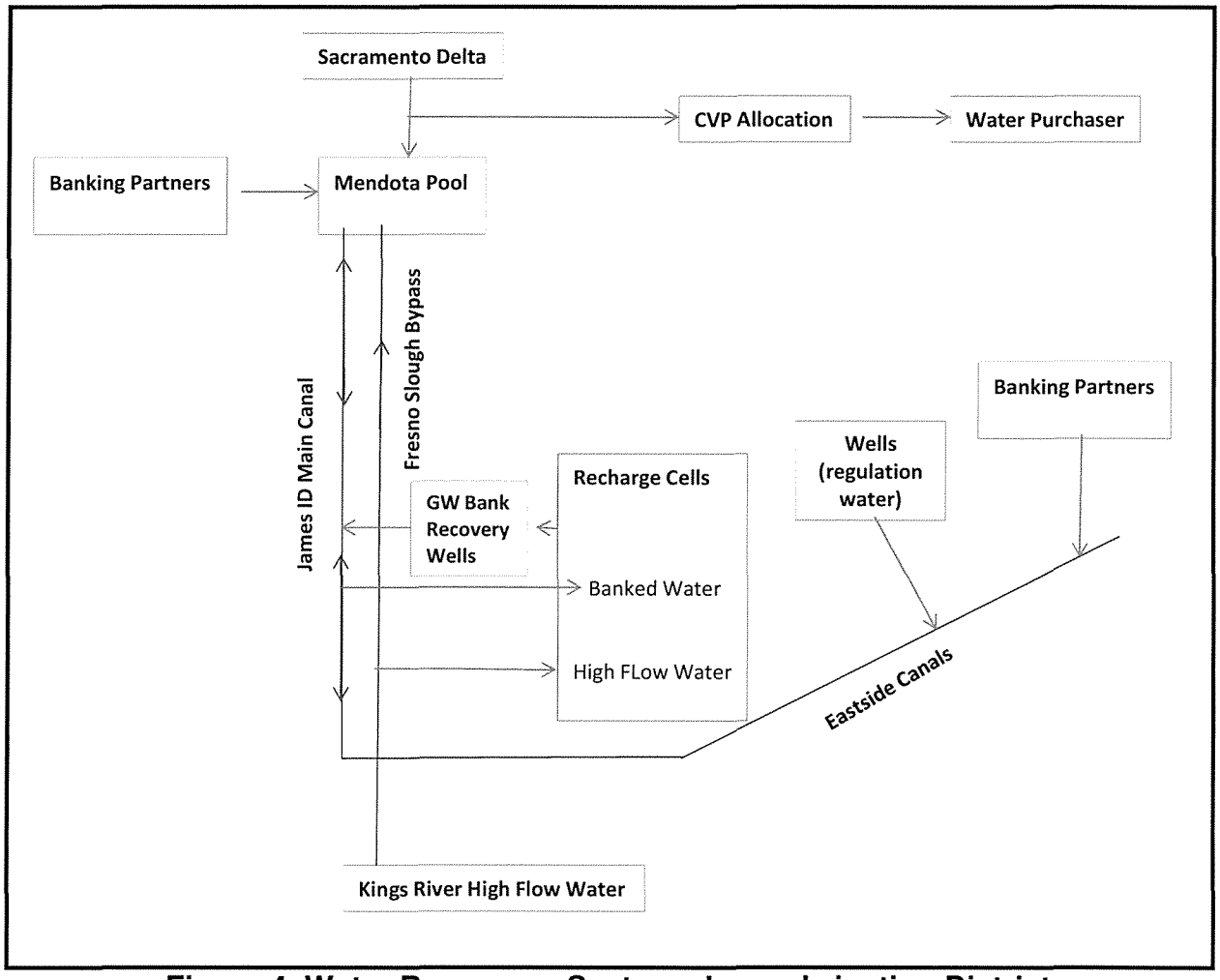



**Figure 4. Water Resources System: James Irrigation District**

(1) ***Estimated amount of water to be marketed.***

The 2,070 AF/yr of Kings River high flow water that is expected to be recharged could all be marketed to other Districts in need of supply. When high flow water is not being recharged this site will be used as a place for other agencies to bank water as is outlined in the Banking Prospectus

(**Appendix H**). The Banking Prospectus was originally prepared in 2008 when the project was not yet to the 50% design stage and estimated 1,250 AF/year as available for banking. The current facility design estimates 2,070 AF/year average annual recharge capability from these facilities.

The proposed Basin 2 and 3 areas to be enhanced in the Fresno Slough Bypass already have sufficient recovery well capacity to pump the recharged groundwater. Adjacent to the project site are two recovery wells capable of 3 cfs/well on average, or 5.95 AF/day/well. This will provide pumping capacity of about 356 AF/month, or about 3,200 AF over 9 months, which will be ample capacity to recover recharged or banked water at the proposed cells.

(2) ***A detailed description of the mechanism through which water will be marketed (e.g., individual sale, contribution to an existing market, the creation of a new water market, or construction of a recharge facility).***

The project will include the development of a water bank that will provide a mechanism for willing participants to buy, sell, lease, or exchange water to meet existing needs for agricultural, municipal or in-stream uses. JID is offering water banking services using water supplied by banking partners, as put forth in their Water Banking Program Prospectus (**Appendix H**). Through this program, the District could percolate water in Basin 2 and 3 and extract it at a later date for the banking partner. JID has several existing extraction wells along their Main Canal that can be used to recover the banked water. This will provide a water supply for the banking partner in dry and critically dry years.

Water Marketing. The expanded storage/recharge basins (Basins 2 and 3) will also serve as regulation reservoirs. Currently, the District's well capacity is insufficient to meet peak demands. Therefore, during peak demands the wells are supplemented with CVP surface water or groundwater that has been pumped earlier and stored in Mendota Pool. With the proposed improvements, the District will begin pumping additional groundwater to store in the basins prior to peak demand months. This stored capacity will then be used in addition to the well water during these peak demands. As a result, the regulation reservoirs will reduce competition for valuable storage space in Mendota Pool, and, more importantly, reduce the Districts demand for CVP surface water which will instead be sold to other water agencies.

Water Banking. The project will include the development of a water bank that will provide a mechanism for willing participants to buy, sell, lease, or exchange water to meet existing needs for agricultural, municipal or in-stream uses. The JID is offering water banking services using water supplied by banking partners, as put forth in their Water Banking Program Prospectus (**Appendix H**). Through this program, the District will percolate water in the two basins and extract it at a later date for the banking partner. JID has several existing extraction wells that can be used to recover the banked water. This will provide a water supply for the banking partner in dry and critically dry years.

As explained in the Groundwater Banking Prospectus, JID has a unique combination of access and rights to various water resources, and equally unique geographical setting that could allow them to bank water for many different water agencies.

Water banked within JID must be brought to the District's turnout from the Mendota Pool or other

locations, as agreed upon. The original banked water quantity placed with the District will be reduced by ten percent to account for any losses and related mitigation. While this program will benefit all who choose to use the District's banking facility, JID also has goals that it must meet to make it viable. The program must generate significant, quantifiable benefits to the District and its landowners, the program should not have any significant adverse impacts on the District, its landowners, or any third parties, including impacts to the local groundwater supplies, and the program should not have any adverse implications on the District's ability to continue to receive water under its existing water or contract rights. Banking will be performed in months when the basins are not being used for Kings River high flow recharge.

Water left behind from groundwater banking. Water banking agreements will require that 10 percent of banked water be left behind in the District's aquifer. Some of this water will be lost to evaporation during spreading and groundwater outflow, while the remaining water will be used towards groundwater recharge. Though not quantified, any water remaining in the water bank at the end of the term will also become the asset of JID.

San Luis Reservoir Water. At times, JID has water stored in San Luis Reservoir. Water can only be stored in the reservoir for a limited amount of time. When JID's storage period ends the water is released and JID must either take or transfer the water or relinquish it. The proposed facilities will help to ensure that the water is not relinquished. If there is no demand for the water in JID it could be stored in the basins and later pumped out for irrigation, or recharged. However, it is not possible to accurately simulate how much San Luis Reservoir water can be saved using the basins.

(3) ***Number of users, types of water use, etc. in the water market***

JID plans to send a copy of their Groundwater Banking Prospectus (which discusses groundwater banking and water marketing) to Central Valley Project water users south of the Delta. JID is open to working with any of these agencies as long as they can deliver or receive water from JID, they can cooperate without violating any of the legal issues described below, and they can develop a reasonable banking or water purchase agreement that benefits both parties. Most of these agencies are facing some challenges in meeting water demands, and it is expected that many already have an interest in banking or water purchases. Transfers have occurred with Tranquillity Irrigation District, Fresno Irrigation District, and San Luis Water District. Additionally, Westlands Water District has recently expressed interest in banking water as is evident by their letter of support (**Appendix I**).

(4) ***A description of any applicable legal issues pertaining to water marketing or banking (e.g., restrictions to marketing under reclamation law or contracts, individual project authorities, or State water laws).***

JID will obtain all necessary agreements, approvals and permits prior to marketing and banking water. These will be obtained from USBR, DWR, and other relevant agencies. Pertinent legal issues will include water transfer and exchange regulations, place of use restrictions for CVP water, Reclamation law regarding uses of water, such as on Excess Lands, and proper tracking and oversight of the water sources once they are banked

(5) ***Estimated duration of water transfers or market***

The water transfers and water market is expected to continue as long as the project facilities exist. The project facilities have a life expectancy of 50 years, and the life expectancy can be extended

with proper maintenance and rehabilitation.

## (E) Other Contributions to Water Sustainability

***Criterion No. E – Other Contributions to Water Supply Sustainability***

(1) ***Describe in detail the adaptation strategy that will be implemented through this WaterSMART Grant project. Identify the specific WaterSMART Basin Study where this adaptation strategy was developed.***

The project falls within the Sacramento-San Joaquin River Basin Study. This study is underway and no final adaptation strategies have been identified by USBR. However, a USBR representative stated that the 'Resource Management Strategies' in the 2009 California Water Plan Update will be a starting point for developing adaptation strategies. The project is consistent with the following 'Resources Management Strategies' from the 2009 California Water Plan Update:

**Conveyance – Regional-Local**

The intertie will increase conveyance capabilities to a large portion of JID by the installation of the siphons, storage basins and recovery pumps, adding to the conveyance capacity of the District at the head of their system.

**System Reoperation**

The project will provide a new facility that allows the District greater flexibility in deliveries and operations. The new operations will improve reliability, improve flexibility, and reduce conveyance losses since the storage is on the high end of the JID system.

**Water Transfers**

The project will conserve water that can be marketed to other agencies. The Water Banking Project will also allow the recharge of Kings River flows, and thus facilitate the sale of CVP.

(2) ***Describe other benefits to water supply sustainability that are not described elsewhere.***

Mendota Dam Storage Restrictions

An important benefit to water supply sustainability is reducing reliance on water from Mendota Pool, the source of CVP supply for JID. The Water Banking Project will do this by providing a mechanism to deliver additional water supply to the District that does not travel through Mendota Pool. In recent years, Mendota Pool/ Dam have become a subject of concern. There is typically a high demand for storage in the Pool among numerous water users. Leak concerns at Mendota Dam along with silt and weed buildup in the Pool have made it more difficult to get pool water to the District's pumping plant (P Booster) on Fresno Slough. Dam seepage prompted the Central California Irrigation District (CCID), who owns the Dam and manages the Pool, to lower the pool's surface elevation in 2006, to reduce pressure on the Dam. The California Division of Safety of Dams has also limited the water level behind Mendota Dam during the 2005, 2006 and future irrigation seasons to less than historic and preferred levels. There continue to be restriction on Mendota Pool water levels which bring uncertainty to JID surface water supplies. There is also a growing concern in the District with quality of water from the pool, especially as more entities pump groundwater into the pool for transfer. Uncertainty in the future operations of the pool are a concern due to the decisions being made regarding how Mendota Dam will ultimately be plumbed or laid out due to the San Joaquin River Restoration Program.

Water Supply Shortages Due to Climate Variability and/or Heightened Competition
Climate change, or the increase in annual temperatures, is theorized to lead to an increase in flood flows due to an increase in the amount of rain that the Sierra Nevada Mountains receive in-lieu of snowpack during the winter. Climate change may also bring warmer and more intense precipitation events. These factors could result in an increase in high river flows during the winter and spring months, and a reduction in late spring and summer river flows. JID will have to rely more on water regulated in the basins of the Water Banking Project. The project basins will be the most effective basins for regulation in the District as they are at the upstream or high end of their system and therefore provide the most benefit to the District.

(3) ***Will the project help to expedite future on-farm irrigation improvements, including future on farm improvements that may be eligible for NRCS funding.***

List of fields and acreage that may be improved in the future
As water, fuel and fertilizer prices increase, and the District obtains more local and reliable water supplies, the trend in the District is to convert to permanent crops and drip or micro-sprinkler irrigation methods. Hence, most of the entire District (26,400 acres) could be improved over time.

Describe the on-farm improvements that can be made as a result of the project
The Water Banking Project will provide a more reliable water supply, with a more constant flow. Water stored in a regulation basin means the District has additional flow that they can count on when there is demand. This will provide incentive for growers to consider planting higher value crops or permanent crops, and installing drip or micro irrigation systems.

Provide an explanation of how the proposed project would help to expedite such on-farm efficiency improvements
See above

Estimate the potential on-farm water savings that could result in acre-feet per year
The area served by the project includes the entire District of 26,400 acres, and provides a more reliable water supply for the entire District. If recent trends continue, where about 3% of the District is yearly converted from surface to drip/micro irrigation methods, then the District would see a yearly water savings from about 750 acres, for about 340 AF/year

750 acres x 3 acre-ft/acre x (90% - 75% efficiency) = 340 AF/year

In 2003 about 3% of the District was on drip/micro irrigation methods, where in 2009 about 25% of the District lands were using drip or micro irrigation. Conversions to these methods has usually been associated also with the planting of permanent crops.

Describe the number or percentage of shareholders that plan to participate in NRCS funding
The number of shareholders that would participate in NRCS funding is not precisely known. However, the project is being constructed partially due to requests from growers who want a more reliable water supply so they can plant permanent crops and install drip and micro irrigation systems. As a result, it is possible that participation would be high.

Describe the extent to which this project complements an existing or newly awarded AWEP project
A local Agricultural Water Enhancement Program (AWEP) is being administered by the Kings River

Conservation District (KRCD), a regional water management agency that covers most of the service area for the Kings River (http://www.krcd.org/water/water_management/awep.html). Since 2010, 176 growers in KRCD have received $6.4 million to treat 8,460 acres. JID is a member of KRCD and JID growers have full access to the AWEP benefits.

(4) ***Will the project make water available to address a specific concern?***

The project will conserve water and make it available for marketing to other south of the Delta contractors. These agencies rely on Delta water for part of their supply, so it will reduce reliance on Delta water and address specific concerns related to Delta pumping restrictions. As discussed herein, groundwater recharge will occur on an average annual basis estimated to be 2,070 AF/year, making a more reliable supply available to JID.

(5) ***Does the project promote and encourage collaboration among parties? Is there widespread support for the project? Will the project help to prevent a water-related crisis or conflict?***

The JID Board of Directors directed the District Manager to make application for the project and will formally approve a resolution for the project at their February 2014 Board meeting. The Board of Directors is comprised of local landowners, so this endorsement also represents support for the project from the local farmers. In addition, the District has received letters of support from five local entities (**Appendix I**). Both Westlands Water District and Fresno Irrigation District have had recent conversations concerning water banking and transfer opportunities. The proposed project will provide additional opportunities to JID for their facilities to help in alleviate water conflicts in the vicinity of their District.

(6) ***Will the project increase awareness of water and/or energy conservation and efficiency efforts?***

JID typically publishes a summer and winter newsletter that is sent to their customers. The District has been updating their customers on the status of the project since the initial 2008 application and will continue to provide updates on the project. The article will discuss the renewable energy and energy conservation benefits of the project. This will help to educate many of the growers in JID.

## (F) Implementation and Results

***Criterion No. F – Implementation and Results***

***Subcriteria No. F.1: Project Planning. Does the project have a Water Conservation Plan, System Optimization Review, and/or district or geographic area drought contingency plans in place?***

The District has a Water Management Plan and a Groundwater Management Plan. Copies of these documents are available upon request. The Water Management Plan and annual updates are regularly submitted to the USBR as required. A 2010 5-year update to the Water Conservation Plan covers years 2005 to 2009, and was finalized in March 2011. The Water Management Plan is equivalent to a Water Conservation Plan since it incorporates water conservation and drought contingency actions through best management practices (BMPs) according to the California Agricultural Water Management Council and Reclamation guidelines. The current Groundwater Management Plan was adopted in November 2010 to make it compliant with California Senate Bill 1938. These two plans are available upon request.

***Provide the following information regarding project planning:***

(1) ***Identify any district-wide, or system-wide, planning that provides support for the proposed project. This could include a Water Conservation Plan, SOR, or other planning efforts done to determine the priority of this project in relation to other potential projects.***

James ID 2010 Water Management Plan Update

In 2010, a 5-Year update of the District's Water Conservation Plan. Recommendations in the plan included constructing more regulation reservoirs and groundwater recharge/banking facilities. Specifically, the plan stated the following about the Water Augmentation or Water Banking Project:

> *"The JID Water Augmentation (also known as Water Banking) Project will include new facilities for storing and recharging water, with the goal of reducing JID's dependence on surface water. The project will include improvements to basins and construction of new recovery wells and conveyance facilities" (pg 22).*
>
> *"The JID Water Augmentation (or Banking) Project was developed to sustain the District's current practices in the absences of our 35,300 AF CVP Supply." (pg 53)*

James Irrigation District Groundwater Management Plan

JID's 2010 Groundwater Management Plan has sections discussing Mitigation of Conditions of Overdraft, Replenishment of Ground Water Extracted by Water Producers, Facilitating Conjunctive Use Operations, and Construction and Management of Ground Water Management Facilities, all of which are relevant to the proposed project. In addition, the following statement from the GMP is consistent with the plan to capture high flow water in the basins:

> *"Mitigation measures to negate current overdraft and contribute to lessening future overdraft conditions rely on the importation of additional surface supplies. Increasing JID's surface water supply would rely on improving the District's ability to use excess Kings River flows. Flood water appears adequate on the Kings River to mitigate the overdraft condition if sufficient recharge capacity can be developed. JID already recharges water in the K-Basin Recharge Project and plans to recharge additional flood waters with their proposed Water Augmentation (or Banking) Project." (pg 43)*

Groundwater Banking Study

In Nov 2005, the study "*Report of Findings for Potential Banking Facilities*" (herein groundwater banking study) was performed on the potential for banking/recharge facilities in/around the District (study is available upon request). The study identified the topsoils and subsurface geologic conditions, groundwater quality, and recharge banking potential for the District. The investigation identifies the location of Basin 2 and Basin 3 as an apparently favorable recharge area. Plate 3 of the study shows areas with topsoils favorable for recharge. Plate 4 identifies apparently favorable recharge areas, including the proposed Basin 2 and Basin 3 locations. Plate 10 shows the total dissolved solid levels in District wells. The wells located near the recharge/banking areas of Basin 2 and Basin 3 as having some of the better water quality within the District. Infiltration rates in the JID Main Canal & Lateral K Basin were obtained as part of this study.

McMullin Recharge Feasibility Study

The McMullin Recharge Group, which consists of JID, Kings River Conservation District, Mid-

Valley Water District, Raisin City Water District, Terranova Management Co., and Tranquillity Irrigation District, performed a Recharge Feasibility Study for the McMullin Grade area, completed in Jan 2006 (the study is available upon request). The results of subsurface borings showed nearly ideal recharge conditions, with the majority of the profiles being sand, with some silty layers mixed in. The areas investigated were not in the immediate vicinity of the proposed project; however, the results illustrated the potential for groundwater recharge in the District. As a result, JID performed additional recharge investigations culminating in preparation of this application.

Integrated Regional Water Management Plan

The project is also consistent with several Resource Management Strategies listed in the Kings Basin Integrated Regional Water Management Plan (IRWMP). These strategies include Agricultural Water Use Efficiency, Conveyance – Regional/Local, System Reoperation, and Water Transfers. These are discussed in Chapter 6 of the 2012 IRWMP at http://www.krcd.org.

KRCD Regional Groundwater Management Plan

In April 2005, the Kings River Conservation District (KRCD) prepared a regional Groundwater Management Plan (GWMP) Update for Lower Kings Basin, which includes and was supported by JID. Section 3 – Goals and Objectives of this document includes extensive discussion on proposed GWMP objectives, including building groundwater recharge projects as well as groundwater banking projects within each water management area, in order to begin stabilizing the basin. Groundwater recharge and groundwater banks were identified as important facilities for taking advantage of the vast unused storage space in the Kings Groundwater Basin.

(2) ***Identify and describe any engineering or design work performed specifically in support of the proposed project.***

Initial Design

A 50% design plan has been developed for the structures, pipelines, siphons, pump station, and appurtenances (see **Appendix C**).

(3) ***Describe how the project conforms to and meets the goals of any applicable planning efforts, and identify any aspect of the project that implements a feature of an existing water plan(s).***

See Subcriteria No. F.1: Project Planning, Part 1 above. The Water Banking Project (also called Water Augmentation Project in other documents) is directly referenced in the Water Management Plan and the Groundwater Management Plan.

***Subcriteria No. F.2 - Readiness to Proceed***

(1) ***Environmental/Plans/Design***

Work completed to date includes initial planning, 50% design project designs (see **Appendix C**), and environmental studies and permitting applications (**Appendix B** is a chronology of work done thus far on permits and environmental compliance). These efforts have helped to eliminate potential fatal flaws and confirmed to JID that the project is worth pursuing. The complete design and specifications are expected to be completed by the project award date (assumed to be October 1, 2014). Permitting and environmental studies have been ongoing since June 2008 and will be complete early in 2014. CEQA is completed. South-Central California Area Office staff are not anticipating problems with NEPA. Section 106 compliance is complete. JID has completed all

the studies and prepared the information requested by the Army Corps for the 404 permit and US Fish & Wildlife Service for a Biological Opinion.

(2) ***Project Implementation Plan***

The anticipated project schedule is included in **Appendix D**. It is anticipated that NEPA, environmental compliance and permitting will be complete by the summer of 2014 with final design and construction documents complete by late September 2014. By the anticipated contract award date, the project will be "shovel ready." The project, including all construction and grant-related reporting, is anticipated to be completed by the end of September 2016.

(3) ***Permitting Requirements***

Permits and approvals needed for the project will primarily include a CEQA and NEPA, a Biological Opinion from the USFWS, and creation of a Kit Fox Preserve. The NEPA environmental process is almost complete and is being performed by local USBR staff. Refer to the section on "Environmental and Cultural Resources Compliance" below for more details on required permits.

***Subcriteria No. F.3 - Performance Measures***

***Provide a brief summary describing the performance measure that will be used to quantify actual benefits upon completion of the project (i.e., water saved, marketed, or better managed, or energy saved).***

The following performance measures will be used to quantify actual benefits during project operations. Flows will generally be recorded on a monthly basis.

**Performance Measure A.4 – Automation**

Automation of canal gates and pumping plants operating with levels controls is anticipated to lessen uncontrolled spills. JID has kept unintentional operational spills to very small percentages of the water used. After project construction, operational spills will be compared on a monthly and yearly basis to historical values.

**Performance Measure A.5 – Groundwater Recharge**

The accessible nearby production wells that are presently monitored twice per year for groundwater levels, will be compared pre and post project construction. Also, after the end the recharge event, an infiltration test will be conducted to estimate the actual recharge rate for Basin 2 and Basin 3. Once the basin is no longer filling, the vertical change in water surface will be measured to estimate the actual recharge or infiltration rate. The rate will be compared to other tests which have been done in the District.

**Performance Measure B.1 – Implementation of Renewable Energy Improvement**

The two existing wells (D-48 and D-54) that are along the JID Main Canal across from the regulation and recharge basins (Basins 2 and 3) that are using power from the Power and Water Resources Pooling Authority (PWRPA) will be monitored for volume pumped and power use. A comparison between past use and post project construction will be compared and contrasted.

**Performance Measure B.2 – Increasing Energy Efficiency in Water Management**

The construction of Basin 3 and the storage for re-regulation can be quantified by measuring how

much the booster pump is operated. Both the electric meter and flow meter will be read on a monthly basis and compared to pre-project use, which is non-existent since it is new construction. JID also maintains annual records of cropping and irrigation methods. Changes in these two parameters may be attributed to the improved water reliability from the project. Data for the District will be maintained and compared.

**Performance Measure C – Projects that Benefit Endangered Species and/or Critical Habitat**
The District will be establishing a Kit Fox Preserve for 154.7 acres of grassland that will be covered with earthwork, eliminating the area as foraging habitat for the Kit Fox, even though it is poor habitat. Between the preserve, the recharge area and the storage/regulation basins, there will be 28 artificial escape dens (5 along the existing basins, 12 along the recharge area and 11 in the preserve) installed and 8 artificial pupping dens installed in the preserve. Ten years of annual monitoring for the Kit Fox is normally required by USFWS. A comparison of number of observed Kit Fox sittings will determine if the improvements to assist the Kit Fox increase the numbers of sitting or not. When the project biologist is on the project site for the Kit Fox surveys, they will make note of and count any raptors roosting or nesting around the project site and on the power poles on-site.

**Performance Measure D – Projects that Establish a Water Market**
The District maintains monthly records for groundwater pumping, groundwater recharge, diversions, cropping, and water consumption, as well as water transfers. Pre-project to post-project data can will be compared on a monthly and yearly basis. Historical water transfers compared to post-project water transfers or sales can be compared.

## (G) Additional Non-Federal Funding

***Subcriterion No. G – Additional Non-Federal Funding***
The proposal includes a non-federal cost share of 69.2% of the total project cost, based on the following formula:

$$\frac{\text{Cost Share}}{\text{Total Project Cost}} = \frac{\$1,000,000}{\$3,244,794} = 30.8\%$$

In reality, the District has already provided significant funding for the project, having incurred approximately $650,000 in costs since 2008, for the administration, planning, cultural and biological investigations, permitting, and design of the proposed facilities, and will continue to have costs to finalize the design and finish the permitting/environmental processes

## (H) Connection to Reclamation Project Activities

***Subcriterion No. H – Connection to Reclamation Project Activities***
The proposed project will benefit James Irrigation District, whom has a contract for Reclamation water, through the Central Valley Project (CVP). The CVP water is delivered by USBR from the Shasta Division (Delta water) or Friant Division (San Joaquin River water) according to water supply availability. This water is delivered to JID through Reclamation facilities including the Delta-Mendota Canal. The project will also benefit other water agencies within the same basin with Reclamation water supplies through water banking and water marketing opportunities.

The James Irrigation District contracts with Reclamation for up to 35,300 AF/year of Central Valley

Project water (contract no. 14-06-200-700A-LTR1). The project will benefit JID through groundwater recharge, river high flow water capture, improved flow measurement, improved water management, improved flexibility of operations, capture of spillwater, and reducing dependency on CVP supplies.

The project will also allow JID to market a portion of their CVP water (estimated at up to 2,070 AF/year). Due to place of use restrictions, this marketing will be limited to other CVP water users, and specifically those south of the Delta. The project will also provide facilities for groundwater banking. JID will market the groundwater banking opportunities to CVP water users south of the Delta. Separate approvals will be required of Reclamation to actually use the project site for banking.

**5 . Performance Measures**

See Subcriterion F.3 above for specific information on performance measures.

## ENVIRONMENTAL AND CULTURAL RESOURCES COMPLIANCE

(1) ***Will the project impact the surrounding environment (i.e., soil [dust], air, water [quality and quantity], animal habitat, etc.)? Please briefly describe all earth-disturbing work and any work that will affect the air, water, or animal habitat in the project area. Please also explain the impacts of such work on the surrounding environment and any steps that could be taken to minimize the impacts.***

The project will disturb just over 29 acres, moving approximately 254,000 cubic yards of materials for earthen excavation or fill of the majority of which has been previously disturbed and is actively maintained by Reclamation District 1606. The dust generated during Project construction will only be temporary and nothing more than is normal for the agricultural fields in the vicinity. The project has obtained a Stream Bed Alteration Agreement and Section 401 Clean Water Certification with conditions for crossing or being in the bypass channel. It should be noted that normally the bypass incised channels are dry as the Kings River is diverted some distance upstream primarily for agricultural irrigation uses. Work in the channel will be only be conducted when the channel is in the dry. A Storm Water Pollution Prevention Plan will also be prepared. They are many mitigation measures built into the project and environmental/permitting process to protect the air, water or animal habitat in the area during construction. A Mitigation Monitoring and Reporting Program has been adopted by the District Board of Directors to address the various conditions and requirements.

(2) ***Are you aware of any species listed or proposed to be listed as a Federal endangered or threatened species, or designated Critical Habitat in the project area? If so, would they be affected by any activities associated with the proposed project?***

The federal and state endangered San Joaquin Kit was found foraging but not living on the adjoining project (Water Banking Expansion) but not on the Water Banking Project site. Since the "take" of foraging habitat is considered a take of the species under federal endangered species act, a Section 7 consultation is occurring with the US Fish & Wildlife Service. Due to the Kit Fox habitat, a Kit Fox Preserve will be established and multiple protective and mitigative measures will be in effect. Special status species including an American Badger and Burrowing Owls were also found on the adjoining project and additional protection and mitigative measures for these species

are also in effect during project construction and operations. The Department of Fish & Wildlife Streambed Alteration Agreement also listed the Swainson's Hawk as a species that could be potentially impacted and mandated certain protective measures for the same, even though the hawk was not found on or in the vicinity of the project site.

Prior to beginning construction, a qualified biological consultant will perform a pre-construction survey to verify existing biological conditions prior to the start of construction and confirm if specific protective measures will be activated.

(3) ***Are there wetlands or other surface waters inside the project boundaries that potentially fall under Federal Clean Water Act jurisdiction as "waters of the United States"? If so, please describe and estimate any impacts the project may have.***

As discussed below in the section "Required Permits or Approvals," the project is located within a Water of US. The proposed improvements are viewed as an enhancement to the Waters of the US, as the improvements between the Water Banking Project (2014 grant) and the Water Banking Expansion Project (2010 grant) will allow a greater area to be wetted more frequently than the area propose for fill. There are six poor quality vernal pools (wetlands) on the adjoining project site, which are being avoided by all project improvements.

(4) ***When was the water delivery system constructed?***

Irrigation systems were first constructed in the area of the James Irrigation District in 1885 and construction and rehabilitation has continued through the present. The JID Main Canal was constructed around starting in 1919 and was completed by 1923. Reclamation District 1606 Levee No.1 and the Main Fresno Slough Bypass Channel was constructed about 1915 (A Cultural Resources Assessment of the Fresno Slough (James) Bypass Regulation and Recharge Project, James ID, July 2013).

(5) ***Will the project result in any modification of or effects to, individual features of an irrigation system (e.g., headgates, canals, or flumes)? If so, state when those features were constructed and describe the nature and timing of any extensive alterations or modifications to those features completed previously.***

The proposed pipeline will connect to existing earth channel/canal that were built in the early 1900's and cross under the Fresno Slough Bypass which is believed to have been constructed in about 1915. The connections will have minimal impact on the existing facilities. The facilities have been modified multiple times since their original construction and are maintained on a regular basis.

(6) ***Are any buildings, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places? A cultural resources specialist at your local Reclamation office or the State Historic Preservation Office can assist in answering this question.***

Previous inquiries have not identified any buildings, structures or features in the James Irrigation District that are listed or eligible for listing on the National Register of Historic Places. However, within the built environment of both projects (2010 and 2014 grant projects) four historic-era structures (Reclamation District Levee No. 1, Fresno Slough Main Bypass & Auxiliary Channels, and the JID Main Canal) were identified and formally evaluated in the "*Cultural Resources*

*Assessment of the Fresno Slough Bypass Regulation and Recharge Project*". All four properties were determined to ineligible for listing in the National Register of Historic Places. Reclamation initiated consultation with the California State Historic Preservation Officer (SHPO) seeking concurrence with the determinations of National Register eligibility for these properties. Additionally, Reclamation requested concurrence with the finding that the undertaking results in no adverse effects to historic properties. SHPO did not respond to Reclamation, and therefore Reclamation has fulfilled their obligations and commitments to Section 106.

(7) ***Are there any known archeological sites in the proposed project area?***

The Reclamation approved "*Cultural Resources Assessment of the Fresno Slough Bypass Regulation and Recharge Project*" dated July 2013 identified one prehistoric site in the architectural Area of Potential Effect (APE) but outside the archaeological APE. This site is near the 2010 grant project (Water Banking Expansion Project) and will be avoided during construction and a 20 meter buffer area placed around the site during construction. There is also a report pending for the Kit Fox Preserve location, an "*Extended Phase One Cultural Resources Investigation for the Fresno Slough (James) Bypass Regulation and Recharge Project, Kit Fox Preserve, James ID."* Previously recorded sites will also be avoided on the Kit Fox Preserve with the construction of escape and pupping dens.

(8) ***Will the project have a disproportionately high and adverse effect on low income or minority populations?***

The City of San Joaquin is surrounded by James Irrigation District and is designated as a low income area. This project will benefit this community by improving the District's surface water and groundwater supply reliability. In addition, this project would increase the quantity of water available for irrigation in the region, improving the region's economy. The water being used for groundwater recharge is of better quality than the groundwater and therefore will improve the regional groundwater quality which is of benefit to the City as their municipal and drinking water supply is dependent on groundwater.

(9) ***Will the project limit access to and ceremonial use of Indian sacred sites or result in other impacts on tribal lands?***

There are no tribal lands in the project's vicinity. Thus, there will be no impacts. The archeological surveys conducted on the project did not identify any ceremonial sites. All archeological sites identified are located within near adjoining project (water banking expansion project), near the recharge area and are being avoided by construction.

(10) ***Will the project contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area?***

The project will consist of a new pumping station, pipelines and concrete structures that will be buried underground. It is not expected that these items will contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species in the area. The earthwork being completed will be from soil already on the project site, which will not introduce new weeds. The project specifications will require earth moving equipment to be cleaned and inspected prior to entering the site, to mitigate for the potential of the equipment bringing in noxious weeds or non-native invasive species.

# REQUIRED PERMITS OR APPROVALS

*Applicants must state in the application whether any permits or approvals are required and explain the plan for obtaining such permits or approvals.*

The anticipated permits and approvals needed for the project are described below. Both JID and their engineering consultant, Provost & Pritchard Consulting Group, have experience in securing these type of permits and have expended significant effort thus far in obtaining regulatory approvals (see **Appendix B** for work completed since 2008 on the project). The project will be "shovel ready" by the end of the current 2013-2014 fiscal year.

***Federal Regulatory Approvals:***

NEPA (In Progress)

JID, in cooperation with USBR, is in the process of complying with the National Environmental Policy Act (NEPA). JID has already performed most of the work for complying with NEPA. Rain Emerson (remerson@usbr.gov) at the Mid-Pacific Region, South-Central California Area Office has been the primary point of contact for the preparation of the Environmental Assessment (EA) and anticipates that the draft EA will be out for a 30-day public review in February 2014. Finalization of NEPA is dependent on the pending Biological Opinion (BO) from the US Fish & Wildlife Service.

Reclamation initiated consultation with the California State Historic Preservation Officer (SHPO) on November 5, 2013 seeking concurrence with the determinations of National Register eligibility for four historic-era properties. Additionally, Reclamation requested concurrence with the finding that the undertaking results in no adverse effects to historic properties. SHPO did not respond to Reclamation, and therefore Reclamation has fulfilled their obligations and commitments to Section 106 as discussed in the Finding of no adverse effects to historic properties for the action.

US Fish & Wildlife Service (USFWS) Section 7 Consultation (In Progress)

Informal consultation with the US Fish & Wildlife Service began on August 8, 2009 regarding the take of San Joaquin Kit Fox (*Vlupes macrotis mutica).* The biological surveys found San Joaquin Kit Fox foraging on the adjoining project site (water banking expansion project), and the take of foraging habitat is considered a "take" of the species according to the Federal Endangered Species Act. No Kit Fox were found living on either project sites. Correspondence and discussions have been occurring since 2009. Reclamation sent the first Biological Assessment (BA) to USFWS on December 12, 2011. The USFWS biologist toured the project site on March 6, 2012. USFWS staff indicated that the location of a preserve for the Kit Fox must be set-up at a minimum one to one ratio for 154.7 acres for foraging habitat prior to issuing the Biological Opinion (BO). On January 15, 2013 JID Board of Directors approve the location of the proposed Kit Fox Preserve. On June 18, 2013 a revised BA was sent to USFWS addressing the major comments by USFWS. On December 20, 2013 the second revised BA was sent to the USFWS by Reclamation, addressing minor changes to the project. The USFWS has a 30-day review period of the BA to determine if the BA is sufficient and they can begin their preparation of the Biological Opinion. Then the USFWS has 135 days to prepare the BO. Once the BO is accepted, Reclamation can finalize compliance with NEPA and obtain signature on the Environmental Assessment. As of the date of the WaterSMART application, USFWS has not contacted Reclamation concerning the BA that was last submitted.

Army Corp 404 Permit - (In Progress)
This permit has already been applied for and is currently going through the approval process. Although the site is primarily uplands between two incised channels, the Army Corps considers the area jurisdictional and a Water of the US. The initial 404 permit application was sent to the Army Corps on May 29, 2009. JID executed a Preliminary Jurisdictional Determination from the Army Corps on October 22, 2010. The District has complied with requests for additional information to the present, and understands that the Army Corps is nearly ready to publically notice the permit. Since the uplands area seldom is wetted by high flows from the North Fork of the Kings River, Army Corps staff have indicated that the 114 acres of the adjoining project recharge area mitigates for the overall fill areas of 67.5 acres (acreages from the Water Banking and Water Banking Expansion Projects). The project will allow an area that is seldom wetted to be wetted more frequently, thereby enhancing a Water of the US.

Approvals from USBR
JID will secure the necessary future approvals from USBR before operating a groundwater bank. It is expected that USBR will want verification that groundwater banking agreements do not violate any Central Valley Project place of use restrictions or Reclamation land use laws, such as those pertaining to Excess Lands. In addition, JID will provide USBR with a plan to track and monitor any water that is percolated for groundwater banking. Initially, the project site will be used for recharge and regulation of existing JID water supplies, until additional approvals are in place for any banking.

***California Regulatory Approvals:***
Department of Fish & Wildlife, Stream Bed Alteration Agreement [APPROVALS OBTAINED]
The Streambed Alteration Agreement was executed October 3, 2012 was the construction of the siphons across the main or westerly channel of the Fresno Slough Bypass, as well as the construction of the water control structure in the auxiliary or easterly channel of the Bypass.

Regional Water Quality Control Board, Section401 Clean Water Certification [PERMIT OBTAINED]
In compliance with Section 401 of the Clean Water Act, JID was issued a Water Quality Certification materials on October 10, 2013 for the project for the discharge of dredged and/or fill. The certification becomes valid upon payment of the final fees, which will be paid at the time of construction.

Central Valley Flood Protection Board [PERMIT OBTAINED]
An encroachment permit was approved November 23, 2009 for the siphon pipeline crossing the main or westerly channel and embankment of the Fresno Slough (James) Bypass.

Storm Water Pollution Prevention Plan (SWPPP)
JID will prepare a Storm Water Pollution Prevention Plan for the project meeting State Water Resource Control Board requirements. A SWPPP is required in California for any construction site disturbing one or more acres, and prepared in conjunction with the final construction documents.

***Other Approvals:***

Water rights/transfer agreements

JID and any banking partners will secure the appropriate approvals for water transfers and exchanges that are needed for the groundwater bank, including NEPA and CEQA. No approvals are needed for the existing local surface water supplies proposed to be recharged.

Grading permit

In Fresno County, government agencies are exempt from the County Grading Ordinance, and therefore JID will not need a grading permit for the project.

## LETTERS OF PROJECT SUPPORT

The District has received letters of support (see **Appendix I**) from the following entities for the project: 1) Reclamation District 1606, 2) Fresno Irrigation District, 3) Westlands Water District, 4) Tranquillity Irrigation District, and 5) Kings River Conservation District.

## OFFICIAL RESOLUTION

The District Board of Directors will adopt a resolution meeting the FOA grant requirements at the regularly scheduled February 11, 2014 Board of Directors meeting and then forwarded to USBR. The Board of Directors is comprised entirely of local landowners, so the resolution will also represent support for the project from local farmers. The Board of Directors directed the District Manager to prepare applications at their December 17, 2013 meeting, but overlooked the need for a resolution at that time. The January 2014 Board of Directors meeting was cancelled.

## PROJECT BUDGET

### 1. Funding Plan and Letters of Commitment

(1) ***A description of how the applicant will make its contribution to the cost share requirement, such as monetary and/or in-kind contributions and source funds contributed by the applicant (e.g., reserve account, tax revenue, and/or assessments).***

A copy of James Irrigation District's Cash Position Report from November 30, 2013 is included in **Appendix J**. The report shows that the District has $5.2 million in their General Reserve Fund. This exceeds the amount proposed for the JID cost share of $2,244,794. The General Reserve is not dedicated to any projects, recurring expenses, or debt payments, and they are available for use on the proposed project. Therefore, the District has the financial resources to pay for the project from existing reserves.

(2) ***Describe any in-kind costs incurred before the anticipated project start date that the applicant seeks to include as project costs.***

***(a)*** What project expenses have been incurred - The James Irrigation District has incurred approximately $650,000 in costs since 2008, for the administration, planning, cultural and biological investigations, permitting, and design of the proposed facilities, and

will continue to have costs to finalize the design and finish the permitting/environmental processes. However, the District has not included these costs as part of the federal cost share, as they are costs occurred incurred prior to July 1, 2013 are not eligible.

The remaining estimated environmental costs of $144,056 and other costs of $382,026 (see the "Engineer's Opinion of Probable Cost in **Appendix F**) are proposed to be covered by the District without federal cost sharing.

***(b)*** How they benefitted the project - The in-kind services have benefitted the project by completing the environmental and permitting requirements, and allow the final design to be completed, which will in turn cause the project to be ready for construction

***(c)*** The amount of expense - The expenses that will be incurred prior to the project start date (assumed to be Oct 1, 2014) are estimated to be $526,082 environmental compliance and final design

***(d)*** The date of cost incurrence - These costs have been and will be incurred from July 2013 to September 30, 2014.

(3) ***Provide the identity and amount of funding to be provided by funding partners, as well as the required letters of commitment.***

The project will not include any funding partners. The project will be funded entirely by JID and Reclamation if the grant is approved.

(4) ***Describe any funding requested or received from other Federal partners. Note: other sources of Federal funding may not be counted towards the applicant's 50 percent cost share unless otherwise allowed by statute.***

JID has a 2008 WaterSMART grant (Agreement #R10AP20563 (*formerly #08FG200151*), which they have not obtained any of the funds from Reclamation, and will request a cancelling of the agreement, since the project is unable to be completed by the June 30, 2014 grant deadline and Reclamation has indicated that a extension will not be authorized.

The District was awarded a WaterSMART grant in 2010 for a project which entails the construction of the separate but adjoining recharge area and distribution canal. Because the earth material excavated from Basin 3 in this proposal will be used in the building of embankments for the 2010 grant project, the environmental documents like CEQA/NEPA and permits have been combined

(5) ***Describe any pending funding requests that have not yet been approved, and explain how the project will be affected if such funding is denied.***

The James Irrigation District has unallocated reserves in excess of the project costs to fund the proposed work.

**Table 4 – Summary of non-Federal and Federal funding sources**

| Funding Source | Funding Amount | Percentage |
|---|---|---|
| Non-Federal Entities | | |
| 1. James ID | $2,244,794 | 69.2% |
| *Non-Federal Subtotal:* | $2,244,794 | 69.2% |
| *Other Federal Entities* | $0 | 0% |
| *Requested Reclamation Funding:* | $1,000,000 | 30.8% |
| *Total Project Funding:* | $3,244,794 | 100% |

## 2 . Budget Proposal

| BUDGET ITEM DESCRIPTION | COMPUTATION | | RECIPIENT FUNDING | RECLAMATION FUNDING | TOTAL COST |
|---|---|---|---|---|---|
| | $/Unit and Unit | Quantity | | | |
| SALARIES AND WAGES | | 0 | | | |
| FRINGE BENEFITS | | 0 | | | |
| TRAVEL | | 0 | | | |
| EQUIPMENT | | 0 | | | |
| SUPPLIES/MATERIALS | | 0 | | | |
| CONTRACTUAL/ CONSTRUCTION | | | | | |
| Project Administration | $67,968 | 1 | $67,968 | $0 | $67,968 |
| SWPPP Preparation | $15,000 | 1 | $15,000 | $0 | $15,000 |
| Final Design | $135,935 | 1 | $135,935 | $0 | $135,935 |
| Construction Management | $163,123 | 1 | $163,123 | $0 | $163,123 |
| Construction | $2,718,712 | 1 | $1,718,712 | $1,000,000 | $2,718,712 |
| ENVIRONMENTAL & REGULATORY COMPLIANCE (under contractual) | $144,056 | 1 | $144,056 | $0 | $144,056 |
| OTHER | $0 | | $0 | $0 | $0 |
| **TOTAL DIRECT COSTS** | $3,244,794 | 1 | $2,244,794 | $1,000,000 | $3,244,794 |
| INDIRECT COSTS - 0% | $0 | | $0 | $0 | $0 |
| **TOTAL PROJECT COSTS** | | | $2,244,794 | $1,000,000 | $3,244,794 |

*See detailed estimate (Engineer's Opinion of Probable Cost) in* ***Appendix F*** *for more details.*

## 3 . Budge Narrative

Detailed cost estimates (Engineer's Opinion of Probable Cost) for the project can be found in **Appendix F**.

**Salaries and Wages** – Since it is anticipated that the District will not perform the construction, there will be no District Salaries and Wages accrued. However, if contractors were not available, the District may elect to perform a portion of the construction.

**Fringe Benefits** – Since it is anticipated that the District will not perform the construction, there will be no District Fringe Benefits accrued.

**Travel** – Since it is anticipated that the District will not perform the construction, there will be no District travel expenses accrued.

**Equipment** – It is anticipated that all the heavy equipment that will be used in this project will be supplied by the awarded contractor.

**Materials and Supplies** – All Material and Supply costs associated with the project are included in the contractual category. All material and supplies will be included under the awarded contract.

**Contractual** – JID plans to hire a contractor or contractors to perform the project construction required. The construction costs were estimated by the District's engineering consultant, using unit prices from similar recent jobs, and judgment of constructability factors. The District will also contract with a local engineering consulting firm to complete the design and provide construction oversight. The rates shown for all contractual categories are for budgetary purposes; the actual rates in effect at the time the work is performed will be charged to the project. Percentages were used for estimating what the District will pay for the Final Design and Construction Management, based on the total construction costs.

**Environmental and Regulatory Compliance Costs** – A portion of the budget was set aside for the remaining environmental and regulatory compliance requirements. The majority of these costs have already been paid by the District since planning started in 2008. These costs will be incurred by the District's consultants for the Kit Fox Preserve Cultural Report, Kit Fox Preserve Management Plan documents, the construction and monitoring of the Kit Fox dens and the Water Quality Certification fees. The total estimated costs are $144,056 which represents 4.4% of the total estimated project cost. These costs are to be paid by the District with these tasks being complete prior to the anticipated award date.

**Project Management** – Project Management and reporting costs include consultant time to prepare semi-annual reports and a final report. The total cost was estimated based on person-hours and billing rates. These costs are included in the contractual category and will not have a federal cost share. A percentage was used for estimating what the District will pay for Project Management based on the total construction costs.

**Other** – None

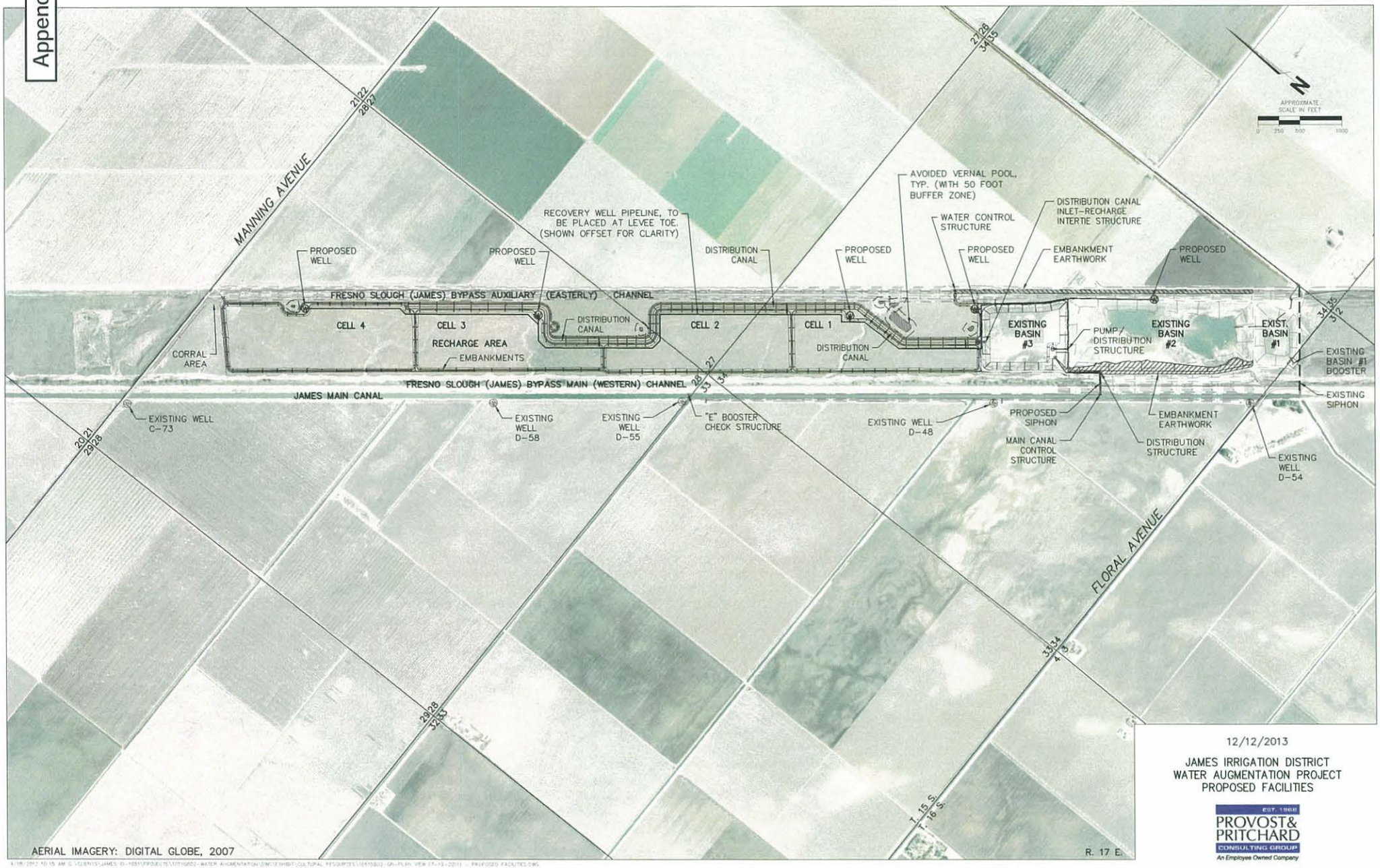
**Indirect Costs** – The Project will not have indirect costs.

**Total Cost** – Total Project Cost is estimated to be $3,244,794. The Federal share will be $1,000,000 (30.8% of the Total Project cost); and the applicant share will be $2,244,794 (69.2 of the Total Project Cost).

## 4 . Budget Form SF-424C

Budget Form SF-424C is included in **Appendix K** with the other cost information.

Appendix A




12/12/2013

JAMES IRRIGATION DISTRICT
WATER AUGMENTATION PROJECT
PROPOSED FACILITIES

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**Water Banking Project and WaterSMART grant Timeline & Work Completed Apr 2008 to Dec 2013**

**2008 Grant:** James ID Water Banking Project, R10AP20563 (*formerly #08FG200151*)
**2010 Grant:** James ID Water Banking Project Expansion Project, RA10AP20117

| | |
|---|---|
| 04/28/2008 | 2008 WaterSMART Grant application submittal |
| June 2008 | Biological Reconnaissance Survey for Sensitive Species and Habitat completed |
| August 2008 | Burrowing Owl Survey, San Joaquin Kit Fox Survey, Fresno Kangaroo Rat Trapping Survey & A Cultural Resources Assessment of the Fresno Slough (James) Bypass Water Regulation and Recharge Project completed |
| 09/04/2008 | Meeting with California Department of Fish & Game staff to review project |
| 09/15/2008 | Meet with Reclamation staff to review the project |
| 09/25/2008 | 2008 Water Smart Grant contract executed by Reclamation |
| November 2008 | Sensitive Plant Survey completed |
| 01/27/2009 | Site tour for Reclamation staff from Reclamation with USBR NEPA document consultants) by project engineer and District Manager |
| February 2009 | Wetlands and Waters Evaluation completed |
| May 2009 | Sensitive Plant Survey (Phase 2) for Munz's Tidy-Tips and Recurved Larkspur completed |
| 05/29/2009 | 404 permit application sent to US Army Corps of Engineers |
| 07/10/2009 | Central Valley Flood Protection Board application submitted |
| 07/14/2009 | As part of CEQA, the James ID Board of Directors adopts Initial Study and Mitigated Negative Declaration, Notice of Determination, and Mitigation and Monitoring Program for the project |
| 08/18/2009 | Informal consultation with USFWS staff by project biologist and engineer. USFWS staff request vernal pool buffer zone justification, additional surveys to try to locate natal den for Kit Fox observed, and foraging habitat mitigation. USFWS suggests that Army Corps do consultation with the Service |
| 08/18/2009 | Project engineer and biologist meet with USACOE staff in Sacramento to discuss the project |
| November 2009 | Avoidance of Vernal Pools and Justification for Vernal Pool Buffer Zones investigation/report completed |
| 11/23/2009 | Central Valley Flood Protection Board encroachment permit approved |
| 02/09/2010 | Revised 404 permit application sent to US Army Corps |
| March 2010 | Survey & Count of Potential San Joaquin Kit Fox Dens investigation/report completed |
| 04/27/2010 | USACOE on project site for tour and review for 404 permit |
| 05/04/2010 | 2010 WaterSMART Grant application submittal |
| 07/12/2010 | Requested Cross Channel memo (revised) sent to USACOE |
| 09/24/2010 | 2010 Grant contract executed by Reclamation |
| 10/22/2010 | James ID executes Preliminary Determination from the Army Corps and returns executed document |
| November 2010 | Mitigation Concepts for Impacts to San Joaquin Kit Fox Foraging Habitat report completed |
| 11/17/2010 | Site tour for Reclamation staff (Rain Emerson & Ned Gruenhagen) with project engineer and project biologists |
| 11/17/2010 | Consultant prepared draft biological assessment for USACOE use given to Reclamation staff for review |
| 02/15/2011 | James ID receives Reclamation comments to consultant prepared Biological Assessment |
| 07/20/2011 | USBR designated as the lead federal agency by Army Corps for Section 7 consultation with USFWS |
| 12/09/2011 | James ID accepts the Reclamation prepared Biological Assessment |
| 12/12/2011 | Biological Assessment sent to USFWS by Reclamation |
| 12/14/2011 | James ID requests contract extension for 2008 and 2010 grant |
| 12/31/2011 | 2008 grant original deadline |

| | |
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| 03/06/2012 | USFWS, ACOE and Reclamation staff conduct project site meeting regarding Section 7 endangered species consultation |
| 05/08/2012 | James ID receives US Fish & Wildlife Service (USFWS) comments and questions on the Reclamation prepared 12/12/2011 version of the Biological Assessment and the 03/06/2012 USFWS site visit |
| 05/16/2012 | James ID consultants meet with Regional Water Quality Control Board staff to discuss Section 401 permit requirements |
| 06/01/2012 | James ID consultants provide response to 05/08/2012 comments/questions on the Biological Assessment |
| 06/04/2012 | James ID submits Streambed Alteration Notification application to California Department of Fish & Game |
| 06/13/2012 | James ID receives additional USFWS comments and questions on the Biological Assessment |
| 06/21/2012 | James ID consultants respond to 06/13/2012 Biological Assessment comments/questions |
| 06/29/2012 | James ID receives extension to the grant deadline to June 30, 2014 on the 2008 and 2010 grants |
| 07/13/2012 | CDFG deems the Streambed Alteration Notification application complete |
| 07/18/2012 | Cultural consultants site visit |
| 08/06/2012 | CDFG staff visit the project site in order to determine if additional information is needed for the Streambed Alteration Agreement, and if CDFG will require any additional mitigation for state endangered species. CDFG staff request a minor addition to the project description and indicate that a letter/comments regarding endangered species from the state would not be issued |
| 08/16/2012 | James ID consultants submit project description edits to CDFG for the Streambed Alteration Agreement |
| 08/27/2012 | Received initial draft of revised cultural resources report "Assessment of the Fresno Slough (James) Bypass Regulation and Recharge Project" for use in the Section 106 process |
| 09/07/2012 | Regional Quality Control Board responds to Section 401 permit questions from 05/16/2012 meeting |
| 09/13/2012 | James ID provides comments to revised cultural resources report |
| 09/20/2012 | USFWS now indicates that the previously prepared project description for the Biological Opinion is incomplete, until a specific Kit Fox preserve location is determined |
| 10/03/2012 | California Department of Fish & Wildlife Streambed Alteration Agreement executed |
| 10/10/2012 | Final draft of cultural report received for internal review |
| 10/26/2012 | Provided "Biological Assessment" Appendices in editable digital format to US Fish & Wildlife Service (USFWS) |
| 11/02/2012 | USFWS staff reiterate that the preserve location needs to be determined prior to the issuing of a Biological Opinion (BO), and now that the cultural investigation for the preserve site also needs to be completed prior to issuance of the BO |
| 11/15/2012 | Conference call conducted with Reclamation staff where Reclamation suggests that James ID request applicant status under the Section 7 endangered species consultation process |
| 12/04/2012 | James ID formally requests recognition from Reclamation as an "applicant" during the endangered species consultation process |
| 12/31/2012 | 2010 grant original deadline |
| 01/15/2013 | James ID Board of Directors approves location of the kit fox preserve, north of Placer Avenue in the Fresno Slough Bypass |
| 01/16/2013 | James ID is recognized by Reclamation with "applicant status" for the Section 7 consultation with the USFWS. |

| | |
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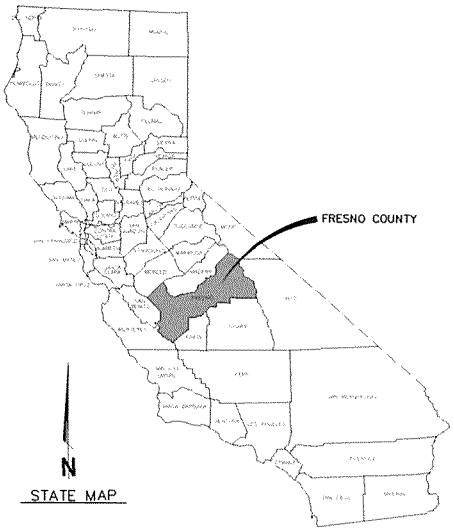
| 02/12/2013 | The revised cultural report "Assessment of the Fresno Slough (James) Bypass Regulation and Recharge Project, James Irrigation District, Western Fresno County, California" is sent to Reclamation |
| 02/28/2013 | The District's consulting biologist conducts a site evaluation of the proposed kit fox preserve location and determined that the site "is and would be suitable as a kit fox preserve" |
| 03/06/2013 | Reclamation archaeological staff provide comments to the 02/12/2013 submitted cultural report |
| 03/20/2013 | James ID consultants and Reclamation archaeological staff review project cultural status and submitted report and comments during a conference call, developing a draft plan to finish the cultural requirements |
| 03/22/2013 | Project status conference call conducted at the request of Reclamation's Grants Officer Technical Representative |
| 04/17/2013 | Revised Biological Assessment sent to Reclamation by District's consulting biologist. |
| 05/22/2013 | Conference call with Reclamation cultural staff regarding cultural investigation. |
| 06/18/2013 | Revised Biological Assessment sent to US Fish & Wildlife Service by Reclamation. |
| 06/20/2013 | Comments received from the Army Corps of Engineers on Reclamation's revised Biological Assessment. |
| 07/10/2013 | Paper copy of revised Biological Assessment with full appendices sent to USFWS. |
| 08/15/2013 | Cultural Investigation Report sent to Reclamation cultural staff for review and approval. |
| 09/06/2013 | Reclamation cultural staff approve general cultural investigation report. |
| 09/16/2013 | Revisions submitted to the Regional Water Control Board for the Section 401 Water Quality Certification. |
| 09/20/2013 | Consulting biologist began preparation of conservation & management documents for the Kit Fox Preserve. |
| 09/2013 | Discussions conducted with possible easement holder for the Kit Fox Preserve. |
| 10/10/2013 | Section 401 Water Quality Certification received from the Regional Water Control Board. |
| 10/14/2013 | Kit Fox Preserve cultural investigation work plan submitted to Reclamation staff for review. |
| 10/17/2013 | Kit Fox Preserve cultural investigation work plan comments received from Reclamation staff. |
| 10/30/2013 | Kit Fox Preserve cultural investigation work plan approved by Reclamation staff. |
| 11/09-10/2013 | Kit Fox Preserve on-site cultural investigation and layout by biologist of mitigation agreed to pupping and escape dens. |
| 11/11/2013 | Project site cultural investigation report sent by Reclamation to the State Historic Preservation Officer for Section 106 review consultation. |
| 12/16/2013 | Conference call where USBR Grant Officer representatives indicate that the 2008 grant will not be extended past the June 30, 2014 deadline. |
| 12/20/2013 | Revised Biological Assessment sent to USFWS by Reclamation staff. |
| 01/07/2014 | SHPO Section 106 review end date. Section 106 compliance completed. |

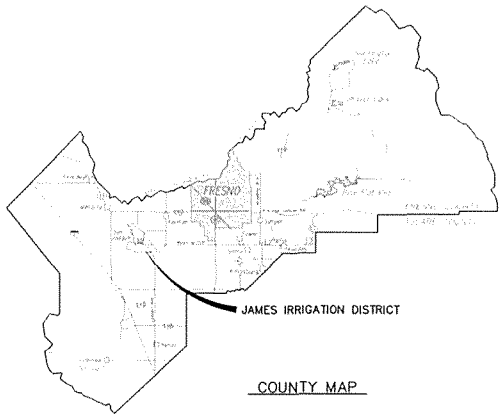
# JAMES IRRIGATION DISTRICT

## FRESNO COUNTY, CA

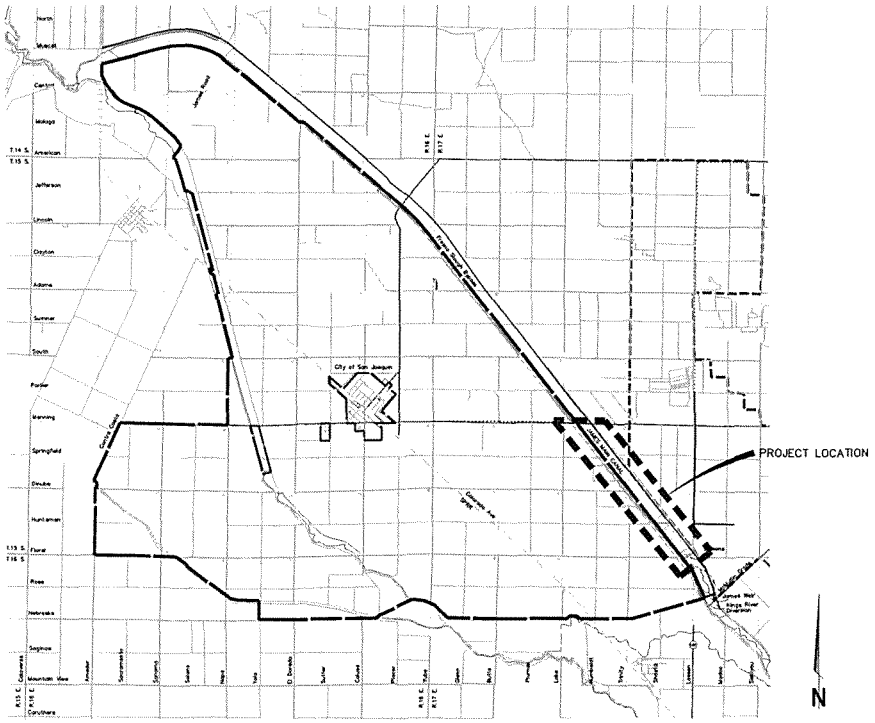
# WATER AUGMENTATION PROJECT
# FRESNO SLOUGH BYPASS IMPROVEMENTS




STATE MAP




COUNTY MAP




DISTRICT MAP

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WATER AUGMENTATION PROJECT
FRESNO SLOUGH BYPASS IMPROVEMENTS
JAMES IRRIGATION DISTRICT
FRESNO COUNTY, CA

COVER SHEET

SHEET INDEX




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ERIC A. ABRAHAMSEN
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GRAFTED BY | CHECKED BY
PAP | EAA
SCALE: AS SHOWN
DATE: 8/9/2011
JOB NO. 1931.00
DWG. NO.
SHEET
1 of 21

## SITE SAFETY AND PROTECTION NOTES

The duty of the Engineer, Owner or its agents to conduct construction review of the Contractor's performance and the undertaking of inspections or the giving of instructions as authorized herein is not intended to include review of the adequacy of the Contractor's safety measures in, on, or near the construction site and shall not be construed as supervision of the actual construction nor make the Engineer, Owner or its agents responsible for providing a safe place for the performance of work by the Contractor, subcontractors, or suppliers, or for access, visits, use, work, travel or occupancy by any person.

The Contractor shall have at the work site, copies or suitable extracts of Construction Safety Orders, issued by Cal-OSHA. He shall comply with provisions of these and all other applicable laws, ordinances and regulations. The Contractor must comply with provisions of the safety and health regulations for construction, promulgated by the Secretary of Labor under Section 107 of the Contract Work Hours and Safety Standards Act, as set forth in Title 29 C.F.R.

To protect the lives and health of his employees under the Contract, the Contractor shall comply with all pertinent provisions of the "Manual of Accident Prevention in Construction" issued by the Associated General Contractors of America, Inc., and shall maintain an accurate record of all cases of death, occupational disease, and injury requiring medical attention or causing loss of time from work, arising out of and in the course of employment or work under the Contract.

The Contractor alone shall be responsible for the safety, efficiency, and adequacy of his facilities, appliances, and methods and for any damage, which may result from their failure or their improper construction, maintenance or operation.

The Contractor agrees that it shall assume sole and complete responsibility for job site conditions during the course of construction of this project, including safety of all persons and property; that this requirement shall apply continuously and not be limited to normal working hours; and that the Contractor shall defend, indemnify and hold the Owner, Provost & Pritchard Engineering Group, Inc., and their respective agents harmless from any and all liability, real or alleged, in connection with the performance of work on this project, excepting for liability arising from the sole negligence of Owner, Engineer, or their respective agents.

The Owner and its agents' site responsibilities are limited solely to the activities of their employees on site. These responsibilities shall not be inferred by any party to mean that the Owner or its agents have responsibility for site safety. Safety in, on, or about the site is the sole and exclusive responsibility of the Contractor alone. The Contractor's methods of work performance, superintendence and the Contractor's employees, and sequencing of construction are also the sole and exclusive responsibilities of the Contractor alone.

## AMERICAN COUNCIL OF ENGINEERING COMPANIES OF CALIFORNIA NOTE:

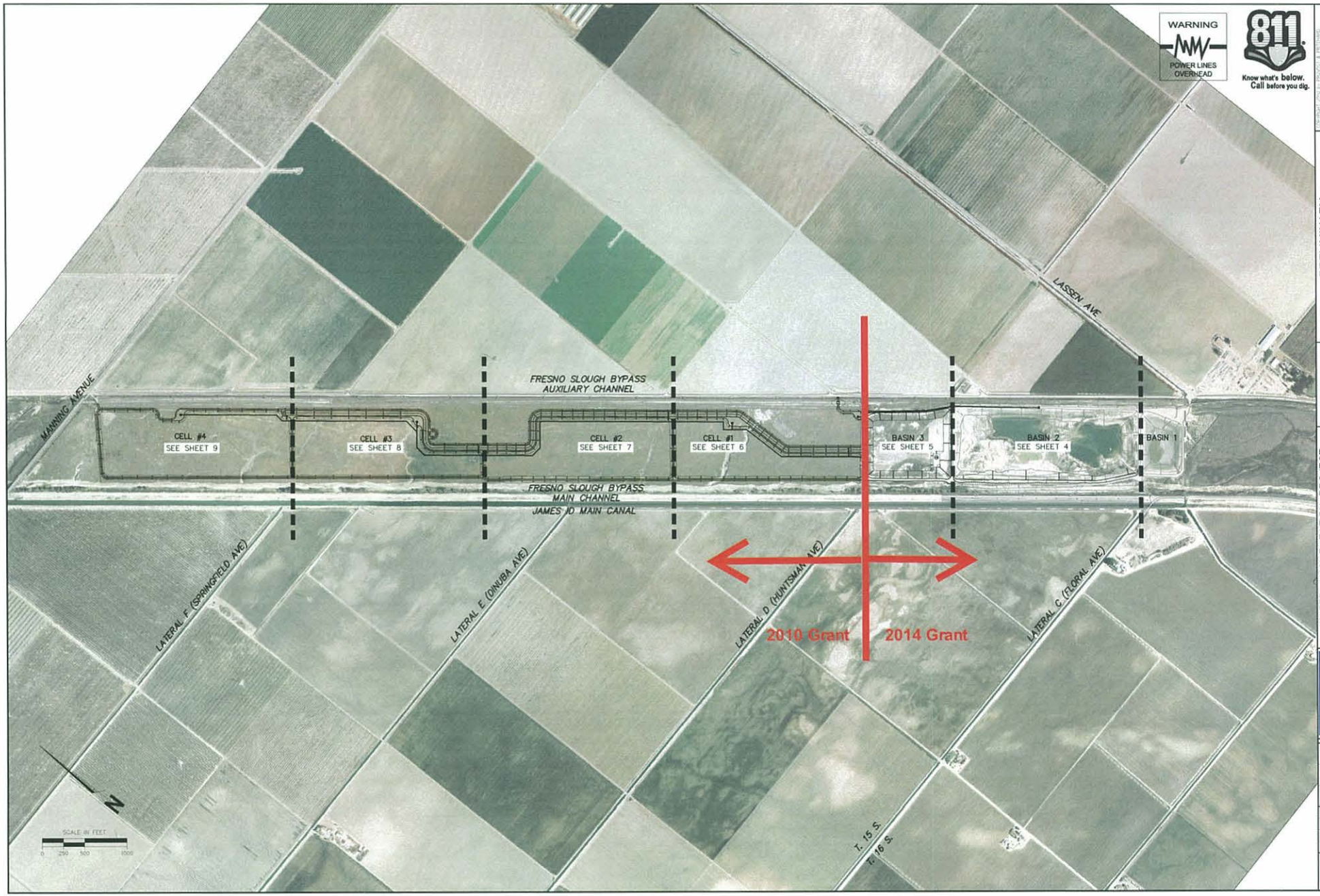
Construction Contractor agrees that in accordance with generally accepted construction practices, construction Contractor will be required to assume sole and complete responsibility for job site conditions during the course of construction of the project, including safety of all persons and property, that this requirement shall be made to apply continuously and not be limited to normal working hours, and construction Contractor further agrees to defend, indemnify and hold design professional harmless from any and all liability, real and alleged, in connection with the performance of work on this project, excepting liability arising from the sole negligence of design professional.

## SPECIAL NOTE

Where underground and surface structures are shown on the plans, the locations, depth and dimensions of structures are believed to be reasonably correct, but are not guaranteed, such structures are shown for the information of the Contractor, but information so given is not to be construed as a representation that such structures will, in all cases, be found where shown, or that they represent all of the structures which may be encountered.

APPROVED: _____ DATE: _____
JAMES IRRIGATION DISTRICT

Appendix C

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WATER AUGMENTATION PROJECT
FRESNO SLOUGH BYPASS IMPROVEMENTS
JAMES IRRIGATION DISTRICT
FRESNO COUNTY, CA

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SCALE: AS SHOWN
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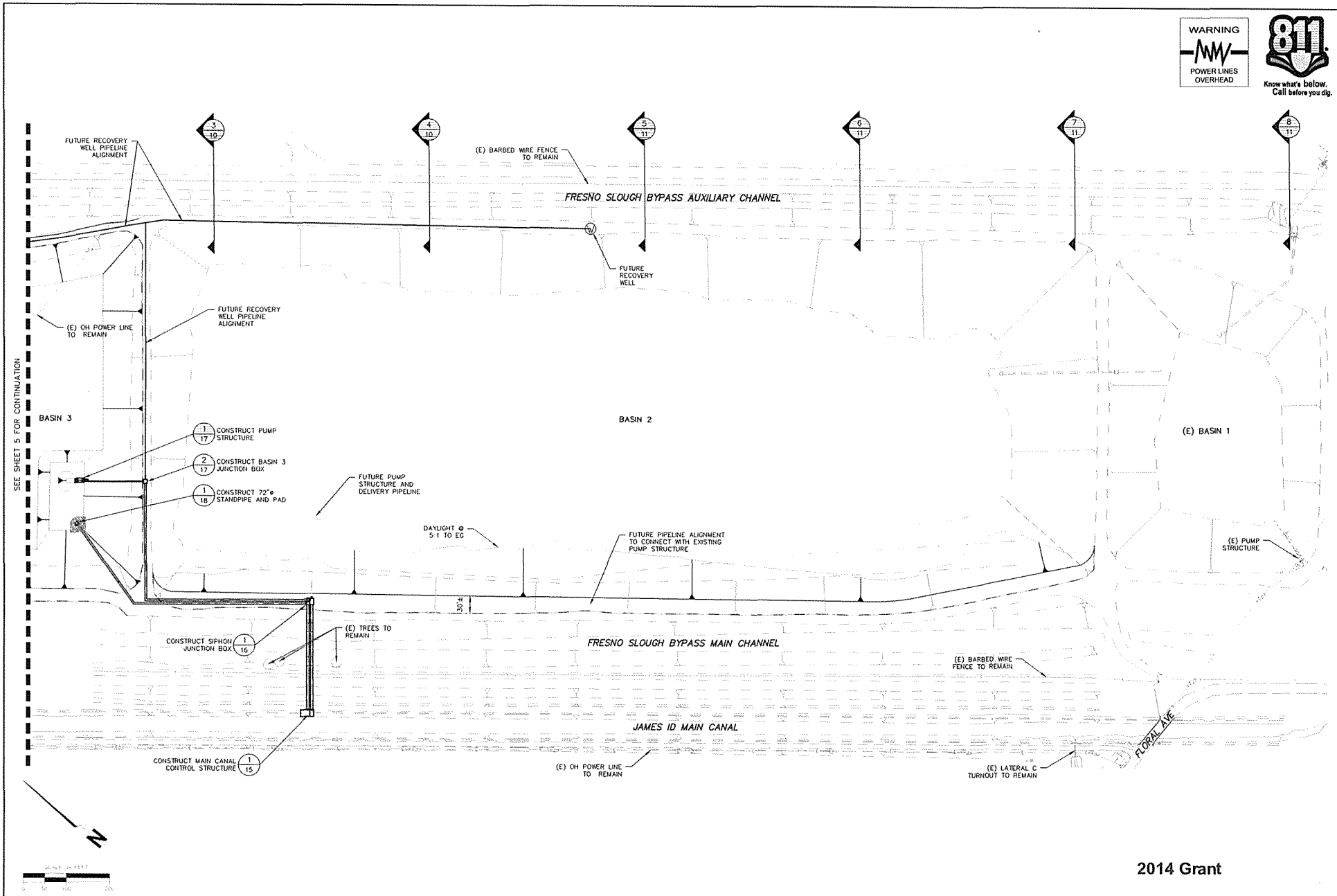
JOB NO: 1059.0802
DWG. NO.
SHEET 3 OF 21

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FRESNO COUNTY, CA

BASIN 2 GRADING PLAN

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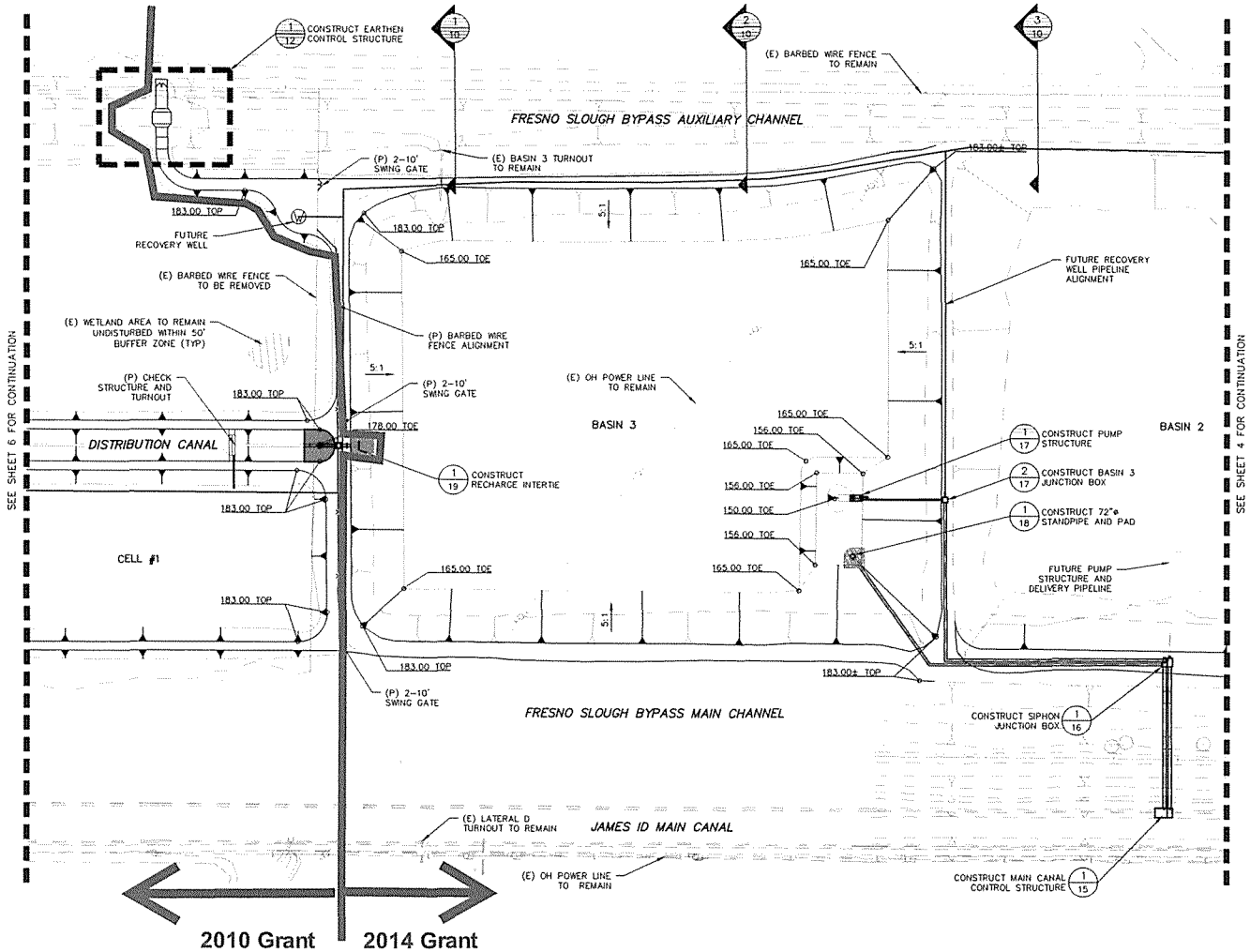


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BASIN 3 GRADING PLAN

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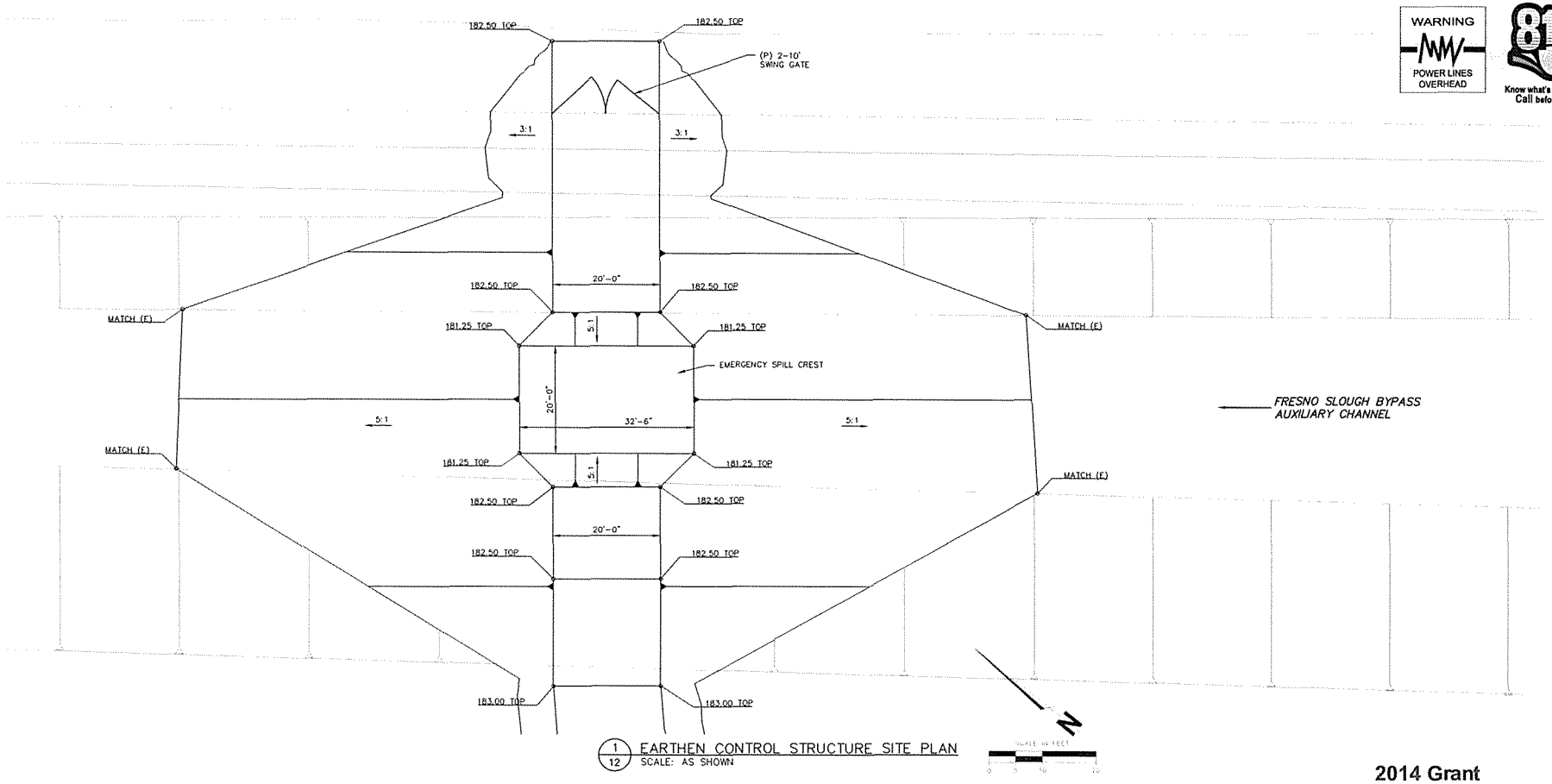


1/12 EARTHEN CONTROL STRUCTURE SITE PLAN
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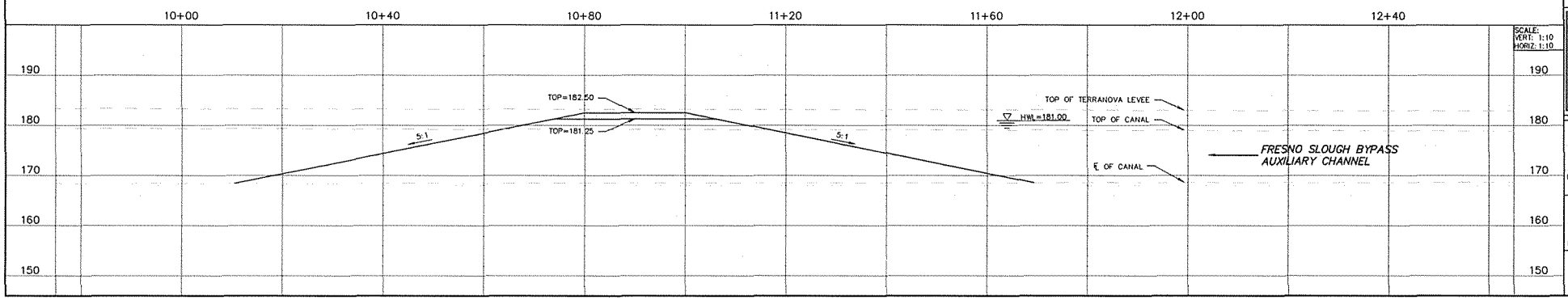


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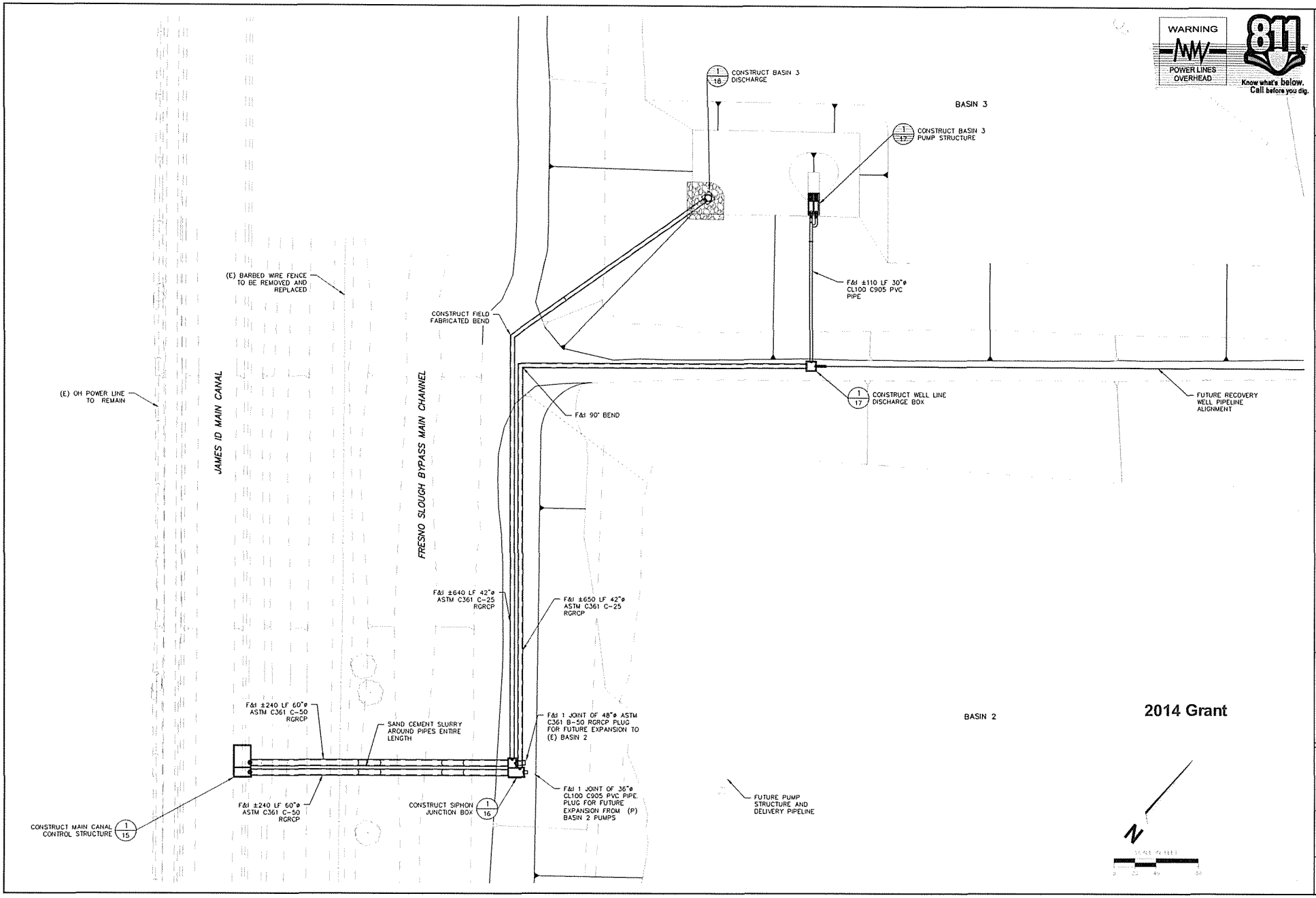


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| JOB NO | 1153.0005 |
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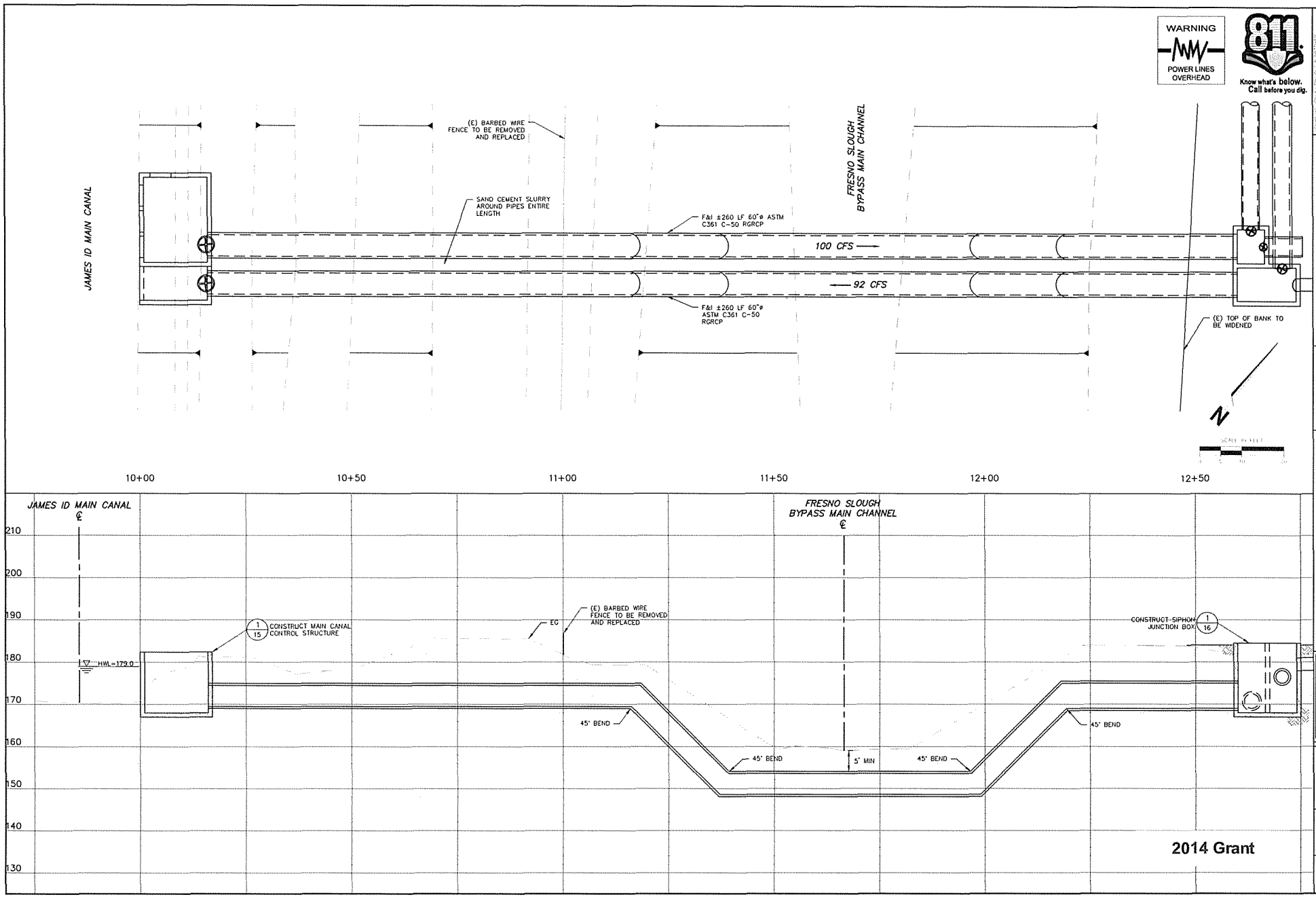


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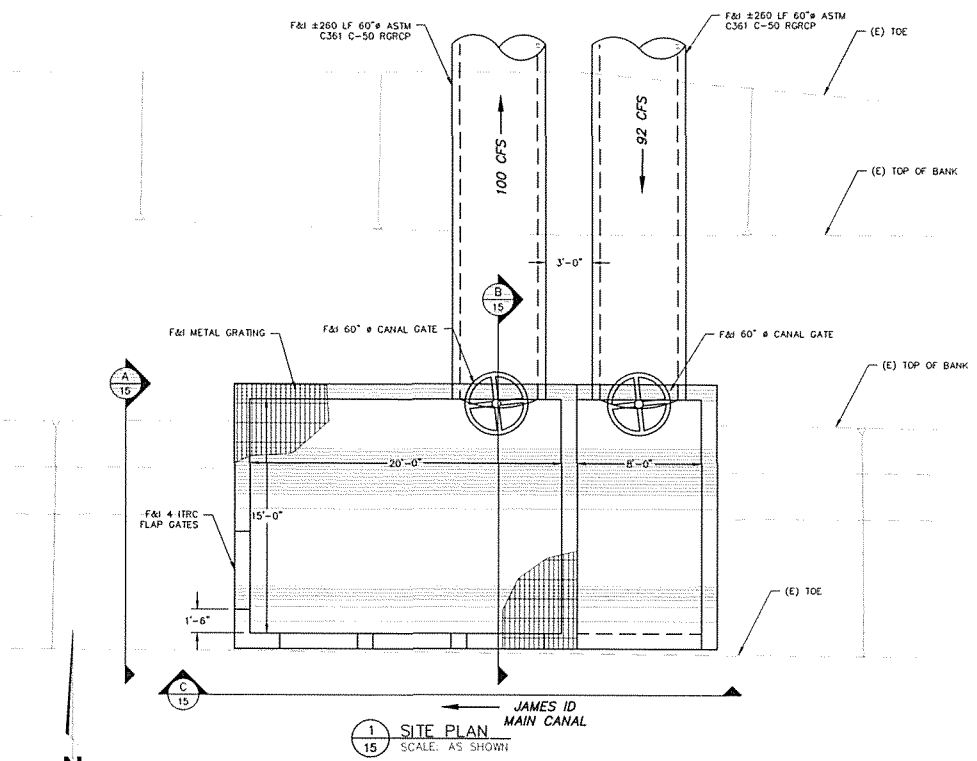


1/15 SITE PLAN
SCALE: AS SHOWN

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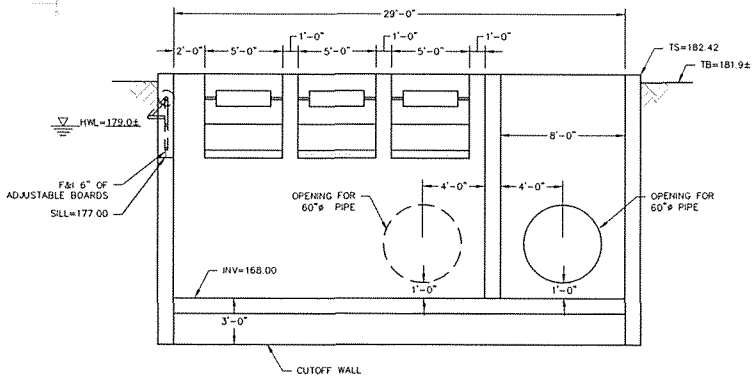


C/15 ELEVATION VIEW
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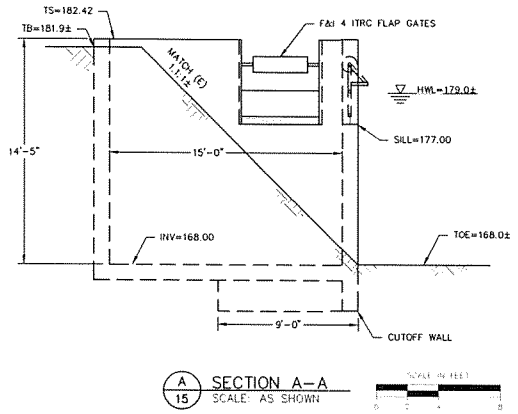


A/15 SECTION A–A
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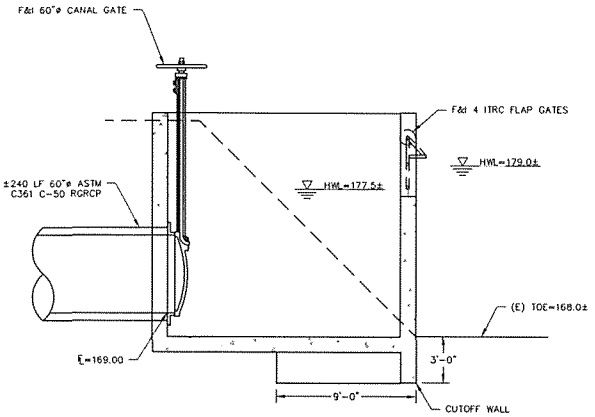


B/15 SECTION B–B
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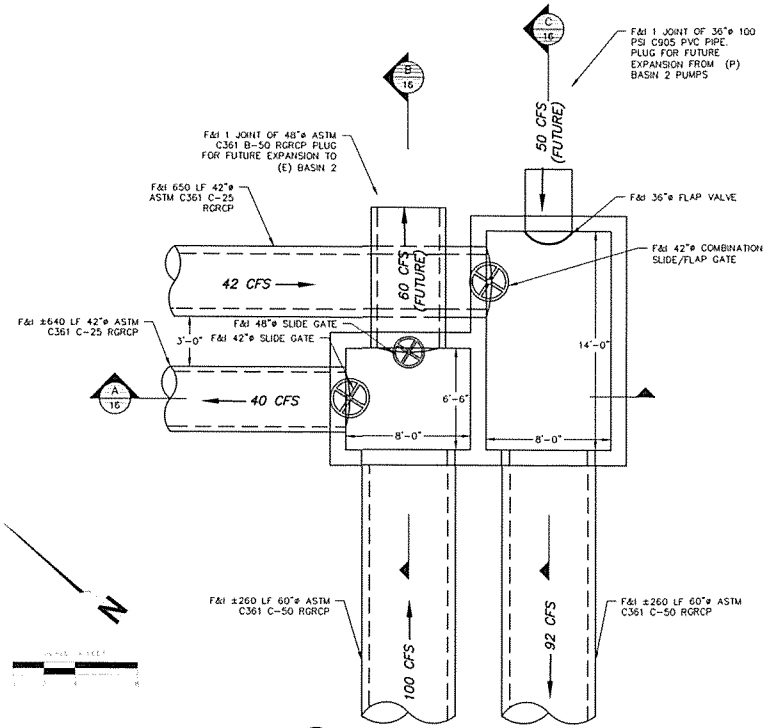
WATER AUGMENTATION PROJECT
FRESNO SLOUGH BYPASS IMPROVEMENTS
JAMES IRRIGATION DISTRICT
FRESNO COUNTY, CA

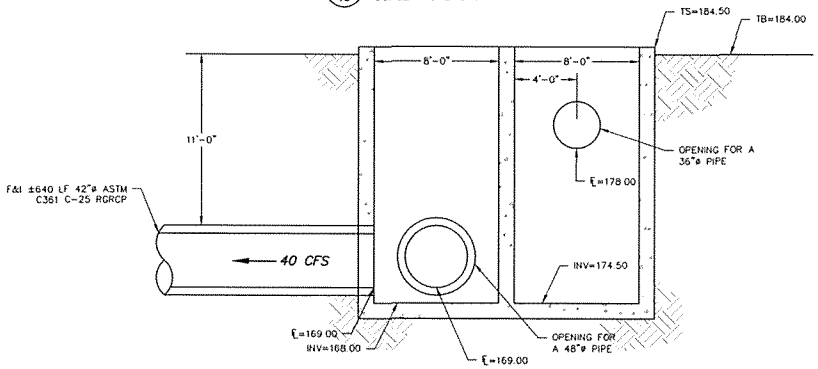
MAIN CANAL CONTROL STRUCTURE

PROVOST & PRITCHARD
CONSULTING ENGINEERS
An Employee Owned Company
CLOVIS, CALIFORNIA 93611-3966
559/326-1100 FAX 559/326-1090

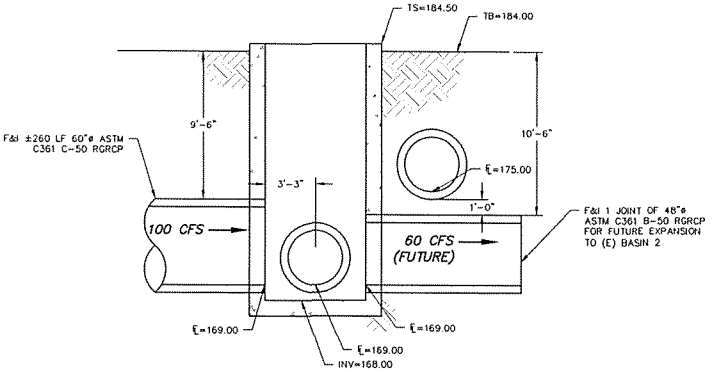
DESIGN ENGINEER: ERIC A. ABRAHAMSEN
LICENSE NO: [illegible]
DRAFTED BY: MAP | CHECKED BY: EAE
SCALE: AS SHOWN
DATE: 8/9/2011
JOB NO: [illegible]
DWG. NO
SHEET 15 OF 21



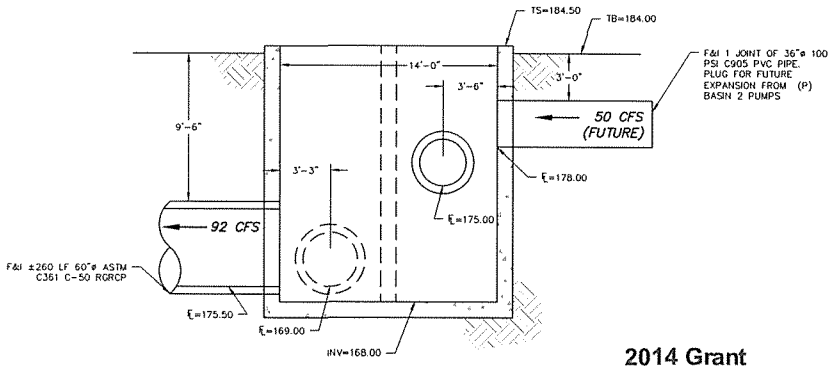

1/16 SIPHON JUNCTION BOX (SITE PLAN)
SCALE: AS SHOWN




A/16 SECTION A-A
SCALE: AS SHOWN




B/16 SECTION B-B
SCALE: AS SHOWN




C/16 SECTION C-C
SCALE: AS SHOWN

**2014 Grant**

DESIGN NOTE:

42" PIPELINE INVERT FROM BASIN 3 SET DEEP TO ACCOMODATE REVERSE FLOW.

WARNING
POWER LINES OVERHEAD

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

PRELIMINARY
PLAN SET
NOT FOR CONSTRUCTION
08/09/2011
PHASES I, II, & III

| No. | REVISION | BY | DATE |
|---|---|---|---|

REGISTERED PROFESSIONAL ENGINEER STATE OF CALIFORNIA
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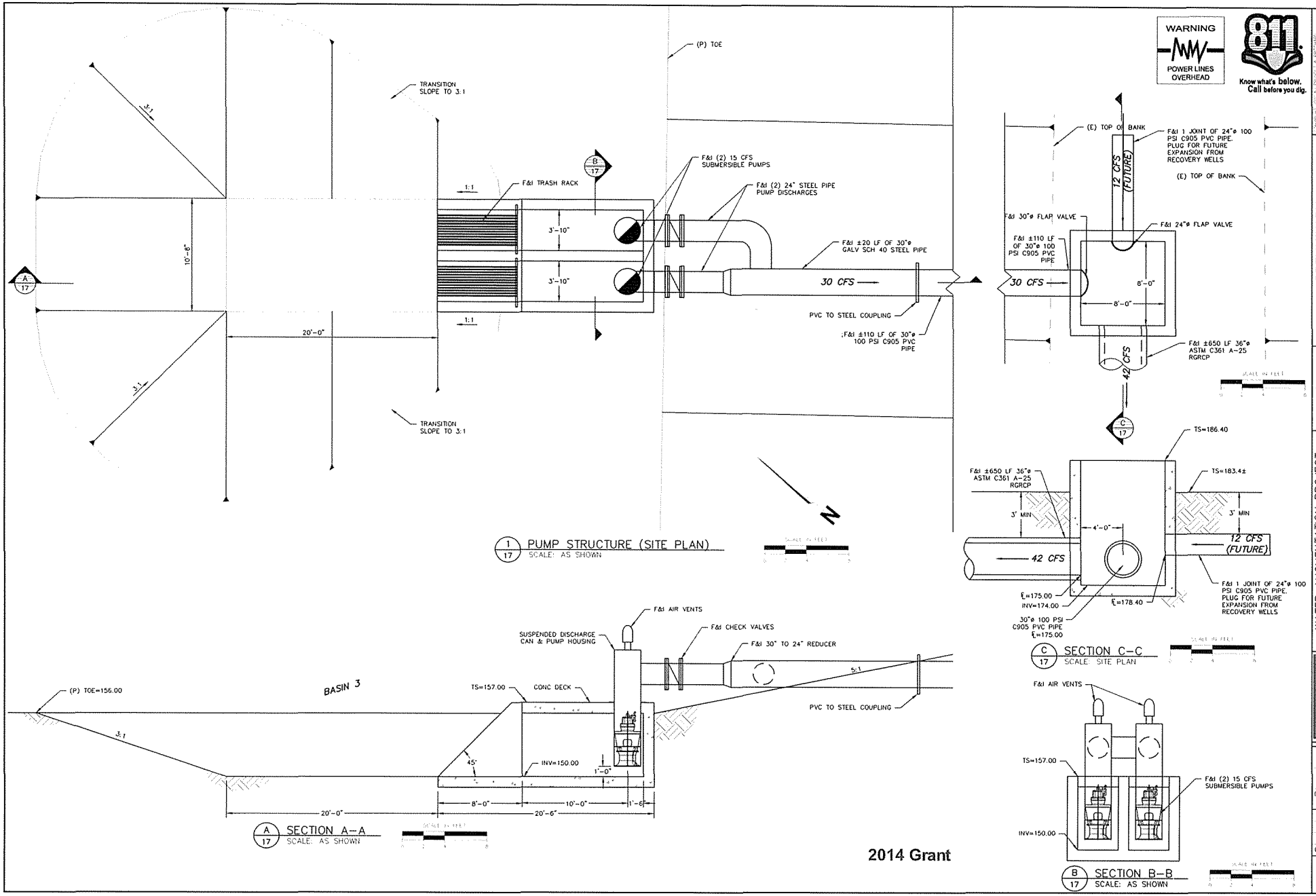
DATE SIGNED

WATER AUGMENTATION PROJECT
FRESNO SLOUGH BYPASS IMPROVEMENTS
JAMES IRRIGATION DISTRICT
FRESNO COUNTY, CA

SIPHON JUNCTION BOX


PROVOST & PRITCHARD
EXPERT LISTENING SOLUTIONS
An Employee Owned Company
CLOVIS, CALIFORNIA 93611-0915
559/326-1100 FAX 559/326-1090
www.provostpritchard.com


DESIGN ENGINEER: ERIC A. ABRAHAMIAN
LICENSE NO: RCE 52080
DRAFTED BY: MAP | CHECKED BY: EEE
SCALE: AS SHOWN
DATE: 8/19/2013
JOB NO: 1651.0015
DWG. NO.
SHEET: 16 of 21



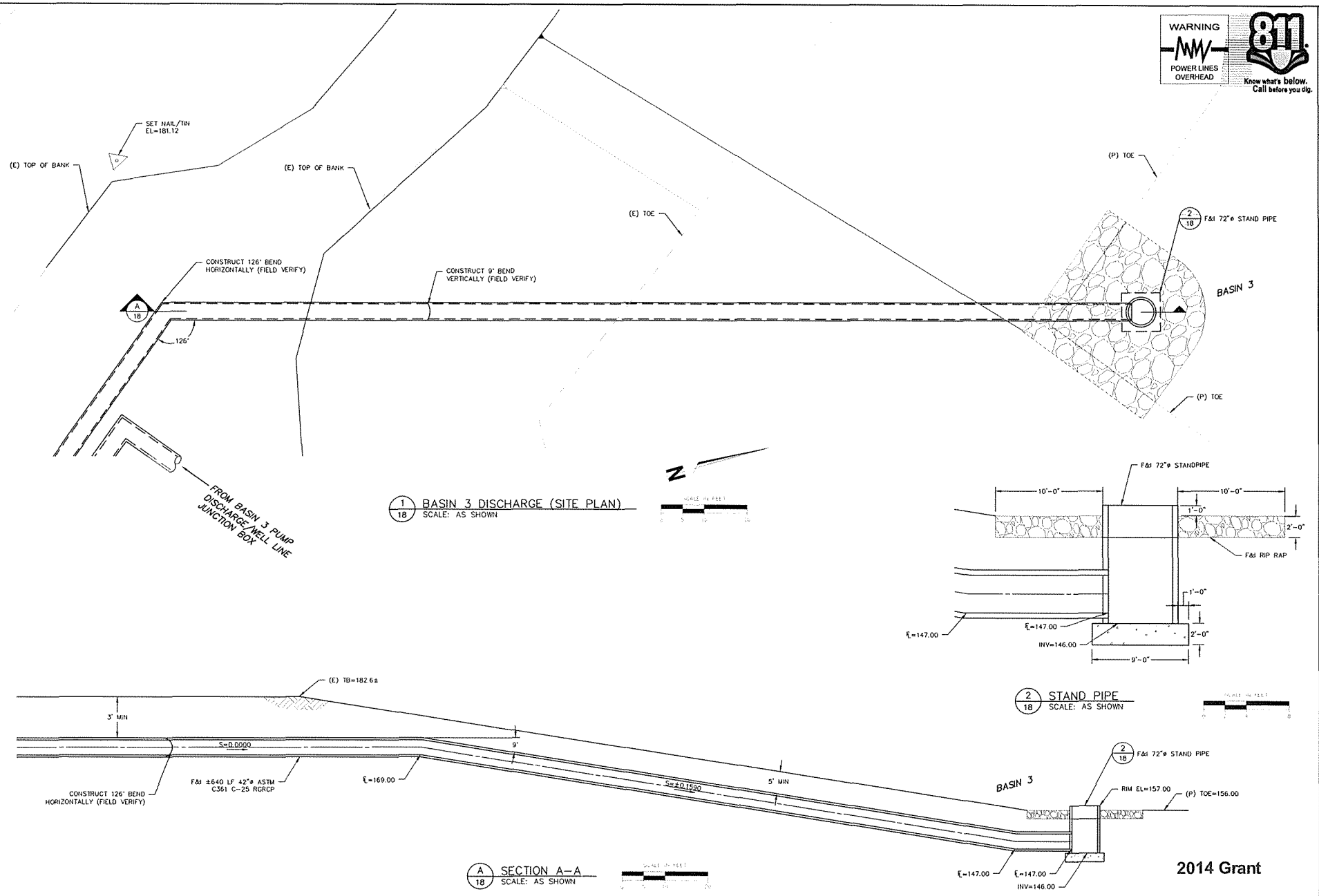

1/17 PUMP STRUCTURE (SITE PLAN)
SCALE: AS SHOWN

A/17 SECTION A–A
SCALE: AS SHOWN

C/17 SECTION C–C
SCALE: SITE PLAN

B/17 SECTION B–B
SCALE: AS SHOWN

**2014 Grant**




PRELIMINARY
PLAN SET
NOT FOR CONSTRUCTION
08/09/2011
PHASES I, II, & III

| No. | REVISION | BY | DATE |
|---|---|---|---|

PROFESSIONAL ENGINEER REGISTERED STATE OF CALIFORNIA
FOR REVIEW ONLY
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WATER AUGMENTATION PROJECT
FRESNO SLOUGH BYPASS IMPROVEMENTS
JAMES IRRIGATION DISTRICT
FRESNO COUNTY, CA

BASIN 3 DISCHARGE

PROVOST& PRITCHARD
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An Employee Owned Company
2507 ALLUVIAL AVENUE
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559/326-1950 FAX 559/326-1995
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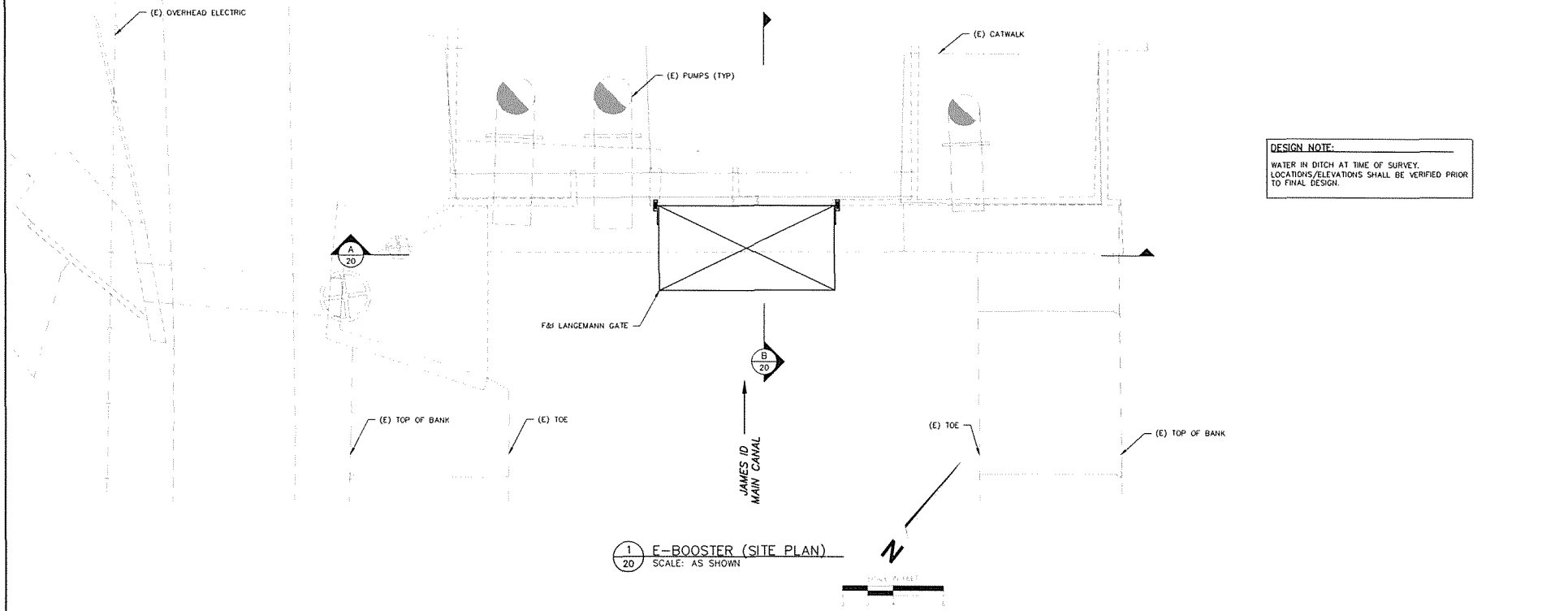
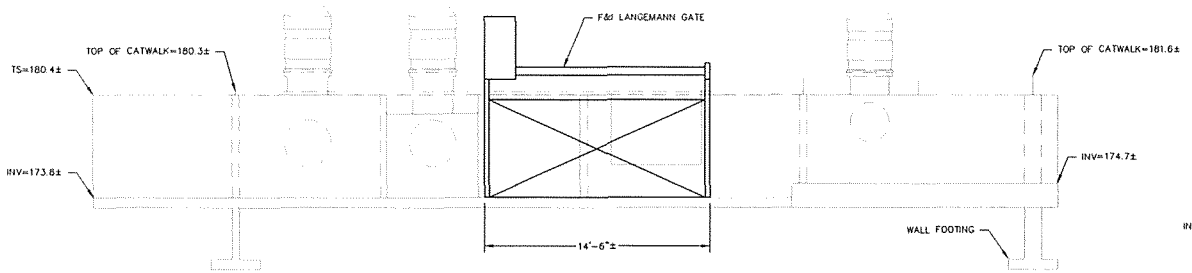
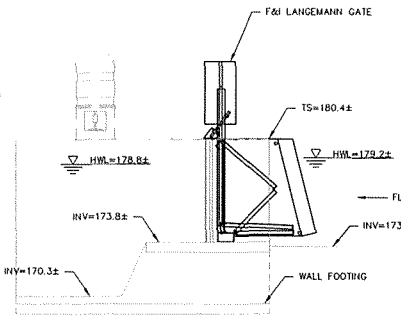
DESIGN ENGINEER
ERIC A. ABRAHAMSEN
LICENSE NO.
GRAFTED BY: PAM
CHECKED BY: EAE
SCALE: AS SHOWN
DATE: 8/9/2011
JOB NO. 1010.052
DWG. NO.
SHEET
18 of 21




1/20 E-BOOSTER (SITE PLAN)
SCALE: AS SHOWN




A/20 SECTION A-A
SCALE: AS SHOWN




B/20 SECTION B-B
SCALE: AS SHOWN

**2014 Grant**

**DESIGN NOTE:**

WATER IN DITCH AT TIME OF SURVEY. LOCATIONS/ELEVATIONS SHALL BE VERIFIED PRIOR TO FINAL DESIGN.

WARNING
POWER LINES OVERHEAD

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

PRELIMINARY
PLAN SET
NOT FOR CONSTRUCTION
08/09/2011
PHASES I, II, & III

| NO. | REVISION | BY | DATE |
|---|---|---|---|

FOR REVIEW ONLY

WATER AUGMENTATION PROJECT
FRESNO SLOUGH BYPASS IMPROVEMENTS
JAMES IRRIGATION DISTRICT
FRESNO COUNTY, CA

E-BOOSTER MODIFICATIONS

PROVOST & PRITCHARD
CONSULTING GROUP
An Employee Owned Company
559/326-1100 FAX 559/326-1090

DESIGN ENGINEER: ERIC A ABRAHAMSEN
LICENSE NO: CE 52760
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SCALE: AS SHOWN
DATE: 8/09/2011
JOB NO: 1650602
DWG NO:
SHEET 20 of 21

**James Irrigation District**
**Water Banking Project**
**Estimated Project Schedule**

| Task | Description | 2014 | | | | | | | | | 2015 | | | | | | | | | | | | | 2016 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | FY 2013-14 | | | | | | | | | FY 2014-15 | | | | | | | | | | | | | FY 2015-16 | | | | | | | | | |
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
| | Grant Application | 01/23 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Funding Award | | | | | | | | | | 10/01 | | | | | | | | | | | | | | | | | | | | | | | |
| **Task 1** | **Project Administration** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Task 1.1 | Project Management | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Task 1.2 | USBR Semi-annual Reporting | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Task 1.3 | Draft Project Report | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Task 1.4 | Final Project Report | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Task 2** | **Environmental/Permitting** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Task 2.1 | NEPA Environmental Compliance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Task 2.2 | USFWS Biological Opinion/Section 7 Consultation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Task 2.3 | Kit Fox Preserve Cultural Report | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Task 2.4 | Kit Fox Preserve Management Plan | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Task 2.5 | Power Connection Permitting | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Task 3** | **Engineering Design** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Task 3.1 | 90% Design | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Task 3.2 | Generation of Specifications and Final Design | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Task 3.3 | Engineers Cost Estimate | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Task 4** | **Construction Management** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Task 4.1 | Project Bid and Award | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Task 4.2 | Construction Staking | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Task 4.3 | Construction Inspection/Misc. Engineering | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Task 4.4 | Record Drawings | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Task 5** | **Construction** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Task 5.1 | Basin 3 Earthwork | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Task 5.2 | Basin 2, Auxiliary Channel Earthwork | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Task 5.3 | Main Canal Structures - E check/Control Structure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Task 5.4 | Siphon and Junction Box | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Task 5.5 | Basin 3 Pumps and Project Pipelines | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Task 5.6 | Kit Fox Den Construction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Notes: Assumed Funding Award Date is October 1, 2014. The Funding Annoucement (pg 5) indicates that "Reclamation expects to contact potential award recipients and unsuccessful applicatins in May 2014, or slightly later.... within one to three months after that date, financial assistance agreements will be awarded .... Therefore, based on past applications, October 2014 is the assumed start date for construction actitivities.

Appendix D

Appendix E

# Quantification of High Flow Water Diversions and Groundwater Recharge Volumes

## James Irrigation District

## 2014 WaterSMART Grant Application

The Kings River is impounded by Pine Flat Dam. For the 50 years after the dam was constructed (1955-2006), there have been 21 water years with high flow releases in the North Fork of the Kings River and water has flowed past the James Bypass Gaging Station (Fresno Slough Bypass), downstream of Placer Road. Tranquillity Irrigation District is the only entity entitled to any of these flows downstream of James ID. Tranquillity ID is entitled to 500 cfs (approximately 1,000 AF/day), but can divert only up to about 250 cfs and does not presently have any storage capacity. Therefore in most cases, James ID could effectively use all of the floodwaters flowing past them if they have the diversion capacity, demand or storage capability.

For the 50 years from 1955 to 2006, the total high flow water available on the James Bypass has been 210,370 acre-feet over an average annual duration of 40 days, or about 5,259 AF/day (2,650 cfs). This flow far exceeds the diversion capacity of James ID and Tranquillity ID combined. This high flow water is available every 2.3 years or 44% of the years based on the historical hydrology. On average, the Kings River high flows typically start the end of April and go until mid June, although they have started as early as October 1$^{st}$ and ended as late as September 30$^{th}$.

The total surface area available for Basin 2 and Basin 3 is 51 acres. For simplicity of project benefit calculations, it will be assumed that evaporation is negligible, infiltration will occur for the 40 day release duration, and the Basins will be full (1,240 acre-feet) at the end of 40 days. Therefore, floodwater diversions that occur are the combined infiltration during high flow release events and total cell volume. With the construction of the water control structure in the easterly or auxiliary channel of the Fresno Slough Bypass, there is additional storage of about 110 acre-feet over 21 acres.

The District conducted infiltration tests on Basins 1 and 2 in 1998 and 1999, for 15 to 84 days. Rates ranged from 0.12 to 0.30 feet per day. Experience with numerous recharge basins indicates that infiltration rates normally decrease exponentially with time. Therefore, typically the rates are higher at the beginning of a recharge period than the end. Additional tests were conducted on portions of the nearby and already wetted Main Canal in December 2004, and ranged from 0.1 to 0.2 feet per day. For the James ID Lateral K Recharge Basin, infiltration rates ranged from 0.13 to 0.19 feet/day for years 2004 to 2006. Rates would be expected to be lower in the District interior than along the Fresno Slough Bypass where the project recharge cells are located. Based on the historic data available, and the site locations, an estimated infiltration rate of 0.25 feet/day is anticipated, and was used in estimating groundwater recharge.

# James Irrigation District
## 2014 WaterSMART Grant Application
### King River North Fork High Flow Releases to San Joaquin River (1995-2005)

| Flood Release # | Water Year | Start Date | End Date | Flood Duration (Days) | Total Discharge at James Bypass Gaging Station (AF) |
|---|---|---|---|---|---|
| 1 | 1955 - 56 | 2/2 | 3/8 | 36 | 91,205 |
| 2 | 1957 - 58 | 4/12 | 6/30 | 80 | 212,797 |
| 3 | 1966 - 67 | 4/14 | 7/21 | 99 | 484,870 |
| 5 | 1968 - 69 | 1/27 | 8/4 | 190 | 1,551,340 |
| 6 | 1969 - 70 | 12/2 | 2/4 | 53 | 62,170 |
| 7 | 1972 - 73 | 6/9 | 6/12 | 4 | 139 |
| 8 | 1973 - 74 | 4/13 | 6/18 | 62 | 86,353 |
| 9 | 1977 - 78 | 3/7 | 6/30 | 115 | 551,186 |
| 10 | 1978 - 79 | 4/10 | 6/2 | 30 | 11,752 |
| 11 | 1979 - 80 | 1/15 | 7/7 | 159 | 579,580 |
| 12 | 1981 - 82 | 4/6 | 7/13 | 91 | 450,071 |
| 13 | 1982 - 83 | 11/4 | 9/30 | 310 | 2,309,280 |
| 14 | 1983 - 84 | 10/1 | 2/2 | 125 | 568,610 |
| 15 | 1985 - 86 | 2/21 | 6/12 | 112 | 667,750 |
| 16 | 1994 - 95 | 3/23 | 7/20 | 120 | 584,352 |
| 17 | 1995 - 96 | 3/14 | 5/30 | 37 | 74,542 |
| 18 | 1996 - 97 | 1/6 | 3/17 | 71 | 432,033 |
| 19 | 1997 - 98 | 2/24 | 7/20 | 149 | 983,678 |
| 20 | 1998 - 99 | 11/23 | 12/16 | 24 | 20,042 |
| 21 | 2004 - 5 | 5/11 | 6/13 | 34 | 63,573 |
| 22 | 2005 - 6 | 4/3 | 6/30 | 89 | 733,152 |
| | | | Total | 1,990 | 10,518,475 |
| | | | Average Annual from 50 years of data: | 40 | 210,370 |

Flows available typically every: 2.4 years

| | | | |
|---|---|---|---|
| earliest start | 10/1 | 12/16 | earliest end |
| latest start | 5/11 | 9/30 | latest end |
| average start | 4/30 | 6/17 | average end |

**Total Groundwater Recharge from Floodwater**

Number of days of Infiltration: 40 (average annual basis)

| Location | Approx. Volume (acre-feet) | Average Infiltration area (acres) | Typical Infiltration Rate (ft/day) | Typical Infiltration Rate (AF/day) | Infiltration during Flood Season (AF) | Total Infiltration (AF) |
|---|---|---|---|---|---|---|
| Basin No. 3 | 240 | 14 | 0.25 | 3.5 | 140 | 380 |
| Basin No. 2 | 1,000 | 37 | 0.25 | 9.3 | 370 | 1,370 |
| Eastside Channel | 110 | 21 | 0.25 | 5.3 | 210 | 320 |
| Totals | 1,350 | 72 | | 18.0 | 720 | 2,070 |

Evaporation is neglected for simplicity

It is assumed that the channel or basins are filled at the end of the flood season, so total infiltration = infiltration during the flood

Appendix F

James Irrigation District
Water Banking Project
## Engineer's Opinion of Probable Cost
(2014 prices)

| Schedule Task | Item Description | Quantity | Unit | Unit Cost | Amount | 1st Fiscal Year 2014-15 | 2nd Fiscal Year 2015-16 | Total |
|---|---|---|---|---|---|---|---|---|
| | *01/15/2014* | | | | | | | |
| | **Construction Costs:** | | | | | | | |
| 5.1 | **Basin 3** | | | | | | | |
| | **Description:** *Excavation of Basin 3* | | | | | | | |
| | Excavation and Transport (from Basin 3) | 253,500 | CY | $ 2.75 | $ 697,125 | | | |
| | Electrical Line Relocation (including raptor protection) | 1,000 | LF | $ 60.00 | $ 60,000 | | | |
| | | | | **Subtotal** | $ 757,125 | $ 757,125 | $ - | $ 757,125 |
| 5.2 | **Eastside Channel Earthen Diversion Dam and Spill Structure** | | | | | | | |
| | **Description:** *Earthen Dam and 72" Dia. Level Control Structure in Auxiliary Flood Channel* | | | | | | | |
| | 72" Level Control Overflow | 1 | EA | $ 15,625.00 | $ 15,625 | | | |
| | 36" RCP pipe | 150 | LF | $ 123.00 | $ 18,450 | | | |
| | Riprap | 4 | SY | $ 88.00 | $ 352 | | | |
| | Earthwork | 3,000 | CY | $ 5.00 | $ 15,000 | | | |
| | | | | **Subtotal** | $ 49,427 | $ 49,427 | $ - | $ 49,427 |
| 5.2 | **Auxillary Channel Levee Build-Up** | | | | | | | |
| | **Description:** *12' wide road along fence from water control structure to end of Basin 1* | | | | | | | |
| | **Item** | **Quantity** | **Unit** | | | | | |
| | Earthwork | 12,000 | CY | $ 5.00 | $ 60,000 | | | |
| | | | | **Subtotal** | $ 60,000 | $ 60,000 | $ - | $ 60,000 |
| 5.2 | **Basin 2** | | | | | | | |
| | **Description:** *Embankment widening of Basin 2* | | | | | | | |
| | Earthwork | 34,500 | CY | $ 5.00 | $ 172,500 | | | |
| | | | | **Subtotal** | $ 172,500 | $ 172,500 | $ - | $ 172,500 |
| 5.3 | **E-Booster Check Structure Modifications** | | | | | | | |
| | **Description:** *Langemann gate directly upstream of the existing E-Booster, to control downstream flow rate* | | | | | | | |
| | Langemann Gate | 1 | EA | $ 87,500.00 | $ 87,500 | | | |
| | | | | **Subtotal** | $ 87,500 | $ - | $ 87,500 | $ 87,500 |
| 5.3 | **Main Canal Control Structure** | | | | | | | |
| | **Description:** *8 foot wide discharge bay with 20' x 15' intake chamber with ITRC flap gates* | | | | | | | |
| | ITRC Flap Gates | 4 | EA | $ 5,000.00 | $ 20,000 | | | |
| | 60" Canal Gates | 2 | EA | $ 16,250.00 | $ 32,500 | | | |
| | Catwalk | 374 | SF | $ 69.00 | $ 25,806 | | | |
| | Concrete Structure | 70 | CY | $ 1,563.00 | $ 109,410 | | | |
| | | | | **Subtotal** | $ 187,716 | $ - | $ 187,716 | $ 187,716 |
| 5.4 | **Siphons From Main Control Structure to Siphon Junction Box** | | | | | | | |
| | **Description:** *Two pipes to run water both ways, placed in the same trench* | | | | | | | |
| | 60" RCP Pipe | 480 | LF | $ 310.00 | $ 148,800 | | | |
| | 60" 22.5° Elbow | 16 | EA | $ 5,000.00 | $ 80,000 | | | |
| | Trenching/Compaction (Incl. both pipes) | 2000 | CY | $ 11.00 | $ 22,000 | | | |
| | Concrete Sand Slurry | 440 | CY | $ 313.00 | $ 137,720 | | | |
| | | | | **Subtotal** | $ 388,520 | $ - | $ 388,520 | $ 388,520 |
| 5.4 | **Siphon Junction Box** | | | | | | | |
| | **Description:** *Concrete Structure Serving as Junction for Pipelines and Future Pipe ( 36" and 48" stubs) from Basin 2* | | | | | | | |
| | 36" PVC Stub | 20 | LF | $ 130.00 | $ 2,600 | | | |
| | 36" Flap Valve | 2 | EA | $ 2,875.00 | $ 5,750 | | | |
| | 48" RCP Stub | 12 | LF | $ 180.00 | $ 2,160 | | | |
| | 48" Slide Gate | 1 | EA | $ 8,125.00 | $ 8,125 | | | |
| | 42" Slide Gate | 1 | EA | $ 7,500.00 | $ 7,500 | | | |
| | Concrete Structure | 40 | CY | $ 1,563.00 | $ 62,520 | | | |
| | | | | **Subtotal** | $ 88,655 | $ - | $ 88,655 | $ 88,655 |

James Irrigation District
Water Banking Project

# Engineer's Opinion of Probable Cost

(2014 prices)

| Schedule Task | Item Description | Quantity | Unit | Unit Cost | Amount | 1st Fiscal Year 2014-15 | 2nd Fiscal Year 2015-16 | Total |
|---|---|---|---|---|---|---|---|---|
| *01/15/2014* | | | | | | | | |
| 5.5 | **Pipe From Siphon Junction Box to Basin 3** | | | | | | | |
| | **Description:** *One pipe to Basin 3* | | | | | | | |
| | 42" RCP Pipe | 640 | LF | $ 238.00 | $ 152,320 | | | |
| | 42" Elbows | 3 | EA | $ 4,375.00 | $ 13,125 | | | |
| | 72" Stand Pipe | 11 | LF | $ 400.00 | $ 4,400 | | | |
| | Riprap | 100 | TN | $ 125.00 | $ 12,500 | | | |
| | Concrete Pad | 1.3 | CY | $ 1,563.00 | $ 2,032 | | | |
| | Trenching/Compaction | 7232 | CY | $ 11.00 | $ 79,552 | | | |
| | | | | **Subtotal** | **$ 263,929** | **$ -** | **$ 263,929** | **$ 263,929** |
| 5.5 | **Basin 3 Pump Structure** | | | | | | | |
| | **Description:** *Concrete Structure to house pumps and return water to the Main Canal from Basin 3. (15 cfs/pump)* | | | | | | | |
| | 30" Steel Pipe | 45 | LF | $ 158.00 | $ 7,110 | | | |
| | 30" PVC Pipe | 110 | LF | $ 116.00 | $ 12,760 | | | |
| | PVC to Steel Coupling | 1 | EA | $ 1,750.00 | $ 1,750 | | | |
| | Air Vents | 2 | EA | $ 219.00 | $ 438 | | | |
| | Manifold | 1 | LS | $ 15,000.00 | $ 15,000 | | | |
| | Trash Racks | 2 | EA | $ 7,500.00 | $ 15,000 | | | |
| | Pumps (15 cfs) | 2 | EA | $ 93,750.00 | $ 187,500 | | | |
| | Controls | 1 | EA | $ 10,000.00 | $ 10,000 | | | |
| | Concrete Structure | 26 | CY | $ 1,563.00 | $ 40,638 | | | |
| | | | | **Subtotal** | **$ 290,196** | **$ -** | **$ 290,196** | **$ 290,196** |
| 5.5 | **Basin 3/Well Line Junction Box** | | | | | | | |
| | **Description:** *Structure to connect recovery well pipeline and Basin 3 Discharge to the return line to the Siphon Junction Box* | | | | | | | |
| | 24" PVC Stub | 20 | LF | $ 53.00 | $ 1,060 | | | |
| | 24" Flap Valve | 1 | EA | $ 1,750.00 | $ 1,750 | | | |
| | 30" Flap Valve | 1 | EA | $ 2,500.00 | $ 2,500 | | | |
| | Concrete Structure | 18 | CY | $ 1,563.00 | $ 28,134 | | | |
| | | | | **Subtotal** | **$ 33,444** | **$ -** | **$ 33,444** | **$ 33,444** |
| 5.5 | **Pipe From Basin 3/Well Line Junction Box to Siphon Junction Box** | | | | | | | |
| | **Description:** *Well line box to siphon junction box* | | | | | | | |
| | 42" Concrete Pipe | 680 | LF | $ 238.00 | $ 161,840 | | | |
| | | | | **Subtotal** | **$ 161,840** | **$ -** | **$ 161,840** | **$ 161,840** |
| | | | | | **Subtotal** | **$ 1,039,052** | **$ 1,501,800** | **$ 2,540,852** |
| 5 | Mobilization/Demobiliation/Bonds/Insurance | % | | 5 | | $ 51,953 | $ 75,090 | $ 127,043 |
| 5 | SWPPP Implementation | % | | 2 | | $ 20,781 | $ 30,036 | $ 50,817 |
| | | | | | Subtotal | $ 1,111,786 | $ 1,606,926 | $ 2,718,712 |
| | | | | | | **Construction Total** | | **$ 2,718,712** |
| | **Remaining Environmental Costs:** | | | | | | | |
| 2.3 | Kit Fox Preserve Cultural Report * | 1 | EA | $ 18,000 | $ 18,000 | $ 18,000 | $ - | $ 18,000 |
| 2.4 | Kit Fox Preserve Management Plan * | 1 | EA | $ 60,000 | $ 60,000 | $ 60,000 | $ - | $ 60,000 |
| 5.6 | Kit Fox Den Construction & Monitoring | 1 | EA | $ 8,000 | $ 8,000 | $ 8,000 | $ - | $ 8,000 |
| - | Water Quality (Section 401) Certification | 1 | EA | $ 58,056 | $ 58,056 | $ 58,056 | $ - | $ 58,056 |
| | | | | | Subtotal | $ 144,056 | $ - | $ 144,056 |
| | | | | | | **Environmental Total** | | **$ 144,056** |
| | **Other Costs:** | | | | | | | |
| 3.2 | SWPPP Preparation * | 1 | EA | $ 15,000 | $ 15,000 | $ 15,000 | $ - | $ 15,000 |
| 2.5, 3 | Final Design * | % | | 5 | $ 135,935 | $ 135,935 | $ - | $ 135,935 |
| 1 | Project Administration | % | | 2.5 | $ 67,968 | $ 27,795 | $ 40,173 | $ 67,968 |
| 4 | Construction Management | % | | 6 | $ 163,123 | $ 66,707 | $ 96,416 | $ 163,123 |
| | | | | | Subtotal | $ 245,437 | $ 136,589 | $ 382,026 |
| | | | | | | **Other Total** | | **$ 382,026** |
| | * These costs will be incurred prior to anticipated award date of 10/01/2014 | | | | **Subtotal** | **$ 1,501,278** | **$ 1,743,515** | **$3,244,793.53** |
| | | | | | | **TOTAL COST** | | **$ 3,244,794** |

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An Employee Owned Company

# James Irrigation District
# Water Banking Project
# Cost Comparison of Operating Deep Wells Exclusively vs Substituting Booster Pumps During Peak Hours

JOB #: 1051-10C3
COMP. BY: VSL
CHKD. BY: EAA
DATE: 1/20/2014

Appendix G

| PG&E Rate Analysis[1] | |
|---|---|
| PG&E Summer rate off-peak | $0.07615 /kwh |
| PG&E Summer rate peak | $0.18246 /kwh |
| PG&E Daily off-peak hours (Mon - Fri) | 6 hrs |
| PG&E Daily peak hours (Mon - Fri) | 18 hrs |
| PG&E Daily off-peak hours (Weekend) | 24 hrs |
| Percentage of week peak | 18% |
| Percentage of week off-peak | 82% |

| Existing Wells Pumping | | |
|---|---|---|
| Days of operation | | 100 |
| Hours operating per day | | 24 hrs |
| Operating days in a week | | 7 |
| Number of wells | | 10 |
| Average pumping TDH, feet | | 275 ft |
| Average well discharge, cfs | | 3 cfs |
| Number of weeks | | 14.5 |
| Estimated hp demand per well @ 70% eff | | 134 hp |
| Estimated kw demand per well | | 100 kw |
| Total deep well electrical draw | | 996 kw |
| **Cost of Operating Wells** | **$** | **230,829** |

| Existing Wells Pumping with Booster Pumps operating hours to match peak hours | |
|---|---|
| **Existing Wells** | |
| Number of wells | 12.2 |
| Average pumping TDH, feet | 275 ft |
| Average well discharge, cfs | 3 cfs |
| Estimated hp demand per well @ 70% eff | 134 hp |
| Estimated kw demand per well | 100 kw |
| Total deep well electrical draw | 1213 kw |
| **Booster Pumps** | |
| Number of booster pumps | 2 |
| Booster pump flow, cfs | 15 cfs |
| Booster pump TDH, feet | 40 ft |
| Estimated hp demand per pump @ 70% eff | 97 hp |
| Estimated kw demand per pump | 72 kw |
| Total booster pump electrical draw | 145 kw |
| **Cost Breakdown** | |
| Days of operation | 100 |
| Hours operating per day | 24 hrs |
| Operating days in a week | 7 |
| Number of weeks | 14.5 |
| **Cost of Operating** | **$ 196,267** |

| Operating Scenarios Comparison | | |
|---|---|---|
| Amount of water pumped, af | | 5,950 af |
| Deep well pumping only | $ | 230,829 |
| Deep well with boosters pumping | $ | 196,267 |
| Cost savings with boosters | **$** | **34,563** |
| **Savings/AF** | | **$5.81 /af** |

Notes:

1. Electrical rates are based upon the AG-5B PG&E rate schedule for the Large Agricultural classification rates effected January 1, 2014 at the attached link: http://www.pge.com/tariffs/electric.shtml#LARGEAG

# JAMES IRRIGATION DISTRICT

**Incorporated February 16, 1920**

Appendix H



8749 Ninth Street
Post Office Box 757
San Joaquin, California 93660-0757

John Mallyon, Manager
Donna Hanneman, Secretary

Telephone: (559) 693-4356
Facsimile: (559) 693-4357

## Water Banking Program Prospectus

### Overview

The following is a solicitation of interest in purchasing a long-term water supply or water banking services from the James Irrigation District. Those interested should immediately contact Richard M. Moss, California, at (559) 636-1166. As you will read, the James Irrigation District is uniquely positioned from a geographic, hydrologic and water rights entitlement/contractual basis to offer water banking services to others as well as to offer water generated from the District's own banking program for sale on a long-term basis to willing purchasers throughout California.

### Description of District

The James Irrigation District is an agricultural water purveyor located in the heart of the San Joaquin Valley near the town of San Joaquin, 25 miles southwest of Fresno in California. The District has been in formal operation since 1920 with predecessor interests dating back to the mid-1800's. The 26,000-acre (23,000 acres irrigated) district is farmed primarily to row crops, cotton, alfalfa and seed alfalfa. More recently, many acres of almonds have been planted in the District. It has a mixture of soil types ranging from light (sandy) textured soils on the eastern side of the District to very heavy clay soils for much of the central and western part of the District.

The District is underlain with a good quality groundwater aquifer with capacity to store an estimated 1.5 million acre-feet of water. The District is located near the "trough" of the San Joaquin Valley and sits between the Fresno Slough, the northern most distributary of the Kings River, and the James Bypass, the floodway that transports Kings River floodwaters to Mendota Pool and the San Joaquin River. The District can pump water from or deliver water to the Mendota Pool, an operational reservoir located on the San Joaquin River near the town of Mendota, which is also the terminus of the federal Central Valley Project (CVP) Delta-Mendota Canal and the headworks for the historic diversions from the San Joaquin River by the San Joaquin River Exchange Contractors (which hold some of the oldest and firmest water rights in the state). In some respects the Mendota Pool serves as a "switchyard" for water and water transactions with some of the most senior water rights holders in the state and some of the more junior water rights holders in the state receiving water directly or indirectly from Mendota Pool, as well having the ability to receive water from the San Joaquin River, the Kings River, the federal CVP and the California State Water Project. On the average, more than 1.5 million acre-feet of water pass through Mendota Pool every year.

The James Irrigation District has available to it several different water sources, including:

- A good quality groundwater aquifer with a dedicated well field and overlying and deeded rights to groundwater extraction within and outside of the District's boundaries. The District currently owns and operates 58 wells and deep well turbine pumps;

- Water rights to the Kings River granting it access to floodwater;

- The ability to contract for floodwater from the San Joaquin River via the CVP's Friant Division (with delivery through the Friant-Kern Canal and the Kings River) or to take San Joaquin River floodwater reaching Mendota Pool;

- The ability to contract for surplus CVP water made available from the Delta-Mendota Canal and Mendota Pool;

- A perpetual right (in settlement of water rights issues, called "Schedule 2 Water") to 9,700 acre-feet of CVP water made available from the Delta-Mendota Canal and Mendota Pool subject only to an approximately 22 percent shortage in certain (infrequent) critically dry years for the Sacramento River; and

- Contractual entitlement to 35,300 acre-feet of CVP water via a long-term water service contract subject to CVP agricultural water shortages from the CVP's Mendota Pool Unit.

It is this unique combination of access and rights to various water resources and equally unique geographical setting that allows James Irrigation District to provide water banking services using its groundwater reservoir and extraction wells and/or to make a water supply available for sale to others.

How is James Irrigation District Able to Make Water Available in a Dry Year?

James Irrigation District has embarked on an aggressive program of construction of direct groundwater recharge facilities (sinking basins) and groundwater wells and pumps. It intends to use these new facilities to generate new yield for use within the District by capturing available floodwater from either the Kings or San Joaquin rivers or other sources. Some of the additional yield from this new groundwater storage capability will be exchanged for the District's surface water to facilitate the sale of banked floodwater. The District has constructed a major new groundwater recharge facility and has validated on a large-scale basis the technical and policy foundation upon which the Water Sales portion of the Program is based. The balance of the needed construction of new facilities (groundwater wells) will commence with the finalization of water sales or banking agreement(s).

The third party Water Banking portion of the Program will operated by the District taking surface water deliveries from its banking customer either for direct recharge or by using the existing distribution system to offset use by the District's water users at times they would otherwise be using their groundwater. The inverse of these operations will occur when water is to be returned to the District's Water Banking customers.

Sale of New Yield from Banking Facilities

James Irrigation District is offering a portion of the new water supplies produced through its banking program for long-term sale. This water is significantly differentiated by its relative firmness of availability. This supply is some of the most reliable water in California, and is

even more reliable than Municipal and Industrial water supplies available by way of water service contract from the CVP.

Quantity - James Irrigation has available for sale up to 1,250 acre-feet per year of surface water supply produced through its banking program to be made available at O'Neill Forebay.

Term - The James Irrigation District is interested in providing a long-term program of banked water sales for the term of its CVP long-term contract water supply and renewals thereof.

Price – The price of the water is split into two components: (i) an initial one-time payment for each acre-foot of annual entitlement to be purchased of $450 per acre-foot, and (ii) an annual charge of $450 per acre-foot for each acre-foot of entitlement to be purchased (to be paid annually regardless of how much water is actually delivered). The annual charge will be adjusted annually using the All Urban Consumers, All Items Index, Western Cities with populations between 50,000 and 1,500,000 (CPI-U) as an index with the November 2007 CPI-U as its base over the term of the contract(s). Once purchased, this water supply will be available to the buyer for as long as the District retains its water service contract with the Bureau of Reclamation, up until 2054.

Other terms of sale such as build-up provisions, return of unused water, etc. of significance should be noted and flagged for negotiation early as part of the potential buyers' indication of interest.

Such supplies would be available every year, unless and to the extent the District's Schedule 2 water supply of at least 7,600 acre-feet is not made available to the District (which to date has never occurred).

Water Banking Services

James Irrigation District is also offering water banking or firming services using water supplied by banking partner(s). Much like the firm ability to provide water banked by the District itself for sale, water supplied by a partner and banked with the District can be returned in even the driest of years.

Quantity - James Irrigation District has available for return as part of its Water Banking Program up to 1,250 acre-feet per year of surface water supply to be made available at O'Neill Forebay. Water to be banked with James Irrigation District must be made available at the District's turnout from the Mendota Pool or at other locations agreeable to the District. All costs of providing the water to be banked are to be borne by the banking partner. Water to be banked with James Irrigation District must be made available at times acceptable to the District. The original banked water quantity put with the District will be reduced by ten (10) percent to account for spreading, aquifer and any other losses and related mitigation..

Term - The James Irrigation District is interested in providing a long-term program of water banking for a term of twenty-five (25) years. The water banking program may be renewed upon terms and conditions mutually agreeable to the parties. Any water remaining in the Water Bank at the end of the term will become the asset of the James Irrigation District

unless there is a renewal agreement that specifically addresses existing water supplies already in the bank.

Price - The price of the banking service is split into three (3) components: (i) an initial one-time payment of $1,750 per acre-foot of annual return capacity, (ii) a $30 per acre-foot fee when each acre-foot is actually placed into the Water Bank, and (iii) a $30 per acre-foot fee when each acre-foot is returned from the Water Bank. The placement and return charges will be adjusted annually in using the All Urban Consumers, All Items Index, Western Cities with populations between 50,000 and 1,500,000 (CPI-U) as an index with the November 2007 CPI-U as its base over the term of the contract(s). There is no limit to how much water can be placed and subsequently returned, only a limit (three times the annual return capacity purchased) that can be stored in the bank at any one time (see Banking Capacity below). It should be noted that the costs to be paid to James Irrigation District are in addition to any operation and maintenance (O&M) costs associated with operating the Water Bank including the O&M costs for a portion of the District's distribution system, groundwater recharge system and groundwater extraction system. This cost is currently estimated to be $18 per acre-foot for annual O&M plus an additional $45 per acre-foot energy charge in years when groundwater extraction occurs on behalf of the banking partner. These charges will be adjusted annually to reflect actual costs.

Banking Capacity – Three (3) acre-feet of storage capacity within the James Irrigation District's groundwater reservoir for each acre-foot of annual return capacity will be provided by the District.

District Goals

The District's Program has some fundamental underlying goals:

- The Program must generate significant, quantifiable benefits to the District and its landowners;
- The Program should not have any significant adverse impacts (short-term or long-term) on the District, its landowners or any third parties. This includes impacts to local groundwater supplies; and
- The Program should not have any adverse implications on the District's ability to continue to receive water (or the benefits of that water) under its existing water or contract rights.

The Program (or any portion of it) will not be pursued unless it meets those goals.

It should also be noted that James Irrigation District might pursue an expansion of this initial offering or other such programs. While the commitments made pursuant to this Program are intended to be kept, there is no intention of priority associated with this Program over other programs the District is currently involved with or may become involved with in the future.

# RECLAMATION DISTRICT NO. 1606

Incorporated May 9, 1914

BOARD OF TRUSTEES
Jerome Salvador, President
Gerald W. Kinnunen, Vice-President
Robert Barcellos, Trustee

8749 Ninth Street
Post Office Box 757
San Joaquin, California 93660-0757

John Mallyon, Manager
Donna Hanneman, Secretary
Telephone: (559) 693-4356
Facsimile: (559) 693-4357

January 10, 2014

Appendix I

John Mallyon, General Manager
**JAMES IRRIGATION DISTRICT**
Post Office Box 757
San Joaquin, CA 93660-0757

**SUBJECT:** **JAMES IRRIGATION DISTRICT - WaterSMART GRANT**

Dear John:

Reclamation District No. 1606 is very supportive of the James Irrigation District's efforts to conserve and recharge water. The proposed project includes an addition or expansion of the existing regulation/recharge facilities on RD1606 property. We supported the District's efforts for funding in 2008 and 2010 and continue to support the District.

The Reclamation District No. 1606 is also a Reclamation contractor and is located in the same groundwater basin and we have common interests in protecting our water resources. Stewardship of the region's water supplies is a key to the future viability of this area's economy. The James Irrigation District's application for grant funds would be an investment in our future.

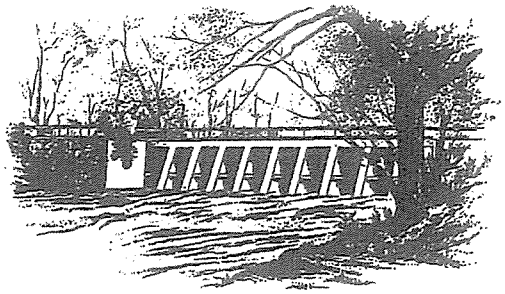
We have cooperated with James Irrigation District in the past by allowing Kings River high flows to be recharged on Reclamation District No. 1606 property. James Irrigation District has also constructed regulation basins on RD1606 property. Both types of facilities benefit the overall water management of the area. We look forward to cooperating with the James Irrigation District in order to improve the reliability of the water in the area and we support the District's efforts to do so.

Sincerely,

Jerome F. Salvador, President
BOARD OF DIRECTORS

JF:dh

T:\Secretary\Documents\letters\2014\rd1606 ltr to JID.wpd



YOUR MOST VALUABLE RESOURCE - WATER

OFFICE OF
FRESNO IRRIGATION DISTRICT

TELEPHONE (559) 233-7161
FAX (559) 233-8227
2907 S. MAPLE AVENUE
FRESNO, CALIFORNIA 93725-2208

January 17, 2014

Mr. John Mallyon
James Irrigation District
P.O. Box 757
San Joaquin, CA 93660

Subject: Endorsement of District's WaterSMART Grant Application

Dear Mr. Mallyon:

The Fresno Irrigation District (Fresno ID) supports the James Irrigation District (James ID) in their pursuit of a WaterSMART Grant to expand regulation and recharge facilities in the Fresno Slough Bypass. Fresno Irrigation District recognizes the importance of water management and conservation projects and the role they plan in stabilizing water supply for the area. The project proposed by James Irrigation District is the kind of water management tool that we must secure to ensure a viable water supply in the Central Valley.

Recently, our Districts submitted together and were awarded a construction grant through the California Integrated Regional Water Management Plan program, for a project which helps the water management efforts of both Districts. We also have been in regular discussions since 2010, in order to find ways to work together. Discussions have focused on water supply, recharge and banking opportunities. The proposed project in the Fresno Slough Bypass would enhance any future opportunities between the Districts. Fresno ID would be interested in the possibility of banking water at this site.

Fresno Irrigation District strongly encourages the USBR to provide funding to James Irrigation District for this much needed project.

Sincerely,

*Gary R. Serrato*
General Manager
Fresno Irrigation District

Westlands Water District
3130 N. Fresno Street, P.O. Box 6056, Fresno, California 93703-6056, (559) 224-1523, FAX (559) 241-6277

January 15, 2014

John Mallyon
District Manager
James Irrigation District
Post Office Box 757
San Joaquin, CA 93660-0757

**Subject: Letter of Support for USBR WaterSMART Grant**
**James Irrigation District Water Conservation Project**

Dear John:

The Westlands Water District wishes to pledge its support for James Irrigation District's grant proposal to improve and expand groundwater recharge basins, groundwater banking programs, regulation and conservation. This project will offer many benefits to James Irrigation District and help to relieve conflicts for water supply in the area. This project will help improve water reliability for James Irrigation District, and other agencies on the Westside of the San Joaquin Valley. Westlands Water District has investigated options for banking our own water, and we are interested in continuing our discussions on both short-term and long-term water supply and banking opportunities with the James Irrigation District. Please accept our support for your application.

Sincerely,

Jose Gutierrez
Deputy General Manager for Resource

# Tranquillity Irrigation District





January 14, 2014

Mr. John Mallyon
Manager
James Irrigation District
P.O. Box 757
San Joaquin, CA 93660

Re: Letter of Support
James Irrigation District – 2014 WaterSMART Grant Application

Dear John Mallyon:

Tranquillity Irrigation District is aware of the James Irrigation District's plan to submit an application for grant funds for the creation of basins for banking, regulation and recharge. Tranquillity Irrigation District has supported, and will continue to support, their efforts in groundwater management and water conservation. This support is provided since Tranquillity Irrigation District is a neighboring agency sharing the same groundwater basin, and surface water supply sources. Our District supplements agricultural surface water supplies with groundwater, and is dependent on groundwater for the local drinking water supply to all the residents and businesses within Tranquillity. Thus, it is crucial to us that water resources are used as efficiently as possible. Tranquillity Irrigation District has collaborated on projects with James Irrigation District in the past, and looks forward to the possibility of working with them on this project and other projects in the future.

Sincerely,

Danny M. Wade

Danny M. Wade
District Manager

P.O. Box 487, Tranquillity, CA 93668
Telephone (559) 698-7225 - FAX (559) 698-5105
E-mail contact@trqid.com - www.trqid.com

KRCD
Kings River Conservation District

4886 East Jensen Avenue
Fresno, California 93725

Tel: 559-237-5567
Fax: 559-237-5560

www.krcd.org

January 16, 2014

Mr. John Mallyon, General Manager
James Irrigation District
P.O. Box 757
San Joaquin, CA 93660

Re: James Irrigation District USBR WaterSMART Grant Application Letter of Support

Dear Mr. Mallyon:

Kings River Conservation District (KRCD) understands that James Irrigation District (JID) is applying for funding from the WaterSMART grant program for a project to expand water regulation and groundwater recharge facilities in the Fresno Slough Bypass. The grant program and the project strive towards achieving a sustainable water strategy to meet regional and national needs.

As you are aware, the JID has a long history of addressing water conservation issues and implementing water conservation projects on a local and regional level. Efforts undertaken by JID include participation and financial support of regional planning efforts, adoption of the Kings Basin Integrated Regional Water Management Plan, and partnership with KRCD on a number of efforts addressing groundwater issues common to our overlapping boundaries. We jointly appreciate the importance of conserving and recharging our groundwater sources in order to become less dependent on external water sources.

Accordingly, KRCD supports the James Irrigation District WaterSMART grant application and its aim to conserve and bank water so it is available during times of higher demand. Should you need support from KRCD on your project, please feel free to contact myself or Rick Hoelzel, Manager of Water Resources, at (559) 237-5567 extension 130.

Sincerely,

David Orth,
General Manager

DO/RH/sjs

L14-0004
File: 523.07