NORTH KERN WATER STORAGE DISTRICT

ORIGINAL

February 2018

NKWSD Return Capacity Improvements for Regional Drought Resiliency

Project Location–Southern San Joaquin Valley, California

Application for
WaterSMART Drought Response Program:
Drought Resiliency Projects for FY 2018
Funding Opportunity Announcement No. BOR-DO-18-F008

Applicant: North Kern Water Storage District
33380 Cawelo Avenue
Bakersfield,CA93308

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3. Technical Proposal

Project Information	
Date	February 13, 2018
Project Name	NKWSD Return Capacity Improvements for Regional Drought Resiliency
Expected Completion	32 to 36 months (September 2021)
Near a Federal Facility?	Yes, adjacent to CVP's Friant-Kern Canal

Applicant Information	
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Note: All figures are in Appendix A, unless otherwise noted.

3.1 Executive Summary

The North Kern Water Storage District (North Kern, NKWSD, District) proposes to utilize their resources in a cost-share agreement with the U.S. Bureau of Reclamation (Reclamation, USBR) to construct the *"NKWSD Return Capacity Improvements for Regional Drought Resiliency"* (Project). NKWSD has practiced conjunctive use of their highly variable Kern River water supply for over 60 years. Despite the success of North Kern's conjunctive use program, as well as regional water management programs conducted by other districts in the Poso Creek IRWM Plan Group (Poso region) (Figure 1), concerns regarding future regional groundwater conditions persist. North Kern has identified a need to improve recovery and return capacity of their groundwater recharge facilities to allow surface water recharged and banked in North Kern's groundwater basin to be available to the Poso Creek IRWM Group of districts. The proposed Project helps meet this need to enhance the Poso region drought resiliency by connecting seven deep production wells to the Central Valley Project's (CVP's) Friant-Kern Canal (FKC) through dedicated manifold pipes. Of the seven deep wells, five are currently operational with fully equipped pumps, motors, and telemetry systems. North Kern proposes to drill and equip two deep wells with the pump, motor, electrical and telemetry to add recovery and conveyance return capacity for dry period return of stored water.

In a coordinated effort with the Poso Creek IRWM Group to improve the Region and District's capabilities to absorb available surface supply; NKWSD has participated in improvements to their conjunctive use facilities and has entered into agreements with CVP contractors to recharge and bank wet period surface supply using their groundwater recharge facilities; namely Shafter-Wasco Irrigation District (SWID), Southern San Joaquin Municipal Utility District (SSJMUD), Delano-Earlimart Irrigation District (DEID) and Kern Tulare Water District (KTWD), who are in the Poso Creek IRWM Group, of which North Kern is a part. This Project will add capacity for the recovery and return of banked CVP supply from NKWSD to the Poso Creek IRWM districts via the Friant Kern Canal (FKC). The added recovery and return capacity will help alleviate constraints in the return to the CVP Contactors since North Kern must meet its in-district needs while at the same

time return banked supply. These wells, along with the manifold pipe tie-ins to the FKC, will serve as the conveyance mechanism for return of as much as **11,032 AF** of the previously banked water to the CVP Contractors within the Poso Creek IRWM Group during critically dry years. The proposed Project and benefits are classified under Task A: *Increasing the Reliability of Water Supplies through Infrastructure Improvement.*

Improving the District's infrastructure by constructing a well and manifold pipelines that connect four wells to the FKC adds to the District's physical capability to return water to the FKC and satisfy the District's agreements with their water management partners in the Poso Creek IRWM Region. It is noted that North Kern is well-positioned to participate in exchanges that involve CVP supplies since the Friant-Kern Canal runs directly through the middle of North Kern from north to south. Therefore, the proposed Project removes the need to establish a direct pipeline connection between North Kern and each of the Poso Creek IRWM Group partners by strategically connecting a network of wells to the FKC. This use of existing major conveyance system to return banked water increases operational flexibility and reliability throughout the region during times of drought. The proposed Project is to be completed within 32 to 36 months from the signing of the grant funding agreement. The Project would start in October 2018, and is identified as a key component in reducing the return conveyance constraints experienced in the recent drought by the District's efforts towards return of banked water for their neighboring districts; the proposed improvement adds drought resiliency to the Region and the District.

The Project is estimated to provide the following annual benefits, in acre-feet.

Est. Annual Additional Water	11,032 AF
Est. Annual Water Better Managed	5,516 AF

3.2 Background Data

The following section provides background regarding the District and information on general water management and water use considerations, not necessarily specific to the proposed Project but to provide context for the Project need.

3.2.1 *Geographic Location, Major Crops and Total Acres Served*

North Kern WSD, shown in Figure 1, is located in Kern County along the eastern side of California's southern San Joaquin Valley. The District lies between the City of Bakersfield on the South and the City of Delano on the north, and between Highway 99 on the east and the cities of Wasco and Shafter on the west. Figure 2 provides the facilities within the District. Figure 3, provides overviews of the location of the Return Capacity Improvements Project within the North Kern service area.

Major crops and total acres served - The cropping pattern within North Kern's 52,000-acre water service area has changed significantly from row crops to permanent plantings over the past 25 years. Currently, about 75 percent of the District's irrigated lands are planted to permanent crops, primarily almonds, grapes and pistachios. Additional detailed information may be found in North Kern's 2015 Agricultural Water Management Plan, at http://www.water.ca.gov.

3.2.2 *Primary Water Supplies and Sources*

The North Kern WSD, established in 1935, is a public agency, which supplies surface water from the Kern River and groundwater to primarily agricultural customers. About 52,000 acres of the 60,000 gross acres (87 percent) in the North Kern service area have been essentially fully developed to irrigated agriculture for over forty years; however, cropping patterns have varied over the years.

Average Annual Acre-Feet of Water Supply: While North Kern's principal source of surface water is the Kern River, the program for lining the Calloway Canal was developed collaboratively with neighboring CVP and SWP contractors as part of the Poso Creek Integrated Regional Water Management (IRWM) Plan and the Water 2025 System Optimization Review for the Poso Creek IRWM Plan Area.

North Kern has utilized Kern River water under a schedule of long-standing diversion rights, with this water being supplemented from time to time by water from Poso Creek, which traverses the northern portion of the District and contributes primarily through infiltration, to the underlying groundwater supply. While North Kern is not a CVP-Friant Unit contractor, the District has purchased and diverted "surplus" CVP-Friant water when available.

Historical water supplies to North Kern from the Kern River have ranged from less than 10,000 acre-feet per year to nearly 400,000 acre-feet per year. As a result of this highly variable water supply, North Kern has developed an extensive groundwater recharge and extraction program utilizing groundwater to regulate its water supplies by pumping an estimated average of 80,000 acre-feet of groundwater per year to meet the District total demand for irrigation water which is on the order of 180,000 acre-feet. North Kern has successfully operated this conjunctive surface and groundwater management program for over 60 years.

Water Delivery System: In North Kern, surface water is delivered through approximately 130 miles of unlined canals heading at two diversion points on the Kern River, 20 miles of pipeline, and 20 miles of lined canal. The District's principal supply artery, and most important upstream point of diversion on the Kern River, is the Beardsley-Lerdo system. This system is entirely gravity flow and consists of the diversion structure or headworks on the Kern River, 9.5 miles of concrete-lined canal (the Beardsley Canal) between the headworks and the District's southern boundary, followed by an unlined canal section (the Lerdo Canal) that continue along North Kern's eastern or "high" side.

As much as 850 cfs has been conveyed through the Beardsley Canal and delivered to the District, which represents the practical maximum delivery in this system. The second point of diversion, 4.5 miles downstream, is the Calloway headworks, which services the relatively large, now unlined section of the Calloway Canal shown on Figure 2. This facility is also entirely gravity flow and extends for 10.4 miles before entering North Kern at Seventh Standard Road. The Calloway Canal is now used as a "wet year" facility and has a capacity of 1,000 cfs at its headworks. As described throughout this grant application, the central purpose of component-1 for lining a portion of the Calloway Canal is to enable the canal below the CVC-Calloway Intertie to serve as a conveyance during all years.

Typically, District-owned wells are used only during "dry" years when surface water supplies are inadequate. Groundwater is delivered to customers during dry years via a network of small, lined canals running parallel to the larger, unlined canals used for conveyance of surface

water. The District owns and operates about 100 wells at locations shown in Figure 2. Approximately 200 privately owned wells in the Class 2 service area are used to meet irrigation demands in this part of the District. The District recently entered into an agreement with Reclamation and DWR to install state of the art automated control equipment and remote monitoring devices along with SCADA upgrades to tie in all the District owned wells. This project is scheduled to be completed in 2019.

3.2.3 *Water Use*

The North Kern Water Storage District under its present name was organized in 1935, in accordance with the provisions of California laws pertaining to the formation and operation of municipal utility districts. The District was formed for the purpose of entering into a contract for purchase and distribution of water from the Kern River. However, when CVP surface water supplies that are surplus to immediate irrigation requirements for its Poso Creek IRWM partners are available, the District will dedicate them for direct groundwater recharge through their spreading grounds. In addition, CVP's FKC runs directly through North Kern and has turnouts at various locations making it operationally viable for North Kern to receive delivery of water from the FKC on behalf of other CVP contractors (Figure 4) during wet years for recharge in their highly accessible spreading ponds (Refer Figure 2). In this regard, NKWSD makes use of approximately 300,000 AFY of its spreading ground capacity for direct recharge of CVP water, of this banked supply, NKWSD is estimated to receive a portion between 25% to 50% of the net supply augmenting the basin in the form of a storage 'leave behind' (based on agreement between districts). The dedicated return wells will enable the successful return of the stored water to its CVP water banking partners.

Table 3.1 – Recharge and Storage capacity of NKWSD

District	Spreading Basins	Fill Rate (cfs)	Recharge Rate (AF/Day)	Spreading Ground Capacity (AFY)
North Kern	5 sites (existing)	363	720	300,000

Source: Final EA-09-121, Poso Creek IRWM plan

3.2.4 *Regional Climate*

The climate of the District is typical of the San Joaquin Valley, being semiarid and characterized by mild winters and hot, dry summers. Regarding the anticipated changing climate, several investigations have been conducted by the USGS California Water Science Center (CAWSC) regarding hydrological effects of typical climate change scenarios. Each of these investigations predict that California's climate will become warmer (+2 to +4° C) and drier (10 to 15 percent) during the mid- to late-21st century, relative to historical conditions. If these predictions materialize, the level of runoff from the Sierra Nevada Mountains, and thus the Kern River Watershed, is expected to be much less reliable with quantities presumably declining over time limiting Kern River supplies.

Reduced surface water deliveries to the District, as well as for other regional districts and agencies, which can be dedicated for agricultural uses, combined with increased demands for irrigation water due to the increasingly warmer, drier climate, will result in increased use of

groundwater resources, the impacts of which could include the following:

- Reduced base flow in streams;
- Reduced groundwater outflows;
- Increased depths to groundwater, and
- Increased land subsidence.

Local communities, rural residences, and businesses also rely on groundwater from the Kern County Sub basin as their main supply. Should climate change result in a reduction in water available from traditional surface supplies, the increased frequency of groundwater pumping, from agricultural water districts and other users, will lead to a decrease in groundwater storage without the necessary means of replenishing the depleted storage. Climate change concerns, such as those listed above, set a high-priority for exploring and importing any other available surface water supplies, such as CVP wet period water.

3.2.5 *Prior Working Relationships with USBR*

Examples of North Kern's working relationships with the USBR include the following:

Various North Kern has entered into short-term (annual) contracts for the purchase of Section 215 water from the Friant Division of the CVP. All contracts were with Reclamation.

2002 North Kern entered into a long-term water banking agreement with Kern-Tulare Water District to regulate CVP supplies available to Kern-Tulare. This agreement was approved by Reclamation.

2002-2003 North Kern constructed a turnout from the Friant-Kern Canal, which provides for the diversion of water from the Friant-Kern Canal into North Kern's 8-1 Lateral and thence into North Kern's Calloway Canal. The design and rights-of-way were approved and permitted by Reclamation.

2004-2005 North Kern constructed four deep wells and installed piping on Friant-Kern Canal rights-of-way to route the discharge from these wells into the Friant-Kern Canal. The design and rights-of-way were approved and permitted by Reclamation.

Various North Kern has participated in a number of short-term water banking and exchange arrangements that involved CVP contractors and CVP water, including Shafter-Wasco Irrigation District, Delano-Earlimart Irrigation District, Madera Irrigation District, and Westlands Water District. These arrangements were approved by Reclamation.

2008-2013 Semitropic Water Storage District, acting as lead agency for the Poso Creek Regional Water Management Group, was awarded a Reclamation grant in the fall of 2008 to prepare a System Optimization Review for the region. North Kern is a member of that group. The focus of the SOR was to (1) prioritize the implementation of structural water management measures for the region based on their expected benefits to the region's water reliability, and (2) identify and resolve institutional constraints to exchanges between districts and enhance the use of

District groundwater banking facilities that will help mitigate the projected loss of water reliability to the region. In this regard, the group has worked with Reclamation to complete an Environmental Assessment to cover long-term banking and exchange activities among neighboring districts in the Poso Creek IRWM Plan Area. This work was a collaboration with Reclamation on the preparation of the EA; the SOR grant was administered by Reclamation.

2012 North Kern, collaborated with Cawelo WD, and received the 2012 CalFed Grant funding to concrete line Reach A of the Calloway Canal. The project was successfully constructed in 2015 and the Grant is entering the Post-Project Completion phase.

2013 North Kern partnered with Cawelo WD, and was awarded the 2013 CalFed Grant funding to concrete line Reach B of the Calloway Canal. The project was successfully constructed in 2015 and the Grant is entering the Post-Project Completion phase.

2014 North Kern, on a joint venture with Cawelo WD, received 2014 CalFed Grant funding to concrete line Reaches C1, C2, and D of the Calloway Canal. The project was successfully constructed in 2015 and the Grant is entering the Post-Project Completion phase.

2016 North Kern entered into a contract with the USBR for $1,000,000 to line 1,600 LF of currently unlined portion of the Calloway Canal, and equipping 50 District owned wells with state of the art telemetry systems. This project is currently being implemented.

2017 North Kern entered into a contract with the USBR for $1,000,000 to line 2,631 LF of currently unlined portion of the Calloway Canal, and equipping 50 District owned wells with state of the art telemetry systems. This project is expected to begin in summer, 2018.

2017 North Kern entered into a contract with the USBR for $300,000 to line 1,320 LF of currently unlined portion of the Calloway Canal. This project is expected to begin in summer, 2018.

3.3 Technical Project Description

3.3.1 *Proposed Project Description*

The proposed Project involves the addition of two wells and the conveyance connection of the District's seven deep wells to the FKC to improve return capacity. The Project proposes to construct the necessary pipelines to connect seven deeps wells to the District's FKC pump-in system that improves the capacity to return water supplies to Poso Creek IRWM Group of districts during dry years. The wells to be connected to North Kern's return network consist of three existing wells and one well to be drilled and equipped.

The location of the wells and pipeline is shown in Figure 3. The Project is anticipated to return previously stored water into the FKC at a rate of approximately~31 cfs. This equates to a

total estimated average of 1,839 acre-feet per month, or an annual capacity of 11,032 acre-feet per year for the seasonal use of the wells (six months in a year) to improve the return capacity for the Poso Creek IRWM CVP Contractors to meet irrigation demands during a critically dry year.

As noted previously in Section 3.2.3, the District has substantial recharge and recovery assets/capabilities. The use of most of these assets was designed to manage the District's highly variable surface water supplies for the direct benefit of District landowners (primarily agricultural operators). However, with the development of the Poso Creek IRWM Plan, portions of these assets are being improved and made available for regional use to fulfill agreements for storing water in North Kern in wet periods and then returning the stored water to neighboring Poso Creek IRWM districts in dry periods.

Existing Water Management and Exchange Programs

North Kern has implemented water management and exchange programs to optimize water supplies, increase the total volume of water brought into the District, and develop facilities to improve regional water management. These programs include numerous "bucket-for-bucket" exchanges, one-time "low priority/mutually agreeable" banking programs, and several longer-term higher priority programs. These water management programs include provisions whereby 25% - 50% of the net water recharged and augmenting the basin is "left behind" for District use, which supports groundwater levels and supply water needs in the District. Furthermore, development of the higher priority programs included construction of facilities (e.g., wells, turnouts, etc.) that benefit the partner and the District.

Expansion of Water Management and Exchange Programs

As discussed previously, through the Poso Creek IRWMP, North Kern identified several capital projects to improve the District's regional water management capabilities to partially compensate for losses in the Region's water supply reliability. More specifically, the District identified projects focused on significant regional conveyance improvements that allow North Kern to enhance the utilization of its existing water management assets, particularly its facilities to recharge water in wetter years, to the benefit of the District and its neighboring districts.

Recharge Capacity

In addition to substantial capacity to recharge water "in-lieu" of groundwater pumping by the District and District landowners, North Kern operates about 1,500 acres of recharge ponds with a capacity to recharge up to 25,000 AF of water per month and with a maximum annual recharge capacity of 300,000 AF (Refer Table 3.1). The District directly recharges significant quantities of water in about three of ten years, with an average of 150,000 AF recharged in its spreading ponds in these years. Although the District has an additional 150,000 AF of physical recharge capacity available in these wetter years for use by neighboring CVP Contractors, the lack of recovery and return capacity of the stored water pose constraints that prevent the CVP contractors from using North Kern's spreading grounds. Therefore, based on the typical timing for the availability of wet year supplies from the Friant systems, the District has identified a need to improve conveyance capacity to return the stored water to their partners during dry years. As evidenced in their Agricultural Water Management Plan, North Kern operates a system of 100 wells with an

approximate instantaneous capacity of 350 cfs. This capacity is approximately equal to peak irrigation season demands for in-District needs on Class 1 lands. Unused District well capacity is available for use by Class 2 lands in the District and to return water to the Poso Creek IRWM district partners. The proposed project is to improve the shared recovery and return capacity to reduce the constraints for return in dry periods.

As noted above, the District's instantaneous well recovery capacity roughly matches its peak irrigation season obligation to Class 1 lands. Consequently, under very dry conditions when the District has limited surface water storage available in Lake Isabella, little well capacity is available to return water to neighboring districts during the peak irrigation months. To this extent, North Kern's partners require recovery of previously recharged and banked water during this period, therefore, additional wells are necessary. Importantly, these additional "peaking" wells will allow the timing of water recovery to match the neighboring district needs. Currently, the constraints on the return capacity conveyance restricts the neighboring districts from utilizing North Kern's spreading grounds to store surplus wet year water, which would otherwise be lost to the region. As an example, SSJMUD anticipates that for each year with an excess of 100,000 AF of water supplies from the FKC (Class-1, Class-2 and Other Water combined), it would 'put' 10,000 AF of SSJMUD supplies into storage within North Kern. A detailed review of the 83 years of historical water supply at the FKC can be found in Appendix - A, an excess of 100,000 AFY of available FKC supply occurred at a frequency of 42% over the 83-year hydrology or 4.2 out of 10 years. Because of the proposed Project, SSJMUD can now expect dry year returns from North Kern and can "put" 10,000 AF of wet year water into storage in North Kern, which would otherwise be unavailable due to lack of absorptive capacity in SSJMUD. Therefore, the entire groundwater basin boundary gains 10,000 AFY by SSJMUD banking the FKC water in North Kern. As an example, given that 66.7 % of the banked water will be returned to SSJMUD, it results in an average annual return capacity of 6,667 AFY. Under this scenario, North Kern will potentially recharge its ground water basin by approximately 3,333 AFY; and SSJMUD will receive a new dry year, firm source of supply to the amount of 6,667 AFY with the help of this proposed Project.

The total Project cost for installation of the Project is approximately $1,547,121 (see Section 4 for budget estimation). This estimation includes grant administration, construction, design, and planning costs as described in the following sub-section. NKWSD is requesting $750,000 from the USBR towards this Project, with the remainder ($797,121) provided by the District. If the requested grant funding is awarded to the Project, a grant agreement is to be signed prior to September 30, 2018; construction bidding is to take place in 2019 with construction completed by mid- to late-2020 or 2021. The District will work with the USBR to address any environmental compliance or planning documentation, while adhering to project reporting and update requirements as defined in the potential grant agreement.

3.3.2 *Tasks and Project Work*

Several tasks are defined below to accomplish the Project Work and are organized to track Budget and Schedule items. The design of the well would be based on some of the previously drilled deep wells based on the hydrology of the drilling area under the guidance of a consultant. If grant funding is awarded for this Project, a grant agreement is expected to be signed by September 2018. Construction bidding would take place in 2019 with construction scheduled for completion prior to 2021.

The following list of details the anticipated tasks associated with the Project work:

Task 1: Administration

Coordination of all Project activities, including budget, schedule, communication, and grant and cost-share administration. ***Expected Deliverables: Preparation of invoices and other deliverables, as required.***

Task 2: Grant Reporting

Report on project financial status on a semi-annual basis and prepare significant development reports and a Final Project Report. In addition, the Project will comply with any other reporting requirements specified in the potential grant agreement between North Kern and Reclamation. ***Expected Deliverables: Submission of semi-annual status reports, significant development reports, and a Final Project Report as specified in the potential grant agreement.***

Task 3: Design

The District has already completed the installation of pumps, motors, and electrical panels for five of the seven wells included as part of this Project. The exact path of the pipeline will be decided after performing the required land survey. It is anticipated that the pipeline will be designed to minimize the amount of land disturbed Regarding the drilling of a well, appropriate subsurface studies will be conducted to identify and drill the deep well based on past well design reports. At this point, the exact location of the proposed well hasn't been decided, but it is anticipated that the proposed location will be in close proximity to the existing wells that are included as part of the District's return network. Additionally, pipeline connections will be sized and designed under this task. ***Expected Deliverables: Design documents will be prepared and approved at the 100-percent design level.***

Task 4: Environmental Documentation

An environmental document that meets the requirements of CEQA and NEPA will be prepared for the proposed improvements. Proposed in this application is to add one well and to connect seven wells to the FKC, which will require an evaluation and concurrence with Reclamation. The FKC has federal and state historical significance and any alterations proposed to the FKC will require a separate permit and evaluation under NEPA (see Task 5). Details related to design and construction occurring in the Canal as well as details related to restoration of the Canal after construction are necessary. Proposed structures within the FKC ROW would require the same level of detail. ***Expected Deliverables: An Environmental Assessment, following Reclamation's NEPA guidelines; an appropriate level of analysis and documentation as required under CEQA; a biological assessment and report in compliance with federal and state species protection acts; and a cultural and historical resources report as required by federal and state historical resources protection laws.***

Task 5: Permits/Approval

- The pipeline connections and the well are located exclusively within maintained rights-of-way owned and operated by North Kern WSD. The District would need to file a Bureau of Reclamation SF 299 Application for Transportation and Utility Systems and Facilities on Federal Lands (encroachment permit) for work within the FKC ROW. Reclamation will

require the NEPA process to be completed prior to reviewing the encroachment permit application. There may be additional fees to Reclamation and Reclamation can grant, deny or approve the permit with stipulations. Bids for construction will be solicited through a competitive bidding process based on final plans and specifications. The language in the standard specifications relating to permitting state "The Contractor is an independent contractor and shall, at his sole cost and expense, comply with all laws, rules, ordinances and regulations of all governing bodies having jurisdiction over the work, obtain all necessary permits and licenses therefore..." This would include, but is not limited to, any required NPDES permitting and the preparation of a Stormwater Pollution Prevention Plan.

- A pre-activity survey will be ordered and conducted by a qualified biologist shortly before the start of construction.
- It is noted that the District is not subject to the County's or City's jurisdiction with regard to building and grading permits relative to water resource projects. Accordingly, no City- or County-issued permits will be required.

Expected Deliverables: Complete necessary permitting and approval activities prior to any construction activities.

Task 6: Construction

Construction involves furnishing and installing of all Project works, primarily all works pertaining to the physical drilling of the proposed well and pipeline construction connecting the existing wells to the FKC. A contract for this task will be awarded to the successful bidder. ***Expected Deliverables: (Reference Construction Management task below).***

Task 7: Construction Management

Construction Management involves everything from the advertisement for bids from qualified construction firms to filing a Notice of Completion for the Project works and preparation of "As-Builts" drawings. Construction management activities can generally be categorized as field observation and contract administration, where the latter includes items such as the Notice to Proceed, pre-construction conference, correspondence with the Contractor, submittal review, progress payments, periodic meetings with the Contractor, Contract Change Orders, etc. ***Expected Deliverables: Multiple deliverables including a (1) abstract of bids received; (2) successful bid proposal; (3) construction progress pay estimates; (4) start-up and testing verification; (5) Notice of Completion; and (6) "As-Builts" drawings.***

The proposed Project will be implemented under the direction of North Kern WSD. A consultant will provide design, construction management, administrative, reporting assistance, and coordination with local firms, as needed. Richard Diamond, North Kern's General Manager, will have responsibility for overall Project Management, while Ram Venkatesan, North Kern's Engineer (a California-licensed Civil Engineer), will provide the technical Project Management on behalf of North Kern and will work closely with the designated construction manager.

Project Schedule - Based on the above-described tasks, this schedule for this Project is shown in Figure 5. As such, construction contract documents will be provided by early 2019 for bidding purposes and completion of construction is anticipated by 2021 with all Project work being completed and a Final Project Report delivered by September 2021. For purposes of this Proposal,

assuming the Project is approved for grant funding, the contract start date is anticipated to be October 1, 2018.

The Project is not expected to deviate from Reclamation's proposed schedule of a start date of October 1, 2018 and completion within the 36-month project duration.

3.3.3 *Anticipated Schedule*

Based on the tasks listed in Section 3.3.2, this Project has a schedule to provide design documents by mid-year 2019 for construction purposes. Anticipated completion date would be during mid- to late-year of 2020. For the purposes of this proposal, the start date of the grant contract was assumed as October 1, 2018. All Project work is expected to be completed with a final report completed before September 2021.

3.4 Performance Measures

All deliveries of water pumped from the wells will be measured at output points using propeller flowmeters. These meters are equipped with totalizers, a flow accumulation measurement device, periodically checked for measurement accuracy as part of the District's routine maintenance program. When properly calibrated, the meters with totalizers provide an accurate method of measuring both the flow rate and the volume of water delivered from the well through the pipeline and into the FKC. As part of an agreement with the water partner, North Kern will typically retain 25% to 50% of the water which augments the groundwater. By measuring the volume of water input to North Kern and the volume of return to banking partners, it will determine the total amount of water supply made available to the districts and can report the measured volume that is of benefit.

The volume of water retained by North Kern and its banking partners will be reflected on the reduced annual groundwater pumping rates.

3.5 Evaluation Criteria

3.5.1 *Evaluation Criterion A: Project Benefits*

How will the project build long-term resilience to drought? How many years will the project continue to provide benefits?

The water savings benefit of the Project stems from its ability to return banked water from the North Kern Water Storage District (North Kern). North Kern operates water recharge ponds over part of the sub basin favorable for recharge. Because North Kern has a direct conveyance connection with CVP water supplies, it often recharges surface water on behalf of neighboring districts with CVP contract water supplies (as referenced in Section 3.2.3, North Kern has numerous turnouts leading from FKC to its spreading grounds) and typically retains a portion of the recharged supply (25% to 50%). The CVP contractors often have a right to surplus CVP flows in addition to their CVP Class 1 and Class 2 supplies, which in wet years need absorptive capacity outside of their own district to increase the reliability of their supply, which benefits the region. North Kern has experienced constraints on the existing in-District facilities to return the banked (previously stored) water back to the neighboring districts during a dry year when they need the

banked supply the most. As elaborated in Section 3, North Kern identified the need to add recovery and return conveyance capacity to provide dry period water to both their landowners and their neighboring districts. Improving the recovery and return capacity will reduce the constraints on returning the stored water to their neighboring districts, which enables the CVP contractors opportunities to capitalize on wet period storage of CVP supplies. The proposed Project provides an opportunity to improve the capacity for the retrieval of banked water from North Kern. The Poso Creek IRWM Group developed a Banking, Transfer, and Exchange Agreement Environmental Assessment (EA 09-121) to be able to partner with their neighbors who have substantial recharge facilities. This Project is identified to help solve a constraint to increase drought resiliency for North Kern and the Poso Creek IRWM districts.

The Project ensures neighboring districts will continue to deliver wet period water to North Kern that adds supply to the sub basin, increases reliability, and adds drought resiliency. Improvements to the recovery and return conveyance of the system improves the mechanism to return water to the CVP contractors from North Kern. CVP contractors such as SWID, SSJMUD, KTWD and DEID can deliver surplus CVP supply to North Kern and be assured a conveyance mechanism to recover and return previously banked water, increasing its resiliency to drought. The diverted floodwater would have otherwise been destined outside of the region and possibly for the ocean.

For the purposes of this application, the 'life' of the project is estimated as 30-years for pump, control mechanisms, and outlet pipe operational life. This timeframe for life cycle analysis has been used in prior grant applications.

Will the project make additional water supplies available? If so, what is the estimated quantity of additional supply the project will provide and how was this estimate calculated? What percentage of the total water supply does the additional water supply represent and how was this estimate calculated? Provide a brief qualitative description of the degree/significance of the benefits associated with the additional water supplies.

A major benefit of this Project is the return of the banked water to the neighboring districts during the critically dry years. North Kern's capability to recover banked water supplies is directly related to their neighboring district's resiliency during drought years. Table 3.2 lists the capacity of the recovery wells that to be connected to the FKC by the return conveyance pipe.

The daily flow of 30.9 cfs yields a daily average of 61 AFD, which equals to ~1,839 AF/month, which when used over a six-month period in a critically dry year, roughly translates to **11,032 AFY.** The 11,032 AFY is an additional supply available to North Kern's neighboring districts. Assuming a 'leave behind' of 33% on an average, which will be utilized by North Kern to replenish its underlying groundwater, the **additional water**, when calculated numerically, amounts to **5,516 AFY** (0.33/0.66 * 11,032 AFY).

The benefit amount to NKWSD alone represents about `**3.5 percent** of their groundwater pumping (5,516 AFY / 163,575 AFY of average groundwater pumping in a critically dry year 2014)), not to forget the additional water brought into the neighboring districts through this Project.

Flood capture projects are instrumental to increasing regional flexibility and drought resiliency.

PROPOSED WELLS TO BE CONNECTED TO FRIANT KERN CANAL							
WELL #	Year Drilled	Cas. Size	Total Depth	Perf	Blank Cas.	Pump Setting	Average Flow cfs
88-01-010	Dec-11	18"	1024	584	440	500	3.8
88-01-013	Oct-11	18"	1000	560	440	500	5.6
88-17-036	Apr-16	18"	1120	400	720	500	4.5
88-25-010	Mar-16	20" Steel, 17.4" PVC	1252	400' Steel, 380' PVC	472	500	4.5
88-25-013	May-16	20" Steel, 17.4" PVC	1212	400' Steel, 360' PVC	452	500	4.5
New							4
New							4
Total							30.9

Table 3.2 - Details of the existing wells and the new well

Environmental constraints on delivery of surface supplies from the CVP into the District and the recent exceptional drought in California have caused growers to meet shortfalls in surface supplies by pumping groundwater. As the volume of pumped water in Kern County often exceeds the volume replenishing the aquifers, a number of undesirable results (as defined by recent legislation and the Department of Water Resources) may occur. These results include reduced groundwater storage, subsidence, and increased pumping lifts due to lower groundwater tables. Flood capture infrastructure such as the proposed Project work to mitigate each of these effects by direct recharge, or by delivering surface supplies in-lieu of pumping groundwater.

By providing flexibility to deliver supply to the District, the Project helps to offset reliance on other, environmentally sensitive supply sources. Note that CVP Other Water supplies are only released as floodwater (Section 215) after all environmental and contract supplies (Class 1 or 2) have been met at the time of release. Constructing the Project gives the District a tool to offset the effects of drought and increase drought resiliency, each time floodwater is available for capture.

Will the project improve the management of water supplies? For example, will the project increase efficiency, increase operational flexibility, or facilitate water marketing? If so, how will the project increase efficiency or operational flexibility? What is the estimated quantity of water better managed as a result of the project and how was this estimate calculated? What percentage of the total water supply does the water better managed represent? How was this estimate calculated? Provide a brief qualitative description of the degree/significance of anticipated water management benefits.

Drilling two wells and including five existing wells to the recovery and return facilities is expected to increase the operational flexibility of the District to meet both in-District and neighboring district's critically dry year needs by providing more reliable return for previously banked supplies. Increasing the District's operational flexibility improves water supply management for the District's groundwater management and conjunctive use program;

specifically, the *Recovery* and *Return* elements of the program while still fulfilling in-District landowner needs. Increasing their delivery system's return capacity by 31 cfs will improve the District's ability to return banked water or add to the local water supplies by 7% (11,032 AFY/163,575 AFY of average groundwater pumping in a critically dry year (2014)).

Will the project make new information available to water managers? If so, what is that information and how will it improve water management?

The Project will add return capacity for the District and neighboring districts. Water managers affiliated with the Poso Creek IRWM Plan will benefit from greater return water supply in times of drought or shortage. Increased return capacity will allow for greater flexibility in meeting the in-district needs of landowners and at the same time the ability for the District to meet the needs of neighboring districts. The Project will help neighboring water managers complete their agreements with North Kern within the Poso Creek IRWM Group due to the increased return capacity. Data collected pertaining to extraction volume will be made available to water managers. Letter of Support has been included as part of Appendix – A.

Will the project have benefits to fish, wildlife, or the environment? If so, please describe those benefits.

Any measure which captures floodwater and enables later delivery of banked surface water directly to water users improves the efficiency of water management in the entire region, reduces demand on the Delta and, supports the environmental objectives of the California Bay-Delta Conservation Plan and the San Joaquin River Restoration Program.

With regard to the Delta, relevant species include the following:

- Delta Smelt, Federally endangered
- Longfin Smelt,
- Chinook Salmon, federally threatened (spring runs)/endangered (winter runs).

Increasing regional drought resiliency will result in decreased reliance of surface water from the Delta during a critically dry year.

Well Benefits:

What is the estimated capacity of the new well(s), and how was the estimate calculated? How much water do you plan to extract through the well(s)? Will the well be used as a primary supply or supplemental supply when there is a lack of surface supplies?

Please refer to Table 3.2 for estimated flow capacity, sizes, depth, diameter, and casing of the new and existing wells. The flow capacity of these wells will be calculated accurately by the District's ongoing efforts to install flowmeters on each of the District owned wells. The wells will be used to provide the District and its neighboring districts with supplemental supply by returning banked supply when there is a lack of surface water during dry years and drought conditions. The water management Program utilizes excess and available surface water supplies for recharge during wet years, effectively recharging the aquifer underlying the District. Water supplies previously recharged by neighboring districts and the District are then pumped out of the ground during dry

years and drought conditions during a time where surface water deliveries are lower than normal allocations.

Please provide information documenting that proposed well(s) will not adversely impact the aquifer they are pumping from (overdraft or land subsidence). At a minimum, this should include aquifer description, information on existing or planned aquifer recharge facilities, a map of the well location and other nearby surface water supplies, and physical descriptions of the proposed well(s) (depth, diameter, casing description, etc.). If available, information should be provided on nearby wells (sizes, capacities, yields, etc.), aquifer test results, and if the area is currently experiencing aquifer overdraft or land subsidence.

The proposed Project is designed to bring in additional water supply to North Kern's underlying groundwater basin during the wet years. As calculated earlier, the wells will be used to return 66% of the banked water, which was recharged during wet years. This Project will not impact the aquifer adversely, instead, it is water management program designed to replenish the groundwater supplies by augmenting the basin groundwater supply and retaining a minimum of 33% of the wet year water delivered to North Kern by its neighboring districts. The District anticipates that the environmental analysis is expected to be minimal as the District will confer with Reclamation for the required level of environmental analysis under NEPA. The environmental analyses and documentation will contain information regarding well impacts on the aquifer, and their potential frequent use. According to a third CAWSC study (Proceedings of the Eighth International Symposium on Land Subsidence, 2010), Kern County may experience an extreme amount of land subsidence due to the increased demand on groundwater.

The average depth to groundwater in the District has been around 200 feet at the end of a "wet" period and around 270 feet at the end of a "dry" period. Over the last 20 years, the annual (average) spring water levels have fluctuated within a band of about 50 feet. Seasonal fluctuations can be significant and are a function of the amount of groundwater pumping in a given year and the location within the District. In general, seasonal fluctuations are greatest in the northern portion of the District and are less pronounced in the south. Please refer to Section 3.2.3 for capacity of existing recharge sites and Figure 2 for the location of the recharge sites. Figure 3 provides the locations of the proposed well and the existing wells that are proposed to be a part of this Project. Table 3.2 provides the depth, diameter, casing, and screen intervals of all the four wells. Table 3.3 provides the sizes, capacities and other pertinent details of the wells that are in close proximity to the location of the proposed well. Figure 6 titled Subsidence Monitoring Points provides adequate details of subsidence at various points across the District. The detailed report is provided as Appendix - C.

WELL #	Year Drilled	Cas. Size	Total Depth	Perf	Blank Cas.	Pump Setting	Average Flow cfs
88-09-006	Aug-11	18"	1000'	460'	530	500	3.8
88-09-009	Jul-05	18"	1003'	513'	490'	620	4.9
88-17-022	Apr-05	18"	935'	452'	483'	520	4.5
88-17-023	Jun-05	18"	990'	500'	490'	520	4.9

Table 3.3 - Details of nearby wells

*Describe the **groundwater monitoring plan** that will be undertaken and the associated monitoring triggers for mitigation actions. Describe how mitigation actions will respond to or help avoid significant adverse impacts to Third Parties that occur from groundwater pumping.*

Long-term water-level data in selected wells representing the unconfined to semi-confined aquifers are used to evaluate groundwater movement, storage conditions, and pumping costs. Historically, water levels in supply wells have been measured twice a year, in both the "spring" and "fall", with the timing of these measurements intended to coincide with the annual water level high and low, respectively. These data have been made available to the KCWA and the DWR for the District-owned wells.

However, due to the recent contracts awarded to North Kern by the State and Federal agencies, measurement of water levels will be monitored daily due to the ongoing implementation of well telemetry and SCADA systems on each District well. These data will enable the District to monitor triggers instantaneously. Additionally, the District is actively working on determining the 'safe yield' number for the Kern County Groundwater Sub basin ((DWR basin number 5-22-14), and will use the District's state of the art monitoring system to mitigate adverse impacts instantaneously.

3.5.2 *Evaluation Criterion B: Drought Planning and Preparedness*

NKWSD resides in the Tulare Basin of the Central Valley. As such, NKWSD and the member agencies of the Poso Creek IRWM Group are within the purview of the Central Valley Project and State Water Project 2016 Drought Contingency Plan (DCP) (Appendix – B). The DCP was produced with input from multiple stakeholders including Reclamation, the California Department of Fish and Wildlife, the U.S. Fish and Wildlife Service, the California Department of Water Resources, the State Water Resource Control Board, and many others. Taken together these agencies reflect the environmental, agricultural, and municipal stakeholders affected by local and statewide water management. The DCP accounts for climate change impacts since the operational forecasts account for different anticipated future precipitation and runoff.

The Project provides NKWSD's neighboring districts recovery and return capacity for delivery of banked supply in a dry year. It improves drought resiliency to meet existing irrigation demand by adding to the recovery and return capacity to be used in dry years for returning surplus CVP water recharged and banked during wet years. This sort of opportunistic capture is part of the Primary Goals of the Drought Management component of the Agricultural Plan. The project addresses the critical operational consideration of "...improving water supply through ... facilitating water transfers for municipal and industrial, refuge, and agriculture to ensure the most critical supply needs are met throughout the service areas of the CVP and ensuring flow standards are as flexible as possible in order to capture runoff from multiple storm events under the otherwise dry conditions".

NKWSD is also a long-standing stakeholder and member of the Poso Creek Integrated Regional Water Management Group (Group). The Group published an Integrated Regional Water Management Plan (Plan) updated in 2014 that discusses regional vulnerability to drought and its impacts, though no drought specific section was adopted in the 2014 Plan Update, a Drought Contingency Plan is intended to be included in the 2019 Plan Update. Instead, the 2014 Plan

recognizes that drought year preparedness begins in wet years by meeting the regional goals and measurable objectives set forth in the Plan. The drought relevant goals in the Plan include: 1) maintain and enhance water supply reliability, 2) improve operational efficiency and flexibility, and 7) improve flood management. Nearly all the measurable objectives outlined in the Plan work to mitigate the effects of drought. Figure 5 of the Poso Creek Plan describes the measurable objectives of the Group and is included below for convenience.

A	Enhance reliability of surface water supplies delivered to region.	H	Enhance region-wide flood control measures.
B	Identify any significant threats to groundwater resources from overdrafting.	I	Promote environmental conservation and support wildlife habitat enhancement.
C	Improve regional water conveyance, direct recharge, and in-lieu service areas.	J	Identify drinking water quality issues of communities, water-related needs of DAC's, and consider improvements.
D	Increase absorptive capacity within the region.	K	Implement regional opportunities, projects, and programs.
E	Promote regional conjunctive water-use.	L	Implement region-wide water management actions.
F	Support groundwater monitoring activities.	M	Maintain compliance with State and Federal planning requirements.
G	Maintain and enhance quality of water supply.	N	Maintain coordination between Poso Creek RWMG Participants and Interested Parties.

Figure 5. Poso Creek Measurable Objectives

3.5.3 *Evaluation Criterion C: Severity of Actual or Potential Drought Impacts to be addressed by the Project.*

The National Drought Mitigation Center recognized the Project area as undergoing some intensity of drought for nearly the entirety of the previous decade. The near constant state of drought has recently been punctuated by an exceptional drought (category D4) or extreme drought (category D3) over the previous two years. In times of drought, irrigation and municipal agencies often meet shortfalls in surface supplies by pumping groundwater. The sustained need to pump has contributed to many drought indicators within the Kern Sub basin, including:

- Nearly two inches of subsidence in the nearby City of Delano between 2008 and 2010 (ca.water.usgs.gov; land subsidence).
- A 160-foot decrease in groundwater elevation within neighboring Cawelo between 1970 and 2015 (ca.water.usgs.gov; land subsidence section; Well 27S26E21F001M).
- About 1.5 billion dollars in lost labor income, profits, taxes, and output (Economic

Analysis of the 2015 Drought for California Agriculture, UC Davis, 2015)

Without further improvements in water management infrastructure, these trends are likely to continue. Overall, the District noted its vulnerability to drought and climate change as 'high', since each year the groundwater elevation lowers, the existing groundwater supply decreases, along with its resiliency. The Project helps to mitigate the impact of drought by storing wet period water for delivery in dry years, so that any groundwater level decrease is offset.

3.5.4 *Evaluation Criterion D: Project Implementation*

NKWSD is the sole constructor and financier of the Project. NKWSD will engage engineering consultants to assist in design and construction management efforts throughout the project.

i) Describe the implementation plan of the proposed project. Please include an estimated project schedule that shows the stages and duration of the proposed work, including major tasks, milestones, and dates.

The overall project and task schedule is presented in Figure 5, and gives a task-wise schedule. The Project has a schedule to provide construction contract documents by mid-2019 for bidding purposes. Anticipated completion date would be during late-year of 2019. For the purposes of this proposal, the start date of the grant contract was assumed as October 1, 2018. All Project work is expected to be completed with a final report completed by September 2021.

ii) Describe any permits that will be required, along with the process for obtaining such permits.

The manifold pipeline and the wells are located exclusively within maintained rights-of-way owned and operated by NKWSD. The District would need to file a Bureau of Reclamation SF 299 encroachment permit for FKC. Form: SF299- Application for Transportation and Utility Systems and Facilities on Federal Lands, prior to connecting the return pipeline to the FKC.

In addition to and accordance with the permitting and approval concerns stated in Task 5 of the Project Work (Section 3.3.2), the following paragraphs detail specific points of the District's commitment to obtaining all relevant permits and approvals.

a) "The Contractor is an independent contractor and shall, at his sole cost and expense, comply with all laws, rules, ordinances and regulations of all governing bodies having jurisdiction over the work, obtain all necessary permits and licenses therefore..." This would include, but is not limited to, any required NPDES permitting and the preparation of a Stormwater Pollution Prevention Plan.

b) A pre-activity survey will be ordered and conducted by a qualified biologist shortly before the start of construction; this would include, but is not limited to, protocol-level surveys for the San Joaquin Kit Fox and the Western Burrowing Owl (or other local endangered species).

c) Note that the District is not subject to the County's or City's jurisdiction regarding building and grading permits relative to water resource projects. Accordingly, no city or County-issued permits will be required.

iii) Describe any engineering or design work performed specifically in support of the proposed project.

The district completed a preliminary design to estimate the cost required to drill a well and to connect seven wells via manifold pipelines to the FKC. The District anticipates the proposed well to be of similar design to existing wells. However, a detailed study and design review will be conducted.

iv) Describe any new policies or administrative actions required to implement the project.

The District does not anticipate any policies or administrative actions required as part of implementing the Project.

v) For Environmental Compliance costs, please refer to Budget narrative Sec 4.3.

3.5.5 *Evaluation Criterion E: Nexus to Reclamation*

Describe the nexus between the proposed project and a Reclamation project or activity.

The proposed Project is located in the Tulare Lake Basin, which also includes Reclamation's Friant-Kern Canal (FKC). The Project lands do not meet trust responsibilities to Tribes.

Although North Kern is not a registered CVP contractor, it has a direct conveyance connection with CVP water supplies, it often receives delivery of surface water on behalf of neighboring districts with CVP contract water supplies, through turnouts located along the FKC, and typically retains a portion of the stored supply (25% to 50%). The CVP contractors often have a right to surplus CVP flows in addition to their CVP Class 1 and Class 2 supplies, which in wet years need to utilize banking faculties for groundwater recharge and storage to increase the reliability of their supply. The proposed project will add recovery and return capacity to return banked supply to the District and neighboring districts by establishing a connection to the Friant-Kern Canal.

The proposed wells to be drilled and manifold pipeline to connect seven wells are not on Reclamation project lands, but each of the pipelines proposed are to be terminated at the FKC, which is a Reclamation facility. However, the District will consult the Reclamation to complete the required NEPA and SF-299 encroachment permit before starting any construction activity.

North Kern will effectively utilize its absorptive capacity to recharge excess water during wet years on behalf of its Poso Creek IRWM group partners, bank the supply, and deliver back to them during the dry years when the demand for water is at its peak. This Project increases operational flexibility, improves effective utilization of their surface water sources, and promotes regional co-operation in conjunctive water use, which is a crucial nexus to mitigate drought.

4. Project Budget

4.1 Funding Plan and Letters of Commitment

How you will make your 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).

North Kern Water Storage District (North Kern or District) has identified the need to designate monetary funds from their construction capital account to be available for the Project, which is a District revenue account. The District identified the Reserve Fund for 2017 and into 2018 to be utilized to meet the cost obligations for the purchase and installation of the equipment, if needed. The District adopts an annual budget during the fall of each year and revisits the budget at mid-year to evaluate the need for any mid-year adjustments.

Describe any In-kind costs incurred before the anticipated project start date to include as project costs.

North Kern authorized consultant costs for preliminary design to allow Project definition in preparation for this application. Further authorizations will be made for consultant costs that will continue to be incurred as design progresses. North Kern does not anticipate including any in-kind costs incurred as Project costs. The design is being completed under a contract cost for consulting services. Preliminary design work has supported the preparation of construction cost estimates.

Identity and amount of funding to be provided by funding partners. No other funding partners need to be identified.

Funding requested or received from other Federal partners. No other Federal funding has been requested or received for the proposed work.

Pending funding requests that have not yet been approved. The District does not have any pending funding requests that have not yet been approved for the Project components.

Summary of Non-Federal and Federal Funding Sources

Funding Sources	Funding
Non-Federal Entities	
North Kern Water Storage District Monetary	$ 797,121
Non-Federal Subtotal	**$ 797,121**
Other Federal Entities	
Other Federal	**$**
Requested Reclamation	**$ 750,000**
Total Project Funding	**$ 1,547,121**

4.2 Budget Proposal

The total Project budget for the *Return Capacity Improvements for Regional Drought Resiliency* (Project) is estimated at $1,547,121 with $750,000 in requested grant funds (Federal Cost Share) and $797,121 in Non-Federal Cost Share funds. The approach has been reflected in the budget estimates. The total requested grant funds amount to about 48 percent of total project costs, with the remainder (52 percent) funded by the Applicant. Refer to Table 4-1, which provides a summary of the estimated budget, by task, including Reclamation and Applicant contributions.

The Project budget was prepared based on the level of effort required to implement the project as discussed in Section 3.3.2 – Tasks and Project Work. The Work Plan identifies and describes eight tasks used to define the overall Project Scope, Schedule, and Budgets:

Task 1: Grant Administration
Task 2: Project Reporting
Task 3: Project Design
Task 4: Environmental Documentation and Regulatory Compliance
Task 5: Permits & Approvals
Task 6: Construction
Task 7: Construction Administration

Budget Table Format:

Several tables have been prepared in support of these budget estimates, which immediately follow this section in the order shown below.

a. Table 4-1a provides a one-page, task-by-task summary of the estimated budget, including Reclamation and Applicant contributions shown in Table 4-1b.
b. Tables 4-2 through 4-7 provide a summary of project costs by task and follow the "sample budget proposal format" from the FOA.
c. Table 4-8 provides a summary of the aggregated costs for implementation of the Project.
d. Tables 4-6a and 4-6b are detailed estimate of construction components, which support the estimate presented in Task 6-Construction.
e. Tables 4-9a and 4-9b provide hourly rates of District staff and Consultant respectively.

Table 4-1a Budget Summary by Task[1]

Task Number - Name	Total Cost
Task 1 - Administration	$39,910
Task 2 - Reporting	$38,028
Task 3 - Design	$51,220
Task 4 - Environmental Compliance[2]	$26,210
Task 5 - Permits and Approvals	$18,306
Task 6 - Construction	$1,310,500
Task 7 - Construction Administration	$62,947
TOTALS	**$1,547,121**

Table 4-1b Program Funding Sources[1]

Funding Sources	Percent of Total Project Costs	Total Cost by Source
Recipient Funding	52%	$ 797,121
Reclamation Funding	48%	$ 750,000
TOTAL PROGRAM COSTS	**100%**	**$1,547,121**

Cost Estimating Notes:

(1) This table is supported by detailed tables which are included immediately following the Budget Narrative.

(2) Task 4: Environmental Compliance - The cost for this task is assumed to be 2% of the construction cost. This will be modified once the final estimate is provided by Reclamation

(3) Salaries and Wages with Fringe Benefits for District office and field staff are shown in Table 4-9.

(4) Reference the Work Plan in Section 3 for task descriptions.

(5) Refer to Table 4-8 for a Budget Summary of all Projects costs.

(6) The amount of personnel hours was estimated from District and Consultant engineer experience based on the previously completed well drilling and reclamation projects.

4.3 Budget Narrative

In addition to the following discussion, it is noted that the above-listed tables include cost-estimating notes.

Salaries and Wages – Ram Venkatesan, District Engineer for North Kern WSD, and a licensed Civil Engineer in the state of California is the representative for the Applicant and will

provide overall Project Management, technical design, and construction of the project components. The District will have an Administrative Assistant responsible for providing project-related administrative support and providing grant reporting assistance. Additionally, the District will have accounting staff responsible for tracking costs and maintaining financial records to administer Project finances, including making all payments for contracted services and collecting monies from funding partners as required for meeting Project cash-flow requirements.

Concerning District staff, the work under the Project will be completed as part of the Districts' daily operations. In this regard, the District will be asking for reimbursement for any Salaries and Wages cost as part of this Project. The District is proposing to track these costs separately from daily operations for employees who will be providing services necessary for implementation of the grant-funded Project. Accordingly, expenses under "Salaries and Wages" have been included. A Groundwater Specialist and a Utility Worker will be working on this Project on behalf of the District apart from the district Engineer and the Administrative Accountant. The number of hours for each District representative was calculated based on the recently completed Calloway Canal Lining project (NK-608 - Calloway Canal Lining project) and past experience of the District and the Consulting Engineer. The hourly rate of the District staff can be found on Table 4-6a.

Fringe Benefits – The District staff's hourly rate including the Fringe Benefits, and split up can be found in Table 4-6b below. The detailed split -up of Fringe benefits has not been included here due to page restrictions. This can be provided upon request.

Travel - The District will not be charging any travel expenses to the Project, nor will they be asking for reimbursement of any incidental travel costs. However, travel costs have been included in the "Contractual" category in Tables 4-2 through 4-7, under the subcategory "Travel/Mileage". These costs represent travel expenses for local travel by the engineering consultant and sub consultants. Travel expenses have been included as part of Task 6–Construction and Task 3–Design. Travel expenses for the above-mentioned tasks were determined by the number of miles driven for a roundtrip at the mileage rate of compensation determined by the 2017 Internal Revenue Service (currently $0.535).

Below is a summary of how the travel expenses that were estimated by task.

For Task 6–Construction, travel expenses were included for the geotechnical engineering consultant and the surveyor, under "Travel/Mileage". As part of the construction work, the geotechnical engineering consultant will be required to travel to the project site to conduct hydrogeological tests and earthwork testing during construction. Similarly, the surveyor will be required to travel to the project site to survey the project prior to construction commencing. The mileage for each sub consultant was calculated as follows:

Surveyor (in support of Design) =25 miles/roundtrip x 2 roundtrips =50 miles

Surveyor (in support of Construction) =25 miles/roundtrip x 2 roundtrips =50 miles

Equipment - The proposed Project will be advertised for bid and the District will be soliciting sealed bids for construction of the Project work. In this regard, the District will contract with a local contractor who will provide costs to "furnish and install" the necessary project components. Equipment expenses have not been included inasmuch as the District will not be purchasing or leasing any equipment to construct the project works, but rather the successful

contractor will be providing such equipment as part of the work. Refer to Table 4-6 Construction Estimate. Accordingly, no "Equipment" expenses have been included.

Materials and Supplies - Acquisition of materials and supplies for office use is not anticipated; rather, the District will provide any incidental supplies. Accordingly, no "Materials and Supplies" expenses have been included.

General Contractual/Construction - With regards to contractual costs, the District will use an existing professional services contract with GEI Consultants, one of the District's engineering consultants, to assist the District with implementing the Project including providing administrative and reporting assistance, design, bid-phase support, and construction management assistance as needed. In this regard, the District operates with minimal professional staff and have maintained a long-standing relationship with the consultant, who is familiar with District facilities and operations. Additionally, sub consultants will be retained to supplement the engineering consultant's technical expertise. It is noted that work described in the work plan other than construction will be completed primarily by the engineering consultants, with assistance from the District. In this regard, costs for the engineering consultant and sub consultants to complete the work have been estimated under the category "Contractual" for all tasks. Refer to Tables 4-2 through 4-7 under the category "Contractual" for a summary of the contractual costs. A copy of the fee schedules for the engineering consultant and sub consultants are included in Tables 4-9a and 4-9b. The fee schedules list the billing rates by job classification. The contractual costs were determined by multiplying the total number of hours by the applicable labor rate identified in the fee schedules. The budgets under the "Contractual" category for each task are estimates at this time. However, they have been prepared based on the level of effort to complete past projects by the consultants and sub consultants, whom over the years, have provided similar services to the District for projects that have been similar in scope and complexity.

Under contractual costs, costs for other consultants are also presented including the District's legal counsel. The estimate presented is based on recent experience and recent work done by the consultant for implementation of various projects funded by Reclamation and similar well and pipeline design projects. The total was determined by multiplying the number of hours by job classification by the applicable hourly rate.

Task – 7 Construction administration (Table 4-7) includes District staff and the Engineering Consultant hours towards site inspection, periodic walk-through and As-built preparation and review for this Project. An estimate of 5% of the construction cost has been allotted for this task based on the consulting engineer's experience from similar well design and pipeline projects built in the area.

Other contractual costs, including costs for local travel, equipment, and supplies incurred by the consultant or sub consultants as part of the contractual work are discussed in the applicable sections above.

Well Drilling and Equipping -

The proposed Project will be advertised for bid and the District will be soliciting sealed bids for construction of the project work. The District will contract with a local contractor who will provide costs to "furnish and install" the necessary project components. The estimated costs for the construction work, presented in Tables 4-6 (and Appendix – D through F) is based on cost incurred by the District on recent bids received to drill and equip wells in the District. Appendix – D is a bid detail from S.A. Camp Pump & Drilling Company from September 2017. Appendix – E includes a sample bid detail from Hydro Resources – West, Inc. for installing the shafts, bowls and pump head, among other things. Finally, Appendix – F is an example consisting of the costs to electrically equip the well.

Well Telemetry Contractual/Construction – Because the Water Delivery Improvements described in this application are new to both the District and the area, the costs presented here are primarily from the District's energy consultant Aviva Energy, and REDtrac, an agricultural remote-asset management company that specializes in the work. Table 4-6a presents the components of the Water Delivery Improvements, the quoted unit price, and from where the quote was provided. For components that are readily available for purchase, an online quote was used in conjunction with that of the energy consultant. The online quotes, as noted in Table 4-6a, are not attached along with this application due to page restrictions but are available upon request.

To avoid any possible markup from contractors, the District will attempt to purchase and install the equipment themselves. However, where greater technical expertise is required, the District may enlist the help of a contractor or their energy consultant to assist with the construction of the project.

Manifold Piping – The District performed preliminary estimates to calculate the length and size of the pipeline required to connect each well to the recovery and return network. The unit costs of the connection components were obtained from similar purchases by the District in the past. These preliminary costs may change once the District along with its Engineering design consultant completes the final design. The District will contract with a local contractor who will provide costs to "furnish and install" the necessary components under this task.

Environmental and Regulatory Compliance Costs – In the budget table it shows various permitting and environmental fees that are estimated and identified as to be part of the District's expenses. Once the Project moves into construction, only the invoiced expenses paid by the District will be part of the incurred expense, invoiced reimbursement requests. The costs are now shown in one table to identify the overall cost of this Project. How each individual fee gets paid is up to the District and how much they include in the contract documents for construction.

According to the Funding Opportunity Announcement (FOA) guidelines, "...a minimum amount budgeted for environmental compliance should be equal to 1-2 percent of the total project costs." In this regard, the District intends to work with Reclamation to determine the potential environmental effects the proposed Project may have in relation to NEPA, NHPA, ESA, and the Clean Water Act to ensure compliance with all applicable environmental laws. All major work is located on District-owned and maintained rights of way, with the exception of pipeline connection

FKC. Accordingly, it is anticipated that it will not be difficult to obtain permits or approvals necessary for the work that is the subject of this Proposal.

Reporting - Any work related to "Grant Reporting" will be completed by the Engineering Consultant and the work is covered under the "Contractual" work under Task 2- Grant Reporting.

Other Costs – Costs under this category were included for project tasks. A description of the costs by task follows.

Task – 5 Permitting, "Environmental Compliance and Other Costs" were estimated and include costs associated with filing three permits prior to construction commencing of the pipeline. The permits include an NPDES SWPPP permit, a PM-10 Dust Control permit, and an SF-299 Application for Transportation and Utility Systems and Facilities on Federal Lands (encroachment permit) for work within FKC ROW. The costs provided are estimates based on recent experience by the District in filing similar permits for the recent CALFED funded Calloway Canal Lining project. The permits costs were estimated by calculating the area of disturbance (Pipe length multiplied by width of disturbance) and identifying the associated cost per acre disturbed.

Please note: The costs under Task – 5 are only for constructing the pipeline. The permits cost for the well drilling has already been included under Task – 6 construction, as evidenced in the attached sample bid documents.

A fee of $4,720 has been estimated for this Project as part of the pre-construction biological survey. This cost has been estimated by scaling down the cost incurred for this task for the recently completed Calloway Canal lining of 12,554 feet (NK-608). The cost incurred for the previously lined portion equaled to $ 8,050, which yields a per linear foot cost of $0.64. This per unit cost when multiplied by 7,375 feet amounts to $4,720.

Indirect Costs - No indirect costs are included in the budget. Accordingly, this category does not apply.

Table 4-8, Overall Budget Summary

BUDGET ITEM DESCRIPTION	COMPUTATION		QUANTITY TYPE	TOTAL COST
	$/Unit	Quantity		
SALARIES AND WAGES (INCLUDING FRINGE BENEFITS)				
District Engineer	92.26	299	Hours	**$27,586**
Administrative Staff	45.09	217	Hours	**$9,785**
CONTRACTUAL				
Engineering Consultant				
Senior Consultant - Grade 8	275.00	108	Hours	**$29,700**
Senior Professional - Grade 7	245.00	150	Hours	**$36,750**
Senior Professional - Grade 6	206.00	100	Hours	**$20,600**
Senior Professional - Grade 5	181.00	123	Hours	**$22,263**
Project Professional - Grade 4	154.00	293	Hours	**$45,122**
Project Professional - Grade 3	137.00	120	Hours	**$16,440**
Staff Professional - Grade 2	125.00	90	Hours	**$11,250**
Staff Professional - Grade 1	113.00	82	Hours	**$9,266**
Senior CADD Drafter	137.00	36	Hours	**$4,932**
Technician	102.00	104	Hours	**$10,608**
Legal Counsel				
Junior Associate Attorney	195.00	2	Hours	**$390**
Surveying				
2-Man Survey Crew	266.00	56	Hours	**$14,896**
Senior Licensed Land Surveyor	252.00	24	Hours	**$6,048**
Office Engineer	158.00	2	Hours	**$316**
Canal Lining (Table 10-9)				
Well Drilling	*See Appendix-D*			**$492,930**
Well Equipping	*See Appendix-E*			**$223,320**
Well Motors and Electrical Panelling	*See Appendix-F*			**$163,227**
Well Telemetry	*See Table 4-6a*			**$24,946**
Manifold Piping	*See Table 4-6b*			**$344,000**
SUPPLIES/MATERIALS				
EQUIPMENT PROCUREMENT				
				$0
TRAVEL				
Survey Crew - 4 roundtrips @ 25 mi/trip	0.535	100	Miles	**$54**
ENVIRONMENTAL/REG.				
NPDES Application Filing Fee	1,379.00	17	Filing	**$1,379**
PM-10 Dust Control Application Filing Fee	384.00	17	Filing	**$384**
ENVIRONMENTAL/REG.				**$26,210**
SF-299 encroachment permit			Filing	**$0**
OTHER				
Biological Survey	0.64	7375	Each	**$4,720**
Equipment Rental				
				$0
TOTAL DIRECT COSTS				**$1,547,121**
INDIRECT COSTS - __%				**$0**
TOTAL PROJECT COSTS				**$1,547,121**

Table 4-2, Task 1 - Administration

BUDGET ITEM DESCRIPTION	COMPUTATION		QUANTITY TYPE	TOTAL COST
	$/Unit	Quantity		
SALARIES AND WAGES (INCLUDING FRINGE BENEFITS)				
District Engineer	92.26	26	Hours	**$2,398.76**
Accounting Clerk	45.09	60	Hours	**$2,705.40**
CONTRACTUAL				
Engineering Consultant				
Senior Consultant - Grade 8	275.00	0	Hours	**$0.00**
Senior Professional - Grade 7	245.00	40	Hours	**$9,800.00**
Senior Professional - Grade 6	206.00	0	Hours	**$0.00**
Senior Professional - Grade 5	181.00	20	Hours	**$3,620.00**
Project Professional - Grade 4	154.00	24	Hours	**$3,696.00**
Project Professional - Grade 3	137.00	60	Hours	**$8,220.00**
Staff Professional - Grade 2	125.00	40	Hours	**$5,000.00**
Staff Professional - Grade 1	113.00	0	Hours	**$0.00**
Senior CADD Drafter	137.00	0	Hours	**$0.00**
Technician	102.00	40	Hours	**$4,080.00**
Legal Counsel				
Junior Associate Attorney	195.00	2	Hours	**$390.00**
TRAVEL				
				$0.00
SUPPLIES/MATERIALS				
				$0.00
ENVIRONMENTAL/REG.				
				$0.00
OTHER				
				$0.00
TOTAL DIRECT COSTS				**$39,910.16**
INDIRECT COSTS - __%				**$0.00**
TOTAL PROJECT COSTS				**$39,910.16**

Notes:

(1) Estimated to be 3% of overall project costs, based on recently completed reclamation projects

Table 4-3, Task 2 - Reporting [1]

BUDGET ITEM DESCRIPTION	COMPUTATION		QUANTITY TYPE	TOTAL COST
	$/Unit	Quantity		
SALARIES AND WAGES (INCLUDING FRINGE BENEFITS)				
District Engineer	92.26	0	Hours	**$0.00**
Administrative Staff	45.09	24	Hours	**$1,082.16**
CONTRACTUAL				
Engineering Consultant				
Senior Consultant - Grade 8	275.00	0	Hours	**$0.00**
Senior Professional - Grade 7	245.00	60	Hours	**$14,700.00**
Senior Professional - Grade 6	206.00	0	Hours	**$0.00**
Senior Professional - Grade 5	181.00	0	Hours	**$0.00**
Project Professional - Grade 4	154.00	24	Hours	**$3,696.00**
Project Professional - Grade 3	137.00	60	Hours	**$8,220.00**
Staff Professional - Grade 2	125.00	50	Hours	**$6,250.00**
Staff Professional - Grade 1	113.00	0	Hours	**$0.00**
Senior CADD Drafter	137.00	0	Hours	**$0.00**
Technician	102.00	40	Hours	**$4,080.00**
TRAVEL				
				$0.00
SUPPLIES/MATERIALS				
				$0.00
ENVIRONMENTAL/REG.				
				$0.00
OTHER				
				$0.00
TOTAL DIRECT COSTS				**$38,028.16**
INDIRECT COSTS - __%				**$0.00**
TOTAL PROJECT COSTS				**$38,028.16**

[1] Based on Consultant experience from previously completed reclamation projects

Table 4-4, Task 3 - Design [1]

BUDGET ITEM DESCRIPTION	COMPUTATION		QUANTITY TYPE	TOTAL COST
	$/Unit	Quantity		
SALARIES AND WAGES (INCLUDING FRINGE BENEFITS)				
District Engineer	92.26	60	Hours	**$5,535.60**
Administrative Staff	45.09	0	Hours	**$0.00**
CONTRACTUAL				
Engineering Consultant				
Senior Consultant - Grade 8	275.00	48	Hours	**$13,200.00**
Senior Professional - Grade 7	245.00	50	Hours	**$12,250.00**
Senior Professional - Grade 6	206.00	0	Hours	**$0.00**
Senior Professional - Grade 5	181.00	48	Hours	**$8,688.00**
Project Professional - Grade 4	154.00	0	Hours	**$0.00**
Project Professional - Grade 3	137.00	0	Hours	**$0.00**
Staff Professional - Grade 2	125.00	0	Hours	**$0.00**
Staff Professional - Grade 1	113.00	0	Hours	**$0.00**
Senior CADD Drafter	137.00	36	Hours	**$4,932.00**
Technician	102.00	0	Hours	**$0.00**
Surveying				
2-Man Survey Crew	266.00	16	Hours	**$4,256.00**
Senior Licensed Land Surveyor	252.00	8	Hours	**$2,016.00**
Office Engineer	158.00	2	Hours	**$316.00**
TRAVEL				
Survey Crew - 2 roundtrips @ 25 mi/trip	0.535	50	Miles	**$27**
SUPPLIES/MATERIALS				
				$0.00
ENVIRONMENTAL/REG.				
				$0.00
TOTAL DIRECT COSTS				**$51,220.35**
INDIRECT COSTS - __%				**$0.00**
TOTAL PROJECT COSTS				**$51,220.35**

Notes:

(1) Estimate based on 5% of overall Construction Costs from previously completed well design and preliminary pipeline design estimate

Table 4-5, Task 5 - Permits and Approvals

BUDGET ITEM DESCRIPTION	COMPUTATION		QUANTITY TYPE	TOTAL COST
	$/Unit	Quantity		
SALARIES AND WAGES (INCLUDING FRINGE BENEFITS)				
District Engineer	92.26	5	Hours	**$461.30**
Administrative Staff	45.09	5	Hours	**$225.45**
CONTRACTUAL				
Engineering Consultant				
Senior Consultant - Grade 8	275.00	0	Hours	**$0.00**
Senior Professional - Grade 7	245.00	0	Hours	**$0.00**
Senior Professional - Grade 6	206.00	20	Hours	**$4,120.00**
Senior Professional - Grade 5	181.00	10	Hours	**$1,810.00**
Project Professional - Grade 4	154.00	25	Hours	**$3,850.00**
Project Professional - Grade 3	137.00	0	Hours	**$0.00**
Staff Professional - Grade 2	125.00	0	Hours	**$0.00**
Staff Professional - Grade 1	113.00	12	Hours	**$1,356.00**
Senior CADD Drafter	137.00	0	Hours	**$0.00**
Technician	102.00	0	Hours	**$0.00**
TRAVEL				
				$0.00
SUPPLIES/MATERIALS				
				$0.00
CONTRACTUAL				
				$0.00
ENVIRONMENTAL/REG. COMPLIANCE [1]				
NPDES Application Filing Fee	1379.00	17	Filing	**$1,379.00**
PM-10 Dust Control App. Filing Fee	384.00	17	Filing	**$384.00**
SF-299 encroachment permit*				**$0.00**
OTHER				
Biological Survey	0.64	7375	LF	**$4,720.00**
TOTAL DIRECT COSTS				**$18,305.75**
INDIRECT COSTS - __%				**$0.00**
TOTAL PROJECT COSTS				**$18,305.75**

Notes:

[1] Unit fee based on total acres of land disturbed, Area of Disturbance was calulated when the preliminary cost estimate was prepared.

*This fee will be determined once NEPA is complete

Table 4-6, Task 6 - Construction

BUDGET ITEM DESCRIPTION	COMPUTATION		QUANTITY TYPE	TOTAL COST
	$/Unit	Quantity		
SALARIES AND WAGES (INCLUDING FRINGE BENEFITS)				
District Engineer	92.26	160	Hours	**$14,762**
Administrative Staff	45.09	120	Hours	**$5,411**
CONTRACTUAL				
Engineering Consultant				
Senior Consultant - Grade 8	275.00	0	Hours	**$0**
Senior Professional - Grade 7	245.00	0	Hours	**$0**
Senior Professional - Grade 6	206.00	40	Hours	**$8,240**
Senior Professional - Grade 5	181.00	35	Hours	**$6,335**
Project Professional - Grade 4	154.00	60	Hours	**$9,240**
Project Professional - Grade 3	137.00	0	Hours	**$0**
Staff Professional - Grade 2	125.00	0	Hours	**$0**
Staff Professional - Grade 1	113.00	30	Hours	**$3,390**
Senior CADD Drafter	137.00	0	Hours	**$0**
Technician	102.00	0	Hours	**$0**
Surveying				
2-man Survey Crew	266.00	40	Hours	**$10,640**
Senior Licensed Land Surveyor	252.00	16	Hours	**$4,032**
Well Construction (Table 10-9)				
Well Drilling	***See Appendix-D***			**$492,930**
Well Equipping	***See Appendix-E***			**$223,320**
Well Motors and Electrical Panelling	***See Appendix-F***			**$163,227**
Well Telemetry	***See Table 4-6a***			**$24,946**
Manifold Piping	***See Table 4-6b***			**$344,000**
TRAVEL				
Survey Crew - 2 roundtrips @ 25 mi/trip	0.535	50	Miles	**$27**
ENVIRONMENTAL/REG.				
				$0
OTHER-EQUIPMENT RENTAL				
				$0
TOTAL DIRECT COSTS				**$1,310,500**
INDIRECT COSTS - __%				**$0**
TOTAL PROJECT COSTS				**$1,310,500**

Table 4-7. Task 7 - Construction Administration[1]

BUDGET ITEM DESCRIPTION	COMPUTATION		QUANTITY TYPE	TOTAL COST
	$/Unit	Quantity		
SALARIES AND WAGES (INCLUDING FRINGE BENEFITS)				
District Engineer	92.26	48	Hours	**$4,428.48**
Administrative Staff	45.09	8	Hours	**$360.72**
CONTRACTUAL				
Engineering Consultant				
Senior Consultant - Grade 8	275.00	60	Hours	**$16,500.00**
Senior Professional - Grade 7	245.00	0	Hours	**$0.00**
Senior Professional - Grade 6	206.00	40	Hours	**$8,240.00**
Senior Professional - Grade 5	181.00	10	Hours	**$1,810.00**
Project Professional - Grade 4	154.00	160	Hours	**$24,640.00**
Project Professional - Grade 3	137.00	0	Hours	**$0.00**
Staff Professional - Grade 2	125.00	0	Hours	**$0.00**
Staff Professional - Grade 1	113.00	40	Hours	**$4,520.00**
Senior CADD Drafter	137.00	0	Hours	**$0.00**
Technician	102.00	24	Hours	**$2,448.00**
TRAVEL				
				$0.00
SUPPLIES/MATERIALS				
				$0.00
CONTRACTUAL				
				$0.00
ENVIRONMENTAL/REG.				
				$0.00
OTHER				
				$0.00
TOTAL DIRECT COSTS				**$62,947.20**
INDIRECT COSTS - __%				**$0.00**
TOTAL PROJECT COSTS				**$62,947.20**

Notes:

‡j Construction Administration activities include field Observation and oversight.

‡j Estimate based on cost incurred in the previously completed well drilling and pipeline installation! costs (approx 5% of Construction cost)

‡j Salaries and Wages and Fringe Benefits for District staff will be charged to a general accounting! number as part of their daily operations.

‡j Activities include preparation of solicitation packages, selection of vendors, issuance of Purchase! Orders and coordination of delivery of equipment and material.

AVIVA ENERGY CORP - comments as energy consultant to North Kern Water district on September 11, 2016.

TELEMETRY UNITS

Device	Description	Unit Price/site	Number of units	Total	Quote From	Notes
Telemetery Unit	To transmit information from well to data display point	$3,100	2	$6,200	REDtrac	Includes- Data logger, Electric meter, CTs, Radio, DC trasnformer, Box, Conduits, Relay
Site Assessment	Site assessment	$500	2	$1,000	AVIVA Energy	To assess the site for telemetry installation
Telemetry Installation	Installation of telemetry hardware	$2,500	2	$5,000	AVIVA Energy	Possibly done by NKWSD staff
Total material and installation cost				**$12,200**		

WATER FLOW METERS

Flowmeter	Electromagnetic Meter	$4,373	2	$8,746	Seametrics	12 " diameter pipe, see Budget Appendix for Quote
Total material and installation cost		**$4,373**	**50**	**$8,746**		

MONITORING WELL WATER LEVEL SENSORS

Level sensors in monitoring wells	Water level sensors	$2,000	2	$4,000	AVIVA Energy	to measure the depth of water
Total material and installation cost		**$2,000**	**9**	**$4,000**		

GRAND TOTAL $24,946

Table 4-6b

88-1-10 Connection to FKC

COST ESTIMATE

ITEM	QUANTITY	UNIT COST	COST
24" PVC	2,200 ft	$ 40.00 $/ft	$ 88,000
Valve, Metering & Inlet at Friant	1 LS	$ 15,000	$ 15,000
Bends	2 ea	$ 1,000 $/ea	$ 2,000
Airvents	2 ea	$ 500 $/ea	$ 1,000
		TOTAL	$ 106,000

Total area disturbed: 2,200 LF*100/43650 = 5.1 ac

88-1-13 Connection to FKC

ITEM	QUANTITY	UNIT COST	COST
15" PVC	425 ft	$ 25.00 $/ft	$ 11,000
Valve, Metering & Inlet at Friant	1 LS	$ 15,000	$ 15,000
Bends	2 ea	$ 1,000 $/ea	$ 2,000
Airvents	2 ea	$ 500 $/ea	$ 1,000
		TOTAL	$ 29,000

Total area disturbed: 425 LF*100/43650 = 1.0 ac

88-17-36 Connection to FKC

ITEM	QUANTITY	UNIT COST	COST
15" PVC	1,600 ft	$ 25.00 $/ft	$ 40,000
Valve, Metering & Inlet at Friant	1 LS	$ 15,000	$ 15,000
Bends	2 ea	$ 1,000 $/ea	$ 2,000
Airvents	2 ea	$ 500 $/ea	$ 1,000
		TOTAL	$ 58,000

Total area disturbed: 1,600 LF*100/43650 = 3.7 ac

88-25-10 Connection to FKC

COST ESTIMATE

ITEM	QUANTITY	UNIT COST	COST
24" PVC	2,750 ft	$ 40.00 $/ft	$ 110,000
Bends	2 ea	$ 1,000 $/ea	$ 2,000
Airvents	3 ea	$ 500 $/ea	$ 2,000
		TOTAL	$ 114,000

Total area disturbed: 2,750 LF*100/43650 = 6.3 ac

88-25-13 Connection to FKC

COST ESTIMATE

ITEM	QUANTITY	UNIT COST	COST
27" PVC	400 ft	$ 48.00 $/ft	$ 19,000
Valve, Metering & Inlet at Friant	1 LS	$ 15,000	$ 15,000
Bends	2 ea	$ 1,000 $/ea	$ 2,000
Airvents	2 ea	$ 500 $/ea	$ 1,000
		TOTAL	$ 37,000

Total area disturbed: 400 LF*100/43650 = 0.9 ac

Total = $344,000

Table 4-9a

Calculation of Burdened Labor Hourly Rate for District Staff

Job Classification	Hourly Rate[1]	Fringe Benefits[2]	Total Burdened Hourly Rate
District Engineer	$64.13	$28.13	$92.26
Accounting Clerk	$26.00	$13.89	$39.89
Utility Worker	$22.95	$14.20	$37.15
Well Maintenance Tech.	$27.55	$17.54	$45.09

Notes:

[1] Fixed annual base salary divided by 2080 hours.

[2] Fixed total yearly benefits divided by 2080 hours.

Table 4-9b

Calculation of Burdened Labor Hourly Rate for Consultants

Job Classification	Hourly Rate
Senior Consultant - Grade 8	$275.00
Senior Professional - Grade 7	$245.00
Senior Professional - Grade 6	$206.00
Senior Professional - Grade 5	$181.00
Project Professional - Grade 4	$154.00
Project Professional - Grade 3	$137.00
Staff Professional - Grade 2	$125.00
Staff Professional - Grade 1	$113.00
Senior CADD Drafter	$137.00
Technician	$102.00

5. Environmental and Cultural Resources Compliance

The following section summarizes NKWSD's approach to avoid, minimize, and mitigate any potential environmental impacts related to connecting the five existing wells and the two wells to the FKC with a manifold pipeline. The following paragraphs address the specific questions posted in the Environmental and Cultural Resources Compliance section of the FOA.

Will the project impact the surrounding environment (e.g., soil [dust], air, water [quality and quantity], animal habitat)?

The extent of construction activities (footprint) for the Project is relatively small and located within property owned and operated by North Kern Water Storage District and the Friant-Kern Canal (An SF-299 permit will be obtained in this regard). The Project's area of potential affect is located within a canal easement or is on agriculturally disturbed soil. At this time, the District is not aware of any part of this project that will have a significant impact on soil, air, water, or animal habitat quality. Regardless, all applicable environmental compliance measures will be followed, at a minimum, to ensure no improper disturbances are made to the environment and animal life. Such environmental measures include executing the PM-10 Dust Control Plan, Storm Water Pollution Prevention Plan, and all necessary biological site surveys.

Are you aware of any species listed or proposed to be listed as a Federal threatened or endangered species, or designated critical habitat in the project area?

NKWSD is aware that threatened and endangered species exist in the Southern San Joaquin Valley. The FWS Endangered Species Database listed several threatened and endangered species within Kern County. However, based on experience, the Kern Council of Governments Habitat Conservation map, and federally-listed species mapping, no endangered species habitats have been identified within the pipeline rights-of-way.

Are there wetlands or other surface waters inside the project boundaries that potentially fall under CWA jurisdiction as "Waters of the United States?"

No.

When was the water delivery system constructed?

As discussed in NKWSD's AWMP (2015), North Kern's canal and pipeline distribution system and related works were originally completed in the 1950s, with additional features and enlargements (e.g., pumping stations, discharge pipelines, and reservoir systems) constructed with the expansion of the District's service area (i.e., increased water demand). Kern County Land and Water Company, who subsequently lengthened it to its current 30-mile length, originally constructed the Calloway Canal between 1875 by O.P. Calloway and 1877. Over time, the canal's prism (i.e., trapezoidal shape), head gates, weirs and other features have been replaced, repaired, or improved to allow for greater capacity and flow delivery to water users (Districts). As of late, modifications have been made to accommodate commercial, housing, and road development as the City of Bakersfield has slowly been expanding to the north. It is worth

noting that the Project will not result in any modifications or effects to individual irrigation system features (e.g., headgates, canals, or flumes).

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.

There will be no modifications to the existing irrigation distribution system.

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.

No. NKWSD will contract with a private cultural resources management consultant and arrange for Reclamation staff to coordinate to determine what, if any previous cultural resources surveys have been conducted in the project area. The District currently does not expect to encounter any obstacles in receiving clearance.

Are there any known archeological sites in the proposed project area?

No. Since the Project area has been disturbed previously for the construction of farm roads and fields, it is expected that there will be no obstacles to receipt of clearance with respect to archeological sites. In addition, the District is prepared to implement any necessary mitigation measures should cultural resources be identified.

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

No. Construction of the project will support the important agricultural-based economy in the Southern San Joaquin Valley, and should have only positive impacts on low income or minority persons living in the region.

Will the proposed project limit access to and ceremonial use of Indian sacred sites or result in other impacts or tribal lands?

No.

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?

No.

6. Required Permits or Approvals

As summarized in Section 3.3.2:

- The pipeline connections and the well are located exclusively within maintained rights-of-way owned and operated by North Kern WSD. The District would need to file a Bureau of Reclamation SF 299 Application for Transportation and Utility Systems and Facilities on Federal Lands (encroachment permit) for work within the FKC ROW. Reclamation will require the NEPA process to be completed prior to reviewing the encroachment permit application. There may be additional fees to Reclamation and Reclamation can grant, deny or approve the permit with stipulations. Bids for construction will be solicited through a competitive bidding process based on final plans and specifications. The language in the standard specifications relating to permitting state "The Contractor is an independent contractor and shall, at his sole cost and expense, comply with all laws, rules, ordinances and regulations of all governing bodies having jurisdiction over the work, obtain all necessary permits and licenses therefore..." This would include, but is not limited to, any required NPDES permitting and the preparation of a Stormwater Pollution Prevention Plan.
- A pre-activity survey will be ordered and conducted by a qualified biologist shortly before the start of construction.
- It is noted that the District is not subject to the County's or City's jurisdiction with regard to building and grading permits relative to water resource projects. Accordingly, no City- or County-issued permits will be required

7. Existing Drought Contingency Plan

The Drought Contingency Plan (DCP) has been included as Appendix – C.

North Kern is also a long-standing stakeholder and member of the Poso Creek Integrated Regional Water Management Group (Group). The Group published an Integrated Regional Water Management Plan (Plan) updated in 2014 that discusses regional vulnerability to drought and its impacts, though no drought specific section was adopted in the 2014 Plan Update, a Drought Contingency Plan is intended to be included in the 2019 Plan Update.

8. Official Board Resolution

BEFORE THE BOARD OF DIRECTORS

OF THE NORTH KERN WATER STORAGE DISTRICT

ON BEHALF OF ITSELF AND ROSEDALE RANCH IMPROVEMENT DISTRICT

IN THE MATTER OF: RESOLUTION NO. XXX

RESOLUTION OF INTENTION OF NORTH KERN WATER STORAGE DISTRICT

TO FILE AN APPLICATION WITH THE BUREAU OF RECLAMATION FOR A GRANT UNDER THE WATERSMART *DROUGHT REPONSE PROGRAM: DROUGHT RESILIENCY PROJECTS FOR FISCAL YEAR 2018*

WHEREAS, North Kern Water Storage District partnered with several neighboring water districts and formulated the Poso Creek Integrated Regional Water Management Plan (Plan), adopted in July 2007 and updated in 2014 by each of the districts for their collective area; and

WHEREAS, District staff, in conjunction with surrounding water districts, communities, and stakeholders, has formulated a plan of improvements; and

WHEREAS, the Plan identified regional projects that, once implemented, would improve the water management of the Region and the ability for North Kern to regulate water supplies available to the district; and

WHEREAS, the Plan promotes a regional recharge, reduction of overdraft, and operation changes in responding to reductions in water supply reliability to the region; and

WHEREAS, District staff has formulated a project improvement, referred to as ***Return Capacity Improvements for Regional Drought Resiliency***, which has the support of surrounding water districts and communities; and would be funded by a combination of North Kern Water Storage District funds, and grant funds; and

WHERAS, recovery and return capacity will be improved by drilling and equipping wells, and connecting existing wells to the Friant Kern Canal; and

WHEREAS, the United States Bureau of Reclamation is currently soliciting proposals for grant funding assistance under their *Drought Resiliency Projects for Fiscal Year 2018* (Funding Opportunity No BOR-DO-18-F008); and

WHEREAS, District staff has formulated a grant proposal to construct the ***Return Capacity Improvements for Regional Drought Resiliency Project***.

NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of the North Kern Water Storage District as follows:

a. The District's Board of Directors has reviewed and supports the submission of a grant application to Reclamation entitled *Return Capacity Improvements*

for Regional Drought Resiliency Project.

b. The District's Manager, Richard Diamond, is hereby authorized and directed to submit the grant application and is authorized to enter into an agreement with Reclamation on behalf of North Kern Water Storage District for grant funding under Reclamation's *Drought Resiliency Projects Grant.*

c. The Applicant is capable of providing the amount of funding and in-kind contributions specified in the application; and

d. The Applicant will work with Reclamation to meet established deadlines for entering into a cooperative agreement.

PASSED APPROVED AND ADOPTED on this _____ day of _____, 20 ___ by the following roll-call vote:

AYES:

NOES:

ABSENT:

ABSTAIN:

NORTH KERN WATER STORAGE DISTRICT

_____
President/Board of Directors

ATTEST:

_____
Board of Directors

9. System of Award Management (SAM) and ASAP Registration

All applicants must maintain an active SAM registration with current information at all times while they have an active federal award or an application under consideration. The District is providing this screen shot (below) of their account as sufficient verification of an open and active System of Award Management (SAM) account.

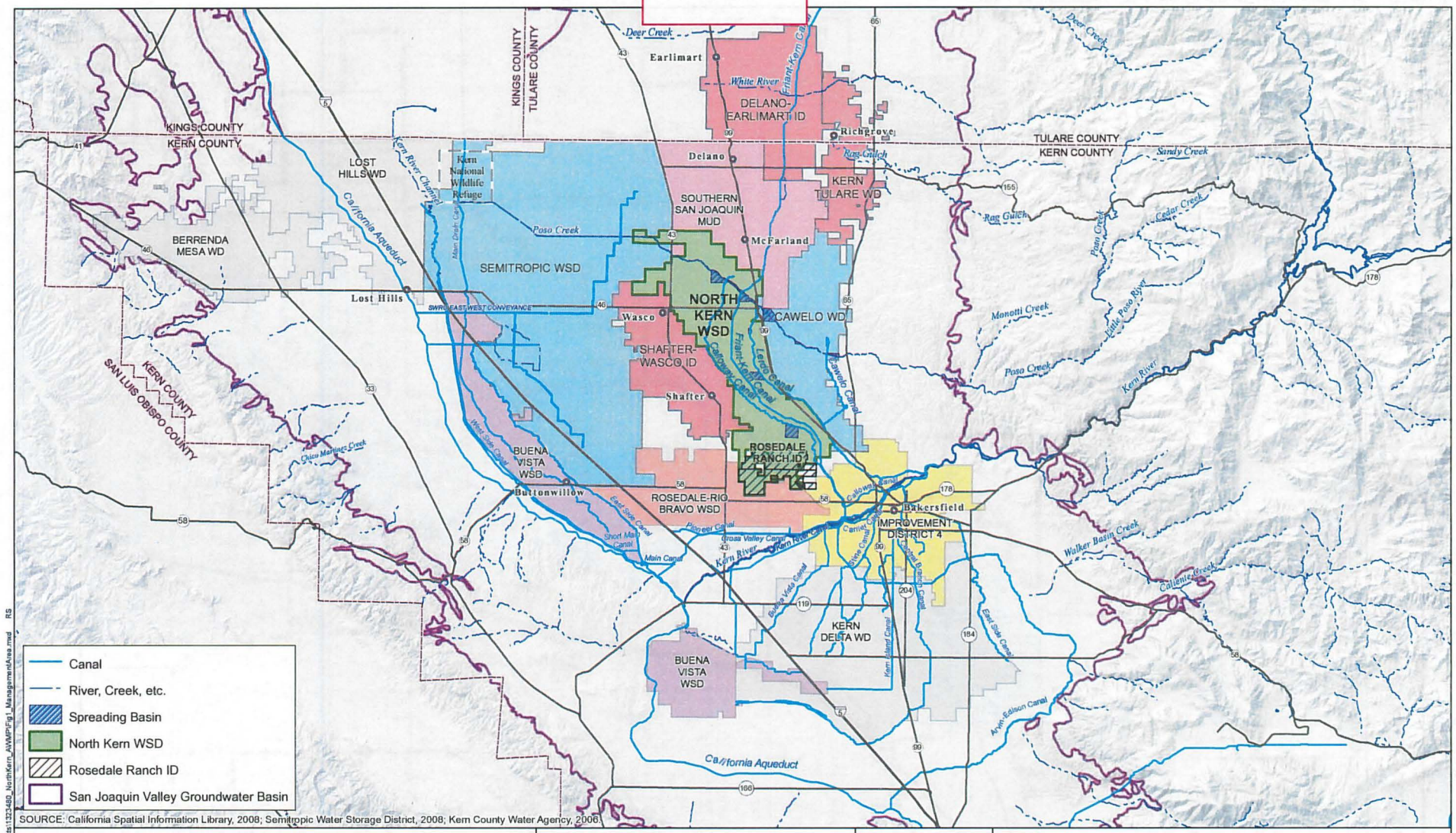
SAM Search Results
List of records matching your search for :

Record Status: Active
DUNS Number: 081783946
Functional Area: Entity Management, Performance Information

ENTITY	NORTH KERN WATER STORAGE DISTRICT		Status:Active
DUNS: 081783946	+4:	CAGE Code: 5P2X5	DoDAAC:
Expiration Date: Jan 15, 2019	Has Active Exclusion?: No	Debt Subject to Offset?: No	
Address: 33380 CAWELO AVE City: BAKERSFIELD ZIP Code: 93308-9575		State/Province: CALIFORNIA Country: UNITED STATES	

In addition, the District maintains and open and active Automated System Application for Payment (ASAP) account.

APPENDIX - A



SOURCE: California Spatial Information Library, 2008; Semitropic Water Storage District, 2008; Kern County Water Agency, 2008

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North Kern Water Storage District
Kern County, California

2013 Agricultural Water Management Plan

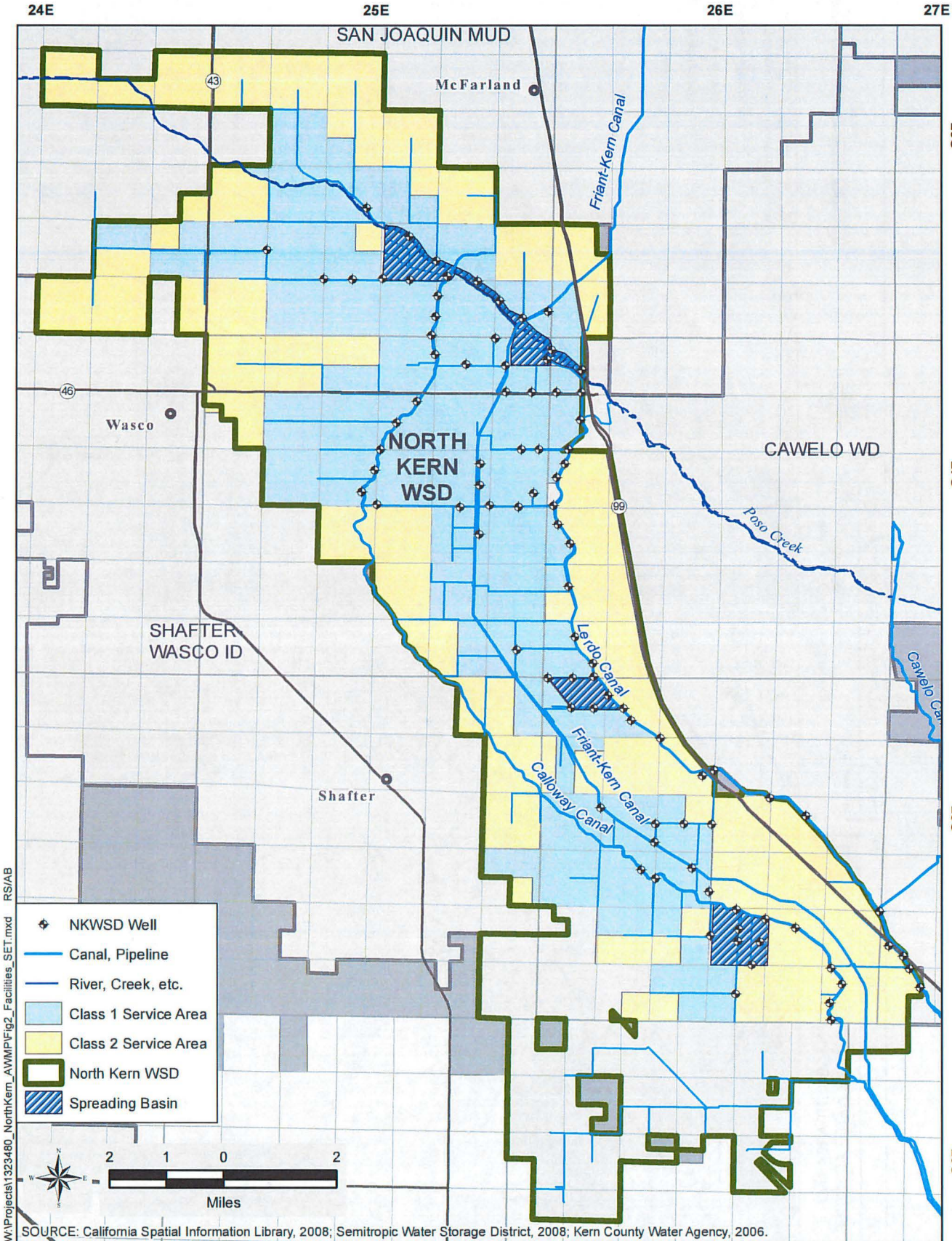
GEI Consultants

MANAGEMENT AREA AND
NEIGHBORING WATER AGENCIES

AUGUST 2013

FIGURE 1

05-Sep-2013 Z:\Projects\1323480_NorthKern_AWMP\Fig1_ManagementArea.mxd RS



W:\Projects\1323480_NorthKern_AWMP\Fig2_Facilities_SET.mxd RS/AB

07-Feb-2018

North Kern Water Storage District
Kern County, California

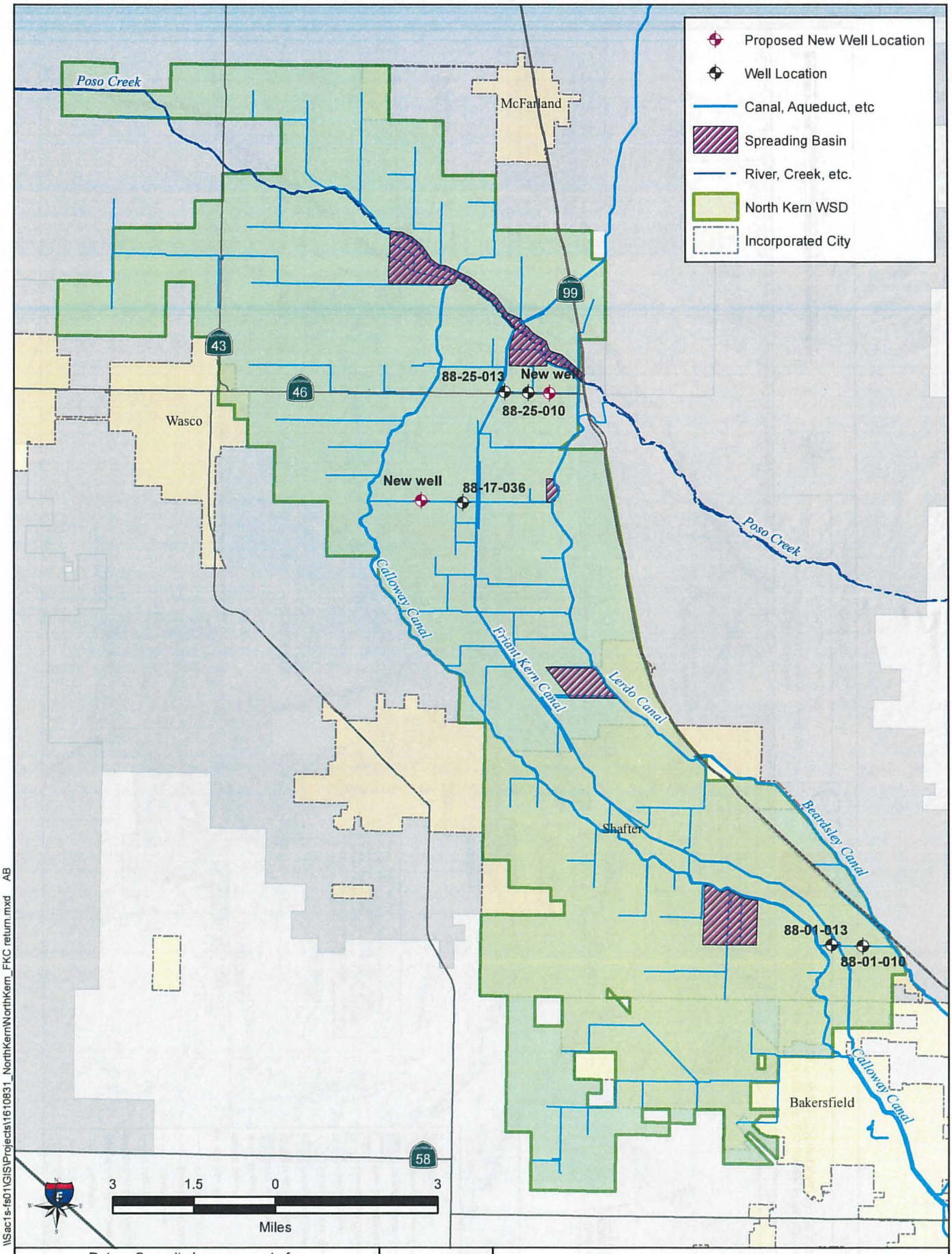
Agricultural Water Management Plan

GEI Consultants

FACILITIES AND WATER SERVICE AREAS

FEBRUARY 2018

FIGURE 2



\\Sac1s-fs01\GIS\Projects\1610831_NorthKern\NorthKern_FKC return.mxd AB

07-Feb-2018

Return Capacity Improvements for Regional Drought Resiliency
Kern County, California

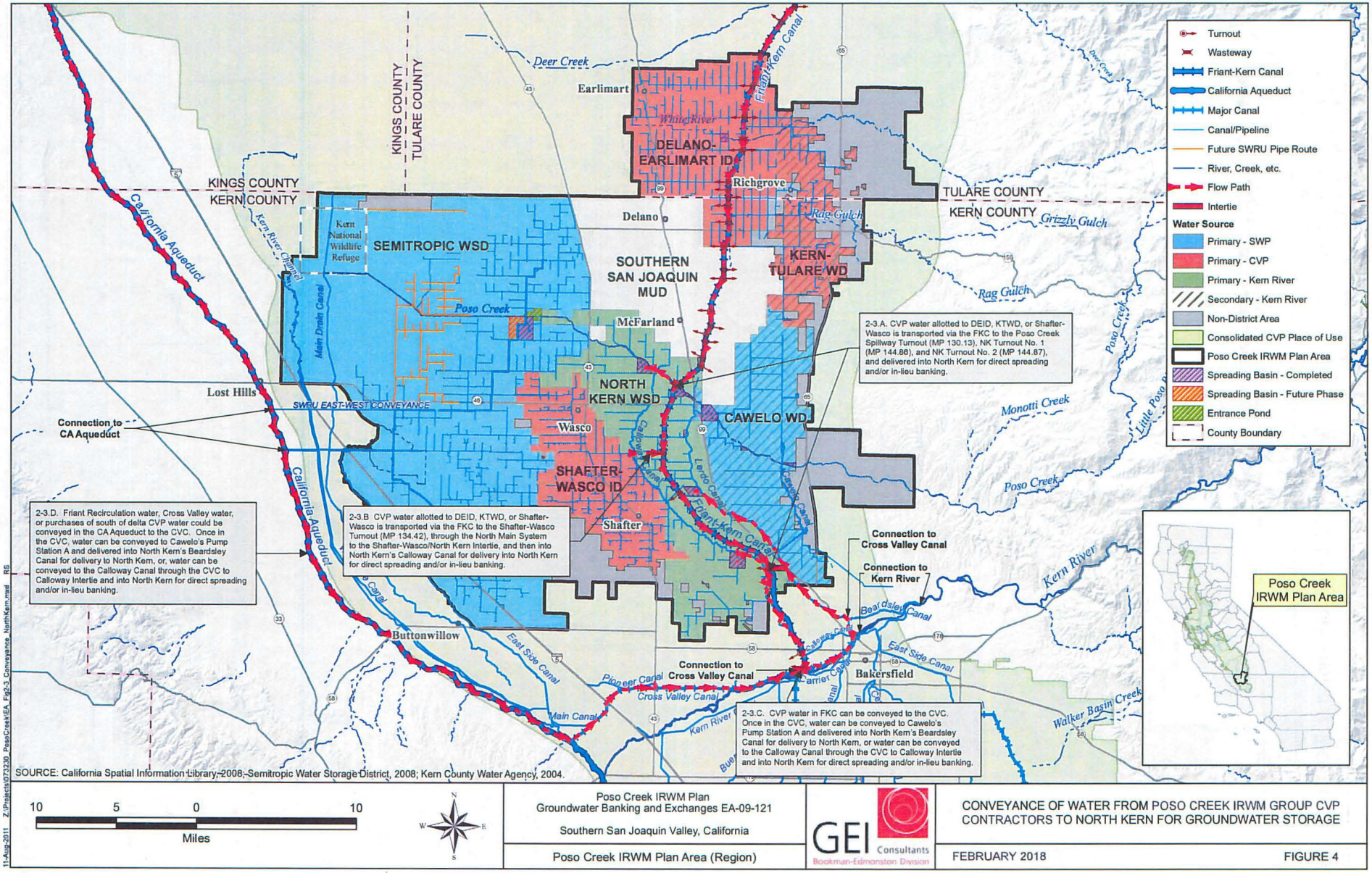
North Kern Water Storage District

GEI Consultants

Well Network Adding to FKC Return Capacity

FEBRUARY 2018

FIGURE 3



Poso Creek IRWM Plan
Groundwater Banking and Exchanges EA-09-121
Southern San Joaquin Valley, California

Poso Creek IRWM Plan Area (Region)

GEI Consultants
Bookman-Edmonston Division

CONVEYANCE OF WATER FROM POSO CREEK IRWM GROUP CVP CONTRACTORS TO NORTH KERN FOR GROUNDWATER STORAGE

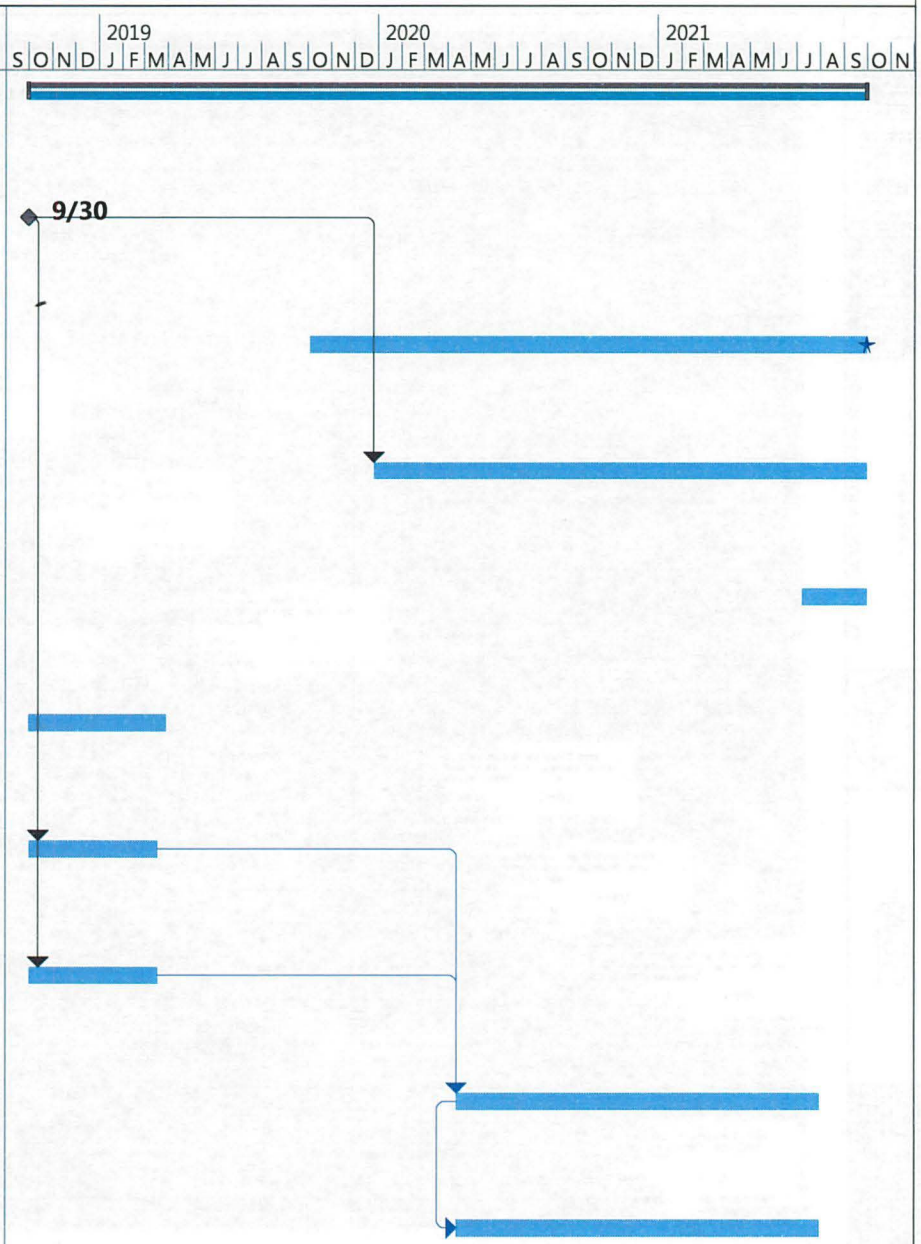
FEBRUARY 2018

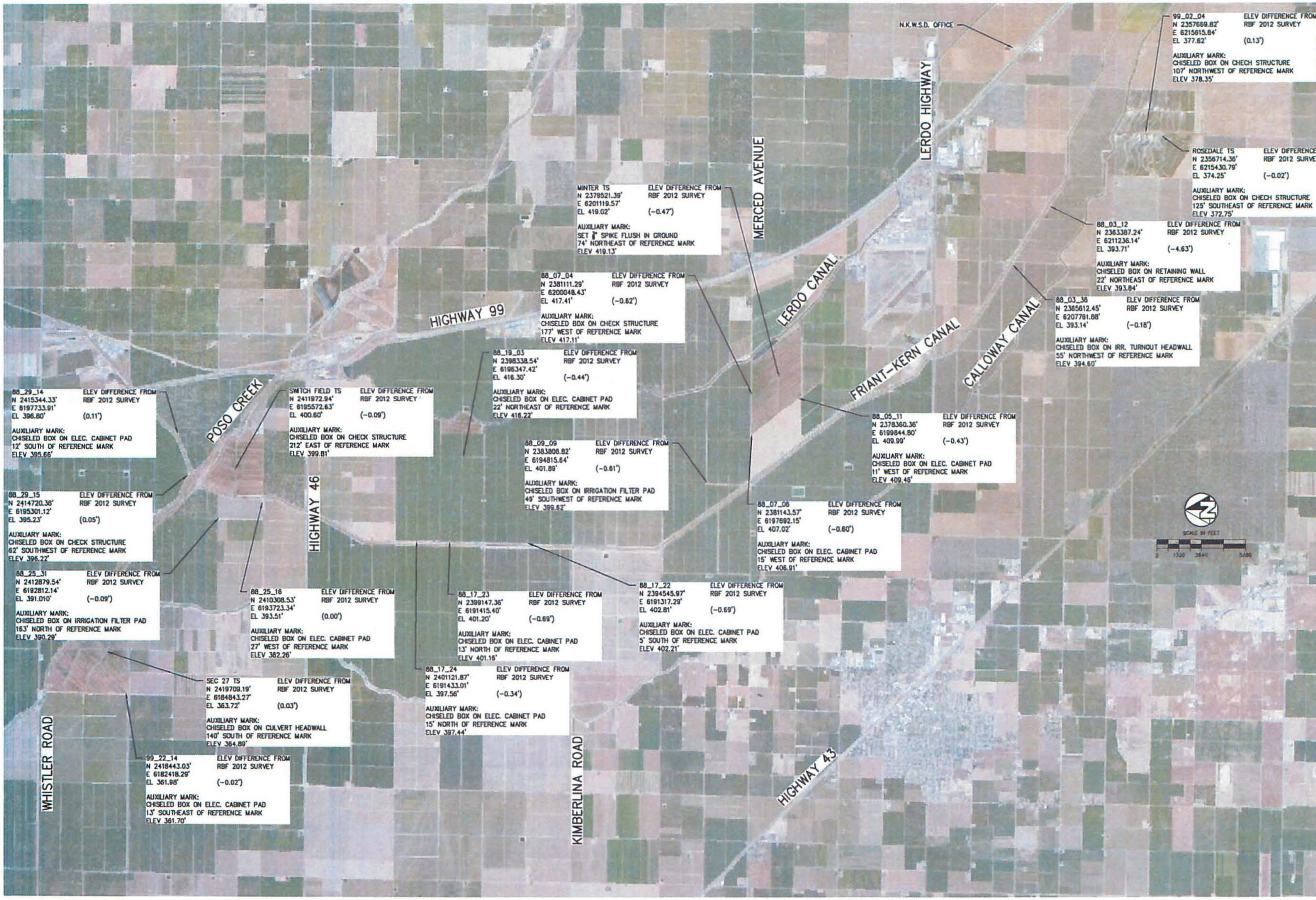
FIGURE 4

11-Aug-2011 Z:\Projects\073230_PosoCreek\EA_Fig2-3_Conveyance_NorthKern.mxd RS

Figure 5: Project Schedule

ID	Task Name	Start	Finish
1	**Return Capacity Improvements for Regional Drought Resiliency**	**Mon 10/1/18**	**Thu 9/30/21**
2	Grant Agreement Signed	Sun 9/30/18	Sun 9/30/18
3	Task 1 - Grant Administration	Fri 10/4/19	Thu 9/30/21
4	Task 2 - Project Reporting	Fri 12/27/19	Thu 9/30/21
5	Project Completion Report	Fri 7/9/21	Thu 9/30/21
6	Task 3 - Project Design	Mon 10/1/18	Fri 3/29/19
7	Task 4 - Environmental Documentation	Tue 10/2/18	Mon 3/18/19
8	Task 5 - Permits & Approvals	Tue 10/2/18	Mon 3/18/19
9	Task 6 - Project Construction	Mon 4/13/20	Fri 7/30/21
10	Task 7 - Construction Administration	Mon 4/13/20	Fri 7/30/21





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No.	REVISION	BY	DATE

Figure 6

PROFESSIONAL LAND SURVEYOR TIMOTHY M. ODOM No. 8468 STATE OF CALIFORNIA

NORTH KERN WATER STORAGE DISTRICT

KERN COUNTY

SUBSIDENCE MONITORING POINTS

EST. 1968
PROVOST & PRITCHARD
CONSULTING GROUP
An Employee Owned Company
286 WEST CROMWELL AVENUE
FRESNO, CALIFORNIA 93711-6162
559/449-2700 FAX 559/449-2715
www.ppeng.com

LAND SURVEYOR: TIMOTHY M. ODOM
LICENSE NO: PLS 8468
DRAFTED BY: TMO | CHECKED BY: PAM
DATE: JULY 25, 2017
JOB NO. 174515VI
PHASE: SM1
0 1"
ORIGINAL SCALE SHOWN IS ONE INCH. ADJUST SCALE FOR REDUCED OR ENLARGED PLANS.
SHEET
1 OF 1

7/25/2017 1:41 PM G:\North Kern WSD-1745\174515B1-Subsidence Monitoring Survey\DWG\SUR_DWG\174515V1-SUR-SUBSIDENCE MONITORING POINTS.dwg -Tim Odom

POSO CREEK IRWMP
Management Group

1101 Central Avenue, Wasco, CA 93280
661-758-5113

February 4, 2017

Mr. Richard Diamond
General Manager
North Kern Water Storage District
33380 Cawelo Avenue
Bakersfield, CA 93308

Subject: Proposed Project – Return Capacity Improvements for Regional Drought Resiliency.

Dear Mr. Diamond:

The Poso Creek IRWM group supports North Kern Water Storage District's continued efforts to improve Drought Resilience in Kern County. We are clearly interested and supportive of the *Return Capacity Improvements for Regional Drought Resiliency Project*, as this project will incrementally improve the return capacity from North Kern, which will help improve operational flexibility, efficiency, and drought preparedness within the region. This Project is a vital improvement that will be of great benefit to the entire Poso Creek IRWM region.

We hope that our expression of support is helpful in your efforts to secure grant funding assistance to implement your plans. If the funding agency would like to discuss our interest and support of your project, we would be happy to do so.

Sincerely,

Dana Munn
Chairman
Poso Creek IRWM group

APPENDIX - D

Bid Detail Schedule For Primary Well Construction

Bidder Information

Bidding Company Name: S.A. CAMP PUMP & DRILLING COMPANY

Bidding Company Address: 17876 ZERKER RD. BAKERSFIELD, CA 93308

Bidding Company Phone: (661) 399-2976

Bidding Company Email: donp@sacamp.net

Bidding Company Contact Person Information: DONALD PEDERSEN (661) 747-2060

Date of Bid: SEPTEMBER 8, 2017

Fixed Cost Detailed Bid (For Each Well)

Line Item	Quantity	Unit of Measure	Item Description	Unit Price	Extended Price
			Permits & Bonds		
1	1	Ea	County Drilling Permit and Paperwork	925.00	925.00
2	1	Ea	Other Permit Related	500.00	500.00
3	1	Ea	Bond Charges	7,000.00	7,000.00
			Drilling		
4	1	Ea	Mobilize/Demobilize Equipment and Personnel/Water Supply	7,500.00	7,500.00
5	1	Ea	Daily Log Entry & Core Sample Collection, Archiving	500.00	500.00
6	1100	Ft	Drilling Per Foot (Adjustment to bid to be made based upon actual drilling depth during construction based upon the per foot price)	40.00	44,000.00
7	1	Ea	E-log (includes rig time)	2,500.00	2,500.00
8	1	Ea	Deviation Survey (includes rig time)	950.00	950.00
9	1000	Ft	Reaming Per Foot (Adjustment to bid to be made based upon actual drilling depth during construction based upon the per foot price)	40.00	40,000.00
10	1	Ea	Other (Describe)	-0-	-0-
			Casing & Other		
11	50	Ft	Furnish & Install 36" Conductor Casing (any additional, if required and authorized to be at unit price)	300.00	15,000.00
12	400	Ft	Furnish & Install 18" Blank Casing (any additional, if required, to be at unit price)	50.00	20,000.00
13	600	Ft	Furnish & Install 18" Perforated Casing (any additional, if required, to be at unit price)	70.00	42,000.00
14	700	Ft	Furnish & Install Gravel & Sand (between gravel and seal)	15.00	10,500.00
15	300	Ft	Furnish & Install Annular Seal (any additional, if required, to be at unit price)	35.00	10,500.00
16	315	Ft	Furnish & Install Gravel Tube	10.00	3,150.00
17	1	Ea	Furnish & Install Air Vent/Sounding Tube Stickup	200.00	200.00
18	1	Ea	Furnish & Install Casing Guides and Rounded Closed Shoe for Bottom of Casing String	2,380.00	2,380.00
19	1	Ea	Well Alignment (Gyro) Survey	3,200.00	3,200.00
20	48	Hr	Swab & Airlift	320.00	15,360.00
21	600	Ft	mud additives used) Not required if only fresh water with no mud additives is used in drilling pilot hole and reaming process.	-0-	-0-
22	1	Ea	Freight Charges	-0-	-0-
23	1	Ea	Other (Describe)	-0-	-0-

			Test Pumping		
24	1	Ea	Mobilize Pump Rig and Personnel	500.00	500.00
25	1	EA	Install & Remove Develop/Test Pump	3,500.00	3,500.00
26	48	Hr	Develop & Test Well	250.00	12,000.00
27	200	Ft	Discharge Piping	2.00	400.00
28	2	Ea	Mud Dispersant Treatment during pump development process (Mud-Nox)	-0-	-0-
29	1	Ea	Deviation Survey (includes rig time)	1,950.00	1,950.00
30	1	Ea	Video Log	850.00	850.00
31	1	Ea	Weld Steel Plate At Top Casing After Completion If Required	100.00	100.00
32	1	Ea	Other (Describe)	-0-	-0-
			Site Cleanup		
33	1	Ea	General Cleanup, Restore Fencing, Roadways, and All Other Public & Private "Facilities"	1,000.00	1,000.00
34	1	Ea	Other (Describe)	-0-	-0-
				Total	246,465.00

Variable Cost Items & "If Required" Item Prices (For Each Well)					
Line Item	**Quantity**	**Unit of Measure**	**Item Description**	**Unit Price**	**Extended Price**
35	1	Ea	Disposal of Cuttings and Drilling mud residue, restore cuttings and drilling mud holding site.	5,000.00	5,000.00
36	1	Hr	High Speed Bailing of well for well development (as directed by District Representive)	350.00	350.00
37	1	Hr	Rock Bit Charge Per Hour If Required (Actual hours to be added to bid during drilling phase at the per hour price)	200.00	200.00
38	1	Hr.	Standby rate per hour if authorized	250.00	250.00
39	1	Ea	Other (Describe)	-0-	-0-

Signed: John C Rollins Date: 09/08/2017

Notes: TOTAL PRICE TO DRILL TWO (2) 18" X 1,000' DEEP WELLS $492,930.00

APPENDIX - E

Bid Detail Schedule For Well Outfitting

Bidder Information

Bidding Company Name: Hydro Resources - West, Inc.

Bidding Company Address: 4975 West Winnemucca Blvd. Winnemucca, NV 89445

Bidding Company Phone: 775-623-5259

Bidding Company Email: mscharenbroich@hydroresources.com

Bidding Company Contact Person Information: Mark Scharenbroich Cell 775-293-0724

Date of Bid: June 12, 2015

Detailed Bid (For Each Well)

Line Item	Quantity	Unit of Measure	Item Description	Each Price	Extended Price
			Permits & Bonds		
1	1	Ea	County Drilling Permit and Paperwork	$0.00	$0.00
2	1	Ea	Other Permit Related	$0.00	$0.00
3	1	Ea	Bond Charges	$3,750.00	$3,750.00
			Shafts		
4	1	Ea	Mobilize Pump Rig and Personnel	$2,200.00	$2,200.00
5	1	Ea	Furnish & Install Turn Shafts	$63,250.00	$63,250.00
6	1	Ea	Other (Describe)		$0.00
			Bowls & Pump Head		
7	1	Ea	Furnish & Install Bowls, Pump Head	$20,735.00	$20,735.00
8	1	Ea	Factory Testing (Hydrostatic and Performance)	$9,900.00	$9,900.00
			Discharge Head		
9	1	Ea	Furnish & Install Complete Discharge Head Assembly	$11,825.00	$11,825.00
10	1	Ea	Other (Describe)	$0.00	$0.00
			Test Pumping		
11	1	EA	Install & Remove Test Motor		N/A
12	24	Hr	Develop & Test Well		N/A
13	200	Ft	Discharge Piping		N/A
14	1	Ea	E-log (includes rig time)		N/A
15	1	Ea	Mud Dispersant		N/A
16	1	Ea	Other (Describe)		N/A
			Site Cleanup		
17	1	Ea	General Cleanup, Disposal of Cuttings/Waste, and Full Reclamation		N/A
18	1	Ea	Restore Fencing, Roadways, and All Other Public & Private "Facilities"		N/A
19	1	Ea	Other (Describe)		N/A
				Total	$111,660.00

Signed: Michelle Strother Date: 6/10/2015

Notes:

South Valley PUMP, INC.

APPENDIX - F

19325 Flightpath Way, Bakersfield, California 93308 PH: 661-831-5703 FX: 661-831-5976 Lic. # 410385

North Kern Water Storage District
33380 Cawelo Extension
Bakersfield, Ca 93308
ATTN: Ram Venkatesan, P.E.

July 1, 2015

RE: NEW WELLS – ELECTRICAL CONSTRUCTION PROPOSAL

PROPOSAL

SCOPE OF WORK

The following proposal is to electrify the 12 new wells to be constructed.

ITEMS INCLUDED

Quote includes the following items:

- 400HP US Motor, Model #HO400 S2SLHX, 1800RPM, 480VAC, 3ph, 60Hz, Standard Efficiency, 449TPH Frame, WPI, High Thrust
- Eaton 800A Service Entrance Switchboard, PG&E Metering, 800A main breaker, 800A feeder circuit breaker, 65kAIC, NEMA 3R, freestanding
- 400HP Eaton SSRV starter
- Transformer pad, bollards per PG&E specs
- All underground trenching and backfill
- All wire, lugs and conduit
- Labor to install

ITEMS EXCLUDED

Please note the following exceptions:

- Permits will be billed at cost +25%
- If site is in flood zone additional charge of $3,500 will apply
- Any required sales tax will be billed extra

PREVAILING WAGE

All labor is quoted as prevailing wage.

PRICING (PER WELL SITE)

Price of Material	$ 73,613.68
Price of Labor/Equipment	$ 8,000.00
Total Price of Materials and Labor (per well)	**$ 81,613.68**

APPENDIX - C

EST. 1968
PROVOST& PRITCHARD
CONSULTING GROUP
An Employee Owned Company

Engineering
Surveying
Planning
Environmental
GIS
Construction Services
Hydrogeology
Consulting

130 N Garden Street
Visalia, CA 93291-6362
Tel: (559) 636-1166 • Fax: (559) 636-1177
www.ppeng.com

FRESNO • CLOVIS • VISALIA • BAKERSFIELD • MODESTO • LOS BANOS • CHICO

MEMORANDUM

To: Ram Venkatesan – North Kern Water Storage District

From: Timothy Odom, PLS – Provost & Pritchard

Subject: Subsidence Monitoring Survey

Date: July 25, 2017

Provost & Pritchard has completed a survey to determine the current elevations of 20 monuments surveyed by RBF Consulting in the Spring of 2012. The results of our survey are detailed below and depicted on the attached map.

Summary of Survey Techniques

Coordinates and elevations for the survey control points were established by making simultaneous static GPS observations of the monuments. Each observation lasted at least 2 hours.

The data was processed through the National Geodetic Survey's OPUS Projects software, which utilizes observation data from Continuously Operating Reference Stations (CORS) to tie the new survey control points to the National Spatial Reference System and establish coordinates in a local coordinate system. We utilized the same reference stations that were used in the survey by RBF Consulting, with the exception of stations ARM2 and P564, for which the corresponding reference data was not available for processing through OPUS Projects, and BKR2, which has been decommissioned since the previous survey was completed.

The following table lists the Northing and Easting coordinates of each point in the California Coordinate System of 1983 (Zone 5, US Survey feet), and Elevations in the North American Vertical Datum of 1988, which were computed utilizing Geoid Model 12B.

Tabulated Survey Results

North Kern Water Storage District Subsidence Monitoring Survey Provost & Pritchard Consulting Group July, 2017					
STATION	NORTHING	EASTING	2017 ELEVATION	2012 ELEVATION BY RBF	ELEVATION DIFFERENCE
88_03_12	2363387.25	6211236.14	393.71	398.34	**-4.63**
88_03_36	2365612.45	6207761.88	393.14	393.32	-0.18
88_05_11	2378360.36	6199844.81	409.99	410.42	**-0.43**
88_07_04	2381111.29	6200048.43	417.41	418.03	**-0.62**
88_07_06	2381143.57	6197692.15	407.02	407.62	**-0.60**
88_09_09	2383806.82	6194815.65	401.89	402.50	**-0.61**
88_17_22	2394545.97	6191317.29	402.81	403.50	**-0.69**
88_17_23	2399147.36	6191415.40	401.20	401.89	**-0.69**
88_17_24	2401121.87	6191433.01	397.55	397.90	**-0.35**
88_19_03	2398338.54	6196347.42	416.30	416.74	**-0.44**
88_25_16	2410308.53	6193723.34	393.51	393.51	0.00
88_25_31	2412879.54	6192812.14	391.01	391.10	-0.09
88_29_14	2415344.33	6197733.91	396.80	396.69	0.11
88_29_15	2414720.36	6195301.12	395.23	395.18	0.05
99_02_04	2357669.83	6215615.84	377.62	377.49	0.13
99_22_14	2418443.04	6182418.29	361.98	362.00	-0.02
MINTER	2379521.39	6201119.57	419.02	419.49	**-0.47**
ROSEDALE	2356714.36	6215430.79	374.25	374.27	-0.02
SEC 27	2419709.19	6184843.27	363.72	363.69	0.03
SWITCH	2411972.94	6195572.63	400.60	400.69	-0.09
CONTROL STATIONS					
ISLK	2427700.41	6420764.73	2802.04	2802.21	
P545	2371732.67	6104523.65	282.64	282.56	
P563	2341686.43	6138227.66	301.01	301.00	
P565	2459339.75	6194657.73	318.13	318.07	
P567	2340363.48	6337139.85	2423.97	2424.06	

Summary of Survey Results

The difference in the Northing and Easting values for each station from the RBF Consulting survey and the current survey were very minimal, so the older values were omitted from the results table above.

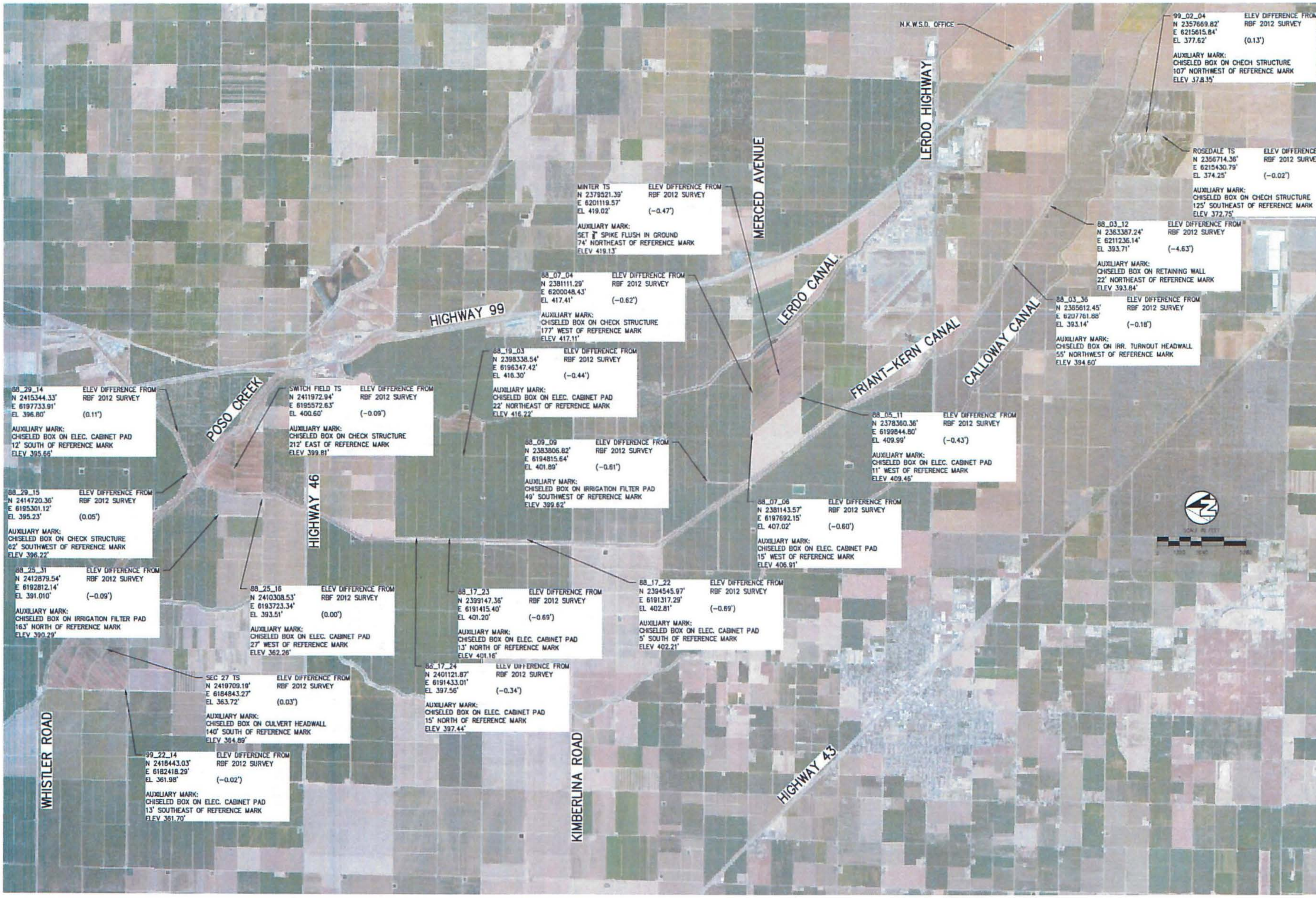
In the northern portion of the project, from Whistler Road down to Highway 46, and the extreme southern portion of the project, at the Rosedale Spreading Basin, very little change in elevation was seen between the two surveys. The observed differences in these areas are near or within the expected error for the method of surveying used in both 2012 and 2017.

In the area between Highway 46 and Lerdo Highway, the differences between the two surveys appear to reveal a depression with the most-effected areas lying along the Friant Kern Canal, and having elevations 0.69' lower in 2017 than were observed in 2012.

One outlier exists, at Station 88_03_12, located on the South side of the Friant Kern Canal between the Rosedale Spreading Basin and Lerdo Highway. At this station a change of -4.63' was observed between the 2012 and 2017 surveys, though the nearest stations up and down the canal reveal practically no change at all. Due to the magnitude and apparent isolation of this change I've reviewed the field data and processing information to identify any sources of error in the current survey or the 2012 survey that could be skewing this result. In each survey a standard 2 meter (6.562') survey pole was used at this station, so if the antenna height was not taken into account in the 2012 survey, then the 2012 survey value would be lower by that amount, and thus *lower* than the 2017 value by nearly two feet, which would not make sense. I have double-checked the current survey to ensure that the proper antenna height was used. The 2012 and 2017 surveys utilized different geoid models (a product created and periodically updated by the National Geodetic Survey that is used in the computation of elevations from GPS data) but the difference between the two models in this location is minimal, as can be seen in the comparison of the elevations of the control stations used. The 2012 survey report and processing information have been reviewed and no typographical errors were found in the reported elevations. Being confident in the data and methods of the current survey, I have to conclude that either some blunder occurred in the preliminary stages of the 2012 survey in regards to this station or there has been a localized change causing the observed difference in elevation at this point.

Sincerely,

Timothy M. Odom, PLS 8468



NORTH KERN WATER STORAGE DISTRICT

KERN COUNTY

SUBSIDENCE MONITORING POINTS

PROVOST & PRITCHARD CONSULTING GROUP
An Employee Owned Company

LAND SURVEYOR: TIMOTHY M. ODOM

LICENSE NO: P.L.S. 8465

PROFESSIONAL LAND SURVEYOR TIMOTHY M. ODOM No. 8465 STATE OF CALIFORNIA

DRAFTED BY: TMO	CHECKED BY: PAM
DATE: JULY 25, 2017	
JOB NO: 1745 15M	
PHASE: SM1	

ORIGINAL SCALE SHOWN IS ONE INCH. ADJUST SCALE FOR REDUCED OR ENLARGED PLANS.

No.	REVISION	BY	DATE

SHEET 1 OF 1