Funding Opportunity Announcement R14AS00001

WaterSMART: Water and Energy Efficiency Grants for Fiscal Year (FY) 2014

R Drain Check Structure Automation Project

Natomas Basin in Sacramento and Sutter County, CA

Natomas Central Mutual Water Company
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I. EXECUTIVE SUMMARY

Project: R Drain Check Structure Automation Project

Date: January 23, 2014

Applicant: Natomas Central Mutual Water Company
Rio Linda, Sacramento and Sutter County, CA

Project Funding

FUNDING SOURCE	FUNDING AMOUNT
Non-Federal Entities:	
Natomas Central Mutual Water Company	
In-Kind Contribution	$10,100
Cash Contribution	$137,800
Non-Federal Subtotal:	$147,900
Reclamation Funding:	$147,900
TOTAL PROJECT FUNDING:	$295,800

Project Summary

Natomas Mutual Water Company (Company) is proposing to reconstruct the existing check structure in the Northern Main Canal at the turn out to the R Drain Canal to improve the capacity to carry flow (base and fluctuations) past the R Drain turnout. An automated control gate will be installed on the new check structure and integrated into the Company's SCADA (supervisory control and data acquisition) system to maintain the water level in the Northern Main and provide constant flow to the R Drain Canal, reducing operational spills from over-delivery at the end of the R Drain Canal.

Project Duration: Approximately 24 months from contract award with completion by September 30, 2016.

This project is not located on a federal facility.

II. BACKGROUND DATA

A map of the Company's service area is presented in Appendix A. The project is located in Sutter County, CA, north of Sacramento, but will also affect water deliveries downstream into Sacramento County.

Water Supply and Water Rights

The Company receives its irrigation supply from the Sacramento River and through an extensive tailwater recovery system.

The Company has a U.S. Bureau of Reclamation Settlement Contract for an annual water supply of 120,200 acre-feet made up of 98,200 acre-feet of base supply and 22,000 acre-feet of "Project" supply allocated by the Bureau of Reclamation. The actual amount of Sacramento River water used varies annually depending on farming practices and weather conditions.

Current Water Uses: Major Crops and Total Acreage Served:

The primary use of water is for irrigation deliveries to farming operations. Rice is the primary crop grown within the Natomas Basin. The two additional main crops grown are alfalfa and wheat. Other row crops and low water demand crops are grown within the vicinity of the Sacramento International Airport. The Company's service area is approximately 50,000 acres within the 200 square-mile basin. Currently there are approximately 24,000 irrigatable acres. The majority of the fields use flood irrigation methods, either wide border checks or furrows.

Water is also supplied to mitigated marshes and other environmental mitigation properties owned and maintained by the Natomas Basin Conservancy as a result of development within the Natomas Basin. A map of Natomas Basin Conservancy property is provided in Appendix A.

The average annual diversion over the past 5 years is 56,000 acre-feet. The Company captures approximately 37,700 acre-ft of tailwater annually and blends it with the river diversions to meet the total demand. The actual amount served varies by year depending on hydrologic conditions and farming practices.

Description of Water Delivery System

The water supply facilities are made up of four diversions from the Sacramento River. There are a total of approximately 100 miles of canals and laterals. Water is applied directly to fields through gated turnouts in the irrigation canals. Lateral seepage losses are minimal.

The Company completed construction of a new diversion on the Sacramento River in 2012. This new diversion replaces its two diversions on the Natomas Cross Canal to improve fisheries habitat. The new diversion is connected to the heads of the two existing systems with a new supply canal.

The four river pump stations and several of the drainage canal lift pumps are equipped with variable speed drives and flow meters to maintain consistent deliveries. These facilities are also integrated in the Company's SCADA system which includes real time monitoring/alarming and remote operation. The remaining pumps, gates and check structures are operated manually by field personnel.

The Company operates a tail water recovery system within the basin during the irrigation season through existing joint use agreements with Reclamation District 1000 (RD1000) which allow the Company to operate and maintain the drainage canal system during the irrigation season (April 1 to October 30). Utilizing check structures and lift pumps in the drainage canal system, the Company re-circulates run-off from fields (tail water) and pumps the tail water back into the irrigation canals. This operation annually captures approximately 37,700 acre-feet, a majority of the run-off that would otherwise be pumped back into the Sacramento River by RD1000, thereby reducing the amount of water diverted from the Sacramento River.

Past Working Relationship with Reclamation:

The project is connected to Reclamation Central Valley Project activities as the Company is a Reclamation Settlement Contractor.

In coordination with the Anadromous Fish Screen Program, the Company constructed a new Sacramento River Diversion to consolidate and remove their two diversions on the Natomas Cross Canal. Reclamation is cost sharing on this project with Central Valley Project Improvement Act (CVPIA) funds through Grant Agreement R09AP20008. The project is substantially complete with final completion items scheduled in 2014.

The Company began a phased SCADA implementation in 2008. The first phase was to establish water level monitoring at key locations throughout the service area. This work was cost shared by Reclamation through CALFED Water Use Efficiency Grant 07SF200084 and two Water Conservation Field Services Program Grants 08FG200097 and R09AP20041. This work was completed in December 2010.

The second phase of the SCADA program is to install flow meters at key SCADA sites. The Company received a funding award from Reclamation's CALFED Water use Efficiency Grant Program in 2011 to install flow meters at the 30's Pump Station, and a second funding award from Reclamation's Water Conservation Field Services Program to install flow meters at the Pullman Pumping Plant.

The Company received two additional funding awards in 2011 to provide automation improvements for two projects. The first award from Reclamation's WaterSMART: Water and Energy Efficiency Program provided assistance with the replacement of two diesel pump drivers with electric motors and installation of flow meters at the Bennett Drain Pump and the County Line Check and Lift Pump. The second award Reclamation's CALFED Water Use Efficiency Program provided assistance with automation improvements to Barnes Crossing Control Structure.

In 2012, the Company received an award from Reclamation's WaterSMART Grant program for the Dodge Crossing Automation Project which, when completed, will provide automation improvements to the Dodge Crossing control structure. The automation improvements will provide water savings from reduced spills, improved water management, and reduce energy usage from pumping.

In 2013, the Company received an award from Reclamation's WaterSMART Grant program for the Sankey Road Check Automation Project which, when completed, will provide automation improvements to the next check structure downstream of Dodge Crossing control structure located just south of Sankey Road. The automation improvements will provide water savings from reduced spills, improved water management, and reduce energy usage from pumping.

III. TECHNICAL PROJECT DESCRIPTION

Northern Main Canal System Improvements

This project will continue an effort to provide automation on the Northern Main Canal system. The following improvements to the system have been made or will be made prior to construction of this project. Their locations are provided on the map in Appendix A.

- Sankey Diversion and Canal Project – new river diversion and modern canal facilities that deliver desired flow into the Northern Main Canal, operational in 2011
- Barnes Crossing – automated control structure constructed in 2012
- Dodge Crossing – automated control structure to be constructed 2014
- Sankey Road Check – automated control structure to be constructed in 2015

These improvements have increased the capacity to carry more water down the Northern Main Canal while reducing operational spills upstream of each structure. With the completion of the Sankey Road Check structure, the canal system will be able to carry and pass up to 80 cubic feet per second (cfs) downstream of Sankey Road.

The R Drain check structure is the next facility downstream of the Sankey Road Check. It controls water level for a 2-mile section of the Northern Main Canal below Sankey Road and maintains the water level to make deliveries to the R Drain turnout. The check structure only has the capacity to move 10 cfs south, down the Northern Main Canal. Due to this restriction, over deliveries to R Drain are often required to maintain water balance without risking overtopping the canal banks.

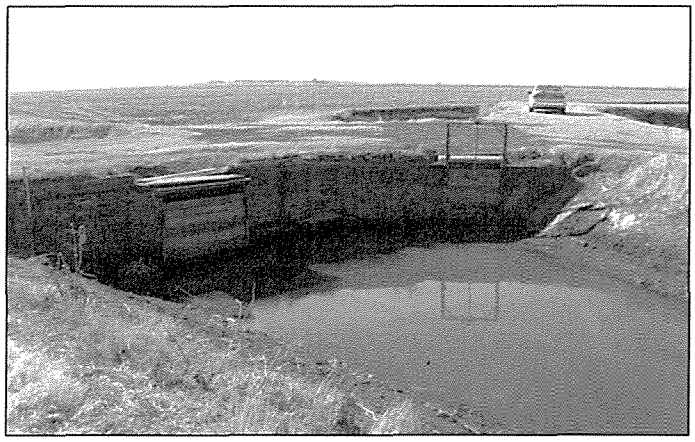
Tailwater Recovery System Efficiency Improvements

During the irrigation season, the Company operates facilities in the main drainage canal system to recover tailwater runoff from fields and operational spills. Check structures in the drainage canals with low lift pumps maintain three tailwater pools by pumping over the check. When excess tailwater accumulates, it spills over the check structures to the lower pools until it reaches the bottom of the drainage system and is pumped out to the Sacramento River.

The upper tailwater pool receives field runoff and operational spills from the Northern Main Canal. Tailwater is recirculated into the Northern Main Canal at the 30's pump station located approximately 1 mile downstream of the R Drain check structure. Because of the limited capacity of the R Drain Check structure, the majority of water supplied to the Northern Main Canal downstream of R Drain is provided by the 30's pump station. Due in part to this demand, the upper tailwater pool requires supplemental supply water from the Sacramento River diversion to augment the tailwater supply from field runoff and operational spills.

Existing Infrastructure and Operating Conditions at R Drain

As shown in the picture below, the existing structure consists of a 72-inch flashboard riser installed on the 60-inch CMP road crossing culvert in the Northern Main Canal. The turnout to the R Drain Canal is a 48-inch slide gate installed in a flashboard riser. Flashboards have been set to maintain a constant water level for the turnout. However, the width of the flashboards is not sufficient to accommodate fluctuations in flow. Therefore, the ditch tender sets the slide gate to the R Drain Canal to deliver more water than is required to prevent the Northern Main Canal from overtopping. The over-delivery to R Drain is spilled to the drainage canal system and lifted back into the Northern Main at the 30's pump station.



Existing Check Structure and Turnout to R Drain Canal

Proposed Improvements to the R Drain Check Structure

To eliminate over-delivery and spill in the R Drain Canal, the check structure needs to be automated to maintain a consistent water level and accommodate supply fluctuations. Prior modifications and the conditions of the concrete require the headwall to be reconstructed. In addition to reconstructing the existing headwall, the existing 48-inch turnout slide gate will be replaced and the following canal automation improvements will be made.

The 72-inch flashboard riser will be replaced with a Hydra-Lopac® automated control gate to stabilize the upstream water level. A similar installation is shown below. A level transducer will be installed upstream for regulating the gate opening. The gate will be solar powered because bringing power to the site is not practicable. To offset the risk of power failure on consecutive overcast days, emergency overflow weirs will be constructed to prevent canal overtopping while operators respond.

Hydra – Lopac ® Control Gate

With the upstream water level stabilized, delivery to the R Drain Canal can be made through the manually operated 48-inch slide gate. A flow meter will be installed in the R Drain Canal that will allow the ditch tender to adjust the gate to set the desired flow.

A solar powered SCADA station will be installed to improve water management at the site by providing real-time monitoring and alarming. In addition to the R Drain Canal, a flow meter will be installed in the Northern Main Canal to measure flow upstream of the turnout. Water level sensors will also be installed in the R Drain Canal and in the Northern Main Canal upstream and downstream of the check structure.

Operational Improvements Resulting from the Proposed R Drain Check Structure

The proposed improvements to the R Drain check structure will provide the following operational improvements:

- Provide continuity of water deliveries to the lower end of the Northern Main Canal;
- Eliminate over deliveries to the R Drain Canal and associated operational spill from the R Drain Canal into the drainage canal system;
- Reduce the demand for tailwater re-lifted at the 30's pump station and associated energy usage; and
- Improve water management by providing additional coverage of real-time monitoring in the Northern Main Canal.

Execution of Work

The following scope of work will be executed to complete the implementation of the R Drain Check Structure Automation Project:

Task 1 – Administration/Management:

This task includes the effort required to manage the project, administer the grant reporting requirements, and document project performance required by the grant.

Task 2 – Final Design:

This task includes the final design efforts required to prepare a set of construction documents to solicit proposals for construction of the project. The Project Manager will engage their Consulting Engineer to execute this work. The work to be performed by the Consulting Engineer includes:

- Perform site survey and additional site investigations to confirm design water surface elevations and canal sections.
- Prepare draft and final construction plans.
- Assist the Project Manager as necessary to procure equipment.
- Assist the Project Manager in soliciting and evaluating proposals from contractors.
- Assist the Project Manager as necessary to respond to questions from the contractor during construction.
- Assist the Project Manager as necessary to respond to questions from Tesco Controls regarding the control logic and SCADA integration.
- Assist the Project Manager as necessary to evaluate project performance.

Task 3 – Construction:

This task includes all work associated with reconstruction of the check structure. This work will be executed in three overlapping phases.

Phase 1 – Procurement (Performed by Project Manager)

- Solicit final proposals for the slide gate and automatic control gate, and issue purchase order for delivery of the gates prior to site construction.

Phase 2 – Site Construction (Performed by Construction Contractor)

- Demolition and removal of existing check structure.
- Site preparation.
- Construction of concrete structure and installation of gates.
- Construction of control section for flow meters (two locations).
- Backfill and finish grading.

Phase 3 – Controls and SCADA Integration (Performed by TESCO Controls)

- Prepare submittal for controls equipment and programming logic for approval by Project Manager.
- Install electrical and controls equipment, conduit and wiring. This includes installing water level sensors, flow meters, remote terminal unit (RTU) cabinet, solar panels and SCADA antenna.
- Complete programmable logic controller (PLC) programming at site.
- Complete SCADA integration at base station in main office.
- Complete start-up and testing for final acceptance.

The estimated project schedule demonstrating the stages and duration of the proposed work is as follows:

Execute USBR Contract	by October 1, 2014
Administration/Management	October 2014 – September 2016
Final Design	October 2014 – February 2015
Environmental Compliance *	October 2014 – February 2015
Construction:	
Procurement	October 2014 – February 2015
Site Construction	February 2015 – March 2015
Controls and SCADA Integration	December 2014 – March 2015
Start-up and Testing	April 2015
Project Performance Monitoring	April 2015 – December 2015
Project Closeout	by September 2016

*Environmental compliance is to be completed by USBR.

IV. EVALUATION CRITERIA

Criterion A – Water Conservation

Subcriterion A.1. – Water Conservation

Subcriterion A.1(a) – Quantifiable Water Savings

The Company's average annual water supply (river diversions and tailwater recovery) over the past 5 years is 93,300 acre-ft, of which 55,600 acre-ft are diverted from the Sacramento River and 37,700 acre-ft from the tailwater recovery system. Approximately 14,000 acre-ft is delivered down the Northern Main Canal at the R Drain check structure.

As discussed previously, to reduce the risk of overtopping, the turnout to the R Drain Canal is opened to allow for flow fluctuation which results in over-deliveries to the R Drain Canal. With the new automated control gate, deliveries to the R Drain Canal can match the demand, eliminating the operational spill.

Therefore, the quantifiable water savings can be determined by estimating the current quantity of over-delivery to the R Drain Canal.

Pre-Project Delivery to the R Drain Canal:

Headloss across turnout:	6 inches
Gate Size:	4 ft square
Gate position:	75% open

Flow through the gate can be approximated by the orifice equation:

$$Q = 0.61bd\sqrt{2gh} = 0.61(4ft)(75\% \times 4ft)\sqrt{2 \times 32.2 \times (0.5ft)}$$

$$Q = 41.5\ cfs$$

Use 40 cfs continuous for 150 days (April to August) ⇒ 11,900 ac-ft

Average Annual demand for water to the R Drain Canal:

During rice flood-up (13 field turnouts delivering 3 cfs each):		
(April to May)	39 cfs continuous for 60 days ⇒	4,640 ac-ft
During maintenance (13 field turnout delivering1.5 cfs each):		
(June to August)	19.5 cfs continuous for 90 days ⇒	3,480 ac-ft
Annual Demand		8,100 ac-ft

Quantifiable Water Savings:

Pre-project Delivery less Average Annual Demand	**3,800 ac-ft**

The water conserved will reduce the demand for Sacramento River diversions and will remain in the Sacramento River. However, due to the variation in demand it will be difficult to verify by comparing pre- and post-project volumes from the Sankey Diversion. To verify the actual water savings, the Company will compare the estimate of the pre-project quantity of over-delivery with the post-project measurements of water delivered to R Drain Canal.

Pre-project Measurements

Pre-project deliveries to the R Drain Canal will be estimated by periodically measuring water levels in the Northern Main Canal and the R Drain Canal. Based on the gate position, the flow will be calculated using the orifice equation. The volume of water delivered will be calculated by multiplying the average flow by the duration between periodic measurements.

Demand in the R Drain will be determined by utilizing billing records for each of the turnouts in the R Drain.

The quantity of over-delivery will be estimated by calculating the difference between the periodic measurement records for the turnout with the billing records over the 2014 irrigation season.

Post-project Measurements

The post-project volume of water delivered to the R Drain Canal will be determined using SCADA records from the flow meter that will be installed in the R Drain Canal.

Subcriterion A.1(b) – Improved Water Management

This project will improve water management in the Northern Main Canal. The current quantity of water delivered south of Sankey Road Check is 14,000 acre-feet. The percentage of the Company's total water supply (river diversions and tailwater recovery) better managed is:

$$\frac{\text{Estimated Amount of Water Better Managed}}{\text{Average Total Annual Water Supply}} = \frac{14{,}000}{93{,}300} = 15\%$$

The percentage of the Company's water supply (river diversions only) better managed is:

$$\frac{\text{Estimated Amount of Water Better Managed}}{\text{Average Annual River Diversion}} = \frac{14{,}000}{55{,}600} = 25\%$$

Subcriterion A.2. – Percentage of Total Supply

The percentage of the Company's total water supply (river diversions and tailwater recovery) conserved is:

$$\frac{\text{Estimated Amount of Water Conserved}}{\text{Average Total Annual Water Supply}} = \frac{3{,}800}{93{,}300} = 4\%$$

The percentage of the Company's water supply from river diversions that is better managed is:

$$\frac{\text{Estimated Amount of Water Conserved}}{\text{Average Annual River Diversion}} = \frac{3{,}800}{55{,}600} = 7\%$$

Subcriterion A.3. – Reasonableness of Costs

Initial Project Cost: $295,800

Present Value of Replacement Costs: $37,000 (See discussion below)

Total Project Cost: $332,800

Replacement Required: Electrical equipment is expected to last approximately 20 years before replacement is required. Therefore, the electrical controls and SCADA equipment will require replacement four times over the life of the project. See Appendix C for calculation of the present value of the replacement costs.

Aside from the electrical, this project should have a lifespan of 100 years before any significant rehabilitation is required.

Annual Acre-feet Conserved: 3,800 acre-feet

Acre-Feet Better Managed: 14,000 acre-feet

Reasonableness of Cost:

$$= \frac{\text{Total Project Cost}}{\text{Acre} - \text{feet} \times \text{Improvement Life}}$$

$$= \frac{\$332{,}800}{(3{,}800) \times (100 \text{ years})} \approx \$0.88 \text{ per ac - ft conserved per year}$$

$$= \frac{\$332{,}800}{(14{,}000) \times (100 \text{ years})} \approx \$0.24 \text{ per ac - ft better managed per year}$$

Criterion B – Energy-Water Nexus

Subcriterion B.1. – Implementing Renewable Energy Projects Related to Water Management and Delivery

This project does not implement significant renewable energy sources.

Subcriterion B.2. – Increasing Energy Efficiency in Water Management

The reduction in system spill will result in reduced pumping and associated energy savings by reducing the quantity of water pumped at the 30's pump station.

The estimated energy savings is approximately:

Fundamental Pump Equation:

$$HP = \frac{Q \times \gamma_{water} \times TDH}{550 \times e_{pump} \times e_{motor}}$$

Energy consumption per acre-foot:

$$= \frac{HP}{Q} \times \frac{0.746 \times 43560}{3600} = \frac{0.746 \times 43560}{3600} \times \frac{\gamma_{water} \times TDH}{550 \times e}$$

$$= \frac{0.746 \times 43560}{3600} \times \frac{62.4 \times 15}{550 \times 0.80} = 19.2 \text{ kWh per acre} - \text{ft}$$

Annual Enegery Consumption Savings:

$$= 19.2 \times 3{,}800 = 72{,}960 \text{ kWh per year}$$

In addition to the energy savings associated with pumping, the project will include two solar panels to supply power to operate the automated control gate, and to the SCADA RTU.

Criterion C – Benefits To Endangered Species

The Company diverts water from the Sacramento River north of the confluence with the American River. These rivers and their tributaries provide critical habitat for protected Anadromous fish species (salmon, steelhead, green sturgeon and Delta Smelt). The water conserved by this project would remain in the river, providing more fresh water downstream to improve survival rates during migration.

Within the Natomas Basin, the Company delivers water to approximately 4,500 acres of habitat preserve managed by the Natomas Basin Conservancy. These preserves provide critical foraging habitat for Swainson's Hawk and Giant Garter Snake, as well as critical habitat for several other species such as burrowing owl, tricolored blackbird and white-faced-ibis. More than half of the preserve land is located in the north end of the basin. The improvements to water management and conservation resulting from this project will also increase the reliability of water deliveries to the preserve sites, which is essential to their long-term sustainability.

Criterion D – Water Marketing

This project does not propose to directly market the water saved through conservation and better water management. However, the water savings and contribution to water supply sustainability will allow flexibility in Sacramento River diversions that would allow for water transfers to other Settlement Contractors to meet short term supply deficiencies on a year-by-year basis.

Criterion E – Other Contributions to Water Supply Sustainability

The Company also has a relationship to the California Bay-Delta in that the Company's service area diverts water from the Sacramento River north of the confluence with the American River. These rivers provide a significant source of fresh water to the California Bay-Delta. Excess drain water from the services area is pumped back into the Sacramento River by RD1000. Water conservation and improvements in water management will result in less fresh water being diverted from the Sacramento River as well as a reduction in the amount of drain water being pumped back into the river. The combination of these two effects would result in a higher quantity and quality of water being delivered to the California Bay-Delta.

This project contributes towards achieving the goals for the following CALFED Quantifiable Objectives and Targeted Benefits for Sub-Region 7, Lower Sacramento River below Verona:

TB-57: Provide flow to improve aquatic ecosystem conditions, Sac River

Quantifiable Objective: 44 to 180 TAF per year.

One possible action toward achieving the quantifiable objective is identified as a "Reduction in operational spill through improved management, canal automation or regulatory storage." This project will improve tailwater recovery by increasing recirculation by utilizing variable frequency drive controllers and by increasing water management by installing flow meters and integration in to the Company's SCADA system. Improved tailwater recovery will reduce the amount of fresh water diversions and the amount of excess drain water being pumped into the Sacramento River.

TB-60: Reduce salinity to enhance and maintain aquatic species populations, NEMDC

Quantifiable Objective: TBD.

TB-60 is targeting a reduction in electrical conductivity to allow municipal treatment facilities the flexibility to meet the potential long-term regulatory scenario. While it is unclear what that scenario is and what the quantifiable objective will be, it may involve the reduction of salt levels. Agricultural drain water tends to have a higher level of salts that are picked up from the irrigated fields. This project will improve the efficient use of drain water, thereby reducing fresh water diversions and reducing the amount of drain water being pumped back into the Sacramento River. The combined affect will improve water quality and reduce salinity.

TB-64: Provide long-term diversion flexibility to increase the water supply for beneficial uses.

Quantifiable Objective TBD

TB-64 is aimed at providing diversion flexibility to enhance conjunctive use projects by reducing flows to groundwater in dry years and increasing flows to groundwater in wet years. The improvement to tailwater recovery gained by this project will improve the Company's ability to manage water in dry years, providing additional water supply in the Sacramento River for conjunctive use projects downstream.

TB-65: Provide long-term diversion flexibility to increase the water supply for beneficial uses, Wetlands

Quantifiable Objective: 1 TAF per year

TB-65 is targeting improved water management to provide addition water for wetlands. Possible actions to achieve TB-65 are the same as TB-57. This project will improve tailwater recovery and reduce excess drain water pumping, as discussed above. In addition, the Company provides water to approximately 4,500 acres of Natomas Basin Conservancy mitigation property for sustained rice farming, upland habitat preservation and managed marsh lands. The operational efficiencies and water management improvements resulting from this project will improve long-term reliability of water supply to these mitigation lands.

Criterion F – Implementation and Results

Subcriterion F.1. – Project Planning

Planning, Engineering and Design Work:

In 2010, the Company began planning and implementing canal automation improvements for the Northern Main Canal. The first automation project was completed in 2013 at the head of canal. Two automation projects are planned to be constructed in 2014 that will provide full automation from the point of diversion on the Sacramento River to the Sankey Road crossing, approximately 10 miles of canal. This project is the next check structure requiring automation in an on-going effort to reduce or eliminate operational spills. Further improvements downstream cannot be made until this project has been completed. A preliminary design and cost estimate have been prepared for the project and are included in Appendix C.

Conformance to Regional Water Plans:

The proposed project is consistent with the Sacramento Valley Integrated Regional Water Management Plan (SVIRWMP). This project contributes to the "System Improvement/Water Conservation" water management strategy contained in Section 4.1.2 and subsection 4.1.2.2 of the document. These sections have been included with this proposal in Appendix B. The improvements of this project meet the key objectives of improved measurement and management outlined in subsection 4.1.2.2

Subcriterion F.2. – Readiness to Proceed

The Company is ready to implement the project as follows:

Design and Procurement Phase:

The objective of this phase is to be ready to construct prior to the Spring 2015 Irrigation Season. In anticipation of an award, the Company will collect the required pre-project data described above in Subcriterion A.1(a) section.

Following award of the grant, the Company will complete the design of the improvements to R Drain Check Structure. This includes designing the site layout and structure, finalizing equipment selection, and field locating where instrumentation is to be installed. Once complete, procurement documents will be prepared for soliciting competitive bids from construction contractors. The Company will also coordinate with Aqua Systems Inc. for fabrication and delivery of the Hydra-Lopac® gate. Once the gate been ordered, the Company will begin coordinating the PLC programming and SCADA integration with TESCO Controls in order to be ready for construction by January 1, 2015.

Construction Phase:

The available construction window runs from January 1 through March 31 during the winter when irrigation deliveries are not required and the sites are not in operation. Some site work and selective demolition will be required by the Company to facilitate reconstruction of the check structure. The bulk of the construction activities will be associated with the check structure. The site will undergo operational testing with the vendors on site to assist with any troubleshooting. Any corrections will be completed in time to bring the facility operational by April 1.

Performance Monitoring Phase:

The R Drain Check Structure is planned to be operational for the 2015 irrigation season. Recorded flow data will be used to summarize the post-project measurements identified in Subcriterion A.1(a). A comparison of the 2014 and 2015 measurements will be made to confirm quantity of water conserved by the project. The results will be summarized in the final report.

Estimated Project Schedule:

Execute USBR Contract	By October 1, 2014
Administration/Management	October 2014 – September 2016
Final Design	October 2014 – January 2015
Environmental Compliance*	October 2014 – February 2015
Construction:	
Procurement	October 2014 – February 2015
Site Construction	February 2015 – April 2015
Controls and SCADA Integration	December 2014 – April 2015
Start-up and Testing	April 2015
Project Performance Monitoring	April 2015 – December 2015
Project Closeout	By September 2016

*Environmental compliance is to be completed by USBR.

Subcriterion F.3. – Performance Measures

The following performance measures will be made to quantify the benefits upon completion of the project:

Pre-project monitoring will consist of creating a record of the over-deliveries to the R Drain Canal. The pre-project conditions require preparation of two records:

1) Tabulated estimate of water deliveries to the R Drain Canal. The record will include:
   - Date of each entry in the record, which are to be performed on a routine periodic basis.
   - Measurements of the water level in the Northern Main Canal and in the R Drain adjacent to the gated turnout.
   - Position of 48-inch slide gate.
   - Calculation of estimate flow through the turnout using orifice equation.
   - For each time step, the average flow, duration and estimated volume of water delivered will be calculated.
   - Volumes will be subtotaled by month for comparison with the pre-project record of water deliveries from R Drain and the post-project records.

2) Record of water deliveries from R Drain. The Company maintains a record of deliveries that will be summarized to include:
    - Turnout identification. A total of 13 turnouts are located on the R Drain.
    - Date of gate/delivery change.
    - Position of gate.
    - For each time step, the flow, duration and estimated volume of water delivered will be calculated.
    - Volumes will be subtotaled by month for comparison with the pre- and post-project deliveries into R Drain from the Northern Main Canal, and the post-project

Post-project measurements include maintaining a record of the flow meter measurements in the R Drain Canal. The record will be created and stored in SCADA. Data will be tabulated and summarized on a monthly basis for comparison to the pre-project conditions.

The project performance will be determined by comparing the monthly pre-project over-delivery to the R Drain Canal to the post-project flow meter measurements to determine the quantity of water conserved. A description of any acute observations will be included with the comparison. The monthly comparisons will be provided in the final performance report.

Criterion G – Additional Non-Federal Funding

$$\frac{\text{Non - Federal Funding}}{\text{Total Project Cost}} = \frac{\$147{,}900}{\$295{,}800} = 50\%$$

Criterion H – Connection To Reclamation Project Activities

How is the proposed project connected to Reclamation project activities?

The project is connected to Reclamation's California Central Valley Project activities as the Company is a Reclamation Settlement Contractor. Any savings in water by the Company can be made available to other Settlement Contractors during dry water years.

Does the applicant receive Reclamation project water?

As a Settlement Contractor, the Company has water rights for 98,200 acre-feet of base supply and 22,000 acre-feet of contract water.

Is the project on Reclamation project lands or involving Reclamation facilities?

No.

Is the project in the same basin as Reclamation project or activity?

Yes, the Project is located in the Sacramento River Basin and within the CALFED Solution Area.

Will the proposed work contribute water to a basin where Reclamation project is located?

Yes, expected water savings will result in a higher quantity and quality of water being delivered to the California Bay-Delta, the source of water for the Central Valley Project.

V. PERFORMANCE MEASURES

Currently, the Company's Northern Main Canal frequently experiences operational spills due to limitations at the existing R Drain site. The amount of water currently spilled due to management practices to compensate for this limitation is estimated to be approximately 3,800 acre-feet annually, as shown in Subcriterion A.1(a) – Quantifiable Water Savings.

Pre-project monitoring will consist of creating a record of the over-deliveries to the R Drain Canal. The pre-project conditions require preparation of two records:

1) Tabulated estimate of water deliveries to the R Drain Canal. The record will include:
   - Date of each entry in the record, which are to be performed on a routine periodic basis.
   - Measurements of the water level in the Northern Main Canal and in the R Drain adjacent to the gated turnout.
   - Position of 48-inch slide gate.
   - Calculation of estimate flow through the turnout using orifice equation.
   - For each time step, the average flow, duration and estimated volume of water delivered will be calculated.
   - Volumes will be subtotaled by month for comparison with the pre-project record of water deliveries from R Drain and the post-project records.

2) Record of field deliveries from R Drain. The Company maintains a record of deliveries that will be summarized to include:
   - Turnout identification. A total of 13 turnouts are located on the R Drain.
   - Date of gate/delivery change.
   - Position of gate.
   - For each time step, the flow, duration and estimated volume of water delivered will be calculated.
   - Volumes will be subtotaled by month for comparison with the pre- and post-project deliveries into R Drain from the Northern Main Canal, and the post-project

   Post-project measurements include maintaining a record of the flow meter measurements in the R Drain Canal. The record will be created and stored in SCADA. Data will be tabulated and summarized on a monthly basis for comparison to the pre-project conditions.

   The project performance will be determined by comparing the monthly pre-project over-delivery to the R Drain Canal to the post-project flow meter measurements to determine the quantity of water conserved. A description of any acute observations will be included with the comparison. The monthly comparisons will be provided in the final performance report.

ENVIRONMENTAL AND CULTURAL RESOURCES COMPLIANCE

The Company believes that the proposed project does not negatively impact the surrounding environment. However, based on prior experience with the Barnes Crossing Automation Project, it is recognized that the project does not qualify as a categorical exemption. Therefore, we have included budget for Reclamation to complete an Environmental Assessment (EA) to identify any impacts in order to obtain clearance to begin construction. Recognizing the need for an EA prior to award should provide sufficient time to complete the EA prior to February 2015. The following answers are provided in response to the questions in the solicitation.

1. Construction of the upstream level gate structure will have no permanent impacts and insignificant temporary impacts on the surrounding environment. All major construction activities, including all excavation work, will be located below the normal water level in the canal following shutdown of the system in December. Minor trench will be required for electrical conduit along the top of canal banks used for vehicular access.

2. Endangered and threatened species found in parts of the Company's service area include:

   - Giant Garter Snake – The work will be performed during the inactive season and will not disturb any ground above the normal water level in the canal.
   - Swainson's Hawk – No trees are located within the vicinity of the project site that would be potential nesting sites.
   - Valley Elderberry Beetle – There are no Elderberry shrubs at the project site.

3. Wetlands are not present within the vicinity of the site. There are wetlands in the Company's service area that are managed by the Natomas Basin Conservancy that will not be impacted by this project.

4. Construction of the irrigation water distribution system began in 1921 and continued throughout the 1920's.

5. The R Drain Check Structure was constructed in the 1920's. Minor alterations to access walkways and slide gates have been made since, but no record exists.

6. Buildings, structures, or features in the Company's district that might be eligible for listing on the National Register of Historic Places include two pump station buildings that are historically significant. However, neither of these structures is currently eligible for listing on the National Register of Historic Places. Furthermore, this project does not involve any activities at these pump stations.

7. There are known archeological sites that exist along the river in the Company's service area. However, this project is not located near any of these sites.

8. The project will not have any disproportionately high and adverse effects on low income or minority populations.

9. The project does not limit access to and ceremonial use of Indian sacred sites or result in other impacts on tribal lands.

10. The project will not contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area.

REQUIRED PERMITS AND APPROVALS

There are no permits required for the project. However, based on prior experience with the two upstream check structures, it is recognized that the project does not qualify as a categorical exemption. Therefore, budget has been included for Reclamation to complete an Environmental Assessment (EA) to identify any impacts in order to obtain clearance to begin construction. Recognizing the need for an EA prior to award should provide sufficient time to complete the EA before February 2015.

LETTERS OF PROJECT SUPPORT

This project only impacts the Company's shareholders and tenant farmers. These individuals will be informed of the project through existing communications with the Company's Board of Directors. There are no local agencies that will be involved and no third party impacts.

OFFICIAL RESOLUTION

This project has been presented to the Company's Board for consideration and has been included in discussions of the 2014 budget. However, due to the timing of the January Board meeting, an official resolution is not included in this application package. In accordance with the solicitation, an official resolution in support of the Project by the Board will be provided to Reclamation following the February board meeting on February 11, 2014.

PROJECT BUDGET

Funding Plan and Letters of Commitment

Letters of Commitment

The Company is not relying on other funding sources to support this project. The Company will contribute to the cost share requirement by providing at least 50% of the total project cost in order to implement the project. In-kind contributions will be provided for project administration and performance reporting, and minor construction activities that can reasonably be accomplished by Company staff. Cash contributions will be provided from the Company's Capital Improvements Fund to cost share with Reclamation on equipment procurement and construction. This work will be performed under service contracts with the Company's current vendors.

Aside from Reclamation, no other funding partners are required for this project. No other Federal funding is being sought or provided for this project. No other funding requests have or will be prepared for this project.

Table 1 – Summary of Non-Federal and Federal Funding Sources

FUNDING SOURCE	FUNDING AMOUNT
Non-Federal Entities:	
Natomas Central Mutual Water Company	
In-Kind Contribution	$10,100
Cash Contribution	$137,800
Non-Federal Subtotal:	$147,900
Reclamation Funding:	$147,900
TOTAL PROJECT FUNDING:	$295,800

Budget Proposal

The proposed budget for this project is presented on the following pages, in conformance with the guidelines of the funding opportunity announcement.

A budget narrative is provided after the proposed budget discussing each item in the proposal.

The proposed budget has been consolidated onto Standard Form 424C, Budget Information –Construction Programs, and included in this proposal following the budget narrative.

Table 1 on the prior page summarized the funding sources for the project.

Table 2 on the following page shows a detailed breakdown of the costs by category and summarizes the costs by the task items described in Section III of the Technical Proposal.

Table 2 - Budget Proposal

BUDGET ITEM DESCRIPTION	COMPUTATION $/Unit and Unit		Quantity	RECIPIENT FUNDING In-Kind	Cash	USBR FUNDING	TOTAL COST	Task 1 Admin/ Mgmt	Task 2 Final Design	Task 3 Construction	Total
Salary & Wages											
Assistant General Manager	$45.67	/hour	60	$ 2,740			$ 2,740	$ 2,740			$ 2,740
SCADA Technician	$17.00	/hour	120	$ 2,040			$ 2,040	$ 2,040			$ 2,040
Maintenance Labor	$17.25	/hour	120	$ 2,070			$ 2,070	$ 2,070			$ 2,070
Fringe Benefits											
Assistant General Manager	$10.05	/hour	60	$ 603			$ 603	$ 603			$ 603
SCADA Technician	$10.37	/hour	120	$ 1,244			$ 1,244	$ 1,244			$ 1,244
Maintenance Labor	$11.04	/hour	120	$ 1,325			$ 1,325	$ 1,325			$ 1,325
Travel - Site Visits											
Staff Vehicles	$0.56	/mile	160	$ 90			$ 90	$ 90			$ 90
Equipment											
Supplies/Materials											
none											
Contractual/Construction											
Construction Contract	$100,000	LS	1		$50,000	$50,000	$ 100,000			$ 100,000	$ 100,000
Aqua Systems 2000, Inc. (Lopac Gate)	$48,600	LS	1		$0	$48,600	$ 48,600			$ 48,600	$ 48,600
Tesco Controls	$90,900	LS	1		$51,600	$39,300	$ 90,900			$ 90,900	$ 90,900
Psomas - Site Survey	$4,500	LS	1		$4,500		$ 4,500		$ 4,500		$ 4,500
Parsons Brinckerhoff - Final Design											
Project Manager	$215	/hr	60		$12,900		$ 12,900		$ 12,900		$ 12,900
Staff Engineer II	$125	/hr	80		$10,000		$ 10,000		$ 10,000		$ 10,000
CADD Technician	$110	/hr	80		$8,800		$ 8,800		$ 8,800		$ 8,800
Environmental & Regulatory Compliance											$ -
Environmental Compliance Document	$10,000	LS	1			$10,000	$ 10,000		$ 10,000		$ 10,000
Other											
none											
Total Direct Costs				$ 10,112	$ 137,800	$ 147,900	$ 295,812	$ 10,112	$ 46,200	$ 239,500	$ 295,812
Indirect Costs				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Rounded Total Project Costs				**$ 10,100**	**$ 137,800**	**$ 147,900**	**$ 295,800**	$ 10,100	$ 46,200	$ 239,500	$ 295,800

Budget Narrative

Salaries and Wages – Company Staff

Current salary and wage rates have been provided for the Company staff along with an estimate of its effort required to manage the project and for administration of the grant. While these rates may increase annually depending on the Company's approval, no allowance has been made on the spreadsheet for future increases to these labor rates. Actual rates in place at the time work is performed will be used to determine the in-kind contribution.

Fringe Benefits – Company Staff

The Fringe Benefits associated with the direct labor rate for Company staff has been included in Appendix E of this proposal. The current actual rates have been used to establish the proposed budget. As with the salaries and wages, the actual rates at the time work is perform will be used when determining the in-kind contribution.

Travel

Costs have been included for up to eight specific trips to the project site by Company staff in Company vehicles.

Equipment

Company equipment should not be required to complete this project. Should the Company elect to self-perform any of the work in lieu of the Construction Contractor described below, the Company's equipment usage will be tracked and invoiced to the project based on the US Army Corps of Engineer's recommended equipment rates for the Sacramento region.

Materials and Supplies

There are no supplies or materials to be provided by the Company for this project. The costs of these items are included under the Contractual category.

Contractual/Construction

The Company will solicit bids from local contractors to construct the project. The lowest qualified bidder will be selected for award. A cost estimate has been prepared for this work and included in Appendix C.

TESCO Controls (TESCO) is the Company's SCADA integrator. Tesco completed the installation of the first phase of the SCADA system in 2010 and has since been integrating the Company's upgraded facilities. Tesco has developed standardized RTU and ClearSCADA programming and is the logical selection for completing the integration of this project. The budget allocated for Tesco is based on their performance in the installation and integration of similar facilities.

Parsons Brinckerhoff will complete the project design and assist with performance evaluation as describe in Section C.1. Parsons Brinckerhoff has been assisting the Company with other facility improvements and implementation of its SCADA system upgrades. The level of effort was estimated based on similar efforts on other projects.

Environmental and Regulatory Compliance Costs

No permits or approvals are anticipated for this project, as discussed in Section G.7 However, based on the Company's experience with other Reclamation funded check structure upgrade projects, an Environmental Assessment (EA) is anticipated. The cost for Reclamation to complete this work is likely to be similar to the effort required for the Barnes Crossing Project. Based on conversation with local Reclamation staff, a $10,000 budget was deemed prudent to prepare the EA for this project.

Reporting

Project reporting costs incurred by the Company have been included in the Company staff hours above.

Other Expenses

No other costs are associated with this project.

Indirect Costs

Indirect costs are not included in this proposal.

Total Costs

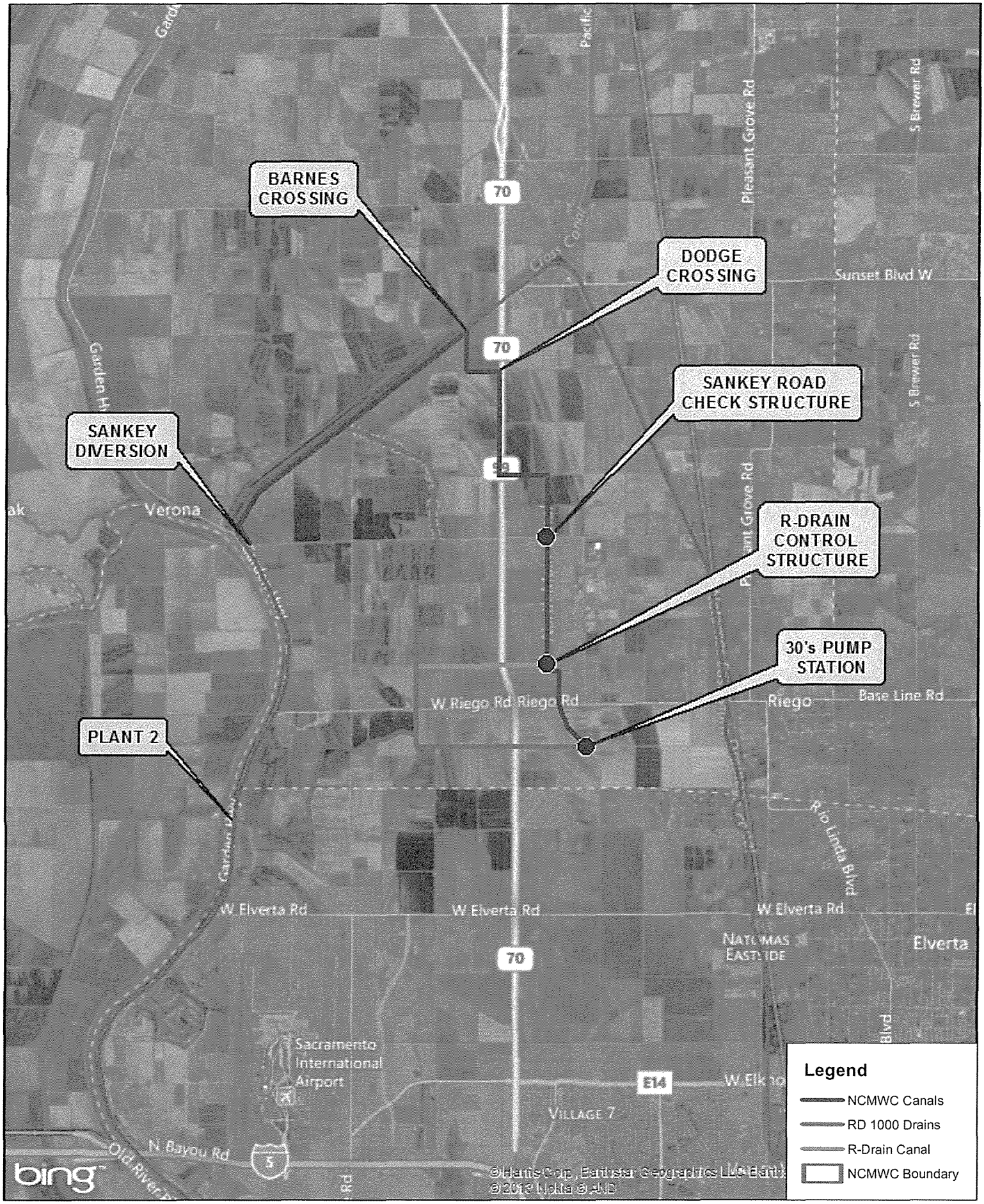
Total project costs have been identified, as well as the subtotal cost for each task identified in the work plan in order to provide a clear definition of how the budget was determined.

APPENDIX A

COMPANY SERVICE AREA MAP

AND

NATOMAS BASIN CONSERVANCY MAP



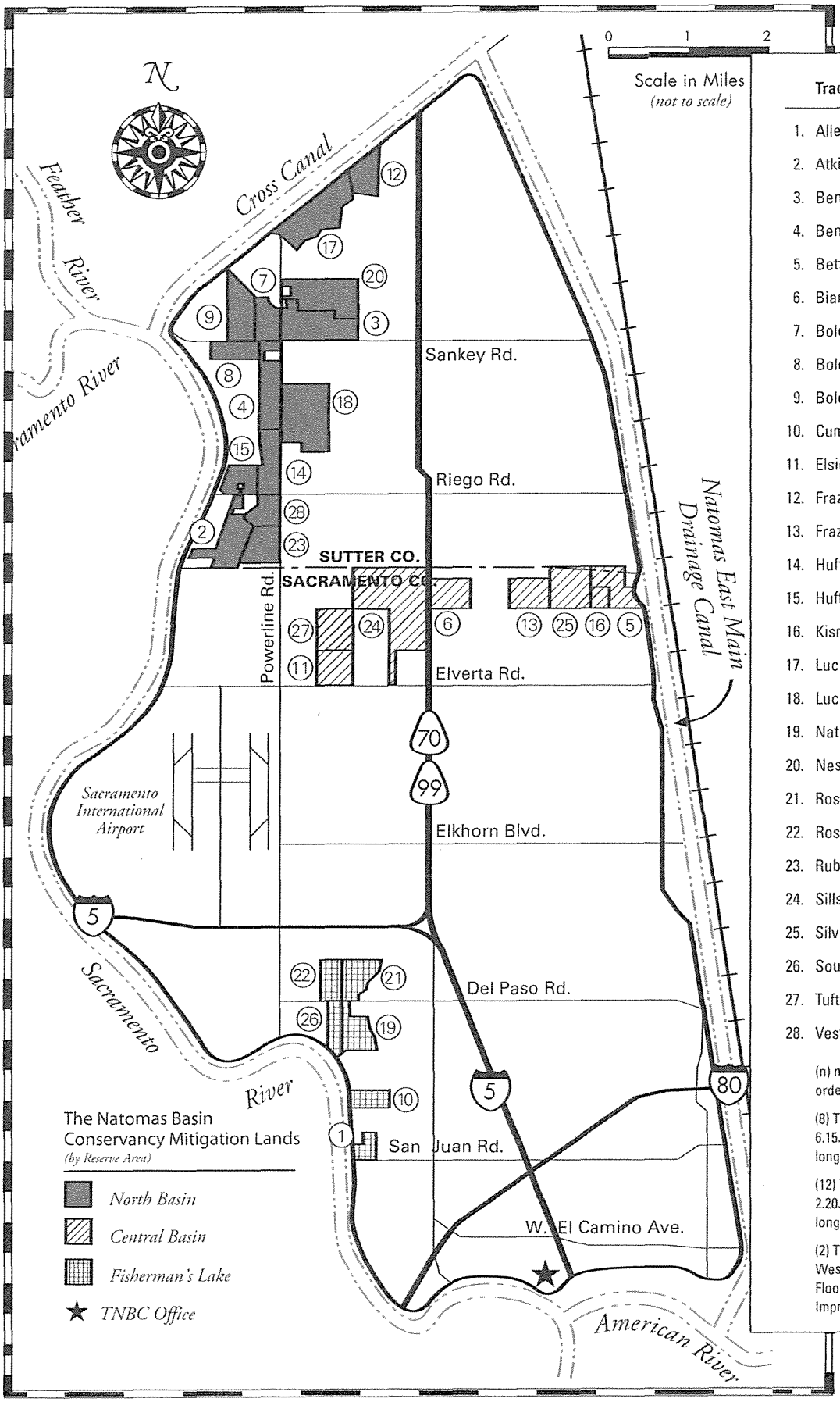
NATOMAS CENTRAL MUTUAL WATER COMPANY

R-DRAIN CONTROL STRUCTURE AUTOMATION PROJECT

0 0.250.5 1 1.5 2 Miles

2010 BASE MAP

THE NATOMAS BASIN CONSERVANCY



	Tract	Acq. Date	Acres
1.	Alleghany (14)	11.07.02	50.2601
2.	Atkinson (16)	06.12.03	198.83
3.	Bennett North (4)	05.17.99	226.675
4.	Bennett South (5)	05.17.99	132.486
5.	Betts (2)	04.05.99	138.992
6.	Bianchi West (28)	11.07.06	110.16
7.	Bolen North (23)	04.29.05	113.619
8.	Bolen South (24)	04.29.05	102.381
9.	Bolen West (26)	09.01.06	155.141
10.	Cummings (15)	11.07.02	66.8307
11.	Elsie (29)	11.07.06	158.031
12.	Frazer (9)	07.31.00	92.6
13.	Frazer South (30)	11.07.06	110.372
14.	Huffman East (19)	09.30.03	135.746
15.	Huffman West (18)	09.30.03	157.85
16.	Kismat (3)	04.16.99	40.293
17.	Lucich North (6)	05.18.99	267.986
18.	Lucich South (7)	05.18.99	351.889
19.	Natomas Farms (11)	07.09.01	96.46
20.	Nestor (27)	09.01.06	233.16
21.	Rosa East (21)	03.23.05	106.2827
22.	Rosa Central (22)	03.23.05	100.015
23.	Ruby Ranch (17)	06.23.03	91.078
24.	Sills (13)	07.15.02	436.0559
25.	Silva (1)	01.07.99	159.2
26.	Souza (10)	07.02.01	40.00
27.	Tufts (20)	09.29.04	147.95
28.	Vestal (25)	09.12.05	94.951

(n) number in parentheses represents chronological order of acquisition

(8) The Brennan tract, acquisition #8,was acquired 6.15.00, subsequently exchanged on 9.1.06, and no longer owned by TNBC.

(12) The Ayala tract, acquisition #12, was acquired on 2.20.02, subsequently exchanged on 11.03.06, and no longer owned by TNBC.

(2) The Atkinson tract (6.566 acres), and (15) the Huffman West tract (23.146 acres) were sold to the Sacramento Area Flood Control Agency on 05.15.09 for the Natomas Levee Improvement Program.

Revision Date: 01/28/2010

APPENDIX B

EXCERPTS FROM THE SACRAMENTO VALLEY INTEGRATED REGIONAL WATER MANAGEMENT PLAN

Final

Sacramento Valley Integrated Regional Water Management Plan

December 5, 2006

- Formulate and conduct data gathering and investigations to build a credible body of knowledge about the groundwater resources.
- Prepare and distribute factual information to ensure that the public has an opportunity to become better informed about this important groundwater resource.
- Identify policy issues that need to be considered by or recommended to the respective entities in the region.

Additionally, the Coordinating Group will help facilitate and clarify the respective roles of the Department, special districts, and counties. This discussion may form the basis for an MOU or similar arrangement that will articulate the respective roles necessary for a cogent and coordinated integrated plan for groundwater management in Northern California.

4.1.2 System Improvement/Water Conservation Strategies

For this IRWMP, the system improvement strategy refers to potential projects or operational changes that will improve water management at the district or farm level, and actions that can be taken related to urban use. System improvement projects include canal lining, installation of facilities to reduce operational spills, or changes in management that can result in decreased river diversions or additional reuse of water.

The system improvement/water conservation strategies are designed to provide multiple benefits and serve multiple objectives. They provide for agricultural water recycling, water conservation, drainwater management, system automation, and associated water quality improvements. These types of projects help meet local and regional water supply needs, improve water quality, and enhance water system flexibility. Common elements among these strategies follow:

- They are locally formulated.
- They provide local/districtwide water supply reliability.
- They improve water system operation at the district level.
- They generally provide water quality benefits.
- They enhance district water system flexibility and system operations.

Numerous water use efficiency projects have been implemented recently, with additional projects seeking funding either underway or awaiting final approvals to proceed. A list of proposed projects formulated under system improvement strategies is provided in Appendix A.

In October 2002, NCWA, working with various agencies throughout Northern California, developed a regional agricultural water use efficiency program to encourage water use efficiency in the region and to help implement cost-effective local and regional programs to use water more efficiently. The regional program was based on meeting Quantifiable Objectives and/or Targeted Benefits established by CALFED and the Department. The

IRWMP provides an opportunity to further this regional water use efficiency program by a more detailed review of the potential opportunities and limitations for water use efficiency in the Sacramento Valley and then providing a framework for additional system improvements or other water use efficiency measures.

4.1.2.1 Urban Water Management

The Urban Water Management Planning Act of 1983 requires that every urban water supplier (public or private) who provides water for municipal purposes either directly or indirectly to more than 3,000 customers or supplies more than 3,000 ac-ft of water annually must prepare and submit to the Department an urban water management plan. The plan is to be updated at least every 5 years. Urban water management plans include the area served, quantity and sources of water, groundwater management plans, and future supply and demand projections. The Department reviews all submitted urban water management plans. All cities across the region have prepared these plans, and many urban purveyors have also completed and are implementing water master plans that guide their provision of water services.

4.1.2.2 Agricultural Drainwater Recycling and Management

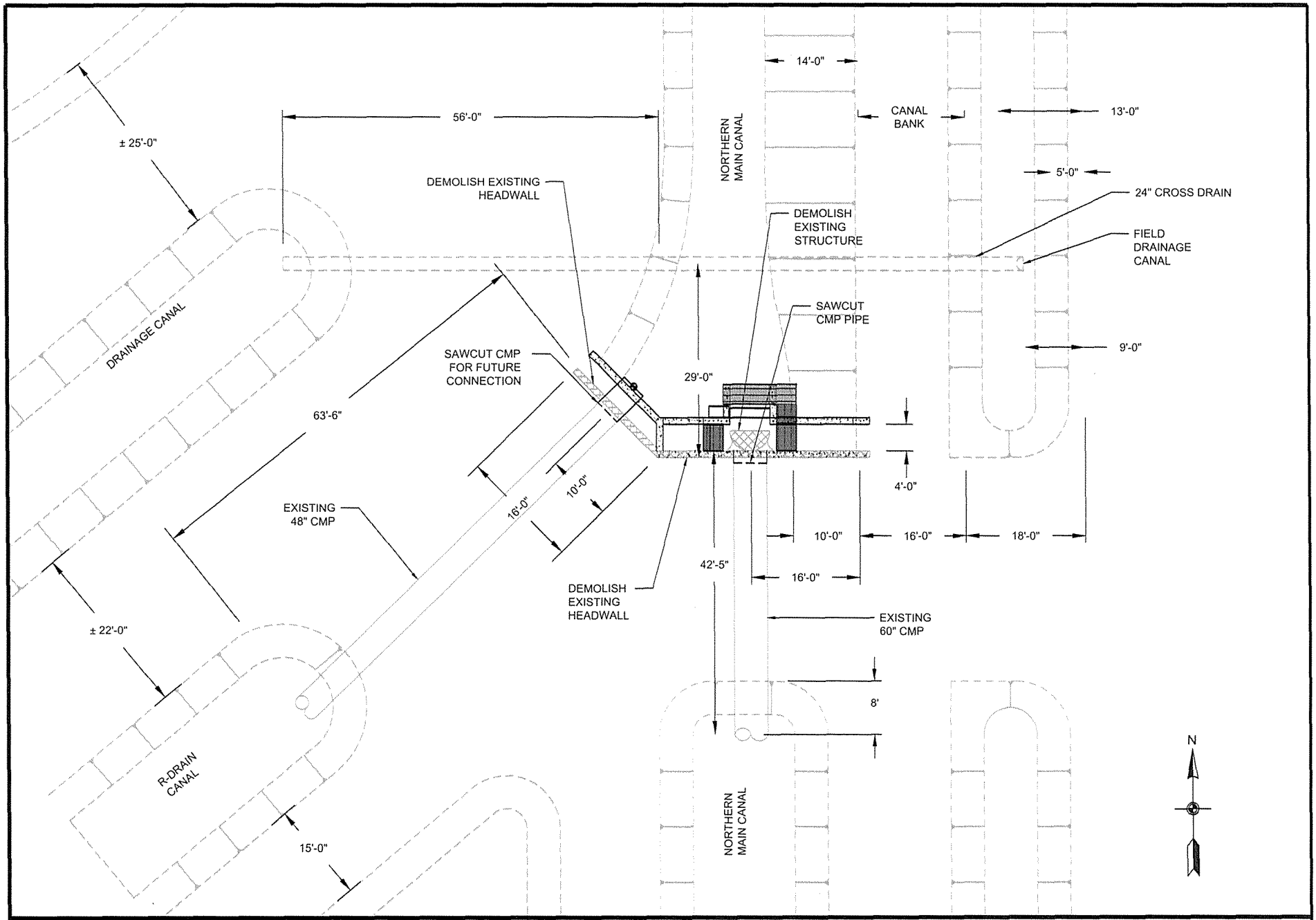
Drainwater management, in the form of controlling releases of drainwater from fields, reusing drainwater for onfield irrigation, and monitoring inflows to and outflows from drains, is a common practice in much of the Sacramento Valley. On a subbasin or larger scale, the management actions of the farmers within the individual districts can result in major cumulative influences on regional hydrology. These influences could include changes in river diversions (reduced or increased diversions as drainwater supplies change relative to irrigation demand); changes in flow rates in many natural sloughs, streams, and drains; the creation of habitat along the watercourses; and water quality and temperature effects at points of discharge to receiving waters. In addition to these influences on regional hydrology and habitat, drainwater management provides critical, regional-scale benefits by increasing the overall subbasin efficiency through repeated use of field tailwater runoff.

All of these impacts and benefits result from the largely independent actions of many irrigators who respond daily to changes in their local water supply and demand conditions. With some level of regional coordination, drainwater management could be expanded in conjunction with actions to address the water quality of return flows and other regulatory issues. The most logical and effective geographic unit for regional drainwater management appears to be the hydrologic subbasin. The following are the key objectives and related benefits of a regional drainwater management program:

- Improved measurement of drainage flows.
- Improved water quality sampling and real-time monitoring.
- Coordinated management of drainwater flow rates.
- Increased water management flexibility and potential for benefits.

APPENDIX C

PROJECT DOCUMENTATION



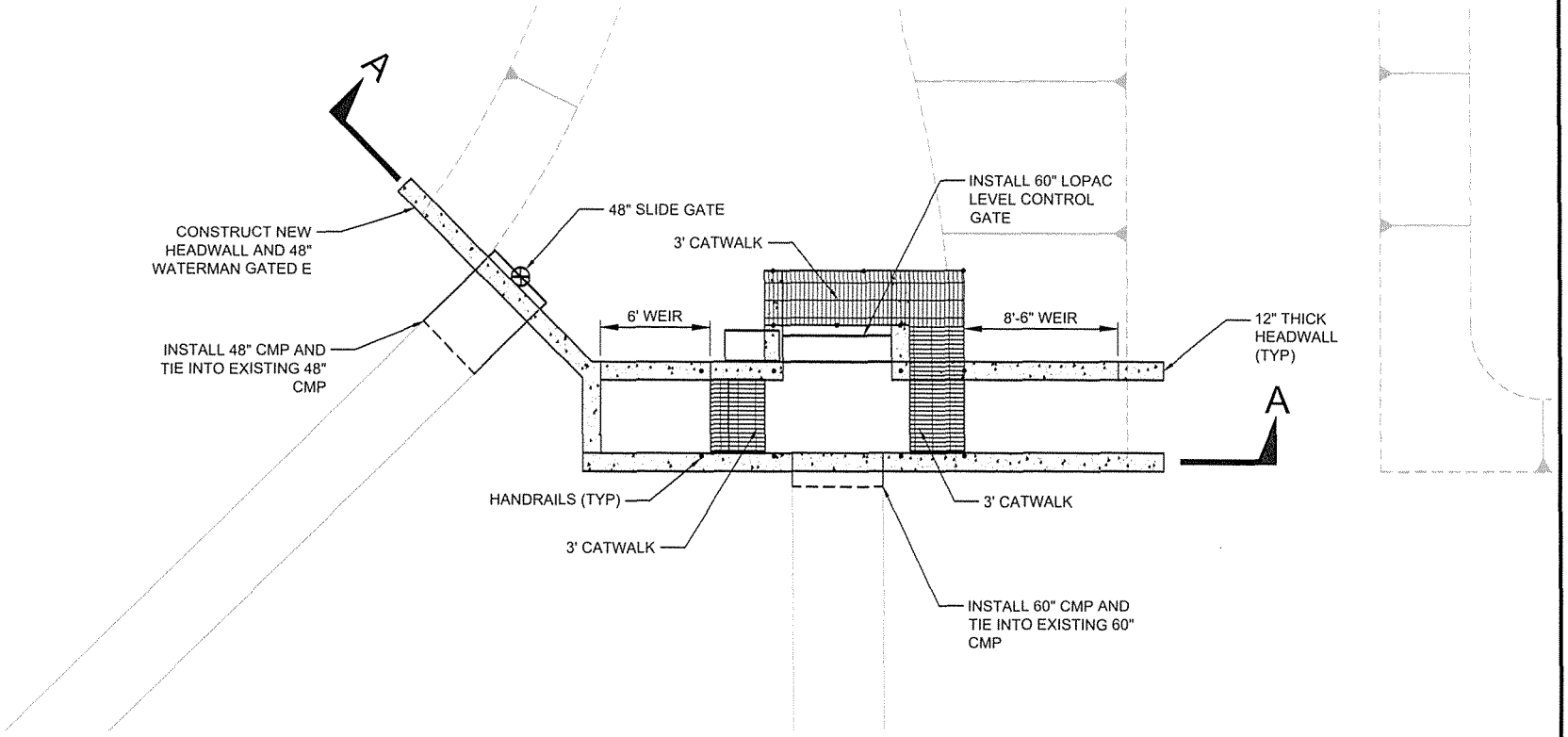
PARSONS BRINCKERHOFF

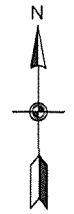
2329 Gateway Oaks Drive
SACRAMENTO, CALIFORNIA 95833
Tele: 916-567-2500
Fax 916-925-3517

SITE LAYOUT & DEMOLITION

0 20 40 60

SCALE:1" = 20' FEET





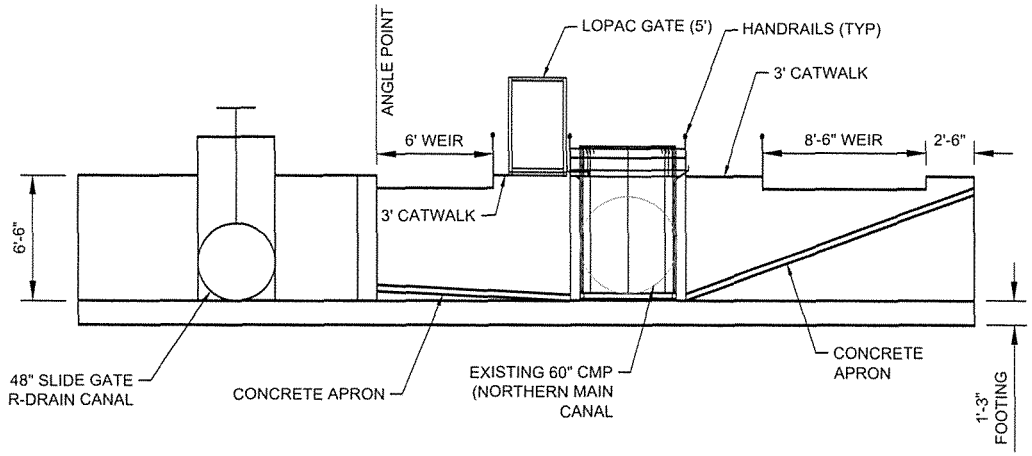
PARSONS BRINCKERHOFF

2329 Gateway Oaks Drive
SACRAMENTO, CALIFORNIA 95833
Tele: 916-567-2500
Fax 916-925-3517

SITE LAYOUT

0 10 20 30

SCALE: 1" = 10' FEET



SECTION A-A

PARSONS BRINCKERHOFF
2329 Gateway Oaks Drive
SACRAMENTO, CALIFORNIA 95833
Tele: 916-567-2500
Fax 916-925-3517

TYPICAL CROSS SECTION

0 10 20 30
SCALE: 1" = 10' FEET

R-Drain Check Structure Automation Project

Preliminary Opinion of Probably Costs January 10, 2014

Item #	Description	Cost
Construction Contract		**100,000**
1	Mobilization and Bonding (10% of Construction Costs)	11,000
2	Demolition	9,000
3	Site Preparation	6,000
4	Concrete	44,700
5	Backfill/Fine Grading	6,000
6	Rip Rap	800
7	Corrugated Metal Pipe (CMP) and Connections	2,500
8	Slide Gate (48") Turnout to R Drain	9,300
9	Grating/Walkways	3,200
11	Lopac Gate -Installation	3,000
14	Control Section for Flow Meter Installation	4,500
Aqua Systems 2000, Inc		**48,600**
10	Lopac (60" Slide Gate)	48,600
Tesco Controls		**90,900**
12	Flow Meters	19,600
13	Controls/SCADA/Solar/PLC Programming	58,500
15	Level Tranceducers	12,800
	Subtotal Costs (Items 1.0, 2.0, & 3.0):	**239,500**
4.0	**Soft Costs**	**56,300**
4.1	Survey - Psomas	4,500
4.2	Design - Pasons Brinckerhoff	31,700
4.3	Project Admin/Mgmt - Natomas Mutial Water Co	10,100
4.4	Environmental Compliance - Reclamation	10,000
	Total Costs(Items 1.0, 2.0, 3.0, & 4.0):	**295,800**

Item Number matches Preliminary Design Cost Estimate prepared on 1/16/2014

1. MOBILIZATION / DEMOBILIZATION
   * 10% OF CONSTRUCTION

2. DEMOLITION — $9,000
   - ASSUME 2 DAYS @ $3,000/DAY ⇒ $6,000
     FOR EXCAVATOR + 2 LABORERS
   - DISPOSAL
     CONCRETE: $[60 \times 1 \times 8 + 6 \times 1 \times 60] \times 150 pcf / 2000 = 63$ TONS
     DISPOSAL FEE = $40/TON × 63 TONS ≅ $2,500
     HAULING: TWO TRUCKS, 3 TRIPS, 1 hr PER TRIP
     = 2 × 3 × 1 = 6 hrs @ $60/hr = $360

   TOTAL = 6,000 + 2,500 + $360 = $8,860 SAY $9,000

3. SITE PREPARATION — $6,000

   ASSUME 2 DAYS @ $3,000/DAY = $6,000

4. CONCRETE — $44,700
   - FOOTING VOLUME = $\frac{15''}{12} \times (32' + 32' + 4' + 14') \times 6 FT / 27$
     = 23 CY @ $600/CY = $13,800
   - SLAB @ GATE V = $(5 FT)(8 FT)(15''/12)/27$
     ≅ 2 CY @ $600 = $1,200
   - WALLS = $\frac{15''}{12}[32 + (32 - 5) + 2 \times 5 + 4 + 14] \times 7.5 FT / 27$
     V ≅ 24 CY @ $1,200 CY = $28,800
   - LINING BETWEEN WALLS
     $V = 4 FT \times [20 + 12\sqrt{5}] \times 4/12/27$
     = 0.3 CY @ $400/CY ≅ $900

   TOTAL = 13,800 + 1,200 + 28,800 + 900 = 44,700

5) BACKFILL & FINISH GRADING $6,000

ASSUME 2 DAY @ $3,000/DAY = $6,000

6) RIP RAP $800

PLACE ON SLOPE, 5FT IN FRONT OF STRUCTURE

$Y = 2 \times 5\text{FT} \times 12\sqrt{5} \times 1.25\text{FT}/27 = 12.4\text{CY}$

TOTAL = 12.4 CY · 1.6 TONS/CY × $40/TON = 800

7) CMP PIPE CONNECTIONS/CASTING $2,500

48": 6FT + FITTING ⇒ 6FT × $150/LF + 1(150) = $1,050
60": 6FT + FITTING ⇒ 6FT × $200/LF + 1(250) = 1,450

TOTAL = 1,050 + 1,450 = $2,500

8) 48" SLIDEGATE $9,300

WATERMAN FABRICATED 48" SLIDE GATE
$6,500 + TAX & DELIVERY = 6,500 × 1.075 + 800
≈ 7,800

INSTALLATION, ASSUME 1/2 DAY @ $3,000/DAY

TOTAL = 7,800 + 3,000/2 = $9,300

9) GRATING & WALKWAY $3,200

STRUCTURAL: 4×4FT + 2×10FT + 2×5FT = 46FT
@ 20 lbs/FT ⇒ 920 lbs @ $3/LB = $2,760
HANDRAIL: 2×4 + 2×10 + 2×8 = 44LF @ $3/LF ≈ $140
GRATING: (4×3) + (10×3) + (8×3) = 66SF @ $5/SF = $330

TOTAL = 2760 + 140 + 330 = $3,230 SAY $3,200

10) LOPAC GATE - 5'x6' GATE $48,600
SOLAR POWERED
SEE QUOTE FROM SUPPLIER! 45,000 + TAX = 48,600

11) LOPAG GATE INSTALLATION $3,000
ASSUME 1 DAY @ $3,000/DAY
PROGRAMMING COVERED IN SCADA STATION

12) FLOW METERS $19,600

(2) SONTEK IQ PLUS @ 8,200 EA PER VENDOR (PLUS TAX + FREIGHT)
(2) CABLES (60m) @ 740 EA PER VENDOR
INSTALLATION INCLUDED IN SCADA STATION

TOTAL = 2 x [8,200 + 740] x 1.075 + $400 = 19,621
SAY 19,600

13) LEVEL TRANSDUCERS w/ STILLING WELLS $12,500
THREE (3) LOCATIONS
USE $3,000 EA FOR EQUIPMENT, STILLING WELL & INSTALL
CONDUIT 4 3 (#12) WIRE: 250 FT TOTAL @ $15/LF

TOTAL = 3 x 3,000 + 250 FT x 15 = $12,750 SAY 12,500

14) CONTROL SECTION FOR FLOW METER $4,500
2 LOCATION w/ CONCRETE CONTROL SECTION
VOL = 2 x [(16) x 28] x 4 1/2/27 = 11.1 CY @ $400/CY = 4,440
USE 4,500

15) SCADA STATION $58,500
SOLAR POWERED STATION
SEE QUOTE: 58,500 INCLUDING TAX

Aqua Systems 2000 Inc.
5, 4006 - 9 Avenue North, Lethbridge, Alberta, Canada T1H 6T8
Phone: (403) 380-2724 or (800) 315-8947 Fax: (403) 327-8543

10 January 2014

Parsons Brinckerhoff
2329 Gateway Oaks Dr.
Suite 200
Sacramento, CA 95833-4231

Attention: Ashley L. Orsaba-Finders, P.E.
Engineer II

RE: Natomas Central Mutual Water Company – R -Drain
Budget – Manual Electric Hydra-Lopac Gate

The following is our budget for the supply of the following equipment and services:

Solar Powered – 12 VDC Manual Electric HYRA - LOPAC Gate - $41,000.00

- Approximately 5.0 feet wide x 6.0 feet high.
- Approximate frame width – 58"
- 3CR12 Stainless steel.
- Nylatron submerged bearings (self-lubricated).
- Hydraulic actuator.
- Mechanical enclosure.
- Electrical panel c/w fuse & terminal blocks, motor starter.
- 170 watt solar panel c/w regulator.
- 12 Vdc deep cycle battery (1) by owner.
- High level assist probe and relay.
- Gate position transducer (4 – 20 mA output)
- Assembled ready for installation – outer enclosure to mount.
- Operation and maintenance manual.
- Installation assistance and training.

- **Shipping – FOB - Coaldale, AB $4,000.00**
  - AS2I to pay and charge
- **Total this Budget - $45,000.00**

- Currency: US$
- Note: The above budgets do not include local, state or federal taxes.
- Warranty: Two years.

The above budget does not include controller, human machine interface or instruments except for a gate position transducer. There should enough room on the electrical panel door for an interface and on the back pan for a controller and radio.

The district will be responsible for the installation of the Hydra-LOPAC gate with assistance provided by AS2I representative.

The HYDRA-LOPAC gate will be assembled ready for installation. The following summarizes the labor and equipment requirements to install the gate and outer enclosure – total installation time is usually less than a day:

- Small crane capable of lifting and placing – 6 hours on site time.
- Labor – three men – 8 hours on site time.
- Concrete drill and anchor bolts.
- Miscellaneous tools.

The Hydra-LOPAC gates are custom designed and fabricated for each site. The clearance allowed between the gate frame and walls is approximately two inches.

Thank you for the opportunity for providing a quote for this project. If you wish to discuss please call me at 1-800-315-8947.

Sincerely,

Gerald D. Robinson
Aqua Systems 2000 Inc.

TESCO™
Headquarters
8440 Florin Rd.
Sacramento CA, 95828
(P) 916-395-8800
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42015 Remington Ave, Ste 102
Temecula, CA 92590
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213 Sage Street
Carson City, NV 89706
(P) 800-94-TESCO

Louisiana
10699 Airline Hwy Suite B
Baton Rouge, LA 70816
(P) 225-910-4573

♦♦♦ Engineering • Manufacturing • Systems Design • Systems Integration • Service & Support ♦♦♦

DATE: January 10, 2014

TO: **Parsons Brinckerhoff**
ATTN: **Scott Brown**

JOB NAME: Natomas Central Mutual Water Company, R Drain solar Powered Control Panel, Budgetary Estimate
TESCO QUOTE NO.: 14A066Q01

As per your request, we are pleased to quote the following "Scope-of-Work" pertaining to the above-mentioned project. The scope of work includes a new pre-programmed control panel to monitor and control the following:

- Qty. of (2) Sontek flow meters
- Qty. of (3) level transmitters
- Qty. of (1) gate actuator

The new solar powered control panel shall be programmed to allow operations to monitor statuses and control the gate from SCADA. Gate position shall be controlled based on maintaining operator determined level and maintaining operator determined flow. Tesco will provide the control panel, solar equipment, antenna and coaxial cable for installation by others. Antenna mast and solar array mast shall be provided and installed by others. Tesco shall also perform a radio signal strength test to determine antenna height requirements. Startup and operational test shall be performed by Tesco.

Item	Description
1	**NEMA 3R Wall Mounted Control and RTU Panel to Include:** • Outdoor rated enclosure • 120V disconnects • Tesco L2000 PLC with operator interface • 5-Card rack • Required I/O • Required I/O termination blocks • Low voltage power supply • Backup battery with charger • RS232 to RS485 converter for modbus interface • Radio transceiver • Antenna with mounting bracket (shipped loose) • Coaxial cable with connectors (shipped loose) • Misc. relays, fuses, terminal blocks, etc.
2	**Solar Equipment to Include:** • 110 Watt solar modules • Solar module pole mount hardware • PV combiner box with distribution blocks and DC breakers • Battery enclosure with required 12V batteries and charge regulator

Item	Description
3	**Tesco Controls, Inc. Professional Services to Include:** • Project Engineering and Management • PLC Programming • SCADA configuration • Field Services to include on site radio signal strength verification, startup, calibration, and operational test

Total cost for items 1 thru 3: $58,500.00
Including Tax

TERMS

- SUBMITTAL: approximately 4-6 weeks after receipt of purchase order.
- DELIVERY: approximately 8-10 weeks after receipt of approved submittals.
- QUOTATION FIRM FOR 30 DAYS UNLESS OTHERWISE STATED.
- Final retention to be paid 10 days after the project notice of completion.
- TESCO's price does include applicable sales taxes, use taxes and applicable fees.
- TESCO price is FOB factory, full freight allowed.
- TESCO warranties against defect in design workmanship and materials for a period of one year from date of installation, and does not exceed 18 months from the date of shipment from the factory.
- TESCO carries liability insurance, with full workman's compensation coverage.
- Terms: Net 30 days on approved credit accounts.
- Interest will be applied on all past due invoices.
- All merchandise sold is subject to lien laws.

PROJECT CLARIFICATIONS:

- TESCO's price will be to furnish only, and does not include conduit, wire, tubing, termination, or installation.
- TESCO's price does not include local control stations and/or field mounted disconnects.
- TESCO's price does not include instrumentation, instrumentation mounting brackets, stanchions, and sunshields.

If we can be of any further assistance, please contact us.

Sincerely,

Richard Martinez
Estimator, Design/Build

TESCO Controls, Inc.
An Employee-Owned Company
Phone: (916) 395-8800
rmartinez@tescocontrols.com
www.tescocontrols.com
"Excellence in Controls and System Integration"

ANNUAL O&M COSTS

UTILITY BILL (ASSUME PG&E AG-I RATES)

STAND-BY CHARGE: $4/MONTH ⇒ $48/YR

ELECTRIC USAGE:

ASSUME: 2 hp MOTORS FOR EACH GATE
RUNTIME: 1 min EVERY 30 MINUTES

$$2 \times 2\,hp \times 0.746\,kW/hp \times \frac{1\,min}{60\,min/hr} \times (2 \times 24\,hrs)$$

= 2.5 kwhrs PER DAY
USE 4 kwhrs PER DAY TO INCLUDE STATION USE FOR SCADA / BATTERY CHARGERS

SUMMER USE = 6 MONTHS × 30 day/month × $\frac{4\,kwhrs}{day}$ × 22¢/kwhr

= $158.40

WINTER USE = 3 MONTHS × 30 days/month × $\frac{4\,kwhrs}{day}$ × 17¢/kwhr

= $61.20

NON-OPERATIONAL 3 MONTHS /YR

TOTAL ANNUAL OPERATIONS COST

= $48 + $158.40 + $61.20 = $267.20 SAY $300/YR

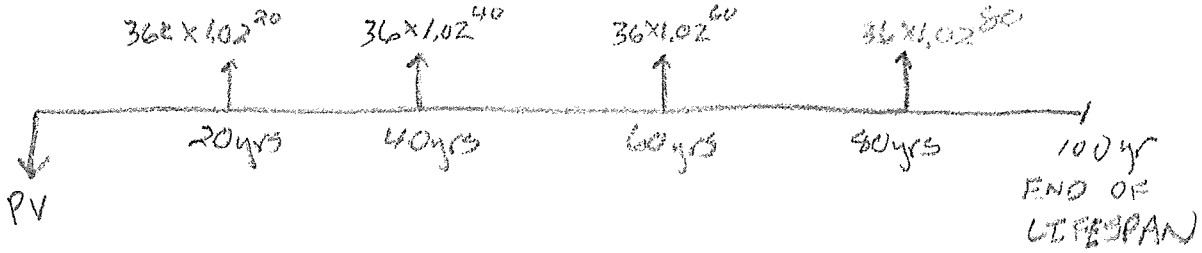
MAINTENANCE COST

ELECTRICAL EQUIPMENT LIFE SPAN = 20 yrs

REPLACE ELECTRICAL EQUIPMENT 4 TIMES OVER LIFE OF INVESTMENT

- SCADA COMPONENTS	@ 20,000
- LEVEL TRANDUCER	6,000
- FLOW METER	10,000
	$36,000

PRESENT VALUE ANALYSIS: ASSUME 2% INFLATION, 6% DISCOUNT



$$PV = 36{,}000\left[\left(\frac{1.02}{1.06}\right)^{20} + \left(\frac{1.02}{1.06}\right)^{40} + \left(\frac{1.02}{1.06}\right)^{60} + \left(\frac{1.02}{1.06}\right)^{80}\right]$$

$\approx \$29{,}650$

ANNUALIZE @ 6% FOR 100 yrs

$$\text{ANNUAL MAINTENANCE COST} = 29{,}650\left[\frac{0.06(1.06)^{100}}{(1.06)^{100}-1}\right]$$

$= 1784$ SAY $\$1{,}800$/YEAR

APPENDIX D

ANNUAL DIVERSIONS

Natomas Mutual Water Company

Summary of Monthly Diversions, 1986 to 2013

Monthly Values in acre-ft

	April	May	June	July	Aug	Sept	Oct	Total
1986	5363	18705	16498	16822	12677	5799	1074	76,938
1987	6821	19147	16934	15906	14973	4867	2527	81,175
1988	5178	16313	15774	21258	17251	5873	3070	84,717
1989	3097	18151	17768	19027	15695	5643	593	79,974
1990	7366	16571	16782	20585	16805	4447	2900	85,456
1991	2307	18584	18996	20219	17131	3754	1629	82,620
1992	1789	22027	19807	20366	16730	1952	671	83,342
1993	447	17985	15215	20272	16291	5225	1153	76,588
1994	8807	19622	23459	24116	13898	2916	1185	94,003
1995	519	9441	16274	18050	19307	4410	2910	70,911
1996	1088	16225	15242	23078	19563	10034	5198	90,428
1997	9197	22629	19726	18935	11144	3627	3497	88,755
1998	434	10398	8610	19997	14211	5845	5034	64,529
1999	1982	21824	17941	23628	17379	5216	2846	90,816
2000	2006	17892	19591	21876	17009	1612	558	80,544
2001	3170	15921	15832	18586	12334	2849	1289	69,981
2002	5104	19869	21247	21815	13026	6551	416	88,028
2003	1290	12566	16459	23861	17875	4112	983	77,146
2004	8173	18706	21850	23882	14508	6586	1219	94,924
2005	1068	13409	12874	21991	19114	10248	1535	80,239
2006	0	10556	14013	20783	18394	8396	698	72,840
2007	2677	13497	13943	15552	12856	5416	914	64,855
2008	6042	12153	11735	13879	10440	2284	683	57,216
2009	2612	9959	10423	15280	11117	3096	288	52,775
2010	0	7166	9333	13752	10355	4495	955	46,056
2011	24	10425	6209	12368	11354	3281	346	44,007
2012	1203	12652	13798	16084	12389	4295	702	61,123
2013	4350	19198	14776	20285	13097	2209	136	74,051
Average	3289.8	15771.1	15753.9	19366.2	14890.1	4822.8	1607.5	75,501
Range								
Max	9197	22629	23459	24116	19563	10248	5198	94,924
Min	0	7166	6209	12368	10355	1612	136	44,007

APPENDIX E

NATOMAS CENTRAL MUTUAL WATER COMPANY

EMPLOYEE FRINGE BENEFITS

Fringe Benefits for Company Employees

HOURLY RATE:			AMOUNT AND PERCENTAGE OF BASE HOURLY RATE															
			BASE	MEDICAL		PENSION/401k		SOCIAL SEC		MEDICARE		WORK/COMP		TOTAL	
			per Hr	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%
ADMINISTRATION:		**Hours**													
General Manager	$ 135,000.00		$ 64.90	$ 9,838.80	7%	$ 10,125.00	8%	$ 8,100.00	6%	$ 1,957.50	1%	$ 1,404.00	1%	$ 31,425.30	23%
Assistant Gen. Mgr.	$ 95,000.00		$ 45.67		0%	$ 7,125.00	8%	$ 5,700.00	6%	$ 1,377.50	1%	$ 6,362.72	7%	$ 20,565.22	22%
CLERICAL:		**Hours**													
Office Mgr.	$ 58,988.80		$ 28.36	$ 8,659.32	15%	$ 4,424.16	8%	$ 3,539.33	6%	$ 855.34	1%	$ 533.73	1%	$ 18,011.88	31%
Secretary	$ 33,280.00		$ 16.00	$ 9,338.64	28%	$ 2,496.00	8%	$ 1,996.80	6%	$ 482.56	1%	$ 301.12	1%	$ 14,615.12	44%
Average for Clerical					**21%**		**8%**		**6%**		**1%**		**1%**		**25%**
FIELD PERSONNEL:		**Hours**													
Field Supervisor	$ 41,600.00		$ 20.00	$ 6,625.20	16%	$ 3,120.00	8%	$ 2,496.00	6%	$ 603.20	1%	$ 8,965.26	22%	$ 21,809.66	52%
North Ditchtender	$ 34,320.00		$ 16.50	$ 3,758.40	11%	$ 2,574.00	8%	$ 2,059.20	6%	$ 497.64	1%	$ 7,396.34	22%	$ 16,285.58	47%
Central Ditchtender	$ 37,440.00		$ 18.00	$ 8,353.20	22%	$ 2,808.00	8%	$ 2,246.40	6%	$ 542.88	1%	$ 8,068.74	22%	$ 22,019.22	59%
South Ditchtender	$ 35,360.00		$ 17.00	$ 8,592.00	24%	$ 2,652.00	8%	$ 2,121.60	6%	$ 512.72	1%	$ 7,620.47	22%	$ 21,498.79	61%
Relief Ditchtender	$ 33,280.00		$ 16.00	$ 3,758.40	11%	$ 2,496.00	8%	$ 1,996.80	6%	$ 482.56	1%	$ 7,172.21	22%	$ 15,905.97	48%
Equipment Operator	$ 40,040.00		$ 19.25	$ 11,156.40	28%	$ 3,003.00	8%	$ 2,402.40	6%	$ 580.58	1%	$ 8,629.07	22%	$ 25,771.45	64%
Main Labor/ Equip Op	$ 39,520.00		$ 19.00	$ -	0%	$ 2,964.00	8%	$ 2,371.20	6%	$ 573.04	1%	$ 8,517.00	22%	$ 14,425.24	37%
Maintenance Labor	$ 33,280.00		$ 16.00	$ 7,001.40	21%	$ 2,496.00	8%	$ 1,996.80	6%	$ 482.56	1%	$ 7,172.21	22%	$ 19,148.97	58%
Maintenance Labor	$ 35,880.00		$ 17.25	$ 9,794.40	27%	$ 2,691.00	8%	$ 2,152.80	6%	$ 520.26	1%	$ 7,732.54	22%	$ 22,891.00	64%
Maintenance Labor	$ 37,440.00		$ 18.00	$ 19,688.40	53%	$ 2,808.00	8%	$ 2,246.40	6%	$ 542.88	1%	$ 8,068.74	22%	$ 33,354.42	89%
SCADA Tech	$ 35,360.00		$ 17.00	$ 8,769.60	25%	$ 2,652.00	8%	$ 2,121.60	6%	$ 512.72	1%	$ 7,620.47	22%	$ 21,676.39	61%
Operations Supervisor	$ 41,600.00		$ 20.00			$ 3,120.00	8%	$ 2,496.00	6%	$ 603.20	1%	8965.2643	22%	$ 15,184.46	37%
Average for Field:		**$ -**			**26%**		**10%**		**8%**		**2%**		**29%**		**58%**
OVERALL AVERAGE:					**14%**		**8%**		**7%**		**2%**		**9%**		**32%**

1. The basis of rate computations are the base hourly rates for all employees during 2013
2. The above rates are the company's provisional rates and are used for proposals and billing purposes. These rates can change on an annual basis if and when the BASE/Hr.is increased or decreased.
3. The above amounts attributed are based upon a 40 hour work-week.