MADERA IRRIGATION DISTRICT

APPLICATION

FOR

U.S. BUREAU OF RECLAMATION

2013 WATER AND ENERGY EFFICIENCY GRANT

Funding Group I

JANUARY 17, 2013

IRRIGATION WATER CONSERVATION, TELEMETRY AND DELIVERY SYSTEM MANAGEMENT IMPROVEMENT PROJECT

MADERA IRRIGATION DISTRICT
12152 Road 28 1/4
Madera, CA 93637

Thomas Greci, General Manager
Tele: (559) 673-3514 / Fax: (559) 673-0564

Email: tgreci@madera-id.org

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Technical Proposal and Evaluation Criteria

Executive Summary

The following is the pertinent information regarding the Applicant:

Date Of Application:	January 17, 2013
Name of Applicant:	Madera Irrigation District
City/County:	Madera, Madera County
State:	California

Address and Contact Information:

MADERA IRRIGATION DISTRICT
12152 Road 28 1/4
Madera, CA 93637

ATTN: Thomas Greci, General Manager
Tele: (559) 673-3514 / Fax: (559) 673-0564

Email: tgreci@madera-id.org

The proposed work to be accomplished with the combined resources of District and the Water Smart Grant funding is to replace the numerous manual control gates within the Districts extensive canal system with an automated precise metered control gate operation along with remote sensing capability to provide system wide management and monitoring for flow control. The project goal is to achieve sustainable water savings, improved management of resources through conveyance improvements (compliance with Section III Eligible Projects - **Irrigation Flow Measurement** and **SCADA and Automation**) that will:

- Meter flows to maintain constant levels in in each canal segment and reduce the need to release excess waters from reservoirs.
- Install automated gates to maintain constant volume canal levels and reduce losses through current manual surcharging of channel segments to compensate for high/low imbalance.
- Install SCADA system to provide remote sensing of all gate/channel operations to eliminate losses from overflows, over-deliveries at turnouts and to provide early detection of breaching of dikes.
- When excess waters are available, direct water savings to groundwater water bank and recharge facilities.
- Install solar power to operate gates and SCADA system (renewable energy) to eliminate extension of electrical service and demands on electrical system (carbon neutral installation).

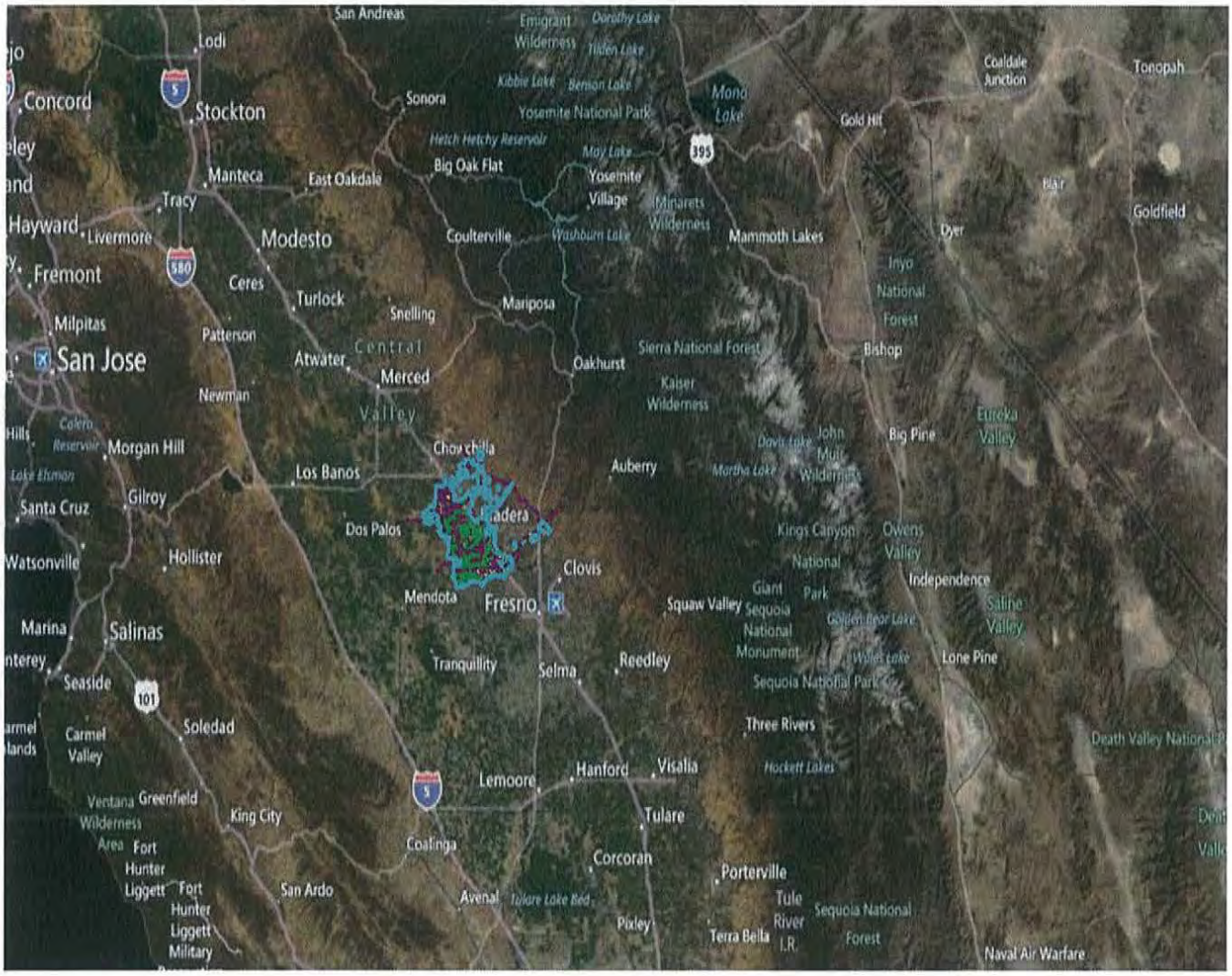
Project will be complete in two years with an estimated completion date of July 2015.

Background Data

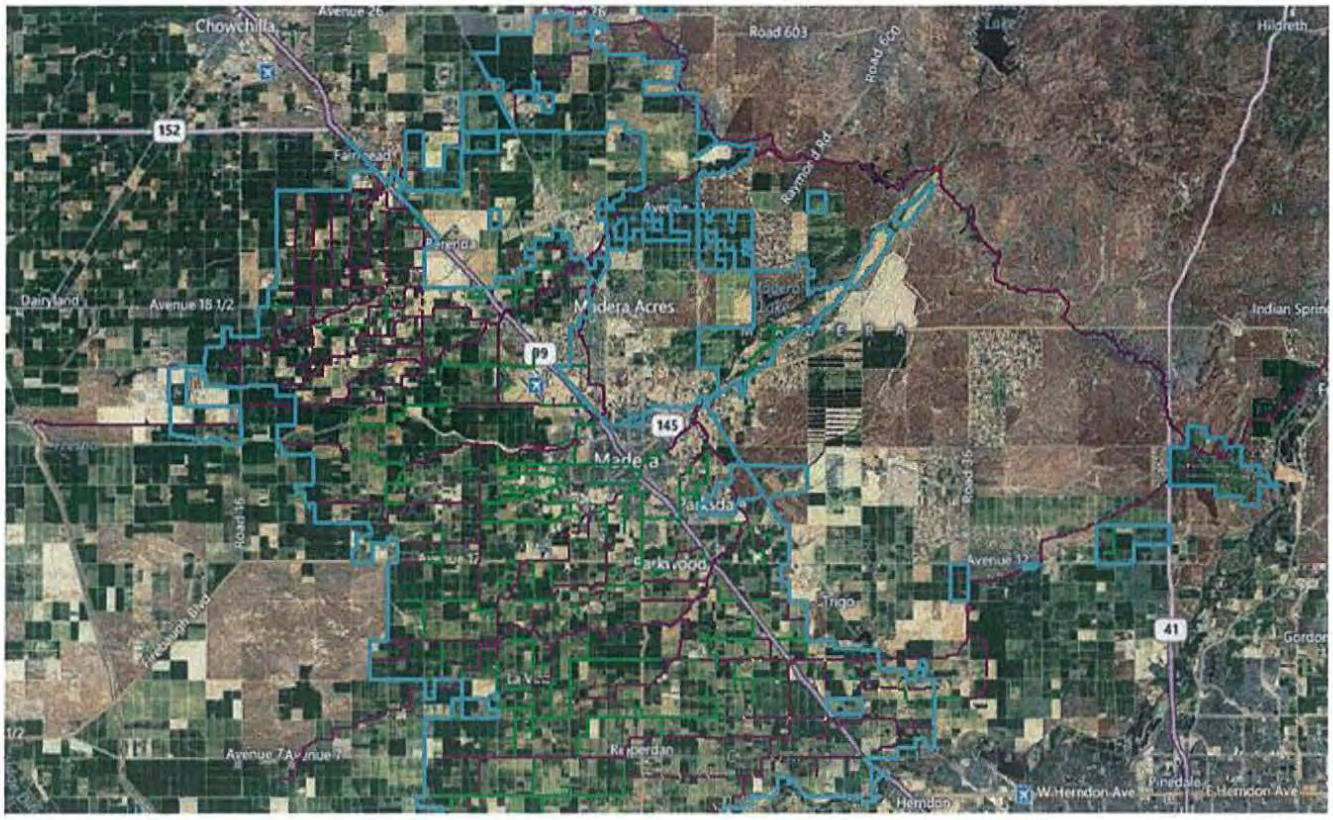
Map of District and Location of Proposed Improvements.

Location Map – Central California - Madera Irrigation District – Madera County, California

Note: Blue line designates the boundary of the District. The City of Madera is in the center of the District.



Location Map – District Boundary



Location – The map below shows the location of the District boundaries (shown in blue) in relation to its geographic location within the Central portion of the State of California. The District is located 18 miles north of the City of Fresno and is bisected by State Highway 99 and State Highway 145. The City of Madera is located within the District boundaries.

Formation - The Madera Irrigation District was formed in 1920 by popular vote of the people residing within the then proposed Madera Irrigation District and comprised 350,000 acres. The Madera Irrigation District operates under rules as set forth by the California Water Code. Under Section Code 20571, irrigation districts are given the right to assess land within their district boundaries. The District sells irrigation water for a fee above and beyond assessments levied on land within the District.

Over the 90 year history of the District, portions where removed or transferred for the formation of other Districts and the District is currently 130,400 acres in size.

Distribution System - The District utilizes 315 miles of canals to deliver water to agricultural users including 90 miles of unlined canal and 225 miles of clay lined canals.

In addition, the District also distributes irrigation waters through 118 miles of pipeline.

Source of Water - Water Supply Contracts – MID has three sources of water; the San Joaquin River, the Fresno River, and pre-1914 rights to Big Creek and Soquel Creek. This water is then stored at either Millerton Lake (Friant Dam) or Hensley Lake (Hidden Dam). MID water is distributed via the Madera Canal and the Fresno River (below Hidden Dam).

From the Hidden Dam of Hensley Lake, the water flows into the district along the Fresno River to deliver other federal and non-federal water rights. The Bureau of Reclamation has recently agreed to store and convey up to 36,000 acre-feet of Madera Irrigation District (MID) non-federal water from 2010 through February 2015. The storage provides greater water management flexibility as compared to operating Hensley Lake for flood control alone which tends to make water available too early in the growing season.

The district calls water off the Madera Canal and Hidden Dam, USBR-owned facilities. On three locations of the Madera Canal, USBR sets the daily flows at the head gates of three conveyances: Lateral 6.2, Dry Creek, and Lateral 32.2. USBR controls the flow into the district from the Fresno River through its operations on the Hidden Dam of Hensley Lake. From the two laterals and two natural channels, the total seasonal surface water volume into the district is roughly broken up evenly in four paths or 25% per channel. Table 1 summarizes Madera Irrigation Districts' annual entitlements.

The District receives water for its customers from several sources as follows:

	AF	Source	Contract #	Contract / Restriction	Expiration
USBR Agricultural Class I	85,000	Federal	175R2891-IRd	Firm as available	None
USBR Agricultural Class II	186,000	Federal	175R2891-IRd	As available subject to obligation	None
Hensley Lake	24,000+	Federal	14-06-200-4020-IRd	Fluctuating annual yield	None
Other Pre-1914	Varies	Prior historic rights		Fluctuation annual yield	None

Land Information

a) Area – The District is 130,400 acres (of which 15,000 acres were annexed as a part of the Hidden Dam contract with the Bureau of Reclamation in 1975) and irrigated land totals 96,000 acres.

b) Topography - gently sloping plain, ranging in elevation from about 370 to 470 feet above sea level along the eastern boundary to 180 to 200 feet along the western boundary.

c) Depth to groundwater in the District is, in the extreme range, anywhere form 10 feet to 350 feet below the ground surface. Ninety percent of Bureau wells and private agricultural wells within the District fall within the depth range of 100 to 225 depending on geographic location. The historical trend of the Ground Water Table shows it is dropping 3 ft. per year.

Water Use - Water use has ranged from a low of 21,250 acre feet in 1977 to a high of 173,979 in 2011. Unused District irrigation water is usually disposed of through discharge into the water bank lands, sold to other districts either in direct transfer or through indirect transfer from waters allocated to the District in the San Luis Reservoir or released into natural creeks and rivers. It should be noted that such sales or disposal are usually a direct result of storm waters or excess availability during periods of low demand for agricultural uses within the District. In addition, drought years yielding below average rainfall and mountain runoff to reservoirs yields reduce availability of water from federal contracts.

Crop Data - District waters are primarily used for crop irrigation purposes. The cropping pattern in the District has changed from row crops in 1968 to one of principally permanent crops at present. High water costs have been one of the factors contributing to the present cropping pattern.

Listed below are the District crops grown in 2011 as listed by the Madera County Agricultural Commissioner:

Almonds	31,282 acres
Pistachios	7,903 acres
Pecans	5 acres
Walnut	651 acres
Olive	584 acres
Tree Fruit (Kiwi, persimmon, pomegranate, pear, apple, fig) (peach, plum, prune, nectarine, cherry, apricot)	4534 acres
Small Fruit (strawberry, blueberry, blackberry)	90.08 acres
Fallow / Pastureland	5,890.acres
Agriculture – Industrial (packing, cold storage)	235 aces
Small Lot / Urban / ROW	24,489 acres
Misc. Hay and Grains	4,943 acres
Grapes (table, wine, raisins)	44,231acres
Vegetables (carrots, lettuce, tomato, onion, beans)	1,426 acres
Corn	1,501acres
Citrus	2,171acres
Melons	26 acres
Landscaping /Nursery Stock	348 acres
Cotton	137 acres
Safflower	101 acres
TOTAL	**131,612 acres**

Note: This figure includes approximately 35,293 acres for which the District does not provide irrigation waters or for lands classified as developed for urban uses.

Irrigation System Types (estimated 2012)

a) Drip / Microspray Irrigation – 75,822 acres (75.2%)
b) Sprinkler - 137 acres (0.1%)
c) Surface – 24,849 acres (24.6)

Past Working Relationship with the Bureau of Reclamation – The District has a long history of participation with Reclamation and works with the agency on many levels as follows:

- In 1951the District entered into a contract for a loan from Reclamation for funding of the distribution system that served approximately ½ of the District lands.
- In 1959 the District entered into second contract for a loan from Reclamation for to construct the remainder of the distribution system. This financing of District improvements was recently paid off and the District is waiting for formal title transfer of the improvements from Reclamation.
- The District receives Class 1 and Class 2 Irrigation waters from Reclamation owned or administered water storage facilities.
- The District is working with Reclamation of Warren Act Contracts, Fresno River Riparian Plan and the Madera Ranch Water Bank.
- The District has received Field Service Grants from Reclamation for GIS and District Mapping including sensors and handheld equipment.
- Reclamation has also funded Meter Replacement grants in 2009, 2010 and 2011 including a SCADA grant (Franchi Gate) and grants for water management plans.

Technical Project Description

The proposed project will retrofit/replace the following:

- Replace the current manually operated check gates with 23 new automated flume gates, slip meters, and flume meters.
- Retrofit 6 mace meter flow sensors.
- Install 6 I/O modules on existing Mace meters to convert from manual information downloads to the automated transmission system.
- Install a new tower at the main office and a repeater tower to provide radio linkage to the SCADA system.
- Install a new SCADA control system at Basin 32.2 pump station.
- Purchase SCADAConnect licenses for flume gates "in system" and 1 license for the Franchi flume gate at the reservoir.
- Install new SCADA servers at the District office for flow monitoring and automated gate system which will be supervised and monitored by the District from a centralized station using the remote sensing capabilities of a SCADA control and communication system.

District operations staff and engineers have determined that the majority of the flume gate installation can be accomplished "in place" within the existing concrete abutments and weirs being retained with only minor modification and with modification of existing electronic equipment modifications where it currently exists.

To accomplish the work, District staff will remove the 23 existing manually operated gates and install new precision motorized flume gates operated via a site specific solar panel power system. The solar system will also provide power to the SCADA and communication system that will allow constant measurement to balance water flows throughout each canal segment

and system-wide management of all check gates to ensure accurate flows and delivery to meet grower needs.

This type of installation will save on the cost of complete reconstruction of concrete weirs and abutments and the work may be completed in the off peak water delivery season. By using 85 watt solar panels for powering equipment to operate the motorized gates and the SCADA control system, the District also avoids the expense and time of requiring Pacific Gas & Electric to extend poles and overhead transmission wires to provide electricity to the motorized gates and monitoring devices at each canal segment location.

IV.D Performance Measures

IV.D.1 Environmental and Cultural Resources Compliance

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

Air Quality – Mitigation Measure - Installation of new automated gates and SCADA systems will require truck transport along canal access roads, potential access through adjacent farmlands access roads along with equipment to lift and place components and minor concrete work may require concrete trucks. Any equipment that will generate dust will be mitigated by water sprayed on access roads prior to and during truck movement to reduce dust generation and impacts to air quality.

Water Quality – No impact. Work will be completed during the non-irrigation season between when the District stops transporting water and prior to the rain season when significant storm waters are diverted into the canal system.

Animal Habitat – No impact. Construction activity is consistent with normal maintenance work and will be confined to existing access roads and turnouts at gate locations and therefore no impact is foreseen to any existing animal habitat. The majority of the access roads are also used by farm equipment for adjacent lands developed for agricultural uses.

(2) 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? If so, would they be affected by any activities associated with the proposed project?

Yes, the project is within the Madera County region where there are a number of endangered species, such as the Blunt Nosed Leopard Lizard, Tiger Salamander, San Joaquin Kit Fox, Fresno Kangaroo Rat and the perimeter of the territory for the Swainson Hawk. However, lands adjacent to the project are in active agricultural use and therefore: i) not considered as habitat, ii) the retrofit project will not result in the disturbance of soils or breeding areas and is in line with normal maintenance operations performed throughout the year and will not introduce a new

element of activity not currently present. Since no wetlands are within the project area, it is not anticipated that the Blunt Nosed Leopard Lizard or Tiger Salamander would be present.

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

None present.

(4) When was the water delivery system constructed?

The canal system originates back in the late 1800s but the modern delivery system was constructed with Reclamation assistance in 1951and 1955.

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

The project involves replacement of 23 manual monitoring stations with new motorized gate or meter systems. The majority of the new installations can be retrofitted within existing gates and concrete abutments without any significant modification. A few of the existing weir structures may require minor modification to accept the prefabricated gates and frames.

The project will replace existing monitoring stations constructed in the 1950's with minor modifications to the gates in the 1970's and 1980's. No modifications have been completed to the canal gate systems since the aforementioned time.

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

A number of historical structures listed on the National Register of Historic Places with are present within the District Boundaries; however, all of these are within the Madera City limits and far removed from the location of the proposed project.

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

Although the project area is within the historical boundaries of the Mono Tribe, no known archaeological sites or features are present in the project area or adjacent vicinity.

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

No. Low income or minority populations will not be affected by this proposed project.

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

No. The proposed project will not limit access to and ceremonial use of Indian sacred sites or result in other impacts on tribal lands

(10) Will the project contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area? Note, if mitigation is required to lessen environmental impacts, the applicant may, at Reclamation's discretion, be required to report on progress and completion of these commitments. Reclamation will coordinate with the applicant to establish reporting requirements and intervals accordingly.

No, the proposed 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.

IV.D.2 Required Permits or Approvals

Applicants must state in the application whether any permits or approvals are required and explain the plan for obtaining such permits or approvals. To complete a renewable energy project within the time frame required of this FOA, it is recommended that an applicant has commenced the necessary permitting process prior to applying.

The project is in the process of transfer of ownership from Reclamation to the District after completion of debt repayment for improvements made within the District with funding provided by Reclamation. It is possible since this transaction has not been completed that the District may be required to procure MP-620 permits.

The proposed project will not require any permits or approvals from any other regulatory agencies have jurisdiction within the District or project area boundaries. This is a retrofit project within existing weirs and concrete abutments to replace manual check gates with precise measurement automated gates and control systems.

IV.D.3 Official Resolution

Attached is the official resolution by the Board of Directors of the Madera Irrigation District complying with the following requirements.

- ☐ The identity of the official with legal authority to enter into agreement
- ☐ The board of directors, governing body, or appropriate official who has reviewed and supports the application submitted
- ☐ The capability of the applicant to provide the amount of funding and/or in- kind contributions specified in the funding plan
- ☐ That the applicant will work with Reclamation to meet established deadlines for

entering into a cooperative agreement

IV.D.4 Project Budget

The project budget includes: (1) Funding Plan and Letters of Commitment, (2) Budget Proposal, (3) Budget Narrative and (4) Budget Form.

Funding Plan and Letters of Commitment

Describe how the non-Reclamation share of project costs will be obtained. Reclamation will use this information in making a determination of financial capability.

The proposed project non-Reclamation cost share shall be funded by Madera Irrigation District capital project (cash) reserves. No third party funding agency or other source is intended to be used for this project.

It is anticipated that this project will require two Fiscal calendar years to complete and the District will allocate appropriations within its annual budget for 50% of the cost of its share per Fiscal calendar year.

The funding plan must include all project costs, as follows:

(1) 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).

The District contribution shall be accounted for using in kind costs for District's share of salaries and wages and monetary for District's share of equipment purchases, training costs and grant management expenses. The source of the District's funds is from designated capital project reserves.

(2) Describe any in-kind costs incurred before the anticipated project start date that you seek to include as project costs. Include:

There are **no** prior costs to be included as "in-kind" for which the District would seek reimbursement.

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

These are no participating outside funding sources beyond the District's match commitment.

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

There are no other Federal partners contributing to this proposed project.

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

There are no pending funding requests from any other sources beyond this application.

Budget Proposal

The project budget shall include detailed information on the categories listed below and must clearly identify all project costs. Unit costs shall be provided for all budget items including the cost of work to be provided by contractors. Additionally, applicants shall include a narrative description of the items included in the project budget, including the value of in-kind contributions of goods and services provided to complete the project. It is strongly advised that applicants use the budget proposal format shown below on tables 3 and 4 or a similar format that provides this information.

Table 3. Funding Sources.

Funding Sources	Percent of Total Project Cost	Total Cost by Source
Recipient Funding	50%	$ -299,609.00
Reclamation Funding	50%	$ -299,608.00
Other Federal Funding		$ -0
Totals	**100%**	**$ -599,217.00**

Budget Narrative

Submission of a budget narrative is mandatory. An award will not be made to any applicant who fails to fully disclose this information. The budget narrative provides a discussion of, or explanation for, items included in the budget proposal. Include the value of in-kind contributions of goods and services and sources of funds provided to complete the project. The types of information to describe in the narrative include, but are not limited, to those listed in the following subsections.

Budget Proposal Narrative

The following provides an explanation of costs for the proposed project budget:

a) *Salaries and Wages* – The District intends to complete the removal of the existing check gates and to install the new automated gates, SCADA system and solar power

array using its own employees under force account labor. The estimated cost is based on the assumption that employees can accomplish the work within nine work days per gate installation. It is also assumed that the work will be done in the "off irrigation season" which will require two calendar years to complete the entire 23 gates. The following table illustrates who will be involved in the project, monthly salary or hourly rates, fringe benefits per month or hourly and percent of their monthly time involved in the project. Note that although most employees will only be involved during the "off irrigation" season, percentages of time allocated to the project are based on a per month/per year basis.

Designated Personnel:

Name/Title	Base Salaries/Wages	Fringe	Hours
Dina Nolan, Chief Engineer	$55.12 / hr.	$20.39 / hr.	45
Sean Smith, Associate Engineer	$40.70 / hr.	$15.06 / hr.	120
Engineering Staff	$37.68 / hr.	$7.93 / hr.	188
John Bese, Chief O&M	$40.11 / hr.	$14.84 / hr.	45
Maintenance Foreman	$32.58 / hr.	$6.91 / hr.	127
Maintenance Worker	$26.94 / hr.	$5.64 / hr.	214

b) *Fringe Benefits* - Rates per employee account for health insurances required State workers compensation insurance, retirement etc. and are fixed rates for billing purposes.

c) *Travel* – No travel and related expense costs outside of the District are anticipated for the purposes of implementing this project.

d) *Equipment* – The District proposes to use its own construction equipment and no rental or purchase is anticipated at this time. Unanticipated expense not foreseen at this time would be purchased out of contingencies.

e) *Materials and Supplies* - The District proposes to purchase concrete for minor modification of the gate structures to hold the frames for the new automated gates systems. The estimated cost of $110 per cubic yard for delivery of short loads which usually have a higher cost and include a fuel surcharge by the vendor.

f) *Contractual* – The following list includes contracted work and tasks to be performed:

Rubicon -
- Supply 23 gate assemblies inclusive of SCADA equipment.
- Supply SCADA software and hardware for main terminal and servers
- Supply software and hardware to connect existing monitoring

stations to the SCADA system.

W.L. & Associates
- Status of project reports
- Reimbursement request including reporting of costs (SF-425)
- Semi-annual reports
- Final report

g) *Environmental and Regulatory Compliance Costs* -

h) *Reporting* – In addition to the required 1% set-aside for environmental and regulatory permits as set forth in the application instructions, the District will contract with a consultant to prepare the required reports, reimbursements and other grantor required information as it does not have sufficient administrative staff. It is anticipated that 2.5% of project cost will be sufficient to cover this expense over a two year project timeline.

i) *Indirect Costs* - The District does not have an approved OMB overhead cost allocation plan.

j) *Contingency* – The District used a 5% of project cost estimate for contingencies reserve. Since the work will be performed under force account, it is assumed that this percentage will be more than adequate to cover unanticipated or unforeseen construction issues. If additional unforeseen costs occur, the District will cover these from its capital improvement fund reserves.

Budget Form

In addition to the above-described budget information, the applicant must complete an SF-424A, Budget Information—Nonconstruction Programs, or an SF-424C, Budget Information—Construction Programs.

Please see the attached SF-424C, Budget Information—Construction Programs.

Table 4. Budget Proposal Format

Budget Item Description	$/Unit And Unit	Quantity*	Recipient Funding	Reclamation Funding	Total Cost
Salaries and Wages					
Dina Nolan, Chief Engineer	$55.12/hr x 1.55 hrs/site	29	$ 1,239	$ 1,239	$ 2,478
Sean Smith, Associate Engineer	$40.70/hr x 4.14 hrs/site	29	$ 2,443	$ 2,443	$ 4,886
Engineering Staff	$37.68/hr x 6.48 hrs/site	29	$ 3,540	$ 3,540	$ 7,081
John Bese, Chief O&M	$40.11/hr x 1.55 hrs/site	29	$ 901	$ 901	$ 1,803
Maintenance Foreman	$32.58/hr x 4.38 hrs/site	29	$ 2,069	$ 2,069	$ 4,138
Maintenance Worker	$26.94/hr x 7.38 hrs/site	29	$ 2,883	$ 2,883	$ 5,766
Fringe Benefits					
Dina Nolan, Chief Engineer	$20.39/hr x 45 hrs	1	$ 459	$ 459	$ 918
Sean Smith, Associate Engineer	$15.06/hr x 120 hrs	1	$ 904	$ 904	$ 1,807
Engineering Staff	$7.93/hr x 188 hrs	1	$ 745	$ 745	$ 1,491
John Bese, Chief O&M	$14.84/hr x 45 hrs	1	$ 334	$ 334	$ 668
Maintenance Foreman	$6.91/hr x 127 hrs	1	$ 439	$ 439	$ 878
Maintenance Worker	$5.64/hr x 214 hrs	1	$ 603	$ 603	$ 1,207
Equipment					
I/O modules for Mace Meters	$550 each	6	$ 1,650	$ 1,650	$ 3,300
Supplies and Materials					
Office Supplies	N/A	0	0	0	0
Construction (Concrete allowance)	1.5 c.y @ $110/c.y./site	29	$ 2,393	$ 2,393	$ 4,785
Contractual Items/Construction					
Rubicon Water Task 1: SCADAConnect Hardware	Lump sum, refer to Exhibit 5	1	$ 30,105	$ 30,105	$ 60,210
Rubicon Water Task 2: Basin 32.2 Pump Station	Lump sum, refer to Exhibit 5	1	$ 6,250	$ 6,250	$ 12,500
Rubicon Water Task 3: Mace AgriFlo Xci Meter Sites	Lump sum, refer to Exhibit 5	1	$ 24,300	$ 24,300	$ 48,600
Rubicon Water Task 4: FlumeGate Sites	Lump sum, refer to Exhibit 5	1	$ 37,800	$ 37,800	$ 75,600
Rubicon Water Task 5: SlipMeter and FlumeMeter Sites	Lump sum, refer to Exhibit 5	1	$ 136,188	$ 136,188	$ 272,376
Rubicon Water Task 6: Repeater Antenna Tower	Lump sum, refer to Exhibit 5	1	$ 5,000	$ 5,000	$ 10,000
Rubicon Water Task 7: SCADAConnect Licenses	Lump sum, refer to Exhibit 5	1	$ 6,600	$ 6,600	$ 13,200

Rubicon Water Task 8: Training	Lump sum, refer to Exhibit 5	1	$ 7,500	$ 7,500	$ 15,000
Consultant: Administer Grant	approx. 2.5% of total cost	1	$ 7,500	$ 7,500	$ 15,000
Environmental and Regulatory Compliance					
Permits	approx. 1% of total cost	1	$ 3,000	$ 3,000	$ 6,000
Total Direct Costs			$ 284,845	$ 284,845	$ 569,691
Contingencies (5%)			$ 15,000	$ 15,000	$ 30,000
Total Project Costs			$ 299,845	$ 299,845	$ 599,691

* Note: The quantity of 29 was used because 4 of the 33 site locations do not require site installation/construction.

V.A.1 Evaluation Criteria

Evaluation Criterion A: Water Conservation

Subcriterion No. A.1—Water Conservation:

Subcriterion No. A.1(a)—Quantifiable Water Savings:

Describe the amount of water saved. *For projects that conserve water, please state the estimated amount of water expected to be conserved (in acre-feet per year) as a direct result of this project. Please provide sufficient detail supporting how the estimate was determined, including all supporting calculations. Please be sure to consider the questions associated with your project type (listed below) when determining the estimated water savings, along with the necessary support needed for a full review of your proposal (please note, the following is* ***not*** *an exclusive list of eligible project types. If your proposed project does not align with any of the projects listed below, please be sure to provide support for the estimated project benefits, including all supporting calculations and assumptions made).*

In January 2011, Rubicon Water prepared a Total Channel Control (TCC) Assessment Report to determine losses, water balance and corrective measures to capture same.

It is estimated that the District's water losses are approximately 59,000 to 63,000 acre feet in above average rainfall seasons and 6,000 to 12,000 acre feet in below average rainfall seasons. These losses are attributed to: i) imbalances in channel flows, ii) unanticipated high flows from storm waters that are channeled or piped into the system from the City of Madera requiring "dumping" of excess into the Madera Ranch Water Bank lands (partially completed at this time) or through overflows into creeks and rivers, and iii) unforeseen dike breaching caused by ground squirrels burrowing into embankments. In situations where water is lost during irrigation season, it may require upstream releases to compensate for lost volumes from stored allocations behind federal dams. This then, especially in a drier than normal rainfall season and Federal allocations are reduced, releases limited resources earlier than intended by the District.

The report states that:

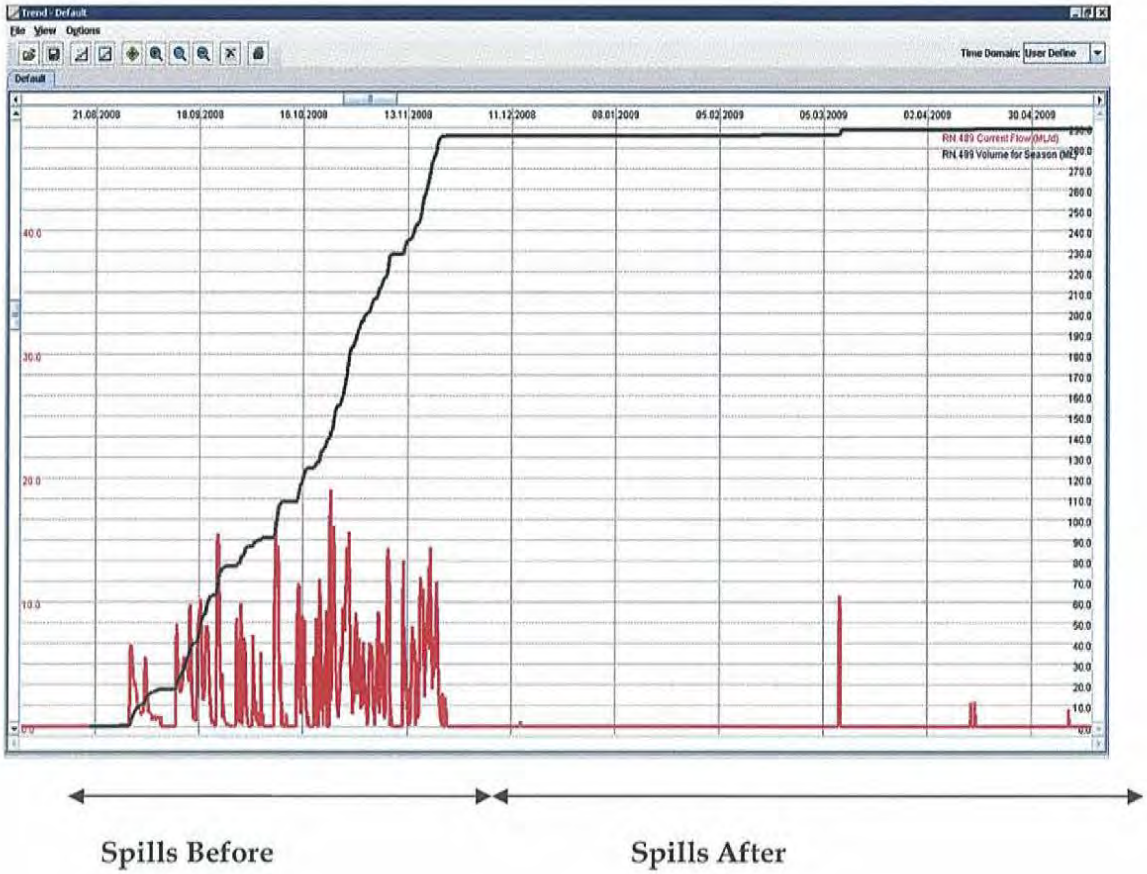
- Based on the information available for the water balance, it appears that during above average rainfall years, through implementation of TCC, it is estimated that about 14,700 to 30,000 acre feet of this could be conserved.
- Below average rainfall year savings would be proportionate in that 1,440 to 2,880 acre feet of irrigation waters could be conserved.

The installation of a precise gate metered flow system will allow the District to maintain constant water levels in each channel segment using an acoustic level monitoring system at each check gate. The combination of automated gates, flow monitoring and centralized reporting system (SCADA) and inter-channel /central station communication devices will allow the District to implement a network management system that provides management of flow control, demand management (faster response to meet grower demands in multiple channel segments), customer order management (from multiple days to a day and in some instances, down to hours), distribution efficiency and system wide operational controls that are lacking at this time due to the required individual manual gate operations that impact accuracy of water deliveries.

As an example of achievable savings:

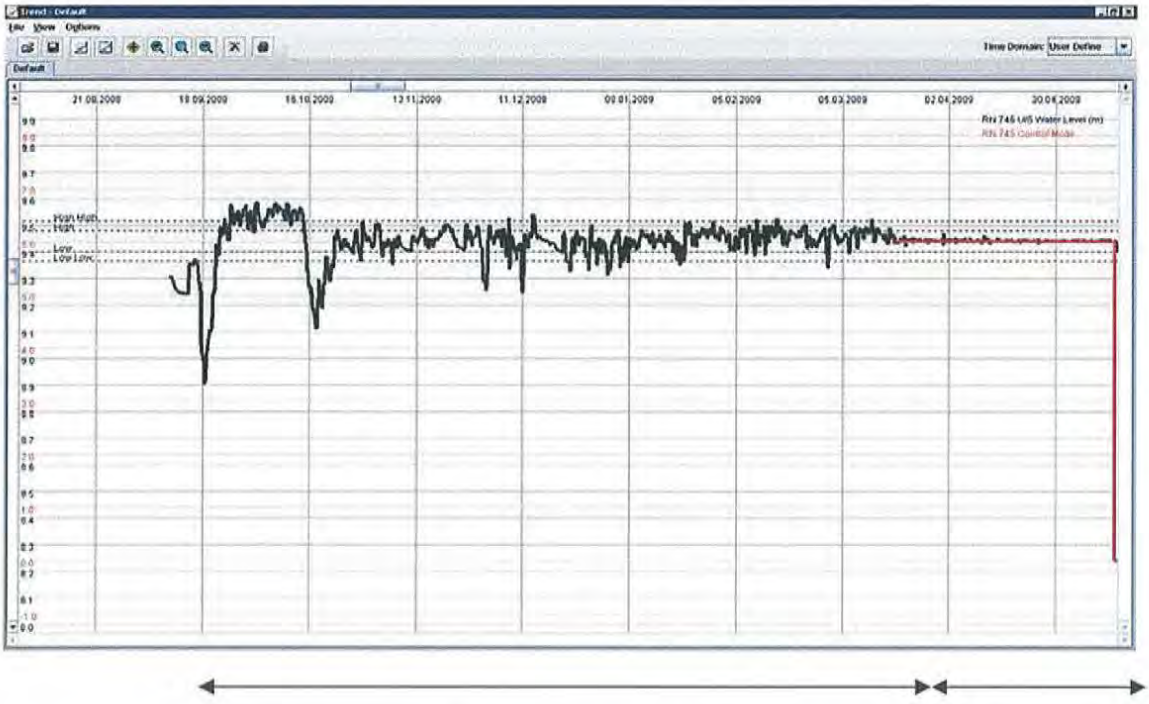
System generated data (fig 1) shows just how well demand is matched to capacity in a canal operating under Total Channel Control. The graph is a screenshot of management information data showing a typical canal spill. Instantaneous and cumulative outfall volumes from the CG No. 5 canal - 100 cfs off-take capacity and 11.2 miles in length are shown for the 2008-2009 irrigation season. The canal was modernized in July 2008 with FlumeGates™ and operated manually until mid- November 2008, when full TCC was initiated. Cumulative outfalls up until TCC implementation were 230 AF (286ML). Outfalls for the remainder of the 2008-2009 season (to end April 2009) under TCC were just 2.4 AF (3ML).

Figure1. Reduced Spills with TCC® - CG No. 5 Canal



In addition, automation within the canal system minimizes fluctuating supply levels caused by manual operation of the gates. The ability to remotely monitor motorized gates and match supply to demand equalizes water levels. In Figure 2 below, the graph shows the upstream water levels in the manual vs, automated mode.

Figure2. Canal Levels Stabilization



Water Level – Manual Operations **After Automation**

- *What is the applicant's average annual acre-feet of water supply?*

The District's annual water is approximately 122,500 acre feet.

- *Where is that water currently going (i.e., back to the stream, spilled at the end of the ditch, seeping into the ground, etc.)?*

Since the District does not have the ability to pump and recirculate surplus waters back to the headworks or to the reservoir and keep these waters "in system". In the TCC report, waters not consumed for irrigation purposes are lost to the following:

a) Lost through seepage in either in unlined canals or clay lined canals whose clay barrier has been breached or through leakage (point source).
b) Channeled through the canal system and, i) flow through to the Madera Ranch Water Bank lands; ii) are diverted to natural channels, or iii) captured and sold to neighboring irrigation districts.
c) Lost through unauthorized use or theft via bypassed or altered meters at turnouts.
d) Lost to system filling at the beginning of the irrigation season.
e) Lost to evaporation.
f) Meter error.
g) Lost through spills.

- *Where will the conserved water go?*

Depending on the time of year and related factors (IE: storm water runoff waters), conserved waters will be: i) better utilized within the District; ii) channeled to the water bank lands, or iii) remain behind the dam at the Hidden or Friant Dams until needed.

Please address the following questions according to the type of project you propose for funding.

(3) ***Irrigation Flow Measurement****: Irrigation flow measurement improvements can provide water savings when improved measurement accuracy results in reduced spills and over-deliveries to irrigators.*

□ *How have average annual water savings estimates been determined? Please provide all relevant calculations, assumptions, and supporting data.*

The current management system using manually operated gates and scattered monitoring sites of various types is labor intensive and provides questionable and inaccurate data. The ability to implement a system wide management plan using remote sensing will result in achievable savings as shown in Figures 1 and 2 on the previous pages. These examples show the current installation of a flume gate and the performance characteristics demonstrated from the before and after conditions and calculation of the savings achieved which can be applied across the entire system.

As noted in the TCC report:

"Monitoring of the old manual systems relies on a large field staff presence for visual inspections and manual non-continuous monitoring. Delays in the collection, transmission and analysis of data result in delayed decision making when responding to changing circumstances."

"By contrast, automation provides the opportunity to monitor remotely in real time, collect appropriate amounts of data. In addition, automatic alarming allows operators to respond to irregular or emergency operational problems that require immediate attention or intervention. A modern district can establish a central 24 hour a day water operations and monitoring center to ensure proper management, including timely action on problems to minimize service disruption. The wealth of performance data generated is used to monitor and routinely fine-tune canal operating parameters to improve system performance."

Also as noted in the next section, current measurement of system performance is based upon a "best estimate" scenario as measurement current device accuracy is questionable.

□ *Are flows currently measured at proposed sites and if so what is the accuracy of existing devices? How has the existing measurement accuracy been established?*

Flows are currently measured at 52 stations using the following methods:

Type of Measurement Device	*Interval Frequency*	*Accuracy*
Rubicon FlumeGate	15 minutes, Continuous	±2.5%
Rubicon FlumeMeter	15 minutes, Continuous	±2.5%
Rubicon SlipMeter	15 minutes, Continuous	±2.5%
Parshall Flume	Single	±3-5% (free flow)
Radial Gate	Single	±10%
Recorder	Continuous	±5-10%
Staff Gauge	Single	water depth only
Weir & Stick Measurement	Single	±10%
Weir & Staff Gauge	Single	±10%
Weir, Recorder, & Staff Gauge	Continuous	±10%
Sensor	15 minutes, Continuous	±5%
Macemeter	5 minutes, Continuous	±5%
Propeller Meter	Single	±10%
In-line Meter	Single	±10%

Accurate calculations are not possible as several canal and check gate systems have only site gauges and channel level sensors and canal segment flows are mostly estimates only. The system meters water at the headwaters at Franchise Diversion structure and at the terminus weir and the SCADA system is localized and requires manual data downloads which is also typical of several locations along the canal system. Site gauges provide depth of water measurement only. Where measurement is possible on the headwater side of a gate, the downstream segment may only have a staff gauge or stick measurement therefore losses between measurement points is not possible. Therefore, there is no "real time" ability to monitor flows.

□ *Provide detailed descriptions of all proposed flow measurement devices, including accuracy and the basis for the accuracy.*

The automated gated system calculates flow using measurements of upstream water levels, downstream water levels, and gate position and must have an accuracy of +/- 2.5%. The use of stilling wells for the acoustic sensors creates a constant controlled environment unaffected by debris, surrounding objects, foam or silts or other contaminants. The sensors are self-calibrating on each reading to eliminate drift in speed of sound variations.

The gate positioning is controlled by a wire rope and drum mechanism that provide precise gate position accuracy in
both raising and lowering operations to within +/-0.02 inches. The modular gate system is factory checked before installation and field checked after installation.

The installation will be a combination of 23 Flume Meters and Slip Meters with an accuracy of +/- 2.5% with continuous measurement over 15 minute intervals. Six Mace Meters will also be installed with an accuracy of +/- 5% with continuous measurement over 5 minute intervals.

□ *How will actual water savings be verified upon completion of the project?*

Given that the District can only accurately measure headwaters into the system and tail waters exiting the system, with a few scattered flow meters, accurate historical data is variable and imprecise. The new measurement system will compile a historic database that, over time, will provide annual use and user (grower) information to show flows and grower deliveries both in each individual canal segment and system-wide.

The level of accuracy attained by a system wide management program, individual canal segment volumes and flows, and both instantaneous and historical data for same will provide the District with an accurate performance tool. Limited measurement stations that require manual data downloads, channel site gauges and level sensors that is at best guesswork based solely on limited water measurements, and estimates from gate tenders and their logs. There are currently only 52 monitoring stations in the more than 315 miles of canal.

Once the system is operational and water balance is achieved through the automated gate and measurement system and subsequent grower demand controls are in place, the measurement of flows will be compared to water release rates at the headwaters from the reservoir in the before and after condition to determine actual savings.

Water will be measured accurately through each gate for both free over-fall and submerged flow conditions integrated into the design of each gate. The high level of measurement accuracy at each structure, leakage, seepage and theft losses can be identified, pinpointing these losses to individual canal pools.

*(4) **SCADA and Automation**: SCADA and Automation components can provide water savings when irrigation delivery system operational efficiency is improved to reduce spills, over-deliveries, and seepage. Applicants proposing municipal metering projects should address the following:*

□ *How have average annual water savings estimates been determined? Please provide all relevant calculations, assumptions, and supporting data.*

The average annual water savings derived from installation 23 flume gates and associated system wide SCADA control system are based upon the performance from a test installation at the gate shown in Figure 1 and 2.

A key feature of modernization is transforming irrigations systems from manual operation and monitoring to remote operation and system performance recording. The District are able to manage the modernized system more efficiently with the ability to operate in real time, 24 hours a day. For each site, alarms, communications, upstream and downstream water levels, current flow, season-to-date flow volume, and site status can be monitored or controlled remotely.

□ *Have current operational losses been determined? If water savings are based on a reduction of spills, please provide support for the amount of water currently being lost to spills.*

Accurate calculations are not possible as several canal and check gate systems have only site gauges and channel level sensors and canal segment flows are mostly estimates only. The system meters water at the headwaters at Franchise Diversion structure and at the terminus weir and the SCADA system is localized and requires manual data downloads which is also typical of several locations along the canal system. Site gauges provide depth of water measurement only. Where measurement is possible on the headwater side of a gate, the downstream segment may only have a staff gauge or stick measurement therefore losses between measurement points is not possible. Therefore, there is no "real time" ability to monitor flows.

See Figure 2 for an example of spill control when measured in conjunction with a test gate and SCADA system.

□ *Will annual farm delivery volumes be reduced by more efficient and timely deliveries and if so, how has this reduction been estimated?*

Yes! The ability to deliver water to each user in a day vs. multiple days or in some cases days down to hours, will allow the District to better manage each grower's needs (without excess water flow as currently exists that results in spills or oversupply) while maintaining a water balance within each canal segment. This will offset the current system of increasing flows from the headworks and reservoir to achieve downstream deliveries to multiple growers by visually measuring and constantly monitoring each canal segment and making delayed (due to travel time by the ditch tender) manual gate adjustments to maintain flow rates through the entire system. On an automated and remote metered system, less water is required to flow through the system and the grower gets exactly what he needs, when he needs it.

It is estimated that in the current management system and with manually operated clamshell gate, the District loses 10-15% of the flow. The centralized SCADA automated control and measurement system will reduce loses to 2-3%. Therefore, as an example, a 40 acre foot delivery with "pass through loses" would equate to 4 to 6 acre feet of wasted flow. In the proposed scenario, the automated flume gates would only lose 0.8 to 1.2 acre feet. Applied over the new 23 gate system the loss would be 92 to 138 acre feet of lost flow reduced to 18.4 to 27.6 acre feet, a savings of 73.6 to 100.4 acre feet of scarce water resources.

□ *Will canal seepage be reduced through improved system management? If so, what is the estimated amount and how was it calculated?*

Somewhat as the ability to measure flows between check gate structures will allow the District to monitor volumes which will provide a level of accuracy to determine losses from cracks in the clay lined canals. Deviations of measured flows into and out of each segment allows for more precise calculation of losses from leakage. However, older clay lined or unlined canal segments will experience some measure of seepage and in a positive sense, this contributes to groundwater recharge and since there is not a system wide canal segment measurement system in place at each check gate, determining actual loss is not possible.

□ *How will actual water savings be verified upon completion of the project?*

The measurement system will compile a historic database that, over time, will provide annual use and user (grower) information to show flows and grower deliveries both in each individual canal segment and system-wide.

The level of accuracy attained by a system wide management program, individual canal segment volumes and flows, and both instantaneous and historical data for same, will provide the District with an accurate performance tool that currently is at best guesswork based solely on limited metering devices and estimates from gate tenders and their logs. There are currently only 52 monitoring stations using everything from few Mace meters to channel gauges in the more than 315 miles of canal.

Once the system is operational and water balance is achieved through the automated gate and measurement system and subsequent grower demand controls are in place, the measurement of flows will be compared to water historical release data from the Hidden and Friant Dams, the Franchise Diversion structure and against data from the current limited metering system.

> (5) ***Groundwater Recharge****: Groundwater recharge can provide savings when surface water storage evaporation is reduced and/or surface runoff is intercepted for recharge. Applicants proposing groundwater recharge projects should address the following:*

No groundwater recharge facility is proposed beyond the current diversion to the Madera Ranch Water Bank lands and a few small ground water recharge basins. However, better management of water resources will allow the District to divert surplus waters to the Water bank which is located in a low area within the District identified as water deficient.

Subcriterion No. A.1(b)—Improved Water Management

*Up to **5 points** may be awarded if the proposal will improve water management through measurement, automation, advanced water measurement systems, or through implementation of a renewable energy project, or through other approaches where water savings are not quantifiable.*

Describe the amount of water better managed. *For projects that improve water management but which may not result in measurable water savings, **state the amount of water expected to be better managed, in acre-feet per year and as a percentage of the average annual water supply.** (The average annual water supply is the amount actually diverted, pumped, or released from storage, on average, each year. This does not refer to the applicant's total water right or potential water supply.) Please use the following formula:*

It is estimated that the District's water losses are approximately 59,000 to 63,000 acre feet in above average rainfall seasons and 6,000 to 12,000 acre feet in below average rainfall seasons.

Based on the information available for the water balance, it appears that during above average rainfall years, through implementation of TCC, it is estimated that about 14,700 to 30,000 acre feet of this could be conserved.

Below average rainfall year savings would be proportionate in that 1,440 to 2,880 acre feet of irrigation waters could be conserved.

The following assumptions are based on the low end of savings with the provision that some breaching of canal banks will occur resulting in spills that will be significantly reduced using the automated system, but still in reality cannot be avoided.

$$\frac{\text{Estimated Amount of Water Better Managed}}{\text{Average Annual Water Supply}}$$

For above average rainfall years, the estimated savings are 12%

$$\frac{\text{14,700 acre feet}}{\text{122,500 acre feet}}$$

For below average rainfall years, the estimated savings are 0.04%:

$$\frac{\text{2,880 acre feet}}{\text{73,500 acre feet}}$$

Note that the below average rainfall year assumes 60% of a normal rainfall year allocation from Federal sources. Actual allocations may be substantially less and result in a higher percentage in savings.

Subcriterion No. A.2.—Percentage of Total Supply

*Up to **4 additional points** may be allocated based on the percentage of the applicant's total average water supply (i.e., including all facilities managed by the applicant) that will be conserved directly as a result of the project.*

***Provide the percentage of total water supply conserved:** State the applicant's total average annual water supply in acre-feet. Please use the following formula:*

$$\frac{\text{Estimated Amount of Water Conserved}}{\text{Average Annual Water Supply}}$$

The following calculation assumes an above average rainfall year and accounts for the storm water flows which will be better managed by the District using a water balance within the canal system monitored and controlled by the SCADA management system which yields a savings of 25%.

$$\frac{\text{30,000 acre feet}}{\text{122,500}}$$

Subcriterion No. A.3.—Reasonableness of Costs

*Up to **4 additional points** may be awarded based on the reasonableness of the cost for the benefits gained.*

Please include information related to the total project cost, annual acre-feet conserved (or better managed), and the expected life of the improvement. Use the following calculation:

$$\frac{\text{Total Project Cost}}{\text{(Acre-Feet Conserved, or Better Managed x Improvement Life)}}$$

The following calculation assumes an average rainfall year and accounts for the storm water flows which will be better managed by the District using a water balance within the canal system monitored and controlled by the SCADA management system.

$$\frac{\$599{,}691}{14{,}700 \times 40} = 1.02$$

Failure to include this required calculation will result in no score for this section.

For all projects involving physical improvements, specify the expected life of the improvement in number of years and provide support for the expectation (e.g., manufacturer's guarantee, industry accepted life-expectancy, description of corrosion mitigation for ferrous pipe and fittings, etc.). Failure to provide this information may result in a reduced score for this section.

The retrofit flume gate installation inclusive of gates and frames has a useful life of 40 years.

V.A.2. Evaluation Criterion B: Energy-Water Nexus (16 points)

For projects that include construction or installation of renewable energy components, please respond to Subcriterion No. B.1— Implementing Renewable Energy Projects Related to Water Management and Delivery. If the project does not implement a renewable energy project but will increase energy efficiency, please respond to Subcriterion No. B.2— Increasing Energy Efficiency in Water Management. If the project has separate components that will result in both implementing a renewable energy project and increasing energy efficiency, an applicant may respond to both. However, an applicant may receive no more than 16 points total under both Subcriteria No. B.1 and B.2.

Subcriterion No. B.2—Increasing Energy Efficiency in Water Management

If the project is not implementing a renewable energy component, as described in Subcriterion No. B.1 above, up to ***4 points*** *may be awarded for projects that address energy demands by retrofitting equipment to increase energy efficiency and/or through water conservation improvements that result in reduced pumping or diversions.*

Describe any energy efficiencies that are expected to result from implementation of the water conservation or water management project *(e.g., reduced pumping).*

- *Please provide sufficient detail supporting the calculation of any energy savings expected to result from water conservation improvements. If quantifiable energy savings are expected to result from water conservation improvements, please provide sufficient details and supporting calculations. If quantifiying energy savings, please state the estimated amount in kilowatt hours per year.*

Better water management will lead to surpluses stored at the reservoir and therefore, an extended irrigation season or resulting in less demand by agricultural operations to use private wells to pump ground water. This would be especially true during water shortage years resulting in lower Federal water allocations to the District.

The number, size and power consumption of private wells within the District on lands supplied with District waters is not known. However, as an example, the water needs to irrigate the 75,000 acres within the District that are irrigated by drip and spray/micro-spray irrigation systems would be considerable and any extension of water deliveries derived from a better managed delivery system would be a substantial savings in utility costs to each grower who must pump water after the irrigation deliveries are terminated for the season.

- *Please describe the current pumping requirements and the types of pumps (e.g., size) currently being used. How would the proposed project impact the current pumping requirements?*

The exact number and size of pumps on private property used by the growers within the District is not known at this time. The TCC report estimates that after deliveries are terminated by the District, growers pump an additional 213,000 to 217,000 acre feet of well water. The estimated savings in acre feet of conserved water from this project would result in a potential reduction of 5% up to 15% in annual pumping volume depending on whether it is an above average or below average rainfall season.

- *Please indicate whether you energy savings estimate originates from the point of diversion, or whether the estimate is based upon an alternate site of origin.*

The energy savings originate from the point of diversion at the Franchise diversion structure to the alternates sites which are the individual SCADA and motorized gate control systems.

The combination of solar powered automated check gates, flow monitoring and reporting system (SCADA) and inter-channel /central station communication devices will allow the District to implement a network management system that provides management of flow control, demand management, customer order management, distribution efficiency and system wide operational controls.

Site specific solar power generation to supply the demand for gate operations and monitor/metering equipment will eliminate the need for extension of utility grid power sources which in some cases are not in the immediate vicinity of the improvements.

- *Does the calculation include the energy required to treat the water?*

N/A

- *Will the project result in reduced vehicle miles driven, in turn reducing carbon emissions? Please provide supporting details and calculations.*

The installation of a remotely managed system results in the reduced employee trips to monitor, manually open and close gates. Currently ditch tenders must make from 3-4 trips per day to perform these operations and with the new system travel will be reduced to one trip per day for observation and maintenance work.

- *Does the calculation include the energy required to treat the water? **Describe** any renewable energy components that will result in minimal energy savings/production (e.g., installing small-scale solar as part of a SCADA system).*

The energy savings are not related to water treatment, however, they are related energy savings/production due to small scale solar installations. Each check gate, SCADA control and communication system is powered by a 85 watt solar panel and battery backup system. Twenty three manual gates will be replaced with the newer automated gate system. The savings occurs then at multiple locations. The new retrofit automated check gates and metering equipment solar powered and require no external utility grid connection along with the time, cost and energy consumption (maintenance truck) of a ditch tender to manually operate same. The self-contained solar powered systems and no extension from the utility grid saves power and installation cost, thereby removing the usually required external power source and a small reduction is achieved by removing the carbon footprint created from the external power generation and fuel consumption for manual gate operation.

***Describe** any renewable energy components that will result in minimal energy savings/production (e.g., installing small-scale solar as part of a SCADA system).*

The energy savings produced by the installation of 23 gate and metering systems powered by 85 watt solar panels equates to .085 kilowatt hour savings per year per site or a total of 1.96 kilowatt hours.

V.A.3 Evaluation Criterion C: Benefits to Endangered Species

N/A. This is a retrofit project and no benefit can be attributed to an endangered species.

V.A.4 Evaluation Criterion D: Water Marketing

*Up to **12 points** may be awarded for projects that propose water marketing elements, with maximum points for projects that establish a new water market. Note: Water marketing does **not** include an entity selling conserved water to an existing customer. This criterion is intended for the situation where an entity that is conserving water uses water marketing to make the conserved water available to meet other existing water supply needs or uses.*

***Briefly describe any water marketing elements included in the proposed project.** Include the following elements:*

(1) Estimated amount of water to be marketed

Based upon the type of season experienced by the District, either an above average rainfall or below average rainfall season will determine how much water the District has to market. Given that the high range of 30,000 acre feet to low range of 1,440 acre feet of projected surplus allows the District to make decisions as to how to best use its reserves.

A high range season allows the District to place waters in the Madera Ranch Water Bank, sell waters to other irrigation districts and to supply smaller agricultural operations referred to as "subordinate growers" within the current District boundaries that are not holders of immediate rights to water deliveries and are classified as secondary water users.

It is assumed that in low annual rainfall event years, any savings would be best served to extend service to existing primary agricultural operations and prolong the irrigation season as much as possible to reduce the need by individual farms to pump their own irrigation water.

The water marketing therefore depends on the weather as much as how many acre feet can be conserved by this proposed project.

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

The mechanism for marketing of District waters is through:

- Existing agreements Districts based on acre feet of water delivered / received (contribution to an existing market) with adjacent or regional districts such as :

  Gravelly Ford Water District
  Chowchilla Water District
  Lower Tule River Irrigation District
  North Kern Water Storage District
  Tulare irrigation District

Westlands Water District
Wheeler Ridge – Maricopa Water Storage District

- Metered flow to Subordinate Growers (secondary users not entitled to District water – individual sale).
- Diversion to the Madera Ranch Water bank (for future pumped withdrawal and sale)

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

The number of users varies and is dependent on availability of a surplus (weather dependent). 10 percent of the waters marketed or reserved for future sale from the Water Bank are agricultural users.

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

The marketing of surplus waters must take into account any existing agreements for purchase of same, commitments to deposit waters in the Water Bank and potentially any changes to the San Joaquin River restoration agreements that in the future may alter delivery allocations .

(5) Estimated duration of the water market

April through October with occasional flows during the rainy season between November through March.

V.A.5 Evaluation Criterion E: Other Contributions to Water Supply Sustainability

*Up to **14 points** may be awarded for projects expected to contribute to a more sustainable water supply. This criterion is intended to provide an opportunity for the applicant to explain how the project relates to a **WaterSMART Basin Study**, how the project could expedite future **on-farm improvements**, or how the project will provide **other benefits to water supply sustainability** within the basin. An applicant may receive the maximum 14 points under this criterion based on discussion of one or more of the numbered sections below.*

*(1) Points may be awarded for projects that address an adapatation strategy identified in a **WaterSMART Basin Study**.*
Proposals that thoroughly discuss how a project is addressing an adapatation strategy identified in a Basin Study (i.e., a strategy to mitigate the impacts of water shortages resulting from climate change, drought, increased demands, or other causes) may receive maximum points under this criterion. Applicants should provide as much detail as possible about the relationship of the proposed project to the adaptation strategy identified in the Basin Study, including, but not limited to, the following:

- *Describe in detail the adaptation strategy that will be implemented through*

this WaterSMART Grant project. Identify the specific WaterSMART Basin Study where this adaptation strategy was developed. Describe the water supply or water management issue that this adaptation strategy will address.

Although not tied to Reclamation funded WaterSMART Basin Study, the District is implementing a water storage program as a participant with a consortium of members in the Madera Ranch Water Bank project. A recently completed Rapid Appraisal Process by California Polytechnic State University in San Luis Obispo, California illustrates the need for this type of action within the San Joaquin /Fresno River Water Basin.

The adaptation strategy is to provide available surface waters in the Madera Groundwater basin for use in recharging unconfined aquifers. The Madera Ranch project located at a natural low point / depression within the basin is ideal for this purpose. Agricultural operations that have a history of over pumping for agricultural uses are drawing ground water into the depression from the west which has salinity content not conducive for irrigation waters. In addition, this over- use of the aquifer has caused degradation of groundwater levels upstream from the District.

The full RAP report is available for review at the Madera Irrigation District website: http://www.madera-id.org/index.php/services/engineering-department

- *Provide a detailed explanation of how the proposed WaterSMART Grant project would help implement the adaptation strategy identified in the Basin Study.*

The one issue that will contribute to the success of the Water Bank project is the ability of the District to generate surplus flows during both above average and below average rainfall seasons. The RAP report notes that even a 100 acre foot contribution to the Water bank has beneficial values to rebuilding the unconfined aquifer. The WaterSMART Grant will allow the District to achieve a water balance throughout its 315 mile canal system, manage flows to reduce spill over, lessen severity of dike breaching and surcharging of the system due to manual operation of the Districts gates.

The 23 gate replacement program including installation of flow measurement devices, addition of 6 Mace Meters and system wide SCADA management system will contribute to maximizing conservation efforts. The surplus created from these endeavors will create an allocation for deposit in the Water Bank project.

- *Fully describe any other benefits to water supply sustainability that are not described elsewhere in your proposal that will result from this WaterSMART Grant project, for example, if the project will result in further collaboration among Basin Study partners, or demonstrate a new or innovative approach, among other benefits.*

The implementation of the WaterSMART grant project will contribute to efforts set forth in the Madera Basin - Integrated Water Management Plan (IRWMP). This State of California required planning document requires cooperation between all water uses including agricultural, urban and environmental entities to achieve basin wide conservation and management programs. This is especially true in areas that have a depleted aquifer system due to historic over-drafting. The IRWMP sets forth goals and policies to achieve

performance based results. This project is in line with those goals and policies through the Districts efforts to implement conservation efforts and contributions to restore the ground water levels.

Through the WaterSMART Basin Study Program, Reclamation is working with State and local partners, as well as other stakeholders, to comprehensively evaluate the ability to meeting future water demands within a river basin. The Basin Studies allow Reclamation and its partners to evaluate potential impacts of climate change to water resources within a particular river basin, and to identify adaptation strategies to address those impacts. For more information on Basin Studies, please visit:
<www.usbr.gov/WaterSMART/bsp>.

*(2) Points may be awarded for projects that will help to expedite future **on-farm irrigation improvements**, including future on farm improvements that may be eligible for NRCS funding. Please address the following:*

No on-farm irrigation improvements are proposed through this current project except for the following topic:

- *Describe the extent to which this project complements an existing or newly awarded AWEP project.*

The District is in the process of completing a Ground Water Management Plan in conjunction with the development of the Madera Ranch Water Bank project. The proposed project to be funded by the WaterSMART grant will implement the first steps to integrating surface water conservation through physical improvements including automated gate installations, real time metering from each location and system wide management program.

As such, the grant will provide a key component of the Ground Water Management Plan by conserving irrigation waters to extend the irrigation season thereby reducing the need for pumping of ground waters and by diverting surpluses to the Water Bank

Note: On-farm water conservation improvements that complement the water delivery improvement projects selected through this FOA may be considered for NRCS funding and technical assistance in FY 2013 to the extent such assistance is available. Complementing NRCS Farm Bill programs include the Environmental Quality Incentive Program (EQIP) and Agricultural Water Enhancement Program (AWEP), which are the primary programs that address water quantity and water quality conservation practices. For more information, including application deadlines and a description of available funding, please contact your local NRCS office or visit

<www.nrcs.usda.gov>for further contact information in your area.

*(3) Points may be awarded for projects that include **other benefits** to water supply sustainability.*

Projects that do not address a need/adaptation strategy identified in a Basin Study or do not help expedite future on-farm irrigation improvements, may receive maximum points under this criterion by thoroughly explaining additional project benefits. Please provide sufficient explanation of the additional expected project benefits and their significance. Additional project benefits may include, but are not limited to, the following:

□ *Will the project make water available to address a specific concern? For Example:*

i. *Will the project address water supply shortages due to climate variability and/or heightened competition for finite water supplies (e.g., population growth or drought)? Is the river, aquifer or other source of supply over-allocated?*

Yes. Water resources in the Central San Joaquin valley are a finite supply. This project will allow for better utilization of these limited water resources. With climate change the Friant Dam which is mainly served by snowmelt will have different and more frequent peaks thus reducing the District's supply which increases the need for this project.

ii. *Will the project market water to other users? If so, what is the significance of this (e.g., does this help stretch water supplies in a water-short basin)?*

The installation of the automated gate and computerized management system may result in a net water savings to the Madera Irrigation District growers which in turn creates more water availability to downstream users if the individual growers or District determines an excess from their allocation and opts to market same. This extends the availability of irrigation waters, allows for supplying Secondary Users (non-entitlement) and allows for water transfers

iii. *Will the project make additional water available for Indian tribes?*

No. Tribal lands are not present in the vicinity of the District.

iv. *Will the project help to address an issue that could potentially result in an interruption to the water supply if unresolved? (e.g., will the project benefit an endangered species by maintaining an adequate water supply)? Are there endangered species within the basin or other factors that may lead to heightened competition for available water supplies among multiple water uses?*

The San Joaquin River Restoration Settlement which implements the San Joaquin River Restoration project reduced allocations to all water users. All users of Friant Dam waters have had to adjust to this reallocation. As stated above, this project will allow for better utilization of these limited water resources.

v. *Will the project generally make more water available in the water basin where the proposed work is located?*

Yes. Better management of water resources equates to meeting demand for water that is in short supply and increasingly reduced by allocations to different interests not only in the water basin but in the San Joaquin Valley. Better management also means meeting grower needs without excessive waste in doing so, such as over-supplying growers in an unbalanced water distribution system. What is not wasted here is used elsewhere.

The installation of the automated gate and computerized management system may result in a net water savings to the Madera Irrigation District growers which in turn creates more water availability to downstream users if the District determine an excess from their allocation and opts to market this surplus.

□ *Does the project promote and encourage collaboration among parties?*

Yes.

i. Is there widespread support for the project?

Yes. Adjacent Water Districts will monitor the installation and operation and are very interested in exploring similar projects. Chowchilla Irrigation District is an adjacent irrigation water provider that is pursuing engineering studies and implementation of this type of project. Letters of support are located in Exhibit 1.

This project also furthers implements the goals and policies of the Integrated Water Management Plan adopted by the water districts, cities and County of Madera. Each participant to the plan must implement conservation measures and this project addresses the District's role in the IRWMP.

ii. What is the significance of the collaboration/support?

Water loss is a critical issue in the adjacent districts and a project that results in savings and better management is widely supported. A drought year is devastating to all districts and their member agricultural users. The ability to maintain a resource during droughts and to bank waters during abundance is beneficial to all.

iii. Will the project help to prevent a water-related crisis or conflict?

The majority of the discussion in the previous sections has dealt with water limitations within the Madera Water Basin. Of equal importance are operation issues that lead to extensive losses of irrigation water. Breaching of dikes and overtopping can contribute to significant loses, especially if the discovery is delayed due to time of day or other factors.

The ability to have a system that can "sense" a change in flow characteristics such as breaching, or that levels out deliveries within the system thereby removing the probability of overtopping, will contribute greatly to water savings, especially in drought years.

iv. Is there frequently tension or litigation over water in the basin?

Yes. As evidenced over the last decade with the San Joaquin River Restoration Settlement, competing interests, be it environmental or agricultural, continue to litigate over a finite resource.

v. *Is the possibility of future water conservation improvements by other water users enhanced by completion of this project?*

Yes. This project will demonstrate the viability of installing automation and replacement of antiquated manual gate systems with retrofit equipment that minimizes water losses.

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

  i. *Will the project serve as an example of water and/or energy conservation and efficiency within a community?*

Yes, but within the agricultural community. This project will demonstrate the viability of installing automation and replacement of antiquated manual gate systems with retrofit equipment that minimizes water losses.

The installation of solar powered motorized gates and SCADA controls saves on utility provided energy supplies and the cost of installing and extending electrical service, especially when the sites do not have such infrastructure immediately adjacent.

ii. *Will the project increase the capability of future water conservation or energy efficiency efforts for use by others?*

Yes. Adjacent Water Districts will monitor the installation and operation and are very interested in exploring similar projects.

iii. *Does the project integrate water and energy components?*

Yes. The project incorporates physical improvements to the water delivery system and incorporates small scale solar installations to power these devices and the SCADA control systems that manage them.

V.A.6 Evaluation Criterion F: Implementation and Results

Subcriterion No. F.1—Project Planning

Does the project have a Water Conservation Plan, System Optimization Review (SOR), and/or district or geographic area drought contingency plans in place? Does the project relate/have a nexus to an adaptation strategy developed as part of a WaterSMART Basin Study)? *Please self- certify, or provide copies of these plans where appropriate, to verify that such a plan is in place. Please self-certify, or provide copies of these plans where appropriate, to verify that such a plan is in place. Provide the following information regarding project planning:*

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

As required by the State of California, Madera County has adopted a county-wide Integrated Regional Water Management Plan (IRWMP) which was approved by the State of California on June 6, 2011. This document sets forth the goals and policies for water management and conservation between all consumers whether urban or agricultural.

The goals and policies include increased use of reclaimed waters, implementation of advanced water management and delivery methods, reduction of irrigation water needs, and water basin recharge.

The Madera Irrigation District certifies that it is a member of the Regional Water Management Group. The document can be viewed at http://www.madera-county.com/index.php/forms-and-documents/category/167-the-integrated-regional-water-management-plan-irwmp

The District has also prepared optimization reviews for the delivery system through the Total Channel Control report and the Rapid Appraisal Program. These documents can be reviewed at http://www.madera-id.org/index.php/services/engineering-department

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

Previous and current engineering design studies provided or will provide:

a) Analysis of the ability of the District to retrofit gates into existing concrete abutments with little or no modification and the installation of metering systems with new solar powered SCADA control systems or modification to existing control systems.
b) Analysis and implementation of ground water recharge at the Madera Ranch Water Bank.
c) A current study is underway to determine a Water Management Plan.

The completed studies include a Rapid Appraisal Process Report by the California Polytechnic State University and a Total Channel Control Assessment Report by Rubicon Water.

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

The proposed project achieves or implements several goals of the IRWMP as follows:

- Sustainable management plan for water resources.
- Reduction in District water needs.
- Ability of the growers to implement alternative irrigation methods due to efficient and accurate water supply on demand.
- Water savings can be used for water recharge.

Subcriterion No. F.2—Readiness to Proceed

Points may be awarded based upon the extent to which the proposed project is capable of proceeding upon entering into a financial assistance agreement. 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.

(Please note, under no circumstances may an applicant begin any ground-disturbing activities—including grading, clearing, and other preliminary activities—on a project before environmental compliance is complete and Reclamation explicitly authorizes work to proceed).

This proposed project involves: i) removing existing check gates and retrofitting modular check gate systems into existing concrete weirs and abutments, and ii) installation of flow metering devices and monitoring equipment modifications by District staff. No permits are required. The SCADA and solar power installation is also modular and either mounts to the gate frames and adjacent concrete abutments or pole mounted adjacent to the installation along access roads. The project may entail minor earthwork may be required immediately adjacent to the gate installations and minor formwork on some gate locations to fit the new frames. Work can proceed as soon as the irrigation "off-season" arrives.

The following schedule shows the sequence and timing of the proposed work.

Item	Start Date	End Date
Administer grant	6/1/2013	6/1/2015
Obtain permits	6/1/2013	10/1/2013
Task 1: Install SCADAConnect Hardware	10/1/2013	3/31/2014
Task 2: Install SCADA Control at Basin 32.2 pump station	1/1/2015	3/31/2015
Task 3: Retrofit Mace meter locations	2/1/2015	6/1/2015
Task 4: Install flume gates	10/1/2013	3/31/2015
Task 5: Install slip and flume meters	10/1/2013	3/31/2015
Task 6: Install repeater antenna tower	2/1/2015	6/1/2015
Task 7: Activate SCADAConnect licenses	10/1/2013	6/1/2015
Task 8: Rubicon conducts MID staff training	4/1/2014	6/1/2015

Please explain any permits that will be required, along with the process for obtaining such permits.

The project is in the process of transfer of ownership from Reclamation to the District after completion of debt repayment. It is possible since this transaction has not been completed that the District may be required to procure MP-620 permits. District staff will work with their designated representatives from Reclamation to secure the permits if such action is required.

Subcriterion No. F.3—Performance Measures

Points may be awarded based on the description and development of performance measures to quantify actual project benefits upon completion of the project.

Provide a brief summary describing the performance measure that will be used to quantify actual benefits upon completion of the project (i.e., water saved, marketed, or better managed, or energy saved). For more information calculating performance measure, see Section VIII.A.1. "FY2013 WaterSMART Water and Energy Efficiency Grants: Performance Measures".

Note: All WaterSMART Grant applicants are required to propose a "performance measure" (a method of quantifying the actual benefits of their project once it is completed). A provision will be included in all assistance agreements with WaterSMART Grant recipients describing the performance measure, and requiring the recipient to quantify the actual project benefits in their final report to Reclamation upon completion of the project. If information regarding project benefits is not available immediately upon completion of the project, the financial assistance agreement may be modified to remain open until such information is available and until a Final Report is submitted.

Quantification of project benefits is an important means to determine the relative effectiveness of various water management efforts, as well as the overall effectiveness of WaterSMART Grants.

The performance measures for the project will include the following:

a) Improved operational control throughout the district – provide graphs of the before and after conditions. The District will more accurately be able to quantify losses through seepage between the new gates and metering devices, compare historic flows into and out of the system against a system wide management program. The latter issue will help quantify actual water conservation efforts.

   The post project SCADA system will allow the District to measure performance in a real time environment and allow decision makers to make adjusts with immediate impact to flow management.

b) Reduced staffing and trip costs along with energy generation savings from small scale solar installations – analysis of time cards and trip logs. How much time was spent on water operations vs. maintenance that would have been deferred?

   The completion of the SCADA installation for system wide management will involve training of staff to use the software systems to manage water flows, thereby shifting staff from a in the field operational/management role to supervisory. A contract with the system provider will require a training component for District employees to facilitate this change in operations.

   There is also a secondary benefit to real time monitoring of the system by the District staff. Spills and dike breaches will register as flow loss in the system and allow staff

to become more alert via an alarm and therefore able to react quicker and more responsive to solving the problem before it results in significant losses. Remote operation of gates would allow isolation of a canal segment to confine the loss.

c) Water savings from reduced spills – actual vs. previously estimated and reaction time by staff to resolve the issues based on an automated alarm system as opposed to visual inspection or farmer notification. This measure also allows the District to quantify spills that will continue to occur until a water balance within canal segments is achieved at completion of the improvements and to measure spills in a before and after state.

d) Increased take up of MID water as a substitute for groundwater pumping – was it possible to extend the delivery season? By how long based upon how much was measured and therefore stored behind the dams.

e) Increased service levels to farmers – responding to on demand delivery and maintaining channel levels for same. Graphing of flow measurements through each segment which cannot be done currently. The implementation of accurate flow management will allow the District to measure distribution of irrigation waters throughout its 315 miles of canals through remote sensing as opposed to manual adjustments and field observations/

f) Accurate accounting of water stored at MID's future water bank – allocations of surplus waters can be broken down to individual commitments as opposed to gross measurement and accounted for from a better managed system including such items as reductions in spills discussed in item c). (spillage without project – spillage with project)

g) Accurate measurement of water sold – allocations for market water can be measured. Retention within a water balanced system will show exactly what is available for transfer as opposed to the current pass through, especially for storm water flow excess.

h) Accurate accounting of environmental flows to Fresno River – This will complete a current project that will show actual allocations that are required to pass the system through the weir. It is anticipated that the prior manual system was highly inaccurate and allowed more than the required flow.

As an example, these measures will be implemented through the following operational measures:

- Running sheets and metering reports will be printed for the ditch tenders. The running sheets provide a schedule of flows for each of the customers listed. The running sheets provide times for turnout gates to be opened and closed. With TCC the supply of water in the canals will respond automatically to the changing demands as turnout gates are opened and closed.

- The implementation strategy would be to break district-wide automation into phases to build understanding and buy in from the operators on the Rubicon technology and

products. Before progressing to a large-scale implementation, Rubicon is recommending to focus on operational improvements at key sites followed by implementing a strategic measurement program to accurately measure spill points in the district.

- It is proposed that FlumeGates™ and SCADA are implemented at targeted locations for improved operational control. The purpose of key site projects is to target structures that exhibit a high degree of difficulty for water level control, flow, and measurement as identified by MID. Potential applications could be at:

    - Franchise Dam – 3 FlumeGates™ and 2 Level Sensor Systems;
    - Abbey's Hole – 2 FlumeGates™ total - 1 FlumeGate at Lateral 24.2 Diversion off Dry Creek and 1 FlumeGate™ in Dry Creek Dam;
    - Lateral 32.2-9.9 – 1 FlumeGate™ to control flow where Lateral 9.9 head gate comes off the Lateral 32.2;
    - Lateral 32.2 Holding Basin – 1 FlumeGate™ to control the flow at 10 cfs and excess flow diverted into new holding basin;
    - Lateral 6.2-16.9 – 1 FlumeGate™;
    - Lateral 6.2-18.4 – 1 FlumeGate™;
    - Lateral 6.2 Extension – 1 FlumeGate™;
    - Staff meters at spill sites; and,
    - 15 existing water level sensors connected to SCADA or data logger.

- As the system is completed, the District will be able to compare historical flows against the more complete information that will be available system wide and by channel segment. Where current limited channel segment information is available, a before and after retrofit gate installation comparison will be possible.

V.A.7 Evaluation Criterion G: Additional Non-Federal Funding

No additional Non-Federal funding beyond the District's match funds are provided to this project.

V.A.8 Evaluation Criterion H: Connection to Reclamation Project Activities (4 points)

*Up to **4 points** may be awarded if the proposed project is in a basin with connections to Reclamation project activities. No points will be awarded for proposals without connection to a Reclamation project or Reclamation activity.*

(1) How is the proposed project connected to Reclamation project activities?

The District has participated with Reclamation on the following projects and activities:

- The primary connection to Reclamation activities is through contracted water deliveries. In 1939, the District contracted with Reclamation for water deliveries in exchange for certain properties and interests in water filings. This agreement was modified in 1950 and in 1959.

- In 1975, the District contracted with Reclamation for the Hidden Dam project where Reclamation required the District to acquire 15,000 additional acres in exchange for water from this dam.

- The District is a participant in the San Joaquin River Restoration Settlement wherein Reclamation must provide waters from the Friant Dam to the San Joaquin River to restore historic fisheries.

(2) Does the applicant receive Reclamation project water?

Yes, under the following contracts with deliveries from the Friant and Hidden Dams:

	AF	Source	Contract #	Contract / Restriction	Expiration
USBR Agricultural Class I	85,000	Federal	175R2891-IRd	Firm as available	None
USBR Agricultural Class II	186,000	Federal	175R2891-IRd	As available subject to obligation	None
Hensley Lake	24,000+	Federal	14-06-200-4020-IRd	Fluctuating annual yield	None

(3) Is the project on Reclamation project lands or involving Reclamation facilities?

The project involves Reclamation facilities. The District is in the process of transfer of ownership from Reclamation to the District after completion of debt repayment for improvements made within the District with funding provided by Reclamation. Technically, Reclamation owns these historic improvements until the transfer of ownership is completed.

(4) Is the project in the same basin as a Reclamation project or activity?

The Madera Water Basin, in which the District and the Project are located, includes the San Joaquin and Fresno Rivers which are under the jurisdiction of Reclamation.

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

Yes. The development of the Madera Ranch Water Bank is an effort by the District and its partners to restore the ground water to a basin that has historically been over drafted by agricultural and urban uses. Portions of the surface waters provided through the Reclamation water delivery contracts and conserved under the Project will be used to replenish ground water.

SUPPLEMENTAL INFORMATION

Exhibit 1 – Letters of Support for the Project

Exhibit 2 - Map of District with Project Improvement locations

Exhibit 3 – Representative Photos of the Existing and Proposed Improvements

Exhibit 4 – District Master Plan for Prioritization of Capital Improvements

Exhibit 5 – Rubicon Cost Proposal

Exhibit 6 – Board Resolution

Exhibit 1

Letters of Support

January 8, 2012

Attn: Thomas Greci, General Manager
MADERA IRRIGATION DISTRICT
12152 Road 28 1/4
Madera, CA 93637

RE: 2013 WaterSMART Grant Application

The City has a history of supporting worthwhile efforts such as this that seek to conserve one of our most precious natural resources. To that end, I support the Madera Irrigation District's application to obtain the WaterSMART: Water and Efficiency Grant from the U.S. Department of the Interior - Policy and Administration, Bureau of Reclamation. It represents a noteworthy and effective example of MID's commitment to water conservation.

The District's efforts to conserve our limited water resources and improve our local agriculture are commendable. I would encourage the Bureau of Reclamation to consider this funding request and provide financial support. Recent drought years have been hard on local farms and families. Anything that can be done to conserve irrigation water is a high priority.

Sincerely,

Keith Helmuth, P.E.
City Engineer

Engineering
205 W. Fourth Street • Madera, CA 93637 • TEL (559) 661-5418 • FAX (559) 675-6605
www.madera-ca.gov

GRAVELLY FORD WATER DISTRICT

18811 Road 27· Madera, CA 93638 (559)·474·1000 Fax: (559) 673· 1086

Michael P. Jackson, P.E.

Area Manager

Bureau of Reclamation

1243 N. Street

Fresno, CA 93721

January 9, 2013

RE: 2013 WaterSMART Grant Application

Dear Mr. Jackson,

The *Gravelly Ford Water District* supports the Madera Irrigation District's application to obtain a 2013 U.S. Department of the Interior - Policy and Administration, Bureau of Reclamation WaterSMART: Water and Energy Efficiency Grant.

Madera's efforts to conserve our basins limited water resources is critical to the overall well being of the entire urban and agricultural of Madera. We encourage the Bureau of Reclamation to consider this funding request and provide financial support for such an important and necessary project for the Madera ground water basin. Recent drought years have had a significant impact on local farms and families as well as the City of Madera. Anything that can be done to assist in the conservation of irrigation water is of high priority and will be of benefit to the entire Madera Irrigation District area as well as adjacent neighbors. We urge you to give the utmost consideration to Madera's request for such a worthwhile grant application.

Sincerely,

Don Roberts

cc Tom Greci, Manager MID

RESOURCE MANAGEMENT AGENCY
DEPARTMENT OF ENGINEERING
KEN VANG PE, COUNTY ENGINEER

2037 W. Cleveland Avenue
Madera, CA 93637-8720
(559) 675-7817
FAX (559) 675-7639
Kheng.vang@madera-county.com

DATE: January 4, 2013

TO: Thomas Greci, General Manager
MADERA IRRIGATION DISTRICT
12152 Road 28 1/4
Madera, CA 93637

RE: 2013 WaterSMART Grant Application

Madera County supports the Madera Irrigation District's application to obtain a 2013 U.S. Department of the Interior - Policy and Administration, Bureau of Reclamation WaterSMART: Water and Energy Efficiency Grant.

The District's efforts to conserve our limited water resources and improve our local agriculture are commendable. We encourage the Bureau of Reclamation to consider this funding request and provide financial support. Recent drought years have been hard on local farms and families. Anything that can be done to conserve our limited resources is a high priority.

Sincerely,

Ken Vang, PE
County Engineer

TULARE IRRIGATION DISTRICT

6826 Avenue 240 ◆ Tulare, California 93274 ◆ Telephone (559) 686-3425

January 7, 2013

Thomas Greci, General Manager
Madera Irrigation District
12152 Road 28 1/4
Madera, California 93637

Subject: Madera Irrigation District – USBR WaterSMART Grant Application

Dear Mr. Greci:

The Tulare Irrigation District (TID) supports the efforts of the Madera Irrigation District (MID) in their pursuit of a WaterSMART grant application from the United States Department of the Interior, Bureau of Reclamation (Bureau) for Fiscal Year 2013. This grant application involves the development of increased water management efficiency, by installing automated control structures and Supervisory Control and Data Acquisition (SCADA) equipment. TID, through its experience with similar projects, believes strongly that this project will be an effective tool for efficient water management. TID began its SCADA and automation program approximately 10 years ago and has continued to expand each year, also with the assistance of Bureau grant funding. The benefits that TID has experienced include water savings and an increased flexibility in managing water to meet grower demands.

TID recognizes the importance of sound water management and conservation projects, and the significant role they play in stabilizing the local water supply. TID and MID have a long history of coordinating water management projects and programs aimed at managing water supplies in our respective regions to efficiently meet local demands. The SCADA and automation project being proposed by MID is a project that will support current and future efficient water management practices. TID strongly encourages the Bureau to consider funding MID in their pursuit of this grant application.

Sincerely,

J. Paul Hendrix

J. Paul Hendrix
General Manager

Exhibit 2

Map of District with Project Improvement locations

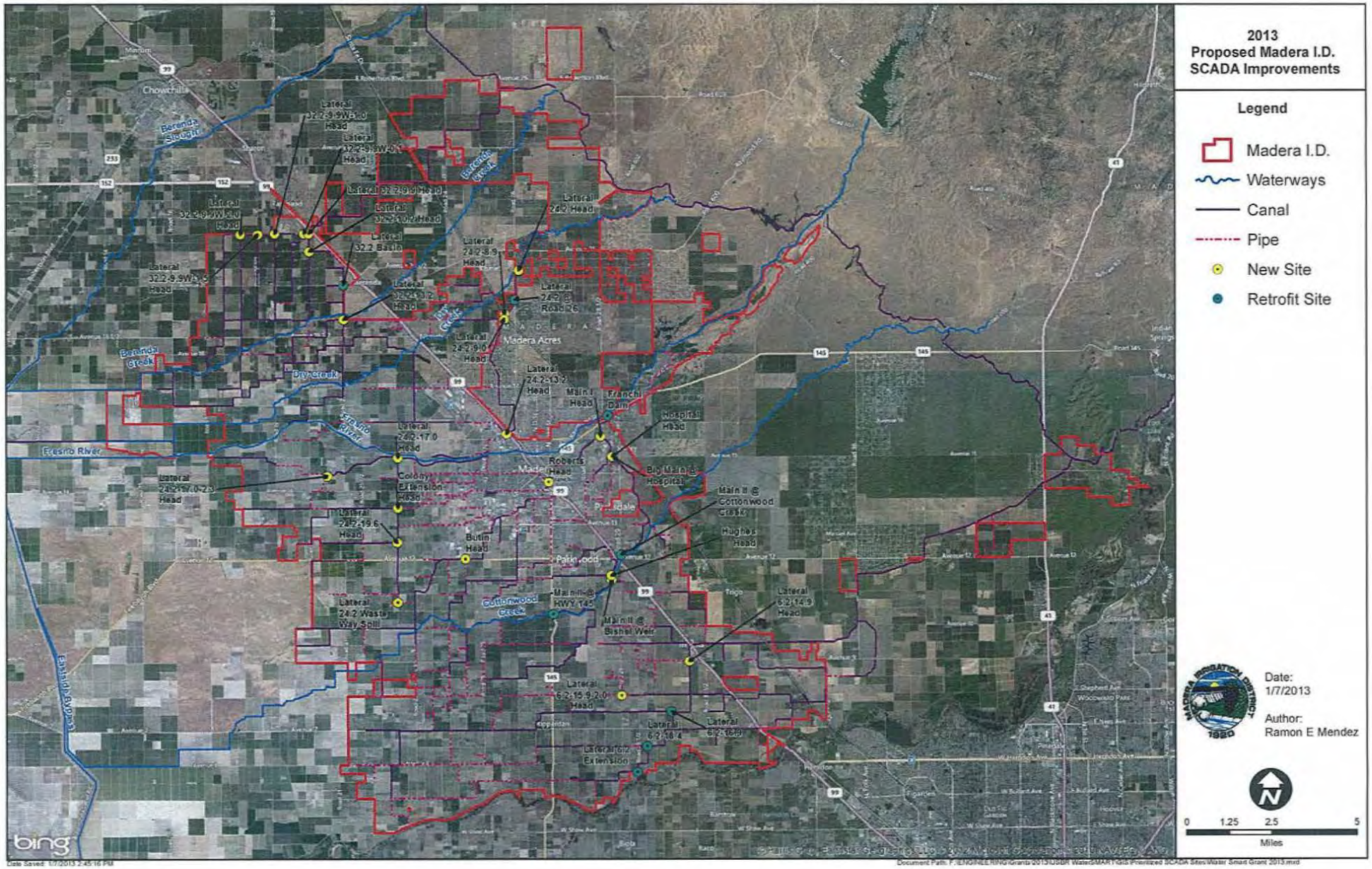
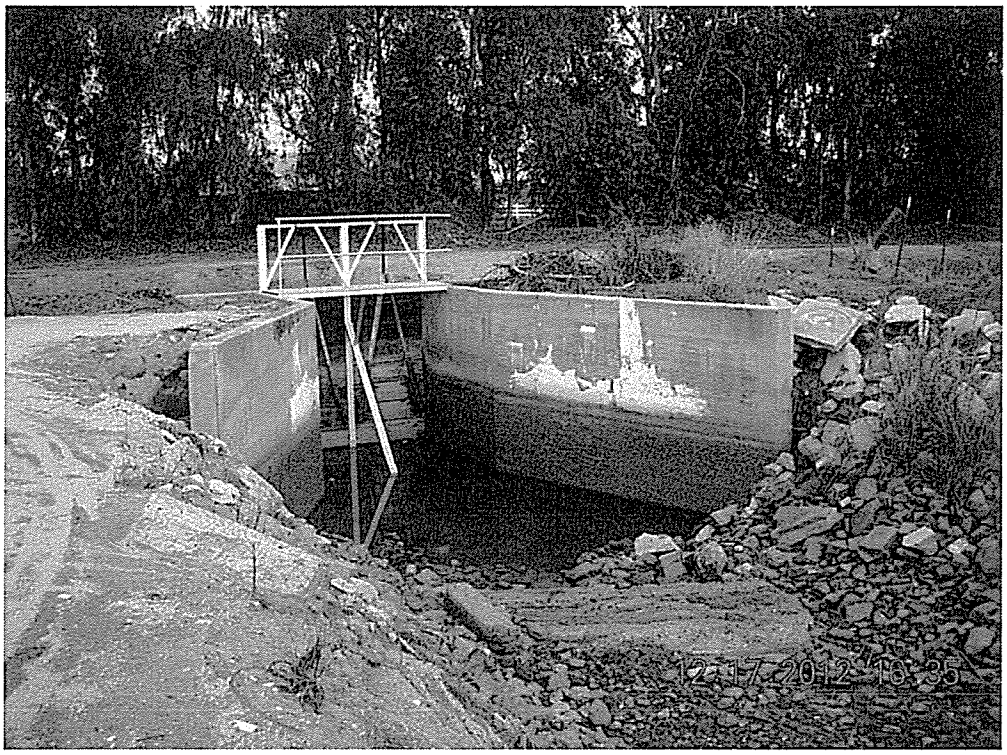

2013
Proposed Madera I.D.
SCADA Improvements
Legend
Madera I.D.
Waterways
Canal
Pipe
New Site
Retrofit Site
Date:
1/7/2013
Author:
Ramon E Mendez
0
1.25
2.5
5
Miles
Chowchilla
Berenda Slough
Berenda Creek
Dry Creek
Fresno River
Madera Acres
Main I Head
Franchi Dam
Hospital Head
Roberts Head
Big Madera Hospital
Main II @ Cottonwood Creek
Hughes Head
Butlin Head
Parkwood
Main II @ HWY 145
Main II @ Bishal Weir
Cottonwood Creek
Lateral 24.2 Waste Way Spill
Lateral 24.2 Head
Lateral 24.2-8.9 Head
Lateral 24.2 @ Road 26
Lateral 24.2-13.2 Head
Lateral 24.2-17.0 Head
Lateral 24.2-19.6 Head
Lateral 24.2-17.0-2.3 Head
Lateral 32.2 Basin
Lateral 6.2-14.9 Head
Lateral 6.2-15.9-2.0 Head
Lateral 6.2-16.4
Lateral 6.2-16.9
Lateral 6.2 Extension
bing

Exhibit 3

Photos of Existing Conditions/samples of type of improvements proposed.

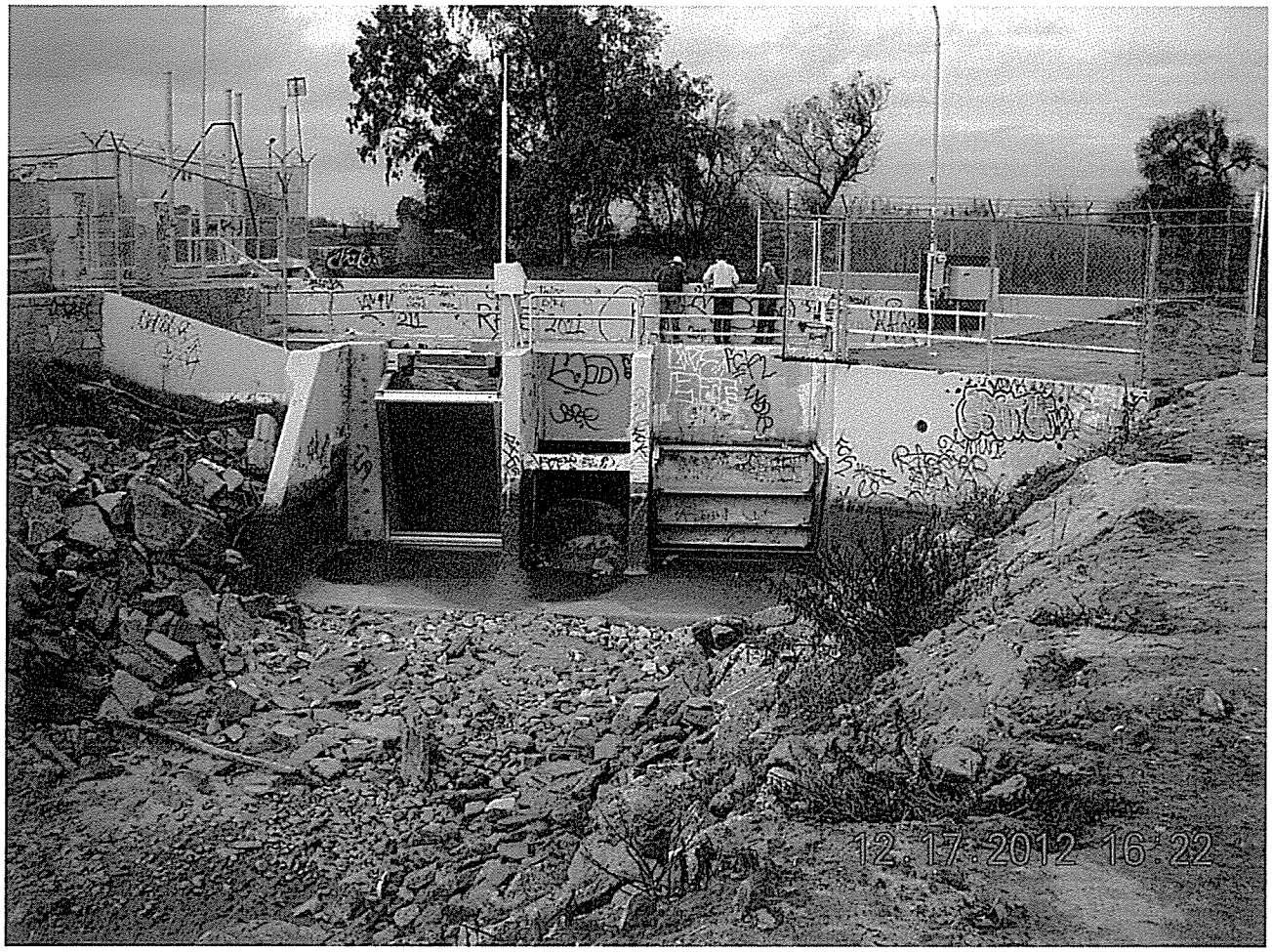
Representative sample of Check Gates and manual controls



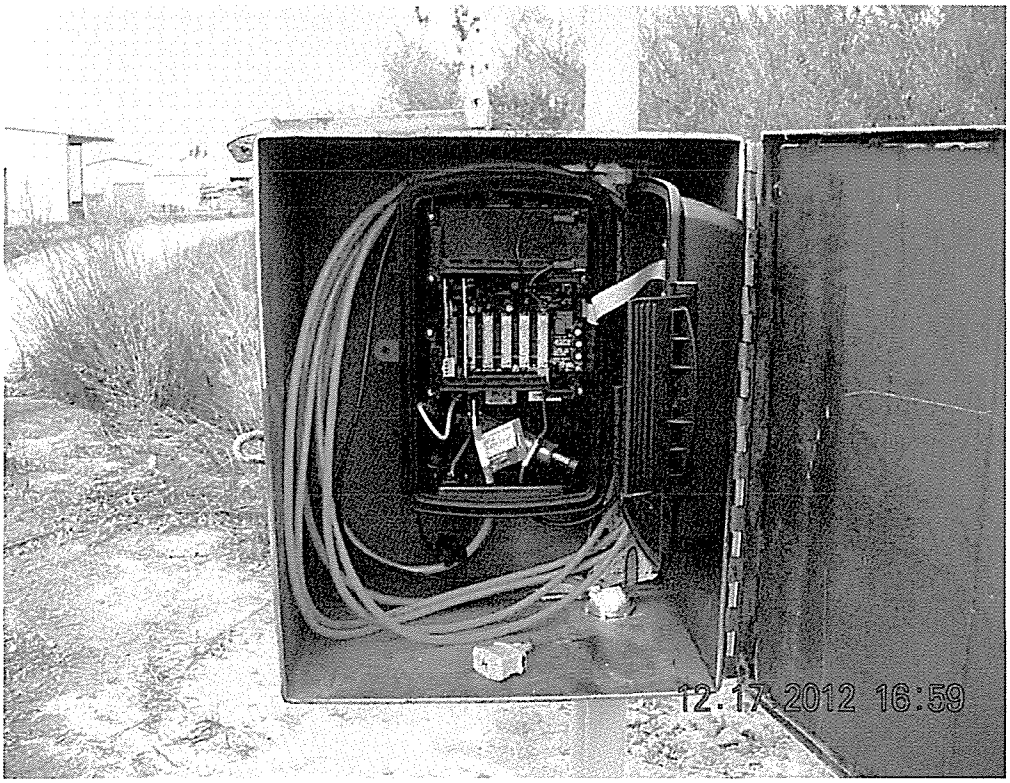

12-17-2012 17:17

Manual checks for Flow Levels and Gate elevations,
Staff Gauge and Recorder

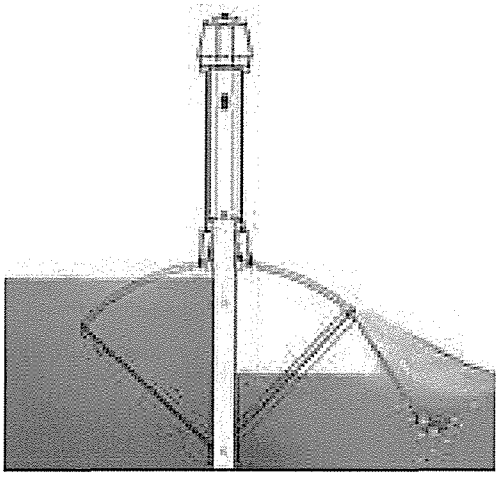
Example of existing check gate replacement demonstration project.



Examples of Automated monitoring station requiring manual download of information. This type of station to be upgraded with transmitter for full SCADA remote monitoring.



Example of proposed retrofit Automated Gate System



Examples of Flume Meters

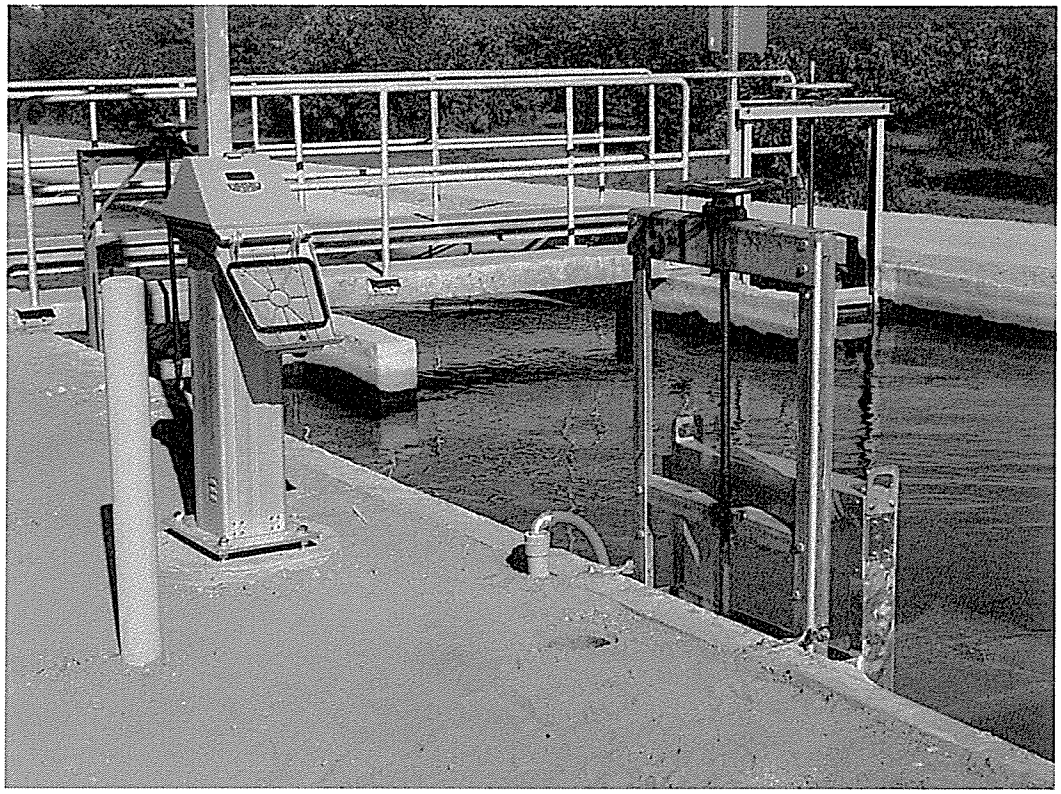


Exhibit 4

District Master Plan for Prioritization of Capital Improvements

2013 WaterSMART Grant for S.C.A.D.A. Improvements
Priority List

Priority	Location	GPS Coordinates (latitude)	GPS Coordinates (longitude)	Nearest Cross Streets	Status	Device	Normal Flow (cfs)	Capacity (cfs)	Existing Measurement Device or Structure
1	Main II @ Cottonwood Creek	36.92543494	-120.0187909	Ave. 12 & Rd. 29	Existing	Mace Meter	60	100	Macemeter
2	Main II @ Hwy 145	36.90033757	-120.0550978	Hwy 145 Crossing	Existing	Mace Meter	30	65	Macemeter
3	Lateral 24.2	37.03372044	-120.0745734	Ave. 19 1/2 & Rd. 25 1/2	Existing	Mace Meter	115	140	Macemeter
4	Lateral 6.2-16.9	36.85860686	-119.9925431	Ave. 7 1/2 & Rd. 30 1/2	Existing	Mace Meter	30	60	Macemeter
5	Lateral 6.2-18.4	36.84400869	-120.0057419	Ave. 6 1/2 & Rd. 29 3/4	Existing	Mace Meter	30	60	Macemeter
6	Lateral 6.2 Extension	36.83313851	-120.0110455	Ave. 5 3/4 & Rd. 29 3/4	Existing	Mace Meter	30	60	Macemeter
7	Franchi Dam	36.98447764	-120.0257231	Hwy 145 & Fresno River	Existing	Flume Gate	180	300	Rubicon Flume Gate
8	Big Main @ Hospital Weir	36.96674531	-120.02309	Ave. 15 & Rd. 29	Proposed	Flume Gate	160	180	
9	Main I Head	36.97558432	-120.0295461	Ave. 15 1/2 & Rd. 28 1/2	Proposed	Flume Gate	40	100	Weir & Recorder
10	Main II @ Bishel Weir	36.91475252	-120.0240552	Ave. 11 1/2 & Rd. 28 3/4	Proposed	Flume Gate	80	85	
11	Lateral 32.2 Basin	37.04041475	-120.1656916	Ave. 20 & Rd. 21	Future	Flume Gate	20	75	Flow Sensor
12	Roberts Head	36.95626946	-120.0572636	G St. N. of Hwy 145	Future	Flume Meter	15	35	
13	Hughes Head	36.9165788	-120.0242292	Ave. 11 1/2 & Rd. 28 3/4	Future	Flume Meter	10	20	Weir & Staff Gauge
14	Butin Head	36.92392017	-120.101698	Ave. 12 & Rd. 24 1/2	Future	Flume Meter	3	10	
15	Hospital Head	36.96701487	-120.023539	Ave. 15 & Rd. 29	Future	Flume Meter	8	15	
16	Lateral 24.2 Head	37.04610339	-120.072589	Ave. 20 1/2 & Rd. 26	Future	Flume Gate	120	140	
17	Lateral 24.2-8.9 Head	37.0277362	-120.0801831	Ave. 19 1/2 & Rd. 25 1/2	Future	Flume Meter	8	30	Weir & Staff Gauge
18	Lateral 24.2-9.0 Head	37.02559946	-120.0803762	Ave. 19 & Rd. 25 1/2	Future	Flume Meter	5	30	Weir & Staff Gauge
19	Lateral 24.2-13.2 Head	36.97685701	-120.079482	Cleveland Ave. & Hwy 99	Future	Flume Meter	15	45	Weir & Staff Gauge
20	Lateral 24.2-17.0 Head	36.96692445	-120.1373315	Ave. 15 & Rd. 22 1/2	Future	Flume Meter	25	25	Weir & Staff Gauge
21	Lateral 24.2-17.0-2.3 Head	36.95913288	-120.1748396	Ave. 14 1/2 & Rd. 20 1/2	Future	Flume Meter	8	15	
22	Lateral 24.2-19.6 Head	36.93096347	-120.13785	Ave. 12 1/2 & Rd. 22 1/2	Future	Flume Meter	10	15	
23	Lateral 32.2-9.9 Head	37.06205871	-120.1841226	Ave. 21 1/2 & Rd. 20	Future	Flume Meter	80	100	
24	Lateral 32.2-10.2 Head	37.05444191	-120.1839071	Ave. 21 & Rd. 20	Future	Flume Meter	5	30	Weir & Staff Gauge
25	Lateral 32.2-13.2 Head	37.02571213	-120.1658627	Ave. 19 & Rd. 21	Future	Flume Meter	10	15	
26	Lateral 32.2-9.9W-0.1 Head	37.06203672	-120.1866197	Ave. 21 1/2 & Rd. 19 3/4	Future	Flume Meter	5	15	Weir & Staff Gauge
27	Lateral 32.2-9.9W-1.0 Head	37.06195307	-120.2022321	Ave. 21 1/2 & Rd. 19	Future	Flume Meter	7	15	
28	Lateral 32.2-9.9W-1.5 Head	37.06166215	-120.2112585	Ave. 21 1/2 & Rd. 18 1/2	Future	Flume Meter	4	15	Open Flow Meter
29	Lateral 32.2-9.9W-2.0 Head	37.06166977	-120.2205541	Ave. 21 1/2 & Rd. 18	Future	Flume Meter	12	30	Weir & Staff Gauge
30	Colony Extension Head	36.94550819	-120.1374026	Ave. 13 1/2 & Rd. 22 1/2	Future	Flume Meter	17	17	Weir & Staff Gauge
31	Lateral 6.2-14.9 Head	36.88006309	-119.9832671	Ave. 9 & Rd. 31	Future	Slip Meter	7	15	
32	Lateral 6.2-15.9-2.0 Head	36.86574122	-120.0192508	Ave. 8 & Rd. 29	Future	Slip Meter	5	15	
33	Lateral 24.2 Waste Way Spill	36.90559844	-120.1376772	Ave. 10 3/4 & Rd. 22 1/2	Future	Flume Meter	4	7	Weir

2013 WaterSMART Grant for S.C.A.D.A. Improvements
Priority List

Priority	Location	GPS Coordinates (latitude)	GPS Coordinates (longitude)	Nearest Cross Streets	Status	Device	Normal Flow (cfs)	Capacity (cfs)	Existing Measurement Device or Structure
NOT INCLUDED IN GRANT									
34	Main I Spill	36.89456739	-120.1287071	Ave. 10 1/2 & Rd. 23	Future	Flume Meter	5	25	Weir, Recorder & Staff Gauge
35	Colony Spill	36.94549713	-120.1284305	Ave. 13 1/2 & Rd. 22 1/2	Future	Flume Meter	2	10	Weir & Stick Measurement
36	Stockton Spill	36.96624782	-120.1285783	Ave. 14 1/2 & Rd. 23	Future	Flume Meter	2	10	Weir & Stick Measurement
37	Lateral 6.2 Waste Way Spill	36.83087092	-120.0111142	Ave. 5 1/2 & Rd. 30	Future	Flume Meter	2	50	Weir, Recorder & Staff Gauge
38	Lateral 6.2 Extension Waste Way Spill	36.81154071	-120.1332601	Ave. 4 & Rd. 23	Future	Flume Meter	2	15	Weir, Recorder & Staff Gauge
39	Lateral 6.2-14.0 Spill	36.91289019	-119.9921612	Ave. 11 1/2 & Rd. 31	Future	Flume Meter	2	5	Stick Measurement
40	Lateral 24.2-17.0 Spill	36.96741843	-120.2223497	Ave. 15 & Rd. 17	Future	Flume Meter	2	10	Weir, Recorder & Staff Gauge
41	Colony Extension Spill	36.94549159	-120.2200512	Ave. 13 1/2 & Rd. 18	Future	Flume Meter	1.5	10	Weir & Stick Measurement
42	Lateral 24.2-19.5	36.9235626	-120.1742348	Ave. 19 1/2 & Rd. 20 1/2	Future	Flume Meter	2	10	Weir & Meter
43	Lateral 6.2-14.0 Head	36.88742503	-119.974506	Ave. 9 1/2 & Rd. 31 1/2	Future	Flume Gate	10	15	Weir, Recorder & Staff Gauge
44	Lateral 6.2 @ Root Creek	36.90747939	-119.8938017	Ave. 11 & Rd. 36	Future	Flume Gate	N/A	35	
45	Cottonwood Creek Spill	36.88320549	-120.1463637	Ave. 9 & Rd. 22	Future	Flume Gate	5 to 10	240	Weir, Recorder & Staff Gauge
46	Dry Creek Spill	36.98127331	-120.2563507	Ave. 16 & Rd. 16	Future	Flume Gate	10	800	Weir, Recorder & Staff Gauge
47	Berenda Creek Spill	36.99657722	-120.2743374	Ave. 17 & Rd. 15	Future	Flume Gate	3	90	Sensor
48	Section 8 Head	36.8946519	-120.1286883	Ave. 10 & Rd. 23	Future	Redesign	35	50	
49	Airport (MID) Basin	36.98217894	-120.1010292	Ave. 16 & Falcon Dr.	Existing	Basin	5	45	Open Flow Meter
50	Burgess (MID) Basin	36.92736322	-120.033209	Borden St. & Rd. 28 1/4	Existing	Basin	3	20	Open Flow Meter
51	Russell (MID) Basin	36.89856161	-120.0196026	Ave. 10 1/2 & Rd. 29	Existing	Basin	3	15	Open Flow Meter
52	Beeman (MID) Basin	36.88753352	-120.0238346	Ave. 9 1/2 & Rd. 29	Existing	Basin	2	30	Open Flow Meter
NOT INCLUDED IN GRANT - OTHER MONITORING LOCATIONS									
53	Berenda Creek Spill @ Road 15			Ave. 17 & Rd. 15	Existing		3	90	Weir, Recorder & Staff Gauge
54	Lateral 6.2-9.2-3.2 Head			Ave. 9 & Rd. 35	Existing		15	30	Weir & Staff Gauge
55	Lateral 6.2-9.2-5.0 Head			Ave. 8 & Rd. 34	Existing		15	45	Weir & Staff Gauge
56	Lateral 6.2-9.2 Head			Ave. 10 & Rd. 36	Existing		60	75	Weir & Staff Gauge
57	Lateral 6.2-14.5 Head			Ave. 9 & Rd. 31	Existing		15	30	Weir & Staff Gauge
58	Shubert Spill			Ave. 7 & Rd. 24	Existing		1	5	Weir & Stick Measurement
59	Butin Spill			Ave. 10 & Rd. 24	Existing		2	10	Weir & Stick Measurement
60	Hughes Spill			Ave. 11 & Rd. 25	Existing		2	10	Weir & Stick Measurement
61	Dixieland Spill			Ave. 16 1/2 & Rd. 16	Existing		3	10	Weir & Stick Measurement
62	Lateral 32.2 Spill			Ave. 17 & Rd. 21	Existing		1	8	Weir & Stick Measurement
63	Lateral 24.2-17.0 Spill @ Road 22			Ave. 15 & Rd. 22	Existing		1	10	Weir, Recorder & Staff Gauge
64	Dry Creek Lateral Spill			Ave. 16 & Rd. 20	Existing		1	3	Weir, Recorder & Staff Gauge
65	Dry Creek above Road 26			Ave. 22 & Rd. 26	Existing		180	225	Weir, Recorder & Staff Gauge
66	Lateral 24.2-13.2 Spill			Ave. 16 Rd. 20	Existing		1	10	Weir, Recorder & Staff Gauge
67	Lateral 24.2 Spill @ Fresno River			Granada Dr. & Riverview Dr.	Existing		1	100	Weir, Recorder & Staff Gauge
68	Cody Spill			Ave. 13 & Rd. 23	Existing		1	5	Weir & Stick Measurement

Exhibit 5

Rubicon Cost Proposal

Budgetary SCADA System Proposal

Madera Irrigation District

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RUBICON™

1. Project Understanding

According to Madera Irrigation District (District) WaterSmart Grant objectives, the District would like to install a Supervisory Control and Data Acquisition (SCADA) system for monitoring and control of various key locations within the District. The District does not currently have any SCADA system to monitor flows or control gates. The implementation of SCADA would provide multiple benefits; real-time feedback to the District, reduce man-hours, reduce gasoline, and reduce vehicle wear and tear.

1.1 Customer Introduction

The District encompasses an area of 128,292 acres, which includes the 15,000 acres annexed as part of the Hidden Dam contract with the Bureau of Reclamation, with a gravity irrigation distribution system of approximately 300 miles of open flow canal systems, as well as 150 miles of pipelines. The District functions on a budget of over $11 million in which revenues are approximately divided by 32% assessments, 55% water sales and standby charges, and 13% of District revenues are paid by the residents of the City of Madera. Organization staffing varies from approximately 40 permanent employees to a maximum of around 45 employees, including part-time, temporary and seasonal workers. The District is a public agency, established by the State Legislature as a Special Act District. It is governed by a five member Board of Directors who are elected at large; but, who must reside within the division they serve. The statutory authority under which an irrigation district operates is what is known as the California Water Code. A large segment of the City of Madera is included within the District, and each resident of the City, who is registered to vote, has an opportunity to vote for the Directors of his/her choice; or, in fact, may opt to run for the directorship. In addition to the services rendered to the lands within the District, the District also conveys agricultural water to the Gravelly Ford Water District. The District is also a member of the Madera-Chowchilla Water and Power Authority which operates and maintains the Madera Canal under an agreement with the United States Bureau of Reclamation, from the valves at Friant Dam, to the delivery of Millerton Lake water to Madera Irrigation District. Information courtesy of www.Madera-id.org.

1.2 System Overview

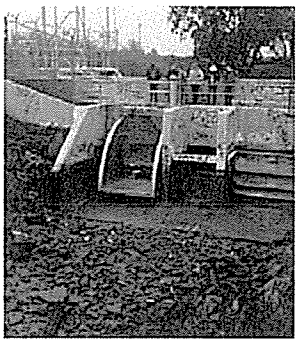
(a) Mace AgriFlo XCi

The District currently owns six (6) Mace AgriFlo XCi meters. I/O modules will need to be added to get communications output. It is our understanding that the District will purchase and install the modules to provide flow measurement output readings. Rubicon would utilize the analog 4-20ma output for communications.

(b) FlumeGates

The District currently owns one 2886-3038 FlumeGate. The FlumeGate currently has a cellular modem and is operated through SCADAConnect Live and as a stand-alone site. The existing cellular modem will be replaced by a radio and antenna at no cost to the District as outlined in the FlumeGate purchase agreement.

Figure 1: Big Main FlumeGate



The District has identified three (3) additional proposed locations that may be online by the time the SCADA installation is complete. Integration of these sites into SCADAConnect® will be included as part of this proposal.

The District has identified two (2) future FlumeGate locations. These sites will be integrated with SCADAConnect as part of this proposal.

(c) SlipMeter and FlumeMeter Sites

The District has identified twenty-three (23) additional sites to be included as part of the proposal. Rubicon has included the integration only of these additional sites as part of the proposal.

2. Objective

The objective of the project is to furnish and install SCADAConnect at the District's main office. Rubicon will provide SCADAConnect to the following sites.

Priority	Location	Nearest Cross Streets	Status	Device
1	Main II @ Cottonwood Creek	Ave. 12 & Rd. 29	Existing	Mace Meter
2	Main II @ Hwy 145	Hwy 145 Crossing	Existing	Mace Meter
3	Lateral 24.2	Ave. 19 1/2 & Rd. 25 1/2	Existing	Mace Meter
4	Lateral 6.2-16.9	Ave. 7 1/2 & Rd. 30 1/2	Existing	Mace Meter
5	Lateral 6.2-18.4	Ave. 6 1/2 & Rd. 29 3/4	Existing	Mace Meter
6	Lateral 6.2 Extension	Ave. 5 3/4 & Rd. 29 3/4	Existing	Mace Meter
7	Franchi Dam	Hwy 145 & Fresno River	Existing	Flume Gate
8	Big Main @ Hospital Weir	Ave. 15 & Rd. 29	Proposed	Flume Gate
9	Main I Head	Ave. 15 1/2 & Rd. 28 1/2	Proposed	Flume Gate
10	Main II @ Bishel Weir	Ave. 11 1/2 & Rd. 28 3/4	Proposed	Flume Gate
11	Lateral 32.2 Basin	Ave. 20 & Rd. 21	Future	Flume Gate
12	Roberts Head	G St. N. of Hwy 145	Future	Flume Meter
13	Hughes Head	Ave. 11 1/2 & Rd. 28 3/4	Future	Flume Meter
14	Butin Head	Ave. 12 & Rd. 24 1/2	Future	Flume Meter
15	Hospital Head	Ave. 15 & Rd. 29	Future	Flume Meter
16	Lateral 24.2 Head	Ave. 20 1/2 & Rd. 26	Future	Flume Gate
17	Lateral 24.2-8.9 Head	Ave. 19 1/2 & Rd. 25 1/2	Future	Flume Meter
18	Lateral 24.2-9.0 Head	Ave. 19 & Rd. 25 1/2	Future	Flume Meter
19	Lateral 24.2-13.2 Head	Cleveland Ave. & Hwy 99	Future	Flume Meter
20	Lateral 24.2-17.0 Head	Ave. 15 & Rd. 22 1/2	Future	Flume Meter
21	Lateral 24.2-17.0-2.3 Head	Ave. 14 1/2 & Rd. 20 1/2	Future	Flume Meter
22	Lateral 24.2-19.6 Head	Ave. 12 1/2 & Rd. 22 1/2	Future	Flume Meter
23	Lateral 32.2-9.9 Head	Ave. 21 1/2 & Rd. 20	Future	FlumeMeter
24	Lateral 32.2-10.2 Head	Ave. 21 & Rd. 20	Future	Flume Meter
25	Lateral 32.2-13.2 Head	Ave. 19 & Rd. 21	Future	Flume Meter
26	Lateral 32.2-9.9W-0.1 Head	Ave. 21 1/2 & Rd. 19 3/4	Future	Flume Meter
27	Lateral 32.2-9.9W-1.0 Head	Ave. 21 1/2 & Rd. 19	Future	Flume Meter
28	Lateral 32.2-9.9W-1.5 Head	Ave. 21 1/2 & Rd. 18 1/2	Future	Flume Meter
29	Lateral 32.2-9.9W-2.0 Head	Ave. 21 1/2 & Rd. 18	Future	Flume Meter
30	Colony Extension Head	Ave. 13 1/2 & Rd. 22 1/2	Future	Flume Meter
31	Lateral 6.2-14.9 Head	Ave. 9 & Rd. 31	Future	Slip Meter
32	Lateral 6.2-15.9-2.0 Head	Ave. 8 & Rd. 29	Future	Slip Meter
33	Lateral 24.2 Waste Way Spill	Ave. 10 3/4 & Rd. 22 1/2	Future	Flume Meter

A future project objective may include the addition of SlipMeters for flow measurement and control, in lieu of the FlumeMeters.

3. Rubicon Solution

Rubicon proposes a solution to improve monitoring of remote sites throughout the District. This would be accomplished using a combination of Rubicon and third-party products to provide a robust, cost-effective solution for Madera Irrigation District. The solution details are outlined below.

3.1 Solution Details

(a) Components

SCADAConnect Hardware:

- Database Server: Dell Poweredge R415 Rack Server, Dell 1U KMM/KVM Console, 1x2.40GHZ 6C Xeon CPU, 8GB RAM, 4x500GB 7.2k HDD in RAID 10, W2K8Server SP1 x64 Standard OS, redundant power supplies, Dell Remote Access Controller (iDRAC7 Enterprise), Symantec backup software.
- Backup tape drive: LTO-4: Dell LTO-3, 400GB native, 800GB compressed
- Hub/Switch Netgear GS-108
- 10 Back up tapes
- UPS APC Smart UPS 1500VA
- Firewall Watchguard XTM21
- Rack/Cabinet to house the above
- Oracle License
- Miscellaneous cables, etc.
- Database and Software Driver Setup
- Schematic Configuration
- Host Engineering FlumeGate/AgriFlo/SlipMeter/FlumeMeter sites
- SCADAConnect Licenses

Basin Pump Station Site:

- 32.2
  - Further information will be required at this site; the estimated cost is higher than will be expected. For the grant application we are assuming the District wants full control and that new panels may need to be installed, depending on site conditions. Scope to be determined at a later date.

Mace AgriFlo XCi Meter Sites:

- 24.2 @ Road 26,
- Main II @ CWC,
- Main II @ Hwy 145,
- 6.2-16.9,
- 6.2-18.4,
- 6.2 Ext

Figure 2: Typical AgriFlo XCi Installation

Scope:

- Furnish and Install one (1) 12v (brand) battery, per site,
- Furnish and Install one (1) XXamp solar panel, per site,
- Furnish and Install one (1) Microhard 920 Radio, per site,
- Furnish and Install one (1) Yagi directional antenna, per site,
- Integrate one "flow" tag from each meter to SCADAConnect software,
- Geographic visualized of the location of the meter within the SCADAConnect software.

FlumeGate Sites:

- Big Main @ Franchi Dam (existing),
- Big Main @ Hospital (proposed),
- Head of Main 1 (proposed),
- Main II at Bishel Weir (proposed),
- Basin 32.2 (future),
- Lateral 24.2 Head (future).

Scope:

- Remove cellular modem and replace with one (1) Microhard 920 Radio, if applicable, per site,

- Furnish and Install one (1) Yagi directional antenna, per site,
- Integrate all 140+ tags into SCADAConnect software,
- Geographic visualization of the location of the gate within the SCADAConnect software.

SlipMeter and FlumeMeter Sites:

- See list above.

Scope:

- Furnish and Install one (1) FlumeMeter/SlipMeter, per site,
- Furnish and Install one (1) standard Rubicon pedestal, per site,
- Furnish and Install one (1) Microhard 920 Radio, per site,
- Furnish and Install one (1) Yagi directional antenna, per site,
- Furnish and Install one (1) 85watt solar panel, per site,
- Furnish and Install one (1) 12v Panasonic battery, per site,
- Integrate all 140+ tags into SCADAConnect software,
- Geographic visualization of the location within the SCADAConnect software

(b) Communications

Rubicon has performed a desktop radio path analysis surrounding the District's main office. The result suggests that a standard Microhard 920 radio transmitting to the 92-foot tall tower located at the District's main office. The District does have an 80-foot tall repeater tower located northeast of the main office. An additional repeater tower will be necessary in the northern area of the District.

The communications frequency will utilize a 900 MHz spread spectrum radio system. This is a non-licensed frequency hopping band commonly used to transmit data.

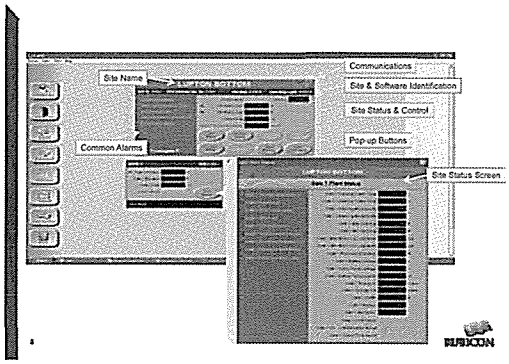
Each site noted in this proposal will be retrofitted with a Yagi direction antenna.

It is possible that additional repeater locations will need to be installed within the District to provide full radio coverage in the future.

(c) Included Software

SCADAConnect - Remote management of infrastructure

SCADAConnect will enable the District to improve safeguards, reduce costs and enhance control of your network with real-time remote management of field equipment.



A comprehensive suite of remote device monitoring tools and sophisticated alarms can transform your operation by giving your team the detailed real-time performance information they need to rapidly respond to issues before they become problems and without having to travel to the site.

SCADAConnect's data analysis and graphing tools (also called trending) convert the huge quantities of field data into information you can use to manage, to plan and to improve.

Features include:

- Real-time remote supervision and management of gates, meters and other field devices (using Motorola Data Link Communications (MDLC) or Modbus protocols),
- Geographic visualization of devices using satellite maps and customizable overview screens,
- Alarm notification, acknowledgement and critical alarm escalation from operator's desktop, text, email or pager,
- Data analysis and graphing for performance management,
- Can be used by multiple users simultaneously,
- Radio and cellular connection,
- Secure storage of years of data.

(d) Additional Rubicon Confluent™ Software Packs (not included)

Rubicon's Confluent Software transforms the way irrigation districts manage water, administer operations and serve their customers.

Confluent consists of a core database and fundamental tools, and your choice of a number of function packs. Each pack is a collection of tools that streamlines a part of your business. For example, SCADAConnect, which is included, helps you remotely manage automated devices in the field and Customer Connect (not included) enhances communication with your customers. A list of available packs not included as part of this proposal can be found below. A data sheet labeled, Confluent™, has been attached to this proposal to provide additional information about these packs.

- Customer Connect – Efficient customer interaction
- Tariffs, Rates and Invoicing – Streamlined revenue generation
- Network Visualization – Dynamic visibility of network behaviour
- Data Aggregation – Streamlined data collection, analysis and reporting
- Orders, Rotations and Scheduling – Tools for planning of water delivery
- Automatic Delivery – Automatic water order confirmation and optimized scheduling and delivery
- NeuroFlo® Network Control – Intelligent automated regulation
- Rights and Compliance – Water rights management

4. Scope

The solution offered includes the following items:

- SCADAConnect Software, Hardware and Training related to project scope,
- Furnish and Install those components previously mentioned in Section 3.1 Solution Details,
- Project Engineering,
- Delivery to designated location,
- A Rubicon certified technician to supervise installation of SlipMeters, FlumeGates and FlumeMeters above components outlined in Section 3.1 Solution Details,
- Two Operation and Maintenance Manuals and five waterproof operator guides,
- 24/7 customer support,
- SCADAConnect licenses.

4.1 Customer Timing Requirements

The United States Bureau of Reclamation (USBR) WaterSmart grant will need to be completed by the middle of January 2013. The USBR will make a determination of projects that will receive funding by mid-March 2013 and construction/installation could begin as early as September 2013. Rubicon recommends the District place order by June 2013 to insure delivery by September 2013.

4.2 Customer Training

The following standard Rubicon training courses will be delivered to Madera ID staff as part of this proposal. Rubicon is committed to work with Madera ID to ensure their staff members gain a high level of understanding of SCADAConnect. Rubicon suggests the following anticipated schedule for course duration and recommended attendees.

Course Description	Duration	Recommended Attendees
Rubicon Course 1.3 – MOSCAD Toolbox Overview	1 day	Maintenance Techs, System Admin.
Rubicon Course 1.4 – MOSCAD Toolbox Programming Course	3 days	Maintenance Techs, System Admin.
Rubicon Course 1.5 – Gate Control Software (GCS) Overview	1 day	Maintenance Techs, System Admin.
Rubicon Course 2.1 – SCADA Database Administration	2 days	System Admin.
Rubicon Course 2.2 – SCADA Screen Building	2 days	System Admin.
Rubicon Course 2.3 – SCADA Editing and Database Construction	2 days	System Admin.
Rubicon Course 2.4 – SCADAConnect Web Interface	0.5 days	All Users
Rubicon Course 2.5 – SCADA Screen Usage	0.5 days	Operators
Rubicon Course 2.6 – SCADA and Schematics Usage	1 day	System Admin., Operators, Supervisors
Rubicon Course 2.7 – Trending	0.5 days	System Admin, Operators, Supervisors

5. Exclusions and Assumptions

5.1 Exclusions:

- Purchase of additional Mace AgriFlo XCi meters and Mace I/O modules to be handled by District,
- Installation to be done by District staff,

5.2 Assumptions

- A "Virtual Private Network" access will be provided, by Rubicon, to enable Rubicon engineers to support the system,
- Tax rate of 8.0% (included),
- Rubicon will appoint a Project Director and Project Manager to govern the project should it proceed and it is expected that Madera ID will appoint corresponding resources,
- Validity is 60 days from date of this Quotation,
- Warranty on New Equipment is 12 months from Delivery,
- Warranty on "supply only" items and spares are 3 months from Dispatch, and
- Rubicon Water Standard Terms of Sale can be found on our website, and applies to this Quotation.

6. References

6.1 Reclamation District 108

(a) Lewis Bair, General Manager, (530) 437-2221

(b) SCADAConnect, FlumeGates, NeuroFlo, Network Visualization, Radio Network

6.2 Oakdale Irrigation District

(a) Steve Knell, General Manager, (209) 847-0341

(b) SCADAConnect, FlumeGates, SlipMeters, NeuroFlo, Network Visualization, Radio Network

6.3 Naches-Selah

(a) Justin Harter, General Manager, (509) 697-4177

(b) SCADAConnect, FlumeGates

7. Pricing

The estimated price to carry out the works of the priority list is approximately $507,486. We understand that certain components of the project may be deleted/altered and a specific scope of work will be negotiated when the District receives approval of the grant. The estimated costs for each site outlined in the priority spread sheet are based on high "one off" costs and do not take into consideration volume discounts that would normally be applied to a project of this size. Furthermore, each site would need to be evaluated by a Rubicon representative to insure the District is receiving the best product for their application.

Solution	Cost
SCADAConnect Hardware	$ 60,210
Basin 32.2 Pump Station	$ 12,500
Mace AgriFlo Xci Meter Sites	$ 48,600
FlumeGate Sites	$ 75,600
SlipMeter and FlumeMeter Sites	$ 272,376
Repeater Antenna Tower	$ 10,000
SCADAConnect Licenses	$ 13,200
Training	$ 15,000
Total	$ 507,486

Rubicon recommends that the District sign an agreement prior to June 2013 to be prepared for installs in September 2013. Payment terms can be negotiated to work with grant timeline.

The project will be invoiced in three instalments:

- 20% upon signing of Purchase Order,
- 20% upon delivery of Frames for FlumeGates, SlipMeters and FlumeMeters, and
- 60% upon delivery of Hardware for FlumeGates and SlipMeters.

8. About Rubicon

Rubicon Water has a global vision to improve the productivity of the world's farmers in an environmentally sustainable way. We do this by delivering advanced technology to managers of gravity fed open channel irrigation systems that will enable them to manage and operate their water resources to unprecedented levels of efficiency and control.

Dedicated to irrigation management, Rubicon Water has a unique ability to solve irrigation problems because all our solutions are designed, built and installed by us specifically for the purpose and to integrate seamlessly.

In addition to research and collaboration from leading academic institutions, our team of experts and specialists in agriculture, engineering, radio, telemetry and software give our clients the assurance that our solutions can be implemented quickly, cost effectively and with low project risk. Rubicon has over 12,000 gates and meters installed worldwide providing unparalleled performance and the highest quality of service.

9. The Next Step

We would value your comments to this proposal and would like to arrange a time to discuss in more detail.

Yours Sincerely,

Darrel Evensen, PE
Solutions Engineer
Cell: (209) 480-7334

Rubicon Water
Fort Collins Office
4563 Denrose Court, Fort Collins
CO 80524
USA
Tel: 1 877 440 6080
Fax: +1 970 482 3222
www.rubiconwater.com

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Exhibit 6

Board Resolution 2013-01

PART 5: Official Resolution

RESOLUTION NO. 2013-01

APPLICANT'S NAME: **MADERA IRRIGATION DISTRICT**

WHEREAS, the District is implementing the Madera Irrigation District Water Supply Enhancement Project; and

WHEREAS, the District is submitting an application for a grant to the Bureau of Reclamation under Funding Opportunity No. R13SF80003 WaterSMART: Water and Energy Efficiency Grants for FY2013.

NOW, THEREFORE, BE IT RESOLVED that the Board of Directors agrees and authorizes that:

1. The General Manager will review and the Board supports the proposal submitted; and
2. The District is capable of providing the amount of funding and/or in-kind contributions, specified in the funding plan; and
3. If selected for a Grant, the District will work with Reclamation to meet established deadlines for entering into a cooperative agreement.

The foregoing Resolution was duly and regularly adopted by the Board of Directors of the Madera Irrigation District at the regular meeting of January 8, 2013 upon motion of Director Petrucci, seconded by Director Cavallero upon the following vote:

AYES: Directors Cavallero, Janzen, Petrucci, Cosyns, and Bursey
NOES:
ABSTAINING:
ABSENT:

Gary Bursey, Chairman

ATTEST:

Andrea Kwock Sandoval, Secretary

CERTIFICATION

I do hereby certify that I am the duly appointed, qualified Secretary of the Board of Directors of the Madera Irrigation District; that the foregoing is a full, true and correct copy of Resolution No. 2013-01, duly, regularly and unanimously adopted at the regular meeting of the Board of Directors of the Madera Irrigation District duly and regularly called and held at the offices of the District on the 8th day of January, 2013, at which meeting a quorum of said Board of Directors was present and acting; that said Resolution as so adopted was duly entered in the minute book of said District, and the same has not since been revoked, rescinded, altered, amended, modified or changed and is now in full force and effect.

Dated: 01/08/2013

Andrea Kwock Sandoval, Secretary