

Lindmore Irrigation District

93.2E Plant Modernization

Tulare County, California

APPLICATION SUBMITTED TO THE UNITED STATES BUREAU OF RECLAMATION FOR A
WATERSMART GRANT: SMALL SCALE WATER EFFICIENCY PROJECTS FOR FISCAL YEAR 2018

(Funding Opportunity Announcement No: BOR-DO-18-F009)



Lindmore Irrigation District

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Table of Contents

TECHNICAL PROPOSAL AND EVALUATION CRITERIA

Executive Summary.....	3
Project Summary.....	3
Project Timeline.....	3
Project Facilities.....	3
Background Data.....	3
Project Location	3-4
Water Supply.....	4
Water Delivery System.....	4
Bureau of Reclamation Working Relationship.....	5
Technical Project Description.....	5-6
Evaluation Criteria	
E.1.1. Evaluation Criterion A – Project Benefits.....	6 - 7
E.1.2. Evaluation Criterion B – Planning Efforts Supporting the Project.....	7
E.1.3. Evaluation Criterion C – Project Implementation.....	7
E.1.4. Evaluation Criterion D – Nexus to Reclamation Project Activities.....	7
E.1.5. Evaluation Criterion E – Department of Interior Priorities.....	8
PROJECT BUDGET	
Budget Proposal.....	8-9
Budget Narrative.....	9-10
ENVIRONMENTAL AND CULTURAL RESOURCES COMPLIANCE.....	11
REQUIRED PERMITS OR APPROVALS.....	12
OFFICIAL RESOLUTION.....	12
ATTACHMENTS.....	13 - 15

TECHNICAL PROPOSAL AND EVALUATION CRITERIA

Executive Summary

Date: July 25, 2018
Applicant Name: Lindmore Irrigation District
City: Lindsay
County: Tulare County
State: California

Project Summary

Water is recognized as a precious natural resource in California's Central Valley due to the Central Valley's low rainfall. The Lindmore Irrigation District (District) takes water from the Central Valley Project, Friant Division. The District pumps roughly 3,500 AF of its annual supply from the canal and delivers it to the east side of the canal. The current pumping plant (Plant) was installed in 1952. Its controls, due to design and quality, are of that vintage and are fully operational. However, the District would like to improve the efficiency of that Plant to tie delivery flow quantities more precisely to grower demand. The District is proposing to add supervisory control and data acquisition (SCADA) to its pumping plant, as well as soft starts and variable flow devices on the pumps.

Project Timeline

The project must be completed within the time period of November through March so as not to interrupt the irrigation needs of District growers. Upon award of the grant, materials can be ordered and received within sixty days. Deconstruction can begin immediately after award is assured. Installation of the project can begin immediately upon receipt of the material. The District anticipates replacement will be completed within three months of approval of the grant but certainly before the two-year grant award project period. The estimated completion date of the project is March 1, 2019 if awarded prior to January 1, 2019 or March 1, 2020 if the award is approved later than that.

Project Facilities

The proposed improvements will be carried out at the Plant. The District's delivery system was developed using federal 9(d) appropriated funds in 1950. The District fulfilled its financial obligation for the Plant in 1995. The Federal government still holds title to the Plant, but the District operates and maintains it.

Background Data

Project Location

The District is located at the base of the western foothills of the Sierra Nevada, on the east side of the San Joaquin Valley. The District extends from two miles north of the City of Lindsay, and nine miles south of the City of Lindsay which is approximately 1 ½ miles south of the City of

Strathmore. A location map for the District is included as **Attachment A**. The grant award will assist the District in modernizing and automating the Plant’s motor controls. The Plant is located next to the Friant-Kern Canal (designated as the 93.2 East Pump Site). The numeric designation 93.2 of the Line description, indicates the approximate distance of the Line turnout from the Friant-Kern Canal headworks at Friant Dam in western Fresno County.

Water Supply

The Lindmore Irrigation District is a federal irrigation water contractor in the Friant Division of the Central Valley Project. The District has a perpetual 9(d) contract in the amounts of Class I (33,000 AF) and Class 2 (22,000 AF). The District has submitted and operates under its five-year agricultural water management plan (2014 criteria with SBx7-7 State of California Supplemental detail). Allocations of water supply from the USBR are hydrologically dependent on precipitation and snowpack in the San Joaquin watershed. Over the history of the contract (1949-current), the average annual federal supply delivered to the District has been 38,500 AF. Total irrigation demand in the District is approximately 71,500 AF (including 6,000 AF from effective precipitation).

The District provides its federal supply as irrigation water to the agricultural acreage surrounding the City of Lindsay and the unincorporated town of Strathmore. The water supply is supplemental to the groundwater and is used for irrigating 23,272 acres of planted crops. Primary crops include alfalfa, grapes, olives, citrus, corn, nuts, and tree fruit with quantities shown in **Table 1**.

Table 1. List of Primary Crops.

<i>Current Plan (2017)</i>	
<i>Crop Name</i>	<i>Acres</i>
Alfalfa	869
Grapes	1,149
Olives	3,265
Citrus	12,239
Corn	1,371
Nuts	2,927
Tree Fruit	1,168
<i>Other (5%)</i>	284
<i>Total</i>	23,272

The federal contract supply has been the main reason for the elimination of groundwater overdraft in its area. Approximately 3,500 AF of the District federal contract supply is delivered by pumping out of the Friant-Kern Canal through the Plant to growers in the east side of the District.

Water Delivery System

Water is delivered from the Friant-Kern Canal through four head gates into the District’s 125 miles of concrete pipeline (referred to as System). Most of the District deliveries are delivered

by gravity to individual parcels based on queued quantities and about 3,500 AF annually is pumped. All deliveries within the District are metered at the grower turnout.

Bureau of Reclamation Working Relationship

The District has a long-standing relationship with Reclamation, beginning in 1937 with the establishment of the District and the securing of a supplemental water supply from the Reclamation's Central Valley Project (CVP). Prior to this agreement, ground water was the major source of irrigation supply. On February 28, 1948 the District and the USBR entered into Contract No. 175r-1635 for a water supply from the Friant-Kern Canal to the District. The Friant-Kern Canal is a unit of the Friant Division of the CVP, Mid Pacific Region. The contract was amended, renewed, or designated interim renewed until November 17, 2010 when the District paid its share of the CVP and signed a perpetual right to contract supply (175r-1635D).

Technical Project Description

In 1952, the District installed its current delivery system including the Plant. Due to the District's high maintenance standards and the original superior design of the Plant and quality of equipment, the Plant has endured time well. The Plant delivers water from the canal by pumping it out of a pit well located next to the Friant-Kern Canal. There are two east side delivery lines that have four pumps each (a total of eight pumps). These pumps extract water out of the pit wells. The operator turns on pumps (between one to four on each line) to deliver water to meet the grower demand. However, the strict "on or off" control of the pumps and their delivery capacity being either "all on" or "all off" modes, supply must always exceed demand because meeting demand is the priority. As a result, the excess supply must be delivered into mitigating reservoirs. There are two overflow cement lined reservoirs that take this excess supply. This supply remains in the reservoir unless we have demand adjacent to the reservoir (approximately every other week or more during irrigation season). District staff can pump water out of the reservoir to the adjacent grower to meet their irrigation needs. If it is not pumped to these growers it sits in the reservoir and is exposed to evaporation. During the Plant operation period, area temperatures are typically above 80 degrees Fahrenheit and can reach as high as 110 degrees Fahrenheit or more. The USBR meters the head gate to the plant and the District measures all deliveries to individual growers. The difference between the USBR reading and the totalized District meters is labeled by District staff a "delivery variance". On the Plant deliveries, in total, the delivery variance is typically 13% or more (District meters indicate we deliver 13% less than what the USBR has metered to us). On the District's gravity side, it loses about 2%. Because there are typical operating losses (attributable to either clock variances between the line head meter and the combined District meters, or from actual supply losses due to seepage, evaporation, or other), we feel comfortable estimating evaporation losses from water delivered by the Plant to be the balance of the difference. We estimate the annual combined losses due to evaporation in the two reservoirs to be 350 AF. We have determined that if we can control the supply closer to the demand, moving water into the reservoirs will be limited to just the amount needed to meet the adjacent grower needs. Therefore, we plan on installing a Variable Flow Device (VFD) on each of pumps #1 and #5 and soft starts on pumps 2, 3, 4, 6, 7, and 8 as well as a Supervisory Control and Data Acquisition program to manage the Plant. With this project completed, the operator could remotely

manage the two main pumps to meet demand on the line and deliver closer to the demand thus reducing deliveries into the reservoir and reducing losses to evaporation.

A secondary efficiency benefit of this project is to reduce the amperage demand and associated power company charges in controlling Plant supply. The soft starts will eliminate the substantial amperage demand from an immediate “ON” action by taking a soft start or “ramp up” approach to pump starts. The slower start of the pump eliminates the amperage demand charges and consumption of electricity and the District will be able to limit its pumping to what is needed instead of what is required due to pump size.

TECHNICAL PROPOSAL: EVALUATION CRITERIA

E.1.1. Evaluation Criterion A—Project Benefits

Describe the expected benefits and outcomes of implementing the proposed project: By completing this project, the District expects to see:

- 1 300 AF reduction in evaporation losses annually** - There is always a variance between the USBR Report of Water Deliveries (a monthly report of the Friant Kern Canal daily head gate readings) and the District’s totalized deliveries. This is usually 13-15% (District total meters indicate less delivered than what measured into our head gate). On an average annual delivery of 3,500 AF, losses would be 455-525 AF annually. The District expects a 2% up or down variance due to clock calculation variances between the USBR meters and the District’s totalized meters (This experience occurs on the District’s gravity lines as well where the delivery to mitigating reservoirs is small). Assuming a 2% loss to meter variances, the balance of losses must be attributed to some physical variance. We assume some loss in seepage, possibly as much as 15 AF in a year. Amounts more than that would present an obvious line loss condition (water visible coming up from the underground pipeline). We do have leaks such as those, but we typically repair them quickly. We estimate physical loss to be around 100 AF per year. Assuming approximately 100 AF a year in physical losses and a meter calculation loss of 70 AF, the remaining losses must be attributable to evaporation (285 AF – 355 AF). As an example, in WY2017, per the year-end USBR Report of Water Deliveries, the head gate meter reading showed 4,691 AF of water delivered to these lines. The District’s totalized deliveries, per its combined Work Order Audit Report (meter reading report) for those lines was 3,907 AF. This variance between the two reports indicates a 784 AF difference in that year’s deliveries or 16.71% variance. If this project were installed prior to 2017 water year, it would have saved up to 600 AF of water in that year.
- 2 Reduction in electricity demand of approximately 17-19%** - Power savings will occur because under current design, the pumps are hard started, and as such it requires a substantial amount of amperage resulting in hefty charges for each of those starts (several in a day). By starting the motors slowly over a one-minute time frame, and oscillating the main pump to meet demand, the District will substantially reduce the frequency of starts and the amperage demand of starting the motors. This will reduce the electricity costs of operating the Plant. The benefits are estimated by our electrical

engineer to be about 17-19%. The estimates will be confirmed in the future by comparing the pumping costs per AF delivered against the resulting experience from project installation.

With this Project completed, the saved 300 AF will become available to District growers.

E.1.2. Evaluation Criterion B—Planning Efforts Supporting the Project

a. Is this project developed in conjunction with planning efforts?

As a federal water contractor, the District has submitted an Agricultural Water Management Plan (AWMP). This plan is updated every five years. The most recent one was accepted and approved by the USBR was for December 2015 and includes the California SB7x7-7 Supplemental Criteria).

In Section 3 of the AWMP it describes “Best Management Practices”. Measurement accuracy (3.A.1) is a substantial criterion in water use efficiency. If the District takes supply in excess of its needs others will get less. Understanding the reason for calculated variances between the USBR and the District will allow us to identify measures to correct the variance. This includes reduce the amount of water molecules being wasted.

Section 3.A.5 of the AWMP describes actions taken to improve the Plant efficiency. The District installed four remote pump controls that allow the operator to turn the pump on remotely when needed. This allowed better control of the supply and lowered the cost of the pumping. This Project will increase control, by allowing flexibility in the supply control (oscillate the supply within a range). This project will also add efficiency to the starting and stopping of the pump motors. This will increase the life of the motor and reduce the amount of electrical demand on hard starts.

E.1.3 Evaluation Criterion C—Project Implementation

The District has paid an electrical engineer to design the proposed grant Project because of its nexus to our panel modernization program which we will be doing at the same time. The Plant’s main and sub-panels were installed in 1952. One subpanel was replaced with a modern panel to add remote pump control. The balance of the panels, although serviceable, are 66 years old and have substantial electrical shock exposure and antiquated design. The panel upgrades will prepare the District for this proposed grant Project (motor controls and SCADA and install). These panel upgrades will occur regardless of the outcome of this proposed grant Project. **Attachment B** is the District’s project schedule that shows the timeline for the proposed Project. It’s a four-week plan, not including schedule for ordering of materials. The District is confident that lead times are sufficient to complete the project in three months.

E.1.4 Evaluation Criterion D — Nexus to Reclamation

The District’s federal water supply contract is directly related to this proposed Project and Reclamation’s Central Valley Project – Friant Division. If allocations and deliveries of allocations are accurately calculated, the USBR can better allocate the resource to all the partners in the Reclamation’s Central Valley Project - Friant Division.

E.1.5 Evaluation Criterion E — Department of Interior Priorities

The Project will improve on delivery calculations, delivery needs and timeliness, reduce the amount of water wasted in operations, and reduce the amount of electricity needed to deliver supply to growers. As such we will more efficiently use our natural resource of water and hydro-power and those actions align with the Department’s “utilizing our natural resources” priority.

The Project will modernize a pumping plant that has had minimal updates since 1952 aligning this effort with the Interiors goal of “modernizing our infrastructure” priority.

PROJECT BUDGET

The District proposes the costs of the Plant Modernization Project that are not being requested under this grant application will be contributed from various District sources. The following District sources will be utilized:

- In-Kind Labor costs associated with specific employees who will be working on the project. Further detail is provided in the Budget Proposal.
- Funds from District reserves and budgeted water rates to cover the cost-share associated with specific materials and equipment required to carry out the grant.

The District can provide a set of audited financials for the fiscal year 2017 to the Bureau of Reclamation, upon request, to verify and detail the funds available to the District through reserves. The District is budgeting this Project in its FY2019 Budget (due by October 31, 2018).

The District has not incurred any costs for the proposed Project to date and anticipates that the project will begin once funding is awarded and made available. The District has not sought any other federal, state or other funding for this project at this time. In the event other funding becomes available, other than federal funding, the District will notify the Bureau of Reclamation immediately. Presented in **Table 2** below, is a summary of the budgeted funding for the Project.

Table 2. Summary of Non-Federal and Federal Funding Sources

Funding Sources	Funding Amount
Non-Federal Entities	
1. Lindmore Irrigation District	\$122,000
Other Federal Entities	
1. None	\$0
Other Federal Subtotal	\$0
Requested Reclamation Funding	\$ 75,000
Total Installation Project Funding	\$197,000

Budget Proposal

Budget Item	Amount	Units	Hours	Total
Salaries and Wages				
Necmi Sanli	\$ 155.25/hr		72	\$16,148
Edward France	\$ 44.37/hr		178	\$8,162
Fringe Benefits				
Necmi Sanli	12.71%			\$2,052
Edward France	12.71%			\$1,038
Travel				
N/A				
Equipment				
Variable Flow Device (Eaton 60 HP)	\$10,000	1		\$10,000
Variable Flow Device (Eaton 40 HP)	\$7,800	1		\$7,800
Eaton Soft Starts	\$2,200	8		\$17,600
MCC Boxes (constructed)	\$8,000	10		\$80,000
Programmable Logic Controllers	\$1,147	10		\$11,470
SCADA Software (Licenses 7 field, 1 for the server)	15,000	1		\$15,000
Supplies and Materials				
Miscellaneous: Wire, Tabs, Connectors,	\$27,730	1	Miscellaneous Equipment	\$27,730
Contractual/Construction				
N/A				
TOTAL ESTIMATED PROJECT COSTS				\$197,000

Budget Narrative

Salaries and Wages

The two employees assigned to the project will be:

Project Manager - Necmi Sanli (Ness) is an electrical engineer with a stamp. He has 30 years' experience in developing automated control projects for the oil and gas industry, power industry and water industry. Ness has been working with the Lindmore Irrigation District for over 8 years.

Project Electrician – Edward France (Ed) has been a high voltage electrician for 25 years. Ed has been working with the Lindmore Irrigation District for 6 years.

Fringe Benefits

Both Ness and Ed are seasonal full-time staff. They do not get paid benefits except those required by law for less than regular full-time staff. Therefore, they receive FICA/Medicare and Workers' Compensation. The Fringe Benefits for the staff members involved in this project will be 12.71% of their wages. Fringe benefits that are available to these employees will be used on this project are included in Table 3 below.

Table 3. District Fringe Benefits as a Percentage of Wages.

Description	Percentage (%) of Wages
FICA/Medicare	7.62%
Workers Compensation Insurance	5.09%
Total	12.71%

Travel

No additional travel outside of the boundaries of the District is anticipated for the completion of the project and no travel costs were included in the budget proposal.

Equipment

The District will use small tools and small equipment that have no rate to apply for this project. Material included in the project that require large equipment are included in the supplier's responsibility (MCC Boxes). Therefore, no charges for equipment will be necessary.

Materials and Supplies

Materials and supplies required to install the project equipment include wire, connectors, utility coordination and fees, tie downs, circuit breakers, circuit boxes, etc.

Environmental and Regulatory Compliance Costs

The District anticipates that there will be no environmental and regulatory compliance costs for this project.

Indirect Costs

The District does not have a federally approved indirect cost rate agreement and will not include in the budget reimbursement for this item.

Total Costs

The total amount for the Project \$197,000. The Federal share is \$75,000 and the Non-Federal cost share is \$122,000 (See Table 1).

D.2.2.6. Environmental and Cultural Resources Compliance

Due to the project location and the nature of this application for Federal Assistance (retrofit of new mag meters onto existing mechanical meters), the District does not have an impact on either environmental or cultural resources. Environmental factors have been weighed, there are no archeological or historic structures and there will be no habitat loss or alteration in ecological balance because of the retrofit project.

Will the proposed project impact the surrounding environment? The project has minimal impact on the soil as staff clears debris collected around existing meters to be retrofitted with the mag meters. There will be no impact on the surrounding environment as it is retrofitting onto existing meters.

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? There are no Federal threatened or endangered species or designated critical habitat in the areas of existing mechanical meters.

Are there wetlands or other surface waters inside the project boundaries that potentially fall under CWA jurisdiction as “Waters of the United States?” There are no wetlands or other surface waters inside the project area or district.

When was the water delivery system constructed? The water delivery system was completed in 1952.

Will the proposed project result in any modification of or effects to, individual features of an irrigation system? No modifications of effects to individual features of District’s irrigation system.

Are any buildings, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places? There are no buildings, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places.

Are there any known archeological sites in the proposed project area? There are no known archeological sites in the proposed project area.

Will the proposed project have a disproportionately high and adverse effect on low income or minority populations? Retrofit of mag meters in existing sites will have no effect on low income or minority population.

Will the proposed project limit access to and ceremonial use of Indian sacred sites or result in other impacts on tribal lands? There are no Indian sacred sites or tribal lands within the District.

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

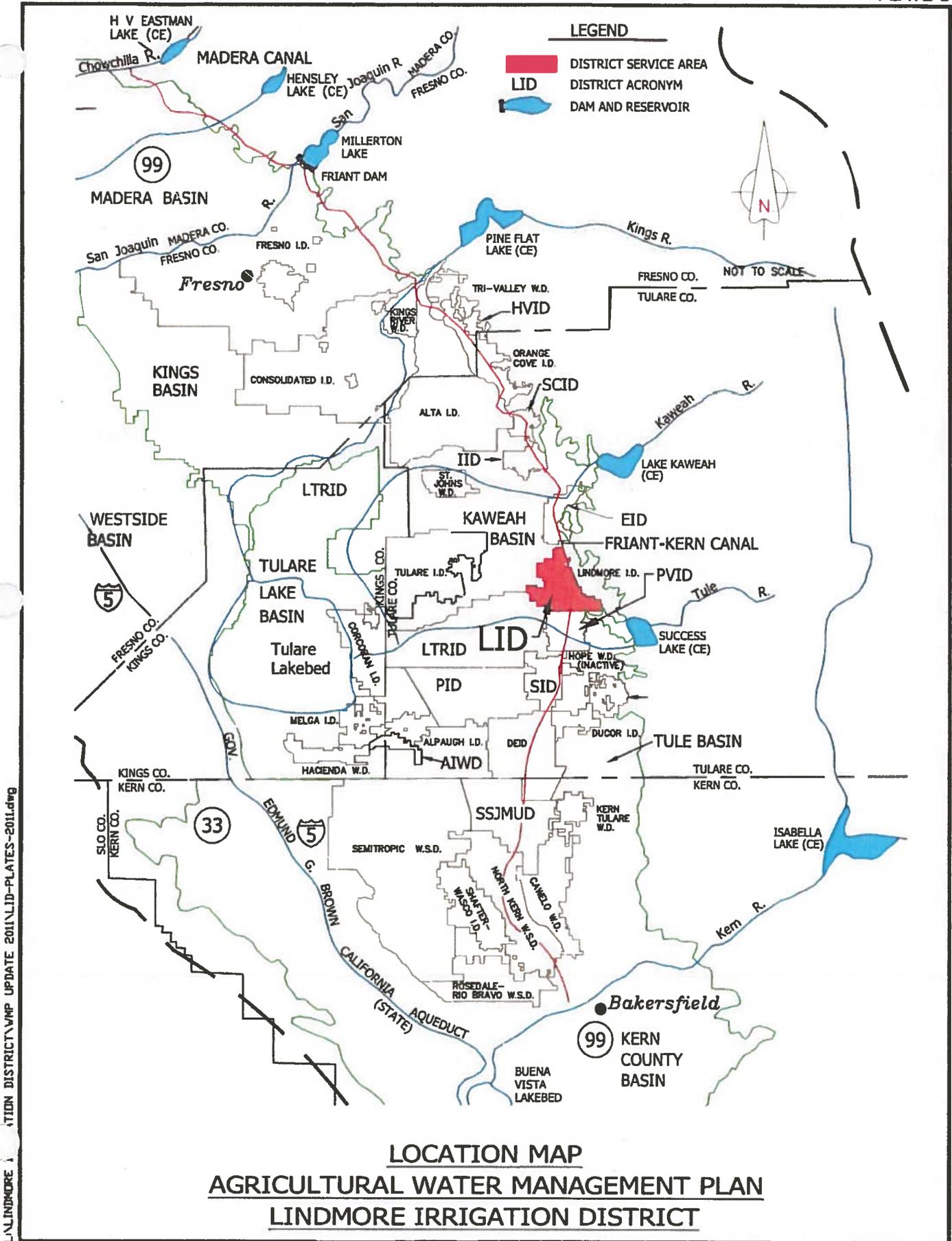
D.2.2. Required Permits or Approvals

This project is replacement in nature and will be done on existing Plant site, there due to the nature of this, no permits or other approvals are necessary.

D.2.2 Official Resolution

The District has included a draft resolution that will be adopted by the Lindmore Irrigation District Board before August 31, 2018 and is included as **Attachment C**. The draft resolution covers the following mandatory requirements of the grant proposal:

- *The identity of the official with legal authority to enter into an 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 grant or cooperative agreement*



LOCATION MAP
AGRICULTURAL WATER MANAGEMENT PLAN
LINDMORE IRRIGATION DISTRICT

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ATTACHMENT C

BEFORE THE BOARD OF DIRECTORS OF THE LINDMORE IRRIGATION DISTRICT

COUNTY OF TULARE, STATE OF CALIFORNIA

RESOLUTION AUTHORIZING THE DISTRICT TO ENTER INTO A FUNDING AGREEMENT WITH THE UNITED STATES GOVERNMENT FOR THE WATERSMART GRANTS: SMALL -SCALE WATER EFFICIENCY PROJECTS, TO AUTHORIZE A DISTRICT SIGNATORY, AND TO AGREE TO THE TERMS OF THE GRANT

RESOLUTION NO.: 2018-03

WHEREAS, the United States Bureau of Reclamation (USBR) has announced through a FOA the opportunity to submit projects for federal grant money consideration, and

WHEREAS, the District has prepared a grant proposal for the purpose of obtaining grant money to complete a proposed project, and

WHEREAS, the District desires to receive grant money to assist in the modernization of the 93.2E Pumping Plant, and

WHEREAS, the District's Board of Director has reviewed the grant proposal and all supporting documentation and supports the application and desires to receive grant money to assist in the modernization of the 93.2E Pumping Plant, and

WHEREAS, the District appoints Michael D. Hagman to agree to and sign all necessary documents to enter into an agreement to effectuate the grant and receive moneys associated with the grant, and

WHEREAS, the District has set aside reserves to modernize the 93.2E Plant and the grant will offer the opportunity to add supervisory control and oscillation of the Plant pumps, and

WHEREAS, the District agrees to work with the Bureau of Reclamation to meet established deadlines for entering into a grant or cooperative agreement, and

NOW, THEREFORE, BE IT RESOLVED, that the Board submits the aforementioned FFY2018 WaterSMART grant and this supporting resolution as required by the grant application.

Upon motion by **Director XXXXXX** seconded by **Director YYYYYY**, the foregoing Resolution was passed and adopted the 14th day of August 2018 by the following vote:

AYES:

NOES:

ABSENT:

ABSTAIN:

CERTIFICATE OF RESOLUTION

We, the undersigned, hereby certify as follows:

1. That we are the President and Secretary of the Lindmore Irrigation District; and

2. That the foregoing resolution, consisting of this page, is a true and correct copy of a resolution of the Board of Directors of the Lindmore Irrigation District passed at the meeting of the Board of Directors held on August 14, 2018, at the District address of 315 East Lindmore Avenue, Lindsay California.

IN WITNESS WHEREOF, we have signed this certificate this 14th day of August 2018, at Lindsay, California.

John A. Arnold, President

Michael D. Hagman, Secretary/Treasurer

DRAFT