WaterSMART Grant

Water and Energy Efficiency Grant for Fiscal Year 2023

Funding Opportunity Announcement No. R23AS00008

Lower Yellowstone Irrigation District #1
Thomas Point Pumping Plant
Rehabilitation Project

WWC ENGINEERING

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D.2.2.2 TECHNICAL PROPOSAL CONTENT

EXECUTIVE SUMMARY

The executive summary should include:

- The date, applicant name, city, county, and state

  Date: June 10, 2022
  Applicant Name: *Lower Yellowstone Irrigation Project*
  Address: *2327 Lincoln Avenue SE, Sidney, MT 59270 (Richland County)*

- Please indicate whether you are a Category A applicant or a Category B applicant. If you are a Category B applicant, please briefly explain how you are acting in partnership with a Category A partner. Note: If you are a Category B applicant, you must include a letter from the Category A partner confirming that they are partnering with you and agree to the submittal and content of the proposal. See Section C.1. Eligible Applicants.

  The Lower Yellowstone Irrigation Project is a Category A Applicant

- A one-paragraph project summary that provides the location of the project, a brief description of the work that will be carried out, any partners involved, expected benefits, and how those benefits relate to the water management issues you plan to address. Please note: this information will be used to create a summary of your project for our website if the project is selected for funding. For example, note the following description of a project selected for funding in FY 2020:

  The Lower Yellowstone Irrigation Project (LYIP) in partnership with Lower Yellowstone Irrigation District #1 (LYID #1) is proposing to replace the existing south 200 HP pump at the Thomas Point Pumping Plant with a new primary pump, motor, and switchgear with new higher efficiency components, as well as to install a variable frequency drive (VFD) on the pump to allow more flexibility in pumping and install a Remote Monitoring and Control system that can be monitored and controlled from the LYID#1 main office in Sidney. The project is generally located near Savage, MT with specific location information shown below. The existing pump station is old, inefficient and has recently become difficult to keep running due to the age of the equipment and inaccessibility in getting parts. The existing pumps, motors and switchgear are obsolete, requiring the LYID #1 to have replacement parts custom manufactured and/or retrofitted to patch the pumps back together to keep them running. These non-factory parts have significantly reduced the water output of the pumps. The proposed improvements will conserve up to 22.5 cfs, making this pump station more efficient and leaving more water in the system for periods of drought and/or to also provide the full water right to many farmers when needed during a drought. The existing drought conditions in eastern Montana are considered extreme to exceptional by the U.S. Drought

Monitor. Project partners include members of the Lower Yellowstone Irrigation Project and the Lower Yellowstone Irrigation District #1.

- State the length of time and estimated completion date for the proposed project. Note: proposed projects should not have an estimated construction start date that is prior to May 2023.

  Proposed Construction Start Date: 10/2023
  Proposed Construction End Date: 12/2024
  Project Duration: 14 Months

- Whether or not the proposed project is located on a Federal facility.

  The Lower Yellowstone Irrigation District #1 (LYID#1) is part of the Bureau of Reclamation Lower Yellowstone Irrigation Project (LYIP) and is located on a Federal Facility. The LYID#1 is one of four districts within the overall LYIP. The LYID#1 will utilize the manpower and equipment of the overall LYIP to complete this work as a joint effort.

PROJECT LOCATION

Provide detailed information on the proposed project location or project area including a map showing the specific geographic location. For example, {project name} is located in {state and county} approximately {distance} miles {direction, e.g., northeast} of {nearest town}. The project latitude is {##°##'N} and longitude is {###°##'W}.

The Thomas Point Pumping Plant is located in Richland County, MT approximately 1.0 mile north of the Town of Savage, MT. The project latitude is 47.467613ºN and longitude is 104.337027ºW. The Thomas Point Pumping Plant is specifically located in the NW/4 of Section 28, Township 20 North, Range 58 East. A map is provided as Figure 1.

TECHNICAL PROJECT DESCRIPTION

Provide a more comprehensive description of the technical aspects of your project, including the work to be accomplished and the approach to complete the work. This description should provide detailed information about the project including materials and equipment and the work to be conducted to complete the project. This section provides an opportunity for the applicant to provide a clear description of the technical nature of the project and to address any aspect of the project that reviewers may need additional information to understand.

The Thomas Point Pumping Plant consists of a concrete substructure, steel superstructure, and three vertical turbine pumps, one that is powered by a 200 hp motor and two that are powered by 125 hp motors. The south 200 hp pump is capable of discharging 14,000 gpm (37.5 cfs), the middle 125 hp pump is capable of discharging 11,220 gpm (30.0 cfs), and the north 125 hp pump is capable of discharging 11,220 gpm (30.0 cfs). The total rated capacity of the pumping plant is 97.5 cfs with a total working head of 42 feet. Since the pumps do not have variable frequency drives, they

are either on and pumping the full amount or off and pumping no flow. Each pump can be operated individually to pump water into the system. The Thomas Point pumps are all fed through a concrete intake structure equipped with steel trash racks to feed water to the pump vault, and the pump discharges are all separate 24-inch diameter steel pipelines that run from the outlet of each pump to the start of the LL Lateral system. These pumps are old, inefficient and have become difficult to operate due to the age of the equipment and extreme difficulty in getting replacement parts. The existing pumps, motors and switchgear are obsolete, requiring the LYID #1 to have replacement parts custom manufactured and/or retrofitted to patch the pumps back together to keep them running. These non-factory parts have significantly reduced the water output and electrical efficiency of the pumps.

The proposed project is to replace the Thomas Point south 200 hp pump with a new pump, motor, and switchgear with new higher efficiency components, as well as to install a variable frequency drive (VFD) on the pump to allow more flexibility in pumping and install a Remote Monitoring and Control system that can be monitored and controlled from the LYID#1 main office in Sidney.

The existing pumps have experienced significant deterioration in the form of worn-out irreplaceable components, degraded switchgear, and deteriorated safety equipment. The pumps, motors and switchgear are obsolete and in need of replacement. The existing pumps, motors and switchgear are severely aged, barely run, and are vintage 1952. The existing pumps are difficult to keep running, resulting in water shortages to the entire 2,650-acres served Lateral LL. This water shortage is devastating to the farmers who depend on this water and will likely result in significant financial issues for many of them. The degradation of the pumps requires multiple daily trips, about 50 miles round-trip to the pumping plant to check water flows and make necessary adjustments to the pumps and/or perform maintenance. The access road to the pumping plant is difficult to navigate during adverse weather conditions. This daily travel is inefficient and has become unnecessary as technology has advanced in recent years. With automation, a weekly manned trip to the site would be sufficient to verify pump station function and condition. At times when access is limited due to muddy roadways, the pumps may not be adjusted for several days, leaving producers short or necessitating wasting of the extra water. The introduction of a Remote Monitoring and Control system with electrical system upgrades will allow the LYID #1 to monitor and control the pumps from a remote location, thus limiting daily trips to the pumping plant. The Remote Monitoring and Control system is an electronic monitoring system that logs the pumping plant's operating history data and allows operations personnel to adjust the pump flows with computer software and an internet, cell phone, or radio connection. The remote system and corresponding electrical system upgrades would increase the efficiency of the pump station by allowing LYID #1 staff to closely monitor the pumping station output and make instantaneous adjustments to pump flows to ensure the outflow is optimum for the present conditions. Pump adjustments could also be automated to occur dozens of times each day based upon information from flow monitoring. By implementing this new technology, the LYID #1 can far better regulate outflows and

precisely match their real-time demand of water. The current operational process requires the discharge of an excess amount of water from the LYIP Main Canal to buffer any demand or loss fluctuations. Currently, these fluctuations are only observed once per operating day when the ditch rider visits the pumping plant to record flow rates and make adjustments. Automating the pumping plant would make more water available to cover the demands of the water users.

Problems and Needs

The existing pumps have broken and replacement parts that have not been in stock at any supplier for both annual off-seasons since the Covid-19 pandemic began. The LYID #1 hired a machinist and a welding/brazing fabricator to plug large holes caused by abrasive content (sand) in the water and to fabricate parts that would allow the LYID #1 to put pumps back in service during 2020, 2021 and the 2022 seasons. However, due to a difference to original tolerances and irreparable broken vanes, the pumps have lost a minimum of 25 % of their pumping capacity so the LYID #1 has had to put water users on reduced water usage which substantially reduces crop production, shallow aquifer recharge that supports hundreds of acres of riparian habitat and wetlands, works against drought preparedness, and reduces the tax revenues. A substantial amount of the weld repaired internal pieces have broken off again due to vibration and will need to be repaired again every year. The manufacturers' representatives have offered CNC machining service, but the cost of the necessary parts adds up to more than a new pump with a 6 month wait time for the machined parts while still leaving LYID#1 with a worn-out pump. The last two years of drought conditions has magnified the problem immensely and reduced flows are causing significant crop damage. Due to the greater than 25% efficiency loss the LYID #1's energy usage has increased at least 33% due to the additional pump run times. The LYID#1 will utilize existing equipment and manpower to assist in installing the new pump, motor, switchgear and VFD as described later in this application.

Specific Activities that will be Accomplished

Design/Permitting/Construction Oversight: *The LYID#1 will contract with a licensed Professional Engineer to complete the design of the Thomas Point Pumping Plant Rehabilitation Project. The Engineer will be responsible for the design of the proposed project, which will include, but is not limited to hydraulics, pump details, motor details, VFD control details, electrical switchgear, remote monitoring and control system components, automation and controls, alignment/grade, details, etc. The Engineer will work with regulatory agencies to complete environmental compliance. The Engineer will provide a final plan set and specifications for the proposed project to facilitate construction. The Engineer will also provide advisory services during construction of the project to assure proper installation in accordance with the design plans and specifications.*

Construction: *The proposed project will be completed using LYIP personnel and equipment via contract with LYID#1 as well as assistance from an electrician, pump supplier and remote monitoring and control installer. Since the LYID#1 is a part of the LYIP, the LYID#1 pays a certain percentage of the overall LYIP operation and*

maintenance costs each year, and thus have access to the LYIP crews to have them assist with construction and/or rehabilitation projects for the LYID#1. The LYIP owns the construction equipment that is necessary to set the pumps and equipment, and the LYID#1/LYIP personnel are trained and experienced at using this equipment. The LYIP has their own construction crews to be able to maintain their existing infrastructure and keep costs low, providing a benefit to their users. The LYIP has an experienced earthwork construction crew that will perform the work. The LYIP has experienced equipment operators and laborers that perform all the LYIP's construction tasks. Recent improvements completed by the LYIP include relocation of approximately ½-mile of the main canal, construction of the new Lateral O, Lateral W and Terminal Wasteway structures, various check structure and wasteway rehabilitation projects, concrete pump station construction, canal lining projects, road construction and other various construction and maintenance projects. The existing site will require no modification to accept the new pump, switchgear, VFD and remote monitoring and control components. Therefore, only purchased material costs are included in the proposed budget. All material and supply costs are accounted for in the unit prices provided in Table 2. The material costs were determined as follows:

- *Thomas Point #1 South 200 HP Pump/Motor: Determined from estimate provided by MidAmerica Pump & Supply in Hastings, NE.*
- *Thomas Point #1 South 200 HP Pump/Motor Controls and Electrical Switchgear: Determined from estimate provided by MidAmerica Pump & Supply in Hastings, NE.*
- *Thomas Point #1 South VFD: Determined from estimate provided by Dykman, Inc. in Gillette, WY.*
- *Remote monitoring and control components: Determined from estimate provided by Stealth Industries, Inc.*

The LYID#1 will utilize the following LYIP equipment to perform the work:

- *2009 Chevrolet 1 Ton Welding Truck and 2001 Trail-Eze 3-axle Trailer to haul materials to and from the work site.*
- *2013 Kenworth T-800 Tractor with Lowboy Trailer*
- *2017 Ford F-250 Pickup and 2018 GMC 2500HD Pickup: To transport equipment operators and laborers to and from the project work site. Will also be used for general site activities, materials, and trips to obtain parts and materials.*
- *2018 Kenworth T-800 Dump Truck (10 cubic yard capacity): Will provide haul of materials to and from the project site and various materials hauling activities required for the construction.*
- *2004 John Deere 310SG Backhoe: Will provide loading and unloading of trucked materials, spreading of materials, and general material handling throughout the construction process.*

- *2020 Cat 330FL Excavator: Will provide the primary means of Removing and Replacing the Vertical Turbine Pump installation and miscellaneous material handling work.*
- *2016 Cat 323FL Excavator: Will provide the primary means to load/unload parts and materials at the project site.*

EVALUATION CRITERIA

E.1.1. Evaluation Criterion A—Quantifiable Water Savings (28 points)

*Up to **28 points** may be awarded for this criterion. This criterion prioritizes projects that will conserve water and improve water use efficiency, supporting the goals of E.O. 14008. Points will be allocated based on the quantifiable water savings expected as a result of the project. Points will be allocated to give greater consideration to projects that are expected to result in more significant water savings.*

The proposed project will result in water conservation, drought resiliency, enhanced staff safety, improved water supply and management, water users conflict resolution, power savings, and increased irrigation efficiency that will improve future on-farm improvements. The proposed pump station rehabilitation is expected to increase available water to the LYID#1 irrigators by nearly 4,800 acre-feet during an average water year. This water is normally lost to inefficiencies and poorly timed deliveries relating to manual operation of the pumping plant and reduced pumping capacity of the pumps. The proposed upgrades would also provide value by reducing manual operation and maintenance input to the site by approximately 3 hours per day and 327 annual man-hours per year. Furthermore, rehabilitation of the Thomas Point Pump Station will help preserve the LYID#1's ability to supply domestic water to the community of Savage, MT as Lateral LL serves as one of the primary sources of aquifer recharge as documented by the Montana Bureau of Mines and Geology in their report, "Lower Yellowstone Ground-Water Reservation: Water Development Potential of Buried Channel Aquifers in Richland County, Montana". Additional project benefits will include improved crop production. Using their Annual Crop Census Report, the LYID#1 has estimated that a water savings of 4,800 ac-ft per year would translate to an approximate 10% increase in crop yield for 2,650 acres served by Lateral LL. If realized, the projected yield improvements could produce a regional agricultural revenue increase of $183,000 per year.

Describe the Amount of Estimated Water Savings:

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 include a specific quantifiable water savings estimate; do not include a range of potential water savings.

The proposed pumping plant improvements will provide a significant water savings of an average of 22.2 cfs, or 4,800 acre-feet per year at the Thomas Point Pumping Plant. The pumping plant takes water directly from the LYIP main canal. By saving this water, the LYID#1 will have an additional 4,800 acre-feet that will be available for

crops during peak irrigation demand and periods of drought. The water volume was calculated by taking the amount of water pumped each year from the Thomas Point Pumping Plant for the past 5 years, the number of days the pumps were in operation, and the amount of water that was taken in each turnout within the Lateral LL system. The difference amounts to an average of 4,800 acre-feet per year and an estimated 22.2 cfs per day that is pumped into the system as excess water. The existing pumps are not equipped with a VFD and are either on or off, and thus if a pump is on it will only pump at its maximum rated capacity. The average pumping plant operation was 109 days for Thomas Point Pumping Plant over the 5-year period. The proposed project will provide these benefits throughout the expected life of the equipment which is estimated at 30 years. One of the proposed pumps will be equipped with a variable speed drive (VFD) which will effectively allow the LYID#1 to dial up or dial down the flow from the pump to be able to exactly match the required demand. The current configuration only allows a pump to be on or off. For example, if the demand is 7 cfs and the pump is an 18 cfs pump, the current situation would only allow the 18 cfs pump to be turned on and pump 18 cfs, which is 11 cfs more than what is needed. The use of a VFD allows the pump to be dialed down to exactly match the required demand.

Describe current losses:

Please explain where the water that will be conserved is currently going and how it is being used. Consider the following:

a. Explain where current losses are going (e.g., back to the stream, spilled at the end of the ditch, seeping into the ground)?

   The proposed Thomas Point Pumping Plant Rehabilitation project will result in minimal spills from the wasteway at the end of Lateral LL that spills water into a drain that carries water back to the Yellowstone River. The drain is an ephemeral channel that cannot accept a significant amount of water without excessive erosion and seepage. The excess water travels through the drain for approximately 3.3 miles to the Yellowstone River. Based on estimates provided by the LYID#1, approximately 50% of the water wasted does not make it back to the Yellowstone River and is lost through evaporation and seepage. The remaining 50% is loaded with sediment and nutrients that is returned to the Yellowstone River. The returned water also has a significantly higher temperature than water in the river, creating an unnecessary contribution to higher temperatures and nutrients in the Yellowstone River that is already identified by the EPA as an impaired stream and is under a TMDL.

b. If known, please explain how current losses are being used. For example, are current losses returning to the system for use by others? Are current losses entering an impaired groundwater table becoming unsuitable for future use?

   Based on estimates provided by the LYID#1, approximately 50% of the water wasted does not make it back to the Yellowstone River and is lost through evaporation and seepage. The remaining 50% is loaded with sediment and nutrients that is returned to the Yellowstone River. The returned water also

has a significantly higher temperature than water in the river, creating an unnecessary contribution to higher temperatures and nutrients in the Yellowstone River that is already identified by the EPA as an impaired stream and is under a TMDL.

c. Are there any known benefits associated with where the current losses are going? For example, is seepage water providing additional habitat for fish or animal species?

No. The returned water has a significantly higher temperature than water in the river, creating an unnecessary contribution to higher temperatures in the Yellowstone River that is already identified by the EPA as an impaired stream and is under a TMDL. The returned water also carries significant amounts of sediment and nutrients that contribute to the TMDL in the Yellowstone River. The returned water has a negative benefit to the Yellowstone River.

Describe the support/documentation of estimated water savings:

Please provide sufficient detail supporting how the estimate was determined, including all supporting calculations. Note: projects that do not provide sufficient supporting detail/calculations may not receive credit under this section. 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.

*In addition, please note that the use of visual observations alone to calculate water savings, without additional documentation/data, are **not** sufficient to receive credit under this section. Further, the water savings must be the result of reducing or eliminating a current, ongoing loss, not the result of an expected future loss.*

The estimated quantity of additional supply the project will provide is 4,800 acre-feet of water per year as an average annual benefit over the next 10 years. The amount was calculated by taking the amount of water pumped each year from the Thomas Point Pumping Plant for the past 5 years, the number of days the pumps were in operation, and the amount of water that was taken in each turnout within the Lateral LL system. The difference amounts to an average of 4,800 acre-feet per year and an estimated 22.2 cfs per day that is pumped into the system as excess water. The existing pumps are either on or off, and thus if a pump is on it will only pump at its maximum rated capacity. The average pumping plant operation was 109 days for Thomas Point Pumping Plant over the 5-year period. From interviews with the LYID ditch rider for this area, it is a common occurrence to have to pump more water into the Lateral LL system than is called for in order to satisfy the demand. Appendix A of this application includes the individual pump run times for the Thomas Point pumping plant and turnout records for Lateral LL for the past 5 years.

Please address the following questions according to the type of infrastructure improvement you are proposing for funding.

See Appendix A: *Benefit Quantification and Performance Measure Guidance* for additional guidance on quantifying water savings.

(1) **Canal Lining/Piping:** Canal lining/piping projects can provide water savings when irrigation delivery systems experience significant losses due to canal seepage. Applicants proposing lining/piping projects should address:

a. How has the estimated average annual water savings that will result from the project been determined? Please provide all relevant calculations, assumptions, and supporting data. *N/A*

b. How have average annual canal seepage losses been determined? Have ponding and/or inflow/outflow tests been conducted to determine seepage rates under varying conditions? If so, please provide detailed descriptions of testing methods and all results. If not, please provide an explanation of the method(s) used to calculate seepage losses. All estimates should be supported with multiple sets of data/measurements from representative sections of canals. *N/A*

c. What are the expected post-project seepage/leakage losses and how were these estimates determined (e.g., can data specific to the type of material being used in the project be provided)? *N/A*

d. What are the anticipated annual transit loss reductions in terms of acre-feet per mile for the overall project and for each section of canal included in the project? *N/A*

e. How will actual canal loss seepage reductions be verified? *N/A*

f. Include a detailed description of the materials being used. *N/A*

(2) **Municipal Metering:** Municipal metering projects can provide water savings when individual user meters are installed where none exist to allow for unit or tiered pricing and when existing individual user meters are replaced with advanced metering infrastructure (AMI) meters. To receive credit for water savings for a municipal metering project, an applicant must provide a detailed description of the method used to estimate savings, including references to documented savings from similar previously implemented projects. Applicants proposing municipal metering projects should address the following: *N/A*

a. How has the estimated average annual water savings that will result from the project been determined? Please provide all relevant calculations, assumptions, and supporting data. *N/A*
b. How have current system losses and/or the potential for reductions in water use by individual users been determined? *N/A*
c. For installing end-user water service meters, e.g., for a residential or commercial building unit., refer to studies in the region or in the applicant's service area that are relevant to water use patterns and the potential for

reducing such use. In the absence of such studies, please explain in detail how expected water use reductions have been estimated and the basis for the estimations. *N/A*

d. What types (manufacturer and model) of devices will be installed and what quantity of each? *N/A*

e. How will actual water savings be verified upon completion of the project? *N/A*

(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. Applicants proposing municipal metering projects should address:

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

The estimated quantity of additional supply the project will provide is 4,800 acre-feet of water per year as an average annual benefit over the next 30 years. The amount was calculated by taking the amount of water pumped each year from the Thomas Point Pumping Plant for the past 5 years, the number of days the pumps were in operation, and the amount of water that was taken in each turnout within the LYID#1 system. The difference amounts to an average of 4,800 acre-feet per year and an estimated 22.2 cfs per day that is pumped into the system as excess water. The existing pumps are either on or off, and thus if a pump is on it will only pump at its maximum rated capacity. The average pumping plant operation was 109 days for the Thomas Point Pumping Plant over the past 5-year period. From interviews with the LYID#1 ditch rider for this area, it is a common occurrence to have to pump more water into the LYID#1 system than is called for to satisfy the demand. Flow records for the LYID#1 system as well as the pump run times and output are provided in Appendix A.

b. 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.

Please see the explanation above in 3a.

c. 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?

The LYID#1 laterals and sub-laterals are all measured via rectangular weirs that are placed just downstream of each turnout. The pump discharges from the Thomas Point Pumping Plant are measured via a Cipolletti weir that is just downstream of the pump discharge. All the measuring devices are installed properly and are in good working condition. Thus, the accuracy of these measuring devices is likely within +/-5%. The accuracy of both rectangular and

Cipolletti weirs is well documented in literature such as the USBR Water Measurement Manual.

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

Please see the explanation above in 3c.

e. Will annual farm delivery volumes be reduced by more efficient and timely deliveries? If so, how has this reduction been estimated?

Yes, the annual farm delivery volumes will be reduced as the current practice is to pump more water into the system and divert more water than is necessary into the turnouts. The proposed new pump will be equipped with a variable speed drive (VFD) which will effectively allow the LYID#1 to dial up or dial down the flow from the pump to be able to exactly match the required demand. The current situation only allows a pump to be on or off. For example, if the demand is 7 cfs and the pump is an 18 cfs pump, the current situation would only allow the 18 cfs pump to be turned on and pump 18 cfs, which is 11 cfs more than what is needed. The use of a VFD allows the pump to be dialed down to exactly match the required demand. The reduction of 22.2 cfs diverted into the LYID#1 system has been estimated by taking the amount of water diverted into the system through the Thomas Point Pumping Plant and subtracting the water diverted into the individual turnouts throughout the LYID#1 system. This is a very conservative estimate as the amount of water diverted into the turnouts is generally more than is needed to spread the excess water out so that it does not overwhelm the wasteway and drain system at the end of the Lateral LL system.

f. How will actual water savings be verified upon completion of the project?

The LYID#1 maintains pumping and flow records for the Thomas Point Pumping Plant that are used by LYID#1 and LYIP management to monitor daily flows and inputs into Lateral LL. The water savings will be verified by the measurements taken at the pumping plant and subtracting out the daily flows taken at each turnout. Once the project is completed, these records will be maintained in the future to validate the proposed water conservation savings.

The proposed pump improvements will provide the LYID#1 the ability to measure pumped flows real-time. The proposed pumps will be controlled and monitored through remote monitoring and control components that will tie into the LYID#1's existing remote monitoring system. The LYID#1 has been using this technology for the past 10 years with great success. This technology is not new and has been proven to be effective for control and operation of irrigation infrastructure such as pumps, gates and measuring stations. The proposed improvements will allow the LYID#1 to control and monitor flows very precisely into the Lateral LL system, which is a large lateral that is located in the upper delivery portion in the LYIP system. The LYID#1/LYIP closely monitors snowpack, Yellowstone River flows and flows into their diversion. These tools

allow the LYID#1/LYIP to predict the amount of water that will be available and provide drought monitoring tools that can predict current drought conditions. By providing more controls within the LYIP system, they will be able to be proactive at managing the water within their system rather than being reactive, which will allow the LYIP to have more water for downstream users when water rationing is being implemented to reduce the overall impact to the LYID#1 water users.

(4)**Turf Removal:** Applicants proposing turf removal projects should address:

a. How have average annual water savings estimates been determined? Please provide all relevant calculations, assumptions, and supporting data. *N/A*
b. What is the total surface area of turf to be removed and what is the estimated average annual turf consumptive use rate per unit area? *N/A*
c. Was historical water consumption data evaluated to estimate average annual turf consumptive use per unit area? If so, did the evaluation include a weather adjustment component? *N/A*
d. Will site audits be performed before applicants are accepted into the program? *N/A*
e. How will actual water savings be verified upon completion of the project? *N/A*

(5) **Smart Irrigation Controllers, Controllers with Rain Sensor Shutoff, Drip Irrigation, and High-Efficiency Nozzles:** Applicants proposing smart irrigation controllers, controllers with rain sensor shutoff, drip irrigation, or high-efficiency nozzle projects should address:

a. How have average annual water savings estimates been determined? Please provide all relevant calculations, assumptions, and supporting data. *N/A*
b. Was historical water consumption data evaluated to estimate the percent reduction in water demand per unit area of irrigated landscape? If so, did the evaluation include a weather adjustment component? *N/A*
c. What types (manufacturer and model) of devices will be installed and what quantity of each? *N/A*
d. Will the devices be installed through a rebate or direct-install program? *N/A*
e. Will site audits be performed before and after installation? *N/A*
f. How will actual water savings be verified upon completion of the project? *N/A*

(6) **High-Efficiency Indoor Appliances and Fixtures:** Installing high- efficiency indoor appliances and fixtures can provide water savings for municipal water entities where there is significant potential for replacing existing non-efficient indoor appliances and fixtures. Applicants proposing high-efficiency indoor appliance and fixtures projects should address:

a. How have average annual water savings estimates been determined? Please provide all relevant calculations, assumptions, and supporting data. *N/A*
b. What types (clothes washers, shower heads, etc.) of appliances and fixtures will be installed and what quantity of each? *N/A*

c. Have studies been conducted to verify the existence of non-efficient appliances and fixtures? Provide published water savings rates for each of these devices and reference the source for each of the device savings rates. *N/A*
d. Will the devices be installed through rebate or direct-install programs? *N/A*
e. How will actual water savings be verified upon completion of the project? *N/A*

(7) **Commercial Cooling Systems:** Cooling towers are components of many refrigeration systems with many applications. They dissipate heat to the atmosphere through the evaporative process and are common in manufacturing processes where cooling is required. They are also used for cooling large commercial buildings. Cooling tower structures vary in size, design, and efficiency. Regardless, all cooling towers consume large volumes of water and energy. *N/A*

Open-circuit or direct contact are the most common types of cooling towers. Water is supplied to the tower after gathering heat and then released in the upper tower levels. A fan near the base of the tower creates upward airflow. Closed-circuit towers are more efficient and closed-circuit towers with adiabatic cooling are more efficient yet. *N/A*

Water and energy savings can be achieved by replacing or retrofitting older low efficiency cooling towers. Applicants proposing cooling system projects should address:

a. How have average annual water savings estimates been determined? Please provide all relevant calculations, assumptions, and supporting data. *N/A*
b. Was historical water consumption data evaluated to estimate the percent reduction in water demand? *N/A*
c. Specify type (manufacturer and model) of cooling tower system to be installed and/or provide a detailed description of the system retrofit plan. *N/A*

Note that an agreement will not be awarded for an improvement to conserve irrigation water unless the applicant agrees to the terms of Public Law 111-11 § 9504(a)(3)(B) (see
Section F.2.7. *Requirements for Agricultural Operations under P.L. 111-11 §9504(a)(3)(B).*

The LYIP and LYID#1 understands and will agree to the terms of Section 9504(a)(3)(B) of Public Law 111-11.

E.1.2. Evaluation Criterion B—Renewable Energy (20 points)

Up to 20 points may be awarded based on the extent to which the project increases the use of renewable energy or otherwise results in increased energy efficiency and reduced greenhouse gas emissions.

For projects that include constructing or installing 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.

Note: an applicant may receive points under both Subcriteria No.B.1 and B.2 if the project consists of an energy efficiency component separate from the renewable energy component of the project. However, an applicant may receive no more than 20 points total under both Subcriteria No. B.1 and B.2.

E.1.2.1. Subcriterion No. B.1: Implementing Renewable Energy Projects Related to Water Management and Delivery

Up to 20 points may be awarded for projects that include constructing or installing renewable energy components (e.g., hydroelectric units, solar-electric facilities, wind energy systems, or facilities that otherwise enable the use of renewable energy). Projects such as small-scale solar resulting in minimal energy savings or production will be considered under Subcriterion No. B.2.

Describe the amount of energy capacity. For projects that implement renewable energy systems, state the estimated amount of capacity (in kilowatts) of the system. Please provide sufficient detail supporting the stated estimate, including all calculations in support of the estimate. *N/A*

Describe the amount of energy generated. For projects that implement renewable energy systems, state the estimated amount of energy that the system will generate (in kilowatt hours per year). Please provide sufficient detail supporting the stated estimate, including all calculations in support of the estimate. Please explain how the power generated as a result of this project will be used, including any existing or planned agreements and infrastructure. *N/A*

Describe the status of a mothballed hydropower plant. For projects that are brining mothballed hydropower capacity back online, please describe the following:

- Clearly describe the work that will be accomplished through the WaterSMART Grant. Note: normal OM&R activities are not eligible for funding. The work being proposed must be an investment. *N/A*

- Provide information about the capacity (in kilowatts) of the existing hydro system and the expected capacity once it is brough back on-line. *N/A*

- Provide information about the duration that the hydro system has been offline and the reasons why it has been mothballed. Please include any regulatory reporting or filings (e.g., FERC filings) or other documentation regarding the system. *N/A*

Describe any other benefits of the renewable energy project. Please describe and provide sufficient detail on any additional benefits expected to result from the renewable energy project, including:

- How the system will combat/offset the impacts of climate change, including an expected reduction in greenhouse gas emissions

  See answer to E.1.2.2. below.

- Expected environmental benefits of the renewable energy system

  The wasted water from the LYID#1 system has a significantly higher temperature than water in the river, creating an unnecessary contribution to higher temperatures and nutrients in the Yellowstone River that is already identified by the EPA as an impaired stream and is under a TMDL. The returned water has a negative benefit to the Yellowstone River. The proposed Thomas Point Pumping Plant improvements will enable the LYID#1 to dial in exactly what is needed within the Lateral LL system, minimizing spills that will significantly reduce the higher temperature sediment and nutrient heavy return flows to the Yellowstone River.

- Any expected reduction in the use of energy currently supplied through a Reclamation project.

  See answer to E.1.2.2. below.

- Anticipated benefits to other sectors/entities.

  The proposed project will have a beneficial impact on the local economy by furnishing short-term work during construction of the project and long-term allotments for sustainable agricultural production. Sustaining agricultural production and increasing ag-driven revenue generation are crucial to maintaining rural communities in Montana. All the LYID#1 users rely heavily on ag-based commerce. The proposed project will protect the source of water supply to the LYID#1 system to preserve the agricultural crops and revenue. The protection of this revenue generated by the project will tie back into the local economy by way of commercial trucking, local implement dealers, and local businesses. The project will also prevent significant revenue losses to LYID#1 Lateral LL users in typical annual revenue by providing a consistent flow of water for irrigation. Consistent flows from the proposed project will facilitate improved crop production, increase revenues to producers, and stimulate the local and regional economies. The LYID#1 Lateral LL users primarily grow alfalfa hay, grass hay, wheat, barley, corn, sugar beets and soybeans. Discussions with local growers within the area indicate that the locally grown crops will be distributed throughout the State of Montana. Increases in crop production will have a direct impact on a statewide basis, as

the crops produced are used throughout the State and contribute to the local and state tax bases from increased revenues.

The proposed rehabilitation project will provide significant financial, safety, and operational improvements to the LYID#1 Lateral LL users. Rehabilitation of the Thomas Point Pumping Plant south pump will ensure that the agricultural revenues from irrigated crops and pasture lands will continue to support over $2 million in annual revenues that result directly from alfalfa, wheat, corn, soybeans, barley, beets, and grass hay production on 2,650 acres within the LYID#1 system. The proposed automation will provide a safer work environment with new, state-of-the-art components that will alleviate many of the existing operational issues and reduce the chance that employees will be placed in harm's way. The proposed rehabilitation project will significantly reduce the amount of time that the LYID#1 spends on operation and maintenance, allowing them to focus on other improvements and operations within the LYID#1 system that need their attention. Additional local benefits include boosting the local economy through workers, material suppliers, truckers, and other temporary workers contributing to local stores, restaurants, and gas stations during construction of the proposed project.

- Expected water needs, if any, of the system. *N/A*

AND/OR

E.1.2.2. Subcriterion No. B.2: Increasing Energy Efficiency in Water Management

Up to 10 points may be awarded for projects that address energy demands and reduce greenhouse gas emissions 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 efficiency project (e.g., reduced pumping).

- If quantifiable energy savings is expected to result from the project, please provide sufficient details and supporting calculations. If quantifying energy savings, please state the estimated amount in kilowatt hours per year.

The existing motors and pumps at the Thomas Point Pumping Plant are very old models and inefficient. Based on available information, the existing pumps and motors are around 70% efficient. The LYID#1 has rebuilt the pumps and motors a number of times, but parts are getting very hard to find as the pumps and motors are obsolete. At this point, replacement of pumps is the only real option to keep the pump station running. Replacement of the 200 hp south pump and motor with a newer energy efficient pump model will boost the energy efficiency to approximately 95%. The existing pump station annual power usage in 2020 was 348,489 kWh. This was a low power use year, as shown from LYID#1 pump records showing that the number of days the pumps were

used in 2020 was 96 days, the lowest usage in the past 5 years. The south 200 hp pump draws approximately 40% of the power at this location as it is the largest pump and is the most frequently used and operated. Based on that allocation, the south 200 hp pump consumed approximately 140,000 kWh of electricity in 2020. If the south 200 hp pump were upgraded to a new pump, motor and switchgear, the pump would become 95% efficient, saving at least 87,122 kWh per year. The new energy efficient motor and VFD will provide improved design, materials and manufacturing techniques that will allow the new motors to have a higher service factor, longer insulation and bearing life, lower waste heat output and less vibration, which will increase reliability and significantly decrease operation and maintenance costs.

- How will the energy efficiency improvement combat/offset the impacts of climate change, including an expected reduction in greenhouse gas emissions.

The proposed project will provide a higher efficiency electric motor and Variable Frequency Drive that will use less electricity which provides a direct impact on air pollution. In addition, the more efficient use of the water within the LYID#1 will reduce the amount of waste from the system that will also reduce the amount of sediment and nutrients that are transported back to the Yellowstone River via wasteways and drains.

The proposed project reduces greenhouse gas emissions in three ways. First the additional water that is saved can be utilized by downstream water users within the LYIP system to increase crop production which will create more vegetation to sequester carbon. Second, the more efficient pump and Variable Frequency Drive will utilize less electricity which has a direct correlation to less carbon dioxide production. Third, the LYID#1 will not have to make as many trips to the pumping plant to adjust flows and check on the pumps, saving vehicle miles that will burn less overall fuel and lower carbon dioxide emissions from LYID#1/LYIP vehicles.

- If the project will result in reduced pumping, 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 and energy usage?

The proposed project will result in reduced pumping. The Thomas Point Pumping Plant consists of a concrete substructure, steel superstructure, and four vertical turbine pumps, one that is powered by a 200 hp motor and two that are powered by 125 hp motors. The south 200 hp pump is capable of discharging 14,000 gpm (37.5 cfs), the middle 125 hp pump is capable of discharging 11,220 gpm (30.0 cfs), and the north 125 hp pump is capable of discharging 11,220 gpm (30.0 cfs). The total rated capacity of the pumping plant is 97.5 cfs with a total working head of 42 feet. Since the pumps do not have variable frequency drives, they are either on and pumping the full amount or off and pumping no flow. Each pump can be operated individually to pump

water into the system. The Thomas Point pumps are all fed through a concrete intake structure equipped with steel trash racks to feed water to the pump vault, and the pump discharges are all separate 24-inch diameter steel pipelines that run from the outlet of each pump to the start of the LL Lateral system.

Replacement of the 200 hp south pump and motor with a newer energy efficient pump model will boost the energy efficiency to approximately 95%. The existing pump station annual power usage in 2020 was 348,489 kWh. This was a low power use year, as shown from LYID#1 pump records showing that the number of days the pumps were used in 2020 was 96 days, the lowest usage in the past 5 years. The south 200 hp pump draws approximately 40% of the power at this location as it is the largest pump and is the most frequently used and operated. Based on that allocation, the south 200 hp pump consumed approximately 140,000 kWh of electricity in 2020. If the south 200 hp pump were upgraded to a new pump, motor and switchgear, the pump would become 95% efficient, saving at least 87,122 kWh per year.

The existing pumps have experienced significant deterioration in the form of worn-out irreplaceable components, degraded switchgear, and deteriorated safety equipment. The pumps, motors and switchgear are obsolete and in need of replacement. The existing pumps, motors and switchgear are severely aged, barely run, and are vintage 1952. The existing pumps are difficult to keep running, resulting in water shortages to the entire 2,650-acres served by Lateral LL. This water shortage is devastating to the farmers who depend on this water and will likely result in significant financial issues for many of them. The degradation of the pumps requires multiple daily trips, about 50 miles round-trip to the pumping plant to check water flows and make necessary adjustments to the pumps and/or perform maintenance. The access road to the pumping plant is difficult to navigate during adverse weather conditions. This daily travel is inefficient and has become unnecessary as technology has advanced in recent years. With automation, a weekly manned trip to the site would be sufficient to verify pump station function and condition. At times when access is limited due to muddy roadways, the pumps may not be adjusted for several days, leaving producers short or necessitating wasting of the extra water. The introduction of a Remote Monitoring and Control system with electrical system upgrades will allow the LYID #1 to monitor and control the pumps from a remote location, thus limiting daily trips to the pumping plant. The Remote Monitoring and Control system is an electronic monitoring system that logs the pumping plant's operating history data and allows operations personnel to adjust the pump flows with computer software and an internet, cell phone, or radio connection. The remote system and corresponding electrical system upgrades would increase the efficiency of the pump station by allowing LYID #1 staff to closely monitor the pumping station output and make instantaneous adjustments to pump flows to ensure the outflow is optimum for the present conditions. Pump adjustments could also be

automated to occur dozens of times each day based upon information from flow monitoring. By implementing this new technology, the LYID #1 can far better regulate outflows and precisely match their real-time demand of water. The current operational process requires the discharge of an excess amount of water from the LYIP Main Canal to buffer any demand or loss fluctuations. Currently, these fluctuations are only observed once per operating day when the ditch rider visits the pumping plant to record flow rates and make adjustments. Automating the pumping plant would make more water available to cover the demands of the water users.

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

The energy savings estimate originates from the point of diversion.

- Does the calculation include any energy required to treat the water, if applicable?

N/A

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

Implementation of the proposed improvements will significantly benefit the LYID#1's management of the irrigation water delivery network and reduce greenhouse gas emissions. The existing pumps are currently in a severe state of disrepair and consume a significant amount of time by LYID#1 personnel each year to be able to continue pumping operations to supply the district. The current pump configuration does not work well and requires a significant amount of attention to operate. The LYID#1 system does not receive the amount of water that they need from the pump station due to its state of disrepair and does not run at the efficiency that they need, thus leaving users within the irrigation system water short. LYID#1 personnel typically make 3 trips per day to the pump station to check, adjust and maintain the pumps to maintain water delivery within the system at a round-trip of 50 miles for each trip. Rehabilitation of the Thomas Point Pumping Plant would allow LYID#1 personnel to reduce maintenance operations and reduce system management time by a minimum of 3 hours per day and over 150 miles traveled each day. At an average operation of 109 days during the irrigation season, that equates to over 16,350 miles traveled for operation and maintenance that could be reduced by over 90% each irrigation season.

- 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 proposed automation and Remote Monitoring and Control improvements for the Thomas Point Pumping Plant would conserve water through improved operation and efficiency of the pump station and allow more precise control

of water being diverted from the Yellowstone River by eliminating the age-old practice of diverting extra water and wasting it if it's not needed. The LYID#1 has historically had to divert extra water from the LYIP Main Canal due to unknown water demands, the distance of the pump station from the LYID#1/LYIP main offices, and the inability to make incremental adjustments due to a lack of a VFD. The proposed automation and remote operation system components along with the new pumps, motors, VFD and switchgear will provide the LYID#1 with real-time data and allow adjustments to the system instantly, allowing more efficient water control and delivery. The proposed remote monitoring and control components will include solar panels to assist in providing power for the monitoring components.

E.1.3. Evaluation Criterion C—Sustainability Benefits (20 points)

*Up to **20 points** may be awarded under this criterion. This criterion prioritizes projects that address a specific water and/or energy sustainability concern(s), including enhancing drought resilience, addressing the current and future impacts of climate change, and resolving water related conflicts in the region. In addition, this criterion is focused on the benefits associated with the project, including benefits to tribes, ecosystem benefits, and other benefits to water and/or energy supply sustainability.*

Enhancing drought resiliency. In addition to the separate WaterSMART Environmental Water Resources Projects NOFO, this NOFO places a priority on projects that enhance drought resiliency, through this section and other sections above, consistent with the SECURE Water Act. Please provide information regarding how the project will enhance drought resilience by benefitting the water supply and ecosystem, including the following:

The proposed pumping plant improvements will provide a significant water savings of an average of 22.2 cfs, or 4,800 acre-feet per year at the Thomas Point Pumping Plant. The pumping plant takes water directly from the LYIP main canal. By saving this water, the LYID#1 will have an additional 4,800 acre-feet that will be available for crops during peak irrigation demand and periods of drought. The proposed pump improvements will also provide the LYID#1 the ability to measure pumped flows real-time. The proposed pumps will be controlled and monitored through remote monitoring and control components that will tie into the LYIP's existing remote monitoring and control system. The LYID#1 has been using this monitoring technology for the past 10 years with great success. This technology is not new and has been proven to be effective for control and operation of irrigation infrastructure such as pumps, gates and measuring stations. The proposed improvements will allow the LYID#1 to control and monitor flows very precisely into the LYID#1 system, which is one of the largest laterals that occurs early in the LYIP system. This project will provide a means for the LYID#1 to monitor water use and flow in these laterals to provide more efficient use of water. The LYID#1 and LYIP closely monitors snowpack, Yellowstone River flows and flows into their diversion. These tools allow the LYID#1 and LYIP to predict the amount of water that will be available and provide drought monitoring tools that can predict current drought conditions. By providing more

controls within the LYID#1 system, they will be able to be proactive at managing the water within their system rather than being reactive, which will allow the LYID#1 to have more water for downstream users when water rationing is being implemented to reduce the overall impact of drought conditions when they occur and the water rationing that is necessary.

- Does the project seek to improve ecological resiliency to climate change?

  The proposed project includes both green and sustainable infrastructure to improve community climate resilience. This project will not only save precious water that can be used to mitigate the magnitude of downstream water rationing but will also reduce the amount of energy used due to higher efficiency pumps, motors, and variable speed controls. The proposed project will provide a higher efficiency electric motor that will use less electricity which provides a direct impact on air pollution. In addition, the more efficient use of the water within the LYID#1 will reduce the amount of waste from the system that will also reduce the amount of sediment and nutrients that are transported back to the Yellowstone River via wasteways and drains.

  One of the prominent features of climate change that we have noticed and that has been scientifically proven is that as climate change continues to occur, winter months are shortened, and runoff tends to occur earlier than it did in the previous decade (documented in the 2017 Montana Climate Assessment, https://montanaclimate.org/chapter/title-page). When this happens, river flows fall off earlier than previously and water rationing within irrigation districts becomes more prevalent as river flows drop off going into the hotter summer months of July, August, and September. The LYID#1 has focused on irrigation efficiency as their primary defense against drought and climate change. As the LYID#1 and LYIP system becomes more efficient, more water is available to the LYID#1 users to reduce the impacts of water rationing due to drought. Although water rationing will not be completely avoided, the more water that is saved will result in less water rationing that has to occur and keep more water in the Yellowstone River outside of periods of peak irrigation demand.

- Will water remain in the system for longer periods of time? If so, provide details on current/future durations and any expected resulting benefits (e.g., maintaining water temperatures or water levels).

  The proposed project will involve water conservation, energy conservation and a management component that will promote healthy lands and soils that will also protect the LYID#1's water supply. The proposed pump improvements will allow the LYID#1 to provide the exact amount of water that is needed within each lateral system, promoting healthy agricultural crop production, and minimizing the amount of waste flows from the system which will minimize the amount of erosion that occurs from discharges into drains and wasteways. The proposed project provides a unique opportunity to save water by not having to pump more water than is necessary. The LYIP is required to supply

more water to the LYID#1 because they do not have the ability to supply the exact amount of water that is needed. Thus, during certain periods of the year that are outside of the peak irrigation demand, more water is diverted from the Yellowstone River than is necessary to fulfill the demand. When this happens, much of this water is spilled from the system and is lost to evaporation and seepage. The remaining water is discharged back to the Yellowstone River in the form of higher temperature water that contains significant amounts of nutrients and sediment. The proposed project will minimize discharges back to the river by being able to pump variable flows into the LYID#1 system to exactly meet the demand.

- Will the project benefit species (e.g., federally threatened or endangered, a federally recognized candidate species, a state listed species, or a species of particular recreational, or economic importance)? Please describe the relationship of the species to the water supply, and whether the species is adversely affected by a Reclamation project or is subject to a recovery plan or conservation plan under the Endangered Species Act (ESA).

  The proposed project will provide water conservation benefits that can be left in the Yellowstone River outside of peak irrigation demand periods. The additional water will benefit the Yellowstone River ecology by leaving cleaner water in the river system to support fish and wildlife habitat. The Pallid Sturgeon is an endangered species that has been in the media spotlight for some time in this portion of the Yellowstone River. The new diversion bypass that is currently being constructed will allow the Pallid Sturgeon to migrate further upstream to promote the natural spawning of this species. Additional river flows during the spring and fall months can facilitate more water through the bypass system that will promote Pallid Sturgeon spawning and recovery.

  Reclamation has been heavily involved in the restoration of Pallid Sturgeon through the recent Lower Yellowstone Intake Diversion Dam project that is implementing a river bypass to assist in Pallid Sturgeon recovery by allowing a path for the fish to migrate upstream of the intake diversion dam. The amount of streamflow added could be as high as 22.2 cfs during periods outside of peak irrigation demand. The exact number of natural fish left within the lower Yellowstone River and the Missouri River below Fort Peck Dam and above Lake Sakakawea are not known, but the numbers are dwindling. Water conservation efforts by the LYID#1 will leave more water in the river outside of peak irrigation demand periods to facilitate the use of the new bypass structure for Pallid Sturgeon.

- Please describe any other ecosystem benefits as a direct result of the project.

  The proposed Thomas Point Pumping Plant Rehabilitation project will result in minimal spills from the wasteway at the end of Lateral LL that spills water into a drain that carries water back to the Yellowstone River. Currently, the LYID#1 spills significant amounts of water from this wasteway and the end of the sub-laterals which results in soil erosion to the drainage channels that carry

this water toward the Yellowstone River. By providing water efficiency through the use of a VFD on the south pump, the LYID#1 can precisely control the water pumped into the LYID#1 system to minimize spills. The minimal spills will provide an optimal condition for the drainage channels that carry this excess water toward the Yellowstone River, as the minimal spills will not be erosive, will allows the channels to establish vegetation, and will promote a healthy riparian ecosystem for fish and wildlife habitat.

- Will the project directly result in more efficient management of the water supply? For example, will the project provide greater flexibility to water managers, resulting in a more efficient use of water supplies?

  In recent years, drought conditions and climate change have had a significant impact on the users within the LYID#1 system. Water rationing has become an annual occurrence within the LYID#1, as water demands continue to increase due to increased heat index and warmer weather conditions while the water availability continues to decrease due to climate change which continues to result in earlier runoff and longer periods of low-flow conditions in the river. The LYID#1 has turned its focus to making its system more efficient to be able to reduce the impact of water rationing and make more water available to downstream users by not wasting or losing water in the system.

  The proposed automation and remote monitoring and control improvements for the Thomas Point Pumping Plant would conserve water through improved operation and efficiency of the pump station and allow more precise control of water being diverted from the Yellowstone River by eliminating the age-old practice of diverting extra water and wasting it if it's not needed. The LYID#1 has historically had to divert extra water from the LYIP Main Canal due to full flow pumps, unknown water demands, the distance of the pump station from the LYID#1/LYIP main offices, and the inability to make incremental adjustments due to a lack of a VFD. The proposed automation and remote operation system components along with the new pump, motor, VFD and switchgear will provide the LYID#1 with real-time data and allow adjustments to the system instantly, allowing more efficient water control and delivery.

  The installation of a pump with a VFD gives the operator the capability to only supply the quantity of water needed, thereby conserving energy from unnecessary pump run times as well as conserving water. Pumps with VFDs also reduce amps during motor starting, lowering demand charges which is another significant portion of the electrical charges. Pump manufacturers have documented studies that the installation of a VFD onto a pump is approximately 25% more efficient than a pump without a VFD. Only one pump will be equipped with a VFD, therefore the 25% energy saving can only be applied to one pump within the pump station. In addition, the use of the VFD will allow the LYID#1 flexibility in operation.

  Implementation of the proposed improvements will significantly benefit the LYID#1's management of the irrigation water delivery network. The existing

pumps are currently in a severe state of disrepair due to a lack of replacement parts and consume a significant amount of time by LYID#1 personnel each year to be able to continue pumping operations to supply the district. The current pump configuration does not work well and requires a significant amount of attention to operate. The LYID#1 system does not receive the amount of water that they need from the pump station due to its state of disrepair and does not run at the efficiency that they need, thus leaving users within the irrigation system water short. LYID#1 personnel typically make 3 trips per day to the pump station to check, adjust and maintain the pumps to maintain water delivery within the system. Rehabilitation of the LYID#1 Pump would allow LYID#1 personnel to reduce maintenance operations and reduce system management time by a minimum of 3 hours per day.

The proposed new pump replacement with remote monitoring and control improvements would provide improved design, materials and manufacturing techniques that will allow the new motor to have a higher service factor, longer insulation and bearing life, lower waste heat output and less vibration, which will ***increase reliability and significantly decrease operation and maintenance costs****. The proposed automation and remote monitoring and control improvements would reduce the amount of labor involved in operating the pumps and operation of the systems would be more efficient. The proposed automation and remote monitoring and control system improvements will reduce the man hours required to drive back and forth to perform Operation and Maintenance (O&M) on the pumps to allow additional time for O&M at other locations.*

Projects that are intended to improve streamflows or aquatic habit, and that are requesting $500,000 or more in Federal funding, must include information about plans to monitor the benefits of the project. Please describe the plan to monitor improved streamflows or aquatic habit benefits over a five-year period once the project has been completed. Provide detail on the steps to be taken to carry out the plan.

The proposed project will not be requesting $500,000 or more in Federal funding. However, the LYID#1 and LYIP currently monitor flows within the LYID#1 and LYIP systems as well as water in the Yellowstone River on a constant basis. These records will continue to be kept following the proposed Thomas Point Pumping Plant Rehabilitation to track the improvements in water efficiency and improved streamflow that will occur outside periods of peak irrigation demand when the LYID#1 and LYIP need to pull their full water right.

Addressing a specific water and/or energy sustainability concern(s). Will the project address a specific sustainability concern? Please address the following:

- Explain and provide detail of the specific issue(s) in the area that is impacting water sustainability, such as shortages due to drought and/or climate change, increased demand, or reduced deliveries.

One of the prominent features of climate change that we have noticed and that has been scientifically proven is that as climate change continues to occur, winter months are shortened, and runoff tends to occur earlier than it did in the previous decade (documented in the 2017 Montana Climate Assessment, https://montanaclimate.org/chapter/title-page). When this happens, river flows fall off earlier than previously and water rationing within irrigation districts becomes more prevalent as river flows drop off going into the hotter summer months of July, August, and September.

The impacts to water supply availability due to climate change has been documented in the 2017 Montana Climate Assessment, https://montanaclimate.org/chapter/title-page. Based on this report, there are several major findings that include:

- *Montana's snowpack has declined over the observational record, since the 1930s.*
- *Continued warming temperatures will reduce snowpack at mid and low elevations.*
- *Historical observations show a shift toward earlier snowmelt and an earlier peak in spring runoff.*
- *Earlier onset of snowmelt and spring runoff will reduce late-summer water availability.*
- *Multi-year and decadal-scale droughts have been and will continue to be a natural feature of Montana's climate.*
- *Changes in snowpack and runoff timing will likely increase the frequency and duration of drought during late summer and early fall.*

- Explain and provide detail of the specific issue(s) in the area that is impacting energy sustainability, such as reliance on fossil fuels, pollution, or interruptions in service.

The proposed project includes both green and sustainable infrastructure to improve community climate resilience. This project will not only save precious water that can be used to mitigate the magnitude of downstream water rationing but will also reduce the amount of energy used due to higher efficiency pumps, motors, and variable speed controls. Energy sustainability is a concern in eastern Montana, as we brace for the eventual shutdown of the Colstrip coal-fired power station. The Colstrip power station is a major source of power throughout the West, and its eventual shutdown may cause power outages, especially during periods of peak demand in the late summer when temperatures are high, which also corresponds to peak irrigation demand. The LYID#1 will need to be as efficient as possible to assist in overall lower power use to avoid these potential power outages.

- Please describe how the project will directly address the concern(s) stated above. For example, if experiencing shortages due to drought or climate change, how will the project directly address and confront the shortages?

The LYID#1 has focused on irrigation efficiency as their primary defense against drought and climate change. As the LYIP system becomes more efficient, more water is available to the LYID#1 users to reduce the impacts of water rationing due to drought. Although water rationing will not be completely avoided, the more water that is saved will result in less water rationing that has to occur. This proposed project will save water consistently that will leave more water available to downstream LYIP users to protect against water rationing due to drought and/or climate change. The proposed Remote Monitoring and Control Improvements will utilize solar panels with a battery bank as the primary energy source, thus eliminating the reliance on the energy grid.

- Please address where any conserved water as a result of the project will go and how it will be used, including whether the conserved water will be used to offset groundwater pumping, used to reduce diversions, used to address shortages that impact diversions or reduce deliveries, made available for transfer, left in the river system, or used to meet another intended use.

  The proposed project will provide water conservation benefits that can be left in the Yellowstone River outside of peak irrigation demand periods. During periods of peak irrigation demand, the LYID#1 and LYIP currently experience water shortages due to a lack of available water, especially during periods in the late summer months. The water saved during these periods will be left in the LYIP Main Canal to be used by downstream users on the LYIP system to combat water shortages.

- Provide a description of the mechanism that will be used, if necessary, to put the conserved water to the intended use.

  The real-time water measurements from the pump discharge will be used from the proposed remote control and monitoring system to allow the LYID#1 and LYIP to make real-time decisions on water diversions and water use throughout the LYID#1 and the LYIP to either leave the conserved water in the river or utilize the conserved water to alleviate water demands further downstream in the LYIP system.

- Indicate the quantity of conserved water that will be used for the intended purpose(s).

  The estimated quantity of additional supply the project will provide is 4,800 acre-feet of water per year as an average annual benefit over the next 30 years. The amount was calculated by taking the amount of water pumped each year from the Thomas Point Pumping Plant for the past 5 years, the number of days the pumps were in operation, and the amount of water that was taken in each turnout within the LYID#1 system. The difference amounts to an average of 4,800 acre-feet per year and an estimated 22.2 cfs per day that is pumped into the system as excess water. The existing pumps are either on or off, and thus if a pump is on it will only pump at its maximum rated capacity, thereby wasting all unrequested water. The average pumping plant operation was 109 days for the Thomas Point Pumping Plant over the past 5-year period.

Other project benefits. Please provide a detailed explanation of the project benefits and their significance. These benefits may include, but are not limited to, the following:

(1) **Combating the Climate Crisis:** E.O. 14008: "Tackling the Climate Crisis at Home and Abroad", focuses on increasing resilience to climate change and supporting climate- resilient development. For additional information on the impacts of climate change throughout the western United States, see: https://www.usbr.gov/climate/secure/docs/2021secure/2021SECUREReport.pdf. Please describe how the project will address climate change, including:

- Please provide specific details and examples on how the project will address the impacts of climate change and help combat the climate crisis.

  The proposed pump improvements will provide the LYID#1 the ability to measure pumped flows real-time. The proposed pumps will be controlled and monitored through remote monitoring and control components that will tie into the LYID#1's existing remote monitoring system. The LYID#1 and LYIP have been using this technology for the past 10 years with great success. This technology is not new and has been proven to be effective for control and operation of irrigation infrastructure such as pumps, gates and measuring stations. The proposed improvements will allow the LYID#1 to control and monitor flows very precisely into the LYID#1 system, which occurs early in the LYIP system. The LYID#1 and LYIP closely monitor snowpack, Yellowstone River flows and flows into their diversion. These tools allow the LYID#1 and LYIP to predict the amount of water that will be available and provide drought monitoring tools that can predict current drought conditions to account for climate change. By providing more controls within the LYID#1 system, they will be able to be proactive at managing the water within their system rather than being reactive, which will allow the LYID#1 to have more water for downstream users when water rationing is being implemented to reduce the overall impact of climate change such as drought conditions when they occur and the water rationing that is necessary.

- Does this proposed project strengthen water supply sustainability to increase resilience to climate change?

  Yes, the proposed improvements will reduce the water diverted from the Yellowstone River during non-peak irrigation demand. This improves the sustainability of the water supply. One of the prominent features of climate change that we have noticed and that has been scientifically proven is that as climate change continues to occur, winter months are shortened, and runoff tends to occur earlier than it did in the previous decade (documented in the 2017 Montana Climate Assessment, https://montanaclimate.org/chapter/title-page). When this happens, river flows fall off earlier than previously and water rationing within irrigation districts becomes more prevalent as river flows drop off going into the

hotter summer months of July, August, and September. The LYID#1 has focused on irrigation efficiency as their primary defense against drought and climate change. As the LYID#1 and LYIP systems becomes more efficient, more water is available to the LYID#1 users to reduce the impacts of water rationing due to drought. Although water rationing will not be completely avoided, the more water that is saved will result in less water rationing that has to occur.

- Will the proposed project establish and utilize a renewable energy source?

  N/A

- Will the project result in lower greenhouse gas emissions?

  The proposed project reduces greenhouse gas emissions in three ways. First the additional water that is saved can be utilized by downstream water users within the LYIP system to increase crop production which will create more vegetation to sequester carbon. Second, the more efficient pump will utilize less electricity which has a direct correlation to less carbon dioxide production. Third, the LYID#1 will not have to make as many trips to the pumping plants to adjust flows and check on the pumps, saving vehicle miles that will burn less overall fuel and lower carbon dioxide emissions from LYID#1/LYIP vehicles.

(2) **Disadvantaged or Underserved Communities**: E.O. 14008 and E.O. 13985 support environmental and economic justice by investing in underserved and disadvantaged communities and addressing the climate-related impacts to these communities, including impacts to public health, safety, and economic opportunities. Please describe how the project supports these Executive Orders, including:

a. Does the proposed project directly serve and/or benefit a disadvantaged or historically underserved community? Benefits can include but are not limited to: public health and safety through water quality improvements, new water supplies, new renewable energy sources, or economic growth opportunities. *N/A*

b. If the proposed project is providing benefits to a disadvantaged community, provide sufficient information to demonstrate that the community meets the disadvantaged community definition in Section 1015 of the Cooperative Watershed Act, which is defined as a community with an annual median household income that is less than 100 percent of the statewide annual median household income for the State, or the applicable state criteria for determining disadvantaged status. *N/A*

c. If the proposed project is providing benefits to an underserved community, provide sufficient information to demonstrate that the community meets the underserved definition in E.O. 13985, which includes populations sharing a particular characteristic, as well as geographic communities, that have

been systematically denied a full opportunity to participate in aspects of economic, social, and civic life. *N/A*

(3) **Tribal Benefits:** The Department of the Interior is committed to strengthening tribal sovereignty and the fulfillment of Federal Tribal trust responsibilities. The President's memorandum "Tribal Consultation and Strengthening Nation-to-Nation Relationships" asserts the importance of honoring the Federal government's commitments to Tribal Nations. Please address the following, if applicable:

a. Does the proposed project directly serve and/or benefit a Tribe? Will the project increase water supply sustainability for an Indian Tribe? Will the project provide renewable energy for an Indian Tribe? *N/A*

b. Does the proposed project directly support tribal resilience to climate change and drought impacts or provide other Tribal benefits such as improved public health and safety through water quality improvements, new water supplies, or economic growth opportunities? *N/A*

(4) Other Benefits: Will the project address water and/or energy sustainability in other ways not described above? For example:

a. Will the project assist States and water users in complying with interstate compacts?

The proposed project will provide water conservation that can be used to assist in complying with the Yellowstone River Compact.

b. Will the project benefit multiple sectors and/or users (e.g., agriculture, municipal and industrial, environmental, recreation, or others)?

The proposed project will provide water via conservation that can be used for agriculture, downstream industrial use (as allowed within the LYIP water rights), environmental uses such as the preservation of fish and wildlife habitat, and to facilitate recreation and navigation in the Yellowstone River.

c. Will the project benefit a larger initiative to address sustainability?

The proposed project is one of the first in a series of planned projects by the LYID#1 to modernize their irrigation system and make it more efficient to address the sustainability of the water supply. The more water that can be saved within the system will allow the LYID#1 to reduce and minimize the overall impact of drought conditions.

d. Will the project help to prevent a water-related crisis or conflict? Is there frequently tension or litigation over water in the basin?

The following is a quote from LYID#1/LYIP Manager James Brower: "The drought caused the LYID#1 and LYIP to start water rationing (enforced reduced water delivery) early and multiple times during the season. The LYIP office and employees received hundreds of phone calls and complaints

from multiple farmers believing their neighbors or other towns were receiving more water than they were. LYIP employees were called out to settle water disputes over 100 times in 2021 at any time of the week and at any hour of the day. The LYIP spent hundreds of hours of overtime monitoring water deliveries and settling water disputes." The proposed project will allow the LYID#1 and LYIP save water that can be used to mitigate downstream shortages in water demand within the LYIP system.

E.1.4. Evaluation Criterion D—Complementing On-Farm Irrigation Improvements (10 points)

Up to 10 points may be awarded for projects that describe in detail how they will complement on-farm irrigation improvements eligible for NRCS financial or technical assistance.

Note: Scoring under this criterion is based on an overall assessment of the extent to which the WaterSMART Grant project will complement ongoing or future on-farm improvements.

Applicants should describe any proposal made to NRCS, or any plans to seek assistance from NRCS in the future, and how an NRCS-assisted activity would complement the WaterSMART Grant project. Financial assistance through EQIP is the most commonly used program by which NRCS helps producers implement improvements to irrigation systems, but NRCS does have additional technical or financial assistance programs that may be available. Applicants may receive maximum points under this criterion by providing the information described in the bullet points below. Applicants are not required to have assurances of NRCS assistance by the application deadline to be awarded the maximum number of points under this sub- criterion. Reclamation may contact applicants during the review process to gather additional information about pending applications for NRCS assistance if necessary.

Please note: On-farm improvements themselves are not eligible activities for funding under

NRCS will have a separate application process for the on-farm components of selected projects that may be undertaken in the future, separate of the WaterSMART Grant project.

If the proposed project will complement an on-farm improvement eligible for NRCS assistance, please address the following:

- Describe any planned or ongoing projects by farmers/ranchers that receive water from the applicant to improve on-farm efficiencies.
    - Provide a detailed description of the on-farm efficiency improvements.

      The LYID#1 project provides water to approximately 2,650 acres for irrigation to over 30 water users. Many of the farmers/ranchers within the project have applied for and have received EQIP funding for pivots and other on-farm conservation improvements. The LYID#1 currently has no farmers who are working with the local NRCS to put in on-farm

improvements. However, several farmers have taken advantage of the NRCS EQIP program in the past to install center pivots on lands served by the LYID#1 and many of the farmers within the LYID#1 are open to potential support through NRCS programs.

- Have the farmers requested technical or financial assistance from NRCS for the on- farm efficiency projects, or do they plan to in the future?

  The farmers typically request technical and financial assistance from the NRCS for their on-farm efficiency projects. The local NRCS either performs the technical assistance with in-house staff or utilizes Technical Service Providers. We are not aware of any request for technical or financial assistance from the NRCS at the present time, but the LYID#1 users remain open to potential support through NRCS programs.

- If available, provide documentation that the on-farm projects are eligible for NRCS assistance, that such assistance has or will be requested, and the number or percentage of farms that plan to participate in available NRCS programs.

  After speaking with Jamie Selting (October 20, 2021), the local NRCS District Conservationist in Sidney, past projects involving the construction of pressurized pipelines and center pivots have been completed through assistance from the NRCS to implement these on-farm conservation and efficiency projects through the EQIP program. The local NRCS has provided additional services within the LYID#1 that includes inventory of irrigation structures, seepage analysis and mitigation, engaging the Montana Salinity Control to install wells to identify losses and other studies. Thus, Mr. Selting was excited about the proposed project as the project meets the local NRCS goals for water conservation and expects that several of the existing landowners within the LYID#1 will approach the local NRCS once the project is completed. It is anticipated that additional pipelines for the main turnout ditches, other seepage mitigation measures such as canal lining and additional center pivots may be projects that would benefit the local landowners and that would be served well by the proposed Thomas Point Pumping Plant Rehabilitation.

- Applicants should provide letters of intent from farmers/ranchers in the affected project areas.

  None available at this time.

- Describe how the proposed WaterSMART project would complement any ongoing or planned on-farm improvement.
  - Will the proposed WaterSMART project directly facilitate the on-farm improvement? If so, how? For example, installing a pressurized pipe through WaterSMART can help support efficient on-farm irrigation practices, such as drip-irrigation.

The proposed project will prevent water shortages through the mitigation of 4,800 acre-feet per year of wasted flows due to over-pumping and will provide a more consistent and timely water delivery. The proposed pump replacement and VFD will provide the LYID#1 water users with the precise amount of water that is necessary that will serve to support efficient on-farm practices such as center pivot irrigation. Based on discussions with Jamie Selting, NRCS District Conservationist in Sidney, the proposed pump improvements provide an optimal situation for farmers who want to put in efficient on-farm irrigation practices such as center pivots.

OR

- Will the proposed WaterSMART project complement the on-farm project by maximizing efficiency in the area? If so, how?

  The proposed pump rehabilitation project will maximize efficiency in this area by providing mitigation to conserve 4,800 acre-feet per year, provide an increase to water delivery efficiency, and provide precise water delivery to facilitate on-farm efficiency.

- Describe the on-farm water conservation or water use efficiency benefits that are expected to result from any on-farm work.
  - Estimate the potential on-farm water savings that could result in acre-feet per year. Include support or backup documentation for any calculations or assumptions.

    Based on information provided by the local NRCS, the proposed pump improvements would provide more opportunities for landowners to incorporate on-farm water conservation and/or water use efficiency projects.

- Please provide a map of your water service area boundaries. If your project is selected for funding under this NOFO, this information will help NRCS identify the irrigated lands that may be approved for NRCS funding and technical assistance to complement funded WaterSMART projects.

  A map depicting the LYID#1's water service area boundaries has been provided as Figure 1.

Note: On-farm water conservation improvements that complement the water delivery improvement projects selected through this NOFO may be considered for NRCS funding and technical assistance to the extent that such assistance is available. For more information, including application deadlines and a description of available funding, please contact your local NRCS office. See the NRCS website for office contact information, www.nrcs.usda.gov/wps/portal/nrcs/main/national/contact/states/.

E.1.5. Evaluation Criterion E—Planning and Implementation (8 Points)

*Up to **8 points** may be awarded for these subcriteria.*

E.1.5.1. Subcriterion E.2 – Readiness to Proceed

Points may be awarded for proposals with planning efforts that provide support for the proposed project.

Does the applicant have a Water Conservation Plan and/or System Optimization Review (SOR) in place? Does the project address an adaptation strategy identified in a completed WaterSMART Basin Study? Please self-certify or provide copies of these plans where appropriate to verify that such a plan is in place. Including a specific excerpt or a link to the planning document may also be considered where appropriate.

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, Drought Contingency Plan or other planning efforts done to determine the priority of this project in relation to other potential projects.

The LYID#1 and the LYIP are both following the Montana State Water Plan and the Montana Drought Response Plan. The Montana Drought Response Plan and the Montana State Water Plan are attached to this application. The Montana Drought Response Plan (http://dnrc.mt.gov/divisions/water/drought-management/drought-documents/MT_1995.pdf) and the Montana State Water Plan (http://dnrc.mt.gov/divisions/water/management/docs/state-water-plan/2015_mt_water_plan.pdf). Although the Missouri Headwaters Basin Study is located upstream of the LYID#1 service area, the study also provides guidance to the LYID#1 and LYIP in their planning efforts. The plan can be found at https://www.usbr.gov/watersmart/bsp/docs/finalreport/Missouri/MissouriBasinStudyFinalReport.pdf. *Based on the objectives found in these plans, the LYID#1 and LYIP boards meet annually to discuss projects that fit within the goals and objectives of both plans. Water conservation is high on this list as outlined on Page 67 of the Montana State Water Plan that identifies water use efficiency and water conservation as one of the primary goals and key recommendations to address water supply and demand in Montana. Section 6.6.1 of the Missouri Headwaters Basin Study outlines increasing canal and on-farm irrigation efficiencies as a system-wide water management strategy. The LYID#1 Board has recently met and believes that the Thomas Point Pumping Plant Rehabilitation project is their highest priority in meeting these objectives.*

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

One of the Key Recommendations from the Montana State Water Plan to address water supply and demand is the implementation of water use efficiency and water conservation (Page 67 of the Montana State Water Plan). The plan also identifies other key recommendations to address water supply

and demand that are relevant to this project including: improve and expand efforts to quantify surface water supplies and availability; increase flexibility to manage available water supplies through storage and rehabilitation of existing infrastructure; as well as support and expand existing drought preparedness and planning efforts.

(3) If applicable, provide a detailed description of how a project is addressing an adaptation strategy specifically identified in a completed WaterSMART Basin Study or Water Management Options Pilot (e.g., a strategy to mitigate the impacts of water shortages resulting from climate change, drought, increased demands, or other causes)

As discussed above, *Section 6.6.1 of the Missouri Headwaters Basin Study outlines increasing canal and on-farm irrigation efficiencies as a system-wide water management strategy. The study also references conserving water as a mitigation and response action for increased drought resilience (page 122). As previously described, the proposed pumping plant rehabilitation will provide a new energy-efficient pump and motor, more efficient controls, a VFD to provide precise control over the amount of water pumped and a remote control and monitoring system to operate the new pump system in order to conserve water and deliver the precise amount of water that is needed for the system, thereby conserving 4,800 acre-feet per year that can be used to address water shortages in other parts of the system.*

For more information on Basin Studies, including a list of completed basin studies and reports, please visit: www.usbr.gov/WaterSMART/bsp.

E.1.5.2. Subcriterion E.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. Please note, if your project is selected, responses provided in this section will be used to develop the scope of work that will be included in the financial assistance agreement.

Applications that include a detailed project implementation plan (e.g., estimated project schedule that shows the stages and duration of the proposed work, including major tasks, milestones, and dates) will receive the most points under this criterion.

- Identify and provide a summary description of the major tasks necessary to complete the project. Note: please do not repeat the more detailed technical project description provided in Section D.2.2.2. Application Content. This section should focus on a summary of the major tasks to be accomplished as part of the project.

  The proposed Rehabilitation & Automation Project will consist of the following tasks:

  - *Planning – The project will require a planning level effort to coordinate activities for the project up-front following award and contracting with Reclamation.*

- *Site Survey – The proposed pumping plant will need to be inspected and measurements taken to gather the baseline data required for design of the new pump.*
- *Design – The proposed pump replacement will need to be designed to reflect the proper alignment and grade, hydraulic profile, and size requirements. A set of plans and specifications will be developed and submitted to LYID#1 and Reclamation for approval.*
- *Permitting – The necessary permits will need to be obtained to facilitate construction of the project. A copy of the permit documents will be submitted to LYID#1 and Reclamation. Permitting will include environmental and cultural resource compliance.*
- *Construction – LYID#1 crews will assist pump suppliers in the installation of the new pump, motor, VFD, electrical switchgear, remote monitoring and control components, automation/monitoring components and appurtenant materials.*
- *Construction Administration – An Engineer will be needed to provide construction administration, inspection of the work, and ensure compliance with the plans and specifications. Photos, submittal approvals, daily logs and other construction information will be saved and compiled throughout the project.*
- *As-Built Documentation – An Engineer will be needed to perform an as-built verification of the new pump system. A construction completion report will be submitted to LYID#1 and Reclamation.*
- *Construction and Grant Close-Out – The LYID#1 or consultant will be required to ensure that all the requirements of the construction and WaterSMART grant have been completed and submitted to Reclamation for approval.*

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

For each of the permits listed below, the LYID#1 will work with each permitting agency to determine whether a formal permit is needed for the construction of the proposed project. Although it is not anticipated that any permits will be needed, we have provided the following list of permits that the LYID#1 will follow up on if the grant is awarded. If needed, the following permits may be obtained with assistance from the engineer during the design process:

***SPA 124 Permit** – The Montana Department of Fish, Wildlife & Parks requires a permit for any activity that physically alters or modifies the bed or banks of a perennially flowing stream for a legal public entity. Consultation will be performed, but the activities proposed herein are likely exempt from this rule. A Montana joint application form will need to be filled out and submitted to FWP for review.*

***404 Permit** – The Army Corps of Engineers (USACE) requires a permit for any activity that will result in the discharge or placement of dredged or fill material into waters of the United States, including wetlands. Consultation*

will be performed, but the activities proposed herein are likely exempt as stated in CRF 323.4(a)3. A Montana joint application form will need to be filled out and submitted to the USACE for a determination.

***318 Authorization** – The Short-Term Water Quality Standard for Turbidity requires a permit for any construction activities that will cause temporary violations of state surface water quality standards for turbidity. Since no water will be in the lateral at the time of construction, no turbidity permit will be required.*

***Storm Water Discharge General Permit** – State Storm Water Rules require a storm water discharge permit under the requirements of the 2018 General Permit for any construction project over one acre in total disturbance that discharges into State waters. A Notice of Intent form and Stormwater Pollution Prevention Plan Form along with all attachments and supplements will need to be submitted to the Montana Department of Environmental Quality.*

***Montana Sage Grouse Habitat Conservation Program -** The program's role is to implement Montana's Sage Grouse Conservation Strategy including the conservation, restoration, and mitigation of changes to sage grouse habitat because of development. Montana has a website https://sagegrouse.mt.gov/ProgramMap that will need to be consulted prior to construction activities. The current map shows that there are no Sage Grouse Habitat within the project area.*

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

  The proposed project will require the assistance of an engineer for the design of the new pump, VFD and controls system. A site visit to inspect and take measurements of the pump system will need to be completed, followed by the design of the proposed new pump system (including hydraulics, pump details, motor details, VFD control details, electrical switchgear, remote monitoring and control system components, automation and controls, alignment/grade, details, etc.), followed by the development of plans and specifications for the proposed pump replacement project.

- Describe any new policies or administrative actions required to implement the project. N/A

- Please also include an estimated project schedule that shows the stages and duration of the proposed work, including major tasks, milestones, and dates. Milestones may include, but are not limited to, the following: complete environmental and cultural compliance; mobilization; begin construction/installation; construction/installation (50% complete); and construction/installation (100% complete). Was the expected timeline for environmental and cultural compliance discussed with the local Reclamation Regional or Area Office?

Activity	Date(s)
WaterSMART Grant Due Date	July 28, 2022
Evaluate Grant Applications -- BOR	Jul 28, 2022 – Jan 2023
Grant Award	February 2023
Contract Execution	March 2023 – June 2023
Project Initiation	June 2023
Project Kickoff Meeting	July 2023
Project Site Survey	August 2023
Project Design	Sept 2023 – March 2024
Environmental/Cultural Resource Compliance	Nov 2023 – May 2024
LYID#1 and Reclamation Plans Review	April 2024 – June 2024
Final Plans & Specifications	July 2024
Order Materials*	July 2024
Begin Construction	November 2024
Mid-Point Construction (50%)	February 2025
End Construction (100%)	April 2025
Construction Administration	Oct 2024 – April 2025
Construction Closeout	April 2025
As-Built Verification	May 2025
Construction Completion Report	May 2025
Grant Closeout	June 2025
Project Completion	June 2025

*Based on current materials availability. This may need to be changed pending future supply/demand.

E.1.6. Evaluation Criterion F—Collaboration (6 points)

Up to 6 points may be awarded for projects that promote and encourage collaboration among parties in a way that helps increase the sustainability of the water supply.

- Please describe how the project promotes and encourages collaboration. Consider the following:

The LYID#1 manager attends and actively participates in training seminars, courses, and conferences such as Montana Water Resources Association (MWRA), Montana Association of Dams and Canal Systems (MADCS), Upper Missouri Water Association (UMWA), the US BOR Montana Area Office's Dam Operator Trainings, and watershed symposiums throughout Montana where they collaborate and share information. One of the primary topics as of late is the implementation of remote monitoring and control systems to improve irrigation efficiency. The LYID#1 is committed to sharing the success and implementation of this project with other districts and water user associations throughout the region to assist them in their planning and water delivery efforts.

- Is there widespread support for the project? Please provide specific details regarding any support and/or partners involved in the project. What is the extent of their involvement in the process?

  The LYID#1 Board, LYIP Board, the Richland County Conservation District and the NRCS have all shown support for this project. The LYID#1 and LYIP Boards will make financial, manpower, equipment and material purchasing decisions as well as provide overall management of the project. The Richland County Conservation District, NRCS, and local Lateral LL water users have been consulted on the project and will continue to be consulted throughout the project.

- What is the significance of the collaboration/support?

  The Richland County Conservation District works with not only other water users in the area but also shares their success stories with the other conservation districts throughout the State through the Montana Association of Conservation Districts. This information will be shared with the other conservation districts who in turn will share this information with nearly all the remaining irrigation districts and water user associations throughout the State of Montana.

  The NRCS is watching this project closely to determine the actual benefits of the proposed high efficiency pumping with Variable Frequency Drive for irrigation delivery. The NRCS is a national organization that provides training and knowledge sharing throughout the US, and this information would be shared with the national program and neighboring states that could benefit a broad audience of water users.

- Will this project increase the possibility/likelihood of future water conservation improvements by other water users?

  The implementation of this project and the sharing of its benefits through the Montana Association of Dams and Canal Systems (MADCS), Montana Water Resources Association, the Montana Association of Conservation Districts, Upper Missouri Water Association, and the NRCS provides a large audience to share this information with in order for them to learn from the project and evaluate pump efficiency and remote monitoring and control projects for a number of irrigation districts and water users associations throughout the western US.

- Please attach any relevant supporting documents (e.g., letters of support or memorandum of understanding).

  Letters of support are attached as Appendix B.

E.1.7. Evaluation Criterion G—Additional Non-Federal Funding (4 points)

Up to 4 points may be awarded to proposals that provide non-Federal funding in excess of 50 percent of the project costs. State the percentage of non-Federal funding provided using the following calculation:

Non-Federal Funding
Total Project Cost

The LYID#1 is proposing to contribute *$203,505.12 in cash reserves and in-kind work of the total $407,010.24 project cost. This equates to the LYID#1 contributing 50% of the total project budget.*

E.1.8. Evaluation Criterion H—Nexus to Reclamation (4 points)

Up to 4 points may be awarded if the proposed project is connected to a Reclamation project or Reclamation activity. No points will be awarded for proposals without connection to a Reclamation project or Reclamation activity.

- Describe the nexus between the proposed project and a Reclamation project or Reclamation activity. Please consider:

  The LYIP is a Transferred Works facility. The LYIP was authorized by the Secretary of Interior on May 10, 1904, under the Reclamation Act of June 17, 1902. Construction began on July 22, 1905, and water was available for irrigation during the season of 1909. The LYIP and LYID#1 are part of the Pick-Sloan Missouri River Basin Program that is a general comprehensive plan for the conservation, control, and use of water resources in the entire Missouri River Basin. LYIP operates an extensive system of canals and laterals including the Main Canal, 225 miles of laterals, and 118 miles of drains. Water is diverted from the Yellowstone River into the Main Canal by the Lower Yellowstone Diversion Dam near Intake, Montana. The USBR built the Lower Yellowstone Irrigation District #1 as part of the Pick-Sloan Missouri River Basin Program in 1949. The Savage Unit was authorized by the Flood Control Act of December 22, 1944, Public Law 534. The Thomas Point Pumping Plant was designed to supply 2,650 acres of lands above the existing LYIP main canal system.

- Does the applicant have a water service, repayment, or operations and maintenance (O&M) contract with Reclamation?

  Yes, the applicant is the Lower Yellowstone Irrigation Project which does receive Reclamation project water through a Reclamation Repayment Contract.

- If the applicant is not a Reclamation contractor, does the applicant receive Reclamation water through a Reclamation contractor or by any other contractual means? N/A

- Will the proposed work benefit a Reclamation project area or activity?

  Yes, the proposed project will benefit the Lower Yellowstone Irrigation Project.

- Is the applicant a Tribe? *No*

PERFORMANCE MEASURES

Provide a brief summary describing the performance measure that will be used to quantify actual benefits upon completion of the project (e.g., water saved or better managed, energy generated or saved). For more information calculating performance measure, see Appendix A: Benefit Quantification and Performance Measure Guidance.

The LYID#1 maintains pumping and flow records for the Thomas Point Pumping Plant that are used by LYID#1 and LYIP management to monitor daily flows and inputs into Lateral LL. The water savings will be verified by the measurements taken at the pumping plant and subtracting out the daily flows taken at each turnout. Once the project is completed, these records will be maintained in the future to validate the proposed water conservation savings.

The proposed pump improvements will provide the LYID#1 the ability to measure pumped flows real-time. The proposed pumps will be controlled and monitored through remote monitoring and control components that will tie into the LYID#1's existing remote monitoring system. The remote monitoring system will log the flow data in LYIP's computer system that can be compared to historical pumping and diversion data to quantify the water conservation. The LYID#1 has been using this technology for the past 10 years with great success. This technology is not new and has been proven to be effective for control and operation of irrigation infrastructure such as pumps, gates and measuring stations. The proposed improvements will allow the LYID#1 to control and monitor flows very precisely into the LYID#1 system, which is a large lateral that occurs early in the LYIP system. The LYID#1/LYIP closely monitors snowpack, Yellowstone River flows and flows into their diversion. These tools allow the LYID#1/LYIP to predict the amount of water that will be available and provide drought monitoring tools that can predict current drought conditions. By providing more controls within the LYID#1 system, they will be able to be proactive at managing the water within their system rather than being reactive, which will allow the LYIP to have more water for downstream users when water rationing is being implemented to reduce the overall impact of drought conditions when they occur and the water rationing that is necessary.