NEBRASKA NATURAL RESOURCES COMMISSION

Water Sustainability Fund

Application for Funding

Section A.

ADMINISTRATIVE

PROJECT NAME: **Village of Pender Ion Exchange Media Vessel Refurbishment**

SPONSOR'S *PRIMARY CONTACT INFORMATION* **(Not Consultant's)**

Sponsor Business Name: **Village of Pender**

Sponsor Contact's Name: **Pete Rizzo**

Sponsor Contact's Address: **416 Main Street, Pender, NE 68047**

Sponsor Contact's Phone: **(402) 385-3232**

Sponsor Contact's Email: **peterizzo.vop@outlook.com**

1. **Funding** amount requested from the Water Sustainability Fund:

   Grant amount requested. **$172,008**

   - If requesting less than 60% cost share, what %? **60%**

   If a loan is requested amount requested. **N/A**

   - How many years repayment period? **N/A**
   - Supply a complete year-by-year repayment schedule. **N/A**

2. **Neb. Rev. Stat. § 2-1507 (2)**

   Are you applying for a **combined sewer overflow project**? YES☐ NO☒

   If yes:

- Do you have a Long Term Control Plan that is currently approved by the Nebraska Department of Environmental Quality? YES☐ NO☐
- Attach a copy to your application. Click here to enter text.
- What is the population served by your project? Click here to enter text.
- Provide a demonstration of need. Click here to enter text.
- **Do not complete the remainder of the application.**

3. **Permits Required/Obtained** Attach a copy of each that has been obtained. For those needed, but not yet obtained (box **"NO"** checked), 1.) State when you will apply for the permit, 2.) When you anticipate receiving the permit, and 3.) Your estimated cost to obtain the permit.

(N/A = Not applicable/not asking for cost share to obtain)
(Yes = See attached)
(No = Might need, don't have & are asking for 60% cost share to obtain)

G&P - T&E consultation (required)	N/A☒	Obtained: YES☐	NO☐
DNR Surface Water Right	N/A☒	Obtained: YES☐	NO☐
USACE (e.g., 404/other Permit)	N/A☒	Obtained: YES☐	NO☐
FEMA (CLOMR)	N/A☒	Obtained: YES☐	NO☐
Local Zoning/Construction	N/A☒	Obtained: YES☐	NO☐
Cultural Resources Evaluation	N/A☒	Obtained: YES☐	NO☐
Other (provide explanation below)	N/A☒	Obtained: YES☐	NO☐

Click here to enter text.

4. **Partnerships**

List each Partner / Co-sponsor, attach documentation of agreement:
N/A

Identify the roles and responsibilities of each Partner / Co-sponsor involved in the proposed project regardless of whether each is an additional funding source.

N/A

5. **Other Sources of Funding**

Identify the costs of the entire project, what costs each other source of funding will be applied to, and whether each of these other sources of funding is confirmed. If not, please identify those entities and list the date when confirmation is expected. Explain how you will implement the project if these sources are not obtained.

The total cost of the entire project is $286,680. The Village of Pender intends to use funding provided to the Village through the Coronavirus Capital Projects Fund as part of the American Rescue Plan Act (ARPA) of 2021 for their 40% match. This funding has been confirmed (see Attachment A). The ARPA money will be applied to the project cost in the amount of $114,672. A 20% contingency has been factored into the total cost of the project. Since this project involves construction, material and labor costs are subject to change between the time this application is completed and when the work can start. Should material and labor costs not fluctuate, the contingency fee will be removed from the overall project cost.

6. **Overview**

In 1,000 words *or less*, provide a brief description of your project including the nature/purpose of the project and its objectives. Do not exceed one page!

The Village of Pender is located in Thurston County in northeastern Nebraska. Pender is a small, thriving community of about 1,000 residents. Residents depend on groundwater as their only drinking water source, and the Village of Pender owns and operates a water treatment plan to provide it safely. The Village of Pender not only supplies drinking water for residents within the Village, but also to the Thurston County Rural Water Service. This project seeks to address the aging infrastructure within Pender's water treatment plant, so that the Village can continue to provide a vital resource to the community. Two ion exchange vessels in the treatment plant are in need of refurbishment. The ion exchange vessels perform a very important function within the plant: they remove contaminants from the water like nitrates and arsenic, which can have harmful health effects in elevated quantities. Like much of Nebraska, groundwater supplies in the areas surrounding Pender have high nitrate levels due to excess fertilizer application and leaching from septic systems. Without functioning ion exchange vessels, it is very likely that nitrate levels would exceed the maximum contaminant level of 10 mg/L set by the Environmental Protection Agency. This exact scenario occurred in March of 2022, when a routine water sample submitted by the Village resulted in a nitrate level of 16.3 mg/L. In response the Village immediately issued a warning to the public that infants and pregnant women

should not consume tap water due to higher risk of methemoglobinemia, which is cause by high nitrates. As a short term fix to the problem, the Village began purchasing $30,000 worth of salt on a monthly basis to aid in the ion exchange process. This has placed a heavy financial burden on the small community but cannot be avoided in order to continue providing safe drinking water. In addition to the high costs of purchasing salt, it is necessary for the Village to pump excess groundwater for backwashing. Kurita America, a water treatment solutions provider, supplied the Village with the original ion exchange vessels in 2004. They have since visited the plant to diagnose the issue and have provided a solution. The Village of Pender is requesting cost share through the Water Sustainability Fund to refurbish their existing ion exchange vessels. Refurbishment of the vessels involves the exact replacement of the previously approved and installed ion exchange media in accordance with the AWWA B100-2016 Standard for filter material. Other materials provided will be a 15" layer of support gravel, a 48" layer of high-capacity cation resin, 110 underdrain nozzles, four (4) manway gaskets, and new polyvinyl chloride (PVC) brine grids. Completing this project will help the Village of Pender break their current cycle of purchasing excessive amounts of salt and resume normal operation of their water treatment plant. Water savings resulting from this project will be on the order of 1,056,000 gallons per month, which will benefit both the aquifer and hydrologically connected Logan Creek Dredge.

7. **Project Tasks and Timeline**

Identify what activities will be conducted to complete the project, and the anticipated completion date.
For multiyear projects please list (using the following example):

Tasks	Year 1$	Year 2$	Year 3$	Remaining	Total $ Amt.
Permits	$18,000				$18,000
Engineering		$96,000			$96,000
Construction		$87,000	$96,000		$183,000
Close-out				$8,000	$8,000
				TOTAL	$305,000

- What activities (Tasks) are to be completed.
- An estimate of each Tasks expenditures/cost per year.
- Activities in years 4 through project completion under a single column.

Project costs not covered by a Water Sustainability Fund grant will be paid for by the Village of Pender using American Rescue Plan Act (ARPA) funds (see Table 1). ARPA funds have been confirmed and are evidenced in the budget provided as Attachment A. The anticipated completion date for this project is spring 2023.

Table 1 Project costs and funding sources.

Year	WSF Grant	Pender Portion (ARPA)	Project Cost
1	**$172,008**	**$114,672**	**$286,680**

8. **IMP**

Do you have an **Integrated Management Plan** in place, or have you initiated one? YES☐ NO☐ Sponsor is not an NRD☒

Section B.

DNR DIRECTOR'S FINDINGS

Prove Engineering & Technical Feasibility

(Applicant must demonstrate compliance with Title 261, CH 2 - 004)

1. Does your project include physical construction (defined as moving dirt, directing water, physically constructing something, or installing equipment)?
YES☒ NO☐

If you answered "YES" you must answer all questions in section 1.A.
If you answer "NO" you must answer all questions in section 1.B.

If "YES", it is considered mostly structural, so answer the following:

1.A.1 Insert a feasibility report to comply with Title 261, Chapter 2, including engineering and technical data;

This project involves the refurbishment of two ion exchange vessels at the water treatment plant in the Village of Pender. Replacement of the filter material will be in accordance with American Water Works Association (AWWA) B100-216 Standard (Attachment B). Since this project involves the replacement of the ion exchange media in an existing system, it is inherently feasible. For this reason, a feasibility report has not been prepared. Certified contractors and field service technicians with Kurita America will perform the replacement and monitoring once the system has been refurbished. The original ion exchange vessels were designed and supplied by Tonka Water, a Kurita America brand. The plant operation will run according to Kurita America Engineering design.

1.A.2 Describe the plan of development (004.01 A);

Kurita America field service technicians and certified contractors will perform the labor associated with refurbishing two ion exchange vessels. Kurita America will also supply the components and equipment necessary to perform the work. The project will include the exact replacement of the previously approved and installed ion exchange media in accordance with the AWWA B100-2016 Standard for filter material. Other materials provided will be a 15" layer of support gravel, a 48" layer of high-capacity cation resin, 110 underdrain nozzles, four (4) manway gaskets, and new polyvinyl chloride (PVC) brine grids. The plan of development first includes the removal of the existing filter media and ion exchange media. Media will be removed via a high velocity high vacuum industrial vacuum truck operation. Once collected in the vacuum truck, the media will be taken to an area onsite as designated by the Village of Pender. Filter media and graded gravels will be replaced in the ion exchange vessels in strict

accordance with the AWWA B100-2016 Standard. Service technician(s) will remain onsite for two days to ensure backwash sequencing and ion exchange regeneration valve sequencing are within the original specification. The technician(s) will also review the entire operation and ensure proper operation and flowrates.

1.A.3 Include a description of all field investigations made to substantiate the feasibility report (004.01 B);

A site visit was performed by Kurita America to diagnose the need for refurbishment of the ion exchange vessels. Since Kurita America supplied the original ion exchange vessels, it was deemed that they have the expertise necessary to provide recommendations. Upon review of the treatment plant and discussions with the Village of Pender, a quote was provided from Kurita America (Attachment C) detailing the work necessary to ensure the continued supply of safe drinking water.

1.A.4 Provide maps, drawings, charts, tables, etc., used as a basis for the feasibility report (004.01 C);

The ion exchange vessels are currently operating as part of the water treatment plant in the Village of Pender. The original design and installation of the vessels was completed in 2004. Since this project involves the replacement of the filter media and associated parts within the vessels (gaskets, nozzles, brine grids), the project's feasibility was established in 2004 with the installation of the original vessels. Engineering drawings of the vessels are included in Attachment D.

1.A.5 Describe any necessary water and/or land rights including pertinent water supply and water quality information (004.01 D);

Water and/or land rights are not applicable to this project. This project involves the refurbishment of existing water treatment equipment within the plant owned by the Village of Pender.

1.A.6 Discuss each component of the final plan (004.01 E); **Kurita America field service technicians and certified contractors will perform the labor associated with refurbishing two ion exchange vessels. Kurita America will also supply the components and equipment necessary to perform the work. The project will include the exact replacement of the previously approved and installed ion exchange media in accordance with the AWWA B100-2016 Standard for filter material. Other materials provided will be a 15" layer of support gravel, a 48" layer of high-capacity cation resin, 110 underdrain nozzles, four (4) manway gaskets, and new polyvinyl chloride (PVC) brine grids. The plan of development first includes the removal of the existing filter media and ion exchange media. Media will be removed via a**

high velocity high vacuum industrial vacuum truck operation. Once collected in the vacuum truck, the media will be taken to an area onsite as designated by the Village of Pender. Filter media and graded gravels will be replaced in the ion exchange vessels in strict accordance with the AWWA B100-2016 Standard. Service technician(s) will remain onsite for two days to ensure backwash sequencing and ion exchange regeneration valve sequencing are within the original specification. The technician(s) will also review the entire operation and ensure proper operation and flowrates.

1.A.7 When applicable include the geologic investigation required for the project (004.01 E 1);

A geologic investigation is not applicable to this project.

1.A.8 When applicable include the hydrologic data investigation required for the project (004.01 E 2);

A hydrologic data investigation is not applicable to this project.

1.A.9 When applicable include the criteria for final design including, but not limited to, soil mechanics, hydraulic, hydrologic, structural, embankments and foundation criteria (004.01 E 3).

Criteria for final design was established based on the AWWA B100-2016 Standard and by Kurita America.

If “NO”, it is considered mostly non-structural, so answer the following:

1.B.1 Insert data necessary to establish technical feasibility (004.02); **N/A**

1.B.2 Discuss the plan of development (004.02 A); **N/A**

1.B.3 Describe field or research investigations utilized to substantiate the project conception (004.02 B); **N/A**

1.B.4 Describe any necessary water and/or land rights (004.02 C); **N/A**

1.B.5 Discuss the anticipated effects, if any, of the project upon the development and/or operation of existing or envisioned structural measures including a brief description of any such measure (004.02 D). **N/A**

Prove Economic Feasibility

(Applicant must demonstrate compliance with Title 261, CH 2 - 005)

2. Provide evidence that there are no known means of accomplishing the same purpose or purposes more economically, by describing the next best alternative.

The next best alternative to the proposed work is the continued use of excessive amounts of salt in the water treatment plant. The Village of Pender currently uses salt to aid in the ion exchange process, which is necessary for removing harmful contaminants such as nitrates and arsenic. Ion exchange is also necessary for removing hardness from the water and preventing scale buildup, which can cause expensive maintenance issues. The Village is purchasing $30,000 worth of salt, or 141 tons, on a monthly basis. This has placed a heavy financial burden on the Village but cannot be avoided as the Village must provide safe drinking water to its residents. To break this cycle, the Village is requesting cost share from the Water Sustainability Fund to replace the filter media and associated equipment within the ion exchange vessels. If this project is funded, the costs incurred by the Village in refurbishing the vessels would be less than the costs of purchasing salt at the current rate in four months.

3. Document all sources and report all **costs** and **benefit data** using current data, (commodity prices, recreation benefit prices, and wildlife prices as prescribed by the Director) using both dollar values and other units of measurement when appropriate (environmental, social, cultural, data improvement, etc.). The period of analysis for economic feasibility studies is the project life. (Title 261, CH 2 - 005). **The proposed project is the most cost-effective alternative for the Village of Pender to continue providing safe drinking water. Currently, the Village is purchasing $30,000 worth of salt per month to accomplish the ion exchange process in their water treatment plant. Ion exchange is vitally important for removing harmful contaminants such as nitrates and arsenic. This process also removes hardness from the water, which can contribute to costly maintenance repairs to remove scale buildup. There is no other means to accomplish the ion exchange process other than the proposed project or continuing to use excessive amounts of salt and water for backwashing the filter media. The costs incurred by the Village to complete the proposed project total $114,672. If the Village were to not complete the project and continue purchasing salt and pumping excess groundwater for backwashing, annual costs would total approximately $360,000. The proposed project is clearly cost effective and will continue to provide benefits to the Village into the future. Ongoing operation and maintenance costs for the Village to operate the newly refurbished ion exchange vessels is approximately $3,500 annually for inspections and equipment testing. The life of the refurbished ion exchange vessels is 15-25 years, depending on level of use. Over a 25-year period, costs to maintain the ion exchange vessels is about $87,500. Conversely, if the Village were to continue to purchase salt at the current rate, they would spend about $9,000,000 over 25 years.**

3.A Describe any relevant cost information including, but not limited to the engineering and inspection costs, capital construction costs, annual operation and maintenance costs, and replacement costs. Cost information shall also include the estimated construction period as well as the estimated project life (005.01). **The Village of Pender has already paid Kurita America to provide engineering for the ion exchange vessels. The original vessels were installed in 2004. Since this project involves the refurbishment of the original vessels, no further engineering work is needed. Capital construction costs total $286,680 and are based on the quote provided by Kurita America plus a 20% contingency to account for volatility in material pricing (see Attachment C). The estimated construction period is one week, to be completed in Spring 2023. Annual operation and maintenance costs are anticipated to be $3,500. The refurbished ion exchange vessels are expected to have a life of 15-25 years depending on level of use.**

3.B Only primary tangible benefits may be counted in providing the monetary benefit information and shall be displayed by year for the project life. In a multi-purpose project, estimate benefits for each purpose, by year, for the life of the project. Describe intangible or secondary benefits (if any) separately. In a case where there is no generally accepted method for calculation of primary tangible benefits describe how the project will increase water sustainability, in a way that justifies economic feasibility of the project such that the finding can be approved by the Director and the Commission (005.02). **The primary tangible benefit to the Village of Pender is the cost savings that will be realized by not needing to purchase $30,000 worth of salt on a monthly basis. For example, annual maintenance costs for the refurbished ion exchange vessels are anticipated to be $3,500. If the vessels are not refurbished, the Village will need to keep purchasing salt, which costs $360,000 per year. Beyond the primary benefit, this project contributes to water sustainability by conserving groundwater on the order of 1,056,000 gallons per month. The refurbished ion exchange vessels will need much less water to backwash the filter media, contributing to conservation and preservation of the aquifer.**

3.C Present all cost and benefit data in a table to indicate the annual cash flow for the life of the project (005.03). **The anticipated project life is 15-25 years, depending on level of use of the ion exchange vessels. Annual cash flow for the full 25 years is included in Attachment E.**

3.D In the case of projects for which there is no generally accepted method for calculation of primary tangible benefits and if the project will increase water sustainability, demonstrate the economic feasibility of such proposal by such method as the Director and the Commission deem appropriate (005.04). (For example, show costs of and describe the next best alternative.) **Currently, the Village is purchasing $30,000 worth of salt per month to accomplish the ion exchange process in their water treatment plant. Ion exchange is vitally**

important for removing harmful contaminants such as nitrates and arsenic. This process also removes hardness from the water, which can contribute to costly maintenance repairs to remove scale buildup. There is no other means to accomplish the ion exchange process other than the proposed project or continuing to use excessive amounts of salt and water for backwashing the filter media. The costs incurred by the Village to complete the proposed project total $114,672. If the Village were to not complete the project and continue purchasing salt and pumping excess groundwater for backwashing, annual costs would total approximately $360,000.

Prove Financial Feasibility

(Applicant must demonstrate compliance with Title 261, CH 2 - 006)

4. Provide evidence that sufficient funds are available to complete the proposal.
See Attachment A from the City Administrator of the Village of Pender documenting the Village's 2021-2022 budget.

5. Provide evidence that sufficient annual revenue is available to repay the reimbursable costs and to cover OM&R (operate, maintain, and replace).
There are no reimbursable costs related to this project. See Attachment A from the City Administrator of the Village of Pender documenting the Village's 2021-2022 budget. The Village is funded by a property tax levy that has been in place for many decades.

6. If a loan is involved, provide sufficient documentation to prove that the loan can be repaid during the repayment life of the proposal.

N/A

7. Describe how the plan of development minimizes impacts on the natural environment (i.e. timing vs nesting/migration, etc.).

This project will not have a negative impact on the natural environment.

8. Explain how you are qualified, responsible and legally capable of carrying out the project for which you are seeking funds.

The water treatment plant is owned and operated by the Village of Pender. The completion of this application and execution of this project is endorsed by the governing body of the Village, the Village Board. The City Administrator and Utilities Supervisor will be responsible for overseeing the project construction. Project construction will be performed by licensed contractors and field service technicians at Kurita America.

9. Explain how your project considers plans and programs of the state and resources development plans of the political subdivisions of the state.

One of the many benefits of this project includes the conservation of groundwater. By refurbishing the ion exchange vessels in the Village of Pender's water treatment plant, less water will be required to backwash the filter media. The Village estimates that approximately 41,000 gallons of water is used to backwash the original ion exchange vessels every day. Refurbishing the vessels will decrease the volume and frequency of backwashing water that is needed to keep the plant in good operation. When the ion exchange vessels are in good working condition, the Village estimates water use at 5,800 gallons per day for backwashing, which is an 86% reduction in water use. This reduction in water use helps to accomplish the goals of many plans and programs of the state, including the Lower Elkhorn Natural Resources District Integrated Management Plan and Groundwater Management Plan.

10. Are land rights necessary to complete your project? YES☐ NO☒

If yes:

10.A Provide a complete listing of all lands involved in the project. **N/A**

10.B Attach proof of ownership for each easements, rights-of-way and fee title currently held. **N/A**

10.C Provide assurance that you can hold or can acquire title to all lands not currently held. **N/A**

11. Identify how you possess all necessary authority to undertake or participate in the project.

The Village of Pender is governed by the Village Board and the City Administrator. The Village of Pender owns and operates the water treatment plant to supply safe drinking water to residents. This grant application is being completed under the direction of the Village Board and City Administrator. In accordance with the Safe Drinking Water Act (42 U.S.C §300f et seq.), the Village of Pender must comply with minimum health standards for drinking water set by the EPA.

12. Identify the probable consequences (environmental and ecological) that may result if the project is or is not completed. **If the project is not completed, the Village of Pender will continue to purchase excessive amounts of salt on a monthly basis. The salt costs the Village $30,000 per month, and approximately 1,230,000 gallons of water must be used to backwash the filter media monthly. If the project to refurbish the vessels is constructed,**

the Village would use less water for backwashing—a water savings of about 1,056,000 gallons per month. By continuing to pump groundwater for backwashing, the Village would be placing unnecessary stress on the aquifer. The aquifer is an important resource in the area for the ecology of the hydrologically connected streams and wetlands. In the closest observation well (1 mile from Pender) monitored by the United States Geological Survey (USGS), water levels have been dropping slowly over the period of record (see Figure 1). By completing this project, the Village of Pender will not be contributing to groundwater declines by pumping beyond what is necessary to provide drinking water to its residents.

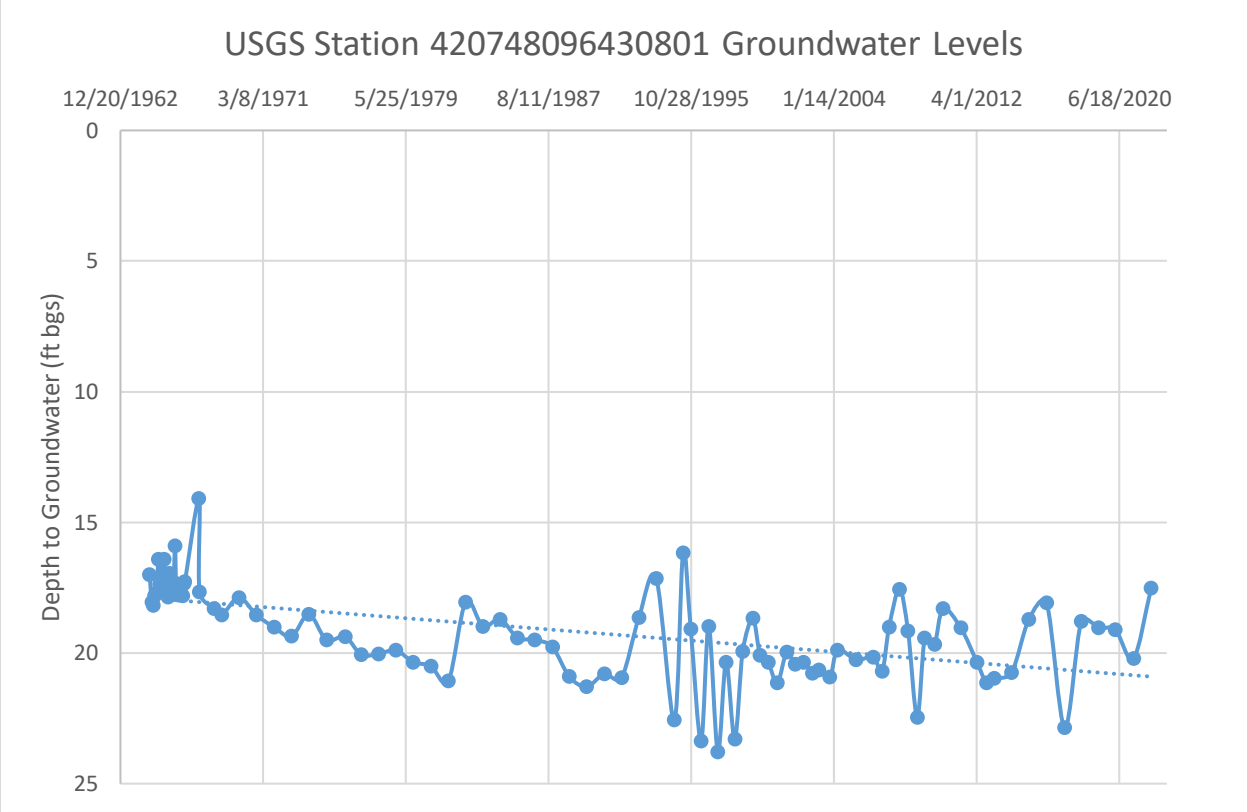

Figure 1. Groundwater levels in the closest USGS observation well to the Village of Pender over a 60-year period. (USGS Groundwater Watch Website)

Section C.

NRC SCORING

In the NRC's scoring process, points will be given to each project in ranking the projects, with the total number of points determining the final project ranking list.

The following 15 criteria constitute the items for which points will be assigned. Point assignments will be 0, 2, 4, or 6 for items 1 through 8; and 0, 1, 2, or 3 for items 9 through 15. Two additional points will be awarded to projects which address issues determined by the NRC to be the result of a federal mandate.

Notes:

- The responses to one criterion *will not* be considered in the scoring of other criteria. Repeat references as needed to support documentation in each criterion as appropriate. The 15 categories are specified by statute and will be used to create scoring matrixes which will ultimately determine which projects receive funding.

- There is a total of 69 possible points, plus two bonus points. The potential number of points awarded for each criteria are noted above. Once points are assigned, they will be added to determine a final score. The scores will determine ranking.

- The Commission recommends providing the requested information and the requests are not intended to limit the information an applicant may provide. An applicant should include additional information that is believed will assist the Commission in understanding a proposal so that it can be awarded the points to which it is entitled.

Complete any of the following (15) criteria which apply to your project. Your response will be reviewed and scored by the NRC. Place an N/A (not applicable) in any that do not apply, an N/A will automatically be placed in any response fields left blank.

1. Remediates or mitigates threats to drinking water;

    - Describe the specific threats to drinking water the project will address.
    - Identify whose drinking water, how many people are affected, how will project remediate or mitigate.
    - Provide a history of issues and tried solutions.
    - Provide detail regarding long-range impacts if issues are not resolved.

Implementation of the refurbished ion exchange vessels at the Village of Pender's water treatment plant will aid in the removal of harmful contaminants from drinking water. The ion exchange process removes nitrates and arsenic,

which in elevated quantities can pose serious health risks. In the areas around Pender, nitrate levels are high in groundwater due to excess fertilizer application and leaching from septic systems. Water treated by the Village of Pender is supplied to residents in town and to the Thurston County Rural Water Service. The total population served by Pender's water treatment plant is approximately 1,050 people. Water is used for residential, industrial, and recreational purposes. In accordance with the United States Safe Drinking Water Act (42 U.S.C §300f et seq.) and Nebraska Department of Environment and Energy requirements, the Village of Pender takes monthly water samples for contaminant analysis. Nitrate levels for the Village of Pender are typically in the range of 6-8 mg/L, which is below the Maximum Contaminant Level (MCL) of 10 mg/L. However, in March 2022, recorded nitrate levels jumped to 16.3 mg/L (see Attachment F). This level of nitrate contaminant has been linked to public health risks, such as methemoglobinemia. Upon notification of this sample result, the Village of Pender identified that the issue was caused by the aging filter media in the ion exchange vessels. The short-term remedy was to issue a warning to the community that infants and pregnant women should not drink tap water. To bring nitrate levels back into compliance with EPA guidelines, the Village began supplementing the ion exchange process with salt. Another water sample was taken eight days later and resulted in a nitrate level of 8.1 mg/L. Since then, the Village has continued to purchase $30,000 of salt per month to keep contaminant levels in the acceptable range. This is the only known alternative to address the issue besides the project proposal. Refurbishing the ion exchange vessels by replacing the filter media and associated equipment will allow the Village to resume their normal operation of the water treatment plant (i.e., without excessive salt and backwash). If the issue is not resolved, the Village will have to keep purchasing salt and pumping more water than is necessary to backwash the filter media in the ion exchange vessels. This places a heavy financial burden on the small community, as well as depletes the aquifer unnecessarily. Receiving cost share from the Water Sustainability Fund will allow Pender to refurbish their ion exchange vessels rather than continuing to mitigate the issue from month to month.

2. Meets the goals and objectives of an approved integrated management plan or ground water management plan;

   - Identify the specific plan that is being referenced including date, who issued it and whether it is an IMP or GW management plan.
   - Provide the history of work completed to achieve the goals of this plan.
   - List which goals and objectives of the management plan the project provides benefits for and how the project provides those benefits.

   The proposed project will assist the Lower Elkhorn Natural Resources District (LENRD) in meeting the goals and objectives of the LENRD's voluntary integrated management plan (IMP) and groundwater management plan (GMP). The LENRD's IMP was jointly adopted by the LENRD and the Department of Natural Resources on November 23, 2018 (see Attachment

G). The LENRD's GMP was implemented in January 1997 (see Attachment H). Specifically, Goal 2 of the IMP states that the LENRD will "sustain a balance between current and future water uses and supplies through water management strategies and projects." Objective 2.3 of the IMP further supports this goal by identifying the need to "collaborate with state and local governments to identify opportunities to augment water supplies in the Lower Elkhorn River Basin." Implementation of this project will help the Village of Pender and LENRD save approximately 1,056,000 gallons of water per month by decreasing the amount of water needed for backwashing the filter media within the ion exchange vessels. Based on a preliminary run completed with the Lower Platte Missouri Tributaries groundwater model, this water savings results in about 1,815 acre-feet of baseflow augmentation to the Logan Creek Dredge over 50 years, which is a tributary of the Elkhorn River (see Figure 2). This project directly contributes to the LENRD's Objective 2.3 of their IMP. In the LENRD's GMP, it is stated that the primary goal of the plan is to "conserve groundwater quantity and quality." To accomplish this goal, objectives must be met including to "protect municipal and domestic groundwater supplies." Water treated at the Village of Pender's water treatment plant is supplied to the residents of Pender and to the Thurston County Rural Water Service. Completing this project will help ensure that the Village of Pender can keep supplying safe and plentiful drinking water by refurbishing a vital part of the treatment process. The ion exchange vessels are responsible for removing harmful contaminants such as nitrates and arsenic from the drinking water. Like stated in the LENRD's GMP objective, refurbishing the vessels will help protect the municipal groundwater supply for these small communities into the future.

3. Contributes to water sustainability goals by increasing aquifer recharge, reducing aquifer depletion, or increasing streamflow;

   List the following information that is applicable:

   - The location, area and amount of recharge;
   - The location, area and amount that aquifer depletion will be reduced;
   - The reach, amount and timing of increased streamflow. Describe how the project will meet these objectives and what the source of the water is;
   - Provide a detailed listing of cross basin benefits, if any.

   This project will reduce the amount of aquifer depletion associated with the current high rate of required due to the failure of the ion exchange vessels. Currently, the Village of Pender is using approximately 41,000 gallons per day for backwashing the ion exchange vessel filter media. Refurbishing the vessels will allow for the Village to pump less groundwater for the purposes of backwashing, an anticipated savings of 12.7 million gallons per year. By reducing groundwater use for backwashing, a preliminary

groundwater model run with the Lower Platte Missouri Tributaries Groundwater Model indicates that aquifer storage depletion will be reduced on the order of 70 acre-feet over a 50-year period (see Figure 2). The project will provide a greater benefit to the hydrologically connected streams in the area due to proximity. Specifically, baseflow in the Logan Creek Dredge will be supplemented by 1,815 acre-feet cumulatively over a 50-year period.

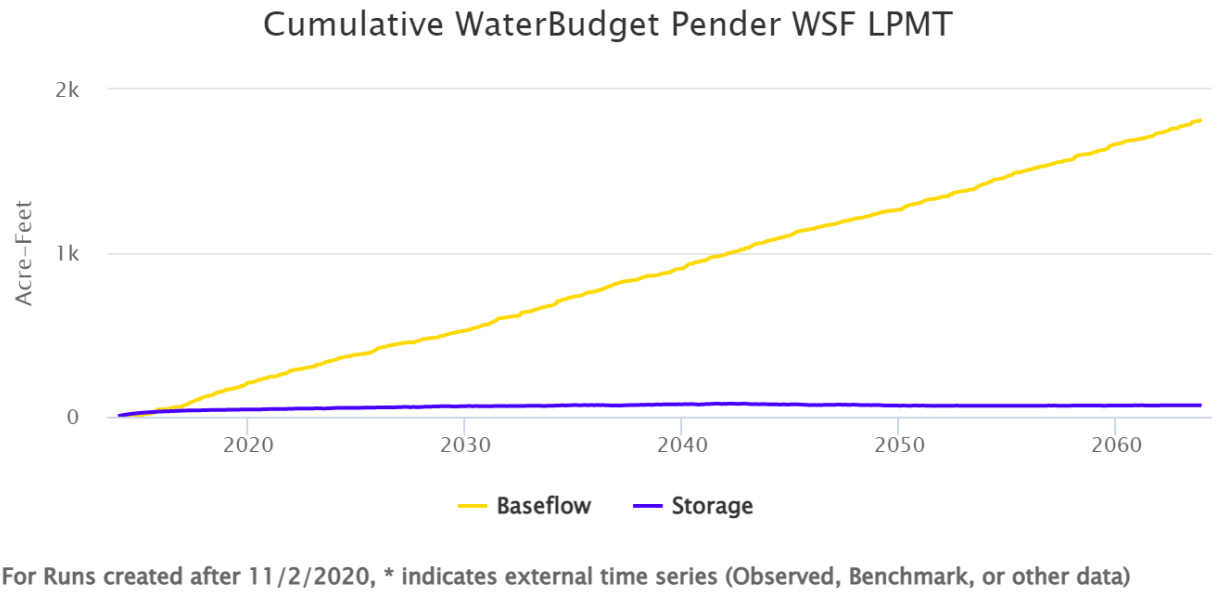

Figure 2 Cumulative water budget results from pumping 3.24 acre-feet per month less at the Pender water treatment plant. (Groundwater Evaluation Toolbox using the Lower Platte Missouri Tributaries Groundwater Model)

4. Contributes to multiple water supply goals, including, but not limited to, flood control, agricultural use, municipal and industrial uses, recreational benefits, wildlife habitat, conservation of water resources, and preservation of water resources;

   - List the goals the project provides benefits.
   - Describe how the project will provide these benefits
   - Provide a long range forecast of the expected benefits this project could have versus continuing on current path.

   The proposed project contributes to multiple water supply goals, including municipal and industrial uses, recreational benefits, and the conservation and preservation of water resources. Water treated at the Village of Pender's water treatment plant is distributed to residents and industry, such as the Emerson Manufacturing plant. Providing clean water that meets the requirements of the Safe Drinking Water Act is essential for public health and for use in the industrial processes in town. By refurbishing the ion exchange vessels, the Village of Pender can continue to meet their statutory requirements of providing safe water. In addition to

municipal and industrial uses, treated water is supplied for recreational uses such as at the community swimming pool, parks, and sporting complexes. Water is used for consumption, recreation, and irrigation purposes. The alternative to refurbishing the ion exchange vessels is to continue purchasing excessive amounts of salt, which costs the Village approximately $30,000 per month. In conjunction with the salt, additional groundwater must be pumped to backwash the filter media. With the refurbishment of the ion exchange vessels, the amount of water needed for backwashing would be reduced on the order of 1,056,000 gallons per month. By reducing the amount of groundwater needed for backwashing, the project will aid in the conservation and preservation of the water resource. The refurbished ion exchange vessels have an expected lifetime of 15-25 years. Over a 25-year period, the amount of water saved due to reduced backwashing is approximately 316.8 million gallons.

5. Maximizes the beneficial use of Nebraska's water resources for the benefit of the state's residents;

   - Describe how the project will maximize the increased beneficial use of Nebraska's water resources.
   - Describe the beneficial uses that will be reduced, if any.
   - Describe how the project provides a beneficial impact to the state's residents.

   Constructing the proposed project will not only serve to benefit the residents of Pender, but also residents that get their water from the Thurston County Rural Water Service. Water treated by the Village of Pender is supplied to Thurston County Rural Water Service (RWS) through a consecutive connection and 105 miles of distribution infrastructure. The Thurston County RWS is operated by the Papio-Missouri River Natural Resources District. In western Thurston and Dakota Counties, groundwater quality has declined due to high nitrate levels, making drinking water from domestic wells potentially unsafe. The solution to this problem was to form the Thurston County RWS and purchase treated water from the Village of Pender. This project will allow the Village of Pender to keep providing a vital resource to residents in an area without another alternative. By refurbishing the ion exchange vessels in the Pender water treatment plant, the Village will pump less groundwater for backwashing purposes; therefore conserving the groundwater resource and maximizing its beneficial use.

6. Is cost-effective;

   - List the estimated construction costs, O/M costs, land and water acquisition costs, alternative options, value of benefits gained.
   - Compare these costs to other methods of achieving the same benefits.
   - List the costs of the project.

- Describe how it is a cost effective project or alternative.

The proposed project is the most cost-effective alternative for the Village of Pender to continue providing safe drinking water. Currently, the Village is purchasing $30,000 worth of salt per month to accomplish the ion exchange process in their water treatment plant. Ion exchange is vitally important for removing harmful contaminants such as nitrates and arsenic. This process also removes hardness from the water, which can contribute to costly maintenance repairs to remove scale buildup. There is no other means to accomplish the ion exchange process other than the proposed project or continuing to use excessive amounts of salt and water for backwashing the filter media. The costs incurred by the Village to complete the proposed project total $114,672. If the Village were to not complete the project and continue purchasing salt and pumping excess groundwater for backwashing, annual costs would total approximately $360,000. The proposed project is clearly cost effective and will continue to provide benefits to the Village into the future. Ongoing operation and maintenance costs for the Village to operate the newly refurbished ion exchange vessels is approximately $3,500 for inspections and equipment testing.

7. Helps the state meet its obligations under interstate compacts, decrees, or other state contracts or agreements or federal law;

- Identify the interstate compact, decree, state contract or agreement or federal law.
- Describe how the project will help the state meet its obligations under compacts, decrees, state contracts or agreements or federal law.
- Describe current deficiencies and document how the project will reduce deficiencies.

The Village of Pender must comply with the United States Safe Drinking Water Act (42 U.S.C §300f et seq.). The Safe Drinking Water Act authorizes the Environmental Protection Agency to establish minimum standards to protect tap water and requires all owners or operators of public water systems to comply with these primary (health-related) standards. The pertinent section of the United States Code is provided as Attachment C. This project meets the requirements of the Safe Drinking Water Act because it ensures that the Village can continue to supply clean drinking water to residents. Properly functioning ion exchange vessels aid in the removal of minerals that cause hard water and scale buildups, as wells as nitrates and arsenic which have been linked to health problems in elevated quantities. The relationship between the Safe Drinking Water Act and water sustainability in Nebraska is clear—this project will serve to "remediate or mitigate threats to drinking water," which is one of the stated goals of the Water Sustainability Fund (Neb. Rev. Stat. § 2-1506).

8. Reduces threats to property damage or protects critical infrastructure that consists of the physical assets, systems, and networks vital to the state or the United States such that their incapacitation would have a debilitating effect on public security or public health and safety;

   - Identify the property that the project is intended to reduce threats to.
   - Describe and quantify reductions in threats to critical infrastructure provided by the project and how the infrastructure is vital to Nebraska or the United States.
   - Identify the potential value of cost savings resulting from completion of the project.
   - Describe the benefits for public security, public health and safety.

   The Village of Pender supplies treated water for residential, industrial, commercial, and recreational purposes to residents of Pender and greater Thurston County. The ion exchange vessels are vital to the removal of contaminants that pose risks to public health in elevated quantities, such as nitrates and arsenic. In addition to providing drinking water, the treatment plant is also responsible for supplying water for fire suppression. When in good working condition, the ion exchange vessels are each capable of providing 450,000 gallons of water before regeneration is needed. Currently, and without the completion of this project, the vessels can only provide about 175,000 gallons of water each for fire suppression before regeneration is needed. This poses a huge risk to Pender and surrounding communities like the Omaha Reservation, for which Pender provides mutual aid. Recently, a fire at the St. Mark's Lutheran Church in Pender stressed the water treatment plant to its current limits. Luckily the fire was caught before it turned into a larger blaze and first responders were able to contain the fire. However, if a larger fire were to break out in the Village of Pender, it may result in catastrophic damages due to the inability of the water treatment plant to keep up its supply. It is difficult to quantify the potential value of infrastructure in Pender and surrounding communities that could be saved by fire suppression, but it is certain that any loss of life or property would be deeply detrimental.

9. Improves water quality;

   - Describe what quality issue(s) is/are to be improved.
   - Describe and quantify how the project improves water quality, what is the target area, what is the population or acreage receiving benefits, what is the usage of the water: residential, industrial, agriculture or recreational.
   - Describe other possible solutions to remedy this issue.
   - Describe the history of the water quality issue including previous attempts to remedy the problem and the results obtained.

Implementation of the refurbished ion exchange vessels at the Village of Pender's water treatment plant will aid in the removal of harmful contaminants from drinking water. The ion exchange process removes nitrates and arsenic, which in elevated quantities can pose serious health risks. In the areas around Pender, nitrate levels are high in groundwater due to excess fertilizer application and leaching from septic systems. Water treated by the Village of Pender is supplied to residents in town and to the Thurston County Rural Water Service. The total population served by Pender's water treatment plan is approximately 1,050 people. Water is used for residential, industrial, and recreational purposes. In accordance with the United States Safe Drinking Water Act (42 U.S.C §300f et seq.) and Nebraska Department of Environment and Energy requirements, the Village of Pender takes quarterly water samples for nitrate analysis. Nitrate levels for the Village of Pender are typically in the range of 6-8 mg/L, which is below the Maximum Contaminant Level of 10 mg/L. However, in March 2022, recorded nitrate levels jumped to 16.3 mg/L (see Attachment F). This level of nitrate contaminant has been linked to public health risks, such as methemoglobinemia. Upon notification of this sample result, the Village of Pender identified that the issue was caused by the aging filter media in the ion exchange vessels. The short-term remedy was to issue a warning to the community that infants and pregnant women should not drink tap water. To bring nitrate levels back into compliance with EPA guidelines, the Village began supplementing the ion exchange process with salt. Another water sample was taken eight days later and resulted in a nitrate level of 8.1 mg/L. Since then, the Village has continued to purchase $30,000 of salt per month to keep contaminant levels in the acceptable range. This is the only known alternative to address the issue besides the project proposal. Refurbishing the ion exchange vessels by replacing the filter media and associated equipment will allow the Village to resume their normal operation of the water treatment plant (i.e., without excessive salt and backwash).

10. Has utilized all available funding resources of the local jurisdiction to support the program, project, or activity;

- Identify the local jurisdiction that supports the project.
- List current property tax levy, valuations, or other sources of revenue for the sponsoring entity.
- List other funding sources for the project.

The local jurisdiction supporting the project is the Village of Pender. The Village can support the proposed project as evidenced by the budget provided (see Attachment A). The Village's current property tax levy is $0.64 per $100 of assessed value. The Village also plans to use funds received from the American Rescue Plan Act of 2021. This money will be used for the Village's 40% match requirement, a total of $114,672.

11. Has a local jurisdiction with plans in place that support sustainable water use;

- List the local jurisdiction and identify specific plans being referenced that are in place to support sustainable water use.
- Provide the history of work completed to achieve the goals of these plans.
- List which goals and objectives this project will provide benefits for and how this project supports or contributes to those plans.
- Describe and quantify how the project supports sustainable water use, what is the target area, what is the population or acreage receiving benefits, what is the usage of the water: residential, industrial, agriculture or recreational.
- List all stakeholders involved in project.
- Identify who benefits from this project.

The local jurisdiction is the Village of Pender. Pender has a Comprehensive Plan (Plan) in place that was written in 2019. The Plan is provided as Attachment I. In the Plan, it is written that the Village strives "to create a sustainable living environment…This can occur by designing with nature, conserving unique features, protecting watersheds and using sensitive development practices." While not directly referencing sustainable water use, the Plan clearly identifies goals and actions devoted to the responsible use of water for municipal, commercial, and industrial purposes. To develop this Plan, the Village of Pender met with local stakeholders such as the Pender Community Development group. In addition, two community surveys were conducted to identify areas of greatest concern, and a community leadership session was held with members of the public to prioritize action items. The Village also has a drought emergency contingency plan in place adopted as a city ordinance (see Attachment J). The purpose of the ordinance is to address short-term water shortages through a series of stages based on conditions of supply and demand with accompanying triggers, goals, and actions. Triggers include groundwater levels, system pressure, and volumetric water demand. Beyond asking the public to conserve water when triggers are hit, the ordinance also authorizes regulatory action to be exercised by the Chairman of the Village Board. Regulatory action can include lawn watering restrictions, excess water use fees, and scheduled watering times. In addition, education actions are outlined in the ordinance should Stage 3 be triggered. Education actions include news releases to inform the public of current conditions and water supply outlook, and public meetings to discuss further actions that need to be taken. This project serves to meet the goals of both the Comprehensive Plan and the Drought Emergency Plan because it conserves groundwater by reducing pumping for backwashing the ion exchange vessels. A water savings of 1,056,000 gallons per month will be realized by completing this project. Avoiding unnecessary depletion to the aquifer and nearby hydrologically connected streams will aid in maintaining groundwater levels and the responsible

management of the water resource. Water treated by the Village of Pender is supplied to residents in town and to the Thurston County Rural Water Service. The total population served by Pender's water treatment plan is approximately 1,050 people. Water is used for residential, industrial, and recreational purposes. Stakeholders of this project include every resident in the Village of Pender that has a water connection, as well as those that are part of the Thurston County Rural Water Serve. Two Natural Resources Districts are also stakeholders: the Thurston County Rural Water Service is administered by the Papio-Missouri River Natural Resources District, and the Lower Elkhorn Natural Resources District maintains an integrated management plan and groundwater management plan for the area surrounding Pender. This project will contribute to the Lower Elkhorn Natural Resources District's efforts to meet the goals and objectives of these two water management plans.

12. Addresses a statewide problem or issue;

- List the issues or problems addressed by the project and why they should be considered statewide.
- Describe how the project will address each issue and/or problem.
- Describe the total number of people and/or total number of acres that would receive benefits.
- Identify the benefit, to the state, this project would provide.

This project contributes to the conservation and preservation of groundwater—one of the state's most precious resources. Municipalities, industries, and agriculture all depend on having access to groundwater in the areas where it is available. The state of Nebraska is very fortunate to have access to plentiful water; which is not the case in much of the western United States. However, regional declines in groundwater levels have been observed in some areas of Nebraska. The University of Nebraska's Conservation and Survey Division publishes maps of groundwater level changes over periods of time using observation well data. On the map provided as Attachment K, groundwater levels have declined in much of northeastern Nebraska over the last five years. Included in the area of declines is most of Thurston County and the Village of Pender. Completing this project will help the Village of Pender conserve approximately 1,056,000 gallons of water per month since excessive groundwater pumping for backwashing will not be needed. Avoiding unnecessary depletion to the aquifer and nearby hydrologically connected streams will aid in maintaining groundwater levels and the responsible management of the water resource. The total number of people directly benefitted by this project is about 1,050, which is the population served by Pender's water treatment plant and Thurston County Rural Water Service. The larger population of northeastern Nebraska, where groundwater

declines have been observed over the last five years, will also benefit as unnecessary depletions will be avoided.

13. Contributes to the state's ability to leverage state dollars with local or federal government partners or other partners to maximize the use of its resources;

    - List other funding sources or other partners, and the amount each will contribute, in a funding matrix.
    - Describe how each source of funding is made available if the project is funded.
    - Provide a copy or evidence of each commitment, for each separate source, of match dollars and funding partners.
    - Describe how you will proceed if other funding sources do not come through.

    The Village of Pender will pay 40% of the project cost in this Water Sustainability Fund application. To pay this 40% cost share, the Village will leverage funds from the American Rescue Plan Act of 2021. This funding has been confirmed and is evidenced in the provided budget (Attachment A). The total project cost as written in this application includes a 20% contingency fee to address possible changes in material and labor costs between now and time of construction. Including the contingency fee, the Village of Pender's 40% cost share is $114,672. Should material and labor costs come in at the provided quote from Kurita America (not fluctuate), the Village of Pender will not need the contingency money from the Water Sustainability Fund. In the scenario where the contingency fee is not needed, Pender would be responsible for paying $95,560 and the Water Sustainability Fund grant amount would be $143,340 for a total project cost of $238,900 (Attachment C).

14. Contributes to watershed health and function;

    - Describe how the project will contribute to watershed health and function in detail and list all of the watersheds affected.

    This project will contribute to watershed health and function in the Logan Creek Dredge, which is a tributary to the Elkhorn River. Refurbishing the ion exchange vessels will allow the Village of Pender to pump less groundwater for backwashing the filter media. The anticipated water savings is about 1,056,000 gallons per month. A preliminary groundwater model run with the Lower Platte Missouri Tributaries Model shows an increase in baseflow of approximately 1,815 acre-feet cumulatively over a 50-year period in the Logan Creek Dredge (see Figure 2). The model run was completed by injecting 1,056,000 gallons/month of water near the location of Pender's municipal well to simulate the effect of conserving water through reduced backwashing. Increasing baseflow in the Logan Creek Dredge contributes to watershed health and function by making

more water available to the ecological system that benefits from surface water supplies.

15. Uses objectives described in the annual report and plan of work for the state water planning and review process issued by the department.

- Identify the date of the Annual Report utilized.
- List any and all objectives of the Annual Report intended to be met by the project
- Explain how the project meets each objective.

In the Annual Report published by the Department of Natural Resources in September 2021, one of the agency goals reads "protect existing water uses through collaborative investments in water resource projects, planning, administration and permitting of surface water rights, and the registration of groundwater wells." The document further states the objective under this goal is to "seek opportunities to promote continued investments in water resource projects aimed at addressing aging water supply infrastructure." This project will directly contribute to accomplishing the stated objective by refurbishing water supply infrastructure that has exceeded its expected lifespan. Receiving funding for the project is very important for a small community like the Village of Pender.

16. Federal Mandate Bonus. If you believe that your project is designed to meet the requirements of a federal mandate which furthers the goals of the WSF, then:

- Describe the federal mandate.
- Provide documentary evidence of the federal mandate.
- Describe how the project meets the requirements of the federal mandate.
- Describe the relationship between the federal mandate and how the project furthers the goals of water sustainability.

The Village of Pender must comply with the United States Safe Drinking Water Act (42 U.S.C §300f et seq.) (Attachment L). The Safe Drinking Water Act authorizes the Environmental Protection Agency to establish minimum standards to protect tap water and requires all owners or operators of public water systems to comply with these primary (health-related) standards. The pertinent section of the United States Code is provided as Attachment C. This project meets the requirements of the Safe Drinking Water Act because it ensures that the Village can continue to supply clean drinking water to residents. Properly functioning ion exchange vessels aid in the removal of minerals that cause hard water and scale buildups, as wells as nitrates and arsenic which have been linked to health problems in elevated quantities. The relationship between the Safe Drinking Water Act

and water sustainability in Nebraska is clear—this project will serve to "remediate or mitigate threats to drinking water," which is one of the stated goals of the Water Sustainability Fund (Neb. Rev. Stat. § 2-1506).