

# NEBRASKA NATURAL RESOURCES COMMISSION

## Water Sustainability Fund

Application for Funding

Section A.

### ADMINISTRATIVE

**PROJECT NAME:** Red Cloud Flood Control Dam Rehabilitation

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

Sponsor Business Name: City of Red Cloud

Sponsor Contact's Name: Maddy Schmitz, City Clerk

Sponsor Contact's Address: 540 N Webster, Red Cloud, NE 68970-2422

Sponsor Contact's Phone: 402-746-2215

Sponsor Contact's Email: [citymaddy@gpcom.net](mailto:citymaddy@gpcom.net)

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

**Grant** amount requested. \$ 145,686

- If requesting less than 60% cost share, what %? [Click here to enter text.](#)

**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. N/A
- What is the population served by your project? N/A
- Provide a demonstration of need. N/A
- **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 <input checked="" type="checkbox"/>	Obtained: YES <input type="checkbox"/>	NO <input type="checkbox"/>
DNR Surface Water Right	N/A <input checked="" type="checkbox"/>	Obtained: YES <input type="checkbox"/>	NO <input type="checkbox"/>
USACE (e.g., 404/other Permit)	N/A <input checked="" type="checkbox"/>	Obtained: YES <input type="checkbox"/>	NO <input type="checkbox"/>
FEMA (CLOMR)	N/A <input checked="" type="checkbox"/>	Obtained: YES <input type="checkbox"/>	NO <input type="checkbox"/>
Local Zoning/Construction	N/A <input checked="" type="checkbox"/>	Obtained: YES <input type="checkbox"/>	NO <input type="checkbox"/>
Cultural Resources Evaluation	N/A <input checked="" type="checkbox"/>	Obtained: YES <input type="checkbox"/>	NO <input type="checkbox"/>
Other (provide explanation below)	N/A <input checked="" type="checkbox"/>	Obtained: YES <input type="checkbox"/>	NO <input type="checkbox"/>

The city is not requesting funds for any permitting efforts. All required permits will be obtained using other funding sources.

4. **Partnerships**

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

The City of Red Cloud is the primary sponsor of this dam rehabilitation project. Two additional agencies are providing support as project sponsors: The Lower Republican Natural Resources District (LRNRD) and South Central Economic

Development District (SCEDD). Each of these partners has provided a letter of support, included in Attachment 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.

Lead Project Sponsor: City of Red Cloud

The City of Red Cloud is the lead project sponsor and primary funding source for the dam rehabilitation project. The city will coordinate project activities with landowners and partner agencies. The city has hired an engineering consultant to complete the rehabilitation project.

Co-Sponsor: LRNRD

The LRNRD has already provided \$15,000 to assist the city with construction, and will also provide input and support, as well as project administration expertise to assist the city throughout the design and construction phases of the project.

Co-Sponsor: SCEDD

SCEDD is administrating the federal Community Development Block Grant (CDBG) that was awarded to the city.

**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.

Total project costs are estimated to be \$496,560, which includes \$70,820 in engineering, design, and permitting, \$15,000 in land easements, and \$410,740 in construction. The total CDBG funding amount awarded for the dam rehabilitation project is \$253,750. After leveraging federal CDBG funds, the remaining costs consist of \$242,810 in construction fees. Construction costs include earthwork, as well as administration work, bidding, and construction oversight. The city is requesting \$145,686 from WSF to help fund the construction phase of the dam rehabilitation project. This amount is 60% of the remaining construction cost after federal CDBG funds have been applied. The remaining 40% (\$97,124) would be contributed by local funds from the city and LRNRD (\$72,124 and \$15,000, respectively). A breakdown of cost distributions is included in Table 1 below. If the city's Water Sustainability Fund application is not selected for funding, the city will need to obtain a loan to complete the project.

**Table 1: Cost Distribution**

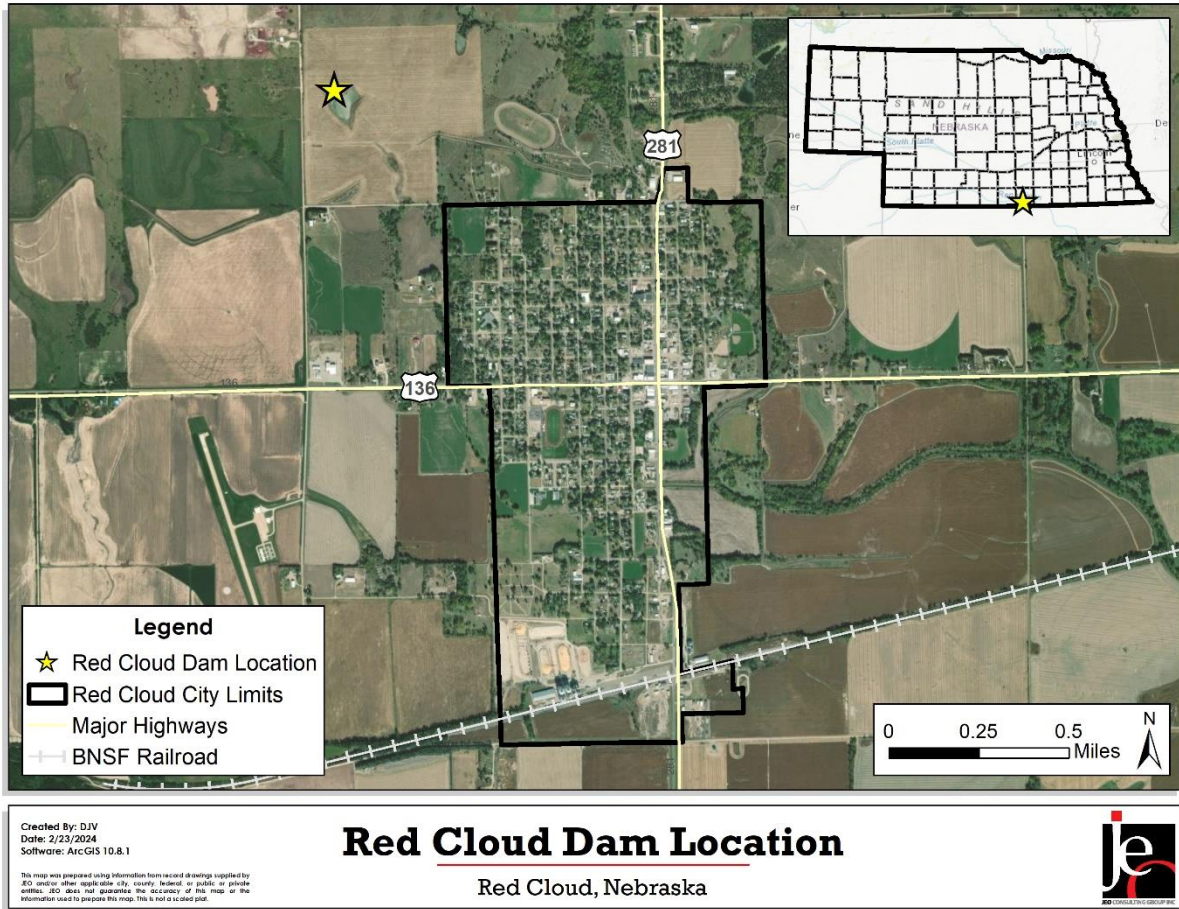
Task	Requested from WSF	CDBG Funds	Local Funds*	Total
Design & Permitting	\$0	\$70,820	\$0	\$70,820
Land Easement	\$0	\$15,000	\$0	\$15,000
Construction	\$145,686	\$167,930	\$97,124	\$410,740
<b>Total</b>	<b>\$145,686</b>	<b>\$253,750</b>	<b>\$97,124</b>	<b>\$496,560</b>

\*LRNRD has contributed \$15,000 towards the project.

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 purpose of this project is to rehabilitate an existing dam which provides flood control for the City of Red Cloud. The dam is located approximately one mile northwest of the City of Red Cloud and provides flood damage reduction benefits to the city (see Figure 1 below). The dam was inspected by the Nebraska Department of Natural Resources (NeDNR) in 2015. This inspection revealed several deficiencies with the dam structure, including erosion, vegetation issues, corrosion within the riser pipe, and damage to the embankment from large rodent burrows and cattle trails. The dam was inspected again in 2023 and found to still be in poor condition. Since the initial inspection in 2015, city maintenance personnel have been working to address deficiencies through actions such as installing fencing around the dam to keep cattle off the structure, and vegetation management. However, significant rehabilitation is still needed. Both inspection reports can be found in Attachment B



**Figure 1: Location Map of the Red Cloud Dam**

The 2015 inspection also determined that the dam structure falls into the significant hazard classification due to the proximity to the City of Red Cloud. A dam of significant hazard potential means that a dam failure will not likely cause loss of life, but could result in major economic loss, environmental damage, and disruption of critical facilities. The dam does not currently meet NeDNR design standards for a significant hazard dam.

Following this dam inspection and classification, the city commissioned a study to weigh the potential cost and consequences of removing the dam structure against the cost of rehabilitating the dam to meet NeDNR requirements. This study was initially completed in 2017 and updated in 2021. A memo documenting the results can be found in Attachment C. Ultimately, the city decided to rehabilitate the dam to conform to current NeDNR standards and keep the flood protection benefits for downstream residents.



Picture of the Red Cloud Dam in 2022 (Credit: JEO Consulting Group, Inc.)

While the exact age of the dam is not known, it is estimated to have been built around 1960. Today, it is in poor condition and is in need of significant rehabilitation. The embankment and auxiliary spillway have been damaged by cattle grazing and farm machinery. The dam provides flood protection to approximately 17 buildings, 16 separate roads (including Highways 136 and 281), the BNSF railway line, and the Red Cloud Cemetery. Rehabilitating this dam will improve public health and safety for residents of Red Cloud for 50+ years, the designed lifespan of the rehabilitated dam. Operations and maintenance of the updated structure will be the responsibility of the city for the lifespan of the dam.

The city is requesting funds for the construction phase of this dam rehabilitation project. Design, permitting, and a land easement have already been funded through a CDBG grant. The dam requires significant alterations to meet NeDNR requirements, including raising the dam height by approximately five feet, constructing a new emergency spillway, and replacing the current riser and spillway inlet/outlet structures. The existing dam riser and principal spillway pipes are made of corrugated steel and are in very poor condition. NeDNR requires that these structures be replaced with reinforced concrete pressure pipe (RCPP), driving up the cost of the rehabilitation significantly. However, through special consultation with NeDNR, it was determined that High Density Polyethylene (HDPE) plastic pipe encased in concrete could be used instead of reinforced concrete pressure pipe while still meeting the requirements for a significant hazard dam. Using HDPE pipe encased in concrete instead of reinforced concrete pipe will reduce the overall cost of the project by an estimated \$93,900. This innovative approach would be the first usage of HDPE pipe encased in concrete for a dam project in the State of Nebraska.

The design of the dam rehabilitation is currently underway and is approximately 80% complete. Final design is anticipated to be completed in May 2024. The current draft plans are included as Attachment D.

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):

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

- 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.

Design, permitting, and a land easement have already been funded and are currently ongoing. It is anticipated that these activities will be completed during Summer 2024. Construction is expected to begin in Fall 2024 and be completed in June 2025.

**Table 2: Project Timeline and Associated Costs**

<b>Task</b>	<b>Year 0 (2024)</b>	<b>Year 1 (2025)</b>	<b>Total</b>
Design & Permitting	\$70,820	-	\$70,820
Land Easement	\$15,000	-	\$15,000
Construction	\$205,370	\$205,370	\$410,740
		<b>Total</b>	<b>\$496,560</b>

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;  
The feasibility of dam rehabilitation was explored in previously completed studies. A study commissioned by the city was initially completed in 2017 and updated in 2021. This study confirmed NeDNR's assessment of the dam hazard classification and investigated potential costs and consequences of removing the structure versus rehabilitating it. To date, design plans are approximately 80% complete, which includes obtaining topographic survey, performing geotechnical explorations and associated lab analysis, hydrology and hydraulic evaluation of the dam and the proposed improvements, performing wetland delineations, beginning to develop a Clean Water Act Section 404 Permit application, and estimating quantities and costs.
- 1.A.2 Describe the plan of development (004.01 A);  
In 2015, a NeDNR dam inspection revealed that the Red Cloud Dam was in poor condition and did not meet its assigned hazard classification requirements. Following this, the city commissioned a study to confirm the hazard classification of the dam and investigate the potential costs and consequences of removing the dam versus rehabilitating it. This study was initially completed in 2017 and updated in 2021. Although dam removal was considered, it was met with strong opposition from residents of Red Cloud who benefit from the flood protection provided by the dam. Ultimately the city decided to rehabilitate the dam to meet current NeDNR standards. The city then applied for and was subsequently awarded a CDBG to help cover a portion of project costs. The city is now requesting WSF funds to cost-share the remaining costs of the project.



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

Fieldwork that has already been completed includes:

- Site survey (Attachment E)
- Wetland delineations (Attachment F)
- Geotechnical investigation (Attachment G)

A professional site survey has been completed which included the dam structure, permanent pool, surrounding area, and key locations downstream of the dam towards the city. The survey points were utilized along with available remote sensing information to create a detailed topographic map and digital elevation model. That information was then used for hydrologic and hydraulic modeling and informed the design of the updated dam.

A wetland delineation was conducted at the dam site in accordance with the 1987 US Army Corps of Engineers Wetlands Delineation Manual. This information will be used to influence the final design and determine potential mitigation needs for permitting purposes. The wetland delineation included both a desktop review of available information, and field investigations to determine wetland characteristics and locations.

A geotechnical investigation of the dam site has been completed. This consisted of two soil borings at the dam site. One was within the footprint of the existing dam embankment, and the other was in the pool area upstream of the embankment. A variety of soil samples were obtained and underwent laboratory testing to determine if the ground is suitable for dam building.

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

The feasibility of dam rehabilitation was thoroughly explored through several efforts. A hydraulic and hydrologic modeling analysis can be found in Attachment C. A summary of dam routing information refined through further modeling is included in the 80% complete draft plans available in Attachment D. Field work completed to date includes professional site survey (Attachment E), wetland delineations (Attachment F), and geotechnical exploration (Attachment G).

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

The city currently has an easement in place that allows for access to the existing dam site for operations and maintenance purposes. This original easement was filed on November 8, 1961, and can be found Attachment H. While this easement would technically allow the city to pursue the dam rehabilitation project with no additional land rights, the city is negotiating with the landowner to offset the loss of crop ground due to the expanded footprint of the dam and auxiliary spillway. The normal water storage in the dam will not increase, therefore no additional

water rights are required with this project. The rehabilitated dam will have a small permanent pool (approximately 2.5 acres) that will provide the opportunity for groundwater recharge and will also capture pollutants in runoff leading to improved surface water quality downstream of the dam.

1.A.6 Discuss each component of the final plan (004.01 E);

This project consists of the following major components:

- Design & Permitting
  - Design of the dam is approximately 80% complete at this time and will continue to be revised through Spring 2024.
  - Permitting is ongoing and is anticipated to be completed during Summer 2024.
- Land Easement
  - The existing easement the city holds for the dam is sufficient to complete the proposed work (see Attachment H). However, the city is currently in negotiations with the landowner to offset the loss of crop ground due to the expanded footprint of the proposed dam and auxiliary spillway improvements. This will be finalized in fall 2024, prior to construction.
- Construction
  - Including physical construction activities such as earthwork, as well as administration work, bidding, and construction oversight and inspection.
  - Anticipated to begin Fall 2024 and be completed by June 2025.
- Operations and Maintenance
  - Ongoing for the life of the dam.

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

A geotechnical investigation of the dam site has already been completed. This consisted of two soil borings at the dam site. One was within the footprint of the existing dam embankment, and the other was in the retention area upstream of the embankment. A variety of soil samples were obtained and underwent laboratory testing to determine if the ground is suitable for dam building. The geotechnical report can be found in Attachment G.

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

A hydraulic and hydrologic modeling analysis was completed by a licensed Professional Engineer in 2021. This analysis helped determine the required dimensions of the updated dam structure to meet NeDNR requirements. The report can be found in Attachment C. Using that initial analysis, a SITES model was developed to further refine the hydraulic evaluation of the proposed improvements. SITES is a program developed by the USDA-NRCS and is widely recognized as an industry standard program for these types of evaluations. A

summary of results of the SITES routings are included in the draft design plan set (Attachment D).

- 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).

The design of the improvements is based upon NRCS TR210-60, Earth Dams and Reservoirs. The improvements are also in compliance with Nebraska Administrative Code Title 458, Chapters 1-13, Rules for the Safety of Dams and Reservoirs. Soil mechanics laboratory testing was completed in accordance with ASTM criteria. Hydrologic and hydraulic design was developed according to TR 210-60 criteria and the NRCS SITES modeling software. Additionally, NeDNR Dam Safety personnel required a minimum 500-year storm design to set the Top of Dam elevation. Rainfall data was obtained from NOAA Atlas 14 and the Nebraska Statewide PMP study. Structural design was completed using NRCS criteria and industry standards. Embankment and Foundation designs were also completed using NRCS criteria and industry standards.

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. As NeDNR will not allow the dam to continue standing indefinitely in its current condition, the only other alternative is to rehabilitate the dam or remove the structure entirely. Dam removal was initially proposed following the NeDNR assessment in 2015 but was met with strong public opposition from residents of the city who lived downstream of the dam. While the initial monetary investment of removing the dam is less than the cost of rehabilitation, there are potential economic and social consequences affiliated with dam removal. The dam provides flood protection to approximately 17 buildings, 16 road crossings (including Highways 136 and 281), a portion of BNSF railway line, and the Red Cloud Cemetery. Based on information available from the Webster County Assessor, the total assessed value of the properties downstream of the dam that would be impacted by flooding if the dam were not present is approximately \$705,000.

Some potential impacts could be mitigated by constructing improvements to road crossings and implementing floodproofing measures to buildings in the inundated area. These actions will come at a significant cost. Detailed cost estimates for improving road crossings and channel capacity to offset dam removal were not developed when it was quickly evident that the summation of improving 16 road crossings and several hundred feet of stream channel would far exceed the cost of rehabilitating the dam. In addition to potential property damage, flooding can threaten public health and safety. Floods can not only kill by drowning but can cause vulnerability to sickness and injury. Floodwater is commonly contaminated with waste and other chemicals and can carry debris that can cause serious harm. For all these reasons, the city decided to rehabilitate the dam to continue providing flood control benefits to residents.

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).  
Costs were estimated by a professional engineer hired by the City of Red Cloud. Benefits were estimated based on information available from the Webster County Assessor. The total cost of the project is estimated to be \$496,560, while the total assessed value of the properties downstream of the dam that would be impacted by flooding if the dam were not present is approximately \$705,000. Therefore, the Red Cloud dam rehabilitation project has an estimated benefit to cost ratio of 1.4. Note that this does not include any monetary benefits associated with

potential disruption to BNSF railway operations due to flooding, or secondary benefits such as improvements to wetland, aquatic, wildlife, and waterfowl habitat. The permanent pool upstream of the dam structure would facilitate groundwater recharge, increasing water sustainability.

- 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).

Total project costs are estimated to be \$496,560. This includes \$70,820 in engineering, design, and permitting, \$15,000 in land easements, and \$410,740 in construction. After leveraging federal CDBG funds, the remaining costs consist of \$242,810 in construction fees.

The city is requesting \$145,686 from WSF to help fund the construction phase of the dam rehabilitation project. This amount is 60% of the remaining construction cost after CDBG funds have been applied. The remaining 40% would be contributed by the city and LRNRD. The total CDBG funding amount for the dam rehabilitation project is \$253,750. A breakdown of cost distributions is included in Table 3 below. Construction costs include physical construction activities such as earthwork, as well as administration work, bidding, and construction oversight.

**Table 3: Cost Distribution**

Task	Requested from WSF	CDBG Funds	Local Funds*	Total
Design & Permitting	\$0	\$70,820	\$0	\$70,820
Land Easement	\$0	\$15,000	\$0	\$15,000
Construction	\$145,686	\$167,930	\$97,124	\$410,740
<b>Total</b>	<b>\$145,686</b>	<b>\$253,750</b>	<b>\$97,124</b>	<b>\$496,560</b>

\*LRNRD has contributed \$15,000 towards the project.

- 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 Red Cloud dam rehabilitation project provides the primary tangible benefit of flood control, resulting in reduced and/or avoided property damages due to flooding. Based on information available from the Webster County Assessor, the total assessed value of the properties downstream of the dam that would be impacted by flooding if the dam were not present is approximately \$705,000. The total cost of the project is estimated to be \$496,560, yielding a benefit to cost

ratio of 1.4. Note that this does not include any monetary benefits associated with potential disruption to BNSF railway operations due to flooding, or non-monetary secondary benefits such as improvements to wetland, aquatic, wildlife, and waterfowl habitat. The permanent pool upstream of the dam structure would facilitate groundwater recharge, increasing water sustainability.

- 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).

Table 4 below provides a summary of the cost and benefit information associated with the Red Cloud dam rehabilitation project.

**Table 4: Cost and Benefit Information**

Action	Total Cost	Avoided Flood Damages	Benefit – Cost Ratio
Red Cloud Dam Rehabilitation	\$496,560	\$705,000	1.4

- 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.)  
N/A

**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. The city has sufficient funds and is committed to paying their portion of the construction fees (\$97,124). The city has leveraged CDBG funding to cover over half of the dam rehabilitation project’s costs, including all design, permitting, and land easement fees, and a substantial portion of the construction fees. See the attached financial commitment letter from the city in attachment A.
- 5. Provide evidence that sufficient annual revenue is available to repay the reimbursable costs and to cover OM&R (operate, maintain, and replace). The City of Red Cloud has an annual operating budget of approximately \$8,500,000 and has already set aside funds to pay their 40% share of the rehabilitation cost. The city will be responsible for long-term maintenance of the dam, which primarily involves mowing, vegetation management, animal/pest management, and caulking/patching of concrete. Annual maintenance is estimated at \$5,000 per year.

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.).

Rehabilitation of the Red Cloud dam will avoid and minimize environmental impacts to the greatest extent feasible. Construction activities will take place primarily outside of the migratory bird nesting season (April – August). The updated dam structure will provide improved riparian habitat for waterfowl and other wildlife. Any potential permanent impacts to wetlands will be mitigated as required under Clean Water Act Section 404. The design of the dam structure considered existing wetland areas as identified through a professional wetland delineation and worked to avoid impacting these areas as much as possible. Additionally, the rehabilitated dam pool will provide opportunities for improved lacustrine wetland habitat. The permanent pool (2.5 acres) will provide opportunities for groundwater recharge to occur and will allow pollutants in runoff to settle out, leading to improved surface water quality downstream.

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

The City of Red Cloud is an incorporated community in the State of Nebraska. The rehabilitated dam will be owned and operated by the city. The city will be liable and responsible for all operations, maintenance, and improvements. The city has full-time maintenance personnel who will be responsible for ongoing operations and maintenance of the dam.

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

NeDNR regulates the design, construction, operations, and maintenance requirements of dams in Nebraska. The city will follow all applicable regulatory requirements. Ongoing dam design is being done in coordination with NeDNR Dam Safety representatives.

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

The city currently has an easement in place that allows for access to the existing dam site for operations and maintenance purposes. This original easement was filed on November 8, 1961, and is included in Attachment H. While this easement would technically allow the city to pursue the dam rehabilitation project with no additional land rights, negotiations with the landowner are ongoing to offset the loss of crop ground due to the increased footprint of the dam and auxiliary spillway.

**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 City of Red Cloud will own and operate the dam and is fully responsible for all the duties that entails, which may include operations, maintenance, improvements, and financial obligations. NeDNR is requiring that the city rehabilitate the dam structure to meet Significant Hazard Classification requirements, to minimize potential property damage and loss of life in the event of a dam failure.

12. Identify the probable consequences (environmental and ecological) that may result if the project is or is not completed.

If the dam is not rehabilitated, it will have to be removed due to conflicts with NeDNR's dam hazard classification criteria. This would cause a loss of wetland and shallow water habitat for wildlife and waterfowl. Additionally, dam removal would harm downstream surface water quality as the structure would no longer function as a settling basin to remove pollutants from runoff. Finally, loss of the dam would decrease groundwater recharge rates as flows would continue downstream instead of being detained.



## 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.

The proposed dam rehabilitation project does not have a direct purpose of protecting drinking water. However, failure of the dam would likely cause damage to public infrastructure including water lines and sewer lines. Therefore, this project will indirectly protect those critical features by making the dam safer and more robust.

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.

This project aligns with the goals of the Lower Republican Natural Resources District Integrated Management Plan (IMP) (Fifth Generation, published September 27, 2021). Goal 4 of the IMP states: “Sustain a balance between water uses and water supplies within LRNRD so that the economic viability, social and environmental health, safety, and welfare of LRNRD can be achieved and maintained for both the near and long-term.” The dam rehabilitation project will help the LRNRD work towards this goal by increasing health and safety of the residents living downstream of the dam, improving economic stability of the City of Red Cloud by reducing the likelihood of flood damages, and providing environmental health through improved wildlife, wetland, and riparian habitat in the dam pool area.

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.

The rehabilitated dam will feature a permanent pool of approximately 2.5 surface acres, and a flood pool of approximately 13.5 surface acres. According to the United States Department of Agriculture’s Web Soil Survey, soils in this area are composed of well drained silt loam that primarily fall into hydrologic soil group B. Group B soils are known to have moderate to high rates of water infiltration. Therefore, the pool area behind the rehabilitated dam will provide groundwater recharge to the local aquifer. Groundwater recharge is an ancillary benefit to the rehabilitation project, so no detailed evaluation of recharge quantities has been performed. There will be no increase in regular streamflow. Flows will pass through the dam spillway and travel downstream only during precipitation events that cause the dam pool to exceed its normal operating capacity.

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 primary purpose of the Red Cloud Dam rehabilitation project is to provide improved flood control benefits to residents of the City of Red Cloud. In addition to flood control benefits, dam rehabilitation will provide a variety of secondary benefits. Wildlife and waterfowl habitat will be improved by deepening and increasing the area of the permanent pool. The permanent pool will provide opportunities for improved lake-side wetland habitat to establish naturally. Groundwater recharge is likely to occur due to the well-drained silt loam soils in the vicinity of the dam. Surface water quality downstream of the dam will be improved as the permanent pool will capture sediment and pollutants carried in runoff and allow them to be treated by the wetland areas and settle out in the permanent pool.

While the exact age of the dam is not known, it is estimated to have been built around 1960. Today, it is in poor condition and does not meet current dam safety standards. The auxiliary spillway has been damaged by cattle grazing and farm machinery. The dam provides flood protection to approximately 17 buildings, 16 separate roads (including Highways 136 and 281), the BNSF railway line, and the Red Cloud Cemetery. Rehabilitating this dam will improve public health and safety for residents of Red Cloud for 50+ years.

The dam requires significant alterations to meet NeDNR hazard classification requirements, including raising the dam height by approximately five feet, constructing a new emergency spillway, and replacing the current riser and spillway inlet/outlet structures. The existing dam riser and principal spillway pipes are made of corrugated steel and are in very poor condition. NeDNR requires that these structures be replaced with reinforced concrete pressure pipe, driving up the cost of the rehabilitation significantly. However, through special consultation with NeDNR, it was determined that High Density Polyethylene (HDPE) plastic pipe encased in concrete could be used instead of reinforced concrete pressure pipe while still meeting NeDNR requirements. Using HDPE pipe encased in concrete instead of reinforced concrete pipe would reduce the overall cost of the project by an estimated \$93,900. This innovative approach would be the first usage of HDPE pipe encased in concrete for a dam project in the State of Nebraska.

The long-range forecast is that the rehabilitated dam will provide the benefits described above for the lifespan of the rehabilitated dam structure. This is designed to be a minimum of 50-years, with a maximum lifespan of 100-years if the city diligently conducts necessary operations and maintenance activities.

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.

This dam rehabilitation project will not reduce beneficial uses of Nebraska's water resources. The primary purpose of the Red Cloud Dam rehabilitation project is to provide improved flood control benefits to residents of the City of Red Cloud. This is a clear beneficial impact to residents of Nebraska. The dam is currently in poor condition and no longer meets current dam safety standards. The auxiliary spillway has been damaged by cattle grazing and farm machinery. The dam provides flood protection to approximately 17 buildings, 16 separate roads (including Highways 136 and 281), the BNSF railway line, and the Red Cloud Cemetery. Rehabilitating this dam would improve public health and safety for residents of Red Cloud for 50+ years.

In addition to flood control benefits, dam rehabilitation will provide a variety of secondary benefits. Wildlife and waterfowl habitat will be maintained into the future by rehabilitating the structure and installing permanent fencing that protects the riparian area immediately around the dam and pool. The permanent pool will provide opportunities for improved lacustrine wetland habitat to establish naturally. Groundwater recharge is likely to occur due to the well-drained silt loam soils in the vicinity of the dam. Surface water quality downstream of the dam will be improved as the permanent pool will capture sediment and pollutants carried in runoff and allow them to be treated by the wetland areas and settle out in the permanent pool.

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.

Total project costs are estimated to be \$496,560. This includes \$70,820 in engineering, design, and permitting, \$15,000 in land easements, and \$410,740 in construction. The total CDBG funding amount for the dam rehabilitation project is \$253,750. After leveraging federal CDBG funds, the remaining costs consist of \$242,810 in construction fees. Construction costs include physical construction activities such as earthwork, as well as administration work, bidding, and construction oversight. The city is requesting \$145,686 from WSF to help fund the construction phase of the dam rehabilitation project. This amount is 60% of the remaining construction cost after federal CDBG funds have been applied. The remaining 40% (\$97,124) would be contributed by the city and LRNRD. A breakdown of cost distributions is included in Table 5 below.

Benefits were estimated based on information available from the Webster County Assessor. The total cost of the project is estimated to be \$496,560, while the total assessed value of the properties downstream of the dam that would be impacted by flooding if the dam were not present is approximately \$705,000. Therefore, the Red Cloud dam rehabilitation project has an estimated benefit to cost ratio of 1.4. Note that this does not include any monetary benefits associated with potential disruption to BNSF railway operations due to flooding, or secondary benefits such as improvements to wetland, aquatic, wildlife, and waterfowl habitat. The permanent pool upstream of the dam structure would facilitate groundwater recharge, increasing water sustainability. Based on this available information, the project is cost effective.

**Table 5: Cost Distribution**

Task	Requested from WSF	CDBG Funds	Local Funds*	Total
Design & Permitting	\$0	\$70,820	\$0	\$70,820
Land Easement	\$0	\$15,000	\$0	\$15,000
Construction	\$145,686	\$167,930	\$97,124	\$410,740
<b>Total</b>	<b>\$145,686</b>	<b>\$253,750</b>	<b>\$97,124</b>	<b>\$496,560</b>

\*LRNRD has contributed \$15,000 towards the project.

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 Red Cloud dam is located within the Republican River basin and is subject to the 1943 Kansas-Nebraska-Colorado Republican River Compact (the Compact). Article IV of the Compact allocates 190,300 acre-feet of water for beneficial use in Kansas annually. This water is derived from seven separate drainage basins upstream of the Kansas-Nebraska border. The rehabilitated Red Cloud dam may be operated as a storage reservoir to assist the State of Nebraska in complying with the requirements of the Compact. Excess water could be stored in the dam pool and released during times of need to supplement flows in the Republican River. The rehabilitation project will include a functioning drawdown valve so water can be released on an as-needed basis. No change to the dam's current water storage right is proposed with the rehabilitation project.

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 primary purpose of the Red Cloud Dam rehabilitation project is to provide improved flood control benefits to residents of the City of Red Cloud. This includes reduced threats of property damage, and protection of downstream infrastructure.

While the exact age of the dam is not known, it is estimated to have been built around 1960. Today, it is in poor condition and no longer meets dam safety standards. The auxiliary spillway has been damaged by cattle grazing and farm machinery. The dam provides flood protection to approximately 17 buildings, 16 separate roads (including Highways 136 and 281), the BNSF railway line, and the Red Cloud Cemetery. Rehabilitating this dam would improve public health

and safety for residents of Red Cloud for 50+ years and would reduce the likelihood of damage to downstream infrastructure including roads, bridges, and the BNSF railroad.

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.

The Red Cloud dam rehabilitation project will help improve surface water quality. The Nebraska Department of Environment and Energy (NDEE) is responsible for implementing the Clean Water Act Section 319 Program for the State of Nebraska. In support of this, NDEE assigns beneficial uses to lakes and streams throughout the state and assesses water quality criteria to determine if a waterbody can successfully meet its assigned beneficial uses. If the waterbody fails to meet the assigned use, it can be considered impaired. According to the 2022 NDEE Integrated Report, the segment of the Republican River directly downstream of the Red Cloud dam is impaired due to elevated concentrations of E. coli bacteria. Runoff captured by the Red Cloud dam will be treated by wetlands surrounding the pool, including harmful bacteria such as E. coli. The permanent pool will allow sediment and other pollutants to settle out of the water. Treated water will then travel through the dam structure and continue downstream, improving the overall water quality in this reach of the Republican River. The Republican River is utilized for recreation, and agriculture water supply in this region.

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.

Total project costs are estimated to be \$496,560. This includes \$70,820 in engineering, design, and permitting, \$15,000 in land easements, and \$410,740 in construction. Construction costs include physical construction activities such as earthwork, as well as administration work, bidding, and construction oversight. The city has secured federal aid through a Community Development Block Grant (CDBG) in the amount of \$253,750 for the dam rehabilitation project. After

leveraging federal CDBG funds, the remaining costs consist of \$242,810 in construction fees. The city is requesting \$145,686 from WSF to help fund the construction phase of the dam rehabilitation project. This amount is 60% of the remaining construction cost after federal CDBG funds have been applied. The remaining 40% (\$97,124) would be contributed by the city and LRNRD. The City of Red Cloud has an annual operating budget of approximately \$8,500,000 and has already set aside funds to pay their share of the 40% costs.

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 City of Red Cloud is an incorporated community in the State of Nebraska. The rehabilitated dam will be owned and operated by the city. The city will be liable and responsible for all operations, maintenance, and improvements. Residents of Red Cloud will be the primary beneficiaries of the dam rehabilitation project. The population of Red Cloud is approximately 982. The Lower Republican Natural Resources District (LRNRD) is a project partner and has statutory responsibilities to protect and conserve natural resources within their jurisdiction. This project aligns with the goals of the LRNRD Integrated Management Plan (IMP) (Fifth Generation, published September 27, 2021). Goal 4 of the IMP states: "Sustain a balance between water uses and water supplies within LRNRD so that the economic viability, social and environmental health, safety, and welfare of LRNRD can be achieved and maintained for both the near and long-term." The dam rehabilitation project would help the LRNRD work towards this goal by increasing health and safety of the residents living downstream of the dam, improving economic stability of the City of Red Cloud by reducing the likelihood of flood damages, and providing environmental health through improved wildlife, wetland, and riparian habitat in the dam pool area. The remaining project partner is the South Central Economic Development District, who is administering the federal Community Development Block Grant that was awarded to the city.



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 will provide flood control, improve surface water quality, and facilitate groundwater recharge. Flood damage, impaired water quality, and groundwater declines are common issues throughout the State of Nebraska. Residents of Red Cloud will be the primary beneficiaries of the dam rehabilitation project. The population of Red Cloud is approximately 982. The dam provides flood protection to approximately 17 buildings, 16 separate roads (including Highways 136 and 281), the BNSF railway line, and the Red Cloud Cemetery. Surface water quality downstream of the dam will be improved as the permanent pool will capture sediment and pollutants carried in runoff and allow them to be treated by the wetland areas and settle out in the permanent pool. Groundwater recharge would occur due to the well-drained silt loam soils in the vicinity of the dam.

Additionally, the Red Cloud dam is located within the Republican River basin and is subject to the 1943 Kansas-Nebraska-Colorado Republican River Compact (the Compact). Article IV of the Compact allocates 190,300 acre-feet of water for beneficial use in Kansas annually. This water is derived from seven separate drainage basins upstream of the Kansas-Nebraska border. The rehabilitated Red Cloud dam may be operated as a storage reservoir to assist the State of Nebraska in complying with the requirements of the Compact. The rehabilitated dam has a maximum storage volume of approximately 131.2 acre-feet of water. Water stored in the dam pool could be released during times of need to supplement flows in the Republican River.

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 City of Red Cloud has secured a federal Community Development Block Grant (CDBG) in the amount of \$253,750 for the purposes of the dam rehabilitation project. These federal funds will cover 51% of the entire project cost. Total project costs

are estimated to be \$496,560. This includes \$70,820 in engineering, design, and permitting, \$15,000 in land easements, and \$410,740 in construction. After leveraging federal CDBG funds, the remaining costs consist of \$242,810 in construction fees. Construction costs include physical construction activities such as earthwork, as well as administration work, bidding, and construction oversight. The city is requesting \$145,686 from WSF to help fund the construction phase of the dam rehabilitation project. This amount is 60% of the remaining construction cost after federal CDBG funds have been applied. The remaining 40% (\$97,124) would be contributed by the city and LRNRD. If Water Sustainability Funds are not made available, the city would obtain a loan to proceed with the project. The City of Red Cloud has an annual operating budget of approximately \$8,500,000 and has already set aside funds to pay their share of the 40% costs. Letters of support and commitment from the city, LRNRD, and SCEDD can be found in Attachment A.

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.

The Red Cloud dam rehabilitation would improve watershed health and function within the dam's watershed and the area directly downstream of the dam to the Republican River. Surface water quality downstream of the dam will be improved as the permanent pool will capture sediment and pollutants carried in runoff and allow them to be treated by the wetland areas and settle out in the permanent pool. Groundwater recharge would occur due to the well-drained silt loam soils in the vicinity of the dam. Additionally, the rehabilitated dam would provide improved wildlife, wetland, and riparian habitat in the dam pool area.

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.

The following objectives from the 2023 Annual Report would be met by the Red Cloud dam rehabilitation project:

- Objective 2B: Work with dam owners to address deficiencies that may place the public or key infrastructure at risk.
  - The Red Cloud dam rehabilitation project has and will continue to involve working directly with NeDNR staff to reduce flooding threats to residents of Red Cloud and downstream infrastructure. The professional engineer hired by the City of Red Cloud to design the rehabilitated dam structure underwent special consultation with

NeDNR to determine that High Density Polyethylene (HDPE) plastic pipe encased in concrete could be used instead of reinforced concrete pressure pipe while still meeting dam hazard classification requirements. Using HDPE pipe encased in concrete instead of reinforced concrete pipe would reduce the overall cost of the project by an estimated \$93,900. This innovative approach would be the first usage of HDPE pipe encased in concrete for a dam project in the State of Nebraska.

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 Red Cloud dam is located within the Republican River basin and is subject to the 1943 Kansas-Nebraska-Colorado Republican River Compact (the Compact). Article IV of the Compact allocates 190,300 acre-feet of water for beneficial use in Kansas annually. This water is derived from seven separate drainage basins upstream of the Kansas-Nebraska border. The rehabilitated Red Cloud dam may be operated as a storage reservoir to assist the State of Nebraska in complying with the requirements of the Compact. The rehabilitated dam will have a slide gate drawdown valve. Water stored in the normal pool could be released during times of need to supplement flows in the Republican River.