NEBRASKA NATURAL RESOURCES COMMISSION

Water Sustainability Fund

Application for Funding

Section A.

ADMINISTRATIVE

PROJECT NAME: Little Indian Creek Watershed Flood Prevention & Operations (WFPO)

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

Sponsor Business Name: Lower Big Blue Natural Resources District

Sponsor Contact's Name: Scott Sobotka

Sponsor Contact's Address: 805 Dorsey St., Beatrice, NE 68310

Sponsor Contact's Phone: (402) 228-3402

Sponsor Contact's Email: sobotka@lbbnrd.net

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

   Grant amount requested. $ 1,788,300.00

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

   If a loan is requested amount requested. $ NA

   - How many years repayment period? NA
   - Supply a complete year-by-year repayment schedule. NA

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.
- What is the population served by your project?
- Provide a demonstration of need.
- **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☒

USACE has been involved with the planning process as a cooperating partner with NRCS since the beginning of the project. Through this process, the permit approach, including avoidance and minimization of impacts have been analyzed and refined through a Clean Water Act (CWA) 404(b)(1) and NEPA merge process. Wetland delineations were completed for all sites during the summer of 2021 and finished in the summer of 2022, so a significant portion of the CWA data collection has been completed. This paves the path for the actual permitting to be completed with the next phase of the project. Through the planning process, cultural resources investigations, including field work, have been completed. The reporting is in process, but no negative impacts have been identified to this point.

Permit applications will occur during the final design phase starting in 2023. It is anticipated that permits would be received in 2024-2025. Costs for obtaining the permits required are in Table 2 and are a portion of the grant application funding being requested. Anticipated permits include NDEE National Pollutant Discharge Elimination System (NPDES) for Construction Storm Water, USACE Clean Water Act (CWA) Section 404, NeDNR Dam Safety construction permits, Big Blue River Compact compliance, NDEE Dust Regulations compliance, NDEE solid waste management compliance, Migratory Bird Treaty Act and Endangered Species Act Section 7 compliance, National Environmental Policy Act compliance, Section 106 National Historic Preservation Act compliance, Gage County Floodplain, and National Flood Insurance Program compliance.

4. Partnerships

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

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

NRCS

The State NRCS office is the funding agent, but also a partner in development of the WFPO Plan-EA. NRCS technical staff are involved in all review meetings, alternative development and analysis, and plan development and review of submittals.

USACE

USACE is acting as a cooperative Federal Agency throughout the plan development, including assistance with reviewing alternatives development and screening, and development of the CWA 404 permitting approach.

City of Beatrice

The City of Beatrice supports this project, and a Letter of Support is provided in Attachment 1.

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.

NRCS is providing 100% funding for the Plan-EA development (ongoing), design, and construction, pending final NRCS approval of the Plan-EA. The local sponsor (NRD) is responsible for permitting and land rights. We are requesting 60% cost share of the permitting and land rights portion of the project. The 2022 Project Cost Distribution is shown in Table 1.

Table 1. 2022 Project Cost Distribution

Alt ID	Brief Description	Water Sustainability Fund (WSF)/LBBNRD Cost Share			NRCS Cost (Not Part of the WSF Grant Request)			Total Installation Cost	O&M Cost (Annual)[2], Paid by LBBNRD
		Real Property Rights Cost[1]	Permitting Cost[4]	Total SLO	Engineering Cost[3]	Construction Cost	Total WFPO		
F1-2	New dam, low hazard	$ 71,841	$ 33,000	**$ 104,841**	$ 216,246	$ 1,554,270	$ 1,770,516	$ 1,875,357	$ 11,657
F1-1	New dam, low hazard	$ 17,479	$ 33,000	**$ 50,479**	$ 134,150	$ 964,204	$ 1,098,355	$ 1,148,834	$ 7,232
F1-10	New dam, significant hazard	$ -	$ 33,000	**$ 33,000**	$ 121,202	$ 871,136	$ 992,338	$ 1,025,338	$ 6,534
F1-63	New dam, low hazard	$ 172,557	$ 33,000	**$ 205,557**	$ 307,946	$ 2,213,362	$ 2,521,308	$ 2,726,865	$ 16,600
F1-65	New dam, low hazard	$ -	$ 33,000	**$ 33,000**	$ 123,593	$ 888,325	$ 1,011,918	$ 1,044,918	$ 6,662
F1-66	New dam, low hazard	$ -	$ 33,000	**$ 33,000**	$ 122,820	$ 882,769	$ 1,005,589	$ 1,038,589	$ 6,621
F1-60	New dam, low hazard	$ -	$ 33,000	**$ 33,000**	$ 145,136	$ 1,043,168	$ 1,188,304	$ 1,221,304	$ 7,824
F1-61	New dam, low hazard	$ 269,500	$ 70,000	**$ 339,500**	$ 151,507	$ 1,088,953	$ 1,240,460	$ 1,579,960	$ 8,167
F1-30	New dam, low hazard	$ 84,561	$ 70,000	**$ 154,561**	$ 190,333	$ 1,368,017	$ 1,558,350	$ 1,712,911	$ 10,260
F1-31	New dam, low hazard	$ 82,775	$ 33,000	**$ 115,775**	$ 190,636	$ 1,370,199	$ 1,560,836	$ 1,676,611	$ 10,276
F1-22	New dam, low hazard	$ -	$ 33,000	**$ 33,000**	$ 134,120	$ 963,985	$ 1,098,104	$ 1,131,104	$ 7,230
F1-21	New dam, low hazard	$ 51,744	$ 33,000	**$ 84,744**	$ 217,533	$ 1,563,515	$ 1,781,048	$ 1,865,792	$ 11,726
F1-24	New dam, low hazard		$ 33,000	**$ 33,000**	$ 153,190	$ 1,101,051	$ 1,254,241	$ 1,287,241	$ 8,258
F1-20	New dam, low hazard	$ 152,306	$ 33,000	**$ 185,306**	$ 328,922	$ 2,364,130	$ 2,693,052	$ 2,878,358	$ 17,731
F1-20A	Wetland/sediment basin	$ 15,400	$ 70,000	**$ 85,400**	$ 25,071	$ 180,199	$ 205,270	$ 290,670	$ 1,351
F1-23	New dam, low hazard	$ -	$ 33,000	**$ 33,000**	$ 141,385	$ 1,016,206	$ 1,157,591	$ 1,190,591	$ 7,622
F1-70	New dam, low hazard	$ 75,537	$ 33,000	**$ 108,537**	$ 163,156	$ 1,172,683	$ 1,335,839	$ 1,444,376	$ 8,795
F1-90	New dam, low hazard	$ -	$ 33,000	**$ 33,000**	$ 133,321	$ 958,247	$ 1,091,568	$ 1,124,568	$ 7,187
F1-91	New dam, low hazard	$ -	$ 33,000	**$ 33,000**	$ 105,284	$ 756,728	$ 862,012	$ 895,012	$ 5,675
F1-92	New dam, low hazard	$ 167,013	$ 33,000	**$ 200,013**	$ 218,895	$ 1,573,307	$ 1,792,202	$ 1,992,215	$ 11,800
F1-93	New dam, low hazard	$ 20,944	$ 33,000	**$ 53,944**	$ 112,848	$ 811,096	$ 923,944	$ 977,888	$ 6,083
F1-40	New dam, low hazard	$ -	$ 33,000	**$ 33,000**	$ 124,453	$ 894,504	$ 1,018,956	$ 1,051,956	$ 6,709
F1-50	New dam, low hazard	$ -	$ 33,000	**$ 33,000**	$ 187,935	$ 1,350,785	$ 1,538,720	$ 1,571,720	$ 10,131
F1-80	New dam, high hazard	$ 280,311	$ 33,000	**$ 313,311**	$ 214,297	$ 1,540,263	$ 1,754,560	$ 2,067,871	$ 11,552
F1-62C	New dam, low hazard	$ 115,500	$ 70,000	**$ 185,500**	$ 99,088	$ 712,195	$ 811,283	$ 996,783	$ 5,341
F1-64	New dam, low hazard	$ 318,780	$ 70,000	**$ 388,780**	$ 120,802	$ 868,264	$ 989,066	$ 1,377,846	$ 6,512
	Totals:	**$ 1,896,248**	**$1,043,000**	**$2,939,248**	**$4,183,869**	**$30,071,562**	**$34,255,431**	**$37,194,680**	

Notes:

[1] Includes cost of legal fees and land appraisals; if blank, existing easements are in place and no land rights are needed.

[2] Operation & Maintenance (O&M) costs estimated as 0.75% of construction per NRCS guidance

[3] Includes design, bidding, construction administration and oversight

[4] Includes all permitting required: USACE 404, Cultural Resources, NeDNR Dam Safety, T&E, Water Rights

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!

Since 1996 there have been 17 separate flooding events recorded in the watershed (*NCEI, 2020*) resulting in repetitive flooding of structures, crops, and communities, such as Beatrice, NE. The project purpose is flood risk reduction, along with improving water quality within the Little Indian Creek Watershed. The project is needed to reduce the risks for flood damages from the Little Indian Creek and its tributaries because the **existing flood risk reduction structures in the watershed have exceeded their 50-year service life**. To prevent flooding, the project scope is to reduce peak runoff measured at the US Highway 77 bridge in Beatrice from the 100-year storm event from 17,600 cubic feet per second (CFS) to approximately 10,100 CFS.

The Little Indian Creek Watershed is a tributary of the Big Blue River and is mostly located in Gage County in Southeastern Nebraska, north of Beatrice, NE generally parallel to US Highway 77. The watershed is subject to flooding damages from Little Indian Creek, primarily to the **City of Beatrice**, but also to the

agricultural lands throughout the watershed. Little Indian Creek has experienced repetitive flooding issues. The watershed is impacted by both flash flooding and riverine floods. Outside of the watershed's communities, most of the land is used for row crop agriculture. Flood damage to cropland and pasture can occurs due to inundation, sediment deposition, scour, and erosion. Additionally, damage to roads and bridges can impede watershed residents' access to emergency services.

Flooding within the Little Indian Creek Watershed affects approximately 80 structures within the 100-year regulatory floodplain, most of which are within the City of Beatrice. Without the watershed's flood control dams, the number of impacted structures would be much higher. To quantify flood risk, the project team calculated the estimated average annual flood damages to buildings and agricultural lands based on existing conditions within the watershed with and without dams. Hydraulic and hydrologic modeling results were assessed using the Federal Emergency Management Agency's (FEMA) Hazards United States (HAZUS) program. For buildings and income losses in the watershed, **the estimated annualized flood damages without dams are $2,827,000. The estimated annualized flood damages to agricultural lands are $42,000. Without this watershed project, future conditions are not anticipated to improve.**

In April 2020, the Lower Big Blue Natural Resources District (LBBNRD) requested funding from the NRCS Watershed and Flood Prevention Operations (WFPO) program. In August 2020, an agreement was established with NRCS and LBBNRD, initiating a 24-month planning process to evaluate alternatives to reduce the flood hazard risk in the Little Indian Creek Watershed. The Watershed Plan and Environmental Assessment (Plan-EA) is prepared under the authority of *WFPO (Public Law 83-566, Stat. 666 as amended) and in accordance with NEPA (40 CRF parts 1500-1508) and following the guidelines of NRCS Title 390 - National Watershed Program Manual and Principles, Requirements, and Guidance for Water and Land Related Resources Implementation Studies (PR&G) of the Water Resources Planning Act of 1965 (PL 89-80).*

The National Economic Development (NED) Alternative is the alternative or combination of alternatives that reasonably maximizes the net economic benefits consistent with protecting the nation's resources. Of the alternatives considered, the multiple dam alternative provided the greatest benefits to the watershed, while also meeting the project purpose and need. Therefore, the multiple dams alternative is the NED Alternative being carried forward for detailed study and recommended within the Plan-EA. **This alternative consists of constructing 25 dams to reduce flooding damages in the Little Indian Creek Watershed, designed for 100-year life, providing an extension of flood risk reduction benefits in this watershed for many years to come.**

7. Project Tasks and Timeline

Identify what activities will be conducted to complete the project, and the anticipated completion date.

- 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.

The current Little Indian Creek WFPO Plan-EA is 90% complete, with final completion scheduled for late 2022 or early 2023 (months ahead of the deadline of August 2023). When the Plan-EA is approved by the NRCS National Watershed Management Center (NWMC), funding for design and construction will be

released. At this time, final land rights negotiations will commence, along with the final permitting and design phases. The construction will be phased with an estimated start date of Spring 2024. Construction is estimated to continue through approximately 2030. The cost information for the estimated construction period as well as the estimated project life is shown in Table 2.

Table 2. Cost information for the estimated construction period as well as the estimated project life.

Cost Item	**Year 0** 2022	**Year 1** 2023	**Year 2** 2024	**Year 3** 2025	**Year 4-100** 2026-2121	**Total Amount**
Engineering (Paid by the NRCS)	Paid by NRCS	Paid by NRCS	Paid by NRCS	Paid by NRCS	Paid by NRCS	**$4,183,869**
Permitting and compliance		$500,000	$584,271			**$1,084,271**
Land Acquisition			$474,062	$474,062	$948,124	**$1,896,248**
Construction (Paid by the NRCS)				Paid by NRCS	Paid by NRCS	**$30,071,562**
Operation and					Maintenance (Paid by the LBBNRD over 100-year time period))	

8. IMP

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

The Voluntary Integrated Management Plan (VIMP) was prepared by the staff and Board of Directors of the Lower Big Blue Natural Resources District and the Nebraska Department of Natural Resources (NeDNR) in consultation with the District Stakeholder Advisory Committee and in accordance with the Nebraska Groundwater Management and Protection Act. The effective date of the VIMP is April 6, 2022. The VIMP is provided at the NeDNR website at https://dnr.nebraska.gov/water-planning/lower-big-blue-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;

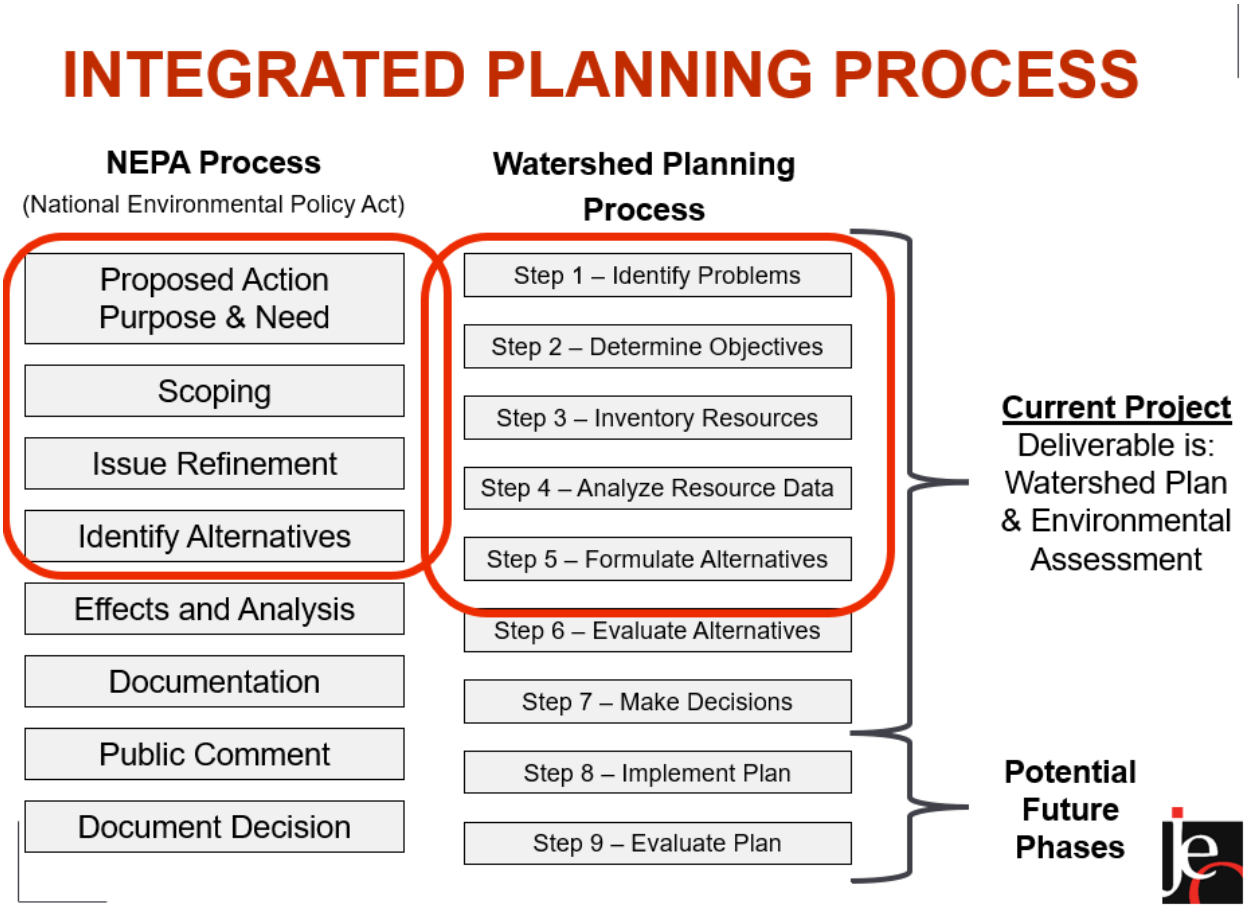
The feasibility of the project has been verified through the economic analysis within the NRCS WFPO Plan-EA. The benefit cost ratio is currently calculated at 1.28:1. Benefits and damages have been estimated using hydraulic modeling outputs and FEMA's HAZUS tool for the primary storm frequencies: 10-year, 25-year, 50-year, 100-year, and 500-year events.

In 2022, the Lower Big Blue Natural Resources District (LBBNRD) and JEO Consulting Group, Inc developed the Little Indian Creek Watershed Work Plan Environmental Assessment Investigation and Analysis to determine the feasibility of the Little Indian Creek Watershed project. The final plan identifies the elements of the project for flood prevention (flood risk reduction) as measures installed to prevent or reduce damages caused by floodwater. Flood damage reduction is further defined as the control and disposal of surface water caused by abnormally high direct precipitation, stream overflow, or floods aggravated or caused by wind. The project is needed to reduce the potential for damages resulting from overtopping of Little Indian Creek and its tributaries, and due to existing flood reduction structures **exceeding their 50-year design life. The existing structures were built in the 1950s and 1960s.**

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

The purpose of the project is flood prevention within the Little Indian Creek Watershed, which is quantified by reducing the peak flow in Little Indian Creek during a 100-year storm event from 17,600 CFS to 10,100 CFS, measured at the US Highway 77 bridge in Beatrice, NE. The NRCS WFPO program requires plan development following their guidelines. A summary of the steps included in that process is shown in the figure below, where the NEPA process is integrated with the watershed planning process. Steps 1 through 7 are being completed through the WFPO Plan-EA development. Upon receiving Plan approval from NRCS National Watershed Management Center (NWMC), funding will be released for final design and construction. **It is important to note that USACE has been engaged as a cooperating Federal Agency throughout the watershed planning process to ensure the NEPA process is adequately merged**

with the 404(b)(1) alternatives analysis process for the Clean Water Act (CWA) compliance. With the completion of the watershed Plan-EA, a portion of the up-front permitting for Section 404 will be complete through the merge process.



WFPO Integrated Planning Process

The alternative analysis process screened the watershed for a complete list of flood risk reduction options including levees, diversion channels, detention cells, single large dam, multiple dams, conservation measures, flood proofing, and zoning. Each alternative was evaluated using the Least Environmental Damaging Practicable Alternative (LEDPA) for 404(b)(1) criteria (2014, Army Corps of Engineers, https://www.swf.usace.army.mil/Portals/47/docs/regulatory/Handouts/Preparing_An_Alternatives_%20Analysis.FINAL.pdf. Accessed 26 July 2022.) for purposes and effectiveness, public acceptance, cost, technology, and logistics. Public involvement and landowner engagement occurred through several required scoping meetings, along with one-on-one landowner meetings with all affected property owners. The range of alternatives considered is shown in Table3.

Table 3. Range of Alternatives Considered

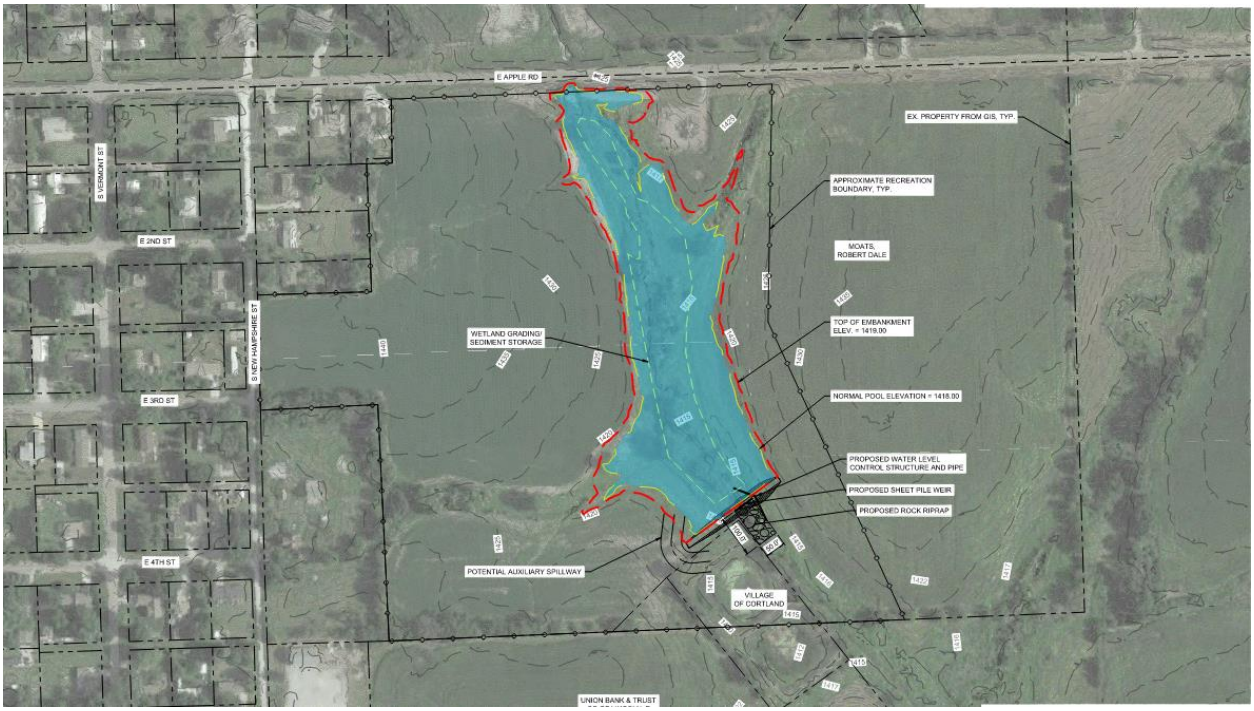
Summary of Alternative	Meets Purpose and Need?	Reasonable	Practicable	Abbreviated Total Cost Estimate	Carried Forward for Detailed Study
No Action Represents the future conditions if there is no federal investment and no projects are implemented.	**No.** Does not meet project purpose and need	n/a	n/a	$0	Yes
Channel Widening Enlarge the existing channel of Little Indian Creek to improve conveyance of floodwaters.	**Yes.** Meets project purpose and need	**Yes**	**No.** The cost is exorbitant.	>$50,000,000	No
Diversion Channel Construct a new channel to divert high flows out of Little Indian Creek and around communities.	**No.** Does not meet project purpose and need	n/a	n/a	Not Estimated	No
Levee Construct one or more levees along the banks of Little Indian Creek to contain or redirect high flows.	**Yes.** Meets project purpose and need	**No.** Impacts to homes are businesses are unreasonable.	**No.** Challenging logistics make this alternative not practicable.	>$36,000,000	No
Detention Cells Excavate one or more basins to detain floodwater before it reaches Beatrice.	**Yes.** Meets project purpose and need	**No.** The amount of land required is unreasonable.	**No.** The cost is exorbitant.	Not Estimated	No
Stream Restoration / Wetland Storage Clear debris from Little Indian Creek and its tributaries and construct new additional wetlands to provide off-channel storage.	**Yes.** Meets project purpose and need	**No.** The amount of land required is infeasible.	**No.** The cost is exorbitant.	Not Estimated	No
Single Dam Construct one large dam on Little Indian Creek to capture and store floodwater.	**Yes.** Meets project purpose and need	**No.** The amount of land required is unreasonable.	**No.** The cost is exorbitant.	>$50,000,000	No
Multiple Dams Construct multiple dams throughout the watershed to capture and store floodwater.	**Yes.** Meets project purpose and need	**Yes**	**Yes**	$37,194,680	Yes

Summary of Alternative	Meets Purpose and Need?	Reasonable	Practicable	Abbreviated Total Cost Estimate	Carried Forward for Detailed Study
Conservation Measures Upstream Convert upstream cropland to grass to reduce runoff and improve infiltration.	**No.** Does not meet project purpose and need	n/a	n/a	Not Estimated	No
Flood Proofing Structures Flood proof structures in the 100-year floodplain to prevent reoccurring damages.	**No.** Does not meet project purpose and need	n/a	n/a	Not Estimated	No
Property Acquisitions Purchase structures in the 100-year floodplain and demolish them to prevent reoccurring damages.	**No.** Does not meet project purpose and need	n/a	n/a	Not Estimated	No
Floodplain Regulation / Zoning Introduce land use regulations to prevent development within flood inundation areas.	**No.** Does not meet project purpose and need	n/a	n/a	Not Estimated	No
Interior Drainage / Storm Sewer System Enlarge existing and construct additional new storm sewers in and around communities.	**No.** Does not meet project purpose and need	n/a	n/a	Not Estimated	No

There are approximately 94 existing structures within the watershed constructed as part of a United States Department of Agriculture (USDA) pilot project in the 1950s and early 1960s. All these dams and grade control structures have exceeded their original design life of 50-years and are no longer providing adequate flood protection. Constructing a new dam on an existing dam site requires that the existing structure to be altered and/or deconstructed and a new structure built to the current design standards and guidelines, including providing 100-years of sediment storage.

More than twenty-five potential project sites for dams were identified and analyzed for the project. The sites were identified by using several factors including aerial imagery, publicly available GIS data, topographic data, field investigations, previous studies, previously implemented projects, and stakeholder and public involvement. The location of existing infrastructure, including roadways, railroads, trails, utilities, homes, and buildings were all considered to select low-impact sites. Structure alignments of the twenty-five dams were adjusted to compensate for infrastructure, residences, and other buildings within a dam embankment and/or top of dam footprint. State of Nebraska dam hazard classification and design criteria are based on the structure's size, proximity to cities, and the consequences of dam failure, as outlined in the Classification of Dams publication produced by NeDNR Dam Safety Section. Initial efforts were made to identify sites that could avoid high or significant hazard class structures due to their cost implications and regulatory/permitting requirements. Furthermore,

zoning restrictions to protect dam breach paths have been investigated and are being implemented by Gage County. Existing sensitive resources were also considered when choosing potential dam site locations. Stream and woodland corridors, potential wetlands, and habitat for threatened and endangered species were identified and used in conjunction with the other data collected. Various combinations of different dams and dam sizes were hydraulically modeled and run through HAZUS.



Example concept design of wetland/sediment basin near Cortland, NE.

Ultimately, 25 dam sites were deemed feasible and were evaluated incrementally for the quantity of potential flow reduction provided downstream at the US Highway 77 bridge. This is the target location for determination of the effectiveness of flood prevention. The combination of twenty-five dams provides the best flood risk reduction for the cost.

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

Field investigations were conducted during the preparation of the project report. The investigations consisted of field inspections, landowner meetings, wetlands delineations, archeological and historic resources assessment, and geotechnical investigations.

Field inspections and landowner meetings documented the general conditions of:

- Soils
- Wetlands
- Land Use and Cover
- Establish air quality conditions
- Water quality conditions in terms of designated uses
- Highly erodible cropland

- Floodplain
- Fish and wildlife habitat and generally describe species composition
- State and federally listed threatened and endangered species
- Invasive species populations
- Water quantity concerns
- Topography
- Climate
- Riparian Areas
- Natural areas (especially designated areas)
- Migratory bird habitat
- Prime and unique farmland
- Wild and scenic rivers

Wetland delineations were completed for the twenty-five project sites. These are done in compliance with the USACE requirements. JEO visited each site, in addition to a desktop assessment, to determine the presence or absence of wetlands, and their general extent and location.

Archeological and historic resources consisted of coordinating with local officials, residents, and landowners to determine if they are aware of any archeological or historic resources within the watershed. Detailed surveys were conducted for the project. A minimally intensive (Class III level) cultural resource inventory of the proposed area of potential effect (APE) identified archeological sites or historic structures that may be affected by the proposed watershed improvements. The inventory was conducted to professional standards in accordance with the *Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation* (48 FR 44716-44742), and the *Secretary's Standard for Identification* (48 FR 44720-44723). All archeological field investigations, reports, and site forms followed the guidelines issued in the *NeSHRP National Historic Preservation Act Archeological Properties Section 106 Guidelines*. All documents produced met the standards for supporting documentation under *Section 106 of the National Historic Preservation Act (36 CFR 800.11(e)*. Field investigations involved the following tasks and considerations included:

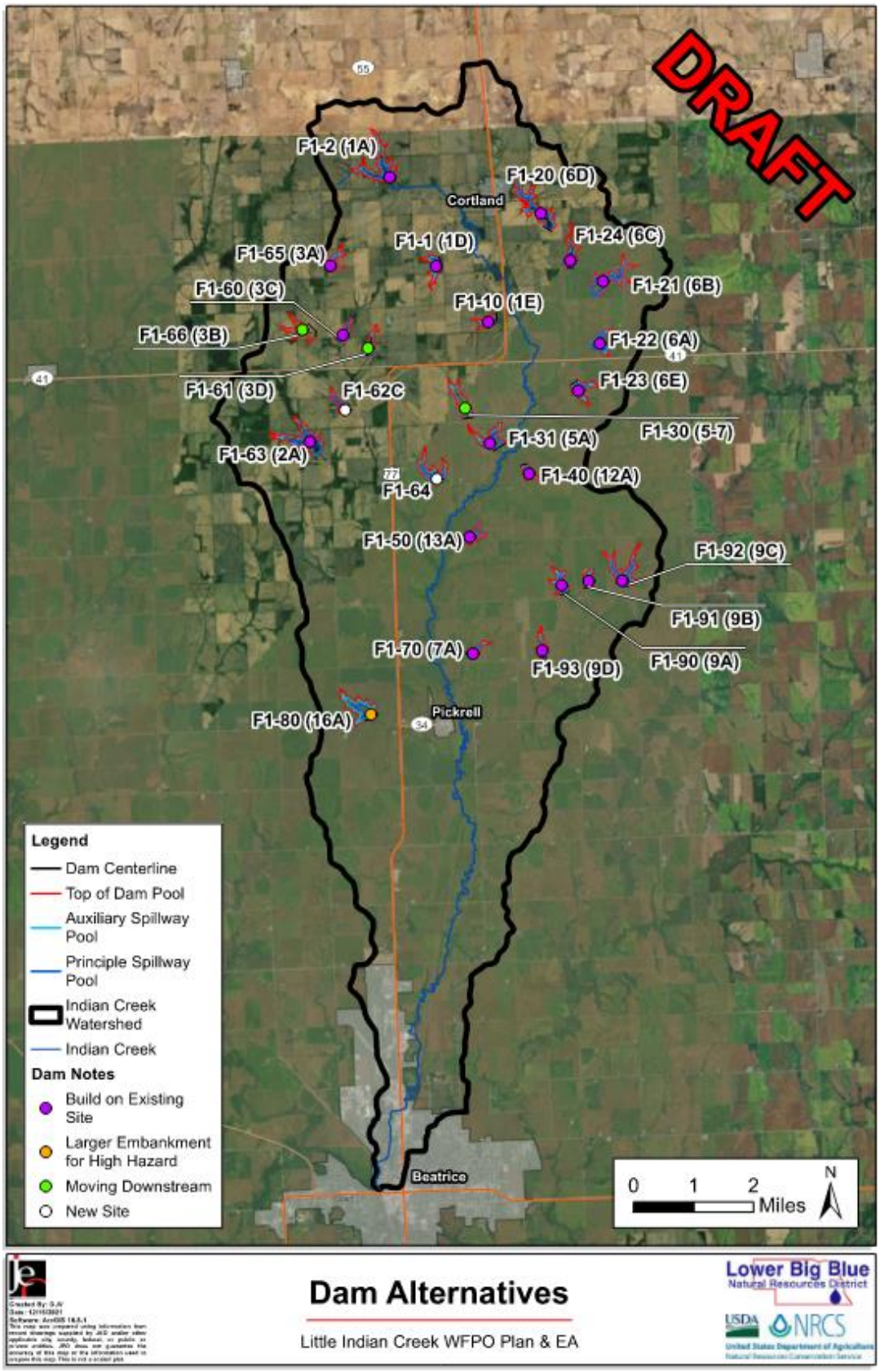
- Pedestrian archeological survey of 100 percent of the APE defined for specific construction projects.
- Based on landform setting and the results of examination of the Nebraska Buried Sites GIS, limited mechanical coring or backhoe trenching was conducted in consultation with a geomorphologist.
- Discovered archeological sites were described, photographed, and mapped using hand-held GPS units. State Archeology Office (SAO) site forms were completed for each site.
- Any artifacts collected during these investigations were returned to the property owners upon conclusion of the investigation unless owners wish to donate material to History Nebraska for permanent curation.
- Nebraska one-call was contacted prior to any subsurface testing to avoid utility conflicts.
- A historic architect conducted additional field investigations and background research to identify all above-ground resources in the defined APE in accordance with Nebraska State Historic Preservation Office (NeSHPO) guidelines for historic architectural survey.
- The results of all archeological and historic architectural investigations were documented in "Reports of Investigations".

A geotechnical investigation evaluated the geologic and groundwater resources. Data collected was intended to identify how those resources were affected by the designs of alternatives and the project sites. Geotechnical analysis occurred on twenty-five sites. Additional discussion regarding geotechnical is presented in Section 1.A.7 of this application.

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

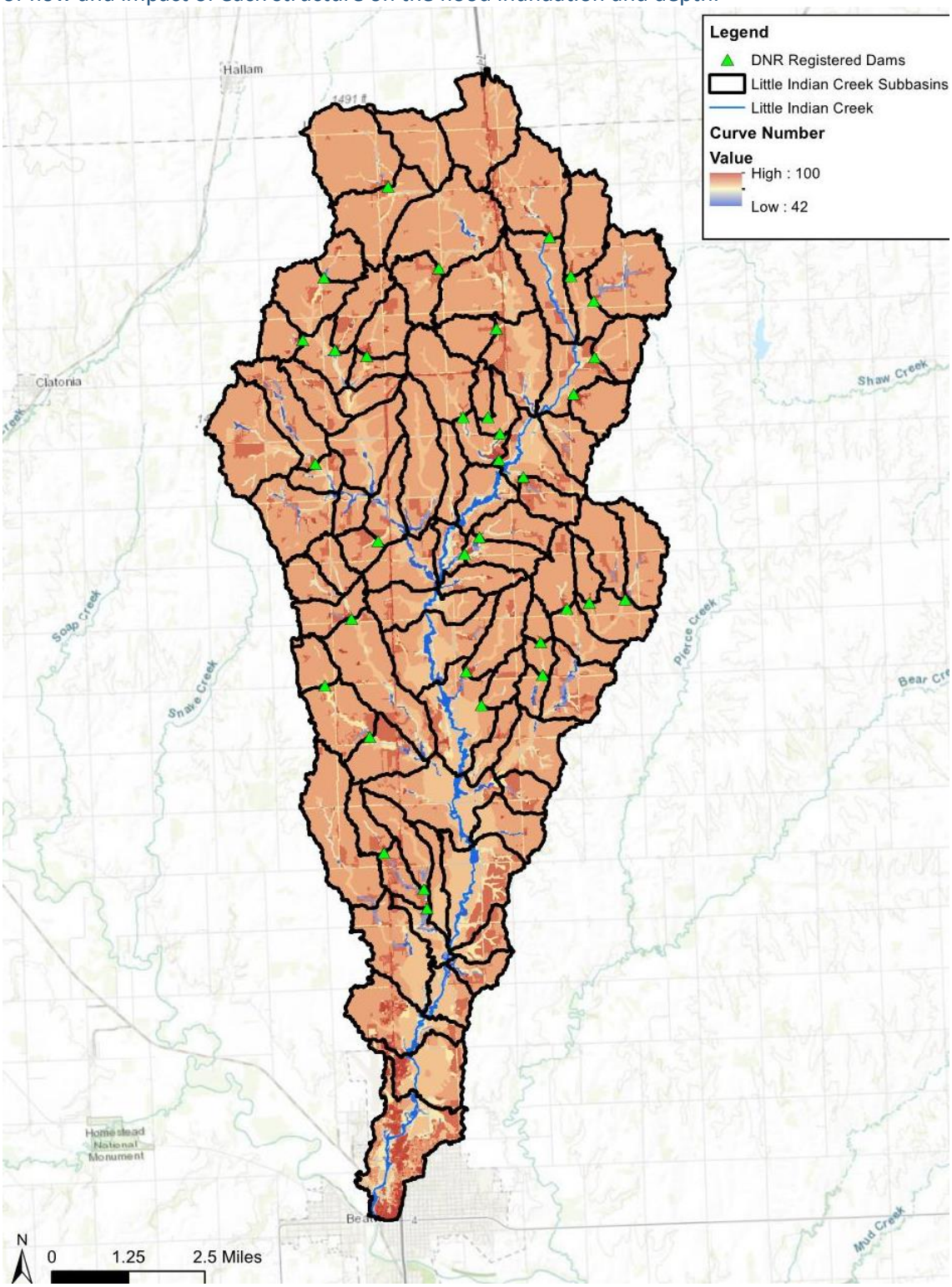
The Little Indian Creek Watershed location is located primarily in Gage County in southeastern Nebraska; the Little Indian Creek Watershed is a tributary of the Big Blue River. The watershed is subject to flooding damages from Little Indian Creek, primarily to the City of Beatrice, but also to the agricultural lands throughout the watershed. The watershed consists of 48,425 acres or 75.7 square miles in southeast Nebraska.

The Little Indian Creek Project dam sites are shown in the figure below. These twenty-five structures are distributed throughout the watershed. The new dams will be constructed to reduce flooding and erosion and to create habitat and wetlands in agricultural areas and adjacent to the cities and villages downstream, including Cortland, Pickrell, and Beatrice. One specific site is located immediately east of the Village of Cortland, and coordination with the Village has identified a future recreation project the Village will pursue incorporating the wetland/sediment basin of the WFPO structure.



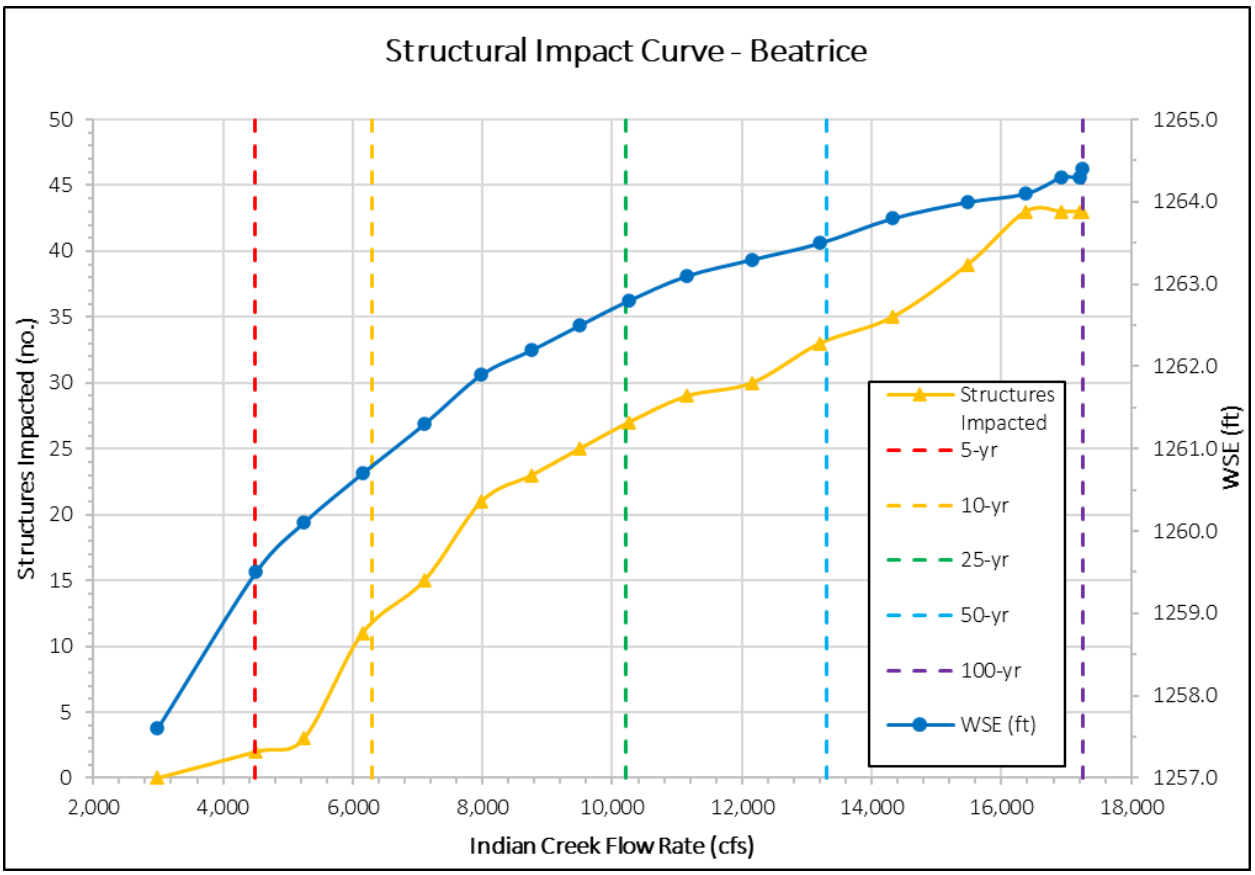
Map of planned structures in the Little Indian Creek Watershed.

The Little Indian Creek extents for hydrologic and hydraulic modeling are shown below. HEC-RAS and HMS models were developed for the watershed. This information was used to determine the reduction of flow and impact of each structure on the flood inundation and depth.



Modeling extents for the Little Indian Creek Watershed.

The “Little Indian Creek Structural Impact Curve” for Beatrice is shown below. A hydraulic risk assessment was performed by creating a structural impact curve for the City of Beatrice. This process included mapping structures impacted at various flow rates. This gives an idea of the sensitivity of the area to various flow rates/frequencies and the baseline flood risk. This was used to refine the target flow reduction.



Structure impact curve for Little Indian Creek.

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

No additional water rights will be needed for this project; however, some farmers wish to investigate the opportunity to irrigate from the reservoirs built with the project. This will be further analyzed during the final design phase. The existing water rights in the project area are listed in Table 4. LBBNRD will work with the Nebraska Department of Natural Resources (NeDNR) and landowners to ensure that existing water rights are complied with.

Table 4. Existing water rights in the watershed.

Dam	App Number	Source	Facility Name	Total AC-FT
F1-1	A-12880	Indian Creek, Trib. To	Little Indian Creek Reservoir 1-D	34.7
F1-1	A-13002	Little Indian Creek Reservoir 1-D	Schlake Pump	0
F1-2	A-14143	Indian Creek, Trib. To	Little Indian Res. 1-A	27.9
F1-24	A-9663	Indian Creek, Trib. To	Indian Creek Res. 6-C	34
F1-21	A-9664	Indian Creek, Trib. To	Indian Creek Res. 6-B	14
F1-22	A-7183	Indian Creek, Trib. To	Indian Creek Res. 6-A	21
F1-23	A-6316	Indian Creek	Boesiger Reservoir	76
F1-23	A-8670	Boesiger Reservoir	Pump	76
F1-40	A-8983	Indian Creek, Trib. To	Schernikau Reservoir	20
F1-40	A-9469	Schernikau Reservoir	Pump	21
F1-61	A-10940	Indian Creek, Trib. To	Little Indian Creek Reservoir 3-D	41.03
F1-61	A-10941	Little Indian Creek Reservoir 3-D	Spiker & Talley Pumps	0
F1-90	A-9668	Town Creek, Trib. To	Indian Creek Res. 9-A	38
F1-91	A-9669	Town Creek, Trib. To	Indian Creek Res. 9-B	15
F1-93	A-9667	Town Creek, Trib. To	Indian Creek Res. 9-11	11
F1-93	A-9470	Town Creek, Trib. To	Indian Creek Res. 9-D	20

The LBBNRD will secure all land rights and easements for implementation of this project.

As a political subdivision of the State of Nebraska, the LBBNRD has the authority to undertake the project because the purpose of the project directly relates to the development, management, utilization and conservation of groundwater and surface water as designated in Neb. Rev. Stat. Chapter 2, Article 32. Further authority of the NRDs is defined under the Nebraska Groundwater Management and Protection Act, Neb. Rev. Stat. Chapter 46, Article 7, to enter into contracts or agreements, to budget and expend levied property taxes, to own and operate property and equipment and to conduct investigations relative to the protection and management of groundwater.

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

The project consists of engineering design, construction, permitting and compliance, land acquisition, operation and maintenance, construction administration, oversight, and inspection, and project administration of twenty-five dams in the Little Indian Creek watershed. There are approximately 94 existing structures within the watershed constructed as part of a USDA pilot project in the 1950s and early 1960s. All these dams have exceeded their original design life and are no longer providing adequate flood protection. Constructing a new dam on an existing dam site requires the existing structure to be altered and/or deconstructed and a new structure built to the current design standards and guidelines, and to have sediment removed from the pool area to allow for 100 years of sediment storage for the new structure. Combinations of different numbers and locations of dams were analyzed incrementally to determine the minimum number of dams required to provide flood risk reduction to the watershed. As a result, the incremental analysis identified twenty-five dams.

The engineering component of the project will consist of final design plans and specifications for the twenty-five dams. **NRCS will pay for the engineering design and construction and, therefore, no funds for these components are being requested from the Water Sustainability Fund.** Detailed hydrologic and hydraulic design, additional geotechnical investigations, topographic and property survey, dam design, and floodplain mapping provide critical information to the engineering design. Construction bidding and contracting, and construction oversight will also be part of the engineering component. Construction will include all parts of the dam construction from initial contractor mobilization through as-built drawings, final seeding, fencing, and mitigation activities.

Land acquisition and easements will be required for implementation of the project. **The LBBNRD is proposing to cost share with the Water Sustainability Fund for land acquisition and easements. Costs of legal fees and land appraisals are estimated at 10% of the total land rights costs and are included in the request.**

Numerous permits and compliance will be required for this project. The LBBNRD is proposing to cost share with the Water Sustainability Fund for permits and compliance. Permits and compliance will include: Clean Water Act Section 404 permits, NeDNR Dam Safety construction permits, Big Blue River Compact compliance, NDEE Dust Regulations compliance, NDEE solid waste management compliance, Migratory Bird Treaty Act and Endangered Species Act Section 7 compliance, National Environmental Policy Act compliance, Section 106 National Historic Preservation Act compliance, NDEE National Pollutant Discharge Elimination System permits, and National Flood Insurance Program compliance.

Operation and Maintenance (O&M) for the project will extend for the 100-year design life. The LBBNRD will be responsible for O&M costs, no funding from the Water Sustainability Fund is requested. O&M costs do not include replacement of the structure once the design life has been exceeded.

Project administration costs for this project are based on previous experience. The LBBNRD will be responsible for the project administration costs, no funding from the Water Sustainability Fund is requested.

Therefore, as bolded above, the project only needs support from the WSF for easements and permits.

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

A geologic investigation was conducted for the Project. The investigation included:

- Use of aerials to get an overview of watershed including:
    - Unusual characteristics such as exposed rock, thin vegetation, or soil erosion
    - Active head cuts and gullies
    - Identification of recent clearing and channel alteration
    - General site topography
    - Soil Surveys
    - State or USGS geology maps for bedrock depth, parent material
    - Local topography maps or online data
    - Well drilling logs
    - Base stream flow – groundwater.
    -

- The dam sites were visited to complete the following:
    - Discuss soils and erosion potential with local agency personnel
    - Walk general site area and note unusual characteristics
        - Identify main drain stem or gully for stratification of soils, seepage and slope of cut banks for material strength
        - Validate/refute assumptions of office recon
        - Investigate with a Giddings drill rig to classify soils and stratification for auxiliary spillway analysis
- A brief geologic report for each site was developed that included:
    - Identify site anomalies that would complicate or prevent construction
    - Estimation of seepage potential
    - Document severe soils such as dispersive clay, fractured rock, gypsum, sand
    - Make determination of suitability of soil for construction and permeability
    - A professional geologist signed off on each report
- The following testing were completed at each site:

Site Type	Number of 15-ft Deep Borings	Lab Testing Locations
Small Dam	6	3

    - Lab testing completed on the soils from borings located along the auxiliary spillway. Lab testing included:
        - Atterberg Limits Testing ASTM D-4318
        - Soil Moisture Content ASTM D-2216
        - Dry Unit Weights ASTM D-7263
        - Hydrometer Tests ASTM S-422
        - Percent Passing #200 Sieve ASTM D-1140
        - Pin-Hole Dispersion Test ASTM D4647

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

The project will provide flood prevention within the Little Indian Creek Watershed, which is quantified by reducing the peak flow in Little Indian Creek from a 100-year storm event from 17,600 CFS to 10,100 CFS, as measured at the US Highway 77 bridge in Beatrice, NE.

Hydrologic analysis was conducted using various methods depending on the unique flow characteristics and potential solutions for the watershed. In general, modeling parameters were developed in accordance with appropriate engineering-based methods by professional engineers licensed in the State of Nebraska. Each of the models developed was calibrated using the best available scientific data including historical observations, historical gage information, and results from other studies.

Little Indian Creek subbasins were delineated using HEC-GeoHMS. Terrain data was obtained from USGS Gage County and Lancaster County LiDAR collected in 2020. Basins were delineated based on the locations of tributary confluences and existing dams. In total, 90 subbasins ranging in size from 0.2 to 2.0 square miles were delineated.

The hydraulic analysis for the Little Indian Creek Watershed was completed in HEC-RAS Version 6.0.0. Terrain data for the analysis was obtained from the most recent Gage County LiDAR (2020) and

supplemented as needed. Nebraska Department of Transportation (NDOT) as-built bridge plans and Homestead Trail plans were used to verify bridge openings as needed in the LiDAR. Numerous break lines were incorporated within the model to enforce important topographic features (roadway embankments, berms, channel bottoms, etc.) into the 2-Dimensional grid to shape the modeled flow of water to natural topographic features. Manning's roughness coefficients of the channel and floodplains were based off land use data obtained from USDA's Cropscape website.

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 dams are designed in compliance with NRCS Technical Release 60 (TR60) updated in 2019, the most up to date NRCS dam design standards. The dams will also meet NEDNR Dam Safety requirements and procedures for review and approval. Additional geotechnical data collection, lab testing, and design will be completed during the final design phase. The dams are being designed as low hazard structures (except one high hazard structure due to breach mapping) because we are working with Gage County to implement zoning regulations to protect the breach paths of all structures. Breach mapping has been completed for all structures to verify the appropriate hazard classification for design. TR60 design criteria will include foundation drainage design, embankment design, spillway design, and energy dissipation design.

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

1.B.1 Insert data necessary to establish technical feasibility (004.02); NA

1.B.2 Discuss the plan of development (004.02 A); NA

1.B.3 Describe field or research investigations utilized to substantiate the project conception (004.02 B); NA

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

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). NA

Prove Economic Feasibility

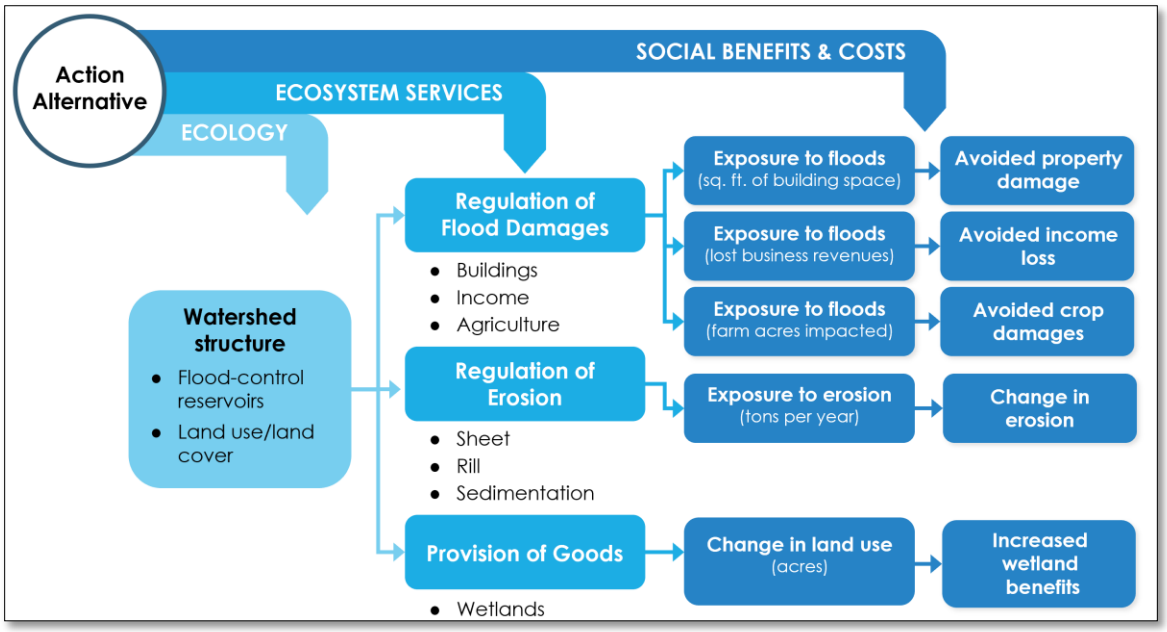
(Applicant must demonstrate compliance with Title 261, CH 2 - 005)

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 considered through the alternative analysis and screening process was three large reservoirs. Through several meetings with the property owners where the three large

reservoirs would be built, it was determined that their acceptance of the project would not be obtained. Aside from not being able to get landowner acceptance, several grain-to-market county roads would have been impacted with this alternative, therefore, focus was turned to the next alternative, multiple smaller dams.

To reduce the risk of flooding and the damages associated with future flood events in the Little Indian Creek Watershed, the LBBNRD examined many alternatives. The alternatives were evaluated on a technical and economic basis. A range of reasonable alternatives was identified, including structural and non-structural options, and were analyzed individually to determine if they would meet the project purpose and planning requirements. This initial screening helped decide whether an alternative would be eliminated or carried forward for detailed study. The alternatives consisted of multiple dams, channel widening, diversion channel, levee, detention cells, stream restoration/wetland storage, single dam, conservation measures upstream, flood proofing structures, property acquisition, floodplain regulation/zoning, interior drainage/storm sewer system and no action.



Economic Analysis flow chart.

The No Action Alternative describes the future if no investment is made in the watershed.

Detailed study includes factors such as economics, environmental and social impacts, cultural and social issues, permitting requirements, and refined preliminary designs. The multiple dam's alternative and no action alternative were considered reasonable and practical and therefore were selected to be carried forward for detailed study. Upon completion of the detailed analysis the multiple dam alternative was selected as the preferred option and the no-action alternative was the next best option. The summary and comparison of selected alternatives' impacts on resource concerns is presented in Table 3.

Under the No Action Alternative, the Little Indian Creek Watershed would be at continued risk of flooding events similar in size and magnitude to events experienced in the past. The No Action Alternative was eliminated due to many negative impacts. The impacts will include:

- Greater damage from flooding in urban and agricultural areas.
- Soil loss will be incurred in agricultural areas as a result because of erosion.
- Little Indian Creek water quality will be impaired due to soil erosion.
- Groundwater recharge will be lost because the 25 dams that impound water will not be constructed.
- Ecological damage will be incurred due to wildlife habitat and wetlands not being constructed.

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, up to fifty (50) years; *or*, with prior approval of the Director up to one hundred (100) years, (Title 261, CH 2 - 005).

Benefits and costs were calculated based on the expected effects of the project on the ecosystem, resulting in a **1.28:1 BCR**. The analysis evaluated the costs of the project based on construction cost estimates developed by JEO Consulting Group, Inc., which included costs for engineering design, construction, land acquisition, permitting and compliance, and operations and maintenance. These were compared against benefits received by preventing losses associated with flood damages. This $37M project is leveraging $34M of Federal funding. The Natural Resources Conservation Service (NRCS) will pay for all engineering design and construction costs, pending approval of the final Plan-EA. **The LBBNRD is requesting cost share funding from the Water Sustainability Fund for only land acquisition and permitting and compliance**. The LBBNRD will pay for operation and maintenance costs and is not requesting funding for O&M from the Water Sustainability Fund. A detailed discussion of the EA Economic Analysis is located in Attachment 3.

Benefits are expected to begin accruing the year after the structures are installed and continue to accrue until the end of the 100-year period. Since all the project structures have design lives of 100-years, replacement costs were not included in the analysis since the project time horizon does not exceed the life of the measures (*Principles, Requirements, and Guidelines for Water and Land Related Resources Implementation Studies (PR&G) Section 9, National Watershed Program Handbook (NWPM) 501.37.B and the Economics Handbook, Part 611, 1.12.*). To assess the economic benefits and costs of the Project, GIS-based hydrologic and hydraulic (H&H) projections were developed to assess flood extent and depth in the watershed for 10-, 25-, 50-, 100-, and 500-year events. The analysis used this information to quantify and value the benefits and costs associated with the Project.

Projected benefits and costs are based on a full employment economy and assume no change in relative prices during the period of analysis. Results are reported in both net present values and average annual values in 2022 dollars. Avoided property loss and avoided income loss were estimated with the HAZUS model for the Project. The HAZUS model, developed by Federal Emergency Management Agency (FEMA) based on records of previous flood events and expert judgement, was created as a tool for flood plain managers and others to use in flood mitigation efforts impacting people and property (*2018, HAZUS Technical Manual 2.1 pg. 2-2, https://www.fema.gov/flood-maps/tools-resources/flood-map-products/hazus/user-technical-*

manuals). Its primary goal is to provide quantifiable information on the damages caused by flood events in support of disaster relief and watershed planning efforts. The HAZUS model works in a two-step process, which includes a flood risk projection step and a flood loss estimation step. In the flood risk projection step, the user defines flood risk in terms of parameters like flood frequency, discharge, and ground elevation in the study area. In the second step, damages are calculated based on the flood risk projections developed in the first step and using default functions relating depth to damage (depth-damage functions) from the U.S. Army Corps of Engineers (USACE) and building inventory and valuation data from the U.S. Census (*FEMA, 2018*). The model combines this information to produce spatial and tabular data describing flood losses in monetary terms. Building repair and replacement cost estimates are based on the full replacement cost model, whereby losses from flood-damaged buildings are calculated assuming the full value of damages are restored. The costs are based on industry-standard cost models published by R.S. Means Company (Means Square Foot Costs, 2006) updated to 2022 dollars (*https://www.rsmeans.com/*). The H&H projections developed for the HAZUS model were also used to estimate the number of acres of farmland that would be impacted during 10-, 25-, 50-, 100-, and 500-year flood events under the Project.

The cost projections were combined with data from the U.S. Department of Agriculture's (USDA) National Agricultural Statistics Service (NASS) Cropscape database. The web-based database, which shows crop cover in the United States, was used to classify the land cover of impacted acres in the Little Indian Creek watershed. Land cover data for alfalfa, corn, and soybeans were carried forward for analysis as they represent the predominant crops grown in the watershed (*USDA NASS Cropscape Database, 2021, https://www.nass.usda.gov/Research_and_Science/Cropland/SARS1a.php.*). The project would remove approximately 1,849 acres of agricultural land from flood risk. The gross value of each crop was estimated using state and county-level yield and price data from the USDA's NASS. Price information was taken from the NRCS USDA data series on annual normalized prices for the state of Nebraska for alfalfa, corn, and soybeans for the period from 2011 through 2020 (*NRCS, 2021*). Annual prices for each crop were averaged over the 10-year period and used to calculate the gross value of each crop per acre. Price information for pasture was collected from the University of Nebraska's 2020-2021 Farm Real Estate Report, which estimated the statewide average annual cash rent for pastures (*UNL, 2020-2021*). Data on crop yields was gathered from the USDA NASS (*USDA NASS, 2021a/b*). Yield data was taken from statewide estimates (*USDA NASS, 2021a/b*).

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 LBBNRD is only seeking funds from the Water Sustainability Fund for construction permitting and compliance and land acquisition, but all relevant project costs are being considered as cost information. The project will construct 25 dam structures in the Little Indian Creek Watershed. These structures range in size from a few acres surface area up to 44 acres. The relevant total project cost estimate includes engineering design, construction permitting and compliance, land

acquisition, and operation and maintenance. **Costs are based on 2022 dollars, amortized over a 100-year project life at a rate of 2.25%.** The total estimated project cost distribution is presented in Table 1. Table 2 separates relevant cost information by funding source:

- Permitting, compliance and land acquisition costs to be covered by the LBBNRD and for which WSF funding is being sought,
- Engineering design and construction project costs to be covered by the NRCS, and
- Operation and maintenance project costs to be covered by the LBBNRD.

The project total cost distribution is shown in Table 1. The cost information for the estimated project life is presented in Table 2.

Table 1: 2022 Estimated Total Project Cost Distribution

		Water Sustainability Fund (WSF)/LBBNRD Cost Share			NRCS Cost (Not Part of the WSF Grant Request)				O&M Cost (Annual)[2],
Alt ID	Brief Description	Real Property Rights Cost[1]	Permitting Cost[4]	Total SLO	Engineering Cost[3]	Construction Cost	Total WFPO	Total Installation Cost	Paid by LBBNRD
F1-2	New dam, low hazard	$ 71,841	$ 33,000	**$ 104,841**	$ 216,246	$ 1,554,270	$ 1,770,516	$ 1,875,357	$ 11,657
F1-1	New dam, low hazard	$ 17,479	$ 33,000	**$ 50,479**	$ 134,150	$ 964,204	$ 1,098,355	$ 1,148,834	$ 7,232
F1-10	New dam, significant hazard	$ -	$ 33,000	**$ 33,000**	$ 121,202	$ 871,136	$ 992,338	$ 1,025,338	$ 6,534
F1-63	New dam, low hazard	$ 172,557	$ 33,000	**$ 205,557**	$ 307,946	$ 2,213,362	$ 2,521,308	$ 2,726,865	$ 16,600
F1-65	New dam, low hazard	$ -	$ 33,000	**$ 33,000**	$ 123,593	$ 888,325	$ 1,011,918	$ 1,044,918	$ 6,662
F1-66	New dam, low hazard	$ -	$ 33,000	**$ 33,000**	$ 122,820	$ 882,769	$ 1,005,589	$ 1,038,589	$ 6,621
F1-60	New dam, low hazard	$ -	$ 33,000	**$ 33,000**	$ 145,136	$ 1,043,168	$ 1,188,304	$ 1,221,304	$ 7,824
F1-61	New dam, low hazard	$ 269,500	$ 70,000	**$ 339,500**	$ 151,507	$ 1,088,953	$ 1,240,460	$ 1,579,960	$ 8,167
F1-30	New dam, low hazard	$ 84,561	$ 70,000	**$ 154,561**	$ 190,333	$ 1,368,017	$ 1,558,350	$ 1,712,911	$ 10,260
F1-31	New dam, low hazard	$ 82,775	$ 33,000	**$ 115,775**	$ 190,636	$ 1,370,199	$ 1,560,836	$ 1,676,611	$ 10,276
F1-22	New dam, low hazard	$ -	$ 33,000	**$ 33,000**	$ 134,120	$ 963,985	$ 1,098,104	$ 1,131,104	$ 7,230
F1-21	New dam, low hazard	$ 51,744	$ 33,000	**$ 84,744**	$ 217,533	$ 1,563,515	$ 1,781,048	$ 1,865,792	$ 11,726
F1-24	New dam, low hazard		$ 33,000	**$ 33,000**	$ 153,190	$ 1,101,051	$ 1,254,241	$ 1,287,241	$ 8,258
F1-20	New dam, low hazard	$ 152,306	$ 33,000	**$ 185,306**	$ 328,922	$ 2,364,130	$ 2,693,052	$ 2,878,358	$ 17,731
F1-20A	Wetland/sediment basin	$ 15,400	$ 70,000	**$ 85,400**	$ 25,071	$ 180,199	$ 205,270	$ 290,670	$ 1,351
F1-23	New dam, low hazard	$ -	$ 33,000	**$ 33,000**	$ 141,385	$ 1,016,206	$ 1,157,591	$ 1,190,591	$ 7,622
F1-70	New dam, low hazard	$ 75,537	$ 33,000	**$ 108,537**	$ 163,156	$ 1,172,683	$ 1,335,839	$ 1,444,376	$ 8,795
F1-90	New dam, low hazard	$ -	$ 33,000	**$ 33,000**	$ 133,321	$ 958,247	$ 1,091,568	$ 1,124,568	$ 7,187
F1-91	New dam, low hazard	$ -	$ 33,000	**$ 33,000**	$ 105,284	$ 756,728	$ 862,012	$ 895,012	$ 5,675
F1-92	New dam, low hazard	$ 167,013	$ 33,000	**$ 200,013**	$ 218,895	$ 1,573,307	$ 1,792,202	$ 1,992,215	$ 11,800
F1-93	New dam, low hazard	$ 20,944	$ 33,000	**$ 53,944**	$ 112,848	$ 811,096	$ 923,944	$ 977,888	$ 6,083
F1-40	New dam, low hazard	$ -	$ 33,000	**$ 33,000**	$ 124,453	$ 894,504	$ 1,018,956	$ 1,051,956	$ 6,709
F1-50	New dam, low hazard	$ -	$ 33,000	**$ 33,000**	$ 187,935	$ 1,350,785	$ 1,538,720	$ 1,571,720	$ 10,131
F1-80	New dam, high hazard	$ 280,311	$ 33,000	**$ 313,311**	$ 214,297	$ 1,540,263	$ 1,754,560	$ 2,067,871	$ 11,552
F1-62C	New dam, low hazard	$ 115,500	$ 70,000	**$ 185,500**	$ 99,088	$ 712,195	$ 811,283	$ 996,783	$ 5,341
F1-64	New dam, low hazard	$ 318,780	$ 70,000	**$ 388,780**	$ 120,802	$ 868,264	$ 989,066	$ 1,377,846	$ 6,512
	Totals:	**$ 1,896,248**	**$ 1,043,000**	**$ 2,939,248**	**$ 4,183,869**	**$ 30,071,562**	**$ 34,255,431**	**$ 37,194,680**	

Notes:

[1] Includes cost of legal fees and land appraisals; if blank, existing easements are in place and no land rights are needed.

[2] Operation & Maintenance (O&M) costs estimated as 0.75% of construction per NRCS guidance

[3] Includes design, bidding, construction administration and oversight

[4] Includes all permitting required: USACE 404, Cultural Resources, NeDNR Dam Safety, T&E, Water Rights

Table 2. Cost information for the estimated construction period as well as the estimated project life.

Cost Item	Year 0 2022	Year 1 2023	Year 2 2024	Year 3 2025	Year 4-100 2026-2121	Total Amount
Engineering (Paid by the NRCS)	Paid by NRCS	Paid by NRCS	Paid by NRCS	Paid by NRCS	Paid by NRCS	**$4,183,869**
Permitting and compliance		$500,000	$543,000			**$1,043,000**
Land Acquisition			$474,062	$474,062	$948,124	**$1,896,248**
Construction (Paid by the NRCS)				Paid by NRCS	Paid by NRCS	**$30,071,562**
Operation and Maintenance					(Paid by the LBBNRD over 100-year time period))	

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 project would positively impact the watershed by providing benefits by reducing losses of property, income, and crops caused by flood damage. Avoided income loss is the largest single benefit of the project, followed by avoided property loss. The project average annual avoided damages and benefits on ecosystem flows and values is presented in Table 5. The creation of approximately 26 acres of wetland would generate an average annual value of $201,368 per year by increasing the production of regulating, provisioning, and cultural services associated with this land cover type. In total, the project would create average annual gross benefits of approximately $1,547,165 per year.

Table 5. Average Annual Avoided Damages and Benefits, 2022

Structure ID	Avoided Property Loss, Critical Facility Loss, and Income Loss	Avoided Crop Yield Damages	Wetland Benefits	Average Annual Benefits Total
F1-2	$75,127	$634	$11,698	$87,460
F1-1	$41,790	$353	$3,899	$46,043
F1-10	$38,664	$326	$1,950	$40,941
F1-63	$138,474	$1,169	$11,698	$151,342
F1-65	$39,725	$335	$3,899	$43,960
F1-66	$41,979	$354	$7,019	$49,352
F1-60	$26,274	$222	$6,239	$32,735
F1-61	$30,690	$259	$3,120	$34,068
F1-31/F1-30	$90,666	$766	$14,038	$105,469
F1-22	$50,746	$428	$6,239	$57,414
F1-21	$78,048	$659	$15,598	$94,305
F1-24	$28,288	$239	$3,899	$32,426
F1-20	$114,476	$967	$7,799	$123,242
F1-23	$50,341	$425	$6,239	$57,006
F1-70	$29,058	$245	$3,120	$32,423
F1-90	$49,143	$415	$6,239	$55,798
F1-91	$20,810	$176	$3,120	$24,105
F1-92	$58,733	$496	$7,799	$67,027
F1-93	$38,790	$328	$3,899	$43,017
F1-40	$36,560	$309	$3,899	$40,768
F1-50	$70,238	$593	$3,120	$73,951
F1-80	$115,240	$973	$10,139	$126,352

F1-62C	$35,042	$296	$17,859	$53,198
F1-64	$35,624	$301	$38,839	$74,763
Total	**$1,334,529**	**$11,269**	**201,368**	**$1,547,165**

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).

Using the benefits and costs from Tables 2 and 5, Table 6 was developed to present the average annual costs, avoided damages and benefits and benefit cost ratio for the project. In total, the project will generate average annual benefits of $1,547,165 compared to average annual costs of $1,210,686 for a benefit-cost ratio of 1.28.

Table 6. Average Annual Costs, Avoided Damages and Benefits and Benefit Cost Ratio, 2022

Works of Improvement					Average Annual Cost	Benefit Cost Ratio
	Avoided Property Loss, Critical Facility Loss, and Income Loss	Avoided Crop Yield Damages	Wetland Benefits	Average Annual Benefits Total		
F1-2	$75,127	$634	$11,698	$87,460	$61,765	1.42
F1-1	$41,790	$353	$3,899	$46,043	$38,711	1.19
F1-10	$38,664	$326	$1,950	$40,941	$33,656	1.22
F1-63	$138,474	$1,169	$11,698	$151,342	$89,722	1.69
F1-65	$39,725	$335	$3,899	$43,960	$34,314	1.28
F1-66	$41,979	$354	$7,019	$49,352	$34,101	1.45
F1-60	$26,274	$222	$6,239	$32,735	$40,252	0.81
F1-61	$30,690	$259	$3,120	$34,068	$49,188	0.69
F1-31/F1-30	$90,666	$766	$14,038	$105,469	$109,709	0.96
F1-22	$50,746	$428	$6,239	$57,414	$37,216	1.54
F1-21	$78,048	$659	$15,598	$94,305	$61,584	1.53
F1-24	$28,288	$239	$3,899	$32,426	$42,472	0.76
F1-20	$114,476	$967	$7,799	$123,242	$102,284	1.20

F1-23	$50,341	$425	$6,239	$57,006	$39,218	1.45
F1-70	$29,058	$245	$3,120	$32,423	$47,231	0.69
F1-90	$49,143	$415	$6,239	$55,798	$36,996	1.51
F1-91	$20,810	$176	$3,120	$24,105	$29,268	0.82
F1-92	$58,733	$496	$7,799	$67,027	$65,031	1.03
F1-93	$38,790	$328	$3,899	$43,017	$31,911	1.35
F1-40	$36,560	$309	$3,899	$40,768	$34,551	1.18
F1-50	$70,238	$593	$3,120	$73,951	$52,048	1.42
F1-80	$115,240	$973	$10,139	$126,352	$66,783	1.89
F1-62C	$35,042	$296	$17,859	$53,198	$30,638	1.74
F1-64	$35,624	$301	$38,839	$74,763	$42,039	1.78
Total	**$1,334,529**	**$11,269**	**201,368**	**$1,547,165**	**$1,210,686**	**1.28**

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 LBBNRD certifies that it has sufficient funds to commit to pay for its 40% share of the project costs. The LBBNRD's budget for July 1, 2022 to June 30, 2023 is $1,288,760 derived from a local property tax levy of 2.1334. A letter of financial commitment from the LBBNRD is submitted with this application.

5. Provide evidence that sufficient annual revenue is available to repay the reimbursable costs and to cover OM&R (operate, maintain, and replace).

The LBBNRD includes operations and maintenance costs into annual budgets prepared on a yearly basis. The replacement costs will be budgeted in the annual budget near the time that the useful life of the structure is reached. A letter of financial commitment from the LBBNRD is submitted with this application, and the past 3-years' budget information in Table 7.

Table 7. LBBNRD 3-Year Budget Information

Valuations		LEVIES	
6,040,805,119.00	**FY 2022**	2.1334 cents	**1,288,760.00**
5,880,120,167.00	**FY 2021**	2.1921 cents	**1,289,000.00**
5,924,750,041.00	**FY 2020**	2.3873 cents	**1,414,420.00**

X. 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

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

The proposed plan of constructing 18 dams on the footprint of existing dam sites minimizes additional impacts to the environment. The seven new or modified sites will provide additional wildlife and aquatic habitat, upland habitat, and migratory bird habitat, along with providing reduced streambank erosion, lessening the sediment and pollutant loading for all downstream areas.

The project will minimize the impact on the natural environment by examining the 25 dams within the Affected Resource Areas (ARAs). Especially, soil erosion will be addressed and minimized, stream channel and bank stabilization and prime farmland erosion will occur, construction will be restricted during migratory bird nesting season, and wetlands protected and created. The Affected Environment within the Affected Resource Areas. Peak flows will be attenuated and thereby stream banks and channels, and agricultural land will be stabilized due to the construction of the 25 dams. Streams within the ARAs were assessed between October and November 2021 as part of the wetland delineation and inventory wetland resources. JEO performed field work and obtained information on stream channel and banks, soils, plants, and hydrology, including record of the Ordinary High-Water Mark (OHWM). Prime farmland and farmland of statewide importance was found within the ARAs was determined using the USDA, NRCS web soil survey, for Gage County. There are approximately 27,955.07 acres of prime and unique farmland of statewide importance within the ARAs. The NRCS soil map unit identifies the prime farmland or farmland of statewide importance within the Affected Resource Areas. Dam construction will be restricted during migratory bird nesting season from April to August. Wetland areas will be protected and created by the Project thereby minimizing the impacts on the natural environment. Wetland investigations were conducted for the ARAs areas by JEO in October 2021 and summer of 2022.

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

The LBBNRD has a wide range of statutory responsibilities and authorities, including, but not limited to, Nebraska. Revised. Statutes. 2-3229 for erosion prevention and control, soil conservation, and management of water supplies for beneficial uses, Nebraska Revised Statutes §2-3,201 through §2-

3,243 and the Ground Water Management and Protection Act (Nebraska Rev. Statutes §46-701 through §46-756). Specifically, Nebraska Rev. Stat. 2-3230 and 2-3232 allows the NRDs to develop facilities, works, studies, and complete demonstration projects that further the purposes of the district. Nebraska Revised Statutes 46-707(f) confer to the NRDs the power to "conduct investigations and cooperate or contract with public or private corporations, or any association or individual on any matter relevant to the administration of the Ground Water Management and Protection act." The LBBNRD has the power of eminent domain. A letter of financial commitment from the LBBNRD is submitted with this application in Attachment 2.

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

The project considers plans and programs of the state and resources development plan of the LBBNRD. Compliance with the Big Blue River Interstate Compact is a consideration because the project regulates streamflow. The structures will improve water quality by impounding contaminated water and sediment. This will help the Compact meet their water quality plan to "encourage an active pollution abatement program in each state". The VIMP between NeDNR and LBBNRD is considered in the project. The six goals of the NeDNR Annual Report to the Legislature are considered and addressed by this project. Finally, this project helps in the development of multiple water and natural resources issues.

The project also brings over approximately $34 million in Federal funding through the Natural Resources Conservation Service (NRCS), thereby freeing up State of Nebraska and LBBNRD funds to be used on other projects.

The Big Blue River Interstate Compact benefits from the WFPO project. The Kansas-Nebraska Big Blue River Compact was entered into in 1971. The purpose of the Compact is to promote interstate comity, achieve equitable apportionment of the waters of the Big Blue River Basin and promote the orderly development thereof, and to "encourage an active pollution abatement program in each state". The Compact provides for minimum target flows to reach the Kansas state line on both the Big and Little Blue Rivers, as measured by river gages at Barneston, NE on the Big Blue and Hollenberg, KS on the Little Blue from May through September. When stream flow falls below these target values, Nebraska is required to administer surface water rights and associated alluvial groundwater use located within the regulatory reaches of either river junior to 1968, until the target value is exceeded.

The Lower Big Blue Natural Resources District (LBBNRD) Voluntary Integrated Management Plan (VIMP) was prepared by the staff and Board of Directors of the LBBNRD and the Nebraska Department of Natural Resources (NeDNR) in consultation with the District Stakeholder Advisory Committee (SAC) and in accordance with the Nebraska Groundwater Management and Protection Act. The act assigns the responsibilities and the authority to the NeDNR and the LBBNRD for management of groundwater and hydrologically connected waters in accordance with Nebraska Revised Statutes (*Neb. Rev. Stat*.) §46-715(1)(b), §46-715 to 46-717, and subsections (1) and (2) of §46-718. The VIMP can be found at: https://dnr.nebraska.gov/water-planning/lower-big-blue-nrd.

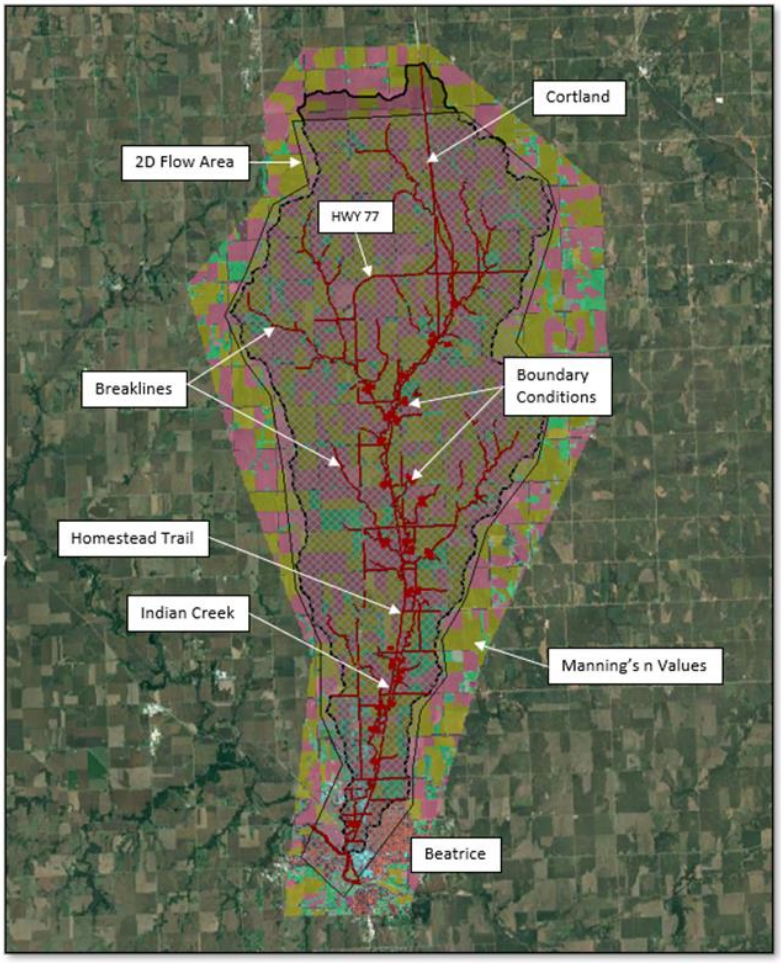
The LBBNRD, in collaboration with the NeDNR, developed the VIMP to attain and maintain a desired balance between uses and supplies of both surface water and groundwater sources so economic viability, as well as social and environmental health, safety, and welfare can be achieved and maintained in the LBBNRD for both the near-term and long-term, while considering effects on existing

surface water appropriators and groundwater users. Should the NeDNR subsequently determine an affected river basin, subbasin, or reach within the LBBNRD to be fully appropriated, either agency may amend the VIMP.

The NeDNR Annual Report to the Legislature for Fiscal Year 2020-2021 identifies NeDNR six goals that are measurable objectives. These six goals are indictive of the long-term goal of protecting and managing the State of Nebraska most precious resource, water. The WFPO project. will meet the following six goals/objectives:

Goal/Objective #1 – Establish strong state leadership, involvement, and support for science-based decision making that is necessary to sustain state and local water management outcomes.

The project will support this goal/objective by demonstrating that the new WFPO process can leverage funding and expertise with the Water Sustainability Fund (if approved). This innovative concept of requesting only WSF funding for land acquisition and permitting while having the NRCS pay for engineering and construction and the LBBNRD pay for O&M and cost share can be duplicated across the State. The technically robust Little Indian Creek Watershed Environmental Assessment used state of the art methodology to analyze technically complicated science processes such as hydrology and hydraulics by numerical modeling. The two-dimensional hydrologic numerical model and its flow grids are shown in the below figure.



Hydraulic model extents for the Little Indian Creek Watershed.

Goal/Objective #2 – Provide high quality products and services through the performance of our duties in the areas of floodplain management, flood mitigation planning, dam safety, and survey to promote the safety of all Nebraskans.

The Project provides multiple benefits on flood control/management/mitigation and dam safety. By constructing 25 dams in the Little Indian Creek Watershed flood damages will be reduced and public safety will be improved. The dams will attenuate peak flows by capturing high water. The positive impact of the flood control will occur not only in the Little Indian Creek watershed including Beatrice, but also possibility downstream of the confluence of the Big Blue River. Reducing peak flows will add protection for over 80 structures. Agricultural land will be protected from scouring flows that erode valuable farmland soil. Head cutting and streambank bank erosion will be reduced with the reduction of high flows. Wetlands will be protected from harmful sediment that diminishes the capacity to provide valuable habitat. Water quality will be improved by the reduction of bacteria, agricultural chemicals, and sediment because of the controlled flows. Floodplain management will be improved by the reduction of flows and flood insurance costs will be reduced. By providing flood control damages to structures and agricultural land will be reduced thereby allowing the local and regional economy to grow as opposed to paying for recovery costs due to flooding.

Goal/Objective #3 – Develop and implement customized and decentralized water management plans established through collaboration with local Natural Resource Districts and stakeholders that provide for long-term sustainability of the state's water resources.

Based on the LBBNRD/NeDNR Voluntary Integrated Management Plan (VIMP), Big Blue River Interstate Compact, and the Little Indian Creek Watershed Environmental Assessment (EA) extensive public and stakeholder collaboration will occur. The VIMP Stakeholders Advisory Committee (SAC), Big Blue River Interstate Compact Administration group, and the EA stakeholders group public and stakeholder outreach will be a long-term and ongoing process. This will ensure that continuous feedback is received from the public and stakeholders that will promote the long-term sustainability of Nebraska's water resources.

Goal/Objective #4 – Encourage strong public engagement with multiple constituents and stakeholder groups in planning and implementation activities to ensure that local and state needs are addressed.

The LBBNRD board meetings are open to the public and input is invited during the meetings additionally input from received from the SAC. The Big Blue River Interstate Compact Administration is a consortium of State of Nebraska and Kansas, and the Federal government which provides guidance and regulation. The list of stakeholders for this Little Indian Creek Watershed Flood Prevention & Operations (WFPO) Environmental Assessment (EA) is extensive. The stakeholder list from the April 2022 public meetings is presented in Table 8.

Table 8: Environmental Assessment Agency Mailing List

Agency/Tribe	Position	Name
US Army Corps of Engineers – Nebraska Regulatory Office	Nebraska State Project Manager	Matt Wray
US Army Corps of Engineers – Nebraska Flood Risk and Floodplain Management	Chief Flood Risk and Floodplain Management	Tony Krause, P.E. C.F.M
US Environmental Protection Agency Region 7	NEPA Reviewer	Larry Shepard
US Environmental Protection Agency Region 7	NEPA Reviewer	Joe Summerlin
US Environmental Protection Agency Region 7	NEPA Project Manager	Amber Tilley
US Fish and Wildlife Service	Fish and Wildlife Biologist/Assistant Field Supervisor	Eliza Hines
FEMA Region VII Mitigation Division	Acting Director	Teri Mayer
FEMA Region VII	Regional Administrator	Paul Taylor
FEMA Region VII	Natural Hazards Program Specialist	Emily Hatcher
Nebraska Department of Natural Resources	Director	Tom Riley, P.E.
Nebraska Department of Transportation Headquarters	Interim Director	Moe Jamshidi, P.E.
NDOT District 1 Headquarters	District Engineer	Thomas Goodbarn

NDOT	Roadway Design Division	Julie Ramirez, P.E. C.F.M.
Office of the Governor	Governor	Pete Ricketts
Nebraska Game & Parks Commission Headquarters	Environmental Analyst Supervisor	Shannon Sjolie
Nebraska Game & Parks Commission Headquarters	Assistant Division Administrator	Melissa Marinovich
Nebraska Department of Environment and Energy	Wellhead Protection Program Coordinator	Ryan Chapman
Nebraska Department of Transportation Headquarters	Assistant Bridge Engineer	Kirk Harvey, P.E.
Nebraska Department of Natural Resources	Chief I Floodplain Management Section	Katie Ringland, P.E., C.F.M
Lower Platte South NRD	General Manager	Paul Zillig
Gage County Board of Commissioners	Chairperson	Erich Tiemann
Gage County Highway Department	Highway Superintendent	Galen Engel
Gage County Planning/Zoning/Floodplain	Zoning & Emergency Manager	Lisa Wiegand
Lancaster County Board of Commissioners	Chairman	Rick Vest
Lancaster County Highway Department	Highway Superintendent	Pamela Dingman, P.E.
Lancaster County Emergency Management	Emergency Manager	James Davidsaver

Lancaster County Planning/Zoning/Floodplain	Zoning Administrator	David Cary
Village of Pickrell	Clerk	LaVonna Moslander
Village of Pickrell Board of Trustees	Board Chairperson	Ross Travernicht
Village of Cortland	Clerk	Lori Hogan
Village of Cortland	Board Chairperson	Fred Hilmen

Goal/Objective #5 – 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 LBBNRD registers groundwater wells and NeDNR administrators surface water-rights, and both are signatory agencies of the VIMP. It is inherent in the VIMP that water is used through collaborative investments in water resources projects, planning administration, and permitting occur. Extensive permitting will occur as part of the Little Indian Creek Watershed WFPO project.

Goal/Objective #6 – Provide agencywide services and support in the areas of information technology and transparent data sharing, business process improvement, public information, and administration of state-aid funds in conjunction with the NRC.

The Little Indian Creek Watershed WFPO project will use advanced technology such as numerical 2-dimensional hydraulic models and predictive erosion models to collect and share data. Information will be released and shared through the LBBNRD and the NRCS. Administration of the WSF grant at the local level will be done by the LBBNRD.

The project helps in the development of the following water and natural resources issues:

- Flood Control
- Agricultural use
- Municipal and industrial use
- Recreational benefits
- Wildlife habitat
- Conservation of water resources
- Preservation of water resources

Flood Control: By constructing 25 dams in the Little Indian watershed flood damages will be reduced and public safety will be improved. The dams will attenuate peak flows by capturing high water. The positive impact of the flood control will occur not only in the Little Indian Creek watershed including Beatrice, but also possibility downstream of the confluence of the Big Blue River. This project provides critical infrastructure flood protection to US Highway 77 and to the Burlington Northern Railroad and numerous residential, commercial, and industrial properties. Possibility downstream of the Little

Indian Creek and the Big Blue River confluence other critical infrastructure consists of US Highway 136, Beatrice Wastewater Treatment Plant and numerous residential, commercial, and industrial properties. Reducing peak flows will add protection over 80 structures in the watershed. Agricultural land will be protected from scouring flows that erode valuable farmland soils. Head cutting and streambank bank erosion will be reduced with the reduction of high flows. Wetlands will be protected from harmful sediment that diminishes the capacity to provide valuable habitat. Water quality will be improved by the reduction of bacteria, agricultural chemicals, and sediment because of the controlled flows. Floodplain management will be improved by the reduction of flows and flood insurance costs will be reduced. By providing flood control damages to structures and agricultural land will be reduced thereby allowing the local and regional economy to grow as opposed to paying for recovery costs due to flooding.

Agricultural Use: More than 27,000 acres of prime farmland in is the Little Indian Creek Watershed which may be impacted by flooding (NRCS 2020). Drainage systems in the fields degraded by rill erosion and streambank and channel erosion will be reduced since peak flows will be attenuated. Water quality will be improved by the reduction of bacteria, agricultural chemicals, and sediment because of the controlled flows. Sediment buildup in unwanted areas will be reduced by the reduction of scouring flows.

Municipal and Industrial Use: Flooding in the urban areas will be reduced by dams. Critical infrastructure such as roads, storm and sanitary sewers, utilities, and domestic/commercial/industrial buildings will be protected. Floodplain management will be improved by the reduction of flows and flood insurance costs will be reduced or eliminated. The local and regional economy will be able to grow with the additional protection.

Recreation: The newly constructed dams will create aquatic and wetland habitat including aquatic and wetland that will be prime for hunting, fishing, and bird watching. Some of the species that will benefit include waterfowl and migratory birds, eagles, and terrestrial wildlife. The reservoirs will provide fishing opportunities. Recreational facilities and parks in the watershed of the Little Indian Creek floodplain will receive protection from flood flows. Water safety will be improved by the regulation of peak flows.

Wildlife Habitat: The newly constructed dams will create aquatic and wetland habitat that will be suitable for fish, waterfowl, migratory birds, and terrestrial wildlife. Stream flow will be more regulated and due to higher groundwater levels from recharge flows in Little Indian Creek could be improved which is beneficial for fisheries habitat.

Conservation and Preservation of Water Resources: Conservation and preservation of water resources within the Little Indian Watershed will be improved and compliance with the Blue River Compact will be maintained by implementation of this project. This is due to the many primary and secondary benefits of this project. Conservation and preservation of both surface water and groundwater will occur by the construction of the 25 dams. Surface water flows will be regulated by peak flow reduction and the dams will provide groundwater recharge. Conjunction management of the water resources will benefit the citizens in the watershed and downstream of the watershed.

The project would positively impact the watershed by providing benefits by reducing losses of property, income, and crops caused by flood damage. Avoided income loss is the largest single benefit of the

Project, followed by avoided property loss. The Project average annual avoided damages and benefits on ecosystem flows and values is presented in Table 6. The creation of approximately 26 acres of wetland would generate an average annual value of $201,368 per year by increasing the production of regulating, provisioning, and cultural services associated with this land cover type. **In total, the Project would create average annual gross benefits of approximately $1,547,165 per year.**

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.

Anticipated land rights have been estimated for each site through development of the ongoing WFPO Plan-EA. Execution of easements and/or purchase agreements will occur during the final design phase of the project. A portion of the land rights exist through original easements for existing sites. Where new structures will be built on existing site footprints, the land rights necessary will be minimal. Existing easements were written to the auxiliary spillway elevation; NRCS now requires obtaining land rights to the 'Top of Dam' elevation, which will require more real estate than the old easements. Seven of the twenty-five sites are either new or modified and will require new land rights. All landowners are aware of the project and we have verified their willingness to participate.

Table 9: List of landowners per site.

Site ID	Landowner (based on APEs)
F1-1	SCHLAKE, LARRY LEE
	NELSON, DANALEE FIX
F1-2	TOPP, BRUCE A & KIMBERLY A TRUSTEES
	PERRY FAMILY FARMS & INVESTMENT CO LLC
	MEINTS, ROGER L
	JURGENS, JAMES R & REBECCA B
	HARRINGTON, ROJAYNE
	ZOLKOSKI, WALKER L & KATIE W TRUSTEES
	P & C MEINTS DEVELOPMENT LLC
	CARPENTER, GREGORY JAY & JILL R
	RAHORST, RONALD & MARY K
	MOREHEAD, JEREMIAH J & CORINNE D
	KURTZER, BRIAN D & AMY J
	BALDERSON, EDWARD E TRUSTEE
F1-10	MOORMEIER, RONALD L & DONELLE J
	MEINTS, PAUL H & CAROL D
	KILE, PATRICK F & HEIDI E
	CHRISTIANSEN, LOWELL
	SPILKER, CHAD R & ALICIA I

F1-20	UNION BANK & TRUST CO OF LINCOLN NE
	MOATS, ROBERT DALE
	VILLAGE OF CORTLAND
	SCHMIDT, CHARLES E TRUSTEE &
	PAPKE, DALE E & PHYLLIS J
	PAPKE, CLARK & JANELLE
F1-21	GENERAL AGRICULTURAL SERVICES LLC
F1-22	GENERAL AGRICULTURAL SERVICES LLC
F1-23	BOESIGER FAMILY INVESTMENTS LP
	BOESIGER LAND LLC
	BOESIGER, JEAN EDITH TRUSTEE
F1-24	PAPKE, DALE E & PHYLLIS J
	MEINTS, PAUL H & CAROL
	GENERAL AGRICULTURAL SERVICES LLC
F1-30	WALLMAN, NORMAN T & PATRICIA S
	HEART J FARMS LLC
	OLTMAN, JAMES E & BETH A
F1-31	KENT, DENNIS K & RITA L
	HERRON, SCOTT & DYAN CO-TSTEES
	SEJKORA, TIMOTHY S & HEATHER A
	YOUNG, LINDA KAY & KRUEGER, DEBRA SUE
	BULLER, BRIAN J & REBECCA A
	KRUPICKA, RACHEL A TRUSTEE
	DEER HAVEN HOMEOWNERS ASSOC INC
	WEBER, JOSHUA A & KELSEY L
	DIETER, DONALD D & LEONE E
	GENERAL AGRICULTURAL SERVICES LLC
	SCHROEDER, MARK & JENNIFER
	ARCHER, LARRY L JR & KARY S
	REINKE, CORY L
	MATULKA, ALAN A & LORI M
	KLATT, MICHAEL C & REBECCA L
F1-40	YOUNG, LINDA KAY & KRUEGER, DEBRA SUE
	OLTMAN, JAMES & BETH &
F1-50	BUSBOOM, MICHAEL L & DOREEN B
	BERGEN, KARLA J
	EVERMAN, DOUGLAS & KATHY J
F1-60	BREWER, CHARLES D & LAUREL A
	WOLLENBURG, DAVID W
	NIEMEYER, JOHN P & LORI P
F1-61	KOHN, RYAN J & MELISSA S

	SPILKER, MARCIA L
	MARBET FARMS LLC
	HULS, RANDALL L & LAUREL A
	HULS, RANDALL L & LAUREL
F1-62C	HULS, RANDALL L
	HULS, RANDALL L & LAUREL A
F1-63	SPILKER, MARCIA L
	SPILKER, SAMUEL P TRUSTEE
	SPILKER, CHRISTOPHER W, TRUSTEE OF THE
F1-64	SCHLAKE, LELAND W & ALICE J
	REHM, DAVID D
	SCHLAKE, GAYLE LELAND & MARILYN RAE
	FIX, CALVIN C & RITA J TSTEES &
F1-65	HECKMAN, JAMES L & MCPHERSON, MARY L
	SCHWANINGER, SHAWN E & SHEREEN L
	ALLDER, LARRY
F1-66	HAUPT, JULIA A
	MURKLE, MONTE D
	PACKARD, STEVEN D &
F1-70	DRENT, WILLA MAE
	WARDLAW, LINDA J LIGHT
	BUEL, TODD L TRUSTEE OF THE
	MEINTS, DAVID W
F1-80	HULS, LOREN D & MARY C
	SPETTRO
	GENERAL AGRICULTURAL SERVICES LLC
F1-90	GENERAL AGRICULTURAL SERVICES LLC
	JOHNSEN, RAYMOND & MYRNA
F1-91	GENERAL AGRICULTURAL SERVICES LLC
F1-92	GENERAL AGRICULTURAL SERVICES LLC
F1-93	GENERAL AGRICULTURAL SERVICES LLC

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

The existing easements are located in Attachment 4 Existing Easements.

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

The LBBNRD has the authority to carry out their mission within their jurisdictional boundaries, including taxing and eminent domain, if needed. All landowners are aware of the Project and at this time and are anticipated to be willing participants for easements.

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

As a political subdivision of the State of Nebraska, the LBBNRD has the authority to undertake the project because the purpose of the project directly relates to the development, management, utilization and conservation of groundwater and surface water as designated in Neb. Rev. Stat. Chapter 2, Article 32. Further authority of the NRDs is defined under the Nebraska Groundwater Management and Protection Act, Neb. Rev. Stat. Chapter 46, Article 7, to enter into contracts or agreements, to budget and expend levied property taxes, to own and operate property and equipment and to conduct investigations relative to the protection and management of groundwater. The LBBNRD has the power of eminent domain. A letter of financial commitment from the LBBNRD is located in Attachment 2 LBBNRD Financial Assurance.

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

It should be noted that this project has limited environmental and ecological impacts. However, if not completed, it may result in more soil loss, erosion, and some habitat loss due to increased runoff. Below, the various positive impacts are explained in greater detail.

EROSION

The 25 dams would slightly reduce erosion from uplands draining into Little Indian Creek by slowing runoff and allowing for infiltration and reduce streambank erosion by providing stabilization in the vicinity of the dam structures.

SEDIMENTATION

The dams are designed to capture and store sediment for the 100-year lifespan of the project. This would lead to reduced downstream sedimentation over time. Construction of the dams would capture sediment over the life of the project.

PRIME AND UNIQUE FARMLAND

No adverse impacts.

GRASSLANDS

No adverse impacts.

WOODLANDS

No adverse impacts

SURFACE WATER QUALITY

The structures will capture a portion of upstream flow, allowing time for pollutants to settle out and reducing the overall amounts of pollutants present in downstream waterbodies.

STREAMS

Most dams are planned in areas without a defined bed or bank or within the footprint of an existing site, and therefore would not have impacts on existing streams. Eighteen of the total twenty-five dams will be built on the footprint of previous sites with previously maintained permanent pool, and therefore would not have impacts on existing streams. Five sites will be primarily built within the footprint of an existing site, with minor modifications that will have only minor impacts to streams. Two sites are new structures: one does not have any stream impacts, and the second will impact approximately 500 linear feet of ephemeral stream.

WETLANDS

Wetland impacts were determined for each dam site based on field visits and delineations and are being avoided and minimized through the planning process. Further avoidance and minimization will occur during the final design phase through the permitting process.

THREATENED AND ENDANGERED SPECIES

An evaluation of potential impacts to threatened and endangered (T&E) species was conducted through NRCS Programmatic Consultation evaluation parameters that included input from NRCS biologists, NGPC's Conservation and Environmental Review Tool (CERT), NGPC and USFWS staff input through the agency scoping meetings, and general coordination and professional judgement. Using existing information, it was determined that the project is not adversely impacting any state or federally listed T&E species or candidate species.

Northern Long-eared Bat

Any potential impact to the Northern long-eared bat (NLEB) can be avoided. According to the USFWS, the NLEB was listed as threatened in May 2015, with a 4(d) rule that became effective in January 2016. No critical habitat has been designated for the NLEB. The state of Nebraska is within the known range of the NLEB. During the summer, NLEBs typically roost singly or in colonies in cavities, underneath bark, crevices, or hollows of both live and dead trees and/or snags. Males and non-reproductive females may also roost in cooler places, like caves and mines. This bat seems opportunistic in selecting roosts, using tree species based on presence of cavities, crevices, or peeling bark. It has also been occasionally found roosting in structures like barns and sheds (particularly when suitable tree roosts are unavailable). They forage for insects in upland and lowland woodlots and tree-lined corridors along water features. During the winter, NLEBs predominately hibernate in caves and abandon mine portals. Additional habitat types may be identified as new information is obtained. The greatest risk to populations of this species is from white nose syndrome (WNS), which poses as severe and immediate threat. WNS combined with other impacts such as loss and degradation of overwintering habitat and loss of habitat during the pup season can cause further declines of the NLEB (USFWS, 2020).

The proposed project is within the WNS buffer zone. Tree clearing will be avoided during the pup season of June 1 – July 31 to avoid impacts to the NLEB during its reproductive time (*USFWS, 2020, https://www.fws.gov/species/northern-long-eared-bat-myotis-septentrionalis*).

Western Prairie Fringed Orchid

The watershed falls within the range of the Western Prairie Fringed Orchid. This orchid is part of the tallgrass prairie landscape and can be found in upland prairies and loess soils in eastern Nebraska. Surveys will be conducted for the Western Prairie Fringed Orchid prior to construction of the alternative, and appropriate mitigation actions will be taken if necessary.

RIPARIAN AREAS

There are no anticipated adverse impacts to riparian areas. Most of the dam sites utilized in the project already exist and will be designed to current standards and guidelines for flood damage reduction purposes. Construction of dam sites where a dam does not currently exist will take place in areas void of perennially flowing waterways.

FISH AND WILDLIFE HABITAT

Construction of dams at existing sites are not anticipated to result in any negative changes to fish and wildlife habitat. Construction of dam sites where a dam does not currently exist will take place in areas void of perennially flowing waterways. Therefore, no negative changes to fish and wildlife habitat are anticipated. The Town Creek to Big Blue River segment of Indian Creek supports a sensitive species of fish, the tadpole madtom. It is not anticipated that the completion of this project will negatively impact the tadpole madtom.

MIGRATORY BIRDS

To avoid impacts to migratory birds there would be no tree clearing from April 1 to July 15 to avoid potential disturbances during the primary nesting season for breeding birds. The project will be in compliance with the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act. Based upon a database provided by the NPGC, there are no bald eagle or golden eagle nests or roosting sites within 0.5 miles of the project sites.

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;

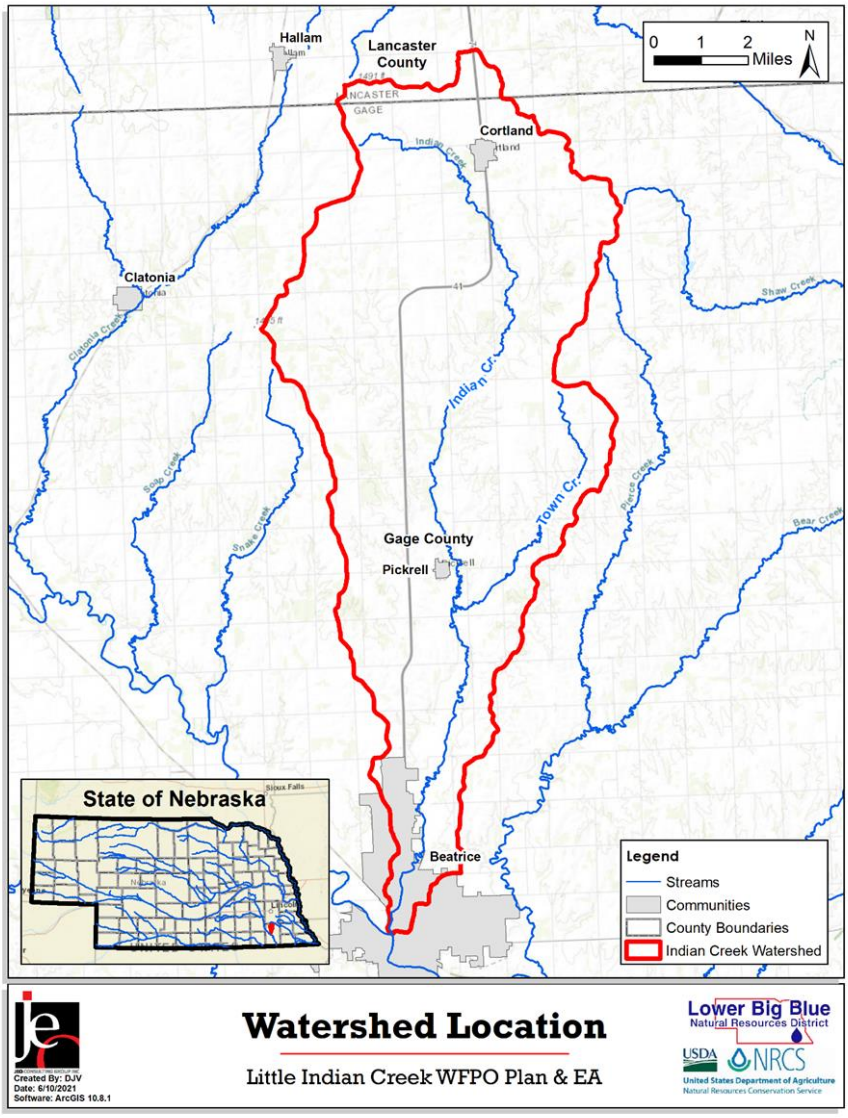
    - Describe the specific threats to drinking water the project will address.
    - Identify whose drinking water, how many people are affected, how will project remediate or mitigate.
    - Provide a history of issues and tried solutions.
    - Provide detail regarding long-range impacts if issues are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

Part of the City of Beatrice's water distribution network is in the Little Indian Creek Floodplain. The flood reduction structures located upstream in the watershed will protect this critical infrastructure in a watershed that has a history of flooding. Therefore, this has a direct link to protecting or mitigating water quality issues. This is described in more detail below.

The purpose of the NRCS Watershed and Flood Prevention Operations Program (WFPO) is flood prevention and damage reduction within the watershed and downstream of the watershed. By preventing flood damage to critical infrastructure such as groundwater domestic wells and drinking water transmission systems protection can be provided in the watershed and downstream of the watershed including the City of Beatrice. The Little Indian Watershed location is shown in Figure 5. Flood damage reduction and mitigation measures reduce or prevent floodwater damage by reducing runoff, erosion, and sediment. It also assists in modifying the susceptibility of improvements in the floodplain to damage; removing damaging property from the floodplain; or reducing the frequency, depth, or velocity of flooding. Measures may also include actions that prevent encroachment into the floodplain.

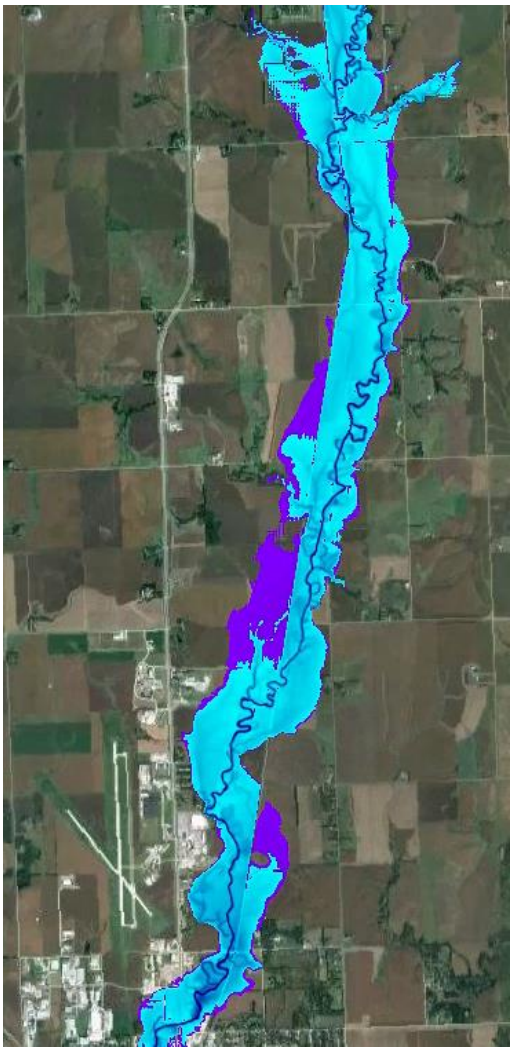
This project, once constructed, will reduce flooding damage in the watershed and downstream of the confluence with the Big Blue River. There are approximately 94 existing dams that provide flood protection within the watershed. These structures were constructed as part of a United States Department of Agriculture (USDA) pilot project in the 1950s and early 1960s. All these dams have exceeded their original design life of 50-years and are no longer providing adequate flood protection. Constructing a new dam on an existing dam site requires that the existing structure to be altered and/or deconstructed and a new structure built to the current design standards and guidelines, and to have sediment removed from the pool area to allow for 100-years of sediment storage for the new structure. The 25 project sites for dams were identified and analyzed for the project.

The project will demonstrate that the NRCS WFPO process can leverage funding and expertise with the Water Sustainability Fund (if approved). The NRCS will pay for 100% of the engineering design and construction costs and, therefore, no funding for those items are being requested from the Water Sustainability Fund. The LBBNRD is requesting cost share funding from the Water Sustainability Fund for land acquisition and permitting and compliance only. The LBBNRD will pay for operation and maintenance costs and is not requesting O&M funding from the Water Sustainability Fund.



Little Indian Creek Watershed location map.

The WFPO project will reduce threats to drinking water. The Little Indian Creek is a tributary to the Big Blue River and high water from this tributary can aggravate and cause flooding in the Big Blue River watershed. During times of peak flows drinking water supplies are susceptible to flood damage. The impairment comes from physical damage to critical infrastructure such as the erosion of buried water mains, service roads, electrical service, and by water contamination due to contaminated floodwaters. The extent of flooding in the Little Indian Creek watershed is shown in the figure below.



Little Indian Creek flooding extents, with and without dams.

The citizens of the City of Beatrice, Villages of Pickrell and Cortland, and rural residents rely on groundwater as their source of water. Numerous water supply wells in the watershed derive drinking water from aquifers underlying Little Indian Creek and the Big Blue River. The 25 dams will attenuate peak flows thereby reducing the risk of flooding and damage within the watershed. Additionally, the structures will capture excess sediment and contaminated water thereby protecting drinking water. Types of water contamination include bacteria and agricultural chemicals including fertilizers and pesticides.

The dams that were constructed in the watershed was the focus of the Indian Creek Watershed Project, a precursor to the NRCS PL-566 program. The Indian Creek Watershed Project was begun by the Soil Conservation Service in September 1954 and completed in June 1963. During that time, 15 dams, 34 grade stabilization structures, nine combination floodwater detention and grade stabilization structures, and five drop structures were built upstream of Beatrice (*USDA Indian Creek Watershed (Pilot), 1963*). Those structures have surpassed their designed lifespans and therefore flood flows that can threaten critical

infrastructure such as drinking water wells. By constructing the 25 dams potential opportunities for new or upgraded flood control alternatives exist.

The watershed is impacted by both flash flooding and riverine floods. Since 1996, there have been 17 separate flooding events recorded in the watershed *(NCEI, 2020*). These flood events threatened critical infrastructure such as wells, associated water transmission, transportation, and power systems. Additionally, outside of the watershed's communities, most of the land is used for row crop agriculture. Flood damage to cropland and pasture can occur due to inundation, sediment deposition, scour, and erosion. Damage to roads and bridges can impede watershed residents' access to emergency services. Flooding within the Little Indian Creek Watershed affects approximately 80 structures within the 100-year regulatory floodplain, most of which are within the City of Beatrice.

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.

There are several goals that have already been established by the WFPO project that will be continued if the Water Sustainability Fund provides future funding to complete the project. These include understanding and protecting water supply and uses, prevention and mitigation of any current or potential water conflicts and involving the public at all levels of engagement. A clear example is the establishment of a database that works in sync with the current surface water model. This database includes access to valuable information related to stream flows and the extent of flooding that assists in flood damage prevention and any threat to water quality. Other areas that this project will assist with are:

-Up-to-date hydrologic and hydraulic model data for the 45,425-acre watershed.
-Accounting of storage in the watershed.
-Increased recharge rates to groundwater and incorporation into groundwater model and monitoring.
-Flood risks reduced to water supply systems and infrastructure ensuring resiliency of the system and confidence in distribution.
-Detention helps reduce sedimentation which improves water quality

Background:

The Lower Big Blue Natural Resources District (LBBNRD) Voluntary Integrated Management Plan (VIMP) April 2022 was prepared by the staff and Board of Directors of the LBBNRD and the Nebraska Department of Natural Resources (NeDNR) in consultation with the District Stakeholder Advisory Committee (SAC) and in accordance with the Nebraska Groundwater Management and Protection Act. The act assigns the responsibilities and the authority to the NeDNR and the LBBNRD for management of groundwater and hydrologically connected waters in accordance with *Nebraska Revised Statutes (Neb. Rev. Stat.) §46-715(1)(b), §46-715 to 46-717, and subsections (1) and (2) of §46-718.* The VIMP is attached.

The LBBNRD, in collaboration with the NeDNR, developed the VIMP to attain and maintain a desired balance between uses and supplies of both surface water and groundwater sources so economic viability, as well as social and environmental health, safety, and welfare can be achieved and maintained in the LBBNRD for both the near-term and long-term, while considering effects on existing surface water appropriators and groundwater users. Should the NeDNR subsequently determine an affected river basin, subbasin, or reach within the LBBNRD to be fully appropriated, either agency may amend the VIMP.

In 1969, the Nebraska Legislature passed LB 1357 that combined 154 special purpose entities into what are now 23 Natural Resources Districts (NRDs) in 1972. Unique to Nebraska, NRDs are local government entities, governed by an elected board of directors, with broad responsibilities to protect Nebraska's natural resources. NRD boundaries generally follow major river basins, enabling local districts to respond best to local needs. NRDs are charged with 12 areas of responsibility, including:

1. Development, management, use, and conservation of groundwater and surface water
2. Soil conservation
3. Erosion prevention and control
4. Flood prevention and control
5. Pollution control
6. Water supply for any beneficial uses
7. Prevention of damage from flood water and sediment
8. Development and management of recreational and park facilities
9. Forestry and range management
10. Development and management of fish and wildlife habitat
11. Drainage improvement
12. Solid waste management

The mission of the LBBNRD fulfills all 12 areas of responsibility. This WFPO project. will achieve numbers 1-through 11 of the areas of responsibility. Therefore, the funding of this project is crucial in order to uphold the historical premise of the VIMP and mission of the LBBNRD.

There are approximately 94 existing dams that provided flood protection within the watershed. These structures were constructed as part of a United States Department of Agriculture (USDA) pilot project in the 1950s and early 1960s. All these dams have exceeded their original design life of 50-years and are no longer providing adequate flood protection. Constructing a new dam on an existing dam site requires that the existing structure to be altered and/or deconstructed and a new structure built to the current design standards and guidelines, and to have sediment removed from the pool area to allow for 100-years of sediment storage for the new structure. The 25 project sites for dams were identified and analyzed for this project. The 25 dams proposed in this project can prevent flood damage in the watershed and downstream of the confluence with the Big Blue River by reducing the peak flow in Little Indian Creek during a 100-year storm event from 17,600 cubic feet per second (CFS) to 10,100 CFS, as measured at the Highway 77 bridge in Beatrice.

It should be noted that the funding request from the Nebraska Water Sustainability Fund consists of leveraging monies for land acquisition and permitting only. The remaining costs will be provided by the Natural Resources Conservation Service and the LBBNRD.

The goal of the integrated management process is to protect existing investments and interests while facilitating economic growth and well-being across the LBBNRD and the State of Nebraska objectives focus on understanding the water supplies and uses, resolving potential conflicts between users, planning for

future uses, and effectively communicating water resource information and management actions to the public. These fundamental elements of integrated management planning allow for tailoring NeDNR and LBBNRD actions in the following phases of the VIMP process and provide the framework for water management decisions going forward.

A goal is a desired outcome of actions taken in support of achieving the overall purpose of the VIMP. An objective is an achievable and measurable action taken to attain the desired result stated in the goal it supports. Goals provide a broad picture of intentions, whereas objectives define specific ways to achieve these goals. The objectives are then supported by detailed action items that will get the necessary work accomplished.

WFPO project. achieves several goals and objectives stated in the VIMP. Goals and objectives that apply include:

Goal 1.0: Develop a better understanding of LBBNRD water supplies and uses.

This goal is focused on data collection and analysis of supplies and uses fundamental to effectively managing the LBBNRD's water resources. The first objective is focused on collecting and maintaining a database of water uses and supplies within LBBNRD. This project will provide valuable data on stream flows and extent of flooding. This will provide important information to the existing numerical surface water model and thereby help in flood damage prevention. Also, by improving the surface water numerical model the existing groundwater numerical model will be enhanced and thereby improve management of this valuable resource. The second objective is focused on development of tools and their use in further understanding the LBBNRD's water resources. As stated in the first objective, the surface water and groundwater models will be greatly enhanced by better understanding the water supplies and uses of the LBBNRD. These predictive management tools are essential in managing water resources. The third objective is focused on monitoring the trends in supplies and uses within the basin to inform management actions in the future. With improved data and numerical models there will be better tools for management of water resources. This will allow the models to predict and address future water issues such as flooding or groundwater declines.

Goal 2.0 Prevent or mitigate water related conflicts within the LBBNRD.

The second objective of goal 2.0 is to maintain compliance with the Big Blue River Compact. To ensure compliance with the Compact the water resources must be managed appropriately. With the construction of the 25 dams the flows can be regulated by reducing peak flows. Additionally, the structures will provide groundwater recharge, and this could result in higher groundwater levels and coupled with the regulated discharge from the dams, this could improve streamflow. The structures will improve water quality by impounding contaminated water and sediment. This will help the Compact meet their water quality plan to "encourage an active pollution abatement program in each state". The LBBNRD and NeDNR participate in the Big Blue River Compact, which the States of Nebraska and Kansas entered in 1971. The major purposes of the Compact are (from *Neb. Rev. Stat.* § 1-115):

1. To promote interstate comity between the States of Nebraska and Kansas;

2. To achieve an equitable apportionment of the waters of the Big Blue River Basin and to promote orderly development thereof; and

3. To encourage continuation of the active pollution-abatement programs in each of the two States and to seek further reduction in both natural and man-made pollution of the waters of the Big Blue River Basin.

Goal 3.0 Inform the public of the LBBNRD water resources and management efforts.

The second objective of goal 3.0 is to maintain and expand public outreach activities. The Little Indian Creek Watershed Environmental Assessment has extensive public outreach woven throughout the process. Initial public meetings were held in April 2022, and they will continue to be an ongoing process.

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 project will contribute to increasing groundwater recharge. The 25 dams will impound water in their reservoirs. These artificial lakes will be the source of localized recharge to the aquifer. As recharge occurs, groundwater levels should increase. The results of higher groundwater levels should be that more water is available for streamflow and localized aquifer depletion should be reduced.

The geology of the LBBNRD is variable and so is the extent of groundwater. Groundwater is almost the entire source of domestic, municipal, industrial, and irrigation water throughout the LBBNRD and in the Little Indian Creek Watershed. The best source of groundwater is the quaternary age of deposits of sands and gravels having high permeability. The bedrock materials underlying the aquifer are mostly impermeable in nature. The most permeable deposits are generally the sand and gravel layers of the Illinoian age. The thickness of these layers is variable and ranges from a few feet to about 200 feet. *LBBNRD Master Plan (2011).* Through geological investigations from the UNL Conservation and Survey Division test hole program and the NeDNR registered well database, conversations with a NRCS's geologist, and as-built plans from existing dams, it is known that sand and gravel layers exist within the Little Indian Creek watershed.

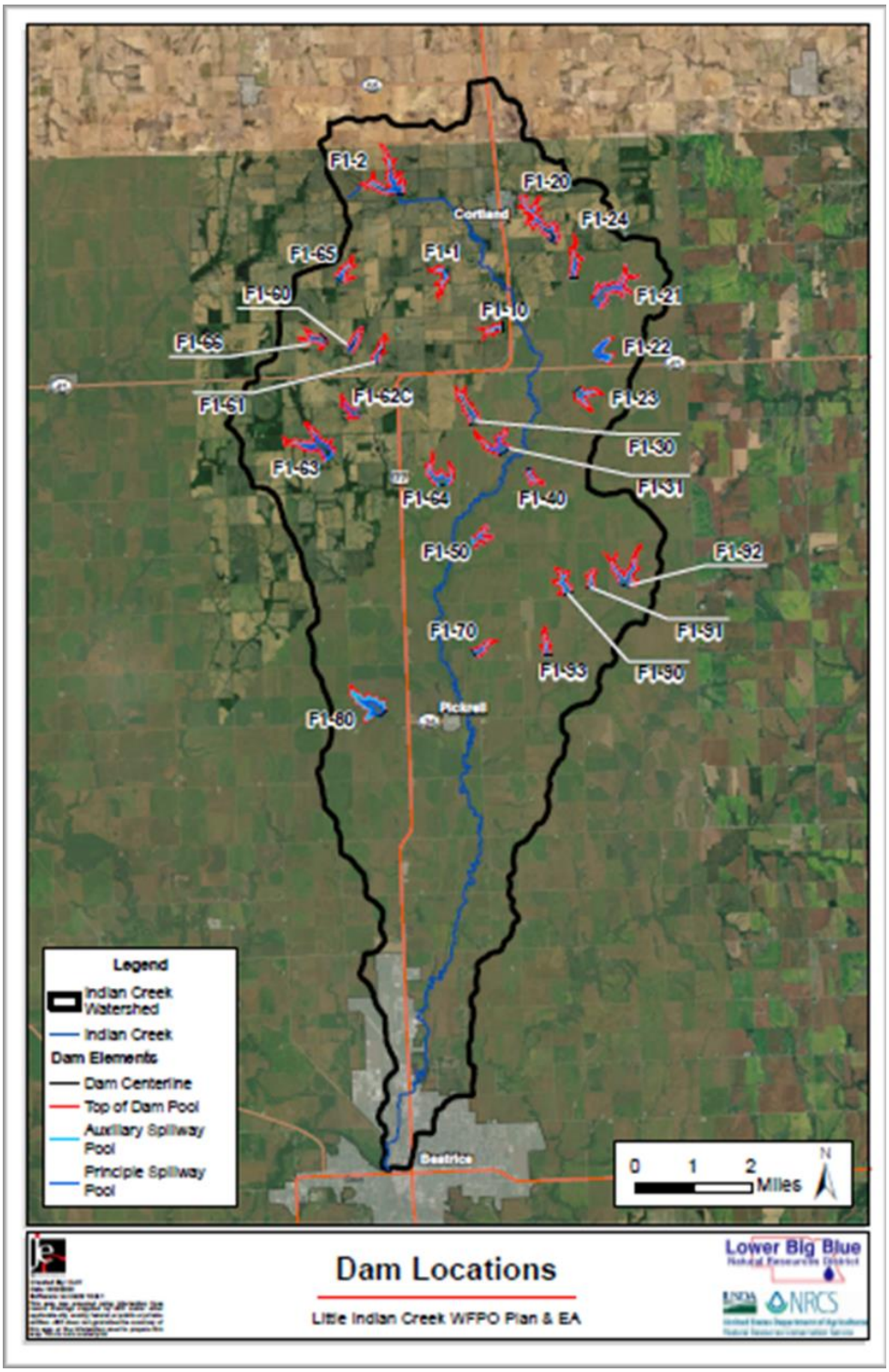
Groundwater is a critical resource in the LBBNRD. Groundwater wells extend throughout the Little Indian Creek Watershed. There are 332 NeDNR registered wells in the watershed. Domestic, irrigation, and monitoring wells account for approximately 89% of the wells in Little Indian Creek, as shown in Table 10. Currently, there are 32 wells in the existing 100-year floodplain. These wells are threatened by flooding due to inundation. The project will reduce high flows and provide protection to the impacted wells.

Table 10. Registered Wells in Little Indian Creek Watershed:

Use	Well Count	Percentage
Domestic	130	39.2%
Irrigation	84	25.3%
Monitoring	81	24.4%
Recovery	12	3.6%
Livestock	10	3.0%

Other	7	2.1%
Heat Exchange	5	1.5%
Commercial/industrial	3	0.9%
Total	332	100.0%

The 25 dams proposed in this project will create reservoirs. The next figure shows the distribution of the 25 dams across the watershed. At these locations geotechnical testing is being conducted and this will document the soil types and geologic layers such as the permeable sands and gravels. Other important physical properties will also be documented. Available well logs and groundwater levels will be identified and recorded. As the 25 impoundments seep water into the underlying soils the groundwater will be recharged. As recharge occurs, groundwater levels should increase. So, the goal is that groundwater recharge will occur at each of these dam sites, although the amount will vary by site. With higher groundwater levels it is expected that streamflow in Little Indian Creek will improve. Concurrently, surface water discharges from the dams will be controlled thereby providing more consistent flows. The net effect of more consistent discharge from the dams with higher groundwater levels could improve streamflow in Little Indian Creek. If this occurs there will be benefits to aquatic and terrestrial species and their habitat. Also, recreational opportunities will be improved. Conjunctive management of the water resources will benefit the citizens in the watershed and downstream of the watershed. Finally, if streamflow is more consistent and regulated this should help Nebraska meet its Big Blue River Interstate Compact requirements.



Proposed Little Indian Creek watershed dam locations.

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 WFPO project. will contribute to achieve multiple water supply goals, including:

- Flood control
- Agricultural use
- Municipal and industrial use
- Recreational benefits
- Wildlife habitat
- Conservation of water resources
- Preservation of water resources

Flood Control: By constructing 25 dams in the Little Indian watershed flood damages will be reduced and public safety will be improved. The dams will attenuate peak flows by capturing high water. The positive impact of the flood control will occur not only in the Little Indian Creek watershed including Beatrice, but also possibility downstream of the confluence of the Big Blue River. This project provides critical infrastructure flood protection to US Highway 77 and to the Burlington Northern Railroad and numerous residential, commercial, and industrial properties. Possibility downstream of the Little Indian Creek and the Big Blue River confluence other critical infrastructure consists of US Highway 136, Beatrice Wastewater Treatment Plant and numerous residential, commercial, and industrial properties. Reducing peak flows will add protection for over 80 structures in the watershed. Agricultural land will be protected from scouring flows that erode valuable farmland soil. Head cutting and streambank bank erosion will be reduced with the reduction of high flows. Wetlands will be protected from harmful sediment that diminishes the capacity to provide valuable habitat. Water quality will be improved by the reduction of bacteria, agricultural chemicals, and sediment because of the controlled flows. The structures will improve water quality by impounding contaminated water and sediment. This will help the Big Blue River Interstate Compact meet their water quality plan to "encourage an active pollution abatement program in each state". Floodplain management will be improved by the reduction of flows and flood insurance costs will be reduced. By providing flood control damages to structures and agricultural land will be reduced thereby allowing the local and regional economy to grow as opposed to paying for recovery costs due to flooding.

Agricultural Use: More than 27,000 acres of prime farmland in is the Little Indian Creek Watershed which may be impacted by flooding (NRCS 2020). Drainage systems in the fields degraded by rill erosion and streambank and channel erosion will be reduced since peak flows will be attenuated. Water quality will be improved by the reduction of bacteria, agricultural chemicals, and sediment because of the controlled flows. Sediment buildup in unwanted areas will be reduced by the reduction of scouring flows.

Municipal and Industrial Use: Flooding in the urban areas will be reduced by dams. Critical infrastructure such as roads, storm and sanitary sewers, utilities, and domestic/commercial/industrial buildings will be protected. Floodplain management will be improved by the reduction of flows and flood insurance costs

will be reduced or eliminated. The 100-year peak flow is reduced by 41% with the installation of the 25 flood reduction structures. The local and regional economy will be able to grow with the additional protection.

Recreation: The newly constructed dams will create aquatic and wetland habitat including aquatic and wetland that will be prime for hunting, fishing, and bird watching. Some of the species that will benefit include waterfowl and migratory birds, eagles, and terrestrial wildlife. Stream flows will be more regulated and groundwater recharge should produce higher groundwater levels therefore stream flow could be improved thereby improving fish habitat. Recreational facilities and parks in the watershed of the Little Indian Creek floodplain will receive protection from flood flows. Water safety will be improved by the regulation of peak flows.

Wildlife Habitat: The newly constructed dams will create aquatic and wetland habitat that will be suitable for fish, waterfowl, migratory birds, eagles, aquatic habitat, and terrestrial wildlife. Stream flows will be more regulated and groundwater recharge should produce higher groundwater levels therefore stream flows could be improved thereby improving fish habitat.

Conservation and Preservation of Water Resources: Conservation and preservation of water resources within the Little Indian Watershed will be improved and compliance with the Big Blue River Interstate Compact could be maintained by implementation of this project. This is due to the many primary and secondary benefits of this project. Conservation and preservation of both surface water and groundwater will occur by the construction of the 25 dams. As the impoundments seep water into the underlying soils the groundwater will be recharged. As recharge occurs, groundwater levels should increase. So, the goal is that groundwater recharge will occur at each of these dam sites, although the amount will vary by site. With higher groundwater levels it is expected that streamflow in Little Indian Creek will improve. Concurrently, surface water discharges from the dams will be controlled thereby providing more consistent flows. The net effect of more consistent discharge from the dams with higher groundwater levels could improve streamflow in Little Indian Creek.

The project would positively impact the watershed by providing benefits by reducing losses of property, income, and crops caused by flood damage. Avoided income loss is the largest single benefit of the Project, followed by avoided property loss. The Project average annual avoided damages and benefits on ecosystem flows and values is presented in Table 5. The creation of approximately 26 acres of wetland would generate an average annual value of $201,368 per year by increasing the production of regulating, provisioning, and cultural services associated with this land cover type. In total, the Project would create average annual gross benefits of approximately $1,505,861 per year. The detailed Environmental Assessment (EA) economic analysis is located in Attachment 3.

Table 5. Average Annual Avoided Damages and Benefits, 2022

Structure ID	Avoided Property Loss, Critical Facility Loss, and Income Loss	Avoided Crop Yield Damages	Wetland Benefits	Average Annual Benefits Total
F1-2	$75,127	$634	$11,698	$87,460
F1-1	$41,790	$353	$3,899	$46,043
F1-10	$38,664	$326	$1,950	$40,941
F1-63	$138,474	$1,169	$11,698	$151,342
F1-65	$39,725	$335	$3,899	$43,960
F1-66	$41,979	$354	$7,019	$49,352
F1-60	$26,274	$222	$6,239	$32,735
F1-61	$30,690	$259	$3,120	$34,068
F1-31/F1-30	$90,666	$766	$14,038	$105,469
F1-22	$50,746	$428	$6,239	$57,414
F1-21	$78,048	$659	$15,598	$94,305
F1-24	$28,288	$239	$3,899	$32,426
F1-20	$114,476	$967	$7,799	$123,242
F1-23	$50,341	$425	$6,239	$57,006
F1-70	$29,058	$245	$3,120	$32,423
F1-90	$49,143	$415	$6,239	$55,798
F1-91	$20,810	$176	$3,120	$24,105
F1-92	$58,733	$496	$7,799	$67,027
F1-93	$38,790	$328	$3,899	$43,017
F1-40	$36,560	$309	$3,899	$40,768
F1-50	$70,238	$593	$3,120	$73,951
F1-80	$115,240	$973	$10,139	$126,352

F1-62C	$35,042	$296	$17,859	$53,198
F1-64	$35,624	$301	$38,839	$74,763
Total	**$1,334,529**	**$11,269**	**201,368**	**$1,547,165**

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.

The WFPO project. will enhance and protect beneficial uses of water resources. There are many beneficial uses by constructing 25 dams in the Little Indian Creek Watershed. While these dams are localized in the Little Indian Creek watershed, the state will benefit from the infusion of approximately $34 million dollars from federal funding through the NRCS. The federal funds will be highly leveraged with the WSF and LBBNRD funding and this reduces the amount Nebraska must spend. The result of the leveraged Federal funding frees up monies for other water resources projects within the State. The project will help in meeting the State Hazard Mitigation Plan by reducing flood risk in the Little Indian Creek watershed.

Little Indian Creek existing watershed structure example.

Specific improvements provided by constructing the 25 dams include: flood damage reduction, improved public safety, possible compact compliance for the Big Blue River Interstate Compact, wildlife and aquatic habitat creation, soil loss prevention, and stream degradation reduction. The dams will attenuate peak flows by capturing and reducing runoff. The positive impact of flood control will occur not only in the Little Indian Creek watershed including Beatrice, US Highway 77, and the Homestead Trail, but also possibility downstream of the confluence of the Big Blue River. Reducing peak flows will add protection for over 80 structures in the watershed. Prime agricultural land will be protected from scouring flows that erode valuable farmland soil. Head cutting and streambank bank erosion will be reduced with the reduction of high flows. Wetlands will be protected from harmful sediment that diminishes the capacity to provide valuable habitat. Stream water quality will be improved by the reduction of bacteria, agricultural chemicals, and sediment because of the controlled flows. Floodplain management will be improved by the reduction of flows and flood insurance costs will be reduced. By providing flood control, damages to structures and agricultural land will be reduced thereby allowing the local and regional economy to grow as opposed to paying for recovery costs due to flooding. The proposed dams will provide control of 35% of the total Little Indian Creek watershed acres and reduce the 100-year peak flow by 41%.

No beneficial uses will be reduced by this project.

The Big Blue River Interstate Compact benefits from the WFPO project. The structures will improve water quality by impounding contaminated water and sediment. This will help the Compact meet their water quality plan to “encourage an active pollution abatement program in each state”. The 25 dams will recharge the groundwater. Regulated streamflow and groundwater recharge resulting in higher groundwater levels could possibly improve streamflow in Little Indian Creek and this could help Nebraska meet its Compact requirements. Without the Project compact compliance could be more difficult possibility exposing the State to an expensive lawsuit. The Kansas-Nebraska Big Blue River Interstate Compact was entered into in 1971. The purpose of the Compact is to promote interstate comity, achieve equitable apportionment of the waters of the Big Blue River Basin and promote the orderly development thereof. The Compact provides for minimum target flows to reach the Kansas state line on both the Big and Little Blue Rivers, as measured by river gages at Barneston, NE on the Big Blue and Hollenberg, KS on the Little Blue from May through September. When stream flow falls below these target values, Nebraska is required to administer surface water rights and associated alluvial groundwater use located within the regulatory reaches of either river junior to 1968, until the target value is exceeded. The Compact stream flow targets are shown in Table 11.

Table 11: Big Blue River Interstate Compact Stream Flow Targets.

	Big Blue River	Little Blue River
May	45 cfs	45 cfs
June	45 cfs	45 cfs
July	80 cfs	75 cfs
August	90 cfs	80 cfs
September	65 cfs	60 cfs

The LBBNRD Voluntary Integrated Management Plan (VIMP) between the LBBNRD and NeDNR benefits from the WFPO project. The goal of the integrated management process is to protect existing investments and interests while facilitating economic growth and well-being across the LBBNRD and the State of Nebraska. For the first phase/increment of the integrated management planning process for the LBBNRD’s

VIMP, the goals and objectives focus on understanding the water supplies and uses, resolving potential conflicts between users, planning for future uses, and effectively communicating water resource information and management actions to the general public. These fundamental elements of integrated management planning allow for tailoring NeDNR and LBBNRD actions in the following phases of the VIMP process and provide the framework for water management decisions going forward.

WFPO project. achieves several goals and objectives stated in the VIMP. As outlined in the VIMP, the citizens of Nebraska will receive beneficial impact by meeting the following goals and objectives:

Goal 1.0 Develop a better understanding of LBBNRD water supplies and uses.

This goal is focused on data collection and analysis of supplies and uses fundamental to effectively managing the LBBNRD's water resources. The first objective is focused on collecting and maintaining a database of water uses and supplies within LBBNRD. This project will provide valuable data on stream flows needed to manage flooding. This will provide important information to the existing numerical surface water model and thereby help in flood damage prevention. Also, by improving the surface water numerical model the existing groundwater numerical model will be enhanced and thereby improving management of this valuable resource. The second objective is focused on development of tools and their use in further understanding the LBBNRD's water resources. As stated in the first objective, the surface water and groundwater models will be greatly enhanced by better understanding the water supplies and uses of the LBBNRD. These predictive management tools are essential in managing water resources. The third objective is focused on monitoring the trends in supplies and uses within the basin to inform management actions in the future. With improved data and numerical models there will be better tools for management of water resources. This will allow the models to predict and address future water issues such as flooding or groundwater declines.

Goal 2.0 Prevent or mitigate water related conflicts within the LBBNRD.

The second objective of goal 2.0 is to maintain compliance with the Big Blue River Compact. To ensure compliance with the compact, the water resources must be managed appropriately. With the construction of the dams the flows can be regulated by reducing peak flows. Regulated discharge from the dams and groundwater recharge caused by the impoundments could improve streamflow. The LBBNRD and NeDNR participate in the Big Blue River Interstate Compact, which the States of Nebraska and Kansas entered in 1971. The major purposes of the Compact are *(from Neb. Rev. Stat.* § 1-115):

1. To promote interstate comity between the States of Nebraska and Kansas;
2. To achieve an equitable apportionment of the waters of the Big Blue River Basin and to promote orderly development thereof; and
3. To encourage continuation of the active pollution-abatement programs in each of the two States and to seek further reduction in both natural and man-made pollution of the waters of the Big Blue River Basin.

Goal 3.0 Inform the public of the LBBNRD water resources and management efforts.

The second objective of Goal 3.0 is to maintain and expand public outreach activities. The Little Indian Creek Watershed Environmental Assessment has extensive public outreach woven throughout the process. Initial public meetings were held in April 2022, and they will continue to be an ongoing process. This will include public scoping meeting at the beginning and end of the project, open houses that will

involve a variety of different engagement techniques, and future feedback related to flood mitigation in the NRD.

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.

Table 6. Average Annual Avoided Damages and Benefits and Benefit Cost Ratio, 2022

Works of Improvement	Agriculture Related			Average Annual Benefits	Average Annual Cost	Benefit Cost Ratio
	Avoided Property Loss, Critical Facility Loss, and Income Loss	Avoided Crop Yield Damages	Wetland Benefits	Total		
F1-2	$75,127	$634	$11,698	$87,460	$61,765	1.42
F1-1	$41,790	$353	$3,899	$46,043	$38,711	1.19
F1-10	$38,664	$326	$1,950	$40,941	$33,656	1.22
F1-63	$138,474	$1,169	$11,698	$151,342	$89,722	1.69
F1-65	$39,725	$335	$3,899	$43,960	$34,314	1.28
F1-66	$41,979	$354	$7,019	$49,352	$34,101	1.45
F1-60	$26,274	$222	$6,239	$32,735	$40,252	0.81
F1-61	$30,690	$259	$3,120	$34,068	$49,188	0.69
F1-31/F1-30	$90,666	$766	$14,038	$105,469	$109,709	0.96
F1-22	$50,746	$428	$6,239	$57,414	$37,216	1.54
F1-21	$78,048	$659	$15,598	$94,305	$61,584	1.53
F1-24	$28,288	$239	$3,899	$32,426	$42,472	0.76
F1-20	$114,476	$967	$7,799	$123,242	$102,284	1.20
F1-23	$50,341	$425	$6,239	$57,006	$39,218	1.45
F1-70	$29,058	$245	$3,120	$32,423	$47,231	0.69
F1-90	$49,143	$415	$6,239	$55,798	$36,996	1.51
F1-91	$20,810	$176	$3,120	$24,105	$29,268	0.82
F1-92	$58,733	$496	$7,799	$67,027	$65,031	1.03
F1-93	$38,790	$328	$3,899	$43,017	$31,911	1.35
F1-40	$36,560	$309	$3,899	$40,768	$34,551	1.18
F1-50	$70,238	$593	$3,120	$73,951	$52,048	1.42
F1-80	$115,240	$973	$10,139	$126,352	$66,783	1.89
F1-62C	$35,042	$296	$17,859	$53,198	$30,638	1.74
F1-64	$35,624	$301	$38,839	$74,763	$42,039	1.78
Total	**$1,334,529**	**$11,269**	**201,368**	**$1,547,165**	**$1,210,686**	**1.28**

The WFPO project benefits and costs were calculated based on the expected effects of the Project on the ecosystem; the resulting benefit cost ratio (BCR) is 1.28:1. The analysis evaluated the costs of the project based on cost estimates from JEO Consulting Group, Inc., which included costs for engineering design, construction, land acquisition, permitting and compliance, and operations and maintenance. These were compared against benefits received by preventing losses associated with flood damages. The detailed Environmental Assessment (EA) economic analysis is located in Attachment 3. The average annual costs avoided damages and benefits and benefit cost ratio are shown in Table 6.

The project will demonstrate that the new WFPO process can leverage funding and expertise with the Water Sustainability Fund (if approved). The NRCS will pay for the engineering design and construction costs and therefore no funds are being requested from the Water Sustainability Fund. The LBBNRD is requesting cost share funding from the Water Sustainability Fund for land acquisition and permitting and compliance only. The LBBNRD will pay for operation and maintenance costs and is not requesting O&M funding from the Water Sustainability Fund.

The potential impacts of the project were evaluated over a 100-year time-period following the completion of installation, which is equal to the length of time over which the dams are expected to have significant beneficial effects. Benefits are expected to begin accruing the year after the structures are installed and continue to accrue until the end of the 100-year time-period. Since all the project structures have design lives of 100-years, replacement costs were not included in the analysis since the project time horizon does not exceed the life of the measures (*Principles , Requirements, and Guidelines for Water and Land Related Resources Implementation Studies (PR&G) Section 9, National Watershed Program Handbook (NWPM) 501.37.B and the Economics Handbook, Part 611, 1.12.*)

To assess the economic benefits and costs of the Project, GIS-based hydrologic and hydraulic (H&H) projections were developed to assess flood extent and depth in the watershed for 10-, 25-, 50-, 100-, and 500-year events. The analysis used this information to quantify and value the benefits and costs associated with the Project.

Projected benefits and costs are based on a full employment economy and assume no change in relative prices during the period of analysis. Benefits and costs are discounted using the discount rate for federal projects of 2.25 percent for 2022 *(NRCS, 2022)*. Results are reported in both net present values and average annual values in 2022 dollars.

Avoided property loss and avoided income loss were estimated with the HAZUS model for the Project. The HAZUS model, developed by Federal Emergency Management Agency (FEMA) based on records of previous flood events and expert judgement, was created as a tool for flood plain managers and others to use in flood mitigation efforts impacting people and property *(HAZUS Technical Manual 2.1 pg. 2-2)*. Its primary goal is to provide quantifiable information on the damage caused by flood events in support of disaster relief and watershed planning efforts.

The HAZUS model works in a two-step process, which includes a flood risk projection step and a flood loss estimation step. In the flood risk projection step, the user defines flood risk in terms of parameters like flood frequency, discharge, and ground elevation in the study area. In the second step, damages are calculated based on the flood risk projections developed in the first step and using default functions relating depth to damage (depth-damage functions) from the U.S. Army Corps of Engineers (USACE) and building inventory and valuation data from the U.S. Census *(FEMA, 2018).* The model combines this information to produce spatial and tabular data describing flood losses in monetary terms.

Building repair and replacement cost estimates are based on the full replacement cost model, whereby losses from flood-damaged buildings are calculated assuming the full value of damages are restored. The costs are based on industry-standard cost models published *by R.S. Means Company (Means Square Foot Costs, 2006), updated to 2022.*

The H&H projections developed for the HAZUS model were also used to estimate the number of acres of farmland that would be impacted during 10-, 25-, 50-, 100-, and 500-year flood events under the project. The cost projections were combined with data from the U.S. Department of Agriculture's (USDA) National Agricultural Statistics Service (NASS) Cropscape database. The web-based database, which shows crop cover in the United States, was used to classify the land cover of impacted acres in the Little Indian Creek watershed.

Land cover data for alfalfa, corn, and soybeans were carried forward for analysis as they represent the predominant crops grown in the watershed *(USDA NASS Cropscape Database, 2021*). The project would remove approximately 1,849 acres (about the area of Philadelphia Airport) of agricultural land from flood risk.

The gross value of each crop was estimated using state and county-level yield and price data from the USDA's NASS. Price information was taken from the NRCS USDA data series on annual normalized prices for the state of Nebraska for alfalfa, corn, and soybeans for the period from 2011 through 2020 *(NRCS, 2021)*. Annual prices for each crop were averaged over the 10-year period and used to calculate the gross value of each crop per acre. Price information for pasture was collected from the University of Nebraska's 2020-2021 Farm Real Estate Report, which estimated the statewide average annual cash rent for pastures *(UNL, 2020-2021)*. Data on crop yields was gathered from the *USDA NASS (USDA NASS, 2021a/b)*. Yield data was taken from statewide estimates *(USDA NASS, 2021a/b)*.

The Project will construct 25 dam structures in the Little Indian Creek watershed. The relevant preliminary cost information includes engineering design, construction permitting and compliance, land acquisition, and operation and maintenance. The price base is in 2022 dollars, amortized over 100-years at a discount rate of 2.25 percent. The estimated project cost distribution for 2022 is presented in Table 1. Costs in Table 1 are separated by the Water Sustainability Fund/LBBNRD cost share funding (permitting and compliance, and land acquisition), the NRCS costs (engineering design and construction), and the LBBNRD O&M costs. The average annual avoided damages and benefits and the benefit cost ratio for all 25 dams is shown Table 6. The cost information for the estimated construction period as well as the estimated project life is shown in Table 2.

Table 1. 2022 Total Estimated Project Cost Distribution

Alt ID	Brief Description	Water Sustainability Fund (WSF)/LBBNRD Cost Share			NRCS Cost (Not Part of the WSF Grant Request)			Total Installation Cost	O&M Cost (Annual)[2], Paid by LBBNRD
		Real Property Rights Cost[1]	Permitting Cost[4]	Total SLO	Engineering Cost[3]	Construction Cost	Total WFPO		
F1-2	New dam, low hazard	$ 71,841	$ 33,000	**$ 104,841**	$ 216,246	$ 1,554,270	$ 1,770,516	$ 1,875,357	$ 11,657
F1-1	New dam, low hazard	$ 17,479	$ 33,000	**$ 50,479**	$ 134,150	$ 964,204	$ 1,098,355	$ 1,148,834	$ 7,232
F1-10	New dam, significant hazard	$ -	$ 33,000	**$ 33,000**	$ 121,202	$ 871,136	$ 992,338	$ 1,025,338	$ 6,534
F1-63	New dam, low hazard	$ 172,557	$ 33,000	**$ 205,557**	$ 307,946	$ 2,213,362	$ 2,521,308	$ 2,726,865	$ 16,600
F1-65	New dam, low hazard	$ -	$ 33,000	**$ 33,000**	$ 123,593	$ 888,325	$ 1,011,918	$ 1,044,918	$ 6,662
F1-66	New dam, low hazard	$ -	$ 33,000	**$ 33,000**	$ 122,820	$ 882,769	$ 1,005,589	$ 1,038,589	$ 6,621
F1-60	New dam, low hazard	$ -	$ 33,000	**$ 33,000**	$ 145,136	$ 1,043,168	$ 1,188,304	$ 1,221,304	$ 7,824
F1-61	New dam, low hazard	$ 269,500	$ 70,000	**$ 339,500**	$ 151,507	$ 1,088,953	$ 1,240,460	$ 1,579,960	$ 8,167
F1-30	New dam, low hazard	$ 84,561	$ 70,000	**$ 154,561**	$ 190,333	$ 1,368,017	$ 1,558,350	$ 1,712,911	$ 10,260
F1-31	New dam, low hazard	$ 82,775	$ 33,000	**$ 115,775**	$ 190,636	$ 1,370,199	$ 1,560,836	$ 1,676,611	$ 10,276
F1-22	New dam, low hazard	$ -	$ 33,000	**$ 33,000**	$ 134,120	$ 963,985	$ 1,098,104	$ 1,131,104	$ 7,230
F1-21	New dam, low hazard	$ 51,744	$ 33,000	**$ 84,744**	$ 217,533	$ 1,563,515	$ 1,781,048	$ 1,865,792	$ 11,726
F1-24	New dam, low hazard		$ 33,000	**$ 33,000**	$ 153,190	$ 1,101,051	$ 1,254,241	$ 1,287,241	$ 8,258
F1-20	New dam, low hazard	$ 152,306	$ 33,000	**$ 185,306**	$ 328,922	$ 2,364,130	$ 2,693,052	$ 2,878,358	$ 17,731
F1-20A	Wetland/sediment basin	$ 15,400	$ 70,000	**$ 85,400**	$ 25,071	$ 180,199	$ 205,270	$ 290,670	$ 1,351
F1-23	New dam, low hazard	$ -	$ 33,000	**$ 33,000**	$ 141,385	$ 1,016,206	$ 1,157,591	$ 1,190,591	$ 7,622
F1-70	New dam, low hazard	$ 75,537	$ 33,000	**$ 108,537**	$ 163,156	$ 1,172,683	$ 1,335,839	$ 1,444,376	$ 8,795
F1-90	New dam, low hazard	$ -	$ 33,000	**$ 33,000**	$ 133,321	$ 958,247	$ 1,091,568	$ 1,124,568	$ 7,187
F1-91	New dam, low hazard	$ -	$ 33,000	**$ 33,000**	$ 105,284	$ 756,728	$ 862,012	$ 895,012	$ 5,675
F1-92	New dam, low hazard	$ 167,013	$ 33,000	**$ 200,013**	$ 218,895	$ 1,573,307	$ 1,792,202	$ 1,992,215	$ 11,800
F1-93	New dam, low hazard	$ 20,944	$ 33,000	**$ 53,944**	$ 112,848	$ 811,096	$ 923,944	$ 977,888	$ 6,083
F1-40	New dam, low hazard	$ -	$ 33,000	**$ 33,000**	$ 124,453	$ 894,504	$ 1,018,956	$ 1,051,956	$ 6,709
F1-50	New dam, low hazard	$ -	$ 33,000	**$ 33,000**	$ 187,935	$ 1,350,785	$ 1,538,720	$ 1,571,720	$ 10,131
F1-80	New dam, high hazard	$ 280,311	$ 33,000	**$ 313,311**	$ 214,297	$ 1,540,263	$ 1,754,560	$ 2,067,871	$ 11,552
F1-62C	New dam, low hazard	$ 115,500	$ 70,000	**$ 185,500**	$ 99,088	$ 712,195	$ 811,283	$ 996,783	$ 5,341
F1-64	New dam, low hazard	$ 318,780	$ 70,000	**$ 388,780**	$ 120,802	$ 868,264	$ 989,066	$ 1,377,846	$ 6,512
	Totals:	**$ 1,896,248**	**$ 1,043,000**	**$ 2,939,248**	**$ 4,183,869**	**$ 30,071,562**	**$ 34,255,431**	**$ 37,194,680**	

Notes:

[1] Includes cost of legal fees and land appraisals; if blank, existing easements are in place and no land rights are needed.

[2] Operation & Maintenance (O&M) costs estimated as 0.75% of construction per NRCS guidance

[3] Includes design, bidding, construction administration and oversight

[4] Includes all permitting required: USACE 404, Cultural Resources, NeDNR Dam Safety, T&E, Water Rights

Table 6. Average Annual Avoided Damages and Benefits, and Benefit Cost Ratio, 2022

Works of Improvement	Agriculture Related			Average Annual Benefits	Average Annual Cost	Benefit Cost Ratio
	Avoided Property Loss, Critical Facility Loss, and Income Loss	Avoided Crop Yield Damages	Wetland Benefits	Total		
F1-2	$75,127	$634	$11,698	$87,460	$61,765	1.42
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F1-66	$41,979	$354	$7,019	$49,352	$34,101	1.45

F1-60	$26,274	$222	$6,239	$32,735	$40,252	0.81
F1-61	$30,690	$259	$3,120	$34,068	$49,188	0.69
F1-31/F1-30	$90,666	$766	$14,038	$105,469	$109,709	0.96
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F1-64	$35,624	$301	$38,839	$74,763	$42,039	1.78
Total	**$1,334,529**	**$11,269**	**201,368**	**$1,547,165**	**$1,210,686**	**1.28**

Table 2. Cost information for the estimated construction period as well as the estimated project life.

Cost Item	**Year 0** 2022	**Year 1** 2023	**Year 2** 2024	**Year 3** 2025	**Year 4-100** 2026-2121	**Total Amount**
Engineering (Paid by the NRCS)	Paid by NRCS	Paid by NRCS	Paid by NRCS	Paid by NRCS	Paid by NRCS	**$4,183,869**
Permitting and compliance		$500,000	$543,000			**$1,043,000**
Land Acquisition			$474,062	$474,062	$948,124	**$1,896,248**
Construction (Paid by the NRCS)				Paid by NRCS	Paid by NRCS	**$30,071,562**
Operation and Maintenance					(Paid by the LBBNRD over 100-year time period))	

To reduce the risk of flooding and the damages associated with future flood events in the Little Indian Creek Watershed, the LBBNRD examined many alternatives. The alternatives were evaluated on a technical and economic basis. A range of reasonable alternatives was identified, including structural and non-structural options, and were analyzed individually to determine if they would meet the project purpose and planning requirements. This initial screening helped decide whether an alternative would be eliminated or carried forward for detailed study. The alternatives consisted of multiple dams, channel widening, diversion channel, levee, detention cells, stream restoration/wetland storage, single dam, conservation measures upstream, flood proofing structures, property acquisition, floodplain regulation/zoning, interior drainage/storm sewer system and no action.

The WFPO project. preferred alternative is the construction of 25 dams. When the preferred alternative was compared to other 13 alternatives presented Little Indian Creek Watershed Work Plan Environmental Assessment Alternatives shown in Table 12, the other alternatives were not suitable. The 13 alternatives do not meet the project purpose or are not practicable (cost, technology, or coordination), or reasonable (technology, economics, or common sense and therefore were eliminated.

Table 12. Summary of Potential Alternatives

Alternative #	Alternative
1	No Action
2	Channel Widening
3	Diversion Channel
4	Levees
5	Detention Cells
6	Stream Restoration with Wetland Storage
7	Single Large Reservoir
8	Multiple Upstream Dams
9	Conservation Measures Upstream in Watershed
10	Flood Proofing Structures
11	Property Acquisitions
12	Floodplain Regulation/Zoning
13	Interior Drainage / Storm Sewer System

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 Big Blue River Interstate Compact exists between the U.S. Government and the States of Nebraska and Kansas.

The Big Blue River Interstate Compact benefits from the WFPO project. The 25 dams help recharge groundwater and regulate streamflow. With regulated discharge from the dams and groundwater recharge this could produce higher groundwater levels and therefore streamflows could be improved and thereby help Nebraska meet its Compact requirements. Without the project Compact compliance would be more difficult possibility exposing the State to an expensive lawsuit. The Kansas-Nebraska Big Blue River Interstate Compact was entered into in 1971. The purpose of the Compact is to promote interstate comity, achieve equitable apportionment of the waters of the Big Blue River Basin and promote the orderly development thereof, and to "encourage an active pollution abatement program in each state". The Compact provides for minimum target flows to reach the Kansas state line on both the Big and Little Blue Rivers, as measured by river gages at Barneston, NE on the Big Blue and Hollenberg, KS on the Little Blue from May through September. When stream flow falls below these target values, Nebraska is required to administer surface water rights and associated alluvial groundwater use located within the regulatory reaches of either river junior to 1968, until the target value is exceeded. The Compact stream flow targets are shown in Table 11.

Table 11. Compact Stream Flow Targets

	Big Blue River	Little Blue River
May	45 cfs	45 cfs
June	45 cfs	45 cfs
July	80 cfs	75 cfs
August	90 cfsm	80 cfs
September	65 cfs	60 cfs

Without the 25 dams groundwater recharge could be deficit. By constructing the dams, groundwater will be enhanced, plus surface water discharge from the structures will be controlled. Regulated discharges from the dams and higher groundwater levels from recharge could improve streamflows and thereby could help Nebraska meet its Compact requirements. Without the project, Compact compliance would be more difficult thereby possibility exposing the State to an expensive lawsuit.

The current deficiencies are from unregulated runoff that cause flooding in the Little Indian Creek Watershed. Also, during peak flows water is lost from the watershed and it leaves Nebraska. By constructing the 25 dams the water can be stored and then released during dry periods. The 25 dams are essential in regulating flows and can possibility provide water to Kansas according to the Compact.

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 WFPO project. would positively impact the watershed by providing benefits by reducing losses of property, income, and crops caused by flood damage. Avoided income loss is the largest single benefit of the Project, followed by avoided property loss. The Project average annual avoided damages and benefits and benefit cost ratios on ecosystem flows and values is presented in Table 6. The creation of approximately 26 acres of wetland would generate an average annual value of $201,368 per year by increasing the production of regulating, provisioning, and cultural services associated with this land cover type. In total, the Project would create average annual gross benefits of approximately $1,547,165 per year. The detailed Environmental Assessment (EA) economic analysis is located in Attachment 3.

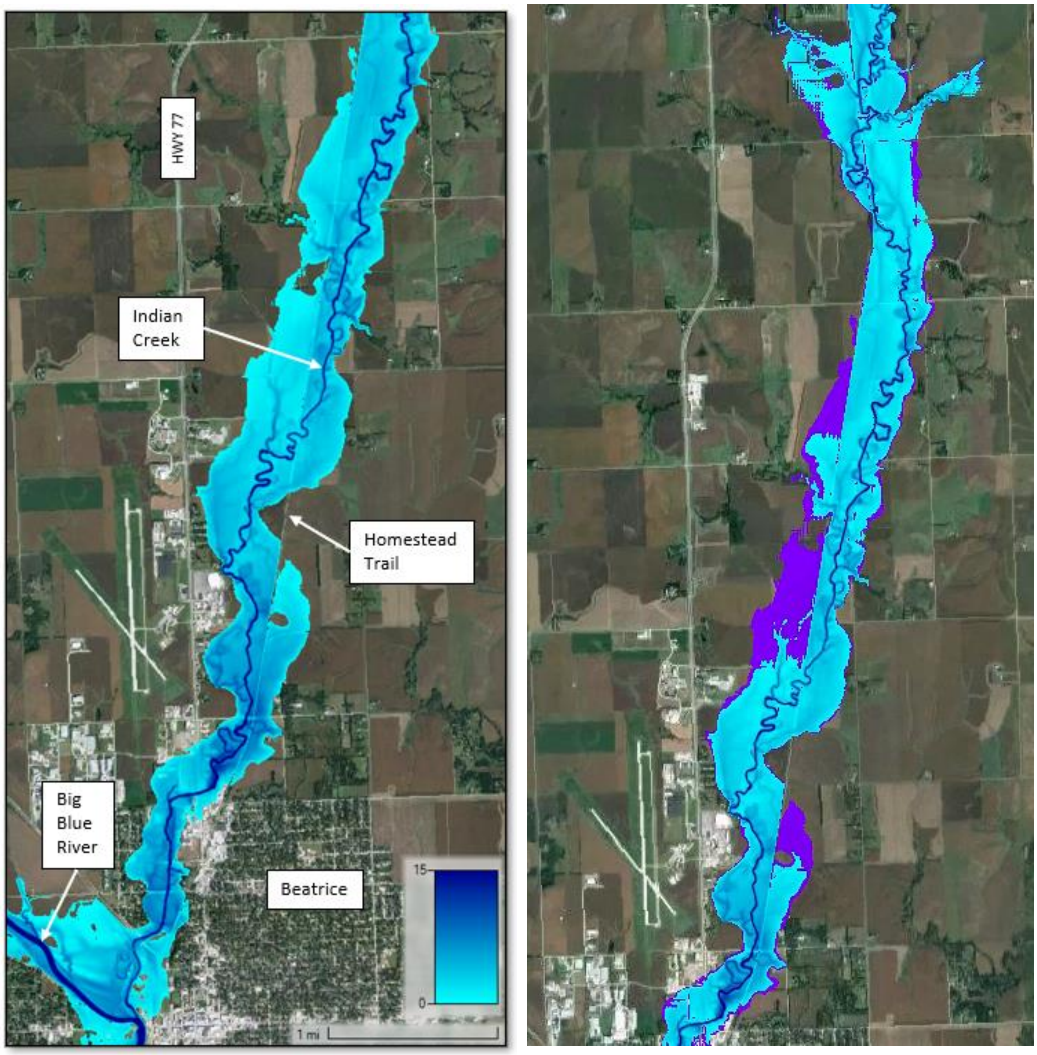
Table 6. Average Annual Avoided Damages and Benefits, and Benefit Cost Ratios 2022

Works of Improvement	Agriculture Related			Average Annual Benefits	Average Annual Cost	Benefit Cost Ratio
	Avoided Property Loss, Critical Facility Loss, and Income Loss	Avoided Crop Yield Damages	Wetland Benefits	Total		
F1-2	$75,127	$634	$11,698	$87,460	$61,765	1.42
F1-1	$41,790	$353	$3,899	$46,043	$38,711	1.19
F1-10	$38,664	$326	$1,950	$40,941	$33,656	1.22
F1-63	$138,474	$1,169	$11,698	$151,342	$89,722	1.69
F1-65	$39,725	$335	$3,899	$43,960	$34,314	1.28
F1-66	$41,979	$354	$7,019	$49,352	$34,101	1.45
F1-60	$26,274	$222	$6,239	$32,735	$40,252	0.81
F1-61	$30,690	$259	$3,120	$34,068	$49,188	0.69
F1-31/F1-30	$90,666	$766	$14,038	$105,469	$109,709	0.96
F1-22	$50,746	$428	$6,239	$57,414	$37,216	1.54
F1-21	$78,048	$659	$15,598	$94,305	$61,584	1.53
F1-24	$28,288	$239	$3,899	$32,426	$42,472	0.76
F1-20	$114,476	$967	$7,799	$123,242	$102,284	1.20
F1-23	$50,341	$425	$6,239	$57,006	$39,218	1.45
F1-70	$29,058	$245	$3,120	$32,423	$47,231	0.69
F1-90	$49,143	$415	$6,239	$55,798	$36,996	1.51
F1-91	$20,810	$176	$3,120	$24,105	$29,268	0.82
F1-92	$58,733	$496	$7,799	$67,027	$65,031	1.03
F1-93	$38,790	$328	$3,899	$43,017	$31,911	1.35
F1-40	$36,560	$309	$3,899	$40,768	$34,551	1.18
F1-50	$70,238	$593	$3,120	$73,951	$52,048	1.42
F1-80	$115,240	$973	$10,139	$126,352	$66,783	1.89

F1-62C	$35,042	$296	$17,859	$53,198	$30,638	1.74
F1-64	$35,624	$301	$38,839	$74,763	$42,039	1.78
Total	**$1,334,529**	**$11,269**	**201,368**	**$1,547,165**	**$1,210,686**	**1.28**

Flood Control is the cornerstone goal of the WFPO project. and it provides multiple benefits. By constructing 25 dams in the Little Indian watershed flood damages will be reduced and public safety will be improved. The dams will attenuate peak flows by capturing high water. The positive impact of the flood control will occur not only in the Little Indian Creek watershed including Beatrice, but also possibility downstream of the confluence of the Big Blue River. This project provides critical infrastructure flood protection to US Highway 77 and to the Burlington Northern Railroad and numerous residential, commercial, and industrial properties. Possibility downstream of the Little Indian Creek and the Big Blue River confluence other critical infrastructure consists of US Highway 136, Beatrice Wastewater Treatment Plant and numerous residential, commercial, and industrial properties. Reducing peak flows will add protection over 80 structures in the watershed. Agricultural land will be protected from scouring flows that erode valuable farmland soils. Head cutting and streambank bank erosion will be reduced with the reduction of high flows. Wetlands will be protected from harmful sediment that diminishes the capacity to provide valuable habitat. Water quality will be improved by the reduction of bacteria, agricultural chemicals, and sediment because of the controlled flows. Floodplain management will be improved by the reduction of flows and flood insurance costs will be reduced. By providing flood control damages to structures and agricultural land will be reduced thereby allowing the local and regional economy to grow as opposed to paying for recovery costs due to flooding.

Agricultural use will be enhanced by the Project. More than 27,000 acres of prime farmland in is the Little Indian Creek Watershed which may be impacted by flooding *(NRCS, 2020).* Drainage systems in the fields degraded by rill erosion and streambank and channel erosion will be reduced since peak flows will be attenuated. Water quality will be improved by the reduction of bacteria, agricultural chemicals, and sediment as a result of the controlled discharges from the structures. Sediment buildup in unwanted areas will be reduced by the reduction of scouring flows.



Little Indian Creek 100-Year maximum flooding extents near Beatrice without dams; flooding extents comparison with and without dams.

Municipal and industrial use will be improved by this Project. Flooding in the urban areas will be reduced by the dams. Critical infrastructure such as roads, storm and sanitary sewers, utilities, and domestic/commercial/industrial buildings will be protected. This project provides critical infrastructure flood protection to US Highway 77, Burlington Northern Railroad, numerous residential, commercial, and industrial properties, and possibility downstream of the Little Indian Creek and Big Blue River US Hwy 136, Beatrice Wastewater Treatment Plant, and. Floodplain management will be improved by the reduction of flows and flood insurance costs should be reduced. The local and regional economy will be able to grow with the additional protection.

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 WFPO project will improve both surface-water and groundwater quality. The 25 dams, and associated buffer strips and wetlands will capture runoff water contaminated with sediment, bacteria, and agricultural chemicals. The structures will trap contaminated surface water runoff preventing it from being released downstream. The buffer strips and wetlands will slow down runoff water by allowing the sediment that is contaminated with bacteria, and agricultural chemicals to settle out, plus plant uptake of the chemical laden sediment will improve water quality. With proper operation and maintenance, the lakes created by the dams will be able to serve their useful life.

The target area for water quality improvement consists of entire 48,425 acres of the Little Indian Creek Watershed and area downstream of its confluence with the Big Blue River. The population served is approximately 3,000 in the watershed that includes a portion of the City of Beatrice and the towns of Pickrell and Cortland. Also, some residents downstream of the Little Indian Creek and Big Blue River confluence could possibility benefit from the water quality improvement.

A solution to improve water quality is to stop agricultural production and this is not a feasible solution. The economy and livelihood of the State of Nebraska and its citizens depend on agriculture. Another solution is to promote precision agricultural practices. These methods can reduce the amount of sediment in the runoff and reduce the application of agricultural chemicals, thereby preventing bacteria and agricultural chemicals from being mobilized into surface-water and groundwater. This will improve water quality. However, many precision agriculture practices have already been implemented in the watershed, so this solution has already been enacted. **The combination of dams with precision agriculture is the best solution.**

The history of the water quality issues in the basin is well documented by the Nebraska Department of Environment and Energy (NDEE) River Basin Rotation Program.

The Basin Rotation Monitoring Program was developed so that NDEE can work towards the goal of assessing all water bodies within the state, while at the same time, ensuring sufficient data is collected to determine if a waterbody is impaired by pollution. By focusing sampling efforts in 1-3 river basins each year for intensive monitoring, NDEE can collect enough water quality samples to perform accurate assessments, while at the same time, collect data from many water bodies because of the reduced size of the sampling area. The Big Blue River Basin is scheduled to be sampled in 2024. In addition to the NDEE monitoring the Little Indian Creek Watershed Environmental Assessment used the Spreadsheet Tool for the Estimation of Pollutant Load (STEPL) model for the assessment of soil erosion and sediment. “STEPL provides a user-friendly Visual Basic (VB) interface to create a customized spreadsheet-based model in Microsoft (MS) Excel. It employs simple algorithms to calculate nutrient and sediment loads from different land uses and the load reductions that would result from the implementation of various best management

practices (BMPs), including Low Impact Development practices (LID) for urban areas. It computes surface runoff; nutrient loads, including nitrogen, phosphorus, and 5-day biological oxygen demand (BOD5)); and sediment delivery based on various land uses and management practices. The annual sediment load (from sheet and rill erosion only) is calculated based on the Universal Soil Loss Equation (USLE) and the sediment delivery ratio." *(TetraTech, 2018*).

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 Lower Big Blue Natural Resources is the local jurisdiction that is the sponsor for the WFPO project.

The LBBNRD budget for July 1, 2022 to June 30, 2023 is $1,288,760 derived from a local property tax levy of 2.1334.

The Project will demonstrate that the new WFPO project can leverage funding and expertise with the Water Sustainability Fund (if approved). This $34M project is leveraging Federal funding extensively. The Natural Resources Conservation Service (NRCS) will pay for all engineering design and construction costs and therefore no funds are being requested from the Water Sustainability Fund. The LBBNRD is requesting cost share funding from the Water Sustainability Fund for only land acquisition and permitting and compliance. The LBBNRD will pay for operation and maintenance costs and is not requesting funding for O&M from the Water Sustainability Fund.

The LBBNRD is coordinating with the Village of Cortland at one site adjacent to the Village. The Village desires to implement a recreation area to include paddle sports and wildlife viewing. The WFPO project will construct a wetland/sediment basin, that will eventually become the focal point of a Village recreation project. The cost information for the estimated construction period as well as the estimated project life is presented in Table 2.

Table 2. Cost information for the estimated construction period as well as the estimated project life.

Cost Item	**Year 0** 2022	**Year 1** 2023	**Year 2** 2024	**Year 3** 2025	**Year 4-100** 2026-2121	**Total Amount**
Engineering (Paid by the NRCS)	Paid by NRCS	Paid by NRCS	Paid by NRCS	Paid by NRCS	Paid by NRCS	**$4,183,869**
Permitting and compliance		$500,000	$543,000			**$1,043,000**
Land Acquisition			$474,062	$474,062	$948,124	**$1,896,248**

Construction (Paid by the NRCS)				Paid by NRCS	Paid by NRCS	**$30,071,562**
Operation and Maintenance					(Paid by the LBBNRD over 100-year time period))	

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 Lower Big Blue Natural Resources is the local jurisdiction that is the sponsor for the WFPO project. There are multiple plans that are in place to support sustainable water use for this project. First, the 2022 Little Indian Creek Environmental Assessment addresses whether-or-not an action such as building 25 dams will significantly affect the quality of human environment. The 2016 Gage County and 1985 Beatrice Flood Insurance Studies FIS are critical plans that delineate the existing floodplains and the methodology to determine them. The 2006 Comprehensive Development Plan for the City of Beatrice that provides long term guidance on City growth including the Little Indian Creek Watershed. The 2016 Lower Big Blue NRD and Little Blue Hazard Mitigation Plan identifies vulnerability to natural disasters. The 2012 LBBNRD Master Plan that serves as a guide for the development of policies and programs within the NRD and broad long-term goals for land and water resources development. The 2022 LBBNRD NeDNR VIMP is a key document that was developed in collaboration with the NeDNR, developed the VIMP to attain and maintain a desired balance between uses and supplies of both surface water and groundwater sources so economic viability, as well as social and environmental health, safety, and welfare can be achieved and maintained in the LBBNRD for both the near-term and long-term, while considering effects on existing surface water appropriators and groundwater users. Should the NeDNR subsequently determine an affected river basin, subbasin, or reach within the LBBNRD to be fully appropriated, either agency may amend the VIMP.

The citizens of Little Indian Creek Watershed benefit directly from this project from multiple benefits such as flood protection, water quality improvements, and groundwater recharge. Additionally, citizens downstream of the Little Indian Creek and Big Blue River confluence benefit from this project from flood control and water quality improvements. Finally, the State of Nebraska will benefit from compliance with

the Big Blue Interstate Compact and to approximately the additional $34M in federal funding that will be brought into the State.

This project will help achieve goals and objectives stated in the plans to support sustainable water use.

The Gage County and Beatrice Flood Insurance Studies goal is to investigate the existence and severity of flood hazards in the City of Beatrice and Gage County, and to aid in the administration of the National Flood Insurance Act. By creating new and advanced hydrologic models the floodplain delineation can be improved thereby providing better protection to the citizens.

The Comprehensive Development Plan for the City of Beatrice goals that apply are:
Quality Public Service and Infrastructure. The goal examines the quality of infrastructure, public facilities and parks within Beatrice. Infrastructure and buildings will be protected by the 25 dams from flooding and other negative consequences associated with flooding such as water quality concerns.
Room for Orderly Growth. This goal addresses growth projections and needs for Beatrice and establishes directions for the city's future growth and development. Floodplain management will be more accurate by improved hydrologic modeling and flood insurance will only be required in areas at risk.

The following LBBNRD Master Plan goals that apply are:

- Soil Conservation. The goal is to use each acre within its capability with the soil resources in the district and manage each acre according to its needs. The project will help meet this goal by capturing soils that runoff of the agricultural fields.
- Floodwater and Sediments Management. The goal is to minimize loss of life and property through feasible floodwater and sediment control programs. The 25 dams will capture flood waters and sediments that can be contaminated agricultural chemicals.
- Groundwater and Surface Water Management. The goal is to maintain the quantity and quality of surface and groundwater for the beneficial use through proper conservation, development, and management. The water stored behind the structures will recharge groundwater and could improve the streamflow of Little Indian Creek.
- Fish and Wildlife Management. The goal is to develop, enhance, and manage the fish and wildlife resources in cooperation with the Games and Parks Commission and NRD property and on private lakes. Terrestrial and aquatic habitat will be created by the 25 dams.
- Pollution Control. The goal is to protect, enhance, and maintain the quality of air, land, surface water and groundwater resources of the District. By capturing runoff pollution will be prevented from flowing into the stream and wetlands will provide uptake of agricultural chemicals reducing groundwater pollution.

<u>The following VIMP goals and objectives that apply are:</u>

Goal 1.0 Develop a better understanding of LBBNRD water supplies and uses.

This goal is focused on data collection and analysis of supplies and uses fundamental to effectively managing the LBBNRD's water resources. The first objective is focused on collecting and maintaining a database of water uses and supplies within LBBNRD. This project will provide valuable data on stream flows needed to manage flooding. This will provide vital information to the existing numerical surface water model and thereby help in flood damage prevention. Also, by improving the surface water numerical model the existing groundwater numerical model will be enhanced and thereby improving management of this valuable resource. The second objective is focused on development of tools and their

use in further understanding the LBBNRD's water resources. As stated in the first objective the surface water and groundwater models will be enhanced by better understanding the water supplies and uses of the LBBNRD. These predictive management tools are essential in managing water resources. The third objective is focused on monitoring the trends in supplies and uses within the basin to inform management actions in the future. With improved data and numerical models there will be better tools for management of water resources. This will allow the models to predict and address future water issues such as flooding or groundwater declines.

Goal 2.0 Prevent or mitigate water related conflicts within the LBBNRD.
The second objective of goal 2.0 is to maintain compliance with the Big Blue River Interstate Compact. To ensure compliance with the compact, the water resources must be managed appropriately. With the construction of the dams the flows can be regulated by reducing peak flows and could possibility improve streamflow from groundwater recharge caused by the impoundments. The LBBNRD and NeDNR participate in the Big Blue River Interstate Compact, which the States of Nebraska and Kansas entered in 1971. The major purposes of the Compact are (from *Neb. Rev. Stat.* § 1-115):
1. To promote interstate comity between the States of Nebraska and Kansas;
2. To achieve an equitable apportionment of the waters of the Big Blue River Basin and to promote orderly development thereof; and
3. To encourage continuation of the active pollution-abatement programs in each of the two States and to seek further reduction in both natural and man-made pollution of the waters of the Big Blue River Basin.

Goal 3.0 Inform the public of the LBBNRD water resources and management efforts.

The second objective of Goal 3.0 is to maintain and expand public outreach activities. The Little Indian Creek Watershed Environmental Assessment has extensive public outreach woven throughout the process. Initial public meetings were held in April 2022, and they will continue to be an ongoing process. This will include public scoping meeting at the beginning and end of the project, open houses that will involve a variety of different engagement techniques, and future feedback related to flood mitigation in the NRD.

The list of stakeholders is included in Table 8. The City of Beatrice supports this project, and a Letter of Support is provided in Attachment 1.

Table 8: Little Indian Creek Watershed Environmental Assessment Agency Mailing List

Agency/Tribe	Position	Name
US Army Corps of Engineers - Nebraska Regulatory Office	Nebraska State Project Manager	Matt Wray
US Army Corps of Engineers - Nebraska Flood Risk and Floodplain Management	Chief Flood Risk and Floodplain Management	Tony Krause, P.E. C.F.M

US Environmental Protection Agency Region 7	NEPA Reviewer	Larry Shepard
US Environmental Protection Agency Region 7	NEPA Reviewer	Joe Summerlin
US Environmental Protection Agency Region 7	NEPA Project Manager	Amber Tilley
US Fish and Wildlife Service	Fish and Wildlife Biologist/Assistant Field Supervisor	Eliza Hines
FEMA Region VII Mitigation Division	Acting Director	Teri Mayer
FEMA Region VII	Regional Administrator	Paul Taylor
FEMA Region VII	Natural Hazards Program Specialist	Emily Hatcher
Nebraska Department of Natural Resources	Director	Tom Riley, P.E.
Nebraska Department of Transportation Headquarters	Interim Director	Moe Jamshidi, P.E.
NDOT District 1 Headquarters	District Engineer	Thomas Goodbarn
NDOT	Roadway Design Division	Julie Ramirez, P.E. C.F.M.
Office of the Governor	Governor	Pete Ricketts
Nebraska Game & Parks Commission Headquarters	Environmental Analyst Supervisor	Shannon Sjolie
Nebraska Game & Parks Commission Headquarters	Assistant Division Administrator	Melissa Marinovich

Nebraska Department of Environment and Energy	Wellhead Protection Program Coordinator	Ryan Chapman
Nebraska Department of Transportation Headquarters	Assistant Bridge Engineer	Kirk Harvey, P.E.
Nebraska Department of Natural Resources	Chief I Floodplain Management Section	Katie Ringland, P.E., C.F.M
Lower Platte South NRD	General Manager	Paul Zillig
Gage County Board of Commissioners	Chairperson	Erich Tiemann
Gage County Highway Department	Highway Superintendent	Galen Engel
Gage County Planning/Zoning/Floodplain	Zoning & Emergency Manager	Lisa Wiegand
Lancaster County Board of Commissioners	Chairman	Rick Vest
Lancaster County Highway Department	Highway Superintendent	Pamela Dingman, P.E.
Lancaster County Emergency Management	Emergency Manager	James Davidsaver
Lancaster County Planning/Zoning/Floodplain	Zoning Administrator	David Cary
Village of Pickrell	Clerk	LaVonna Moslander
Village of Pickrell Board of Trustees	Board Chairperson	Ross Travernicht
Village of Cortland	Clerk	Lori Hogan
Village of Cortland	Board Chairperson	Fred Hilmen

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 address flood risk reduction (as noted in the statewide Hazard Mitigation Plan), **water quality problems**, threats to critical infrastructure, and groundwater declines. All problems that are common statewide. The WFPO project will address the State of Nebraska's priority of maintaining compliance with Kansas on the **Big Blue River Interstate Compact. Also, this project will help mitigate drought in terms of water supply and areas of future work concerning overall drought risk/mitigation.**

The Big Blue River Interstate Compact benefits from the WFPO project. The Kansas-Nebraska Big Blue River Compact was entered into in 1971. The purpose of the Compact is to promote interstate comity, achieve equitable apportionment of the waters of the Big Blue River Basin and promote the orderly development thereof, and to "encourage an active pollution abatement program" in each state. The Compact provides for minimum target flows to reach the Kansas state line on both the Big and Little Blue Rivers, as measured by river gages at Barneston, NE on the Big Blue and Hollenberg, KS on the Little Blue from May through September. When stream flow falls below these target values, Nebraska is required to administer surface water rights and associated alluvial groundwater use located within the regulatory reaches of either river junior to 1968, until the target value is exceeded.

The total number of people in the watershed is approximately 3,000 (including a portion of Beatrice). The total number of acres is 48,425.

This project will bring benefits in the form of flood prevention, water quality improvement, critical infrastructure protection, and groundwater recharge improvement to the watershed and downstream of the Little Indian Creek and Big Blue confluence. Without the 25 dams proposed in the WFPO project groundwater recharge could be deficient. This is due to the lack of groundwater recharge that the impoundments cause. By constructing the dams, groundwater recharge should be enhanced, plus surface water discharge from the structures will be controlled. With higher groundwater levels from groundwater recharge and regulated streamflow from the dams this could provide more consistent flows and this should help Nebraska meet its Big Blue River Interstate Compact requirements. Without the project compact compliance could be more difficult possibility exposing the State to an expensive lawsuit.

As stated previously the project also brings over approximately $34 M in Federal funding through the Natural Resources Conservation Service (NRCS), thereby freeing up State of Nebraska and LBBNRD funds to be used on other projects.

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 Project will demonstrate that the new WFPO process can leverage funding and expertise with the Water Sustainability Fund (if approved). This approximately $37M project is leveraging $34M in Federal funding extensively. The NRCS will pay for all engineering design and construction costs and therefore no funds are being requested from the Water Sustainability Fund. The LBBNRD is requesting cost share funding from the Water Sustainability Fund for only land acquisition and permitting and compliance. The LBBNRD will pay for operation and maintenance costs and is not requesting O&M funding from the Water Sustainability Fund. The listing of funding sources from all partners is provided in Table 2. The City of Beatrice supports this project, and a Letter of Support is provided in Attachment 1.

Table 2. Cost information for the estimated construction period as well as the estimated project life.

Cost Item	**Year 0** 2022	**Year 1** 2023	**Year 2** 2024	**Year 3** 2025	**Year 4-100** 2026-2121	**Total Amount**
Engineering (Paid by the NRCS)	Paid by NRCS	Paid by NRCS	Paid by NRCS	Paid by NRCS	Paid by NRCS	**$4,183,869**
Permitting and compliance		$500,000	$543,000			**$1,043,000**
Land Acquisition			$474,062	$474,062	$948,124	**$1,896,248**
Construction (Paid by the NRCS)				Paid by NRCS	Paid by NRCS	**$30,071,562**
Operation and Maintenance					(Paid by the LBBNRD over 100-year time period))	

The funding from the NRCS is appropriated through the Watersheds and Flood Prevention Operations (WFPO) program under the Flood Control Act of 1944. With the anticipated approval of the Plan-EA

through the NRCS National Watershed Management Headquarters, which is projected to occur early to mid-year 2023, funding will then be obligated for design and construction through the WFPO program. The WFPO program will provide 100% funding for the design and construction of the flood protection project. The LBBNRD funding comes from the current property tax levy. The LBBNRD financial assurance letter is located in Attachment 2.

If the Water Sustainability Fund does not approve this project, then the NRD will be forced to use local tax dollars to cover the local sponsors share of the project cost or re-apply for WSF funding and delay the project from beginning the implementation phase for another year. The Small Watersheds Flood Control Fund was discussed with NeDNR as a potential funding option for land rights, but to our knowledge, that Fund currently does not have enough funding being allocated to it for this purpose.

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 construction of 25 dams in WFPO project will improve watershed health and function. These structures will impound runoff and capture sediments laden with harmful bacteria and agricultural chemicals. This will improve stream water quality. The reservoirs will promote groundwater recharge and regulate streamflow. With regulated streamflow and higher groundwater levels from recharge streamflow could be more consistent. This would help aquatic species and stream health. By attenuating peak flows scouring flood waters will be prevented on streambanks and stream channels and in areas such as Beatrice. Wetlands will provide habitat for wildlife including waterfowl. Wetlands will also help filter out harmful sediment, bacteria, and agricultural chemicals in farmland runoff and plant uptake of the chemicals will improve water quality.

The primary watershed that will benefit is the Little Indian Creek Watershed. However, the watershed downstream of the Little Indian Creek and Big Blue River confluence could also benefit.

Little Indian Creek existing watershed structure example.

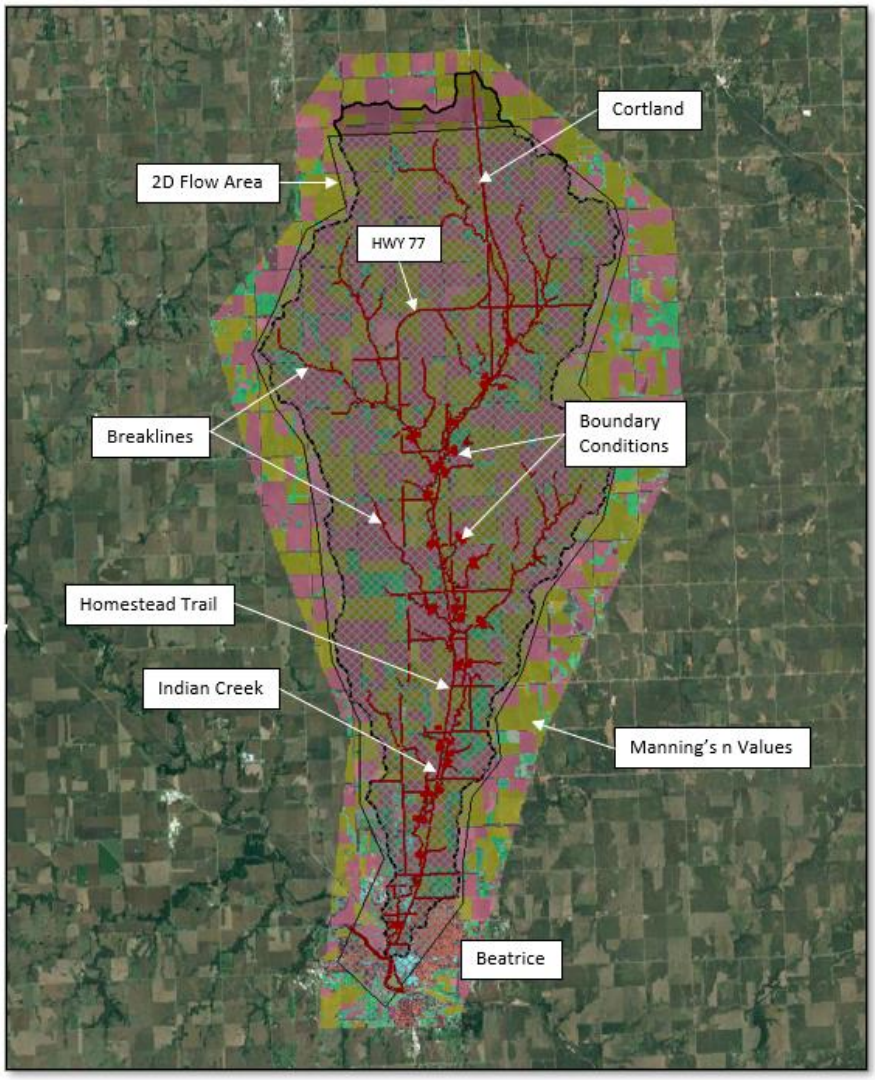
15. Uses objectives described in the annual report and plan of work for the state water planning and review process issued by the department.

- 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 Department of Natural Resources (NeDNR) Annual Report to the Legislature for Fiscal Year 2020-2021 identifies NeDNR six goals that are measurable objectives. These six goals are indictive of the long-term goal of protecting and managing the State of Nebraska most precious resource, water. The WFPO project. will meet the following six goals/objectives:

Goal/Objective #1 - Establish strong state leadership, involvement, and support for science-based decision making that is necessary to sustain state and local water management outcomes.

The project will support this goal/objective by demonstrating that the new WFPO process can leverage funding and expertise with the Water Sustainability Fund (if approved). This innovative concept of requesting only WSF funding for land acquisition and permitting while having the NRCS pay for engineering and construction and the LBBNRD pay for O&M and cost share can be duplicated across the State. The technically robust Little Indian Creek Watershed Environmental Assessment used state of the art methodology to analyze technically complicated science processes such as hydrology and hydraulics by numerical modeling.



Little Indian Creek Hydraulic Model

Goal/Objective #2 - Provide high quality products and services through the performance of our duties in the areas of floodplain management, flood mitigation planning, dam safety, and survey to promote the safety of all Nebraskans.

The Project provides multiple benefits on flood control/management/mitigation and dam safety. By constructing 25 dams in the Little Indian Creek Watershed flood damages will be reduced and public safety will be improved. The dams will attenuate peak flows by capturing high water. The positive impact of the flood control will occur not only in the Little Indian Creek watershed including Beatrice, but also possibility downstream of the confluence of the Big Blue River. Reducing peak flows will add protection for over 80 structures. Agricultural land will be protected from scouring flows that erode valuable farmland soil. Head cutting and streambank bank erosion will be reduced with the reduction of high flows. Wetlands will be protected from harmful sediment that diminishes the capacity to provide valuable habitat. Water quality will be improved by the reduction of bacteria, agricultural chemicals, and sediment because of the controlled flows. Floodplain management will be improved by the reduction of flows and flood insurance costs will be reduced. By providing flood control damages to structures and agricultural land will be

reduced thereby allowing the local and regional economy to grow as opposed to paying for recovery costs due to flooding

Goal/Objective #3 - Develop and implement customized and decentralized water management plans established through collaboration with local Natural Resource Districts and stakeholders that provide for long-term sustainability of the state's water resources.

Based on the LBBNRD/NeDNR Voluntary Integrated Management Plan (VIMP), Big Blue River Interstate Compact, and the Little Indian Creek Watershed Environmental Assessment (EA) extensive public and stakeholder collaboration will occur. The VIMP Stakeholders Advisory Committee (SAC), Big Blue River Interstate Compact Administration group, and the EA stakeholders group public and stakeholder outreach will be a long-term and ongoing process. This will ensure that continuous feedback is received from the public and stakeholders that will promote the long-term sustainability of Nebraska's water resources.

Goal/Objective #4 - Encourage strong public engagement with multiple constituents and stakeholder groups in planning and implementation activities to ensure that local and state needs are addressed.

The LBBNRD board meetings are open to the public and input is invited during the meetings additionally input from received from the SAC. The Big Blue River Interstate Compact Administration is a consortium of State of Nebraska and Kansas, and the Federal government which provides guidance and regulation. The list of stakeholders for this Little Indian Creek Watershed Flood Prevention & Operations (WFPO) Environmental Assessment is extensive. The stakeholder list from the April 2022 public meetings is presented in Table 8.

Table 8: Environmental Assessment Agency Mailing List

Agency/Tribe	Position	Name
US Army Corps of Engineers - Nebraska Regulatory Office	Nebraska State Project Manager	Matt Wray
US Army Corps of Engineers - Nebraska Flood Risk and Floodplain Management	Chief Flood Risk and Floodplain Management	Tony Krause, P.E. C.F.M
US Environmental Protection Agency Region 7	NEPA Reviewer	Larry Shepard
US Environmental Protection Agency Region 7	NEPA Reviewer	Joe Summerlin
US Environmental Protection Agency Region 7	NEPA Project Manager	Amber Tilley

US Fish and Wildlife Service	Fish and Wildlife Biologist/Assistant Field Supervisor	Eliza Hines
FEMA Region VII Mitigation Division	Acting Director	Teri Mayer
FEMA Region VII	Regional Administrator	Paul Taylor
FEMA Region VII	Natural Hazards Program Specialist	Emily Hatcher
Nebraska Department of Natural Resources	Director	Tom Riley, P.E.
Nebraska Department of Transportation Headquarters	Interim Director	Moe Jamshidi, P.E.
NDOT District 1 Headquarters	District Engineer	Thomas Goodbarn
NDOT	Roadway Design Division	Julie Ramirez, P.E. C.F.M.
Office of the Governor	Governor	Pete Ricketts
Nebraska Game & Parks Commission Headquarters	Environmental Analyst Supervisor	Shannon Sjolie
Nebraska Game & Parks Commission Headquarters	Assistant Division Administrator	Melissa Marinovich
Nebraska Department of Environment and Energy	Wellhead Protection Program Coordinator	Ryan Chapman
Nebraska Department of Transportation Headquarters	Assistant Bridge Engineer	Kirk Harvey, P.E.
Nebraska Department of Natural Resources	Chief I Floodplain Management Section	Katie Ringland, P.E., C.F.M

Lower Platte South NRD	General Manager	Paul Zillig
Gage County Board of Commissioners	Chairperson	Erich Tiemann
Gage County Highway Department	Highway Superintendent	Galen Engel
Gage County Planning/Zoning/Floodplain	Zoning & Emergency Manager	Lisa Wiegand
Lancaster County Board of Commissioners	Chairman	Rick Vest
Lancaster County Highway Department	Highway Superintendent	Pamela Dingman, P.E.
Lancaster County Emergency Management	Emergency Manager	James Davidsaver
Lancaster County Planning/Zoning/Floodplain	Zoning Administrator	David Cary
Village of Pickrell	Clerk	LaVonna Moslander
Village of Pickrell Board of Trustees	Board Chairperson	Ross Travernicht
Village of Cortland	Clerk	Lori Hogan
Village of Cortland	Board Chairperson	Fred Hilmen

Goal/Objective #5 - 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 LBBNRD registers groundwater wells and NeDNR administrators surface water-rights, and both are signatory agencies of the VIMP. It is inherent in the VIMP that water is used through collaborative investments in water resources projects, planning administration, and permitting occur. Extensive permitting will occur as part of the Little Indian Creek Watershed WFPO project.

Goal/Objective #6 - Provide agencywide services and support in the areas of information technology and transparent data sharing, business process improvement, public information, and administration of state-aid funds in conjunction with the NRC.

The Little Indian Creek Watershed WFPO project will use advanced technology such as numerical 2-dimensional hydraulic models and predictive erosion models to collect and share data. Information will be released and shared through the LBBNRD and the NRCS. Administration of the WSF grant at the local level will be done by the LBBNRD.

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 Big Blue River Interstate Compact between the U.S. Government and the States of Nebraska and Kansas. The Big Blue River Interstate Compact benefits from the WFPO project. The 25 dams recharge groundwater and regulate streamflow. With higher groundwater levels from recharge and regulated discharges streamflows could improve and this could help Nebraska meet its Compact requirements. Without the project Compact compliance could be more difficult and possibility exposing the State to an expensive lawsuit. The Kansas-Nebraska Big Blue River Interstate Compact was entered into in 1971. The purpose of the Compact is to promote interstate comity, achieve equitable apportionment of the waters of the Big Blue River Basin and promote the orderly development thereof, and to "encourage an active pollution abatement program in each state". The Compact provides for minimum target flows to reach the Kansas state line on both the Big and Little Blue Rivers, as measured by river gages at Barneston, NE on the Big Blue and Hollenberg, KS on the Little Blue from May through September. When stream flow falls below these target values, Nebraska is required to administer surface water rights and associated alluvial groundwater use located within the regulatory reaches of either river junior to 1968, until the target value is exceeded.

The relationship between the federal mandate and the project will further the goals of water sustainability. By storing and regulating flows water will be retained until times that it is needed. With higher groundwater levels from recharge and regulated discharges this could improve streamflow, and this could help in Compact compliance. Water quality will be improved as the structures will capture harmful bacteria and agricultural chemicals. Finally, critical flood prevention will be brought to the watershed protecting human health and infrastructure.