NRCS Watershed Operations Program

Preliminary Investigation Findings Report (PIFR)

Dickey-Sargent Irrigation District Modernization Project

Prepared for:

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June 21, 2023

Contents

Abbreviations

CFR – Code of Federal Regulations (https://www.ecfr.gov/)

NECH – National Environmental Compliance Handbook

NWPH – National Watershed Program Handbook

NWPM – National Watershed Program Manual

USC – United States Code (US Code on House.gov)

References

- NRCS National Environmental Compliance Handbook, Title 190, Part 610, May 2016
- NRCS National Watershed Program Manual, April 2014
- NRCS National Watershed Program Manual, Circular
- NRCS National Watershed Program Handbook, April 2014
- DM 9500-013 – Guidance For Conducting Analyses Under The Principles, Requirements, And Guidelines For Water And Land Related Resources Implementation Studies And Federal Water Resource Investments, January 2017
- Principles and Requirements for Federal Investments in Water Resources, March 2013

* See additional references in Technical Appendix (Appendix 5).

Summary

The Dickey-Sargent Irrigation District (DSID) (Appendix 1, Exhibit 1) was developed as a feature of the Garrison Diversion Unit (GDU). The U.S. Bureau of Reclamation (USBR) constructed the facilities 1982-1987. The Oakes Test Area (historically what USBR called what is now DSID) was intended to be the first phase of an overall 44,000-acre irrigation district to be developed in Dickey and Sargent counties. The plan was for the test area to utilize James River water only until the GDU Principal Supply Works were completed, which then would route Missouri River water through the McClusky Canal to a storage reservoir, which would then be operated to release into the James River to deliver water ~100 miles downstream to the planned irrigation district southeast of Oakes, ND. The reservoir and supply works to the James River were never constructed, as a result of a successful lawsuit from the Province of Manitoba, and as a result the rest of the irrigation district was never developed. The USBR project, with the exception of the OTA, was deauthorized via federal legislation. In 2020 the Dickey-Sargent Irrigation District (DSID) negotiated a transfer of ownership from USBR and is now the sole owner and operator of the land and irrigation district infrastructure. Note that despite the name, all of DSID is located in Dickey County. On May 23, 2022 DSID formally requested PL-566 Planning Assistance from NRCS to address seepage losses caused by deteriorating canal lining (see Appendix 2).

The district serves 58 privately owned center pivots, irrigating 6,279 acres of corn, soybeans, potatoes, onions, and alfalfa. Of those, 18 pivots covering 1,712 acres are supplied from groundwater (DSID well field). The remaining 40 pivots covering 4,567 acres are supplied from a 6.5-mile irrigation canal and network of buried PVC and steel irrigation pipelines (see Exhibit 2). The lift station on a diversion from the James River has 6 vertical turbine pumps which provide ~27 ft of head to supply the canal headworks, with 2 open installation ports within the pump station. The lift station has a fish screen on the intake works. Three booster pump stations are spaced along the 6.5-mile canal, each with multiple vertical turbine pumps, which then supply pressurized water into DSID owned PVC and steel buried pipelines. Privately owned buried pipelines intersect with the DSID owned pipelines at turnouts to supply individual pivots. A wasteway west of the south booster pump station is utilized for fall drainage of the canal to a wetland complex hydraulically connected to the James River. See Appendix 5 for detailed maps of district infrastructure and crop history.

Given that the canal is predominantly underlain by sandy soils, the USBR design included a 20-mil PVC liner, overlain by 12” of earth cover and 6” of sand and gravel. Construction was completed in 1983. By the mid-2000’s, examinations of the liner after intentional and accidental exposure showed the liner to be brittle and cracked. That is consistent with performance monitoring of other aged PVC liners which indicate that they stiffen over time due to leaching plasticizer, leading to formation of fine longitudinal cracks. In addition, the liner has experienced substantial muskrat damage since an explosion of their population starting in the late 1990’s. In one irrigation season alone, muskrats removed by DSID operation and maintenance staff averaged one muskrat per 39 linear feet of canal. DSID staff do attempt to patch and repair muskrat holes when observed, but at this point there are hundreds of patches in the liner. NRCS and DSID conducted seepage tests on the liner in the fall of 2022, as a part of the preliminary feasibility evaluation, and determined an average seepage rate of 0.06 cubic feet per square feet per day (see Appendix 5). Over an average irrigation season, this currently results in a seepage loss of 373 ac-ft which is coupled with an evaporation loss from the canal surface of 91 ac-ft. If not addressed, seepage losses will continue to increase over time as the liner deteriorates. In addition to muskrat trapping and liner patching, DSID has extensive maintenance costs related to algae control in the over-widened, very low slope, canal and maintaining pumps, motors, and control systems that are now 40 years old. Both the canal and lift station were designed for the 44,000 acre planned irrigation district and are therefore oversized for the current 4,567 acres.

NRCS completed preliminary design, economic analysis, and NEPA evaluation for two potential alternatives to address seepage losses (see Appendices 3 and 5). Reconstruction of the canal to a smaller cross section, with a

new composite geomembrane and concrete liner, would be feasible from an engineering standpoint and would not have any significant concerns from a NEPA perspective; however, it would not meet the required 1:1 benefit-cost ratio for PL-566. Full replacement of the canal with a buried pipeline, decommissioning of the 3 booster pump stations, reconstruction of the existing lift station to serve as a single pump station for the district (with 8 new or refurbished vertical turbine pumps on VFDs), and installation of modern control systems for the district is feasible, would not have any significant concerns from a NEPA perspective, and has a projected cost-benefit ratio of 1.9:1 over the 50-year lifespan. There are no identified obstacles to moving forward with a full PL-566 Watershed Plan in cooperation with DSID.

Applicable Agency Authority and Authorized Purposes

The table below, provides documentation that the project is eligible for federal assistance and will meet statutory requirements.

Describe the potential project watershed area; how does the area meet the requirements outlined in NRCS's National Watershed Program Manual (See 506.50 NWPM Glossary - TTT. Watershed).		
Response: The Dickey-Sargent Irrigation District 6.5-mile irrigation canal supplies 4,567 acres of center pivot irrigated cropland. The PL-566 project goal is to reduce seepage and evaporation losses on the ~6.5 miles of canals, thereby providing additional irrigation water supply as well as reducing operation and maintenance costs. DSID operates at a significant irrigation deficit currently, due to limited water supply; water savings will increase crop yields to agricultural producers in the district. Water conservation on irrigation projects is an eligible PL-566 Program purpose under Agricultural Water Management.		
Will the project area exceed 250,000 acres in size? [1,2]	☐YES	■NO
If over 250,000 acres will it be divided into sub-watersheds in one plan?	☐YES	☐NO
Potential Project Area Size: 13,977 acres		
Will any single structure provide more than 12,500 acre-feet of floodwater detention capacity, or have a 25,000 acre-feet of total capacity?	☐YES[3]	■NO
How many recreational developments will be included in the project area? 0		
• One development in a project area less than 75,000 acres	☐YES	☐NO
• Two developments in a project area between 75,000 and 150,000 acres	☐YES	☐NO
• Three developments in a project area greater than 150,000 acres	☐YES	☐NO
Which authorized purposes will the project address? (Indicate only one purpose as primary):		
	Primary	Other
• Flood prevention	☐	☐
• Watershed Protection	☐	☐
• Public Recreation	☐	☐
• Public Fish and Wildlife	☐	☐
• Agricultural Water Management	■	☐
• Municipal or Industrial Water Supply	☐	☐
• Water Quality Management	☐	☐
Will the project produce substantial benefits to the general public, to communities, and to groups of landowners?	■YES	☐NO[3]
Can the project be installed by individual or collective landowners under alternative cost-sharing assistance?	☐YES[3]	■NO

Will the project have strong local citizen and sponsor support through agreements to obtain land rights, permits, contribute the local cost of construction, and carry out operation and maintenance.								☒YES	☐NO[3]	
Will the project take place in a Special Designated Area? (if yes, check applicable area below.)								YES	☒NO	
Appalachia	☐	Delaware River Basin	☐	Susquehanna River Basin	☐	Tennessee Valley	☐			

1- For specific appropriations, the 250,000 acres is waived except for watershed projects with the flood prevention purpose.
2- Watersheds exceeding 250,000 acres can be broken up into smaller sub-watersheds.
3- The project will not meet the statutory requirements.

Potential for 20% Agricultural (Rural) Benefits

The Dickey Sargent Irrigation District Modernization Project will have the authorized purpose of Agricultural Water Management. 100% of project benefits will be agricultural, in the form of increased yields due to additional irrigation water supply.

Project Overview	
Proposed Project Name	Dickey-Sargent Irrigation District Modernization Project
State	North Dakota
County/Parish	Dickey County
Congressional District	ND – 1 (statewide)
USGS Hydrologic Unit Code (HUC) and Watershed Name	Four 12-digit Hydrologic Units are partially present and all are within the Upper James River Basin 8-digit Sub Basin: Town of Oakes – James River (101600031405); Dakota Lake – James River (101600031406); and two closed basins in Mud Lake Reservoir – Sand Lake (101600031402 and 101600031404). See Exhibit 3.
General Coordinates of the Watershed	46°04’23” N, 98°05’40” W
Project Setting	The Area of Interest (AOI) is located in southeastern North Dakota in the northeast corner of Dickey County, South Dakota forms the southern boundary of the county – see Exhibit 4. The city of Oakes is one-half mile north of the AOI. Southeastern North Dakota has a moderate climate featuring cold winters and warm summers. High temperatures in the area in July average in the mid-80s °F; high temperatures in January average around 0°F. This county averages 22 inches of rain and 39 inches of snow each year.

Potential Project Area - Size	The Area of Interest (AOI) for planning, is a total of 13,977 acres and comprises the full irrigation district extents plus downstream areas of the floodplain of potential impact.
Resource Information	
Soils	The AOI is located in the Central Black Glaciated Plains Major Land Resource Area (55B). Soils are deep, ranging from deep to moderately well drained to very poorly drained drainage regimes and varying textures from clayey to sandy. The AOI is dominated by soils with fine sandy loam textures and also includes a significant amount of loamy fine sand textures which are highly susceptible to wind erosion. Irrigated cropland is located within these soils which are inherently limited for crop production due to their limited ability to hold water (Exhibit 5). The AOI contains four farmland classifications: Prime Farmland (23.3%), Farmland of Statewide Importance (31.2%), Prime Farmland if Drained (8.1%) and Not Prime Farmland (37.3%). The third classification, at 23.3%, is all areas are prime farmland (Exhibit 6). Hydric soils are those that are saturated, flooded, or ponded for a significant portion of the growing season and develop anerobic conditions that support the growth and regeneration of hydrophytic vegetation (US Army Corps of Engineers Environmental Laboratory 1987). Soil surveys and individual components are consolidated as map units based on these unique properties and displayed in the range of 0 to 100 indicating nonhydric to hydric (Exhibit 7). The Crop Productivity Index (CPI) is a measure of the physical and chemical properties of a soil. The values range from low inherit productivity to moderately high inherent productivity in the AOI. CPI is independent from land management such as drainage and irrigation. Low and moderately low inherit productivity (due to shallow droughty soils) has been enhanced by irrigation in the AOI (Exhibit 8).
Water	The Area of Interest lies within the James River Basin which ultimately confluences with the Missouri river in southeastern South Dakota near Yankton. Bear Creek is a major tributary that discharges into the James River upstream of the AOI. The James River and Bear Creek are largely unassessed by the ND Department of Health for surface water quality impairments for uses such as recreation and biological function. The AOI is underlined by the Oakes Aquifer. There are no public Wellhead Protection Areas (WHPA) within the AOI, however the Oakes Aquifer WHPA for the City of Oakes lies just north of the AOI. See Exhibit 3. The Oakes Aquifer is part of the North Dakota Department of Environmental Quality Geographic Targeting System for ground water monitoring and is considered highly vulnerable and highly sensitive to leaching. It has a high pesticide DRASTIC rating for groundwater leaching. The AOI lies within the Southeast Water Users District.

Water - Continued	Water supply for the Irrigation district comes from the James River (surface water), district drain pumps (groundwater, ~10 ft deep), and a well field owned and operated by the district (groundwater ~30 ft deep). Delivery from the James River has ranged from 220 ac-ft in 1998 to 4,283 ac-ft in 2021. The average annual volume delivered from 2000-2022 was 2,356 ac-ft. Delivery from drain pumps during that same time period was 371 ac-ft and delivery from the well field was 299 ac-ft. At this location the James River has a drainage area of 5,320 square miles, all of which is in North Dakota, regulated by two upstream flood control structures: Jamestown Dam (USBR) and Pipestem Dam (USACE). Current water losses to seepage and evaporation average 402 ac-ft a year, with seepage losses increasing at a rapid rate over time. Total seepage and evaporation loss under a No Action alternative from 2028-2078 are projected to be 68,770 ac-ft. (Appendix 5)
Air	The air quality of the AOI is consistent with other rural areas in the eastern part of North Dakota. There are no factories or industries within the AOI that would contribute point sources of air pollutants. Potential air pollutants in the AOI are limited to agriculturally related non-point sources from crop and livestock operations.
Plants	The James River watershed lies within the Drift Prairie ecosystem. The North Dakota Heritage Program has identified four Plant Species of Conservation Priority in the Drift Prairie/James River areas including the Wooly milkweed (Level I). None of these species have been documented as present in the DSID. This area is not considered a grasslands focus area for the North Dakota Game and Fish Department, however poor land use practices and water withdrawal are identified as threats to this system. Plant productivity in cropland is limited by the low water holding capacity of the soils. Irrigation systems have significantly improved cropland productivity in the AOI.
Animals	The James River is considered to be a ND Game and Fish focus area for both wetland and river habitats for several level I, II and III Key Species of Conservation Priority. This includes 17 bird, 4 mammal, 4 amphibian, 3 fish and 4 mussel species. Several of these species rely on river/wetland riparian habitat. A fish screen is present at the existing lift station, however it has not been upgraded since initial construction in 1983. Through the course of the full watershed planning effort a performance evaluation of the fish screen would be performed.
Energy	Dakota Valley Electrical Cooperative supplies electricity to the irrigation district from Basin Electric Power Cooperative and the Western Area Power Administration. Power sources are a combination of coal-fired plants, wind power, natural gas combustion turbines, and hydropower. The irrigation district currently operates 20 electric vertical turbine pumps installed 40 years ago within the lift station at the canal headworks and in the 3 booster pump stations. Although variable frequency drives are in place at the booster pump stations, they are operated on 1980s vintage technology and are likely less efficient than modern systems would be. An alternative that would involve replacement of pumps, motors, and control systems would improve energy efficiency.

Human	• Demographics: The AOI crosses or is adjacent to 4 census block groups which include two predominantly rural areas and two within the City of Oakes. The total population is 3,207 people within 606 square miles. The population is 95 % white, 3.3 % Hispanic, 1.4 % American Indian and less than 1% Black or African American and Asian. Metrics for the 4 groups were below both state and national averages as a percent of Low Income, Unemployment, Less than a High School Education and People of Color. Metrics were about equal to state and national averages for Life Expectancy, populations over age 64, and populations below age 5. There were a couple of exceptions within the 2 urban areas where Low Income and Less than a High School Education percentages were greater than the state average, but still equal or less than the national average. • Transportation: One N-S railroad (Red River Valley-Western Railroad) runs through the AOI about 1 mile east of the James River. This rail intersects with an E-W line north of the AOI in the City of Oakes. These railroads are freight lines hauling primarily fuels, grains and other agricultural products. State Highway 1 runs N-S runs through the center of the AOI. State Highway 11 (paved) enters the AOI on the northeast side running E-W, then joins with SH 1 running south. Most of the section lines are graveled township roads or prairie trails. Road Right-of Way widths are 33 ft, 66 ft, and 120 ft for township roads, county roads, and state highways respectively. The canal berm is designed and maintained to accommodate vehicles for maintenance purposes. No major oil or natural gas pipelines are located in the AOI. Buried electric, telecommunication and water utility lines are commonly present in the AOI – See Exhibit 9. • Recreation: The James River has populations of sports fish including Northern Pike, Walleye, Channel Catfish, Yellow Perch and Black Crappie. There are no designated fishing access points on the river near the AOI. No lakes are described as fishing resources in the AOI. The Dakota Lake National Wildlife Refuge is present in the far southwest corner of the AOI. This refuge is privately owned with protected waterfowl easements. Waterfowl watching and hunting is accessible with landowner permission. There is a small area in the NW corner of the AOI that is enrolled in the ND Game and Fish PLOTS (Private Lands Open To Sportsman) program. The City of Oakes, just north of the AOI, has several recreational facilities such as city parks, a county heritage center and a golf course, See Exhibit 10. • Regional Economic Characteristics: Information on the per capita and median income values in Dickey county is in the table below. The per capita personal income and median household income values are in current dollars. The county reports annual per capita income values that fall below the state and national by 7 and 5% respectively. Median household income of Dickey County fall below those of the state and the nation by 20 and 15% respectively.

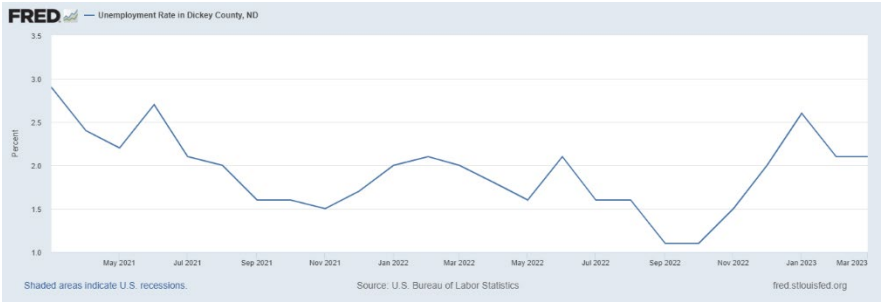
Human - Continued

Annual Per Capita Income	2018	2019	2020	2021
Dickey County	$51,210	$61,984	$68,779	$73,312
North Dakota	$55,396	$57,110	$60,864	$64,524
United States	$53,784	$56,237	$59,774	$64,073
Median Household Income	**2018**	**2019**	**2020**	**2021**
Dickey County	$53,286	$57,490	$60,682	$55,270
North Dakota	$66,505	$70,031	$64,115	$68,882
United States	$63,179	$68,703	$68,010	$71,784

Sources: U.S. Bureau of Economic Analysis, U.S. Census Bureau

The annual rate of unemployment in the area of interest has not exceeded 6% for the most recent 12 months, and it has not averaged at or above that rate during the last five years.

The unemployment rate data for the last two years is shown in the chart below for Dickey County.



Source: U.S. Bureau of Labor Statistics

Annual unemployment rate data is below:

Average Annual Unemployment Rate*	2018	2019	2020	2021	2022
Dickey County	1.6	1.7	3.2	2.7	1.9
North Dakota	2.4	2.2	5	3.1	2.1
United States	3.9	3.7	8.1	5.4	3.7
*Not seasonally adjusted					

Source: U.S. Bureau of Labor Statistics

Resources of Special Concern	
Clean Water Act	The western boundary of the AOI is the James River. Bear Creek is a major tributary that discharges into the James River upstream of the AOI. The James River from Bear Creek to the ND-SD state line has no listed impairments under 303(d) of the Clean Water Act and is noted as not having enough information to assess aquatic life or recreation. There are numerous fresh water emergent wetlands inventoried by on the USFWS National Wetland Inventory (NWI) within the AOI, predominately located between the James River and the western edge of the irrigated cropland. These larger wetland complexes are intersected by large and small drains. The canal intersects natural wetland areas disrupting their hydrology. There is no evidence canal seepage has caused observable changes to the hydrology of adjacent wetlands which is to be expected given that underdrains below the canal likely capture all seepage. The underdrains discharge to ditches west of the irrigation district, hydrologically connected to the James River. During fall drainage operations, the canal currently discharges into an artificially constructed pond and drain system which cuts through a large wetland, ultimately draining into the James River. See Exhibit 11- NWI map and Exhibits 12A and 12B- Field Identified Wetlands in canal area.
Clean Air Act	The air quality of the AOI is consistent with other rural areas in the eastern part of North Dakota. There are no factories or industries within the AOI that would contribute point sources of air pollutants. Potential air pollutants in the AOI are limited to agriculturally related non-point sources from crop and livestock operations.
Cultural Resources	A Class I Cultural Resource Inventory was completed for the proposed project area. No National Register Historic Properties were found. The inventory found five historic structures, fifteen historic sites, four archaeological sites and no cemeteries within the proposed project area. Section 106 consultation with the State Historic Preservation Office and 30 regional tribes was initiated by NRCS on May 22, 2023 and no comments were returned. Appendix 4
Endangered & Threatened Species	A USFWS IPac evaluation was completed for the DSID and found the endangered species Northern Long-Eared Bat May be affected by activities such as removal of trees >/= 3 inches in diameter and bridge removal. The Dakota Skipper may also be present in the DSID, however the IPac determined “No Effect” to the Dakota Skipper. The Monarch Butterfly is a Candidate T & E species and may be present in the area.
Environmental Justice and Equity	Four census block groups are present in the area (https://www.epa.gov/ejscreen). No groups were disproportionally represented with the area. In the eastern edge of the area, residents have incomes slightly below the state average for low incomes.
Essential Fish Habitat	Not applicable in North Dakota
Floodplain Management	Areas designated by FEMA’s Preliminary Flood Insurance Rate Maps as Zone A (1% annual chance of flooding) are present within the AOI. Exhibit 13
Invasive Species	There has been documented presence of Zebra Mussels, Bighead, Silver Carp, Common Carp and Grass Carp in the James River. Several noxious weeds are commonly present in this region including Canada thistle, musk thistle and Absinthe Wormwood. Dickey County also lists Downy Brome as noxious.

Migratory Birds/Bald & Golden Eagle Protection Act	Bald eagle nests are possible but have not been identified in the area. The lack of tall trees make their presence unlikely.
Natural Areas	The Dakota Lake National Wildlife Refuge is within the project area along the James River. The refuge is designated as a "limited-interest" habitat that is not federally owned, but rather there are federal conservation easements on the land for the purpose of maintaining waterfowl populations. Exhibit 10
Prime and Unique Farmlands	Approximately fifty percent of the farmland in the proposed project area, 2,561 acres, is designated as prime farmland. Exhibit 6
Riparian Area	The western boundary of the AOI is the James River; Bear Creek is a major tributary upstream of the AOI. Both are bordered by a mix of native herbaceous vegetation, crop and hay/pastureland There are numerous fresh water emergent wetlands within the AOI intersected by large and small drains. The larger wetlands near the James are lined with native and introduced herbaceous vegetation. Smaller wetlands within the cropland are typically unbuffered. Exhibits 3 and 11
Scenic Beauty	With the exception of the James River itself, the landscape is intensively cropped and largely irrigated. There are no obvious areas of scenic beauty.
Wetlands	There are numerous fresh water palustrine emergent wetlands with seasonal and temporary flooded hydrology identified on the USFWS National Wetland Inventory within the AOI (Exhibit 11). A field wetland delineation was completed by NRCS staff in 2022. This delineation was limited to a corridor of 500 feet on each side of the existing canal. Twenty-two wetlands were identified in this corridor, including the larger wetland at the wasteway outlet which is classified dually as a palustrine/lacustrine partially drained complex (Exhibit 12A and 12B). Most wetlands are intersected by large and small drains and have a cropping history.
Wild and Scenic Rivers	Not applicable in North Dakota

Proposed Project Purpose and Need Statement

The purpose of the proposed project is agricultural water management. The need for the project is that seepage and evaporation losses from the existing irrigation canal currently average 402 ac-ft a year and if no project to address seepage is undertaken total seepage and evaporation loss by 2038 would average 673 ac-ft/yr, by 2048 would average 1,001 ac-ft/yr, by 2058 would average 1,512 ac-ft/yr, and by 2078 would prevent canal operations entirely. Operation and maintenance costs are high, requiring significant labor and herbicide application, due to heavy algal growth in the over-sized canal which was designed for an irrigation district 10 times the size of the current one.

Resource Concerns

This section describes the resource concerns that may potentially be impacted by implementation of the proposed project. Positive effects of the proposed project can include opportunities for improvement or protection of existing resources. For the preliminary investigation findings report; resources are identified within, and adjacent to, the proposed project area. The summary also includes any regional or national impacts that may occur as a result of the projects implementation.

Potential Effects of Proposed Alternatives on SWAPA + E + H Resources and Resources of Special Concern

Use: ***+ - Positive Impact*** ***- - Negative Impact*** ***0 - No Impact***

	Alternative 1: Replace canal with 5.4-miles of new irrigation pipeline (plus a 0.7-mile drain line), reconstruct single pump station at existing lift station, decommission the three existing booster pump stations, and install modern control systems for the entire district. Approximately 19,100 ft of 12-54" diameter HDPE pipeline would be installed during the summer, in locations outside of the existing canal. The remaining ~13,530 ft pf 30-54" HDPE pipeline would be installed in the existing canal in the fall after irrigation season. The existing canal embankments would be excavated, and the canal filled and graded throughout its full length, requiring 291,220 cy of excavation and 279,350 cy of embankment. Excess excavated materials (much of it soils and organic matter that has accumulated in the canal bottom) would be hauled to an approved waste area identified by the construction contractor and approved by NRCS. Disturbed areas that would not be cropland in the future would be seeded. See Tech Appendix 5 for further details and preliminary design drawings. Temporary road closures and detours on 90th St SE, 91st St SE, 92nd St SE, 93rd St SE, and 94th St SE would be required. Over the course of the 50-year project lifespan, a total water savings of 68,770 ac-ft is estimated, which would be applied on the existing 4,567 acres under sprinkler irrigation to increase crop production. The project would significantly reduce operation and maintenance costs for the irrigation district.	**Alternative 2:** Reconstruct 6.5-miles of existing canal to a smaller cross section and install new reinforced concrete canal lining underlain by a multi-layer geosynthetic membrane. Project would require 302,140 cy of excavation, 61,040 cy of embankment, 124,300 sy of membrane, and 15,330 cy of reinforced concrete placement. Excess excavated materials (soils and organic matter that has accumulated in the canal bottom) would be hauled to an approved waste area identified by the construction contractor and approved by NRCS. Disturbed areas that would not be cropland in the future would be seeded. See Tech Appendix 5 for further details and preliminary design drawings. Temporary road closures and detours on 90th St SE, 91st St SE, 92nd St SE, 93rd St SE, and 94th St SE would be required. Over the course of the 50-year project lifespan, a total water savings of 61,120 ac-ft is estimated, which would be applied on the existing 4,567 acres under sprinkler irrigation to increase crop production. The project would somewhat reduce operation and maintenance costs for the district.
Soil	**+**	**+**
Water	**+/-**	**+/-**
Air	**0**	**0**
Plants	**+**	**+**
Animals	**+**	**+**
Energy	**0**	**0**
Human	**+**	**+**
Clean Air Act	**0**	**0**
Clean Water Act/Waters of the U.S.	**+/-**	**+**

Coastal Zone Management	**0**	**0**
Coral Reefs	**0**	**0**
Cultural Resources/Historic Properties	**0**	**0**
Endangered & Threatened Species	**+/-**	**+/-**
Environmental Justice	**0**	**0**
Essential Fish Habitat	**0**	**0**
Floodplain Management	**0**	**0**
Invasive Species	**0**	**0**
Migratory Birds/Bald and Golden Eagle Protection Act	**0**	**0**
Natural Areas	**0**	**0**

Opportunities

In addition to water savings from addressing seepage and excess evaporation from the oversized canal, there is potential for concurrent conservation benefits due to the project. The existing pumps, motors, and control systems are 40 years old so an increase in energy efficiency would be expected if they were replaced with the project. NRCS would work with DSID on a concurrent EQIP or RCPP project to encourage producers within the district to adopt on-farm practices such as advanced irrigation water management, retrofit to zone control variable rate irrigation where field conditions warrant, nutrient management, conservation tillage, and soil health practices. NRCS, North Dakota State University, and the University of Nebraska are currently engaged in evaluating sophisticated, remote sensing based, advanced irrigation water management techniques with several producers in this area. It is anticipated that at least one of these new techniques will be added to the ND FOTG and EQIP/CSP Scenarios by 2026, which would make them available for on-farm implementation concurrent with the PL-566 project.

State, Tribal, Federal Stakeholder Engagement

A link to the Preliminary Investigation of Feasibility Report was sent to the following agencies to provide comments or concerns on June 27, 2023: U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, U.S. Bureau of Reclamation, U.S. Environmental Protection Agency, ND State Department of Water Resources, ND Department of Environmental Quality, ND Game and Fish Department, ND Department of Transportation, ND Geologic Survey, ND State Historical Preservation Office, Dickey County Commission, Dickey County Soil Conservation District, Dickey County Water Resource District, Dickey County Highway Department, Dickey County Sheriff's Office, and the City of Oakes. These same entities would be invited to participate on the planning team should this project proceed to a full watershed planning effort. Section 106 consultation was initiated on the project with a letter and Class I cultural resource report sent to 30 Tribes and the ND State Historic Preservation Office on May 22, 2023 (see Appendix 4). The ND State Historic Preservation Office and 30 Tribes were also sent a copy of the Preliminary Investigation of Feasibility Report on June 27, 2023 to provide any comments or concerns. They would also be invited to participate on the planning team should this project proceed to a full watershed planning effort.

Alternatives

Two general approaches could be taken to address water losses on a long-term basis for the DSID canal. One would be to replace the open canal with a buried, pressurized pipeline and one would be to reconstruct and re-line the canal (Exhibits 14A and 14B). For the purpose of determining economic feasibility of this potential PL-566 project an exhaustive engineering analysis involving every potential iteration of these alternatives (for example various pipe diameters or liner materials) was not completed. Preliminary design and economic analysis assumptions and detailed results are provided in Appendix 5.

Alternatives	Possible Positive Impacts and Effects	Possible Adverse Impacts and Effects
Alternative 1 - Replace canal with 5.4-miles of new irrigation pipeline (plus a 0.7-mile drain), reconstruct single pump station at existing lift station, decommission the three existing booster pump stations, install modern control system for the entire district. Estimated construction cost: $ 9,635,603 Total implementation cost: $ 11,335,603 Project lifespan: 50 years Average annual cost: $ 342,129 Average annual benefits: $ 645,296 Benefit-to-cost ratio: 1.9 : 1	• Reduces seepage losses and eliminates evaporation losses. Over the 50-yr period of analysis total water savings would be 68,770 ac-ft. • Water savings would result in increased irrigation water supply and increased crop yields to DSID producers (see Tables 11-13 in Tech Appendix 5). • Significant reduction in DSID operation and maintenance costs due to elimination of the canal, 3 booster pump stations, and reconstruction of lift station as a single pump station with modern motors and control systems throughout the district. • Eliminates high volume herbicide application in canal for algae management. • Reduced safety risk (drowning/fish entrapment) to humans and animals. • Bridges over the canal are narrower than modern farm equipment, requiring long distances to route around them. The project would result in removal of these narrow bridges. • 67acres of land within the filled canal section and under the adjacent embankments to be removed would either be planted to perennial vegetation or farmed, either of which	• The James River carries a high suspended sediment load, which will be a concern for the pipeline and appurtenances. DSID will need to flush the pipelines per the O&M Plan, clean valves, and do other regular maintenance. Ensuring proper function of the fish screen is critical for a pipeline. • Canal seepage is currently collected in the underdrains below the canal, which is discharged to the west in ditches hydrologically connected to the river. While this is a negligible volume in terms of flow in the James River, the project will result in less water discharging back to the river. • When the canal is drained in the fall, that water is released into a wasteway to the west of the south pump station which flows into a pond, then into wetlands and a ditch connected to the James River. The pipeline will have a smaller volume of water, therefore the fall water release will be less than current. • Increase in irrigated crop acres (due to filling in the canal) may increase nutrient and pesticide leaching into groundwater. • Traffic disruptions, including temporary road closures and

	would generate wildlife habitat improvements and possibly benefit ND Species of Concern or Federal T&E species. • Land currently utilized for booster pump stations would likely be either be planted to perennial vegetation or farmed, either of which would generate wildlife habitat improvements. • Reconnection of landscape due to the elimination of the canal has the potential to reconnect wetlands and reconnects wildlife corridors. • Class I Cultural Resources Literature Search found the alternative as designed would have No Effect to Historic Properties.	detours would occur during construction. Dust and noise would increase in the area due to construction operations and related truck traffic. • Potential for spread of noxious weeds always exists with a large construction project like this, which will need to be mitigated through measures such as equipment/truck washing requirements. • Pipeline alternative would disturb one small wetland (0.14 ac) that would require mitigation; likely through purchase of credits through a wetland mitigation bank. • USFWS IPac evaluation indicates alternative May Effect, but is Not Likely to Effect T& E species.
Alternative 2 - Reconstruct 6.5-miles of existing canal to a smaller cross section and install new reinforced concrete canal lining underlain by a multi-layer geosynthetic membrane. Estimated construction cost: $ 19,683,972 Total implementation cost: $ 20,803,971 Project lifespan: 50 years Average annual cost: $ 751,487 Average annual benefits: $ 282,184 Benefit-to-cost ratio: 0.38 : 1	• Reduces seepage losses and evaporation losses. Over the 50-yr period of analysis total water savings would be 61,120 ac-ft. • Water savings would result in increased irrigation water supply and increased crop yields to DSID producers (see Tables 11-13 in Tech Appendix 5). • Slight reduction in DSID operation and maintenance costs due to the fact the liner would no longer need patching (concrete would be effectively "muskrat proof") and algal growth in the narrower, deeper canal would be much reduced. • Reduces high volume herbicide application in canal for algae management. • 45.6 acres within the filled canal section and under the adjacent embankments that would be	• The canal will continue to need maintenance, albeit at a lower level than the current canal. The lift station and all 3 booster pump stations will continue to operate with 40-year old equipment which will have increasingly high maintenance costs. Eventually DSID will need to replace equipment as it fails, with local funding. • Canal seepage is currently collected in the underdrains below the canal, which is discharged to the west in ditches hydrologically connected to the river. While this is a negligible volume in terms of flow in the James River, the project will result in less water discharging back to the river. • When the canal is drained in the fall, that water is released into a

	removed, would either be planted to perennial vegetation or farmed, either of which would generate wildlife habitat improvements and possibly benefit ND Species of Concern or Federal T&E species. • Class I Cultural Resources Literature Search found the alternative as designed would have No Effect to Historic Properties.	wasteway to the west of the south pump station which flows into a pond, then into wetlands and a ditch connected to the James River. The smaller sized canal will have a reduced volume of water, therefore the fall water release will be less than current. • Increase in irrigated crop acres (due to partially filling the canal and eliminating berms) may increase nutrient and pesticide leaching into groundwater. • Traffic disruptions, including temporary road closures and detours would occur during construction. Dust and noise would increase in the area due to construction operations and related truck traffic. • Potential for spread of noxious weeds always exists with a large construction project like this, which will need to be mitigated through measures such as equipment/truck washing requirements. • USFWS IPac evaluation indicates alternative May Effect, but is Not Likely to Effect T&E species.

Facilitating Factors

Dickey-Sargent Irrigation District is highly invested in addressing seepage, upgrading pumps and control systems, and otherwise modernizing their irrigation system now that they have obtained ownership from USBR. There is significant support for the project from producers within the district, including those on which new easements would need to be acquired for pipelines. Cost for easements would likely be offset by trading land under the old canal (currently owned by DSID), which would be filled with the project, to producers. Likewise, DSID will be able to sell the land and buildings at the 3 booster pump stations. The Sponsor will be eligible for ND Department of Water Resources grant funding for 50% of the 25% non-federal share of the construction costs. DSID has indicated that they have the capacity to fund the remaining 12.5% local share. There are minimal environmental concerns with the project and no perennial streams or rivers impacted unless the fish screen is determined to need retrofits. A 404 permit may be required due to the 0.11-acre wetland that would be impacted by the project (if it is considered Waters of the U.S.) and potential need for fish screen improvements.

The only state permit required would likely be a construction site discharge permit, which is a no cost notification with an accompanying Stormwater Pollution Protection Plan. Both permits are free of charge.

Obstructing Factors

No obstructing factors have been identified. The largest concern with this project was whether it would be economically feasible, hence the significant effort ND NRCS invested in seepage testing, preliminary design, and economic analysis for the PIFR. Results indicate that the project will easily meet the benefit to cost ratio requirement for PL-566.

Sponsor

The project sponsor for this project has been identified as listed below:

Sponsor Will:	Assist in Planning	Land Rights / Eminent Doman	Local Cost Share	O/M Funds	Permits	Land Treatment	In-Kind MOU
Dickey-Sargent Irrigation District	Yes	Yes	Yes	Yes	Yes	N/A	N/A

Sponsor(s) will:

- Assist in the locally led planning effort.
- Obtain needed land rights including the use of power of eminent domain, if necessary.
- Provide local cost-share funds and/or in-kind services to provide the required portion of total project costs.
- Provide funds for continuing operation and maintenance actions.
- Obtain required permits and approvals at sponsor cost:
- Before being credited with the value of any in-kind contribution for any in-kind services and/or acquisition of land rights, sponsor will sign a Memorandum of Understanding (MOU) with NRCS.

Potential Federal Cooperating Agencies

Agency	Contact Information	Type of Involvement
US Army Corps of Engineers	Toni Erhardt North Dakota Regulatory Branch 3319 University Drive Bismarck, North Dakota, 58504 Toni.R.Erhardt@usace.army.mil 701-255-0015	Regulatory [X]
		Informed [ ]
		Prepare permits or letters of permission document [X]
		Provide input [ ]
US Fish and Wildlife Service	Drew Becker ND Ecological Services Supervisor	Regulatory [X]
		Informed [ ]
		Prepare permits or letters of permission document []
		Provide input [X]

Potential Interagency Planning Team

Stakeholder	Role	Resources	Planning Contribution
Dickey-Sargent Irrigation District	Sponsor	Funding, contract administration for specialty technical consultants and construction. Legal services for construction and permanent easements	Local cost share, contract administration to hire specialty technical consultants. Host public meetings, coordinate input from producers, collect data and assist in analysis.
USDA-Natural Resources Conservation Service	Lead Federal Agency	Funds and engineering, environmental, and cultural resources staff.	Federal portion of costs, responsible for overall development of Plan-EA.
U.S. Army Corps of Engineers	Cooperating Federal Agency 404 Permit (if needed)	Wetlands- Waters of the US Jurisdiction	Participant, input on fish screen, wetlands, any other environmental concerns.
U.S. Fish and Wildlife Service	Cooperating Federal Agency	Consults with USACE on wetlands/404 permits	Participant, input on fish screen, wetlands, wildlife refuge, any other environmental concerns.
State Historical Preservation Office	Permit – cultural review	Review of project APE	Permit for project APE
ND Department of Environmental Quality	Permits	Review for permit	Construction site discharge permit, input on ground and surface water quality
ND Department of Water Resources	Funding agency	Potential construction funding source for a portion of the non-federal share.	State cost share, input on ground and surface water quantity.
Tribal Governments	Sovereign Nation	Section 106 consultation and NEPA consultation	Input on cultural resources, NEPA
U.S. Environmental Protection Agency	Partner	Review of Plan – ED	Input on NEPA
U.S. Bureau of Reclamation	Partner	Review of Plan - ED	Input on water quantity
State Department of Transportation	Partner	Review of Plan – ED	Input on roads and bridges
ND Game and Fish Department	Partner	Review of Plan - ED	Input on fish and wildlife habitat
Dickey County Highway Department	Partner	Review of Plan – ED	Input on roads and bridges
ND Geological Survey	Partner	Review of Plan – ED	Input on geological resources
Dickey County Soil Conservation District	Partner	Review of Plan – ED	Input on soil and water resources
City of Oakes	Partner	Review of Plan - ED	Input on impacts to City of Oakes

Dickey County Water Resource District	Partner	Review of Plan – ED	Input on county water resources
Dickey County Sheriff's Department	Partner	Review of Plan - ED	Input on county safety
Dickey County Commissioners	Partner	Review of Plan - ED	Input on county government

Principal Sponsors – Primary Stakeholders who will make financial and in-kind commitments to the project.	Regulatory – Entities involved in regulatory aspects of the project's implementation, whose input during planning is sought.	Keep Informed – Stakeholders who should be kept informed of the projects progress and whose input during planning is sought.

Notifications

If a preliminary investigation findings report is undertaken, the STC must notify in writing the Governors concerned, the U.S. Fish and Wildlife Service, the U.S. Army Corps of Engineers, and all other Federal agencies concerned with a decision to initiate any survey or field investigation involving water resources development work and furnish them with appropriate information regarding the scope, nature, status, and results of such survey or investigation (Executive Order 10584 Section 3).

	Method and Date Notified
North Dakota Governor (copied to ND State Engineer)	Email – 6/30/23
U.S. Fish and Wildlife Service	Email – 6/30/23
U.S. Army Corps of Engineers	Email – 6/30/23
U.S. Bureau of Reclamation	Email – 6/30/23
U.S. Environmental Protection Agency	Email – 6/30/23

Estimated Project Implementation Timeline

The Plan of Work for the Watershed Plan-EA is provided in Appendix 6, however below is a summary of overall anticipated schedule. The schedule is based on the assumptions that: 1) WSOPs funding for planning would be received in time to sign a cooperative agreement by 10/15/23, 2) ND NRCS is successful in hiring another watershed planner and backfilling a vacant civil engineer position, and 3) the WRD is able to hire specialty technical expertise through a cooperative agreement with NRCS for services as outlined (mechanical/electrical engineering, fish screen expertise, licensed land surveyor services). If NRCS cannot fill positions and consultants are utilized for the majority of planning work in lieu of NRCS staff, rather than just for the specialty technical services planned currently, the timeline would increase substantially.

Planning Start	8/21/2023
Planning End	11/30/2025

Design Start	1/2/2026
Design End	4/30/2026
Construction Start	8/1/2026
Construction End	4/30/2027

Recommendation

This preliminary investigation findings report has been completed and submitted for approval to Nathan Jones, Acting State Conservationist. It has been determined that this potential PL-566 Watershed Operations project:

Does	Does Not	
■	☐	… meet the statutory acreage, volume/capacity of structure and recreational limit requirements;
■	☐	… meet the requirements of one or more Watershed Operations authorized purposes;
■	☐	… have the potential for a minimum of 20% agricultural, or rural, benefits;
■	☐	… have one or more viable alternatives;
■	☐	… have potential project sponsor(s) that meet and agree to all terms of responsibilities;
☐	■	… have apparent insurmountable obstacles.

State Conservation Engineer/
Watershed Program Manager

Signature: CHRISTI FISHER Digitally signed by CHRISTI FISHER Date: 2023.06.23 16:56:52 -05'00'

State Resource Conservationist

Signature: RICHARD WEBB Digitally signed by RICHARD WEBB Date: 2023.06.26 06:23:02 -05'00'

	Not recommended for planning funding
X	Accepted and recommended for Planning Funding

State Conservationist

Signature: DANIEL HOVLAND Digitally signed by DANIEL HOVLAND Date: 2023.07.10 11:36:48 -05'00' Date: _____

Glossary

Rural – All territories of a State that are not within the outer boundary of any city or town that has a population of 50,000 or more according to the latest decennial census of the United States (2010 Census Urban and Rural Classification and Urban Area Criteria). [Source Title 390 – NWPM Part 506.50 Glossary, MMM]

Appendices

- Appendix 1: Exhibits
    - Exhibit 1: DSID Primary Features Map
    - Exhibit 2: Pivot, Pipe and Booster Station Map
    - Exhibit 3: Water Features Map
    - Exhibit 4: Project Setting Map
    - Exhibit 5: Soil Texture Map
    - Exhibit 6: Soil Classifications Map
    - Exhibit 7: Hydric Soils Map
    - Exhibit 8: Crop Productivity Map
    - Exhibit 9: Transportation Features Map
    - Exhibit 10: Recreation Map
    - Exhibit 11: National Wetlands Inventory Map
    - Exhibits 12A and 12B: Field Wetland Inventory Maps
    - Exhibit 13: FEMA Floodplain Map
    - Exhibits 14A and 14B: Alternative Maps
- Appendix 2: DSID Request Letter and Checklist
- Appendix 3: Preliminary Environmental Evaluation (CPA 52)
- Appendix 4: Cultural Resources
- Appendix 5: PIFR Technical Appendix
- Appendix 6: Plan of Work