MINUTES

North Dakota State Water Commission
Bismarck, North Dakota

August 9, 2018

The North Dakota State Water Commission (State Water Commission or Commission) held a meeting at the Coteau Room, State Capitol, Bismarck, North Dakota, on August 8, 2018. Lt. Governor Brent Sanford, acting Chairman, called the meeting to order at 1:05 p.m., and requested Garland Erbele, State Engineer, and Chief Engineer-Secretary to the State Water Commission, call the roll. Lt. Governor Sanford announced a quorum was present.

STATE WATER COMMISSION MEMBERS PRESENT:

Lt. Governor Brent Sanford, acting Chairman
Doug Goehring, Commissioner, ND Department of Agriculture
Katie Andersen, Jamestown
Michael Anderson, Hillsboro
Richard Johnson, Devils Lake
Leander McDonald, Bismarck (arrived at 1:10 p.m.)
Mark Owan, Williston
Matthew Pedersen, Valley City
Jason Zimmerman, Minot

OTHERS PRESENT:

Garland Erbele, State Engineer, and Chief Engineer-Secretary, State Water Commission
State Water Commission Staff
Jennifer Verleger, General Counsel, Attorney General's Office
Leslie Bakken-Oliver, General Counsel, Governor's Office
Reice Haase, Policy Advisor, Governor's Office
Approximately 50 people interested in agenda items.

The attendance register is on file with the official minutes.

The meeting was recorded to assist in compilation of the minutes.

Governor Burgum was absent because of meetings in Washington, D.C. Lt. Governor Sanford chaired the meeting.

CONSIDERATION OF AGENDA:

The agenda for the August 9, 2018, State Water Commission meeting was presented; there were no modifications.

CONSIDERATION OF DRAFT MINUTES OF JUNE 14, 2018, AND JULY 12, 2018, SUBCOMMITTEE MEETING MINUTES:

The draft minutes of the June 14, 2018, State Water Commission meeting and July 12, 2018, subcommittee meetings were reviewed; there were no modifications.

It was moved by Commissioner Johnson, seconded by Commissioner Andersen, and unanimously carried, that the minutes of June 14, 2018, and July 12, 2018, subcommittee meeting minutes be approved as presented. Commissioner McDonald was absent for vote.

STATE WATER COMMISSION FINANCIAL REPORTS:

The allocated program expenditures for the period ending June 30, 2018, were presented and discussed by David Laschkewitsch, Director of Administrative Services. The total expenditures are within the authorized budget amounts.

The Project Summary for the 2017-2019 Biennium, **APPENDIX A**, provides information on the committed and uncommitted funds from the Resources Trust Fund and the Water Development Trust Fund. The final summary for projects shows approved projects totaling $567,937,936 with expenditures of $172,096,020. A balance of $113,496,079 remains available to commit to projects in the 2017-2019 biennium.

The oil extraction tax deposits into the Resources Trust Fund total $157,305,706 through July 2018 and are currently $25,534,723 or 19.4 percent above budgeted revenues.

Deposits received for the Water Development Trust Fund total $23,874,965 through July 2018 and are currently $14,874,965 above the budget revenues of $9,000,000. The large increase is due to a settlement agreement being reached between the state and the major tobacco companies over enforcement of the 1998 Tobacco Master Settlement agreement. The next scheduled deposit will be in April 2019 and is anticipated to be $9,000,000.

REVISED COST-SHARE POLICY:

Craig Odenbach, Director of Water Development Division, presented the final proposed cost-share policy revisions. A spreadsheet listing the final revisions is attached as **APPENDIX B.**

After discussion, it was determined that Item 15 would be revised and presented at the October 11 meeting.

It was recommended that the following numbered items, identified in **APPENDIX B**, be amended and approved, effective immediately, in the State Water Commission Cost-Share Policy: 3, 5, 7, 10, 11, 14, and 17.

> **It was moved by Commissioner Andersen and seconded by Commissioner Owan that the State Water Commission amend and approve items 3, 5, 7, 10, 11, 14, and 17 as identified in Appendix B, effective immediately, in the State Water Commission Cost-Share Policy.**
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> **Commissioners Andersen, Anderson, Johnson, McDonald, Owan, Pedersen, Zimmerman, Goehring, and Lt. Governor Sanford voted aye. There were no nay votes. Lt. Governor Sanford announced the motion unanimously carried.**

PROJECT PRIORITIZATION GUIDANCE:

Pat Fridgen, Director of Planning and Education, gave an overview of the final project prioritization guidance chart, attached as **APPENDIX C**.

After discussion, it was determined the word "repair" be added under the Moderate Priority Projects section, first line, to state "Dam safety repair and emergency action plans." All final project prioritization guidance revisions will go into effect for those projects seeking cost-share funding starting July 1, 2019.

> **It was moved by Commissioner Owan and seconded by Commissioner Zimmerman that the State Water Commission add "repair" under the Moderate Priority Projects section, first line, to state "Dam safety repair and emergency action plans" in the State Water Commission Project Prioritization Guidance.**
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> **Commissioners Andersen, Anderson, Johnson, McDonald, Owan, Pedersen, Zimmerman, Goehring, and Lt. Governor Sanford voted aye. There were no nay votes. Lt. Governor Sanford announced the motion unanimously carried.**

ECONOMIC ANALYSIS AND LIFE CYCLE COST ANALYSIS:

Pat Fridgen gave an overview of the Economic Analysis (EA) and Life Cycle Cost Analysis (LCCA) guidelines/processes, attached as **APPENDIX D**.

Background

Legislation passed by the North Dakota Legislature in 2017 created NDCC § 61-03-21.4 - requiring the State Engineer to: "develop an economic analysis process for water

conveyance projects and flood-related projects expected to cost more than one million dollars, and a life cycle analysis process for municipal water supply projects. When the state water commission is considering whether to fund a water conveyance project, flood-related project, or water supply project, the state engineer shall review the economic analysis or life cycle analysis, and inform the state water commission of the findings from the analysis and review."

To comply with NDCC § 61-03-21.4, the Commission contracted with HDR to assist the agency in drafting EA and LCCA guidelines/processes. In addition, the agency and HDR completed fillable electronic platforms that project sponsors and the agency will be able to access to assist with more efficient assessments of projects.

Project Update

Following the June 21 workshop in Bismarck, HDR and staff made a few minor adjustments to the EA and LCCA final draft products. The EA and LCCA guidance documents and fillable models were provided and are in final draft format pending Commission approval.

It was the recommendation of Secretary Erbele that the State Water Commission approve the final EA and LCCA guidance documents and electronic fillable models in fulfillment of the agency's statutory requirement under NDCC § 61-03-21.4; and direct staff to complete updates and minor modifications as necessary for future implementation.

It was moved by Commissioner Andersen and seconded by Commissioner McDonald that the State Water Commission approve the final EA and LCCA guidance documents and electronic fillable models in fulfillment of the agency's statutory requirement under NDCC § 61-03-21.4; and direct staff to complete updates and minor modifications as necessary for future implementation.

Commissioners Andersen, Anderson, Johnson, McDonald, Owan, Pedersen, Zimmerman, Goehring, and Lt. Governor Sanford voted aye. There were no nay votes. Lt. Governor Sanford announced the motion unanimously carried.

2019 WATER DEVELOPMENT PLAN:

Pat Fridgen provided an update on the 2019 Water Development Plan.

Background

NDCC § 61-02-01.3 requires that on a biennial basis, the State Water Commission "develop and maintain a comprehensive water development plan organized on a river basin perspective, including an inventory of future water projects for budgeting and planning purposes."

In compliance with this statutory requirement, the Planning and Education Division began the process of developing a 2019 Water Development Plan – focusing on the 2019-2021 biennium and beyond. The agency sent inquiries to potential project sponsors from all across the state during the second week of January.

Potential project sponsors were asked for their help in identifying the water development projects they're trying to move forward, the timing of their implementation, and estimated costs. The input gained from local project sponsors and water managers will become the foundation of the State Water Commission's budget request to the Governor and Legislature.

Updates and Next Steps

Water Development Plan Outline

On May 15, an outline for the 2019 Water Development Plan was provided to Commissioners for review and comment, and an updated outline was provided. Suggestions or changes can be provided to the Planning and Education Division and necessary adjustments will be made.

Project Inventory Reviews

On May 17 and 18, State Water Commission members met with staff to review approximately 280 water development projects and studies that were submitted as part of the project inventory effort. Projects were reviewed for potential cost-share eligibility, and project types were assigned to each submittal for future prioritization.

Commissioner-Hosted Basin Meetings

Commissioner-hosted basin meetings were completed in all seven of the major drainage basins from July 16 through July 25. Staff compiled notes from all of the meetings and they were provided to Commission members along with all handouts provided by project sponsors. Any changes or modifications to the project inventory that are received from project sponsors will be made as they come in.

Long-Term Planning

In addition to the near-term project inventory efforts, Water Commission staff have been working on 10-year and longer-term financial need forecasts to be included in the Water Development Plan. Estimates of 10-year financial needs were provided at the Commissioner-hosted meetings for project sponsor review and feedback. Staff will continue to work with the larger project sponsors, the League of Cities, and the ND Rural Water Systems Association to compile estimates related to longer-term infrastructure (and financial needs) across the state.

A timeline of milestones to outline completed and future "next steps" in the planning process is attached as **APPENDIX E**.

STATE COST-SHARE PARTICIPATION REQUESTS – WATER SUPPLY

EAST CENTRAL REGIONAL WATER DISTRICT, PHASE 3 - $746,545
(SWC Project No. 2050GFT):

East Central Regional Water District (District) requested cost-share for additional construction costs on the Phase 3 Project to add 40 new users to the Grand Forks system, address capacity issues with connections between the Grand Forks system and the Traill system, and connections to the Agassiz Water Users District (Agassiz) and Larimore.

The Grand Forks rural expansion provides additional capacity by installing 175,000 feet of 4-inch to 12-inch transmission pipeline in the system's central and northern areas. The Grand Forks system water supply is from the Elk Valley Aquifer treated at a water treatment plant six miles north of Northwood. The Grand Forks system's 2,850 users have water rates ranging from $29.40 to $55 per month minimum based on several system expansions with all water users paying $5.40 per 1,000 gallons used. New users will have a water rate of $55 per month minimum and $5.40 per 1,000 gallons.

The Traill system obtains water from Mayville and Hillsboro water treatment plants, both using raw water from the Page/Galesburg Aquifer. Traill system's 779 users have a water rate of $55 per month minimum and $7 per 1,000 gallons.

Agassiz is looking for water supply capacity in the southern and western portion of their system. Agassiz's service area is northern Grand Forks County and southern Walsh County. Agassiz's water supply is from the Inkster Aquifer treated at a water treatment plant two miles from Inkster. The project will install a 12-inch transmission pipeline north from the Grand Forks system water treatment plant to the Agassiz system and then later complete other pipelines that could supply water for all of Agassiz users and eliminate the Agassiz water treatment plant. Agassiz's 1,350 users have a water rate of $20 per month minimum and $5.50 per 1,000 gallons.

The new project cost estimate is $8,075,918 with pre-construction costs of $505,658 and construction costs of $7,570,260. East Central's total cost-share approved to-date is $5,621,880, including $201,880 for 35 percent on pre-construction and $5,420,000 for 75 percent on construction. With pre-construction funded at 35 percent and construction at 75 percent, the total cost-share is $5,854,675 for an additional $232,795.

The pipeline connection to Agassiz will pass five miles east of Larimore. Grand Forks contacted Larimore, and they are interested in possibly buying water and eliminating their water treatment plant. The estimated cost for installing 24,600 feet of 12-inch transmission pipeline to Larimore is an additional $685,000 and 75 percent cost-share is $513,750. The request, Cost-Share Request Form, and supporting material is attached as **APPENDIX F**.

Neil Breidenbach, System Manager, Grand Forks Traill Water District, presented information that Larimore City Council voted to further investigate connecting to the East Central system. After discussion, it was agreed that cost-share funding of $513,750 for the Larimore portion be delayed until the Larimore City Council determines whether or not they will connect to the East Central system.

Based on the additional information, Secretary Erbele made the recommendation that that the State Water Commission only approve an additional $232,795, resulting in a total cost-share of $5,854,675, with pre-construction costs funded at 35 percent and construction costs funded at 75 percent, for the District's projects. The funding is in the form of a cost-share towards eligible costs and contingent on available funding.

It was moved by Commissioner Andersen and seconded by Commissioner Pedersen that the State Water Commission approve an additional cost-share of $232,795, paid on eligible costs for 35 percent pre-construction costs and 75 percent construction costs. This action is contingent upon the availability of funds.

Commissioners Andersen, Johnson, McDonald, Owan, Pedersen, Zimmerman, Goehring, and Lt. Governor Sanford voted aye. There were no nay votes. Commissioner Anderson abstained from voting. Lt. Governor Sanford announced the motion unanimously carried.

MCLEAN-SHERIDAN WATER, WATER STORAGE SYSTEM - $2,271,000 (SWC Project No. 2050MCL):

McLean-Sheridan Water District (District) requested cost-share on the construction costs for construction of a new 400,000-gallon water tower to be located just west of Turtle Lake city limits. The tower would buffer peak demands in the rural area, address pressure issues in Turtle Lake by replacing their existing 50,000-gallon water tower, and provide storage to address future demands of Turtle Lake and rural system. The District bid the project and plans to start construction in the fall.

The District's service area is McLean and Sheridan counties, serving the Turtle Lake (pop. 585), McClusky (pop. 380), Coleharbor (pop. 85), and 600 rural users (est. pop. 1,400). The District's main water supply is from the Lake Nettie Aquifer with a treatment plant located three miles north of Turtle Lake. Additionally, the District receives water from Washburn under a supply agreement and supplies about 150 rural users (est. pop. 350) in the Washburn area. The District users water rate is $59 per month minimum and $6.91 per 1,000 gallons used. Rural systems across the state charge a median rate of $45 per month minimum and $6 per 1,000 gallons. Turtle Lake water rate is $23.50 per month minimum and $4 per 1,000 gallons used.

The estimated construction cost is $3,063,000 with eligible cost of $3,028,000 and ineligible costs of $35,000 for administration, land, and legal costs. On December 8, 2017, the State Water Commission approved 35 percent cost-share of $107,450 on pre-construction costs of $307,000. The recommendation at this time is to provide cost-share of 75 percent construction costs which equates to $2,271,000. The local share will be a loan through the Drinking Water State Revolving Loan Fund with the District and Turtle Lake having a water purchase agreement. The request, Cost-Share Request Form, and supporting material is attached as **APPENDIX G**.

It was the recommendation of Secretary Erbele that the State Water Commission approve an additional $2,271,000, resulting in a total cost-share of $2,378,450, with pre-construction costs funded at 35 percent and construction costs funded at 75 percent for the McLean-Sheridan Water District Turtle Lake Water Tower project. The funding is for eligible costs and is contingent on available funding.

> **It was moved by Commissioner Goehring and seconded by Commissioner McDonald that the State Water Commission approve an additional $2,271,000, resulting in a total cost-share of $2,378,450, with pre-construction costs funded at 35 percent and construction costs funded at 75 percent for the McLean-Sheridan Water District Turtle Lake Water Tower project. The funding is for eligible costs and is contingent on available funding.**
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> **Commissioners Andersen, Anderson, Johnson, McDonald, Owan, Pedersen, Zimmerman, Goehring, and Lt. Governor Sanford voted aye. There were no nay votes. Lt. Governor Sanford announced the motion unanimously carried.**

TRI-COUNTY RURAL WATER, PHASE 4 - $2,700,000
(SWC Project No. 2050TRI):

Tri-County Water District (District) requested cost-share on the construction costs on their Phase 4 expansion to obtain up to 124,000 gallons per day water supply from McVille and expand the rural distribution to 85 new users throughout the southern service area, south of Highway 2, with construction of 4-inch to 1.5-inch pipeline and booster station. Also, the project will correct low-pressure problems for Stump Lake Park area, a dairy, another 30 existing users, and the service area east of McVille.

The District's service area is within portions of the counties of Grand Forks, Nelson, Ramsey, Steele, Traill, and Walsh, serving the cities of Brocket (pop. 55), Lawton (pop. 29), Niagra (pop. 51), Petersburg (pop. 180), and 950 rural users (est. pop. 2,300). The District's main water supply is from the Elk Valley Aquifer with a water treatment plant located ten miles northeast of Niagra. Additionally, the District receives water from Greater Ramsey Water District and supplies about 45 rural users (est. pop. 105) in the

western portion of the system. The system water rate is $54 per month minimum and $6 per 1,000 gallons used. Rural systems across the state have a median rate of $45 per month minimum and $6 per 1,000 gallons. McVille's water supply is from the McVille Aquifer and they can treat 800,000 gallons per day at their water treatment plant. The District will pay McVille a capacity buy-in fee of $101,885 and have a water rate of $1.25 per 1,000 gallons for up to 58,220,000 gallons and above that pay $3 per 1,000 gallons.

The estimated project cost is $3,895,000 with construction cost of $3,600,000 and pre-construction cost of $295,000. On December 8, 2017, the State Water Commission approved 35 percent cost-share of $103,250 on pre-construction costs. The District will bid the project this fall and plan to complete construction in summer of 2019. The recommendation at this time is to provide cost-share of 75 percent construction costs which equates to $2,700,000. The local share will be a loan through the Drinking Water State Revolving Loan Fund with the District and City having a water purchase agreement. The Cost-Share Request Form and supporting material is attached as **APPENDIX H**.

It was the recommendation of Secretary Erbele that the State Water Commission approve an additional $2,700,000 resulting in a total cost-share of $2,803,250, with pre-construction costs funded at 35 percent and construction costs funded at 75 percent for the District's 2018 Expansion Project. The funding is for eligible costs and is contingent on available funding.

> **It was moved by Commissioner Pedersen and seconded by Commissioner Anderson that the State Water Commission approve an additional $2,700,000 resulting in a total cost-share of $2,803,250, with pre-construction costs funded at 35 percent and construction costs funded at 75 percent for the Tri-County Water District 2018 Expansion Project. The funding is for eligible costs and is contingent on available funding.**
>
> **Commissioners Andersen, Anderson, Johnson, McDonald, Owan, Pedersen, Zimmerman, Goehring, and Lt. Governor Sanford voted aye. There were no nay votes. Lt. Governor Sanford announced the motion unanimously carried.**

STATE COST-SHARE PARTICIPATION REQUESTS – FLOOD CONTROL, GENERAL WATER, AND CONVEYANCE

BARNES COUNTY WATER RESOURCE DISTRICT, KATHRYN DAM - $531,564 (SWC Project No. 0399):

Barnes County Water Resource District (District) requested cost-share assistance for the Kathryn Dam Project.

Kathryn Dam was originally constructed by the Civilian Conservation Corps (CCC) in 1934, and the District is statutorily responsible for the dam structure. The dam is located on the main stem of the Sheyenne River about a mile east of Kathryn, which has an estimated population of 50, just north of County Highway 38 in Township 137 North, Range 58 West in Barnes County.

In May 2016, the District submitted a cost-share application to the State Water Commission for the design and construction phases of the Kathryn Dam Project. The project includes the removal of the existing Kathryn Dam and installation of a series of rock arch riffles.

The existing dam is in need of maintenance and results in a potentially dangerous hydraulic roller below the dam. The removal of the dam would address the maintenance issue and eliminate the hydraulic roller affect. The rock riffles are intended to improve fish passage and protect the integrity of the river and existing infrastructure upstream of the dam. The original recommendation was to cost-share the dam removal at 75 percent as a dam safety measure and cost-share the remainder of the project at 40 percent as a recreation project.

The estimated total project cost is $1,010,000. After discussion, it was determined that the full project would be funded at 75 percent of eligible costs as a dam safety measure, resulting in a cost-share of $754,875. The District has also been pursuing other funding sources to cover the remaining costs associated with the design and construction phases of the project. The District has secured $159,500 from the ND Outdoor Heritage Fund and $15,000 from the ND Game and Fish Department. The County Commission is also contributing and the District has some cash on hand and plans on borrowing the rest. The original letter, Cost-Share Request Form, and supporting material is attached as **APPENDIX I**.

It was moved by Commissioner Andersen and seconded by Commissioner Pedersen that the State Water Commission approve the request for state cost-share participation in the Kathryn Dam project at an amount not to exceed $754,875. This approval is subject to the entire contents of the recommendation contained herein, obtaining all applicable permits and the availability of funds.

Commissioners Andersen, Anderson, Johnson, McDonald, Owan, Zimmerman, Goehring, and Lt. Governor Sanford voted aye. There were no nay votes. Lt. Governor Sanford announced the motion unanimously carried.

MCLEAN COUNTY WATER RESOURCE DISTRICT, PAINTED WOODS LAKE FLOOD DAMAGE REDUCTION AND HABITAT ENHANCEMENT - $278,368 (SWC Project No. 160):

The McLean County Water Resource District (District) requested cost-share assistance for the Painted Woods Lake Flood Damage Reduction and Habitat Enhancement project.

In March 2015, the State Engineer approved $24,500 in cost-share for the Painted Woods Lake Mitigation Study. In November 2016, the District requested cost-share for design and construction of a new outlet structure which was denied at the December 9, 2016, State Water Commission meeting.

The project is located in Township 134 North, Range 81 West in McLean County. The estimated population of McLean County is 9,729. Washburn is approximately six miles from Painted Woods Lake, and the estimated population of Washburn is 1,303. The Painted Woods Lake Area Flood Damage Reduction project is centered on Painted Woods Lake. This lake was determined to have been navigable at the time of statehood, and the bed of the lake is therefore Sovereign Land owned by the state of North Dakota. The State Engineer is responsible for administering the state's non-mineral interests in North Dakota's sovereign lands.

The project area is located at the outlet of the 305 square mile Painted Woods Creek Watershed, which drains privately owned land and lies in parts of McLean and Burleigh counties. There is also some water received in Painted Woods Lake that is released into the headwaters of Painted Woods Creek from the Garrison Diversion project. The outlet of the Painted Woods Creek watershed has seen flooding impacts over the last 30 years which has led to damage of private and public land and has also affected fish, wildlife, and recreation resources in the area.

The District is currently requesting cost-share for Phase 1 construction of a high flow diversion channel. Phase 1 of the high flow channel will be constructed across the new Wildlife Management Area (WMA) which was recently purchased from private owners. The second phase of the diversion channel will require the purchase of another privately held tract which is anticipated to occur in the near future. When completed, the high flow channel will provide flood relief by creating a high flow bypass channel on the north side of the WMA, providing relief for ponded flood waters on the northeast side of Painted Woods Lake and reduce the likelihood of damaging breakout flows across private lands. There will be habitat features along the perimeter of the high flow channel to enhance wildlife values.

The secured funding contributions include ND Game and Fish funding of $120,000 and Garrison Diversion Conservancy District funding of $20,000. A grant application has been submitted to the Outdoor Heritage Fund for $218,132. Final design is expected to occur between October 2018 to February 2019, bidding in March 2019, and construction between June and September 2019.

This project is one component of the larger Painted Woods Lake Flood Project. Project implementation will be phased in multiple years as funding from a variety of stakeholders becomes available. Proposed future components include a new water level control structure which would include features to improve the fishery and help control aquatic vegetation. Bank restoration along Merry's Creek below the Painted Woods level control structure is another component of the overall project.

The estimated total project cost of the Phase I diversion channel is $636,500, and the original request was for $278,368 in state funds. Because of the immediate effective date of cost-share funding for pre-construction costs now being whatever percentage the resulting construction costs would be eligible for, the request is now for $284,768. The transmittal letter, Cost-Share Request Form and supporting material is attached as **APPENDIX J**.

It was moved by Commissioner Goehring and seconded by Commissioner McDonald that the State Water Commission approve the state cost-share participation in the Painted Woods Lake Flood Damage Reduction and Habitat Enhancement at an amount not to exceed $284,768. This approval is subject to the entire contents of the recommendation contained herein, obtaining all applicable permits and the availability of funds.

Commissioners Andersen, Anderson, Johnson, McDonald, Owan, Pedersen, Zimmerman, Goehring, and Lt. Governor Sanford voted aye. There were no nay votes. Lt. Governor Sanford announced the motion unanimously carried.

NORTHWEST AREA WATER SUPPLY (NAWS) PROJECT – INTERIM WATER RATES AND PROJECT UPDATE
(SWC Project No. 237-04):

Tim Freije, NAWS Project Manager, presented information on the 2019 Interim Water Rates and provided an update on the NAWS project. The project update is attached as **APPENDIX K.**

The NAWS water service agreements require an annual review and adjustment of water rates to go into effect January 1 of the following year.

The NAWS system started water service to Berthold, Minot's South Hill, and North Prairie rural water near Burlington and Minot in August 2008; Kenmare and Upper Souris Water District at Donnybrook in December 2009; West River Water District and North Prairie Rural Water in Des Lacs in 2010; and Burlington in August 2010. Mohall, Sherwood, and All Seasons Water Users District near Antler received service in the fall of 2011. Upper Souris started taking water for Glenburn, near Mohall, and the rural system near Glenburn in 2012 along with Minot's North Hill and the Minot Air Force

Base. Two turnouts for North Prairie Rural Water near the Air Force Base were also installed.

The operations and maintenance fee charged to NAWS contract customers ($1.22/1,000 gallons for 2018) will need to be increased to cover increased electrical and maintenance costs. Current calculations suggest a 2019 rate of $1.26/1,000 gallons. The replacement and extraordinary maintenance (REM) rate of $0.15/1,000 gallons should stay the same for both the NAWS region and Minot as they were in 2018. The cost for supply and treatment from Minot is $1.54/1,000 gallons for 2019, which is a straight pass-through to the NAWS region customers. As a result, overall water rate for the NAWS region customers should increase from the 2018 rate of $2.85/1,000 gallons to $2.95/1,000 gallons and the Minot rate will remain at $0.41/1,000 gallons. If the 2019 water rate results in more revenue than expenses for the year, then the revenue would be factored into the rate for 2020.

The NAWS water rate is based on capital costs, supply and treatment costs, operation and maintenance costs, and reserve for REM. The recommendations for the NAWS water rate to Minot and the NAWS region (including Berthold, Kenmare, Upper Souris Water District, Burlington, West River Water District, Mohall, Sherwood, and All Seasons Water Users District) are broken down as follows:

Capital costs - $0.00/1,000 gallons - Minot paid 35 percent of capital costs during construction and there are no capital costs to recover in the water rate.

Supply and treatment costs - Minot has developed a supply and treatment rate for 2019 of $1.54/1,000 gallons. Minot water moved through the NAWS facilities will be metered and billed at the NAWS turnouts. No Minot water moved through the NAWS facilities to Minot turnouts will be charged a supply and treatment cost.

Operation and maintenance costs - $0.26/1,000 gallons for Minot; $1.26/1,000 gallons for NAWS contract customers - the difference is power/pumping costs for the NAWS region and maintenance staff costs.

REM costs - $0.15/1,000 gallons - the REM cost was set at $0.15/1,000 during Rugby Phase I. It is recommended that this rate remain at $0.15/1,000 gallons during the interim period with water supply from Minot.

It was the recommendation of Secretary Erbele that the State Water Commission approve NAWS interim water rates for the 2019 calendar year of $2.95/1,000 gallons for NAWS contract customers and $0.41/1,000 gallons for Minot contract customers.

It was moved by Commissioner Goehring and seconded by Commissioner Zimmerman that the State Water Commission approve NAWS interim water rates for the 2019 calendar year of $2.95/1,000

gallons for NAWS contract customers and $0.41/1,000 gallons for Minot contract customers.

Commissioners Andersen, Anderson, Johnson, McDonald, Owan, Pedersen, Zimmerman, Goehring, and Lt. Governor Sanford voted aye. There were no nay votes. Lt. Governor Sanford announced the motion unanimously carried.

AIRBORNE ELECTROMAGNETIC FUNDING - $425,000:

Airborne Electromagnetic (AEM) surveying involves helicopters towing equipment that scans the earth collecting enormous amounts of geophysical data. The geophysical data can be used to help refine our understanding of the geometry and depth of buried valley aquifers and the fresh water supplies they contain.

The volume of data collected - impossible with conventional methods – is a game changer in hydrogeologic investigations. Compared with using only conventional methods – borehole test drilling, and downhole geophysical data collection - it is fast, relatively inexpensive, and safe. The technology has been successfully used by the State Water Commission in two areas of the state, one in the fall of 2016 and one in the fall of 2017.

The 2016 survey consisted of 1,950 km of flight lines flown over the Spiritwood buried valley aquifer in central North Dakota. The results of the survey exceeded expectations. Not only did the survey provide an image of where the deep channel of the Spiritwood aquifer was located, it also showed there was an even deeper, previously unknown, buried aquifer channel traversing through the study area. Test drilling during the following field season confirmed the existence of this previously unknown aquifer. The AEM work greatly increased understanding of the amount of available water supply from the aquifer and will be invaluable for expanding and refining the hydrogeological flow model of the region.

The 2017 survey consisted of 2,000 km of flight lines flown over the West Fargo and Wahpeton buried channel aquifers in eastern North Dakota. Aqua Geo Frameworks (AGF), a hydrogeological consulting firm specializing in AEM data processing, performed advanced processing techniques and methodology. Their work product resulted in valuable 3D imagery and hydrogeological interpretation. Recent test drilling confirmed the location of previously unknown deep channels near Wahpeton that warrant serious consideration of further hydrogeologic investigation as potential replacement supplies for Wahpeton's current tenuous well locations.

The competitive bidding process in 2016 resulted in an unexpectedly low flight-kilometer price point which allowed the project to be paid from the division's 2015-2017 operational budget. Another competitive bidding process was undertaken for the 2017 project which resulted in a multi-year contract with the successful bidder, Geotech, Inc.

An option under the contract was to employ the services of AGF. Similar to the 2016 project, the 2017 project was paid from the division's 2017-2019 operational budget.

With State Water Commission approval, another project will be undertaken in the fall of 2018. The project would involve a continuation of the Spiritwood aquifer AEM investigation in Lamoure, Dickey, and Sargent counties and is estimated at approximately 2,000-3,000 flight-kilometers or approximately $425,000.

The Water Appropriations Division's line item for professional fees and services has been depleted with the payments to Geotech for the 2017 AEM project. Therefore, it is proposed that funding for an approximate 2,000-3,000 flight-kilometer project be approved to be paid from the State Water Commission's *General Water* funds.

It was the recommendation of Secretary Erbele that the State Water Commission approve $425,000 for continued AEM work under the contract with Geotech, Inc. and AGF, Inc. from the funds appropriated to the State Water Commission in the 2017-2019 biennium.

It was moved by Commissioner Goehring and seconded by Commissioner Pedersen that the State Water Commission approve $425,000 for continued AEM work under the contract with Geotech, Inc. and AGF, Inc. from the funds appropriated to the State Water Commission in the 2017-2019 biennium.

Commissioners Andersen, Anderson, Johnson, McDonald, Owan, Pedersen, Zimmerman, Goehring, and Lt. Governor Sanford voted aye. There were no nay votes. Lt. Governor Sanford announced the motion unanimously carried.

CASS RURAL WATER DISTRICT AND FARGO/WEST FARGO REGIONALIZATION:

Jerry Blomeke, Cass Rural Water Users District (District), and Charles Vein, AE2S, provided an update on the Cass regionalization projects with Fargo and West Fargo. A map of the regionalization area is attached as **APPENDIX L.**

In August 2017, the District was awarded $91,000 to construct a 500,000-gallon Horace area storage tank for demands of the system along Cass County Road 17. At that time, Governor Burgum requested an update on how the District is working with Fargo and West Fargo on regionalization and to ensure there was no duplication of projects. The rural water system considered the future water demands of the cities and completed a hydraulic analysis to determine the best locations of future storage. As the systems expand and operating storage is needed, the system will be used as in a municipal water system.

INTERNATIONAL WATER INSTITUTE:

Chuck Fritz, Director, International Water Institute, presented information on agricultural surface and subsurface drainage management at the request of the State Water Commission. The information presented resulted from a study completed in order to better determine impacts of agricultural drainage on peak watershed flows and design of agricultural drainage systems. The full presentation is attached as **APPENDIX M.**

DEVILS LAKE WEST END OUTLET:

Tim Dodd, Water Resource Engineer, and David Nyhus, Engineering Manager, presented background information regarding seepage issues in the Devils Lake West End Outlet and an assessment overview of mitigation options. The information presented is attached as **APPENDIX N.**

It was the recommendation of Lt. Governor Sanford, acting Chairman, that the discussion relating to the Devils Lake West End Outlet seepage be held in executive session, under the provisions of NDCC § 44-04-19.1(9), for the purpose of attorney consultation. The State Water Commission invited the following to participate in the executive session:

STATE WATER COMMISSION MEMBERS:

Lt. Governor Brent Sanford, acting Chairman
Doug Goehring, Commissioner, ND Department of Agriculture (left at 5:20 p.m.)
Katie Andersen, Jamestown
Michael Anderson, Hillsboro
Richard Johnson, Devils Lake
Leander McDonald, Bismarck
Mark Owan, Williston
Matthew Pedersen, Valley City
Jason Zimmerman, Minot

OTHERS:

Garland Erbele, State Engineer, and Chief Engineer-Secretary,
ND State Water Commission
State Water Commission Staff: Craig Odenbach, John Paczkowski, David Laschkewitsch, Aaron Carranza, Tim Dodd, David Nyhus, Braden Rambo, and Cheryl Fitzgerald
Jennifer Verleger, General Counsel, Attorney General's Office
Leslie Bakken-Oliver, General Counsel, Governor's Office
Reice Haase, Policy Advisor, Governor's Office
Shaun Quissell, Policy Advisor, ND Department of Agriculture

It was moved by Commissioner Andersen and seconded by Commissioner Pedersen that under the provision of NDCC § 44-04-19.1(9), the State Water Commission proceed into executive session on August 9, 2018, at 4:30 p.m., for the purpose of attorney consultation relating to the Devils Lake West End Outlet seepage issues.

Commissioners Andersen, Anderson, Johnson, McDonald, Owan, Pedersen, Zimmerman, Goehring, and Lt. Governor Sanford voted aye. There were no nay votes. Lt. Governor Sanford announced the motion unanimously carried.

Following attorney consultation regarding the Devils Lake West End Outlet seepage issues, Lt. Governor Sanford reconvened the open session of the State Water Commission meeting on August 9, 2018, at 5:25 p.m.

It was moved by Commissioner Andersen and seconded by Commissioner Johnson that the State Water Commission approve mediation through the ND Department of Agriculture as requested with Dennis Johnson, LaVonne Bengson, James Fossen, Earl Huffman, and Richard Huffman.

Commissioners Andersen, Anderson, Johnson, McDonald, Owan, Pedersen, Zimmerman, and Lt. Governor Sanford voted aye. There were no nay votes. Commissioner Goehring was absent for the vote. Lt. Governor Sanford announced the motion unanimously carried.

RED RIVER VALLEY WATER SUPPLY PROJECT:

Duane DeKrey, General Manager, Garrison Diversion Conservancy District, presented an update on the Red River Valley Water Supply Project and the plans to move forward with property acquisitions, permitting, and construction. The presentation is attached as **APPENDIX O.**

SOUTHWEST WATER PIPELINE PROJECT (SWPP):

Reimbursement from Reserve Fund for Replacement and Extraordinary Maintenance (REM) – SWC Project. No. 1736-99

The Southwest Water Authority (SWA) collects and maintains a reserve fund for REM. This fund is required by authorizing legislation, and expenditures from this fund are to be authorized by the State Water Commission.

The State Water Commission received a request from the SWA for reimbursement from the REM funds for four separate items of work.

The items requested for reimbursement included repair to a service line on Contract 7-8E for $24,595, relocation of pipeline in the right-of-way in Dunn County for $25,466, and replacement and cathodic protection for Contracts 2-2C, 2-2D, 2-2E and 2-3E Dry Creek Crossing for $307,162.35, and $290,094.82 for the two-foot berm raise on the east lime sludge pond. Final payment of $25,050 is not yet paid out to Edward J. Schwartz Construction, the contractor for the berm raise and is not included in the request.

The total costs for all items requested for reimbursement is $647,318.17. The current balance in the REM fund is $18,247,548.95 as of July 12, 2018. The budgeted year-end balance for 2018 is $18.93 million.

It was the recommendation of Secretary Erbele that the State Water Commission approve the reimbursement from the reserve fund for REM in the amount of $647,318.17.

It was moved by Commissioner Owan and seconded by Commissioner McDonald that the State Water Commission approve the reimbursement from the reserve fund for REM in the amount of $647,318.17.

Commissioners Andersen, Anderson, Johnson, McDonald, Owan, Pedersen, Zimmerman, Goehring, and Lt. Governor Sanford voted aye. There were no nay votes. Lt. Governor Sanford announced the motion unanimously carried.

Project Update

Sindhuja S.Pillai-Grinolds, SWPP Project Manager, provided a project update, attached as **APPENDIX P.**

General Discussion

Sindhuja also provided transfer of ownership, history, funding, and capital repayment information to the Commission, attached as **APPENDIX Q.**

After discussion, the Commission directed a Request for Proposal be drafted to provide an independent review of the state ownership of the SWPP and potential transfer to the SWA, and a comparison of water supply funding models currently used by the State Water Commission.

It was moved by Commissioner McDonald and seconded by Commissioner Johnson that the State Water Commission draft a Request for Proposal to provide an independent review of the state ownership of the SWPP and potential transfer to the SWA, and a comparison of water supply funding models currently used by the State Water Commission.

Commissioners Andersen, Anderson, Johnson, McDonald, Owan, Pedersen, Zimmerman, and Lt. Governor Sanford voted aye. There were no nay votes. Commissioner Goehring was absent for the vote. Lt. Governor Sanford announced the motion unanimously carried.

PROJECT UPDATES:

Commission staff provided brief updates on the following projects with the summary updates attached as **APPENDIX R:**

Tim Dodd, Water Resource Engineer, Devils Lake Outlet; and, Laura Ackerman, Investigations Section Chief, Missouri River and Mouse River.

OTHER:

SWC staff met with BG Helmlinger and Dave Ponganis about the Missouri River Recovery Management Plan and EIS.

Laura Ackerman will work with Commissioner McDonald for contact information needed in order to create a First Nations advisory group in relation to the study being completed between the United States and Canada to update the operating agreement.

Commission Johnson announced the Northeast Regional Water District (NRWD) celebration of water service scheduled for August 22, 1:00 p.m., at the Devils Lake Water Treatment Plant. NRWD provides high quality water to more 2,300 customers in the northeastern North Dakota Counties of Cavalier, Pembina, Walsh, Ramsey, and Towner. With a coverage area of more than 2,000 square miles, the NRWD is the result of a merger of the former Langdon Rural Water and North Valley Water systems. The NRWD also purchases water treated at the Devils Lake Water Treatment Plant to supplement the water supply for its customers. The August 22 event is a celebration of the completion of a large expansion project to deliver water to the Langdon and Cando, as well as supplemental water to the Greater Ramsey Water District.

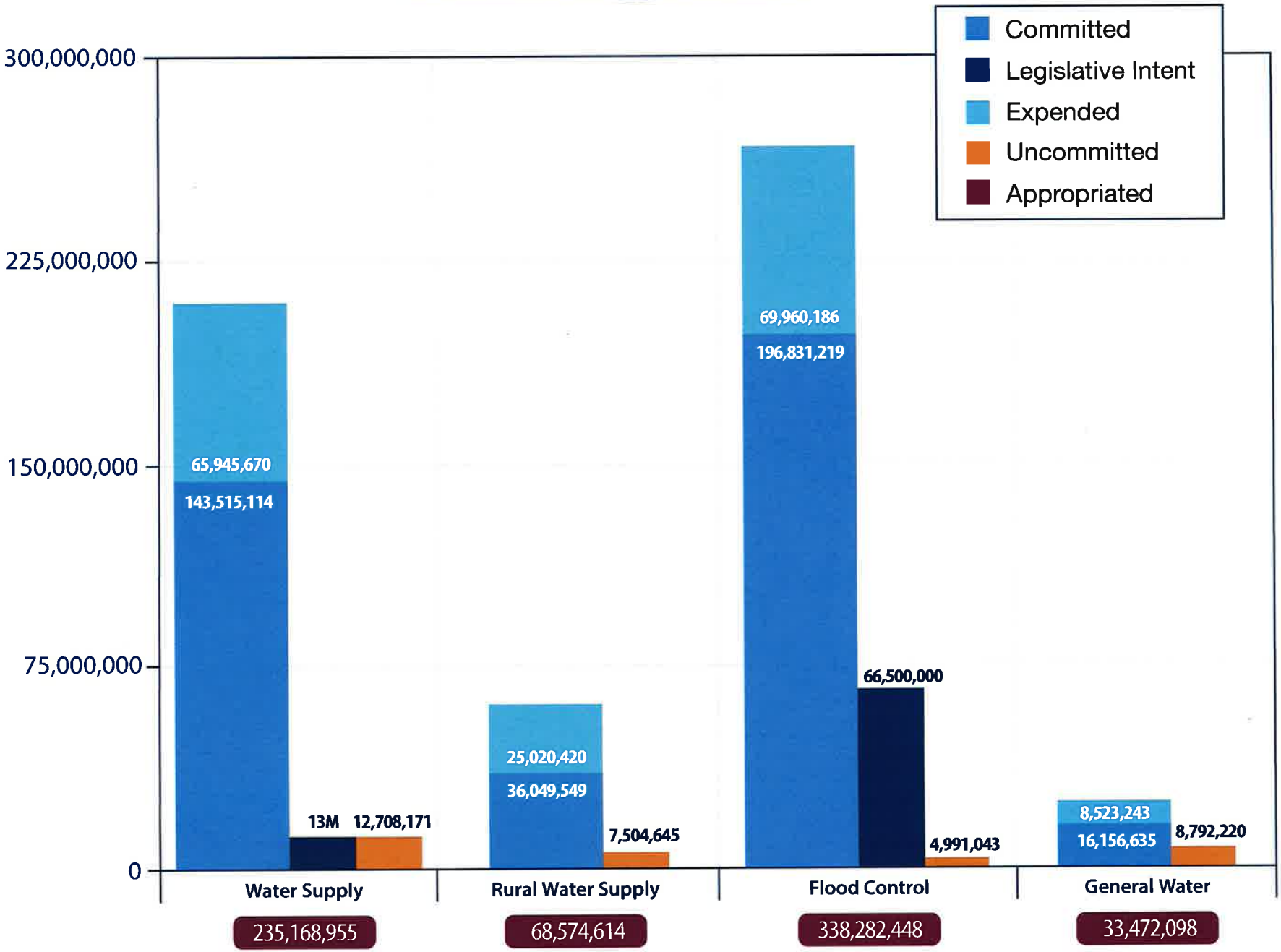
The next meeting is scheduled for October 11, 2018.

There being no further business to come before the State Water Commission, Lt. Governor Sanford adjourned the August 9, 2018, meeting at 6:40 p.m.

Brent Sanford, Lt. Governor
Acting Chairman, State Water Commission

Garland Erbele, P.E.
North Dakota State Engineer,
and Chief Engineer-Secretary
to the State Water Commission

PROJECT FUNDS



APPENDIX A

STATE WATER COMMISSION
PROJECT SUMMARY
2017-2019 BIENNIUM

Jun-18

	BUDGET	SWC/SE APPROVED	EXPENDITURES	REMAINING UNOBLIGATED	REMAINING UNPAID
MUNICIPAL & REGIONAL WATER SUPPLY:					
MUNICIPAL WATER SUPPLY	95,919,488	95,919,488	22,287,275	0	73,632,213
RED RIVER VALLEY	30,000,000	17,000,000	6,000,000	13,000,000	11,000,000
OTHER REGIONAL WATER SUPPLY	96,541,296	96,541,296	37,658,395	0	58,882,901
UNOBLIGATED MUNICIPAL/REG WATER SUPPLY	12,708,171			12,708,171	
RURAL WATER SUPPLY:					
RURAL WATER SUPPLY	61,069,969	61,069,969	25,020,420	0	36,049,549
UNOBLIGATED RURAL WATER SUPPLY	7,504,645			7,504,645	
FLOOD CONTROL:					
FARGO	144,876,087	78,376,087	19,841,999	66,500,000	58,534,088
MOUSE RIVER	86,575,585	86,523,085	12,069,492	52,500	74,453,592
VALLEY CITY	14,607,634	14,607,634	5,542,477	0	9,065,157
LISBON	9,000,010	9,000,010	4,081,524	0	4,918,486
OTHER FLOOD CONTROL	36,110,517	36,110,517	6,818,984	0	29,291,533
PROPERTY ACQUISITIONS	24,257,324	24,257,324	18,123,245	0	6,134,079
WATER CONVEYANCE	17,916,749	17,916,749	3,482,465	0	14,434,284
UNOBLIGATED FLOOD CONTROL	4,938,542			4,938,542	
GENERAL WATER:					
GENERAL WATER	24,679,878	24,679,878	8,523,243	0	16,156,635
UNOBLIGATED GENERAL WATER	8,792,220			8,792,220	
REVOLVING LOAN FUND:					
GENERAL WATER PROJECTS	5,581,900	5,581,900	2,292,500	0	3,289,400
WATER SUPPLY	354,000	354,000	354,000	0	0
TOTALS	681,434,015	567,937,936	172,096,020	113,496,079	395,841,916

STATE WATER COMMISSION
PROJECT SUMMARY
2017-2019 Biennium

WATER SUPPLY

Approved By	SWC No	Dept	Sponsor	Project	Approved Date	Total Approved	Total Payments	*Jun-18* Balance
			Municipal Water Supply:					
	2050-13	5000	Mandan	New Raw Water Intake	10/7/2013	1,515,672	117,447	1,398,225
	2050-15	5000	Washburn	New Raw Water Intake	10/7/2013	2,281,927	140,716	2,141,211
	2050-18	5000	Grafton	Water Treatment Plant Phase 3	10/7/2013	48,822	48,822	(0)
	2050-20	5000	Dickinson	Capital Infrastructure	10/6/2015	1,793,507	0	1,793,507
	2050-21	5000	Watford City	Capital Infrastructure	8/1/2015	536,627	13,873	522,754
	2050-26	5000	Fargo	Fargo Water System Regionalization Improvements	7/29/2015	4,131,788	1,254,302	2,877,486
	2050-28	5000	Mandan	Water Systems Improvement Project	10/6/2015	2,005,765	1,641,484	364,281
	2050-29	5000	Minot	Water Systems Improvement Project	10/6/2015	3,478,647	2,090,403	1,388,244
	2050-30	5000	Watford City	Water Systems Improvement Project	10/6/2015	5,374,639	89,774	5,284,865
	2050-31	5000	West Fargo	Water Systems Improvement Project	10/6/2015	1,086,602	392,388	694,214
	2050-32	5000	Williston	Water Systems Improvement Project	10/6/2015	7,857,010	0	7,857,010
	2050-36	5000	Dickinson	Water Systems Improvement Project	10/6/2015	674,881	0	674,881
	2050-37	5000	Dickinson	Dickinson State Avenue South Water Main	12/11/2015	963,920	0	963,920
	2050-44	5000	Beulah	Water Treatment Plant	3/9/2016	1,639,813	1,461,495	178,317
	2050-49	5000	Grand Forks	Grand Forks Water Treatment Plant	8/23/2017	50,645,520	14,479,270	36,166,249
	2050-51	5000	Mercer	Connect to McLean-Sheridan	8/23/2017	166,950	0	166,950
	2050-52	5000	New Town	Water Transmission Storage	8/23/2017	1,040,000	66,273	973,728
	2050-53	5000	West Fargo	Brooks Harbor Water Tower	8/23/2017	1,950,000	0	1,950,000
	2050-54	5000	West Fargo	North Loop Connection	8/23/2017	510,000	0	510,000
	2050-55	5000	West Fargo	West Loop Connection	8/23/2017	1,110,000	0	1,110,000
	2050-56	5000	Williston	US Highway 2 Water Main	8/23/2017	434,400	419,029	15,371
	2050-66	5000	Lincoln	Lincoln Water System Improvement Project	2/8/2018	1,130,000	0	1,130,000
	2050-67	5000	Williston	Williston Water System Improvements	2/8/2018	2,336,000	0	2,336,000
	2050-69	5000	Mandan	Sunset Reservoir Water Transmission Line	4/12/2018	3,135,000	0	3,135,000
	2050-70	5000	Wing	Water Tower Repair	4/12/2018	72,000	72,000	0
				TOTAL MUNICIPAL WATER SUPPLY		***95,919,488***	***22,287,275***	***73,632,213***
			Regional Water Supply:					
	1736-05	8000	SWPP	Southwest Pipeline Project	7/1/2017	44,988,408	23,293,539	21,694,869
	2374	9000	NAWS	Northwest Area Water Supply	2/8/2018	22,508,462	2,487,128	20,021,334
HB 1020	1973-02	5000	WAWSA	WAWSA	9/15/2014	155,603	155,603	(0)
	1973-05	5000	WAWSA	WAWSA	10/6/2015	8,888,823	5,562,005	3,326,818
	1973-06	5000	WAWSA	WAWSA	12/8/2017	20,000,000	6,160,120	13,839,880
	325-105	5000	RRVWSP	RRVWSP Garrison Diversion	8/23/2017	17,000,000	6,000,000	11,000,000
				TOTAL REGIONAL WATER SUPPLY		***113,541,296***	***43,658,395***	***69,882,901***
			Rural Water Supply:					
	2050-17	5000	Barnes Rural RWD	Improvements	3/11/2015	1,096,634	1,096,634	0
	2050-23	5000	Greater Ramsey WRD	SW Nelson County Expansion	8/23/2017	1,364,794	601,884	762,910
	2050-25	5000	All Seasons Water District	Bottineau County Extension, Phase I	7/29/2015	299,358	0	299,358
	2050-33	5000	Stutsman RWD	Phase V Storage & Pipeline Expansion Project	10/6/2015	1,172,760	733,778	438,982
	2050-34	5000	North Prairie RWD	Storage and Water Main	10/6/2015	1,968,086	814,476	1,153,610
	2050-35	5000	Southeast Water Users Dist	System Wide Expansion Feasibility Study	8/23/2017	13,159,145	5,723,260	7,435,885
	2050-38	5000	Dakota Rural Water District	Reservoir C Expansion	12/11/2015	90,841	52,601	38,240
	2050-41	5000	Northeast Regional WD	City of Devils Lake Water Supply Project	12/11/2015	12,789,020	11,549,270	1,239,750
	2050-42	5000	Walsh RWD	Phase 1 & 2 System Expansion	12/11/2015	1,639,753	1,065,912	573,841
	2050-43	5000	All Seasons Water District	System 4 Connection to System 1	12/11/2015	4,900,000	0	4,900,000
	2050-45	5000	Garrison Rural Water District	System Expansion Project	3/9/2016	1,271,241	1,271,241	0
	2050-50	5000	Grand Forks Traill RWD	Eastern Expansion & TRWD Interconnect Fesibility	8/23/2017	126,000	126,000	0
	2373-39	5000	North Central Rural Water Consortium	Carpio Berthold Phase 2	4/1/2015	2,425,167	594,461	1,830,706
	2373-41	5000	North Central Rural Water Consortium	Granville-Deering Area	10/24/2016	1,831,540	977,152	854,389
	2050-57	5000	North Central Regional Water District	Mountrail Expansion Phase II	8/23/2017	3,086,000	3,063	3,082,938
	2050-58	5000	North Central Regional Water District	Mountrail Co. Watery Phase III	8/23/2017	3,430,000	0	3,430,000
	2050-59	5000	Cass Rural Water District	Horace Storage Tank	8/23/2017	91,000	0	91,000
	2050-60	5000	North Prairie Rural District	Reservoir 9 Water Supply	6/12/2018	1,114,620	0	1,114,620
	2050-61	5000	North Prairie Rural District	Surrey/Silver Spring	6/12/2018	107,430	0	107,430
	2050-62	5000	Traill Rural District	Expansion/Interconnect	8/23/2017	150,880	150,880	0
	2050-63	5000	Walsh RWD	System Expansion Project	4/12/2018	1,300,000	58,100	1,241,900
	2050-64	5000	McLean-Sheridan Water District	Turtle Lake Water Tower	12/8/2017	107,450	0	107,450
	2050-65	5000	Tri-County Rural Water District	System Expansion Project	12/8/2017	103,250	0	103,250
	2050-71	5000	East Central RWD	Grand Forks/Traill Project	4/12/2018	5,345,000	201,708	5,143,292
	2050-72	5000	Stutsman RWD	Phase 6 Pettibone Project	4/12/2018	2,100,000	0	2,100,000
				TOTAL RURAL WATER SUPPLY		***61,069,969***	***25,020,420***	***36,049,549***
				TOTAL		***270,530,753***	***90,966,090***	***179,564,663***

SWC Board Approved to Continue

STATE WATER COMMISSION
PROJECT SUMMARY
2017-2019 Biennium

FLOOD CONTROL

Approved By	SWC No	Dept	Sponsor	Project	Approved Date	Total Approved	Total Payments	Jun-18 Balance
			Flood Control:					
SB 2020	1928-01	5000	Fargo	Fargo Flood Control Project	4/19/2016	20,001,131	19,841,999	159,132
SB 2020	1928-05	5000	Fargo Metro Flood Diversion	Fargo Metro Flood Diversion Authority 2015-2017	7/6/2016	58,374,956	0	58,374,956
	1771-01	5000	Grafton	Grafton Flood Control Project	10/12/2016	32,175,000	6,011,165	26,163,835
	1974-06	5000	Souris River Joint WRD	Development of 2011 Flood Inundation Maps	12/18/2015	1,522	0	1,522
	1974-09	5000	Souris River Joint WRD	Mouse River Flood Control Design Engineering	4/12/2018	276,696	276,696	(0)
	1974-11	5000	Souris River Joint WRD	Funding of 214 agreement between SRJB & USACE	12/5/2014	31,500	0	31,500
	1974-12	5000	Souris River Joint WRD	Maple Diversion Design MI-4	4/12/2018	1,345,000	7,573	1,337,427
	1974-14	5000	Souris River Joint WRD	StARR Program (Structure Acquisition, Relocation, or Ring Dike)	3/9/2016	5,895,975	2,775,961	3,120,014
	1974-13	5000	Souris River Joint WRD	Tierrecita Villejo Levee Design	4/12/2018	1,170,000	0	1,170,000
	1974-15	5000	Souris River Joint WRD	Perkett Ditch Improvements	12/2/2016	404,593	272,916	131,677
	1974-16	5000	Souris River Joint WRD	Corps of Engineers Feasibility Study MREFPP	12/9/2016	355,546	355,546	0
	1974-18	5000	Souris River Joint WRD	Rural Reaches, Preliminary Engineering	10/12/2016	236,941	9,296	227,645
	1974-19	5000	Souris River Joint WRD	4th Avenue Tieback Levee & Burlington Levee - Design Engineerng	4/12/2018	2,853,340	1,518,766	1,334,574
	1974-20	5000	Souris River Joint WRD	Utility Relocations	10/12/2016	422,034	11,289	410,745
	1974-21	5000	Souris River Joint WRD	Highway 83 Bypass & Bridge Replacement	10/12/2016	1,983,623	476,406	1,507,217
	1974-22	5000	Souris River Joint WRD	Broadway Pump Station Phases MI-1	3/29/2017	35,271,200	2,538,694	32,732,506
	1974-23	5000	Souris River Joint WRD	Peterson Coulee Outlet	3/29/2017	1,427,022	0	1,427,022
	1974-25	5000	Souris River Joint WRD	Flood Specific Emergency Action Plan for Ward Co.	7/20/2017	182,000	0	182,000
	1974-26	5000	Souris River Joint WRD	Phases MI-2, MI-3 Construction	8/23/2017	29,348,843	3,701,600	25,647,243
	1974-27	5000	Souris River Joint WRD	Corps of Engineers Section 408 Review Through Section 2145	8/23/2017	74,750	74,750	0
	1974-30	5000	Souris River Joint WRD	Mouse River Park Bridge Design	4/12/2018	390,000	0	390,000
	1974-31	5000	Souris River Joint WRD	Sawyer Bridge Design Project	4/12/2018	260,000	0	260,000
	1974-32	5000	Souris River Joint WRD	Velva Bridge Design Project	4/12/2018	260,000	0	260,000
	1974	5000	Souris River Joint WRD	Phases MI-2, MI-3 Reallocation	4/12/2018	4,082,500	0	4,082,500
	2122-01	5000	US Army Corps of Engineers	Development of Comprehensive Plan for Souris Basin	9/5/2017	250,000	50,000	200,000
	1344-04	5000	Valley City	Sheyenne River Valley Flood Control Project PHII	8/29/2016	58,414	38,278	20,136
	1504-01	5000	Valley City	Permanent Flood Protection Project	5/1/2015	477,445	422,018	55,427
SB 2371	1504-03	5000	Valley City	Permanent Flood Protection PH III	12/9/2016	13,157,600	5,082,181	8,075,419
	1504-06	5000	Valley City	Permanent Flood Protection PH III & PH V	12/8/2017	914,175	0	914,175
	1344-02	5000	Lisbon	Sheyenne River Valley Flood Control Project	8/8/2016	1,000,582	888,040	112,542
	1991-01	5000	Lisbon	Permanent Flood Protection Project	5/29/2014	146,969	0	146,969
	1991-03	5000	Lisbon	Permanent Flood Protection - Levee C Project	3/11/2015	377,799	6,989	370,810
	1991-06	5000	Lisbon	Permanent Flood Protection - Levee E Project	3/9/2016	84,125	52,000	32,125
	1991-08	5000	Lisbon	Permanent Flood Protection - Levee D Project	4/12/2018	2,886,535	2,596,272	290,263
	1991-10	5000	Lisbon	Permanent Flood Protection - Levee F Project	4/12/2018	4,504,000	538,223	3,965,777
	2079-01	5000	Williston	West Williston Flood Control	12/9/2016	3,655,517	807,820	2,847,697
	2131	5000	Lower Heart River WRD	Flood Risk Reduction Project	6/14/2018	280,000	0	280,000
				Subtotal Flood Control		***224,617,332***	***48,354,476***	***176,262,856***
			Floodway Property Acquisitions:					
	1993-05	5000	Minot	Minot Phase 2 - Floodway Acquisitions	4/12/2018	14,093,720	10,131,804	3,961,916
SB 2371	1523-05	5000	Ward County/Minot	Ward County Phase 1, 2 & 3 - Floodway Acquisitions	1/27/2012	6,015,347	5,483,629	531,718
SB 2371	1504-05	5000	Valley City	Valley City Phase 1 - Floodway Acquisitions	12/8/2017	3,406,947	1,968,442	1,438,505
SB 2371	2000-05	5000	Sawyer	Sawyer Phase 1 - Floodway Acquisitions	6/13/2012	135,844	0	135,844
	1991-05	5000	Lisbon	Lisbon - Floodway Acquisition	12/9/2016	603,300	539,371	63,929
	1987-05	5000	Burlington	Mouse River Enhanced Flood Plan Property Acquistion	5/10/2017	2,166	0	2,166
				Subtotal Floodway Property Acquisitions		***24,257,324***	***18,123,245***	***6,134,079***
				TOTAL FLOOD CONTROL		***248,874,656***	***66,477,722***	***182,396,935***
			Revolving Loan Fund:					
			(General Water)					
	2077	1050	Valley City	Valley City Flood Protection - Phase II Construction (LOAN)	12/9/2016	3,289,400	0	3,289,400
	2077-15	1050	Valley City	Valley City Pre Design & Eng & Phase III Buyouts (LOAN)	12/9/2016	1,392,500	1,392,500	0
	2077-14	1050	Lisbon	Permanent Flood Control	8/23/2017	900,000	900,000	0
			(Water Supply)					
	2077-13	1050	North Central Rural Water Consortium II	Carpio Berhold Phase 2 (LOAN)	10/12/2016	215,000	215,000	0
	2077-12	1050	North Central Rural Water Consortium	Granville-Surrey-Deering Water Supply Project (LOAN)	10/12/2016	139,000	139,000	0
				REVOLVING LOAN TOTAL		***5,935,900***	***2,646,500***	***3,289,400***
				TOTAL		***254,810,556***	***69,124,222***	***185,686,335***

SWC Board Approved to Continue

STATE WATER COMMISSION
PROJECT SUMMARY
2017-2019 Biennium
Resources Trust Fund

WATER CONVEYANCE

Approved By	SWC No	Dept	Approved Biennum	Sponsor	Project	Approved Date	Total Approved	Total Payments	*Jun-18* Balance
				Drain & Channel Improvement Projects:					
SWC	1056	5000	2015-17	Bottineau Co. WRD	Tacoma Bitz Legal Drain	7/6/2016	210,572	49,978	160,594
SE	1056	2000	2015-17	Bottineau Co. WRD	Stead Legal Drain	2/16/2017	14,738	7,369	7,369
SWC	1064	5000	2013-15	Rush River WRD	Cass County Drain No. 2 Channel Improvements Proj	3/11/2015	41,683	0	41,683
SWC	1070	5000	2015-17	Maple River WRD	Drain #14 Channel Improvements	3/29/2017	741,562	0	741,562
SWC	1071	5000	2015-17	Maple River WRD	Cass County Drain #15 Channel Improvements	3/9/2016	282,561	179,516	103,045
SWC	1088	5000	2015-17	Maple River WRD	Cass Drain #37 Channel Improvements	3/9/2016	215,157	77,902	137,255
SWC	1089	5000	2015-17	Maple River WRD	Cass County Drain #39 Channel Improvements	3/9/2016	210,568	89,616	120,952
SE	1180	5000	2015-17	Richland Co WRD	Legal Drain No. 7 Channel Improvements	5/11/2017	24,926	19,158	5,768
SWC	1101	5000	2011-13	Dickey Co. WRD	Yorktown-Maple Drainage Improvement Dist No. 3	11/1/2017	798,562	356,270	442,292
SE	1140	5000	2015-17	Pembina Co. WRD	Drain 11 Outlet Extension Cost Overrun Project	7/7/2015	5,088	0	5,088
SWC	1176	5000	2015-17	Richland Co. WRD	Legal Drain #2 Reconstruction/Extension Project	3/9/2016	224,231	33,758	190,473
SWC	1222	5000	2015-17	Sargent Co WRD	Drain No 11 Channel Improvements	10/12/2016	1,378,376	0	1,378,376
SWC	1236	5000	2015-17	Traill Co. WRD	Murray Drain No. 17 Channel Improvements	10/12/2016	127,759	100,838	26,921
SWC	1311	5000	2015-17	Traill Co. WRD	Buxton Township Improvement District No. 68	3/9/2016	110,418	81,285	29,133
SWC	1314	5000	2015-17	Wells Co. WRD	Hurdsfield Legal Drain	3/29/2017	644,292	0	644,292
SE	1328	5000	2015-17	North Cass Co. WRD	Drain No. 23 Channel Improv Preliminary Engineering	9/30/2015	921	0	921
SWC	1328	5000	2015-17	North Cass Co. WRD	Drain #23 Channel Improvements	3/9/2016	81,612	53,103	28,509
SWC	1331	5000	2015-17	Richland Co WRD	Drain #14 Reconstruction	12/9/2016	252,738	138,492	114,246
SWC	1486	5000	2015-17	Griggs Co. WRD	Thompson Bridge Outlet No. 4 Project	10/6/2015	621,661	0	621,661
SWC	1520	5000	2015-17	Walsh Co. WRD	Walsh County Drain 30-1	3/29/2017	282,307	175,589	106,718
SWC	2087	5000	2015-17	Walsh Co. WRD	Drain #87/McLeod Drain	3/29/2017	5,273,586	209,634	5,063,952
SWC	1951	5000	2015-17	Maple River WRD	Lynchburg Channel Improvements	7/6/2016	1,131,338	0	1,131,338
SWC	1951	5000	2015-17	Maple River WRD	Lynchburg Channel Improvements	7/6/2016	23,412	0	23,412
SWC	1975	5000	2015-17	Walsh Co. WRD	Drain 31-1	10/12/2016	111,543	78,964	32,579
SWC	1978	5000	2015-17	Richland-Sargent Joint WRD	RS Legal Drain #1 Extension & Channel Improvement	3/29/2017	378,000	0	378,000
SWC	1990	5000	2011-13	Mercer Co. WRD	Lake Shore Estates High Flow Diversion Project	3/7/2012	43,821	0	43,821
SE	2016	5000	2015-17	Pembina Co. WRD	Establishment of Pembina County Drain No. 80	4/10/2017	74,965	39,404	35,561
SWC	2049	5000	2015-17	Grand Forks Co. WRD	Grand Forks Legal Drain No. 58	3/29/2017	1,481,850	0	1,481,850
SWC	2062	5000	2015-17	Traill Co. WRD	Traill Co. Drain #64	7/6/2016	19,549	13,729	5,820
SWC	2068	5000	2015-17	Traill Co. WRD	Stavanger-Belmont Drain No. 52 Channel Impr	10/12/2016	414,652	294,513	120,139
SWC	2080	5000	2015-17	Walsh Co. WRD	Sam Berg Coulee Drain	10/12/2016	182,775	82,374	100,401
SWC	2081	5000	2015-17	Walsh Co. WRD	Drain #70	10/12/2016	562,429	470,656	91,773
SWC	2088	5000	2015-17	Pembina Co. WRD	Drain No. 79	12/9/2016	875,428	441,671	433,757
SWC	2108	5000	2015-17	Walsh Co. WRD	Walsh Co Drain #22	6/22/2017	266,086	28,430	237,656
SE	2112	5000	2017-19	Pembina Co. WRD	Pembina Co Drain #81	7/30/2017	56,000	0	56,000
SE	2093/1427	5000	2015-17	Bottineau Co. WRD	Moen Legal Drain	9/6/2016	18,542	0	18,542
				Snagging & Clearing Projects:					
SWC	568	5000	2015-17	Southeast Cass WRD	Sheyenne River Snagging & Clearing Reaches I,II,III	12/9/2016	150,073	0	150,073
SE	662	5000	2015-17	Walsh Co. WRD	Park River Snagging & Clearing	2/17/2017	51,435	19,580	31,855
SE	1287	5000	2013-15	McHenry Co. WRD	Souris River Snagging & Clearing Project	2/3/2015	10,500	0	10,500
SE	1934	5000	2015-17	Traill Co. WRD	Elm River Snagging & Clearing	6/21/2017	47,500	19,803	27,697
SE	2095	5000	2015-17	Nelson Co WRD	Sheyenne River Snagging & Clearing	4/10/2017	19,700	0	19,700
SE	2110	5000	2015-17	Ward Co. WRD	Meadowbrook Snagging & Clearing	6/21/2017	33,000	0	33,000
					TOTAL		17,495,916	3,061,632	14,434,284
					SWC Board Approved to Continue				

STATE WATER COMMISSION
PROJECT SUMMARY
2017-2019 Biennium
Resources Trust Fund

COMPLETED WATER CONVEYANCE

Approved By	SWC No	Dept	Approved Biennum	Sponsor	Project	Approved Date	Total Approved	Total Payments	*Jun-18* Balance
SWC	568	5000	2013-15	Southeast Cass WRD	Sheyenne River Reaches Snagging & Clearing Project	12/5/2014	94,238	10,312	83,926
SWC	568	5000	2015-17	Southeast Cass WRD	Sheyenne River Snagging & Clearing Reaches II	12/11/2015	27,905	2,451	25,454
SWC	568	5000	2015-17	Southeast Cass WRD	Sheyenne River Snagging & Clearing Reaches I	12/11/2015	73,902	0	73,902
SWC	568	5000	2015-17	Southeast Cass WRD	Sheyenne River Snagging & Clearing Reaches III	12/11/2015	87,035	0	87,035
SE	571	5000	2013-15	Oak Creek WRD	Oak Creek Snagging & Clearing Project	3/30/2015	1,107	0	1,107
SWC	710	5000	2015-17	Maple River WRD	Upper Swan Creek Channel Improvement Project	10/6/2015	62,061	33,484	28,577
SWC	1179	5000	2015-17	Richalnd Co. WRD	Legal Drain #5 (Lateral 27) Reconstruction	3/9/2016	180,353	10,937	169,416
SWC	1231	5000	2015-17	Traill Co. WRD	Carson Drain No. 10 Channel Improvements	10/12/2016	141,322	110,912	30,410
SWC	1227	5000	2011-13	Traill Co. WRD	Mergenthal Drain No. 5 Reconstruction	9/15/2014	12,225	0	12,225
SWC	1891	5000	2015-17	Steele Co WRD	Drain No. 8 Channel Improvement	7/6/2016	2,599	2,599	0
SWC	1977	5000	2011-13	Dickey-Sargent Co WRD	Jackson Township Improvement Dist. #1	5/20/2015	447,653	106,287	341,366
SE	1978	5000	2015-17	Richland-Sargent Joint W	RS Legal Dam #1 - Pre-Construction Engineering	10/24/2016	13,680	13,680	0
SWC	2042	5000	2015-17	Bottineau Co. WRD	Haas Coulee Legal Drain Phase II	6/22/2017	86,361	86,361	0
					SNAGGING & CLEARING PROJECTS				
SE	1667	5000	2015-17	Traill Co. WRD	Goose River Snagging & Clearing	6/21/2017	47,500	43,811	3,689
					TOTAL		1,277,941	420,833	857,108

STATE WATER COMMISSION
PROJECT SUMMARY
2017-2019 Biennium
Resources Trust Fund

GENERAL PROJECTS

Jun-18

Approved By	SWC No	Dept	Approved Biennum	Sponsor	Project	Approved Date	Total Approved	Total Payments	Balance
				Hydrologic Investigations:					
SE	1400	3000	2015-17	Fireside Office Solutions	Document Conversion (Water Permit Scanning)	3/28/2018	21,125	19,899	1,226
SWC	2041	3000	2017-19	USGS	Stream Gage Joint Funding Agreement	12/8/2017	553,790	276,895	276,895
					Subtotal Hydrologic Investigations		***574,915***	***296,794***	***278,121***
				Devils Lake Basin Development:					
SWC	416-10	4700	2015-17	Operations	Devils Lake Outlet Operations	3/9/2016	10,027,973	3,569,657	6,458,316
SE	416-01	5000	2017-19	Devils Lake Basin Joint WRB	Board Manager	6/14/2017	60,000	0	60,000
					Subtotal Devils Lake Basin Development		***10,087,973***	***3,569,657***	***6,518,316***
				General Water Management:					
SE	274	5000	2015-17	City of Neche	Neche Levee Certification Project	3/21/2016	54,000	0	54,000
SE	390	5000	2015-17	Logan County WRD	Beaver Lake Dam Rehabilitation Feasibility Study	6/8/2016	16,076	0	16,076
SE	394	5000	2015-17	Golden Valley Co WRD	Odland Dam Rehabilitiation Feasibility Study	10/13/2016	13,220	11,418	1,802
SE	420	5000	2015-17	Hettinger Park Board	Mirror Lake Dam Emergency Action Plan	12/2/2016	24,400	12,827	11,573
SE	460	5000	2015-17	Griggs Co. WRD	Ueland Dam Rehabilitation Feasibility Study	5/20/2016	17,500	0	17,500
SE	477	5000	2015-17	Valley City	Mill Dam Rehabilitation Feasibilty Study	6/8/2016	15,073	12,136	2,937
SE	494	5000	2017=19	Nelson Co. WRD	McVille Dam Emergency Action Plan	5/3/2018	10,000	0	10,000
SE	512	5000	2015-17	Emmons County WRD	Nieuwsma Dam Emergency Action Plan	11/28/2016	7,532	812	6,720
SE	531	5000	2015-17	Benson Co WRD	Bouret Dam Rehabilitiation Feasibilitly Study	10/11/2016	12,118	10,109	2,009
SWC	551	5000	2015-17	McHenry Co. WRD	Buffalo Lodge Lake Outlet	6/22/2017	134,915	61,054	73,861
SE	561	5000	2015-17	City of Tioga	Tioga Dam EAP	5/20/2016	40,000	0	40,000
SE	667	5000	2017-19	Burke Co WRD	Northgate Dam 2 Emergency Action Plan	9/5/2017	26,396	0	26,396
SE	841	5000	2013-15	Maple River WRD	Garsteig Dam Repair Project	1/26/2015	18,661	0	18,661
SE	848	5000	2015-17	Sargent Co WRD	Tewaukon WS-T-1-A (Brummond-Lubke) Dam EAP	12/18/2015	12,016	0	12,016
SE	848	5000	2015-17	Sargent Co WRD	Tewaukon WS-T-7 (Nelson) Dam EAP	12/18/2015	12,180	0	12,180
SE	849	5000	2015-17	Pembina Co. WRD	Renwick Dam Emergency Action Plan	9/29/2015	2,212	0	2,212
SWC	980	5000	2015-17	Cass Co. Joint WRD	Rush River Watershed Detention Study	1/7/2016	127,697	8,879	118,818
SWC	980	5000	2013-15	Cass Co. Joint WRD	Swan Creek Watershed Detention Study PHII	3/11/2015	122,666	0	122,666
SWC	980	5000	2015-17	Cass Co. Joint WRD	Upper Maple River Watershed Detention Study	1/11/2016	128,039	40,131	87,908
SE	1059	5000	2017-19	Bottineau Co WRD	Baumann Legal Drain	3/7/2018	41,427	0	41,427
SE	1264	5000	2013-15	Barnes Co WRD	Little Dam Repurposing Feasibility Study	6/17/2015	12,385	0	12,385
SE	1270	5000	2015-17	City of Wilton	Wilton Pond Dredging Recreation Project	12/29/2015	35,707	0	35,707
SWC	1273	5000	2015-17	City of Oakes	James River Bank Stabilization	12/11/2015	262,500	67,457	195,043
SE	1289	5000	2015-17	McKenzie Co. Weed Board	Control of Noxious Weeds on Sovereign Land	4/10/2017	44,010	11,378	32,632
SWC	1301	5000	2015-17	Richland Co. WRD	North Branch Antelope Creek NRCS Small Watershec	3/9/2016	113,400	11,447	101,953
SE	1303	5000	2013-15	Sargent Co WRD	Gwinner Dam Improvement Feasibility Study Program	4/17/2015	20,181	0	20,181
SWC	1303	5000	2015-17	Sargent Co WRD	Shortfoot Creek Watershed Planning Program	3/9/2016	109,047	0	109,047
SE	1334	5000	2017-19	Traill Co WRD	Norway Drain No. 38	3/28/2018	61,917	8,982	52,935
SWC	1389	5000	2013-15	Bank of ND	BND AgPace Program	12/13/2013	170,365	120,000	50,365
SE	1396	5000	2017-19	USGS	Water Level Monitoring of Missouri River	9/7/2017	15,000	0	15,000
SWC	1401	5000	2015-17	Pembina Co. WRD	International Boundary Roadway Dike Pembina	7/20/2017	294,528	33,653	260,875
SE	1444	5000	2015-17	City of Pembina	Flood Protection System Certification	4/19/2016	1,657	0	1,657
SE	1453	5000	2015-17	Hettinger County WRD	Karey Dam Rehabilitation Feasibility Study	5/23/2016	6,853	0	6,853
SE	1625	5000	2015-17	Carlson McCain, Inc.	Ordinary High Water Mark Delineations Left Bank of M	12/2/2016	2,000	0	2,000
SWC	1851-01	5000	2015-17	ND State Water Commission	Drought Disaster Livestock Water Supply Assistance	2/8/2018	2,025,000	1,009,357	1,015,643
SWC	1859	5000	2017-15	ND Dept of Health	NPS Pollution	8/23/2017	200,000	91,955	108,045
SWC	1968	5000	2015-17	Garrison Diversion	MM 15 Irrigation Project	3/29/2017	321,781	228,166	93,615
SWC	1968	5000	2015-17	Garrison Diversion	MM 42L Irrigation Project	8/23/2017	937,207	343,469	593,738
SWC	2008	5000	2013-15	City of Mapleton	Recertification of Flood Control Levee System Project	4/12/2018	314,770	0	314,770
SE	2111	5000	2017-19	Maple River WRD	Davenport Flood Risk Reduction	7/20/2017	35,000	0	35,000
SWC	2050-68	5000	2017-19	Valley City	Valley City Membrane Replacement Project	2/8/2018	586,350	0	586,350
SE	2055	5000	2015-17	Red River Joint Water Resour	Lower Red Basin Regional Detention Study	7/17/2015	45,500	0	45,500
SWC	2059	5000	2015-17	Park River Joint WRD	North Branch Park River NRCS Watershed Study	10/6/2015	81,200	0	81,200
SWC	2060	5000	2015-17	Walsh Co. WRD	Forest River Watershed Study	4/10/2017	154,012	0	154,012
SWC	2065	5000	2015-17	Cass Co. Joint WRD	Lake Bertha Flood Control Project No. 75	3/9/2016	201,350	39,040	162,310
SWC	2066	5000	2015-17	Southeast Cass WRD	Sheyenne-Maple Flood Control Dist #1 Mitigation Impr	3/9/2016	169,201	0	169,201
SE	2070	5000	2015-17	Garrision Diversion Conservan	Mile Marker 42 Irrigation Project	5/20/2016	29,741	0	29,741
SE	2071	5000	2015-17	Foster County WRD	Alkali Lake High Water Feasibilitly Study	4/19/2016	4,830	0	4,830
SE	2072	5000	2015-17	Barnes Co WRD	Ten Mile Lake Flood Risk Reduction Project	6/8/2016	36,812	0	36,812
SWC	2074	5000	2015-17	City of Wahpeton	Flood Control - Levee Certification	7/6/2016	247,500	0	247,500
SWC	2074	5000	2015-17	City of Wahpeton	Breakout Easements	7/6/2016	265,000	0	265,000
SWC	2075	5000	2015-17	Ward Co. WRD	Second Larson Coulee Detention Pond	7/6/2016	602,307	0	602,307
SWC	2083	5000	2015-17	Pembina Co. WRD	Herzog Dam Gate & Catwalk Retrofit - Construction	10/12/2016	114,632	809	113,823
SE	2085	5000	2015-17	Adams Co WRD	Orange Dam Rehabilitation Feasibility Study	10/13/2016	10,770	1,930	8,840
SE	2089	5000	2015-17	Maple River WRD	Tower Township Improvement District No. 77 Study	12/19/2016	28,175	11,717	16,458
SE	2090	5000	2015-17	International Water Institute	River Watch Program	1/12/2017	24,150	11,944	12,206
SE	2090-02	5000	2017-19	International Water Institute	River of Dreams Program	6/6/2018	23,275	0	23,275
SWC	2096	5000	2015-17	Southeast Cass WRD	Sheyenne-Maple Flood Control Dist #2 Improvements	3/29/2017	1,035,358	43,943	991,416
SE	2099	5000	2017-19	City of Hunter	Hunter Dam Emergency Action Plant	2/22/2018	46,108	35,400	10,708
SWC	2107-01	5000	2015-17	City of Minot	Levee Repair & Bank Stabilization Project	6/14/2018	581,476	0	581,476
SWC	2107-02	5000	2017-19	City of Minot	Outfall Pipe Rehabilitation Project	6/14/2018	368,778	0	368,778
SE	2109	5000	2017-19	Logan County WRD	McKenna Lake Feasibility Study	6/21/2017	2,247	0	2,247
HB1020	2114	5000	2017-19	HDR Engineering	Economic Analysis-Flood Control & Conveyance Proje	12/28/2017	74,093	69,730	4,362
HB1020	2119	5000	2017-19	HDR Engineering	Life Cycle Cost Analysis Guidelines & Process Develo	12/28/2017	59,263	57,340	1,923
SE	1396-01	5000	2013-15	Troul, Raley, Montano, Witwer	Missouri River Recovery Program	11/17/2015	46,785	275	46,510
SE	1878-02	5000	2015-17	Maple-Steele Joint WRD	Upper Maple River Dam EAP	5/20/2016	12,800	0	12,800
SWC	1296	5000	2015-17	Pembina Co. WRD	Tongue River NRCS Watershed Plan	3/9/2016	104,703	24,055	80,648
SE	AOC/IRA	5000	2017-19	ND Irrigation Association	Water Irrigation Funding	10/3/2017	75,000	75,000	0
SWC	PS/IRR/LOW	5000	2017-19	Lower Yellowstone Irrigation D	Lateral W Irrigation Project	6/14/2018	692,500	0	692,500
SE	AOC/WEF	5000	2017-19	ND Water Education Foundatic	ND Water Magazine	8/2/2017	26,000	13,000	13,000

STATE WATER COMMISSION
PROJECT SUMMARY
2017-2019 Biennium
Resources Trust Fund

GENERAL PROJECTS

Approved By	SWC No	Dept	Approved Biennum	Sponsor	Project	Approved Date	Total Approved	Total Payments	*Jun-18* Balance
SWC	AOC/RRC	5000	2017-19	Red River Basin Commission	Red River Basin Commission Contractor	6/22/2017	200,000	50,000	150,000
SWC	AOC/ASS	5000	2017-19	Assiniboine River Basin Initiitial	ARBI's Outreach Efforts	6/22/2017	100,000	50,000	50,000
SE	PS/WRD/UPP	5000	2017-19	Upper Sheyenne River Joint W	USRJWB Operational Costs	6/20/2017	6,000	1,082	4,918
SE	PS/WRD/MRJ	5000	2017-19	Missouri River Joint WRB	MRRIC Terry Fleck	6/7/2017	45,000	18,140	26,860
SE	PS/WRD/MRJ	5000	2017-19	Missouri River Joint WRB	Board Operational Costs	6/7/2017	10,000	4,658	5,342
SE	PS/WRD/LOW	5000	2015-17	Lower Heart WRD	Lower Heart Flood Contral Study	5/10/2017	21,140	0	21,140
					Subtotal General Projects		*11,951,491*	*2,591,293*	*9,360,198*
					TOTAL		22,614,378	6,457,744	16,156,635
					SWC Board Approved to Continue				

STATE WATER COMMISSION
PROJECT SUMMARY
2017-2019 Biennium
Resources Trust Fund

COMPLETED GENERAL PROJECTS

Approved By	SWC No	Dept	Approved Biennum	Sponsor	Project	Approved Date	Total Approved	Total Payments	*Jun-18* Balance
					Hydrologic Investigations:				
SE	1396	3000	2017-19	USGS	Maintain Gaging Station East of Lisbon Sheyenne River	9/25/2017	10,500	10,500	0
SE	989	3000	2017-19	ND Dept of Health	Water Sampling Testing	9/25/2017	105,500	105,500	0
SWC	2041	3000	2015-17	USGS	Stream Gage Joint Funding Agreement	10/12/2016	136,028	136,028	0
					Subtotal Hydrologic Investigations		***252,028***	***252,028***	***0***
SWC	322	5000	2009-11	ND Water Education Fou	ND Water: A Century of Challenge	2/22/2010	36,800	35,000	1,800
SWC	346	5000	2015-17	Williams County WRD	Epping Dam Spillway Reconstruction	3/29/2017	19,499	19,439	60
SWC	347	5000	2009-11	City of Velva	City of Velva's Flood Control Levee System Certification	3/28/2011	32,497	32,497	0
SE	399	5000	2013-15	Barnes Co WRD	Kathryn Dam Feasibility Study	9/19/2014	12,742	7,061	5,681
SE	479	5000	2017-19	Morton Co Parks & Recre	Fish Creek Dam Rehabilitiation	10/4/2017	62,970	62,970	0
SWC	620	5000	2007-09	Lower Heart WRD	Mandan Flood Control Protective Works (Levee)	6/22/2017	15,000	14,855	145
SE	1296	5000	2013-15	Pembina Co. WRD	Bathgate-Hamilton & Carlisle Watershed Study	10/17/2013	6,726	6,726	0
SE	1303	5000	2015-17	Sargent Co WRD	Gwinner Dam Breach Project	3/21/2018	44,364	42,673	1,691
SE	1403	5000	2017-19	NDSU	ND Water Resource Institute grant student stipends	1/9/2018	25,000	25,000	0
SE	1418	5000	2015-17	City of Bisbee	Big coulee Dam EAP	5/10/2017	11,320	11,095	225
SWC	1523	5000	2015-17	Ward Co. WRD	Robinwood Bank Stabilization Project	10/6/2015	98,648	18,238	80,410
SWC	1638	5000	2009-11	Mutiple	Red River Basin Non-NRCS Rural/Farmstead Ring Dike Progr	6/23/2009	177,864	0	177,864
SWC	1705	5000	2011-13	Red River Joint Water Re	Red River Joint WRD Watershed Feasibility Study - Phase 2	9/21/2011	19,218	0	19,218
SE	1808	5000	2015-17	Steele Co WRD	Beaver Creek Dam Safety Inspection	5/23/2016	2,625	2,625	0
SWC	1932	5000	2015-17	Nelson Co. WRD	Michigan Spillway Rural Flood Assessment	3/9/2016	67,903	67,903	0
SWC	1968	5000	2013-15	Garrison Diversion	McClusky Canal Mile Marker 10 & 49 Irrigation Project	3/17/2014	51,614	0	51,614
SE	1974	5000	2015-17	USGS	Installation of 5 Rapid Deployment Gages in the Mouse River	3/23/2017	23,200	23,200	0
SE	1974	5000	2015-17	USGS	Regulated Streamflow Frequency for the Upper Souris River B	12/16/2016	12,367	12,367	0
HB1009	1986	5000	2017-19	ND Dept Agriculture	Wildlife Services 17-201	8/22/2017	125,000	125,000	0
SWC	1991	5000	2013-15	City of Lisbon	Sheyenne RIverbank Stabilization Project	9/15/2014	47,768	0	47,768
SE	2058	5000	2015-17	City of Grafton	Grafton Debris Removal Plan	4/10/2017	8,177	8,170	7
SE	2069	5000	2015-17	Center Township	Wild Rice River Bank Stabilization	4/19/2016	954	954	0
SWC	2074	5000	2015-17	City of Wahpeton	Toe Drain & Encroachment Project	7/6/2016	1,125,482	1,125,482	0
SWC	2073	5000	2015-17	Walsh Co. WRD	Oslo Area Ag Levee Feasibility Study	7/6/2016	71,701	71,683	18
SE	2076	5000	2015-17	Elm River Joint WRD	Elm River Dam #1 Modification Study	7/6/2016	9,503	9,503	0
SE	2078	5000	2017-19	Southeast Cass WRD	Raymond-Mapleton Township Imp Dist #76	7/20/2017	3,043	3,043	0
SE	2094	5000	2015-17	McLean Co WRD	Lower Buffalo Creek Flood Management Feasibility	6/7/2017	7,539	7,534	5
SE	2079-01	5000	2015-17	City of Williston	West Williston Flood Control	10/24/2016	39,900	39,900	0
SE	2114	5000	2017=19	HDR Engineering	LCCA & EA Guidance Workshop	5/17/2018	9,804	9,804	0
SE	AOC/MIS	5000	2017-19	Missouri RIver Advisory C	MRAC Startup Funding	8/3/2017	2,000	2,000	0
SE	AOC/WRD	5000	2015-17	ND Water Resource Distr	ND Water Managers Handbook	6/21/2017	24,750	24,750	0
SE	AOC/WEF/TO	5000	2017-19	ND Water Education Fou	Summer Water Tours	4/30/2018	2,500	2,500	0
SE	NDAWN	5000	2017-19	NDSU	NDAWN CENTER	3/13/2018	1,500	1,500	0
SWC	PS/WRD/ELM	5000	2013-15	Elm River Joint WRD	Dam #3 Safety Improvements Project	9/15/2014	5,672	0	5,672
					Subtotal General Projects		***2,205,650***	***1,813,472***	***392,178***
					TOTAL		2,457,677	2,065,499	392,178

Water Supply Bucket 2017-2019		
Bucket Total		**$120,125,000**
Obligated This Biennium	Grand Forks - Water Treatment Plant	$30,000,000
	Lake Agassiz Water Authority - Red River Valley Water Supply	$17,000,000
	Lincoln - Water Supply Main	$1,130,000
	Mandan - Sunset Reservoir Transmission Line	$3,135,000
	Mercer - McLean Sheridan Connection	$166,950
	Minot - Northwest Area Water Supply	$10,000,000
	New Town - Water Tower	$1,040,000
	State Water Commission - Southwest Pipeline Project	$6,300,000
	West Fargo - Brooks Harbor Water Tower	$1,950,000
	West Fargo - North Loop Connection	$510,000
	West Fargo - West Loop Connection	$1,110,000
	Western Area Water Supply - Phase 5	$20,000,000
	Williston - US Highway 2 Water Main	$434,400
	Williston - 9th Ave E Water Main	$246,000
	Williston - 18th St Water Main	$2,090,000
	Wing - Water Tower	$72,000
Remaining Balance		**$24,940,650**
Money Turned Back		$767,521
Remaining Balance		**$25,708,171**
August Agenda		$0
Remaining Balance		**$25,708,171**
Planned Yet This Biennium	Lake Agassiz Water Authority - Red River Valley Water Supply	$13,000,000
	State Water Commission - Southwest Pipeline Project	$10,700,000
Remaining Balance		**$2,008,171**

Rural Water Supply Bucket 2017-2019		
Bucket Total		**$27,000,000**
Obligated This Biennium	East Central Regional Water District - Grand Forks System	$4,150,000
	East Central Regional Water District - Traill System	$1,396,880
	Greater Ramsey Water District - Devils Lake Regionalization	$599,000
	North Prairie Rural Water District - Mountrail County	$6,516,000
	Southeast Water User District - Expansion System Wide	$2,749,000
	Stutsman Rural Water District - Phase 6 Pettibone	$2,100,000
	Walsh Rural Water District - System Improvements	$1,300,000
	North Prairie Rural Water District - Silver Spring Surrey	$133,380
	North Prairie Rural Water District - Reservoir 9	$1,114,620
	Cass Rural Water User District - Horace Tank	$26,950
	McLean-Sheridan Rural Water District - Turtle Lake Tower	$107,450
	Tri-County Rural Water District - McVille Connection	$103,250
Remaining Balance		**$6,703,470**
Money Turned Back		$952,515
Remaining Balance		**$7,655,985**
August Agenda	East Central Regional Water District - Agassiz WUD & Larimore	$746,545
	McLean-Sheridan Rural Water District - Turtle Lake	$2,271,000
	Tri-County Rural Water District - McVille Connection	$2,700,000
Remaining Balance		**$1,938,440**
Planned Yet This Biennium	Cass Rural Water User District - Horace Tank	$1,755,000
Remaining Balance		**$183,440**

Flood Control Bucket 2017-2019		
Bucket Total		**$136,000,000**
Obligated This Biennium	Mouse River Flood Control	$63,781,034
	Valley City Flood Control	$2,171,925
	Maple River WRD	$35,000
	Pembina Co. WRD	$56,000
	SE Cass WRD	$3,043
	Bottineau Co. WRD	$41,427
	Traill Co. WRD	$61,917
	Mapleton Re-Certification	$213,670
	Mandan Flood Control	$280,000
Remaining Balance		**$69,355,984**
Money Turned Back		$814,473
Remaining Balance		**$70,170,457**
Planned Yet This Biennium	Fargo Flood Control	$66,500,000
	Valley City Flood Control	$1,500,000
Remaining Balance		**$2,170,457**
Unplanned Flood Control	Sheldon Subdivision Levee	$323,570
	Lake McKenna	$56,129
	City of Belfield	$35,000
	City of Minot SWIF	$756,211
Pending Conveyance	Various	$1,916,530

General Water Management Bucket 2017-2019		
Bucket Total		**$15,750,000**
Obligated This Biennium	Garrison Diversion Unit, Mile 42 Irrigation	$937,207
	Drought Disaster Livestock Water Supply	$500,000
	Drought Disaster Livestock Water Supply	$200,000
	Drought Disaster Livestock Water Supply	$500,000
	Valley City Water Treatment Plant	$586,350
	Morton County WRD, Fish Creek Dam	$56,000
	Burke County WRD, Northgate Dam EAP	$26,396
	USGS Cooperative Hydrologic Monitoring	$553,790
	Water Sampling and Testing	$52,750
	Missouri River Water Level Monitoring	$15,000
	HDR Engineering - Economic Analysis	$74,093
	HDR Engineering - Life Cycle Cost Analysis	$59,263
	ND Irrigation Association	$50,000
	ND WEF, Water Magazine	$26,000
	Missouri River Advisory Council	$2,000
	Sheyenne River Gage - East of Lisbon	$10,500
	Wildlife Services - ND Dept. of Agriculture	$125,000
	Yellowstone Irrigation District	$692,500
Remaining Balance		**$11,283,151**
Money Turned Back		$342,416
Remaining Balance		**$11,625,567**
August Agenda	Kathryn Dam	$531,563
	Painted Woods Creek	$278,368
	Airborne Electromagnetic (AEM)	$425,000
Remaining Balance		**$10,390,636**
Planned Yet This Biennium	Devils Lake Outlet Operations	$5,000,000
	PMP Update	$500,000
Remaining Balance		**$4,890,636**

SWC Cost Share Policy Changes Summary

#	Sec	Change Made	Discussion
1	I	**Definitions** Definitions for "Water Conveyance Project", "Cost Share", "Grant", and "Loan" are provided in accordance with statutory language.	Provides conformity between policy and statute.
2	I-A	**Definition of Construction Costs** Added "water supply works" to the list of project types included in construction costs.	This was a suggestion from the League of Cities
3	I-F	**Engineering Selection Process** Old Language: "If cost-share is expected to be greater than $25,000, the local sponsor must follow the engineering selection process..." New Language: "If the total anticipated cost share from the State Water Commission for a specific project is anticipated to be greater than $1,000,000, the local sponsor must follow the engineering selection process..."	Raises the threshold for requiring an engineering selection process. With both the existing and proposed language, the selection process requirement is considered to have been satisfied if the sponsor has completed an engineering selection process for general engineering services in the last three years.
4	I-F	**Engineering Services** Replaces "project inspection" with "construction observation" in definition of construction engineering.	This is largely a housekeeping issue, using the descriptor more commonly used today.
5	I-G	**Definition of Improvements** Adds "...or redundancy..." to the definition of improvements.	This addition is in response to discussions during the sub-committee meetings.
6	I, II	**Definitions and Ineligible Items** Changed the outline so that these are two separate headings.	This was a suggestion from the Water Users Association.
7	II	**Ineligible Items** Prior Language: 1 Administrative and easement costs, including those related to permits;	Changes provide additional clarification of what constitutes ineligible administrative costs. Clarifies that it is the property and easement costs to the landowner that are ineligible and provides that the removal of vegetative

APPENDIX B

		2 Property acquisitions, property surveys, and legal expenses unless specifically identified as eligible within the Flood Recovery Property Acquisition Program, the Flood Protection Program, or the Water Retention Projects; 3 Work and costs incurred prior to a cost-share approval date, except for emergencies as determined by the Chief Engineer; 4 Project related operation and regular maintenance costs; 5 Funding contributions provided by federal, other state, or other North Dakota state entities that supplant costs; 6 Work incurred outside the scope of the approved study or project. Proposed Language: 1 Administrative costs, including salaries for local sponsor members and employees as well as consultant services that are not project specific and other incidental costs incurred by the sponsor. 2 Property and easement acquisition costs paid to the landowner unless specifically identified as eligible within the Flood Recovery Property Acquisition Program, the Flood Protection Program, or the Water Retention Projects; 3 Work and costs incurred prior to a cost-share approval date, except for emergencies as determined by the Chief Engineer; 4 Project related operation and regular maintenance costs; 5 Funding contributions provided by federal, other state, or other North Dakota state entities that supplant costs; 6 Work incurred outside the scope of the approved study or project. 7 The removal of vegetative material and sediment for water conveyance projects.	materials and sediment for water conveyance projects is ineligible in accordance with statute.
8	III-A	**Application Required** Added language to change the lead time required for consideration at a SWC meeting from 30 days prior to 45 days prior, "unless specifically exempted by the Chief Engineer".	This was discussed to allow time for sub-committee consideration while still providing some flexibility.

		Added a requirement for a map. Added the requirement for a specific timeline from preliminary study through final closeout. Added the specific requirement of documentation of an engineering selection process if cost share is anticipated to be greater than $1,000,000.	This was in response to the carryover issue.
9	III-C	**Review** Existing Language: If the Chief Engineer is satisfied that the proposal meets all requirements, the Chief Engineer will present the application along with a recommendation to the State Water Commission for its action. Proposed Language: If the Chief Engineer is satisfied that the proposal meets all requirements, the local sponsor will be asked to present the application, and the Chief Engineer will provide a recommendation to the State Water Commission for its action.	These proposed changes are in response to feedback received from the Commissioners.
10	III-C	**Chief Engineer Approval** Existing Language: The Chief Engineer is authorized to approve cost-share up to $75,000 and also approve cost overruns up to $75,000 without State Water Commission action. Proposed Language adds the following sentence: The Chief Engineer will respond to such requests within 60 days of receipt of the request. A final decision may be deferred if warranted by funding or regulatory considerations.	In response to suggestions from Commissioners.
11	III-D	**Notice**	

		New language provides that the Chief Engineer will provide local sponsors with a 10-day notice of their project being considered by the State Water Commission.	In response to suggestions from Commissioners.
12	III-E	**Agreement and Distribution of Funds** New paragraph added: The project sponsor must provide a progress report to the Commission at least once every four years if the term of the project exceeds four years. If a progress report is not received in a timely fashion or, if after a review of the progress report the Commission determines the project has not made sufficient progress, the Commission may terminate the agreement for project funding. The project sponsor may submit a new application to the Commission for funding for a project for which the Commission previously terminated funding.	This is in response to the statutory requirement for four year reviews.
13	IV	**Cost Share Categories** In the existing policy document there were seven cost share categories: Pre-Construction, Water Supply, Flood Control, Rural Flood Control, Recreation, Irrigation, and Bank Stabilization. The proposed outline includes six categories with Rural Flood Control and Bank Stabilization being sub- categories under a new category of Water Conveyance.	This change is proposed in light of the statutory language creating a "Water Conveyance" category which is defined as Rural Flood Control, Bank Stabilization and Snagging and Clearing.
14	IV-A	**Pre-Construction** Existing Language A. **PRE-CONSTRUCTION EXPENSES.** The State Water Commission supports local sponsor development of feasibility studies, engineering designs, and mapping as part of pre-construction activities to develop support for projects within this cost-share policy. Pre-construction expenses approved by the State Water Commission are cost-shared up to 35 percent. The following projects and studies are eligible. Proposed Language: A. **PRE-CONSTRUCTION EXPENSES.** The State Water Commission supports local sponsor development of feasibility studies, engineering designs, and mapping as part of pre-construction activities to develop support for projects within this cost-share policy. The following projects and studies are eligible.	The proposed language would result in the pre-construction engineering costs being eligible at whatever percentage the resulting construction would be eligible for rather than the current policy which only cost shares in pre-construction engineering at 35%.

15	IV-B	**Water Supply** Existing Language: 1 **WATER SUPPLY PROJECT.** The State Water Commission supports water supply efforts and will use a grant and loan program. The local sponsor may apply for water supply funding, and the application will be reviewed to determine project priority. Projects within category (1) may be considered for grant funding up to 75 percent cost-share. Projects in category (2) may be considered for grant funding up to 60 percent of cost-share. Grant funding within category (3) will be on a case-by-case basis. Projects within categories (1) through (4) may be considered for loan funding. After cost-share for grant funding has been determined, the local sponsor may be considered for loan funding in addition to the grant funding. The combination of grant and loan funding will not exceed 80 percent from the State Water Commission. (1) In most cases a 75% cost-share is intended to address improvements to meet primary drinking water standards or expansion into new rural water service areas. Factors considered include: (a) Connection of communities to the regional system as part of this expansion as determined by the Chief Engineer. (b) Willingness of water users at far reaches of the system to pay additional costs for water service as an indicator of greater need for access to water and local commitment in the project as determined by the Chief Engineer. (c) Affordable and sustainable water rate as determined by the Chief Engineer. Lower rates of cost-share up to 60% may be made available to address other necessary improvements in rural water systems as defined in I-D. (2) Supports improvements or connection of new customers within the existing service area of a municipal water system. Population growth and affordability may be used in prioritizing projects in this category. (3) Water treatment improvements that address impacts from other State Water Commission projects. Grant funding is based on level of impact as determined by the State Water Commission. (4) Addresses extraordinary repairs or replacement needs of a water supply system due to damages from a recent natural disaster.	Proposed changes are an attempt to simplify the language describing the split between those projects eligible for 75% funding and those eligible for 60% funding. This language is a compromise between feedback received from Commissioners and comments received from the public.

Debt per capita, either actual or anticipated, may be used as an additional determinant of financial need.

Water Depots for industrial use receiving water from facilities constructed using State Water Commission funding or loans have the following additional requirements:

a) Domestic water supply has priority over industrial water supply in times of shortage. This must be explicit in the water service contracts with industrial users.

b) If water service will be contracted, public notice of availability of water service contracts is required when the depot becomes operational.

c) A portion of the water supply at any depot must be available on a non-contracted basis for public access.

Proposed Language:

1 **WATER SUPPLY PROJECT.** The State Water Commission supports water supply efforts. The local sponsor may apply for funding, and the application will be reviewed to determine project priority. Projects within category (1) may be considered for cost-share funding up to 75 percent. Projects in category (2) may be considered for cost-share funding up to 60 percent. Cost-share funding within category (3) will be on a case-by-case basis. All projects may be considered for loan funding.

(1) In most cases a 75 percent cost-share is intended to address improvements to meet primary drinking water standards or expansion into new rural water service areas or connection of communities to the regional system.

(2) Up to a 60 percent cost-share is intended for projects to support improvements or connection of new customers within the existing service area of a municipal water system or other improvements to rural water systems **or connection of new rural customers located within the extra-territorial jurisdiction of a municipality.** Population growth and affordability may be used in prioritizing projects in this category.

		(3) Water treatment improvements that address impacts from other State Water Commission projects. Funding is based on level of impact as determined by the State Water Commission. Debt per capita, either actual or anticipated, may be used as an additional determinant of financial need. Water Depots for industrial use receiving water from facilities constructed using State Water Commission funding or loans have the following additional requirements: a) Domestic water supply has priority over industrial water supply in times of shortage. This must be explicit in the water service contracts with industrial users. b) If water service will be contracted, public notice of availability of water service contracts is required when the depot becomes operational. c) A portion of the water supply at any depot must be available on a non-contracted basis for public access.	
16	**IV-2**	**Flood Protection Program** Added the following language: The cost-share application must include the return interval or design flow for which the structure will provide protection. The Commission will calculate the amount of its financial assistance, based on the needs for protection against: One-hundred-year flood event as determined by a federal agency; The national economic development alternative; or The local sponsor's preferred alternative if the Commission first determines the historical flood prevention costs and flood damages and the risk of future flood prevention costs and flood damages, warrant protection to the level of the local sponsor's preferred alternative.	This language was added to make the policy consistent with statutory language from last session.

17	IV-2	**Storm Water Management** The following language was added: Storm water management is not an eligible cost-share category. In order to differentiate between a flood control project and storm water management, the Commission may reduce the cost-share provided by the percentage of the contributing watershed that is located within the community's corporate limits as calculated on an acreage basis	This language documents the approach that has been used to differentiate between storm water management and flood control projects.
18	IV-D	**Rural Flood Control** The following paragraph was added: A sediment analysis must be provided with any application for cost-share assistance for reconstruction of an existing drain. The analysis must be completed by a qualified professional engineer and must clearly indicate the percentage volume of sediment removal involved in the project. The cost of that removal must be deducted from the total for which cost-share assistance is being requested.	This language is intended to help us comply with the statutory requirement that sediment removal is an ineligible cost share item for water conveyance projects.
19	IV-F	**Irrigation** The following clarification was added: "The items eligible for cost-share are those associated with the off-farm portion of new central supply works... " The following sentence was added: "The Commission will only enter into cost share agreements with political sub-divisions, including irrigation districts, and not with individual producers."	This was intended to formalize a long-standing approach.

*Shaded items were approved by Commission on June 14

APPENDIX C

SWC PROJECT PRIORITIZATION GUIDANCE

Projects submitted during the project planning inventory process[I] that meet SWC cost-share eligibility requirements will be considered for prioritization. ~~Projects that do not meet local cost-share match requirements, (per SWC cost share policies), will be dropped to the next lowest priority category. Ineligible projects will be diverted toward alternative funding sources.~~ In the interest of strategically investing in the state's highest water development priorities, the Water Commission will give funding preference to projects designated as higher priorities for the first 12 months of each budget cycle.

ESSENTIAL PROJECTS *(No Priority Ranking)*

Agency operational expenses.

An imminent water supply loss to an existing multi-user system, an immediate flood or dam related threat to human life or primary residences, or emergency response efforts.

Existing agency debt obligations.

SWC project mitigation.

HIGH PRIORITY PROJECTS

Federally authorized water supply or flood control projects with a federal funding appropriation.

Federally authorized water supply or flood control projects that do not have a federal appropriation.

Corrects a lack of water supply for a group of water users or connects a city to a regional/rural system.

Corrects a violation of a primary water quality condition in a water supply system.

Addresses severe or anticipated water supply shortages for domestic use in a service area or city with rapid population growth ~~a three-year avg. population growth ≥ 3%~~.

Protects primary residences or businesses from flooding in population centers or involves flood recovery property acquisitions.

MODERATE PRIORITY PROJECTS

Dam safety and emergency action plans ~~repairs, reconstructions, or removals/breaches~~.

Expansion of an existing water supply system.

Levee system accreditations, ~~recertifications~~, floodwater retention, ~~emergency action plans~~, or flood protection ~~mitigation~~ property acquisitions.

Irrigation system construction.

~~Snagging and clearing.~~

New rural flood control projects.

Bank stabilization.

LOW PRIORITY PROJECTS

Studies, reports, analyses, surveys, models, evaluations ~~assessments~~, mapping projects, or engineering designs.[II]

Improvement or extraordinary maintenance of a water supply system.

~~Construction or~~ Improvement or extraordinary maintenance of rural flood control projects ~~drains, ditches, diversion channels, or outlets~~.

Recreation projects.

Individual rural and farmstead ring dike constructions.

Footnotes

I. All local sponsors are encouraged to submit project financial needs during the budgeting process. Projects not submitted as part of the project information collection effort may be held until action can be taken on those that were included during budgeting, unless determined to be an emergency that directly impacts human health and safety or that are a direct result of a natural disaster.

II. May be considered as a higher priority if the related project is of higher priority.

Disclaimer

This process is meant to provide guidance for prioritizing water projects during the budgeting process that may be eligible for cost-share assistance through the State Water Commission. Interpretation and deviations from the process are within the discretion of the state as authorized by the State Water Commission or Legislature.

APPENDIX D

NORTH DAKOTA
STATE WATER COMMISSION

North Dakota Guidance for Economic Analysis of Flood Control and Water Conveyance Projects

WWW.SWC.ND.GOV

900 EAST BOULEVARD AVE, DEPT. 770
BISMARCK, ND 58505-0850

2018

Table of Contents

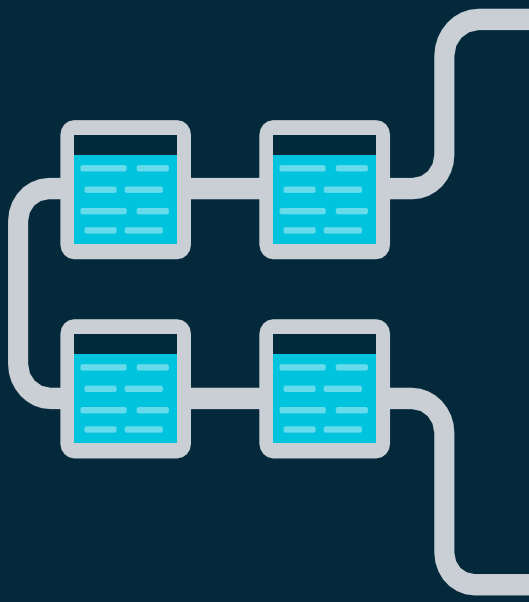
Preface

The North Dakota Guidance for Economic Analysis (EA) of Flood Control and Water Conveyance Projects was developed with a State Economic Development (SED) perspective in mind. SED analysis is concerned with incremental changes in the value of a good or service from the State of North Dakota's perspective, and the costs that bring about that change. SED analyses lead to project evaluation metrics such as benefit-cost ratios (BCR), Net Present Value (NPV), and others that enable projects to be compared and analyzed from the perspective of net value to the state. By Legislative mandate, these types of analyses have been determined to be appropriate and necessary – when the state is being asked to make investments as a cost-share partner.

NORTH DAKOTA
STATE WATER COMMISSION

1. Introduction and Overview

In 2017, the North Dakota Legislature required the State Water Commission (SWC) to include economic analysis in their project reviews and inform the SWC of such findings. In order that project sponsors and their consultants could conduct those analyses, the SWC prepared this guidance which is conceptually similar to Federal guidance but from the State's perspective.



1.1 Background - ND Legislation and Statutes

The 65th (2017) Legislative Assembly passed House Bill 1020 – the North Dakota State Water Commission's budget bill. Section 21 of that bill provided for a new section of North Dakota Century Code (NDCC), Chapter 61-03. Specifically, NDCC 61-03-21.4 requires:

> The State Engineer shall develop an economic analysis process for water conveyance projects and flood-related projects expected to cost more than one million dollars, and a life cycle analysis process for municipal water supply projects. When the State Water Commission is considering whether to fund a water conveyance project, flood-related project, or water supply project, the State Engineer shall review the economic analysis or life cycle analysis, and inform the State Water Commission of the findings from the analysis and review.

The 65th Legislative Assembly also passed HB 1374, providing definitions for "economic analysis" and "water conveyance project" in NDCC 61-02-02.

> *Economic analysis* means an estimate of economic benefits and direct costs that result from the development of a project.
>
> *Water conveyance* project means any surface drainage works, bank stabilization, or snagging and clearing of watercourses.

1.2 Purpose

Economic analysis (EA) is a critical element of water resources planning because it not only evaluates the economic justification of alternative plans but it can assist in plan formulation. Although economic analysis is traditionally performed by economists, the implications of the economic analysis (which often can dictate whether a project is implemented) make it

Steps in a procedure may be abbreviated by reducing the extent of the analysis and amount of data collected where greater accuracy or detail is clearly not justified by the cost of the plan components being analyzed (P&G, 1983, p. 19). The level of effort to determine efficiency (feasibility) of a project should be appropriate to the project scope/scale (P&R, 2013).

imperative that the concepts, methods, and tools used in the economic analysis be understandable to: a) the other specialists involved in feasibility studies, b) management who must make a decision concerning the proposed project, and c) the various stakeholders who are involved in the planning process and who will ultimately be affected by the project.

To meet the statutory requirements of NDCC 61-03-21.4, this document, *Guidance for Economic Analysis of Flood Control and Water Conveyance Projects*, has been developed to:

- Explain the EA concept (Section 2);
- Outline the basic elements of what is included in EA (Sections 3 & 4);
- Provide an overview of why EA is conducted, how it's used, and what is included; and
- Provide a process for conducting EA – from a North Dakota perspective (later referred to as SED) (Sections 4, 5, & 6).

The entire analytical process needs to be understandable in lay terms and implementable by project sponsors or their consultants. This requires simplification of widely available methods for economic analysis, which, in no way, reduces the efficacy of such analysis.

1.3 Federal and State Economic Analysis Guidelines

It is critical to understand Federal guidance, as many agencies (Federal and State) rely on Federal principles as a starting point for conducting economic analysis. Federal agencies engaged in water and related land resources development must follow the *Principles & Guidelines* (P&G, 1983). All other federal agencies must follow *Circular A-94: Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs* (published by the President's Office of Management and Budget, October 29, 1992). Federal agencies may supplement the P&G with their own guidelines and procedural manuals such as the NRCS Natural Resource Economics Handbook.

The P&G sets forth principles "…intended to ensure proper and consistent planning by federal agencies in the formulation and evaluation of water and related land resources implementation studies," and "…establish standards and procedures for use by federal agencies in formulating and evaluating alternative plans for water and related land resources implementation studies." Key elements include more detailed discussions of Federal planning standards (i.e., how to implement the P&G process) as well as specific concepts and procedures for computing benefits that are not typically expressed in monetary units, for example, municipal, industrial, and agricultural water supply; urban and agricultural flood damage; power (hydropower); and transportation (inland and deep draft navigation, recreation, and commercial fishing).

This guidance is for a State Economic Development (SED) model, similar to the NED, but from a state perspective.

Recommended approaches outlined in this document are consistent with the P&G but are focused on preparing economic analysis based on the benefits that contribute to the State of North Dakota's economic development. The P&G identifies four categories of benefits: National Economic Development (NED), Regional Economic Development (RED), Other Social Effects (OSE), and Environmental Quality (EQ). This guidance is for a State Economic Development

(SED) model, similar to the NED, but from a state perspective. It only includes direct, measurable benefits and costs, as specified by the Legislature. It does not include secondary benefits (federal RED), such as jobs created, gross business volumes (obtained using a multiplier), or tax revenues generated; since these are not part of an economic efficiency test.

2. Economic Analysis Methods and Measures

Economic analysis is a logical, systematic approach to finding the optimum use of the State's scarce resources (measured in dollar terms whenever possible), involving comparison of two or more alternatives in achieving a specific objective under the given assumptions and constraints. It explicitly considers the value of resources employed and attempts to measure the private and social costs and benefits of a project to the community or economy. Economic analysis takes a broader perspective, including, in principle, ALL benefits and costs to whomsoever they accrue (in State), whenever they accrue (in State, now or in the future) and wherever they accrue (in State) from the completion of a project.

The level of effort to carry out an EA varies from very little to extreme, depending on the availability of data, hydrologic models, and disciplinary professionals. Using secondary data, assumptions, and expert judgment, an EA can be done with little effort, yet still be defensible (the EA presented in section 5.2 and Appendix B uses this approach). At the other extreme, developing site specific data and refined hydrologic models can lead to a more precise outcome, but it may not be any more accurate, and the level of effort (and cost) could easily be 10x or even 100x more.

Several metrics resulting from economic analysis are useful for decision-making and may be used to help select the best of many projects, or to prioritize several, from the State's perspective.

2.1 Benefit to Cost Ratio (BCR)

The benefit-cost ratio sums the present values of total benefits and costs using a discount rate (see Section 3.2). Benefits and costs are then presented as a ratio with benefits as the numerator and costs as the denominator. A ratio greater than one (>1.0) indicates benefits exceed costs and the project is economically justifiable. SED benefits are estimated using the EA method described below, which is, in essence, a state-level BCR.

$$BCR = \frac{PVB}{PVC}$$

Where: *PVB present value of benefits*
PVC present value of costs

2.2 Least Cost Alternative (cost effectiveness)

Looking at just the cost side of an economic analysis will show which project has the lowest overall cost, but accomplishes the objective. Cost effectiveness measures need to be done by looking at alternatives that provide identical outcomes, or using a cost/unit output as the metric. (The companion State LCCA guidance is based on cost effectiveness.)

$$Least\ Cost = Lowest\ PVC$$

2.3 Net Benefits/Net Present Value (NPV)

The net benefits, or Net Present Value (NPV), is the difference between the present values of total benefits and costs of a project. To ensure fair comparisons, all benefits and costs are adjusted to present values using a discount rate. If the NPV is positive, the benefits of the project exceed its expected costs and the alternative is desirable relative to baseline conditions. A project is economically justified if the present value of its benefits exceeds the present value of its costs over the life of the project. One caveat to consider is that NPV shouldn't be used to compare different-sized projects.

$$NPV = PVB - PVC$$

2.4 Internal Rate of Return (IRR)

The Internal Rate of Return (IRR) is the discount rate that results in net benefits equaling the net costs (i.e., the "breakeven" point where BCR = 1.0, and NPV = 0.0). The IRR approach uses the NPV formulation to sum costs and benefits over time. However, the NPV is set equal to zero and the discount rate that equates benefits and costs is determined. The resulting discount rate can then be compared to the Federal discount rate or other rates of return on alternative investments.

$$IRR = \text{The Discount Rate That Makes } NPV \text{ Zero}$$

2.5 Payback Period

This is the number of years for project benefits to repay initial project costs. Or put another way, the number of years for the project to break even on the initial investment cost is the payback period. Obviously, the shorter the payback period the better. For example, if the BCR = 1.0, it takes the assumed life of the project (50 years) to repay the initial investment cost and reach a breakeven point. Alternatively, if the BCR is <1.0, the project never reaches a breakeven point between benefits and costs during the assumed analysis period of 50 years. When the BCR is >1.0, project costs are repaid in less than the assumed life of the project.

$$\text{Payback Period} = \text{When Cumulative } PVB = \text{Cumulative } PVC$$

3. Principles of Economic Analysis

There is only one widely accepted process for conducting economic analyses—Benefit-Cost Analysis. For all agencies (Federal and State) EA (BCA) guidelines are the same in principle, some are just more pedantic (i.e., detail oriented) than others. The Federal process is not inherently complicated, unless the problem being addressed or the alternatives are complicated. Furthermore, the P&G notes that the Federal EA process can be abbreviated where "greater accuracy or detail is clearly not justified by the cost of the plan components being analyzed." (P&G, 1983, p. 8)

EA is a conceptual framework that quantifies as many of the costs and benefits of a project in monetary terms as possible. Benefits represent the extent to which society and economies impacted by a project are made better-off through lower costs, fewer damages, or enhancements. In principle, any net increase in well-being (as measured by the summation of individual and society well-being changes) is a good thing, even if some groups within society are made worse-off. A project or proposal would pass the efficiency test if the benefits to some are large enough to compensate

Economics may be the dismal science, but it has been carefully developed as a scientific discipline since Adam Smith wrote The Wealth of Nations (1776). As a science, economics is replete with principles, concepts, and notions that may not be familiar to non-economists. Thousands of books and other manuscripts have been written to explain economic theory, so no simple explanation of complex concepts does them justice. Readers are encouraged to refer to other, more in-depth, sources if any of these principles are not clear to them.

the losses of others. Finally, EA is a forward-looking exercise, seeking to anticipate the well-being impacts of a project or proposal over its entire life-cycle. Future well-being changes are weighed against today's changes through discounting, which is meant to reflect society's general preference for the present, as well as broader inter-generational concerns.

3.1 State Economic Development (SED) Perspective

Perspective of value is important to consider since not all perspectives embrace similar values. Value may differ from individual to individual; from local to state to federal perspective; or from a user's to an owner's viewpoint. The SED analysis is concerned with incremental changes in the value of a good or service from the State of North Dakota's perspective and the costs that bring about this change. SED analyses lead to project evaluation metrics such as a benefit-cost ratio or net present value that enable projects to be compared from the perspective of net value to the State. Thus, SED in this guidance is seen from the State's perspective, but is comparable to NED from a Federal viewpoint.

3.2 Discount Rate and Present Value

An inherent problem in any evaluation or decision analysis is the difficulty of making value comparisons among projects that are not measured in common units. For example, dollars spent today are not equal to dollars projected to be spent in 20 years. To account for this, all future costs are converted to present value costs through a process known as discounting, which shows what a dollar received in 20 years, for example, is worth today. Discounting is accomplished using a discount rate selected to represent the time value of money. For the North Dakota EA guidance, the recommended rate is the annual discount rate published in USACE Economic Guidance Memorandum (EGM) Federal Discount Rate, table: Federal Discount Rates for Project Formulation and Evaluation.[1] The EGM is updated annually, and current federal rates should be used. For 2018, the federally approved discount rate is 2.75%.[2] Higher discount rates benefit projects with more costs incurred in the future, while lower discount rates benefit projects with more up-front costs. If the timing of costs is similar between projects, the discount rate has little effect on the economic analysis.

Benefits and costs are converted to present value using the following calculation:

$$PV = \frac{FV}{(1+r)^n}$$

Where:

PV present value of the cost or benefit
FV the future value of the cost or benefit
r the discount rate
n the current time period in years

In an EA framework where benefits and costs occur over the life of the project, total present value costs are obtained by summing the present value of each annual cost (Table 1). For example, consider a project with benefits occurring over 4 years. With a discount rate of 2.75%, the table below shows the calculation of present value in each year. The total present value benefit is $11,421 or the sum of the benefits in the last row.

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[1] *Economic Guidance Memorandum 18-01, Federal Interest Rates for Corps of Engineers Projects* https://planning.erdc.dren.mil/toolbox/library/EGMs/EGM18-01.pdf

[2] *More information on discounting and present value can be found in the CRS Report "Discount Rates in the Economic Evaluation of U.S. Army Corps of Engineers Projects." August 2016.* https://www.everycrsreport.com/reports/R44594.html

Table 1.

Year	1	2	3	4
Benefits	$5,000	$5,000	$1,000	$1,000
Discount Rate	2.875	2.875	2.875	2.875
Present Value Calculation	$PV = \frac{\$5000}{(1.0275)^1}$	$PV = \frac{\$5000}{(1.0275)^2}$	$PV = \frac{\$1000}{(1.0275)^3}$	$PV = \frac{\$1000}{(1.0275)^4}$
Present Value Cost	$4,866	$4,736	$922	$897

3.3 Separable Costs Remaining Benefits (SCRB)

Any separable component of an alternative that can stand alone without affecting the desired outcomes of the alternative should be analyzed separately. In other words, if a recreational add-on feature is not necessary for the project, the overall project benefits should not be used to economically carry an inefficient component. Each separable component must pass its own EA test.

3.4 Economic Analysis vs. Financial Analysis

Economic and financial analyses are not the same. Although both may be required to determine overall project feasibility and use some of the same data, they are conceptually different types of analyses and serve different purposes. The objective of economic analysis is to determine if a project represents the best use of resources over the analysis period (that is, the project is economically justified). The objective of financial analysis is to determine financial feasibility (that is, whether someone is willing and able to pay for a project). Financial analysis occurs as a separate effort, is a different process, and is outside the scope of this guidance process. The key differences between economic analysis and financial analysis are as follows:

Economic Analysis

- Although economic analyses can be evaluated from many different perspectives (e.g., individuals, communities), the State Water Commission is conducting these analyses from a statewide perspective.
- Evaluation period is the economic life of the project (50 years).
- Project benefits and capital and annual operation costs are estimated in uninflated (real) dollars.
- Benefits and costs are adjusted to show expected differences in their relative economic value over time.
- Economic discount rate is applied to account for time value of project costs and economic benefits (or avoided economic costs) produced by the project.
- Project inputs are valued at their economic opportunity cost – meaning alternatives are valued based on choosing one alternative over another and missing the forgone opportunity.
- Intensity of a project sponsors' desire for an alternative is NOT a factor in economic analysis.

Financial Analysis

- Evaluation is from the perspective of parties expected to pay their share of costs.
- Evaluation period is the time it takes to pay for the project (through special tax revenues or bond repayment – of 20 years, for example).
- Project costs are expected, and time wise monetary outlays are required to implement and operate the project.
- Project income and capital and annual operation costs are estimated in inflated (nominal, current) dollars.
- Expected interest rate of bonds sold to finance the project is used as the time value of project costs.
- Project inputs are valued at their purchase cost.
- Bond sale and service costs are included.

3.5 Avoid Double Counting

Since the value of some benefits can be expressed in more than one way; the model developed for the State (See Appendix) only includes one measure of value for each benefit (or cost) in the analysis. For example, the value of flood damage reduction on an acre of cropland, in principle, is equivalent to the increase in land value. Likewise, including both the reduction in flood insurance premiums and estimated physical damages to structures and contents would be double counting because flood insurance premiums represent a capitalized estimate of flood losses from living in a flood plain.

3.6 Economic Externalities

Externalities are the unintended side effects of an alternative on a third party not part of the decision process and can be either positive or negative. Positive externalities of a water impoundment project might be: (1) increased pollinator habitat that helps a neighboring bee farmer, or (2) improved downstream water quality outside of the study area. Negative externalities might be: (1) increased mosquito numbers that require additional control methods by neighbors, or (2) increased waterfowl or blackbird populations that lead to depredation in nearby crops. All of these externalities, as well as any others, should be included in an assessment of the alternative's costs and benefits.

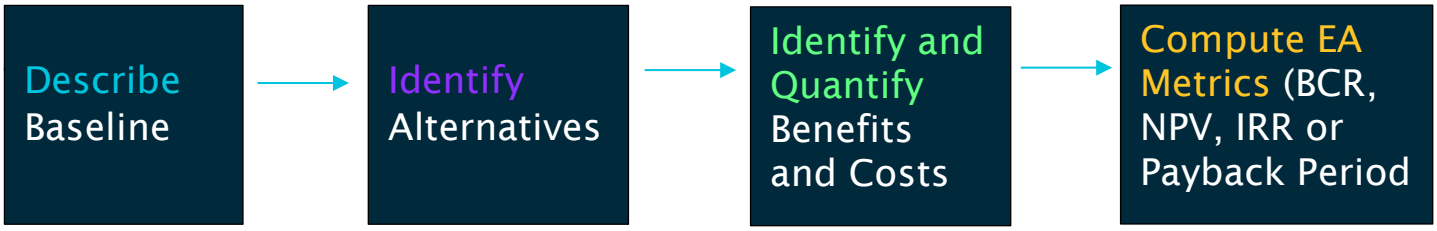
3.7 Sunk Costs and Existing Benefits

Sunk costs are monies spent on an alternative (or a component) prior to a current economic analysis, and are NOT to be included in forward-looking EA. Similarly, existing benefits are also NOT to be included in forward-looking EA. Only those added, future benefits that can be tied directly to implementation of an alternative are to be included.

4. Economic Analysis Process

There are four general steps in development of an Economic Analysis (Figure 1). Each of these steps is described in more detail below.

Figure 1.



4.1 Describe Baseline

In order to determine incremental impacts of a project alternative, it must be compared with a baseline, or the without project condition. Functionally, the without project scenario is existing reality prior to any investment into project alternatives. A clear definition of the baseline helps describe the issues and therefore how the proposed alternative may address the issues. The baseline begins by describing the current situation, but then continues to describe how future conditions will affect key parameters over the planning period.

The without project condition (i.e., baseline) is what would be expected to happen if a state-supported water management project were not to happen. It does not assume the status quo, but considers what locals would do about water management in the future without a state-assisted project.

Regarding adaptive management, we can assume someone attempting to produce crops on flood-prone land will cease their attempts if it is likely that the average of future attempts will result in negative returns. Likewise, we can assume that township officials will either abandon or drastically improve a culvert that washes out frequently. In other words, “without project” is not the same as maintaining the status quo.

The baseline should be consistent among multiple alternatives. The impacts of an alternative are based on changes from the baseline. Therefore, as long as multiple project alternatives are compared to the same baseline, the resulting impacts across alternatives will be consistently calculated and should allow for comparisons of EA measures (identified in Section 2).

4.2 Identify Alternatives

Project alternatives should be identified that are potential solutions to the flood control or water conveyance needs. For example, alternatives for urban flood damage reduction may include upstream impoundments, dikes and levees, buyouts, or watershed land management. Alternatives for rural flood damage reduction could be enhanced soil-water management, water conveyance projects, taking frequently flooded lands out of crop production, or impoundments to store floodwaters.

Alternatives should be specific, significantly different approaches to accomplishing the objectives. Merely scaling up, or down, one alternative does not create a separate alternative. Each alternative should be developed at its optimal scale/size by project sponsors and planners.

Alternative flood control and water conveyance projects are constructed to provide service to current and future generations. To account for this in an economic analysis framework, benefits and costs

are evaluated over an expected operational life of the project. The period of analysis is the length of time over which a project's consequences are included in a study. Typical analysis periods for flood control and water conveyance projects are 50 to 100 years. For the Economic Analysis Worksheets (See Appendix), the period of analysis of each alternative has been set at 50 years for all projects.

Within the analysis period, a base year must be identified which generally is when project construction/implementation occurs, and project benefits occur after the base year. The base year is usually called year 0 and subsequent years are numbered 1 through the end of the analysis period.

4.3 Identify and Quantify Benefits and Costs

The next step of economic analysis is to explicitly identify direct costs and direct benefits for each alternative.

- Direct benefits are a result of project implementation and are generally realized by a community or individual landowners.
- Direct costs are out-of-pocket costs to build and operate the alternatives.
- Secondary benefits are changes in jobs, additional gross business volumes (as measured by multipliers), and changes in tax revenue. These are not applicable to efficiency analysis and are not included in North Dakota's EA guidelines, as directed by State Statute.

Benefits and costs are first described in technical terms (e.g., acre, ton, day, ppm, sandbags) and then quantified in monetary terms. Benefits and costs that are qualitatively described are not included in EA calculations, but can be provided as narrative. Keep in mind that procedures used to estimate damages or potential enhancements need to be transparent, defensible, reasonable, and replicable. Another analyst following essentially the same steps, using the same or similar information, should reach approximately the same outcome. Also, when assumptions are necessary, they should be ballasted with strong supporting arguments. Assumptions should also be explicitly stated so they can be revised to fit others' valid opinions; with new results based on different, but plausible assumptions.

4.3.1 Flood Damage Reduction Benefits

A primary objective in flood damage reduction studies is to determine the Expected Annual Damage (EAD) along a river, stream or lake; taking into account all possible flood scenarios and to compare changes in the damage resulting from various alternative plans over the study period. EAD is approximately equivalent to an average annual damage estimate, taking into account all possible storm events that might occur, from very frequent to very infrequent. The determination of EAD in a flood management study must take into account interrelated hydrologic, hydraulic, geotechnical, and economic information. Specifically, EAD is determined by combining depth of flooding, percent of damage to structures and contents determined using depth-damage functions, elevation data for structures, and values for structures and contents.

4.3.1.1 Depth-Damage Functions (urban)

Depth-damage functions form the link between the engineering data inputs, and structure and contents values and elevations to determine the monetary value of flood damages. These functions identify the percentage of damage to the structure and contents for each stage of flooding. Functions for damages to residential property structures and contents were obtained from the *Corps Economic Guidance Memorandum EGM 0401.1*. Within the model explained in Appendix A, an aggregate depth-damage function for commercial and industrial properties in the study area was used based on curves obtained from the USACE Chicago District.

4.3.1.2 Cropland Inundation-Timing Crop Loss Function (rural)

Similar to depth-damage functions for structure damages, crop-loss functions are an important part of estimating damages to crop production from flooding. Crop loss functions estimate potential maximum crop loss according to crop growth stage, seasonality, and inundation duration. Crop loss functions are described in more detail in the *National Economic Development Procedures Manual – Agricultural Flood Damage*. A detailed procedure for cropland flooding EA is available at Leitch and Fritz (2018).

For example, inundation damages on cropland depend on the type of crop (e.g., corn, wheat, beans), inundation timing (e.g., pre-planting, growing season, harvest), and inundation duration (i.e., how many days the crop is under water). For example,

- A spring snowmelt flood will likely have no effect on the year's crop.
- A pre-planting flood may delay planting, resulting in some crop loss.
- A post-planting early emergence flood of 1 day may result in 13% to 15% loss of wheat, corn, and beets.
- A 3-day flood in the peak of the growing season may result in over 50% loss of crop revenue.
- A 6-day flood during the peak growing season will result in total crop loss for all crop types, except mature corn.

Tables are available for estimating these types of crop loss functions and are included in the Economic Analysis Worksheet (Appendix B), but they are generalized estimates of reality, especially at very site specific locations.

For flood control and water conveyance projects, benefits can include a broad spectrum of impacts - both direct and indirect. A selection of the typical and often monetized effects of these types of projects is shown in the table below. An important note is that these benefits, as they pertain to the State of North Dakota, are divided between urban and rural benefits categories. While, for example, structure damages would occur under both (flood mitigation benefits and rural structure damages), scale (number of structures) and the level of detail required for the analysis can be quite different. Urban flood mitigation benefits might encompass hundreds or thousands of structures, whereas a rural water conveyance project might include only a few structures. In addition, the detail available to conduct such an analysis for a rural project, e.g. information about flooding, including depths, duration, and frequency, may be more limited. Thus, the resulting level of detail in the analysis may be more limited than the urban flood damage assessment. In either case, the analysis should make best use of available data to monetize impacts to the extent possible.

Projects may protect existing development from flood damage and make flood-prone land more suitable for appropriate development. Typical benefit measurement techniques include reduction in costs (damages) associated with flooding. Commonly monetized flood mitigation benefits include, but are not limited to those outlined in Figure 2.

Figure 2. Categories of Flood Damages/Costs (Potential Benefits)

Benefits Area	Potential Benefits Categories
Urban	Flood Preparation
	Flood Fighting
	Flood Recovery
	Income losses
	Transportation Impacts
Rural	Structures and Infrastructure
	Cropland Damage
	Pasture Damage
	Enhancements (Recreation, Water Quality)
	Grade/Bank Stabilization

4.3.2 Enhancement Benefits

Flood damage reduction projects may result in benefits that are not merely reducing damages, but that are increases in natural resource-related outputs, such as increased recreational opportunities and water quality improvements.

4.3.2.1 Recreation Benefits

Alternatives may improve all forms of outdoor leisure activities associated with a water resource project. Typical benefit measurement techniques include values ($/user day) for recreation day activities and travel cost or contingent valuation methods. Specific information concerning how to estimate recreation benefits is found in the P&G (section 2.8). The analyst simply needs to estimate the net number of user days the project will produce. Once a flood control project is built, the enhancement benefits occur annually, without regard to flood frequency.

Consumptive Recreation

Consumptive recreation is that where the person recreating converts a natural resource to private use, such as harvesting a game bird or a fish, making it unavailable to other users. Considerable data are available on the values of various types of recreation. A meta-analysis for North Dakota-specific values indicates that a $113/user day is appropriate for water resources projects. [3]

Additional days of recreation at a project site are not project benefits if they are merely shifted away from nearby sites and do not add to the overall availability of recreation days. Only those recreation days that are net increases at the state level are legitimate project benefits.

Non-Consumptive Recreation

Non-consumptive recreation is that where the person recreating does not alter the amount of resources available to other participants, such as bird-watching, hiking, boating, or sightseeing. The value of a user day of non-consumptive recreation was found to be $153 in North Dakota.[3]

4.3.2.2 Water Quality Benefits

Flood control or water conveyance projects may be designed so as to improve water quality in a watercourse. The benefit would be improved quality for in-stream uses (e.g., aquatic species) and lower treatment costs for downstream water users. A secondary source has reported the benefit of reduced water pollution from some projects could be approximately $0.73/acre-foot of water impounded during flood events. [3]

[3] Leitch and Fritz. (2018)

4.3.3 Flood Damage Reduction Costs

Implementation of alternatives to reduce flood damages requires expenditures, both up-front and on-going. These costs are identified in the worksheets in Appendix A and B, but examples include construction; real estate; and planning, engineering, and design; as well as annual operations and maintenance (O&M) costs.

4.4 Compute EA Metrics

The next step is to develop a system to compute the desired EA metrics (BCR, NPV, etc.). The analyst is provided with a step-by-step model in Appendix A and B.

5. EA/SED in Practice

In practice, the North Dakota EA/SED process must be easy to implement, straightforward, and transparent. The State Water Commission receives funding requests for multiple types of projects. However, the only projects subject to the North Dakota EA/SED are: (1) urban and rural flood damage reduction, and (2) water conveyance projects – with a cost of one million or greater. For reasons that should become apparent below, these are treated as two separate (but comparable) procedures.

5.1 Urban Flood Damage Reduction

In practice, urban flood damage reduction projects are designed to eliminate flood damages up to, and including, a 100-year flood. Most urban areas have, over time, managed their flood plains to eliminate flood damages from 5-year, 10-year, 25-year, and 50-year floods. While there may be some natural resource enhancements from urban flood damage projects, they are a small part of the overall benefits.

5.1.2 Specific Benefits and Costs

The specific benefits for input into the EA Urban (U) model are reductions in costs associated with urban flood damage. These costs include physical damages to properties and infrastructure; reductions in temporary relocations (displacement costs) of families; and post flood cleanup costs. The EA (U) model also includes benefits associated with avoided flood fighting costs and increased travel time for the traveling public seeking alternative routes due to road closures. Finally, the framework also includes a value to society associated with mental well-being from reducing the risk of flooding to homeowners (peace of mind associated with knowing the home is at a lower risk of flooding).

The costs of each alternative (e.g., construction, O&M) are estimated by project planners, engineers, or cost estimators. Construction costs should include all up-front costs, including, but not limited to, design, right-of-way (ROW), actual construction, management and engineering during construction, and contingencies. O&M costs should include all anticipated future annual operation and maintenance costs. All of the aforementioned costs are worksheet inputs as seen in Appendix A.

5.2 Rural Flood Damage Reduction and Conveyance

Economic analysis for project planning purposes in small, rural watersheds also includes the four steps shown on page 11 (Describe Baseline, Identify Alternatives, Identify and Quantify Benefits and Costs, and Compute EA Metrics (BCR, NPV, IRR & Payback Period)). Anyone following these steps should adhere to the policies and principles in all applicable guidance documents. However, an experienced analyst can develop a defensible estimate without using all the detailed procedures and sophisticated modeling suggested in more rigorous guidance documents. An estimate is often done

without the benefit of refined hydrologic models, which are rarely available for small projects in rural areas.

Rural flood damage reduction is primarily implemented to protect cropland from high frequency flooding, such as 5-year, 10-year, and possibly 25-year floods. Rural flood damage protection for structures is typically at the 100-year recurrence level. Natural resource enhancements may be a substantial part of the benefits of rural flood damage reduction projects.

Typical projects in rural areas might be constructing legal drains, diverting or storing floodwaters, ring dikes and levees, and flood proofing infrastructure and utilities.

5.2.1 Specific Benefits and Costs

The costs of each alternative (e.g., construction, and O&M) are estimated by project planners. Construction costs should include all up-front costs, including, but not limited to, design, ROW, and actual construction. O&M costs should include all anticipated future annual operation and maintenance costs. If snagging and clearing or sediment removal are parts of O&M, their costs should be specified in the year(s) they will be conducted (e.g., years 12, 24, and 36). Costs are worksheet inputs as seen in Appendix B.

Benefits are a bit more complicated to estimate. For example, some project benefits occur only when floods occur (e.g., structure or infrastructure damage, and cropland losses), but others, such as enhancement benefits, occur every year once the project is complete. Three categories of benefits are included as worksheet inputs (Appendix B): (1) cropland and pasture, (2) structures and infrastructure, and (3) enhancements. Worksheets are provided that lead to estimates for input to the EA Rural (R) model.

6. Presentation and Comparison of Results

The worksheets in Appendix A and B will produce five EA measures demonstrated in the table below. The measures in Table 2 below are made up, but show that Alternative 1 is clearly the most efficient alternative. Alternative 3 is not efficient, since the total benefits are less than the total costs.

Table 2.

	BCR/EA/SED	*PVC (Least Cost)	NPV	IRR	Payback Period
Alternative 1	2.3	$3,340,000	$1,340,000	6.0	23 years
Alternative 2	1.5	$3,149,000	$1,050,000	3.9	35 years
Alternative 3	0.9	$2,962,000	Negative	2.4	65 years

Each of these economic analysis measures can be used to judge the feasibility of an alternative. The economic analysis requirement per NDCC 61-03-21.4 can be met by presenting any of the above results metrics.

Analysts are encouraged to use the set model values to maintain comparability across projects. However, set values may be changed to better fit local conditions, but adequate justification must be provided. Certain set values (e.g., discount rate, average annual cropland flood damages, recreation day values) will be adjusted by the SWC as better data become available or conditions change.

Epilogue

Given the current state of data and model availability with respect to North Dakota flood control and conveyance projects, numerous assumptions and generalizations were made in the model parameters. Over time, as these models are used by project sponsors, refinements may be suggested and data may improve, at which time the models can be upgraded. However, what is important with EA models is that they are used consistently across the state. If they are used consistently as they are provided, it will provide a valid and useful way to prioritize projects seeking state-level funding.

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NORTH DAKOTA
STATE WATER COMMISSION

Appendix A: Introduction to EA (Urban) Worksheet

This Appendix will take the user through the EA (Urban) model step by step, explaining where user inputs are required to estimate flood control benefits and where the model does internal calculations. The model itself is available for download at www.swc.nd.gov, then click on the "Project Development" tab.

Project sponsors, or more likely their consultants are encouraged to use the model if they so choose. Or, the steps outlined in Appendix A provide a detailed process of how to conduct EA for flood damage reduction projects in urban settings.

NOTE: User inputs are shown as ***bold-italics.***

STEP 1 Name the project and describe the alternative(s)

If using the fillable model/worksheets, proceed to the "**1 – Project Overview**" worksheet to begin information entry (Figure A1).

- ***Provide Contact Information***
- ***Name The Project*** (e.g., Bismarck Flood Control Project)
- ***Describe The Project, Problem, and Need Being Addressed***
- ***Identify The County or City Where the Project Is Located*** (This is necessary for basic informational purposes, and because the model makes some calculations based on county. If the project is located in more than one county, identify the county containing most of the study area.)
- ***Provide Population Served***
- ***Define Project Area***

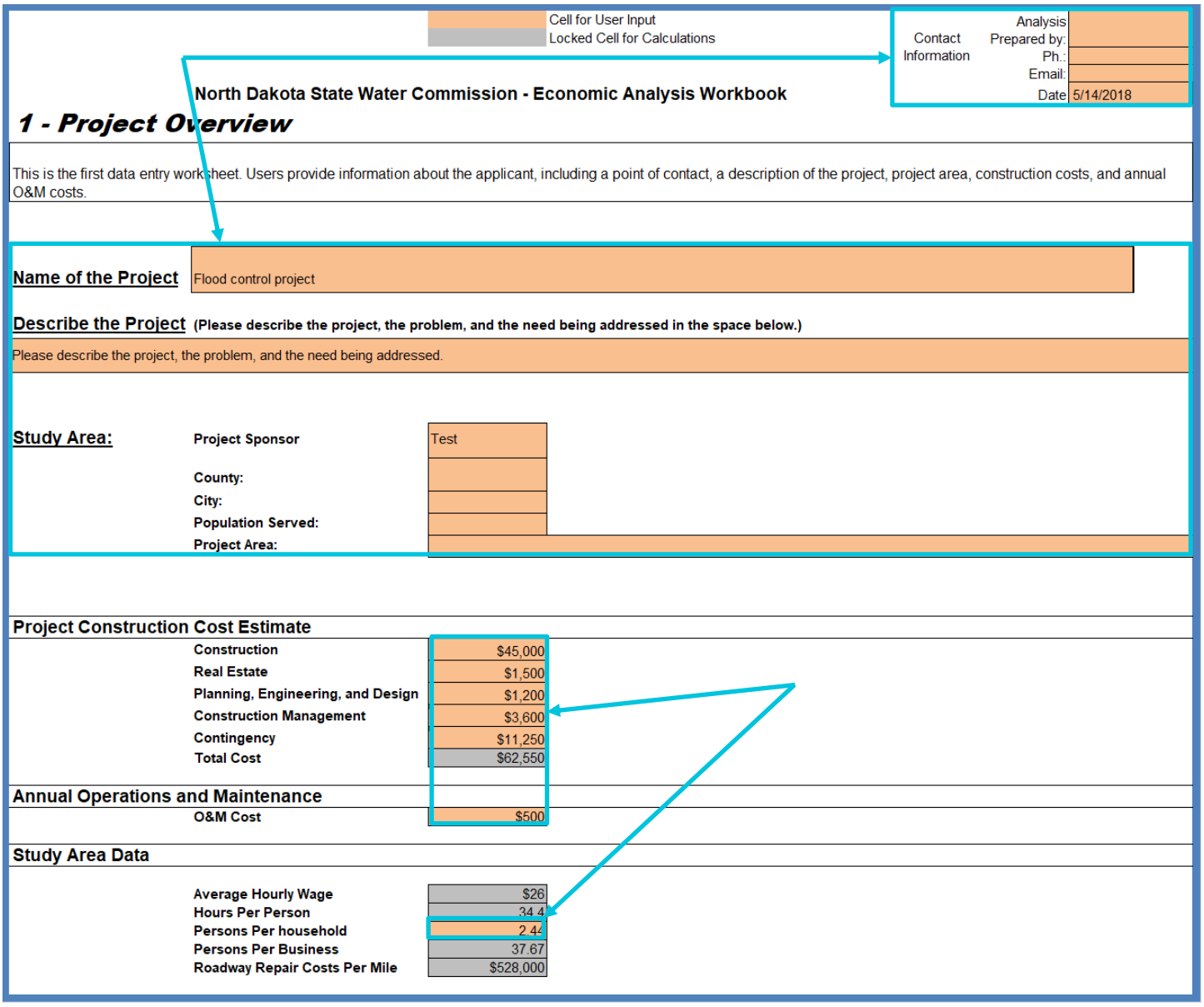
STEP 2 Identify and quantify costs

If using the fillable model/worksheets, continue entering information in the "**1 – Project Overview**" worksheet (Figure A1).

- ***Provide Construction Cost Estimate Information*** (This should include all upfront costs, including construction, real estate, planning, engineering, design, construction management, and contingencies.)
- ***Provide Operation and Maintenance Cost Estimates*** (This is an annual cost estimate.)
- ***Provide An Estimate of Persons Per Household*** (Within the study area.)

Please note, the model can evaluate one alternative at a time. If more than one viable alternative is being considered, a separate model should be created for each alternative and then a comparison should be done of the project metrics outside of the model. However, it may be most common at this phase (external funding request), to have one alternative developed into a project to move forward.

Figure A1: Project Overview Data Entry ("1 – Project Overview" Worksheet)



Cell for User Input
Locked Cell for Calculations

Contact Information
Analysis Prepared by:
Ph.:
Email:
Date 5/14/2018

North Dakota State Water Commission - Economic Analysis Workbook

1 - Project Overview

This is the first data entry worksheet. Users provide information about the applicant, including a point of contact, a description of the project, project area, construction costs, and annual O&M costs.

Name of the Project: Flood control project

Describe the Project (Please describe the project, the problem, and the need being addressed in the space below.)

Please describe the project, the problem, and the need being addressed.

Study Area:

Project Sponsor	Test
County:	
City:	
Population Served:	
Project Area:	

Project Construction Cost Estimate

Construction	$45,000
Real Estate	$1,500
Planning, Engineering, and Design	$1,200
Construction Management	$3,600
Contingency	$11,250
Total Cost	$62,550

Annual Operations and Maintenance

O&M Cost	$500

Study Area Data

Average Hourly Wage	$26
Hours Per Person	34.4
Persons Per household	2.44
Persons Per Business	37.67
Roadway Repair Costs Per Mile	$528,000

STEP 3 Describe the baseline

If using the fillable model/worksheets, proceed to the **"2 – Inputs"** worksheet to continue information entry.

In this step, users will describe the baseline (see section 4.1 of the guidance manual), which includes explanations related to the extent of existing flood and flood-related damages in the study area, and whether the proposed project will ameliorate them all or not. At this stage, the baseline contains several categories of DAMAGES, part of which will become BENEFITS in Step 4 below.

Flood-related damages include:

a. Physical damages to structures and contents;
b. Flood relocation costs;
c. Flood fighting (emergency) costs;
d. Transportation delays due to roadway inundation;
e. Social value of flood risk; and
f. Other damages due to flooding not included in a-e.

Data entry begins by specifying project parameters in the worksheet (Figure A2).

- ***Identify The Base Year*** (This is the beginning of the analysis period.)
- ***Identify The Years of Construction*** (This is the number of years required to construct the project.)

Figure A2: Initial Project Parameters Entry ("2 – Inputs" Worksheet)

2 - Inputs

This is the second data entry worksheet where users provide specific data necessary to estimate project benefits.

Locked Cell for Calculations

Cell for User Input

Category	Sub Category	Input	Units	Input Value	Definition of Term	Reference
Key Inputs	**Base Year**		Year	2018	Beginning year of analysis period	
	End Year		Year	2073	Ending year of analysis period	
	Project Life		Years	50	From construction start to end of analysis. Must be	
	Discount Factor		%	3%	Discount factor used for present value calculations	Discounting is the process of determining the
	Years of Construction		Years	5		

A major issue with estimating flood damage is the need for hydrologic and hydraulic models to develop flood damage curves. To estimate damages, flood depths or water surface profiles are needed for a range of recurrence intervals in order to compute an expected annual damage. If this data is not available or there are only a few structures being impacted, proceed to Appendix B, the EA(R) worksheet, and follow instructions to estimate damages for structures and infrastructure. Otherwise, data entry continues (Figure A3).

- ***Specify Four Recurrence Intervals*** (These will be used to evaluate damages.)
- ***Specify The Level of Protection Provided By The Project***

Figure A3: Entry of Recurrence Intervals and the Level of Protection ("2 – Inputs" Worksheet)

2 - Inputs

This is the second data entry worksheet where users provide specific data necessary to estimate project benefits.

Locked Cell for Calculations

Cell for User Input

Category	Sub Category	Input	Units	Input Value	Definition of Term	Reference
Key Inputs	Base Year		Year	2018	Beginning year of analysis period	
	End Year		Year	2073	Ending year of analysis period	
	Project Life		Years	50	From construction start to end of analysis. Must be	
	Discount Factor		%	3%	Discount factor used for present value calculations	Discounting is the process of determining the
	Years of Construction		Years	5		
Capital Investment	Project Costs		$	62,550.00		
	Annual Operations and Maintenance		$	500.00		
Flood Return Periods	Recurrence level	Interval 1	Years	10		
		Interval 2	Years	20		
		Interval 3	Years	50		
		Interval 4	Years	100		
		Level of Protection	Years	50		
Base Data	Residential Value Per SQFT		$/SQFT	93.62	Depreciated replacement value	Marshall and Swift, 2018, estimated for Bismarck ND

Figure A4: Entry of Lodging Costs ("2 – Inputs" Worksheet)

	Lodging Costs Per Day		$	80.00			
	Meal Costs Per Day		$	30.00			
Recreation	Consumptive Use	Users	#				
		Days	#				
		Value	$	113.00			
	Non-Consumptive Use	Users	#				
		Days	#				
		Value	$	153.00			
Travel Delays	Vehicles Per Day		#/Day				
	Normal Drive Time		Minutes				
	Detour Drive Time		Minutes				
	Duration of Roadway Closure		Interval	Without	With		
			10				
			20				
			50				
			100				

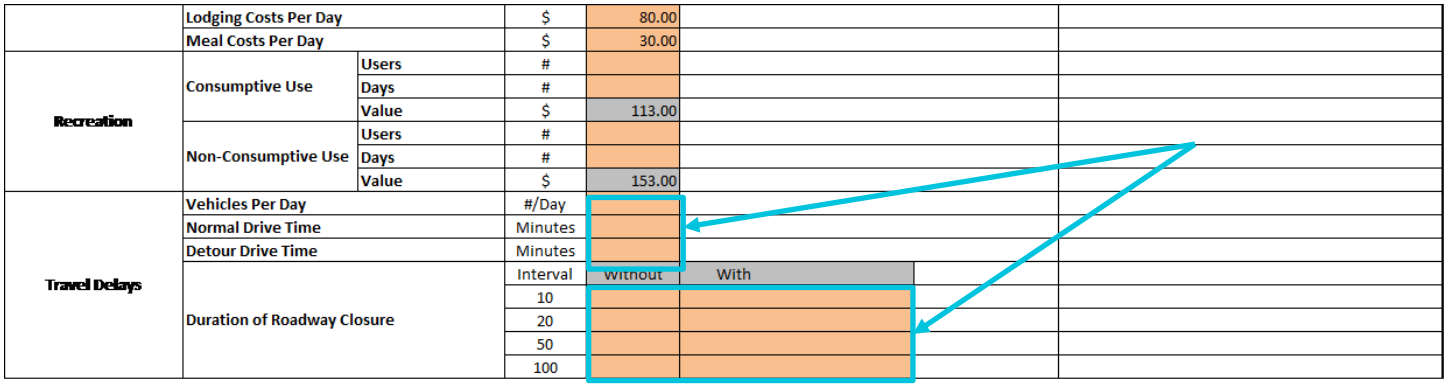
Transportation Delays Due to Roadway Inundation

Key inputs to estimate the impact of transportation delays due to flooding are ***average daily one way trips*** (vehicles per day or average annual daily traffic), ***normal drive time*** and ***drive time of the detour route***, ***and expected duration of road closure*** for each return period.

Vehicles per day and drive times for the preferred and detour routes are entered into the "**2 - Inputs**" worksheet.

- ***Estimate Transportation-related information, including Vehicles per Day, Normal Drive Times, Detour Drive Times, and Duration of Road Closure.*** These data can be sourced from a State DOT, transportation model, or other equivalent sources. Vehicles per day or average annual daily traffic can be obtained from traffic counters, state DOT, or other sources. Drive time can be estimated using the length of the route (normal and alternative) and the approximate vehicle speed. Finally the duration of the road closure should be estimated using either hydrologic information for timing of flood or some other method. Road closure duration should also include the time for cleanup and repairs of the road way.

Figure A5: Transportation Delay Data Entry ("2 – Inputs" Worksheet)



Duration of road closures are entered into the orange cells on the "**2 – Inputs**" worksheet. The model automatically computes transportation delay costs based on the route travel times, the value of time (1/2 the state wage rate) and average annual daily traffic.

Proceed to the "**4 – EA Urban Flood Damages**" worksheet to continue information entry related to structures in the project area.

Physical Damages to Structures and Contents

The worksheet computes flood control benefits at each structure from the difference between without and with project damages for each of four return periods. These individual structure flood control benefits are then aggregated to a comprehensive flood control benefit.

Estimating physical losses to structures and contents requires data from engineering and economics including:

- Engineering models - depth of flooding or water surface elevations and;
- Structure economic data - building square feet, occupancy category (e.g. 1 story with basement), value per square foot, and foundation height (above ground).

The EA (Urban) worksheet contains standardized values for value per square foot and foundation height. The user will need to select the appropriate Occupancy Category for each structure. Data is entered on the "**4 – EA Urban Flood Damages**" Worksheet (Figure A6).

- ***Select Occupancy Categories*** (for each structure).
- ***Input Structural Values*** (If structure values are unknown, enter the square footage. This will value the structure at $93.62 per square foot. This value was determined using the Marshall and Swift Estimator for residential structures.)

Figure A6: Entry of Structure Data ("4 – EA Urban Flood Damages" Worksheet)

4 - EA Urban Flood Damages

This is the final data entry worksheet. This worksheet is used to estimate urban flood damage reduction benefits. In this worksheet users provide information regarding individual structures to estimate urban flood damages. Necessary inputs include: structure type, square footage, building value, and depth of flooding.

Locked Cell for Calculations
Cell for user Input

						Existing - Pre Mitigation				Mitigation				10 yr - Without						
														Index Values for Damage Curves			Damage	Contents		Displace
Structure ID	Occupancy Category	Area (sqft)	Structure Value If Known	Structure Value ($1K)	Column Index	10 yr	20 yr	50 yr	100 yr	10 yr	20 yr	50 yr	100 yr	10 yr - Without - Flood Depth	10 yr - Without - DD Upper Index Range	10 yr - Without - DD Index Midpoint	10 yr - Without - Prop Damage	10 yr - Without - Contents	10 yr - Without - Contents CSVR	10 yr - Without - Displacement Days
1	2+ Story, with Basement	3000	$350,000	$350.00	4	0.50	2.00	3.00	4.00			3.00	4.00	-2.00	-1.00	0.00%	10.20%	0.00%	100.00%	0.00
2	1 Story, with Basement	4500		$421.29	3	0.50	2.00	3.00	4.00			3.00	4.00	-1.00	0.00	0.00%	19.40%	1.00%	100.00%	0.00
3	Apartment	4500	$750,000	$750.00	7	0.50	2.00	3.00	4.00			3.00	4.00	0.50	1.00	50.00%	5.50%	9.64%	38.00%	22.50
4	Public	10000	$1,500,000	$1,500.00	5	0.50	2.00	3.00	4.00			3.00	4.00	0.00	1.00	0.00%	0.00%	0.36%	66.00%	0.00
5	2+ Story, with Basement	2500	$245,000	$245.00	4	0.50	2.00	3.00	4.00			3.00	4.00	-2.00	-1.00	0.00%	10.20%	0.00%	100.00%	0.00

- ***Flood Depths (depth of flood water in relation to the ground level)*** at each structure should be entered (Figure A7).

Figure A7: Entry of Flood Depths ("4 – EA Urban Flood Damages" Worksheet)

4 - EA Urban Flood Damages

This is the final data entry worksheet. This worksheet is used to estimate urban flood damage reduction benefits. In this worksheet users provide information regarding individual structures to estimate urban flood damages. Necessary inputs include: structure type, square footage, building value, and depth of flooding.

Locked Cell for Calculations
Cell for user Input

						Existing - Pre Mitigation				Mitigation				10 yr - Without						
														Index Values for Damage Curves			Damage	Contents		Displace
Structure ID	Occupancy Category	Area (sqft)	Structure Value If Known	Structure Value ($1K)	Column Index	10 yr	20 yr	50 yr	100 yr	10 yr	20 yr	50 yr	100 yr	10 yr - Without - Flood Depth	10 yr - Without - DD Upper Index Range	10 yr - Without - DD Index Midpoint	10 yr - Without - Prop Damage	10 yr - Without - Contents	10 yr - Without - Contents CSVR	10 yr - Without - Displacement Days
1	2+ Story, with Basement	3000	$350,000	$350.00	4	0.50	2.00	3.00	4.00			3.00	4.00	-2.00	-1.00	0.00%	10.20%	0.00%	100.00%	0.00
2	1 Story, with Basement	4500		$421.29	3	0.50	2.00	3.00	4.00			3.00	4.00	-1.00	0.00	0.00%	19.40%	1.00%	100.00%	0.00
3	Apartment	4500	$750,000	$750.00	7	0.50	2.00	3.00	4.00			3.00	4.00	0.50	1.00	50.00%	5.50%	9.64%	38.00%	22.50
4	Public	10000	$1,500,000	$1,500.00	5	0.50	2.00	3.00	4.00			3.00	4.00	0.00	1.00	0.00%	0.00%	0.36%	66.00%	0.00
5	2+ Story, with Basement	2500	$245,000	$245.00	4	0.50	2.00	3.00	4.00			3.00	4.00	-2.00	-1.00	0.00%	10.20%	0.00%	100.00%	0.00

Flood depths can be obtained from a variety of sources including:

- Comparing FIRM mapping with topographical mapping, or
- Overlay of flood depth grids with structure locations.

NOTE: If a structure is not flooded at any recurrence interval, a value of -9 should be used.

Once this information is entered, the model will automatically compute baseline physical damages to structures by comparing flood inundation depths, with structure information, and depth-damage functions (see section 4.3.1.1 of the guidance manual).

Flood Relocation Costs

Regional studies from the US Army Corps of Engineers (USACE) have used flood relocation costs estimated at 7% of expected annual damages in lieu of specific FEMA relocation costs.[4] This percentage is applied here to estimate the costs of disaster relief. Flood relocation costs are automatically computed based on total physical damages initially computed in the worksheet.

Flood Fighting (Emergency) Costs

To estimate typical emergency costs, a survey of planning reports submitted to Head Quarters USACE (HQUSACE) by Corps Districts across the nation in recent years is applied in the model. This analysis found that emergency costs (flood fighting and volunteer costs, and EMS response impacts) claimed in approved Corps reports averaged about 9% of total EAD.[5] This value was used for this study's emergency cost valuation. Emergency costs are calculated on the total physical damages initially computed in the worksheet.

Social Value of Flood Risk

Finally, the framework also includes a value to society associated with mental well-being from reducing the risk of flooding to homeowners (peace of mind associated with knowing the home is at a lower risk of flooding). A value per household of $2.44 from FEMA's BCA Toolkit is used along with the number of residential structures damaged.[6] This benefit is automatically computed for each recurrence interval and the EAD is estimated in the worksheet.

STEP 4 Identify and input project benefits (changes in baseline) for each alternative

Project benefits are somewhat more complicated to estimate than project costs, since they require predicting an unknown future over the life of the project, a future that will likely change with or without a project. However, users already know the baseline level of damages from Step 2 above, which is the upper limit of flood damages that can be eliminated with a project. With each of the benefits categories from Step 3, the with project flood depths and durations should also be entered. The worksheets will automatically compute flood control benefits associated with those projects.

Flood control projects may have other benefits other than those described in the EA (Urban) portions of the worksheets. For example, if a flood control project contains a dam or reservoir, the project may in fact provide agricultural benefits or habitat enhancements downstream of the urban project extents. As noted in the guidance document, every effort should be made to monetize as many

[4] Based on information provided by USACE Omaha District and used in USACE Section 205 Studies, September 2017.

[5] Based on recommended values from USACE Omaha District for flood risk management studies, September 2017.

[6] BCA Reference Guide, Federal Emergency Management Agency, June 2009. https://www.fema.gov/medialibrary-data/20l-30726-1736-25045-7076/bca-reference-guide.pdf

benefits of the project as possible. For additional non-urban benefits please refer to the EA (Rural) benefits analysis covered under Appendix B.

STEP 5 Presentation and comparison of results

When users have completed Steps 1 through 4, the model will have available a number of results in an output table. The results are found in "**5 - Results Summary**" and "**6 – EA Detail**". In "**5 - Results Summary**" users are presented with a breakdown of the total present value and average annual benefits and costs of the project. The estimated benefits and costs are combined into four project performance metrics: Benefit-to-Cost Ratios, Net Benefits, Internal Rate of Return (IRR), and Payback Year. The use of these metrics is described in more detail in the main guidance document.

In "**6 – EA Detail**", users are able to see the annual calculations for costs and benefits. The costs and benefits are shown in both undiscounted (real monetary terms) and converted to present value (discounted). The sheet also provides the total present value sum of the costs and benefits.

Figure A8: Results Summary ("5 – Results Summary" Worksheet)

5 - Results Summary

This worksheet serves as the summary for all outputs created in the model. For the given inputs, the Results Summary provides an overview of present value and average annual benefits and costs. The Results Summary also presents project performance metrics including: Benefit-to-Cost Ratios, Net Benefits, Internal Rate of Return, and Payback Year.

Scenario Analysis - Benefit Summary

Urban Flood Control Benefits	Present Value ($1K)	Average Annual ($1K)
Flood Mitigation Benefits	$50	$2
Flood Relocation	$4	$0
Travel Time Delays	$0	$0
Flood Fighting	$5	$0
Social Benefits	$1	$0
Subtotal	$59	$2

Rural Flood Conveyance Benefits		
Recreation Benefits	$0	$0
Consumptive	$0	$0
Non-Consumptive	$0	$0
Rural Flooding Benefit	$0	$0
Bank Erosion Benefit	$0	$0
Cleanup Cost Benefit	$0	$0
Sediment Removal Benefit	$0	$0
Stored Water Benefit	$0	$0
Detour Benefit	$0	$0
Total Rural Mitigation Benefits	$0	$0
Subtotal	$0	$0
Grand Total	$59	$2

Project Costs	Present Value ($1K)	Average Annual ($1K)
Capital Costs	$59	$2
Annual O&M	$12	$0
Total	$71	$3

Project Performance Metrics	Present Value ($1K)	Average Annual ($1K)
Benefit-to-Cost Ratio	0.84	
Net Benefits	-$12	$0
Internal Rate of Return	2%	
Payback Year	35	

Appendix B: Introduction to EA (Rural) Worksheet

This Appendix will take the user through the EA (Rural) model step by step, explaining where user inputs are required and where the model does internal calculations. The model itself is available for download at www.swc.nd.gov, then click on the "Project Development" tab.

Project sponsors, or more likely their consultants are encouraged to use the model if they so choose. Or, the steps outlined in Appendix B provide a detailed process of how to conduct EA for flood damage reduction or water conveyance projects in rural settings.

NOTE: User inputs are shown as ***bold-italics.***

STEP 1 Name the project and describe the alternative(s)

If using the fillable model/worksheets, proceed to the "**1 – Project Overview**" worksheet to begin information entry (Figure B1).

- ***Provide Contact Information***
- ***Name The Project*** (e.g., Cass County Drain #23)
- ***Describe The Project, Problem, and Need Being Addressed***
- ***Identify The County or City Where the Project Is Located*** (This is necessary for basic informational purposes, and because the model makes some calculations based on county. If the project is located in more than one county, identify the county containing most of the study area.)
- ***Population Served***
- ***Project Area***

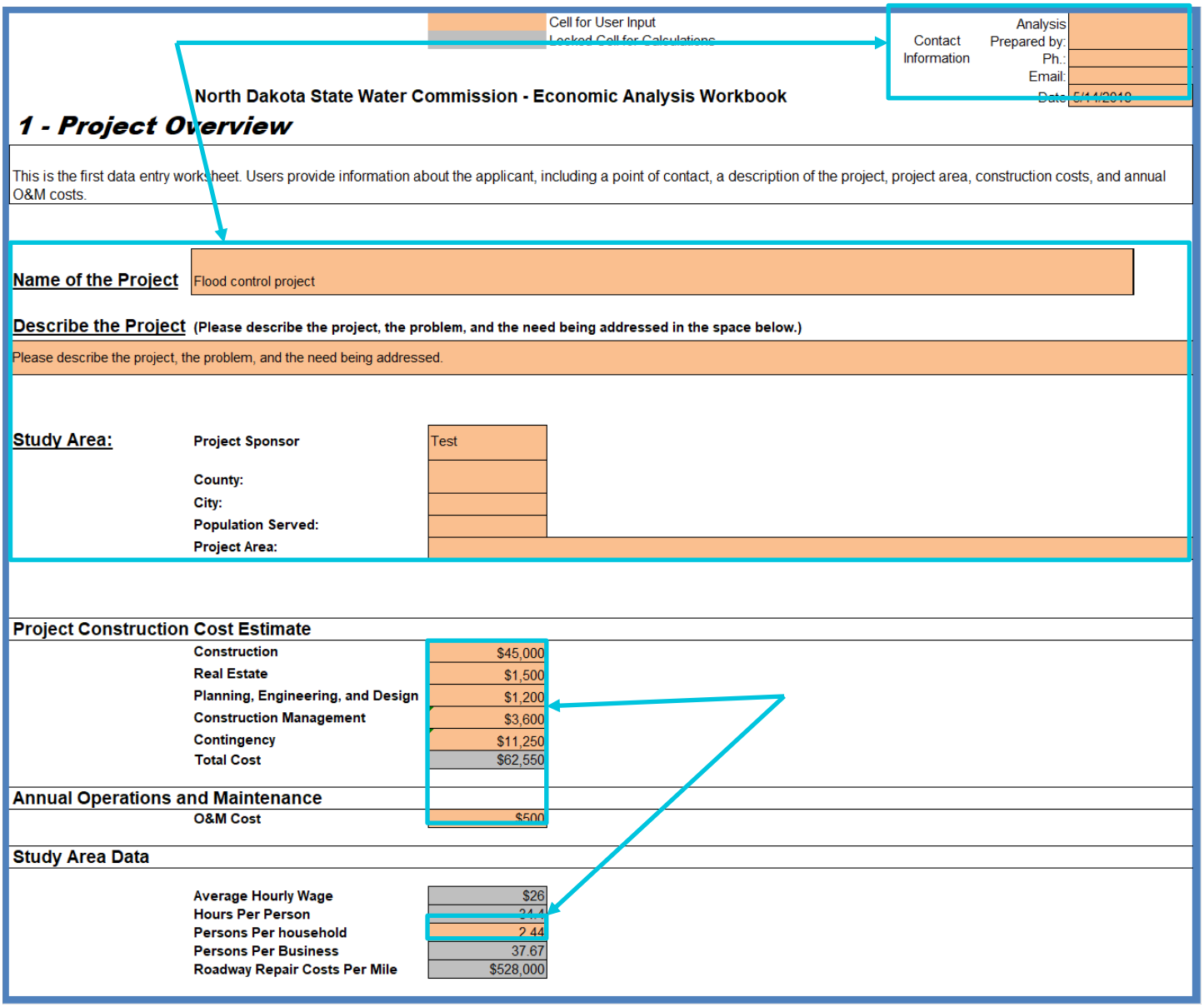
STEP 2 Identify and quantify costs

If using the fillable model/worksheets, continue entering information in the "**1 – Project Overview**" worksheet (Figure B1).

- ***Provide Construction Cost Estimate Information*** (This should include all upfront costs, including construction, real estate, planning, engineering, design, construction management, and contingencies.)
- ***Provide Operation and Maintenance Cost Estimates*** (This is an annual cost estimate.)
- ***Provide An Estimate of Persons Per Household*** (Within the study area.)

Please note, the model can evaluate one alternative at a time. If more than one viable alternative is being considered, a separate model should be created for each alternative and then a comparison should be done of the project metrics outside of the model. However, it may be most common at this phase (external funding request), to have one alternative developed into a project to move forward.

Figure B1: Project Overview Data Entry ("1 – Project Overview" Worksheet)



STEP 3 Describe the baseline

If using the fillable model/worksheets, proceed to the "**2 – Inputs**" worksheet to continue information entry.

In this step, users will describe the baseline (see section 4.1 of the guidance manual) which includes explanations related to the extent of existing flood and flood-related damages in the study area, and whether the proposed project will ameliorate them all or not. At this stage, the baseline contains several categories of DAMAGES, part of which will become BENEFITS in Step 4 below.

Rural flood-related damages include:

a) Losses to production agriculture on flooded cropland and pasture;

b) Damages to inundated structures, infrastructure, and associated transportation costs;

c) Damages to water management infrastructure (i.e., ditches); and

d) Other damages due to flooding not included in a-c.

Data entry begins by specifying project parameters in the worksheet (Figure B2).

- ***Identify The Base Year*** (This is the beginning of the analysis period.)
- ***Identify The Years of Construction*** (This is the number of years required to construct the project.)

Figure B2: Initial Project Parameters Entry ("2 – Inputs" Worksheet)

2 - Inputs

This is the second data entry worksheet where users provide specific data necessary to estimate project benefits.

Locked Cell for Calculations

Cell for User Input

Category	Sub Category	Input	Units	Input Value	Definition of Term	Reference
Key Inputs	Base Year		Year	2018	Beginning year of analysis period	
	End Year		Year	2073	Ending year of analysis period	
	Project Life		Years	50	From construction start to end of analysis. Must be	
	Discount Factor		%	3%	Discount factor used for present value calculations	Discounting is the process of determining the
	Years of Construction		Years	5		

Losses to Production Agriculture on Flooded Cropland

To enter information related to losses to production agriculture on flooded cropland, proceed to the "**3 – EA Rural Flood Damages**" worksheet.

A major issue with estimating flood damage in rural areas is an almost complete absence of appropriate small-scale hydrologic models to develop crop-inundation damage curves. As such, this guidance will use an average-annual-flooded-acre damage estimate taken from secondary sources (Leitch and Fritz, 2018). The damage to each acre of cropland flooded is $100 for every flood event after spring snowmelt (in east central North Dakota). This value was developed for use in Norman County, Minnesota, which is adjacent to Traill and Cass counties in east central North Dakota. The model generates county-specific dollar damage/cropland acre estimates.

In the absence of stage-damage curves, users must estimate the total acres flooded under each flood frequency (Figure B3). The model will compute the average annual acres flooded and subsequent damages.

- ***Estimate and Enter Total Acres Flooded Under Each Flood Event*** (without the project).

The area flooded will likely contain non-cropped areas, wetlands, roads, and farmsteads.

Users enter their best estimates of cropland and pasture acres, within the total area flooded, that are flooded under each flood event. For example, it is possible that no cropland is located within the 2-year floodplain.

Figure B3: Total cropland and pasture acres flooded at different flood frequencies without the project(s) ("3 – EA Rural Flood Damages" Worksheet)

Total Pasture and Cropland Damages For Existing or Without Project											
Flood Event/ Probability		Total Acres Flooded	Cropland Acres Flooded	Pasture Acres Flooded	Cropland Flood Frequency	Pasture Flood Frequency	Average Annual Acres Flooded	Average Annual Cropland Damages	Average Annual Pasture Damages	Average Annual Damages
2-year/0.5	0.5				0	0	0	-	-	$0.00
5-year/0.2	0.2				0	0	0	-	-	$0.00
10-year/0.1	0.1				0	0	0	-	-	$0.00
25-year/0.04	0.04				0	0	0	-	-	$0.00
50-year/0.02	0.02				0	0	0	-	-	$0.00
100-year/0.01	0.01				0	0	0	-	-	$0.00
Without Project Total										**$0.00**

With the above information completed and input into the worksheet by the user, the model multiplies the flood frequency probability by the acres flooded and sums across frequencies to get average-annual-acres-flooded for both cropland and pasture. These sums are then internally multiplied by the county-specific annual values for flooded cropland and pasture (each adjusted for county) which is the baseline total annual value of cropland and pasture flood damage. The annual value is then internally multiplied by the present value multiplier for 50 years to get the present value of the baseline damages over the project period.

Damages to Inundated Structures, Infrastructure, and Detours

To enter information related to damages to inundated structures, infrastructure, and detours, continue data input in the **"3 - EA Rural Flood Damages"** worksheet.

- ***Enter The Number of Farmsteads Flooded*** (without the project).

In the absence of stage-damage information, baseline farmstead (houses, outbuildings, and grain bins) flood damage is based on the number of farmsteads flooded at each flood-frequency. It is unlikely there would be any structures or infrastructure flooded at high frequency events (i.e., 2-year, 5-year), but the user determines if there are any.

The number of farmsteads entered by the user is internally multiplied by $1,250 to arrive at the average annual farmstead damage. The $1,250 comes from a rural watershed flooding study in Norman County (Leitch and Fritz, 2018). The model-generated average-annual number is then converted to present value within the model.

Figure B4. Baseline Farmsteads Without the Project(s) ("3 - EA Rural Flood Damages" Worksheet)

Flood Event/ Probability		Farmsteads Flooded	
		Number of Farmsteads Flooded	Annual Farmstead Damages
2-year/0.5	0.5		$0.00
5-year/0.2	0.2		$0.00
10-year/0.1	0.1		$0.00
25-year/0.04	0.04		$0.00
50-year/0.02	0.02		$0.00
100-year/0.01	0.01		$0.00
			$0.00

Baseline infrastructure damages are based on TOTAL flooded acres (which has already been entered). For every 1,000 acres flooded, there is an average annual infrastructure damage of $500 (Leitch and Fritz, 2018). That annual average is multiplied by the present value multiplier to get the

50-year total. If site specific conditions indicate there is more, or less, infrastructure damage, the user will enter that number in place of $500, but justification is required to make that change.

Baseline detour costs are calculated in the model by multiplying miles x vehicles x days of detour x Federal mileage rate, plus total miles/30 x local labor rate for detour time.

Damages to Water Management Infrastructure (i.e., ditches)

"Without project" flooding can lead to ditch bank sloughing and erosion. The expected length of bank erosion during each flood event is entered into Figure B5 and the input worksheet. The model computes an average annual bank erosion factor, assigns a value of $40/foot for repair, and computes the present value over the 50-year project life. The value of $40/foot is from recent bank repair projects in North Dakota.

- ***Enter Feet of Bank Erosion*** (without the project).
- ***Enter Feet of Snagging and Clearing*** (without the project).
- ***Enter Feet of Sediment Removal*** (without the project).

Figure B5. Irregular Project Cost Data Entry ("3 - EA Rural" Worksheet)

Flood Event/ Probability		Bank Erosion		Cleanup		Sediment Removal	
		Feet of Bank Erosion	Annual Erosion Damage	Length Snagging & Clearing	Annual Clearing Costs	Sediment Removal	Annual Sediment Removal Costs
2-year/0.5	0.5		$0.00		$0.00		$0.00
5-year/0.2	0.2		$0.00		$0.00		$0.00
10-year/0.1	0.1		$0.00		$0.00		$0.00
25-year/0.04	0.04		$0.00		$0.00		$0.00
50-year/0.02	0.02		$0.00		$0.00		$0.00
100-year/0.01	0.01		$0.00		$0.00		$0.00
			$0.00		**$0.00**		**$0.00**

Without project detour costs are calculated in the model by multiplying miles x vehicles x days of detour x Federal mileage rate, plus total miles/30 x local labor rate for detour time. In the **"3 – EA Rural"** worksheet:

- ***Enter the Length of Detour in Miles*** (without the project).
- ***Enter the Number of Vehicles Detoured*** (without the project).
- ***Enter the Number of Days of Detour*** (without the project).

Summary of Step 3

After completing Step 3, the model will provide an estimate of the present value of baseline flood damages if they occurred over the project life (50 years). Both total and category-specific PV estimates will be included.

STEP 4 Identify and input project benefits (changes in baseline) for each alternative

Project benefits are somewhat more complicated to estimate than project costs, since they require predicting an unknown future over the life of the project, a future that will likely change with or

without a project. However, users already know the baseline level of damages from Step 3, which is the upper limit of flood damages that can be eliminated with a project.

Another nuance about benefits, is that some benefits occur only when floods occur (e.g., reduced structure or infrastructure damage, reduced cropland losses), but others, such as enhancement benefits, occur every year once the project is complete. Three categories of benefits are included as worksheet inputs: (1) cropland and pasture, (2) structures and infrastructure, and (3) enhancements. Worksheets are provided that lead to estimates for input to the EA(R) model (Figure B6).

Referring again to the four categories of Baseline damages:

a) Losses to production agriculture on flooded cropland and pasture;

b) Damages to inundated structures, infrastructure, and associated transportation costs;

c) Damages to water management infrastructure (i.e., ditches); and

d) Other damages due to flooding not included in a-d.

These are the four areas where a project can reduce damages from the baseline.

Benefits to Production Agriculture on Flooded Cropland and Pasture

To enter information related to benefits pertaining to production agriculture, continue data input in the **"3 - EA Rural Flood Damages"** worksheet.

Benefits (damages prevented) to production agriculture are estimated similarly to damages under the baseline condition.

- ***Enter Estimates of Total, Cropland, and Pasture Acres Flooded With The Project*** (under each flooding scenario, or for each alternative (Figure B6)).

It is expected that a rural flood damage control project will eliminate most, if not all, of the high frequency flood damages. Typically the goal for production agriculture is to eliminate all damages up to and including the 10-year event, which may reduce some of the lower frequency events. However, there may be projects where more protection is desired and the model allows for that.

Figure B6. WITH PROJECT Total, cropland, and pasture acres flooded at different flood frequencies ("3- EA Rural Flood Damages" Worksheet)

Total Pasture and Cropland Damages With Project										
Flood Event/ Probability		Total acres Flooded	Cropland Acres Flooded	Pasture Acres Flooded	Cropland Flood Frequency	Pasture Flood Frequency	Average Annual Acres Flooded	Average Annual Cropland Damages	Average Annual Pasture Damages	Average Annual Damages
2-year/0.5	0.5				0	0	0			$0.00
5-year/0.2	0.2				0	0	0			$0.00
10-year/0.1	0.1				0	0	0			$0.00
25-year/0.04	0.04				0	0	0			$0.00
50-year/0.02	0.02				0	0	0			$0.00
100-year/0.01	0.01				0	0	0			$0.00
With Project Total										$0.00
Total Rural Mitigation Benefits										**$0.00**

The EA(R) model will internally calculate residual damages with the project and subtract those from the baseline condition, leaving an estimate of project benefits for production agriculture.

Structure, Infrastructure, and Avoided Detour Benefits

Projects that change the extent of land flooded will reduce baseline flood damages to structures and infrastructure. Reduced flooding will also reduce, or eliminate, flood-related detours. Users estimate

data to complete the following information, by project or alternative, and enter that data into the worksheet.

- ***Enter the Number of Farmsteads Flooded*** (with the project).
- ***Enter Feet of Bank Erosion*** (with the project).

Figure B7. WITH PROJECT Farmsteads Protected and Bank Erosion Prevented ("3 – EA Rural Flood Damages" Worksheet)

Flood Event/ Probability		Farmsteads Flooded		Bank Erosion	
		Number of Farmsteads Flooded	Annual Farmstead Damages	Feet of Bank Erosion	Annual Erosion Damage
2-year/0.5	0.5		$0.00		$0.00
5-year/0.2	0.2		$0.00		$0.00
10-year/0.1	0.1		$0.00		$0.00
25-year/0.04	0.04		$0.00		$0.00
50-year/0.02	0.02		$0.00		$0.00
100-year/0.01	0.01		$0.00		$0.00
			$0.00		**$0.00**

- ***Enter Feet of Snagging and Clearing*** (with the project).
- ***Enter Feet of Sediment Removal*** (with the project).

Figure B8: WITH PROJECT Length of Snagging and Clearing and Sediment Removal ("3 – EA Rural Flood Damages" Worksheet)

Flood Event/ Probability		Cleanup		Sediment Removal	
		Length Snagging & Clearing	Annual Clearing Costs	Sediment Removal	Annual Sediment Removal Costs
2-year/0.5	0.5		$0.00		$0.00
5-year/0.2	0.2		$0.00		$0.00
10-year/0.1	0.1		$0.00		$0.00
25-year/0.04	0.04		$0.00		$0.00
50-year/0.02	0.02		$0.00		$0.00
100-year/0.01	0.01		$0.00		$0.00
			$0.00		**$0.00**

The EA(R) model will calculate the present value of bank erosion prevented, farmsteads protected, and detours avoided by comparing to the baseline.

With project detour costs are calculated in the model by multiplying miles x vehicles x days of detour x Federal mileage rate, plus total miles/30 x local labor rate for detour time.

- ***Enter the Length of Detour in Miles*** (with the project).
- ***Enter the Number of Vehicles Detoured*** (with the project).
- ***Enter the Number of Days of Detour*** (with the project).

Figure B9: WITH PROJECT Detour Costs ("3 – EA Rural Flood Damages" Worksheet)

Flood Event/ Probability		Detour Costs			
		Miles	Vehicles	Days	Detour Costs
2-year/0.5	0.5				$0.00
5-year/0.2	0.2				$0.00
10-year/0.1	0.1				$0.00
25-year/0.04	0.04				$0.00
50-year/0.02	0.02				$0.00
100-year/0.01	0.01				$0.00
					$0.00

Enhancement Benefits WITH Project

Rural flood control projects may produce natural resources and environmental (NRE) enhancements, such as habitat and improved water quality. Project planners will identify the extent of NRE enhancements shown in Figure B9 in the **"2 - Inputs"** worksheet and input those estimates. Enhancements are assumed to be in addition to baseline conditions, so it isn't necessary to estimate a baseline.

- ***Enter the Number of Users and Days Used for Both Consumptive and Non-Consumptive Usage***

Figure B10: WITH PROJECT Natural Resources Enhancements - Recreation ("2 – Inputs" Worksheet)

Category	Sub Category	Input	Units	Input Value		
	Lodging Costs Per Day		$	80.00		
	Meal Costs Per Day		$	30.00		
Recreation	Consumptive Use	Users	#			
		Days	#			
		Value	$	113.00		
	Non-Consumptive Use	Users	#			
		Days	#			
		Value	$	153.00		
Travel Delays	Vehicles Per Day		#/Day			
	Normal Drive Time		Minutes			
	Detour Drive Time		Minutes			
	Duration of Roadway Closure		Interval	Without	With	
			10			
			20			
			50			
			100			

Consumptive and non-consumptive recreation days will be available annually from a project, not just when it floods. The model will value each type of day and generate the present value of those benefits over the life of the project. Including benefits for both "habitat" and "recreation days" is double counting. Users are encouraged to include other justifiable benefits as an "other" input in the worksheets, but justification must be included.

Water quality improvement is expected to occur only when impoundments are a project component. Flood waters are stored upstream and released slowly later. As such, water quality benefits only occur when floods occur. Users will enter acre-feet stored during each flood frequency event and the model will annualize that number, assign a value, and calculate its present value over the life of the project.

- ***Enter Acre-feet Stored***

Water quality improvements are valued at $0.73/acre-feet of stored water, for keeping nitrogen, phosphorus, and TSS out of the waterway (Taff, 2017).

Figure B11: WITH PROJECT Stored Water Benefits ("3 – EA Rural Flood Damages" Worksheet)

Flood Event/ Probability		Stored Water Benefits	
		Acre Feet of Stored Water	Annual Stored Water Benefits
2-year/0.5	0.5		$0.00
5-year/0.2	0.2		$0.00
10-year/0.1	0.1		$0.00
25-year/0.04	0.04		$0.00
50-year/0.02	0.02		$0.00
100-year/0.01	0.01		$0.00
			$0.00

STEP 5 Presentation and comparison of results

When users have completed Steps 1 through 4, the model will report a number of results in an output table.

The results are found in "**5 - Results Summary**" and "**6 – EA Detail**". In "**5 – Results Summary**" users are presented with a breakdown of the total present value and average annual benefits and costs of the project. The estimated benefits and costs are combined into four project performance metrics: Benefit-to-Cost Ratios, Net Benefits, Internal Rate of Return (IRR), and Payback Year (Figure B12). The use of these metrics is described in more detail in the main guidance document.

In "**6 – Detail**", users are able to see the annual calculations for costs and benefits. The costs and benefits are shown in both undiscounted (real monetary terms) and converted to present value (discounted). The sheet also provides the total present value sum of the costs and benefits.

Figure B12: Results Summary ("5 – Results Summary" Worksheet)

5 - Results Summary

This worksheet serves as the summary for all outputs created in the model. For the given inputs, the Results Summary provides an overview of present value and average annual benefits and costs. The Results Summary also presents project performance metrics including: Benefit-to-Cost Ratios, Net Benefits, Internal Rate of Return, and Payback Year.

Scenario Analysis - Benefit Summary

Urban Flood Control Benefits	Present Value ($1K)	Average Annual ($1K)
Flood Mitigation Benefits	$50	$2
Flood Relocation	$4	$0
Travel Time Delays	$0	$0
Flood Fighting	$5	$0
Social Benefits	$1	$0
Subtotal	$59	$2

Rural Flood Conveyance Benefits		
Recreation Benefits	$0	$0
Consumptive	$0	$0
Non-Consumptive	$0	$0
Rural Flooding Benefit	$0	$0
Bank Erosion Benefit	$0	$0
Cleanup Cost Benefit	$0	$0
Sediment Removal Benefit	$0	$0
Stored Water Benefit	$0	$0
Detour Benefit	$0	$0
Total Rural Mitigation Benefits	$0	$0
Subtotal	$0	$0
Grand Total	$59	$2

Project Costs	Present Value ($1K)	Average Annual ($1K)
Capital Costs	$59	$2
Annual O&M	$12	$0
Total	$71	$3

Project Performance Metrics	Present Value ($1K)	Average Annual ($1K)
Benefit-to-Cost Ratio	0.84	
Net Benefits	-$12	$0
Internal Rate of Return	2%	
Payback Year	35	

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NORTH DAKOTA
STATE WATER COMMISSION

2019 Water Development Plan Timeline & Milestones

Tasks	2018												2019
	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan
Request Project Information From Sponsors													
Project Sponsor Information Development & Submittals													
Review & Compile Project Information Submitted To SWC By Sponsors													
First Draft Of Project Inventory													
Commissioner-Hosted Basin Meetings													
10-Year & Longer Project Financial Need Estimate Development													
Project Prioritization													
Project Inventory Updates													
Water Development Plan Writing, Layout, Figure & Table Development													
First Draft To SWC For Review													
Final Draft To SWC For Review & Consideration For Approval													
2019 Water Development Plan Distribution													

Completed

Underway or Planned

APPENDIX E

APPENDIX F

SWC Date Received : 6/25/18

Grand Forks Traill Water District

BOX 287
1401 7th AVENUE N.E.
THOMPSON, NORTH DAKOTA 58278
"Rural Water for a Better Rural Life"

Office: 1 Mile West of Thompson
Phone: 701-599-2963
Fax: 701-599-2056

Neil Breidenbach
System Manager
www.gftwd.com

June 25, 2018

Garland Erbele, P.E.
North Dakota State Water Commission
900 E Boulevard Ave
Bismarck ND 58505-0850

Re: GFTWD: User Expansion, Pipeline Expansion, and TRWD/AWUD Interconnect (Phase 3)
GFTWD: Larimore Interconnect
Grand Forks Traill Water District (GFTWD)

Dear Mr. Erbele:

GFTWD recently bid the Phase 3 portion of the above-mentioned project. The bids were favorable and were at or under the engineers estimate. However, GFTWD is still lacking adequate grant funds to complete the above referenced project. GFTWD is requesting an additional $232,795 in grant dollars to be able to complete the Base Bid, Alternate 1 and Alternate 4, as designed. Alternate 2 and Alternate 3 were rejected, and put on the SWC 2019-2021 planning form.

The Alternate 1 and Alternate 4 portions of the project includes a pipeline that extends from the GFTWD WTP north towards AWUD. The pipeline passes 5-miles east of the City of Larimore. With a push towards regionalization, GFTWD wanted to make sure Larimore, was contacted regarding potentially regionalizing with GFTWD. To make the project feasible GFTWD is requesting additional matching grant funds to complete the project. GFTWD is requesting an additional $513,750 in matching grant funds to be able to serve the City of Larimore under the current favorable bidding market.

The request would increase the currently approved grant amount from $5,621,880 to $6,368,425.

Thank you for your continued cooperation regarding the above referenced project. If you have any questions, please feel free to contact me at (701) 599-2963.

Sincerely,

Neil Breidenbach

Neil Breidenbach
GFTWD System Manager

COST-SHARE REQUEST FORM

NORTH DAKOTA STATE WATER COMMISSION
DEVELOPMENT DIVISION
SFN 60439 (6/2018)

This form is to be filled out by the project or program sponsor with State Water Commission staff assistance as needed. Applications for cost-share are accepted at any time. However, applications received less than 45 days before a State Water Commission meeting will be held for consideration at the next scheduled meeting.

Please answer the following questions as completely as possible. Supporting documents such as maps, detailed cost estimates, and engineering reports should be attached to this form. If additional space is required, please use extra sheets as necessary.

For information regarding cost-share program eligibility see the *State Water Commission Cost-Share Policy, Procedure, and General Requirements* – available upon request or at www.swc.nd.gov.

Project, Program, Or Study Name
GFTWD: User Expansion, Pipeline Expansion / GFTWD: TRWD/AWUD Interconnect / GFTWD: Larimore Interconnect

Sponsor(s)
Grand Forks Traill Water District (East Central Regional Water District)

County	City	Township/Range/Section
Grand Forks		

Description Of Request ☐ New ☑ Updated (previously submitted)

Specific Needs Addressed By The Project, Program, Or Study
Addition of new users, regionalization with neighboring Cities and Districts.

If Study, What Type ☑ Water Supply ☐ Hydrologic ☐ Floodplain Mgmt. ☐ Feasibility ☐ Other

If Project/Program

☐ Flood Control	☐ Multi-Purpose	☐ Bank Stabilization	☐ Dam Safety/EAP
☐ Recreation	☑ Water Supply	☐ Snagging & Clearing	☐ Property Acquisition
☐ Irrigation	☐ Water Retention	☐ Rural Flood Control	☐ Other

Jurisdictions/Stakeholders Involved
Grand Forks Traill Water District (GFTWD), Traill Rural Water District, (TRWD), East Central Regional Water District (ECRWD) Agassiz Water User District (AWUD) and City of Larimore (Larimore).

Description Of Problem Or Need And How Project Addresses That Problem Or Need
Currently, GFTWD has an additional 40 users requesting to become part of GFTWD. These users have requested to become members of GFTWD under previous phases of the project, but due to lack of funding were not installed.
TRWD is lacking water supply and capacity to serve all new and existing users. The proposed project would interconnect the western portion of TRWD with GFTWD. TRWD and GFTWD recently merged to form ECRWD.
AWUD is lacking water supply capacity in the southern and western portion of their system. The proposed project would bring a pipeline from the GFTWD WTP to AWUD system. This would be the first phase of a multi-phase project that would supply all of AWUD users with water from the GFTWD WTP. The AWUD WTP is nearing its useful life. The addition of this project, not only fixes lack of capcacity in the southern portion of the system, but it also helps eliminate having to renovate a WTP. The new pipeline will be extending from the GFTWD WTP north towards AWUD. While extending north it will pass 5-miles east of the City of Larimore. Realizing, that the Larimore WTP is approaching 20 years old, GFTWD thought it was in the best intrested to contact Larimore, to see if it made sense to bring a pipeline to them. GFTWD is requesting grant funds to bring a pipeline to the Larimore.

Has Feasibility Study Been Completed?	☑ Yes	☐ No	☐ Ongoing	☐ Not Applicable
Has Engineering Design Been Completed?	☑ Yes	☐ No	☐ Ongoing	☐ Not Applicable
Have Land Or Easements Been Acquired?	☑ Yes	☐ No	☑ Ongoing	☐ Not Applicable

Have You Applied For Any State Permits?	☐ Yes	☐ No	☑ Not Applicable
If Yes, Please Explain			
Have You Been Approved For Any State Permits?	☐ Yes	☐ No	☑ Not Applicable
If Yes, Please Explain			
Have You Applied For Any Local Permits?	☐ Yes	☐ No	☑ Not Applicable
If Yes, Please Explain			
Have You Been Approved For Any Local Permits?	☐ Yes	☐ No	☑ Not Applicable
If Yes, Please Explain			

Briefly Explain The Level Of Review The Project Or Program Has Undergone
GFTWD, TRWD and AWUD boards have all approved moving forward with the project.

Do You Expect Any Obstacles To Implementation (i.e., problems with land acquisition, permits, funding, local, opposition, environmental concerns, etc.)? None At this time.

Funding Timeline (carefully consider when SWC cost-share will be needed)

Source	Total Cost	2017-2019 7/1/17-6/30/19	2017-2019 Requesting	Beyond 7/1/21
Federal	$	$	$	$
State Water Commission	$	$ 5,621,880.00	$ 746,545.00	$
Other State	$	$	$	$
Local	$	$ 2,144,236.00	$ 248,848.00	$
Total	$ 0.00	$ 7,766,116.00	$ 995,393.00	$ 0.00

List All Other State Of North Dakota Funding Sources (Grant or Loan), For Which You Have Applied
ND SRF will be used for the local share.

Please Explain Implementation Timelines, Considering All Phases And Their Current Status
The project has been bid. The Base bid, Alternate 1 and 4 have been awarded. GFTWD has a shortage of $232,795 in grant funds for the project, in which portions of the project will not get built, or pipelines will be decreaesed in size. The pipeline to Larimore has not been awarded due to lack of Grant funds.

Have Assessment Districts Been Formed? ☐ Yes ☐ No ☐ Ongoing ☑ Not Applicable

Submitted By: Neil Breidenbach			Date: 06/25/18
Address: PO Box 287	City: Thompson	State: ND	ZIP Code: 58278
Telephone Number: 701-599-2963		Engineer Telephone Number: 701-746-8087	
Sponsor Email: neilbre@yahoo.com		Engineer Email: Geoffrey.slick@ae2s.com	

I Certify That, To The Best Of My Knowledge, The Provided Information Is True And Accurate.

Signature: Neil Breidenbach Date: June 25-2018

MAIL TO:

ND State Water Commission • ATTN: Cost-Share Program
900 E Boulevard Ave. • Bismarck, ND 58505-0850

PHASE 3 - TOTAL Project

Last Updated: June 25, 2018

	As-Bid TOTAL	As-Bid GRANT
GFTWD - BASE BID=	**$4,429,368.25**	**$3,322,026.19**
GFTWD ALTERNATE No. 1 =	**$1,788,410.00**	**$1,341,307.50**
GFTWD - ALTERNATE No. 4 =	**$61,680.00**	**$46,260.00**
TOTAL CONSTRUCTION ACS (PART 1 & 2) =	**$371,802.00**	**$278,851.50**
TRWD BOOSTER STATION RENOVATION (Material Only)	**$68,000.00**	**$51,000.00**
ADMINISTRATIVE COSTS		
Land Acquisition (Crop Damage)	$200,000.00	$150,000.00
ENGINEERING		
Report	$55,000.00	$19,250.00
Preliminary Engineering	$26,658.00	$9,330.30
Design	$384,000.00	$134,400.00
Bidding	$40,000.00	$14,000.00
Construction	$561,000.00	$420,750.00
Post Construction Engineering	$90,000.00	$67,500.00
CONTINGENCIES	$0.00	$0.00
TOTAL PROJECT COSTS:	**$8,075,918.25**	**$5,854,675.49**
SWC Approved (Grant)		**$5,621,880.00**
Sub-Total Shortage (Grant)		**$232,795.49**
SERVICE TO LARIMORE	**$685,000.00**	
Sub-Total Shortage (Grant)		**$513,750.00**
Total Shortage (Grant)		**$746,545.49**

SERVICE TO LARIMORE

ITEM	ITEM DESCRIPTION	QUANTITY	UNITS	UNIT COST	EXTENDED COST
A.	**Mobilization**	1	l.s.	$42,568.75	$42,568.75
B.	**Pipe**				
	2. 12-inch PVC SDR 26 CL 160 IPS	24,600	l.f.	$16.75	$412,050.00
C.	**Gate Valves**				
	1. 12-inch **(PE X PE)**	2	ea.	$3,465.00	$6,930.00
D.	**1-Inch Flush/Air Blow-off Valve**	2	ea.	$1,100.00	$2,200.00
E.	**Non-Cased Bores** *(includes pipe & couplers)*				
	1. 12-Inch DR 11 IPS POLY **(100' Length)**	6		$10,050.00	$60,300.00
F.	**Directional Bores** *(includes pipe & couplers)*				
	1. 12-Inch DR 11 IPS POLY	900	l.f.	$76.25	$68,625.00
G.	**Cased Bores** *(includes pipe, casing, couplers, spacers, & other fittings)*				
	1. 180' - 12" DR 11 IPS POLY Carrier Pipe w/ 160' - 16" Steel Casing	1	l.s.	$28,500.00	$28,500.00
H.	**Gas Line Crossing** *(includes pipe, couplers, & hydro-vac)*				
	1. 12-Inch DR 11 IPS POLY	0	l.s.	$11,250.00	$0.00
I.	**Fittings** *(includes couplers to transition from Poly to PVC)*				
	1. 12-Inch POLY 90° Bend	3	ea.	$1,700.00	$5,100.00
	2. 12-Inch POLY Tee	1	ea.	$1,100.00	$1,100.00
J.	**Air Release Valve Manhole (ARV)**	1	ea.	$6,500.00	$6,500.00
K.	**Fused Connection to Meter-PRV Manhole**	1	l.s.	$1,300.00	$1,300.00
L.	**Signs**	9	ea.	$80.00	$720.00
M.	**Seeding**	5	acre	$500.00	$2,500.00
N.	**Gravel**	0	ton	$50.00	$0.00
O.	**Restortation**	24,600	l.f.	$0.50	$12,300.00

SUBTOTAL CONSTRUCTION: **$650,693.75**

Engineering	**$29,306**
Crop Damage	**$5,000**
TOTAL PROJECT COST:	**$685,000**

Grand Forks-Traill Water District and Traill Rural Water District 2017-2019 System Expansion

* Rural Users = 40

Agassiz Water Users District

Agassiz Water Users District

Emerado

Grand Forks

Larimore

ALTERNATE 1

Pipeline to Larimore

Res 4

Res 10

Fairfield

Res 6

Thompson

Res 12

Res 3

Res 8

Northwood

Grand Forks-Traill Water District

Res 2

ALTERNATE 2

Res 7

Reynolds

Res 11

Tri-County Water District

Res 9

Hatton

Buxton

Res 1

ALTERNATE 3

Portland

Mayville

Traill Rural Water District

Part 1- Complete

Part 2- Complete

Hillsboro

Dakota

Elm Grove | Hegton | Mekinock | Bloomng | Rye | Falconer | Larimore | Arvilla | Chester | Oakville | Brenna | Grand Forks | Avon | Grace | Pleasant View | Allendale | Walle | Lind | Northwood | Washington | Union | Michigan | Americus | Bentru | Beaver Creek | Newburgh | Garfield | Morgan | Buxton | Stavanger | Golden Lake | Enger | Viking | Lindaas | Wold | Ervin | Bingham | Sherbrooke | Primrose | Roseville | Mayville | Eldorado | Caledonia | Edendale | Norman | Blanchard | Bloomfield | Hillsboro | Herberg

New Users

Rural Water District

GFTWD Proposed Pipeline

4"

12"

New User Pipe

TRWD Proposed Pipeline

8"

N

Coordinate System:
NAD 1983 StatePlane North Dakota North FIPS 3301 Feet

AE2S

Last Edit: HKTL 1/19/15

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

Document Path: P:\Grand Forks Traill Water District\WallMaps\GFTWD_Traill SystemExpansionMap v3.mxd

APPENDIX G

McLean-Sheridan Rural Water District

987 17th. Avenue NW
Turtle Lake, ND 58575-9649

E-mail msrwater@westriv.com
Website: www.msrwater.com

Phone: 701-448-2686
Fax: 701-448-2315

June 25, 2018

Garland Erbele, P.E.
State Engineer
North Dakota State Water Commission
900 East Boulevard Avenue, Dept. 770
Bismarck, North Dakota 58105-0850

Copy via email: Original US Mail

Subject: Request for Water Storage System
McLean-Sheridan Rural Water Storage Tower

The Mclean-Sheridan Rural Water District is requesting State Water Commission funding for a new 400,000 gallon water storage tower, located on the western edge of the city of Turtle Lake, pumping for the rural water system, and the piping to connect it to the existing Turtle Lake water system. The design is complete and the project has been bid. It is anticipated construction will begin in the fall of this year.

The McLean-Sheridan system needs additional storage to buffer peak demands. The City of Turtle Lake storage tank has reached its useful life. This tank will be used by both systems to provide adequate storage and help ensure adequate water is available to both systems. The tank will feed the Turtle Lake system directly. It will be constructed at an elevation that will correct existing pressure issues in the city system.

The tank will feed a pump station that will feed into the rural water system. Having this storage available will help buffer the peak demands in the rural water system.

Our Engineer has included a detailed opinion of cost totaling $3,063,000 in total construction costs for the water storage tower. We are respectfully requesting funding on this project for all eligible construction costs including Construction Engineering to be up to 75% ($2,271,000) cost share from the State Water Commission. The remaining 25% ($792,000) will be a Local Share funded by the Mclean-Sheridan Rural Water District and City of Turtle Lake.

If you have any questions regarding the applications, please contact Ann Oberg (McLean-Sheridan Rural Water) at (701) 448-2686 or Kent Ritterman (Engineer) at (701) 499-5818. Your time and efforts with this program are greatly appreciated!

Sincerely,

Ann Oberg
McLean-Sheridan Rural Water
Enclosures

COST-SHARE REQUEST FORM

NORTH DAKOTA STATE WATER COMMISSION
DEVELOPMENT DIVISION
SFN 60439 (6/2018)

RECEIVED
JUL 18 2018
STATE WATER COMMISSION

This form is to be filled out by the project or program sponsor with State Water Commission staff assistance as needed. Applications for cost-share are accepted at any time. However, applications received less than 45 days before a State Water Commission meeting will be held for consideration at the next scheduled meeting.

Please answer the following questions as completely as possible. Supporting documents such as maps, detailed cost estimates, and engineering reports should be attached to this form. If additional space is required, please use extra sheets as necessary.

For information regarding cost-share program eligibility see the *State Water Commission Cost-Share Policy, Procedure, and General Requirements* – available upon request or at www.swc.nd.gov.

Project, Program, Or Study Name
McLean-Sheridan Rural Water Storage System

Sponsor(s)
McLean-Sheridan Rural Water District

County	City	Township/Range/Section
McLean	Turtle Lake	147N / 80W / 29

Description Of Request ☐ New ☑ Updated (previously submitted)

Specific Needs Addressed By The Project, Program, Or Study
Will allow rural water system and city to adequately maintain water storage needs.

If Study, What Type ☐ Water Supply ☐ Hydrologic ☐ Floodplain Mgmt. ☐ Feasibility ☐ Other

If Project/Program

☐ Flood Control	☐ Multi-Purpose	☐ Bank Stabilization	☐ Dam Safety/EAP
☐ Recreation	☑ Water Supply	☐ Snagging & Clearing	☐ Property Acquisition
☐ Irrigation	☐ Water Retention	☐ Rural Flood Control	☐ Other

Jurisdictions/Stakeholders Involved
McLean-Sheridan Rural Water District

Description Of Problem Or Need And How Project Addresses That Problem Or Need
The McLean Sheridan system needs additional storage to buffer peak demands. The City of Turtle Lake storage tank has reached its useful life. This tank will be used by both systems to provide adequate storage and help ensure adequate water is available to both systems. The tank will feed the Turtle Lake system directly. It will be constructed at an elevation that will correct existing pressure issues in the city system.

The tank will feed a pump station that will feed into the rural water system. Having this storage available will help buffer the peak demands in the rural water system.

Has Feasibility Study Been Completed?	☑ Yes	☐ No	☐ Ongoing	☐ Not Applicable
Has Engineering Design Been Completed?	☑ Yes	☐ No	☐ Ongoing	☐ Not Applicable
Have Land Or Easements Been Acquired?	☑ Yes	☐ No	☐ Ongoing	☐ Not Applicable

Have You Applied For Any State Permits?	☑ Yes	☐ No	☐ Not Applicable
If Yes, Please Explain NDDOH plan approval.			
Have You Been Approved For Any State Permits?	☐ Yes	☑ No	☐ Not Applicable
If Yes, Please Explain			
Have You Applied For Any Local Permits?	☐ Yes	☐ No	☑ Not Applicable
If Yes, Please Explain			
Have You Been Approved For Any Local Permits?	☐ Yes	☐ No	☑ Not Applicable
If Yes, Please Explain			

Briefly Explain The Level Of Review The Project Or Program Has Undergone

An engineering study was completed including a water system hydraulic model. Several alternatives were evaluated. This tank is the recommended alternative from the study effort.

Do You Expect Any Obstacles To Implementation (i.e., problems with land acquisition, permits, funding, local, opposition, environmental concerns, etc.)? The Rural Water District does not currently expect any implementation obstacles.

Funding Timeline (carefully consider when SWC cost-share will be needed)

Source	Total Cost	2017-2019 7/1/17-6/30/19	2019-2021 7/1/19-6/30/21	Beyond 7/1/21
Federal	$	$	$	$
State Water Commission	$ 2,271,000.00	$	$ 2,271,000.00	$
Other State	$	$	$	$
Local	$ 792,000.00	$	$ 792,000.00	$
Total	$ 3,063,000.00	$ 0.00	$ 3,063,000.00	$ 0.00

List All Other State Of North Dakota Funding Sources (Grant or Loan), For Which You Have Applied

N/A

Please Explain Implementation Timelines, Considering All Phases And Their Current Status

The design is complete and the project has been bid. It is anticipated construction will begin in the fall of this year.

Have Assessment Districts Been Formed? ☐ Yes ☑ No ☐ Ongoing ☐ Not Applicable

Submitted By Ann Oberg			Date June 25, 2018
Address 987 17th Ave. NW	City Turtle Lake	State ND	ZIP Code 58575
Telephone Number 701-448-2686	Engineer Telephone Number 701-282-4692		
Sponsor Email msrwater@westriv.com	Engineer Email KRitterman@mooreengineeringinc.com		

I Certify That, To The Best Of My Knowledge, The Provided Information Is True And Accurate.

Signature Ann Oberg Date 7/16/18

MAIL TO:

ND State Water Commission • ATTN: Cost-Share Program
900 E Boulevard Ave. • Bismarck, ND 58505-0850

MEMORANDUM

To: Governor Doug Burgum
Members of the State Water Commission
From: Mclean Sheridan Rural Water District
Subject: Request for Water Storage System
McLean-Sheridan Rural Water Storage Tower

Date: June 25, 2018

Project Summary

The Mclean-Sheridan Rural Water District is requesting State Water Commission funding for a new 400,000 gallon water storage tower, located on the western edge of the City of Turtle Lake, pumping for the rural water system, and the piping to connect it to the existing Turtle Lake water system. The design is complete and the project has been bid. It is anticipated construction will begin in the fall of this year.

Our Engineer has included a detailed opinion of cost totaling $3,063,000 in total construction costs for the water storage tower. We are respectfully requesting funding on this project for all eligible construction costs including Construction Engineering to be up to 75% ($2,271,000) cost share from the State Water Commission. The remaining 25% ($792,000) will be a Local Share funded by the Mclean - Sheridan Rural Water District and City of Turtle Lake.

Project Background

The McLean-Sheridan system needs additional storage to buffer peak demands. The City of Turtle Lake storage tank has reached its useful life. This tank will be used by both systems to provide adequate storage and help ensure adequate water is available to both systems. The tank will feed the Turtle Lake system directly. It will be constructed at an elevation that will correct existing pressure issues in the city system.

The tank will feed a pump station that will feed into the rural water system. Having this storage available will help buffer the peak demands in the rural water system.

Project Overview

The proposed project includes a 400,000 gallon tank. The storage will be shared between the Turtle Lake and Mclean-Sheridan systems. This tank will be filled by pumps at the existing rural water system treatment plant. A pumping system will draw from this tank and pump water up the hydraulic grade line of the rural water system. The new tank will directly feed the Turtle Lake storage system.

WATER TOWER & WATER MAIN REPLACEMENT
CITY OF TURTLE LAKE / MCLEAN-SHERIDAN WATER DIST.
MCLEAN COUNTY, NORTH DAKOTA

Created By: TJS Date Created: 10/12/16 Date Saved: 02/13/18 Date Plotted: NEVER Date Exported: 02/13/18
Plotted By: Andrew.Buchmann Parcel Data: N/A Aerial Image: 2015 County NAIP SIDS Elevation Data: Lidar
Horizontal Datum: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet Vertical Datum: NAVD1988
W:\ND_Bismarck\17317\17317_Water_Tower_Water_Main_Replacement.mxd

0 400 800 1,600 Feet
1 in = 800 feet

moore engineering, inc.

Water System Improvements - New Water Tower
Mclean-Sheridan Rural Water District
Preliminary Engineer's Opinion of Cost

BID ITEM NO. & DESCRIPTION	*UNIT*	*QTNY*	*UNIT PRICE*	*TOTAL*
Part 1 - Water Tower General				
1. Remove Existing Tower & Foundation	LS	1	$45,000.00	**$45,000.00**
2. New 400k Gallon Waterspheroid Tower	LS	1	$1,284,000.00	**$1,284,000.00**
3. Owner's Allowance-Pump Station Building	LS	1	$100,000.00	**$100,000.00**
			Part 1 Construction	**$1,429,000.00**
Part 2 - Water Tower Electrical				
1. Water Tower Electrical	LS	1	$166,963.00	**$166,963.00**
			Part 2 Construction	**$166,963.00**
Part 3 - Water Main Looping/Transmission				
1. Clearing & Grubbing	L SUM	1	$7,000.00	**$7,000.00**
2. Removal Of Trees 10In	EA	1	$1,000.00	**$1,000.00**
3. Removal Of Concrete Pavement	SY	40	$20.00	**$800.00**
4. Removal Of Curb-Type 1	LF	150	$12.00	**$1,800.00**
5. Removal Of Culverts-All Types & Sizes	LF	150	$25.00	**$3,750.00**
6. Topsoil	CY	1,670	$8.00	**$13,360.00**
7. Borrow-Excavation	CY	315	$11.50	**$3,622.50**
8. Subgrade Preparation-Type A-12In	SY	1,260	$20.00	**$25,200.00**
9. Seeding Class I	SY	3,040	$1.50	**$4,560.00**
10. Seeding Class II	SY	5,055	$0.30	**$1,516.50**
11. Straw Mulch	SY	5,055	$0.15	**$758.25**
12. Hydraulic Mulch	SY	3,040	$0.32	**$972.80**
13. Silt Fence Supported	LF	1,700	$2.35	**$3,995.00**
14. Remove Silt Fence Supported	LF	1,700	$0.25	**$425.00**
15. Fiber Rolls 6In	LF	432	$2.25	**$972.00**
16. Remove Fiber Rolls 6In	LF	432	$0.20	**$86.40**
17. Aggregate Base Course Cl 5	TON	315	$13.00	**$4,095.00**
18. Aggregate Surface Course Cl 5	TON	705	$30.00	**$21,150.00**
19. Patching	TON	145	$230.00	**$33,350.00**
20. Traffic Control	L SUM	1	$6,000.00	**$6,000.00**
21. Pipe Corr Steel .064In 18In	LF	150	$100.00	**$15,000.00**
22. Curb & Gutter-Type I	LF	150	$92.00	**$13,800.00**
23. Valley Gutter-Type I 48In	SY	30	$160.00	**$4,800.00**
24. Valley Gutter-Type I 72In	SY	5	$245.00	**$1,225.00**
25. Sidewalk Concrete 4In	SY	10	$87.00	**$870.00**
26. Reset Sign Panel	EA	9	$55.00	**$495.00**
27. Reset Sign Support	EA	9	$80.00	**$720.00**
28. Testing Allowance	ALLOW	30,000	$1.00	**$30,000.00**
29. Mobilization	LS	1	$37,536.55	**$37,536.55**
30. Temporary Water Service	LS	1	$22,000.00	**$22,000.00**

moore engineering, inc.

Water System Improvements - New Water Tower
Mclean-Sheridan Rural Water District
Preliminary Engineer's Opinion of Cost

31.	ACP Removal and Disposal	LF	25	$100.00	**$2,500.00**
32.	Storm Water Management	LS	1	$6,500.00	**$6,500.00**
33.	Casing - 12"	LF	300	$250.00	**$75,000.00**
34.	Electromagnetic Locator	EA	1	$8,000.00	**$8,000.00**
35.	Water Main - 6"	LF	1,205	$60.00	**$72,300.00**
36.	Water Main - 8"	LF	2,140	$80.00	**$171,200.00**
37.	Water Main - 10"	LF	2,155	$60.00	**$129,300.00**
38.	Corporation - 1"	EA	12	$260.00	**$3,120.00**
39.	Curb Stop & Box - 1"	EA	11	$320.00	**$3,520.00**
40.	Water Service Line - 1"	LF	360	$60.00	**$21,600.00**
41.	Gate Valve & Box - 6"	EA	14	$1,300.00	**$18,200.00**
42.	Gate Valve & Box - 8"	EA	8	$1,700.00	**$13,600.00**
43.	Gate Valve & Box - 10"	EA	4	$2,450.00	**$9,800.00**
44.	Hydrant - 6"	EA	9	$4,600.00	**$41,400.00**

Part 3 Construction	**$836,900.00**
Construction	**$2,432,863.00**
Contingencies	**$245,137.00**
Total Construction	**$2,678,000.00**

Total Construction	**$2,678,000.00**
Construction Engineering Services	**$135,000.00**
RPR Inspection/Staking/Post Construction Services	**$130,000.00**
Coating Inspection & Testing	**$85,000.00**
Publishing & Administration	**$1,500.00**
Land Acquisiton	**$20,000.00**
Legal & Bond Counsel	**$13,500.00**
Total Construction Cost	**$3,063,000.00**

North Dakota Rural Water Districts & Associations

North Dakota State Water Commission, March 2018

This data is provided by the ND State Water Commission for your convenience. This data is provisional. This service is provided "AS IS" and without warranty of any kind, either express or implied. No warranty, either expressed or implied, is made regarding the accuracy or utility of the data or information presented at this site. The ND State Water Commission is not responsible for any errors or damages that may occur resulting from the use or mis-use of the data that is provided at th is site. If you have any questions regarding the data, generation methods, or errors, please direct any these comments to ND State Water Commission. Phone: (701) 328-4998

Burke-Divide-Williams Rural Water Association (701) 965-6029

Northwest Rural Water District (701) 774-8915

McKenzie County Rural Water Association (701) 444-3452

Fort Berthold Rural Water (701) 627-8185

Upper Souris Water Dist (701) 385-4093

Turtle Mtn Public Utilities (701) 477-6159

Northeast Regional Water District (701) 265-8503

Walsh Rural Water Dist (701) 352-3915

All Seasons Water Users Dist (701) 228-3663

Greater Ramsey Water Dist (701) 662-5782

North Central Regional Water Dist (701) 852-1886

North Central Regional Water Dist (701) 852-1886

North Central Regional Water Dist (701) 852-1886

North Prairie Rural Water Dist (701) 852-1886

Tri-County Water Dist (701) 345-8595

Agassiz Water Users Dist (701) 869-2690

Spirit Lake Rural Water (701) 766-1209

Central Plains Water Dist (701) 547-3751

Garrison Rural Water Dist (701) 463-7276

Greater Ramsey Water Dist (701) 662-5782

Dakota Rural Water Dist (701) 524-2393

East Central Regional Water Dist (701) 599-2963

McLean-Sheridan Water Dist (701) 448-2686

South Central Regional Water Dist (701) 258-8710

Stutsman Rural Water Dist (701) 252-7727

Barnes Rural Water Dist (701) 845-1117

Cass Rural Water Users Dist (701) 428-3139

Missouri West Water System (701) 663-8549

Water Service Provided By South Central Regional Water Dist (701) 258-8710

Southeast Water Users District (701) 242-7432

Standing Rock Rural Water (701) 854-7477

State Line Water Co-op (701) 336-7681

DIVIDE BURKE WILLIAMS MOUNTRAIL MCKENZIE WARD RENVILLE BOTTINEAU MCHENRY PIERCE ROLETTE TOWNER CAVALIER PEMBINA WALSH RAMSEY BENSON NELSON GRAND FORKS EDDY FOSTER GRIGGS STEELE TRAILL DUNN MERCER OLIVER GOLDEN VALLEY BILLINGS STARK MORTON BURLEIGH KIDDER STUTSMAN BARNES CASS SLOPE HETTINGER ADAMS BOWMAN GRANT SIOUX EMMONS LOGAN MCINTOSH DICKEY LAMOURE RANSOM RICHLAND SARGENT MCLEAN SHERIDAN WELLS

Williston Minot Bismarck Mandan Dickinson Jamestown Devils Lake Valley City Fargo West Fargo Grand Forks

APPENDIX H

COST-SHARE REQUEST FORM

NORTH DAKOTA STATE WATER COMMISSION
DEVELOPMENT DIVISION
SFN 60439 (3/2017)

This form is to be filled out by the project or program sponsor with State Water Commission staff assistance as needed. Applications for cost-share are accepted at any time. However, applications received less than 30 days before a State Water Commission meeting will be held for consideration at the next scheduled meeting.

Please answer the following questions as completely as possible. Supporting documents such as maps, detailed cost estimates, and engineering reports should be attached to this form. If additional space is required, please use extra sheets as necessary.

For information regarding cost-share program eligibility see the *State Water Commission Cost-Share Policy, Procedure, and General Requirements* – available upon request or at www.swc.nd.gov.

Project, Program, Or Study Name
Tri-County Water District Connection to McVille & Rural Distribution Pipeline Expansion

Sponsor(s)
Tri-County Water District

County	City	Township/Range/Section
Grand Forks County, Nelson County, etc.		

Description Of Request ☐ New ☑ Updated (previously submitted)

Specific Needs Addressed By The Project, Program, Or Study
Providing an alternate, higher quality water source to residents not currently served by TCWD

If Study, What Type ☑ Water Supply ☐ Hydrologic ☐ Floodplain Mgmt. ☐ Feasibility ☐ Other

If Project/Program

☐ Flood Control	☑ Multi-Purpose	☐ Bank Stabilization	☐ Dam Safety/EAP
☐ Recreation	☑ Water Supply	☐ Snagging & Clearing	☐ Property Acquisition
☐ Irrigation	☐ Water Retention	☐ Rural Flood Control	☐ Other

Jurisdictions/Stakeholders Involved
Rural Grand Forks & Nelson Counties, City of McVille

Description Of Problem Or Need And How Project Addresses That Problem Or Need
Currently there are additional potential users in areas throughout the Tri-County Water District which have shown interest in connecting to the system. At this time, there is not enough capacity in certain areas to serve these potential users. However, the Town of McVille has indicated they are able to provide additional capacity to the Tri-County Water District from the existing McVille water treatment facility. This additional capacity from McVille would allow Tri-County to serve these additional users, providing them with higher quality drinking water.

Has Feasibility Study Been Completed?	☑ Yes	☐ No	☐ Ongoing	☐ Not Applicable
Has Engineering Design Been Completed?	☐ Yes	☐ No	☑ Ongoing	☐ Not Applicable
Have Land Or Easements Been Acquired?	☐ Yes	☐ No	☑ Ongoing	☐ Not Applicable

Have You Applied For Any State Permits?	☐ Yes	☑ No	☐ Not Applicable
If Yes, Please Explain			
Have You Been Approved For Any State Permits?	☐ Yes	☐ No	☑ Not Applicable
If Yes, Please Explain			
Have You Applied For Any Local Permits?	☐ Yes	☑ No	☐ Not Applicable
If Yes, Please Explain			
Have You Been Approved For Any Local Permits?	☐ Yes	☐ No	☑ Not Applicable
If Yes, Please Explain			

Briefly Explain The Level Of Review The Project Or Program Has Undergone

A Facility Plan has been completed and submitted to the ND Department of Health including solicitation of comments to federal and state agencies. A user sign-up process has been performed to confirm potential users. A Class I cultural review has been coordinated.

Do You Expect Any Obstacles To Implementation (i.e., problems with land acquisition, permits, funding, local, opposition, environmental concerns, etc.)? No

Funding Timeline (carefully consider when SWC cost-share will be needed)

Source	Total Cost	2015-2017 7/1/15-6/30/17	2017-2019 7/1/17-6/30/19	Beyond 7/1/19
Federal	$	$	$	$
State Water Commission	$ 2,700,000.00	$	$ 2,700,000.00	$
Other State	$	$	$	$
Local	$ 1,050,000.00	$	$ 1,050,000.00	$
Total	$ 3,750,000.00	$	$ 3,750,000.00	$

List All Other State Of North Dakota Funding Sources (Grant or Loan), For Which You Have Applied

Tri-County Water District has coordinated with the ND Department of Health for a loan through the Drinking Water State Revolving Fund (DWSRF) Program for the 25% local share.

Please Explain Implementation Timelines, Considering All Phases And Their Current Status

Design - Spring/Summer 2018
Bid - Fall/Winter 2018
Construction 2018-2019

Have Assessment Districts Been Formed? ☐ Yes ☑ No ☐ Ongoing ☐ Not Applicable

Submitted By	Date
Mike Blessum, Manager	

Address	City	State	ZIP Code
207 5th St.	Petersburg	ND	58272

Telephone Number	Sponsor Email	Engineer Email
701-345-8595	waterboy@polarcomm.com	philip.markwed@bartwest.com

I Certify That, To The Best Of My Knowledge, The Provided Information Is True And Accurate.

Signature	Date
Mike Blessum	6-21-2018

MAIL TO:

ND State Water Commission • ATTN: Cost-Share Program
900 E Boulevard Ave. • Bismarck, ND 58505-0850

Cost Estimate
Tri-County Water District
Connection to McVille & Rural Distribution (TCWD Phase 4)
Pipeline Expansion

Rural Water Distribution System			
Description	**Quantity**	**Unit Price**	**Extension**
6" Cl. 200 PVC	62,000 '	$ 10.00	$620,000.00
4" Cl. 200 PVC	12,000 '	$ 4.75	$57,000.00
4" Cl. 160 PVC	30,000	$ 4.45	$133,500.00
3" Cl. 200 PVC	52,000 '	$ 4.10	$213,200.00
3" Cl. 160 PVC	25,000	$ 3.90	$97,500.00
2" Cl. 200 PVC	88,000 '	$ 3.60	$316,800.00
2" Cl. 160 PVC	96,000	$ 3.45	$331,200.00
1-1/2" Cl. 200 PVC	1,500 '	$ 7.50	$11,250.00
Appurtenances at 25% of Pipe			$445,000.00
Meterpit	85	$ 3,000.00	$255,000.00
Connection to McVille	1	$ 145,000.00	$145,000.00
Booster Station	1	$ 500,000.00	$500,000.00
Telemetry	1	$ 45,000.00	$45,000.00
Dewatering	1	$ 50,000.00	$44,550.00
Subtotal Rural Distribution System Construction Cost			**$3,215,000.00**
Crop Input Loss			$60,000.00
Desing Engineering @ 6.5%			$195,000.00
Project Inspection			$325,000.00
Archaeology, Cultural Environmental			$100,000.00
Total Project Cost			**$3,895,000.00**

20 User Connections

20 User Connections

Bartlett&West
Driving Community and Industry Forward, Together.

Tri-County Rural Water District

Project Overview

Proposed Services
1"
1.5"
2"
3"
4"
6"
Existing System

0 1.25 2.5 5 7.5 10 Miles

N
W E
S

F:\Proj\3000\3056\3056.024\ArcGIS\Project Overview.mxd

APPENDIX I

Barnes County Water Resource District
PO Box 306
Valley City ND 58072
701-845-8508

May 30, 2018

Mr. Craig Odenbach
North Dakota State Water Commission
900 East Boulevard Avenue, Dept. 770
Bismarck ND 58505-0850

Dear Craig:

Re: Kathryn Dam Repurposing Project
Sheyenne River, Kathryn, ND

The Barnes County Water Resource District ("District") respectfully submits the enclosed cost-share application to the North Dakota State Water Commission ("SWC") for the design and construction phases of the Kathryn Dam Repurposing Project. The project would include the removal of the existing Kathryn Dam, located on the Sheyenne River just east of Kathryn, North Dakota, and replacing it with a rock arch riffle structure. The existing dam is currently in need of maintenance and the proposed project would address the maintenance issues, but more importantly it would also eliminate the dangerous hydraulic roller that exists below the dam, improve fish passage and protect the integrity of the river and existing infrastructure upstream of the dam.

The District originally submitted a cost-share application to the SWC for this project in May of 2016 and that was followed by additional submittals and discussion with SWC staff regarding the categorization of the request under the SWC's cost-share policy. While the District would still appreciate consideration from the SWC for funding the entire project at 75% of eligible costs under the "Dam Safety" category, the District understands that the project will likely be funded partially under the "Dam Safety" category and partially under the "Recreation" categories of the cost-share policy.

The District has been pursuing other sources of funding to cover the remaining costs associated with the design and construction phases of the project. At this time the District is optimistic that sufficient funding will be available and the decision was made to move forward with the project. With that, the District respectfully requests consideration of the enclosed cost-share application. The funding breakdown included in the application reflects the split between the dam safety related items being funded at 75% and the remaining items being funded at 40%, but the District would greatly appreciate consideration of all costs being funded at 75%. A copy of the *Engineer's Opinion of Probable Cost* is also enclosed.

If you have any questions, please feel free to contact me or our project engineer, Mike Opat, Moore Engineering, Inc., at 701-282-4692.

Sincerely,

BARNES COUNTY WATER RESOURCE DISTRICT

Heather Manson

Heather Manson
Secretary-Treasurer

Enclosures

COST-SHARE REQUEST FORM

NORTH DAKOTA STATE WATER COMMISSION
DEVELOPMENT DIVISION
SFN 60439 (5/2017)

This form is to be filled out by the project or program sponsor with State Water Commission staff assistance as needed. Applications for cost-share are accepted at any time. However, applications received less than 30 days before a State Water Commission meeting will be held for consideration at the next scheduled meeting.

Please answer the following questions as completely as possible. Supporting documents such as maps, detailed cost estimates, and engineering reports should be attached to this form. If additional space is required, please use extra sheets as necessary.

For information regarding cost-share program eligibility see the *State Water Commission Cost-Share Policy, Procedure, and General Requirements* – available upon request or at www.swc.nd.gov.

Project, Program, Or Study Name
Kathryn Dam Repurposing Project

Sponsor(s)
Barnes County Water Resource District

County	City	Township/Range/Section
Barnes		Section 13-T137N-R58W

Description Of Request ☐ New ☑ Updated (previously submitted)

Specific Needs Addressed By The Project, Program, Or Study
Dam safety

If Study, What Type ☐ Water Supply ☐ Hydrologic ☐ Floodplain Mgmt. ☐ Feasibility ☐ Other

If Project/Program

☐ Flood Control	☐ Multi-Purpose	☐ Bank Stabilization	☑ Dam Safety/EAP
☐ Recreation	☐ Water Supply	☐ Snagging & Clearing	☐ Property Acquisition
☐ Irrigation	☐ Water Retention	☐ Rural Flood Control	☐ Other

Jurisdictions/Stakeholders Involved
Barnes County Water Resource District, Barnes County Commission, North Dakota Game & Fish, USFWS, North Dakota Outdoor Heritage Fund, others

Description Of Problem Or Need And How Project Addresses That Problem Or Need
The existing dam is currently in need of maintenance and the proposed project would address the maintenance issues, but more importantly it would also eliminate the dangerous hydraulic roller that exists below the dam, improve fish passage and protect the integrity of the river and existing infrastructure upstream of the dam.

Has Feasibility Study Been Completed?	☑ Yes	☐ No	☐ Ongoing	☐ Not Applicable
Has Engineering Design Been Completed?	☐ Yes	☑ No	☐ Ongoing	☐ Not Applicable
Have Land Or Easements Been Acquired?	☐ Yes	☑ No	☐ Ongoing	☐ Not Applicable

Have You Applied For Any State Permits?	☐ Yes	☑ No	☐ Not Applicable
If Yes, Please Explain			
Have You Been Approved For Any State Permits?	☐ Yes	☑ No	☐ Not Applicable
If Yes, Please Explain			
Have You Applied For Any Local Permits?	☐ Yes	☑ No	☐ Not Applicable
If Yes, Please Explain			
Have You Been Approved For Any Local Permits?	☐ Yes	☑ No	☐ Not Applicable
If Yes, Please Explain			

Briefly Explain The Level Of Review The Project Or Program Has Undergone

The feasibility of the project has been discussed by the District for years, including numerous public meetings and discussions with funding and regulatory agencies.

Do You Expect Any Obstacles To Implementation (i.e., problems with land acquisition, permits, funding, local, opposition, environmental concerns, etc.)? Funding may become an issue if construction bids come in higher than the estimates

Funding Timeline (carefully consider when SWC cost-share will be needed)

Source	Total Cost	2015-2017 7/1/15-6/30/17	2017-2019 7/1/17-6/30/19	Beyond 7/1/19
Federal	$	$	$ 50,000	$
State Water Commission	$	$	$ 531,565	$
Other State	$	$	$ 174,505	$
Local	$	$	$ 253,930	$
Total	$	$	$ 1,010,000	$

List All Other State Of North Dakota Funding Sources (Grant or Loan), For Which You Have Applied

Outdoor Heritage, ND Game & Fish

Please Explain Implementation Timelines, Considering All Phases And Their Current Status

The District will likely proceed with design during the fall of 2018 and begin construction in 2019.

Have Assessment Districts Been Formed? ☐ Yes ☐ No ☐ Ongoing ☑ Not Applicable

Submitted By Heather Manson			Date 5/30/2018
Address PO Box 306	City Valley City	State ND	ZIP Code 58072
Telephone Number 701-845-8508	Sponsor Email hmanson@barnescounty.us	Engineer Email mopat@mooreengineeringinc.com	

I Certify That, To The Best Of My Knowledge, The Provided Information Is True And Accurate.

Signature Heather Manson	Date 5/30/2018

MAIL TO:

ND State Water Commission • ATTN: Cost-Share Program
900 E Boulevard Ave. • Bismarck, ND 58505-0850

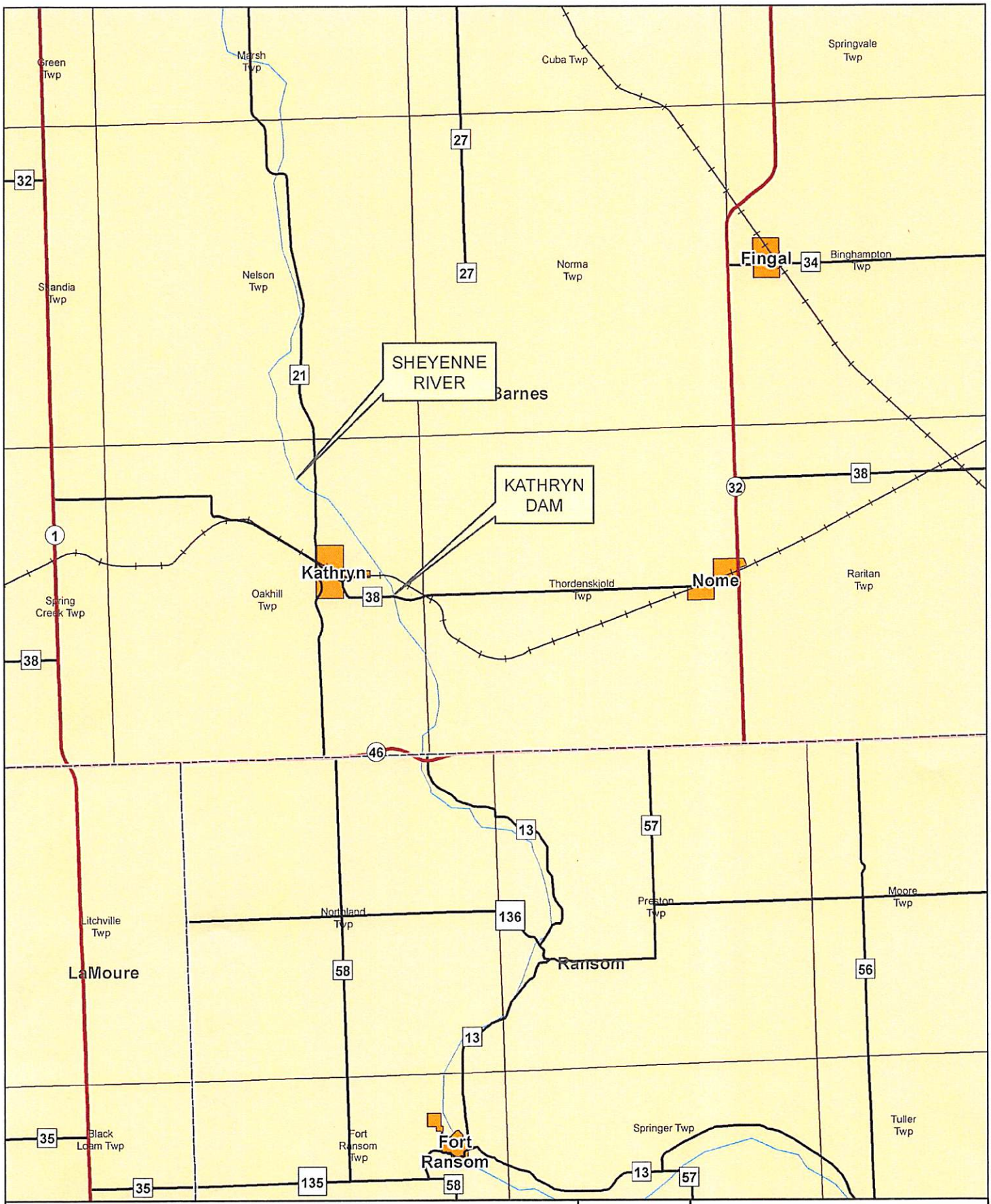
Project # 17300
Date Created: 5/6/2016
Date Revised: 5/30/2018

Kathryn Dam Improvements
Barnes County Water Resource District
Barnes County, North Dakota

Engineer's Opinion of Probable Cost
Rock Arch Riffles w/Lowered Crest Elevation

	ITEM	UNIT	QUANTITY	UNIT PRICE	TOTAL	FUNDING SOURCES	
	Remaining Construction					SWC (75%/40%)	LOCAL
1.	Mobilization	L.Sum	1	$69,200.00	$69,200.00	$51,900.00	$17,300.00
2.	Water Control	L.Sum	1	$50,000.00	$50,000.00	$37,500.00	$12,500.00
3.	Remove Existing Dam	L.Sum	1	$130,000.00	$130,000.00	$97,500.00	$32,500.00
4.	Sediment Removal	L.Sum	1	$26,400.00	$26,400.00	$19,800.00	$6,600.00
5.	Granular Filter for Rock Riffles	L.Sum	1	$33,000.00	$33,000.00	$13,200.00	$19,800.00
6.	Filter Rock for Rock Riffles	L.Sum	1	$47,000.00	$47,000.00	$18,800.00	$28,200.00
7.	Base Rock for Rock Riffles	L.Sum	1	$127,900.00	$127,900.00	$51,160.00	$76,740.00
8.	Cobbles and Chinking Rock for Rock Riffles	L.Sum	1	$1,600.00	$1,600.00	$640.00	$960.00
9.	Boulders for Rock Riffles	L.Sum	1	$57,100.00	$57,100.00	$22,840.00	$34,260.00
10.	Install Downstream Sheetpile Cutoff	L.Sum	1	$51,000.00	$51,000.00	$20,400.00	$30,600.00
11.	Improved Angler Access	L.Sum	1	$15,000.00	$15,000.00	$6,000.00	$9,000.00
12.	Stabilize Downstream Left River Bank	L.Sum	1	$44,000.00	$44,000.00	$33,000.00	$11,000.00
13.	Stabilize Downstream Right River Bank	L.Sum	1	$53,000.00	$53,000.00	$39,750.00	$13,250.00
14.	Site Restoration	L.Sum	1	$20,000.00	$20,000.00	$15,000.00	$5,000.00
				Total Construction	$725,200.00	$427,490.00	$297,710.00
				Contingencies (20%)	$145,800.00	$42,749.00	$103,051.00
				Engineering - Design	$72,500.00	$25,375.00	$47,125.00
				Engineering - Construction	$58,000.00	$34,199.20	$23,800.80
				Geotechnical Engineering/Soil Borings	$5,000.00	$1,750.00	$3,250.00
				Legal Fees	$500.00	$0.00	$500.00
				Administrative Expenses	$500.00	$0.00	$500.00
				Right of Way	$2,500.00	$0.00	$2,500.00
				TOTAL PROJECT COST	**$1,010,000.00**	**$531,563.20**	**$478,436.80**

moore engineering, inc.



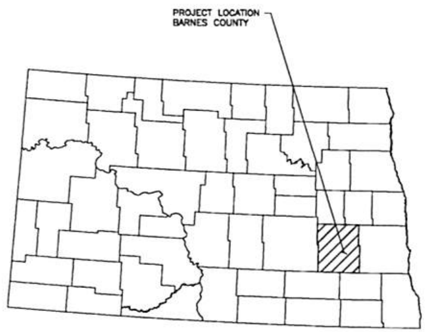
VICINITY MAP
KATHRYN DAM REPURPOSING PROJECT
SHEYENNE RIVER, KATHRYN, BARNES CO.

Created By: GZ Date Created: 5/16/2016 Date Saved: 05/16/16 Date Plotted: 05/16/16 Date Exported: 05/16/16
Plotted By: gary.zimmer Parcel Date: NA Aerial Image: NA Elevation Data: NA
Horizontal Datum: NAD 1983 StatePlane North Dakota South FIPS 3302 Feet Vertical Datum: NAVD1988
T:\Projects\17300\17300\17300_sht1_85x11.mxd

N W E S

moore engineering, inc.

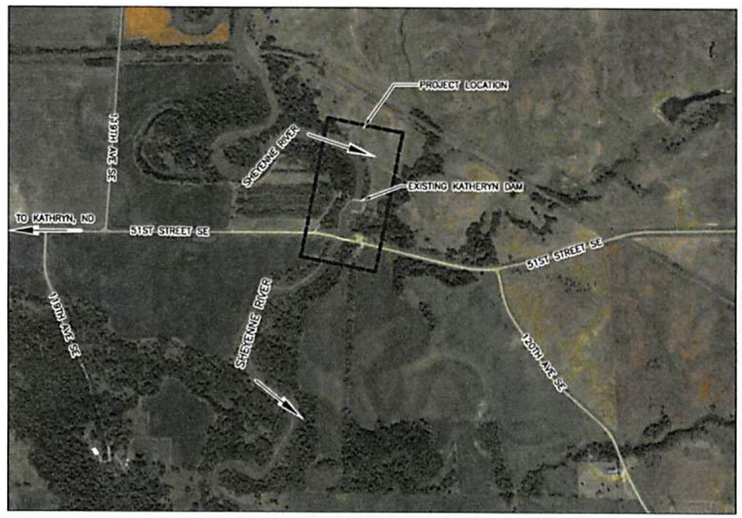
KATHRYN DAM REPURPOSING PROJECT
BARNES COUNTY WATER RESOURCE DISTRICT
SHEYENNE RIVER
KATHRYN, NORTH DAKOTA



LOCATION MAP
NOT TO SCALE

TABLE C–01

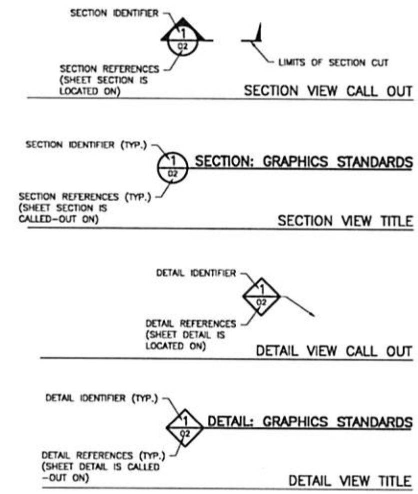
ABBREVIATIONS	
ABBREVIATION	DESCRIPTION
APPROX.	APPROXIMATE
CFS	CUBIC FEET PER SECOND
ELEV.	ELEVATION
H	HORIZONTAL
L.W.L.	LOW WATER LEVEL
NAVD	NORTH AMERICAN VERTICAL DATUM
NAD	NORTH AMERICAN DATUM
ND	NORTH DAKOTA
NE	NORTH EAST
SE	SOUTH EAST
SF	SQUARE FEET
STA	STATION
TBD	TO BE DETERMINED
T.O.	TOP OF
TYP	TYPICAL
V	VERTICAL
WSE	WATER SURFACE ELEVATION



VICINITY MAP
NOT TO SCALE

GENERAL NOTES:

1. LEFT BANK AND RIGHT BANK NOMENCLATURE IN THIS DRAWING SET REFERS TO THE LEFT AND RIGHT RIVER BANKS WHEN LOOKING DOWNSTREAM



SHEET INDEX

NORTH DAKOTA ONE CALL:
CALL BEFORE YOU DIG.
1-800-795-0555 or 811

THIS DOCUMENT WAS ORIGINALLY ISSUED AND SEALED BY XXXXX XXXXXXXXXX, REGISTRATION NUMBER PE-XXXX ON XX/XX/XXXX AND THE ORIGINAL DOCUMENT IS STORED AT BARR ENGINEERING COMPANY, 234 WEST CENTURY AVENUE, BISMARCK, ND 58503

CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD-LOCATING ALL SITE UTILITIES, PRIVATE AND PUBLIC, PRIOR TO STARTING THE WORK. ALL UTILITIES SHOWN ON THE PLANS ARE APPROXIMATE. ANY UTILITIES DAMAGED BY CONTRACTOR SHALL BE REPAIRED BY CONTRACTOR TO THE SATISFACTION OF THE UTILITY OWNER.

30% DRAFT SUBMITTAL

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION

RELEASED TO/FOR	A	B	C	0	1	2	3
CLIENT	1/27/16						
BID							
CONSTRUCTION							
DATE RELEASED							

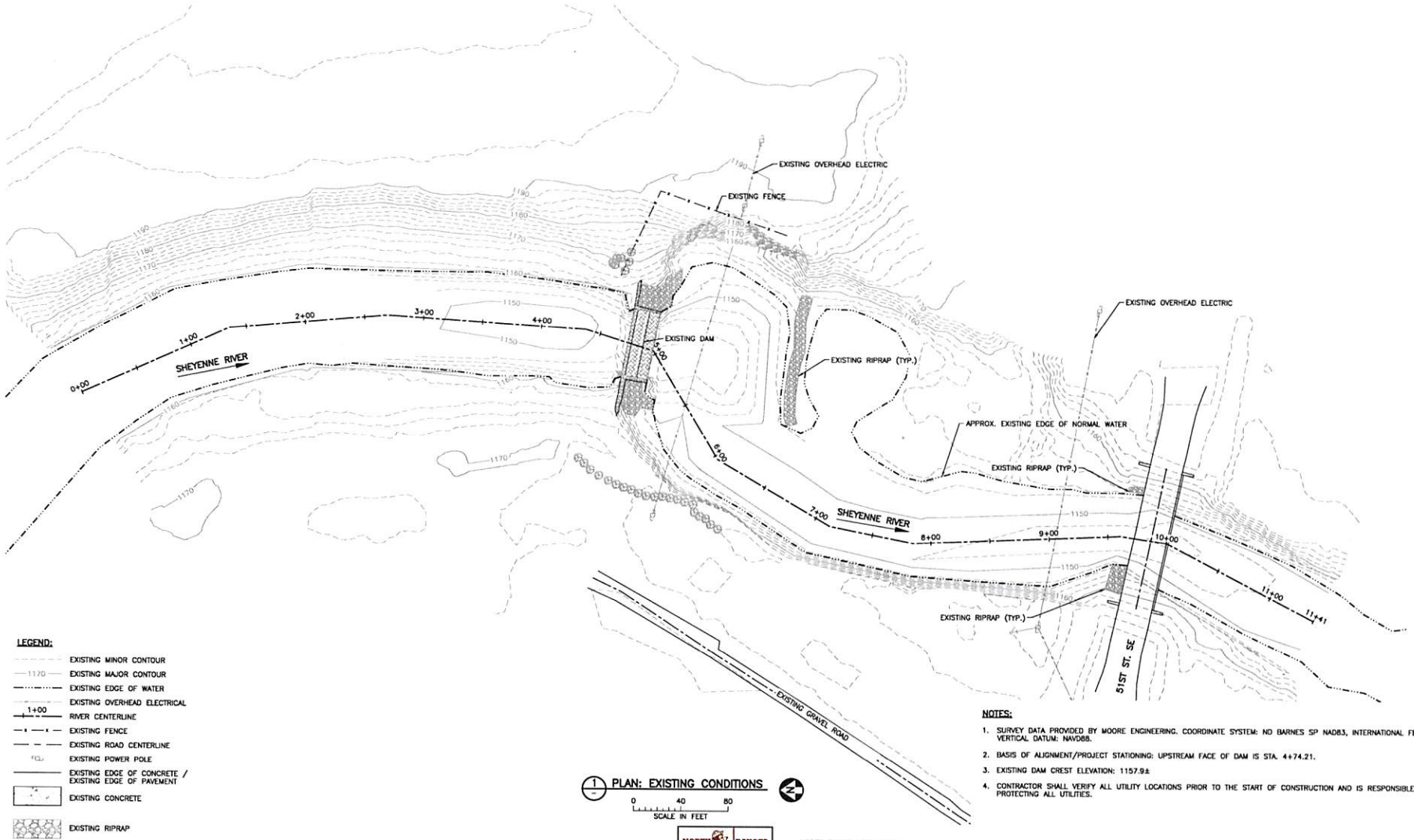
BARR
Project Office:
BARR ENGINEERING CO.
234 WEST CENTURY AVENUE
BISMARCK, ND 58503
Ph: 1-800-632-2277
Fax: (701) 222-6371
www.barr.com
Corporate Headquarters:
Minneapolis, Minnesota
Ph: 1-800-632-2277

Scale	AS SHOWN
Date	1/18/2016
Drawn	STD
Checked	MTP2
Designed	STD
Approved	

BARNES COUNTY
WATER RESOURCE DISTRICT

KATHRYN DAM REPURPOSING PROJECT
KATHRYN, NORTH DAKOTA
TITLE SHEET

BARR PROJECT No. 34021004.00
CLIENT PROJECT No.
DWG. No. C–01
REV. No. A



LEGEND:

- EXISTING MINOR CONTOUR
- 1170 EXISTING MAJOR CONTOUR
- EXISTING EDGE OF WATER
- EXISTING OVERHEAD ELECTRICAL
- 1+00 RIVER CENTERLINE
- EXISTING FENCE
- EXISTING ROAD CENTERLINE
- EXISTING POWER POLE
- EXISTING EDGE OF CONCRETE / EXISTING EDGE OF PAVEMENT
- EXISTING CONCRETE
- EXISTING RIPRAP
- EXISTING TREE

NOTES:

1. SURVEY DATA PROVIDED BY MOORE ENGINEERING. COORDINATE SYSTEM: ND BARNES SP NAD83, INTERNATIONAL FEET. VERTICAL DATUM: NAVD88.
2. BASIS OF ALIGNMENT/PROJECT STATIONING: UPSTREAM FACE OF DAM IS STA. 4+74.21.
3. EXISTING DAM CREST ELEVATION: 1157.9±
4. CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO THE START OF CONSTRUCTION AND IS RESPONSIBLE FOR PROTECTING ALL UTILITIES.

1 PLAN: EXISTING CONDITIONS

0 40 80
SCALE IN FEET

NORTH DAKOTA ONE CALL
CALL BEFORE YOU DIG.
1-800-795-0555 or 811

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30% DRAFT SUBMITTAL

NO.	BY	CHK	APP	DATE	REVISION DESCRIPTION

	7/7/16
CLIENT	
BID	
CONSTRUCTION	

RELEASED TO/FOR: A | B | C | 0 | 1 | 2 | 3 — DATE RELEASED

BARR
Project Office:
BARR ENGINEERING CO.
234 WEST CENTURY AVE.
BISMARCK, ND
58503
Ph: 1-800-632-2277
Fax: (701) 222-6371
www.barr.com
Corporate Headquarters:
Minneapolis, Minnesota
Ph: 1-800-632-2277

Scale	AS SHOWN
Date	1/18/2016
Drawn	STD
Checked	MTP2
Designed	MTP2
Approved	

BARNES COUNTY
WATER RESOURCE DISTRICT

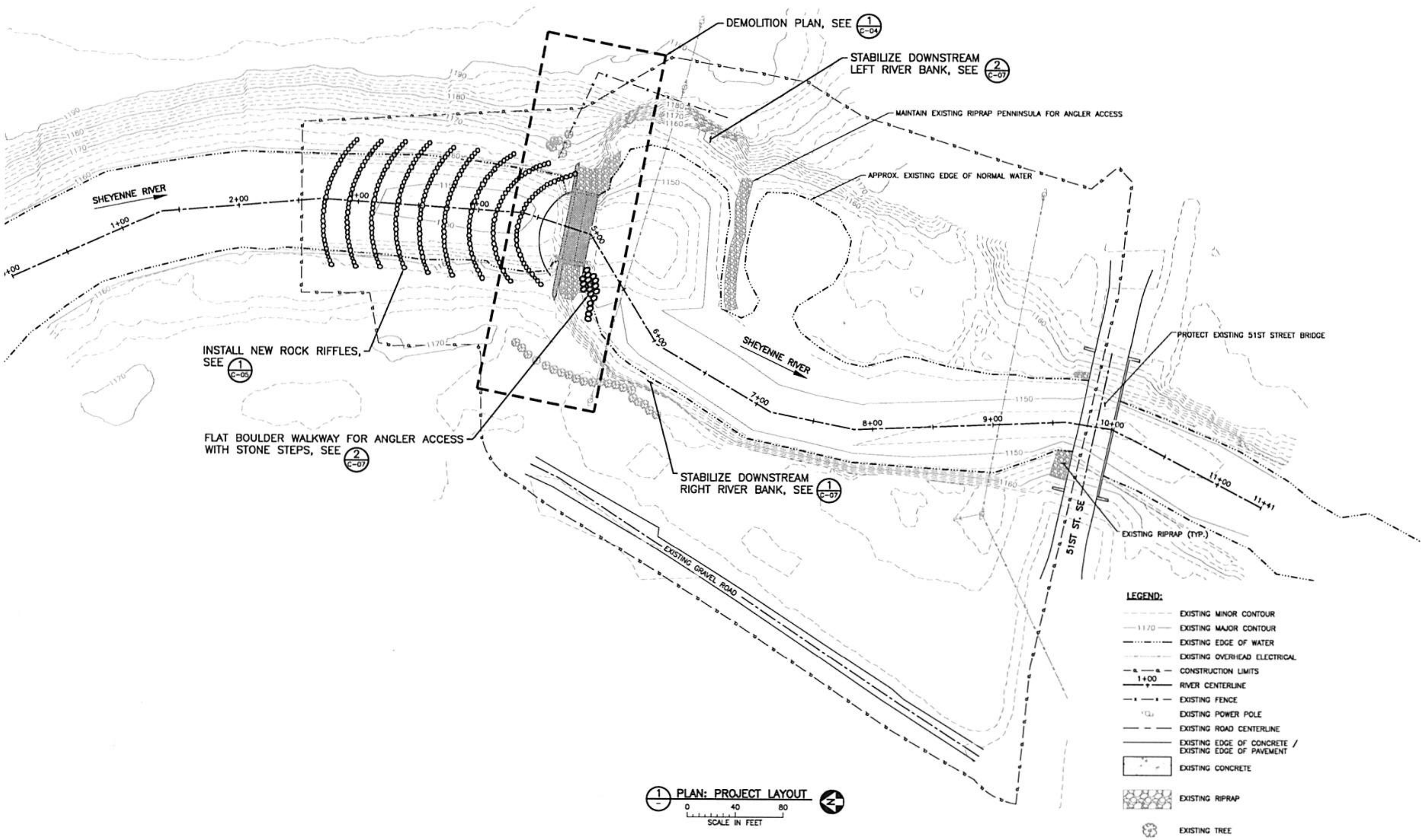
KATHRYN DAM REPURPOSING PROJECT
KATHRYN, NORTH DAKOTA

EXISTING CONDITIONS PLAN

BARR PROJECT No. 34021004.00
CLIENT PROJECT No.
DWG. No. C-02
REV. No. A

CADD USER: Stephanie T. Dor FILE: M:\DESIGN\34021004.00\3402100400_C-03.DWG PLOT SCALE: 1:2 PLOT DATE: 1/26/2016 3:06 PM

BAR M:\AutoCAD 2011\AutoCAD 2011 Support\enu\Template\Barr_2011_Template.dwt Plot at 1 10/05/2010 14:03:50



1 PLAN: PROJECT LAYOUT

0 40 80
SCALE IN FEET

30% DRAFT SUBMITTAL

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NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION

RELEASED TO/FOR	A	B	C	0	1	2	3
CLIENT	1/7/16						
BID							
CONSTRUCTION							

DATE RELEASED

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Corporate Headquarters: Minneapolis, Minnesota
Ph: 1-800-632-2277

Project Office:
BARR ENGINEERING CO.
234 WEST CENTURY AVE.
BISMARCK, ND
58503
Ph: 1-800-632-2277
Fax: (701) 222-8371
www.barr.com

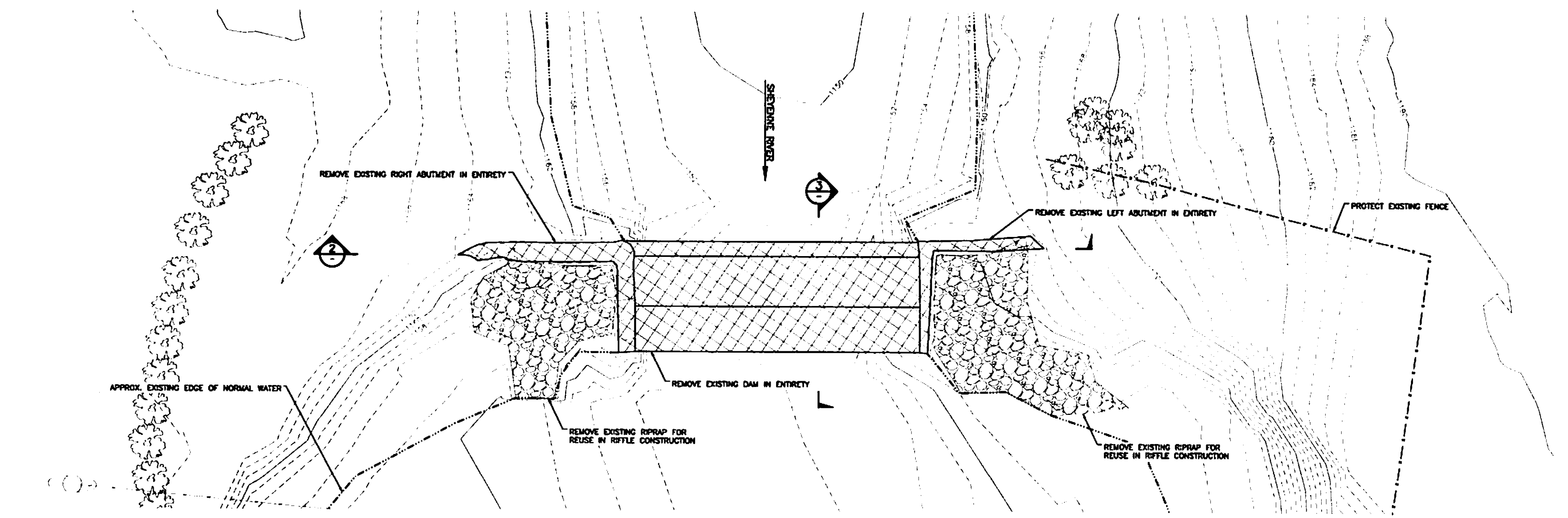
Scale	AS SHOWN
Date	1/20/2016
Drawn	STD
Checked	MTP2
Designed	MTP2
Approved	

BARNES COUNTY
WATER RESOURCE DISTRICT

KATHRYN DAM REPURPOSING PROJECT
KATHRYN, NORTH DAKOTA

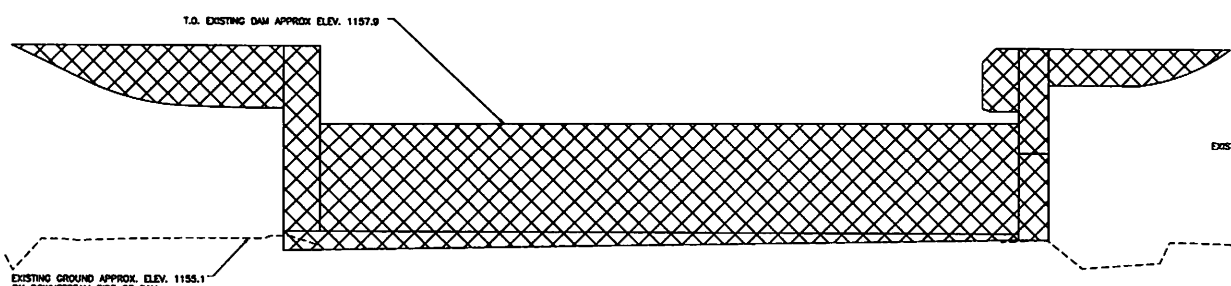
PROJECT LAYOUT PLAN

BARR PROJECT No. 34021004.00
CLIENT PROJECT No.
DWG. No. C-03
REV. No. A



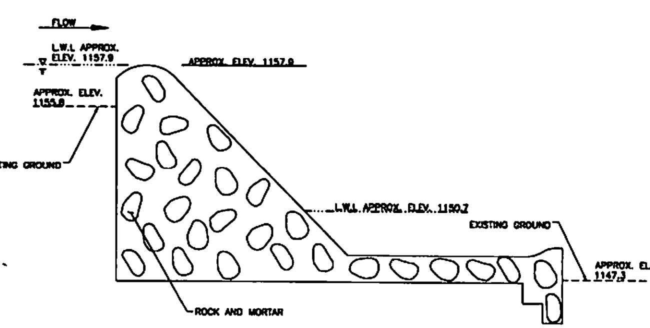
1 / C-03 PLAN: DAM DEMOLITION

0 10 20 SCALE IN FEET



2 / C-03 ELEVATION: DAM DEMOLITION

0 5 10 SCALE IN FEET



3 / - SECTION: EXISTING DAM

0 3 6 SCALE IN FEET

NOTES:

1. REMOVE EXISTING DAM AND APPURTENANCES IN ENTIRETY UNLESS NOTED OTHERWISE.
2. ABUTMENT REMOVAL NOT SHOWN ON SECTION VIEW.

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30% DRAFT SUBMITTAL

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION

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BID							
CONSTRUCTION							
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	DATE RELEASED						

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Project Office: BARR ENGINEERING CO. 234 WEST CENTURY AVE. BISMARCK, ND 58503 Ph: 1-800-632-2277 Fax: (701) 222-4371 www.barr.com

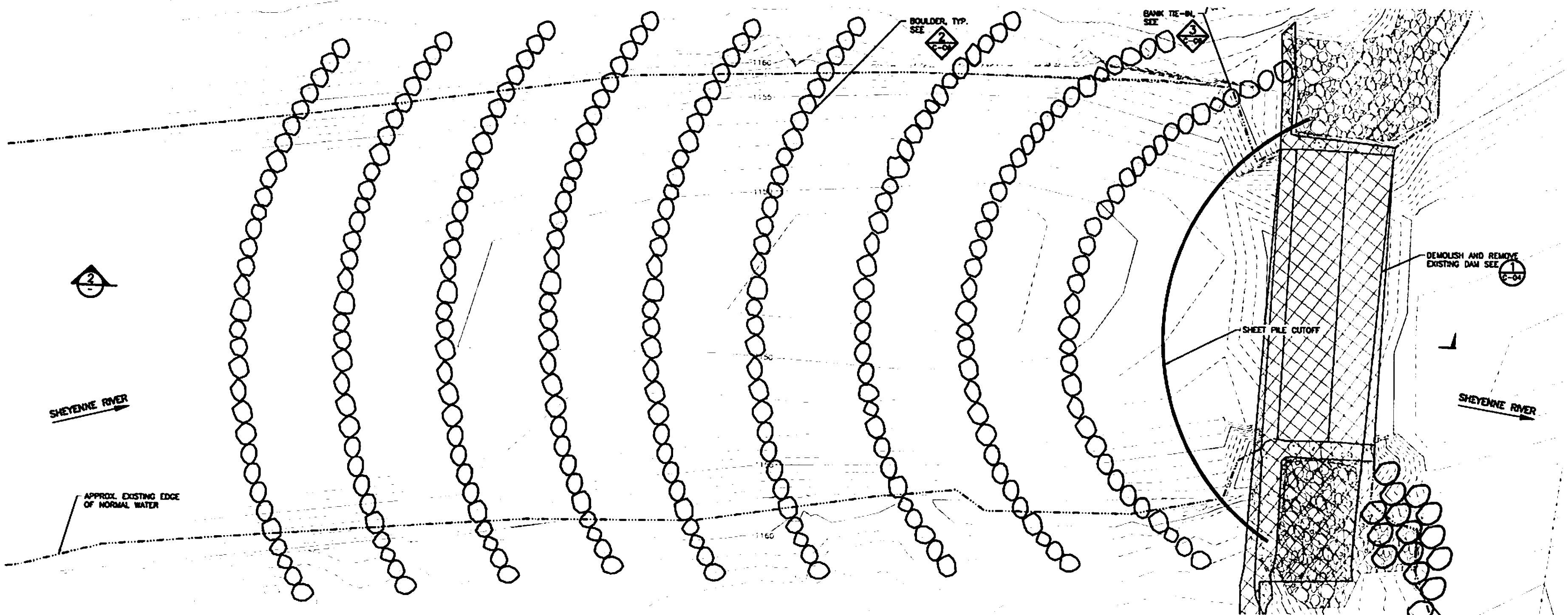
Scale	AS SHOWN
Date	1/18/2016
Drawn	STD
Checked	MTP2
Designed	MTP2
Approved	

BARNES COUNTY
WATER RESOURCE DISTRICT

KATHRYN DAM REPURPOSING PROJECT
KATHRYN, NORTH DAKOTA

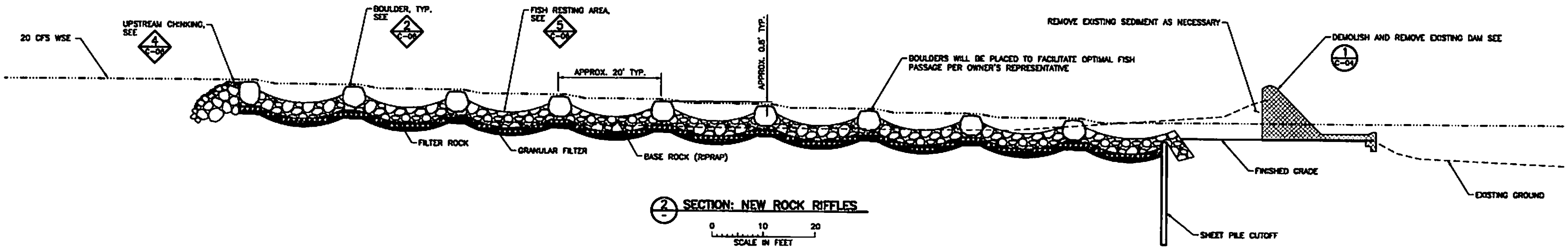
DEMOLITION
PLAN, ELEVATION AND SECTION

BARR PROJECT No. 34021004.00
CLIENT PROJECT No.
DWG. No. C-04
REV. No. A



1 PLAN: NEW ROCK RIFFLES

0 10 20 SCALE IN FEET



2 SECTION: NEW ROCK RIFFLES

0 10 20 SCALE IN FEET

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NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION

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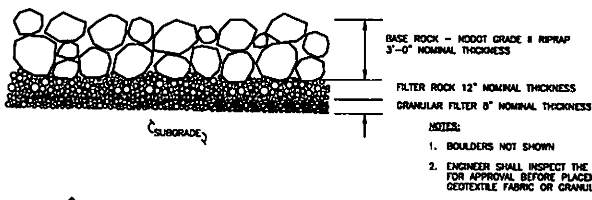
Scale	AS SHOWN
Date	1/20/2016
Drawn	STD
Checked	MTP2
Designed	MTP2
Approved	

BARNES COUNTY
WATER RESOURCE DISTRICT

KATHRYN DAM REPURPOSING PROJECT
KATHRYN, NORTH DAKOTA

ROCK RIFFLE
PLAN AND PROFILE

BARR PROJECT No. 34021004.00
CLIENT PROJECT No.
DWG. No. C-05 REV. No. A

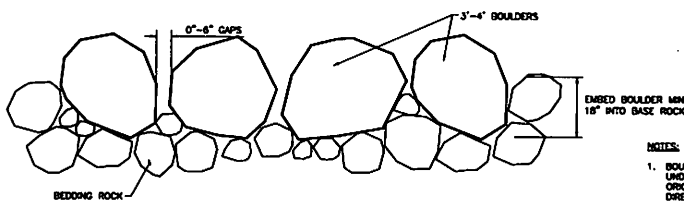


NOTES:

1. BOULDERS NOT SHOWN
2. ENGINEER SHALL INSPECT THE SUBGRADE FOR APPROVAL BEFORE PLACEMENT OF GEOTEXTILE FABRIC OR GRANULAR FILTER

1 / C-06 DETAIL: ROCK RAPIDS (TYP.)

0 3 6 SCALE IN FEET

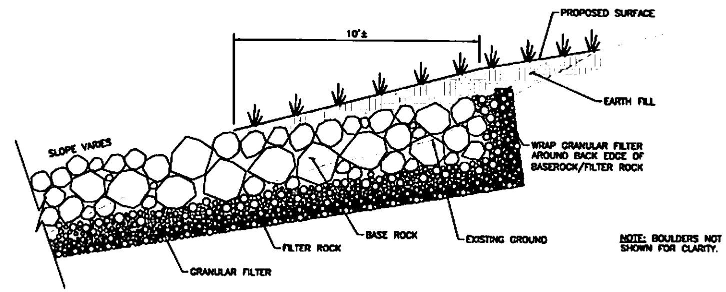


NOTES:

1. BOULDER GAPS WILL BE ADJUSTED UNDER FLOW CONDITIONS AFTER ORIGINAL PLACEMENT UNDER THE DIRECTION OF THE ENGINEER
2. BOULDERS SHALL BE 4' – 5' NOMINAL DIAMETER FOR MOST UPSTREAM RIFFLE

2 / C-06 DETAIL: BOULDERS

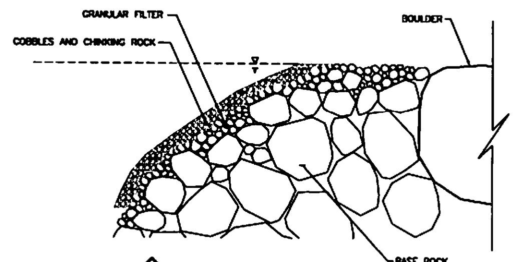
0 3 6 SCALE IN FEET



NOTE: BOULDERS NOT SHOWN FOR CLARITY.

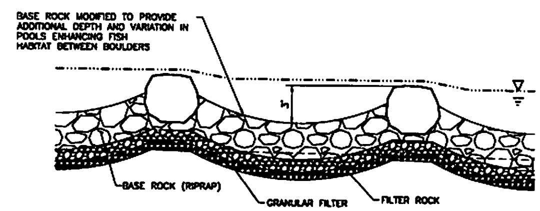
3 / C-06 DETAIL: BANK TIE-IN (TYP.)

0 3 6 SCALE IN FEET



4 / C-06 DETAIL: UPSTREAM CHINKING

0 1 2 3 4 SCALE IN FEET



5 / C-06 DETAIL: FISH RESTING POOL

0 5 10 SCALE IN FEET

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NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION

CLIENT							
BID							
CONSTRUCTION							
RELEASED TO/FOR	A	B	C	0	1	2	3
	DATE RELEASED						

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Project Office: BARR ENGINEERING CO. 234 WEST CENTURY AVE. BISMARCK, ND 58503 Ph: 1-800-632-2277 Fax: (701) 222-6371 www.barr.com

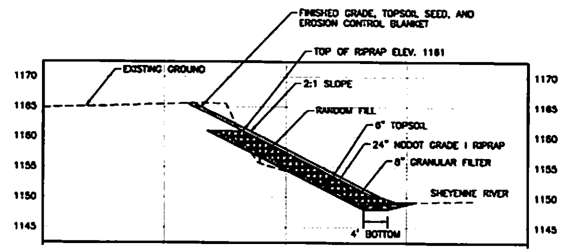
Scale	AS SHOWN
Date	1/20/2016
Drawn	STD
Checked	MTP2
Designed	MTP2
Approved	

BARNES COUNTY
WATER RESOURCE DISTRICT

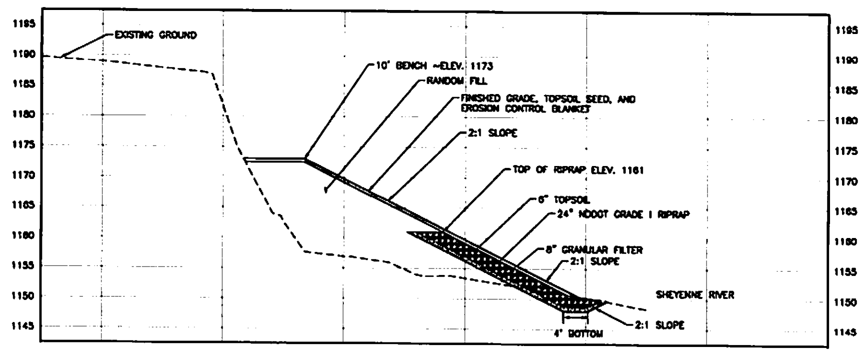
KATHRYN DAM REPURPOSING PROJECT
KATHRYN, NORTH DAKOTA

ROCK RIFFLE AND EARTHWORK
SECTION AND DETAILS

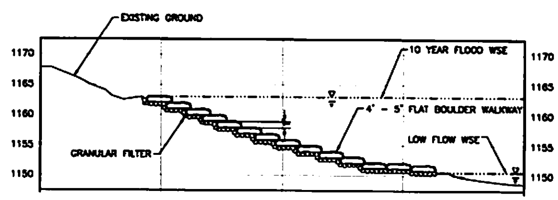
BARR PROJECT No. 34021004.00
CLIENT PROJECT No.
DWG. No. C-06
REV. No. A



SECTION: RIGHT BANK RESTORATION TYPICAL



SECTION: LEFT BANK RESTORATION TYPICAL



SECTION: RIGHT BANK ANGLER ACCESS

NOTES:

1. HEIGHT BETWEEN BOULDERS IN WALKWAY SHALL BE ON AVERAGE NO MORE THAN 1 FOOT.

30% DRAFT SUBMITTAL

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NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION

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Project Office: BARR ENGINEERING CO., 234 WEST CENTURY AVE., BISMARCK, ND 58503, Ph: 1-800-632-2277, Fax: (701) 222-4371, www.barr.com
Corporate Headquarters: Minneapolis, Minnesota, Ph: 1-800-632-2277

Scale	AS SHOWN
Date	1/22/2016
Drawn	STD
Checked	MTP2
Designed	MTP2
Approved	

BARNES COUNTY
WATER RESOURCE DISTRICT

KATHRYN DAM REPURPOSING PROJECT
KATHRYN, NORTH DAKOTA

ANGLER ACCESS AND EARTHWORK
SECTION AND DETAILS

BARR PROJECT No. 34021004.00
CLIENT PROJECT No.
DWG. No. C-07
REV. No. A

CADD USER: Stephanie T. Orr FILE: M:\DESIGN\34021004.00\34021004.00_C-07.DWG PLOT SCALE: 1:2 PLOT DATE: 1/27/2016 7:15 AM

APPENDIX J

RECEIVED
JUN 22 2018
STATE WATER COMMISSION

moore engineering, inc.

444 Sheyenne Plaza, Suite 301, West Fargo, ND 58078
701.282.4692 | mooreengineeringinc.com

LETTER OF TRANSMITTAL

TO: ND State Water Commission
ATTN: Cost-Share Program
900 E. Boulevard Ave.
Bismarck, ND 58505-0850

DATE: June 21, 2018
PROJECT NO.: 17889
RE:

COPIES	NO.	DESCRIPTION
1		Cost Share Request for Painted Woods Lake Area Flood Damage Reduction

THESE ARE TRANSMITTED AS CHECKED BELOW:

- [x] For approval
- [ ] For your use
- [ ] As requested
- [ ] For review
- [ ] Approved as submitted
- [ ] Approved as noted
- [ ] Returned for corrections
- [ ] Resubmit for approval
- [ ] _____

REMARKS:

COPY TO: Lynn Oberg - McLean Co. WRB

SIGNED: Roger Clay

COST-SHARE REQUEST FORM

NORTH DAKOTA STATE WATER COMMISSION
DEVELOPMENT DIVISION
SFN 60439 (5/2018)

This form is to be filled out by the project or program sponsor with State Water Commission staff assistance as needed. Applications for cost-share are accepted at any time. However, applications received less than 30 days before a State Water Commission meeting will be held for consideration at the next scheduled meeting.

Please answer the following questions as completely as possible. Supporting documents such as maps, detailed cost estimates, and engineering reports should be attached to this form. If additional space is required, please use extra sheets as necessary.

For information regarding cost-share program eligibility see the *State Water Commission Cost-Share Policy, Procedure, and General Requirements* – available upon request or at www.swc.nd.gov.

Project, Program, Or Study Name
Painted Woods Lake Flood Damage Reduction and Habitat Enhancement

Sponsor(s)
McLean County Water Resource District

County	City	Township/Range/Section
McLean		T134N R81W

Description Of Request ☑ New ☐ Updated (previously submitted)

Specific Needs Addressed By The Project, Program, Or Study
See attached letter

If Study, What Type ☐ Water Supply ☐ Hydrologic ☐ Floodplain Mgmt. ☐ Feasibility ☐ Other

If Project/Program

☐ Flood Control	☐ Multi-Purpose	☐ Bank Stabilization	☐ Dam Safety/EAP
☐ Recreation	☐ Water Supply	☐ Snagging & Clearing	☐ Property Acquisition
☐ Irrigation	☐ Water Retention	☑ Rural Flood Control	☐ Other

Jurisdictions/Stakeholders Involved
See attached letter: McLean County Water Resource District, North Dakota State Water Commission, North Dakota Game and Fish, Garrison Diversion Conservancy District

Description Of Problem Or Need And How Project Addresses That Problem Or Need

See Attached Letter

Has Feasibility Study Been Completed?	☑ Yes	☐ No	☐ Ongoing	☐ Not Applicable
Has Engineering Design Been Completed?	☐ Yes	☐ No	☑ Ongoing	☐ Not Applicable
Have Land Or Easements Been Acquired?	☑ Yes	☐ No	☐ Ongoing	☐ Not Applicable

Have You Applied For Any State Permits? ☑ Yes ☐ No ☐ Not Applicable

If Yes, Please Explain
Applications have been submitted for construction and drainage permits

Have You Been Approved For Any State Permits? ☐ Yes ☑ No ☐ Not Applicable

If Yes, Please Explain

Have You Applied For Any Local Permits? ☐ Yes ☐ No ☑ Not Applicable

If Yes, Please Explain

Have You Been Approved For Any Local Permits? ☐ Yes ☐ No ☑ Not Applicable

If Yes, Please Explain

Briefly Explain The Level Of Review The Project Or Program Has Undergone
The initial hydrologic and hydraulic feasibility study titled "Painted Woods Lake Mitigation Study", dated December 2015, has been provided to the State Water Commission. There has been multiple stakeholder meetings and have ongoing contact with Reclamation, Fish and Wildlife Service, ND Game and Fish, Garrison Diversion Conservancy District, Burleigh County WRD, and others.

Do You Expect Any Obstacles To Implementation (i.e., problems with land acquisition, permits, funding, local, opposition, environmental concerns, etc.)?

Funding Timeline (carefully consider when SWC cost-share will be needed)

Source	Total Cost	2017-2019 7/1/17-6/30/19	2019-2021 7/1/19-6/30/21	Beyond 7/1/21
Federal	$ 0	$	$	$
State Water Commission	$ 278,367.88	$ 278,367.88	$ 189,290.16	$
Other State	$ 338,132.12	$ 338,132.12	$ 229,929.84	$
Local	$ 20,000	$ 20,000	$ 13,600	$
Total	$ 636.50	$ 636.50	$ 432.82	$ 0.00

List All Other State Of North Dakota Funding Sources (Grant or Loan), For Which You Have Applied

Game and Fish Department $120,000, Outdoor Heritage Fund $218,132.12

Please Explain Implementation Timelines, Considering All Phases And Their Current Status

Final design would occur October 2018 to February 2019, bidding March 2019, construction June - September 2019.

Have Assessment Districts Been Formed? ☐ Yes ☐ No ☐ Ongoing ☑ Not Applicable

Submitted By	Date
Lynn Oberg	

Address	City	State	ZIP Code
1237 Riverside Lane	Washburn	ND	58577

Telephone Number	Sponsor Email	Engineer Email
701 400 7793	obergm@westriv.com	rclay@mooreengineeringinc.com

I Certify That, To The Best Of My Knowledge, The Provided Information Is True And Accurate.

Signature	Date
Lynn Oberg	6-19-2018

MAIL TO:
ND State Water Commission • ATTN: Cost-Share Program
900 E Boulevard Ave. • Bismarck, ND 58505-0850

June 20, 2018

Mr. Garland Erbele, PE
State Engineer
900 East Boulevard Avenue, Dept. 770
Bismarck ND 58505-0850

Dear Garland:

Re: Cost Share Request - Painted Woods Lake Area Flood Damage Reduction Project

Project Overview
The Painted Woods Lake Area Flood Damage Reduction Project (Project) is centered on Painted Woods Lake, a Sovereign Water of the State of North Dakota and an area of statewide importance. The Project area is located at the outlet of the 305 square mile Painted Woods Creek watershed, which largely drains privately owned land and which lies in parts of McLean (1/3 of watershed) and Burleigh Counties (2/3 of watershed). There is also some water received in Painted Woods Lake that is released into the headwaters of Painted Woods Creek at New Johns Lake from the Garrison Diversion Project. The outlet of the Painted Woods Creek watershed has seen some dramatic flooding impacts over the last 30 years, with there being significant damage to private and public lands near Painted Woods Lake and to infrastructure at Painted Woods Lake. It is apparent that the Painted Woods Creek watershed does not have an adequate outlet and that private lands, public lands, wildlife, fishery and recreation resources in the area are being adversely affected by flooding.

In 2016, a 255.6 acre parcel of land was purchased on the east side of Painted Woods Lake for resolving water management issues and for enhanced natural resource management (see Attachment 1). The purchase was approved by the Governor of North Dakota, the Natural Area Acquisition Advisory Committee and fully supported by the McLean County Commission. Purchase of this land was led by the North Dakota Natural Resources Trust. It was supported by $1,113,000 of funding from the North Dakota Natural Resources Trust, the American Foundation for Wildlife, Pheasants for the Future (private donation total $286,000), North Dakota Game and Fish ($286,000) and federal sources. After the purchase the ownership of this parcel was transferred to the North Dakota Game and Fish Department (NDGF) who are managing the land as a Wildlife Management Area (WMA). Securing this land will allow a high flow channel to mitigate flood damages to be constructed along a natural channel named Goose Creek, and for wildlife enhancements to be constructed at the same time.

On the west side of Painted Woods Lake is a federal Wildlife Development Area (WDA) owned by the US Fish and Wildlife Service (FWS) and managed by the NDGF. There is also a lake level control structure which is in need of replacement. Both the FWS and NDGF are Project partners of the McLean County Water Resource District.

Painted Woods Lake has been a state wide resource for hunting, fishing and general recreation for over a hundred years and it is a long term objective of the Project to improve and protect this state owned lake and the surrounding public resources. In the last 50 years, however, access to the lake has been limited. One public access point was created by the purchase of the federal WDA in the early 1980s. It is also a goal of the Project to improve public access to the area to the extent feasible as flood mitigation and habitat enhancement measures are implemented.

Funding Request

The McLean County Water Resource Board (the "Board") originally requested NDSWC cost-share in March of 2015 in the amount of $24,500, which was approved by the State Engineers office. This enabled the Board to conduct stakeholder meetings, evaluate alternatives to alleviate the flooding issues, and complete the hydrologic and hydraulic study titled "Painted Woods Lake Mitigation Study," dated January 2016. We greatly appreciate your support.

Additional NDSWC cost-share funds were requested in February 2016 to support the Board in its expansion of the Scope of Work for the Project and to continue stakeholder involvement. At that time development of preliminary design details and cost estimates were added to the project for three alternatives as follows (see Figure 1):

1. A high flow channel (Alternative 3A) on the east side of Painted Woods Lake generally following the natural but degraded Goose Creek channel. It will be constructed to add additional capacity to Painted Woods Creek on the east side of Painted Woods Lake to prevent break out flows to the Missouri River west of Painted Woods Creek at undesirable locations.

Phase 1 of the high flow channel will be constructed across the new WMA (see Figure C-201). It will immediately provide flood relief by creating a channel through relatively high ground on the north side of the WMA, providing relief for ponded flood waters on the northeast side of Painted Woods Lake. There will be habitat features along the perimeter of the high flow channel to enhance wildlife values.

2. Preliminary design of a new water level control structure for Painted Woods Lake, designated as Alternate 3C. The new structure would replace the existing aging and unsafe structure and would include features to improve fisheries and help control aquatic vegetation. Fishery enhancement would involve restoring fish passage from the Missouri River into the lake and Painted Woods Creek immediately upstream of the lake. A low flow draw down gate is included in the structure. The ability to raise the lake water level up to 2-ft above the normal water level on a temporary basis is anticipated be added to the structure in the future for the control of aquatic vegetation.

3. Bank restoration along Merry's Creek below the Painted Woods Lake water level control structure (the principal outlet to the Missouri River for the Painted Woods Creek watershed, designated as Alternative 5).

Preliminary Plans and Cost Estimates were completed for the three selected alternatives and have been submitted to the State Engineers Office. Additional stakeholder meetings were also held. One result of the preliminary design work is that Project implementation will be phased into multiple years as funding from a variety of stakeholders becomes available.

Final Design and Construction
The next step in the Project includes final design and construction for the first segment of the High Flow Channel. Final design will include preparation of final plans, specifications and a bid package. There will be continued stakeholder involvement. A pre-application meeting was held with NDSWC staff in June 2018. Permit applications has been submitted to the NDSWC.

Cost Share and Funding Sources
The Board has been communicating with other Project stakeholders to find additional funding sources. To date we have obtained the following commitments for funding:

The ND Game and Fish is providing $120,000 to support (see attached letter).

The Garrison Diversion Conservancy District is providing $20,000 in support (see attached letter).

A grant application has been submitted to the Outdoor Heritage Fund for $218,132.12.

Final Design and Construction Cost Share Funding Request
The Board respectfully requests that the NDSWC approve the additional cost-share amount for final design and construction of the following project:

1. $278,367.88 for Alternate 3A – Painted Woods Lake High Flow Channel Segment 1 (45% cost share - Rural Flood Control)

The attached "Opinion of Probable Cost" was prepared on the basis of quantities estimated during the preliminary engineering phase and unit prices selected from recent projects completed by Moore Engineering or from relevant bid results obtained by the North Dakota Department of Transportation. A table showing all the cost share contributions is attached. Additional letters of support are also attached.

This work is expected to be completed in the 2019 construction season. If you have any questions, please feel free to contact me or our Project Manager, Roger Clay, PE, at Moore Engineering, Inc., at 701-551-1083.

Sincerely,

MCLEAN COUNTY WATER RESOURCE BOARD

Lynn Oberg
Chairman

Enclosures

Attachment 1

State of
North Dakota
Office of the Governor

Jack Dalrymple
Governor

April 28, 2016

Peter Ressler, President
American Foundation for Wildlife
PO Box 236
Bismarck, ND 58502

RE: American Foundation for Wildlife proposal to acquire land in McLean County

Dear Mr. Ressler;

Pursuant to N.D.C.C. § 10-06.1-10 and subject to its requirements and the recommendations of the Natural Areas Acquisition Advisory Committee, I approve the acquisition of 255.6 acres, more or less, of land owned by Robert Landgren in McLean County by the American Foundation for Wildlife.

My decision is based on the fact that the Natural Areas Acquisition Advisory Committee provided a 6-2 vote to approve the recommendation, based on the potential the purchase has for resolving water management issues, while also providing for enhanced natural resource management and public recreation.

The land will be deeded to the North Dakota Game and Fish Department (Department), who will manage and maintain it. The Department has agreed to accept transfer of the property and will pay taxes, as required by state law. The property will be open for public purposes such as hunting, nature study, and general public enjoyment. The Department will allow easements on the property that benefit the State of North Dakota. Pursuant to these terms, I approve this acquisition.

Thank you for your continued work in cooperative agreements with landowners and local officials regarding stewardship and management of natural resources in the State of North Dakota.

Sincerely,

Jack Dalrymple
Governor

C: Natural Areas Acquisition Advisory Committee
McLean County Board of Commissioners
Natural Resources Trust

COMMISSIONER
DOUG GOEHRING

ndda@nd.gov
www.nd.gov/ndda

NORTH DAKOTA
DEPARTMENT OF AGRICULTURE
STATE CAPITOL
600 E BOULEVARD AVE DEPT 602
BISMARCK ND 58505-0020

MEMORANDUM

Date: March 30, 2016

To: Jack Dalrymple, Governor

From: Doug Goehring, Chairman
Natural Areas Acquisition Advisory Committee (NAAAC)

Re: NAAAC recommendation on American Foundation for Wildlife proposal to acquire land in McLean County

The Natural Areas Acquisition Advisory Committee (NAAAC) convened pursuant to the authority granted by § 10-6.1-10 of the North Dakota Century Code (NDCC) to provide a recommendation on a proposal from American Foundation for Wildlife to acquire land in McLean County.

As required by § 10-6.1-10, the NAAAC held a local hearing on March 10, 2016 at the McLean County Courthouse in Washburn. The approved hearing minutes are attached for your review, I have also attached the public comments that were received regarding the proposed acquisition and the recommendation of the McLean County Commission.

The NAAAC Committee held a conference call on March 18, 2016 to develop a recommendation on the proposal. Steve Lee, McLean County Commission, moved to recommend approval of the proposed acquisition, Mark Zimmerman, ND Parks and Recreation, seconded the motion.

The motion passed on a vote of 6-2 with no abstentions. The voting record follows:

YEA

Doug Goehring, ND Agriculture Commissioner
Mark Zimmerman, ND Parks and Recreation
Scott Peterson, ND Game and Fish
Steve Lee, McLean County Commission
Larry Kotchman, ND State Forester
Mark Watne, ND Farmers Union

NAY

Mark Giedd, ND Stockman's Association
Daryl Lies, ND Farm Bureau

COMMISSIONER
DOUG GOEHRING

ndda@nd.gov
www.nd.gov/ndda

NORTH DAKOTA
DEPARTMENT OF AGRICULTURE
STATE CAPITOL
600 E BOULEVARD AVE DEPT 602
BISMARCK ND 58505-0020

Natural Areas Acquisition Advisory Committee Public Hearing Agenda

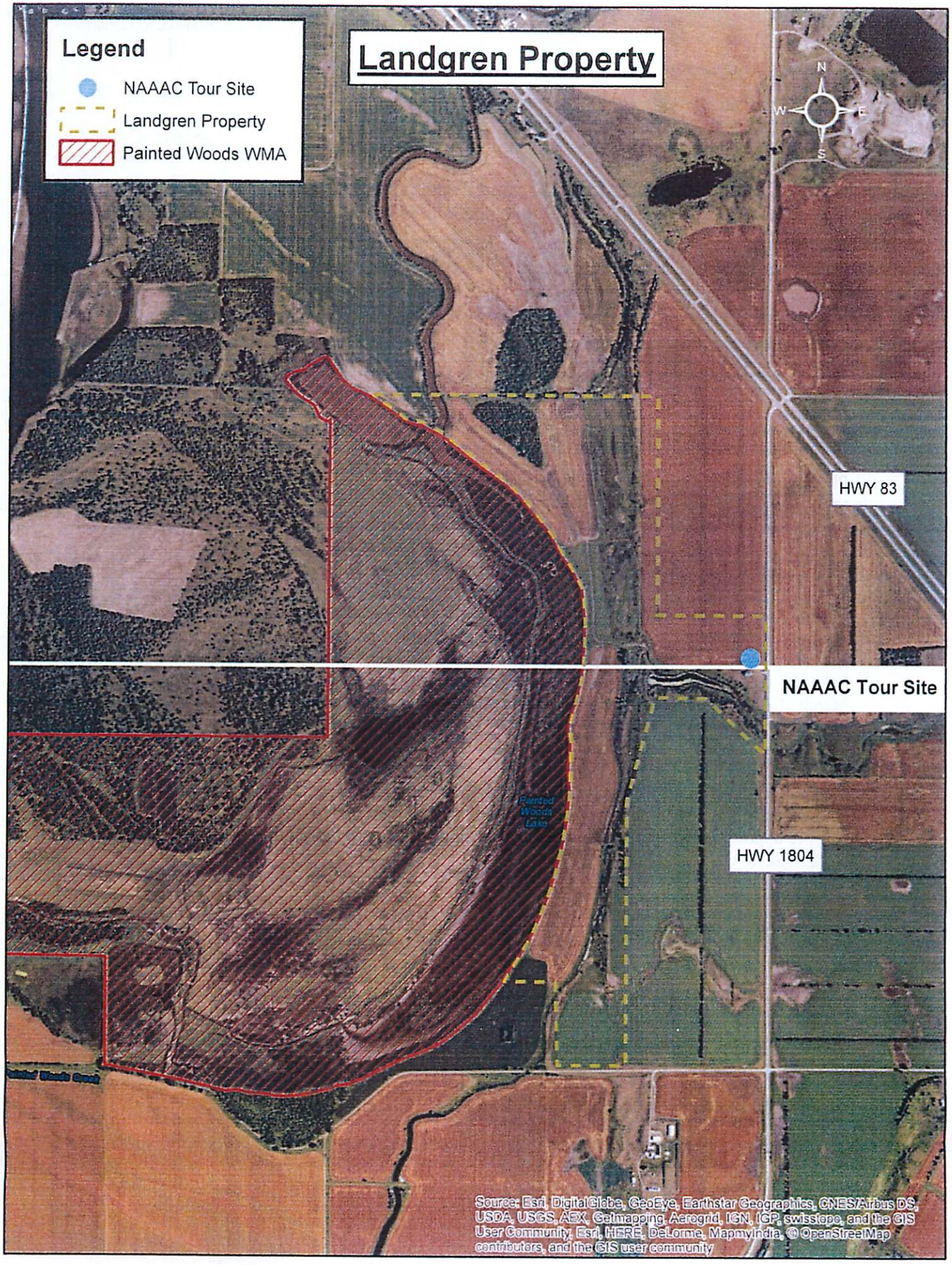
Regarding the American Foundation for Wildlife Proposal
McLean County Courthouse
Washburn, ND
March 10, 2016; 1:00pm

1. Call to Order
2. Roll Call
3. Explanation of N.D.C.C § 10-06.1-10
4. Presentation by American Foundation for Wildlife or Natural Resource Trust
5. Question and Answer Period
6. County Commission Statements
7. Public Comment
8. NAAAC Statements
9. Formulate Advisory Recommendation to the Governor by April 1, 2016
10. Adjourn

Natural Areas Acquisition Advisory Committee (NAAAC)
McLean County Courthouse, Washburn, ND – March 10, 2016, 1 p.m.

NAAAC Members Present:
ND Department of Agricutlure – Doug Goehring
ND Farm Bureau – Daryl Lies
ND Farmers Union – Kayla Pulvermacher
ND Game & Fish – Scott Peterson
ND Forest Service – Larry Kotchman
ND Parks & Recreation – Mark Zimmerman
ND Stockmen's Association – Mark Giedd
McLean County Board of Commissioners – Steve Lee

1. Call to Order – Chairman Goehring called the meeting to order at 1:04 p.m.
2. Roll Call – Chairman Goehring conducted roll call. All committee members were present.
3. Explanation of N.D.C.C. § 10-06.1-10 – Chairman Goehring read the attached document explaining the details of N.D.C.C. § 10-06.1-10 and responsibilities of NAAAC.
    a. The proposal was received February 16, 2016.
    b. A formal recommendation from NAAAC must be submitted to the Governor for approval/disapproval by April 1, 2016.
4. Presentation by American Foundation for Wildlife or Natural Resource Trust
    a. Lynn Olberg – Presented pictures of damaged areas due to overland flooding and discussed the history of the proposed area and landowner concerns. Cattails have grown and are acting as a dam where Painted Woods Creek empties into Painted Woods Lake, causing overland flooding to occur. Possible solutions included dredging, but at this time that option would be cost prohibitive and only provide temporary relief as it is likely the area would silt in again in several years. At this time, the McLean County Water Resource Board has paid for the engineering costs.
    b. Terry Allbee, Natural Resource Trust, presented information in regard to the American Foundation for Wildlife's non-profit status, their intent to donate the purchased land to ND Game and Fish and funding for the proposed land.
    c. Casey Anderson, ND Game and Fish, discussed the process ND Game and Fish has followed. They have submitted a meeting notice to the McLean County Commission, submitted a meeting notice in the official McLean County newspaper for 2 weeks, sent a letter to every landowner within one mile of the proposed acquisition and have submitted a meeting notice to Washburn and Wilton as they are the only incorporated cities within 12 miles of the proposed acquisition. Per North Dakota State law, an appraisal must be completed and the budget section of the North Dakota Legislature will need to approve this spending. Management of the proposed acquisition will ultimately be in accordance with the ND Game and Fish mission, and Dan Halstad will be the manager of the project. ND Game and Fish will pay the taxes on the property.
    d. Brock Storrusten, Moore Engineering, presented the specific details of the project in regard to both wildlife management and water management, and stressed that this is a three- to five-year plan. The next step will be working with the ND Water Commission.
5. Question and Answer Period – Issues of concern included endangered species currently living in the area, where the water will be drained to, and the timeline of the project.
6. County Commission Statements – Ladd Erickson, McLean County State's Attorney, discussed the history of the project.
7. Public Comment – Landowners present showed support for the project, but have concern with the timeline in which it will be completed, and who will be held accountable for the completion of the project.
8. NAAAC Statements – A formal NAAAC vote will not be held at this meeting. The public will be able to submit comments on the issue until March 17, 2016, and a NAAAC conference call will be held on March 18, 2016 to formulate a recommendation for the Governor.
9. Adjourn – Chairman Goehring adjourned the meeting at 2:26 p.m.


Legend
NAAAC Tour Site
Landgren Property
Painted Woods WMA
Landgren Property
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HWY 83
NAAAC Tour Site
Painted Woods Lake
HWY 1804
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community, Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community

Randy Kowalski
1328 N 21st Street
Bismarck ND 58501

March 16, 2016

Natural Areas Acquisition Advisory Committee
Doug Goehring, Commissioner
ND Department of Agriculture
600 East Boulevard Ave Dept 602
Bismarck ND 58505-0020

Dear Advisory Committee:

Please accept this in support of the American Foundation for Wildlife proposal to purchase a tract of land near Painted Woods Lake in McLean County, North Dakota. I am also in favor of the intended transfer of the parcel to the North Dakota Game and Fish Department to provide wildlife management and to facilitate the development of necessary water management controls on the Painted Woods Creek watercourse to the Missouri River.

Recently I became aware of the difficulties and deteriorated condition of the Painted Woods Creek watercourse in the proposed project area. As a nearby property owner (S2SW4SE4 Section 5-143-81) I support the action plan to manage the drainage through Painted Woods Lake and its outlet to the Missouri River as described by McLean County officials during the March 10, 2016, public hearing. The rehabilitation and improved management of the existing drainage is necessary to minimize the potential for additional uncontrolled overland flooding and erosion damage to nearby land.

I appreciate the efforts by those involved to bring this proposal forward. We are thankful to the landowner willing to sell this land for the needed water project and to offer the public unique wildlife opportunities as an addition to the existing wildlife management area operated by the North Dakota Game and Fish Department.

Again, I encourage the Natural Areas Acquisition Advisory Committee to recommend approval of this land purchase.

Sincerely,

Randy Kowalski

cc: McLean County Water Resource Board

AFW
AMERICAN
FOUNDATION FOR
WILDLIFE

P.O. Box 236 • Bismarck, ND 58502 • 701-222-0266 • Fax 701-222-3084

February 10, 2016

Doug Goehring, Commissioner
North Dakota Department of Agriculture
600 E. Boulevard 6th Floor
Bismarck, ND 58502-5020

Dear Commissioner Goehring:

The American Foundation for Wildlife (Foundation), a North Dakota 501(C) 3 nonprofit corporation, has enclosed an acquisition proposal for a 255.3 acre parcel of land owned by Bob Landgren in McLean County.

McLean County officials approached other project partners in 2014 requesting assistance in developing and carrying out this project. McLean County, the Foundation and other partners have as their goal finding a long term solution to reduce flooding impacts on private lands adjacent to the Painted Woods Wildlife Management Area and maintaining the integrity of the entire Painted Woods complex.

Location
Portions of Section 9, and Section 16, Township 143 N., Range 81W, McLean County, North Dakota

The land, if acquired, will be gifted by the Foundation to the State of North Dakota with ownership and management by the ND Game and Fish Department (NDGF); NDGF has committed to accepting the land.

This our official request to initiate the Natural Areas Acquisition Advisory Committee process to obtain governor's approval for the land acquisition as provided under North Dakota Century Code §10-06. 1-10. Maps and a full legal description of the property are enclosed as part of the official notice.

If you have any questions on any of the acquisition proposal materials enclosed or any other aspects of the potential project, please let us know

Sincerely,

Pete Ressler
President

Enclosures

cc: Andrea Travnicek, Governor's Office
McLean County Commission
Lynn Oberg, McLean County Water Resource Board
ND Natural Resources Trust
Jeb Williams, NDG&F
Bob Landgren

OFFICIAL NOTICE

ACQUISITION PROPOSAL

FOR A NORTH DAKOTA NONPROFIT CORPORATION

February 10, 2016

AMERICAN FOUNDATION FOR WILDLIFE

AMERICAN FOUNDATION FOR WILDLIFE
ACQUISITION PROPOSAL
PAINTED WOODS – ROBERT LANDGREN ACQUISITION
McLEAN COUNTY, NORTH DAKOTA

Introduction – American Foundation For Wildlife

The American Foundation for Wildlife (Foundation) is a North Dakota nonprofit conservation organization established in 1972. A unique private, nonprofit corporation, the Foundation works to make sure our state's important natural resources heritage will always be a part of our future by balancing wildlife conservation and management with the interests and values of our landowners, citizens, and communities.

The Foundation is managed by an elected Board of Directors that is responsible for establishing and managing the vision, policies, and practices of the Foundation, striving to bring balance between landowners, wildlife resource interests, and environmental organizations.

The Foundation is the "buyer" in this planned acquisition, but because of the interests of historical organizations, state and federal conservation and recreation agencies, and other private conservation groups, the Foundation has enlisted and welcomed other partners' participation in this planned acquisition. The partners are assisting in funding and other forms of contribution and are as follows:

ND Game and Fish Department
ND Natural Resources Trust

The Foundation is a charitable organization who will fulfill a part of their mission by donating the acquired property to the ND Game and Fish Department for benefit of and use by the public.

Painted Woods Area – A Short Lesson in History

The woodlands, grasslands and waters that make up the Painted Woods Lake complex have constituted an area of significance to Native Americans for centuries and to European settlers in more recent times. The country was pleasant, with its cooling water and woodland shade in the summer, and its protection from wind during the winter. It has been suggested that the Painted Woods complex might be one of the most historically significant places in the state.

Native Americans utilized the area extensively for hunting, and it was the Native American activity that gave rise to the name. Whether the name ascribed, Painted Woods, springs from fact or legend, or some combination of the two, no one will likely ever know for sure. But it is said the name grew from the practice of warring Indian tribes painting taunting figures to each other on the whitened bark of cottonwood trees in the area (see attached ND Outdoors article).

Early frontiersmen and settlers also spoke and wrote affectionately of the area, noted for its wide variety of game. The Painted Woods area became an important gathering place for local residents. The area even hosted a summer resort and hotel in the early 1900s.

Painted Woods Area – A Time of Great Transition

Prior to 1952 the Lake was a classic "oxbow" lake in the Missouri River bottoms. It had depths exceeding 20 feet and supported a vibrant fishery as well as waterfowl hunting. The proximity of the Lake to the Missouri River allowed surrounding woods and riverine wetlands to combine with the Lake's features to create a tremendous recreation area.

One year prior to the Garrison Dam completion, a massive flood in the spring of 1952 altered the Lake and its surroundings significantly. The Lake's depth was reduced to 6' – 8'; all structures and improvements in the surrounding bottoms were destroyed.

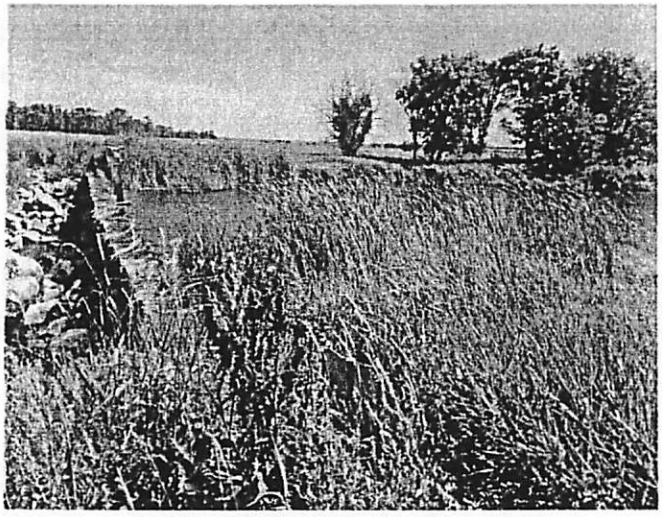
Despite the changes brought on by the 1952 flood, until sometime in the early 1980s, the Lake and the surrounding private land continued to function in a fairly normal manner. The Lake and creek system maintained its connection with the Missouri River, providing a viable fishery. The land surrounding the Lake was farmed, and center pivot irrigation systems were installed west of the Lake. Around 2009 water management issues around the Lake became more challenging. Flooding began to occur on a more frequent basis, adversely affecting adjacent agricultural land, and siltation in the upper end of the Lake lessened the ability of water to pass through.

Painted Woods Area – The Last Twenty-Five Years

In 1988 the U.S. Bureau of Reclamation (BOR) purchased 585 acres of Missouri River bottomland as a component of both the management and mitigation requirements of the Garrison Diversion Unit (GDU). A weir structure was

constructed in the same year under a contract between the BOR, NDSWC, and McLean County Water Resources Board (MCWRB) to restore Painted Woods Lake to its historic elevation. Title to the acquired land was transferred to the US Fish and Wildlife Service (USFWS) as a GDU mitigation feature. USFWS entered into a long-term management agreement with the North Dakota Game and Fish Department (NDGF), creating the Painted Woods Wildlife Management Area (PWWMA) as it currently exists.

The BOR continues to maintain the weir structure that controls the elevation of Painted Woods Lake into Merry's Creek. Of special significance is the fact that since the Lonetree Reservoir has been deauthorized as a GDU feature, Painted Woods Creek, and by definition Painted Woods Lake, has become an integral GDU feature receiving and stabilizing McClusky Canal flows.



Painted Woods WMA – Weir Structure

The North Dakota State Water Commission (NDSWC) has jurisdiction over the lake bed itself, which has an ordinary high water mark established and is designated as state sovereign land.

And finally, McLean County, through its Commission and Water Resource Board, have obligations under Title 61 NDCC over maintaining flows, protecting adjacent private property from flooding and protection of roads, bridges, and other public infrastructure in association with the Lake and its watershed.

It is clear that jurisdiction over the Lake and its watershed is complex, requiring strong interagency and interjurisdictional coordination and planning. That

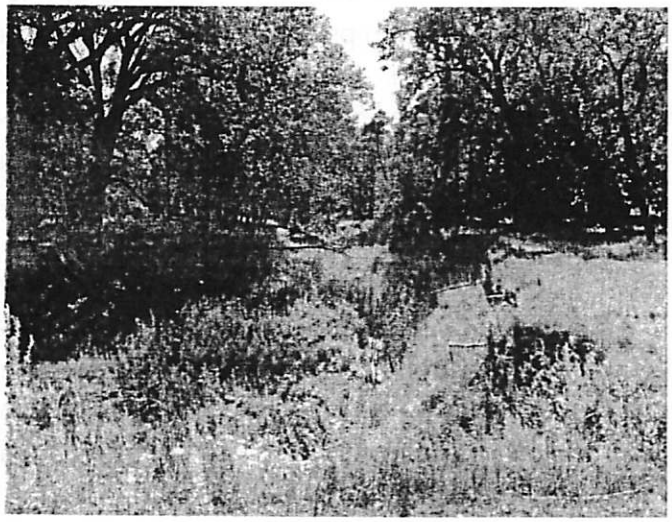
approach was successful in solving water management and land use problems in the 1980s, and we are confident it will be again with this project.

Painted Woods Today

The Painted Woods Creek watershed consists of 305 square miles, draining just over 195,000 acres in parts of both McLean and Burleigh counties (see attached map). As land use has changed within the watershed, precipitation increased and siltation at the upper end the Lake continued to worsen, flooding has increased in both frequency and severity. Crop and hayland near Painted Woods Creek, at one time subject to occasional seasonal flooding, has now become saturated on a more frequent basis. Some land is no longer suitable for cropping and even some of the hayland is unusable in some years.

Of great concern is the fact that high flows produce overland flooding to the west, adversely affecting other private land and ultimately eroding a new path to the Missouri River. Left uncorrected, this path will result in dewatering Painted Woods Lake and all points below and destruction of the PWWMA complex and its GDU mitigation value.

Following 2009 spring runoff, the MCWRB began receiving landowner complaints about flooding. Significant erosion also occurred that spring, both below the weir structure at the head of Merry's Creek and as part of the overland flooding and head cutting to the west across the Fahlgren property.



Fahlgren property head cutting from Missouri River caused by overland flooding.

The extreme flooding of 2011 exacerbated every siltation, erosion, and overall water management problem. What was considered to be a 25-year flood event in 1983-84 is now an annual occurrence in normal and even low spring runoff events. More agricultural land continues to be affected, converting former cropland into marginal, sometimes inaccessible hayland.
McLean County officials, neighboring landowners, and project partners have as their desired outcome a long-term solution to the impacts from the increasing frequency of flooding and damage to private property.

Painted Woods - The Landgren Project

McLean County has recognized the Painted Woods Project as a water management project, with potential for enhanced natural resource management and public recreation. Working with Moore Engineering, the McLean County Commission (MCC) and the MCWRB have been exploring a range of water management options since 2012. McLean County has advocated an approach that would both address water management and private land flooding problems and retain, or possibly even enhance, the wildlife, fishery, and overall natural resource values and outdoor experiences that the Painted Woods complex has provided citizens for decades.

McLean County officials approached the Trust in 2014, asking whether we might have an interest in helping explore and implement project solutions. The Trust has done a number of complex, multi-disciplinary projects of this type and has experience putting together partnerships and funding packages, especially working closely with the Foundation. As a result of the request from McLean County, the Trust consulted with the Foundation and other potential partners and concluded that there was potential to assist in planning and funding the project McLean County had in mind.

Two properties, one owned by the Hecht family and a second owned by Bob Landgren, were identified by Moore Engineering as having implications for water management solutions. In the spring of 2015, the Trust contracted with Allied Appraisals to complete an appraisal on both properties. The Hecht family decided not to pursue a land sale; Mr. Landgren decided to continue moving forward with the process. If the Hecht property becomes available at some future date, McLean County officials may be interested in adding a portion of this property to the public land complex, as it would add some additional water management options to reduce flooding and protect private agricultural land.

To ensure the boundaries of the current proposed land sale fit the needs of both the current and future agricultural producers, as well as the water management solutions identified by Moore Engineering and McLean County officials, a land survey was completed in November 2015. Property boundaries were agreed to and the resulting survey identified the following Landgren property description:

Land Description (see attached land maps and full legal description)

Robert Landgren Property

255.3 acres, more or less, located in McLean County and includes parts of Sections 9 and 16, T.143 N., R.81 W.

As ultimate owner, NDGF is required to follow the provisions of 20.1-02-05.1 NDCC. As per provisions of that statute, public notices have been provided, a meeting with the McLean County Commission has occurred, and an appraisal has been completed.

Justification

The ultimate water management solution identified by McLean County is to modify the pattern of inflows from Painted Woods Creek, keeping flows moving to the south and east, around the silt and cattail buildup at the north end of the lake. With the proposed acquisition of the Landgren property many of the flooding problems can be alleviated by beginning the flow modifications at the north end of this property. If the Hecht property would become available the opportunity to complete additional flood relief work would alleviate most of the flooding issues in the Painted Woods area.

Management

The Foundation will transfer the deed to the NDGF, who will manage the property in conjunction with the existing PWWMA.

Wetlands/Water Resources – The NDGF will manage water levels in Painted Woods Lake, in consultation with BOR and other agency partners, in a manner that accommodates GDU management needs, as well as providing the fish and wildlife management options and benefits noted below.

Uplands – This tract contains agricultural fields that can provide valuable food sources for wildlife species wintering in the Painted Woods WMA and adjacent private lands. The NDGF plans to cooperatively farm some of the tillable acres on the tract and seed some of the hill sides, wet areas, and areas adjacent to fence lines and existing habitat to a grass/forb mix conducive to the area's soils as long as these practices are compatible with the NDGF mission.

Wildlife – Featured species on this area would be waterfowl (including Canada geese), ring-necked pheasant, white-tailed deer, and wild turkey. Secondary species include furbearers, neotropic grassland and woodland migrants, and shore birds. The area will be managed in conjunction with the adjacent Painted Woods WMA and Painted Woods Lake. The ability to have food plots on Painted Woods WMA is hampered by access across the bridge on Painted Woods Creek and soils impacted by frequent flooding. The Landgren property will provide managers much better access and more accessible areas for growing annual food plot crops, thus providing important food for wintering wildlife.

Fisheries – Public fishing use of the Painted Woods Creek is typically limited to the shore fishing area just west of Highway 83 bridge and below the Painted Woods Lake weir. The high use usually occurs in the spring of the year and is a valued opportunity for local anglers. Painted Woods Lake fishing pressure is light and occasionally gets some bowfishing effort for carp. The majority of the fishing pressure occurs in the spring and early summer for northern pike. Netting surveys during 2015 showed the fish community in Painted Woods Lake consists mostly of rough fish while yellow perch, northern pike, and walleye do occupy a presence in the lake as well. The most recent stocking in Painted Woods Lake/Creek occurred in 2012 when 11,000 northern pike fingerlings were stocked. Plans are to stock it with 10,000 northern pike fingerlings in 2016.

Endangered Species – This project also has the ability to benefit species identified in the North Dakota State Wildlife Action Plan as threatened or endangered as well as many species of conservation priority. The threatened and endangered species most likely to benefit from this project would be the Northern Long-eared Bat and the Whooping Crane. Also the Monarch Butterfly, a species of conservation priority that has been petitioned for listing under the Endangered Species Act, will benefit from this acquisition.

Public Access – The NDGF plans to construct a parking lot near Hwy 1804 for hunting access. In addition, the NDGF plans to develop an access trail along the NW boundary of the Landgren property and create a new parking lot and lake

access site. If feasible, a new boat access site would be developed here that would allow direct boat access to the lake and adequate parking space.

ISSUES OF SPECIAL CONCERN

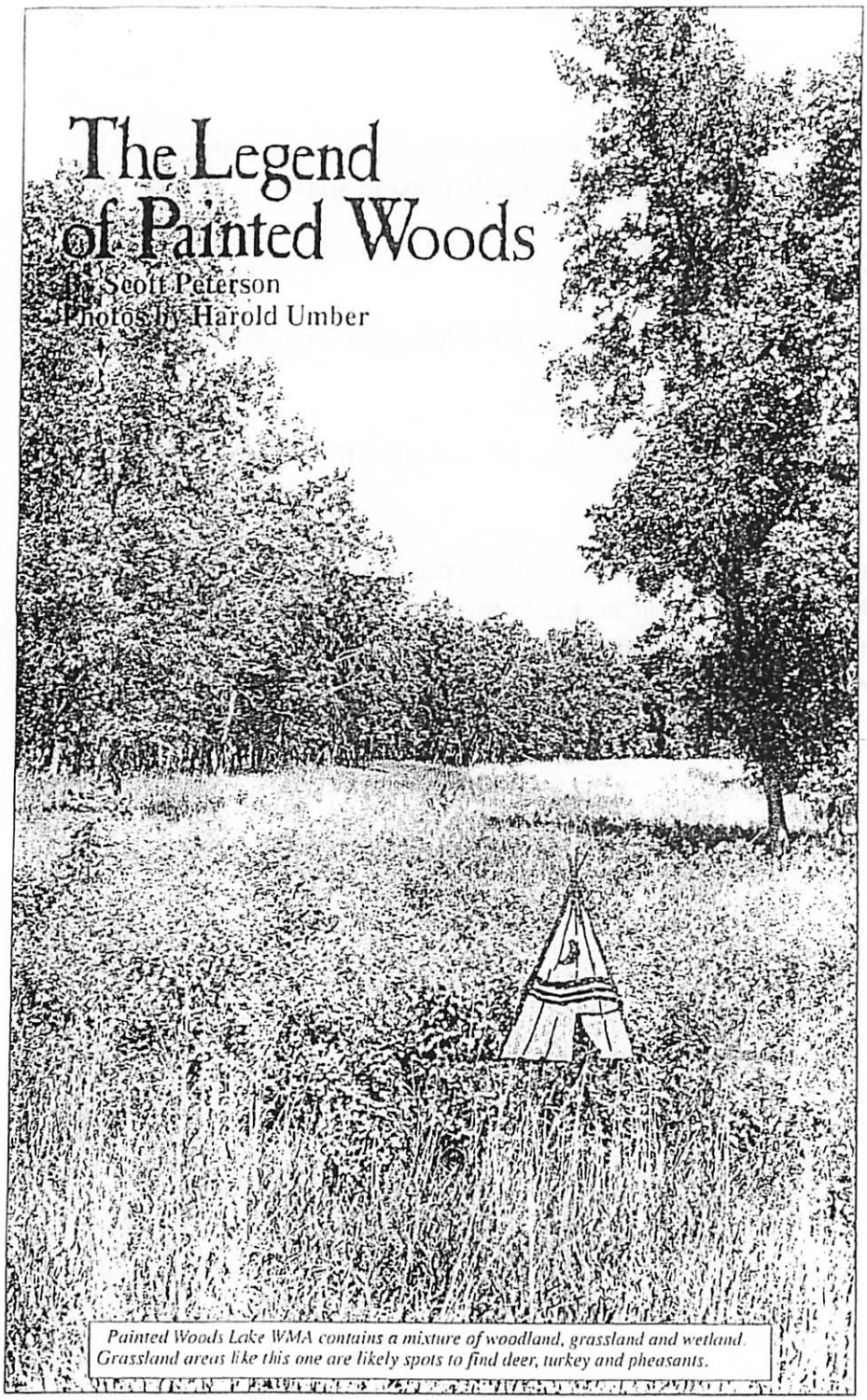
Noxious Weeds – Weed control will be assured under long-term management by the NDGF.

Taxes - The NDGF pays full property taxes as required under North Dakota law (Chapter 57-02.1).

Public Use – NDGF will continue to allow and encourage public use of the WMA compatible with the NDGF mission. Public access to the WMA will improve with the addition of a parking area along the east side of the Landgren property. This will provide much enhanced public use options for the PWWMA.

The Legend of Painted Woods

By Scott Peterson
Photos by Harold Umber



Painted Woods Lake WMA contains a mixture of woodland, grassland and wetland. Grassland areas like this one are likely spots to find deer, turkey and pheasants.

Five miles southeast of Washburn and across the Missouri River from Cross Ranch State Park lies a stretch of timberland known as Painted Woods. It is perhaps one of the most historically significant places in the state.

The U.S. Bureau of Reclamation purchased 585 acres of this Missouri River bottomland in 1988. The Bureau restored a large drained wetland and developed the tract for wildlife, before transferring management authority to the Game and Fish Department. The area is now called Painted Woods Lake Wildlife Management Area and is open to public use.

More specifically, the Painted Woods Lake WMA is 1 1/2 miles south and one mile west of the intersection of highways 1804 and 83 in McLean County. There is really only one access area, on the south end of the unit.

The tract is comprised of 279 acres of marsh, 211 acres of grassland and 95 acres of woodland. Good waterfowl hunting is possible at Painted Woods, although access to the marsh is somewhat limited. Deer and pheasant hunting are also popular.

The WMA is fenced and signed, which serves as a handy boundary marker for visitors. Painted Woods Lake, to the east of the WMA, is not part of the management area.

As the Game and Fish Department's representative on the development of this WMA, I spent considerable time in the Painted Woods area. During that time, I became curious about the origin of its name, and have since uncovered some interesting stories.

The area now called Painted Woods once harbored a large gourd-shaped lake several miles long tucked away amidst a forest of elms, ash, willows, and cottonwoods. The Sioux knew it as Broken Axe Lake while early-day trappers called it Medicine Lodge Lake. The surrounding land was considered neutral hunting grounds even between rival tribes. The use of the area as hunting grounds is understandable, considering the wildlife that once flourished there.

Accounts of the late frontiersman, Joseph Henry Taylor, shed light on the history of the area and its wildlife. Taylor tells of numerous beaver and otter, wolves and coyotes, and of course, big game such as buffalo, deer, elk, and antelope. Big game made up a large part of the Plains Indians' diet, which made the area attractive for hunting. There is even mention of sightings of grizzly bears and mountain lions.

The last elk shot in the Painted Woods area, according to Taylor, was taken in the summer of 1874. By that time this large bull, which had become almost invincible, was referred to as "the Bull of the Woods." The hunting pressure on local deer herds increased dramatically after elk numbers were depleted, but populations reportedly remained relatively stable for the next few decades.

The various tribes which frequented the area eventually tired of the brutal wars between Indian nations. In an attempt to end these ongoing tribal wars, a great peace council was planned at the lakeside. This assemblage was to be hosted by the Mandan tribe as self-proclaimed owners of the land. Other tribes attending included the Anahaways, Assiniboines, Gros Ventres, Crows, Yanktonai Sioux, and Sissetons. The festivities were held during the "season of the tinted leaves," or fall as we know it. The clear, balmy days of autumn coupled with a bountiful harvest of pumpkins, squashes, melons, corn, as well as buffalo, deer, elk, and antelope helped set the stage for this grand gesture

of future peace between these northern tribes.

During this monumental occasion the scrupulously laid plans went awry. It seems a Yanktonai Sioux warrior had won the heart of a young and beautiful Mandan girl. The Mandan girl, coincidentally, was the daughter of the Mandan chief. After many futile attempts at trying to persuade his daughter not to mingle with a member of a rival tribe, the Mandan chief ordered the Yanktonai Sioux warrior killed. The murder was carried out by jealous Mandan warriors on the night the two were wed.

This, of course, did not go unnoticed, and soon the entire assemblage was worked into a mighty uproar. In retaliation, the Yanktonai Sioux warriors killed the fair maiden as she knelt sobbing at her groom's side. With justice apparently served, the entire camp disbanded sometime after daybreak and each tribe went its separate way.

It was tribal custom at that time to place the dead in the branches of trees. So it was that the bodies of the slain young couple were placed in the branches of a large elm tree. The elm eventually withered and died and it was said that its trunk and branches became whitened, resembling the bones of the dead it held.

As might be expected, the neutrality of the hunting grounds ended abruptly. The old wounds did not heal quickly.

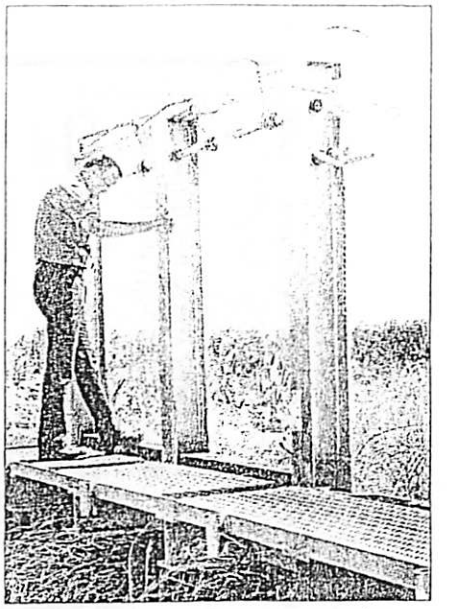
The burial tree became the main rendezvous point for the growing tribe of Yanktonai Sioux. Before attacks were made, the Yanktonai Sioux would paint up there. They would also paint taunting figures, in spite and aimed at the Mandans, on the whitened trunk of the burial tree. The Mandan would then come along and, seeing this challenge, return the favor by painting even more mocking art on some nearby cottonwoods. This primitive form of jeering continued until the trees in the area became excessively painted. Hence the name for which we know it now-Painted Woods.

The last hostile encounter between rival tribes in the Painted Woods area reportedly took place in 1869. This involved a party of Mandans and Two Kettle Sioux. A warrior from each tribe apparently killed each other in combat, and unknowingly marked the end of the Indian "affair of honor" among the painted trees.

The Painted Woods area later became a common playground for special gatherings of local communities. This probably originated with construction of a summer resort and hotel along Painted Woods Lake in the early 1900s.

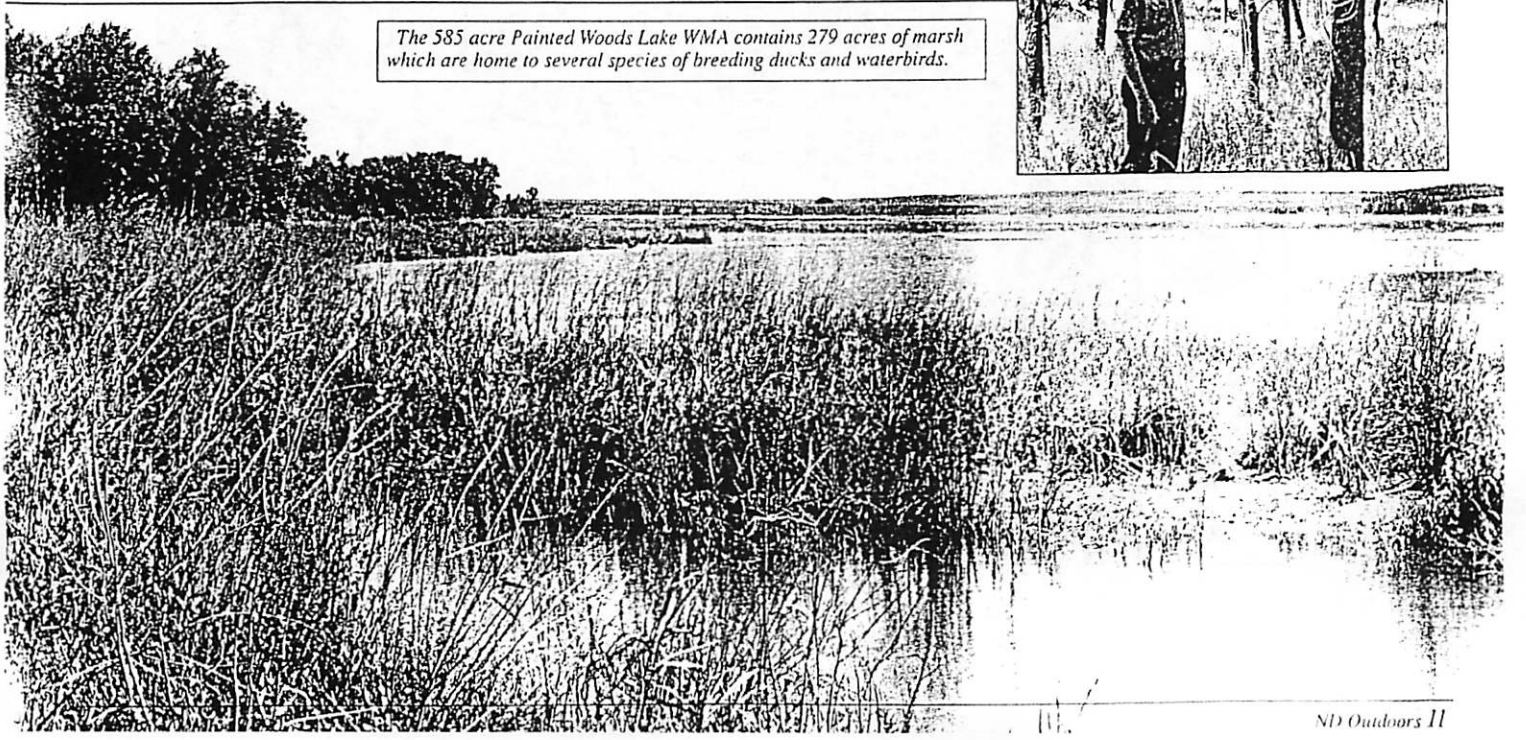
Many changes have taken place at Painted Woods, including the destruction of the old burial tree in a sweeping fire 140 years ago. There is something about this land that has always drawn people to its natural wonders. Although it has been somewhat scarred by human encroachment, and the feared war parties have long since passed into legend, a leisurely stroll through the timber here gives striking reminders of how this land got the name Painted Woods.

SCOTT PETERSON is a Garrison Diversion biologist working in the Department's natural resource division.



Above: The author examines a water control structure used to restore a drained wetland on the Painted Woods Lake WMA. Below: The author points to a recently placed wood duck nesting box on the Painted Woods Lake WMA. Boxes are placed on trees near the water for use by cavity nesting species like the wood duck and hooded merganser.

The 585 acre Painted Woods Lake WMA contains 279 acres of marsh which are home to several species of breeding ducks and waterbirds.



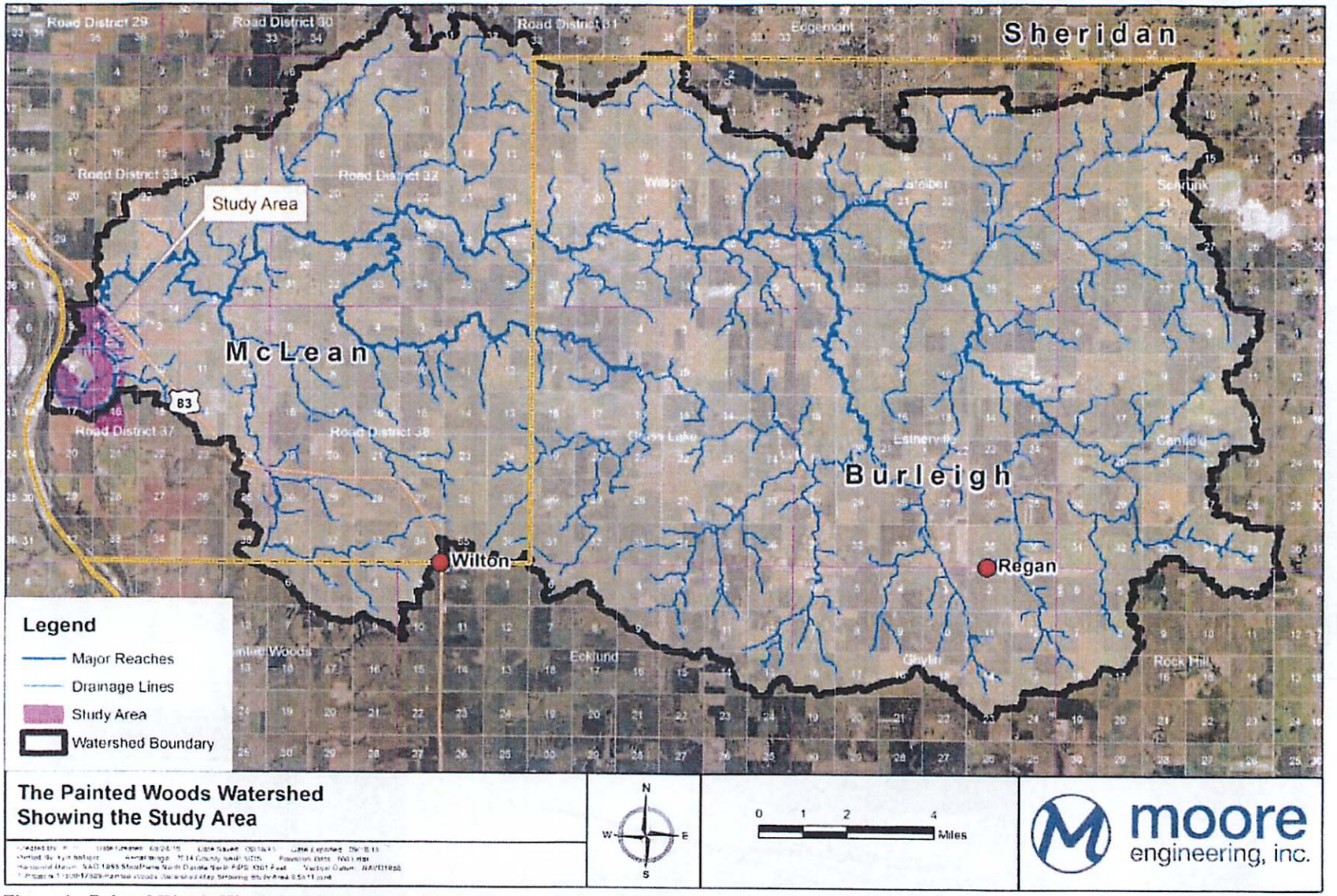
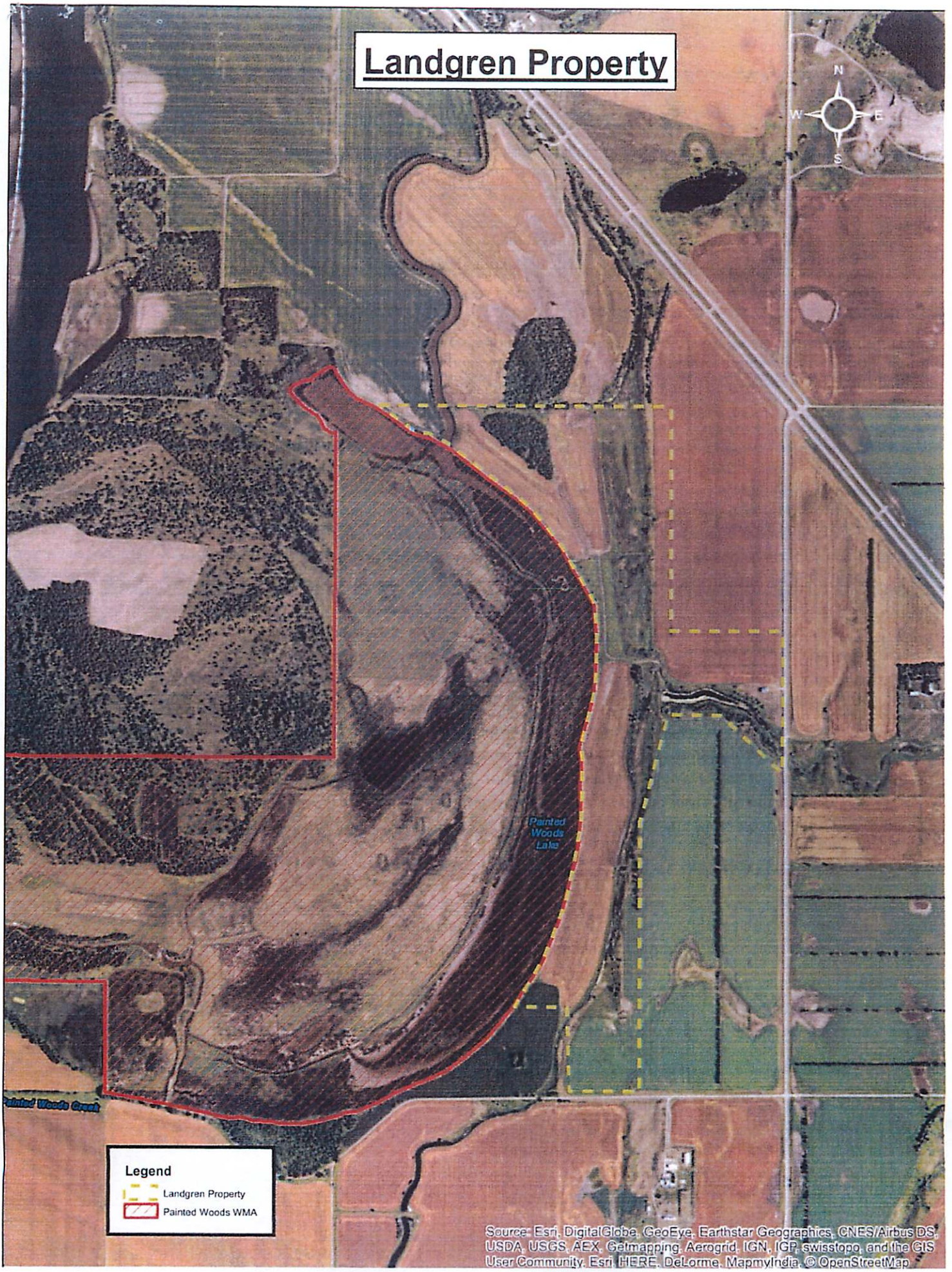


Figure 1 - Painted Woods Watershed Showing the Study Area


Landgren Property
N
W
E
S
Painted Woods Lake
Painted Woods Creek
Legend
Landgren Property
Painted Woods WMA
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap

OUTLOT D OF SECTIONS 9 & 16
TOWNSHIP 143 N RANGE 81 W
DESCRIBED AS FOLLOWS:

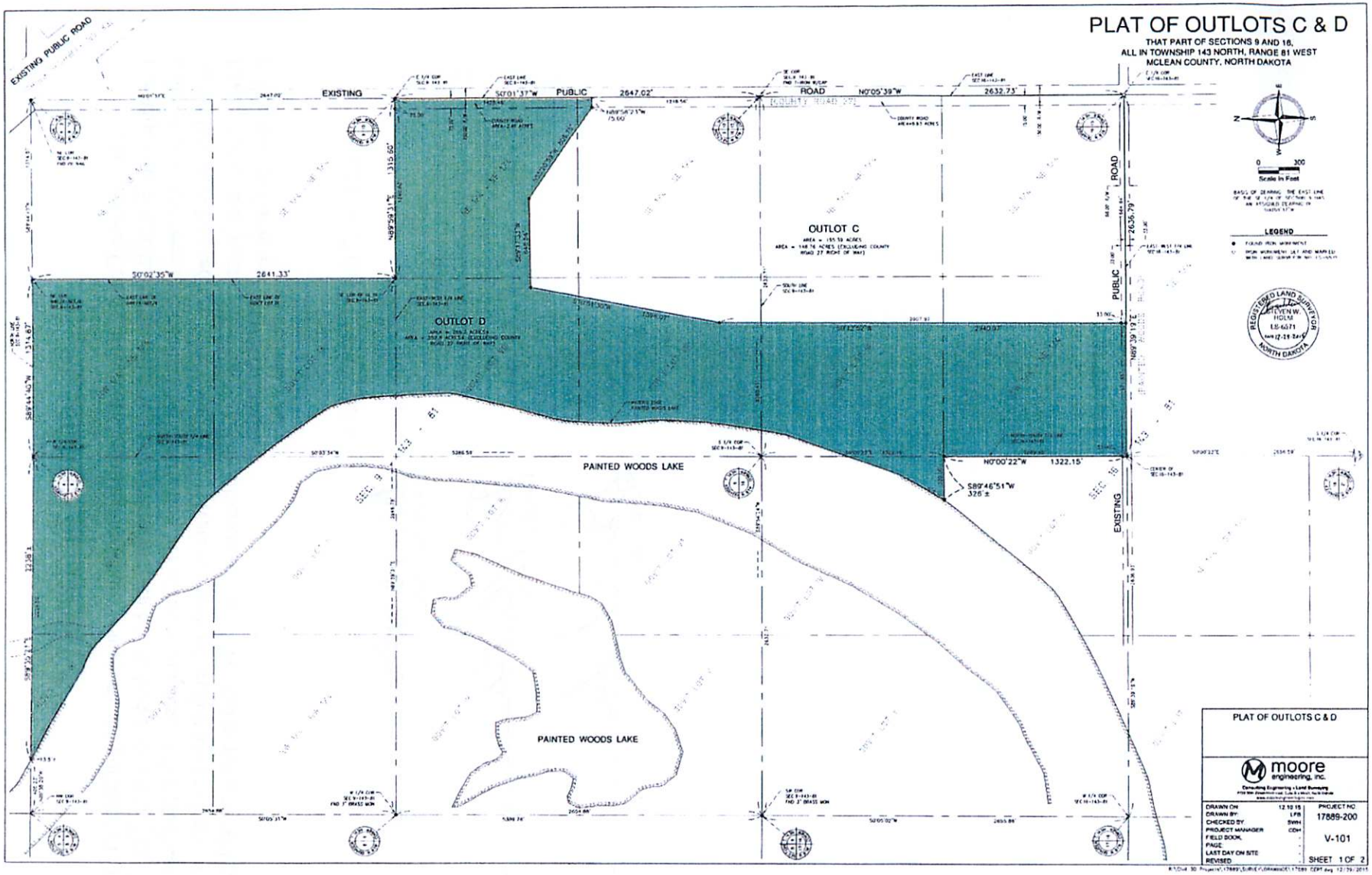
That part of Section 9 and that part of Section 16, all in Township 143 North, Range 81 West of the Fifth Principal Meridian, McLean County, North Dakota, described as follows:

Beginning at an iron monument which designates the north quarter corner of said Section 9; thence North 89 degrees 44 minutes 40 seconds East along the north line of said Section 9 for a distance of 1314.87 feet to an iron monument at the northeast corner of the Northwest Quarter of the Northeast Quarter of said Section 9; thence South 00 degrees 02 minutes 35 seconds West along the east line of said Northwest Quarter of the Northeast Quarter and along the east line of Government Lot IX of said Section 9 for a distance of 2641.33 feet to an iron monument at the southeast corner of said Government Lot IX; thence North 89 degrees 59 minutes 31 seconds East along the east-west quarter line of said Section 9 for a distance of 1315.60 feet to an iron monument at the east quarter corner of said Section 9; thence South 00 degrees 01 minute 37 seconds West along the east line of said Section 9 for a distance of 1428.46 feet; thence North 89 degrees 58 minutes 23 seconds West for a distance of 75.00 feet to an iron monument on the westerly right of way line of County Road Number 27; thence North 55 degrees 20 minutes 59 seconds West for a distance of 806.75 feet to an iron monument; thence South 89 degrees 17 minutes 33 seconds West for a distance of 648.54 feet to an iron monument; thence South 10 degrees 51 minutes 30 seconds West for a distance of 1396.07 feet to an iron monument; thence South 00 degrees 12 minutes 52 seconds West for a distance of 2940.97 feet to an iron monument on the east-west quarter line of said Section 16; thence South 89 degrees 39 minutes 19 seconds West along the east-west quarter line of said Section 16 for a distance of 971.85 feet to an iron monument at the center of said Section 16; thence North 00 degrees 00 minutes 22 seconds West along the north-south quarter line of said Section 16 for a distance of 1322.15 feet to an iron monument at the northwest corner of the Southwest Quarter of the Northeast Quarter of said Section 16; thence South 89 degrees 46 minutes 51 seconds West along the south line of Government Lot III of said Section 16 for a distance of 320.00 feet to an iron monument; thence continuing South 89 degrees 46 minutes 51 seconds West along the south line of said Government Lot 3 for a distance of 6 feet, more or less, to the water's edge of Painted Woods Lake; thence northeasterly, northerly and northwesterly along the water's edge of said Painted Woods Lake to its intersection with the north line of said Section 9; thence South 89 degrees 35 minutes 21 seconds East along the north line of said Section 9 for a distance of 13.5 feet, more or less, to an iron monument; thence continuing South 89 degrees 35 minutes 21 seconds East along the north line of said Section 9 for a distance of 2224.50 feet to the point of beginning.

Said tract contains 255.3 acres, more or less, and is subject to the rights of the public in McLean County Road No. 27, Painted Woods Road and all easements, restrictions, reservations and rights of way of record, if any.

PLAT OF OUTLOTS C & D

THAT PART OF SECTIONS 9 AND 16,
ALL IN TOWNSHIP 143 NORTH, RANGE 81 WEST
MCLEAN COUNTY, NORTH DAKOTA



PLAT OF OUTLOTS C & D

moore engineering, inc.

DRAWN ON	12.10.15	PROJECT NO
DRAWN BY:	LFB	17889-200
CHECKED BY:	SWH	
PROJECT MANAGER	CDH	V-101
FIELD BOOK:		
PAGE:		
LAST DAY ON SITE		SHEET 1 OF 2
REVISED		

RESOLUTION OF SUPPORT

The McLean County Board of Commissioners hereby supports the purchase of land by the American Foundation for Wildlife and its partners from Mr. Robert Landgren. The Commission has been briefed on this project a number of times and desires this purchase occur so the land may be used for flood control and private property protection around Painted Woods Lake. The Commission understands that the ultimate owner of the land purchased will be the North Dakota Game and Fish Department.

Dated this 1st day of March, 2016.

Barry Suydam

Doug Krebsbach

Steve Lee

RESOLUTION OF SUPPORT

The McLean County Water Resource Board hereby supports the purchase of land by the American Foundation for Wildlife and its partners from Mr. Robert Landgren. The Board has been integrally involved in the develop of a flood control and private property protection project around Painted Woods Lake. The purchase of the Landgren tract will assist the Board in the performance of its flood control duties in N.D.C.C. Title 61. The Board understands that the ultimate owner of the land purchased will be the North Dakota Game and Fish Department.

Dated this 29th day of February, 2016.

Lynn Oberg

Shannon Jeffers

Gerard Goven

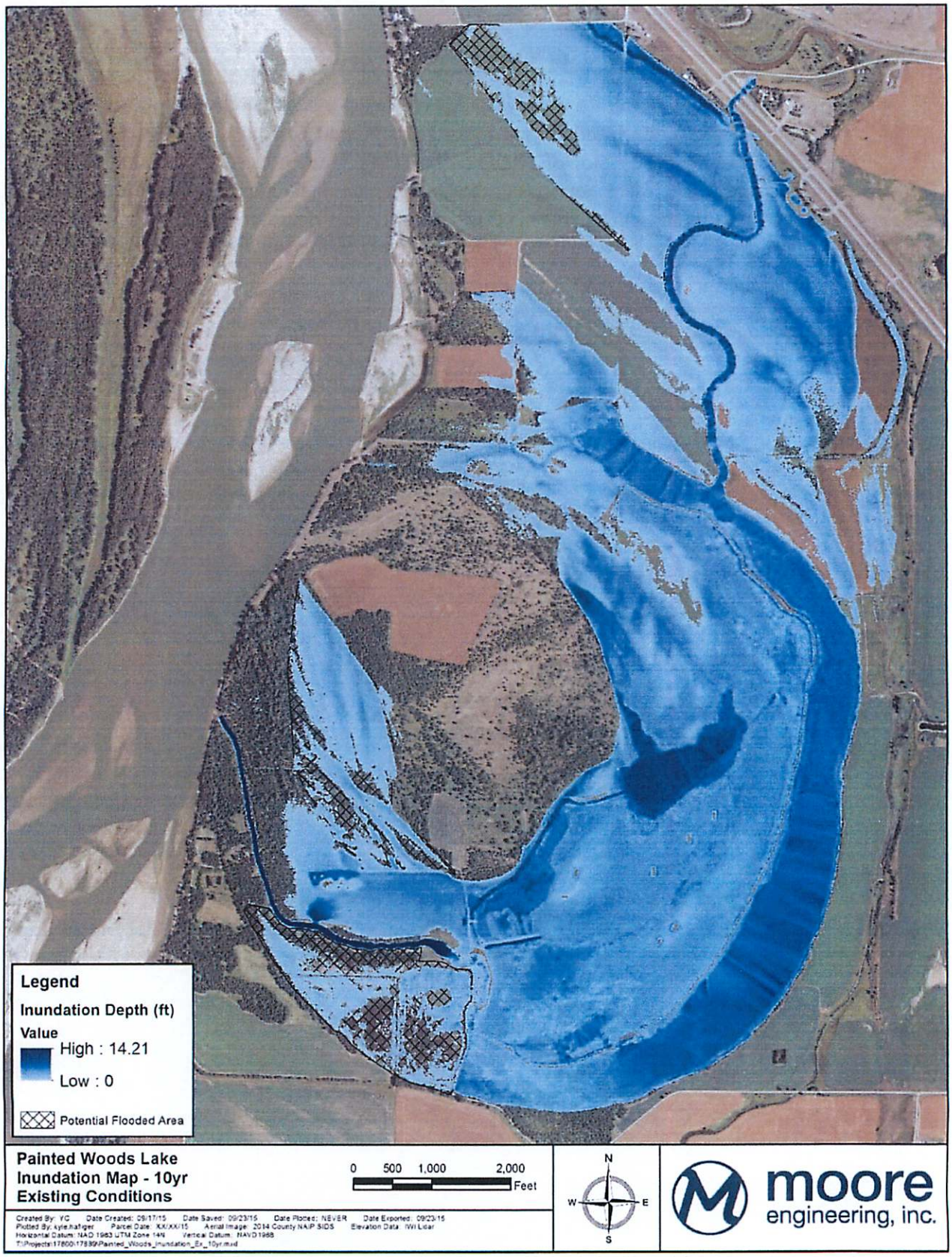


Figure 10 - Painted Woods Lake 10-year 24-hour Inundation Map - Existing Conditions

Figures

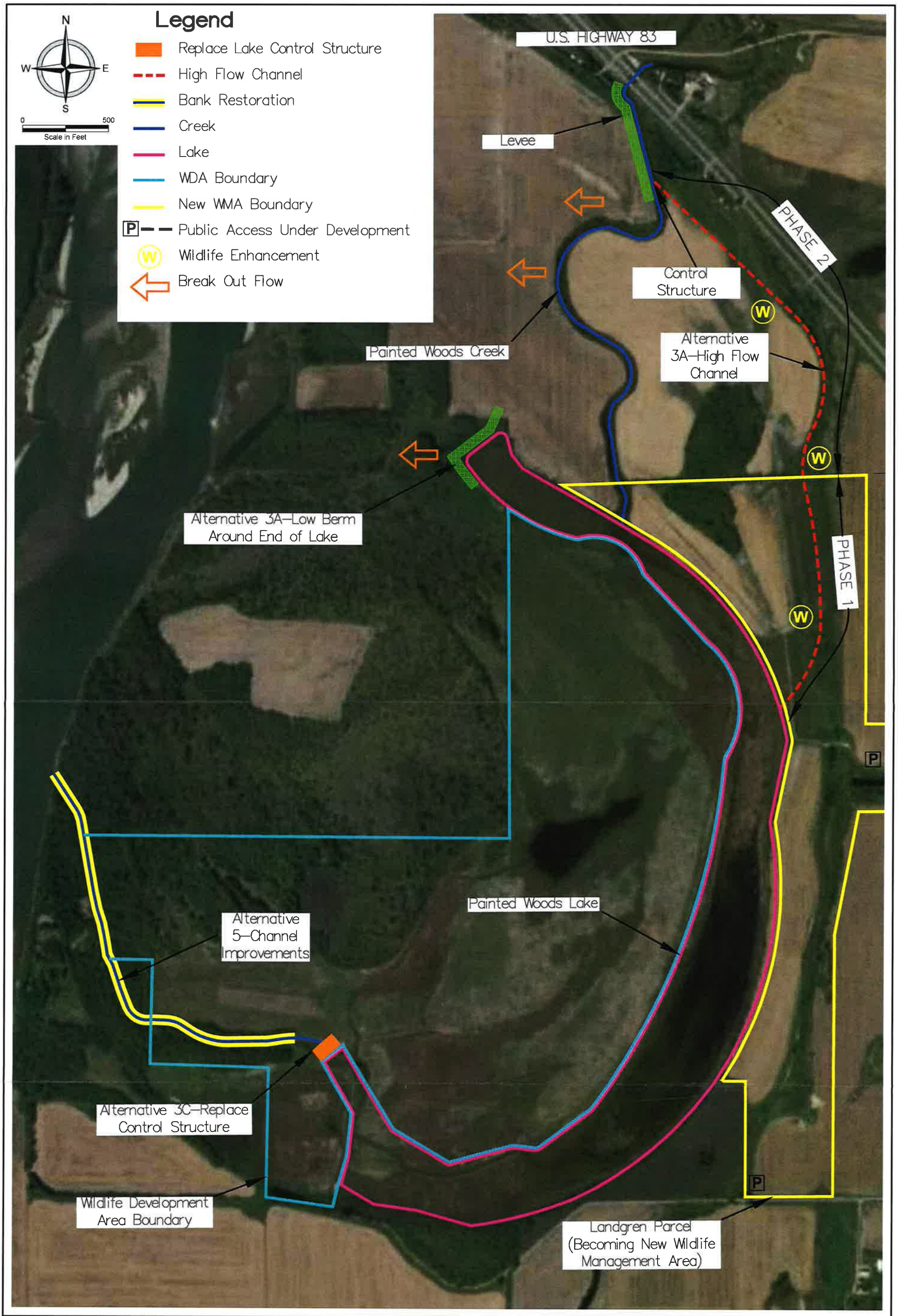


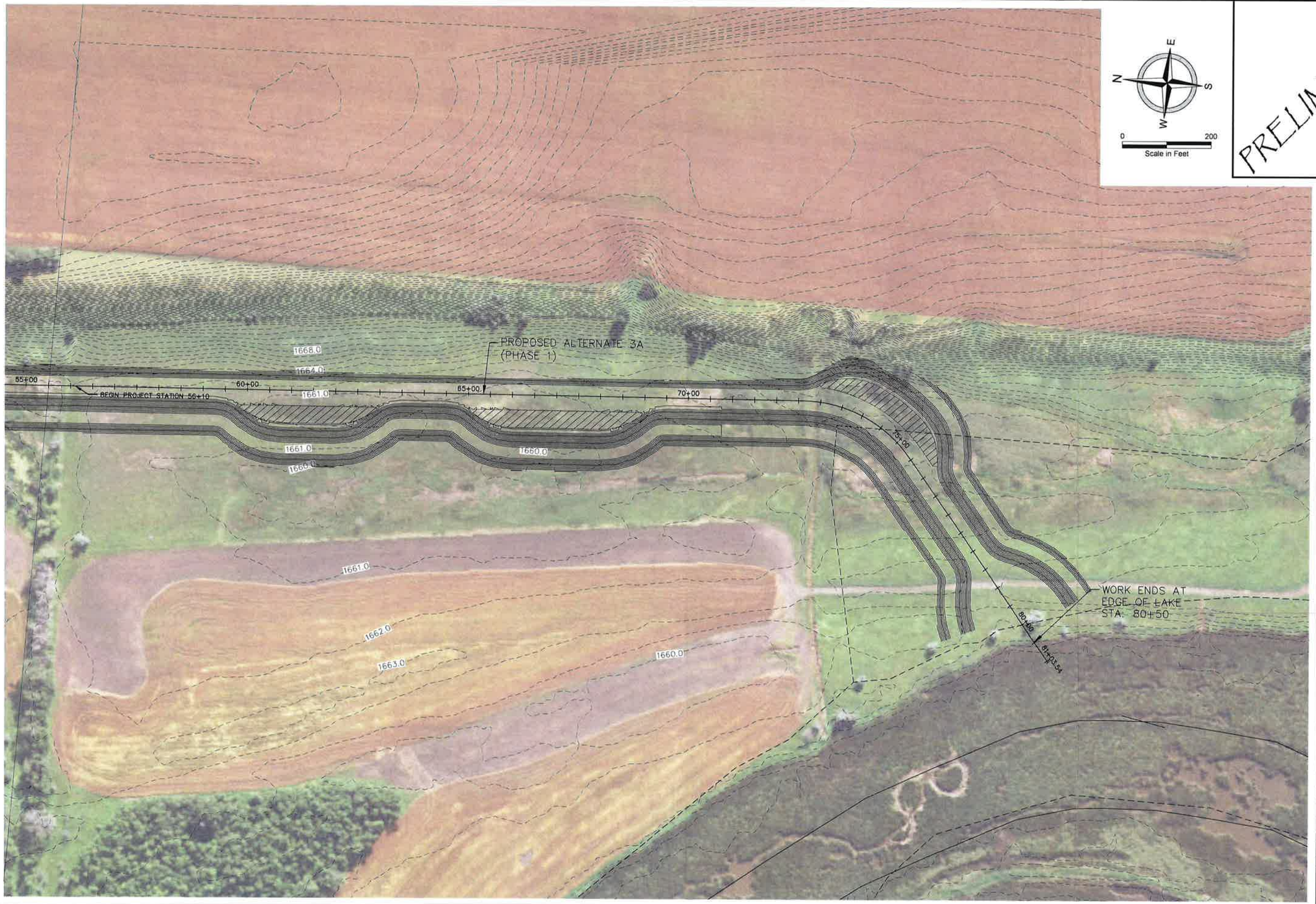
FIGURE 1
PAINTED WOODS LAKE FLOOD MITIGATION PROJECT
McLEAN COUNTY, NORTH DAKOTA

PROJECT No.	17889
DATE:	10.28.16
REVISED:	---
DRAWN BY:	ASM/AJB
CHECKED BY:	RAC

moore engineering, inc.

FILE LOCATION: R:\Civil 3D Projects\17889\DRAWINGS\PRESENTATION\17889 Painted Woods Report Alternatives fig 1.dwg

FILE LOCATION: R:\Civil 3D Projects\17889\DRAWINGS\ENGINEERING\17889-ENG V2017.dwg



PRELIMINARY

moore engineering, inc.

WETLANDS HABITAT OF HIGH FLOW CHANNEL PHASE I
PAINTED WOODS LAKE
McLEAN COUNTY, NORTH DAKOTA
ALTERNATIVE 3A

DATE:	09.26.16
REVISED:	----
REVISED:	----
REVISED:	----
REVISED:	----
REVISED:	----
RECORD:	----
PROJECT No.	17889
DRAWN BY:	AJB
CHECKED BY:	KTH
PROJ. MANAGER:	BMS
PROJ. DESIGNER:	SVD

C-201

SHEET 1 OF 1

Budget Tables

moore engineering, inc.

MEI Project 17889
October 11, 2017

Painted Woods Lake Alternative 3A - Phase 1
Southern Portion High Flow Inlet Channel
McLean County Water Resource District
McLean County, North Dakota

Engineer's Opinion of Probable Cost

						FUNDING SOURCES	
	ITEM	*UNIT*	*QUANTITY*	*UNIT PRICE*	*TOTAL*	*NDSWC - 45%**	*OTHER*
1.	Mobilization	LS	1	$25,000.00	$25,000.00	$11,250.00	$13,750.00
2.	Excavation - Channel	CY	49,000	$2.00	$98,000.00	$44,100.00	$53,900.00
3.	Embankment	CY	49,000	$3.00	$147,000.00	$66,150.00	$80,850.00
4.	Topsoil Stripping and Spreading	CY	12,350	$1.50	$18,525.00	$8,336.25	$10,188.75
5.	Riprap Grade III	CY	1,100	$80.00	$88,000.00	$39,600.00	$48,400.00
6.	Riprap Filter Blanket	SY	3,200	$2.00	$6,400.00	$2,880.00	$3,520.00
7.	Turf Reinforcement Mat Type 2	SY	1,500	$6.00	$9,000.00	$4,050.00	$4,950.00
8.	Rock Check - Temporary	EA	5	$1,000.00	$5,000.00	$2,250.00	$2,750.00
9.	Vegetation Restoration	AC	16	$2,000.00	$32,000.00	$14,400.00	$17,600.00
10.	Storm Water Management	LS	1.0	$5,000.00	$5,000.00	$2,250.00	$2,750.00
11.	Constructed Wetland	LS	1	$50,000.00	$50,000.00	$22,500.00	$27,500.00
					$0.00	$0.00	$0.00
				Total Construction	$483,925.00	$217,766.25	$266,158.75
				Preliminary Engineering	$0.00	$0.00	$0.00
				Engineering - Design*	$36,500.00	$12,775.00	$23,725.00
				Engineering - Construction	$36,500.00	$16,425.00	$20,075.00
				Contingencies (10%)	$48,575.00	$21,776.63	$26,798.38
				Legal Fees	$1,000.00	$0.00	$1,000.00
				Aministrative Fees	$2,500.00	$0.00	$2,500.00
				Wetland Delineation*	$12,500.00	$4,375.00	$8,125.00
				Geotechnical Engineering*	$15,000.00	$5,250.00	$9,750.00
				Right-of-Way Administration	$0.00	$0.00	$0.00
				Easements & Monuments	$0.00	$0.00	$0.00
				Utility Company Relocations	$0.00	$0.00	$0.00
				Utility Relocation Administration	$0.00	$0.00	$0.00
				Fiscal	$0.00	$0.00	$0.00
				TOTAL PROJECT COST	**$636,500.00**	**$278,367.88**	**$358,132.13**

* Cost share for preconstruction expenses is 35%

Proposed Budget - High Flow Channel Phase 1
Painted Woods Lake Mitigation Plan
McLean County Water Resource District

6/15/2018

	Engineer's Opinion of Probable Cost	Funding Contributions				
Project Expense	High Flow Channel Ph1	State Water Commission Grant	ND Game and Fish	Garrison Diversion Conservancy District	Outdoor Heritage Fund	Total Funding
Total Project Cost	$636,500.00	$278,367.88	$120,000.00	$20,000.00	$218,132.12	$636,500.00

Letters of Support & Funding Resolution

NORTH DAKOTA
GAME & FISH
DEPARTMENT

"Variety in Hunting and Fishing"

GOVERNOR, Doug Burgum

DIRECTOR, Terry Steinwand
DEPUTY, Scott A. Peterson

100 North Bismarck Expressway
Bismarck, North Dakota 58501-5095
Phone: (701) 328-6300
FAX: (701) 328-6352

October 26, 2017

McLean County Water Resource Board
Attn: Lynn Oberg
1237 Riverside Ln
Washburn ND 58577

Dear Lynn:

The North Dakota Game and Fish Department (Department), from the beginning, has been in support of the Landgren-Hauck Painted Woods Creek Wildlife Management Area Addition, and the proposed flood relief project. This was solidified by the Department's commitment of over $400,000 towards the acquisition of the property. Going forward, if McLean County is successful in securing funding from the Outdoor Heritage Fund and the State Water Commission, the Department will commit an additional $80,000 of capital improvement funding for wetland construction along with an additional $40,000 of general operating for herbaceous seeding.

In keeping consistent with previous conversations, our funds can only be used for those portions of the flood relief project that enhances or creates wildlife habitat. The Department will coordinate with Moore Engineering and the McLean County Water Board to identify which segments of the project are eligible for our funding.

We look forward to working with you as you move forward with this project.

Sincerely,

Terry Steinwand

Terry Steinwand
Director

AFW
AMERICAN
FOUNDATION FOR
WILDLIFE

P.O. Box 236 • Bismarck, ND 58502 • 701-222-0266 • Fax 701-222-3084

June 20, 2018

McLean County Water Resources Board
Attn: Lynn Oberg
1237 Riverside Lane
Washburn, ND 58577

Dear Mr. Oberg:

The American Foundation for Wildlife (Foundation) is a North Dakota nonprofit conservation organization established in 1972. A unique private, nonprofit corporation, the Foundation works to make sure our state's important natural resources heritage will always be a part of our future by balancing wildlife conservation and management with the interests and values of our landowners, citizens, and communities.

The Foundation was part of a partnership acquisition of the Painted Woods Wildlife Management Area addition in July 2016. The acquisitions purpose was to address water management, protect private land flooding impacts and to enhance the wildlife, fishery, and overall natural resource values and outdoor experiences for the area. The property was donated to the North Dakota Game and Fish Department for wildlife and water management as well as to ensure public access for outdoor recreational enjoyment. This proposal will be a critical step in creating long term solutions to the water management in the lower portion of the Painted Woods watershed. The Foundation supports the McLean County Water Resource Districts plan to reduce flooding on private lands, enhance existing wildlife habitat, and increase public access.

We are happy to provide our endorsement of this proposal and look forward toward its future accomplishments.

Sincerely,

Vern Axtman
Vice President

GARRISON DIVERSION CONSERVANCY DISTRICT

ENGINEERING & OPERATIONS COMMITTEE

Garrison Diversion Conservancy District
Carrington, North Dakota
January 12, 2017

A meeting of the Engineering and Operations Committee of the Garrison Diversion Conservancy District was held at the Garrison Diversion headquarters, Carrington, North Dakota, on January 12, 2017. The meeting was called to order by Chairman Anderson at 7:30 a.m.

DIRECTORS PRESENT

Board Chairman Ken Vein
Committee Chairman Dave Anderson
Director John Peyerl
Secretary Kip Kovar

DIRECTORS ABSENT

None

OTHERS PRESENT

Ken Royse, Vice Chairman, Garrison Diversion Conservancy District, Bismarck, North Dakota
Cliff Hanretty, Director, McHenry County, Garrison Diversion Conservancy District, Towner, North Dakota
Duane DeKrey, General Manager, Garrison Diversion Conservancy District, Carrington, North Dakota
Kimberly Cook, Communications Director, Garrison Diversion Conservancy District, Carrington, North Dakota
Lisa Schafer, Executive Assistant, Garrison Diversion Conservancy District, Carrington, North Dakota

BY CONFERENCE PHONE

Arden Freitag, Area Manager, Bureau of Reclamation, Dakotas Area Office, Bismarck, North Dakota
Mike Marohl, Bureau of Reclamation, Dakotas Area Office, Bismarck, North Dakota

The meeting was recorded to assist with compilation of the minutes.

READING OF THE MINUTES

Motion by Director Vein to dispense with a reading of the October 6, 2016, Engineering & Operations Committee minutes and approve them as distributed. Second by Director Peyerl. Upon voice vote, motion carried.

PAINTED WOODS LAKE PROJECT

Kip Kovar, Secretary, referred to a copy of the Bureau of Reclamation's (Reclamation) letter to the McLean County Water Resource District (MCWRD) dated August 16, 2016, regarding the Painted Woods Lake Mitigation Project. He reminded the committee that the MCWRD made a presentation to the committee in October requesting a contribution of $350,000 in value either through direct funding or from in-kind services. A control weir structure currently holds the water in the lake, and this structure needs to be replaced with a structure that has more modern features. The MCWRD would like to construct a high flow channel from Painted Woods Creek to the east of the lake. The schedule for the project is to replace the control weir structure and complete Phase 1 of the overflow channel at a cost of $2.2 million in 2017. The final component is to repair and restore the severely eroded and unstable stream banks on Merry's Creek in 2018.

Mr. Kovar commented that Reclamation is suggesting delaying the plans they had to haul 4,000 cubic yards of rip-rap for the weir site until the MCWRD makes a decision on replacing the weir. A copy of Reclamation's letter is attached to these minutes as Annex I.

Mr. Kovar added that this topic was also discussed at the Executive Committee, and it was felt that replacing the control structure was not Garrison Diversion's responsibility. Garrison Diversion would like to help out to some degree because the water that is released from the McClusky Canal via the Painted Woods Outlet has to travel through this structure. It was suggested that Garrison Diversion contribute $10,000 a year for two years for a total of $20,000 toward the project contingent upon the State Water Commission also taking part in the project.

Mr. Kovar reported that the State Water Commission did act on this request at its meeting on December 9. At that time, the request was denied until more information could be provided.

Mr. Kovar added that funding is also being sought from other agencies.

Mr. Kovar recommended following the Executive Committee's suggestion to provide $10,000 in funding annually for two years. He also commented that funds may be available through the recreation grant program for portions of the project in the future.

Motion by Director Peyerl to recommend approving $10,000 per year for two years for the Painted Woods Lake Mitigation Project contingent upon funding approval from the State Water Commission to the full board. Second by Director Vein. Upon roll call vote, the following directors voted aye: Anderson, Peyerl and Vein. Those voting nay: none. Absent and not voting: none. Motion carried.

PRE-CONSTRUCTION AGREEMENT UPDATE

Mr. Kovar reported that the McClusky Canal Pre-Construction Agreement is the most recent cooperative agreement between Garrison Diversion and the Bureau of Reclamation. It will

APPENDIX K

North Dakota State Water Commission

900 EAST BOULEVARD AVENUE, DEPT 770 • BISMARCK, NORTH DAKOTA 58505-0850
(701) 328-2750 • TTY 1-800-366-6888 or 711 • FAX (701) 328-3696 • http://swc.nd.gov

MEMORANDUM

TO: Governor Doug Burgum
Members of the State Water Commission
FROM: Garland Erbele, P.E., Chief Engineer-Secretary
SUBJECT: NAWS – Project Update
DATE: July 18, 2018

Manitoba & Missouri Lawsuit

Summary judgement was granted to North Dakota on August 10, 2017. Both plaintiffs filed appeals in October, and initial filings were due November 27, 2017. The court issued a briefing schedule January 3, 2018 with appellant's briefs due February 12, 2018, appellee's briefs due March 14, 2018, and appellant's reply briefs due March 28, 2018. A joint motion was filed and approved by the court to hold the case in abeyance for 90 days to allow settlement negotiations between appellant Manitoba and the appellees. Another joint motion was filed and approved by the Court to extend the abeyance further to allow further discussions. A joint motion by North Dakota, Department of Interior, and Province of Manitoba moving to dismiss Manitoba's appeal was filed June 22nd, 2018 and granted by the Circuit Court the following week. The State of Missouri filed their appeal brief June 22, 2018 based solely on the issue of their standing in the case. No arguments were made on the merits of their opposition to the project. Our brief and that of the Department of Interior are due August 3rd, and Missouri's reply brief is due August 17. We anticipate oral arguments in the winter of 2018-2019.

Biota Water Treatment Plant Design

A pre-design meeting for the Biota WTP has held May 23, 2017 at Reclamation's office in Bismarck with the intent of establishing the guidelines for the design to ensure compliance with the Final SEIS and ROD. Multiple treatment technologies were examined. Discussions were held with legal counsel for the State and the Department of Interior regarding the flexibility of design allowed by the environmental documents. It was determined that there was little flexibility allowed by the Record of Decision, so design is proceeding on a conventional water treatment plant utilizing dissolved air floatation as the sedimentation process and dual media filtration followed by ultraviolet radiation disinfection and chemical disinfection with chlorine converted to chloramine to maintain a pipeline disinfectant residual. The decision has been made to construct the Biota WTP in phases to free up funding for other critical project components and add to the plant later as demand warrants it. The estimated cost of this design is roughly $4.9 million. As this is a federal facility, it is 100 percent eligible for federal reimbursement for design, construction, and operations and maintenance. Two value engineering studies are also required; one after the basis of design is established and one closer to the 60 percent design level. The first value engineering session will be the week of July 30, 2018.

NAWS Contract 7-1B

NAWS Contract 7-1B was awarded by the State Water Commission at its February 8, 2018 meeting to PKG Contracting and generally consists of construction of a new primary treatment building at the Minot water treatment facility to replace the aging softening basins, chemical storage and feed systems, a new laboratory, break room, and IT facilities. All contract documents have been executed, and the notice to proceed was signed March 21, 2018. A preconstruction conference was held that same day in Minot. Work on this project is currently underway. The substantial completion date for this contract is December 20, 2019.

NAWS Contract 2-2A-2

Bids were opened for NAWS Contract 2-2A-2 June 20, 2018. Four bids were received and opened and are summarized below. All bids received were in accordance with the advertisement for bids and no anomalies were found.

Contractor	Total Bid	Amount greater than low bid
PKG Contracting, Inc	$515,695.00	-
Rice Lake Construction, Inc	$623,797.20	$108,102.20 (20.96%)
Wagner Construction, Inc	$649,715.00	$134,020.00 (25.99%)
Kemper Construction Co.	$919,426.00	$403,731.00 (78.29%)
Engineer's Estimate	$587,000.00	$71,305.00 (13.83%)

This contract includes approximately 700 feet of pipe, a new vault pad, 95 feet of casing, relocating the existing vault, and associated valving and tie-ins to the existing infrastructure. The contract was awarded to PKG Contracting, Inc., and we are currently awaiting contract documents for review and execution. We have an extensive work history with PKG including the ongoing work at the Minot water treatment plant. The substantial completion date for this project is October 31, 2018. We anticipate the majority of the work taking place after water use has subsided.

GE:TJF:pdh/237-04

APPENDIX L

N

www.ae2s.com | Advanced Engineering and Environmental Services, Inc.

Cass Rural Water User District

- WTP — Water Treatment Plant
- Cass RWD Tanks
- Future Cass RWD Tower
- 12" Water Main
- 10" Water Main
- 8" Water Main
- 6" Water Main

- WTP — Water Treatment Plant
- Ground Storage Reservoir (GSR)
- GSR Pump Station
- Fargo Water Towers
- WF Water Towers
- Future WF Tower

Pressure Zone

- 1025
- 1037
- 1043
- 1048

City Limits

- Fargo
- Harwood
- Horace
- Reile's Acres
- West Fargo

City ET Area

- Fargo
- Harwood
- Horace
- Reile's Acres
- West Fargo
- Cass RWD Boundary
- Horace Proper

Future System

- Future Water Towers
- Future Control Valves

Pressure Zone

- 1025
- 1037
- 1043
- 1048

Information depicted may include data unverified by AE2S. Any reliance upon such data is at the user's own risk. AE2S does not warrant this map or its features are either spatially or temporally accurate.

Coordinate System: NAD 1983 StatePlane North Dakota South FIPS 3302 Feet | Edited by: BWeiss | D:\Projects\Fargo\Miscellaneous Modeling\2017 Modeling\Regional Water System Planning\Fargo Preliminary Hydraulic Analysis of South Pressure Zone\Hydraulic Modeling\Maps\Overall System Analysis\System Map 36x60.mxd

Locator Map Not to Scale

0 2,500 5,000

Feet

1 inch = 2,500 feet

REGIONAL WATER DISTRIBUTION SYSTEM

CASS RWD, CITY OF FARGO, CITY OF WEST FARGO

Date: 8/2/2018

AGRICULTURAL SURFACE AND SUBSURFACE DRAINAGE MANAGEMENT RECOMMENDATIONS

Basin technical and scientific advisory Committee (BTSAC)

APPENDIX M

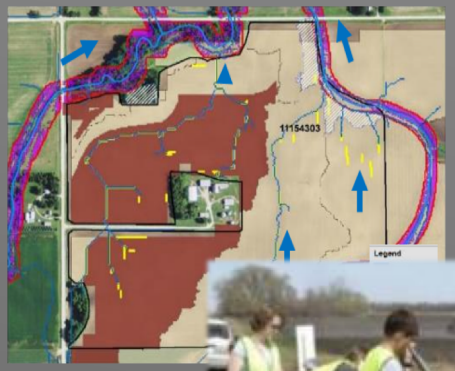
International Water Institute

PRESENTATION OUTLINE

- ✓ Study Background
- ✓ Study Scope/Steps
- ✓ Water Management Objectives
- ✓ Literature Summary Conclusions
- ✓ BTSAC Recommendations

1997 Red River of the North Flood

- International Flood Mitigation Initiative (IFMI) 2000



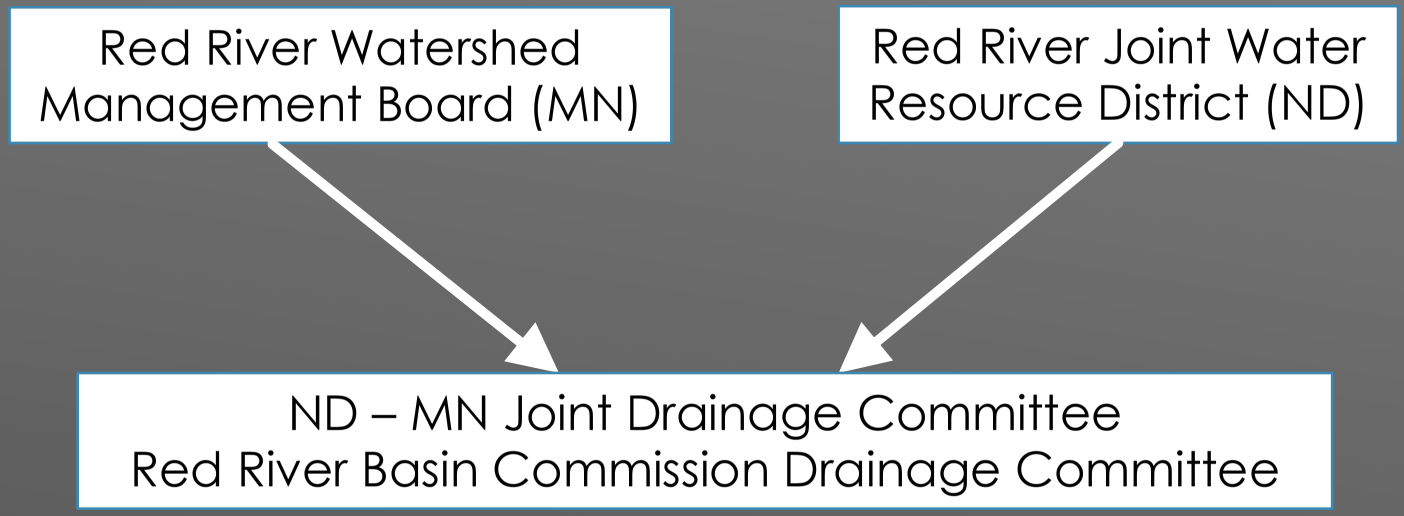
Mission:

To foster watershed stewardship through leadership in decision support, environmental monitoring, and educational programming.

International Water Institute

www.iwinst.org

2009/11 Flood - Public Statements Referring to Factors Causing or Exacerbating Recent Red River Basin Flood Events.



STUDY BACKGROUND

International Water Institute

- ✓ What are the impacts of agricultural drainage on peak watershed flows?
- ✓ How should agricultural drainage systems be designed and managed to maximize benefits while minimizing adverse impacts?

WATER MANAGEMENT QUESTIONS

International Water Institute

- Establish a ***defendable*** process to address water management questions.

  ~~Dueling Scientists~~

  ~~Bias~~

  ~~Rhetoric~~

- Basin Technical and Scientific Advisory Committee (BTSAC).
  - ✓ Stakeholder **Technical Representative**.
  - ✓ Participation is Exclusive - Stakeholder organizations Identified by the International Water Institute.

  Goal – Ensure that a given stakeholder's Interest is REPRESENTED.

- Funded by the Red River Watershed Management Board and the Red River Joint Water Resource District.

CONCEPT/PROCESS

International Water Institute

BTSAC MEMBERSHIP – SURFACE

STAKEHOLDER ORGANIZATION	BTSAC REPRESENTATIVE	STAKEHOLDER ORGANIZATION	BTSAC REPRESENTATIVE
MN Red River Watershed Management Board	Charlie Anderson	MN Board of Water and Soil Resources	Al Kean
City of Fargo, ND	Mark Bittner	ND Red River Joint Water Resource District	Chad Engels
MN Red River Watershed Management Board	Nate Dalager	US Geological Survey	Rochelle Nustad
US Fish and Wildlife Service	Josh Eash	ND Natural Resources Conservation Service	Dennis Reep
ND Red River Joint Water Resource District	Damon DeVillers	ND State Water Commission	Bill Schuh
International Water Institute	Charles Fritz	MN Department of Agriculture	Rob Sip
ND Red River Joint Water Resource District	Randy Gjestvang	MN Corn Growers	Adam Birr
MN Natural Resources Conservation Service	Dave Jones	Red River Basin Commission	Jeff Lewis
US Army Corps of Engineers	Scott Jutila	Ducks Unlimited	Roger Smith
MN Red River Watershed Management Board	Dan Thul	MN Department of Natural Resources	Jim Solstad

BTSAC MEMBERSHIP - TILE

Stakeholder	Representative
MN Red River Watershed Management Board	Charlie Anderson
City of Fargo, ND	Mark Bittner
MN Red River Watershed Management Board	Nate Dalager
US Fish and Wildlife Service	Josh Eash
International Water Institute	Charles Fritz
ND Red River Joint Water Resources Board	Randy Gjestvang
MN Natural Resources Conservation Service	Dave Jones
US Army Corps of Engineers	Scott Jutila
MN Board of Soil and Water Resources	Al Kean

Stakeholder	Representative
ND Red River Joint Water Resources Board	Kurt Lynse
US Geological Survey	Rochelle Nustad
ND Natural Resources Conservation Service	Dennis Reep
ND State Water Commission	Bill Schuh
MN Department of Agriculture	Rob Sip
MN Department of Natural Resources	Jim Solstad
MN Red River Watershed Management Board	Dan Thul
MN Center for Environmental Advocacy	Henry VanOffelen
City of Moorhead, MN	Bob Zimmerman

BTSAC ROLE

- Assemble, Review, and Discuss Relevant Scientific Information
- Use Best Professional Judgment
- Initiate Studies (if necessary) to Draw Conclusions and Make Water Management Recommendations.
- BTSAC did NOT Address…Environmental, Social, or Economic Aspects of Surface/Tile Drainage

International Water Institute

Field/Producer

- Optimize Crop Production/Revenue
  - Remove water during wet periods (planting and harvesting)
  - Conserve water during droughts

Watershed/Basin/Manager

- Reduce flood flows (spring/summer events)
- Minimize flood / drought damages

WATER MANAGEMENT OBJECTIVES

TILE/SUBSURFACE DRAINAGE

Study Conclusions and Management Recommendations

International Water Institute

- Available literature and hydrologic modeling Subsurface Drained ***FIELDS***:
  - Attenuate outflows
    - Decrease Peak Flow
    - Delayed Discharge*
  - Increase Water Yield
    - Predominately early spring and fall*

TILE DRAINAGE – LIT. REVIEW CONCLUSIONS

…“Any general statement implying that subsurface drainage decreases (or increases) flood peaks is strongly discouraged because it oversimplifies the complex processes involved.”…

BTSAC TILE DRAINAGE STATEMENT:

- ✓ *Situations do exist where adding uncontrolled subsurface drainage to areas of the landscape has the potential to increase flooding. This risk must be considered and evaluated in water management decision making.*

- ✓ **The inclusion and appropriate operation of **control structures** on existing and proposed subsurface drainage systems can maximize water storage potential and reduce flood flows.*

  **(assuming in situ conditions allow)*

TILE DRAINAGE - CONCLUSIONS:

International Water Institute

TILE DRAINAGE - MANAGEMENT RECOMMENDATION

- Incorporate controls (ability to shut drains off) on Tile Drainage Systems

  Storage and release of subsurface water should consider flood peak coincidence (basin timing – early, middle, late).

International Water Institute

SURFACE DRAINAGE

Study Conclusions and Management Recommendations

International Water Institute

- Climate is the major hydrology driver, especially during large scale flood events.
- Trend analyses of surface drainage effects on flooding in the Red River Basin have failed to conclusively attribute floods to increased surface drainage.
  - ✓ Trend analyses have indicated that combined climate and land use changes have resulted in larger annualized flow volume.

SURFACE DRAINAGE – LIT. REVIEW CONCLUSIONS

SURFACE DRAINAGE – LIT. REVIEW CONCLUSIONS

- Reducing floodwater runoff that otherwise would have entered waterways during floods will result in flood peak and volume reduction.
- Effects of retention and detention storage will decrease with increasing flood intensity.
  - ✓ Even small proportion storage may have a beneficial effect at some locations during flood events.
- Increasing drainage conveyance tends to increase flood peaks downstream.
  - ✓ Unless flow timing at the point of interest is altered to decouple flood peaks.

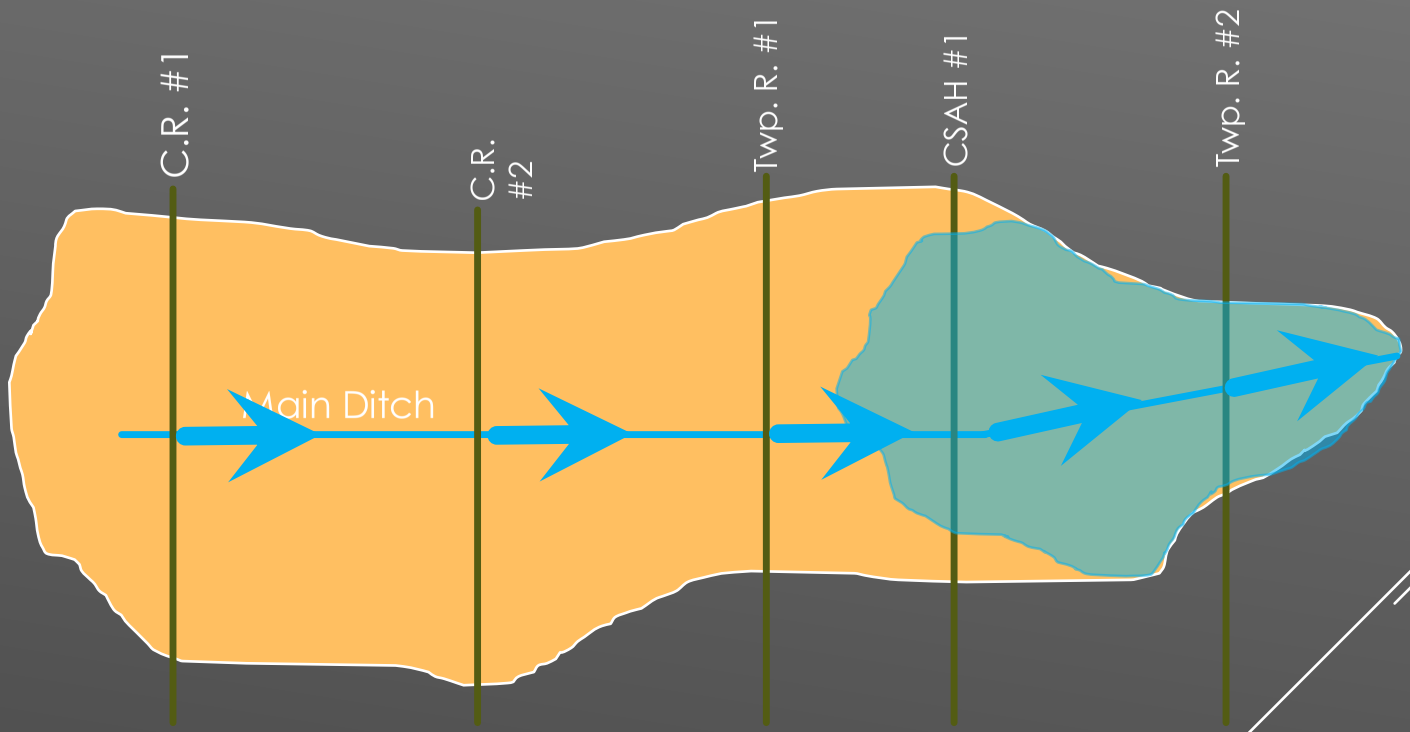
Adequacy and Equitable Policy

- RRB Landowners have a right to adequate, but not more than adequate, drainage.
- Equal distribution of positive and negative effects of drainage throughout the system.

SURFACE DRAINAGE – POLICY RECOMMENDATION

CURRENT CONDITION
(TRADITIONAL DITCH DESIGN)

- Water is conveyed downstream unrestricted until it reaches a point where inflows exceed outflow capacity and flood occurs
- Long duration of concentrated flooding >48 hours



International Water Institute

THREE PRIMARY GOALS:

1. Adequate Agricultural drainage during 10 year summer event

2. Equal benefits throughout the drainage system

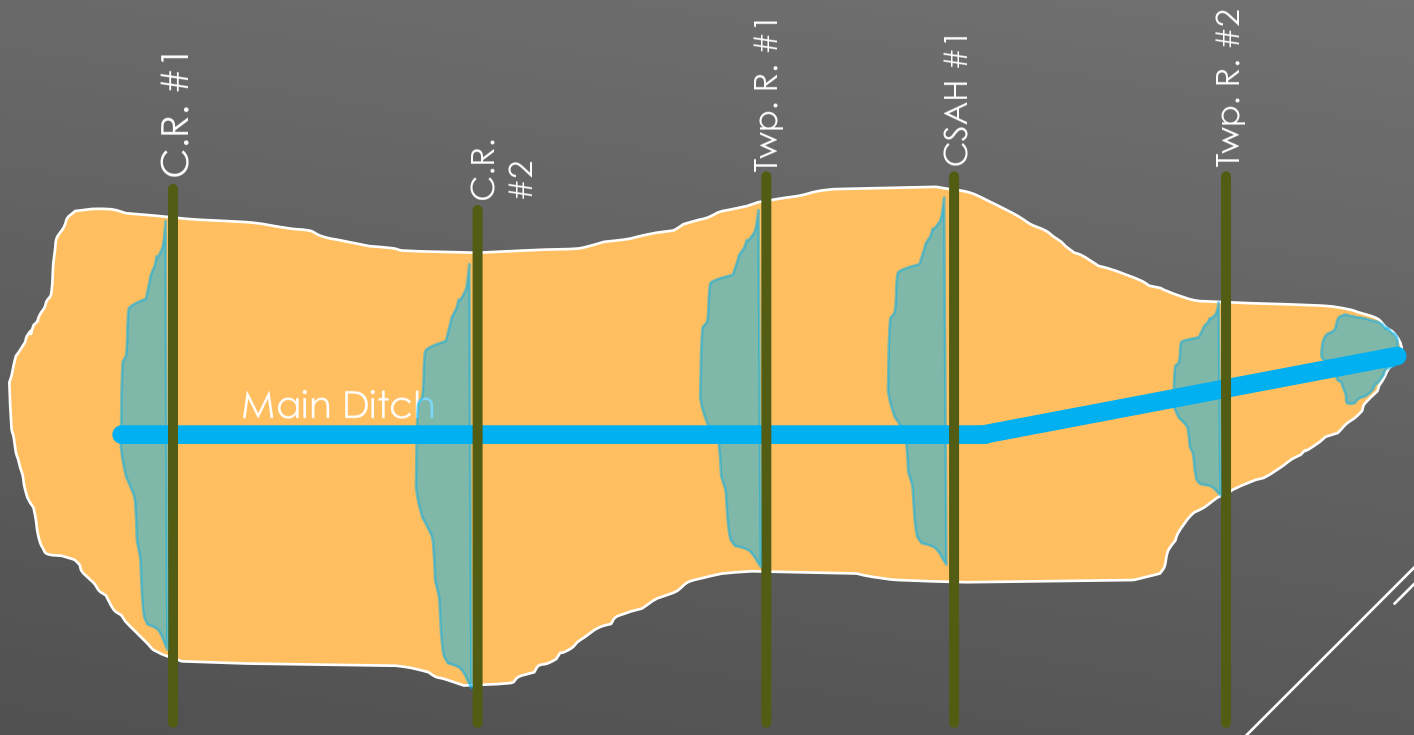
3. Controlled outflows during major floods.

SURFACE DRAINAGE - UNIFORM DESIGN GUIDANCE

International Water Institute

UNIFORM SURFACE DRAINAGE DESIGN GUIDANCE *(SELF MITIGATING)*

- Water is delayed by culvert sizing – storage
- Flood duration = 24 hours (storage)
- Storage Distributed throughout the drainage area



International Water Institute

- The design guidance should be considered when permitting and/or improving public and private surface drainage systems.

- Every available opportunity should be utilized to retrofit the design guidance on existing drainage systems.

SURFACE DRAINAGE – UNIFORM DESIGN GUIDANCE RECOMMENDATION

International Water Institute

- Gated storage is preferred over ungated storage

- Strategically located

- Sufficient capacity to store floodwaters until they can be released without adding to flood damages

FLOODWATER STORAGE (RETENTION/DETENTION) RECOMMENDATION

- Discourage drainage of non-contributing areas in watersheds.

- Where drainage of non-contributing areas is unavoidable, other strategies to mitigate the additional downstream flow contribution should be implemented.

MAINTAIN NON-CONTRIBUTING AREAS RECOMMENDATION

SUBSURFACE DRAINAGE - MANAGEMENT RECOMMENDATION

- BTSAC reaffirms the subsurface management recommendations.
- Encourage water managers to comprehensively implement measures to install controls
  - If condition allow, operate to increase temporary storage during flood events.
- Coupling management of subsurface and surface drainage can be a best management practice, but only if the infrastructure to control the release of water is installed and appropriately managed.

- No Basin Governance - BTSAC recommendations require voluntary adoption by watershed and water resource districts.
- Audience:
  - Local Water Managers – watershed and water resource districts and county commissions
  - Landowners
  - Drainage Engineers
  - Township, County, and State Road Authorities and Engineers
  - Public
  - Media

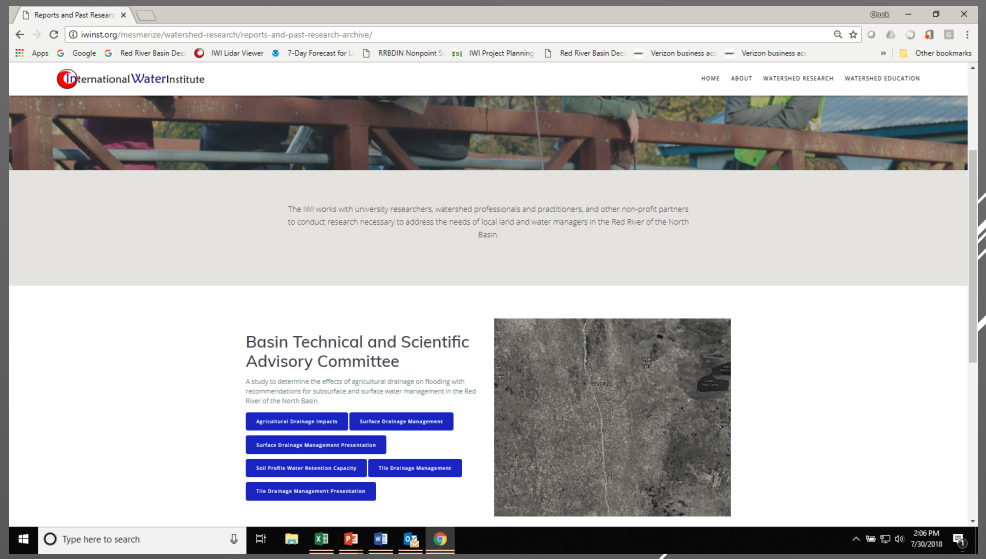
OUTREACH AND EDUCATION - RECOMMENDATION

International Water Institute

"Availability of good information lies at the heart of effective and equitable decision making"

(Allen and Kilvington 1999)

FOR MORE INFORMATION: http://iwinst.org/



Charles Fritz

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InternationalWaterInstitute
Flood research and watershed education for the Red River Basin

APPENDIX N

North Dakota State Water Commission
900 EAST BOULEVARD AVENUE, DEPT 770 • BISMARCK, NORTH DAKOTA 58505-0850
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MEMORANDUM

TO: Governor Doug Burgum
Members of the State Water Commission
FROM: Garland Erbele P.E., Chief Engineer – Secretary
SUBJECT: Devils Lake West End Outlet Impact Assessment Review
DATE: August 8, 2018

Background and Review

The SWC has reviewed the report titled "Devils Lake West Outlet Impact Assessment" (WPC report) submitted by the Gibbens Law Firm and prepared by Western Plains Consulting, Inc. This report was prepared at the request of several landowners and renters who farm land along the Devils Lake West End Outlet canal right-of-way. It focuses on four specific properties with concerns that seepage from the open channel sections of the outlet have caused increased wetness and salinity that have impacted crop yields and prevented areas from being farmed in recent years. Several methods including wetland delineation, soil sampling, and incremental aerial imagery comparisons were used to evaluate the effects of the canal on the adjacent properties.

The Devils Lake West End Outlet transfers water from the southwest tip of Devils Lake (Round Lake) approximately 14 miles to the Sheyenne River. The outlet uses a combination of underground pipe and open channel to convey up to 250 cubic feet per second (cfs) throughout its operating season, typically May through October. Initial construction was completed in 2005, and that year a total of 38 acre-feet of water were removed from Devils Lake through the outlet. A relatively small volume was discharged between 2005 and 2008, but since 2010, over 45,000 ac-ft has been discharged every year. The West Outlet also enables the East End Outlet to operate at a more significant rate because the dilution provided by West End releases helps the outlets meet the downstream water quality limitations. Without the West Outlet, the East Outlet would be very limited in its operation based on the current water quality permit requirements. As of 6/30/2018, approximately 3.3 feet of floodwater has been removed through the West Outlet, and together the outlets have removed approximately 5 feet of water.

Prior to 2012, underground leakage was reported at some of the short pipeline segments that were used to avoid construction through wetlands. No evidence was ever found to substantiate any of those reports. In the summer of 2012, a report was received that groundwater was impacting the basement of a house that was approximately 300 feet from the outlet channel. A settlement of $150,000 was reached regarding that property in November 2012.

Also, in 2012, renters on the May and Bengson properties near the canal in Sections 25 and 26, T152N, R68W reported that groundwater was impacting crops. It was evident that outlet water from the channel was contributing to moisture in the fields, but the exact extent of the impact was difficult to determine. Devils Lake Outlet Mitigation Applications were received for 22.3 acres of soybeans in Section 25 and 80 acres of corn in Section 26. After review, agreements were reached

with both renters. In Section 25, $8,349 was paid for 15 acres of soybeans, and in Section 26, $59,184 was paid for 80 acres of corn.

In 2013, the renter on Section 26 (Mr. Johnson) again submitted a Devils Lake Outlet Mitigation Application for crop damages. That year, it was determined that the land south of the canal was not affected by the outlet, as it did not operate until July and wet conditions were the result of spring rains. The SWC approved $11,938 for damages caused by debris in culverts delaying drainage to the south, but denied the request for crop damage. The debris was the previous year's corn stalks that were washed from the field into the culverts and were caught on the trash racks. The trash racks were removed at Mr. Johnson's request. After these payments, the SWC determined that it should compensate the landowners directly for the ground water effects as opposed to compensating the renter for crop damages.

The claims of damage and apparent impact also resulted in a detailed study of the seepage in this area. The 2013 seepage report was completed by the SWC Appropriations Division and identified an area of canal seepage on the May (Section 25) and Bengson (Section 26) properties. The area affected was determined to be about 62 acres mostly south of the canal, and is split between Section 25 (44 acres) and Section 26 (18 acres). This area is approximated on the May and Bengson property overview maps.

The SWC currently has a 5-year rental agreement (2014-2018) for 50 acres in Section 25. A similar offer was made to the landowner of Section 26 for 18 acres of impact, but the offer was not accepted. Those 18 acres have a large area of productive land and are not the main area that is being claimed as effected on the Bengson property. The 2013 seepage report did not address the Huffman and Fossen properties because no mitigation application was received on those areas prior to 2013, or to date, other than this Impact Assessment Report.

Summary of Initial WPC Report Review

As stated above, an area of canal seepage has been identified, and the effects can be witnessed in close proximity to the canal. Additional areas of seepage or other effects of the canal such as interruption of groundwater flow paths are possible, but the realistic extent of these effects has not been accurately verified by SWC staff for these properties. The 2013 seepage report highlights the fact that these properties all lie within the area of natural rising water tables in the state, and this factor must be considered when attempting to determine which areas the canal has impacted. The WPC report indicates that wetlands and problem areas have grown as a result of outlet operations, but it does not provide a spatial control for comparison of regional water table vs. canal effects.

Producers around the Devils Lake Basin have reported changes in land production as the water table has risen. Some land has become flooded or excessively wet, and other land has become more productive as increased rainfall and higher water tables have supplied adequate moisture where they were previously too dry. This can be viewed throughout the incremental aerial imagery comparison. In particular, historic aerial imagery indicates that several of the areas claimed in the

report had wetness and salinity problems in wet years prior to significant outlet operations, and that most of the reported wet areas don't appear to be expanding as a result of outlet operation.

The WPC report provides precipitation data from the Minnewaukan reporting station (≈ 8 miles NE) and states that the average precipitation was lower for the 2007-2017 period than for the 1993-2006 period. This information is provided as the defining metric for separation of the climatic effect and was used to conclude that precipitation did not cause the increased salinity or wetness problems on any of the properties. A closer review of available precipitation data indicates that the averages for the periods were very similar, and that the 2007-2017 average was slightly higher than the 1993 – 2006 period. Regardless, a comparison of average precipitation between these time periods is not, in itself, a defining metric for separation of the climatic effect. Once the new elevated water table regime has been established, it is self-sustaining, and only very gradually and over a very long term, or with several exceptionally dry years will it diminish to a lower level. This may require years or decades of a drier climate regime.

Comparing water-table response in Devils Lake and regional observation wells shows that all experienced a significant rise at approximately the same time that the West Outlet began to discharge considerable volumes of water. The long-term record from the Carrington and Warwick wells indicates a trend of a large initial rise of about five to seven feet beginning in the wet year of 1993, and a second rise beginning in 2008. The Devils Lake hydrograph also shows a similar trend, with substantial increases in lake elevations.

In the years since the 2013 report was completed, well readings near the canal in sections 25 and 26 indicate that the water table at approximately 100 feet from the canal does rise and fall steadily in response to the outlet operation. With this information, it appears possible that canal seepage may extend further into the areas immediately south of the canal in section 26 beyond what was identified in the 2013 study. While much of this area shows signs of being wet historically, there is no simple way to separate the effects of the natural rise vs. any effects caused by seepage. Additional wells could potentially clarify this situation and help to delineate impacts, but the additional time required would delay any conclusion. In general, the incremental aerial photography may provide the most time-effective method to evaluate the change since the outlet has become operational.

Evidence of salinization is also a major factor identified in the WPC report, and the interpretations vary. The initial SWC review of the WPC report indicates that some areas may warrant closer examination, but that the evidence was inconclusive for most of the areas examined. Salinization is a product of a high-water table, which prevents deep retention or movement of naturally occurring or added salts and enables their upward movement and evaporative deposition within the soil profile. It is therefore both an indicator of and a product of natural high-water table conditions occurring in the post-1993 wet climate shift. In short, there have been measured changes in salinity near the outlet, but the relative change (and direction) and cause for the change varies by location and needs to be reviewed more thoroughly before a final conclusion is reached.

Summary of Claimed Damages

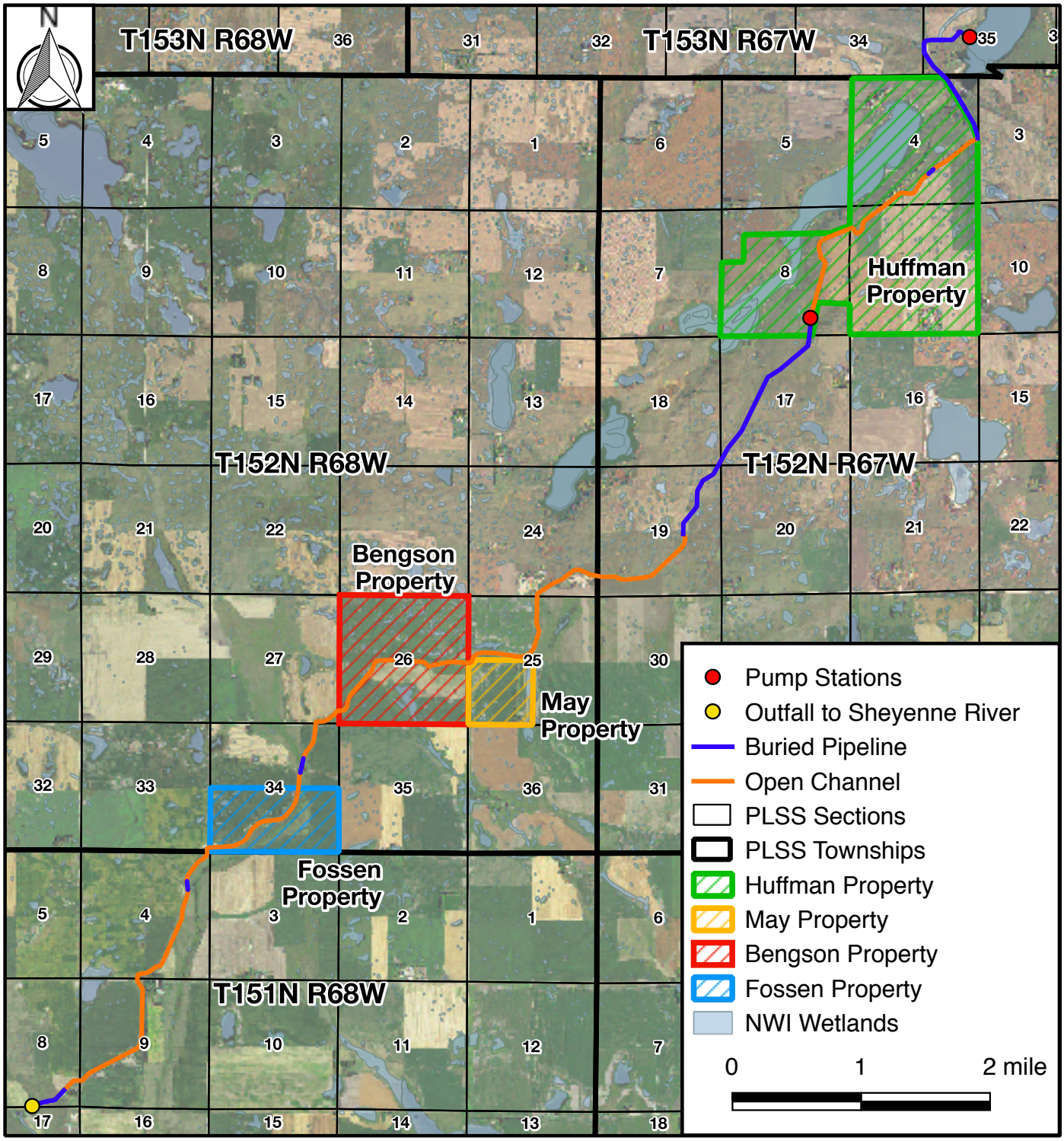
A handout provided three pages of past financial impacts at the June 14, 2018 Commission meeting. This was the first time that most of these claims have been received and the claims are summarized in the table below

Landowner	Renter	Claim Amount	Claimed Item	Year(s)
Huffman	-	$166,000	Hay Production Loss	10 years (unspecified)
	-	$20,230	Replacement Pasture rent	
	-	$810,000	Cattle Production Loss	
May	James Fossen	$195,064.35	Crop Production Loss	2007 - 2017
Bengson	Dennis Johnson	$246,169.46	Crop Production Loss	2007 - 2017
Fossen	-	$127,267.64	Crop Production Loss	2007 - 2017

Total = $1,564,731.45

GE:TD: /416-10

Devils Lake West End Outlet Overview



Devils Lake West End Outlet Facts

- Inital construction was completed in 2005 (100 cfs capacity)
- Approximately 4 miles of pipeline and 10 miles of open channel
- Discharge capacity expanded to 250 cfs in 2010
- 602,948 acre-feet discharged as of 6/30/2018

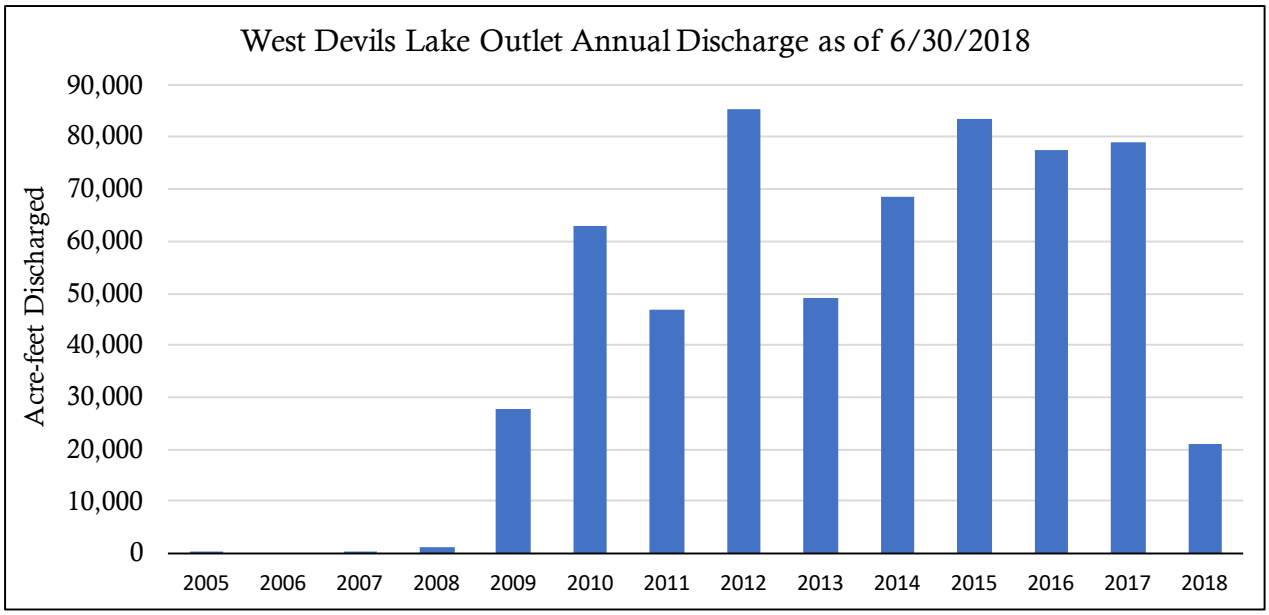
(This volume equals approximately 3.3 feet of Devils Lake elevation)

North Dakota
State Water Commission

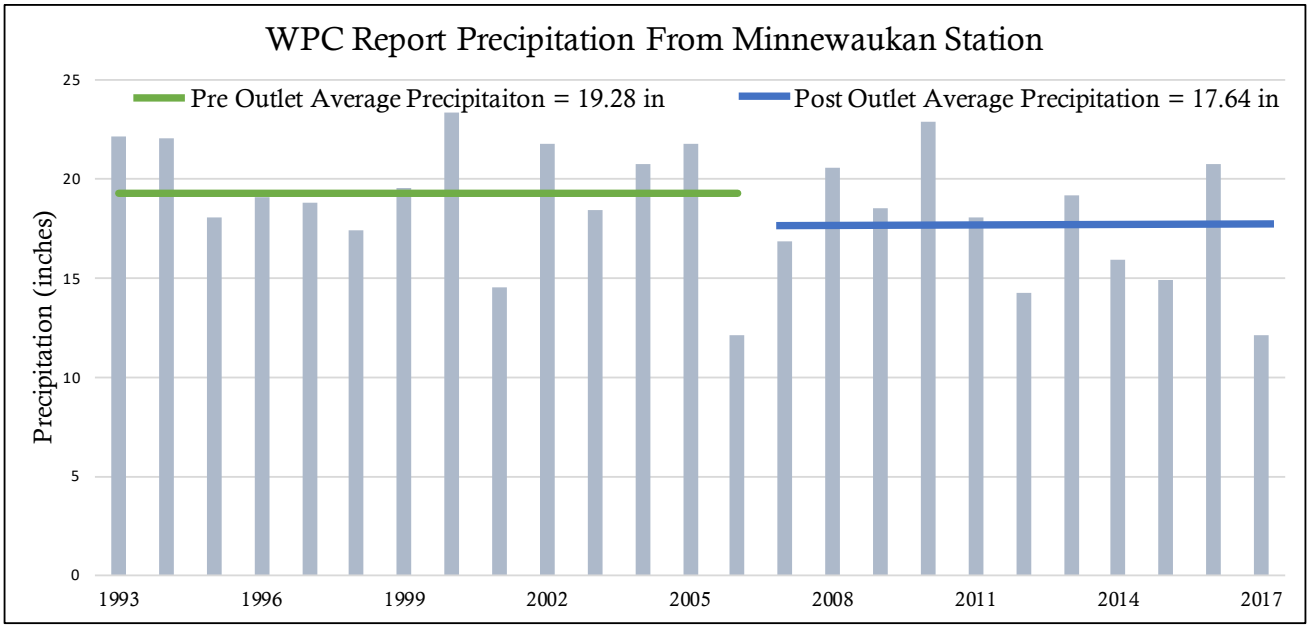
27 July 2018

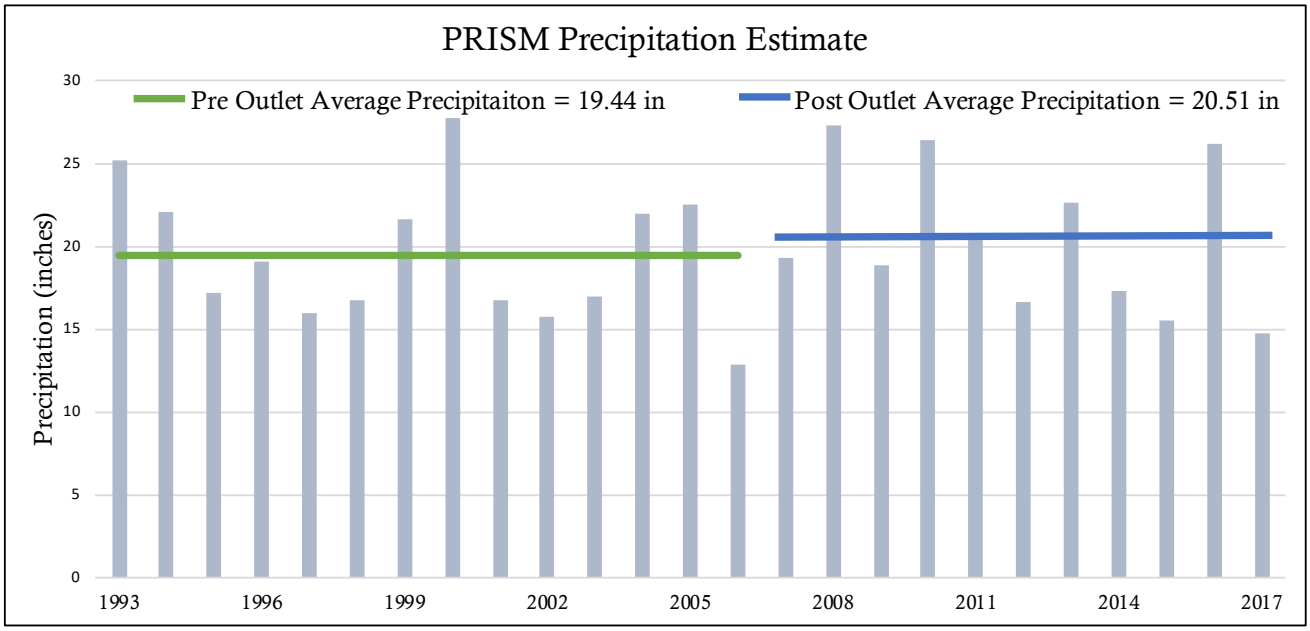
Devils Lake West End Outlet Annual Discharge Summary

Year	Start Date	Shutdown Date	Operating Window (days)	Ac-ft Discharged
2005	8/5/05	8/29/05	25	38
2006	No Operation		0	0
2007	6/13/07	8/19/07	68	298
2008	4/21/08	11/9/08	203	1,241
2009	5/22/09	11/4/09	167	27,653
2010	5/21/10	11/13/10	177	62,977
2011	5/26/11	11/14/11	173	46,911
2012	4/2/12	11/8/12	221	85,196
2013	7/1/13	10/17/13	109	48,912
2014	5/20/14	11/9/14	174	68,548
2015	4/23/15	11/9/15	201	83,565
2016	4/18/16	11/17/16	214	77,535
2017	5/8/17	10/30/17	176	79,102
2018	5/9/18			20,970
			Total as of 6/30/2018	**602,948**



Precipitation Near the Devils Lake West End Outlet





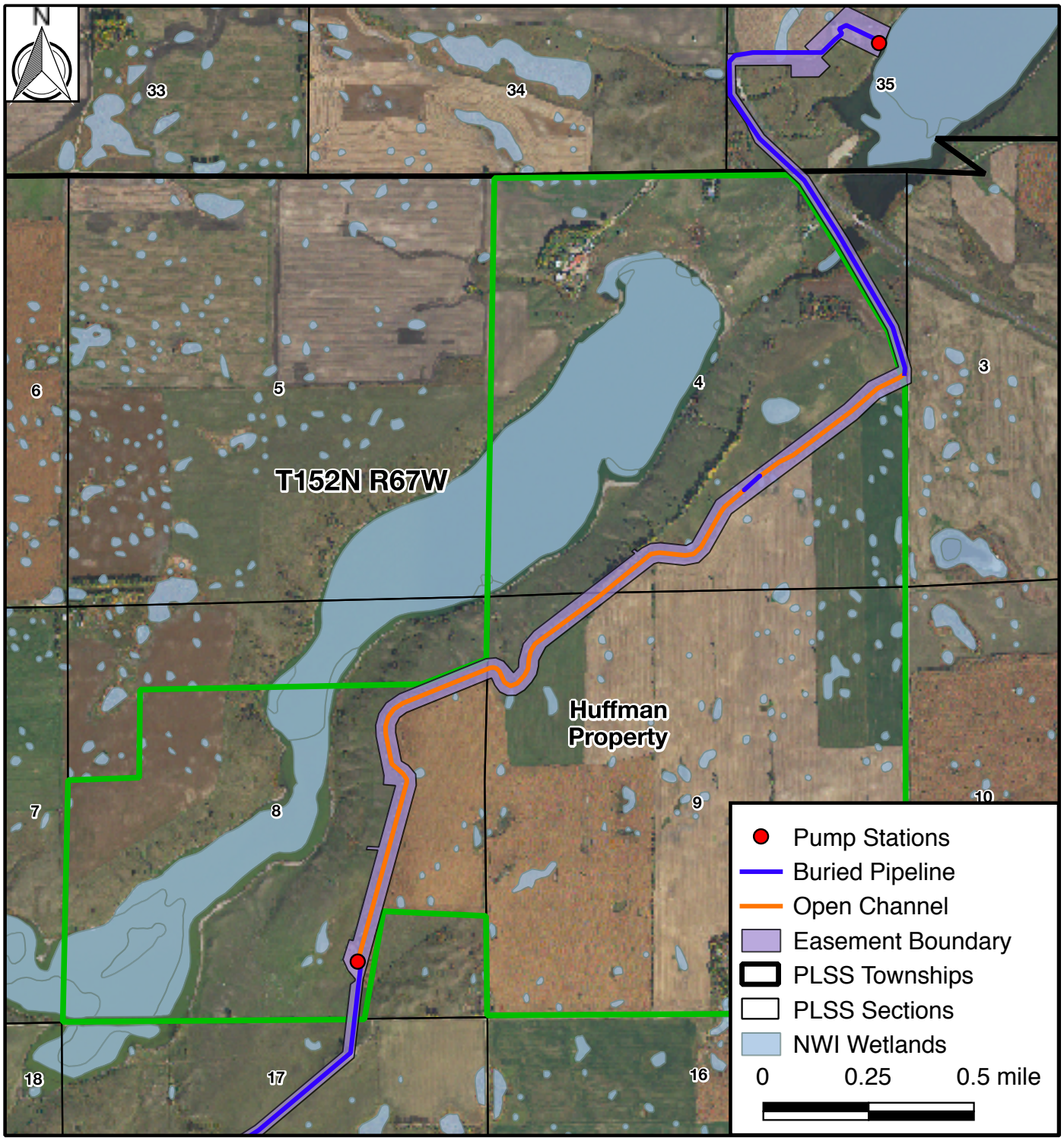
In general, the pre and post outlet periods represented in these figures show that the precipitation averages for the periods are very similar with years both well above and below the averages.

The PRISM data represents the best available estimate for an ungauged location and was collected from the PRISM Data Explorer for the May/Bengson properties (Lat: 47.955, Long: -99.328 on 6 Aug 2018) (http://prism.oregonstate.edu)

The WPC report states that the "Minnewaukan data for some months during both the 2007 - 2016 period were not available" but does not state how the final precipitation values were determined.

Huffman Property

Devils Lake - West End Outlet



Property boundaries shown are approximate based on WPC report maps

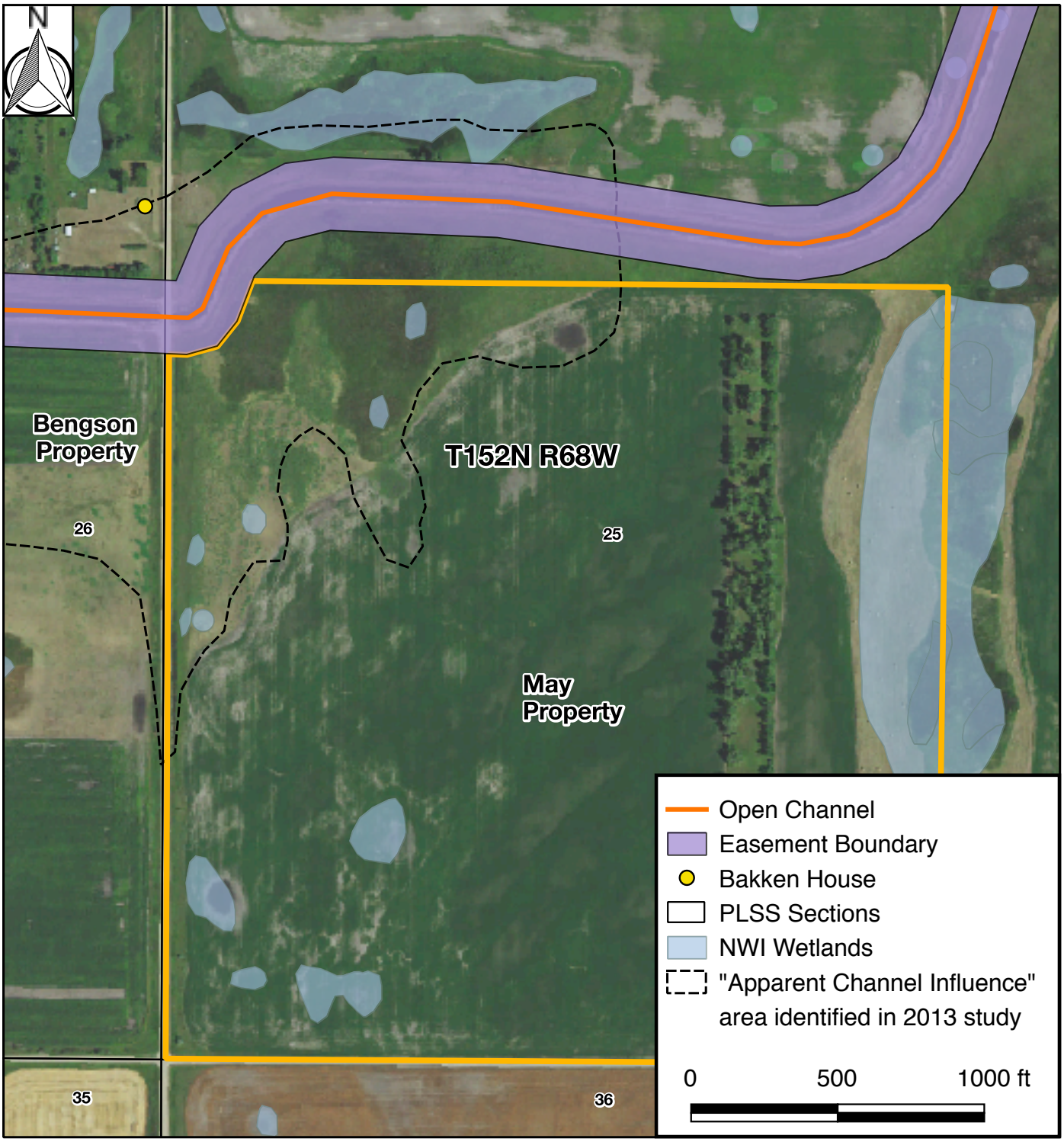
Background Imagery is 2017 NAIP (National Agricultural Imagery Program)

North Dakota
State Water Commission

30 July 2018

May Property

Devils Lake - West End Outlet



Property boundaries shown are approximate based on WPC report maps

Background Imagery is 2017 NAIP (National Agricultural Imagery Program)

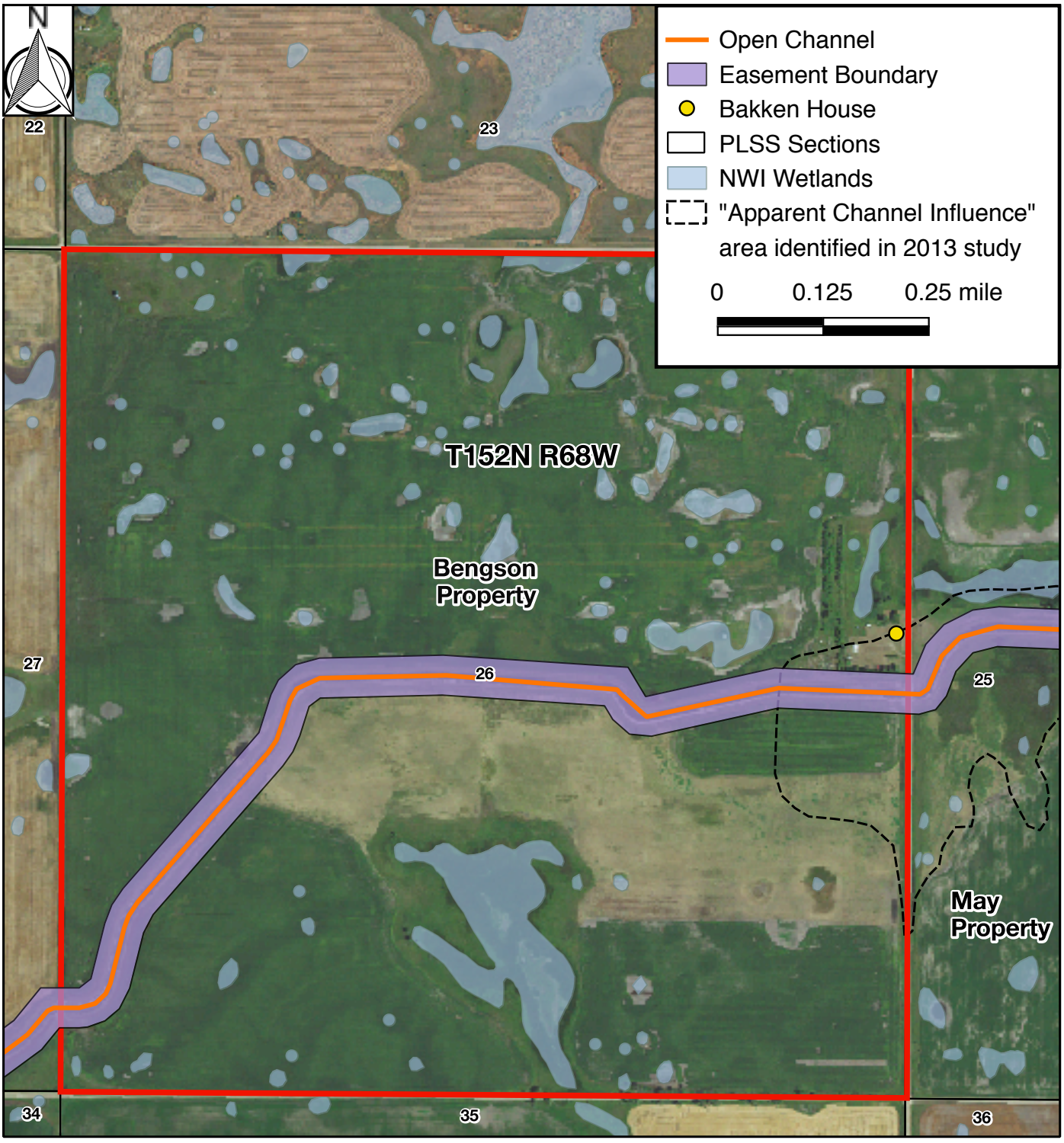
The noted channel influence area was identified and disclosed in 2013 using observation well data

30 July 2018

North Dakota
State Water Commission

Bengson Property

Devils Lake - West End Outlet



Property boundaries shown are approximate based on WPC report maps

Background Imagery is 2017 NAIP (National Agricultural Imagery Program)

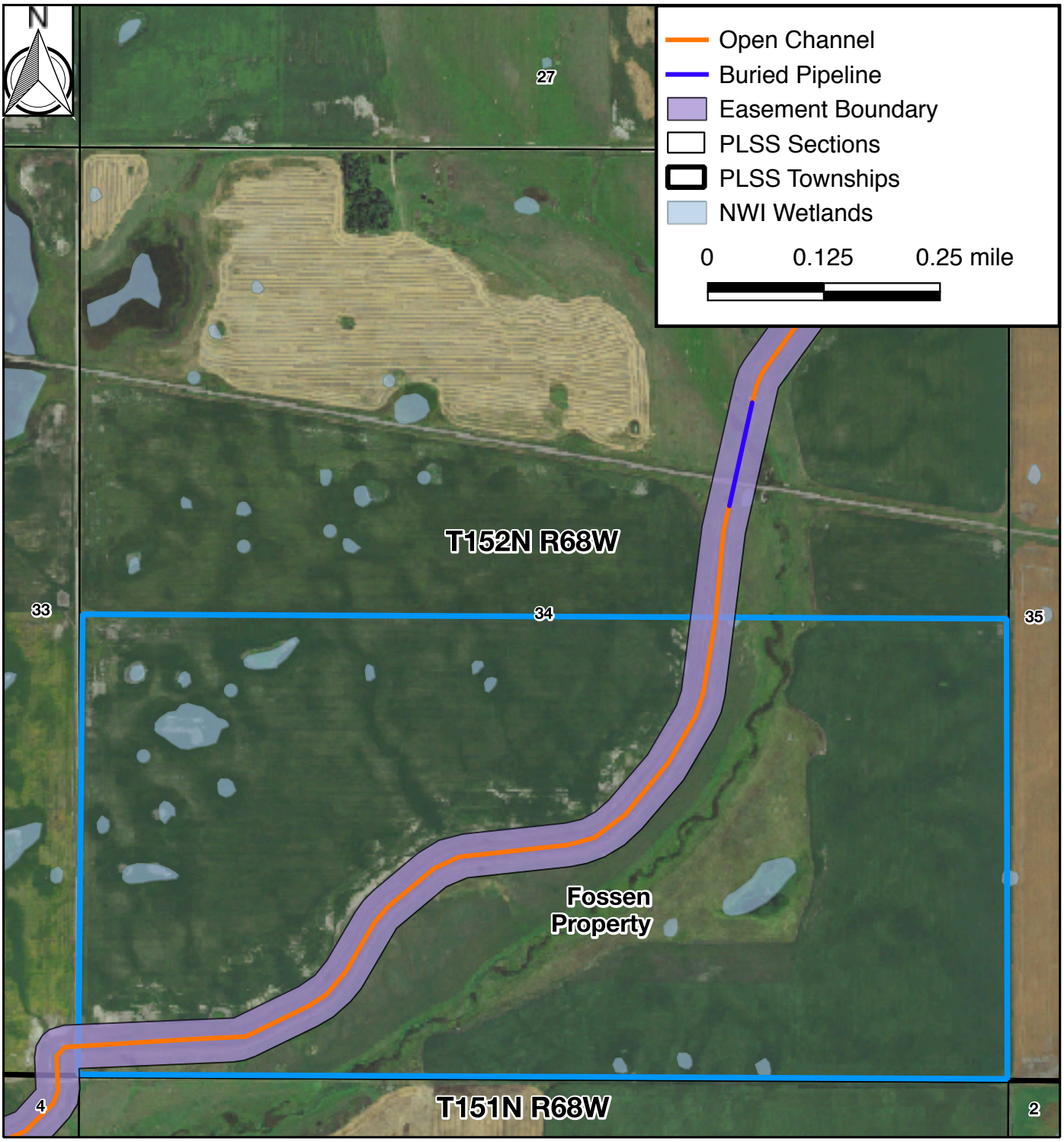
The noted channel influence area was identified and disclosed in 2013 using observation well data

North Dakota
State Water Commission

30 July 2018

Fossen Property

Devils Lake - West End Outlet



Property boundaries shown are approximate based on WPC report maps

Background Imagery is 2017 NAIP (National Agricultural Imagery Program)

North Dakota
State Water Commission

30 July 2018

North Dakota State Water Commission
900 EAST BOULEVARD AVENUE, DEPT 770 • BISMARCK, NORTH DAKOTA 58505-0850
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MEMORANDUM

TO: Governor Doug Burgum
Members of the State Water Commission
FROM: Garland Erbele P.E., Chief Engineer – Secretary
SUBJECT: Devils Lake West End Outlet Canal Seepage Mitigation Options Overview
DATE: August 09, 2018

In response to the concerns expressed by landowners along the Devils Lake West End Outlet canal during the June 14th Commission meeting, the following options have been identified as possible courses of action for mitigation of the reported impacts from the Devils Lake West End Outlet canal seepage. This summary is a preliminary overview of the technical options and does not specifically address the damage claims that were provided to the Commission during the June meeting. Ultimately, a combination of options may be considered as a possible solution.

Options Examined

1. Stop West End Outlet Operation
2. Canal Lining
    a. Grout Curtain
    b. Proprietary Liner System
    c. Rebuild Canal with Improved Materials and Methods
3. Drain Tile to capture seepage and return to canal
4. Reconstruct using a buried pipe
5. Cutoff Wall
6. Land Negotiation
7. Do Nothing / Continue Current Operations

Option 1: Stop Outlet Operation

The current slow decline of the Devils Lake water surface elevation has led to an increased pressure from some recreational interests to slow or stop outlet operations to preserve the current lake level for as long as possible. The City of Devils lake is adequately protected, and many of the roadways have been raised. The lake is more than 8 feet below its natural overflow elevation, and a control structure is in place in the Tolna Coulee to limit flows if erosion takes place during a natural overflow of the lake.

Advantages:

- Saves the State of ND on pumping costs
- Stops the concern of canal seepage onto adjacent properties
- Easy to implement

Disadvantages:

- East End outlet discharge will be very limited without the dilution provided by West End discharges
- Removal of floodwater from the Devils Lake Basin would be very limited
- Additional downstream protection of a natural overflow would not be achieved
- The West End Outlet would face the same challenges if the lake were to rise again to levels that placed the outlet back into service after a period of shutdown

Option 2: Canal Lining

Several options are available to line the canal to prevent seepage and groundwater intrusion. These options were considered for the stretch of canal that is approximately 2 miles long through the May and Bengson properties with the idea that the methods could be expanded to other areas of the canal if selected. Three methods have been assessed for this preliminary overview.

2a. Permeation Grouting of the Canal

This option would involve a specialty contractor who would inject grout through the canal bottom and sides to form a layer with dramatically reduced permeability to stop or reduce groundwater interaction with the pumped water. Figure 1 below shows a canal cross section that provides a basic overview of what this option may look like. The preliminary estimate for this option is $5 to $8 million per mile.

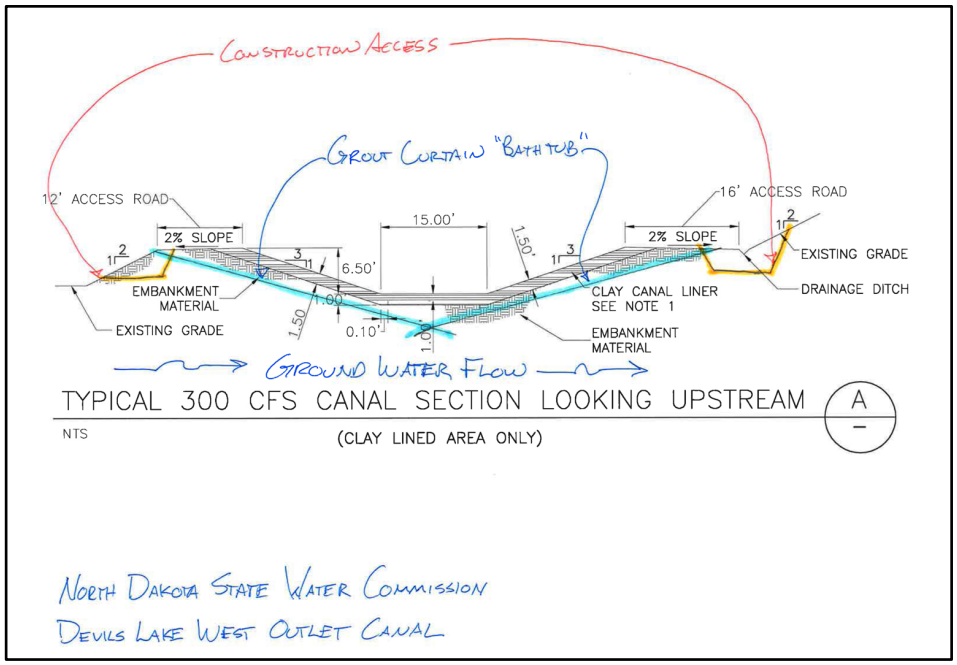


Figure 1: Permeation Grouting Alternative Schematic

Option 2a Advantages

- Will stop or significantly reduce leakage
- Suitable for sands and gravels
- Can possibly be done with canal in operation
- Special tie-in details at structures not necessary
- Longevity, not subject to weather and UV deterioration

Option 2a Disadvantages

- High project cost with uncertainty of timing for specialized contractor
- Specialized construction project, will have few bidders
- Not suitable for silts and clays
- Needs extensive geotechnical investigation
- Does not solve weed problem which requires canal to be treated and cleaned
- Uncertainty of effectiveness
- Uncertainty of impact on groundwater flow
- Not readily accessible to inspect, either during or after construction, a system of observation wells would be required to observe effectiveness
- Not visible to the public; may not convince public that the repair did anything

2b. Proprietary Liner System

This method would also involve a specialty contractor who would design and install a SIBELONMAT liner system that consists of a geomembrane mattress which is filled with grout. This option could possibly be placed directly onto the existing canal with limited earthwork required. A preliminary cost estimate for this option is $9 million per mile. Many of the same advantages and disadvantages exist as option 2a. Some of the differences are highlighted below.

Option 2b Advantages

- Should completely stop transfer between ground water and outlet water
- Weeds would no longer be a problem
- Outlet may not have to be shut down during construction
- Public will be able to see that something has been done to stop water transfer
- Soil type makes no difference, could be placed over any canal area
- No concern of altering groundwater flow under the canal
- High groundwater should not be a problem for installation

Option 2b Disadvantages

- High project cost with uncertainty of timing for specialized contractor
- Membrane would be subject to freeze/thaw and UV deterioration when canal is not running
- Would alter system hydraulics which would need to be evaluated along the canal

2c. Rebuild Canal with improved materials and methods

This option would involve installing an impermeable polyethylene or similar liner. This would require removing 1-2 feet of material from the bottom and side slopes of the canal. Installing the liner, then placing fill to bring the canal back to grade using either the existing removed fill or importing clay. Many of the same advantages and disadvantages exist as options 3a and 3b. Some of the differences are highlighted below.

Option 2b Advantages

- Will stop transfer between ground water and outlet water
- Relatively simple construction project
- Should have a high number of bidders
- Likely lower cost than 3a and 3b

Option 2b Disadvantages

- West End Outlet will be shut down during construction.
- Flows from East End Outlet will have to be reduced during construction
- Weeds may still be a problem.
- Once construction is completed there will be no visible sign that anything has changed
- May still require an evaluation of system hydraulics if canal surface changes

Option 3: Drain Tile to Capture Leakage and Return to Canal

This option would be to place longitudinal perforated drain tile pipe(s) along the canal at an adequate depth to collect seepage flow. An added benefit to this option is that the drain tile pumps could be managed in a way that maintains groundwater levels in the canal vicinity at an adequate level for planted crops to grow.

This option was explored in some detail in 2013, and at that time an estimate was prepared to install one four-inch drain tile at a 6- foot depth for a length of 2700 feet along the south side of the canal, approximately 125 feet from the canal centerline. This estimate was based on a hydraulic conductivity of 30 feet per day which would provide a discharge capacity of approximately 3.6 cfs. Additional study would be required to determine proper depth, location, sizing and power requirements.

Advantages

- Drain tile would intercept seepage from the canal and may help maintain the water table in adjacent fields at a level that is more suitable for crop production
- Outlet could likely operate during construction
- Lower cost than lining options

Disadvantages

- Drain tile will not stop seepage from the canal
- Increase maintenance of additional outlet infrastructure
- If landowner participates in farm program, NRCS requires a wetland determination and verification that the drain tile system will not drain wetlands
- Drain tile may also collect groundwater at times, affecting operating costs
- The U.S. Fish and Wildlife Service has wetland easements on many of the areas with seepage concerns, and approval would be required prior to installing drain tile

Option 4: Redesign Open Canal into a Pipe

This option was briefly explored in 2013. At that time, a rough estimate was prepared using 96-inch HDPE, concrete, or steel pipe. Estimates at that time for materials alone were approximately $3 million per mile. After considering the associated construction cost, the tie-in infrastructure, and complete re-engineering of the system, it was determined that this option would not be explored for further evaluation at that time. If the Commission decides that a major repair project is the best choice then this option would likely be the most robust form of repair.

Advantages

- Would solve the seepage problem
- Would remove any outlet impacts to agricultural production
- Should be a permanent solution

Disadvantages

- Cost
- Major system re-engineering required

Option 5: Cutoff Wall

A seepage cutoff wall has been suggested in the past as a method to keep the canal seepage within the right-of-way. The problem is that this could eliminate cross-canal subsurface drainage. This could potentially cause greater impacts than the current canal situation. This option is not recommended for further assessment.

Option 6: Land Negotiation

6a. Buy, Rent or Obtain Easement on Affected Land

This option has been explored and offered in the past with mixed success. There is currently a rental agreement for 50 acres in place on the May property which will end after 2018. Offers to rent or purchase 18 acres of land on the Bengson property have not been accepted. This option has not yet been explored for the Huffman and Fossen properties.

6a. Advantages

- Likely lower total cost than any major construction option
- No future claims of crop damage or seepage effects on agreed acreage
- Potential, if purchased, for cooperation with Game and Fish or US Fish and Wildlife Service for management as wetland habitat or recreational area

6a. Disadvantages

- May take agricultural land out of production
- Does not improve land value or productivity

6b. Idle Land Compensation

This option would pay land owners to idle the effected lands through the duration of the canal operation, similar to the CRP program through the USDA Farm Services Agency. This option has not yet been explored for any properties along the West End Outlet canal.

If this approach is considered for the areas in question, several factors would likely be reasonable aspects of negotiation. The specific acreage, opportunities for periodic re-evaluation throughout the duration of the agreement, and how to address damage claims after the outlet is shut down for an extended period of time are a few of the factors that need to be considered. A major drawback of this option is that there is potential for recurring disputes over the effected acreage and compensation when wet years cause additional crop damage. If this alternative is selected for any of these properties, it is suggested that the specific acreage and compensations should be agreed to for a period of several years at a time to reduce the potential for disputes over the details.

6b. Advantages

- Allows the landowners to maintain ownership of their land

6b. Disadvantages

- Does not prevent seepage from the canal
- Takes agricultural land out of production
- Not a permanent solution, would require periodic re-negotiation

Option 7: Do Nothing Option

Continue current operations without modifying the canal and resolve impacts through other means.

Table 2: Preliminary estimate of costs

Option	Description	Cost Estimate
1. Stop Operation	No water flowing in the canal	$0 for implementation, but has undetermined economic impact
2.a Canal Lining/Grout Curtain	Permeation Grouting of the Canal	$5 - $8 M per Mile
2.b Proprietary Liner System	Grout filled liner	$9 M per Mile
2.c Rebuild Canal	Remove existing material, Polyethylene liner and clay cover	$1 M per Mile
3. Drain Tile	Capture Seepage and Return to canal	$100,000 per Mile
4. Reconstruct with Pipe	Buried Pipe	$3 – $4 M per Mile
5. Cutoff Wall	Cutoff walls to impermeable layer	Not recommended
6a(1) Rent Land	Rent affected acres	$50 per Acre/per year
6a(2) Buy Land	Purchase affected acres	$1,700 per Acre
6b. Idle Land	Pay landowner to permanently idle land for the duration of West Outlet operations	$50 per Acre/per year
7. Do Nothing	Continue current operations	Same operating costs as today

RED RIVER VALLEY WATER SUPPLY PROJECT

Serving the Water Supply Needs of Central North Dakota and the Red River Valley

STATE WATER COMMISSION MEETING UPDATE

AUGUST 9, 2018

Lake Agassiz Water Authority

GARRISON DIVERSION

APPENDIX O

PRESENTATION OVERVIEW

RRVWSP RECENT PROGRESS

UPPER SHEYENNE DISCHARGE ISSUE

- Devils Lake Suggestions
- Upper Sheyenne Discharge
- New Upper Sheyenne Analysis
- Barriers to Upper Sheyenne River
- Additional Considerations
- Past Federal Government Roadblocks

RRVWSP MOVING FORWARD

RRVWSP RECENT PROGRESS

RRVWSP RECENT PROGRESS

1. CENTRAL NORTH DAKOTA FONSI FOR 20 CFS IN-BASIN

- Reclamation Released the Final Environmental Assessment and a Draft FONSI
- Review Period Ends August 31

2. JURISDICTIONAL WETLAND DETERMINATIONS RECEIVED FROM CORPS OF ENGINEERS

- 2 Years +

3. PERMIT APPLICATIONS SUBMITTED

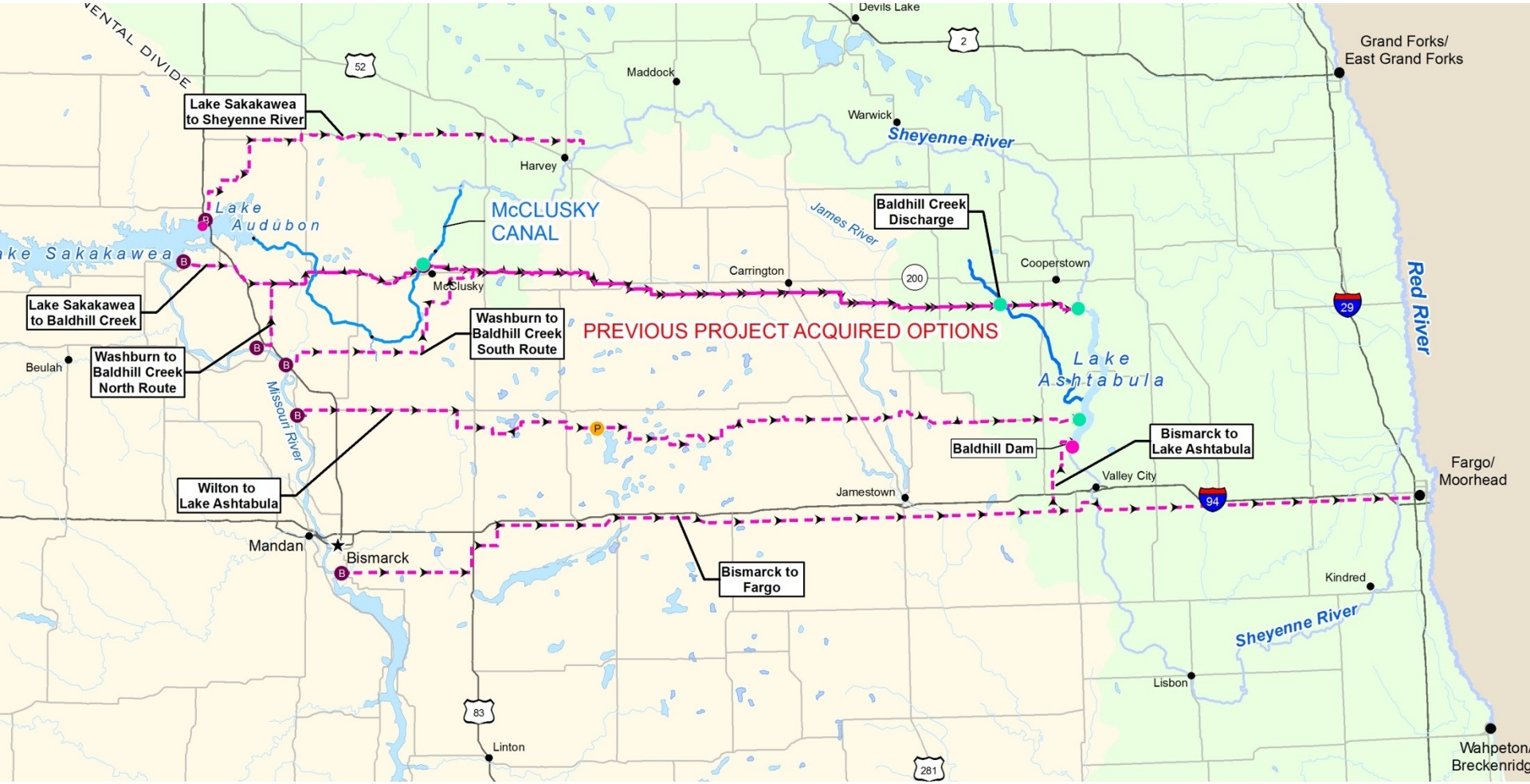
- Intake Permit (USACE)
- Discharge Permit (NDDH)
- Sovereign Lands Permit (SWC)

4. VALUE ENGINEERING STUDY

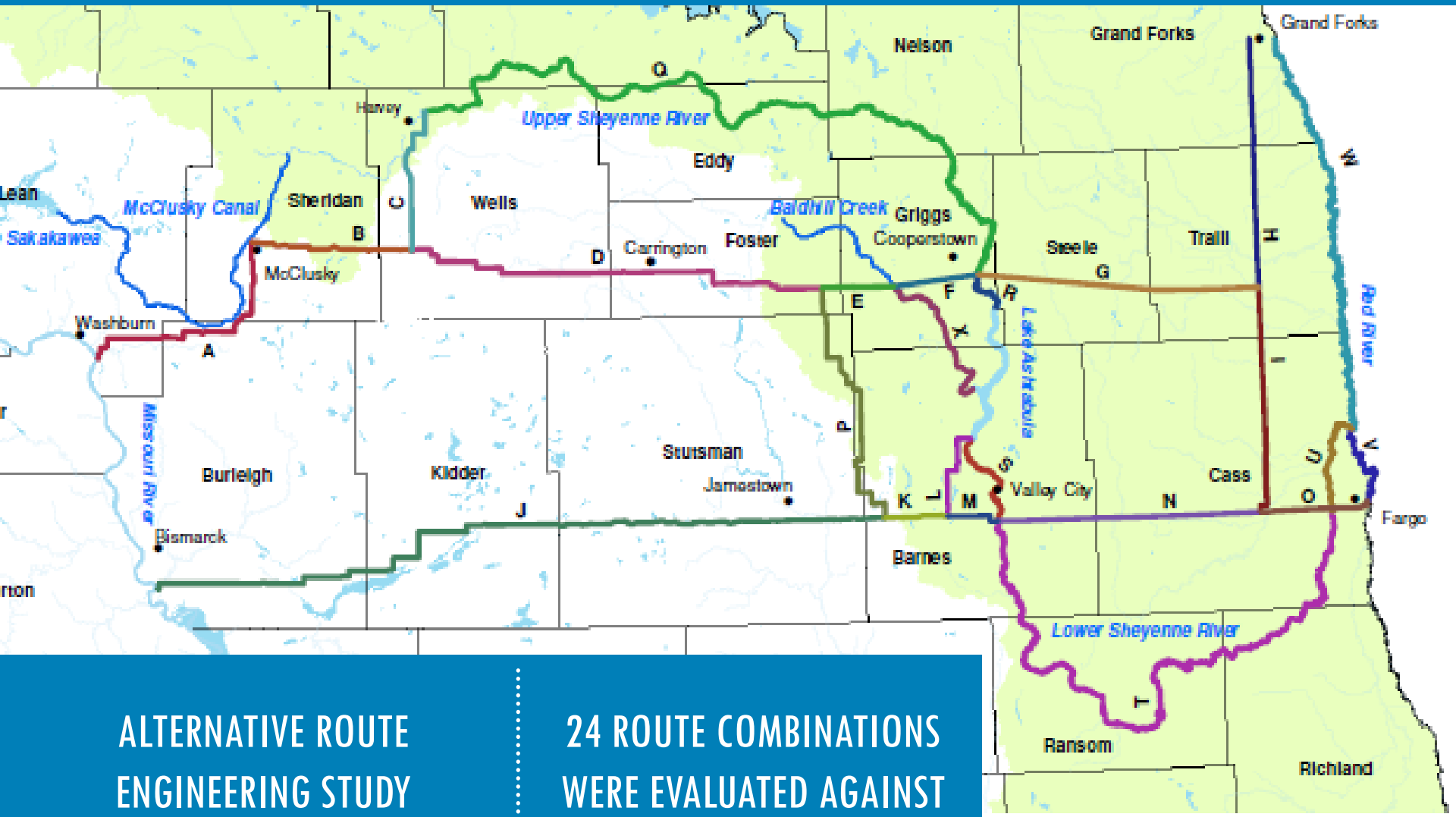
- September 10-14, HDR selected as firm
- Selection Committee: Garrison Diversion, Lake Agassiz Water Authority, and State Water Commission Representatives

DEVILS LAKE SUGGESTIONS

ROUTE ALTERNATIVES
MANY ALTERNATIVES EVALUATED & ELIMINATED



ROUTE ALTERNATIVES
MANY ALTERNATIVES EVALUATED & ELIMINATED



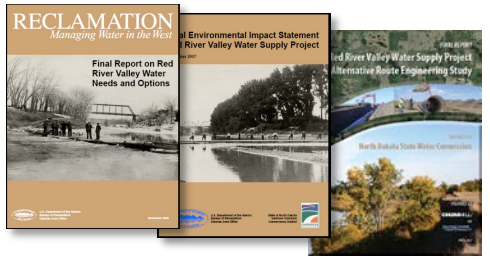
ALTERNATIVE ROUTE ENGINEERING STUDY CH2M HILL **LED BY NDSWC**

24 ROUTE COMBINATIONS WERE EVALUATED AGAINST STAKEHOLDER CRITERIA

UPPER SHEYENNE DISCHARGE
REPEATEDLY STUDIED AND ELIMINATED

- Federal RRVWSP Needs Assessment – Reclamation, 2000
- Federal EIS – Reclamation and Garrison Diversion, 2007
- RRVWSP State Phase I Alternative Analysis – B&V/AE2S, March 2012
- SWC Led RRVWSP Alternative Route Engineering Study – CH2M Hill, 2014

ALL ELIMINATED FROM FURTHER CONSIDERATION



DESKTOP REVIEW – B&V/AE2S, MARCH 2017

- Upon Request from City of Devils Lake

UPPER SHEYENNE DISCHARGE ANALYSIS REVIEW – B&V/AE2S TASK ORDER, AUGUST 2017

- Per Governor Request

NEW UPPER SHEYENNE ANALYSIS

REQUIRED ROUTE

- Highway 30 to Cross New Rockford Canal

CHANNEL CAPACITY

- With Devils Lake Outlet & Subsequent Analysis, Channel Capacity Appears to be Adequate at Near Bank Full

PROJECTED WATER LOSSES – 188 ADDITIONAL RIVER MILES

- Evaporation, Evapotranspiration, Seepage Loss
- Level of Loss Unknown and Unpredictable

NEW UPPER SHEYENNE ANALYSIS

LIFE CYCLE COST ANALYSIS		
	SHEYENNE RIVER ABOVE LAKE ASHTABULA	UPPER SHEYENNE RIVER
FLOW (CFS)	165	215*
CAPITAL COST	$938,742,000	$875,602,000
CENTRAL NORTH DAKOTA EXTENSION	$56,300,000	$63,570,000
CARRINGTON & COOPERSTOWN EXTENSIONS	$500,000	$17,430,000
PRESENT VALUE 50 YEAR O&M COSTS	$263,000,000	$324,320,000
TOTAL	**$1,258,542,000**	**$1,280,922,000**
DIFFERENCE		**+$22,380,000**

* MORE WATER IS REQUIRED TO ACCOUNT FOR WATER LOSS FROM EVAPORATION, EVAPOTRANSPIRATION, & SEEPAGE LOSS

BARRIERS TO UPPER SHEYENNE RIVER

INCREASED LIFE CYCLE COSTS

- Lower Capital Costs for Main Line
- Increased Costs for:
  - Upsized Intake, Pumps, & WTP
  - Pipeline Extensions to CND
  - Annual O&M

RISK OF WATER LOSS

Additional 188 River Miles

- Evaporation
- Evapotranspiration
- Seepage Loss

LACK OF USERS

Along the Upper Sheyenne River

HORIZONTAL COLLECTOR WELLS

Not Enough Well Field Capacity

BARRIERS TO UPPER SHEYENNE RIVER

FEDERAL RESTRICTIONS:

PROHIBITS USE OF GARRISON DIVERSION UNIT FACILITIES

DWRA SECTION 8(F)

"No funds authorized under this Act may be used to carry out the portion of the feasibility study of the Devils Lake basin, North Dakota, authorized under the Energy and Water Development Appropriation Act of 1993 (Public Law 102-377), that addresses the needs of the area for stabilized lake levels through inlet controls, **or to otherwise study any facility or carry out any activity that would permit the transfer of water from the Missouri River drainage basin into Devils Lake, North Dakota."**

ADDITIONAL CONSIDERATIONS

INCREASED FLOWS NEEDED TO KEEP UPPER SHEYENNE WET TO PROTECT FROM ADDITIONAL SEEPAGE LOSSES

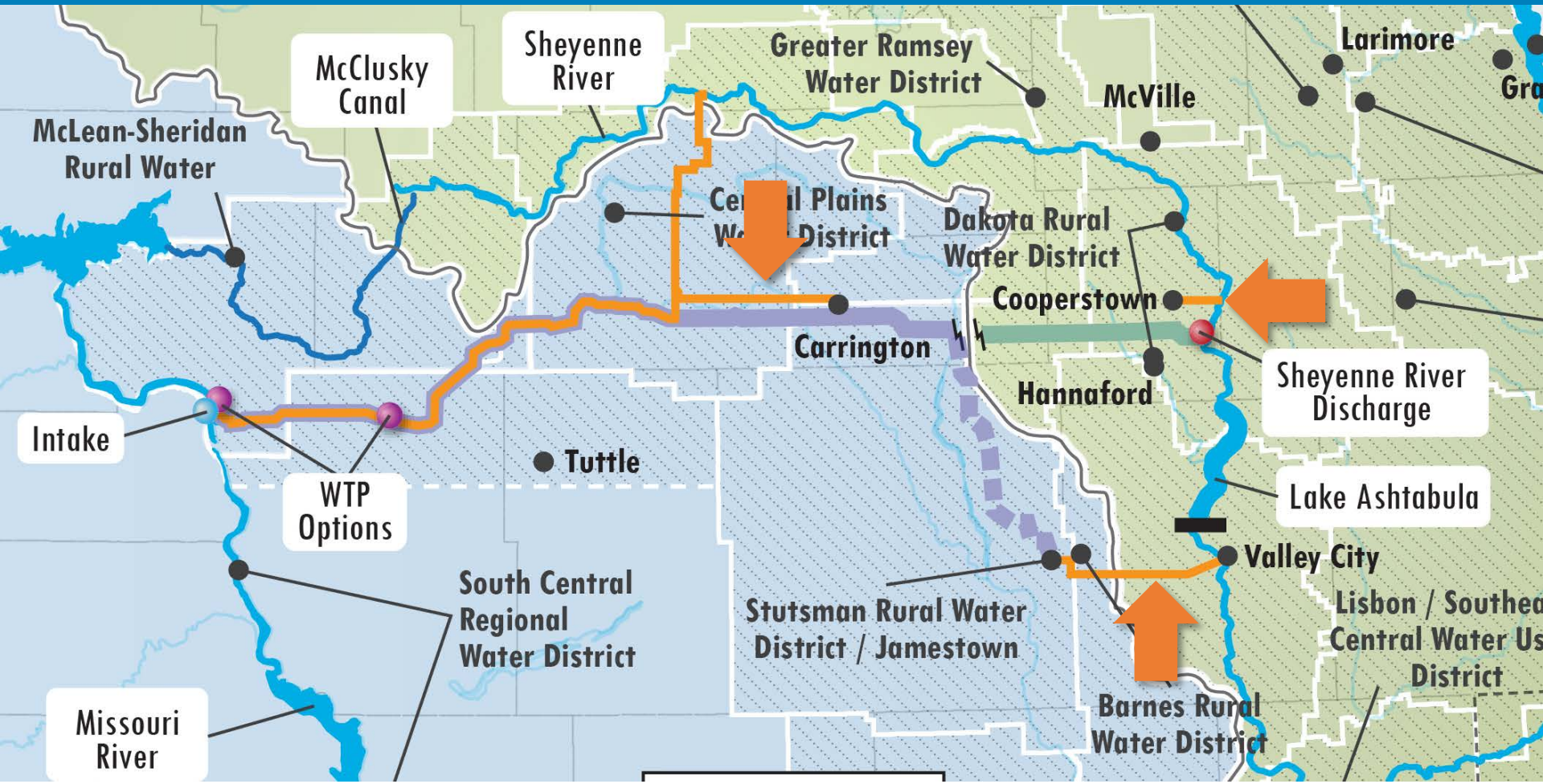
WHO PAYS FOR:

- Upsizing Facilities to Overcome Losses
- Increased Operating Costs
- Operating Costs if Used to Fill Devils Lake ($20M Annually)

PROJECT DELAYS LEAD TO INCREASED COSTS ($28M ANNUALLY)

- A 2-3 Year Delay Would Be Expected

ADDITIONAL CONSIDERATIONS



INCREASED PIPELINE COSTS FOR SPIRITWOOD, CARRINGTON, COOPERSTOWN

- Very Limited Users Would Benefit to the North
- Can't Keep Central ND 20 CFS In-Basin

RELYING ON CONGRESS TO AMEND DWRA IN TIMES OF DROUGHT IS A RISKY STRATEGY

PAST FEDERAL GOVERNMENT ROADBLOCKS

- Federal Refusal to Pursue GDU Project
- Federal Settlement and Abandoned GDU Project in 1980s after 10 Years of Litigation
- Federal Refusal to Issue RRVWSP ROD Since 2007+
- Difficult Federal Legislative Process to get to DWRA, with a Requirement to go Back to Congress to Complete Project

HOW DO YOU GET INDUSTRIES TO INVEST IN ND WITH THE RISKY STRATEGY OF RELYING ON THE FEDERAL GOVERNMENT?

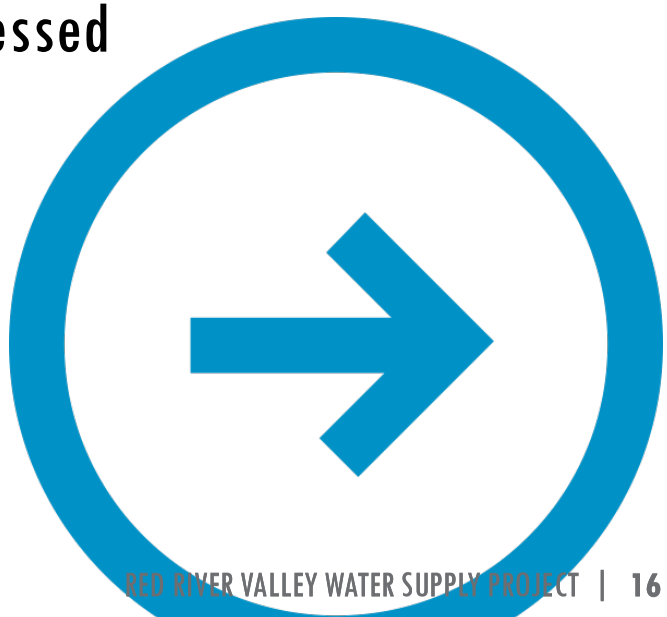
RRVWSP MOVING FORWARD

THE ND LEGISLATURE APPROPRIATED FUNDS TO KEEP THE RRVWSP MOVING FORWARD

DELAYED PROPERTY ACQUISITION SINCE JANUARY

- Will Move Forward with Property Acquisition Now That the Upper Sheyenne River Discharge Has Been Addressed

PERMITTING AND BEGINNING CONSTRUCTION UNDER TRUMP ADMINISTRATION IS STRATEGIC



RED RIVER VALLEY
WATER SUPPLY PROJECT

Serving the Water Supply Needs of Central North Dakota and the Red River Valley

THANK YOU!

www.rrvwsp.org facebook.com/RRVWSP @RRVWSP

Lake Agassiz
Water Authority

GARRISON DIVERSION

APPENDIX P

North Dakota State Water Commission

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(701) 328-2750 • TTY 1-800-366-6888 or 711 • FAX (701) 328-3696 • http://swc.nd.gov

MEMORANDUM

TO: Governor Doug Burgum
Members of the State Water Commission
FROM: Garland Erbele, P.E., Chief Engineer - Secretary
SUBJECT: SWPP – Project Update
DATE: July 19, 2018

Oliver, Mercer, North Dunn (OMND) Regional Service Area
Rural Distribution Contracts 7-9E, 7-9G Bid Schedule 1 and 2:
Reclamation, seeding and final administrative items remain before final payments can be made on Contract 7-9E and Contracts 7-9G Bid 2.

Other Contracts
Contract 8-1A New Hradec Reservoir:
This contract involves furnishing and installing a 296,000-gallon fusion powder coated bolted steel reservoir. Olander Contracting Company is the contractor. The contract documents were executed on May 16, 2013, and the Notice to Proceed was issued on June 3, 2013. The substantial completion date on this contract was September 15, 2013. The tank was put into service on February 20, 2014. The contractor disputes the liquidated damages withheld. The contractor has not provided any justification for the delays. The contractor has filed a lawsuit against us and their tank sub-contractor. Our legal counsel has filed an answer to their lawsuit. We have not heard anything regarding the lawsuit for many months.

Contract 3-2D Six (6) MGD Water Treatment Plant (WTP) at Dickinson:
The water treatment plant started producing finished water on February 7, 2018. The contract was considered substantially complete on March 7, 2018. Contractor is working on administrative and punch list items. An issue with the concrete floor has been identified, and solutions for remedying it have been proposed to the General contractor. Contractor has filed a claim disputing the decision by the Engineer on potential change order for the concrete floor repair work. The contractor has been directed to complete the repair work, and then the responsibility of the cost be disputed. BW/AECOM has determined the cost responsibility for the temporary and permanent heat and electricity between SWC, General, Mechanical and Electrical contractors and forwarded that information to the contractors. It will be incorporated into a future change order. To date, six change orders totaling $401,652.24 (1.5 percent of the contract amount) have been signed by all parties.

The Electrical Contractor, Edling Electric, is working on administrative items and punch list items. One change order for $25,408.92 (2 percent of the contract amount) is signed by all parties.

The Mechanical Contractor, Williams Plumbing and Heating, is working on administrative items and punch list items. Two change orders for $115,911.72 (4 percent of the contract amount) has been signed by all parties.

Contract 3-2E Residual Handling Building at Dickinson WTP:

The preconstruction conference for this contract was held on October 5, 2017 with all three contractors, Rice Lake Construction Group, Central Mechanical, Inc. and Edling Electric. The General Contractor, Rice Lake Construction Group, mobilized to site on October 16, 2017 and has completed the majority of the cast in place concrete work. Installation of the precast concrete panels will commence in the next few weeks. The filter press equipment delivery is expected the third week of August. The contract has a milestone completion date of September 1, 2018 for having the building enclosed and a Substantial Completion date of February 28, 2019.

During the overnight hours on December 18, 2017, the construction site flooded because of a malfunctioning raw water control valve in the Water Treatment Plant site. This caused a week delay for this contract. The contractor has filed claims with the Builder's Risk insurance policy.

Contract 5-1A and 5-2A 2nd Richardton Reservoir and 2nd Dickinson Reservoir:

The State Water Commission (SWC), at its October 12, 2016 meeting, awarded Contract 5-2A, 2nd Dickinson Reservoir, to John T. Jones Construction Company. Preconstruction conference for this contract was held on March 30, 2017. The contract is around 85 percent complete with completion of the cast in place reservoir walls, floor and site piping. The installation of the dome is mostly complete. The current schedule from the contractor indicates that the contract will be substantially complete by mid-August. One change order for $19,475 (0.5 percent of the contract amount) has been executed by all parties. The contract completion date on this contract was November 1, 2017. Contractor initially requested a 115-day extension to the contract due to weather delays and changes incorporated to the contract. In response to request for more documentation, the contractor changed their request to 67 days. We have responded to their request indicating 45-day extension is justified.

The SWC at its December 9, 2016 meeting awarded Contract 5-1A, 2nd Richardton Reservoir, to Engineering America, Inc. A preconstruction conference for this was held on June 7, 2017. The tank panel installation was mostly completed last winter. The contract has a milestone completion date of November 15, 2017 for the work on the new reservoir. The contractor sent in a letter requesting extension through January 5, 2018. BW/AECOM responded to their request agreeing to 17 out of the 31 days requested which extended the completion date to December 11, 2017. The inlet piping to the reservoir did not pass the pressure test last winter. Because of the unfavorable weather conditions for completing the remaining site work, an extension of the contract completion date, with contractor the reimbursing the State Water Commission for the additional field inspection costs was agreed to by all parties. One change order for $21,487.78 (1 percent of the contract amount) has been executed by all parties. The most recent schedule from the contractor indicated an

anticipated completion date of mid-July. An updated schedule has been requested from the contractor. The contract is approximately 85 percent complete.

Contract 2-1B Raw Water Line Capacity Upgrade from intake to OMND WTP:
The scope of work for Contract 2-1B generally consists of furnishing and installing 19,026 lineal feet of 30" diameter steel pipeline. Contractor has completed installation of all three jack and bore crossings and installation of approximately 8500 ft of pipeline. This contract has a substantial completion date of August 15, 2018.

Contract 1-2A Supplemental Raw Water Intake:
The contractor, J.W.Fowler Company (JWF), launched the Microtunneling Boring Machine (MTBM) along the current alignment on August 2017. On October 5, 2017, JWF had installed approximately 1000 feet of intake pipe when employees observed some cracks on pipe no. 58 located approximately 500 feet from the caisson. After pushing a few additional pipes, the cracks worsened. On October 18, 2017, JWF informed that the best course of action to remediate the incident was to leave the installed pipe string in place and pursue other options to complete the intake pipe to the screen location.

JWF's initial plan was to install a rescue shaft 65 feet X 25 feet on top of the MTBM to retrieve the machine and relaunch the machine from the rescue shaft. This information was conveyed to the United States Army Corps of Engineers (USACE) to get permission for performing geotechnical exploration. USACE's review indicated that the rescue shaft is located on an established culturally significant site. USACE's ability to allow a rescue shaft at the location would depend on consultation and review by other agencies and tribes and will involve a significant amount of time. JWF is evaluating other options which include constructing an emergency rescue shaft on the shoreline approximately 150' lake side of the MTBM location or installing the intake pipe by using Direct Pipe® option from near the existing shaft to the proposed screen location. JWF is exploring both the options at this point and working with the builder's risk to secure coverage.

Geotechnical exploration at the emergency shaft location was completed during the week of April 30th. The contractor is currently exploring the option of Horizontal Directional Drilling with 42" outside diameter HDPE pipe for completing the Project.

Contract 4-1E/4-2B Upgrades at the Dodge and Richardton pump stations:
This contract is currently advertised for bids with bid opening on August 30, 2018.

Transfer of Service Agreements:
At the December 12, 2015 SWC meeting, the Commission approved the Transfer of Service agreement between the City of Killdeer, the SWA and the SWC. This was the first annexation agreement negotiated between a city served by Southwest Pipeline Project and the SWA. In early January 2016, the SWA mailed similar agreements to 33 communities within the SWPP service area except for the City of Dickinson using the same template as used for the City of Killdeer. The SWA has been negotiating different terms with the City of Dickinson, but now the City of Dickinson is agreeable to the same terms as the other communities.

Some communities executed the agreement, while many communities expressed concerns about terms of the annexation agreement that was mailed to them. The SWA continues to meet with the communities to negotiate the terms. Thirty communities out of the total 35 communities have executed the agreement.

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APPENDIX Q

North Dakota State Water Commission

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MEMORANDUM

TO: Governor Doug Burgum
Members of the State Water Commission
FROM: Garland Erbele, P.E., Chief Engineer - Secretary
SUBJECT: SWPP – SWPP Information
DATE: July 23, 2018

Transfer of ownership of SWPP:

At the last Finance and Budget subcommittee meeting, transferring the ownership of Southwest Pipeline Project (SWPP) was discussed. Having an independent study conducted to evaluate transferring of ownership was also discussed. This memo is intended to provide background information on the SWPP's history, funding and Capital Repayment.

History of SWPP:

The 1981 Legislature authorized the preliminary design of the Southwest Pipeline Project (SWPP). The plan for the SWPP was selected by the 1983 Legislature, and construction was authorized by the 1985 Legislature. Construction on the SWPP began in 1985 and continues today. The State Water Commission (SWC) owns the Project and manages construction contracts.

The original Project was intended to be a wholesale water supply system to serve entities under contracts. Later it was realized that the service to rural water systems would be more efficient if their configuration was considered in the overall Project design. The 1989 Legislative Assembly gave the SWC the authority to study the idea of integrating rural water distribution systems into the Project and implement when beneficial. In 1991, the SWC considered the proposal and took final action to integrate rural water distribution systems into the Project.

The Southwest Water Authority (SWA) was created as a political subdivision by the 1991 Legislative Assembly as tasks of collecting and coordinating rural sign ups, rural easements, providing customer service for rural water customers and collecting user fees grew more burdensome. The SWA was given specific authority to operate and maintain the SWPP as an agent of the SWC. In January of 1996, all operation and maintenance functions of the Project were transferred to SWA through an agreement (Transfer Agreement) with the SWC.

Funding for SWPP:

Through May 2018, a total of $393.03 Million has been spent on the Project including $246.62 Million of State grants, $122.17 Million of Federal grants, and $24.24 Million in bonds and loans. The breakdown of the funding spent on the Project is shown below. The costs for the Project started to incur in 1976. The total spending on the Project averages approximately 9 Million per year.

State Funding	
Resources Trust Fund (RTF)	219.85
Water Development Trust Fund (WDTF)	8.47
Bond Payoff	18.30
Sub Total	246.62
Federal Grants	
GDCD MR&I Fund	105.92
USDA RUS	15.32
NRCS PL566	0.93
Sub Total	122.17
State Bonds	
Public Revenue Bonds	7.04
USDA RD Bonds	15.70
ND Drinking Water Revolving Loan Fund	1.50
Sub Total	24.24
Total	**393.03**

Capital Repayment:

Century Code section § 61-24.3-1, provides the SWC shall establish the rates for water service to be paid by water user entities for purchase of water from the SWPP. The payments for water service shall include the water user entity's proportionate share of operation, maintenance and replacement costs and also include a component for payment of capital costs.

The Capital Repayment rate for contract customers was initially established based on a financial report completed by Chiles, Heider & Co. in 1982. The repayment was based on ability to pay and not on a termed repayment schedule. The report determined weighted Capital Repayment for North Dakota systems is 0.25 percent of per capita income which in the Project area was $0.59/1000 gallons. However, the report recommended the Capital Repayment portion be reduced to $0.44 because of the higher expected operation and maintenance cost. The higher than expected operation and maintenance costs were the result of the large geographic area with relatively few users encompassed by the Project. It

was also recommended an adjustment to the Capital Repayment rate be made annually based on the Consumer Price Index (CPI). In 1996, when the operation and maintenance of the SWPP was assigned to the SWA, the Capital Repayment rate was $0.72/1000 gallons. Since 1996, the average CPI increase is 2.2 percent per year which has resulted in a 2018 Capital Repayment rate of $1.18/1000 gallons.

For rural SWPP customers, the SWC set the Capital Repayment rate for a standard rural customer at $20 per month in 1991. The Capital Repayment rate is included in the monthly minimum for the rural water customers. The rural Capital Repayment rate is also adjusted annually based on the CPI. The 2018 rural Capital Repayment rate for a standard customer is $36 per month. For SWPP users in Morton County receiving water through Missouri West Water System, the SWC set the Capital Repayment rate at $22 per month in 2005. The 2018 Capital Repayment rate for Morton county SWPP users is $28.51 per month.

Table 1 below shows the monthly minimum for the different rural water systems in North Dakota.

ND Rural Water System Rates as of January 2018
Sorted by Minimum Cost

SYSTEM	# of Users	Minimum Cost	Minimum Gal.	$/1000 Gal.	$/6000 Gal.
Agassiz Water Users District	1,334	$20.00	0	$4.50	$47.00
Greater Ramsey Water District	1,892	$20.00	0	$4.25	$45.50
Southeast Water Users District East	1,699	$26.00	0	$4.50	$53.00
Cass Rural Water District	4,337	$27.00	0	$5.40	$59.40
Grand Forks Traill Water District	2,429	$29.40	0	$5.78	$64.08
Central Plains Water District	775	$30.00	0	$6.00	$66.00
Upper Souris Water District	625	$30.00	0	$9.00	$84.00
All Seasons Water Users District System 1-4	722	$32.00	0	$7.00	$74.00
Garrison Rural Water Association	526	$33.00	0	$4.00	$57.00
South Central Regional Water District	5,000	$34.00	500	$7.50	$75.25
Missouri West Water System	1,654	$35.00	0	$7.88	$82.28
State Line Water Cooperative	452	$35.00	0	$5.00	$65.00
Walsh Rural Water District R1	1,290	$36.00	0	$7.50	$81.00
Northeast Regional Water District/North Valley Branch	1,369	$39.00	0	$6.00	$75.00
South Central Regional Water District	1,100	$40.00	0	$5.15	$70.90
Stutsman Rural Water District	1,241	$40.00	0	$5.00	$70.00
All Seasons Water Users District System 4 Phase 1&2	107	$42.00	0	$7.00	$84.00
All Seasons Water Users District System 5	480	$42.00	0	$7.00	$84.00
Southwest Water Authority	7,100	$42.00	0	$5.04	$72.24
Walsh Rural Water District C1	21	$42.00	0	$7.50	$87.00
Barnes Rural Water District #1	1,377	$43.00	0	$5.00	$73.00
Dakota Rural Water District	599	$44.00	0	$4.70	$72.20
Greater Ramsey Water District Expansion	351	$45.00	0	$4.25	$70.50
R&T Water Supply Association	75	$45.00	0	$6.50	$84.00
Southeast Water Users District West	544	$45.00	0	$3.50	$66.00
Southeast Water Users District Central	791	$45.00	0	$5.75	$79.50
Williams Rural Water District	2,124	$45.00	0	$8.57	$96.42
McKenzie County Water Resource District	1,175	$45.90	0	$5.57	$79.32
Stutsman Rural Water District Expansion Project	1,049	$48.00	0	$5.00	$78.00
Walsh Rural Water District R3	147	$48.00	0	$7.50	$93.00
McLean Sheridan Rural Water	520	$49.00	0	$6.91	$90.46
North Prairie Rural Water District	2,549	$49.00	0	$7.45	$93.70
Barnes Rural Water District #3	350	$52.00	0	$5.00	$82.00
Dakota Rural Water District Expansion	188	$52.00	0	$4.70	$80.20
Tri-County Water District	700	$54.00	0	$6.00	$90.00
Tri-County Water District Expansion	240	$54.00	0	$6.00	$90.00
Tri-County Water District Expansion	9	$54.00	0	$6.00	$90.00
Grand Forks Traill Water District	315	$55.00	0	$5.78	$89.68
Northeast Regional Water District/Langdon Branch	962	$55.00	0	$6.00	$91.00
Southeast Water Users District New Construction		$55.00	0	$4.50	$82.00
Traill Rural Water District	779	$55.00	0	$7.00	$97.00
Walsh Rural Water District R4	74	$55.00	0	$7.50	$100.00
Barnes Rural Water District #2	261	$59.00	0	$5.00	$89.00
McLean Sheridan Rural Water/Washburn Project	150	$59.00	0	$6.91	$100.46
North Central Regional Water District	1,554	$65.00	0	$7.50	$110.00
Walsh Rural Water District C2	4	$68.00	0	$7.50	$113.00
	47,814				
Median		$45.00		$6.00	$81.50
Average		$43.88		$6.02	$79.94
Yearly Average					$959.24

Table 1: ND Rural Water Rates Comparison

The Capital Repayment rates collected from the SWPP users were used for bond payments and the excess returned to the Resources Trust Fund (RTF). The Capital Repayment deposited in the RTF is included in the SWC's budget for funding other water resource projects. In 2014, the outstanding bond debts for SWPP, which were around $18.3 Million, were paid off by the SWC, so currently all Capital Repayment is deposited in the RTF. Since 2015, the average annual Capital Repayment deposited in the RTF is $5 Million. Through May 2018, the total Capital Repayment collected is $59.35 Million with $40.1 Million deposited in RTF. The Capital Repayment deposited in the RTF through May 2018 equates to approximately 16 percent of the total State funding (including the bond payoff) spent on the Project.

The 1996 Transfer Agreement states, "The Commission shall have the authority to adjust the base water rate for capital costs annually for each category of user in accordance with the increase or the decrease in the CPI". If the Commission desires to change the Capital Repayment for SWPP, it is possible with an amendment to the Transfer Agreement.

Figure 1, shows the annual Capital Repayment deposited in the RTF in comparison with the annual State spending on the Project. The data through 2017 is the actual data. The annual State spending on the Project from 2018 and beyond is estimated based on estimated Project needs submitted by SWA divided over 10 years with 3 percent inflation in construction costs every year. The estimated Project needs include all the raw water transmission line upgrades, replacement of the 12 Million Gallons per day water treatment plant in Dickinson and distribution capacity upgrades needed to address the growth in the Project area. The Capital Repayment deposited in RTF from 2018 and beyond is projected conservatively using the average CPI increase of 2 percent every year and assuming water sales remain the same as 2017. The total State spending on the SWPP is estimated to be approximately $468 Million.

Figure 2 shows the cumulative State spending (actual and projected) on SWPP and the cumulative Capital Repayment deposited into the RTF (actual and projected). Under the current model of CPI adjustment of Capital Repayment every year, 100 percent of State spending on the SWPP through 2028 will be repaid by the year 2066.

Most of the rural water systems have received 60 – 75 percent cost share assistance from the SWC and the remaining 25-40 percent is considered local share. Since the SWPP's Capital Repayment is the local share of the Project, the 25 to 40 percent of the State spending through 2028 is estimated to be recovered by Capital Repayment by the year 2030 and 2040 respectively.

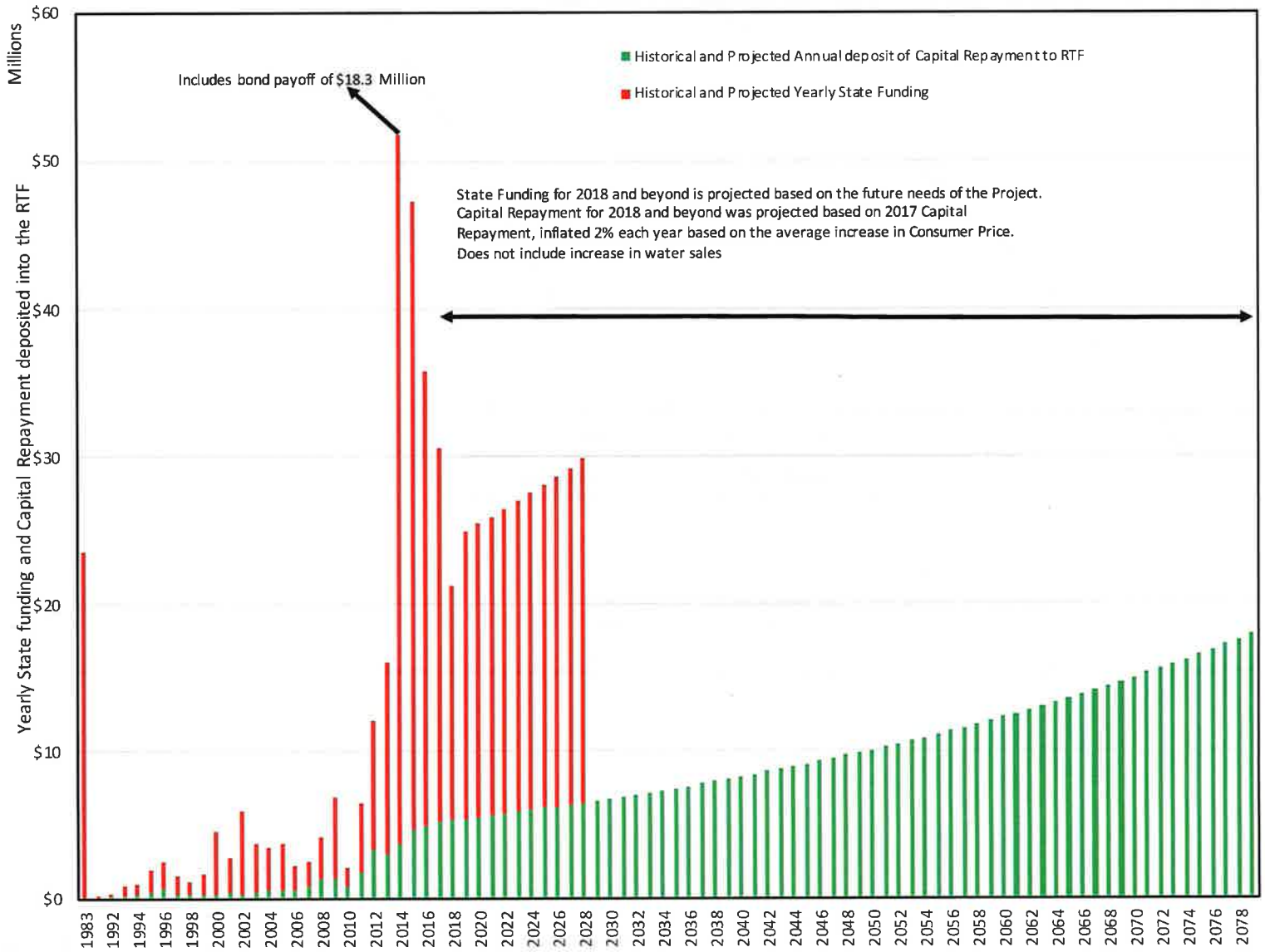

Figure 1: State Funding Vs. Capital Repayment Deposited into RTF

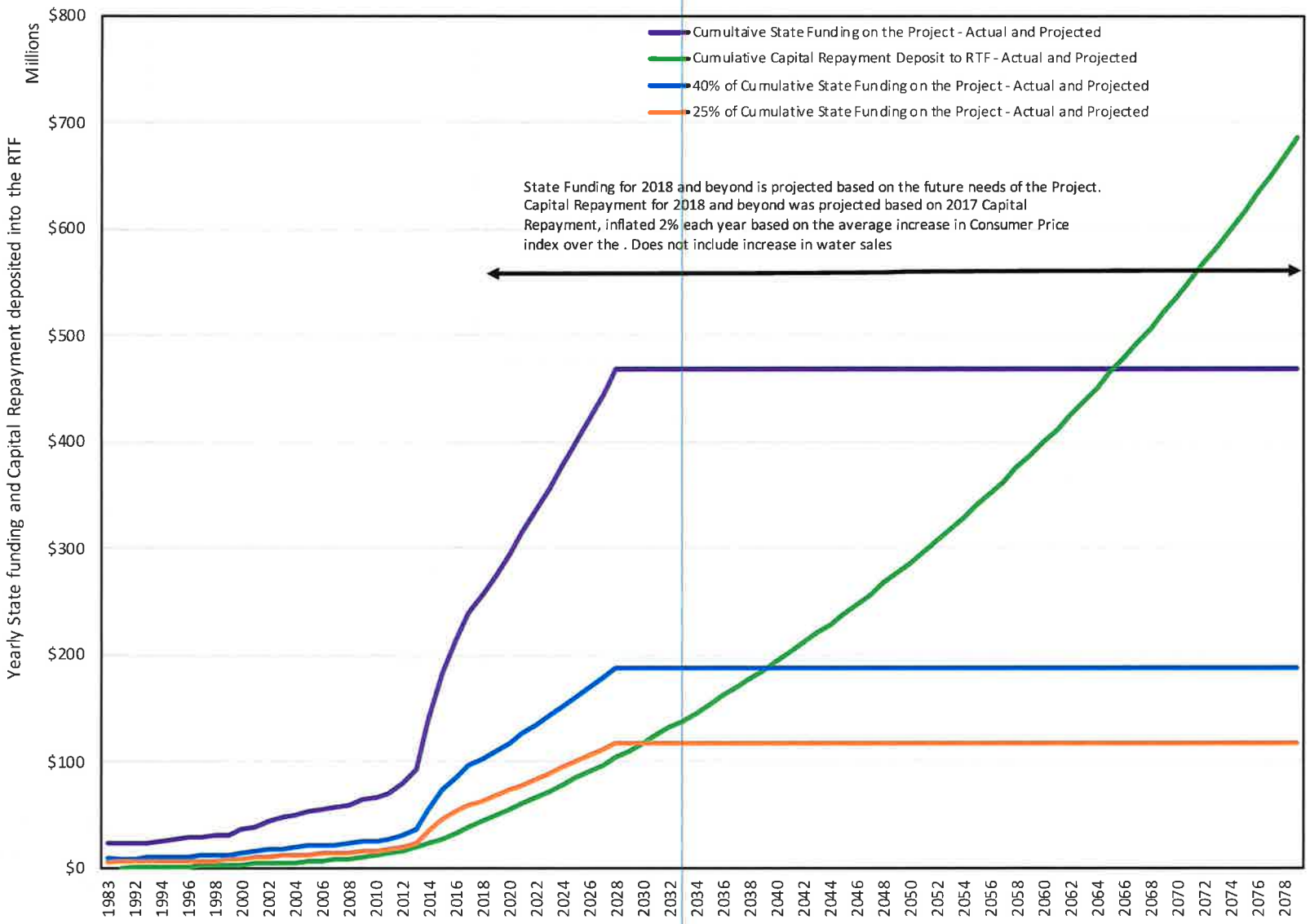

Figure 2: Cumulative State Spending on SWPP Vs. Cumulative Deposit to RTF

Comparison of Capital Repayment of SWPP with Loan Repayment:

Projections can be made to compare the funds received back to the State through Capital Repayments with the payment that would have been received, had the local share been funded with a conventional loan.

Cost share based on State Funding only:

If a 40 percent local share were loaned to the SWA, at the end of a 40-year loan term, with a 1.5 percent interest rate on the loan, loan repayment would be $295 Million, while the Capital Repayments deposit to the RTF would be $506 Million, and Capital Repayment continues after the 40-year term. Figure 3 shows the comparison of loan repayment versus Capital Repayment.

Even if a lower 25 percent local share were considered as a loan to the SWA, with a higher 2.5 percent interest rate, at the end of 40-year loan term, the total loan repayment would be $307 million, while the Capital Repayment deposit to RTF would be $506 Million.

Cost share based on State and Federal Funding:

If 25 percent of both the State and Federal funding were loaned to the SWA, at the end of 40-year loan term, with a 1.5 percent interest rate on the loan, the loan repayment would be $231 Million, while the Capital Repayment deposit to RTF would be $506 Million

Comparison with other Regional Water systems in the State:

All of the regional water systems in the State have different funding models. Table 2 provides a comparison of the State funding spent on the different regional water system projects through May 2018 along with the local cost share.

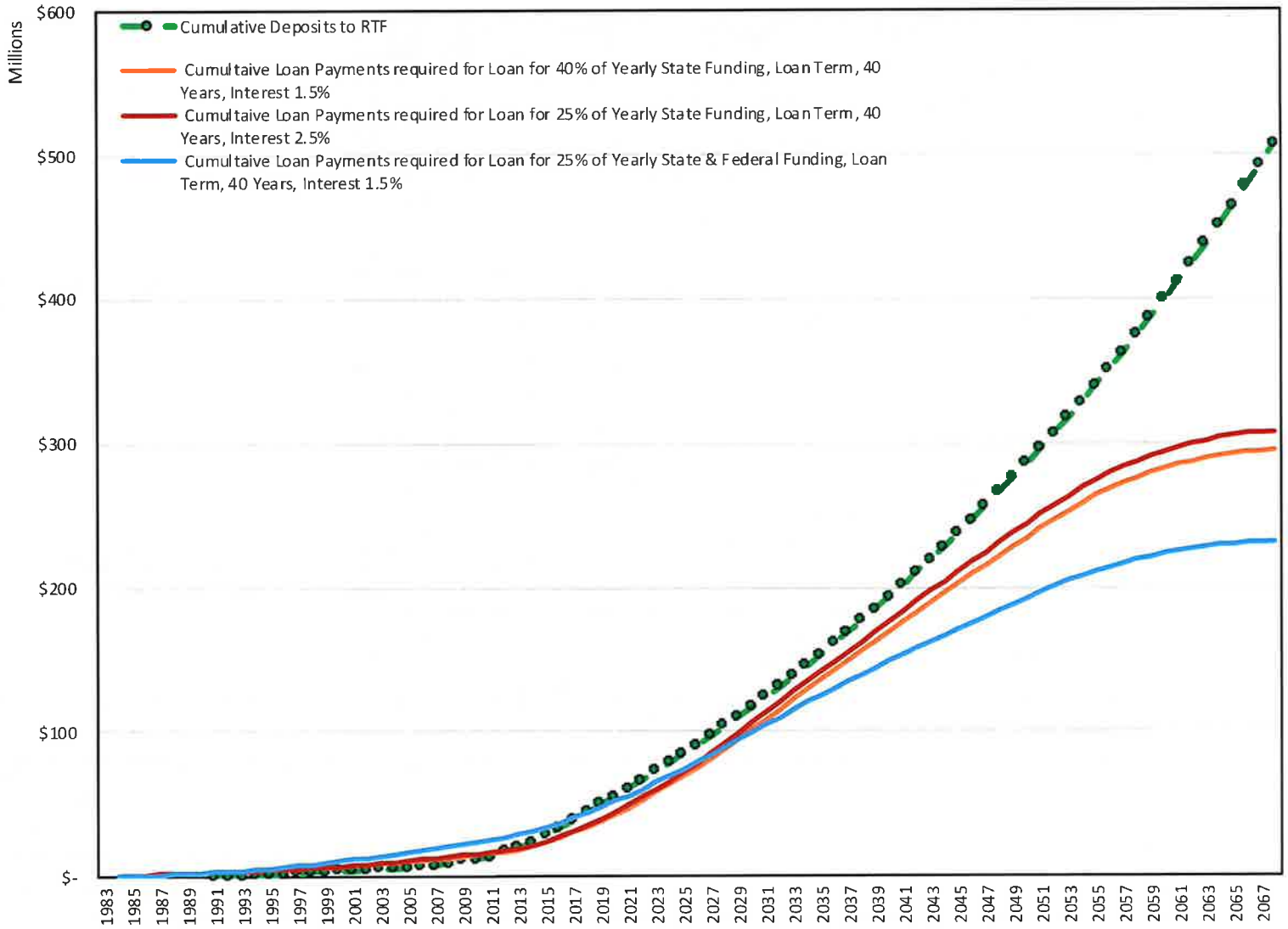

Figure 3: Loan Repayment Vs. Capital Repayment Deposit to RTF

Project	Funding as of May, 2018 in Millions			Comments
	State Funding Spent	Federal Funding	Local Share	
NAWS	$ 27.09	$ 52.15	$ 44.90	City of Minot and City of Rugby contributed towards the local share. Local share accounts for 36.2% of total funding. Ultimately Minot will be providing 35%
SWPP	$ 246.62	$ 122.17	$ 40.10	The local share for SWPP is not included in the total costs, as it is a Repayment. Capital Repayment is the local share. The $40.10 Million in repayment does not include $19.25 Million paid towards bond payments. SWPP had $24.24 Million in bonds which was paid off in 2014 by SWC. The Bond payoff amount is included in the State funding for the Project. The Capital Repayment received through May 2018 in the RTF equates to 16% of the State spending on the Project.
WAWS	$ 121.07	$ -	$199.5*	Local share is through loans from SWC ($84.5 Million), BND ($90 Million) & General Fund ($25 Million). Through May 2018, the local share has been 62% of the total funding. * Excludes member entity debts. **SWC Loan breakdown:** **2011-2013 Biennium** $25 Million - 0% interest rate No interest or Principal paid yet. $10 Million - 5% interest rate, changed to 2.5% in HB 1020 in 2017 Legislative session. Interest paid - $1.14 Million, Principal - none **2013-2015 Biennium** $39.5 Million - 2.5% interest rate Interest paid - $2.27 Million, Principal - none **2015-2017 Biennium** $10 Million - 1.5% interest rate - 20 Year, Repayment with domestic sales. Interest paid - $0.32 Million, Principal - $1.23 Million **Other Loan** The $115 Million loan from BND and General fund was consolidated to a single $87.75 Million loan. As of February 2018, the remaining loan balance is $85.6 Million. **Member entity debts** As of February 2018, outstanding member entity debt is $29.6 Million

Table 2: Comparison of Regional Water Systems in ND

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