United States
Department
Of Agriculture

Natural Resources Conservation Service

DRAFT
WATERSHED PLAN
and
Environmental Assessment
for the
Amenia Levee Flood Protection Project
in the
Rush River Watershed
Cass County, North Dakota

Prepared by:
U.S. Department of Agriculture
Natural Resources Conservation Service
Christi Fisher, State Conservation Engineer/Watershed Program Manager, USDA-NRCS (christi.fisher@usda.gov; 701-530-2091).

In Cooperation with:
Cass County Joint Water Resource District

OCTOBER 2021

Draft
Watershed Plan - Environmental Assessment
For the
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Of the
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AUTHORITY

The watershed plan was prepared under the authority of the Watershed Protection and Flood Prevention Act of 1954 (Public Law 83-566) and the Regional Conservation Partnership Program (RCPP; 16 U.S.C Chapter 58, Subchapter VIII).

ABSTRACT

Historical floods occurred in 1943, 1946, 1966, and 1979 in the city of Amenia. Due to wetter climatic conditions since 1993 and with the updating of Federal Emergency Management Agency Flood Insurance Rate Maps, the entire city of Amenia is expected to continue to experience floods and to be included in the 100-year regulatory floodplain delineated by FEMA. This would require properties with federally backed mortgages to have flood insurance. Installing a certified flood protection project would remove the required flood insurance, saving property owners money in the long term and reducing the risk of flood damage. Key components of the proposed action include approximately 11,820 feet of levee around the city of Amenia. Other permanent items include external drainage ditches to prevent standing water against the levee (7,570 feet), internal drainage, stormwater pond (35.38 acre-feet), gate well structures (2), sleeper slabs (2), culverts (320 feet), riprap, etc. A flood protection project, which would include a certified levee, is expected to cost $3,282,200 and will be paid from a combination of federal, state, county, and local funds.

COMMENTS AND INQUIRIES

Submit comments and inquiries to: Christi Fisher, State Conservation Engineer/Watershed Program Manager, USDA-NRCS (christi.fisher@usda.gov; 701-530-2091). Comments are due by December 24, 2021.

Rush River Watershed

Watershed Plan Agreement

between the
Cass County Joint Water Resource District
(Referred to herein as Sponsor)

and the

NATURAL RESOURCES CONSERVATION SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE
(Referred to herein as NRCS)

Whereas, application has heretofore been made to the Secretary of Agriculture by the Sponsor for assistance in preparing a plan for works of improvement for the Rush River Watershed, State of North Dakota, under the authority of the Watershed Protection and Flood Prevention Act, as amended (16 U.S.C. Sections 1001 to 1008, 1010, and 1012); and

Whereas, the responsibility for administration of the Watershed Protection and Flood Prevention Act, has been assigned by the Secretary of Agriculture to NRCS; and

Whereas, there has been developed through the cooperative efforts of the Sponsor and NRCS a watershed project plan and an environmental assessment for works of improvement for the Rush River Watershed, State of North Dakota, hereinafter referred to as the watershed project plan or plan, which plan is annexed to and made a part of this agreement;

Now, therefore, in view of the foregoing considerations, the Secretary of Agriculture, through NRCS, and the Sponsor hereby agree on this watershed project plan and that the works of improvement for this project will be installed, operated, and maintained in accordance with the terms, conditions, and stipulations provided for in this plan and including the following:

1. **Term.** The term of this agreement is for the installation period and evaluated life of the project (51 years) and does not commit NRCS to assistance of any kind beyond the end of the evaluated life.

2. **Costs.** The costs shown in this plan are preliminary estimates. Final costs to be borne by the parties hereto will be the actual costs incurred in the installation of works of improvement.

3. **Real property.** The sponsor will acquire such real property as will be needed in connection with the works of improvement. The amounts and percentages of the real property acquisition costs to be borne by the Sponsor and NRCS are as shown in the Cost-share table in item 5 hereof.

   The sponsor agrees that all land acquired for measures, other than land treatment practices, with financial or credit assistance under this agreement will not be sold or otherwise disposed of for the evaluated life of the project except to a public agency which will continue to maintain and operate the development in accordance with the Operation and Maintenance Agreement

4. **Uniform Relocation Assistance and Real Property Acquisition Policies Act.** The sponsor hereby agrees to comply with all of the policies and procedures of the Uniform Relocation Assistance and Real Property Acquisition Policies Act (42 U.S.C. Section 4601 et seq. as further implemented through regulations in 49 CFR Part 24 and 7 CFR Part 21) when acquiring real property interests for this federally assisted project. If the sponsor are legally unable to comply with the real property acquisition requirements, it agrees that, before any Federal financial assistance is furnished, it will

provide a statement to that effect, supported by an opinion of the chief legal officer of the state containing a full discussion of the facts and law involved. This statement may be accepted as constituting compliance.

5. **Cost-share for Watershed Work Plan.** The following table shows cost-share percentages and amounts for Watershed Work Plan implementation.

Cost-share Table for Watershed Operation or Rehabilitation Projects					
Works of Improvement Cost-Shareable Items	**NRCS**		**Sponsor**		**Total**
	Percent	Cost	Percent	Cost	Cost
List measures by purpose and rate of assistance [1/]					
Levee Construction	100 %	$1,342,800			
Stormwater Infrastructure Construction	100 %	$ 807,000			
Wetland Mitigation	50 %	$ 33,600	50 %	$ 33,600	
Sponsor's Design & Construction Engineering Costs	100 %	$ 353,200			
Subtotal: Cost-Sharable Costs		$2,536,600		$ 33,600	
Non-Cost-Sharable Items [3/]					
NRCS Technical Assistance/Engineering	100 %	$ 40,000	0%		
Project Administration, CLOMR/LOMR, Fiscal [4/] P			100 %	$220,000	
Real Property Rights Acquisition, real estate appraisal fees, legal fees, and related land survey costs [5/]			100 %	$272,000	
Utility Relocation			100%	$175,000	
Permitting Costs			100 %	$ 5,000	
Subtotal: Non-Cost-Share Costs		$ 40,000		$672,000	
Total:		$2,576,600		$705,600	$3,282,200

1/ Installation costs explanatory notes:

(a) List each multiple-purpose measure separately. Specific cost items and joint costs of multiple-purpose measures will be shown as separate line item entries. Single-purpose measures may be grouped by kind if the rate of assistance is the same for each measure or group.

(b) For watershed protection enduring measures, the following footnote should be included: 1/ The cost-share rate is the percentage of the average cost of installing the practice in the selected plan for the evaluation unit. During project implementation, the actual cost-share rate must not exceed the rate of assistance for similar practices and measures under existing national programs.

2/ Relocation payments and assurances explanatory notes:

(a) The planned project measures will not cause the displacement of any person, business, or farm operation under present conditions

3/ If actual non-cost-sharable item expenditures vary from these figures, the responsible party will bear the change.

4/ The sponsor and NRCS will each bear the costs of project administration that each incurs.

5/ The sponsor will acquire with other than Watershed Protection and Flood Prevention Act funds, such real property as will be needed in connection with the works of improvement. The value of real property is eligible as in-kind contributions toward the sponsor's share of the works of improvement costs. In no case will the amount of an in-kind contribution exceed the sponsor's share of the cost for the works of improvement. The maximum cost eligible for in-kind credit is the same as that for cost sharing.

6. **Land treatment agreements.** The sponsor will obtain agreements from owners of not less than 50 percent of the land above each multiple-purpose and floodwater-retarding structure. These agreements must provide that the owners will carry out farm or ranch conservation plans on their land. The sponsor will ensure that 50 percent of the land upstream of any retention reservoir site is adequately protected before construction of the dam. The sponsor will provide assistance to landowners and operators to ensure the installation of the land treatment measures shown in the watershed project plan. The sponsor will encourage landowners and operators to continue to operate and maintain the land treatment measures after the long-term contracts expire, for the protection and improvement of the watershed.

7. **Floodplain Management.** Before construction of any project for flood prevention, the sponsor must agree to participate in and comply with applicable Federal floodplain management and flood insurance programs. The sponsor is required to have development controls in place below low and significant hazard dams prior to NRCS or the sponsor entering into a construction contract.

8. **Water and mineral rights.** The sponsor will acquire or provide assurance that landowners or resource users have acquired such water, mineral, or other natural resources rights pursuant to State law as may be needed in the installation and operation of the works of improvement.

9. **Permits.** The sponsor will obtain and bear the cost for all necessary Federal, State, and local permits required by law, ordinance, or regulation for installation of the works of improvement.

10. **NRCS assistance.** This agreement is not a fund-obligating document. Financial and other assistance to be furnished by NRCS in carrying out the plan is contingent upon the fulfillment of applicable laws and regulations and the availability of appropriations for this purpose.

11. **Additional agreements**. A separate agreement will be entered into between NRCS and the sponsor before either party initiates work involving funds of the other party. Such agreements will set forth in detail the financial and working arrangements and other conditions that are applicable to the specific works of improvement.

12. **Amendments.** This plan may be amended or revised only by mutual agreement of the parties hereto, except that NRCS may deauthorize or terminate funding at any time it determines that the sponsor have failed to comply with the conditions of this agreement or when the program funding or authority expires. In this case, NRCS must promptly notify the sponsor in writing of the determination and the reasons for the deauthorization of project funding, together with the effective date. Payments made to the sponsor or recoveries by NRCS must be in accordance with the legal rights and liabilities of the parties when project funding has been deauthorized. An amendment to incorporate changes affecting a specific measure may be made by mutual agreement between NRCS and the sponsor having specific responsibilities for the measure involved.

13. **Prohibitions.** No member of or delegate to Congress, or resident commissioner, may be admitted to any share or part of this plan, or to any benefit that may arise therefrom; but this provision may not be construed to extend to this agreement if made with a corporation for its general benefit.

14. **Operation and Maintenance (O&M).** The sponsor will be responsible for the operation, maintenance, and any needed replacement of the works of improvement by actually performing the work or arranging for such work, in accordance with an O&M Agreement. An O&M agreement will be

entered into before Federal funds are obligated and will continue for the project life (50 years). Although the sponsor's responsibility to the Federal Government for O&M ends when the O&M agreement expires upon completion of the evaluated life of measures covered by the agreement, the sponsor acknowledge that continued liabilities and responsibilities associated with works of improvement may exist beyond the evaluated life.

15. **Emergency Action Plan.** Prior to construction, the sponsor must prepare an Emergency Action Plan (EAP) for each dam or similar structure where failure may cause loss of life or as required by state and local regulations. The EAP must meet the minimum content specified in the NRCS Title 180, National Operation and Maintenance Manual (NOMM), Part 500, Subpart F, Section 500.52, and meet applicable State agency dam safety requirements. The NRCS will determine that an EAP is prepared prior to the execution of fund obligating documents for construction of the structure. EAPs must be reviewed and updated by the sponsor annually.

16. **Nondiscrimination Provisions.** In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident.

    Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotape, American Sign Language, etc.) should contact the responsible Agency or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.

    To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at How to File a Program Discrimination Complaint and at any USDA office or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by: (1) mail: U.S. Department of Agriculture, Office of the Assistant Secretary for Civil Rights, 1400 Independence Avenue, SW, Washington, D.C. 20250-9410; (2) fax: (202) 690-7442; or (3) email: program.intake@usda.gov.

    USDA is an equal opportunity provider, employer, and lender.

17. **Certification Regarding Drug-Free Workplace Requirements** (7 CFR Part 3021). By signing this Watershed Agreement, the sponsor are providing the certification set out below. If it is later determined that the sponsor knowingly rendered a false certification, or otherwise violated the requirements of the Drug-Free Workplace Act, the NRCS, in addition to any other remedies available to the Federal Government, may take action authorized under the Drug-Free Workplace Act.

    Controlled substance means a controlled substance in Schedules I through V of the Controlled Substances Act (21 U.S.C. Section 812) and as further defined by regulation (21 CFR Sections 1308.11 through 1308.15);

    Conviction means a finding of guilt (including a plea of *nolo contendere*) or imposition of sentence, or both, by any judicial body charged with the responsibility to determine violations of the Federal or State criminal drug statutes;

    Criminal drug statute means a Federal or non-Federal criminal statute involving the manufacturing, distribution, dispensing, use, or possession of any controlled substance;

Employee means the employee of a grantee directly engaged in the performance of work under a grant, including: (i) all direct charge employees; (ii) all indirect charge employees unless their impact or involvement is insignificant to the performance of the grant; and, (iii) temporary personnel and consultants who are directly engaged in the performance of work under the grant and who are on the grantee's payroll. This definition does not include workers not on the payroll of the grantee (e.g., volunteers, even if used to meet a matching requirement; consultants or independent contractors not on the grantees' payroll; or employees of subrecipients or subcontractors in covered workplaces).

Certification:

A. The sponsor certify that they will or will continue to provide a drug-free workplace by—

(1) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the grantee's workplace and specifying the actions that will be taken against employees for violation of such prohibition.

(2) Establishing an ongoing drug-free awareness program to inform employees about—
(a) The danger of drug abuse in the workplace;
(b) The grantee's policy of maintaining a drug-free workplace;
(c) Any available drug counseling, rehabilitation, and employee assistance programs; and
(d) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace

(3) Making it a requirement that each employee to be engaged in the performance of the grant be given a copy of the statement required by paragraph (1).

(4) Notifying the employee in the statement required by paragraph (1) that, as a condition of employment under the grant, the employee must—
(a) Abide by the terms of the statement; and
(b) Notify the employer in writing of his or her conviction for a violation of a criminal drug statute occurring in the workplace no later than five calendar days after such conviction.

(5) Notifying the NRCS in writing, within 10 calendar days after receiving notice under paragraph (4)(b) from an employee or otherwise receiving actual notice of such conviction. Employers of convicted employees must provide notice, including position title, to every grant officer or other designee on whose grant activity the convicted employee was working, unless the Federal agency has designated a central point for the receipt of such notices. Notice must include the identification numbers of each affected grant.

(6) Taking one of the following actions, within 30 calendar days of receiving notice under paragraph (4) (b), with respect to any employee who is so convicted—
(a) Taking appropriate personnel action against such an employee, up to and including termination, consistent with the requirements of the Rehabilitation Act of 1973, as amended; or
(b) Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency.

(7) Making a good faith effort to continue to maintain a drug-free workplace through implementation of paragraphs (1), (2), (3), (4), (5), and (6).

B. The sponsor may provide a list of the sites for the performance of work done in connection with a specific project or other agreement.

C. Agencies will keep the original of all disclosure reports in the official files of the agency.

18. **Certification Regarding Lobbying** (7 CFR Part 3018) (for projects > $100,000)

A. The sponsor certify to the best of their knowledge and belief, that:

（1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the sponsor, to any person for influencing or attempting to influence an officer or employee of an agency, Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned must complete and submit Standard Form LLL, “Disclosure Form to Report Lobbying,” in accordance with its instructions.

(3) The sponsor must require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients must certify and disclose accordingly.

B. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by U.S. Code, Title 31, Section 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

19**. Certification Regarding Debarment, Suspension, and Other Responsibility Matters—Primary Covered Transactions (7 CFR Part 3017).**

A. The sponsor certify to the best of their knowledge and belief, that they and their principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

(2) Have not within a 3-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph A(2) of this certification; and

(4) (4) Have not within a 3-year period preceding this application/proposal had one or more public transactions (Federal, State, or local) terminated for cause or default.

B. Where the primary sponsor is unable to certify to any of the statements in this certification, such prospective participant must attach an explanation to this agreement.

20**. Clean Air and Water Certification.**

A. The project sponsoring organizations signatory to this agreement certify as follows:

(1) Any facility to be utilized in the performance of this proposed agreement is (____), is not (X) listed on the Environmental Protection Agency List of Violating Facilities.

(2) To promptly notify the NRCS-State administrative officer prior to the signing of this agreement by NRCS, of the receipt of any communication from the Director, Office of Federal Activities, U.S. Environmental Protection Agency, indicating that any facility which is proposed for use under this agreement is under consideration to be listed on the Environmental Protection Agency List of Violating Facilities.

(3) To include substantially this certification, including this subparagraph, in every nonexempt sub-agreement.

B. The project sponsoring organizations signatory to this agreement agrees as follows:

(1) To comply with all the requirements of section 114 of the Clean Air Act as amended (42 U.S.C. Section 7414) and section 308 of the Federal Water Pollution Control Act (33 U.S.C. Section 1318), respectively, relating to inspection, monitoring, entry, reports, and information, as well as other requirements specified in section 114 and section 308 of the Air Act and the Water Act, issued there under before the signing of this agreement by NRCS.

(2) That no portion of the work required by this agreement will be performed in facilities listed on the EPA List of Violating Facilities on the date when this agreement was signed by NRCS unless and until the EPA eliminates the name of such facility or facilities from such listing.

(3) To use their best efforts to comply with clean air standards and clean water standards at the facilities in which the agreement is being performed.

(4) To insert the substance of the provisions of this clause in any nonexempt subagreement.

C. The terms used in this clause have the following meanings:

(1) The term “Air Act” means the Clean Air Act, as amended (42 U.S.C. Section 7401 et seq.).

(2) The term “Water Act” means Federal Water Pollution Control Act, as amended (33 U.S.C. Section 1251 et seq.).

(3) The term “clean air standards” means any enforceable rules, regulations, guidelines, standards, limitations, orders, controls, prohibitions, or other requirements which are contained in, issued under, or otherwise adopted pursuant to the Air Act or Executive Order 11738, an applicable implementation plan as described in section 110 of the Air Act (42 U.S.C. Section 7414) or an approved implementation procedure under section 112 of the Air Act (42 U.S.C. Section 7412).

(4) The term “clean water standards” means any enforceable limitation, control, condition, prohibition, standards, or other requirement which is promulgated pursuant to the Water Act or contained in a permit issued to a discharger by the Environmental Protection Agency or by a State under an approved program, as authorized by section 402 of the Water Act (33 U.S.C. Section 1342), or by a local government to assure compliance with pretreatment regulations as required by section 307 of the Water Act (33 U.S.C. Section 1317).

(5) The term “facility” means any building, plant, installation, structure, mine, vessel, or other floating craft, location or site of operations, owned, leased, or supervised by a sponsor, to be utilized in the performance of an agreement or subagreement. Where a location or site of operations contains or includes more than one building, plant, installation, or structure, the entire location will be deemed to be a facility except where the Director, Office of Federal

Activities, Environmental Protection Agency, determines that independent facilities are collocated in one geographical area.

21. **Assurances and Compliance.** As a condition of the grant or cooperative agreement, the sponsor assures and certifies that it is in compliance with and will comply in the course of the agreement with all applicable laws, regulations, Executive orders and other generally applicable requirements, including those set out below which are hereby incorporated in this agreement by reference, and such other statutory provisions as a specifically set forth herein.

    State, Local, and Indian Tribal Governments: OMB Circular Nos. A-87, A-102, A-129, and A-133; and 7 CFR Parts 3015, 3016, 3017, 3018, 3021, and 3052.

    Nonprofit Organizations, Hospitals, Institutions of Higher Learning: OMB Circular Nos. A-110, A-122, A-129, and A-133; and 7 CFR Parts 3015, 3017, 3018, 3019, 3021 and 3052.

22. **Examination of Records.** The sponsor must give the NRCS or the Comptroller General, through any authorized representative, access to and the right to examine all records, books, papers, or documents related to this agreement, and retain all records related to this agreement for a period of three years after completion of the terms of this agreement in accordance with the applicable OMB Circular.

23. Signatures.

Cass County Joint Water Resource District

The signing of this plan was authorized by a resolution by the Cass County Joint Water Resource District governing body and adopted at an official meeting held on _____, 2021 at West Fargo, North Dakota.

By:

_____ Date: _____

Dan Jacobson

Chairman, Cass County Joint Water Resource District

USDA-NATURAL RESOURCES CONSERVATION SERVICE

Approved by: Date: _____

_____

Mary Podoll, State Conservationist
Natural Resources Conservation Service

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Summary (OMB Fact Sheet)

Watershed Plan – Environmental Assessment
For
Rush River Watershed
Cass County, North Dakota
North Dakota At-Large Congressional District

Authorization

- The watershed plan was prepared under the authority of the Watershed Protection and Flood Prevention Act of 1954 (Public Law 83-566) and as amended, under funding allocated through the Regional Conservation Partnership Program (RCPP; 16 U.S.C Chapter 58, Subchapter VIII).

Sponsors

- Cass County Joint Water Resource District

Proposed Action

- Key components of the proposed action (Levee Alternative 1) include approximately 11,820 feet of levee around the city of Amenia. Other permanent items include external drainage ditches to prevent standing water against the levee(7,570 feet), internal drainage, stormwater pond (35.38 acre-feet), gate well structures (2), sleeper slabs (2), culverts (370 feet), riprap, etc.

Purpose and Need for Action

- Purpose: To reduce the flood risk for the City of Amenia by removing surface water inundation from the Rush River during the 1-percent-annual-chance flood within the city limits.

- Need: Amenia has historic flood risks with overbank flooding from the Rush River, ice jams, and overland flooding. Additionally, preliminary FEMA flood insurance rate maps (FIRMs) indicate that much of the city will be included in the 100-year (1-percent-annual-chance flood) and 500-year (0.2 percent chance flood) floodplain. Therefore, homeowners and businesses with federally backed mortgages would be required to purchase flood insurance on their properties when the preliminary FIRMs are adopted. With the rising costs associated with flood insurance, this is a considerable permanent expense for property owners without certified flood protection.

Description of the Preferred Alternative

- The preferred alternative is **Levee Alternative 1**, which proposes to construct approximately 11,820 feet of levee around the city of Amenia to provide flood protection to residents during a 100-year, 24-hour event. A 10-foot-wide channel would be constructed approximately 15 feet from the toe of the levee as an additional measure of protection from flood flows. A stormwater pond would be developed for Levee Alternative 1 to capture floodwaters and runoff of approximately 180 surface acres within the levee system. Levee Alternative #1 would include constructing removable features to act as temporary levees over three road crossings and two railroad crossings.

- Construction of a levee and associated stormwater collection, with some vegetative treatment measures incorporated, will promote secondary unquantified benefits to reduce delivery of sediment and other possible pollutants to the river during flood events. The stormwater collection system will include constructed grassed waterways to manage the agricultural field runoff on the perimeter of the levee system and the new internal City stormwater system will improve water quality with its

vegetative treatments that will be incorporated. The impacted wetlands by the levee construction will be mitigated off-site, outside the levee system, at a 2:1 ratio. The new grassed waterway agricultural runoff stormwater collection system will consider created wetland features in the final design where practical.

Resource Information

Lat/Long:	The county road intersection in Amenia is at 47°0'23.17"N, 97°13'9.37"W
Hydrologic unit number:	0902020407
Climate:	Humid continental climate with long, exceedingly cold winters and warm-to-hot humid summers. Since the mid-1990s, the Red River Valley has been in a wetter hydrologic cycle than previous decades.
Topography:	The Red River Valley was once the bed of glacial Lake Agassiz and the resulting terrain is extremely flat and prone to flooding.
Watershed area:	141,929 ac
Land uses:	131,518 ac cropland/pasture, 6,164 ac developed, 4,287 ac wetlands, woodlands, and open water
Land ownership:	97.69% Private 2.31% Local/State 0.0% Federal
Population:	The U.S. Census Bureau 2017 estimate for the city of Amenia is 101
Demographics:	2017 census estimate: 99% White, 1% reporting two or more races
Per capita income:	2017 census estimate: $37,040
Poverty level:	2017 census estimate: 3.7% below poverty level
Median home value:	2017 census estimate: $131,300 ±$61,098
Resource concerns:	○ Agriculture ○ Air quality ○ Cultural resources ○ Endangered and threatened species ○ Fish and wildlife ○ Floodplain management ○ Floodwater damage ○ Invasive species ○ Land use ○ Migratory birds ○ Natural areas ○ Noise ○ Parklands ○ Prime and unique farmland ○ Public health and safety ○ Recreation ○ Regional water resource plans ○ Riparian areas ○ Scenic beauty ○ Social issues ○ Soil resources ○ Water quality ○ Waters of the U.S. ○ Wetlands

Alternative Plans Considered

Nineteen alternatives were carried forward for additional consideration and evaluated based on their ability to meet the purpose and need for the project. The No-Action Alternative would involve no federal funding to mitigate flood-related impacts, resulting in the current flooding conditions described.

Alternative #	Location (S-T-R)	Type/Strategy
1	22, 23, & 24–141-52	Diversion
2	23,24, 25, & 26–141-52	Levee option #1
3	22,23, & 24–141-52	Levee option #2
4	23,25, & 26–141-52	Levee option #3
5	23 & 24-141-52	Channel work – widen channel
6	23 & 24-141-52	Channel work – straighten and widen
7	23 & 24-141-52	Bridge widening
8	Empire Twp. (141-53)	Impoundment
9	Various locations	Other impoundment locations
10	Watershed-wide	Culverts – downsize
11	Watershed-wide	Culverts – upsize
12	Various	Overtopping levees
13	Various	Setback levees
14	Watershed-wide	Other beneficial uses
15	City homes - Amenia	Flood proofing
16	City – Amenia	Evacuate the floodplain
17	Watershed-wide	Wetland create/restoration
18	Watershed-wide	Cropland BMPs – grassland conversion/no-till
19	Watershed-wide	Tile – drainage water management

Project Costs for the Preferred Alternative:

		Potential Funding Sources			
Item	**Total**	**Federal**	**NDSWC**	**County Sales Tax**	**Local**
Construction	$2,149,800	$2,149,800	$0.00	$0.00	$0.00
Engineering – Design & Construction	$393,200	$393,200	$0.00	$0.00	$0.00
Land Surveying	$40,000	$0.00	$20,000	$15,000	$5,000
CLOMR/LOMR	$130,000	$0.00	$65,000	$48,750	$16,250
Utility Relocation	$175,000	$0.00	$87,500	$65,625	$21,875
Right-of-Way Acquisition	$212,000	$0.00	$106,000	$79,500	$26,500
Wetland Mitigation	$67,200	$33,600	$16,800	$12,600	$4,200
Legal & Adm. Fees	$50,000	$0.00	$25,000	$18,750	$6,250
Right-of-Way Negotiations	$20,000	$0.00	$10,000	$7,500	$2,500
Permitting	$5,000	$0.00	$2,500	$1,875	$625
Fiscal	$40,000	$0.00	$20,000	$15,000	$5,000
TOTAL PROJECT COST	**$3,282,200**	**$2,576,600***	**$352,800**	**$264,600**	**$88,200**

*Federal cost share is 100% for construction and engineering and 50% for wetland mitigation.

Project Benefits

- Project cost: $135,200 avg. annual
- Monetary benefits: $201,000 avg. annual
- Direct beneficiaries: Population in town and non-resident workforce
- Other beneficial physical effects: Debris cleanup sooner
- Benefit-to-cost ratio (authorized rate): (project not yet authorized)
- Benefit-to-cost ratio (current rate): 1.49
- Net beneficial effects (NED): $65,800

Funding Schedule

- Federal funds (budget year): $464,600 (2020)
- Federal funds (year after budget year): $2,124,800 (2021)
- Non-federal funds (budget year): $345,600 (2020)
- Non-federal funds (year after budget year): $360,000 (2021)

Period of Analysis

- 51 years

Project Life

- Project life is 50 years

Environmental Effects

- Installation of the preferred alternative will have the following localized adverse effects: approximately 0.56 acres of permanent wetland impacts, permanent removal of approximately 4 acres of prime farmland, 7 acres of cultivated cropland, and 0.9 acres of forested land. Removal of trees may affect wildlife habitat. Construction activities will result in 2.1 acres of temporary wetland impacts and temporary impacts to approximately 37 acres of prime farmland. Permanently impacted wetlands are proposed to be mitigated off site, utilizing the Ducks Unlimited wetland mitigation bank at a 2:1 ratio for a total of 1.12 acres.

Major Conclusions

- Reduced risk of flooding of the city of Amenia with minimal temporary and permanent environmental impacts

Areas of Controversy

- There are no known areas of controversy.

Issues to be Resolved

- Flood damage reduction

Evidence of Unusual Congressional or Local Interest

- None at this time

Is this report in compliance with executive orders, public laws, and other statutes governing the formulation of water resource projects? Yes ___X____ No_____

1 Introduction

The Cass County Joint Water Resource District (District) is the sponsoring local organization (SLO) and entered into a cooperative agreement with the Natural Resources Conservation Service (NRCS) to engage in watershed planning in the Rush River watershed, a sub-watershed of the Sheyenne River and the Red River of the North, in Cass County, North Dakota. The cooperative agreement is funded under the Regional Conservation Partnership Program (RCPP), as authorized in the 2014 Farm Bill that allowed RCPP funding for implementing the PL-566 Small Watershed Planning process. In 2015 the Red River Retention Authority (RRRA) secured $12 million of RCPP project funding to support PL-566 planning efforts throughout the Red River Basin, and the Rush River was one of twenty watersheds selected by the RRRA for watershed planning under that effort.

2 Purpose and Need for Action

The purpose of the proposed action is to reduce the flood risk for the city of Amenia by removing surface water inundation from the Rush River during the 1-percent-annual-chance flood, within the city limits.

Amenia has historic flood risks with overbank flooding from the Rush River, ice jams, and overland flooding. Additionally, preliminary FEMA flood insurance rate maps (FIRMs) indicate that much of the city will be included in the 100-year and 500-year floodplain. Therefore, homeowners and businesses with federally backed mortgages would be required to purchase flood insurance on their properties if the preliminary FIRMs are adopted. With the rising costs associated with flood insurance, this is a considerable permanent expense for property owners without certified flood protection.

The initial study included the entire Rush River watershed; however, as meetings with the local planning committee progressed, the focus became the city of Amenia, North Dakota. The Federal Emergency Management Agency (FEMA) designated the city of Amenia to be mapped for the first time. The analysis of flooding issues for the FEMA mapping effort identified a fairly substantial area of the community within the 100-year floodplain. The *Rush River City of Amenia Focus Plan* was prepared and an Environmental Assessment was performed to evaluate alternatives to mitigate flood-related impacts in the Rush River watershed.

Purpose:
To reduce the flood risk for the city of Amenia by removing surface water inundation from the Rush River during the 1-percent-annual-chance flood, within the city limits.

Need:
Amenia has historic flood risks with overbank flooding from the Rush River, ice jams, and overland flooding. Additionally, preliminary FEMA flood insurance rate maps (FIRMs) indicate that much of the city will be included in the 100-year and 500-year floodplain. Therefore, homeowners and businesses with federally backed mortgages would be required to purchase flood insurance on their properties if the preliminary FIRMs are adopted. With the rising costs associated with flood insurance, this is a considerable permanent expense for property owners without certified flood

protection.

Need Basis Information:

- During the local project team meetings there was discussion and recall of flooding that occurred in the city of Amenia in 1943, 1946, 1966, and 1979.
- It was also noted that a few of the flood events may have been caused by ice jams at the railroad bridge about one-half mile north of the city, backing water up into the city.
- The driving initiative behind the need for flood protection for the city of Amenia is the proposed FEMA FIRMs that would bring nearly the whole city into the 1-percent- annual-chance (100-year recurrence interval) floodplain, requiring most property owners to purchase federal flood insurance.

3 Scope of the EA

A scoping process was used to determine the significant issues in defining the problems and formulating and evaluating alternatives. Scoping included a public meeting; written request for input from federal, state, and local agencies; and a steering committee of sponsors and local citizens formed to solicit input (see Section 6.0). The NRCS convened a group of interdisciplinary agency experts to review the alternatives being evaluated. Comments received from the public or agencies are provided in Appendix A and discussed in Section 7. The environmental scoping evaluation is fully documented in the July 2018 Alternative and Initial Screening/City of Amenia Focus document and Strategy Screening matrix, with full documentation available upon request to ND NRCS. Table 3-1 presents a summary of the scoping process.

Table 3-1Summary of Scoping Process

Item/Concern	Relevant to the Proposed Action? Yes	No	Rationale for Specific Resources Studied
National Economic Development (NED) Principles and Guidelines (P&G)	X		Compliance with the 1983 Water Resources Council Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies.
Agriculture	X		Concern for flooding-related impacts
Air quality	X		Potential for temporary construction-related impacts
Coastal zone management area		X	None are present in the planning area
Coral reefs		X	None are present in the planning area
Cultural resources	X		Compliance with Section 106 of the National Historic Preservation Act
Ecologically critical areas		X	None are present in the planning area
Environmental justice	X		Compliance with Executive Order (EO)12898
Essential fish habitat		X	None are present in the planning area
Fish and wildlife resources	X		Potential for temporary impacts to habitat

Item/Concern	Relevant to the Proposed Action? Yes	No	Rationale for Specific Resources Studied
Floodplain/Overland flooding management	X		Compliance with EO 11988
Floodwater damage	X		Concern for flooding-related impacts
Forest resources		X	None are present in the planning area
Invasive species	X		Potential for spread of invasive plant species
Land use	X		Concern for flooding-related impacts
National parks/monuments/ historical sites		X	None are present in the planning area
Natural areas	X		Potential for impacts
Noise	X		Potential for temporary construction-related impacts
Parklands	X		Potential for impacts
Prime and unique farmlands	X		Concern for flooding-related impacts
Public health and safety	X		Concern for safety during flooding
Recreation	X		Potential for impacts
Regional water resource plans	X		Ensure compatibility with plans
Riparian areas	X		Potential for impacts
Scenic areas	X		Potential for impacts
Significant scientific resources		X	None are present in the planning area
Sole-source aquifers		X	None are present in the planning area
Social issues	X		Potential for disruption of community cohesion during flooding
Soil resources	X		Concern for flooding-related impacts
Threatened and endangered species	X		Compliance with Section 7 of the Endangered Species Act
Water quality (including erosion and sedimentation)	X		Concern for flooding-related impacts
Waters of the U.S., including special aquatic sites	X		Concern for flooding-related impacts
Wetlands	X		Potential for temporary impacts
Wild and scenic rivers		X	None are present in the planning area
Wildlife community (including migratory birds)	X		Compliance with Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act

4 Affected Environment

Due to the broad range of rural, overland, flood coverage, the affected environment reviewed (the planning area) was the Rush River watershed, as modeled by Moore Engineering, Inc. (Appendix B & Appendix C). The Rush River watershed comprises a total of 141,630 acres, the majority of which is in Cass County (140,497 acres), with approximately 1,133 acres in Traill County, North Dakota. The city of Amenia is located in the central portion of the Rush River watershed.

The District's original planning area for the Rush River watershed study is shown in Appendix B. The planning area included a portion of Cass County. This area is north and west of Fargo, North Dakota, and north of Casselton, North Dakota. Agriculture dominates the land use, covering almost 95 percent of the land area in the watershed area. The area for this narrow focus on the city of Amenia and its flood protection is the city proper and the area north of town adjacent to the Rush River. This area is highlighted in Appendix B.

4.1 Human Factors

4.1.1 Environmental Justice

Per Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, measures must be taken to avoid disproportionately high adverse impacts to minority or low-income populations. The planning area comprises the following nine census block groups: 380170401001, 380170402001, 380170402002, 380170403002, 380170403003, 380170404001, 380170404002, 380170404003, and 380979703001.

Environmental justice concerns within the planning area were evaluated using the U.S. Environmental Protection Agency's (USEPA's) EJScreen environmental justice screening and mapping tool (reference [1]). According to the EJScreen report, using U.S. Census Bureau American Community Survey data from 2013–2017, the per-capita income within the planning area is similar to the statewide average, and low-income populations are lower than the statewide average, as shown in Table 4-1. The planning area and Traill County lower percentages of minority populations than Cass County and the state of North Dakota; in all locations, the predominant race is white.

Table 4-1Summary of Demographic Information

Location	Population	Per-Capita Income	Low-Income Population	Minority Population	Predominant Race	Predominant Minority
Planning area	10,902	$35,926	18%	5%	White (96%)	Black (2%)
City of Amenia	101	37,060	6%	2%	White (99%)	Two or more races (1%)
Cass County	170,620	$34,193	28%	13%	White (89%)	Black (4%)
Traill County	8,050	$31,77436	25%	7%	White (95%)	American Indian (1%)
State of North Dakota	745,475	$34,256	28%	14%	White (88%)	American Indian (5%)

Based on the EJScreen review, the planning area does not qualify for environmental justice considerations as either a minority or low-income population.

4.1.2 Social Issues

Community cohesion is based on characteristics that keep members of a group together to establish meaningful interactions, common institutions, and agreed-upon ways of behavior. These characteristics may include race, education, ethnicity, religion, language, and mutual economic and social benefits. The planning area is predominantly rural with a focus on agriculture. Flood

damages have impacted communities by disrupting agricultural practices and transportation systems within the planning area.

4.1.3 Land Use

Land use in the planning area was assessed by reviewing local zoning ordinances and relevant comprehensive land-use plans, aerial photography, and the Multi-Resolution Land Characteristics Consortium 2011 National Land Cover Database (reference [2]). Map C-2 Appendix C provides an overview of land use and infrastructure in the planning area.

The major roads in the planning area include several county highways and local paved and unpaved roads, with Interstate Highway 94 running east/west just south of the planning area. Railroads present in the planning area include the Burlington Northern Santa Fe Railway, which primarily travels northwest/southeast through the planning area. Two private airports are present in the planning area: Schroeder private airport, located approximately 9 miles northwest of Amenia, and the Vining private airport, located approximately 4 miles southwest of Amenia. Numerous bridges are present throughout the planning area along the Rush River and its tributaries. Bridges and roads have become compromised during periods of flooding, making them unusable and resulting in detours and the need for extensive infrastructure repairs.

Cass County has developed a "Comprehensive and Transportation Plan," which presents a vision for the future of the County and provides a framework of strategies and policies relevant to the current and future needs of the County (reference [3]). Cass County has also prepared a Draft Model Zoning Ordinance for Townships (reference [4]). Some of the townships in the planning area have developed their own township-level zoning ordinances and/or comprehensive plans, including Erie Township, Rush River Township, Hardwood Township, and Harmony Township. All township zoning ordinances and comprehensive plans are available through the Cass County website (reference [5]). Alternatives developed for the proposed project ensured compatibility with comprehensive plans and zoning ordinances. No comprehensive plans or zoning ordinances have been identified at the county level for Traill County or at the township level for Galesburg Township or Greenfield Township in Traill County.

According to the 2011 National Land Cover Database, land cover in the planning area is primarily cultivated cropland (92 percent), dominated by soybeans and corn (reference [2]) (Map C-2 Appendix C). Developed land (including open space and low-, medium-, and high-intensity) is the next most abundant type, representing approximately 4 percent of the area, primarily in the vicinity of Amenia (Map C-2 Appendix C).

Additional land-cover types in the planning area include hay/pasture, herbaceous, barren land, forested land (including deciduous and evergreen forest types), open water, emergent herbaceous wetlands, shrub/scrub wetlands, and woody wetlands (Map C-2 Appendix C); all represent less than 1 percent of the area.

4.1.4 Agriculture and Prime Farmland

According to CropScape, a program of the U.S. Department of Agriculture (USDA) National Agricultural Statistics Service, in 2015 the majority of the planning area (93 percent) consisted of

cropland [6]. Primary crops included soybeans (44 percent), corn (32 percent), spring wheat (9 percent), sugar beets (3 percent), sunflowers (2 percent), and grass/pasture (2 percent), with lesser quantities (i.e., 1 percent or less) of barley, alfalfa, winter wheat, dry beans, flaxseed, oats, peas, potatoes, rye, and fallow/idle cropland.

Overland flooding within the planning area has posed difficult farming conditions, including delayed planting, lower land values, and loss of agriculturally generated income. Historically, flooding has resulted in annual agricultural damages ranging from $20,612 to nearly $2.1 million between 1989 and 1998 (Appendix D).

The Farmland Protection Policy Act (FPPA), USDA regulations implementing the FPPA (7 CFR Part 658), and USDA Departmental Regulation (DR) No. 9500-3, Land Use Policy, provide protection for prime and important farmland and prime rangeland and forestland. Section 658.5 of the FPPA provides criteria for federal agencies to consider when identifying the potential adverse effects of federal programs on farmland. As appropriate, federal agencies are to consider actions that could lessen adverse effects on farmland. They should also assure that federal programs, to the extent practicable, are compatible with state, local government unit, and private programs and policies that protect farmland.

The planning area is predominantly classified as prime farmland (59 percent of the planning area) and prime farmland if drained (28 percent of the planning area); approximately 4 percent of the planning area is classified as farmland of statewide importance, as shown in Map C-3 Appendix C.

4.1.5 Cultural Resources

Section 106 (54 U.S.C. Section 306108) of the National Historic Preservation Act of 1966, as amended, states that projects (undertakings) that are federally funded, require federal approval, or are carried out with federal financial assistance, be evaluated for their potential effects on historic properties included on or eligible for the National Register of Historic Places (NRHP). To comply with Federal law, regulation and NRCS policy, two investigations were conducted to assess the possible effects of the undertaking on historic properties. A Class I survey is a literature and records review to determine the existence and location of, actual or potential, historic properties. A Class III is a "boots on the ground" physical survey for known properties and documentation of newly discovered cultural resources. The investigations are dependent on establishing the area of potential effect (APE) for the undertaking.

The APE is "*defined as the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties if any such properties exist*" (36CFR800.16 (d)). The proposed water control structure of Alternative 1 surrounds the town of Amenia and creates a physical exterior boundary of the undertaking thus creating the immediate APE. A one mile circumference of the APE is included to assess possible indirect effects. The Alternative 2 APE has not been defined.

In compliance with federal law (54USC§3061) regulation (36CFR§800), and NRCS policy (Title 401 Part 601) the NRCS consulted with the state of North Dakota and federally recognized American Indian tribes with ancestral ties to the APE. Section 7 of this document enumerates the Federal,

State, and sovereign Native American Bands, Tribes and Nations that were requested to participate in consultation.

In 2018 NRCS notified participating stakeholders that the Section 106 process will be implemented utilizing the phased identification and evaluation process as authorized under 36 CFR 800.4(b)(2):

> *Where alternatives under consideration consist of corridors or large land areas, or where access to properties is restricted, the agency official may use a phased process to conduct identification and evaluation efforts. The agency official may also defer final identification and evaluation of historic properties if it is specifically provided for in a memorandum of agreement executed pursuant to § 800.6, a programmatic agreement executed pursuant to § 800.14(b), or the documents used by an agency official to comply with the National Environmental Policy Act pursuant to § 800.8. The process should establish the likely presence of historic properties within the area of potential effects for each alternative or inaccessible area through background research, consultation and an appropriate level of field investigation, taking into account the number of alternatives under consideration, the magnitude of the undertaking and its likely effects, and the views of the SHPO/THPO and any other consulting parties. As specific aspects or locations of an alternative are refined or access is gained, the agency official shall proceed with the identification and evaluation of historic properties in accordance with paragraphs (b)(1) and (c) of this section.*

Of the 17 regional Tribal Historic Preservation Offices (THPO) that were contacted, responses were received from only Fort Peck and White Earth. These THPOs responded with concurrence to move forward with planning, with the stipulation they are contacted with any updates to the plan. ND NRCS Cultural Resource Specialist, Christopher Plount, recommended the final documents be sent to four specific tribes which through treaty or ancestral lands, require continued and thorough consultation, these tribes are Spirit Lake, Lake Traverse, Turtle Mountain and Red Lake. These tribes in addition to the two responding tribes (Fort Peck and White Earth) have been sent the final Draft Watershed Plan/Environmental Assessment for comment and consultation.

In March of 2016, SWCA Environmental Consultants (SWCA) completed a Class I cultural resource inventory of a study area that included Alternative 1 and 2. SWCA reviewed files maintained at the State Historical Society of North Dakota (SHSND) and the General Land Office survey records for buildings, structures, and other features of potential significance. The age of the SWCA report necessitated a review its findings. Research conducted on April 7, 2020 by the NRCS State Cultural Resource Specialist (SRCS) confirmed the SWCA report for Alternative 1**.** SWCA's report concerning Alternative 2 was not investigated given that alternative was not selected. In May of 2020, NRCS completed a Class III cultural resource survey for Alternative 1, which is included in Appendix D and summarized in further detail in Section 6.1.5.

Any future construction contract related to implementation of this plan will incorporate that requirement that should the project require additional borrow material from an offsite unevaluated location, the borrow site will be subjected to investigation and consultation prior to being utilized.

In addition, any construction contract will contain the provision that if human remains, or skeletal elements reasonably suspected to be human, are discovered during construction, all work shall cease, and the discovery site secured. Local law enforcement shall be notified, and the discovery site treated as an active crime scene (statutes NDCC 23-06-27 and NDAC 40-02-03) until declared otherwise by competent authority. The NRCS State Conservationist, State Historic Preservation Officer, NRCS State Engineer, and Tribal Historic Preservation Officer(s), who have been part of the consultation process, shall be notified of the discovery.

4.1.6 Public Health and Safety

According to the North Dakota Department of Health (NDDH), there are no municipal solid waste facilities or special waste landfills in the planning area. The NDDH database indicates that two inactive/closed underground storage tanks (USTs) are present within the planning area, as identified in Map C-10 Appendix C.

The entire planning area is served by the Cass County Sheriff's Department. The Casselton Fire Department and Casselton Ambulance Service cover approximately one-half of the area in the southern part of the planning area. Several other fire departments and ambulance services cover the remaining portion of the planning area, including the Arthur Fire Department, Erie Fire Department, Page Fire Department and Ambulance Service, Galesburg Fire Department, Hardwood Fire Department, Hunter Fire Department and Ambulance Service, West Fargo Fire Department, and the Fargo-Moorhead Ambulance Service. The nearest hospital is in Fargo, North Dakota, approximately 19 miles southeast of Amenia.

4.1.7 Scenic Beauty

The visual quality of an area may be affected by the introduction of new buildings or structures. These buildings or structures may alter visually sensitive areas such as:

- Historic properties.
- Cultural resources, traditional cultural places, and cultural landscapes.
- Areas of scenic beauty, scenic overlooks, and highways.
- Wilderness areas, parks, and national forests.
- Wild and scenic rivers, recreational, or nationwide inventory rivers.
- Areas adjacent to rural residences.

The planning area is located in a rural portion of Cass County and Traill County. The viewshed for the majority of the watershed is rural-agricultural, including fields, hay land, and rural residences. There are no designated scenic byways, scenic waterways, or other visually sensitive or culturally significant viewshed areas within the planning area.

4.1.8 Recreation

Small local parks and playgrounds are present in the planning area. With the exception of the Erie

Dam/Brewer Lake Wildlife Management Area (WMA), the Erie Dam State Recreation Area, and the Brewer Lake Campground, no other county, state, or federal parks are present in the planning area.

General outdoor recreational opportunities in the planning area include hunting, fishing, boating, snowmobiling, and golfing. The Erie Dam/Brewer Lake WMA, the Erie Dam State Recreation Area, and the Brewer Lake Campground, represent the main recreation areas in the planning area, as shown on Figure C-4 Appendix C. Snowmobile trails also run through the southern part of the planning area.

The North Dakota Department of Parks and Recreation manages several Land and Water Conservation Fund (LWCF) project sites throughout the state. These sites are under protection of Section 6(f) of the LWCF Act. The LWCF project sites in the planning area include the Erie Dam State Recreation Area and the Cass County/Brewer Lake Sports Pad (which is part of the Brewer Lake Campground).

According to the North Dakota Parks and Recreation Department website, there are no other county, state, or federal recreation areas—such as parks, preserves, or scenic byways—in the planning area.

4.2 Environmental Factors

4.2.1 Fish and Wildlife

Fish species found in the Rush River watershed include typical communities of warm-water streams and those species found in the connected waters of the Red River of the North drainage area. A list of fish species compiled from a variety of sources by the U.S. Geological Survey (USGS) includes a total of 75 different species in the Red River drainage area; 51 of those species were found in the North Dakota tributaries of the Red River (reference [8]). Notably, only three of the 75 species were found in all tributaries: white sucker (*Catostomus commersoni*), fathead minnow (*Pimephales promelas*), and northern pike (*Esox lucius*). Another nine species were documented in 80 percent of the major tributaries, including the Rush River: carp (*Cyprinus carpio*), creek chub (*Semotilus atomaculatus*), blacknose dace (*Rhinichthys atratulus*), common shiner (*Luxilus cornutus*), black bullhead (*Ameiurus melas*), brook stickleback (*Culaea inconstans*), walleye (*Sander vitreous*), blackside darter (*Percina maculata*), and johnny darter (*Ethostoma nigrum*).

Sources compiled by the USGS for the Red River drainage and tributaries list 12 mollusk species of pelecypod mussels and eight species of sphaeriid clams (reference [8]). The most prevalent mussels were giant floater (*Anodonata grandis*), white heelsplitter (*Lasmigona complanata*), and eastern lampmussel (*Lampsilis radiata*). The most abundant species were eastern lampmussel and giant floater. The North Dakota Natural Heritage biological conservation database also identifies records of the following mollusk species found east of the planning area, in the Sheyenne River: pink heelsplitter (*Potamilus alatus*), black sandshell (*Ligumia recta*), wabash pigtoe (*Fusconaia flava*) and mapleleaf (*Quadrula quadrula*).

The planning area contains suitable habitat for a variety of wildlife, such as whitetail deer (*Odocoileus virginianus*), wild turkey (*Meleagris gallopavo*), coyote (*Canis latrans*), red fox (*Vulpes vulpes*), and rodents such as squirrels (*Sciurus* sp.), rabbits (*Oryctolagus cuniculus*), and raccoons

(*Procyon lotor*). In addition, the Erie Dam/Brewer Lake Wildlife Management Area (WMA) is located in the western part of the planning area, as shown in Map C-4 Appendix C.

The planning area is located in the Central Flyway of North America. Migratory birds use portions of the planning area as resting grounds during spring and fall migration, as well as breeding and nesting grounds throughout the summer.

4.2.2 Invasive Species

North Dakota law (NDCC § 4.1-47-02) includes provisions to control the spread of noxious weeds. The North Dakota Department of Agriculture (NDDA) coordinates the efforts of county and city weed boards and state and federal land managers to implement integrated weed-management programs. All work undertaken and performed under PL83-566 is to be in compliance with applicable federal, state, and local laws, orders, and policy.

According to the NDDA's Weed Mapper (reference [9]), the 2015 weed survey identified the following noxious weed species within the planning area: Canada thistle (*Cirsium arvense*) and leafy spurge (*Euphorbia esula*). The majority of these documented locations were found in road and railroad rights-of-way.

According to the North Dakota Game and Fish Department's January 2020 Aquatic Nuisance Species Infestation Map (https://gf.nd.gov/ans/infested-waters#zebra-mussel), no zebra mussel infestations are known in the Rush River Watershed.

4.2.3 Migratory Birds

The U.S. Department of Interior—USFWS oversees compliance with the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act. The MBTA regulates the taking, selling, transporting, and importing of migratory birds, their nests, eggs, parts, or products. The Bald and Golden Eagle Protection Act prohibits the "taking" (or disturbing) of bald or golden eagles, including their parts, nests, or eggs, without a permit from the Secretary of the Interior.

The planning area is located in the Central Flyway of North America. Migratory birds use portions of the planning area as resting grounds during spring and fall migration, as well as breeding and nesting grounds throughout the summer.

4.2.4 Threatened and Endangered Species

In accordance with Section 7 of the Endangered Species Act of 1973, as amended, federal agencies are required to ensure the following two criteria:

1. Any action funded or carried out by such agency must not be likely to jeopardize the continued existence of any federally listed endangered or threatened species or species proposed to be listed.

2. No such action can result in the destruction or adverse modification of habitat of such species that is determined to be critical by the Secretary.

In accordance with Section 7, the planning area was evaluated to determine the potential presence

of federally listed species. An official list of federally listed species in the planning area was requested through the U.S. Fish and Wildlife Service (USFWS) online Information, Planning, and Conservation System (IPaC) program on September 27, 2016. According to the IPaC results, there is no designated critical habitat in the planning area; the USFWS defines critical habitat as the habitat necessary to support the special needs of federally threatened or endangered species. IPaC identified the following listed species as potentially being present within the vicinity of the planning area: whooping crane (*Grus Americana* – endangered), gray wolf (*Canis lupus* – endangered), and northern long-eared bat (*Myotis septentrionalis* – threatened).

Preferred whooping crane habitat consists of shallow marsh wetlands characterized by cattails, bulrushes, and sedges. They can also be found foraging in upland areas, especially during migration periods. The planning area is located outside of the corridor in which 95% of all confirmed whooping crane sightings in North Dakota have been observed. Nearly 1,479 acres of wetlands are present within the planning area, and the area is surrounded by cropland, which serves as suitable foraging habitat.

Though an infrequent visitor in North Dakota, the gray wolf occasionally traverses the state from neighboring Minnesota, Montana, or Manitoba, Canada. Habitat for the gray wolf in North Dakota includes forested areas in the northcentral and northeastern portions of the state; as such, habitat is limited in the planning area.

The northern long-eared bat roosts in living and dead trees greater than 3 inches in diameter that have loose or peeling bark, cavities, or crevices. During winter, the northern long-eared bat hibernates in caves and mines. According to USFWS and Natural Heritage Data, there are no known occupied roost trees or hibernacula in North Dakota.

North Dakota does not have a state endangered and threatened species list; as such, there are no legally protected state-endangered or threatened species in the state. However, the North Dakota Parks and Recreation Department maintains the North Dakota Natural Heritage biological conservation database, which provides information on rare species across the state. The following rare species have been identified within the planning area: northern redbelly dace (*Phoxinus eos*), northern prairie skink (*Eumeces septentrionalis*), and yellow-billed cuckoo (*Coccyzus americanus*). Because these three species are not legally protected, they are not discussed in significant detail here and are part of the general discussion of potential impacts to fish and wildlife and migratory birds in Sections 5.2.1 and 5.2.3, respectively.

4.2.5 Floodplain/Overland Flooding Management

Floodplains constitute lands situated along rivers and their tributaries that are subject to periodic flooding. A 100-year floodplain represents a 1 percent chance of being flooded in any given year, on the average interval of 100 years or less.

Continued encroachment on floodplains decreases the natural flood control capacity of these lands, creates the need for expensive flood control measures and disaster relief activities, and endangers both lives and property. In compliance with EO 11988, Floodplain Management, and the USDA DR No. 9500-3, it is the USDA's policy to avoid to the extent possible:

- Long- and short-term adverse impacts associated with the occupancy and modification of floodplains.
- Direct or indirect support of floodplain development where there is a practicable alternative.

EO 11988 requires that to the extent practicable, federal agencies avoid actions which would result in the locations of facilities in floodplains and/or affect floodplain values. Facilities located in floodplains may be damaged or destroyed by a flood or may change the flood-handling capability of the floodplain.

FEMA is in the process of finalizing floodplain maps in the majority of the planning area. Currently, the southeast portion of the planning area, near Harwood, contains portions of FEMA-designated 100- and 500-year floodplains of the Rush River, as shown in Map C-5 Appendix C.

At present, flood management is needed in the planning area to control excess runoff and intense rain events, which cause frequent overland and overbank flooding. These flooding events create impacts to agriculture, residences, transportation systems, and infrastructure, as well as create conditions with the potential to increase erosion and subsequent sediment delivery to downstream receiving waters.

4.2.6 Floodwater Damage

At present, excess runoff and intense rain events cause frequent overland and overbank flooding within the planning area. These flooding events create impacts to agriculture, residences, transportation systems, and infrastructure, as well as create conditions with the potential to increase erosion and subsequent sediment delivery to downstream receiving waters. As noted in Appendix C, these floodwaters impact 23 residential, 9 commercial and 2 public properties during the 100 year frequency flood event. Damages resulting from the 100 year frequency flood are $201,000 and would these properties would continue to be impacted under existing conditions.

4.2.7 Air Quality

The Clean Air Act (CAA) of 1970, as amended in 1977 and 1990, is the primary federal statute governing ambient air pollution. The CAA designates standards for the following criteria pollutants that have been determined to affect human health and the environment: particulate matter (PM10 and PM2.5), carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), lead (Pb), and ozone (O_3). Volatile organic compounds (VOC) and NO_2 are precursors to O_3, which is not an emitted source but is formed by these pollutants in the atmosphere (40 CFR Part 50).

The USEPA has developed National Ambient Air Quality Standards (NAAQS) for these criteria pollutants to protect public health and welfare. When a designated air quality area or “airshed” exceeds NAAQS, that area may be designated as a “nonattainment” area. Areas with levels of pollutants below the health-based standard are designated as “attainment” areas. To determine whether an area meets the NAAQS, air monitoring networks have been established and are used to measure ambient air quality and determine attainment status.

The NDDH Air Quality Division regulates air quality throughout the state, with the exception of Indian reservations. North Dakota has promulgated ambient air quality standards (NDAAQS) in addition to the NAAQS. These standards include hydrogen sulfide and SO_2; for all other pollutants, the NAAQS are equivalent or more stringent than the NDAAQS. Both the NAAQS and NDAAQS apply to the proposed project.

The *2020 North Dakota Ambient Air Quality Monitoring Program Network Plan with Data Summary* indicates that no sulfur dioxide, nitrogen dioxide, ozone, or particulate matter exceeds either the state or federal ambient air quality standards measured at any state-operated ambient air monitoring sites (reference [10]). North Dakota is one of 13 states in attainment status for all criteria pollutants (reference [11]). Because of North Dakota's attainment status and because primary emissions associated with the project would not be from major sources, it is not anticipated that any air quality permits or authorizations would be required from the NDDH Air Quality Division.

New projects within attainment or unclassified areas must conform to limits defined under the Prevention of Significant Deterioration (PSD) Program. For actions resulting in emissions that exceed a threshold (250 tons per year or more of any air contaminant regulated under North Dakota Century Code Chapter 23–25), PSD requirements specify maximum allowable increases in pollutant concentrations for areas that are already in compliance with the NAAQS.

4.2.8 Noise

The planning area predominantly consists of rural areas that are exposed to local traffic and agriculture-related noise such as machinery, small aircraft, or other farm-related noise sources. Several highways and county roads traverse the planning area, providing a source of traffic-related noise.

4.2.9 Soil Resources

According to the Soil Survey of Cass County Area (reference [12]) and the Soil Survey of Traill County (reference [13]), there are nearly 150 soil map units found within the planning area. The most predominant are Fargo silty clay (8 percent of the planning area); Kindred-Bearden silty clay loams, 0 to 2 percent slopes (8 percent); Lankin-Gilby loams, 0 to 2 percent slopes (6 percent); Glyndon loam, 0 to 2 percent slopes (6 percent); and Barnes-Svea loams, 0 to 3 percent slopes (5 percent). Topography is generally flat with slopes ranging from 0 to 6 percent. The majority of soils within the planning area have a Kf[1] factor less than 0.37, making them less susceptible to sheet and rill erosion by water. The hydric status of soils within the planning area varies, with approximately 70 percent of the planning area mapped as predominantly non-hydric and approximately 22 percent of the planning area mapped as all hydric; the remaining 8 percent is mapped as partially hydric and predominantly hydric.

4.2.10 Riparian Areas

Riparian areas occur at the interface between land and a watercourse (river, stream, tributary),

[1] The Kf erosion factor indicates the erodibility of materials less than two millimeters in size. Values of K range from 0.02 to 0.69, with higher values indicating greater susceptibility.

such as a streambank or floodplain. These areas have different characteristics from adjacent upland communities, containing vegetation and soil adapted to the presence of water. Riparian areas along streambanks and in floodplains function to reduce the velocity of floodwaters, lessening the erosive force of the flood and capturing nutrient-laden sediment. Riparian areas occur adjacent to some of the watercourses throughout the planning area, including portions of the Rush River. The North Dakota Forest Service has identified riparian forests across North Dakota in North Dakota's Statewide Assessment of Forest Resources and Forest Resource Strategy (reference [14]), including areas adjacent to the Rush River.

4.2.11 Natural Areas

The planning area is primarily agricultural; however, several streams, wetlands, and small lakes are also present. With the exception of the Erie Dam/Brewer Lake WMA and the Erie Dam State Recreation Area, located in the western part of the planning area, no county, state, or federal preserves or designated natural areas are present.

4.2.12 Waters of the United States

Section 404 of the Clean Water Act (CWA) regulates the discharge of dredged and fill material into waters of the United States. Per the April 21, 2020 Navigable Waters Protection Rule, waters of the United States include the following:

- Territorial seas and traditional navigable waters,
- Perennial and intermittent tributaries to those waters,
- Certain lakes and ponds, and impoundments, and
- Wetlands adjacent to jurisdictional waters

Water resources in the planning area are shown on Figure C-5 Appendix C. The main watercourses in the planning area consist of the Rush River and the Lower Branch Rush River; both watercourses are considered waters of the United States. Both branches discharge into the Sheyenne River, just upstream of where the Sheyenne River discharges into the Red River. The downstream reaches of both branches have been altered by the U.S. Army Corps of Engineers (USACE), resulting in the straightening of this portion of their channels. As shown in Figure C-5 Appendix C, there are also several tributaries associated with the Rush River. Brewer Lake, a 125-acre lake, is located in the planning area approximately 10 miles northwest of Amenia.

Two dams are located in the planning area: the Erie Dam and the Brewer Lake 2 Dam, as shown in Figure C-5 Appendix C. There are no USEPA-designated sole-source aquifers in the planning area.

4.2.13 Wetlands

Wetlands are defined in 1977 Executive Order 11990, Protection of Wetlands, and in Section 404 of the CWA as those areas that are inundated by surface or ground water frequently enough to support, under normal circumstances, a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Three parameters that define a wetland, as outlined in the *Corps of Engineers Wetlands Delineation Manual* (reference [15]) and the *2010 Great Plains Regional Supplement* (reference [16]), are hydric soils, hydrophytic vegetation, and hydrology.

Under the authority of Section 404 of the CWA, the USACE regulates the placement of dredged or fill material into waters of the United States, including wetlands that are located adjacent to jurisdictional waters, in this case the Rush River and the Lower Branch Rush River.

The planning area is located in an area known as the Prairie Pothole Region. As glaciers from the last ice age began to recede, millions of small depressional wetlands, known as potholes, were created. As humans settled and developed the area, it is estimated that more than half of the wetlands within the Prairie Pothole Region were drained to accommodate agricultural practices (reference [17]).

The National Wetlands Inventory (NWI) was developed by the USFWS in the late 1970s, based primarily on interpretation of aerial photographs. The NWI classifies wetlands into different types, using the USFWS Cowardin Classification System (reference [18]). The NWI maps identify approximately 1,479 acres of wetlands within the planning area, with approximately 85.1 percent (1,258 acres) mapped as palustrine freshwater emergent wetlands, as shown in Figure C-5 Appendix C. Wetlands shown on Figure C-5 Appendix C that are adjacent to the Rush River or Lower Branch Rush River are considered waters of the United States. Additional wetland types mapped include: lake (Brewer Lake—129 acres, 8.7 percent of the wetland area), palustrine freshwater forested/shrub wetlands (69 acres, 4.6 percent of the wetland area), palustrine freshwater ponds (16 acres, 1.1 percent of the wetland area), and riverine wetlands (7 acres, 0.5 percent of the wetland area). As shown on Figure C-5 Appendix C, wetlands are more abundant in the western part of the planning area.

4.2.14 Water Quality

Under Section 303(d) of the CWA of 1986, states are required to monitor and assess their waters to determine if they meet water quality standards, supporting the beneficial uses they are intended to provide (33 U.S.C. 1313(d)). Waters that do not meet their designated uses due to water quality standard violations are listed as impaired. States are required to develop a list of impaired waters that require total maximum daily load (TMDL) studies and to submit an updated list of impaired waters to the EPA every 2 years. The NDDH monitors waters to determine whether they meet water quality standards for designated uses and lists waters as impaired if they do not meet their designated uses due to water quality standard violations.

Based on the 2016 reporting year, the Rush River (reach ND-09020204-007-S_00) is listed as impaired downstream to an unnamed tributary, as shown on Figure C-5 Figure C-5 Appendix C. Listed impairments include Escherichia coli (designated use recreation), fish and benthic macroinvertebrate bioassessments (designated use fish and other aquatic biota), , and sedimentation/siltation (designated use fish and other aquatic biota). A TMDL has not been completed for these impairments. The Rush River (reach ND-09020204-004-S_00) is also listed as impaired from its confluence with an unnamed tributary watershed, downstream to its confluence with the Sheyenne River. Listed impairments include combination benthic/fishes bioassessment (designated use fish and other aquatic biota) and sedimentation/siltation (designated use fish and other aquatic biota). A TMDL has not been completed for these impairments.

Based on the 2016 reporting year, Brewer Lake (ND-09020204-003-L_00), which is located

approximately 10 miles northwest of Amenia, is listed as impaired, as shown on Figure C-5 Appendix C. Listed impairments include sedimentation/siltation (designated use fish and other aquatic biota). A TMDL has not been completed for the sedimentation/siltation impairment.

A stormwater pond is required to manage internal storm water flows during a flood scenario. In addition to stormwater management, the stormwater pond will help reduce sediment and siltation runoff from the City. Preliminary design of the stormwater pond includes a normal pool which will help prevent floating debris from disrupting the pumps. Additionally, the normal pool will also allow for sediment in the runoff to settle out within the pond rather than continue to move downstream.

4.3 Regional Water Resource Plans

The *2021 North Dakota Water Development Plan* has identified three potential projects on the Rush River: a snagging and clearing project and two drain-improvement projects (reference [19]). These projects are listed under the "general water management" category, which includes rural and small-scale flood control initiatives. Any proposed project that promotes rural flood control within the planning area would be consistent with the general water management priorities of the *2015 North Dakota State Water Management Plan* (reference [19]).

5 Alternatives

5.1 General

The Purpose and Need statement sets the framework for the planning effort and is the basis for eliminating or prioritizing alternatives within the watershed. Once the need was established, the project team identified the purpose for the alternatives identified during the planning effort. Ultimately, the purpose of the alternatives would be to address the problems identified as a need. As the project team proceeded further in the study, they were able to compare the impact of each alternative in the watershed; if they did not meet the "Purpose and Need" they would be eliminated from further review.

5.2 Formulation Process

The process of formulating alternatives to mitigate flood-related impacts in the Rush River watershed followed procedures outlined in the *USDA-NRCS National Environmental Compliance Handbook* (reference [20]).

5.2.1 Initial List of Considered Strategies

The initial set of flood damage reduction (FDR) strategies considered were established from the FDR strategies identified in the Red River Basin Flood Damage Reduction Work Group and Scientific Advisory Committee's *Technical Paper 11 (TP 11)*(reference [21]). Though not an exhaustive list, *TP 11* provides a variety of FDR strategies that have proven track records of success within the Red River Valley. These strategies are divided into four distinct categories, representing four unique methodologies to alleviate flooding. The full list of strategies by category is presented below.

- Category 1 – Increase temporary flood storage

    - 1A – Dams and impoundments
    - 1B – Create or restore wetlands with controls plus added storage
    - 1C – Alter groundwater through drainage (drainage water management)
    - 1D – Culvert sizing to meter runoff
    - 1E – Overtopping levees
- Category 2 – Increase conveyance capacity
    - 2A – Channelization of existing natural water ways and flowages (floodway) and surface drainage
    - 2B – Diversions
    - 2C – Set back levees (move existing)
    - 2D – Increase road crossing capacity
- Category 3 – Reduce flood volume
    - 3A – Create or restore wetlands (natural function)
    - 3B – Cropland BMPs
    - 3C – Cropland conversion (back to grass or forest)
    - 3D – Other beneficial uses—irrigation, municipal/industrial–flow augmentation
- Category 4 – Protection/avoidance
    - 4A – Urban levees
    - 4B – Farmstead levees
    - 4C – Agricultural levees
    - 4D – Evacuation of the floodplain
    - 4E – Flood proofing
    - 4F – Flood warning system
- Category 5 – Additional alternatives
    - None identified or suggested

No additional strategies were discussed or identified by the project team that also could meet the Purpose and Need.

5.2.2 Strategy Evaluation Criteria

Each of the FDR categories listed has undergone several evaluations to eliminate some from further consideration and analysis.

1. Whether or not the strategy will fundamentally address the "Purpose and Need" of the project
2. Whether the alternative would cause a drastic negative impact on the environment
3. Whether the strategy is practical

For each evaluation, each strategy was either designated to be carried forward for further evaluation or not to be carried forward. The following three strategies were immediately eliminated.

- Measure 4B – Farmstead levees: This strategy was deemed as not applicable as the "Purpose and Need" for the study is flood risk reduction for the city of Amenia.
- Measure 4C – Agricultural levees: This strategy was deemed as not applicable as the "Purpose and Need" for the study is flood risk reduction for the city of Amenia.
- Measure 4F – Flood warning system: This strategy was deemed not applicable because while a warning system would could help prevent some damages and loss of life, it does not meet the "Purpose and Need" statement and ultimately result in the removal of the City from the 100 year floodplain.

5.2.3 Preliminary Alternatives and Project Team Comments

After eliminating multiple strategies from further evaluation, strategies remained that can be combined in many different ways to form project alternatives. There can also be multiple alternatives developed for certain strategies. There are 19 listed concepts or alternatives in Table 5-1, below. There is one diversion alternative, three levee alternatives, two channelization (channel widening and channel straightening) alternatives, bridge widening, one impoundment, other impoundments, culvert downsizing, culvert upsizing, overtopping levee, setback levee, other beneficial uses, flood proofing, evacuating the floodplain, wetland restoration/creation, cropland BMPs and grassland conversion, and drain tile management.

The project team reviewed the remaining project alternatives to determine if additional technical analysis would be necessary. The project team used HEC-HMS hydrologic model and HEC-RAS (1dRAS) hydraulic model information, any known environmental concerns, any known financial considerations or barriers, public and agency comments, comments from the project team, any known permitting obstacles, cultural resource concerns, agricultural improvements, and any known impacts to threatened or endangered species to evaluate these alternatives. Interim summary modeling reports are available upon request to ND NRCS.

Table 5-1 Alternatives for Review

Alternative No.	Location (Section-Township-Range)	Type/Strategy
1	22, 23, & 24–141-52	Diversion (Eliminated)
2	23,24, 25, & 26–141-52	Levee option #1 (Moved Forward)
3	22,23, & 24–141-52	Levee option #2 (Moved Forward)
4	23,25, & 26–141-52	Levee option #3 (Eliminated)
5	23 & 24-141-52	Channel work – widen channel (Eliminated)
6	23 & 24-141-52	Channel work – straighten and widen (Eliminated)
7	23 & 24-141-52	Bridge widening (Eliminated)
8	Empire Twp. (141-53)	Impoundment (Eliminated)
9	Various locations	Other impoundment locations (Eliminated)
10	Watershed-wide	Culverts – downsize (Eliminated)
11	Watershed-wide	Culverts – upsize (Eliminated)
12	Various	Overtopping levees (Eliminated)
13	Various	Setback levees (Eliminated)
14	Watershed-wide	Other beneficial uses (Eliminated)
15	City homes – Amenia	Flood proofing (Eliminated)
16	City – Amenia	Evacuate the floodplain (Eliminated)
17	Watershed-wide	Wetland creation/Restoration (Eliminated)
18	Watershed-wide	Cropland BMPs – grassland conversion/no-till (Eliminated)
19	Watershed-wide	Tile – drainage water management (Eliminated)

*Detailed summary table also included in Appendix A.

5.3 Alternatives Eliminated From Detailed Study

Alternative Review; see Appendix A for additional information:

Alternative #1: Diversion – located in Cass County, Amenia Twp. – Sec's 22, 23, & 24 area

This diversion alternative was initially carried forward for further study and review. It meets the "Purpose and Need" by providing a certified level of flood protection to the residents of Amenia and allowing residents to be exempt from purchasing federal flood insurance. The diversion takes approximately 50% of the flows in the Rush River just upstream of 154th ave and discharges the flows back into the Rush River downstream of Highway 18. This alternative was later eliminated due to a number of factors including downstream impacts, impacts to areas designated as prime farmland or prime farmland if drained, wetland concerns, and costs. On-site storage was considered to mitigate downstream impacts; however, the addition of storage required, plus the large diversion channel and new bridges, would have significantly exceeded other alternatives in costs.

Alternative #4: Levees around the south side of city of Amenia – Cass County, Amenia Twp., Sec's 23, 25, & 26

The project team noted that this alternative does not meet the "Purpose and Need" because it does not provide certified flood protection for the city.

This alternative was not chosen for any further review or study.

Alternative #5: Widen the Rush River channel in Cass County – Amenia Twp. – Sec's 23 & 24 (this area was not improved with previous legal drain work)

Channelization of existing natural waterways and flowages (floodway): This alternative was deemed not acceptable because it would likely cause adverse downstream impacts unless an impoundment is incorporated downstream of the channel work. This strategy, as a stand-alone alternative, was not carried forward for further analysis. In addition the combination of channel improvement and an impoundment are not considered socially acceptable.

Alternative #6: Widen and straighten the Rush River channel in Cass County – Amenia Twp. – Sec's 23 & 24 (this area was not improved with previous legal drain work)

The project team noted there would be some environmental concerns with this alternative, as well as potential downstream impacts. As a stand-alone alternative it did not meet the "Purpose and Need" and was not carried forward for further review or analysis. In addition the combination of channel improvement and an impoundment are not considered socially acceptable.

Alternative #7: Widen the bridge over the Rush River channel in Cass County – Amenia Twp. – between sections 23 & 24, where the bridge is located 625 feet north of the intersection of 154th Ave SE and Cass County Road #32.

As a stand-alone alternative this option will not meet the project team's "Purpose and Need" because a portion of the city would still be in the floodplain. Additionally, this alternative does cause downstream impacts which are not socially acceptable. The combination of bridge widening, channelization and impoundments was considered; however, impoundments are not considered socially acceptable. Therefore, this alternative was not carried forward for further review or analysis.

Alternative #8: Impoundment – located in Cass County – Empire Twp. area 141-53

The information for this location was provided by the previous watershed planning effort; this location provided the greatest flood-stage reduction at the Rush River gauge at Amenia.

The project team did not select this alternative for further review. The project team stated that impoundments were not considered a socially accepted alternative based on public comments received.

Alternative #9: Other impoundment locations – located in Cass County – various locations upstream

of Amenia (impoundments were outlined in the previous watershed planning work)

No other impoundment alternatives from the previous watershed planning were carried forward for further review. The project team believed these did not meet the "Purpose and Need" because any impoundment has the uncertainty of being able to certify an impoundment alternative and remove the need to purchase federal flood insurance.

Alternative #10: Culvert upsizing – in the contributing watershed-wide area

This alternative was deemed not practical due to the various township, county, and state jurisdictions that have permitting and approval authority of road crossings. There are also potential downstream impacts due to increased conveyance at these crossing locations which is not a socially accepted solution. This alternative was not carried forward for additional study or analysis.

Alternative #11: Culvert downsizing – in the contributing watershed-wide area

This alternative was deemed not practical due to the various township, county, and state jurisdictions that have permitting and approval authority of road crossings. Reducing culvert sizes would likely mean that the crossings would not follow current North Dakota Administrative Code for roadway crossings. As such every culvert reduction would require a permit to store water behind township, county, and state roadways. This alternative was deemed as impractical from a logistics and cost standpoint because each roadway that impounds or stores water would need to be reconstructed in its entirety to meet appropriate dam design standards. Therefore, this alternative does not meet the "Purpose and Need" and was not carried forward for additional study or analysis.

Alternative #12: Overtopping levees – located in Cass County at various locations in the watershed

This strategy was deemed not applicable because this technique would allow water to overtop levees once a specified event is exceeded. At that point, there would be no difference between existing conditions and post-project conditions. Keeping in mind the purpose of the alternatives is flood damage reduction, the project team determined that this strategy would be counter to the "Purpose and Need."

Alternative #13: Setback levees – located in Cass County in the contributing watershed-wide area

Setback levees could provide some benefit to the downstream portion of the Rush River because when the water breaks out of the river channel there is significant floodplain that is inundated due to the flat terrain adjacent to the river. Because this part of the watershed is significantly downstream of the city, this strategy will not be carried forward for further analysis.

Alternative #14: Other beneficial uses of flood waters – located in Cass County at various locations in the watershed

This strategy was deemed not applicable because the need to store water for other uses was not addressed in the "Purpose and Need." It was also not noted as a need in the public scoping. This

alternative was not carried forward for further analysis or review.

Alternative #15: Flood proofing of the homes and businesses in the city of Amenia – located in Cass County, North Dakota – Amenia Township

This alterative may reduce damages; however, it is not considered certified flood protection for the city. Therefore, this alternative was not carried forward for further review as the project team believed it did not meet the "Purpose and Need."

Alternative #16: Evacuate the floodplain in the city of Amenia – located in Cass County, North Dakota – Amenia Township

One of the project goals is that the city of Amenia remain in place. This alternative is counter to that goal and does not meet the "Purpose and Need." This alternative was not carried forward for further analysis.

Alternative #17: Created/Restored wetlands – with added storage and controls – located in Cass County – watershed-wide.

Restoring all of the drained wetlands within the watershed is not practical or feasible on a large scale for long periods of time. Additionally, restoring wetlands will likely not be considered certified flood protection for the city of Amenia. The National Wetland Inventory (NWI) indicates that there are 238 acres of partially ditched or drained. Analysis was completed assuming that the wetlands could contain the 100-year runoff from an area equal to five times the wetland area. This analysis showed that the restoration of all drained wetlands (per NWI) in the watershed would provide a 0.51% peak flow reduction on the 100-year event at the outlet of the Rush River. Therefore, this alternative was not chosen for any further review or study as it does not adequately meet the "Purpose and Need." However, it was noted that restoring or creating wetlands can be beneficial as a stand-alone landowner initiative or mitigation for another project. A map of this alternative has been included in Appendix D. No detailed analysis of this alternative was completed.

Alternative #18: Cropland best management practices (BMPs) and cropland conversion to grass

The project team's review of this alternative concluded that BMPs should be encouraged and can be better addressed through NRCS Farm Bill programs with individual agricultural producers. For modeling purposes, it was assumed that BMPs resulted in agricultural land mimicking grassland conditions. As such, a cursory analysis of this was completed in HEC-HMS by adjusting curve numbers from calculated values to a generalized number of 64. As this analysis was cursory, it did not take into account the condition or specific soil types. Results of this analysis indicate that BMPs reduced peak flows at the outlet of the watershed from 3% to 71%, depending on the event. While this alternative does show benefits to the watershed, it is not practical or feasible to be completed by the SLO on a watershed-wide scale. Additionally, this alternative would not likely be considered certified flood protection for the city of Amenia. Therefore, this alternative was not carried forward for further analysis or review. However, the project team wanted the utilization of BMPs to be a general goal of the watershed.

Alternative #19: Tile water management (Upstream Cropland)

Effectiveness of tile system management for large scale flooding remains unknown. Detailed studies are currently being pursued within the county. Even if this were an effective alternative, the cost of implementation over half of the watershed would be in excess of $25,000,000 (assuming $1,000/acre of installed tile). This alternative would not be considered certified flood protection for the city of Amenia. This alternative was not carried forward for further analysis or review.

5.3.1 National Economic Development (NED) Principles and Guidelines.

The 1983 Water Resources Council Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (P&G) help support water infrastructure projects with the greatest economic and community benefits (reference [22]). According to the Principles and Guidelines, an alternative that reasonably maximizes the net national economic development benefits is to be formulated and identified as the national economic development (NED) plan.

5.4 Reasonable Alternatives Description

Two Action Alternatives are being carried forward for analysis in the Environmental Assessment. In accordance with NEPA, a No-Action Alternative must also be part of the analysis for an Environmental Assessment. Each alternative is described in detail below.

5.4.1 No-Action Alternative

Under the No-Action Alternative, no new actions would be undertaken. The No-Action Alternative would involve no federal funding to mitigate flood-related impacts in the Rush River watershed or the city of Amenia, resulting in the current flooding conditions as described in Section 2.

5.4.2 Levee Alternative 1

With Levee Alternative 1, approximately 11,820 feet of levee would be constructed around the north, west, and south sides of the city of Amenia to provide flood protection to residents during a 100-year, 24-hour event, as shown in Appendix B. South Woodward Avenue (155th Avenue SE) currently protects the east side of Amenia from floods of this magnitude. Levee Alternative 1 would be constructed with a top elevation of 959.00 feet above mean sea level (MSL), a base that varies between 40–80 feet wide with a 10-foot top and 4:1 side slopes. A 10-foot-wide channel would be constructed approximately 15 feet from the toe of the levee. The channel is necessary to convey water that currently flows along County Highway 32 through town around the levee as to not create pockets of standing water against the levee toe. A 15-foot clear zone would be maintained on the interior of the levee. Trees would not be allowed on the levee or in the clear zone as tree roots can compromise the integrity of levees over time.

A stormwater pond would be developed for Levee Alternative 1 to capture floodwaters and runoff from approximately 180 surface acres within the levee system. The pond for Levee Alternative 1 would cover an area 300 feet by 500 feet with a depth of 16 feet—8 feet for a permanent pool and 8 feet for bounce or fluctuation in water surface elevation, also known as live storage volume. The 8 feet of live storage assumes water levels in the pond would bounce 5 feet for a coincident 100-year event while allowing 3 feet of freeboard. This pond would be connected to a storm lift station.

During normal events, gravity drainage would occur through gate well structures with sluice gates, and the lift station would not be utilized. During a flood, the gate well structures would be closed and gravity flows would be diverted to the pond and pumped through the lift station to remove internal drainage. The lift station would be designed to pump at a peak capacity of 28 cubic feet per second (cfs), based on the capacity of existing culverts. The permanent pool of water would allow for stormwater treatment to improve water quality. The larger volume from the pond excavation would provide additional material for the proposed levee construction.

Approximately 100,150 cubic yards (CY) of material would be required to construct the levee embankment. Material for levee construction would be derived on site, with approximately 67,000 CY obtained through excavation of the stormwater pond and drainage ditch. The remaining volume (33,150 CY) would be acquired by expanding the stormwater pond. Significant cost items for construction for this alternative are related to the levee embankment, pond and pump station, and gatewell structures totaling approximately $1,400,000. Other costs included in the estimate is mitigation for impacts to wetlands. For cost purposed, it was assumed that these wetlands were mitigated off site utilizing a federally approved mitigation bank. The estimated cost for mitigation is $67,200.

Levee Alternative 1 would include construction of removable features to act as temporary levees over three road crossings and two railroad crossings. For paved road crossings, the asphalt pavement would be cut out and road bed prepared such that a concrete sleeper slab could be placed. The concrete sleeper slab would replace the asphalt as a traversable surface, but would act as support for the temporary placement of clay fill at the road crossings to bring the levee up to the design elevation during flood scenarios. Once the flood recedes, the temporary clay fill would be removed and the road would be passable with no additional work. For gravel roads, the gravel overlying the roadbed would be removed and the roadbed would be reconstructed in a similar fashion to the levee to make it congruent in material and compaction. Upon completion of the roadbed, the gravel would be reestablished for normal use. Under a flood scenario, the gravel would be removed and a clay fill temporarily added to bring the levee up to the design elevation. Once the flood recedes, the temporary clay fill would be removed and the gravel layer would be reestablished. The railroads would receive similar treatment to the gravel roadway, differing only in the need to remove the tracks and ballasts in their entirety for clay fill to be brought in.

Levee Alternative 1 has been designed such that it would minimize downstream flooding impacts while providing flood damage reduction to homes, businesses, and infrastructure within the city of Amenia (Appendix D).

Alternative 1 results in the elimination of the flooding seen in the city of Amenia for the 1-percent-chance event within the protected area of the levee. This option reduces the flood risk for approximately 93 acres, while increasing the risk on 72 acres of undeveloped agricultural land, for a net decrease of 21 acres from the floodplain. The areas directly adjacent to the levee have between 0.3 and 0.67 feet of impacts during the 1-percent-chance event due to a reduction in the available storage from the levee. The largest impacts seen in areas not adjacent to the levee were less than 0.1 feet. The effects of this alternative on the flow rates at the Rush River at the Amenia USGS gage were also analyzed. The impacts of Alternative 1 to the peak discharges at the USGS Gage

at Amenia are negligible. This alternative produces an increase of 9 cfs, which is an increase of approximately 0.26%. Pre- and post-project hydrographs and additional design details have been included in Appendix D.

5.4.3 Levee Alternative 2

With Levee Alternative 2, approximately 10,085 feet of levee would be constructed on the south side of the Rush River, approximately 0.13 miles north of the city of Amenia. This alternative would provide flood protection to Amenia residents for a 100-year, 24-hour flood event, as shown in Appendix C Map C-9. Levee Alternative 2 would be constructed with a top elevation varying from 959–969 feet above MSL, a 10-foot top, and 4:1 side slopes. A 15-foot clear zone would be maintained on the interior of the levee. Trees would not be allowed on the levee or in the clear zone as tree roots can compromise the integrity of levees over time.

A stormwater pond would be developed for Levee Alternative 2 to capture floodwaters and runoff from approximately 860 surface acres in the immediate vicinity of the levee precluded from draining directly to the river by levee construction. The stormwater pond for Levee Alternative 2 would cover an area 650 feet by 1,500 feet with a depth of 16 feet—8 feet for a permanent pool and 8 feet for bounce or live storage volume. The 8 feet of live storage assumes water levels in the stormwater pond would bounce 5 feet for a coincident 100-year event while allowing 3 feet of freeboard. This stormwater pond would be connected to a lift station. During normal rain events, gravity drainage would occur through gate well structures with sluice gates and the lift station would not be utilized. During a flood event, the gate well structures would be closed and gravity flows would be diverted to the pond and pumped through the lift station to remove internal drainage. The lift station would be designed to pump at a peak capacity of 28 cfs, based on the capacity of existing culverts. The permanent pool of water would provide stormwater treatment to improve water quality and the larger volume would allow for additional material to construct the proposed levee.

Approximately 42,715 CY of material would be needed to construct the embankment. This material would be collected on site through excavation of the stormwater pond. Significant cost items for construction for this alternative are related to the levee embankment, pond and pump station, and gatewell structures totaling approximately $3,046,670. Other costs included in the estimate is mitigation for impacts to wetlands. For cost purposed, it was assumed that these wetlands were mitigated off site utilizing a federally approved mitigation bank. The estimated cost for mitigation is $68,000.

Levee Alternative 2 has been designed such that it would not exacerbate downstream flooding impacts while providing flood damage reduction to homes, businesses, and infrastructure (Appendix D).

Alternative 2 results in a large reduction to the peak 1-percent-chance event water surface elevations within Amenia. A small volume of water from breakout flows from the Lower Rush River southwest of Amenia is still reaching Amenia with this alternative. This alternative results in impacts to lands in the vicinity of the levee due to the elimination of breakout flow from the Rush River that results in the flooding seen in the city of Amenia for the existing conditions. There is a

reduced risk for approximately 188 acres and an increased risk for 140 acres, for a net decrease of 48 acres from the floodplain. The largest impacts occur directly to the north of the alternative levee where a 0.33 foot increase occurs during the 1-percent-chance event. The effects of this alternative on the flow rates of the Rush River at the Amenia USGS gage were also analyzed. The impacts of Alternative 2 to the peak discharges at the USGS Gage at Amenia are more significant than Alternative 1. This alternative produces an increase of 184 cfs, which is approximately a 5% increase in peak discharge. Based on North Dakota Century Code, land rights will be required for areas that have an impact or increase in water surface elevation of 0.5 feet or more. Per the analysis described above, there are no additional acreage included in the cost estimate for flood easements as the largest impact or increase in water surface elevation is 0.33 feet during the 1-percent-chance event. Pre- and post-project hydrographs and additional design details have been included in Appendix D.

5.5 Summary and Comparison of Alternatives

Table 5-2 Summary and Comparison of Alternative Plans

	Item or Concern	No-Action Alternative (Future without Project)	Levee Alternative 1 (NED Recommended)	Levee Alternative 2
	Measures to address: - Flooding	Continued periodic flooding	Construction of levee system	Construction of levee system
Installation Cost	NRCS Contribution SLO Contribution Total	$0 $0 $0	$2,576,600 $705,600 $3,282,200	$4,803,000 $697,000 $5,500,000
NED Account	Avg. Annual Cost Installation O, M, & R Total	 $0 $0 $0	 $123,200 $13,050 $136,250	 $207,100 $12,000 $219,100
	Annual Benefits	$ 0	$201,000	$201,000
	Annual Costs	$ 0	$136,250	$219,100
	Annual Net Benefits	$ 0	$64,750	-$18,100
	Annual Remaining Flood Damage	$ 7,613	$ 0	$ 0
Environmental Quality (EQ) Account	Soil	Impacts to soil resources would not change.	Temporary and permanent impacts from construction activities due to compaction from heavy equipment could occur. Soil erosion may occur if areas of soil remain exposed and bare during and after construction activities.	Similar to Levee Alternative 1.
	Agriculture and Prime Farmland	Periodic flooding conditions would continue to pose difficult farming conditions.	Construction impacts: Permanent removal: - 7 acres cultivated cropland - 4 acres prime farmland	Construction impacts: Permanent removal: - 30 acres cultivated cropland - 8 acres prime farmland

	Item or Concern	No-Action Alternative (Future without Project)	Levee Alternative 1 (NED Recommended)	Levee Alternative 2
			Temporary impact during construction: - 43 acres cultivated cropland - 35 acres prime farmland Operational impacts: Flood protection for approximately 31 acres and increased risk to approximately 57 acres of cultivated cropland outside the levee system. During operation of the levee a net increase of 23 acres of prime farmland would be protected from 100-year flood events.	Temporary impact during construction: - 17 acres cultivated cropland - 11 acres prime farmland Operational impacts: Flood protection for approximately 108 acres and increased risk to approximately 136 acres of cultivated cropland outside the levee system. During operation of the levee a net increase of 84 acres of prime farmland would be protected from 100-year flood events.
	Waters of the U.S.	Impacts to waters of the U.S. would not change.	Direct impacts to waters of the U.S. are not anticipated from construction of Levee Alternative 1. Potential indirect impacts could occur from the alteration of overland flow outside of the levee system.	Placement of the levee system within and near the floodplain would restrict future channel meander migration of the Rush River as well as disconnect the riverine system from adjacent land uses.
	Wetlands	Impacts to wetlands would not change.	Approximately 0.56 acres of permanent wetland impacts and approximately 1.59 acres of temporary impacts are anticipated from construction activities. Operation of the levee would remove approximately 0.8 acres of wetlands from flooding from a 100-year event while potentially increasing	Approximately 0.2 acres of permanent wetland impacts and approximately 0.1 acres of temporary impacts are anticipated from construction activities. Operation of the levee would remove approximately 2.3 acres of wetlands from flooding from a 100-year event while potentially increasing flooding

	Item or Concern	No-Action Alternative (Future without Project)	Levee Alternative 1 (NED Recommended)	Levee Alternative 2
			flooding on approximately 0.2 additional acres.	on approximately 0.5 additional acres.
	Water Quality	Impacts to water quality would not change.	Potential impacts from sedimentation/siltation of downstream waterways during construction activities and until soils are stabilized; potential reduction in downstream sediment/nutrient delivery during stormwater pond operations.	Potential impacts from sediment and sediment-related pollutants within or adjacent to the Rush River floodplain during construction activities and until soils are stabilized; potential reduction in downstream sediment/nutrient delivery during stormwater pond operations.
	Regional Water Resources Plans	Selection of No-Action Alternative would be consistent with current plans.	Selection of Levee Alternative 1 would be consistent with current plans.	Selection of Levee Alternative 2 would be consistent with current plans.
	Floodplain Management	Continued risk of flooding during 100-year events.	Reduced risk from 100-year flood event for approximately 93 acres. Potential increased risk of flooding from completion of the levee system for approximately 72 additional acres. Overall decrease of flooding during a 100-year event for approximately 21 acres of land.	Reduced risk from 100-year flood event for approximately 188 acres. An additional levee on the east side of the city of Amenia may be necessary. Potential increased risk of flooding from completion of the levee system for approximately 140 additional acres. Overall decrease of flooding during a 100-year event for approximately 48 acres of land. Potential impacts from constructing approximately 1,345 feet of the levee within the 100-year floodplain.
	Air	Air quality conditions would not change.	Temporary and localized construction-related impacts	Similar to Levee Alternative 1.

	Item or Concern	No-Action Alternative (Future without Project)	Levee Alternative 1 (NED Recommended)	Levee Alternative 2
			anticipated from vehicle-related emissions and fugitive dust.	
	Noise	Impacts to noise would not change.	Temporary construction-related noise impacts anticipated.	Similar to Levee Alternative 1.
	Invasive Species	Impacts to the presence or spread of invasive species would not change.	Potential impacts from soil disturbance and importing soil-carrying weed seeds during construction activities.	Potentially greater impacts compared to Levee Alternative 1 due to proximity of soil-disturbing construction activities within the Rush River riparian areas.
	Riparian Areas	Impacts to riparian areas would not change.	Impacts to riparian areas would not change.	Approximately 1,345 feet of the levee system would be constructed within the 100-year floodplain. Potential impacts could occur from tree clearing and other vegetation removal during construction. Operation of the levee system would require regular clearing of vegetation along the levee that could impact the riparian area.
	Natural Areas	Impacts to natural areas would not change.	Potential impacts could occur from construction activities, including soil erosion and sedimentation of downstream waterways.	Greater potential impacts compared to Levee Alternative 1 due to placement of the levee system within portions of the 100-year floodplain of the Rush River.
	Fish and Wildlife	Impacts to fish and wildlife would not change.	Removal of trees, increased noise, and human activity during construction of the levee system could impact habitat or disrupt some wildlife species. The stormwater pond could provide	Removal of trees from within the riparian area along the Rush River could alter habitat for some fish and wildlife species. Temporary impacts could occur from increased noise and human activity. The

	Item or Concern	No-Action Alternative (Future without Project)	Levee Alternative 1 (NED Recommended)	Levee Alternative 2
			additional habitat for some fish and wildlife species.	stormwater pond could provide additional habitat for some fish and wildlife species.
	Migratory Birds	Impacts to migratory birds would not change.	Removal of trees to construct the levee system could alter habitat for some migratory birds, including the potential to damage or destroy nests. Increased noise and human activity during construction could disrupt migratory birds.	Similar to Levee Alternative 1.
	Endangered and Threatened Species	Impacts to endangered or threatened species would not change.	Unlikely potential impact to northern long-eared bats from removing trees that serve as habitat. Temporary impacts from increased noise and human activity during construction could disrupt whooping crane and gray wolf if present within the vicinity of the levee system.	Similar to Levee Alternative 1.
	Land Use	Periodic flooding conditions would continue to impact infrastructure and existing land uses.	Construction impacts: Permanent removal of approximately 4 acres of prime farmland and approximately 0.9 acres of forested land. Temporary impacts to approximately 37 acres of prime farmland are anticipated during construction. Operational impacts: Flood protection for 48 properties within the city of Amenia. Permanent modifications would be required to three road crossings and one railroad crossing.	Construction impacts: Permanent removal of approximately 8 acres of prime farmland and approximately 0.3 acres of forested land. Temporary impacts to approximately 11 acres of prime farmland are anticipated during construction. Operational impacts: Flood protection for 48 properties within the city of Amenia.

	Item or Concern	No-Action Alternative (Future without Project)	Levee Alternative 1 (NED Recommended)	Levee Alternative 2
	Cultural Resources	Ongoing risk of flooding of cultural resources located within the city of Amenia.	A Class III field survey was completed to ensure avoidance of cultural resources.	No known cultural resources within the proposed levee system construction area. Potential impacts could occur to unknown cultural resources during ground-disturbing activities.
Other Social Effects (OSE) Account	Environmental Justice	Planning area does not qualify for environmental justice considerations due to low representation of population groups of concern.	Same as No-Action Alternative.	Same as No-Action Alternative.
	Social Issues	The city of Amenia would not be eligible for exemption from purchasing flood insurance.	Temporary disruption of transportation systems and agricultural practices during construction activities. Residents and businesses within the levee system would be exempt from purchasing flood insurance.	Similar to Levee Alternative 1.
	Public Health and Safety	Periodic flooding conditions, including temporary road closures, delays, and detours, would continue to impact public health and safety.	Reduced risk from 100-year flood events would minimize future road closures, delays, and detours within the levee system. Placement and removal of temporary levees over the road and railroad crossings would briefly restrict access for emergency services. Approximately 72 additional acres outside of the levee system would be at greater risk from flooding.	Reduced risk from 100-year flood events would minimize future road closures, delays, and detours within the levee system. Approximately 140 additional acres would be at greater risk from flooding as a result of the construction of the levee system.
	Recreation	Impacts to recreation would not change.	Construction of the levee system would protect Amenia Park from 100-year flood events.	Compared to Levee Alternative 1, protections for Amenia Park would be less for

	Item or Concern	No-Action Alternative (Future without Project)	Levee Alternative 1 (NED Recommended)	Levee Alternative 2
			Approximately 0.2 miles of an existing snowmobile trail would be impacted by placement of the levee system. The snowmobile trail could be diverted around the levee to avoid potential maintenance impacts into the future. Signage can also be posted in an attempt to reduce the snowmobile traffic onto and over the levee.	future 100-year flood events. Impacts to the snowmobile trail are not anticipated.
	Scenic Beauty	Scenic integrity of the landscape would not change.	Potential visual impacts for sensitive areas within the city of Amenia from the construction of the levee system and stormwater pond.	Potential visual impacts to the rural-agricultural viewshed from the construction of the levee, embankments, and stormwater pond adjacent to the Rush River.

6 Environmental Consequences

Throughout the sections below, impacts are discussed in terms of whether they would be adverse or beneficial in nature; whether they would be temporary or permanent; and whether they would occur during construction or operation of the project. Operational and permanent impacts would last throughout the life (50 years) of the project.

6.1 Human Factors

6.1.1 Environmental Justice

No-Action Alternative – Social issues were examined in the city of Amenia and its vicinity. Based on the EJScreen review, the city of Amenia does not qualify for environmental justice considerations due to the low representation of population groups of concern (reference [1]; Section 4.1.1. The No-Action Alternative would not result in disproportionately high adverse impacts to minority populations, low-income populations, and/or indigenous peoples. Under the No-Action Alternative, flood insurance would be required for most residential and business properties in the city of Amenia and its vicinity.

Levee Alternative 1 – Levee Alternative 1 would not require relocation of homes or businesses or cause disproportionately high adverse impacts to minority populations, low-income populations, and/or indigenous peoples. Once the levee system is operational, it would have positive indirect impacts for the city of Amenia and its vicinity by reducing 100-year flood event impacts to roads, bridges, culverts, agricultural crops, and field erosion. Additionally, Levee Alternative 1 would reduce the need for flood insurance and/or qualify most residential and business properties for exemption from purchase or subsidized flood insurance, a beneficial economic impact that would support community viability.

Levee Alternative 2 – Levee Alternative 2 would not require relocation of homes or businesses or cause disproportionately high adverse impacts to minority populations, low-income populations, and/or indigenous peoples. Once the levee system is operational, it would have positive indirect impacts for the city of Amenia and its vicinity by reducing 100-year flood event impacts to roads, bridges, culverts, agricultural crops, and field erosion. Additionally, Levee Alternative 2 would reduce the need for flood insurance and/or qualify most residential and business properties for exemption from purchase or subsidized flood insurance, a beneficial economic impact that would support community viability.

6.1.2 Social Issues

No-Action Alternative –The city of Amenia and its vicinity consist of a rural town surrounded by rural areas with a focus on agriculture. Under the No-Action Alternative, impacts to social issues would not change from present conditions, with flood damages continuing to impact communities by disrupting agricultural practices and transportation systems within the area. Under the No-Action Alternative, the city of Amenia would not be eligible for exemption from purchasing flood insurance. The burden of having to purchase flood insurance could potentially lead to the displacement of some homeowners.

Levee Alternative 1 –During activities related to the construction and operation of Levee

Alternative 1, there would be temporary, localized disruption of transportation systems and agricultural practices. A temporary increase in traffic during construction may create more congested traffic conditions for residents. The use of temporary levees over three road crossings and one railroad crossing would briefly restrict access while the temporary concrete sleeper slab or fill is placed and removed. The noise generated during construction activities could disrupt adjacent social events (see Section 5.2.8). Levee Alternative 1 has the potential to reduce the cost burden of homeownership of residents in the city of Amenia by qualifying residents and businesses for an exemption from or purchase of subsidized flood insurance.

Levee Alternative 2 – Levee Alternative 2 is not anticipated to substantially impact social issues in the project area during construction, but reducing the risk of flooding means lessening disruption to social cohesion and agricultural practices. The noise generated during construction activities could disrupt adjacent social events (see Section 5.2.8). A temporary increase in traffic during construction may create more congested traffic conditions for residents within the vicinity of the city of Amenia. Levee Alternative 2 also has the potential to yield benefits to income by qualifying residents and businesses for an exemption from or purchase of subsidized flood insurance.

6.1.3 Land Use

No-Action Alternative – Infrastructure in the city of Amenia and its vicinity, includes county highways and local paved and unpaved roads. As shown in Appendix C Map C-10, land cover in the city of Amenia and its vicinity is primarily cultivated cropland and developed land with a small portion comprising forested land and the Rush River. Under the No-Action Alternative, impacts to land use would not change from present conditions as the city has no urgent need for growth or expansion due to no significant change in population.

Levee Alternative 1 – Direct impacts to land use and infrastructure include the construction of the levee system and associated facilities within agriculture and forested lands surrounding the city of Amenia, as shown in Appendix C Map C-10. Construction of Levee Alternative 1 would permanently remove approximately 7 acres of cultivated cropland, 4 acres of prime farmland, and approximately 0.9 acres of forested land. In addition, approximately 43 acres of cultivated cropland and 35 acres of prime farmland are located in the temporary construction workspace; as such, these areas would be temporarily impacted (not usable) during construction. Because Levee Alternative 1 is located within the city limits, the Farmland Protection Policy Act, which documents conversion of farmland to non-agricultural use when federal funding is used, does not apply (see letter in Appendix A).

The levee system would have positive indirect impacts by protecting 25 residential properties, 12 garages, 1 public property, and 10 commercial properties for a total of 48 properties within the city of Amenia from future 100-year flooding events (Appendix D). Levee Alternative 1 would require permanent modifications to three road crossings and one railroad crossing to accommodate removable features that would act as temporary levees.

Levee Alternative 2 – Direct impacts to land use and infrastructure include the construction of the levee system and stormwater pond within agricultural, forested, and riparian areas adjacent to the Rush River, as shown in Appendix C Map C-10. Construction of Levee Alternative 2 would permanently remove approximately 30 acres of cultivated cropland, 8 acres of prime farmland, and

approximately 0.3 acres of forested land. In addition, approximately 17 acres of cultivated cropland and 11 acres of prime farmland are located in the temporary construction workspace; as such, these areas would be temporarily impacted (not usable) during construction. Because Levee Alternative 2 is located within the city limits, the Farmland Protection Policy Act, which documents conversion of farmland to non-agricultural use when federal funding is used, does not apply (see letter in Appendix A).

The levee system would have positive indirect impacts by protecting 48 residential, public, and commercial properties within the city of Amenia from future 100-year flooding events (Appendix D).

6.1.4 Agriculture and Prime Farmland

No-Action Alternative – As shown in Appendix C Map C-10, the majority of undeveloped areas within the city of Amenia and its vicinity consists of cultivated cropland. Appendix C, Map C-11 shows that the majority is also classified as "prime farmland" and "prime farmland if drained." Overland flooding within the planning area, including the city of Amenia and its vicinity, has posed difficult farming conditions, including delayed planting, lower land values, and loss of agriculturally generated income. Historically, between 1989 and 1998, flooding in the planning area has resulted in annual agricultural damages ranging from $20,612 to nearly $2.1 million. Under the No-Action Alternative, impacts to agriculture and prime farmland would not change from present conditions as the city expansion is unlikely due to little change in population.

Levee Alternative 1 – Direct and indirect adverse impacts to agriculture could occur as a result of Levee Alternative 1. Construction of Levee Alternative 1 and associated features would directly impact agriculture and prime farmland by permanently removing approximately 7 acres of cultivated cropland, 4 acres of prime farmland, and 4 acres of prime farmland if drained. In addition, approximately 43 acres of cultivated cropland, 35 acres of prime farmland, and 15 acres of prime farmland if drained, would be temporarily impacted (not usable) during construction. Potential impacts to cultivated cropland, prime farmland, and prime farmland if drained could be minimized by limiting temporary construction impacts to the extent possible and ensuring that restoration occurs promptly after construction. Because Levee Alternative 1 is located within the city limits, the Farmland Protection Policy Act, which documents conversion of farmland to non-agricultural use when federal funding is used, does not apply (see letter in Appendix A).

Once the levee system is operational, it would have beneficial and adverse indirect impacts on agriculture, prime farmland, and prime farmland if drained. Approximately 31 acres of cultivated cropland, 64 acres of prime farmland, and 11 acres of prime farmland if drained within the city of Amenia and its vicinity would be protected from future 100-year flood events. However, land outside of the levee system would not be protected from future flooding and would continue to be vulnerable to future large flooding events. Approximately 57 acres of cultivated cropland, 41 acres of prime farmland, and 19 acres of prime farmland if drained outside of the levee system would be at a greater risk of flooding during a 100-year flood event. Under Levee Alternative 1, there would be a net increase of 23 acres of prime farmland protected from future 100-year flood events and a net decrease of 8 acres of prime farmland if drained and 27 acres of cultivated crop land protected from future 100-year flood events.

Levee Alternative 2 – Direct and indirect adverse impacts to agriculture could occur as a result of Levee Alternative 2. Construction of Levee Alternative 2 and associated features would directly impact agriculture by permanently removing approximately 30 acres of cultivated cropland, including 8 acres of prime farmland and 4 acres of prime farmland if drained. In addition, approximately 17 acres of cultivated cropland, including 11 acres of prime farmland and 4 acres of prime farmland if drained would be temporarily impacted (not usable) during construction. Potential impacts to cultivated cropland, prime farmland, and prime farmland if drained could be minimized by limiting temporary construction impacts to the extent possible and ensuring that restoration occurs promptly after construction. Because Levee Alternative 2 is located within the city limits, the Farmland Protection Policy Act, which documents conversion of farmland to non-agricultural use when federal funding is used, does not apply (see letter in Appendix A).

Once the levee system is operational, it would have beneficial and adverse indirect impacts on agriculture. Approximately 108 acres of cultivated cropland, including 121 acres of prime farmland and 40 acres of prime farmland if drained within the city of Amenia and its vicinity would be protected from future 100-year flood events. However, land outside of the levee system would not be protected from future flooding and would continue to be vulnerable to future large flooding events. Approximately 136 acres of cultivated cropland outside of the levee system, including 38 acres of prime farmland and 100 acres of prime farmland if drained, would be at a greater risk of flooding during a 100-year flood event. Under Levee Alternative 2, there would be a net increase of 84 acres of prime farmland protected from future 100-year flood events and a net decrease of 60 acres of prime farmland if drained and 28 acres of cultivated crop land protected from future 100-year flood events.

6.1.5 Cultural Resources

No-Action Alternative – SWCA Environmental Consultants conducted a Class I study of cultural resources throughout the planning area, including the city of Amenia and its vicinity. As shown in Appendix C Map C-12, cultural resources are located within the city of Amenia and include NDSHPO catalogued sites at risk of flooding. Under the No-Action Alternative, impacts to these cultural resources would not change from present conditions.

Levee Alternative 1 – A Class III cultural resource investigation was completed by the NRCS and has been included in Appendix D. Both the SWCA report and SCRS review showed that, within one mile of the APE of Alternative 1, two previous cultural resource inventories were conducted (1995-2017) in support of highway and county road safety studies, and electric transmission lines. Seven sites are within the APE of Alternative 1; six are not eligible for listing on the NRHP and one requires a determination of eligibility from the NDSHPO.

32CS7- Northern Pacific Depot Burlington Northern: Nominated for the NRHP, 32CS7 has been removed from consideration due to its destruction and loss during a fire. Site form update October 11, 2016 states that structure burned down in approximately 1990. Undertaking Assessment-No effect.

32CSX0142- Unknown Site Lead- Site is an active agricultural field. Pedestrian survey revealed no sign of precontact or historic cultural resources. LIDAR imagery revealed no subsurface structures

such as cellars or foundations. Undertaking Assessment- No effect.

32CSX143- Amenia Burlington Northern: Site form describes exterior boundaries encompassing the entirety of the NW 1/4 of Section 25. The site form, authored January 1980, is assumed to be an attempt of precision over accuracy. Pedestrian survey was restricted to the APE and negative. NRCS has no authority to exceed the APE. Undertaking Assessment- No effect.

32CSX144: E. W. Chaffee Bonanza Farm- Site form encompasses the entire eastern portion of Amenia. It is an area where agricultural infrastructure has been built. While the location of the Chaffee Bonanza farm is documented in multiple sources, as of May 2020 there is no evidence of barns, worker barracks, grain storage or implements. The location is an active agricultural field. Undertaking Assessment-No Effect.

32CSX0145- Amenia Townsite- Includes modern (post 1970) residences and a baseball field. The context of any subsurface finds has been disrupted by sewer, water, natural gas, telephony, agricultural production and engineered street installations. Pedestrian survey was negative. Shovel probing was not permitted as individual homeowner permission had not been obtained. Undertaking Assessment- No effect.

32C190- Trinity Lutheran Church-Per site form, the church was struck by lightning in 1949 and burned. The steeple survived in private ownership until the steeple was donated to the Amenia City Cemetery and is under the care of the cemetery association. Undertaking Assessment- No effect.

32CS5120- Reed House-The property is damaged and brick foundation is being cannibalized. Windows are intact but layers of grime prevented interior view. No permission was obtained to enter the structure. The property is unevaluated for the NRHP. The undertaking may affect the property visually.

Conclusions and Recommendations

The six known sites/site leads have been either destroyed by fire, redevelopment, infrastructure construction or are so generalized they do not meet NRHP listing criteria. While the undertaking will have no direct effect to 32CS5120, there may be minimal visual effects. The undertaking proposes a 5-7-foot-high, grass covered, levee to the north of the site that may be obscured in the Summer and Fall due to tree leaf-out and crop growth. NDSHPO will be requested to make a *determination of NRHP eligibility* during consultation.

Pending concurrence with consulting parties, Alternative 1 is recommended for a "***no effect on historic properties***" determination.

Levee Alternative 2 – As noted previously, both the SWCA report and SCRS review showed that, within one mile of the APE of Alternative 1, two previous cultural resource inventories were conducted (1995-2017) in support of highway and county road safety studies, and electric transmission lines. Alternative 2 is located within one mile of Alternative 1. Seven sites are within the APE of Alternative 1; six are not eligible for listing on the NRHP and one requires a determination of eligibility from the NDSHPO. No known cultural resources are located within the

Levee Alternative 2 construction area; however, there is potential for unknown cultural resources to be present as previous archaeological survey has not been conducted within the project area. Appropriate cultural resource investigations would be applied to identify cultural resources and historic properties, determine the effects of Levee Alternative 2 on historic properties, and determine measures that would be implemented to avoid, minimize, and mitigate adverse effects on historic properties. Potential direct and indirect impacts to unknown cultural resources during construction could result from ground-disturbing activities and/or demolition or removal of historic buildings or structures. Ground-disturbing activities associated with the proposed project include excavation, grading, or other sub-surface disturbance that could damage or destroy surface and subsurface features comprising archaeological resources. Construction of Levee Alternative 2 could cause direct impacts to historic buildings or structures should construction activities require demolition or removal of historic buildings or structures. Appropriate cultural resource investigations would be applied to identify cultural resources and historic properties, determine the effects of Levee Alternative 2 on historic properties, and determine measures that would be implemented to avoid, minimize, and mitigate adverse effects on historic properties.

If cultural resources are discovered during construction or operation, work shall immediately be stopped, the affected site secured, and the state archaeologist notified. All project workers are prohibited from collecting artifacts or disturbing cultural resources in any area under any circumstances.

6.1.6 Public Health and Safety

No-Action Alternative – The city of Amenia is served by a number of public services that require access to the transportation system. Under the No-Action Alternative, current impacts to public health and safety would continue during times of flooding. These impacts include impeded or delayed access to emergency services due to road closures and detours associated with overland flooding.

Levee Alternative 1 – Direct and indirect impacts within the levee system include reduced risk from 100-year flood events that could minimize the need for rescue and other public health and safety services as well as qualify residents and businesses for an exemption from or purchase of subsidized flood insurance. Under Levee Alternative 1, there would be reduced risk from 100-year flood events for approximately 93 acres, with a potential increased risk of flooding for approximately 72 acres. Overall, there would be a decrease of flooding during a 100-year event for approximately 21 acres. There are three roads which are used for access to the City. During a 100-year event, two of these roads and the railroads will be temporarily impacted by the use of temporary levees which are necessary to provide the necessary freeboard during the event. The third road is above the 100-year flood plain and therefore, access for emergency services while the temporary fill is placed and removed will be minimal. While overall risks of flooding are reduced by the project, there are still risks to health and human safety due to pump failure and levee failure. As noted previously, a pump station will be installed to handle internal storm water while the gate well structures are required to be closed. A simulation of the pump station failing was conducted using a coincident rainfall event. Should the pump fail during a 1 percent-chance event and a coincident rainfall event, water would begin to inundate the town and would impact approximately

two commercial structures, one public structure and five private structures. Emergency response to a pump failure could be addressed by removable pumps brought in on a temporary basis until pump station can be repaired. A failure or breach of the levee will result in impacts within the protected area. Depending on the timing and location of the breach, the impacts would be very similar to existing conditions without the flood protection project. Emergency response measures to help prevent such a breach could be utilizing sandbags or temporary clay material mined from inside the levee. Additional details and maps have been included in Appendix D.

Levee Alternative 2 – Direct and indirect impacts within the city of Amenia and its vicinity include reduced risk from 100-year flood events that could minimize the need for rescue and other public health and safety services as well qualify residents and businesses for an exemption from or purchase of subsidized flood insurance. Under Levee Alternative 2, there would be reduced risk from 100-year flood events for approximately 188 acres, with a potential increased risk of flooding for approximately 140 acre. Overall, there would be a decrease of flooding during a 100-year event for approximately 48 acres. The use of temporary levees over three road crossings and one railroad crossing would briefly restrict access for emergency services while the temporary fill is placed and removed.

6.1.7 Scenic Beauty

No-Action Alternative – Scenic beauty elements within the city of Amenia and its vicinity, consist of the Rush River and the rural and agricultural landscape. Under the No-Action Alternative, the overall scenic integrity of the landscape will not change from present conditions.

Levee Alternative 1 – Scenic beauty elements in the vicinity of Levee Alternative 1 consist of Amenia Park, located in the northcentral part of the city of Amenia, and historic properties within the city of Amenia. The levee and stormwater pond associated with Levee Alternative 1 could result in impacts to the local viewshed. Beneficial impacts to these elements under Levee Alternative 1 include reducing risk from future 100-year flooding events and the associated negative visual impacts that go along with these events, such as presence of flood debris. Visual impacts will likely be limited as the views are already limited due to existing trees (likely to remain) or roadways.

Levee Alternative 2 – Scenic beauty elements in the vicinity of Levee Alternative 2 consist of the Rush River, flowing west to east into the Red River, which is surrounded by a rural-agricultural viewshed. The levee and stormwater pond associated with Levee Alternative 2 could result in impacts to the local viewshed. Beneficial impacts to these elements under Levee Alternative 1 include reducing risk from future 100-year flooding events and the associated negative visual impacts that go along with these events, such as presence of flood debris.

6.1.8 Recreation

No-Action Alternative – As shown in Appendix C, Map C-13, the primary recreational resources in the city of Amenia and its vicinity include Amenia Park and a snowmobile trail that traverses through southern and eastern Amenia. No county, state, or federal preserves or parks have been identified in the area. Under the No-Action Alternative, flooding would continue to occur within Amenia Park and the snowmobile trail.

Levee Alternative 1 – Levee Alternative 1 would protect Amenia Park from future 100-year flooding events, which would be a beneficial impact. As shown in Appendix C, Map C-13, the southwest corner of the Levee Alternative 1 footprint would intersect and directly impact the snowmobile trail that traverses southern and eastern Amenia. Indirect adverse impacts could occur to approximately 0.2 miles of the snowmobile trail that are located within the levee construction area and run north of and parallel to the levee, as shown in Appendix C, Map C-13 The snowmobile trail could be diverted around the levee to avoid potential maintenance impacts into the future. Signage could also be posted in an attempt to reduce the snowmobile traffic onto and over the levee. Additionally, access to town by snowmobiles could continue on the gravel roads the trail is currently adjacent to. The roads will be reinforced with a concrete sleeper slab so rutting will be less of a concern.

Levee Alternative 2 – Levee Alternative 2 would protect the majority of Amenia Park from future 100-year flooding events, which would be a beneficial impact. However, this alternative would protect Amenia Park less than Levee Alternative 1. As shown in Appendix C, Map C-13 the snowmobile trail that traverses southern and eastern Amenia is not within the vicinity of Levee Alternative 2; as such, no direct or indirect adverse impacts to the snowmobile trail would occur under Levee Alternative 2.

6.2 Environmental Factors

6.2.1 Fish and Wildlife

No-Action Alternative – The city of Amenia and its vicinity contain habitat for a variety of common fish (and other aquatic organisms) and wildlife species. Under the No-Action Alternative, impacts to fish and wildlife would not change from present conditions. Existing flooding conditions would continue across the landscape during 100-year flood events, as shown in Appendix C, Map C-7. Some species may be temporarily displaced from their habitats during flood events.

Levee Alternative 1 – Direct impacts to fish are not anticipated from the construction of Levee Alternative 1. Direct and indirect adverse impacts to wildlife could occur under Levee Alternative 1. Removal of trees for construction of the levee system could directly or indirectly alter habitat for some wildlife species. During construction, temporary indirect impacts to wildlife species could occur from increased noise and human activity which could disrupt wildlife species, causing them to temporarily abandon habitat. BMPs, such as silt fences, would be used during construction and restoration to minimize impacts to water quality and associated fish habitat. Once construction is complete and the levee system is operational, the storage pond could provide additional habitat for some fish and wildlife species in the vicinity of Levee Alternative 1. Temporary impacts to wildlife, from noise and human presence could occur during maintenance activities once the levee is operational. Other than the minor loss of habitat (e.g., for construction of the levee system and future periodic maintenance) no additional negative direct or indirect impacts to fish and wildlife would be anticipated. A reduced risk of flooding in the Amenia area may benefit terrestrial wildlife residing in that area.

Levee Alternative 2 – Direct and indirect adverse impacts to fish and wildlife could occur under Levee Alternative 2. To construct the levee system, trees would be removed within the riparian

area along the Rush River; this could directly or indirectly alter habitat for some fish and wildlife species. Removal of these trees could increase water temperatures and temporary displace fish within the area. During construction, temporary indirect impacts to fish and wildlife species could occur from increased noise and human activity which could disrupt fish and wildlife species, causing them to temporarily abandon habitat. BMPs, such as silt fences, would be used during construction and restoration to minimize impacts to water quality and associated fish habitat. Once construction is complete and the levee system is operational, the storage pond could provide additional habitat for some fish and wildlife species, such as waterfowl, in the vicinity of Levee Alternative 2. Temporary impacts to fish and wildlife, from noise and human presence could occur during maintenance activities once the levee is operational. The loss of trees and other vegetation within sections of the riparian corridor would permanently alter the existing habitat along the Rush River. However, other than this loss of habitat (e.g., trees) for construction, no additional negative direct or indirect impacts to fish and wildlife would be anticipated once the levee system is operational. A reduced risk of flooding in the Amenia area may benefit terrestrial wildlife residing in that area.

6.2.2 Invasive Species

No-Action Alternative –Two noxious weed species were identified within the vicinity of Amenia: Canada thistle (*Cirsium arvense*) and leafy spurge (*Euphorbia esula*). These have been documented primarily in road and railroad rights-of-way (reference [9]). Both species can be spread through construction equipment or in imported soil carrying the seeds. These species are susceptible to shading and grow most vigorously when no competing vegetation is present. Under the No-Action Alternative, soil disturbing activities and/or tree clearing would be avoided, thus reducing impacts on the presence and/or spread of noxious weed species. However, increased risk of flood events could potentially increase spread of invasive species, many of which establish quickly after disturbances such as flooding.

Levee Alternative 1 – Indirect adverse impacts as a result of implementing Levee Alternative 1 could include the spread of Canada thistle and/or leafy spurge through construction equipment and/or imported soil. Trees and other tall shrub plants would not be permitted to grow on the levee system, thereby reducing the potential to create shade conditions that are less favorable to these plant species. BMPs to reduce the spread and establishment of these and other noxious weeds, such as cleaning vehicles and construction equipment, could help minimize the spread of invasive species. Reduced flooding would likely result in fewer disturbances to existing vegetation; this could potentially reduce the opportunity for the establishment of invasive species.

Levee Alternative 2 –Indirect adverse impacts as a result of implementing Levee Alternative 2 could include the spread of Canada thistle and/or leafy spurge through construction equipment and/or imported soil. Trees and other tall shrub plants would not be permitted to grow on the levee system, thereby reducing the potential to create shade conditions that are less favorable to these plant species. The proximity of the levee system to the Rush River would pose greater risks for disturbing existing forest and vegetated areas. Properly implemented BMPs could reduce this risk, such as cleaning vehicles and construction equipment. Reduced flooding would likely result in fewer

disturbances to existing vegetation; this could potentially reduce the opportunity for the establishment of invasive species.

6.2.3 Migratory Birds

No-Action Alternative – The city of Amenia and its vicinity, is located in the Central Flyway of North America. Migratory birds use portions of the area as resting grounds during spring and fall migration, as well as breeding and nesting grounds throughout the summer. Under the No-Action Alternative, impacts to migratory birds would not change from present conditions. Existing flooding conditions would continue across the landscape during 100-year flood events, as shown in Appendix C Map C-7. Some migratory bird species may be temporarily displaced from their habitats during flood events. **Levee Alternative 1 –** Direct and indirect adverse impacts to migratory birds could occur under Levee Alternative 1. Removal of trees for construction of the levee system could directly alter habitat for some migratory birds. Direct impacts to migratory birds could also occur if nests are damaged or destroyed during construction. These impacts could be mitigated by constructing the levee system outside of the nesting season.

During construction, temporary indirect impacts to migratory birds could occur from increased noise and human activity which could disrupt migratory birds, causing them to temporarily abandon habitat. Once construction is complete and the levee system is operational, the storage pond could provide additional habitat for some migratory birds in the vicinity of Levee Alternative 1, such as waterfowl, wading birds, and shorebirds. No negative direct or indirect impacts to migratory birds would be anticipated once the levee system is operational. A reduced risk of flooding in the Amenia area may benefit migratory birds residing in that area that prefer upland conditions.

Levee Alternative 2 – Direct and indirect impacts to migratory birds could occur under Levee Alternative 2. Removal of trees for construction of the levee system could directly alter habitat for some migratory birds. Direct impacts to migratory birds could also occur if nests are damaged or destroyed during construction. These impacts could be mitigated by constructing the levee system outside of the nesting season.

During construction, temporary indirect impacts to migratory birds could occur from increased noise and human activity which could disrupt migratory birds, causing them to temporarily abandon habitat. Once construction is complete and the levee system is operational, the storage pond could provide additional habitat for some migratory birds in the vicinity of Levee Alternative 2, such as waterfowl, wading birds, and shorebirds. No negative direct or indirect impacts to migratory birds would be anticipated once the levee system is operational. A reduced risk of flooding in the Amenia area may benefit migratory birds residing in that area that prefer upland conditions.

6.2.4 Threatened and Endangered Species

No-Action Alternative – As mentioned in Section 3.2.4,, although unlikely, three federally listed species have the potential to occur within the city of Amenia and its vicinity: whooping crane (federally endangered), gray wolf (federally endangered), and northern long-eared bat (federally threatened). Under the No-Action Alternative, impacts to endangered and threatened species would

not change from present conditions. Existing flooding conditions would continue across the landscape during 100-year flood events, as shown in Appendix C Map C-7. Because the likelihood of federally listed species inhabiting the Amenia area is so low, this flooding does not represent an adverse impact to these federally listed species.

Levee Alternative 1 – Although unlikely, direct and indirect adverse impacts to federally endangered and threatened species could occur under Levee Alternative 1. Construction of Levee Alternative 1 and associated features could directly impact northern long-eared bats (NLEB) by removing trees that serve as suitable habitat; however, there are no known occupied roost trees in the city of Amenia. The Amenia area is within the white-nose syndrome zone (WNS); as such, the 4(d) rule may not allow tree removal between June 1 and July 31 unless a survey confirms that there are no occupied roost trees. Because the site is within the WNZ area and could involve forest conversion, acres of trees to be removed between June 1 and July 31 will be estimated and acres of trees to be removed between April 1 and October 31 will be reported to the USFWS as part of the NLEB Streamlined Consultation. The USFWS has 30 days to comment on the submission. Reduction of flooding as a result of Levee Alternative 1 is not anticipated to affect NLEB.

Temporary indirect impacts could occur to whooping crane and gray wolf in the unlikely event that they are present in the city of Amenia and its vicinity during construction. Construction noise and increased human activity could disrupt these species, causing them to temporarily abandon habitat. However, whooping cranes and gray wolves are not common in North Dakota and suitable habitat, as described in Section 3.2.4, is not present in the vicinity of Levee Alternative 1. As such, these species are not likely to be present in the city of Amenia or its vicinity and indirect impacts to these species are not likely. Once construction is complete and the levee system is operational, no potential direct or indirect impacts to federally endangered or threatened species would be anticipated.

Levee Alternative 2 – Although unlikely, direct and indirect adverse impacts to federally endangered and threatened species could occur under Levee Alternative 2. Construction of Levee Alternative 2 and associated features could directly impact northern long-eared bats (NLEB) by removing trees that serve as suitable habitat; however, there are no known occupied roost trees in the city of Amenia and its vicinity. The Amenia area is within the WNS area; as such, the 4(d) rule may not allow tree removal between June 1 and July 31 unless a survey confirms that there are no occupied trees. Because the site is within the WNZ area and could involve forest conversion, acres of trees to be removed between June 1 and July 31 will be estimated and acres of trees to be removed between April 1 and October 31 will be reported to the USFWS as part of the NLEB Streamlined Consultation. The USFWS has 30 days to comment on the submission. Reduction of flooding as a result of Levee Alternative 2 is not anticipated to affect NLEB.

Temporary indirect impacts could occur to whooping crane and gray wolf in the unlikely event that they are present in the city of Amenia and its vicinity during construction. Construction noise and increased human activity could disrupt these species, causing them to temporarily abandon habitat. However, whooping cranes and gray wolves are not common in North Dakota and suitable habitat, as described in Section 3.2.4, is not present in the vicinity of Levee Alternative 2. As such, these species are not likely to be present in the city of Amenia or its vicinity and indirect impacts to these

species are not likely. Once construction is complete and the levee system is operational, no potential direct or indirect impacts to federally endangered or threatened species would be anticipated.

6.2.5 Floodplain Management

No-Action Alternative – Updated floodplain studies have identified risk from the 1-percent-annual-chance flood event within the city of Amenia (Appendix D). Preliminary FIRMs indicate that much of the city of Amenia would be included in the 100-year floodplain. Flood management would be needed to control excess runoff and intense rain events, which can cause overland and overbank flooding. Under the No-Action Alternative, potential adverse impacts to floodplain management/overland flood management would continue.

Levee Alternative #1 – Direct and indirect, largely beneficial impacts to floodplain management could occur under Levee Alternative #1. Construction of Levee Alternative #1 would reduce the risk from the 100-year flood by removing the risk of flooding across approximately 93 acres of land currently located within the 100-year floodplain (Appendix C Map C-7). This would qualify residents and businesses for an exemption from or purchase of subsidized flood insurance.

A stormwater pond would be developed in the northeast part of the city to capture floodwaters and runoff from within the levee system. Properties outside of the levee system would not benefit from the proposed levee system and would continue to be vulnerable to overland flooding during large flood events. Approximately 72 acres of additional land would be flooded as a result of Levee Alternative #1 (Appendix C Map C-7).

Levee Alternative #2 – Direct and indirect, largely beneficial impacts to floodplain management could occur under Levee Alternative #2. Construction of Levee Alternative #2 would reduce the risk from the 100-year flood and qualify residents and businesses for an exemption from or purchase of subsidized flood insurance. This alternative would remove the risk of flooding from a 100-year flood event by approximately 188 acres. However, this alignment would tie into the roadway and would utilize the road as flood protection which is not recommended. Additionally, more than 140 additional acres would flood as a result of the proposed Levee Alternative #2 (Appendix C Map C-9).

Approximately 1,345 feet of the proposed 10,100-foot levee system would also be built within the 100-year floodplain (Appendix D). This could result in indirect impacts to the Rush River floodplain and could reduce the floodplain capacity in large flood events.

6.2.6 Floodwater Damage

No-Action Alternative – As discussed in Section 4.2.6, excess runoff and intense rain events cause frequent overland and overbank flooding within the city of Amenia and its vicinity. Disasters have been declared in Cass County in 12 of the last 15 years. In 2001, FEMA expenditures were recorded at over $2,042,300 for assistance provided to Cass County. Estimated damages from recent Rush River floods were (2015 dollars):

- 2009 - $16,835

- 2010 - $12,630
- 2011 - $10,624

Damages to residential, commercial, and public properties within the city of Amenia and its vicinity were estimated based on interviews and USACE studies and damage curves. The estimated damages for the 100-year flood event (based on existing conditions) were (Appendix D):

- Residential $3,403,600
- Garage $111,400
- Commercial $6,658,220
- Public $8,200

Under the No-Action Alternative, potential impacts to floodwater damage would not change from present conditions.

Levee Alternative 1 – Potential direct and indirect impacts as a result of implementing Levee Alternative 1 includes the avoidance of future 100-year flooding events that have historically caused impacts as noted in the No-Action Alternative. Overall there would be a difference of approximately 21 acres of land that would be removed from flooding during a 100-year event. However, while there is an increase in the overall area protected, Levee Alternative 1 would result in flooding in approximately 72 additional acres (Appendix C Map C-7).

Levee Alternative 2 – Potential direct and indirect impacts as a result of implementing Levee Alternative 2 include the avoidance of future flooding events similar to Levee Alternative 1. Overall there would be a difference of approximately 48 acres of land that would be removed from flooding during a 100-year event. However, while there is an increase in the overall area protected, the proposed Levee Alternative 2 would result in flooding in approximately 140 additional acres (Appendix C Map C-9). Levee Alternative 2 would also likely require an additional levee on the east side of the city of Amenia to mitigate future impacts from 100-year flood events (see Appendix C Map C-9).

6.2.7 Air Quality

No-Action Alternative – North Dakota is one of 13 states in attainment status for all criteria pollutants (reference [11]). Under the No-Action Alternative, air quality would not change from present conditions.

Levee Alternative 1 – Short-term construction-related impacts to air quality could occur under Levee Alternative 1. During activities related to the construction of Levee Alternative 1 and associated features there would be temporary, localized increases in vehicle-related emissions from trucks and construction equipment operation. Dust could be generated during project construction due to grading and excavation activities. Fugitive dust emissions and construction equipment exhaust would not exceed NAAQS or NDAAQS criteria and as such, the attainment status of the area would be maintained. Because of North Dakota's attainment status and because primary emissions

associated with Levee Alternative 1 would not be from major sources, it is not anticipated that any air quality permits or authorizations would be required from the NDDH Air Quality Division. BMPs, such as wetting dry, exposed soil would be implemented to minimize impacts to air quality.

Levee Alternative 2 – Short-term construction-related impacts to air quality could occur under Levee Alternative 2. During activities related to the construction of Levee Alternative 2 and associated features there would be temporary, localized increases in vehicle-related emissions from trucks and construction equipment operation. Dust could be generated during project construction due to grading and excavation activities. Fugitive dust emissions and construction equipment exhaust would not exceed NAAQS or NDAAQS criteria and as such, the attainment status of the area would be maintained. Because of North Dakota's attainment status and because primary emissions associated with Levee Alternative 2 would not be from major sources, it is not anticipated that any air quality permits or authorizations would be required from the NDDH Air Quality Division. BMPs, such as wetting dry, exposed soil would be implemented to minimize impacts to air quality.

6.2.8 Noise

No-Action Alternative – The city of Amenia and its vicinity is predominantly a rural agricultural area that is exposed to local traffic and agriculture-related noise such as machinery, small aircraft, or other farm-related noise sources. Several highways and county roads traverse the area, providing a source of traffic-related noise. Under the No-Action Alternative, noise would not change from present conditions.

Levee Alternative 1 – Short-term construction-related adverse noise impacts could occur under Levee Alternative 1. During activities related to the construction of Levee Alternative 1 and associated features there would be temporary, localized increases in noise from the operation of construction equipment during the anticipated single construction season. Construction activities would follow any state, county, and local noise guidelines. Once the levee system is constructed, noise in the city of Amenia and its vicinity would return to pre-construction conditions.

Levee Alternative 2 – Short-term construction-related adverse noise impacts could occur under Levee Alternative 2. During activities related to the construction of Levee Alternative 2 and associated features there would be temporary, localized increases in noise from the operation of construction equipment during the anticipated single construction season. Adverse noise impacts from Levee Alternative 2 would be less than Levee Alternative 1 due to the presence of fewer residences in proximity to Levee Alternative 2. Construction activities would follow any state, county, and local noise guidelines. Once the levee system is constructed, noise in the city of Amenia and its vicinity would return to pre-construction conditions.

6.2.9 Soil Resources

No-Action Alternative – Under the No-Action Alternative, impacts to soil resources would not change from present conditions. Existing flooding conditions would continue across the landscape during 100-year flood events, as shown in Appendix C Map C-7. Flooding would likely make soil conditions unproductive for agricultural practices.

Levee Alternative 1 – Short-term adverse construction-related impacts to soil resources could

occur under Levee Alternative 1. During activities related to the construction of Levee Alternative 1 and associated features, compaction of soil from heavy equipment could occur. In addition, areas of exposed soil could occur, resulting in potential erosion. BMPs, such as utilization of construction mats and wetting dry, exposed soil, would be implemented to minimize impacts. Once the levee is operational and the temporary construction area is restored, no additional adverse impacts to soil resources are anticipated. Reduced risk of flooding would allow the soil to be more productive in the Amenia area.

Levee Alternative 2 – Short-term adverse construction-related impacts to soil resources could occur under Levee Alternative 2. During activities related to the construction of Levee Alternative 2 and associated features, compaction of soil from heavy equipment could occur. In addition, areas of exposed soil could occur, resulting in potential erosion. BMPs, such as utilization of construction mats and wetting dry, exposed soil, would be implemented to minimize impacts. Once the levee is operational and the temporary construction area is restored, no additional adverse impacts to soil resources are anticipated. Reduced risk of flooding would allow the soil to be more productive in the Amenia area.

6.2.10 Riparian Areas

No-Action Alternative – Riparian areas within of the city of Amenia and its vicinity, occur adjacent to the Rush River, as shown in Appendix C Map C-14. Under the No-Action Alternative, existing flooding conditions would continue across the landscape during 100-year flood events, as shown in Appendix C Map C-7. The functional role of riparian areas in flooding events would continue, as described in Section 3.2.10.

Levee Alternative 1 – No riparian areas are present within t construction footprint of Levee Alternative 1, as shown in Appendix C Map C-6. Therefore, impacts to existing riparian areas along the Rush River would not change from present conditions.

Levee Alternative 2 – Riparian areas in the vicinity of Levee Alternative 2 occur along the Rush River, as shown in Appendix C Map C-8. The proposed levee system would impact approximately 1,345 feet of existing 100-year floodplain. Direct and indirect impacts to riparian areas include tree clearing and other vegetation removal for the construction of the levee system. The loss of shade from any vegetation removal could result in direct and permanent negative impacts to riparian areas along the Rush River and to the river itself by raising water temperature and thus altering aquatic habitat during the summer months.

6.2.11 Natural Areas

No-Action Alternative – As shown in Appendix C Map C-13 the city of Amenia and its vicinity consists primarily of agricultural and developed areas; no county, state, or federal preserves or designated natural areas are present. The natural areas present in the city of Amenia and its vicinity consist of the Rush River and several small wetlands (Appendix C Map C-13); see Sections 6.2.12 and 6.2.13, respectively. Under the No-Action Alternative, impacts to natural areas would not change from present conditions.

Levee Alternative 1 – Natural areas in the vicinity of Levee Alternative 1 consist of the Rush River

and wetlands (Appendix C Map C-13). Direct and indirect impacts to these natural areas under Levee Alternative 1 are summarized in Sections 6.2.12, 6.2.13, and 6.2.14.

Levee Alternative 2 – Natural areas in the vicinity of Levee Alternative 2 consist of the Rush River and wetlands, as shown in Appendix C Map C-13. Direct and indirect impacts to these natural areas under Levee Alternative 2 are summarized in Sections 6.2.12, 6.2.13, and 6.2.14.

6.2.12 Waters of the United States

No-Action Alternative – Waters of the U.S. within the city of Amenia and its vicinity include the Rush River. Under the No-Action Alternative, the Rush River will continue to flood and would not change from present conditions.

Levee Alternative 1 – Waters of the U.S. in the vicinity of Levee Alternative 1 consist of the Rush River, as shown in Appendix C Map C-14. Under this alternative, direct impacts to the waters of the U.S. are not anticipated as a result of the construction of the levee system around the city of Amenia. Indirect impacts could occur in the alteration of overland flow outside of the proposed levee system during flood events, including an expanded area of cultivated cropland adjacent to the Rush River that could be flooded from a 100-year event, as shown in Appendix C Map C-7.

Levee Alternative 2 – Waters of the U.S. adjacent to Levee Alternative 2 consist of the Rush River, as shown in Appendix C Map C-14. Direct and indirect impacts include potential restriction of future channel meander migration of the Rush River. Approximately 1,345 feet of the proposed levee system would be constructed within the 100-year floodplain of the Rush River. The placement of a permanent structure within and adjacent to the floodplain of the Rush River would disconnect the riverine system from adjacent land uses and could cause indirect future disturbance or alteration of the Rush River and its floodplain.

6.2.13 Wetlands

No-Action Alternative – A wetland delineation was conducted across the project area by Barr Engineering Co. (Barr) on May 30, 2019 (see Appendix D). Wetlands are located within the Rush River floodplain as well as adjacent to Highway 18 on the east side of the city of Amenia, as shown in Appendix C Map C-14. Under the No-Action Alternative, potential impacts to wetlands would not change from present conditions. Existing flooding conditions would continue across the landscape during 100-year flood events, as shown in Appendix C Map C-7. The acreages of wetlands on the landscape would not change under the No-Action Alternative; however, wetlands would become wetter during flood events.

Levee Alternative 1 – Direct impacts to wetlands would occur from the construction of Levee Alternative 1. A total of eight freshwater emergent wetlands (2.15 acres) are located within the Levee Alternative 1 construction footprint. Construction of the Levee Alternative 1 would result in 1.59 acres of temporary wetland impact. Once construction is completed, the project would result in 0.56 acres of permanent wetland impact (Appendix C Map C-15).

Barr completed a hydrogeomorphic wetland assessment (HGM) using the NRCS Prairie Pothole Worksheet (see Appendix D for a summary of HGM methodology). The HGM assessment was

conducted to evaluate the functions of field-delineated wetlands. Each wetland was evaluated and a Functional Capacity Unit (FCU) value for its pre-project wetland functions. Overall, the wetlands were found to have low functional value due to the level of existing disturbance and location within roadside ditches and agricultural fields

A second HGM assessment was conducted to determine the loss in functional value of the wetlands from the construction of Levee Alternative 1. Table 6-1 compares the pre-and post- project FCU values for each of the eight wetland functions. The project would result in a loss of wetland static and dynamic wetland storage, sediment removal, and vegetative quality of the wetland areas. Levee Alternative 1 would also indirectly protect wetland area from agricultural practices resulting in an increase in the wetlands nutrient cycling, water retention, vegetation structure, and habitat. BMPs, such as silt fences, would be used during construction and restoration activities to ensure erosion and sediment control could minimize potential impacts to wetlands from the proposed construction activities.

Table 6-1 Hydrogeomorphic Wetland Assessment Functional Capacity Units

Wetland Functions	Pre-Project (FCU)	Post-Project (FCU)	Mitigation Required (FCU)
Static	0.83	0.60	0.22
Dynamic	0.13	0.08	0.05
Cycling	0.51	0.59	-0.08
Removal	0.76	0.51	0.24
Retention	0.50	0.53	-0.03
Plants	0.87	0.79	0.08
Structure	0.43	0.48	-0.05
Habitat	0.29	0.30	-0.01

Loss in wetland acreage and wetland function will be mitigated off site through a Ducks Unlimited in-lue fee wetland mitigation bank program. The 0.56 acres of permanently impacted wetlands will be replaced at a 2:1 ratio. A total of 1.12 acres of wetland credits will be purchased. Wetland mitigation will cost approximately $67,200 dollars under Levee Alternative 1.

Levee Alternative 2 – Direct impacts to wetlands would occur from construction of Levee Alternative 2. One freshwater emergent wetland is located within the Levee Alternative 2 construction footprint; approximately 0.1 acres of temporary and 0.2 acres of permanent wetland impacts would occur. Completion of the levee system would remove approximately 2.3 acres of wetland impacts from flooding from a 100-year event while adding an additional 0.5 acres of wetland impacts from flooding. This would result in an overall reduction of approximately 1.9 acres of wetland impacts from flooding from a 100-year event. Additional potential impacts to wetlands could occur from construction activities through sedimentation/siltation. Permanently impacted wetlands will be mitigated to match the existing form and function. Should this alternative move forward as the preferred alternative, modifications could also be made during final design to potentially avoid additional impacts. BMPs, such as silt fences, would be used during construction and restoration activities to ensure erosion and sediment control could minimize potential impacts

to wetlands from the proposed construction activities.

6.2.14 Water Quality

No-Action Alternative – The Rush River (reach ND-09020204-207) is listed as impaired as shown in Appendix C Map C-14. Listed impairments include fecal coliform (designated use recreation), fish bioassessments (designated use fish and other aquatic biota), physical substrate habitat alterations (designated use fish and other aquatic biota), and sedimentation/siltation (designated use fish and other aquatic biota). Under the No-Action Alternative, potential impacts to water quality would not change from present conditions. Existing flooding conditions would continue across the landscape during 100-year flood events, as shown in Appendix C Map C-7. The potential for adverse effects on water quality, such as sedimentation, from flood events would continue. As no change would be anticipated, the Rush River will likely remain listed as impaired due to fecal coliform (designated use recreation), fish bioassessments (designated use fish and other aquatic biota), physical substrate habitat alterations (designated use fish and other aquatic biota), and sedimentation/siltation (designated use fish and other aquatic biota).

Levee Alternative 1 – Direct and indirect adverse impacts to water quality in the impaired Rush River would relate to sedimentation/siltation of downstream waterways as a result of the construction of Levee Alternative 1. BMPs, such as silt fences, used during construction and restoration activities to ensure erosion and sediment control could minimize potential risks from the proposed construction activities. All disturbed areas will be seeded and mulched prior to completion to provide erosion control prior to the establishment of vegetation. In addition, secondary containment would be used for storage of all construction fuels or chemicals in order to minimize the potential for construction-related water quality impacts. Direct impacts to water quality are not anticipated after the construction and restoration of the levee system are complete. However, the stormwater pond built to manage internal stormwater during a flood will have a normal pool which will allow sediment and siltation to settle out within the pond prior rather than transferred downstream to the Rush River.

Levee Alternative 2 – Direct and indirect adverse impacts to water quality under Levee Alternative 2 would result from construction stormwater via sediment and sediment-related pollutants within or adjacent to the Rush River floodplain, as shown in Appendix C Map C-14. All work would occur outside the river channel; however, 1,345 feet of the proposed levee system would be located within the 100-year floodplain. BMPs, such as silt fences, used during construction and restoration activities to ensure erosion and sediment control could minimize potential risks from the proposed construction activities. All disturbed areas will be seeded and mulched prior to completion to provide erosion control prior to the establishment of vegetation. In addition, secondary containment would be used for storage of all construction fuels or chemicals in order to minimize the potential for construction-related water quality impacts. Restrictions of the levee system on the flow and/or meander of the Rush River could have direct and indirect water quality impacts during future operation of the levee. However, the stormwater pond built to manage internal stormwater during a flood will have a normal pool which will allow sediment and siltation to settle out within the pond prior rather than transferred downstream to the Rush River.

6.3 Cumulative Impacts

The assessment of cumulative impacts in National Environmental Policy Act (NEPA) documents is required by the Council of Environmental Quality (CEQ) regulations (1987). This section assesses whether either alternative for the project has the potential to result in cumulative impacts to relevant environmental resources when considered in combination with past, present, and reasonably foreseeable projects or actions in the vicinity of the planning area. Cumulative impacts result when the effects of an action are added to or interact with other effects in a particular place and within a particular time. It is the combination of these effects and any resulting environmental degradation that is the focus of this cumulative impact analysis.

As a result of the scoping process and discussions with resource agencies and interested groups, no past, present, or reasonably foreseeable projects that would result in cumulative impacts were identified for this project.

7 Consultation, Coordination, and Public Participation

Consultation, coordination, and public participation was conducted throughout the course of project planning (see Appendix A).

7.1 Agency Consultation

Several agencies were contacted during the scoping process, and were invited to participate in the planning process, including:

- U.S. Army Corps of Engineers (Cooperating Federal Agency)
- U.S. Fish and Wildlife Service (Cooperating Federal Agency)
- Federal Emergency Management Agency, Federal Insurance and Mitigation Division
- North Dakota Game and Fish
- North Dakota Department of Health
- Cass County Soil Conservation Service
- Cass County Highway Department
- North Dakota State Water Commission
- North Dakota State Historic Preservation Office
- North Dakota Forest Service
- North Dakota Geological Survey
- North Dakota Parks and Recreation
- North Dakota Department of Emergency Services
- North Dakota Department of Transportation
- Tribal Historic Preservation Office, Three Affiliated Tribes
- Tribal Historic Preservation Office, Standing Rock Sioux Tribe
- Tribal Historic Preservation Office, Spirit Lake Sioux Nation
- Tribal Historic Preservation Office, Fort Peck Tribes
- Tribal Historic Preservation Office, Wahpekute Band of Dakotah
- Tribal Historic Preservation Office, Crow Nation
- Tribal Historic Preservation Office, Crow Creek Sioux Tribe

- Tribal Historic Preservation Office, Yankton Sioux Tribe
- Tribal Historic Preservation Office, Chippewa Cree Tribe
- Tribal Historic Preservation Office, Sisseton-Wahpeton Oyate Tribe
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- Tribal Historic Preservation Office, Rosebud Sioux Tribe
- Tribal Historic Preservation Office, Oglala Sioux Tribe
- Tribal Historic Preservation Office, Cheyenne River Sioux Tribe
- Tribal Historic Preservation Office, Santee Sioux Nation

Several agencies submitted comments/questions regarding the project (see Appendix A). Relevant comments received from all agencies were incorporated into the document.

7.2 Project Team Coordination

The watershed project team held six meetings to discuss the project with regards to goals and objectives, purpose and need, alternatives review, cost-benefit, etc. Meeting presentations are available upon request to ND NRCS.

- November 8, 2017: Project introduction, history, problem, proposed schedule, and steps; discussed public hearing comments; discussed purpose and need
- December 4, 2017: Reviewed public comments, discussed strategies for flood damage reduction, adopted draft purpose and need, drafted goals for the project, eliminated categories, and identified categories to remain
- March 5, 2018: Reviewed inundation mapping, introduced alternatives, reviewed flood damages and noted priority areas
- March 23, 2018: Began reviewing developed alternatives, updated draft purpose and need, eliminated alternatives from further review, and defined alternatives to be reviewed further
- August 22, 2018: Reviewed alternatives selected for further review, eliminated alternatives, defined two alternatives to move forward to preliminary design
- March 7, 2019: Reviewed preliminary design, cost estimates, and funding scenarios and selected a preferred alternative

7.3 Public Involvement

A public participation plan was developed for the project and the first public meeting for the project was held in Casselton, North Dakota, on January 6, 2016. Eleven comments were received following the first public meeting. A second public meeting was held in Amenia, North Dakota, on April 2, 2019. The town residents were asked to express their alternative preference to the Amenia City Council. The City Council then made their alternative recommendation to the SLO. Minutes of meetings and comments are available upon request. NRCS and the Cass County Joint Water Resource District will publish the Public Notice of Availability of the Final EA in the Cass County Recorder and will also post all information on their public website during the 60-day formal public comment period, and will host a virtual meeting on the project November 2, 2021.

8 The Preferred Alternative

8.1 Rationale for Plan Preference

Levee Alternative 1 meets the purpose and need in that it provides a certified levee system, qualifying the residents of the city of Amenia for an exemption from, or purchase of, subsidized flood insurance and a reduction in risk from a 100-year flood event. The levee system also reduces the risk of damages from flooding from ice dams along the Rush River due to the additional freeboard above the 100-year water surface elevation. The stormwater pond built for internal stormwater management as part of Alternative 1 enhances environmental quality by directing stormwater within the city of Amenia to the stormwater ponds during times of flooding. This will reduce sediment/siltation and nutrient runoff from the city of Amenia. Additionally, Alternative 1 cost estimates are lower than Alternative 2.

8.2 Measures to be Installed

Key components of Levee Alternative 1 include approximately 11,820 feet of levee around the city of Amenia. Other permanent items include external drainage ditches (to prevent standing water against the levee), internal drainage, stormwater pond, gate well structures, sleeper slabs, culverts, riprap, etc. Removable features will act as temporary levees over three road crossings and two railroad crossings. For paved road crossings, the asphalt pavement would be cut out and road bed prepared such that a concrete sleeper slab could be placed. The concrete sleeper slab would replace the asphalt as a traversable surface, but would act as support for the temporary placement of clay fill at the road crossings to bring the levee up to the design elevation during flood scenarios. A detailed Operation and Maintenance plan will be prepared during final design and will address the monitoring frequency and possibly implement a flood warning system to inform the project sponsor that the temporary measures need to be installed. Once the flood recedes, the temporary clay fill would be removed and the road would be passable with no additional work. For gravel roads, the gravel overlying the roadbed would be removed and the roadbed would be reconstructed in a similar fashion to the levee as to make it congruent in material and compaction. Upon completion of the roadbed, the gravel would be reestablished for normal use. Under a flood scenario, the gravel would be removed and a clay fill temporarily added to bring the levee up to the design elevation. Once the flood recedes, the temporary clay fill would be removed and the gravel layer would be reestablished. The railroads would receive similar treatment to the gravel roadway,

differing only in the need to remove the tracks and ballasts in their entirety to facilitate clay fill.

8.3 Mitigation

Impacts to existing wetlands are small. Should mitigation be required, it is anticipated that these features could be incorporated into the design of the stormwater pond to act as dual function. The design of these features would vary depending on the type, form, and function of the existing wetlands impacted. Should stormwater ponds not be viable for the wetland type, form, and function, an alternative location in the watershed will be utilized and a full mitigation plan will be developed in conjunction with the NRCS and USACE to address all permanent impacts to wetlands. Additional features such as buffer strips adjacent to the channels and levee to reduce sediment and erosion will be included.

8.4 Permits and Compliance

The Local Sponsor will obtain all necessary permits to construct the project. Permits that are known to date include:

Construction Permit – North Dakota State Water Commission (Office of the State Engineer)

According to North Dakota Century Code, a construction permit is required from the Office of the State Engineer if a water control structure constructed is capable of retaining, diverting, or obstructing more than 50 acre-feet.

404 Permit – United States Army Corps of Engineers (USACE)

Necessary for the placement of fill in Waters of the United States. If wetlands identified as being impacted by the project are deemed as jurisdictional by the USACE, a 404 permit would be necessary. During 404 permit review, the North Dakota Department of Environmental Quality will for compliance with section 401 water quality certification.

Construction (General) Permit – North Dakota Department of Health

The construction general permit applies to construction projects that disturb 1 or more acres, including smaller projects within or part of a large development. A Stormwater Pollution Prevention Plan would need to be prepared and submitted with the Notification of Intent for the project.

8.5 Costs and Cost Sharing

Costs include construction, contingencies, project development, engineering (civil, geotechnical, structural, electrical, and construction), land surveying, CLOMR or Letter of Map Revision (LOMR), utility relocations, right-of-way and negotiations, wetland mitigation, legal and admit fees, permitting, and fiscal. The overall cost of construction and implementation of Alternative 1 is $3,282,200 and is to be shared among federal, state, county, and local entities. The preliminary funding scenario percentages are as follows:

Table 8-1 Preliminary Funding Scenario

	Federal	North Dakota	Cass County	Local	Estimated

		State Water Commission	Sales Tax	Assessment	Project Cost
Alternative 1	100% (Construction & Engineering, 50% (Wetland Mitigation)	50% (of non-federal share)	50% (of local share)	50% (of local share)	$3,282, 200

8.6 Installation and Financing

Moving forward, the project will be completed in phases. The next phase is final design, followed by the construction phase. Preliminarily, it is assumed that the Local Sponsor will bond for all project costs and seek reimbursement for federal, State Water Commission, and county sales tax shares as the project develops. During development, the Sponsor will develop a local assessment district for the benefiting parcels to pay for the local share of the project. Various options for the bond exist. Typical bonds for these types of projects are 15- or 20-year with a fixed interest rate (to-be-determined).

8.7 Operation, Maintenance, and Replacement

Operation and maintenance activities will occur over the life of the project. All activities will be completed by the Project Owner, or a designated representative with experience in these activities. Specific responsibilities will be identified and further defined with the Project Owner during final design. Annual maintenance items that have been factored into these costs are mowing, rodent abatement, lift station maintenance, and electricity. In addition, the operation and maintenance costs include the replacement of the lift station pumps after 25 years or half of the design life. It is assumed that annual inspections will occur regardless of a flood event to identify potential issues. Temporary enclosures may be necessary depending on the event frequency. Due to the uncertainty in when, or how often they will be utilized, the temporary enclosure costs have been incorporated into the construction costs under the embankment item. The frequency of inspection during a flood will likely be daily or more frequently, depending on the water surface elevation adjacent to the levee.

Table 8-2 Annual Operation, Maintenance, and Replacement Costs

Item	Cost
Mowing	$5,000
Rodent Abatement	$1,000
Lift Station Maintenance	$3,000
Electricity	$1,000
Lift Station – Pump Replacement (every 25 years)	$50,000
Temporary Road Closure	$25,000
Total Annualized	**$13,050**

8.8 Economic Tables

Table 8-3 Estimated Average Annual NED Costs, Rush River Watershed, North Dakota[1/]

Works of Improvement	Project Outlays Amortization of Installation Cost	Project Outlays Operation, Maintenance, and Replacement Cost	Total
Levee Alternative 1 (Recommended NED Plan)	$123,200	$13,050	$136,250
1/ Price Base: FY2020, amortized over 50 years at a discount rate of 2.75 percent			Prepared: Dec/2019

Table 8-4 Estimated Cost Distribution—Water Resource Project Measures, Rush River Watershed, North Dakota[1/]

	Installation Cost - Public Law 83-566						Installation Cost - Other Funds						Total
Works of Improvement	**Construction**	**Engineering**	**Real Prop Rights**	**Utility Relocation Payments[2/]**	**Project Admin**	**Total Public Law 566**	**Construction**	**Engineering**	**Real Prop Rights[3/]**	**Utility Relocation Payments[2/]**	**Project Admin**	**Total Other[4/]**	**Installation Costs**
Levee Alternative 1	$2,149,800	$393,200	$0	$0	$0	**$2,576,600**	$0	$0	$232,000	$175,000	$250,000	$705,600	$3,282,200
1/ Price Base: FY2020											Prepared: Aug/2019		
2/ Includes $175,000 for relocation of utilities													
3/ Includes $212,000 of real property cost													
4/ Includes $285,000 for surveys, legal fees, other costs													
5/ Engineering services contract cost to be borne: $393,200 by Public Law 83-566 funds													

Table 8-5 Estimated Average Annual NED Costs—Water Resources Project Measured, Rush River Watershed, North Dakota[1/]

Works of Improvemen[2/3/]	Project Outlays Amortization of Installation Cost	Project Outlays Operation, Maintenance, and Replacement Cost	Total
Levee Alternative 1 (Recommended NED Plan)	$123,200	$13,050	$136,250

1/ Price Base: FY2020, amortized over 50 years at a discounted rate of 2.75 percent
2/ Costs for technical assistance to install measures and financially assisted land treatment in this evaluation unit are included.
3/ Includes $12,000 for operation, maintenance, and replacement.

Table 8-6 Estimated Average Annual Flood Damage Reduction Benefits—Water Resources Project Measures, Rush River Watershed, North Dakota[1/]

Item	Estimated Average Annual Damage					
	Without Project		With Project		Damage Reduction Benefit [3/ 4/]	
	Agriculture Related [2/]	Non Ag Related	Agriculture Related [2/]	Non Ag Related	Agriculture Related [2/]	Non Ag Related
Floodwater						
Residential	$33,800	N/A	$0	N/A	$33,800	N/A
Commercial	$167,200	N/A	$0	N/A	$167,200	N/A
Other (Public)	$0	N/A	$0	N/A	$0	N/A
Total	$201,000	N/A	$0	N/A	$201,000	N/A
1/ Price Base: FY2020					Prepared: Apr/2021	
2/ Agriculture-related damage includes damage to rural communities						
3/ Includes effects of land treatment measures						
4/ Costs and benefits for on-farm land treatment have been netted out.						

Table 8-7 Comparison of NED Benefits and Costs, Water Resource Project Measures, Rush River Watershed, North Dakota[1/]

Works of Improvement	Agriculture Related			Nonagricultural									
	Floodplain [3/]	Irrigation	Drainage	Residential	Commercial	Other (Public)	Recreation	M&I Water Supply	Unemployed Labor	Other Econ. Effects	Average Annual Benefits	Average Annual Costs [2/]	Benefit-Cost Ratio
Levee Alternative 1	$201,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		$201,000	$136,250	1.475
1/ Price Base: FY2020											Prepared: Apr/2021		
2/ From Table 4													
3/ Residential, Commercial and Public													

8.9 Structural Tables

Table 8-8 Structural Data—Dikes Table, Rush River Watershed, North Dakota[1/]

Dike	Stationing	Top Width (ft)	Average Side Slope	Average Height of Dike (ft)	100-Year Frequency Velocity (ft/s)	Dike Protection	Volume of Fill (yd^3)
Levee Alternative 1	0+00 to 118+20	10	4:1	4.7	Minimal	Vegetation	100,150
1/ Dikes are Class II						Prepared: Aug/2019	

Table 8-9 Structural Data—Channels Table (Exterior Channels), Rush River Watershed, North Dakota[1/]

					Channel Dimensions [1/]					*n* Value		Velocities (ft/s)[5/]					
Channel Name (Reach)	**Station**	**Drainage Area (mi^2)**	**10 Year Freq. Design Discharge (ft^3/s)**	**Water Surface Elevation (ft)**	**Hydraulic Gradient (ft/ft)**	**Gradient (ft/ft)**	**Bottom Width (ft)**	**Elev. (ft NAVD88)**	**Side Slope**	**Aged**	**As Built**	**Aged**	**As Built**	**Excavation Volume (yd^3)**	**Type of Work [2/]**	**Existing Channel Type [3/]**	**Present Flow Condition [4/]**
North Channel	5+00-35+00	0.44	39.66		0.0007	0.0007	10		4	0.04	0.035	1.3	1.18	3896	I	O	Ephemeral
South Channel	35+30-83+00	0.62	39.04		0.0002	0.0002	10		4	0.04	0.035	0.82	0.74	2998	I	O	Ephemeral

1/ Table provides details on exterior channels which convey water around the exterior of the levee.

Prepared: Aug/2019

2/ I Establishment of new channel including necessary stabilization measures
II Enlargement or realignment of existing channel or stream

III Cleaning out natural or manmade channel

IV Clearing and removal of loose debris within channel

V Stabilization as primary purpose (by continuous treatment or localized problem areas—present capacity adequate)

3/ N An unmodified, well-defined natural channel or stream
M Manmade ditch or previously modified channel or stream

O Non or practically no defined channel

4/ Includes $285,000 for surveys, legal fees, other costs
I Intermittent—Continuous flow through some seasons of the year

E Ephemeral—Flows only during periods of surface runoff, otherwise dry

S Ponded water with no noticeable flow—Caused by lack of outlet or high groundwater table

5/ Engineering services contract cost to be borne: $393,200 by Public Law 83-566 funds.

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10 List of Preparers

Name & Present Title	Education	Experience (years)
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Benjamin Kugler, CFM, Project Engineer, Moore Engineering, Inc.	BS, Civil Engineering	3
Yaping Chi, PE, Professional Engineer, Moore Engineering, Inc.	MS, Civil Engineering	8
Brett Bailly, PE, Senior Professional Engineer, Moore Engineering, Inc.	BS, Civil Engineering	24
Ron Koth, Senior Fisheries Ecologist, Barr Engineering Co.	MS, Fisheries Biology	40
Jessica Butler, Senior Ecologist, Barr Engineering Co.	MS, Soil Science	12
Heather Wright-Wendel, Environmental Engineer, Barr Engineering Co.	PhD, Civil Engineering	13
Megan Quinlan, GIS Specialist, Barr Engineering Co.	BS, Geography	4
Kailin Hatlestad, Cultural Resource Specialist, Barr Engineering Co.	MA, Anthropology-Archaeology	5
Annie Breitenbucher, Technical Reports Specialist, Barr Engineering Co.	MLS, English	26
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Charlotte Trende, Editor, J.L. Rooney & Associates	BA, History	33

11 Planning Committee Members

A project team was created to identify watershed problems and determine alternatives that could be implemented in the Rush River watershed to alleviate the identified problems. The project team is comprised of members that included local landowners and local, regional, state and federal agency representatives.

Rush River Watershed (Amenia Focus) RCPP Planning Team

Josh Monson: NRCS Cass County District Conservationist
Mike Hargiss: North Dakota Department of Health
Bruce Kreft: North Dakota Game and Fish
Patricia McQuery: United States Army Corps of Engineers
Eric Dahl & Jeff Miller: Cass County Soil Conservation Service
Jason Benson: Cass County Engineer
Richard Sundberg: Rush River Water Resource District
Jake Gust: Rush River Water Resource District
Donna Myers: Prior Resident
Bill Stansbery: Mayor/Resident
Pete Lindstrom: Area Landowner/ Prior Resident
David Strand: Landowner
Kyle Faught: Landowner
Ben Sand: Business Owner
Keith Peltier: Business Owner
Shaun Nelson: Business Owner
Levi Arneson: Business Owner
Randy Gjestvang: North Dakota State Water Commission
Mike Opat: Moore Engineering – Engineer for the Rush River Water Resource District
Keith Weston: NRCS Red River Basin Coordinator/Red River Retention Authority

12 Distribution List

Comments on the Draft Supplemental Watershed Plan/Environmental Assessment were requested from the following federal, state, and local agencies and organizations. Response letters and disposition of comments area located in Appendix A.

U.S. Army Corps of Engineers
U.S. Fish and Wildlife Service
U.S. Environmental Protection Agency
Federal Emergency Management Agency
North Dakota State Water Commission
North Dakota Department of Environmental Quality
North Dakota Game and Fish Department
North Dakota Department of Transportation
North Dakota State Historical Society
Cass County Commission
Cass County Emergency Management
Cass County Sheriff
Cass County Highway Department
Cass County Soil and Water Conservation District
City of Amenia
Tribal Historic Preservation Office – Three Affiliated Tribes
Tribal Historic Preservation Office – Standing Rock Sioux Tribes
Tribal Historic Preservation Office – Spirit Rock Sioux Nation
Tribal Historic Preservation Office – Fort Peck Tribes

Tribal Historic Preservation Office – Wahpekute Band of Dakotah
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Tribal Historic Preservation Office – Sisseton-Wahpeton Oyate
Tribal Historic Preservation Office – Turtle Mountain Band of Chippewa Indians
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Tribal Historic Preservation Office – Oglala Sioux Tribe
Tribal Historic Preservation Office – Cheyenne River Sioux Tribe
Tribal Historic Preservation Office – Santee Sioux Nation
Western Area Power Organization

13 Appendices

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Preliminary Geotechnical Engineering Report

Economics Report

Wetland Delineation Report

Cultural Resources Reconnaissance Survey

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