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Supplemental Watershed Plan-Environmental Assessment No. 9

Papillion Creek Watershed Washington, Douglas, and Sarpy Counties, Nebraska



December 2022

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Draft Supplemental Watershed Plan Supplement No. 9 & Environmental Assessment For Papillion Creek Watershed Washington, Douglas, and Sarpy Counties, NE

AUTHORITY

The original watershed work plan was prepared, and works of improvement have been installed, under the authority of the Watershed Protection and Flood Prevention Act of 1954 (Public Law 83-566) as amended. The construction of the six grade stabilization sites is authorized under Public Law 83-566 (as amended), as further amended by section 313 of Public Law 106-472, and in accordance with Section 102 (2)(c) of the National Environmental Policy Act of 1969, Public Law 91-190, as amended (42 U.S.C. 43221 et seq).

ABSTRACT

This Draft Supplemental Plan-EA was developed in response to the varied concerns of the Sponsoring Local Organization, Papio-Missouri River Natural Resources District, and includes the remaining viable locations originally identified in the 1966 Watershed Work Plan. Project benefits include flood risk reduction, recreation, and watershed protection damage reduction including land voiding and depreciation, crop stand damage, property values, and protection of infrastructure. Proposed actions include four sites (W-5, D-78, D-2, and S-15) with a series of grade stabilization structures, one stream restoration location (S-5), one sediment control basin (S-1) with grade stabilization, and one high hazard flood damage reduction dam with a permanent pool (WP-1, previously known as D-31). Total project costs are \$27,004,500, of which \$8,367,300 is proposed to be paid by Public Law 83-566 funds and \$18,637,200 will be paid by the Sponsor. This document is intended to fulfill requirements of the National Environmental Policy Act and to be considered for authorization of Public Law 83-566 funding.

Responsible Agency:U.S. Department of Agriculture, Natural Resources Conservation ServiceSponsor:Papio-Missouri River Natural Resources DistrictCooperating Agency:United States Corps of Engineers

COMMENTS AND INQUIRIES

Comments and inquiries must be received by March 5, 2023. Submit comments and inquiries to:

Melissa Baier, Acting Nebraska Watershed Coordinator Natural Resources Conservation Service Federal Building, Room 152 100 Centennial Mall North Lincoln, NE 68508

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Summary of Supplemental Watershed Plan-Environmental Assessment No. 9 OFFICE OF MANAGEMENT AND BUDGET FACT SHEET

for the

Papillion Creek Watershed

Washington, Douglas, and Sarpy Counties, Nebraska Papio-Missouri River Natural Resources District 1st and 2nd CONGRESSIONAL DISTRICT

Authorization: Watershed Protection and Flood Prevention Act, Public Law (PL) 83-566, as amended (16 U.SC. Section 1001, et. seq.)

Sponsor: Papio-Missouri River Natural Resources District (P-MRNRD)

Lead Federal Agency: USDA – Natural Resources Conservation Service (NRCS)

Cooperating Federal Agency: U.S. Army Corps of Engineers (USACE)

Reason for Preparing a Supplement: This Supplemental Watershed Plan-EA is intended to update the 1966 Work Plan and subsequent Supplements to satisfy National Environmental Policy Act (NEPA) requirements, to comply with USACE Clean Water Act 404(b)(1) guidelines, and to provide an analysis that complies with Principles, Requirements, and Guidelines for Water and Land Related Resources (PR&G).

Proposed Action: The proposed action is the construction of 34 loose rock structures, four (4) rigid rock structures, one (1) sediment basin, one (1) wet dam regional detention basin, and channel restoration.

Purpose and Need for the Action: The purpose of the proposed action varies by site, shown in Table S-1. The purposes include watershed protection through grade stabilization, sediment reduction, and improved safety as well as flood damage reduction within the Papillion Creek Watershed.

Site	Purpose
W-5	Watershed protection through grade stabilization
D-78	Watershed protection through grade stabilization
D-2	Watershed protection through grade stabilization
S-15	Watershed protection through grade stabilization
S-5	Watershed protection through grade stabilization and
	improved safety
S-1	Watershed protection through sediment reduction and
	grade stabilization
WP-1	Flood Damage Reduction

Table S-1. Project Purposes

Description of the Preferred Alternative Plan: All locations were previously identified in the 1966 Work Plan. The preferred alternative would include installation of 34 loose rock structures and four rigid rock structures to provide grade control to upstream reaches and allow for stream crossing. Channel restoration is included to stabilize the stream and improve safety along the reach at Site S-5. A sediment basin will be

constructed at Site S-1 upstream of a planned flood control structure to reduce the influx of sediment to the downstream structure. A regional detention basin will be constructed at Site WP-1 to reduce the flood risk within the watershed.

Resource Information. Information is included below to describe the watershed conditions.

Table S-2. Papillion Creek Watershed

Eight-Digit Hydrologic Unit Number	10230006
Latitude, Longitude (decimal degrees)	41.3, -96.1
Papillion Creek Watershed (acres)	245,800 acres
Developed	111,400
Cropland	102,040
Grassland	22,670
Forest	5,760
Water	2,150
Wetlands	1,770
Land Ownership	Private 91%, State-Local 6%, Federal 2%
Prime Farmland and Farmland of Statewide Importance (acres)	123,700



Figure S-1. Land Ownership

Climate: Continental and temperate, characterized by mild, wet springs; mild, dry autumns; hot summers; and cold winters. Mean summer and winter temperatures are about 75°F and 26°F, respectively. Average annual precipitation is approximately 31.1 inches.

Topography: Watershed has rolling hills with steep, incised channel banks.

Table S-3. Population (2020 Census)

	Douglas County	Sarpy County	Washington County
Total Population ¹	584,526	190,604	20,865
Male ^{2,3}	281,580	93,546	10,058
Female ^{2,3}	289,747	93,650	10,303
Under 18 ^{2,3}	145,688	51,072	5,003
65 years and over ^{2,3}	76,854	22,739	3,631

¹2020 US Census

²2019 ACS 1-Year Estimates Subject Tables

³2019 ACS 5-Year Estimates Subject Tables (Washington County only)

Table S-4. Demographics (2020 Census)

	Douglas County	Sarpy County	Washington County
White ¹	68.16%	80.02%	93.54%
Black or African American ¹	11.07%	3.91%	0.35%
American Indian or Alaska Native	0.99%	0.53%	0.18%
Asian	4.76%	2.52%	0.48%
Native Hawaiian or other Pacific Islander	0.09%	0.13%	0.02%
Two or More Races	8.60%	9.19%	4.25%
Hispanic or Latino	13.83%	10.52%	2.97%
Total Households ^{2,4}	222,819	68,947	8,185
Percent of population below poverty level ³	9.80%	4.90%	5.30%
Percent of children below poverty level ³	10.20%	5.10%	6.30%

¹2020 US Census

²2019 ACS 1-Year Estimates Subject Tables

³United States Census Bureau. 2020 SAIPE data.

Threatened and Endangered Species: There are 10 existing and proposed threatened and endangered species with known ranges within the Papillion Creek Watershed. Informal consultation with USFWS has indicated that all listed federal species have a no effect determination except for the Northern long-eared bat - which has a determination of not likely to adversely affect. A concurrence letter from USFWS is included in Appendix A.

Archeological and Historical Resources (within area of potential effect): There are no eligible National Register of Historic Places (NRHP) archaeological resources present and, therefore, no historic properties will be affected.

Wetlands: There is a total of 9 acres of wetlands delineated within the project sites' areas of potential effect. Of these wetlands, 8 acres are palustrine emergent wetlands.

Alternative Plans Considered: Additional alternatives were considered to address the project purposes. The alternative plans considered are shown in Table S-5 below. See Chapter 4.0 for explanations for why alternatives did not meet the purpose or were not carried forward for detailed study.

Purpose	Sites	ites Alternative		Carried forward for Detailed Study	
All	All	No Action/Future Without Project	No	Yes	
Watershed Protection	W-5, D-78, D-2, S-5, S-15	Standard NRCS Grade Stabilization Structures	Yes	No	
through		High Hazard Dam Alternative	Yes	No	
Grade		Nonstructural Alternatives	No	No	
Stabilization	W-5, D-78, D-2,	Stream Restoration	Yes	No	
	S-15	Loose Rock and Rigid Drop Structures	Yes	Yes	
Watershed	S-5	Loose Rock and Rigid Drop Structures	No	No	
Protection through		Loose Rock Structures with Channel Bank Stability	No	No	
Grade Stabilization & Improved Safety		Stream Restoration	Yes	Yes	
Watershed	S-1	Conservation Measures	No	No	
Protection		Small Detention Basins	No	No	
through		Loose Rock Structures/Rigid Drop	No	No	
Sediment		Structures			
Grade		Dredging of DS-19 with Grade Stabilization	Yes	Yes	
Stabilization		Sediment Basin and Rigid Drop Structure	Yes	Yes	
Flood Risk	WP-1	Zoning Alternative	No	No	
Reduction		Floodplain Acquisition	Yes	No	
		Current Conservation Measures	No	No	
		Low Impact Development (LID)	Yes	No	
		Created and Restored Wetlands	No	No	
		Stream Restoration	No	No	
		Conveyance Alternative	Yes	No	
		Raise Existing Levees and Bridges	No	No	
		Small Detention Dams	No	No	
		Regional Detention Site (Dry Dam)	Yes	Yes	
		Regional Detention Site (Wet Dam)	Yes	Yes	

Table S-5. Alternative Plans Considered

Mitigation: There will be over 1/10-acre of impacts to wetlands at Sites S-1 and WP-1 and these sites will therefore require mitigation. There will be approximately 38 acres of lacustrine fringe wetlands created around the proposed permanent pools at Sites S-1 and WP-1, which can be used to mitigate for wetlands and will result in a net gain of wetlands for all sites.



Compensatory stream mitigation will be based on the existing stream conditions and calculated by the loss of stream functional units attributable to project implementation. A stream assessment based on the Nebraska Stream Condition Assessment Procedure (NeSCAP) will be performed to determine the existing stream functional units. The streams within the watershed are severely incised and projects will improve stream function. Compensatory stream mitigation is only anticipated for earthen fill due to embankments at Sites S-1 and WP-1.

Project Costs: Table S-6 summarizes the distribution of project costs between the Sponsor and NRCS for the installation of the project.

Project Costs	PL 83-566 Funds		Other Funds		Total	
Construction ¹	\$	8,727,900	\$	8,401,700	\$	17,129,600
Construction		51%		49%		100%
Funing animal ^{2,3}	\$	3,875,100	\$	378,600	\$	4,253,700
Engineering		91%		9%		100%
Deal Duan autor Diachta ⁴	\$	-	\$	5,394,000	\$	5,394,000
Real Property Rights		0%		100%		100%
Droiget Administration	\$	354,300	\$	793,900	\$	1,148,200
Project Administration		31%		69%		100%
Total Draiget	\$	12,957,300	\$	14,968,200	\$	27,925,500
rotal Project		46%		54%		100%

Table S-6. Project Costs

¹Includes mitigation

²Includes construction observation

³Includes permit acquisition

⁴Includes cost of legal fees and land appraisals

Project Benefits: Project benefits include flood risk reduction, recreation, and watershed protection damage reduction including land voiding and depreciation, crop stand damage, property values, and protection of infrastructure.

Table S-7. Economic Benefits (dollars)¹

	Average Annual Benefits						
	Flood Damage Reduction		Watershed Protection Reduction			Average	Benefit:
improvement	Agriculture related 2/	Non- Agriculture related	Agriculture related 2/	Non- Agriculture related	Total	Cost 3/	Ratio
1 Floodwater Retarding Structure (WP-1)	0	94,500	326,700	0	421,200	382,700	1.1

1/Price base: 2022, amortized over 105 years at a discount rate of 2.25%

Prepared: 02/2022

2/ Includes rural benefits, as defined by the NWPM

Period of Analysis: 105 years

Project Life: 100 years

Environmental Considerations and Effects: Table S-8 summarizes resource elements that were identified during scoping and summarizes potential impacts related to the installment of the Project.

Item or Concern	Alternative 2. (Preferred, Recommended)		
Soils			
Erosion and Sedimentation	Will help stabilize degrading stream banks and provide grade control. Will reduce annual sedimentation rate by approximately 4,660 tons per year.		
Prime and Unique Farmland	Will directly and indirectly impact approximately 160-acres of prime farmland and farmland of statewide importance. No Farmland Protection Policy Act (FPPA) significant concerns.		
Water	1		
Water Quality	Enhanced water quality.		
Water Quantity	Will provide flood risk reduction.		
Regional Water Management Plans	Will implement projects included in and works towards goals of regional water management plans.		
Floodplain Management	Increased flood risk reduction.		
Wetlands and Waters of the U.S.	USACE 404 permit is anticipated.		
Plants			
Threatened and Endangered Species	There is no suitable habitat for species.		
Riparian Areas	Will stabilize streams and protect associated riparian areas.		
Habitats			
Fish and Wildlife Habitat	There is no suitable habitat for other species.		
Animals	·		
Migratory Birds/Bald and Golden Eagles	Habitat destructive activities will be avoided from February 1 to July 15 to avoid impacts to nesting migratory birds and will therefore, not impact these species.		
Threatened and Endangered Species	No tree clearing will occur from June 1 to July 31 to not adversely affect the northern long-eared bat. There is no suitable habitat for other species.		
Humans	· · ·		
Flood Damages	Reduced damages from flooding.		
Historic and Cultural Properties	No historic properties would be affected.		
Social and Demographic Data	Will not adversely impact any known minority groups or individuals living in poverty.		
Public Health and Safety	Will stabilize stream banks to improve safety near streams and provide flood risk reduction.		
Climate Change	Would increase climate change resiliency by reducing peak flows and protecting streams.		
Land Use	Minor land use changes from agriculture to open water at sediment basin and wet dam.		

Table S-8. Summary of Resource Concerns and Impacts

Major Conclusions: The preferred alternative as presented in this Supplemental Plan most closely met the PR&G Guiding Principles, including the Federal Objectives, was the locally preferred alternative, and



presented the most beneficial impacts to relevant ecosystem services. The regional detention structure will provide flood damage reduction within the watershed and the sediment basin will reduce the influx of sediment to downstream waterbodies. The combination of alternatives will provide grade stabilization and improved safety. The preferred alternative will also provide ancillary benefits of improved fish and wildlife habitat, recreation, infrastructure protection, and enhanced water quality.

Areas of Controversy: The planning process included public meetings, coordination with interested agencies and groups, and printed public information to raise issues, resolve conflicts, and recommend the most desirable plan features. No unresolved controversy remains.

Evidence of Unusual Congressional or Local Interest: None. This report is in compliance with executive orders, public laws, and other statutes governing the formulation of water resource projects.



Changes Requiring Preparation of a Supplement

The Watershed Protection Act (PL 83-566) of 1954 authorizes the United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) to cooperate with State and local agencies in planning and carrying out works of improvement for soil conservation and other purposes. The Papillion Creek Watershed Work Plan Supplement No. 9 and Environmental Assessment are combined into this single document (Supplemental Plan-EA).

In March 1966, a Watershed Work Plan (1966 Work Plan) was authorized for the Papillion Creek Watershed (watershed) in Nebraska with the purpose of grade stabilization. It included 52 grade stabilization structures and land treatment measures. The grade stabilization structures included sheet piling drop structures, concrete weir drop structures, and drop inlet structures (dams). Primary benefits consisted of land damage and land depreciation prevention, grade stabilization of the channel beds, and a reduction in sediment. Indirect benefits included reduction to infrastructure damage. Thirty (30) of the original work plan structures have been constructed with the last one of the original sites completed in 2007 (Site S-30). There have been eight supplements to the 1966 Work Plan over the last 54 years which have involved updates to economics, changes to structure locations, removal of structures, and rehabilitation.

The seven remaining viable sites from the 1966 Work Plan are included in this document. One of the proposed structure locations, referred to herein as S-15, was removed from the 1966 Work Plan in a 1995 Supplemental Plan due to interference with a planned urban development. The planned development did not come to fruition due to insufficient funding and grade stabilization remains a problem at this site. Therefore, it is proposed that Site S-15 be reintroduced within this Supplemental Plan-EA. The other remaining viable sites include W-5, D-78, D-2, D-31 (herein referred to as WP-1), S-1, S-5, and S-15. The program funding source for WP-1 is the Regional Conservation Partnership Program (RCPP) and the funding for planning the other six sites is through the Watershed and Flood Prevention Operations Program (WFPO).

Natural and anthropogenic changes in the watershed have led to changes within the streams and additional watershed needs. Site S-5 is deeply incised and continued channel degradation and widening threaten infrastructure and homes which lends this site to require channel restoration in addition to grade stabilization. Site WP-1 has been identified in the Papillion Creek Watershed Management Plan as a high priority location for a flood damage reduction dam and therefore that purpose is being added in this Plan-EA. Site S-1 is located upstream of another high priority flood damage reduction dam site identified within the Papillion Creek Watershed Management Plan (DS-19) and therefore the purpose of Site S-1 is watershed protection through sediment reduction and grade stabilization more efficiently meet the needs of the watershed. The remaining four sites are proposed as grade stabilization sites. Implementation of these seven sites will complete the 1966 Work Plan. The intent of this Supplemental Plan-EA is to evaluate alternatives associated with the aforementioned locations under guidelines outlined in the NRCS Title 390 – National Watershed Program Review (NWPM), 4th edition (NRCS, 2015) and to satisfy National Environmental Policy Act (NEPA) requirements. A copy of the 1966 Work Plan and subsequent supplements can be acquired at the NRCS Nebraska State Office or through the Sponsor, the Papio-Missouri River Natural Resources District (P-MRNRD).



1.0 PURPOSE AND NEED FOR ACTION

1.1 Introduction

The intent of this document is to identify and evaluate alternatives at locations previously identified in the 1966 Work Plan under guidelines outlined in the NRCS Title 390 – National Watershed Program Manual (NWPM), 4th edition (NRCS, 2015) and to satisfy National Environmental Policy Act (NEPA) and Principles, Requirements, and Guidelines for Water and Land Related Resources Implementation Studies (PR&G) requirements. Locations analyzed in this Supplemental Plan-EA are shown in Figure 1-1 below.







1.2 Watershed History

A Watershed Work Plan for the Papillion Creek Watershed was prepared in August 1966 (1966 Work Plan) under the authority of the Watershed Protection and Flood Prevention Act (Public Law 83-566, 83d Congress, 68 Stat. 666) as amended. The 1966 Work Plan was prepared by a combination of conservation districts, county commissioners, county supervisors and the Papio Watershed Board with assistance by the U.S. Department of Agriculture (USDA) Soil Conservation Service, USDA Forest Service, and the State of Nebraska Soil and Water Conservation Commission. The 1966 Work Plan identified flooding, grade stabilization, and sediment and erosion damages within the watershed. The 1966 Work Plan proposed a combination of land treatment measures and 52 grade stabilization structures. Eight Supplements have been completed since this 1966 Work Plan and 30 of the 52 grade stabilization structures have been constructed.

The U.S. Army Corps of Engineers (USACE), Omaha District issued a report in 1967 entitled *Review Report for Papillion Creek and Tributaries, Nebraska* (USACE, 1967), which was being written when the 1966 Work Plan was issued. The proposed 1967 USACE Report was referenced in the 1966 Work Plan as the means to address the flooding problems within the watershed. This 1967 USACE Report proposed a system of 21 dams for the purposes of flood control, recreation, and water quality. Of the 21 structures, nine have been constructed and one structure is no longer viable due to a proposed roadway (DS 14).

The Papillion Creek Watershed Partnership (PCWP) was formed in 2001 through an inter-local agreement between nine local governments to analyze and address the issues of water quality and water quantity throughout the watershed. Many studies have been completed since the creation of the PCWP. Three of these studies that addressed the issue of water quantity include the *Multi-Reservoir Analysis* (HDR, 2004), the *Papillion Creek Watershed Management Plan* (Management Plan) (HDR, 2009), and the *Papillion Creek Watershed Management Plan* (MDR, 2014).

The *Multi-Reservoir Analysis* (HDR, 2004) evaluated fourteen of the remaining dam sites as identified in the 1967 USACE Report in various dam combination alternatives. The Management Plan (HDR, 2009) evaluated water quantity and water quality improvement strategies and policy controls, including an analysis of 19 dam sites and other potential solutions to water quantity issues such as using low impact development (LID) strategies to address both existing (2004) conditions and full build-out (future) conditions. The 19 dam sites included eight sites from the 2004 analysis (HDR, 2004) and 11 additional sites. The Management Plan recommended a combination of 15 dam sites in conjunction with LID strategies to provide the watershed with flood risk reduction.

1.3 Purpose and Need

Channel degradation continues to be a problem in the Papillion Creek Watershed where the planned grade stabilization structures in the original Papillion Creek Watershed plan were not implemented. The sponsors have also identified flooding damages and water quality issues due to sedimentation as problems the public wants to be addressed. Representative photographs of existing conditions at each site are included in Appendix D.

The purpose of **Sites W-5**, **D-78**, **D-2**, **and S-15** is to provide watershed protection through grade stabilization along their respective creeks, as identified in the original 1966 Work Plan. Site S-15 was



removed from the 1966 Work Plan in a 1995 Supplemental Plan due to interference with a planned urban development. The planned development did not come to fruition due to insufficient funding and grade stabilization remains a problem at this site. Therefore, Site S-15 is being reintroduced within this Supplemental Plan-EA.

The purpose of **Site S-5** is to provide watershed protection through grade stabilization and improved safety along the Beadle Creek stream corridor between Lillian Street and the confluence of South Papillion Creek.

The purpose of **Site S-1** is to provide watershed protection through sediment capture on South Papillion Creek and grade stabilization along South Papillion Creek and an unnamed tributary between South 204th Street and South 216th Street.

The purpose of Site D-31 (referred to herein as **Site WP-1**) is to provide long term flood damage reduction within the West Papillion Creek subwatershed so that, under full build-out conditions, there is no increase in the extent of the 100-year floodplain as currently mapped by FEMA.

The hazard classification of all structures evaluated in the original work plan was low hazard (shown in Figure 1-2, below). A low hazard classification is for dams in predominantly rural or agricultural areas where failure may damage farm buildings, agricultural land, or township and county roads. Since the work plan was approved, additional residential development has occurred in the watershed downstream of the structures, and additional development is in the planning stage. Approximately 2,000 acres of agricultural land is developed each year in the Omaha metro area. Structure WP-1 is now classified as high hazard due to the proximity to the city limits and potential loss of life if the structure would fail. The NRCS State Conservation Engineer has concurred with the high hazard designation.







Draft Supplemental Watershed Plan-EA Papillion Creek Watershed



1.4 Federal Objective and Guiding Principles

As set forth in the Water Resources Development Act of 2007 and as stated in the PR&G, the <u>Federal</u> <u>Objective</u> specifies the fundamental goal of Federal investments in water resources and is as follows:

Federal water resources investments shall reflect national priorities, encourage economic development, and protect the environment by:

(1) seeking to maximize sustainable economic development;

(2) seeking to avoid the unwise use of floodplains and flood-prone areas and minimizing adverse impacts and vulnerabilities in any case in which a floodplain or flood-prone area must be used; and(3) protecting and restoring the functions of natural systems and mitigating any unavoidable damage to natural systems.

The <u>Guiding Principles</u> are overarching concepts that the Federal government seeks to achieve through the Federal Objective and are listed below. It is important to note that they do not have a hierarchal relationship and are therefore not listed in order of rank or importance.

- A. Healthy and Resilient Ecosystems
- B. Sustainable Economic Development
- C. Floodplains
- D. Public Safety
- E. Environmental Justice
- F. Watershed Approach

In addition to the Federal Objective and Guiding Principles, Step 2 of the NRCS Planning Process was conducted as outlined in the National Planning Procedures Handbook as well as guidelines presented in the NWPM, the NWPH, and PR&G were consulted during project scoping.

1.5 Problems and Opportunities

1.5.1 Problems

Most major channels within the Papillion Creek Watershed were straightened in the early 1900s, increasing velocities and accelerating channel degradation. Channel degradation and widening within the watershed was identified in the 1966 Work Plan and continues to be a common problem due to the deep deposits of loess soil. This results in incised channels, high banks, and loss of land. Vertical channel banks of greater than 20-feet are commonplace and pose a risk to the public. Infrastructure is often placed along the channel corridor and channel degradation and widening cause costly and dangerous infrastructure damage. Channel bed and bank erosion also results in sedimentation that decreases water quality downstream. All sites within this Supplemental Plan-EA were identified in the 1966 Work Plan and continue to show signs of degradation.

Flooding is another significant problem within the watershed that results in damage to urban, agricultural, and rural lands. Many studies have been completed within the watershed to identify flood damages and potential flood damage reduction measures, as discussed in Section 1.2. Sites WP-1 and DS-19 were included in the PCWP 2009 Management Plan and the PCWP 2014 Plan Update (HDR, 2014) as part of the overall watershed approach to reduce flood damages.



1.5.2 Opportunities

There are many opportunities to improve the quality of life and environmental conditions within this watershed. Protecting streams from degradation, restoring streams, capturing sediment to improve water quality and farming, and reducing flooding will improve economic conditions and decrease the threat to human safety.

2.0 SCOPE OF THE ENVIRONMENTAL ASSESSMENT

The scope of the Environmental Assessment (EA) is based on resources identified in previous studies as well as current site investigations and scoping meetings with the NRCS, the Sponsor, and interested agencies and individuals. The following section identifies the resources of concern that were deemed relevant to decision making as well as resources that were considered but not studied in detail.

A scoping meeting was held with the Sponsor, State NRCS staff, and the National Water Management Center (NWMC) in March 2019 to discuss problems and opportunities within the watershed and to identify potential resource concerns. Additional scoping meetings were held between the Sponsor and State NRCS staff.

Public and agency scoping meetings were held in July 2019 for the seven project sites included in this Supplemental Plan-EA. Background on the project, preliminary design alternatives, project extents, and other relevant information about the project were discussed. Agencies and the public were given opportunities to express concerns in person at the meeting, by email, and through comment cards and resources of concern questionnaires provided at the meeting. A link to a website with project information was also shared for additional and updated information. Provided feedback was used to assist in scoping the resources of concern for this EA. Additional information on public and agency involvement is included in Chapter 6.0.

Tribal consultation was conducted in accordance with the National Historic Preservation Act (NHPA) of 1966 and Executive Order (EO) 13175, *Consultation and Coordination with Indian Tribal Governments*, to maintain NRCS' government-to-government relationship with Tribes. NRCS sent letters to the Iowa Tribe of Kansas and Nebraska, the Iowa Tribe of Oklahoma, the Omaha Tribe of Nebraska, the Otoe-Missouria Tribe of Indians in Oklahoma, the Pawnee Nation of Oklahoma, the Ponca Tribe of Nebraska, the Ponca Tribe of Indians of Oklahoma, the Sac and Fox Nation of Missouri in Kansas and Nebraska, the Sac and Fox Tribe of the Mississippi in Iowa, and the Sac and Fox Nation of Oklahoma notifying them of the scoping process and requesting input on resource concerns.

A summary of scoping is provided in Table 2-1, which identifies resources that are relevant to the project and those that are not studied further within this EA. Resources marked relevant are studied in further detail throughout this document. Impacts of alternatives carried forward for detailed analysis are included in Chapter 5.0, Environmental Consequences.

Item / Concern	Relevant?		Rationale	
Soils	·			
Erosion and Sedimentation	x		Erosion contributes to land damage and depreciation and water quality impairments. Aggradations of eroded sediment contributes to sedimentation in streams and reservoirs and reduces water quality.	

Table 2-1. Summary of Scoping





	Relevant?		Potienale	
Item / Concern			Rationale	
Prime and Unique Farmland	Х		Stream bank erosion threatens prime and unique farmland, alternatives could impact prime and unique farmland.	
Soil Quality	х		There may be minor impacts on soil quality. Soil impacts due to erosion and sedimentation are discussed under the Soil Erosion and Sedimentation sections.	
Water				
Water Quality	х		Water quality within the streams of the watershed is reduced due to sedimentation and the influx of nutrients.	
Water Quantity	Х		There is a need to reduce peak flows to reduce flood damages. Water quantity is discussed and analyzed with Flood Damages.	
Regional Water Management Plans	х		Regional Water Management plans exist within the Watershed.	
Floodplain Management	х		Alternatives could impact the 100-year floodplain.	
Wetlands and Waters of the U.S.	Х		USACE Section 404 permits are anticipated.	
Wild and Scenic Rivers		Х	No designated rivers within the watershed.	
Air				
Air Quality		х	Potential alternatives will not impact the emission rate of any regulated air pollutant and is not subject to any other federal, state, or local air quality regulation.	
Plants				
Threatened and Endangered Species	х		Species have known ranges within the watershed.	
Invasive Species		Х	Alternatives will not cause or promote the introduction and/or spread of invasive species.	
Natural Areas		Х	No Natural Areas will be impacted.	
Riparian Areas	Х		Sporadic, degraded riparian areas can be found in the watershed and may be impacted by alternatives.	
Habitats				
Fish and Wildlife Habitat	Х		Grasslands, woodlands, and fish and wildlife habitat are present.	



	Relevant?			
Item / Concern	Yes	No	Rationale	
Coastal Zone Management		Х	Designated coastal zone management areas are not present within the watershed.	
Coral Reefs		х	Coral reefs and associated waterbodies are not present within the watershed.	
Essential Fish Habitat		х	Essential fish habitat is not present within the watershed.	
Animals				
Threatened and Endangered Species	х		Species have known ranges within the watershed.	
Invasive Species		Х	Invasive species will not be introduced or spread.	
Migratory Birds/Bald and Golden Eagles	х		Migratory birds and bald eagles may be present.	
Humans				
Flood Damages	х		Flood damages are a concern within the watershed.	
Cost	х		Required by the Principles, Requirements, and Guidelines for Water and Land Related Resources Implementation Studies (PR&G)	
Historic and Cultural Properties	х		Potential impact to cultural resources, studies to determine impact included as part of this Supplemental Plan-EA.	
Social and Demographic Data	Х		Potential to impact subject populations, studies to determine impact included as part of this Supplemental Plan-EA.	
Potable Water Supply		Х	Sufficient potable water	
Public Health and Safety	Х		Degrading and widening streams and flooding create a risk to the public's safety.	
Scenic Beauty and Parklands		х	The proposed project does not occur within an area specifically designated unique or valuable scenic landscape.	
Climate Change	Х		Required for PR&G analysis	
Land Use	х		Required by PR&G analysis	
Adaptive Management	Х		Required by PR&G analysis	

In addition to the resources identified as relevant, alternatives carried forward for detailed analysis will also be evaluated with respect to the Federal Objective and Guiding Principles, as required under the PR&G.



3.0 AFFECTED ENVIRONMENT

The following chapter describes the existing conditions of resources identified as relevant during scoping (see Table 2-1). Due to watershed changes that have occurred since the 1966 Work Plan, the resources are described for the entire watershed except where noted below.

3.1 Soil Erosion and Sedimentation

Approximately 896,940 tons of soil erode annually, resulting in resource problems within the Papillion Creek Watershed. Erosion losses are shown in Table 3-1 and calculation details are provided in Appendix D.

Erosion Source	Amount of Erosion (tons/year)
Sheet and Rill	857,470 ¹
Ephemeral and Gully	1,880 ²
Channel/Streambank	37,590 ²
Total	896,940

Table 3-1. Annual Erosion within Papillion Creek Watershed

¹See Table D6-1

²See Table D6-3

Note: Values rounded to the nearest 10 tons/year

Sediment is produced from all parts of the watershed from all land uses. Sheet and rill erosion is the dominant erosion process in the watershed, accounting for over ninety percent of total erosion. The largest single contributor to this is untreated cropland. Sheet and rill erosion reduces crop yields and lowers long-term productivity of cropland due to depletion of topsoil. Crops are destroyed or damaged as sediment is redistributed on fields, especially where sediment laden runoff moves across areas of reduced slope or encounters roads and fence lines. Farm machinery is also subjected to additional wear and tear during farming operations in these areas. The second largest contributor of erosion is channel/streambank erosion and the watershed contains many continually eroding streams. Stream degradation and widening results in loss of agricultural and urban land and poses a public health and safety concern as the stream banks become vertical and can reach heights of over 30 feet tall.

Sedimentation is the portion of total erosion that is transported from its point of origin and delivered to a specific location such as the stream system or the watershed outlet. Sediment transport occurs primarily by water, either as overland runoff or channelized flow in this watershed.

The largest erosion process contributing to delivered sediment is sheet and rill erosion and the largest contributing land use is cropland. Sheet and rill erosion, however, has a low sediment delivery efficiency because overland runoff leaves material behind as depositions on fields, at field boundaries, in road ditches, and other obstacles. An estimated 25 percent of sheet and rill erosion produced annually moves through the stream system. Ephemeral and gully erosion is somewhat more efficient at sediment delivery, due to the proximity to flow channels with an estimated 65 percent delivery rate. Streambank erosion is much more efficiently delivered, due to the greater carrying capacity of channelized flow with an estimated 90 percent delivery rate. Based on the estimated sediment delivery rates, the total sediment produced annually within the Papillion Creek Watershed is 249,420 tons of sediment per year (Table 3-2).



Tuble 5 2. Seament Founded / annually maint apinion ereek matersheu			
Erosion Source	Sediment Transported Downstream (tons/year)		
Sheet and Rill	214,370		
Ephemeral and Gully	1,220		
Channel/Streambank	33,830		
Total	249,420		

Table 3-2. Sediment Produced Annually within Papillion Creek Watershed

Note: Values rounded to the nearest 10 tons/year

3.2 Prime and Unique Farmland

The Farmland Protection Policy Act (FPPA) was established to avoid significant, irreversible losses of farmland. Prime farmland (defined under the FPPA) and farmland of statewide importance are lands that exhibit the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is also available for these uses (SSM 2017). These lands have the soil quality, growing season, and moisture supply needed to produce economically sustainable high yields of crops. The use of acceptable farming methods, including water management, can be used to attain sustainable yields. Prime farmlands generally have an adequate and dependable water supply (from precipitation or irrigation), are not excessively erodible or saturated for long periods of time, and do not flood frequently (SSM 2017). Prime farmland is land that is available for farming, but could currently be cropland, pastureland, rangeland, forestland, or other land, but not urban built-up land or water. More information about the criteria for prime farmland and farmland of statewide importance is available at the local office of the NRCS.

There are approximately 117,400-acres of prime farmland and farmland of statewide importance within the watershed, or approximately 48 percent of the land. Figure 3-1 shows the extents of the prime farmland and farmland of statewide importance within the watershed. The soil types and areas of NRCS soil map units within the watershed that are prime farmland and farmland of statewide importance are listed in Table 3-3 below.

Map Unit Symbol	Map Unit Name	Rating	Area (acres)
3643	Kezan-Kennebec silt loams, drained, occasionally flooded	Prime farmland if drained	2,515
6452	Clamo-Zook-Kezan silty clay loams, occasionally flooded	Prime farmland if drained	717
6756	Nora silt loam, 6 to 11 percent slopes, eroded	Farmland of statewide importance	37
7050	Kennebec silt loam, occasionally flooded	All areas are prime farmland	14,238
7228	Burchard clay loam, 6 to 11 percent slopes, eroded	Farmland of statewide importance	112
7234	Judson silty clay loam, 2 to 6 percent slopes	All areas are prime farmland	19,949
7812	Smithland-Kenridge silty clay loams, occasionally flooded	Prime farmland if drained	4,584

Table 3-3. Prime Farmland and Farmland of Statewide Importance within the Watershed





Map Unit Symbol	Map Unit Name	Rating	Area (acres)
8010	Ida silt loam, 6 to 11 percent slopes, eroded	Farmland of statewide importance	405
8016	Marshall silty clay loam, dry, 0 to 2 percent slopes	All areas are prime farmland	6,909
8019	Marshall silty clay loam, 2 to 6 percent slopes	All areas are prime farmland	6,938
8032	Marshall-Pohocco silty clay loams, 6 to 11 percent slopes, eroded	Farmland of statewide importance	15,225
8035	Marshall-Contrary silty clay loams, 2 to 7 percent slopes	All areas are prime farmland	16,664
8041	Melia silty clay loam, 0 to 2 percent slopes	All areas are prime farmland	2,240
8076	Monona silt loam, 1 to 6 percent slopes, eroded	All areas are prime farmland	802
8097	Monona-Pohocco complex, 6 to 11 percent slopes, eroded	Farmland of statewide importance	1,129
8153	Contrary-Marshall silty clay loams, 6 to 11 percent slopes	Farmland of statewide importance	22,328
8155	Contrary-Monona silty clay loams, 6 to 11 percent slopes	Farmland of statewide importance	2,654

Source: United States Department of Agriculture (USDA). Web Soil Survey. Accessed 2019.







Source: United States Department of Agriculture (USDA). Web Soil Survey. Accessed 2019.

3.3 Water Quality

The 2018 Nebraska Water Quality Integrated Report (IR) is used to establish a priority ranking of perennial streams based on water quality and beneficial uses. The IR defines multiple categories of waterbodies to help present information in a complete, descriptive manner.

These categories include the following:

• Category 1. Waterbodies where all designated uses are met.



- Category 2. Waterbodies where some of the designated uses are met but there is insufficient information to determine if all uses are being met.
- Category 3. Waterbody where there is insufficient data to determine if any beneficial uses are being met.
- Category 4. Waterbody is impaired, but a total maximum daily loads (TMDL) is not needed.
- Category 5. Waterbody where one or more beneficial uses are determined to be impaired by one or more pollutants and all the TMDLs have not been developed. Category 5 waters constitute the Section 303(d) list subject to EPA approval/disapproval.

There are five stream segments within the Papillion Creek Watershed listed as Category 5 waterbodies. All five of these streams are listed on the State's 303(d) list due to impaired aquatic life. Four of the streams have impaired aquatic communities and one has impaired dissolved oxygen for aquatic life. Additionally, one stream segment is listed for impaired stream aesthetics due to trash located within the stream. There are five stream segments listed as Category 4 waterbodies due to recreational E. coli impairments and an E. coli TMDL was approved in September 2009. See Figure 3-2 for a map of the IR Stream Categories.



Figure 3-2. IR Stream Categories



Nebraska Department of Environmental Quality. 2018 Water Quality Integrated Report. April 2018.

Beneficial uses are assigned to surface waters within or bordering the State of Nebraska according to the Nebraska Department of Environment and Energy (NDEE). All uses are not assigned to all waters and use attainability analyses are utilized on a waterbody by waterbody basis to determine whether the use(s) are applicable. These beneficial uses defined by the NDEE include Primary Contact Recreation, Aquatic Life (Coldwater A, Coldwater B, Warmwater A, and Warmwater B), Water Supply (Public Drinking Water, Agricultural, and Industrial), and Aesthetics. The beneficial uses within the Papillion Creek Watershed are described below.



<u>Primary Contact Recreation</u>. Primary contact recreation applies to surface waters which are used, or have a high potential to be used, for primary contact recreation activities. Primary contact recreation includes activities where the body may come into prolonged or intimate contact with the water, such that water may be accidentally ingested and sensitive body organs (e.g., eyes, ears, nose, etc.) may be exposed. These waters shall be free from toxic substances, alone or in combination with other substances, in concentrations that result in adverse health impacts to humans participating in primary contact recreation and *E. coli* bacteria shall not exceed a geometric mean of 126/100 ml. Six streams and nine lakes within the watershed are listed for Primary Contact Recreation.

Aquatic Life. Aquatic life for each waterbody is ranked as being either Coldwater (Class A or B) or Warmwater (Class A or B). The most downstream reaches of Papillion Creek and Big Papillion Creek and all reservoirs in the 2018 IR Report within the Watershed are listed as Warmwater Class A. Classification for Class A Warmwater Aquatic Life means that these waters provide, or could provide, a habitat suitable for maintaining one or more identified key species (channel catfish) on a year-round basis. These waters can maintain year-round populations of a variety of other warmwater fish and associated vertebrate and invertebrate organisms and plants. The upstream tributaries within the watershed are listed as Class B Warmwater, which means these are waters where the variety of warmwater biota is presently limited by water volume or flow, water quality (natural or irretrievable human-induced conditions), substrate composition, or other habitat conditions. These waters are only capable of maintaining year-round populations of tolerant warmwater fish and associated vertebrate and invertebrate organisms and plants. Key species may be supported on a seasonal or intermittent basis but year-round populations cannot be maintained.

<u>Water Supply</u>. All waters within Papillion Creek Watershed are classified for Class A Agriculture Water Supply. Designation for Water Supply means that Class A Agriculture waters can be used for general agriculture purposes such as irrigation and livestock watering without treatment. Nitrate and nitrite as nitrogen cannot exceed 100 mg/l, selenium cannot exceed 0.02 mg/l, and conductivity cannot exceed 2,000 umhos/cm between April 1 and September 30.

<u>Aesthetics.</u> These waters are also protected for an Aesthetic Beneficial Use, meaning they must be free from human induced pollution which causes: noxious odors; floating, suspended, colloidal, or settleable materials that produce objectionable film, colors, turbidity, or deposits; and the occurrence of undesirable or nuisance aquatic life such as algal blooms.

3.4 Regional Watershed Management Plans

This Supplemental Plan-EA includes locations covered under the following regional water resource plans that were considered during the scoping process.

<u>Multi-Reservoir Analysis, Papillion Creek Watershed (2004)</u>. This analysis was released in September 2004 by the Sponsor to analyze flooding problems in the watershed as a continuation of the 1967 Report. The analysis assesses the feasibility of the unbuilt dams from the 1967 Report and includes two locations near sites that were identified in the 1966 Work Plan (S-1 and WP-1).

<u>Papillion Creek Watershed Management Plan (2009).</u> The Papillion Creek Watershed Management Plan (Management Plan) was released in April of 2009 by the Papillion Creek Watershed Partnership (PCWP) as



a part of their on-going objective for improved stormwater management within the watershed. The Sponsor is a member of the PCWP. The watershed management plan includes updated stormwater management policies, enabling bonding and a stormwater utility fee system authority for the Sponsor, recommended project and financing, and potential long-term capital improvement projects. This analysis also included two locations near sites that were identified in the 1966 Work Plan (S-1 and WP-1).

<u>Papillion Creek Watershed Management Plan – March 2014 Update</u>. The plan update was released in March of 2014 as part of the PCWP's mission for improved stormwater management. This plan provides progress updates on various management practices, including financial needs for remaining structural projects.

<u>Papio-Missouri River Basin Water Quality Management Plan (2018).</u> This plan was released in June of 2018 by the Sponsor to provide a concise summary of water resource conditions to provide direction and a coordinated approach for addressing nonpoint source pollution. This plan received Section 319 funding through the Nebraska Nonpoint Source Management Program administered by the Nebraska Department of Environment and Energy (NDEE), formerly the Nebraska Department of Environmental Quality (NDEQ), to facilitate the management of nonpoint source pollution.

<u>P-MRNRD Groundwater Management Plan (2018)</u>. This groundwater management plan was adopted in February of 2018 for the P-MRNRD boundary, which encompasses the entire watershed. The purpose of the plan is to describe the groundwater resources available, current demands and contamination levels of the resources, and define the methods that the NRD will use to oversee the sustainable use of the groundwater resources.

Papillion Creek and Tributaries Lakes, Nebraska Final Feasibility Report and Environmental Assessment (2021). The USACE developed a final feasibility report, environmental assessment, and Finding of No Significant Impact (FONSI) as part of a General Reevaluation Study of the Papillion Creek to reduce flood risks for the Papillion Creek Watershed. The study identifies opportunities, develops alternatives, and selects a proposed plan to reduce flood risk within the watershed. The Recommended Plan was also the National Economic Development (NED) plan for flood risk management and included Site DS-19. NEPA considerations were analyzed for the site, it was recommended for implementation funding, and the Sponsor has begun purchasing land for construction.

3.5 Floodplains

The Federal Emergency Management Agency (FEMA) 100-year floodplains and floodways are mapped by FEMA along major streams within the watershed and encompass areas with a 1 percent chance of being inundated by a flood event in any given year. The 100-year floodplain is broken down into five types of zones, three of which are included within the watershed. Zone A does not include base flood elevations, Zone AE includes base flood elevations, and Zone AO includes sheet flow, ponding, or shallow flooding and also includes base flood depths above ground elevation. In the Papillion Creek Watershed, Zone A is generally mapped within Washington County, Zone AE within Douglas and Sarpy County, and there is one small area of Zone AO (see Figure 3-3). All areas outside of the 100-year floodplain have less than a 1 percent chance of inundation in any given year.

The delineated FEMA Floodway includes areas with restrictions on cumulatively raising the water surface elevation above a designated height. Development in the FEMA Floodways are regulated to ensure that



there are no increases in upstream flood elevations and are mapped along streams in Douglas and Sarpy Counties, as shown in Figure 3-3 below.



Figure 3-3. FEMA Floodplains

Source: United States Department of Homeland Security. FEMA Flood Map Service Center. NFHL Data. September 2019.

3.6 Wetlands

The United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) provides detailed information on the abundance, characteristics, and distribution of wetlands within the United States. There are approximately 2,700-acres of NWI areas within the watershed. Approximately half of these NWI areas are riverine wetlands within and along the streams and tributaries. Freshwater emergent wetlands in this


area are typically represented by *Phalaris arundinacea* and freshwater forested/shrub wetlands are typically dominated by *Salix species* and *Populus deltoides*. The acreage within the subwatershed of each type of wetland and the Cowardin classification (as classified by the NWI) are included in Table 3-4 below and shown in Figure 3-4.

Wetland Type	Cowardin Classification	Area (ac)
	Palustrine emergent, temporarily flooded	21
Freshwater Emergent	Palustrine emergent, seasonally flooded	219
Wetland	Palustrine emergent, semi-permanently flooded	1
	Subtotal	241
Freshwater	Palustrine forested, temporarily flooded	200
Forested/Shrub	Palustrine scrub-shrub, temporarily flooded	23
Wetland	Subtotal	224
	Palustrine aquatic bed, semi-permanently flooded	17
	Palustrine unconsolidated bottom, semi-permanently flooded	174
Freeburgton Daniel	Palustrine unconsolidated bottom, intermittently exposed	23
Freshwater Pond	Palustrine unconsolidated shore, temporarily flooded	2
	Palustrine unconsolidated shore, seasonally flooded	8
	Subtotal	225
	Lacustrine limnetic unconsolidated bottom, permanently flooded	576
Lake	Lacustrine littoral aquatic bed, intermittently exposed	23
	Lacustrine littoral unconsolidated shore, seasonally flooded	28
	Subtotal	627
	Riverine lower perennial unconsolidated bottom, intermittently exposed	50
	Riverine intermittent streambed, temporarily flooded	2
Riverine	Riverine intermittent streambed, seasonally flooded	1235
	Riverine unknown perennial unconsolidated bottom, permanently flooded	102
	Subtotal	1,388
	Total	2,704

Table 3-4. NWI Areas within the Papillion Creek Watershed

Source: United States Fish and Wildlife Service (USFWS). National Wetlands Inventory. NE Wetlands East. Last updated October 2018.





Figure 3-4. Papillion Creek Watershed NWI Areas

Source: United States Fish and Wildlife Service (USFWS). National Wetlands Inventory. NE Wetlands East. Last updated October 2018.

3.7 Streams and Riparian Habitat

Papillion Creek, Big Papillion Creek, Little Papillion Creek, and West Papillion Creek are the four main perennial streams within the Papillion Creek Watershed and flow in a southeasterly direction. These four creeks are perennial except for the headwaters of the Big Papillion Creek and Little Papillion Creek, which are intermittent. The creek lengths and drainage areas of these major streams are included in Table 3-5 and shown in Figure 3-5.



Table 3-5. Stream Lengths with Papillion Creek Watershed

Stream	Drainage Area (mi ²)	Length (mi)
Papillion Creek	384	10.2
Big Papillion Creek	233	39.3
West Papillion Creek	69	16.4
Little Papillion Creek	59	18.4

Source: United States Geological Survey (USGS), National Hydrography Dataset (NHD). Updated: 2020.



Figure 3-5. Watershed Streams

Source: United States Geological Survey (USGS), National Hydrography Dataset (NHD). Updated: 2020.



3.8 Threatened and Endangered Species

There are eleven (11) state and federally listed endangered, threatened, proposed, and candidate species with known ranges in Sarpy, Douglas, and Washington counties. Of those eleven, one occurs outside of the Papillion Creek Watershed (southern flying squirrel) and seven do not have ranges within the seven project sites discussed in this Supplemental Plan-EA (interior least tern, pallid sturgeon, piping plover, red knot, American Ginseng, lake sturgeon, and sicklefin chub) according to the Nebraska Conservation and Environmental Review Tool (CERT) and confirmed by consultation with USFWS (Appendix A). The river otter (*Lontra canadensis*) was identified as a species of concern in the early planning phases of this project but was later removed from the state threatened species list and is therefore not included in this EA. The remaining three two species and their habitat requirements are described below based on information available from the USFWS and the Nebraska Game and Parks Commission (NGPC).

Northern Long-eared Bat (Myotis septentrionalis) – Federally Threatened

This medium-sized bat is approximately 3- to 3.7-inches in length with a wingspan of 9- to 10-inches and is distinguished by its long ears, particularly as compared to other bats in its genus. Their fur color can be medium to dark brown on the back and tawny to pale-brown on its underside. These bats spend winters hibernating in caves and mines (called hibernacula) with constant temperatures, high humidity, and no air currents. During the summer, they roost either singly or in colonies underneath bark, in cavities or in crevices in both live and dead trees, and within structures like barns, sheds, and culverts.

Pregnant females spend summer months roosting in small colonies generally composed of 30 to 60 bats at the beginning of summer. Most of these females will give birth at the same time, which may occur from late May to late July. The predominant and most immediate threat to the Northern long-eared bat is white-nose syndrome, a fungal disease that affects hibernating bats. This fungus causes changes in bats that make them more active than usual and in turn they burn up fat stores needed to survive the winter.

Western Prairie Fringed Orchid (Platanthera praeclara) – Federally Threatened

This orchid is a native perennial forb distinguished by large, white flowers on a single stem that grows up to 3-feet high. Each flower stalk has up to 40 flowers that have fringed margins and are approximately one inch long. It was historically found throughout the tallgrass regions of North America and now occurs in 30 counties in Nebraska, including the majority of Sarpy County. Habitat includes wet to moist soils with full sunlight in wet unplowed tallgrass prairies and meadows as well as bogs, fens, and sedge meadows.

The greatest threat to the Western prairie fringed orchid is habitat loss, predominantly through the conversion of habitat for crop production, grazing, intensive haying, and drainage. Additional threats include overuse of herbicides, livestock overgrazing, and other detrimental practices to native prairies.

Monarch Butterfly (Danaus plexippus) – Candidate Federally Threatened

Monarch butterflies are large and have bright orange wings with a black outline and black veins. Monarchs lay their eggs on milkweed host plants during the breeding season and the larvae feed on the milkweed plants. Adult monarch butterflies pollinate many flowering plants. Monarchs migrate to warmer areas for the winter.



The loss of milkweed and habitat has been the biggest threat to this species. The cutting of fir forests is an additional threat to monarchs' wintering sites. Use of insecticides and herbicides have been linked to the declining monarch butterfly population.

3.9 Fish and Wildlife Habitat

The available wildlife habitat within the watershed is largely disturbed by agriculture and developments. Almost half of the watershed is developed with urban and suburban areas. Rabbits, coyotes, opossums, raccoons, skunks, and squirrels are some of the main types of mammals typically found in the developed areas. Agricultural land is another primary wildlife habitat and is typically home to species that feed on crops such as white-tailed deer, rabbits, mice, squirrels, striped skunks, raccoons, and pheasants. Grassland and pastureland provide habitat for similar species and are scattered throughout the watershed, predominantly as small, discontinuous areas in agricultural areas or adjacent to streams. Grasslands in this part of Nebraska were often historically tallgrass prairies that have since been plowed for agriculture or development. Small artificial wetland areas have been established in some of the agricultural fields or riverine areas and make up a small percentage of the watershed. These wetlands provide habitat for wildlife species that vary by season and wetland hydrologic condition.

Woodland habitats are commonly located adjacent to streams and make up approximately two percent of the watershed. In eastern Nebraska, woodland community types are considered relatively rare. The woodlands found within the Papillion Creek Watershed pre-settlement would probably have been classified as either the Eastern Dry-Mesic Bur Oak Forest and Woodland ecological system or the Eastern Upland Oak Bluff Forest ecological system (NGPC 2010). The trees that are typical of the watershed include *Fraxinus pennsylvanica* (green ash), *Populus deltoides* (eastern cottonwood), *Morus alba* (white mulberry), *Acer saccharinum* (silver maple), *Ulmus pumila* (siberian elm), *Ulmus americana* (american elm), *Celtis occidentalis* (hackberry), *Gleditsia triacanthos* (honey locust), and *Salix nigra* (black willow). The watershed is most closely represented by the Eastern Riparian Forest within the Eastern Upland Oak Bluff Forest ecological system. Underlined species represent species that are listed as 'most abundant' within the Eastern Riparian Forest community by Rolfsmeier and Steinauer (NGPC 2010). The woodland areas may provide habitat for nesting of migratory birds, which occurs primarily between April 1st and July 15.

In-stream habitat for fish is generally lacking throughout the watershed due to poor substrate conditions and lack of vegetation and cover. Fish habitat is predominantly limited to small impoundments and major streams. Numerous ponds and lakes throughout the watershed provide habitat for fish, many of which are open to the public for fishing. Bluegill, channel catfish, largemouth bass, and walleye are some of the most prevalent fish within these waterbodies. There are four public waterbodies within the watershed that are known to contain trout.

3.10 Migratory Birds and Eagles

The Migratory Bird Treaty Act (MBTA) of 1918, as amended, Executive Order 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds), and the Bald and Golden Eagle Protection Act (BGEPA) of 1940, as amended, require NRCS to consider impacts on migratory bird and bald and golden eagle populations and habitats. Migratory birds are essentially all wild birds found in the United States with the exception of the house sparrow, starling, feral pigeon, and resident game birds. The protections under



MBTA and BGEPA cover the birds and their parts (including eggs, nests, and feathers) and therefore it is unlawful for private individuals or Federal agencies to kill, capture, collect, possess, buy, sell, trade, ship, import, or export any migratory bird. The BGEPA includes protections for any disturbance to bald and golden eagles and their nests.

Although the MBTA and BGEPA are applicable year-round, it is accepted that most migratory bird nesting activity occurs in Nebraska during the period of April 1 to July 15. Some migratory birds nest outside of this range. For example, raptors generally nest in woodland habitats during the period of February 1 to July 15.

Many species of migratory birds could be present and could nest within the watershed. Bird species of conservation concern can be found within and near the watershed and those with priority concern are included with habitat descriptions in Table 3-6 below (USFWS). The woodlands surrounding tributaries provide ample habitat for birds protected under the MBTA to nest. Golden eagles breed in western Nebraska, outside the range of the watershed, and are only found within the watershed during winter months. Bald eagles can be found within the watershed year-round and areas of high and moderate density of bald eagles are near the watershed. There are no known bald eagle winter roost sites or nests within 0.5-miles of the project sites.

Species	Potential to Breed in Area	Description
American Golden- plover Pluvialis dominica	No	The American Golden Plover can be found in prairies, mudflats, shores, and in the summer in the tundra. During the migration season they are most often found in short-grass prairies, flooded pastures, and plowed fields.
Black-billed Cuckoo* Coccyzus erythropthalmus	Yes	This species typically occupies dense, wooded habitats that have strong associations with water. They are often found in environments such as deciduous woods, bogs and marshes, lakeshores, or abandoned farmlands or pastures.
Bobolink Dolichonyx oryzirorus	Yes	This bird is often found in hayfields and meadows, but during migration they are usually found in marshes.
Hudsonian Godwit <i>Limosa haemastica</i>	No	The Hudsonian Godwit is typically found occupying marshes, prairie pools, and mudflats. In the summer they can be found on the edge of the tundra. Their nesting habitat is in the far north where ponds, open woods, and patches of tundra are mixed.
Kentucky Warbler Oporornis formosus	Yes	In the summer these birds are often found in deep shaded woods with dense, humid thickets, bottomlands near streams, ravines in upland deciduous woods, and edges of swamps. In the winter the Kentucky Warbler prefers the dense lowland forests and second growth.
Lesser Yellowlegs Tringa flavipes	No	These birds often occupy marshes, mudflats, shores, and ponds, and in the summer they favor open boreal woods. They occur widely in migration, including coastal estuaries, salt and fresh marshes, and edges of lakes and ponds, typically more common on freshwater habitats.

Table 3-6. Birds of Conservation Concern



Species	Potential to Breed in Area	Description
Prothonotary	Yes	The Prothonotary Warbler can typically be found near wooded
Warbler		swamps. They nest near lakes, rivers, and ponds.
Protonotaria citrea		
Red-headed	Yes	This bird can be found in groves, farm country, orchards, shade
Woodpecker		trees, and large scattered trees.
Melanerpes		
erythrocephalus		
Rusty Blackbird	No	The Rusty Blackbird can be found in river groves and wooded
Euphagus		swamps. During migration and winter, these birds favor areas
carolinus		with trees near water such as wooded swamps and riverside
		forest. They have also been known to forage in open fields and
		cattle feedlots.
Short-billed	No	These birds are usually found in mudflats, tidal marshes, and
Dowitcher		pond edges. They favor freshwater ponds with muddy margins
Limnodromus		when they are inland.
griseus		
Wood Thrush*	Yes	This bird occupies mainly deciduous woodlands. During
Hylocichla		migration they are found in various kinds of woodland.
mustelina		

3.11 Flood Damages

Flood damage is a major concern within the watershed, which has a history of damaging floods. Approximately 40 percent of annual precipitation occurs during the summer thunderstorm season and floods or threats of floods occur almost every year during this season. The most damaging flood event occurred in June of 1964 and resulted in the loss of seven lives. Several recent flood events (1994, 1997, 1999, 2004, 2008, 2014, and 2019), three of which resulted in loss of life, highlight the severe flood risks that remain within the watershed despite flood-control measures implemented since the 1964 flood event (USACE 2019). Papillion Creek consistently results in damage from flood events due to the convergence of several major streams on the Papillion Creek. Significant urban development is progressing within the watershed, predominantly located in the upper portions of the watershed, and will continue to increase the damage potential from flooding. Despite construction of flood control, substantial potential for flood damages remains due to development and agriculture adjacent to streams and rapid development within the watershed.

Existing urban, road, and bridge flooding is extensive along West Papillion Creek (shown within the area of benefit downstream of Site WP-1 in Appendix B). Existing flood damages for various storm events are shown below in Table 3-7.



Flood Event	Road and Bridge Damages	Structure and Content Damages
50 year	\$730,400	\$1,417,800
100 year	\$935,000	\$6,138,500
500 year	\$3,029,400	\$55,973,800

Table 3-7. Existing Flooding Damages Downstream of Site WP-1

3.12 Historic and Cultural Resources

Section 106 of the National Historic Preservation Act of 1966, as amended (54 U.S.C. § 306108) and its implementing regulations (36 CFR Part 800) require federal agencies to take into account the effect of undertakings on historic properties. Historic properties are defined as cultural resources that are listed on or are eligible for listing on the National Register of Historic Places (NRHP). The Section 106 compliance process includes the following:

- Identify consulting parties.
- Identify cultural resources located within the Area of Potential Effect (APE) and evaluate their eligibility for inclusion on the National Register of Historic Places (NRHP).
- Assess the effects of the undertaking on historic properties within the APE.
- Consult with the State Historic Preservation Officer, federally recognized Indian tribes, the Advisory Council on Historic Preservation (as appropriate), and other interested parties to resolve adverse effects.

Cultural resources are physical or other expressions of human activity or occupation and include archeological sites, buildings, bridges, business districts, culturally significant landscapes, isolated artifacts or features, culturally sacred places, and objects of cultural and historic significance. In order for a cultural resource to be eligible for the NRHP, it must be associated with events significant to the broad patterns of history; associated with the lives of persons significant in the past; embody distinctive characteristics of a type, period, or method of construction, represent the work of a master, possess high artistic value, or represent a significant and distinguishable entity; and/or must yield or be likely to yield, information important to history or prehistory. If an undertaking will alter, damage, or destroy a historic property, the agency has a responsibility to avoid, minimize, or mitigate the adverse effect.

Several formal archeological surveys have been completed in the general project area, and over 200 archeological sites representing all periods of human occupation have been recorded within the watershed. Only five previously recorded archeological sites are located within one mile of the Preferred Alternative. These resources consist of historic farmsteads, prehistoric artifact scatters, and an early 20th century railroad grade.

Several properties listed on the NRHP are located within the watershed, including Father Flanagan's Boy's Home, Fort Crook Historic District, Gold Coast Historic District, the South Omaha Main Street District, portions of the Lincoln Highway, and two Central Plains Tradition archeological sites. None of these properties are located within 0.5-miles of the proposed area of potential effects.

<u>2019 Cultural Resource Inventory</u>: A cultural resource inventory consisting of background research and field surveys of the APE of the Preferred Alternative was completed in October and November of 2019.



Background research did not identify any properties listed on or eligible for the National Register of Historic Properties within the APE. The field surveys identified only one cultural resource site, a segment of an early 20th century railroad grade. The railroad grade was evaluated against the criteria of eligibility for listing on the National Register of Historic Places and was determined not eligible in consultation with the Nebraska State Historic Preservation Office in August 2021.

3.13 Social and Demographic Data

The watershed is rapidly developing and there are no anticipated major social, cultural, or political factors that may influence major changes in land use, speed of development, or management of resources. The watershed is located within Douglas, Sarpy, and Washington counites in Nebraska. There are over 170 census tracts located within the Papillion Creek Watershed. The watershed is part of the Omaha-Council Bluffs Metropolitan Statistical Area, which encompasses multiple population centers. The City of Omaha is the largest population center in the area. Populations of the counties and major population centers within the watershed are shown below in Table 3-8. As shown in Table 3-8, populations within the watershed have been increasing over the last 10 years.

Population Centers	2010 Populations ¹	2017 Populations ²	2020 Populations ³
Douglas County	517,110	549,706	584,526
City of Omaha	408,958	463,081	486,051
City of Ralston	5,943	7,348	6,494
City of Bennington	1,458	1,611	2,026
Sarpy County	158,840	175,188	190,604
City of Papillion	18,894	19,478	24,159
City of La Vista	15,758	17,062	16,746
City of Bellevue	50,137	53,040	64,176
Offutt Air Force Base	4,644	5,142	5,363
City of Gretna	4,441	5,045	5,083
Washington County	20,234	20,414	20,865
City of Blair	7,990	8,011	7,790

Table 3-8. Social and Demographic Data

¹Source: 2010 Census Data

²Source: 2017 American Community Survey (ACS) 5-Year Estimates

³Source: 2020 Census Data

In accordance with the Environmental Justice Departmental Regulation, it is imperative that the project is compliant with Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations." Although this project will provide many benefits, it is important to ensure any negative human health and/or environmental impacts are not disproportionately carried by minorities or low-income populations. Demographic and poverty data within the watershed are described below to ensure that the project will not disproportionally impact minority or low-income groups.

Table 3-9 shows the percentage of minorities within the three counties, the state of Nebraska, and the United States from 2020 Census data. A minority is a person who is a member of the following population



groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. As shown in Table 3-9, the percentage of minorities within the three counties vary significantly, with Douglas County having a significantly larger percent minority population than Sarpy and Washington Counties. The percentage of minorities within Douglas County is higher than the percentage of Nebraska but lower than the United States. Sarpy and Washington Counties, however, have percent minority populations below both the state and the country percentages.

Table 3-9. 2020 Census Demographic Data

Category	Douglas County	Sarpy County	Washington County	Nebraska	United States
Percent Minority	31.8%	20.0%	6.5%	21.6%	38.4%

Source: United States Census Bureau. 2020 Census.

Table 3-10 shows the percentage of people of all ages and minors (people under 18-years of age) below the poverty line within the watershed's counties, the state of Nebraska, and the United States from 2017 Census Bureau, Small Area Income and Poverty Estimates (SAIPE) Program data. Low-Income populations are identified as the populations living below the poverty line. As shown in Table 3-10, the percentages of all people and minors living below the poverty line in Douglas County are greater than Nebraska percentages and lower than the United States. Sarpy and Washington County have lower percentages in poverty than the state and nationwide percentages.

Table 3-10. 2020 Poverty Data

Category	Douglas County	Sarpy County	Washington County	Nebraska	United States
Percent in Poverty (all ages)	9.8%	4.9%	5.3%	9.2%	11.9%
Percent in Poverty (under 18)	10.2%	5.1%	6.3%	10.1%	15.7%

Source: United States Census Bureau. 2020 SAIPE data.

The minority, low income, and demographic index were analyzed with the Environmental Protection Agency's (EPA) Environmental Justice Screening and Mapping Tool (EJ SCREEN). The 2019 EJ Screen results showed 541 census block groups within the watershed. These 541 census block groups have ranges between 0 to 95 percent minority and 0 to 93 percent low-income (defined as income less than two times the poverty level). The demographic index (a combination of percent minority and percent low-income) varies between 0 and 87 percent within the watershed, which is in the 0 to 99th percentile for the state of Nebraska. The average demographic index, percent minority, and percent low income are 24 percent, 23 percent, and 26 percent, respectively.

Environmental justice communities, specifically minorities, low income, and Indian Tribes (NWPH 600.30) are not located within the affected resources areas of the 7 project sites.

3.14 Public Health and Safety

The Papillion Creek Watershed is a mix of urban and rural and has been continually developing. There is a potential risk to loss of life, property, and essential public services due to flooding. Multiple studies have analyzed flooding potential and developed a watershed approach to flood risk reduction (see Sections 1.2 and 3.4). Additionally, some streams are experiencing major degradation and widening and pose a risk to



the public due to high and eroding banks. Neighborhoods are often developed near watershed streams and as degradation and widening occur, stream footprints encroach into yards and homes. Stream degradation and bank failures also lead to infrastructure damage and interruptions to essential services, particularly to sanitary sewer and power lines that are frequently located adjacent to and cross under stream corridors within the watershed.

3.15 Ecosystem Services

An ecosystem services framework is required by the PR&G and provides for an integrated approach that allows consideration and transparent evaluation of the benefits (both tangible and intangible) and tradeoffs of potential alternatives. Four categories of ecosystem services are described in PR&G and are included below for ease of reference.

- 1. **Provisioning services** are tangible goods provided for direct human use and consumption, such as food, fiber, water, timber, or biomass.
- 2. **Regulating services** maintain a world in which it is possible for people to live, providing critical benefits that buffer against environmental catastrophe examples include flood and disease control, water filtration, climate stabilization, or crop pollination.
- 3. **Supporting services** refer to the underlying processes maintaining conditions for life on Earth, including nutrient cycling, soil formation, and primary production.
- 4. **Cultural services** make the world a place in which people want to live recreational use, spiritual, aesthetic viewsheds, or tribal values.

Project scoping (see Chapter 2) led to the determination of the number and variety of ecosystem services (or resources of concern) to be considered in the analysis and the existing conditions of these resources have been described in this chapter. Each resource of concern (or ecosystem service) is grouped into four service categories, shown below in Table 3-11. Ecosystem service flows are both monetary and non-monetary and appropriate metrics should be based on current methodology to quantify impacted services over time and project- and regional-specific information and values. A concept diagram included below as Figure 3-6 helps to provide a visual representation of the linkages between actions and social values.

Category	Resource		
Provisioning Services	Erosion and Sedimentation		
	Prime and Unique Farmland		
	Threatened and Endangered Species		
	Migratory Birds/Bald and Golden Eagles		
Regulating Services	Water Quality		
	Regional Water Management Plans		
	Floodplain Management		
	Streams and Riparian Habitat		
	Wetlands		
	Flood Damages		

Table 3-11. Categories of Ecosystem Services



Category	Resource		
	Public Health and Safety		
	Climate Change		
	Land Use		
	Fish and Wildlife Habitat		
Cultural Services	Historic and Cultural Properties		
	Environmental Justice		









4.0 ALTERNATIVES

Project formulation revolved around the project purpose and need at each previously identified site, existing resource conditions, originally identified preferred alternatives, and changes in design, technology, and environmental policies and requirements. Plans that could be implemented under the authorities of other Federal agencies, state and local entitles, and nongovernmental interests were also considered. Accordingly, local, state, regional, Federal, and nongovernmental interests participated in the formulation process. Measures considered in the formulation of alternative plans included those measures believed to be effective, efficient, and acceptable in achieving or satisfying the purpose at each previously identified site. Table 4-1 provides a summary of the recommended alternatives in the 1966 Work Plan.

Site	Drop (feet)	Type of Structure ¹	Hazard Classification ²
W-5	25	Drop Inlet	b (Significant)
D-78	14	Drop Inlet	b (Significant)
D-2	20	Drop Inlet	b (Significant)
D-31 (WP-1)	19	Drop Inlet	b (Significant)
S-1	17.5	Drop Inlet	b (Significant)
S-5	24	Drop Inlet	b (Significant)
S-15	25	Drop Inlet	b (Significant)

Table 4-1. Recommended Alternative in 1966 Work Plan

¹Drop inlet consists of earthen dam with riser, principal spillway pipe, and grassed emergency spillway. Typical structure detail included in Appendix D.

²Class b (Significant Hazard) classification based on projected build-out at time of 1966 Work Plan development.

4.1 Formulation Process

The formulation process is the basis for selecting combinations of measures to include as alternatives. The combination of alternatives developed are based on measures that could meet the project site purposes and take into consideration multiple Federal requirements to streamline the planning and decision-making process. This analysis is meant to satisfy the alternative development and screening criteria requirements of NEPA, Clean Water Act (CWA) Section 404(b)(1) guidelines, and Principles, Requirements, and Guidelines (PR&G) for Federal investments in water resources. This means that a wider range of alternatives and a varied screening process was used to satisfy all applicable Federal alternatives analysis requirements to reduce the time, cost, and cumbersome agency reviews that often come with multiple analysis documents. Table 4-2 below gives a description of when each of these regulations are required.

Table 4-2. Federal Requirements for Alternatives Analyses

NEPA	404(b)(1)	PR&G
National Environmental Policy Act	Clean Water Act guidelines	Alternatives analysis requirements
assess the environmental effects	when an Individual Permit for	water projects. Agencies have
of proposed major Federal	fill in jurisdictional wetlands	specific guidelines, including the
	from the USACE.	Supplemental Plan-EA).



Once an appropriate range of alternatives is selected, each alternative is screened to determine if it should be carried forward for a more detailed analysis. Detailed analysis includes a more refined preliminary design, analysis of environmental and social consequences (both beneficial and detrimental), and a detailed economic analysis. This pre-screening allows for a detailed look at a narrower range of alternatives, which allows for a more efficient decision-making process. Different Federal requirements and guidelines present different screening criteria based on the overarching goal of the policy. This screening criteria is shown in Figure 4-1 below.

Figure 4-1. Alternative Screening Process



Tables 4-3a, 4-3b, and 4-3c summarize the alternatives, the screening process summary, and whether each alternative was carried forward for detailed study. Alternatives not carried forward for detailed study are included in Section 4.2 and further information is provided in Appendix D. Costs included in the table include construction, project administration, engineering, construction observation, permitting, and mitigation.



				Rigid Drop Struc	tures			Loose Rock
Site	Goal	FWOFI	Drop Spillways	Chute Spillways/ Drop Inlet Spillways Channel Linings (High Hazard Dams)		Loose Rock Structures	Channel Restoration	Structures with Channel Bank Stability
W-5	Grade Stabilization	Carried Forward	Logistics	Carried forward with Loose Rock Structures Alternative	\$4,625,900 Economics/Cost/ Efficiency	\$2,724,700 Carried Forward	\$6,560,000 Economics/Cost/ Efficiency	N/A
D-78	Grade Stabilization	Carried Forward	Logistics	Logistics	\$10,720,900 Economics/Cost/ Efficiency	\$1,191,700 Carried Forward	\$5,400,000 Economics/Cost /Efficiency	N/A
D-2	Grade Stabilization	Carried Forward	Logistics	Carried forward with Loose Rock Structures Alternative	\$5,584,000 Economics/Cost/ Efficiency	\$1,774,500 Carried Forward	\$6,151,000 Economics/Cost/ Efficiency	N/A
S-15	Grade Stabilization	Carried Forward	Logistics	Carried forward with Loose Rock Structures Alternative	\$8,506,900 Economics/Cost/ Efficiency	\$1,226,700 Carried Forward	\$6,450,000 Economics/Cost/ Efficiency	N/A
S-5	Grade Stabilization / Improved Safety	Carried Forward	Logistics	Carried forward with Channel Restoration Alternative	Logistics	Purpose and Need	\$3,770,200 Carried Forward	\$5,875,800 Economics/Cost/ Efficiency

Table 4-3a. Range of Alternatives and Determination for Detailed Study for Grade Stabilization Sites¹

¹If an alternative is not carried forward for detailed study, the reason is listed in the table. Logistics includes inability to implement due to specific site conditions and not meeting the Federal objective. Information is provided in the following sections and Appendix D to support the rationale.



Site	Goal	FWOFI	Sediment Basin	Maintenance Dredging of DS-19	Conservation Measures	Small Sediment Basins	Rigid Drop Structures	Drop Inlet Spillways (High Hazard Dams)	Loose Rock Structures
S-1	Sediment Reduction	Carried Forward	\$3,491,300 Carried Forward in combination	\$2,605,700 Carried Forward in combination	Purpose	Purpose	N/A	Logistics/ Ability to Implement/ Efficiency	N/A
S-1	Grade Stabilization	Carried Forward	N/A	N/A	N/A	N/A	Carried Forward in combination	Logistics/ Ability to Implement/ Efficiency	Carried Forward in combination

Table 4-3b. Range of Alternatives and Determination for Detailed Study for Site S-1¹

¹If an alternative is not carried forward for detailed study, the reason is listed in the table. Information is provided in the following sections and Appendix D to support the rationale.

Table 4-3c. Range of Alternatives and Determination for Detailed Study for Site WP-1¹

Site	Goal	FWOFI	Nonstructural	Floodplain Acquisition	Current Conservation Measures	Low Impact Development	Created and Restored Wetlands
		Carried Forward	Purpose	\$288,600,000 Economics/Cost/ Efficiency	Purpose	Logistics/ Ability to Implement/ Efficiency	Purpose
WP-1	D-1 Flood Risk Reduction	Stream Restoration	Conveyance	Raise Existing Levees & Bridges	Small Detention Dams	Regional Detention Site (Dry Dam)	Regional Detention Site (Wet Dam)
		Purpose	Purpose	Purpose	Purpose	Carried Forward \$15,390,800	Carried Forward \$13,663,500

¹If an alternative is not carried forward for detailed study, the reason is listed in the table. Information is provided in the following sections and Appendix D to support the rationale.



4.2 Alternatives Eliminated from Detailed Study

The alternatives eliminated from detailed study were analyzed on a site-by-site basis. The following alternatives either did not satisfy the project purpose and need (problems and opportunities) or were otherwise removed from detailed study due to the factors shown in Figure 4-1. To reduce redundancy and improve readability, these are first grouped by site goal and then by specific site where clarity is needed. Alternatives are also shown in Tables 4-3a, 4-3b, and 4-3c above.

4.2.1 Site Goal: Grade Stabilization

Applicable Sites: W-5, D-78, D-2, S-5, S-15

The following briefly describes alternatives that were eliminated from detailed study for sites that have an identified purpose of grade stabilization (sites W-5, D-78, D-2, S-15, and S-5).

4.2.1.1 Standard NRCS Grade Stabilization Structures

Applicable Sites: W-5, D-78, D-2, S-5, S-15

Standard grade stabilization structures as presented in the USDA NRCS National Engineering Handbook (NEH) Part 650 - Engineering Field Handbook were recommended for all sites in the 1966 Work Plan and, more specifically, drop inlet structures were recommended at all sites discussed in this Supplement (Table 4-1). Site visits and desktop surveys were used to determine if standard NRCS grade control structures could still be reasonable alternatives. Structure types, techniques, and design guidelines presented in Technical Supplement (TS)-14G, NEH Part 650, NEH Part 654, 584-CPS-1, NE-410-1, and others were referenced during the analysis. Many alternatives were considered and rejected due to site conditions. A brief description of some of these are included below.

Although all of sites in this Supplement are experiencing bed degradation, existing channel profile drops as identified in the 1966 Work Plan are no longer evident at Sites W-5, D-78, and D-2. This yields a portion of the structures identified in Figure 6-4 of NEH Part 650 (figure included below as Figure 4-2) unreasonable as they do not fit the site conditions. There is one large headcut progressing upstream toward HWY 370 at Site S-15, a large existing drop at the 180th Street culvert at Site S-5, and at an abandoned bridge crossing at Site W-5 and therefore these are considered further at specific locations within those sites, as discussed in the sections below.





Grade Stabilization Alternatives Eliminated from Detailed Study

		DISCHARGE - C.F.S.									
		10	25	50	100	150	200	400	800	1500	
	4	Droj	o spill	way5 c	21		Drop	spill.	ways		
	8	Ноос	ded ini	let spir	lways						
トセセト	12								Drop chute spillw	or ays	
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Figure 4-2 General Guide to Structure Selection¹

Drop inlet spillways (i.e. earthen embankment dams) were given further consideration due to the recommendation in the 1966 Work Plan and the potential additional benefits of flood risk reduction and water quality. Consultation with Nebraska Department of Natural Resources (NDNR) Dam Safety indicated that all structures at these locations would need to be designed to high hazard dam criteria due to development in the watershed and existing infrastructure. High hazard potential means that a failure or misoperation of the dam results in a probable loss of human life (NDNR, 2013). Further information on this alternative is provided below.

4.2.1.2 High Hazard Dam Alternative

Applicable Sites: W-5, D-78, D-2, S-5, S-15

This alternative involves the construction of an earthen embankment dam and was considered at Sites W-5, D-78, D-2, S-5, and S-15. The dams were designed as high hazard flood control structures due to existing development and predicted future build-out downstream of these structures that would result in a probable loss of human life in the case of the dam failure. Design specifications described in NRCS Technical Release 210-60 (TR 210-60) were followed to set the elevations for the dams using National Oceanic and Atmospheric Administration (NOAA) Atlas 14



precipitation values and the NRCS Water Resources Site Analysis Program (SITES) program. Wet and dry dams are sized to the same design criteria and therefore this preliminary analysis encompasses both types of dams. If the alternative were found to be reasonable, both wet and dry dams would be analyzed separately. Additional design information can be found in Appendix D, including figures that show the locations and extents of each high hazard dam alternative that was analyzed. Due to property constraints caused by existing and platted development there is no plausible location at Site S-5 and therefore it is not included in a figure.

Costs were determined at each site to assess if the alternatives were reasonable and were guided by the assumptions listed below. Unit costs, provided in Appendix D, were based on local knowledge and similar, recent projects in the local area. Total project costs for each site are included in Table 4-3a.

- Embankment volume and extents were determined with 3H:1V side slopes, a 10-foot wide access berm, a 10-foot wide buttress on the upstream face, and a 30-foot long stability berm on the downstream face.
- Rock riprap would be placed above and below the permanent pool elevation on the upstream face to protect from wind action.
- Land will be purchased for the embankment, auxiliary spillway, and top of dam extents. When land purchase area encompasses over ³/₄ of the parcel, the whole parcel will be purchased.
- Any homes within the top of dam elevation extents will be purchased.
- A 20 percent contingency was added to the construction costs to account for unforeseen expenses during construction.

This alternative meets the purpose and need and would provide additional benefits in the form of flood risk reduction, water quality, ecological improvements, and passive recreation. However, costs for this alternative are unreasonably expensive in comparison to other available alternatives for the purpose of grade stabilization. This alternative would also create significantly more impacts to waters of the United States (WOTUS). Therefore, this alternative is not reasonable and was not carried forward for detailed analysis at Sites W-5, D-78, D-2, S-5, and S-15.

4.2.1.3 Nonstructural Alternatives *Applicable Sites: W-5, D-78, D-2, S-5, S-15*

Nonstructural alternatives include changes to policy, existing land use, infrastructure, and/or management practices to meet the project purpose and need and potentially minimize adverse changes and impacts to existing hydrologic, geomorphic, and ecological processes. To meet the grade stabilization purpose, a nonstructural alternative (or combination of nonstructural/structural alternatives) would need to halt and prevent future stream degradation including progressing headcuts.

Stream degradation is a known problem within the watershed due to the deep deposits of highly erosive Peoria Loess soil types. Existing policies for development have been established through the PCWP and include stream setbacks, maintaining peak flows on significant developments, and others (PCWP, 2014). Although policies can help to slow stream degradation or protect future developments from being built too close to a stream, public and regulatory policies cannot prevent



the headcut progression that is common in the area. Changes in land use are equally as ineffective. One potential nonstructural alternative is to buy the land that is expected to fall within the stream limits as the streams continue to degrade and widen and allow the channel banks to become higher and the stream footprint to continue to expand. However, this would remove the farmland and residential homes that this project is intending to protect and therefore does not meet the project purpose. This alternative also leaves risk to public health and safety as stream banks can frequently become over 30 feet tall, posing a significant safety risk to residents. Risks to infrastructure, including sewer lines and power poles, previously placed adjacent to and crossing under the streams also remain in this alternative. Relocating infrastructure in conjunction with buying property would also be exorbitantly expensive, would not be socially acceptable, and would be ecologically detrimental as streams would continue to degrade and widen thus leading to further habitat loss. No nonstructural alternatives for grade stabilization were brought forward for detailed analysis.

4.2.1.4 Stream Restoration Alternative

Applicable Sites: W-5, D-78, D-2, S-15

This alternative involves the implementation of a two-stage channel design to meet the project purpose of grade stabilization and to improve stream and ecological function. This alternative would include the grade stabilization structures as well as in-channel grading according to the NRCS Two-Stage Channel Design (NRCS 2007). The two-stage channel design involves grading the channel to create low channel benches that function as floodplains to restore natural alluvial channel processes. This alternative would reduce in-stream erosion due to the shallower flows during large events, which would stabilize streams, lower in-stream maintenance, and improve water quality and ecological function. The implementation of loose rock grade stabilization structures according to detailed methodology included in Appendix D (in conjunction with the two -stage channel design) would also be required to prevent future headcut progression. Assumptions and design criteria utilized to determine costs are listed below.

- Floodplain benches would be graded at the ordinary high water mark (OHWM) elevation to be at the elevation where benches are anticipated to form.
- Floodplain bench widths were determined using a 4:1 floodplain bench width to bankfull channel width ratio.
- Channel bank slopes were graded with 3H:1V side slopes.
- The Manning's equation was used to verify adequate floodplain widths to ensure a stable stream velocity of 3 feet per second at bankfull conditions.
- The stream slope was selected based on NEH stable channel design for Loess soils with plasticity index of less than 15.

A representative cross section and plan view of this alternative for Site D-2 is provided below in Figures 4-3 and 4-4, respectively.





Figure 4-4. Stream Restoration Alternative, Plan View



Costs were determined to assess if the alternatives were reasonable and are included in Table 4-3a. Unit costs, provided in Appendix D, were based on local knowledge and similar, recent projects in the local area. Costs for each site were determined based on specific excavation quantities calculated at Sites D-2 and S-5 and then applied to the other sites. Although land acquisition/easements would be required, these costs were not determined due to the already exorbitant costs without these values included.

This alternative meets the Project's purpose and need and would provide grade control benefits. However, costs for this alternative are unreasonably expensive in comparison to other available alternatives. This alternative also removes much of the land that other alternatives would protect from future channel degradation and widening because of required grading extents. Therefore,



this alternative is not reasonable and was not carried forward for detailed analysis at Sites W-5, D-78, D-2, and S-15.

4.2.1.5 Loose Rock Structures

Applicable Sites: S-5

The loose rock structures alternative at Site S-5 involves the implementation of rock riprap grade stabilization structures within Beadle Creek that would function as deformable energy dissipation structures to "catch" headcuts as they progress upstream. Stream degradation occurs within the watershed due to highly erosive soil types and it is predicted that streams will continue to degrade until reaching a stable stream bed slope. Beadle Creek is nearly fully degraded, but rock structures could be used to prevent further degradation as the stream reaches the stable stream slope. Appendix D provides detailed information about the design and placement of loose rock structures.

As stated in Section 1.3, the purpose of Site S-5 is to provide grade stabilization AND to improve safety along the Beadle Creek stream corridor between Lillian Street and the confluence of South Papillion Creek. This alternative does not improve safety along the Beadle Creek stream corridor and was therefore not carried forward for detailed analysis.

4.2.1.6 Loose Rock Structures with Channel Bank Stability

Applicable Sites: S-5

The loose rock structures with channel stability alternative at Site S-5 involves the implementation of rock riprap grade stabilization structures within Beadle Creek that would function as deformable energy dissipation structures to "catch" headcuts as they progress upstream as well as laying the channel banks back to provide less steep and more stable bank slopes. Stream degradation occurs within the watershed due to highly erosive soil types and it is predicted that streams will continue to degrade until reaching a stable stream bed slope. Beadle Creek is nearly fully degraded, but rock structures could be used to prevent further degradation as the stream reaches the stable stream slope. Appendix D provides detailed information about the design and placement of loose rock structures.

Ideal channel bank slopes are 3:1 (horizontal:vertical) as they are inherently stable using area soils and would significantly reduce public safety concerns. Steeper slopes would likely lead to failure and increased risk to public safety. Due to the extremely high velocities and subsequent stream power, green armor matting would be required along the channel bed and up the channel slopes for the entire stretch of protected Beadle Creek. The existing sanitary sewer and power poles that are adjacent to Beadle Creek (shown in Figure 4-5, below) would require relocation and subsequent property easements (and potentially property buyouts) with this alternative. This alternative would improve public safety but would not decrease the over 20-foot-tall banks and therefore would not remove the public risk. This alternative also has an exorbitant cost (almost \$5.9 million without including any property costs) and was therefore not carried forward for detailed analysis. Cost details are provided in Appendix D.

Other alternatives for stabilizing the channel banks were also considered to avoid the need for infrastructure relocation by stabilizing the banks in-place. These included sheet pile steps to allow



for vertical walls, concrete geowebs, and other alternatives that stabilize the vertical banks. These alternatives do not improve public safety along Beadle Creek and were therefore not carried forward for detailed analysis.

Figure 4-5. Site S-5 Infrastructure



4.2.2 Site Goal: Sediment Retention and Grade Stabilization

Applicable Site: S-1

The following briefly describes alternatives that were eliminated from detailed study for Site S-1. Combinations of alternatives were considered to meet the project purpose.

4.2.2.1 Conservation Measures

Applicable Site: S-1

ONRCS

The conservation measures alternative was analyzed at Site S-1 and uses policy to ensure current conservation methods are used on private agricultural land within the watershed as well as requiring increased conservation measures on private agricultural land within the watershed. Conservation measures maximize infiltration and reduce erosion. Agricultural land takes up approximately 82 percent of the S-1 watershed and 55 percent of those agricultural acres currently utilize conservation practices including grade terraces, ponds, and grassed waterways.

This leaves 45 percent of existing agricultural land available for full implementation of conservation measures. It is estimated that terraces can reduce sedimentation with an 85 percent efficiency. If terraces were applied to all existing agricultural land available for conservation measures, it would only provide a sediment load reduction of approximately 16.7 acre-feet. This alternative will not provide sufficient sediment load reductions to meet the project purpose.

The conservation measures alternative was also analyzed for the entire Site DS-19 watershed. Agricultural land makes up approximately 61 percent of the DS-19 watershed and approximately 60 percent of those agricultural acres currently utilize conservation practices including grade terraces, ponds, and grassed waterways.

This leaves 40 percent of existing agricultural land available for full implementation of conservation measures. It is estimated that terraces can reduce sedimentation with an 85 percent efficiency. If terraces were applied to all existing agricultural land available for conservation measures, it would provide a sediment load reduction of approximately 19 acre-feet over 50-years. This alternative would not provide sufficient sediment load reductions to meet the project purpose.

Additionally, the Sponsor does not have authority to force landowners to implement conservation measures on their land. This alternative is not practical to implement and does not meet the project purpose and was therefore eliminated from further study.

4.2.2.2 Small Detention Basins

Applicable Site: S-1

The small sediment basins alternative involves constructing combinations of small sediment basins to provide the same sediment detention benefits as a single, larger downstream structure at Site S-1 to potentially minimize impacts to stream length and other resources. The S-1 watershed was analyzed for potential locations based on existing streams, topography, and drainage basin areas. Five potential locations for small sediment basins were found with a cumulative watershed area of 0.95 square miles (Figure 4-6). If all five basins were constructed, it is predicted that they would capture approximately 16 acre-feet of sediment over 50 years. Therefore, this alternative does not meet the project purpose and was eliminated from detailed study.





Figure 4-6. Site S-1 Small Detention Basin Alternative

4.2.2.3 Loose Rock Structures and Rigid Structure

Applicable Site: S-1

The loose rock structures alternative at Site S-1 involves the implementation of two rock riprap grade stabilization structures and one rigid structure within South Papillion Creek and its tributary that would function as deformable energy dissipation structures to "catch" headcuts as they progress upstream and maintain existing grade. The location of the proposed structures is shown in Figure 4-7, with Structure 3 being the rigid structure that would allow for stream crossing. This location has an existing channel grade drop and water crossing that frequently washes out. Stream degradation is a problem within the watershed due to highly erosive soil types and it is predicted that the streams will continue to degrade until reaching a stable stream bed slope. The structures would stabilize the stream bed slope and protect approximately 4-acres of upstream land from degradation. See Appendix D for detailed information about the design and placement of the grade stabilization structures.





This alternative meets the Project's purpose to provide grade stabilization benefits; however, does not meet the purpose of sediment retention and therefore this alternative alone was not carried forward for detailed study at Site S-1. Loose rock structures were considered in combination with other alternatives to meet the project purpose and one of these combinations was carried forward for detailed analysis as discussed in Section 4.3.

4.2.3 Site Goal: Flood Risk Reduction

Applicable Site: WP-1

The following briefly describes alternatives that were eliminated from detailed study for site WP-1, which has an identified purpose of providing long term flood damage reduction within the West Papillion Creek subwatershed so that, under full build-out conditions, there is no increase in the extent of the 100-year floodplain as currently mapped by FEMA. Where applicable, alternatives were analyzed using the same drainage area to compare them without bias. This drainage area is referred to simply as 'drainage basin' in the following sections for brevity.

4.2.3.1 Nonstructural Alternatives

Nonstructural alternatives include changes to policy, existing land use, infrastructure, and/or management practices to meet the Project purpose and need. To meet the flood damage reduction purpose, a nonstructural alternative (or combination of nonstructural/structural alternatives) would need to provide flood damage reduction and/or remove structures from the floodplain. Raising building elevations, filling basements, and dry floodproofing are potential nonstructural alternatives that were analyzed as potential solutions.



The Zoning Alternative involves administrative action to adopt zoning regulations that prevent new development within the projected full build-out 100-year floodplain for the affected reach downstream of the identified site, over 3,000 acres from West Papillion Creek to the confluence with Big Papillion Creek. This alternative includes all land within the floodplain, including agricultural, and could reduce flood risk to new construction but would not address flooding of existing structures. It is assumed that no land would be acquired. Adoption and enforcement of new zoning regulations does not reduce flood risk or limit the expansion of the future conditions floodplain and therefore this alternative does not meet the project purpose and was not carried forward for detailed analysis.

4.2.3.2 Floodplain Acquisition Alternative

The Floodplain Acquisition Alternative involves acquiring downstream developed properties along West Papillion Creek within the projected full build-out, 100-year floodplain for the affected reach downstream of the WP-1 project location. This alternative does not include zoning and considers all properties in the downstream 100-year floodplain along West Branch Papillion Creek.

The full build-out, 100-year floodplain contains more than 3,076 acres. The Sponsor would need to acquire land, purchase flooding easements, and use existing public lands. A cost estimate for this alternative includes the following:

- Removing 762 existing permanent structures from the full buildout, 100-year floodplain. Based on Douglas County and Sarpy County assessor structure values, acquiring the existing 762 structures would cost approximately \$151.3 million.
- Approximately 1,013 acres of residential land would need to be purchased to remove structures and to prevent future development. At a cost of \$60,000 per acre, this would cost approximately \$60.8 million.
- Approximately 493 acres of commercial land would need to be purchased to remove structures from the full build-out, 100-year flood plain with an additional 98 acres requiring purchase due to the properties being inundated by more than 50 percent. At a cost of \$60,000 per acre, these purchases would cost \$29.6 million and \$5.9 million, respectively.
- Easements would be required on all agricultural land based on the percentage inundated, as well as commercial land that would be inundated by less than 50 percent. The approximately 45 inundated acres of commercial land that would require an easement at \$60,000 per acre would cost \$2.7 million.
- The flooding easement for 1,095 acres of agricultural land would cost approximately \$35,000 per acre, for a total of \$38.3 million.

The Floodplain Acquisition Alternative is exorbitantly expensive at approximately \$288.6 million and was therefore removed from detailed study.

4.2.3.3 Current Conservation Measures Alternative

The Current Conservation Measures Alternative involves full implementation of conservation measures on existing agricultural lands within the drainage basin. Conservation measures are typically administered through incentive programs offered by the NRCS. Measures are designed to maximize rainwater infiltration and reduce soil erosion. These include practices such as no-till



farming, contouring, strip cropping, terraces, grassed waterways, and similar practices. Water and sediment control basins would not be included as part of this alternative.

It is estimated that a majority of farmland in the drainage basin currently has some type of conservation measure in place based on a review of aerial imagery. Remaining farmland in the basin would be eligible for full implementation of additional conservation measures; however, most of this land is already platted for development and will be removed from agricultural production, hence no longer eligible for federally funded conservation measures.

Implementing the Current Conservation Measures Alternative would require a multiagency effort with federal partners. The alternative would have an unknown effect over the long-term planning horizon due to changes in Congressional appropriations and program implementation. Most conservation measures are designed for the purpose of soil retention; conservation measures alone could not provide the desired level of flood risk reduction. Therefore, this alternative is eliminated from further consideration because it does not meet the purpose and need for Site WP-1.

4.2.3.4 Low Impact Development (LID) Alternative

The LID Alternative would require implementation of future conservation methods that are focused on residential and commercial applications, as opposed to agricultural. LID strategies, such as onsite detention ponds or vegetated swales, can be implemented on future developable land as described in Papillion Creek Watershed Management Plan (Management Plan) (PCWP, 2009). One scenario considered the projected 100-year full build-out floodplain with maximum LID (Max LID). This scenario called for construction of on-site detention basins in addition to an assortment of other LID practices to achieve a high reduction of peak flow. Max LID was considered, instead of a conventional LID scenario, because conventional LID practices primarily address water quality issues, as opposed to stormwater runoff reduction to lessen flood risk.

The Management Plan (PCWP, 2009) found that a Max LID strategy could be equally successful at reducing peak flows as would a network of regional detention basins. PCWP (PCWP, 2009) estimates that, at the point of application, the Max LID scenario would allow storm water control and an approximate 90 percent reduction in peak flows through a 100-year storm event based on HEC-1 hydrologic models (P-MRNRD, 2009). Using 2017 aerial images, an estimated 90 percent of the drainage basin remains to be developed. Assuming that the Max LID measures are implemented throughout the remaining 90 percent of the drainage basin, the incremental reduction in peak discharge for the 100-year storm event would be approximately 81 percent. The full build-out, 100-year flood plain peak flow for the watershed is 2,035 cfs. This would drop to 387 cfs with implementation of future conservation measures.

Although a Max LID strategy would successfully reduce peak flows and discharges within the drainage basin, the overall geometry and topography of the Big Papillion Creek Watershed and West Papillion Creek sub-watershed is not conducive to overall peak flow reduction further downstream. Due to north-to-south peak flow timing, peak flow reduction performance on Big Papillion Creek is dependent on the relative success of efforts upstream of NE Highway 36 in Washington County. The implementation horizon for Max LID strategies in Washington County is currently estimated at decades past 2050. During this transition period, the existing risk of flooding



along the lower reaches of the Big Papillion Creek Watershed would remain mostly unchanged. Other logistical hurdles with Max LID include sustainability relative to jurisdictional responsibilities, inexperienced local contractors, uncertainty regarding FEMA acceptance of LID for Flood Insurance Rate Map (FIRM) development, and funding dependent on Congressional budget appropriations.

The LID Alternative, although meeting the project purpose for flood risk reduction, would not provide this effect within an acceptable timeframe to keep pace with development. The alternative would require innumerable state and federal permits because waters on multiple private properties would be likely impacted for construction, increasing uncertainty (as future funding is dependent on Congressional budget appropriations) and cost due to economics of scale. Furthermore, the Sponsor does not have legislative authority to require LID practices on private property. This alternative is eliminated from further consideration because it is not considered logistically feasible and does not meet the purpose and need within an acceptable timeframe.

4.2. Created and Restored Wetlands Alternative

The Created and Restored Wetlands Alternative would create or restore wetlands and the floodplain in conjunction with buffers and stream restoration to maximize flood storage. Lands that are conducive to wetland creation or enhancement were identified based on location of hydric soils and hydrology. Wetland storage areas would provide habitat quality improvements and water quality benefits.

Soils with hydric components make up 167 acres of the 852-acre drainage basin and are primarily located along streams and within riparian areas, based on Geographic Information System (GIS) spatial analysis results using the Gridded Soil Survey Geographic database (gSSURGO) (USDA, 2017) and its Potential Wetland Soil Landscapes (PWSL) data. The spatial correlation between hydric soils and hydrology across the drainage basin indicates that areas conducive to wetland creation and/or restoration are present. Wetland creation would be accomplished by constructing a series of structures to impound stream flow, creating shallow pools. The maximum storage of floodwater provided per acre of wetland is approximately 4.5 ac-ft (National Oceanic and Atmospheric Administration [NOAA] and EPA, 2003). To provide the necessary protection for the projected full build-out, 100-year flood plain, 85 acres of wetland functioning at maximum efficiency would be required for adequate flood storage of approximately 379 ac-ft. To establish wetlands along channels, conservatively estimating the channel and riparian zone width throughout the basin is 100 feet, 85 acres of wetlands would require approximately 7 miles of stream length. There are approximately 4 miles of stream channel within this reach.

This alternative is eliminated from consideration because there is not enough wetland storage potential along the stream channels to meet the equivalent flood storage volume needed and therefore did not meet the site purpose. This alternative was considered in conjunction with the Stream Restoration Alternative and others as well and none of these alternatives were carried forward for detailed analysis due to inability to meet purpose.

4.2.3.6 Stream Restoration Alternative

The goal of the Stream Restoration Alternative would be to reduce flood flows through stream improvements within the unnamed reaches within the drainage basin. Improvements could include



riffle-pool structures, j-hooks or rock veins, or other stream bank improvements that would effectively roughen the stream bed and channel. Roughening a channel slows velocities, increasing the flow area and wetted perimeter of the channel, potentially expanding the spatial extents of flooding. These measures would provide aquatic habitat improvements and water quality benefits.

This alternative is eliminated from further consideration because the existing 4 miles of channel are in the upper reaches of the watershed and do not provide enough stream length to meet the equivalent flood storage volume needed to meet the purpose. This alternative was considered in conjunction with the Created and Stored Wetlands Alternative as well and was not carried forward for detailed analysis due to inability to meet purpose.

4.2.3.7 Conveyance Alternative

The Conveyance Alternative would improve flow conveyance by using channel modifications, such as levees and stormwater channels, along the urbanized reach of West Papillion Creek for containment of the projected full build-out 100-year flood event. Such structures increase the capacity of streams to carry floodwaters downstream while reducing flood damage to adjacent property. These types of structural flood control measures are typically utilized in the lower portion of a watershed to prevent peak flows from reaching the same place over a short time period. Because peak flows currently exceed existing channel capacity, the existing levees would need to be moved back for the channel to contain the entire peak flow. The existing levee is about 8 to 10 ft high, with a 15-ft top width, and 3:1 side slopes. The levee is approximately 9 miles in length. The cost to remove and replace the entire levee was estimated in 2008 at \$70 million based on levee modifications estimated from the study entitled, West Papillion Levee Restoration Evaluation (P-MRNRD, 2008).

This alternative is eliminated from further consideration due to the exorbitant cost. Also, increasing the capacity of the creek would decrease the travel time of flood flows, placing added pressure on the lower reaches of the watershed and diminish the effectiveness of downstream channels and levees. These types of modifications would likely exacerbate downstream flooding.

4.2.3.8 Raise Existing Levees and Bridges Alternative

The Raise Existing Levees and Bridges Alternative would involve raising the existing levees and bridges along West Papillion Creek to allow the levee system to contain the full build-out 100-year flood event and provide 3-ft of freeboard in accordance with FEMA criteria for certification. It is not reasonable to raise the levees less than the height required to provide flood benefits that do not include this 100-year flood event containment and 3-foot freeboard. Therefore, this alternative uses these criteria as the basis for analysis.

A system of earthen levees currently parallels the lower reach of West Papillion Creek. These levees are not shown as certified on the digital FIRM mapping. During large rain events the floodplain inundates surrounding land and structures. Levees extend from the confluence of Walnut Creek (approximately 96th Street) downstream to approximately 42nd Street on the right bank, and from west of 84th Street downstream to approximately 44th Street on the left bank.



The West Papillion Levee Restoration Evaluation (P-MRNRD, 2008) analyzed three scenarios to raise the levees and bridges for certification. These scenarios compared the required effort and cost with and without additional detention structures within the watershed. In addition, the P-MRNRD (2008) report considered two types of levee improvements. One scenario raised the levee with a flood wall and one raised the levee with earthen fill. The study also evaluated the need to raise bridges at 48th Street, 66th Street, and 84th Street. Costs of the scenarios ranged from \$23 million to \$141 million, and do not include costs needed to relocate businesses along 84th Street in the City of Papillion, an additional cost of approximately \$4.7 million.

The P-MRNRD (2008) report indicated that although raising existing levees and bridges alone, without additional detention structures in the watershed, was the most economical; the alternative provides little flood protection upstream of the confluence of West Papillion Creek with Walnut Creek near 96th Street.

This alternative was eliminated from detailed analysis because it provides flood protection that is limited to the downstream reaches of the West Papillion Creek sub-watershed and therefore does not meet the project purpose.

4.2.3.9 Small Detention Dams Alternative

The Small Detention Dams Alternative would involve constructing several smaller detention structures within the watershed to accomplish flood protection while minimizing impacts. These small detention structures would consist of high hazard (based on State of Nebraska dam safety criteria) dry dams along Whispering Ridge Creek and its tributaries. An analysis was completed to determine the size of dry dam structure required, including earthen dam footprint and flood pool extents, and potential locations. Every effort was made to avoid existing infrastructure, including existing developments and roadways.

The drainage basin is 852 acres. Based on existing topography and land use constraints there are only three potential sites for small detention structures. Each has a drainage area between 69 acres and 345, with combined total flood storage of 653 ac-ft. versus 1,164 ac-ft for the one larger site downstream on Whispering Ridge Creek (Alternatives 2-WP1 and 3-WP1, described below).

This alternative was eliminated from consideration because it would not provide adequate flood storage volume and therefore does not meet the Site's purpose and need.

4.3 Alternatives Carried Forward for Detailed Analysis

The following section describes the alternatives that were carried forward for detailed analysis. An incremental analysis was considered and analyzed at each site to determine the individual measures included and the formulation process was used to combine these measures into the alternatives detailed below.

4.3.1 Alternative 1. No Action/Future Without Project

This alternative is the most likely future condition if none of the action alternatives are selected. The future without project at each site is described below. This alternative does not meet the purpose and need; however, it is carried forward through the analysis as a benchmark condition.



Site W-5

In this alternative, the Sponsor would not construct grade stabilization structures and the Boston Branch would continue to experience advancing headcuts, resulting in degradation and widening. The Road 29 bridge abutment would likely be impacted by the continued stream instability and headcuts would move into yards and farm fields as gullies as the Boston Branch profile lowered. Human health and safety concerns would steadily increase as stream banks rose higher, especially with the adjacent residential development and potential for children to play near the stream.

Site D-78

In this alternative, the Sponsor would not construct grade stabilization structures and Ridgewood Creek and its unnamed upstream tributaries would continue to widen and degrade. An upstream home would likely be impacted by future stream instability and widening, and surrounding farm fields would not be protected from headcut progression. Additionally, human health and safety concerns would arise as stream banks rise higher.

Site D-2

In this alternative, the Sponsor would not construct grade stabilization structures and Boettger Creek and its upstream tributaries would continue to degrade and widen. The Highway 133 embankment would likely be threatened from stream instability and progressing degradation and surrounding farm fields would not be protected from headcut progressions. Additionally, human health and safety concerns would arise as stream banks degrade and become steeper.

Site S-5

In this alternative, the Sponsor would not restore the stream and the channel would continue to degrade and widen. Power poles, an adjacent sanitary sewer, yards, homes, and roadway embankments would be threatened by continued degradation and erosion. Additionally, human health and safety concerns would remain and worsen due to shear and steep banks, especially with the adjacent residential development and potential for children to play near the stream.

Site S-15

In this alternative, the Sponsor would not construct grade stabilization structures and Westmont Creek and its upstream tributaries would continue to experience advancing headcuts, resulting in degradation and widening. The roadway embankments at two crossings under S 144th will likely be impacted by the continued stream instability. Adjacent properties would likely experience damage due to stream widening and as gullies as the stream profiles lower. An approximate 10-foot headcut that is progressing from Westmont Creek up the northern tributary that runs adjacent to Highway 370 would continue to move upstream, causing significant channel grade loss and damage along the Highway 370 corridor. Adjacent sanitary sewer lines would also need to be relocated due to the continued degradation. Human health and safety concerns would steadily increase as stream banks rose higher, especially with the nearby residential development and impending development.

Site S-1

In this alternative, the Sponsor would not address sedimentation or construct any grade stabilization and South Papillion Creek and its upstream tributaries would continue to degrade and widen, moving toward



the crossing at S 216th Street and the existing home along the channel. This alternative would also not prevent sediment from entering the planned DS-19 Reservoir.

Site WP-1

This alternative is the most likely future condition if none of the action alternatives are selected and there is no expenditure of federal funds. This alternative would involve no implementation of any flood risk reduction structures or measures. The flood damages to cropland, urban areas, and infrastructure would continue. This alternative does not meet the purpose and need; however, it is carried forward through the analysis as a benchmark condition.

4.3.2 Alternative 2-Combination 1

This combination of alternatives includes practices at each of the seven identified project sites. Incremental analysis utilizing land and infrastructure benefits and projected stable slope was used at each grade stabilization site to determine the number of practices along each stream reach. An incremental analysis was also used at Site S-1 to determine the optimum sediment retention based on land use, site constraints, and economic benefits. Flood risk reduction was also analyzed using an incremental analysis approach along with watershed-wide considerations, which is described more in depth in Appendix D.

Site W-5

This alternative includes the implementation of eight loose rock structures within the channel and one rigid drop structure to preserve upstream land from future degradation and loss. The structures have two versions of a basic design that are carried out through the site. Both structures grade the banks back to a side slope of 3:1 and line the bank to the 100-year flood water surface elevation with riprap. In areas where a tributary enters the stream at the structure, the tributary will not be graded except as needed to tie into the structure; however, the tributaries will be riprap lined to the 100-year flood water surface elevation. Most of the structures will not change the grade of the stream but the riprap will be placed such that the upstream end is slightly above stream grade to encourage deposition and reduce the stream slope upstream of the structure. One structure will be placed at a drop in the stream and will entail some grading of the stream bottom. This structure includes a flat inlet section, a steeper 4:1 middle section, and a flat outlet section. This alternative would stabilize the streams and protect the adjacent farmland and riparian habitat from degrading due future head cut progressions and stream widening. See Appendix C for the locations of the proposed structures and Appendix D for detailed information on the design of this alternative. Project costs are shown in Table 4-3a. This alternative meets the purpose and need and will be carried forward for detailed analysis.

Site D-78

This alternative includes the implementation of 11 loose rock structures within the channel and is estimated to preserve approximately 36 acres of land from future degradation and loss. This alternative would stabilize the streams and protect the adjacent farmland and riparian habitat from degrading due future headcut progressions and stream widening. See Appendix C for the locations of the proposed loose rock structures. Appendix D includes detailed information on the design and costs of this alternative. Total project costs are shown in Table 4-3a and unit costs are included in Appendix D. This alternative meets the purpose and need and will be carried forward for detailed analysis.



Site D-2

This alternative includes the implementation of eight loose rock structures and one rigid drop structure within the channel. This alternative is estimated to preserve approximately 13 acres of adjacent farmland and riparian habitat from degrading due to future headcut progressions and stream widening. See Appendix C for the locations of the proposed loose rock structures and rigid drop structure. The loose rock structures consist of rock riprap and would act as deformable energy dissipation structures. The rigid drop structure would repair an existing 6-foot drop, would function as a low water crossing, and would protect the upstream channel and highway embankment from future erosion. See Appendix D for detailed information behind the design of the loose rock structures and rigid drop structure at Site D-2. Total project costs are included in Table 4-3a and unit costs are included in Appendix D. This alternative meets the purpose and need and will be carried forward for detailed analysis.

Site S-5

This alternative includes the channel grading within approximately 2,400-feet of Beadle Creek and removal and replacement of the 180th Street culvert with an armored drop structure. The drop structure would protect the upstream channel from a large existing headcut progression and scour hole and prevent further damage downstream of the existing culvert. It will also improve the conveyance capacity, protecting the upstream channel from flooding due to backwater. This alternative will also repair the deeply incised and degraded channel to create a more stable and safer stream by repairing the shear and steep channel banks. See Appendix C for the proposed extents and Appendix D for a detailed description of this alternative. Total project costs are included in Table 4-3a and unit costs are included in Appendix D. This alternative meets the purpose and need and will be carried forward for detailed analysis.

Site S-15

This alternative includes the implementation of seven loose rock structures and one rigid drop structure within the channel and is estimated to preserve approximately 21 acres of adjacent farmland and riparian habitat from degradation due to future headcut progressions and stream widening. See Appendix C for the locations of the proposed structures. The loose rock structures consist of rock riprap and would act as deformable energy dissipation structures. The rigid drop structure would repair an existing 10-foot drop and protect the upstream channel and highway corridor from future erosion. See Appendix D for detailed information behind the design of the loose rock structures and rigid drop structure at Site S-15. Total project costs are included in Table 4-3a and unit costs are included in Appendix D. This alternative meets the purpose and need and will be carried forward for detailed analysis.

Site S-1

The planned DS-19 Reservoir was evaluated for economic feasibility and environmental impacts in the Papillion Creek and Tributaries Lakes Final Feasibility Report and Environmental Assessment and was included as part of the Recommended Plan. Detailed watershed analysis was conducted for DS-19 as a flood reduction solution for the Papillion Creek Watershed and construction of the site is reasonably foreseeable. Funding for implementation has been recommended and the Sponsor has begun purchasing land for the site.

This alternative includes the implementation of a sediment basin upstream of the planned DS-19 Reservoir and one rigid drop structure within the channel upstream of the sediment basin's permanent pool. The rigid drop structure location is at an existing channel grade drop and water crossing that frequently washes



out. The sediment basin will capture approximately 34 acre-feet of sediment that would otherwise enter the DS-19 Reservoir and therefore extend the life the structure and protect its water quality. It would additionally improve terrestrial and aquatic habitat and provide stream stabilization upstream of the sediment basin. The rigid drop structure would also preserve approximately 3 acres of adjacent farmland and riparian habitat from degrading due to future headcut progressions and stream widening. Total project costs are included in Table 4-3b and unit costs are included in Appendix D. This alternative meets the purpose and need and will be carried forward for detailed analysis.

Site WP-1

The wet dam alternative consists of a high-hazard floodwater retarding dam on Whispering Ridge Creek, a left bank tributary to West Papillion Creek, in Section 5, Township 15 North, Range 11 East, in Douglas County, Nebraska. This location was previously identified in the 1966 Work Plan for grade stabilization and subsequently identified in the *Multi-Reservoir Analysis, Papillion Creek Watershed* (HDR, 2004) and the *Papillion Creek Watershed Management Plan* (HDR, 2009) for flood risk reduction. This alternative would control approximately 852 acres to provide flood damage reduction to agricultural lands, businesses, and residential areas.

Due to the urban location and potential breach path, this site would be designed to NRCS high-hazard classification standards. The structure would include an earthen embankment approximately 900-feet in length and about 40-feet tall. The principal spillway would consist of a 4-foot by 12-foot concrete riser and 48-inch reinforced concrete pressure pipe with an impact basin consistent with NRCS design criteria. A vegetated auxiliary spillway would be located on the left abutment. Appendix D includes detailed information on hydrology and other methodology used for design and detailed structural information can be found in Table 3, Chapter 7.0.

The dam is designed for a 100-year lifespan and would trap approximately 98 acre-feet below the principal spillway riser, which exceeds NRCS sediment-storage design criteria (USDA 2008a). A sediment basin, designed to extend the life of the reservoir and improve water quality, would consist of a berm and culvert structure located upstream of the main dam and downstream of Fort Street. The dam is designed for a 100-year sediment lifespan without the sediment basin, but the sediment basin provides an area of shallow inundation for the purpose of improving water quality and decreasing sediment transfer to the main reservoir. By trapping the sediment, these structures would protect downstream waterbodies from an influx of sediment and nutrients, and therefore improve overall water quality. Whispering Ridge Creek and West Papillion Creek are degraded channels with low functional value, similar to many tributaries and main channels in the region. Although there is the potential that sediment-hungry water flowing out of the reservoir may increase downstream erosion, reductions in peak flow events and grade control provided upstream of the structure will provide an overall improvement to grade and bank stability of the system. Sufficient downstream erosion protection would be installed and has been considered in the economic analysis.

The dam's permanent pool will provide aquatic habitat, recreation, and grade control within the stream. Wetlands are anticipated to form around and within the shallow regions of the permanent pool as well, improving water quality and providing habitat. Total costs of this alternative are shown in Table 4-3c and detailed cost information is provided in Appendix D.
4.3.3 Alternative 3. Combination 2

The formulation process revealed that two alternatives should be carried forward for detailed analysis at Site S-1 and therefore this alternative includes all aspects of Alternative 2 (Combination 1) except for the measures proposed at Site S-1. Site S-1 measures for Alternative 3 (Combination 2) are described below.

Site S-1

Site DS-19 was evaluated for economic feasibility and environmental impacts in the Papillion Creek and Tributaries Lakes Final Feasibility Report and Environmental Assessment and was included as part of the Recommended Plan. Detailed watershed analysis was conducted for DS-19 as a flood reduction solution for the Papillion Creek Watershed and construction of the site is reasonably foreseeable. Funding for implementation has been recommended and the Sponsor has begun purchasing land for the site. The dredging alternative involves allowing the sediment to enter the planned DS-19 Reservoir and subsequently dredging the reservoir to remove the sediment and the three grade control structures upstream of DS-19 as described in Section 4.2.2.3. Dredging costs were assigned utilizing local knowledge of recent dredging would occur in 16 years based on predicted sedimentation rates and therefore the amortized present value is used for the analysis. Installation of the grade control structures would occur in the same timeline as the other alternatives and therefore the 2022 cost is used for these. Present value costs are shown in Table 4-3b. This alternative meets the purpose and need and will be carried forward for detailed analysis.

4.3.4 Alternative 4. Combination 3

The formulation process revealed that two alternatives should be carried forward for detailed analysis at Site WP-1 and therefore this alternative includes all aspects of Alternative 2 (Combination 1) except for the measures proposed at Site WP-1. Site WP-1 measures for Alternative 4 (Combination 3) are described below.

Site WP-1

The Dry Dam Alternative would include construction of an earthen embankment and upstream berm at the same locations as the Wet Dam Alternative with the same footprints and elevations. Due to the urban location and potential breach path, this site would be designed to NRCS high-hazard classification Equivalent flood storage volume would be provided as with the Wet Dam Alternative and therefore potential flood damage to downstream properties and infrastructure would be significantly reduced. Costs for the dry dam alternative are approximately 20 percent higher than the wet dam alternative due to geotechnical engineering requirements and maintenance.

The dam is designed for a 100-year lifespan and would trap approximately 98 acre-feet of sediment. By trapping the sediment, these structures would protect downstream waterbodies from an influx of sediment and nutrients, and therefore improve overall water quality. Whispering Ridge Creek and West Papillion Creek are degraded channels with low functional value, similar to many tributaries and main channels in the region. Although there is the potential that sediment-hungry water flowing out of the reservoir may increase downstream erosion, reductions in peak flow events and grade control provided upstream of the structure will provide an overall improvement to grade and bank stability of the system. Sufficient downstream erosion protection would be installed and has been considered in the economic analysis.



This alternative also offers grade control within streams, which would protect and stabilize existing eroding streams. Because there is no reservoir in a dry dam, the volume of storage per vertical foot is smallest at the bottom of the valley and the rate of flood stage increases significantly during a storm event compared to an embankment with a permanent pool. This causes the type of flash flooding characteristic of desert environments. There are no urban developments or homes within the flood pool of the dam; however, there is a risk of rapid inundation that can pose a safety risk to the landowners. This situation is not ideal in a rapidly developing urban setting as development will likely include residential neighborhoods thereby increasing risk to adjacent landowners. Appendix D includes detailed information on hydrology and other methodology used for the design. Total costs of this alternative are shown in Table 4-3c and detailed cost information is provided in Appendix D.

4.4 Alternatives Summary and Comparison

Table 4-4 includes a summary of the groups of alternatives analyzed. Project scoping (see Chapter 2) led to the determination of the number and variety of ecosystem services (or resources of concern) to be considered in the analysis. Information on existing conditions of these resources is provided in Chapter 3, and analysis and discussion of environmental consequences for each resource is provided in Chapter 5. Appropriate metrics were defined for each ecosystem service based on current methodology to quantify impacted services over time. Monetary values were used where appropriate.

To assist in evaluating the trade-offs of the ecosystem services relative to each alternative over time, a symbolic system was developed to show the potential effects. This system and the definitions used to quantify the magnitude of the effects are included below in Table 4-5.

This symbolic summary of the trade-offs is provided in Table 4-6 with details provided in Table 4-7.

Alternative 1. No Action Alternative	Includes the No Action /FWOP Alternative at each of the seven sites identified in this Supplemental Plan-EA.				
	Site W-5: Eight (8) loose rock structures and one (1) rigid rock structure				
	Site D-78: Eleven (11) loose rock structures				
	Site D-2: Eight (8) loose rock structures and (1) rigid structure				
Alternative 2.	Site S-5: Channel restoration with downstream drop structure				
combination 1	Site S-15: Seven (7) loose rock structures and one (1) rigid structure				
	Site S-1: Sediment Basin and one (1) rigid structure				
	Site WP-1: Regional Detention Basin, Wet Dam				
Alternative 3. Site S-1: Dredging of DS-19 and three (3) loose rock structures Combination 2 All other Sites are the same as Alternative 2.					
Alternative 4. Combination 3	Site WP-1: Regional Detention Basin, Dry Dam All other Sites are the same as Alternative 2.				

Table 4-4. Alternatives Analyzed in Detailed Analysis



Symbol	Description
xxx	Alternative will have a major effect on the item or concern. Major impacts include those that are long-term or permanent, result in significant controversy, could result in a loss of life or jeopardize the survival of a sensitive resource, or result in impacts that cannot be mitigated. These also include effects that go directly against the Federal Objective.
хх	Alternative will have a moderate effect on the item or concern. Moderate impacts include those that are short-term or long-term and can be reasonably replaced or restored with mitigation measures.
x	Alternative will have a minor effect on the item or concern. Minor impacts include those that are temporary, short-term, or long-term and do not require mitigation.
	Alternative will have a negligible impact on the item or concern.
+	Alternative will result in a minor improvement on the item or concern. Minor improvements can include those that are temporary or short-term.
++	Alternative will result in a moderate improvement to the item or concern. Moderate improvements include those that are short-term, long-term, or permanent. These include measurable effects that improve services but are not anticipated to result in a major benefit or life- saving measure.
+++	Alternative will result in a major improvement to the item or concern. Major improvements include those that are long-term or permanent. These include measurable effects that improve services resulting in a designation change or life-saving measure. Examples of a designation change include removing a waterbody from the list of 303(d) impaired waters or significantly improving anticipated survival of a listed species.
Duration of Effe	ects
Temporary	Brief effects lasting less than 1 year
Short-Term	Effects lasting 1 to 5 years
Long-Term	Effects lasting 5 to 10 years
Permanent	Effects lasting over 10 years

Table 4-5. System for Ecosystem Services Trade-Offs



Item or Concern		Alternative 1. No Action/FWOFI	Alternative 2. Combination 1	Alternative 3. Combination 2	Alternative 4. Combination 3				
Installation Cost	Total	\$0	\$27,925,500	\$27,039,900	\$29,652,800				
Benefits	Net Monetary Benefits (annualized)	\$0	\$921,700	\$868,400	\$913,200				
PR&G Guiding	Healthy and Resilient Ecosystems*		✓						
Principles	Sustainable Economic Development*		✓						
	Floodplains*		✓	✓					
	Public Safety		✓	✓					
	Environmental Justice	✓	✓	✓	✓				
	Watershed Approach		✓						
	*Represents the Federal Objective	*Represents the Federal Objective							
		Alternatives							
Locally Preferred			✓						
Non-Structural		✓							
		Ecosystem Service Trac	de-Offs						
Provisioning Services	Erosion and Sedimentation	XX	++	++	++				
	Prime and Unique Farmland								
	Threatened and Endangered Species								
	Migratory Birds/Bald and Golden Eagles								
Regulating Services	Water Quality		++	++	++				
	Regional Water Management Plans		++	+	+				
	Floodplain Management		+++		+++				
	Streams and Riparian Habitat	Х	++	++	++				
	Flood Damages		+++		+++				
	Wetlands		++						
	Public Health and Safety	XXX	+++	+	+++				
	Climate Change		+	+	+				
	Land Use								
	Fish and Wildlife Habitat	X	++	+	+				

Table 4-6. Summary Comparison of Alternative Plans¹



Item or Concern		Alternative 1. No Action/FWOFI	Alternative 2. Combination 1	Alternative 3. Combination 2	Alternative 4. Combination 3
Cultural Services	Historic and Cultural Properties				
	Environmental Justice				

¹See Table 4-5 for a description of the symbols shown in this table.

Table 4-7. Ecosystem Trade-offs of Alternative Plans

Item or Concern		Alternative 1. No Action/FWOFI	Alternative 2. Combination 1	Alternative 3. Combination 2	Alternative 4. Combination 3
Provisioning Services	Erosion and Sedimentation	No change in existing condition	Reduction in annual sedimentation rate for the watershed by 4,660 tons/year for all sites combined. <u>Sediment Storage:</u> Site S-1: Will capture and store 44 acre-feet of sediment over the design life. Site WP-1: Will capture and store 101 acre-feet of sediment over the design life.	Reduction in annual sedimentation rate for the watershed by 3,270 tons/year for all sites combined. <u>Sediment Storage:</u> Site S-1: No sediment storage on-site.	Reduction in annual sedimentation rate for the watershed by 4,660 tons/year for all sites combined. <u>Sediment Storage:</u> Site WP-1: Will capture and store 101 acre-feet of sediment over the design life.
	Prime and Unique Farmland	Approximately 117,400-acres of prime farmland and farmland of statewide importance are within the subwatershed. There will be a continued risk to prime farmland due to flooding.	 Will decrease prime and unique farmland lost to stream degradation and widening and will decrease flooding to prime and unique farmland. Will directly convert 56.2-acres and indirectly convert 51.2-acres of prime farmland and farmland of statewide importance. No Farmland Protection Policy Act (FPPA) significant concerns. 	 Will decrease prime and unique farmland lost to stream degradation and widening and will decrease flooding to prime and unique farmland. Will directly convert 44.5-acres and indirectly convert 51.2-acres of prime farmland and farmland of statewide importance. No Farmland Protection Policy Act (FPPA) significant concerns. 	 Will decrease prime and unique farmland lost to stream degradation and widening and will decrease flooding to prime and unique farmland. Will directly convert 35.5-acres and indirectly convert 51.2-acres of prime farmland and farmland of statewide importance. No Farmland Protection Policy Act (FPPA) significant concerns.





Item or Concern		Alternative 1. No Action/FWOFI	Alternative 2. Combination 1	Alternative 3. Combination 2	Alternative 4. Combination 3
Provisioning Thr Services Enc Spe	Threatened and Endangered Species	No effect.	Northern Long-Eared Bat: tree clearing would not occur from June 1 to July 31 and therefore the alternative 'may affect, but is not likely to adversely affect' the species. All other listed species: No suitable habitat and therefore no effect.	Northern Long-Eared Bat: tree clearing would not occur from June 1 to July 31 and therefore the alternative 'may affect, but is not likely to adversely affect' the species. All other listed species: No suitable habitat and therefore no effect.	Northern Long-Eared Bat: tree clearing would not occur from June 1 to July 31 and therefore the alternative 'may affect, but is not likely to adversely affect' the species. All other listed species: No suitable habitat and therefore no effect.
	Migratory Birds/Bald and Golden Eagles	No effect.	No adverse impact. No habitat destruction would occur from February 1 - July 15 to avoid impacts to nesting birds and raptors. If tree clearing must occur, bird surveys would be conducted.	No adverse impact. No habitat destruction would occur from February 1 - July 15 to avoid impacts to nesting birds and raptors. If tree clearing must occur, bird surveys would be conducted.	No adverse impact. No habitat destruction would occur from February 1 - July 15 to avoid impacts to nesting birds and raptors. If tree clearing must occur, bird surveys would be conducted.
Regulating Services	Water Quality	No change in existing condition	Reduction in annual sedimentation rate and associated influx of nutrients for the watershed by 4,630 tons/year for all sites combined. <u>Sediment Storage:</u> Site S-1: Will capture and store 44 acre-feet of sediment over the design life. Site WP-1: Will capture and store 101 acre-feet of sediment over the design life.	Reduction in annual sedimentation rate and associated influx of nutrients for the watershed by 3,240 tons/year for all sites combined. <u>Sediment Storage:</u> Site S-1: No sediment storage on-site.	Reduction in annual sedimentation rate and associated influx of nutrients for the watershed by 4,630 tons/year for all sites combined. <u>Sediment Storage:</u> Site WP-1: Will capture and store 101 acre-feet of sediment over the design life.

4.0 Alternatives



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14		Alternative 1.	Alternative 2.	Alternative 3.	Alternative 4.
Item or Concern		No Action/FWOFI	Combination 1	Combination 2	Combination 3
Regulating Services	Regional Water Management Plans	No effect.	Project at all sites align with the goals and objectives of other water resource plans in the watershed, which include improving water quality with stream stabilization and flood risk reduction. Sites WP-1 and DS-19 (downstream of Site S-1) were identified as part of the watershed-wide flood risk reduction strategy that was developed through locally funded watershed management plans for Papillion Creek. The plans strongly recommend implementation of a sediment basin upstream of DS-19 to extend the dam's design life and improve water quality.	Project at all sites align with the goals and objectives of other water resource plans in the watershed, which include improving water quality with stream stabilization and flood risk reduction. Site S-1 does not work in conjunction with the current watershed management plan as a sediment basin is strongly recommended at this site.	Project at all sites align with the goals and objectives of other water resource plans in the watershed, which include improving water quality with stream stabilization and flood risk reduction. Site WP-1 was identified as part of the watershed-wide flood risk reduction strategy that was developed through locally funded watershed management plans for Papillion Creek. The previous studies recommend a wet dam at this site instead of a dry dam due to a wet dam's
					ability to lower resuspension and turbulence of sediment from



4.0 Alternatives

Item or Concern		Alternative 1.	Alternative 2.	Alternative 3.	Alternative 4.
		No Action/FWOFI	Combination 1	Combination 2	Combination 3
Regulating Services	Floodplain Management	No effect.	Grade stabilization sites: No effect Site S-1: The FEMA mapped floodplain ends within the limits of this. 100-year inundation post-project would slightly increase upstream of the embankment. There is no effect downstream of the embankment. Site WP-1: This alternative would ensure that, under full build-out conditions, there is no increase in the extent of the 100-year floodplain as currently mapped by FEMA. This site also works as a system with other flood control measures in the watershed to provide optimum flood reduction benefits.	Site S-1: No effect	Site WP-1: This alternative would ensure that, under full build-out conditions, there is no increase in the extent of the 100-year floodplain as currently mapped by FEMA. This site also works as a system with other flood control measures in the watershed to provide optimum flood reduction benefits.

4.0 Alternatives



Item or Concern		Alternative 1.	Alternative 2.	Alternative 3.	Alternative 4.
Regulating Services	Streams and Riparian Habitat	No effect.	Overall, streams will improve with this Alternative. Preventing headcut progression and stream degradation and widening will result in an increase in stream function and habitat. Some riprap fill as well as earthen excavation will result from the implementation of the grade stabilization structures. Stream length will be lost due to embankments at Sites S-1 and WP-1. Inundation will create open water in areas that were previously stream length. Stream mitigation will account for stream length lost due to embankments and any overall decrease in stream function at Sites S- 1 and WP-1. <u>Total Impacts</u> (fill, excavation, inundation): Ephemeral: 241-feet Intermittent: 10,392-feet Perennial: 3,099-feet See Chapter 5 of the Plan-EA for impact specifics.	<u>Total Impacts</u> (fill, excavation, inundation): Ephemeral: 106-feet Intermittent: 4,207-feet Perennial: 3,099-feet See Chapter 5 of the Plan-EA for impact specifics.	<u>Total Impacts</u> (fill, excavation, inundation): Ephemeral: 106-feet Intermittent: 10,392-feet Perennial: 543-feet See Chapter 5 of the Plan-EA for impact specifics.
	Flood Damages	No effect.	Site WP-1: Construction would result in \$98,855 in annual flood reduction benefits. All other sites would have no effect.	No effect at Site S-1.	Site WP-1: Construction would result in \$98,855 in annual flood reduction benefits.





Item or Concern		Alternative 1.	Alternative 2.	Alternative 3.	Alternative 4.
Regulating Services	Wetlands	No Action/FWOFI Potential for loss of riparian wetlands due to continued stream degradation and widening	Net gain of approximately 37-acres of wetlands for all Sites combined. Loss of Riverine Wetlands: Total: 0.58-acres Site S-1: 0.12-acres (fill), 0.46-acres (inundation) Loss of Depressional Wetlands: Total: 0.40-acres Site S-1: 0.03-acres (fill) Site WP-1: 0.37-acres (depressional) Gain of Lacustrine Wetlands: Total: 37.2-acres Site S-1: 9.7-acres Site WP-1: 28.5-acres	Net gain of approximately 28- acres of wetlands for all Sites combined. No gain or loss of wetlands at Site S-1.	Net gain of approximately 9.1- acres of wetlands for all Sites combined. No gain or loss of wetlands at Site WP-1.
	Public Health and Safety	Continued safety risks due to existing high and unsafe stream banks, stream degradation and widening, and flooding.	Alternative will improve safety and protect infrastructure along stream corridors and downstream of Site WP- 1. Site S-1 will be implemented in conjunction with the Sponsor-led construction of DS-19. DS-19 is designed a high-hazard structure. An EAP will be in place to address potential risks due to the unlikely event of a sudden breach. WP-1 is designed as a high-hazard structure. An EAP will be in place to address potential risks due to the unlikely event of a sudden breach.	Alternative will improve safety and protect land along stream corridors at Site S-1.	Site WP-1 will reduce flood risk downstream of the dam. The structure is designed as a high- hazard structure. An EAP will be in place to address potential risks due to the unlikely event of a sudden breach.





Item or Concern		Alternative 1. No Action/FWOFI	Alternative 2. Combination 1	Alternative 3. Combination 2	Alternative 4. Combination 3
Regulating Services	Climate Change	No effect.	Climate change in Nebraska could result in an increase in extreme storm events, leading to increased flooding and an increase in stream degradation rate. Alternative would increase climate change resiliency by reducing peak flows and protecting streams from headcut progression and stream degradation.	Climate change in Nebraska could result in an increase in extreme storm events, leading to increased flooding and an increase in stream degradation rate. Alternative would increase climate change resiliency by reducing peak flows and protecting streams from headcut progression and stream degradation.	Climate change in Nebraska could result in an increase in extreme storm events, leading to increased flooding and an increase in stream degradation rate. Alternative would increase climate change resiliency by reducing peak flows and protecting streams from headcut progression and stream degradation.
	Land Use	No effect.	Minor effect on land use within the project area for grade stabilization sites. Site S-1: Land use change from agriculture to open water at sediment basin location. Land use is rapidly urbanizing and is expected to become low density residential at this location within the next 10-years. Site WP-1: Land use change from agriculture to open water/recreation at dam location. Land use is rapidly urbanizing and is expected to become low density residential within the next 10-years.	Minor effect on land use within the project area for grade stabilization sites.	Minor effect on land use within the project area for grade stabilization sites. Site WP-1: Land use change from agriculture to dry basin at project site. Land use is rapidly urbanizing and is expected to become low density residential at this location within the next 10-years.





Item or Concern		Alternative 1. No Action/FWOFI	Alternative 2. Combination 1	Alternative 3. Combination 2	Alternative 4. Combination 3
Cultural Services	ural ices Fish and Wildlife Habitat Habitat	Protection of terrestrial and aquatic habitat due to reduction in stream degradation and widening. <u>Loss of woodlands (cause):</u> All 7 Sites combined: 12.2-acres Site S-1: 2.5 acres (inundation), 0.12 acres (fill) Site WP-1: 0.83-acres (inundation), 1.05 acres (fill) <u>Gain of open water habitat:</u> All 7 Sites combined: 36-acres Site S-1: 16-acres Site WP-1: 20-acres <u>Gain of dedicated upland buffer:</u> All 7 Sites combined: 9.7-acres Site WP-1: 9.7-acres	Protection of terrestrial and aquatic habitat due to reduction in stream degradation and widening. <u>Loss of woodlands:</u> All 7 Sites combined: 9.72-acres Site S-1: 0.16 acres (fill) <u>Gain of open water habitat:</u> All 7 Sites combined: 20-acres Site S-1: No gain <u>Gain of dedicated upland buffer:</u> All 7 Sites combined: 9.7-acres Site S-1: No gain	Protection of terrestrial and aquatic habitat due to reduction in stream degradation and widening. <u>Loss of woodlands:</u> All 7 Sites combined: 11.37-acres Site WP-1: 1.05-acres (fill) <u>Gain of open water habitat:</u> All 7 Sites combined: 16-acres Site WP-1: No gain <u>Gain of dedicated upland buffer:</u> All 7 Sites combined: No gain Site WP-1: No gain	
	Historic and Cultural Properties	No effect.	Surveys were performed within the APEs and no properties eligible for listing on the NRHP or other cultural resources were identified.	Surveys were performed within the APEs and no properties eligible for listing on the NRHP or other cultural resources were identified.	Surveys were performed within the APEs and no properties eligible for listing on the NRHP or other cultural resources were identified.
	Environmental Justice	Alternative would not disproportionately impact minority, Tribal, or low- income populations.	Alternative would not disproportionately impact minority, Tribal, or low-income populations.	Alternative would not disproportionately impact minority, Tribal, or low-income populations.	Alternative would not disproportionately impact minority, Tribal, or low-income populations.



5.0 ENVIRONMENTAL CONSEQUENCES

An Environmental Evaluation using NRCS form number NE-CPA-52 was completed during the planning process. This evaluation has identified the potential affected resources within the Affected Resource Areas (ARAs). Chapter 3 'Affected Environment' describes these resources as they currently exist. This chapter describes the environmental consequences and impacts of the alternatives described in Section 4.3. Each resource of concern (or ecosystem service) is grouped into four service categories. These categories are described in Section 3.15. Environmental consequences are described in both duration and as adverse or beneficial as defined in Table 4-5.

Alternatives brought forward for detailed study are shown in Table 5-1 below for ease.

Alternative 1. No Action Alternative	Includes the No Action /FWOP Alternative at each of the seven sites identified in this Supplemental Plan-EA.				
	Site W-5: Eight (8) loose rock structures and one (1) rigid rock structure				
	Site D-78: Eleven (11) loose rock structures				
	Site D-2: Eight (8) loose rock structures and (1) rigid structure				
Alternative 2.	Site S-5: Channel restoration with downstream drop structure				
combination	Site S-15: Seven (7) loose rock structures and one (1) rigid structure				
	Site S-1: Sediment Basin and one (1) rigid structure				
	Site WP-1: Regional Detention Basin, Wet Dam				
Alternative 3. Combination 2	Site S-1: Dredging of DS-19 and three (3) loose rock structures All other Sites are the same as Alternative 2.				
Alternative 4. Combination 3	Site WP-1: Regional Detention Basin, Dry Dam All other Sites are the same as Alternative 2.				

Table 5-1. Alternatives Analyzed in Detailed Analysis

5.1 Erosion and Sedimentation

<u>No Action Alternative</u>. This alternative would not prevent sediment from entering streams and water bodies and continue to allow the influx of nutrients to enter water and compromise water quality within the watershed. This alternative would have a permanent moderate adverse effect due to decreases in viable farmland, decreases in the aesthetic value of waterbodies, and decreased water quality.

<u>Alternative 2.</u> This alternative includes channel stabilization at Sites W-5, D-78, D-2, S-5, and S-15; a sediment basin at Site S-1; and a wet dam a Site WP-1. Channel stabilization alternatives will prevent channel erosion upstream of Sites W-5, D-78, D-2, S-5 and the sediment basin and wet dam capture and storage accumulated sediment in the S-1 and WP-1 subwatersheds. Due to the reservoir's trapping of sediment, the floodwater that flows out of the reservoirs may be sediment hungry. It is possible this could increase erosion downstream, but the effects are expected to be minimal given the existing conditions of the stream. Sufficient downstream erosion protection would be installed and has been considered in the economic analysis. This alternative would reduce the influx of nutrients from sediment to downstream water bodies, which harms water quality. This alternative also reduces sediment loads transported downstream and reduces the annual sedimentation rate for the Papillion Creek Watershed from 249,420 tons per year to



244,760 tons per year. This alternative provides a long-term, moderate benefit to the watershed. Decreases in sedimentation and erosion increases viable farmland, improves the aesthetic value of the downstream waterbodies, improves water quality, and benefits aquatic and terrestrial habitat for native species. See Table 5-2 for information about the impacts at each site.

<u>Alternative 3</u>. This alternative includes construction of three loose rock structures at Site S-1 and dredging of downstream Structure S-1. The alternative would result in the prevention of channel erosion upstream of Site S-1 and would reduce the influx of nutrients from sediment to downstream water bodies, which harms water quality. This alternative reduces the amount of sediment that is transported downstream of Site S-1 and reduces the annual sedimentation rate for the Papillion Creek Watershed from 249,420 tons per year to 249,310 tons per year. See Table 5-2 for information about the impacts at each site.

<u>Alternative 4.</u> This alternative includes construction of a dry dam at Site WP-1 that would result in the capture and storage of 100-years of accumulated sediment in the WP-1 subwatershed. This would reduce the influx of nutrients from sediment to downstream water bodies, which harms water quality. Due to reservoir's trapping of sediment, the floodwater that flows out of the reservoirs may be sediment hungry. It is possible this could increase erosion downstream, but the effects are expected to be minimal. Sufficient downstream erosion protection would be installed and has been considered in the economic analysis. The Dry Dam Alternative eliminates sediments from being transported downstream in WP-1's subwatershed. All other sites would have the same reduction impacts as Alternative 2. This alternative reduces the annual sedimentation rate for the Papillion Creek Watershed from 249,420 tons per year to 247,090 tons per year. See Table 5-2 for information about the impacts at each site.

	Sediment Transported Downstream by Structure Subwatershed (tons/year)					
Site	Alternative 1.	Alternative 2.	Alternative 3.	Alternative 4.		
	No Action/FWOFI	Combination 1	Combination 2	Combination 3		
D-2	970	930	930	930		
D-78	2,150	2,020	2,020	2,020		
S-1	1,500	0	1,390	0		
S-5	790	440	440	440		
S-15	1,100	900	900	900		
WP-1	2,330	0	0	0		
W-5	1,240	1,130	1,130	1,130		
Subwatershed Total	10,080	5,420	6,810	5,420		
Watershed Total	249,420	244,760	249,310	247,090		

Fable 5-2. Sediment Tr	nsported Downstream b	y Structure Subwatershed
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Note: Values rounded to the nearest 10 tons/year

Both dam alternatives will have a negligible amount of sediment transported downstream. Negligible amounts of sediment are reported as zero for this analysis.



5.2 Prime and Unique Farmland

<u>No Action Alternative.</u> This alternative would not convert any prime or unique farmland or farmland of statewide importance. Continued flooding and land loss due to stream degradation and widening would threaten existing farmland.

<u>Alternative 2</u>. Implementation of the proposed project will directly convert between 70 acres and 154 acres and indirectly convert 62.8 acres of land. This includes direct and indirect conversion between 96 and 167 acres of prime farmland and between 13 and 14 acres of farmland of statewide importance. See Table 5-3 for a summary of the impacts at each site.

The Nebraska NRCS natural resources inventory specialist completed land evaluation analyses using the Form AD-1006 Farmland Conversion Impact Rating for each Site. Form AD-1006 is based on a point system that has 160 points set as a minimum number of 'total points' that triggers in-depth site reviews. Implementation of this alternative results in each site having a 'total points' score of less than 160 and therefore this alternative is clear of Farmland Protection Policy Act (FPPA) significant concerns. Coordination with the NRCS natural resources inventory specialist indicating that the measures within this alternative are clear of FPPA significant concerns and completed AD-1006 forms for each site are included in Appendix E. This alternative does not have an immediate effect on prime or unique farmland but does provide long-term protection of viable farmland which improves economic sustainability to producers.

Cite	Area Directly Converted ¹ (acres)		Area Within ARA ² (acres)			Area Indirectly Converted ³ (acres)			
Site	Prime	Statewide Importance	Total	Prime	Statewide Importance	Total	Prime	Statewide Importance	Total
D-2	0.5	0	0.5	14.7	0	14.7	-	-	-
D-78	0.4	0	0.4	34.8	0.1	34.9	-	-	-
S-15	0.1	0	0.1	7.2	1.1	8.3	-	-	-
W-5	1.3	0	1.3	16.7	0.2	16.9	-	-	-
S-5	11.9	0.1	12.0	-	-	-	-	-	-
S-1	11.8	0.1	11.9	-	-	-	6.9	0.4	7.3
WP-1	28.9	2.4	31.3	-	-	-	34.1	9.8	43.9
Total	53.6	2.6	56.2	56.7	1.2	57.9	41	10.2	51.2

Table 5-3. Prime and Unique Farmland, Alternative 2

¹Area within proposed fill, excavation, and/or permanent pool extents

²Analyzed for FPPA concerns at sites D-2, D-78, S-15, and W-5 for a conservative analysis ³Area within top of dam limits, not including those areas directly converted

<u>Alternative 3</u>. Implementation of this alternative is clear of FPPA significant concerns. Impacts at Site-1 are shown in Table 5-4. Impacts at all other sites are shown in Table 5-3. This alternative does not have an immediate effect on prime or unique farmland but does provide long-term protection of viable farmland which improves economic sustainability to producers.



Table 5-4. Prime and Unique Farmland, Alternative 3

Sito	A	rea Directly Converted ¹ (acres)	
Site	Prime Farmland	Farmland of Statewide Importance	Total
S1	0.2	0	0.2

¹Area within proposed fill, excavation, and/or permanent pool extents

<u>Alternative 4</u>. Implementation of this alternative is clear of FPPA significant concerns. Impacts at WP-1 are shown in Table 5-5. Impacts at all other sites are shown in Table 5-3. This alternative does not have an immediate effect on prime or unique farmland.

Table 5-5. Prime and Unique Farmland, Alternative 4

	Area	Directly Converted ¹ (acres	Area Indirectly Converted ² (acres)			
Site	Prime	Farmland of Statewide	Total	Prime	Farmland of	Total
	Farmland	Importance	TOLAI	Farmland	Statewide Importance	TOLAI
WP-1	7.1	2.2	9.3	34.1	9.8	43.9

¹Area within proposed fill and/or excavation extents

² Area within top of dam limits, not including those areas directly converted

5.3 Water Quality

<u>No Action Alternative.</u> This alternative would allow the existing level of sediment and associated nutrients to enter streams and downstream waterbodies. Streams would continue to degrade and widen, and the associated sediment loads would decrease water quality.

<u>Alternative 2</u>. Implementation of this alternative would provide grade control to streams and would consequently reduce stream erosion and the influx of nutrients from sediment to downstream waterbodies. Additionally, the construction of the S-1 sediment basin will protect DS-19's water quality by detaining approximately 44 acre-feet of sediment that would otherwise enter the downstream DS-19. The wet dam at WP-1 will store 98 acre-feet of sediment and the WP-1 sediment basin will store an additional 3 acre-feet of sediment, protecting the water quality of downstream streams and water bodies. This alternative provides a long-term, moderate benefit to water quality within the watershed. Decreases in sedimentation and erosion improve water quality and benefits aquatic and therefore terrestrial habitat for native species and human health and wellness.

<u>Alternative 3</u>. This alternative would allow 44 acre-feet of sediment to enter DS-19 throughout the 50-year design life, thereby reducing water quality of the pool. However, this alternative would still improve water quality in downstream reaches by capturing the sediment and associated nutrients within the DS-19 pool. This alternative provides a long-term, moderate benefit to water quality within the watershed. Decreases in sedimentation and erosion improve water quality and benefits aquatic and therefore terrestrial habitat for native species and human health and wellness.

<u>Alternative 4</u>. A dry dam at Site WP-1 would provide grade control along Whispering Ridge Creek, decreasing upland and channel erosion. Implementation would also result in capture and storage of 101 acre-feet of sediment, reducing the influx of nutrients from sediment to downstream water bodies. This alternative provides a long-term, moderate benefit to water quality within the watershed. Decreases in sedimentation and erosion improve water quality and benefits aquatic and therefore terrestrial habitat for native species and human health and wellness.



5.4 Regional Watershed Management Plans

No Action Alternative. This alternative would have no impact on regional watershed management plans.

<u>Alternative 2</u>. This alternative includes the construction of a wet dam at WP-1 and a sediment basin upstream of DS-19. DS-19 is a planned structure with 60 percent design complete. Land acquisition and Section 404 permitting have begun. WP-1 and DS-19 are included in the regional watershed management plans described below and therefore this alternative works together with other projects and practices to accomplish the defined goals of the Sponsor and the PCWP within the watershed.

The *Multi-Reservoir Analysis, Papillion Creek Watershed* (2004) details the conceptual design of DS-19 and strongly recommends an upstream sediment basin to extend the dam's design life and improve its water quality. This alternative would actualize the proposed sediment basin upstream of DS-19 described in this analysis. The *Papillion Creek Watershed Management Plan* (2009) and the subsequent *Papillion Creek Watershed Management Plan* (2009) and the subsequent *Papillion Creek Watershed Management Plan* (2009) and Site WP-1 (named the West Papillion Creek Watershed – Regional Detention Basin 1, or WP-RB1, in the watershed management plans) as proposed and recommended flood risk reduction structures. This alternative would implement the previously identified WP-RB1 dam which works with other previously constructed and planned flood risk reduction structures as a system to reduce the flood damage risk in the watershed. This alternative has the potential to add Federal construction dollars to local and State funding sources to meet watershed goals thereby reducing the local financial requirements and potentially speeding up the projected schedule for implementation at Site WP-1 and the sediment basin associated with DS-19.

<u>Alternative 3</u>. The *Multi-Reservoir Analysis, Papillion Creek Watershed* (2004) details the conceptual design of DS-19 and strongly recommends an upstream sediment basin to extend the dam's design life and improve its water quality. This alternative would ignore this recommendation and instead implement dredging at DS-19 but would not impact the implementation, schedule, or financial outcome of any regional watershed management plans.

<u>Alternative 4</u>. Site WP-1 is identified as a recommended flood risk reduction structure in the *Papillion Creek Watershed Management Plan* (2009) and *Papillion Creek Watershed Management Plan – March 2014*. These previous studies recommend a wet dam at this site instead of a dry dam due to wet dam's ability to lower resuspension and turbulence of sediment from incoming flow, but implementation of a dry dam would provide the same flood risk reduction benefits and would therefore work with other previously constructed and planned flood risk reduction structures as a system to reduce the flood damage risk in the watershed. This alternative has the potential to add Federal construction dollars to local and State funding sources to meet watershed goals thereby reducing the local financial requirements and potentially speeding up the projected schedule for implementation at Site WP-1.

5.5 Floodplains

<u>No Action Alternative.</u> This alternative would have no effect on the 100-year floodplain. Increased development is expected to expand the existing 100-year floodplain within the watershed, as mapped by the future conditions FEMA floodplain.

<u>Alternative 2 and Alternative 4</u>. These alternatives provide major permanent improvements to floodplain management, providing measurable and life-saving measures downstream of Site WP-1.



Sites W-5, D-78, and D-2 are not within the regulatory FEMA floodplain.

Site S-15 is located within Zone AE (includes base flood elevations) and partially within the delineated FEMA floodway. Grade stabilization structures will be placed at existing grade with little fill. What fill may be placed will be mitigated by localized widening of the channel to both promote stability of the structure and to ensure that the structure does not raise water surface elevations at any runoff frequency.

The downstream portion of Site S-5 located within the delineated FEMA Zone AE (includes base flood elevations). Careful consideration was given during design to ensure there would be no rise in the 100-year and 500-year future flood conditions.

A "no-rise" certification for construction within the delineated floodway and flood fringe at Sites S-15 and S-5 would be conducted by taking the effective (current) hydraulic model and adding sufficient detail to represent the proposed changes within the model reach to create a "corrected effective" model. This model would prove that there is not a rise in water surface elevations at the required storm intervals. The model is submitted for review through the local floodplain administrator and, once approved, a floodplain development permit is issued for the work. Floodplain maps are included in Appendix C.

Site WP-1 is not within the delineated FEMA floodplain; however, this alternative would provide a reduction of the 100-year and 500-year floodplain downstream of WP-1 (see figures provided in Appendix C) and will work in conjunction with other flood reduction sites in the watershed to provide floodplain reduction throughout the watershed. It is Nebraska's standard that the flood pool behind all dams that require NDNR approval be mapped as regulatory floodplain and therefore this site will require a Conditional Letter fof Map Revision (CLOMR) and follow up Letter of Map Revision (LOMR). Implementation of Site WP-1 results in a reduction of the 100-year flood extents by 131 acres and a decrease of 90 acres during the 500-year flood event.

The downstream portion of Site S-1 is located within Zone AE (includes base flood elevations) and partially within the delineated FEMA floodway. Site S-1 is not a high-hazard structure and therefore does not technically influence the downstream floodplains. However, this site will be constructed as the sediment basin of the planned downstream flood reduction structure and will also influence the upstream floodplain within the pool extents. Figures of with- and without-project floodplain extents are provided in Appendix C. It is Nebraska's standard that the flood pool behind all dams that require NDNR approval be mapped as regulatory floodplain and therefore this site will require a CLOMR and follow up LOMR.

Floodplain management regulations are described in Section 5.17.

<u>Alternative 3</u>. This alternative would have the same effects as Alternative 1 at Sites W-5, D-78, D-2, S-15 and WP-1.

The downstream portion of Site S-1 is located within Zone AE (includes base flood elevations) and partially within the delineated FEMA floodway. Grade stabilization structures would be placed at existing grade with little fill. What fill may be placed will be mitigated by localized widening of the channel to both promote stability of the structure and to ensure that the structure does not raise water surface elevations at any runoff frequency. A "no-rise" certification for construction within the delineated floodway and flood fringe would be conducted by taking the effective (current) hydraulic model and adding sufficient detail to



represent the proposed changes within the model reach to create a "corrected effective" model. This model would prove that there is not a rise in water surface elevations at the required storm intervals. The model is submitted for review through the local floodplain administrator and once approved, a floodplain development permit is issued for the work. Floodplain maps, which show existing floodplains, are included in Appendix C. Floodplain management regulations are described in Section 5.17.

5.6 Wetlands

The extents and types of existing wetlands within each ARA are shown in figures included in Appendix C.

No Action Alternative. No change to existing conditions.

<u>Alternative 2</u>. This alternative has a moderate, long-term beneficial effect to wetlands and associated benefits to water quality and habitat improvements. Wetland impacts of this alternative are shown below in Table 5-6.

Site	Cowardin Wetland Classification ¹	Hydrogeomorphic Classification	Type of Impact	Impacts (ac)
D-2	-	-	-	-
D-78	-	-	-	-
S-1	PEMA/C	Depressional	Fill	0.03
S-1	PEMA/C	Riverine	Fill	0.12
S-1	PEMA/C	Riverine	Inundation	0.46
S-5	-	-	-	-
S-15	-	-	-	-
W-5	-	-	-	-
WP-1	PEMA	Depressional	Inundation	0.37
			Total	0.98

Table 5-6. Wetland Impacts of Alternative 2

¹*PEMA* = *Palustrine emergent temporarily flooded*

PEMA/C = *Palustrine emergent temporarily/seasonally flooded*

A total of 0.15 acres of wetlands are impacted by earthen fill for the S-1 sediment basin embankment. Additionally, 0.83 acres of wetlands will be inundated from the S-1 and WP-1 permanent pools. There will be approximately 1 acre of cumulative wetland impacts.

Approximately 38.2 acres of lacustrine fringe wetlands will be created around the S-1 and WP-1 permanent pools. Wetland vegetation is predicted to establish at 2-feet vertically above and below the permanent pool elevation based on local experience. Wetland vegetation will be planted at 1-foot vertically above the permanent pool as a conservative estimate for wetland establishment due to the large spillway and 2-feet below the permanent pool based on existing topography and proposed grading at the S-1 sediment basin. Lacustrine fringe wetlands established above and below the permanent pool elevations will result in a net gain of 37.2 acres of wetlands for all sites.

<u>Alternative 3</u>. This alternative does not have any wetland impacts at S-1. All impacts at the other sites are the same as listed in Table 5-6 above. This alternative does not create any wetlands at Site S-1 and results



in a net gain of 28.1 acres of wetlands for all sites combined. This alternative would have negligible impacts to wetlands at Site S-1.

<u>Alternative 4</u>. This alternative does not cause any immediate wetland impacts at WP-1 and all impacts at the other sites are the same as listed in Table 5-6 above. This alternative would result in a net gain of 9.1 acres of wetlands for all sites combined. This alternative would have negligible impacts to wetlands at Site WP-1.

5.7 Streams and Riparian Habitat

The extents and types of streams within the ARAs are shown in Appendix C.

<u>No Action Alternative.</u> This alternative would not place fill in or inundate any streams. However, the streams within the ARAs are experiencing continual degradation, widening, and erosion. All streams within the ARAs will continue to degrade and widen and stream erosion will continue with this alternative and therefore it has a long-term adverse impact to stream health, habitat, human safety, and property values.

<u>Alternative 2</u>. This alternative has a moderate, long-term beneficial impact to stream and riparian habitat, providing improvements to property values, protection of land and infrastructure, and a reduction in safety risk. A summary of the stream impacts at each site is shown below in Table 5-7. This alternative would provide grade stabilization and headcut progression prevention in the streams and therefore improve overall stream function, improving aquatic and terrestrial habitat and human safety. Site WP-1 impacts approximately 543 feet of perennial stream impacts due to fill, which results in a loss of stream functional units (Olsson, 2019) according to the Nebraska Stream Condition Assessment Protocol. Therefore, stream mitigation would be required to account for this loss. Stream inundation caused by the permanent pool is offset by creation of lentic aquatic habitat. The restoration at Site S-5 will greatly improve stream function and quality. Fill associated with the raising of the channel grade is not included in fill quantities as the result is a channel elevation and improvement but not a loss.

C:to	Length of Stream Impacts (feet)			
Site	Ephemeral	Intermittent	Perennial	Impact Type
D-2	-	782	-	Excavation (earthen)
D-2	-	95	-	Fill (earthen)
D-2	46	401	-	Fill (rock riprap)
D-78	-	488	-	Excavation (earthen)
D-78	-	500	-	Fill (rock riprap)
S-1		66		Excavation (earthen)
S-1	-	291	-	Fill (earthen)
S-1	-	68	-	Fill (rock riprap)
S-1	135	6,027	-	Inundation
S-15	-	242	-	Excavation (earthen)
S-15	-	125	-	Fill (earthen)
S-15	-	369	-	Fill (rock riprap)
W-5	60	938	-	Fill (rock riprap)

 Table 5-7. Stream Impacts, Alternative 2



Site	Length of Stream Impacts (feet)			
Site	Ephemeral	Intermittent	Perennial	Impact Type
WP-1	-	-	543	Fill (earthen)
WP-1	-	-	2,556	Inundation
Total Fill	106	2,787	543	Fill (earthen and rock)
Total Inundation	135	6,027	2,556	Inundation
Total Excavation	0	1,578	0	Excavation
Total Impacts	241	10,392	3,099	Fill, Inundation, and Excavation

<u>Alternative 3</u>. This alternative includes 36 feet of rock riprap fill within the intermittent South Papillion Creek and 97 feet of rock riprap fill in an intermittent unnamed tributary at Site S-1. All other stream impacts remain the same as those listed in table 5-7 above. This alternative would provide grade stabilization and headcut progression prevention and therefore improve overall stream function, improving aquatic and terrestrial habitat and human safety.

<u>Alternative 4</u>. This alternative includes 543 feet of rock riprap fill within the perennial channel at Site WP-1 from the dam embankment. All other stream impacts remain the same as those listed in Table 5-7 above. This alternative would provide grade stabilization and headcut progression prevention and therefore improve overall stream function, improving aquatic and terrestrial habitat and human safety. However, this alternative does not provide the same benefit of aquatic and terrestrial habitat improvements as identified at Site WP-1 for the wet dam due to the absence of the permanent pool. This alternative would lead to an overall loss of stream functional units (Olsson, 2019) and would therefore require mitigation.

5.8 Threatened and Endangered Species

NRCS Programmatic Consultation evaluation parameters, species matrix, and conservation conditions were used during this Draft EA's environmental evaluation in conjunction with input from natural resource specialists at NRCS, NGPC, and USFWS. Based on discussions with specialists and an assessment of each species' natural history, range, and habitat needs, it has been determined that none of the alternatives are likely to adversely impact any state or federally listed endangered, threatened, proposed, or candidate species. A concurrence letter from USFWS is included in Appendix A and a species-specific discussion is provided below. All alternatives have a negligible effect on threatened and endangered species.

Northern Long-Eared Bat

No Action Alternative. This alternative would have no effect on the northern long-eared bat.

<u>All other alternatives.</u> The northern long-eared bat range is within the ARA limits; however, there are no known hibernacula within the ARAs. Northern long-eared bats could conceivably roost underneath bark, in cavities, or in crevices in both live and dead trees that will be cleared. There is currently no Endangered Species Act (ESA) Section 7 programmatic informal consultation agreement between NRCS and USFWS for the northern long-eared bat. Section 4(d) of the ESA allows the USFWS to endorse special rules for species listed as threated that provide flexibility in implementing the ESA. This helps to reduce ESA conflicts by allowing some activities that do not harm the species and allows more time for the USFWS to focus efforts on threats to the continued existence of the species. The 4(d) rule for the northern long-eared bat focuses on areas affected by white-nose syndrome (which includes the ARAs analyzed in the Supplemental Plan-



EA) during the bat's most sensitive life stages and relies on the findings of the programmatic biological opinion prepared by the USFWS. Federal agencies can choose to follow standard Section 7 of the ESA procedures or use the 4(d) rule framework to streamline consultation when appropriate. Using the key to the 4(d) rule, made available by the USFWS, it is determined that the proposed action is consistent with those evaluated in the programmatic intra-Service consultation for the final 4(d) rule and does not require separate consultation. No tree clearing will occur from June 1 to July 31 to limit the potential of an incidental take. These alternatives may affect, but are not likely to adversely affect the northern long-eared bat.

Western Prairie Fringed Orchid

No Action Alternative. This alternative would have no effect on the western prairie fringed orchid.

<u>All Other Alternatives.</u> The western prairie fringed orchid range is within AAR limits. All ARAs have a cropping history or are currently disturbed and there are no natively vegetated meadows. Therefore, there is no suitable habitat within the ARAs and these alternatives will have no effect on the western prairie fringed orchid.

Monarch Butterfly

No Action Alternative. This alternative would have no effect on the monarch butterfly.

<u>All Other Alternatives.</u> The monarch butterfly range is within AAR limits. There is the potential for milkweed species to inhabit many areas with the AAR limits and therefore, there is the potential for suitable habitat for the monarch butterfly. The monarch butterfly is currently a candidate species. If the monarch butterfly becomes listed prior to construction, consultation with USFWS would occur and avoidance measures would be followed.

5.9 Fish and Wildlife Habitat

No Action Alternative. No change in existing conditions.

<u>Alternative 2</u>. This alternative would impact approximately 12 acres of woodlands, as shown in Table 5-8 below. It would provide grade control along streams, enhancing overall stream function and consequently improve in-stream fish habitat. Existing streams at grade stabilization sites are actively incising and large headcuts frequently cut off fish passage within the watershed. The proposed loose rock structures will be placed at-grade and will launch as headcuts progress upstream toward the structures, resulting in a ramp. These structures will improve stream connectivity by reducing the chance of severe, vertical drops frequently found within the watershed that are a result of unchecked stream degradation. Proposed rigid ramp structures are being placed at existing vertical drops and will improve stream connectivity and wildlife passage.

The permanent pools at Sites WP-1 and S-1 will provide approximately 36-acres of additional fish habitat. The WP-1 Reservoir will provide 20 acres of the fish habitat and has a watershed to lake ratio of approximately 45, which is slightly higher but relatively close to the preferred watershed to lake ratio of 30:1 for desirable fish habitat. Overall, this alternative improves fish habitat and results in minimal impact to woodland and agricultural wildlife habitats.



Site	Inundation	Tree Removal	Total			
D2	0	1.0	1.0			
D78	0	0.5	0.5			
S1	2.5	0.1	2.6			
S15	0	1.3	1.3			
S5	0	3.2	3.2			
W5	0	1.7	1.7			
WP1	0.8	1.1	1.9			
		Total	12.2			

Table 5-8. Woodland Impacts, Alternative 2

<u>Alternative 3</u>. This alternative would impact 0.2 acres of woodlands at Site S-1. Impacts at the other sites would be the same as shown in Table 5-8 above and therefore this alternative results in a total woodland impact of 9.7 acres and a gain in 20 acres of open water habitat. Providing grade stabilization along South Papillion Creek and the unnamed tributary would enhance overall stream function and improve aquatic and terrestrial habitat. Sediment entering downstream DS-19 would decrease water quality and aquatic habitat within the DS-19 permanent pool. This alternative would improve habitat and have negligible impacts to woodlands and other fish and wildlife habitat.

<u>Alternative 4</u>. This alternative would impact 0.8 acres of woodlands at WP-1 with construction of the embankment and an additional 0.8 acres as the structure fills with sediment over time. Impacts at the other sites would be the same as shown in Table 5-8 above and therefore results in an immediate impact of 11.4 acres of woodlands and a gain of 16 acres of open water habitat. The dry dam would reduce sedimentation and associated nutrients from moving downstream and would therefore improve aquatic habitat downstream. However, this alternative would fill the existing upstream reach with sediment over the project design life and does not create any additional wetland or stream habitat. Overall, this alternative improves fish and wildlife habitat at the other six sites but has a negative impact on fish and wildlife habitat at Site WP-1.

5.10 Migratory Birds and Eagles

No Action Alternative. This alternative would have no impact on migratory birds or eagles.

<u>All Other Alternatives.</u> This alternative would avoid any habitat destruction from February 1 to July 15 to avoid impacts to nesting migratory birds or raptors. If tree clearing must occur during these times, bird surveys would be conducted to ensure compliance with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. There are no known bald or golden eagle winter roost sites near or within the ARAs and a database of bald eagles kept by the NGPC indicates that there are no known bald eagle nests within 0.5 miles of the ARAs. Therefore, tree clearing, and construction activities will not impact these eagles. These alternatives would not adversely impact migratory birds, bald eagles, or golden eagles.

5.11 Flood Damages

<u>No Action Alternative and Alternative 3.</u> Frequent flooding and subsequent damages would continue at the existing rates.



<u>Alternative 2 and Alternative 4</u>. Site WP-1 is the only site that provides flood damage reduction and would provide the same reduction with a wet or dry dam. An economic analysis using the 2022 federal discount rate of 2.25 percent and a design life of 100-years was conducted with construction expected to occur in 1 year. Construction of this alternative would result in over \$100,000 of annual flood reduction benefits.

5.12 Historic and Cultural Properties

Section 106 of the NHPA [54 U.S.C. § 306108] and its implementing regulations, "Protection of Historic Properties" [36 CFR part 800] requires Federal agencies to determine whether their undertakings will have an adverse impact on historic properties that are listed on or are eligible for listing on the National Register of Historic Places and to afford the Advisory Council on Historic Preservation a reasonable opportunity to provide comment. In compliance with Section 106 of the NHPA, consulting parties including Indian Tribes were identified and contacted to identify the presence of properties of historic, religious, and cultural significance within the study area. For a list of Tribes contacted see Table 6-1. The public was afforded an opportunity to provide input on cultural resources during the July 24th, 2019 and March 23rd, 2020 public meetings.

After the preferred alternative was identified, the area of potential effect (APE) for each proposed site was surveyed for the presence of historic properties by a professional consultant who meets the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation. Cultural resources investigations were completed in late October and early November 2019.

<u>No Action Alternative.</u> There would be no immediate change to the surrounding lands resulting in No Federal Action that has the potential to affect historic properties and no further NHPA compliance would be required. This alternative would not impact any cultural and historic properties. There will be a continued threat to historic and cultural properties due to streambank erosion.

<u>All Other Alternatives</u>. One cultural resource was identified during the archeological survey. This resource consists of a segment of a cut-off rail line constructed by the C, B, & Q Railroad between 1914 and 1917. This rail line does not meet the criteria for National Register of Historic Places eligibility. No other cultural resources were identified. Based on the results of the cultural resource inventory, NRCS determined that no historic properties would be affected by the proposed watershed plan improvements. NRCS consulted with the Nebraska State Historic Preservation Office and the Tribal governments identified in Table 6-1 (and included in Appendix A) on the results of the cultural resource inventory and its determination of effect in letters dated September 10, 2020. The Nebraska State Historic Preservation Office concurred that no historic properties would be affected in a letter received September 18, 2020 (Appendix A). The Pawnee Nation of Oklahoma concurred with the determination of no historic properties affected in a letter received November 23, 2020 (Appendix A). There was no response received from other Tribes.

It is possible that construction activities could result in disturbance to unknown cultural resources through accidental discovery depending on the extent of the resources and their proximity to structures and access roads. If cultural resources are inadvertently discovered during construction, a stop work order will be issued until the resources can be evaluated by a professional archeologist. NRCS will notify the State



Historic Preservation Officer, consulting tribal governments, and the Advisory Council on the Historic Preservation. NRCS will act as prescribed in NRCS GM 420, Part 401, to protect or recover any significant cultural resources discovered during construction.

5.13 Social and Demographic Data

No Action Alternative. This alternative would not adversely impact minority groups.

<u>All Other Alternatives.</u> This alternative will not adversely impact any known minority groups or individuals living in poverty. No private property will be taken without just compensation and no relocations are anticipated for this alternative. The community and landowners will benefit from stream stabilization and flood damage reduction.

5.14 Public Health and Safety

<u>No Action Alternative</u>. Risks to public safety from high and eroding stream banks will continue and likely worsen as stream banks continue to degrade and widen. High and steep stream banks, especially near developments, pose a risk to loss of life. If the streams continue to degrade to the predicted stable slope in the watershed, major infrastructure including state highways, county roads, residential roads, sanitary sewers, and power transmission lines will be at risk. Residential properties and homes near Sites S-5 and W-5 will also be susceptible to encroachment and damage. Additionally, the potential for risk to loss of life, property, and essential public services due to flooding downstream of Site WP-1 will remain and likely increase with predicted future development.

<u>Alternative 2 and Alternative 4.</u> This alternative would stabilize the stream banks within the ARAs to minimize degradation and erosion and therefore improving public safety in and near the streams within and upstream of the project areas. This alternative also involves restoration of an existing stream at Site S-5, which will reduce the current risks associated from the steep banks and erosion and provide infrastructure protection. Implementation of the flood reduction dam at WP-1 would decrease flood damages and reduce risks to the public health and safety. Utility protection is expected to be \$42,000 annually for the 50-year lifespan of the grade control structures. In addition, protection to roadway embankments, power infrastructure, agricultural land, and homes are expected. A breach analysis was completed for Sites WP-1 and the sediment basin at Site S-1 and figures are included in Appendix C. Site WP-1 is a high-hazard dam and an emergency action plan (EAP) will be developed prior to implementation. The breach path for Site S-1 is contained within the flood pool of the Sponsor-led DS-19 site, which is a high-hazard structure. An EAP will be in place to address potential risks due to the unlikely event of a sudden breach. Overall, this alternative has a permanent, major beneficial effect to public health and safety.

<u>Alternative 3</u>. This alternative would provide a minor, long-term improvement to safety and protect land along stream corridors at Site S-1.

5.15 Indirect Effects

Indirect effects are those that are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable (40 CFR 1508.8). These can be positive or negative and can include effects to the human socioeconomic environment and/or the natural environment. An indirect effect of the no action alternative would be continued stream degradation, resulting in increased bank instability and channel widening. This would also result in loss of land, loss of production, and increased maintenance



costs for producers. Another indirect effect could be an increase to the floodplain and continued flood risk. An indirect effect of Alternative 2 could be increased residential properties due to the recreation benefits of the permanent pool at Site WP-1 and open space and increased property values around the pools of Site WP-1 and S-1. Development is occurring throughout the watershed and this will likely ultimately preserve open space and habitat as opposed to decreasing it.

5.16 Cumulative Impacts

Cumulative impacts are defined by the Council on Environmental Quality (CEQ) as:

the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions (40 CFR 1508.7).

These impacts include both the direct and indirect impacts of the proposed project with any other projects that have happened in the past or could reasonably happen in the future. Reasonably foreseeable actions must have progressed far enough through planning or design so that they are likely to be carried out. The framework provided in CEQ's "Considering Cumulative Effects under the National Environmental Policy Act" was consulted for this analysis. As is discussed in the aforementioned framework, a method to discern cumulative impacts is to assess potential resources affected by the proposed action, to look at other past or future projects that could also impact those resources, and to analyze the locations and timeframes of those actions to determine if cumulative impacts are present.

Actions occurring within the Papillion Creek Watershed were considered for this analysis. Flood damage reduction and impacts to stream stability, wetlands, and streams were identified as the primary resources to consider. This Plan-EA is the only NRCS watershed plan for the area and therefore no other new NRCS structures are planned in the foreseeable future. Foreseeable actions within the watershed impacting stream stability and flood damage reduction include other flood damage reduction structures previously studied and recommended in the watershed (see Sections 3.4, 5.4). Cumulative impacts could include loss of stream length and potential degradation downstream due to sediment-hungry water. Other planned flood reduction structures within the watershed will work in conjunction with WP-1 and the previously implemented flood reduction measures to reduce current and future floodplains and bring needed flood damage reduction to the watershed. Reduced floodplain downstream of WP-1 and in conjunction with the other flood reduction structures could increase developments downstream of the site and within the watershed. Residential development around the WP-1 top of dam could also increase due to the recreation amenities provided.

Any additional stream stabilization projects will provide an overall benefit to watershed streams and surrounding land.

5.17 Compliance with Federal, State, and Local Laws

The following permit and compliance requirements must be met for construction of the Project to occur.



- **Clean Water Act Section 404.** CWA Section 404 permits must be obtained from the USACE to account for fills within jurisdictional waters of the United States prior to construction. The Sponsor will obtain a 404 permit for sites prior to construction. It is anticipated that individual Section 404 permits and 401 water quality certifications will be required for Sites WP-1 and S-1 and a Nationwide Permit 27 will be issued for the other locations.
- Migratory Bird Treaty Act and Endangered Species Act Section 7. To avoid migratory bird nesting and Northern long-eared bat roosting impacts, clearing activities will be conducted between August 1 and March 31. If tree clearing must occur between April 1 and May 31, a field survey will be conducted to ensure compliance with the Migratory Bird Treaty Act.
- **NDEE.** A National Pollutant Discharge Elimination System (NPDES) construction storm water permit from the Nebraska Department of Environment and Energy (NDEE) will be required at each site if more than 1-acre of land is disturbed for construction.
- **Dust Regulations.** Nebraska Title 129, Chapter 32 fugitive dust regulations shall apply to all excavation and construction activities.
- **Excavation.** All applicable regulations in Nebraska Title 128 and Title 132 must be followed. Any solid or hazardous wastes generated or discovered during project operations must be properly handled, contained, disposed, and (if necessary) characterized. No waste permit required.
- National Historic Preservation Act. Section 106 of the NHPA [54 U.S.C. § 306108] and its implementing regulations, "Protection of Historic Properties" [36 CFR part 800] requires Federal agencies to determine whether their undertakings will have an adverse impact on historic properties that are listed on or are eligible for listing on the National Register of Historic Places and to afford the Advisory Council on Historic Preservation a reasonable opportunity to provide comment. In compliance with Section 106 of the NHPA, consulting parties were identified including Indian tribes that might attach religious and cultural significance to historic properties within the APEs. The public was afforded an opportunity to provide input during the July 24th, 2019 and March 23, 2020 public meetings. The APE for each site was identified and reviewed for the presence of historic properties by a professional archeologist. Cultural resource investigations were completed in late October and early November 2019. No cultural resources that are eligible for listing on the National Register of Historic Places were identified during the investigations. Therefore, a determination of "no historic properties affected" was made for these alternatives. The Nebraska State Historic Preservation Office, the Pawnee Nation of Oklahoma, and the Otoe-Missouria Tribe of Indians concurred with this determination of effect. No other responses were received.
- **Storage Permit.** A water storage permit will be obtained from NDNR prior to construction.
- **Dam Safety.** The final engineering plans will be reviewed and approved by the NDNR Dam Safety Section prior to construction. Before approval of a dam, NDNR will have to verify the dam has the proper hazard classification.
- **Water wells.** Coordination with NDNR will occur prior to construction to locate any registered water wells.



- **Operation and Maintenance.** An O&M Plan will be prepared using the NRCS National Operation and Maintenance Manual.
- **Floodplain Management.** Prior to construction, the Sponsor will participate in and comply with applicable Federal, State, and Local floodplain management rules and regulations.
 - Any and all development in the regulatory floodplain or floodway will require a local Floodplain Development Permit (Neb. Rev. Stat. § 31-1021 & Title 455 Nebraska Administrative Code, Chapter 1). This includes all Special Flood Hazard Areas identified on FEMA's Flood Insurance Rate Maps, and any other area adopted by the local jurisdiction. Development is defined as "Any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation, drilling operations or storage of equipment or materials."
 - Any development that causes more than a foot of rise in a regulatory floodplain without floodway or any rise in a regulatory floodplain with floodway is required to obtain a Conditional Letter of Map Revision (CLOMR) from FEMA. (44 CFR 65.12/60.3c10/60.3d3/60.3d4). The floodplain development permit application must contain engineering that shows the project meets these requirements.
 - Any development that causes a change to the regulatory floodplain or floodway boundary must submit a Letter of Map Revision (LOMR) within six months of project completion (44 CFR 65.3)
- **National Environmental Policy Act.** This document was prepared to comply with the National Environmental Policy Act and the Principles and Guidelines for Water and Related Land Resources Implementation Studies.

5.18 Possible Conflicts with Plans and Policies

No potential conflicts between land use plans, regional water resource management plans, policies, or controls for the area were identified.

5.19 Risk and Uncertainty

Each alternative contains risk factors and uncertainty values that could involve changes in costs and benefits. Costs, structural data, and benefits were based on an evaluated life of 50 years for grade stabilization structures and 100-years for the flood risk reduction dam (Site WP-1). Sedimentation rates were calculated using existing land use and conditions. Land use could change and therefore increase or decrease these rates and urbanization can cause a rapid influx of sediment into the basin. Costs, including land values, were determined by engineer estimates for project implementation and were based on local experience and engineering judgement. All estimated costs and benefits are subject to change due to local, regional, or world economics. These uncertainties were not considered for this analysis.

5.19.1 Climate Change

Climate change In Nebraska could result in an increase in extreme storm events (UNL, 2014), leading to increased flooding and an increase in stream degradation rates. All regulations were followed in the design



of Site WP-1 as a high-hazard classification dam. In addition, stream banks at the grade stabilization structures are protected up to the 100-year flood event. Overall, all alternatives brought forward for detailed analysis increase climate change resiliency within the watershed by reducing peak flows and protecting streams from headcut progression and stream degradation.

5.19.2 Land Use

Land use is projected to continue to move from agricultural to developed in most of the watershed. All alternatives brought forward for detailed analysis support both existing and projected future land use and therefore will have a negligible effect.

5.19.3 Adaptive Management

Adaptive management can be a useful tool to reduce uncertainty and maximize goals. Stream grades can change and headcuts can form and migrate quickly, especially with extreme events or in response to a human-induced change. Grade stabilization alternatives were analyzed with an understanding that these changes could occur between the planning process and final design and implementation. ARAs were determined and kept broad enough for individual grade stabilization structure locations to adjust to potential changes and resource impacts were determined and analyzed conservatively. Uncontrollable changes to stream profile and banks during the implantation timeline as well as survey completed during the final design phase may modify the planned design and footprint at grade stabilization sites. For example, sheet pile may be needed at some sites to protect the structure but not at others and some planned locations may shift within their respective ARAs. These changes are expected due to the fluid nature of stream dynamics and are not anticipated to impact the outcome of the included environmental assessment or economic analysis.

5.20 Precedent for Future Actions with Significant Impacts

Implementation of the proposed action does not set a precedent for future actions with significant impacts. Future projects would be analyzed by their own circumstances and evaluated for effects based on resources of concern identified during the scoping process.

5.21 Controversy

There have been no areas of controversy identified. The planning process included public meetings, coordination with interested agencies and groups, and printed public information to raise issues, resolve conflicts, and recommend the most desirable plan features. Comments were generally in-favor at all project sites and landowner recommendations and preferences were considered and utilized when possible. The Plan-EA's preferred alternative is also the locally preferred alternative.



6.0 CONSULTATION, COORDINATION, AND PUBLIC PARTICIPATION

The following section details agency and public participation efforts throughout the planning process. Additional internal consultation and coordination took place between the Sponsor and NRCS throughout the planning process. An online website with the primary project contact information, project meeting information, and relevant project information was additionally made available to keep the public informed and address any concerns they may have had throughout the planning process.

6.1 Scoping Meetings

The Sponsor held agency and public scoping meetings on July 24, 2019 to provide information to the public about the Project and to gather comments that may be relevant to the scoping process. Summaries of the meetings are included in Sections 6.1.1 and 6.1.2 below. The sponsor also held internal scoping meetings with the NWMC, NRCS staff, and consultants to address questions and receive input during the initial scoping phase.

Agency / Tribe	Position	Name	Address
U.S. Fish and Wildlife	Wildlife Biologist	Carrie Allison	9325 South Alda Road
Service	(Consultation)		Wood River, NE 68883
U.S. Fish and Wildlife	Wildlife Biologist	Santiago Martin	9325 South Alda Road
Service	(Consultation)		Wood River, NE 68883
U.S. Fish and Wildlife	Field Supervisor	Lee Andrews	9325 South Alda Road
Service			Wood River, NE 68883
Nebraska Game and		Carey Grell	2200 N. 33rd Street
Parks Commission			P.O. Box 30370
			Lincoln, NE 68503
Nebraska Game and	Douglas County	Rich Berggren	2200 N. 33rd Street
Parks Commission	Conservation Officer		P.O. Box 30370
			Lincoln, NE 68503
Nebraska Game and	Washington County	Jon Reeves	2200 N. 33rd Street
Parks Commission	Conservation Officer		P.O. Box 30370
			Lincoln, NE 68503
Nebraska Game and	Sarpy County	Dan Evasco	2200 N. 33rd Street
Parks Commission	Conservation Officer		P.O. Box 30370
			Lincoln, NE 68503
Nebraska Game and	Commissioner at Large	Scott Cassels	2200 N. 33rd Street
Parks Commission			P.O. Box 30370
			Lincoln, NE 68503
Nebraska Game and	District #1	Dan Kreitman	1689 County Road E
Parks Commission	Commissioner		Wahoo, NE 68066
Nebraska Game and	District #2	Dick Bell	9960 Bloomfield Drive
Parks Commission	Commissioner		Omaha, NE 68114
Nebraska Game and	District #3	Jim Ernst	11 Wildwood Drive
Parks Commission	Commissioner		Columbus, NE 68601
United States Army		John Moeschen	Nebraska Regulatory
Corps of Engineers			Office

Table 6-1. Agency Mailing List



Agency / Tribe	Position	Name	Address
			8901 South 154th Street
			Omaha, NE 68138
United States Army		Matthew Wray	Nebraska Regulatory
Corps of Engineers			Office
			8901 South 154th Street
			Omaha, NE 68138
U.S. Environmental	Region 7 NEPA	Larry Shepard	National Environmental
Protection Agency	Reviewer		Policy Act
			11201 Renner Blvd.
			Lenexa, KS 66219
Nebraska Department of	Nonpoint Source	Carla McCullough	1200 N. Street
Environmental Quality	Pollution Management		Suite 400
	Program contact		Lincoln, NE 68509
Nebraska Department of	Water Management	Steve Goans	1200 N. Street
Environmental Quality	Division Deputy		Suite 400
	Director		Lincoln, NE 68509
Nebraska Department of	Water Quality Division	Marty Link	1200 N. Street
Environmental Quality	Administrator		Suite 400
			Lincoln, NE 68509
Nebraska Department of	Water Permits Division	Shelley Schneider	1200 N. Street
Environmental Quality	Administrator		Suite 400
			Lincoln, NE 68509
Office of the Governor	Governor	Pete Rickets	P.O. Box 94848
			Lincoln, NE 68509
City of Blair	Mayor	Richard Hansen	2323 Colfax Street
			Blair, NE 68008
City of Bennington	Mayor	Matt John	15505 Warehouse Street
			Bennington, NE 68007
Bennington Public		John Bohrer	PO Box 221
Works			Bennington, NE 68007
City of Omaha	Mayor	Jean Stothert	1819 Farnam Street
			Omaha, NE 68183
Omaha Public Works	Public Works Director	Robert G. Stubbe	1819 Farnam Street
	N4	·· · ·	
City of Gretna	Mayor	Jim Timmerman	204 N McKenna Ave
City of Cysters	Dublic Marks Director	Krie Ferie	Biair, NE 68028
City of Gretna	Public Works Director	Kris Faris	20000 Husker Drive
			Grotpa NE 68028
Washington	Director	Al Schoomakor	319 South 16th Street
County/Blair Public		AISCHUEIHAKEI	Rigir NE 68008
Works			Diall, NE 00000
Washington County	Administrator and	Rvan Sullivan	1555 Colfax Street
Planning and Zoning	Planning/Zoning		Rlair NF 68008
Training and Zonnig	r anning/201111g		



Agency / Tribe	Position	Name	Address
Washington County	Board of Supervisors:	Bob Frahm	1133 Park Street
	District #3		Blair, NE 68008
Douglas County	Planning Commission	Murray McArdle	P.O. Box 501
Planning and Zoning	Member		Eklhorn, NE 68022
Douglas County	Board of Supervisors:	Clare Duda	1819 Farnam St.
	District #7		Omaha, NE 68183
Douglas County	Engineer	Tom Doyle	15505 W Maple Rd
			Omaha, NE 68116
Douglas County	Planning/Zoning	Doug Cook	3015 Menke Circle
Carpy County Dianning	Dianning and Building	Bruce Fountain	1210 Colden Cate Drive
Sarpy County Planning	Director	Bruce Fountain	1210 Golden Gate Drive
	Director		Papillion NE 68046
Sarpy County	Board of Supervisors:	lim Warren	1210 Golden Gate Dr
supy county	District #5		#1250
			Papillion, NE 68046
Sarpy County	Board of Supervisors:	David Klug	1210 Golden Gate Dr
	District #2	_	#1250
			Papillion, NE 68046
Sarpy County	Engineer	Denny Wilson	15100 S 84th Street
			Papillion, NE 68046
OPPD	Chair of the Board	Anne McGuire	444 S 16th Street Mall
0.000			Omaha, NE 68102
OPPD	Chief Executive Officer	Timothy J. Burke	444 S 16th Street Mall
Matropolitan Utilitian	President Roard Chairporson &	Tim Cayanayah	1722 Harpov Street
District	Subdivision 4 Board	Titti Cavallaugi	Omaha NE 68102
District	Member		
Metropolitan Utilities	Compensation	James Begley	1723 Harney Street
District	Manager &	5,	Omaha, NE 68102
	Subdivision 1 Board		
	Member		
Metropolitan Utilities	Real Estate &	Jack Frost	1723 Harney Street
District	Subdivision 7 Board		Omaha, NE 68102
	Member		
Federal Emergency	Director, Flood	Michael Scott	9221 Ward Parkway
	Mitigation Division		Kalisas City, MO 64114
Federal Emergency	Regional Administrator	Paul Taylor	9221 Ward Parkway
Management Agency			Kansas City, MO 64114
Region VII			
Nebraska State Historical	Director and SHPO	Trevor Jones	1500 R Street
Society			P.O. Box 82554
			Lincoln, NE 68501
Nebraska State Historical	Deputy State Historic	Jill Dolberg	1500 R Street
Society	Preservation Officer		P.O. Box 82554



Agency / Tribe	Position	Name	Address
			Lincoln, NE 68501
Nebraska State Historical		John Rissetto	1500 R Street
Society			P.O. Box 82554
			Lincoln, NE 68501
Iowa Tribe of Kansas and	Chairman	Timothy Rhodd	3345 B Thrasher Rd.
Nebraska			White Cloud, KS 66094
Iowa Tribe of Oklahoma	Chairman	Edgar B. Kent, Jr.	335588 E. 750 Road
			Perkins, OK 74059
Otoe-Missouria Tribe of	Chairman	John R. Shotton	8151 Highway 177
Indians			Red Rock, OK 74651
Omaha Tribe of	Chairman	Isaac Sherman	PO Box 368
Nebraska			Macy, NE 68039
Pawnee Nation of	President	Walter R. Echo-Hawk	881 Little Dee Drive
Oklahoma			Pawnee, OK 74058
Ponca Tribe of Nebraska	Chairman	Larry Wright, Jr.	2523 Woodbine Street
			P.O. BOX 288
			Niobrara NE 68760
Ponca Tribe of Indians of	Chairman	Oliver Little Cook	20 White Eagle Drive
Oklahoma			Ponca City, OK 74601
Sac and Fox Nation of	Chairwoman	Tiauna Carnes	305 North Main
Missouri in Kansas and			Reserve, Kansas 66434
Nebraska			
Sac & Fox Tribe of the	Chairwoman	Judith Bender	349 Meskwaki Road
Mississippi in Iowa			Tama, IA 52339
Sac & Fox Nation,	Chief	Justin Freeland	920883 S Highway 99
Oklahoma		Wood	Building A
			Stroud, Oklahoma 74079

6.1.1 Public Scoping Meeting (July 24, 2019)

A public scoping meeting was held on July 24, 2019 from 5:30 – 7:30pm in the P-MRNRD conference room in Omaha, Nebraska. This meeting was held after business hours to accommodate the public. Letters about the meeting were mailed to the potentially impacted and nearby landowners and a notice about the meeting was posted in the Omaha World Herald. This public meeting included an open house and presentation to provide an overview of the Supplemental Plan-EA, discuss any concerns, and begin an open line of communication with the public. An overview of the project was presented and included information about the project history, the NEPA planning process, preliminary site locations, and types of projects being considered at each project site. Time was allotted for the public to ask questions and to address concerns from the public. An information and receive feedback from the public. Posters of the preliminary ARAs were available to provide close-up views of potential project extents.



6.1.2 Agency Scoping Meeting (July 24, 2019)

An agency scoping meeting for the Supplemental Plan-EA was held on July 24, 2019 from 3:30pm – 4:30pm in the P-MRNRD conference room in Omaha, Nebraska. This meeting was held during business hours to accommodate agency staff. Letters and a project location figure were sent to the agency members in Table 10-1. The Sponsor, state NRCS staff, engineering consultants, and representatives from USACE Regulatory and NGPC were in attendance. An overview and history of the project and the planning schedule were presented. An informational sheet, Resources of Concern questionnaire, and comment cards were available to provide information and receive feedback about the project. Posters of the preliminary ARAs were available to provide close-up views of potential project extents.

6.2 Public and Agency Meetings

The Sponsor additionally planned pubic and agency meetings for March 23, 2020. Adhering to the Centers for Disease Control Prevention (CDC) recommendation to cancel large gatherings due to the Coronavirus Disease 2019 (COVID-19), the in-person public and agency meetings were canceled, and the information was moved online. The planned presentation and site-specific posters detailing the proposed work were posted on the project website for the public to view. The public and agencies were notified of the online presentation and paper copies of the information as well as additional project information was made available upon request.

6.3 Threatened and Endangered Species and Bald and Golden Eagles

In compliance with the ESA, Section 7, Nebraska NRCS has a programmatic informal consultation process with the USFWS and NGPC to assist NRCS in making the proper effects determination. Table 6-2 provides a discussion for each species. Informal consultation with USFWS has indicated that all listed federal species have a no effect determination except for the Northern long-eared bat - which has a determination of not likely to adversely affect. A concurrence letter from USFWS is included in Appendix A.

Common Name	Scientific Name	State/ Federal	Threatened or Endangered	Discussion & Determination
Northern Long- eared Bat	Myotis septentrionalis	Federal	т	4(d) Rule, no tree clearing from June 1-July 31 consistent with programmatic intra-service consultation. Not likely to adversely affect.
Western Prairie Fringed Orchid	Platanthera praeclara	Federal	Т	No suitable habitat. No effect.
Eastern Black Rail	Laterallus jamaicensis	Federal (proposed)	T (proposed)	No suitable habitat. No effect.

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6.4 Farmland Protection Policy Act

Coordination was conducted with the NRCS natural resources inventory specialist to ensure that the proposed measures are clear of FPPA significant concerns. Completed AD-1006 forms for each site and correspondence with NRCS are included in Appendix E.



7.0 The Preferred Alternative

7.1 Rationale for the Preferred Alternative

Four alternatives were analyzed in detail during project formulation and Alternative 2 provides the most ecosystem service benefits, best meets the Federal Objective, is the locally preferred alternative, and provides a positive monetary benefit to cost ratio. Therefore, Alternative 2 has been agreed upon as the Preferred Alternative. Ecosystem trade-offs for all alternatives analyzed in detail are shown in Tables 4-6 and 4-7, economic tables for the preferred alternative are provided at the end of this chapter, and additional information on the alternatives analysis can be found in Chapter 4.0. Please see Appendix D for additional information about the investigation and analysis of the preferred alternative.

7.2 Measures to be Installed

The proposed action includes a high-hazard flood risk reduction dam (Site WP-1), grade stabilization structures (Sites W-5, D-78, D-2, S-15, and S-1), channel restoration (Site S-5), and a sediment basin (Site S-1) as shown below in Table 7-1.

Preferred Alternative	Site W-5: Eight (8) loose rock structures and one (1) rigid rock structure	
	Site D-78: Eleven (11) loose rock structures	
	Site D-2: Eight (8) loose rock structures and (1) rigid structure	
	Site S-5: Channel restoration with downstream drop structure	
	Site S-15: Seven (7) loose rock structures and one (1) rigid structure	
	Site S-1: Sediment basin and one (1) rigid structure	
	Site WP-1: Regional detention basin, wet dam	

Table 7-1. The Preferred Alternative

Loose rock structures will consist of rock riprap that will act as a deformable energy dissipation structure to "catch" headcuts as they progress upstream. The rock riprap will be placed along the channel bottom and partially up the banks, to a height of the 100-year flood event or the top of bank if flow is not conveyed within the channel at the 100-year event. Riprap will be placed at a depth of approximately 4-feet and will deform to changes in the stream slope. The riprap will be keyed-in at the downstream end to twice this depth. Sheet pile will be used when necessary to ensure longevity. Channel banks will be graded back at a 3:1 ratio upstream of the rock structure to allow stream flow to naturally expand without hitting the channel banks and transitioned back towards the existing channel downstream of the structures at a 1:1 ratio based on stream flow's typical contraction ratio. Rigid rock structures vary and are dependent on site-specific geometry and flows. Typical sections and design details are provided in Appendices C and D.

Channel improvements at Site S-5 include approximately 2,400-feet of channel grading within Beadle Creek and removal and replacement of the 180th Street culvert with an armored drop structure. Channel grading will repair the deeply incised and degraded channel to create a more stable and safer stream by repairing the shear and steep channel banks. The improved channel section, low flow channel, and in-stream benches will provide improved habitat. The drop structure would protect the upstream channel from a large existing headcut progression and scour hole and prevent further damage downstream of the existing culvert. It will also improve the conveyance capacity, protecting the upstream channel from flooding due to backwater. Project extents and detailed information are provided in Appendices C and D.



The Preferred Alternative at Site S-1 includes the implementation of a sediment basin upstream of the Sponsor planned DS-19 regional detention basin and one rigid structure within the channel upstream of the sediment basin's permanent pool. The rigid structure location is at an existing channel grade drop and water crossing that frequently washes out. The sediment basin will be 17-feet tall with a 13.5-acre permanent pool, 24-inch reinforced concrete pressure pipe principal spillway, and articulated concrete block auxiliary spillway. It will capture approximately 41-acre-feet of sediment that would otherwise enter the DS-19 reservoir.

The regional detention basin at Site WP-1 includes a 40-foot tall, 900-foot long earthen embankment on Whispering Ridge Creek. The principal spillway consists of a 4-foot by 12-foot concrete riser and 48-inch reinforced concrete pressure pipe with an impact basin consistent with NRCS sediment-storage design criteria. The proposed vegetated auxiliary spillway is located at the dam's left abutment with a bottom width of 200-feet, a crest length of 50-feet, 3H:1V side slopes, a 1.0 percent approach slope, and a 4.5 percent downstream slope. The reservoir will impound a permanent pool with a surface area of approximately 21-acres, with 98 acre-feet of sediment storage. The dam would provide 1,164 acre-feet of total storage volume and a maximum flood pool area of 80-acres. The proposed upstream sediment basin impounds a permanent pool of approximately two acres with a sediment volume storage of 3-acre-feet.


53 Papillion Creek Watershed NOTONI **Preferred Alternatives** Channel Restoration Blair Nicke rso n De Grade Control Structures **Regional Detention Basin** W-5 • Water Quality Basin Kennard Boyer hute Nat'l Fort Calhoun Arling to n Honey Creek mont NASHINGTON Washington D-2 D-78 DOUGLAS Bennington Leshara WP-1 Levi A Carter Park Carter Lake Elkho m Council Bluffs naha W-D Yutan unty Road-I Zorinsky Lake Park Mead Ralston La Vista S-5 S-1 Chalco $\overline{\bullet}$ Papillion S-15 Bel offutt Air N 15,000 30,000 Feet pringfie ld

Figure 7-1. Preferred Alternative

7.3 Mitigation

There will be minor adverse impacts to some wildlife habitat and other sensitive resources during installation of the Project. Impacts to wildlife habitats include woodlands, streams, and wetlands expected to be permanently lost to construction within structure extents as well as from inundation by permanent pools. Field surveys were conducted within the ARAs to determine the quantities of wetlands and streams to be impacted by implementation of the Plan. Aerial images, ArcMap toolsets, and field investigations were used to determine the areas of woodlands expected to be lost.

Every effort was made to minimize and avoid impacts to sensitive resources. Embankment locations were chosen to help minimize impacts to wetlands. Disturbance limits were limited to those necessary for



structure placement and access roads are planned to avoid disturbing riparian habitat as much as possible. Open water habitat and dedicated upland buffer will be created as a result of the proposed action.

Mitigation requirements were determined in conjunction with NRCS specialists and based on USACE Regulatory requirements of similar, recent projects within eastern Nebraska. Land needed for mitigation measures will be located at or near the Sites and will be acquired by the Sponsor. The designated mitigation areas will be fenced to manage or prevent livestock grazing.

7.3.1 Wetland Mitigation

The Preferred Alternative would result in a loss of 0.58-acres of riverine wetlands and 0.40-acres of depressional wetlands. Mitigation bank credits are not available in the service area where impacts would occur and therefore on-site compensatory mitigation is proposed and will result in no net loss of wetlands.

Mitigation site construction would focus on creating wetland and aquatic habitats typical of the region by restoring hydrology, establishing native vegetation communities, and siting on soil types with the best potential for wetland establishment. A 12-point Mitigation Plan for Compensatory Mitigation has been developed in cooperation with the USACE to account for compensatory mitigation for Site WP-1 and a similar plan will be created for Site S-1. Approximately 38-acres of lacustrine fringe wetlands will be created around the S-1 and WP-1 permanent pools. Wetland vegetation is predicted to establish at 2-feet vertically above and below the permanent pool elevation at Site WP-1 based on local experience. Wetland vegetation will be planted at 1-foot vertically above the permanent pool as a conservative estimate for wetland establishment due to the large spillway and 2-feet below the permanent pool based on existing topography and proposed grading at the S-1 sediment basin. Lacustrine fringe wetlands established above and below the permanent pool elevation sign of approximately 37-acres of wetlands for all sites.

7.3.2 Stream Mitigation

Overall, streams will improve with the Preferred Alternative. Preventing headcut progression and stream degradation and widening will result in an increase in stream function and habitat. Some riprap fill as well as earthen excavation will result from the implementation of the grade stabilization structures. Stream length will also be lost due to embankments at Sites S-1 and WP-1. Inundation will create open water in areas that were previously stream length. A loss of approximately 241-feet of ephemeral stream, 10,392 feet of intermittent stream, and 3,009-feet of stream will be impacted due to fill, excavation, and inundation for the Preferred Alternative. Most of this impact will be from grade stabilization structures, which does not result in a loss of stream length. Stream mitigation will account for stream length lost due to embankments and any overall decrease in stream function at Sites S-1 and WP-1 in accordance with USACE guidance.

Total earthen fill for embankments in the Preferred Alternative include 291-feet of intermittent stream and 543-feet of perennial stream. Inundation from Sites S-1 and WP-1 includes 135-feet of ephemeral stream, 6,027-feet of intermittent stream, and 2,556-feet of perennial stream. These streams are generally low functioning and highly degraded.

An analysis following the Nebraska Stream Condition Assessment Procedure (NeSCAP) was performed at Site WP-1 to assess impacts and potential loss of functional units, which resulted in a loss of approximately 918 functional units (USACE, 2016) from the embankment. Permanent loss to stream channel will be mitigated through restoration of approximately 808-feet of Whispering Ridge Creek immediately below the dam structure in a manner that will achieve, at a minimum, equal functional replacement. Using a holistic



and ecologically based approach, stream mitigation in Whispering Ridge Creek may be combined with the creation of abutting wetlands to maximize the effects of aquatic/terrestrial interactions in the stream corridor. Restoration activities are estimated to result in an increase of approximately 1,593 functional units based on NeSCAP analysis, surpassing the 918 functional units lost due to fill activities.

Channel restoration techniques would include:

- Pull back and contour incised/terraced banks to reestablish floodplain connectivity.
- Achieve improved channel stability with a priority on ecological solutions. Re-establish native vegetation and community structure, enhance bank structure and morphology to reduce erosion, and integrate riparian and upland buffering.
- Establish in-stream structure. Riffle and pool habitat, cover, step pools, check logs, and appropriate substrate to enhance the establishment of a diverse aquatic life community.
- All mitigation areas not abutting existing WOTUS will be protected by a 50-foot buffer consisting of native vegetation.

No mitigation for the 2,556-feet of stream channel that will be inundated by the permanent pool is proposed as the project will result in a functional increase (488,332 functional units) based on methodology established by the USACE (2016). Similar mitigation techniques for Site S-1 will be established.

7.4 Permits and Compliance

The following permit and compliance requirements must be met for construction of the Project to occur.

- **Clean Water Act Section 404.** CWA Section 404 permits must be obtained from the USACE to account for fills within jurisdictional waters of the United States prior to construction. The Sponsor will obtain a 404 permit for each dam site prior to construction.
- **Migratory Bird Treaty Act and Endangered Species Act Section 7.** To avoid migratory bird nesting and Northern long-eared bat roosting impacts, clearing activities will be conducted between August 1 and March 31. If tree clearing must occur between April 1 and May 31, a field survey will be conducted to ensure compliance with the Migratory Bird Treaty Act.
- **NDEE.** A National Pollutant Discharge Elimination System (NPDES) construction storm water permit from the Nebraska Department of Environment and Energy (NDEE) will be required at each site if more than 1-acre of land is disturbed for construction.
- **Dust Regulations.** Nebraska Title 129, Chapter 32 fugitive dust regulations shall apply to all excavation and construction activities.
- **Excavation.** All applicable regulations in Nebraska Title 128 and Title 132 must be followed. Any solid or hazardous wastes generated or discovered during project operations must be properly handled, contained, disposed, and (if necessary) characterized. No waste permit required.
- National Historic Preservation Act. Section 106 of the NHPA [54 U.S.C. § 306108] and its implementing regulations, "Protection of Historic Properties" [36 CFR part 800] requires Federal agencies to determine whether their undertakings will have an adverse impact on historic properties that are listed on or are eligible for listing on the National Register of Historic Places and to afford



the Advisory Council on Historic Preservation a reasonable opportunity to provide comment. In compliance with Section 106 of the NHPA, consulting parties were identified including Indian tribes that might attach religious and cultural significance to historic properties within the APEs. The public was afforded an opportunity to provide input during the July 24th, 2019 and March 23, 2020 public meetings. The APE for each site was identified and reviewed for the presence of historic properties by a professional archeologist. Cultural resource investigations were completed in late October and early November 2019. No cultural resources that are eligible for listing on the National Register of Historic Places were identified during the investigations. Therefore, a determination of "no historic properties affected" was made for these alternatives. The Nebraska State Historic Preservation Office, the Pawnee Nation of Oklahoma, and the Otoe-Missouria Tribe of Indians concurred with this determination of effect. No other responses were received.

- **Storage Permit.** A water storage permit will be obtained from NeDNR prior to construction.
- **Dam Safety.** The final engineering plans will be reviewed and approved by the NeDNR Dam Safety Section prior to construction. Before approval of a dam, NeDNR will have to verify the dam has the proper hazard classification.
- **Water wells.** Coordination with NeDNR will occur prior to construction to locate any registered water wells.
- **Operation and Maintenance.** An O&M Plan will be prepared using the NRCS National Operation and Maintenance Manual.
- **Floodplain Management.** Prior to construction, the Sponsor will participate in and comply with applicable Federal, State, and Local floodplain management rules and regulations.
 - Any and all development in the regulatory floodplain or floodway will require a local Floodplain Development Permit (Neb. Rev. Stat. § 31-1021 & Title 455 Nebraska Administrative Code, Chapter 1). This includes all Special Flood Hazard Areas identified on FEMA's Flood Insurance Rate Maps, and any other area adopted by the local jurisdiction. Development is defined as "Any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation, drilling operations or storage of equipment or materials."
 - Any development that causes more than a foot of rise in a regulatory floodplain without floodway or any rise in a regulatory floodplain with floodway is required to obtain a Conditional Letter of Map Revision (CLOMR) from FEMA. (44 CFR 65.12/60.3c10/60.3d3/60.3d4). The floodplain development permit application must contain engineering that shows the project meets these requirements.
 - Any development that causes a change to the regulatory floodplain or floodway boundary must submit a Letter of Map Revision (LOMR) within six months of project completion (44 CFR 65.3)
- **National Environmental Policy Act.** This document was prepared to comply with the National Environmental Policy Act and the Principles and Guidelines for Water and Related Land Resources Implementation Studies.



7.5 Costs and Cost Sharing

This Project received funding through two NRCS P.L. 83-566 programs, the Regional Conservation Partnership Program (RCPP) and the Watershed and Flood Prevention Operations program (WFPO). RCPP has a program wide goal of a minimum of a 1:1 ratio of Sponsor to NRCS contributions. RCPP allocated funds include a portion of Site WP-1 planning (\$380,600), design (\$750,000), and construction observation (\$400,000) for Sponsor use. RCPP also allocated funds for NRCS technical use, including \$86,000 for planning, \$200,000 for design, and \$400,000 in construction observation. Financial assistance was also funded in the amount of \$2,202,469 for construction. Additional costs for WP-1 (including all costs for recreation facilities) will be funded by the Sponsor. WFPO allocated funds include 100 percent funding for planning (\$560,000) for the six additional sites. It is anticipated that that 100 percent of design costs and 26 percent of total construction costs for the six sites will also be funded by the WFPO program. The Sponsor will be responsible for all permitting, mitigation, and land acquisition costs. The availability of Federal funds is contingent upon appropriations available for this purpose.

A description of the costs and cost sharing for the preferred alternative are included below. Economic Tables 1, 2, 2B, 4, 5, 5a, and 6 are included at the end of this chapter and further cost and assumption details are included in Appendix D. Cost and cost sharing details are also presented in the Papillion Creek Supplemental Watershed Agreement No. 9 between the Sponsor and NRCS.

7.5.1 Construction

Construction costs include all costs to build the proposed project, including mitigation. Major components include mobilization, clearing and grubbing, excavation, fill, reinforced concrete, reinforced concrete pressure pipe, sheet pile, and riprap. A detailed engineer's estimate is included in Appendix D and economic Tables 1 and 2 provided at the end of this chapter summarize construction costs and cost share. The Sponsor is responsible for 100 percent of the mitigation costs.

7.5.2 Engineering

Engineering costs include final design of the preferred alternative, surveys, geotechnical investigations, construction observation, and permit acquisition. The Sponsor is responsible for 100 percent of the permit acquisition costs. Engineering costs are based on contracts in-place between the Sponsor and a private engineering consultant for WP-1 and engineering judgement for the other sites. Construction observation costs are estimated at 10 percent of the construction cost (not including mitigation). See economic Tables 1 and 2 at the end of this chapter and Appendix D for a summary of engineering costs and cost share.

7.5.3 Real Property Acquisition and Easements

The Sponsor is responsible for 100 percent of real property acquisition and easements. Easements for construction and maintenance access will be required for approximately 14 acres for project implementation. Payment to the landowner for access easements are estimated at 50 percent of land value (\$30,000/acre). Easements for land within the grade stabilization structure extents at Sites W-5, D-78, D-2, S-1, and S-15 (approximately 4 acres) are estimated at 75 percent of land value (\$45,000/acre). Land acquisition for areas within the top of dam limits, embankments, and areas within the limits of the auxiliary spillway at Sites WP-1 and S-1 (approximately 80-acres) are estimated at 100 percent of land value (\$60,000/acre). It is assumed that the property at Site S-5 (approximately 9 acres) will be acquired at no



cost due to the protection and improved safety for the adjacent homes. See economic Tables 1 and 2 at the end of this chapter and Appendix D for a summary of real property rights costs and cost share.

7.5.4 Operation, Maintenance, and Replacement

Costs of operation and maintenance of the measures is based on experience from similar structures and is included at 0.75 percent of the construction cost, not including mitigation. Replacement costs were included in the economic analysis for structures with a design life less than the project life (100 years). The Sponsor is responsible for 100 percent of the operation and maintenance costs for the planned life of the structures. Maintenance costs include items such as seeding and fence repairs, repair of riprap after large events, and other maintenance requirements. See economic Tables 1 and 2 at the end of this chapter and Appendix D for a summary of operations and maintenance costs and cost share.

7.5.5 Project Administration

Project administration is estimated based on local experience. Project administration includes project oversight and review, contract administration and supervision, and checking installation measures to ensure the proposed and installed works meet NRCS criteria. The Sponsor would be required to provide 100 percent of funding for its own administrative costs. See economic Table 2 at the end of this chapter for a summary of project administration cost and cost share.

7.6 Installation and Financing

7.6.1 Framework for Carrying out the Plan

Final design for all seven sites would occur in the first two years. Construction would occur over a 5-year period. Table 7-2 shows the distribution of estimated total project costs.

Project Costs		PL 83-566 Funds	Other Funds		Total	
Construction 1		8,727,900	\$	8,401,700	\$	17,129,600
Construction		51%		49%		100%
Engineering ^{2,3}	\$	3,875,100	\$	378,600	\$	4,253,700
Engineering		91%		9%		100%
Real Property Rights ⁴	\$	-	\$	5,394,000	\$	5,394,000
		0%		100%		100%
Project Administration	\$	354,300	\$	793,900	\$	1,148,200
		31%		69%		100%
Total Project	\$	12,957,300	\$	14,968,200	\$	27,925,500
Total Project		46%		54%		100%

Table 7-2. Distribution of Total Project Costs, Installation of Preferred Alternative

¹Includes mitigation

²Includes construction observation

³Includes permit acquisition

⁴Includes cost of legal fees and land appraisals

7.6.2 Planned Sequence of Installation

Table 7-3 depicts the timeline for the preferred alternative. The Sponsor has taxing authority for project funding and the power of imminent domain if needed.

Action	Timeframe
Site WP-1 final design plans and specifications complete. Sponsor obtains USACE Section 404 permit for Site WP-1.	2022
Secure easements and complete construction for Site WP-1.	2022-2023
Site S-1 final design plans and specifications complete. Sponsor obtains USACE Section 404 permit for Site S-1.	2023
Secure easements and complete construction for Site S-1.	2024
Site S-5 final design plans and specifications complete.	2024
Sponsor obtains USACE Section 404 permit for Site S-5. Secure easements and complete construction for Site S-5.	2025
Site W-5, S-15, D-2, and D-78 final design plans and specifications	2026
Sponsor obtains USACE Section 404 permit for Sites W-5 and S-15	2025
Secure easements and complete construction for Sites W-5 and S-15	2026
Sponsor obtains USACE Section 404 permit for Sites D-2 and D78	2026
Secure easements and complete construction for Sites D-2 and D78	2027

Table 7-3. Preferred Alternative Timeline

7.6.3 Responsibilities

The Sponsor is responsible for obtaining all permits and ensuring compliance as identified in Section 7.4, Permits and Compliance. In addition, the Sponsor is responsible for obtaining all land rights and easements required for project implementation. The Sponsor has analyzed their financial needs and is able to make funds available when needed. Federal funds are to be provided by NRCS for a portion of the construction of Site WP-1 through the Regional Conservation Partnership Program and final design and construction of the six additional sites through the Watershed and Flood Prevention Operations program. Federal funds are to be provided for project administration, technical assistance, and construction observation as well. The availability of Federal funds is contingent upon appropriations available for this purpose. Prior to entering into agreements that obligate funds of NRCS, the Sponsor will have a financial management system for control, accountability, and disclosure of P.L. 83-566 funds received and for control and accountability for property and other assets purchased with P.L. 83-566 funds.

7.6.4 Contracting

Each site will be constructed through project agreements between the NRCS and the Sponsor by means of Federal contract procedures and resultant contracts.

7.6.5 Real Property and Relocations

Easements on approximately 27 acres and land acquisition of approximately 80 acres will be acquired by the Sponsor for project implementation. No relocations are anticipated.

7.6.6 Financing

The Sponsor has the power and authority to levy taxes, issue revenue bonds for the purpose of financing authorized construction facilities, and exercise the power of eminent domain. Costs for easements, permits, and mitigation are the responsibility of the Sponsor.



7.6.7 Conditions for Providing Assistance

The estimated cost of installing the project is \$27,004,500. The NRCS, under authority of the Watershed Protection and Flood Prevention Act, Public Law 566, as amended, will provide \$8,367,331. The Sponsor, using other authorities and private funds, will provide approximately \$18,637,169. Federal financial assistance for construction is contingent upon appropriations for this purpose.

7.7 Operation, Maintenance, and Replacement

Operation includes the administration, management, and performance of non-maintenance actions needed to keep the structures safe and functioning as planned. Maintenance includes performance of work to prevent deterioration of practices and repair damage of the structures if one or more of their components fail. Damages to a completed structure caused by normal deterioration, droughts, flooding caused by rainfall in excess of design rainfall, or vandalism are considered maintenance.

Structures in this Plan-EA would be operated and maintained by the Sponsor with the technical assistance from Federal, State, and local agencies in accordance with their delegated authority. A specific Operations and Maintenance (O&M) plan would be prepared using the NRCS National Operation and Maintenance Manual for each site. The Sponsor obligation for Federal O&M on a work of improvement is complete when the measure reaches its evaluated life. However, the Sponsor may have continued O&M responsibilities in order to remain in compliance with applicable Federal, State, and local laws, regulations, and ordinances and a separate O&M agreement would be developed before construction of each site in this case. The agreement would provide for inspections, reports, and procedures for performing the maintenance items. The agreement would include specific provisions for retention, use, and disposal of property acquired or improved with federal assistance. The term of this new O&M agreement would be for a period equivalent to the life expectancy of each project.

The structures are to be inspected by the Sponsor on a regularly scheduled basis; during or immediately following major storms or other occurrences that may adversely affect the structure and appurtenant works. The floodwater retarding structure at Site WP-1 and the sediment basin at Site S-1 are also to be inspected during or immediately following the initial filling of the reservoirs. A vigorous stand of vegetation shall be maintained on the vegetated banks at the grade stabilization structures. All gullies in the bank shall be filled and reseeded as necessary. Rock riprap that is displaced shall be replaced and woody debris deposited on the toe rock shall be removed. Problems that may occur affecting the project area shall be repaired in a timely manner.

The estimated average annual operation and maintenance costs are \$119,450 for the design life of all structures and \$51,915 for the remainder of the design life of WP-1.

7.8 Emergency Action Plan

An EAP is a formal document that identifies potential emergency conditions at a dam and specifies actions to be followed to minimize loss of life and property damage (FEMA, 2013). An EAP commensurate with the potential impact of a dam failure or operational incident will be developed by the Sponsor prior to construction of each dam site. The Sponsor will update the EAP annually with input from local emergency response officials, as needed. NRCS will provide technical assistance throughout the development and update of each EAP.



TABLE 1 Estimated Installation Costs

Papillion Creek Watershed, NE

(Dollars) 1/

Works of Improvement	Unit	Non-Federal	Estimated cost (dollars) 1/				
works of improvement	Unit	land 2/	Public Law 83-566 Funds	Other Funds	Total		
Floodwater Retarding Structure	No.	1	3,952,500	9,711,000	13,663,500		
Sediment Basin	No.	1	1,467,800	2,023,500	3,491,300		
Grade Stabilization Sites	No.	6	7,537,000	3,233,700	10,770,700		
Total			12,957,300	14,968,200	27,925,500		

1/ Price base: 2022

Prepared: 02/2022

2/ Only nonfederal land is involved in this project



TABLE 2 Estimated Cost Distribution

Structural Measures Papillion Creek Watershed, NE

(Dollars) 1/

		Installation Cost-Public Law 83-566			Installation Cost - Other funds				Total			
Works of Improvement	Structure No.	Construction	Engineering 2/	Real Property Rights	Project Admin.	Total Public Law 566	Construction 3/	Engineering 2/4/	Real Property Rights 5/	Project Admin.	Total other	Installation Costs
1 Floodwater	W-5	1,353,200	451,000	0	63,000	1,867,200	541,000	90,000	163,500	63,000	857,500	2,724,700
Retarding	D-78	553,700	185,000	0	26,000	764,700	221,500	37,000	142,500	26,000	427,000	1,191,700
Site, 1	D-2	871,100	290,000	0	40,500	1,201,600	348,400	58,000	126,000	40,500	572,900	1,774,500
Sediment Basin 6	WP-1	2,202,500	1,700,000	0	50,000	3,952,500	5,894,000	27,200	3,300,000	489,800	9,711,000	13,663,500
Grade	S-1	1,107,400	369,100	0	51,800	1,528,300	442,900	45,400	1,506,000	51,600	2,045,900	3,574,200
Stabilization	S-5	2,050,700	683,000	0	95,500	2,829,200	718,500	82,000	45,000	95,500	941,000	3,770,200
Sites	S-15	589,300	197,000	0	27,500	813,800	235,400	39,000	111,000	27,500	412,900	1,226,700
Total		8,727,900	3,875,100	0	354,300	12,957,300	8,401,700	378,600	5,394,000	793,900	14,968,200	27,925,500
1/ Price base	: 2022										Prepare	ed: 02/2022

1/ Price base: 2022

2/ Includes construction observation

3/ Includes mitigation

4/ Includes permit acquisition

5/ Includes cost of legal fees and land appraisals



TABLE 2b
Recreational Facilities - Estimated Construction Costs

Papillion Creek Watershed, NE

(Dollars)	1/2/3/
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ltem	Number	Estimated Unit Cost	Total Construction Cost
Boat Ramp	1	25,000	25,000
Picnic Shelter	1	30,000	30,000
Concrete Trail	1	552,300	552,300
Restroom	1	50,000	50,000
Site Paving	1	473,800	473,800
Lighting	1	10,000	10,000
Total			1,141,100

1/ Price base: 2022

Prepared: 02/2022

2/ Estimated quantity, subject to minor variation at time of detailed planning

3/ All recreation costs are responsibility of Sponsor



TABLE 3
Structural Data - Dams with planned storage capacity
Papillion Creek Watershed NF

Item	Unit	WP-1	S-1
Class of structure		High	low
Seismic zone		1	1
Uncontrolled drainage area	mi²	135	2 73
Controlled drainage area	mi ²	0	0
Total drainage area	mi ²	135	2 73
Runoff curve No. (1-day) (AMC II)		83	80
Time of concentration (Tc)	hrs	1.0	09
Elevation top of dam	ft	1194	1181
Elevation crest auxiliary spillway	ft	1189.5	1178
Principal spillway crest elevation	ft	1178	1177
Auxiliary spillway type		Veg	ACB 2/
Auxiliary spillway bottom width	ft	200	150
	nercent	5	130
Maximum height of dam	ft	40.0	17.0
	vd ³	202 200	16 600
Total capacity 1/	acre-ft	552	10,000
Sediment submerged	acre-ft	94	37
Sediment serviced	acre-ft	10	7
Eloodwater retarding	acre-ft	448	0
Surface area		440	0
Sediment nool	acres	20.2	13 5
Eloodwater retarding pool 1/	acres	61.2	13.5
Principal spillway design 3/	acres	01.2	15.5
Rainfall volume (1-dav)	in	9.06	
Rainfall volume (10-day)	in	12.90	
Runoff volume (10-day)	in	10.7	
Capacity at auxiliary spillway crest elevation	ft ³ /s	286	74
Dimensions of conduit	in	48	24
		RCPP	RCPP
Frequency operation-auxiliary spillway	percent chance	02	herr
Auxiliary spillway hydrograph	percent chance	0.2	
Rainfall volume	in	11 32	
Bunoff volume	in	9.17	
Storm duration	hrs	24	
Velocity of flow (Ve)	ft/s	0.0	
Max reservoir water surface elev	ft	1189.3	
Freeboard hydrograph			
Rainfall volume	in	23.7	9.4
Runoff volume	in	21.4	7.5
Storm duration	hrs	24	24
Max reservoir water surface elev	ft	1193.4	1180.8
Sediment volume	in	1.4	0.3
Floodwater retarding volume	in	6.2	0.0

1/ Crest of auxiliary spillway

2/ Articulated Concrete Blocks

3/ Principal and auxiliary spillway designs considered NCRS CPS-350 for the design of S-1

TABLE 4 Estimated Average Annual Costs

Papillion C	Creek Waters	hed, NE
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(Dollars) 1/								
Works of Improvement	Amortization of	Operation and	Total					
works of improvement	Installation Cost	Maintenance Cost	TOtal					
Floodwater Retarding Structure (WP-1)	325,400	57,300	382,700					
Sediment Basin (S-1)	94,000	10,300	104,300					
Grade Stabilization Sites (6 sites)	315,200	50,200	365,400					
Total	734,600	117,800	852,400					

Prepared: 02/2022

1/Price base: 2022, amortized over 105 years at a discount rate of 2.25%



 Table 5

 Estimated Average Annual Flood Damage Reduction Benefits – Site WP-1

 Papillion Creek Watershed, NE

ltem	Estimated average annual flood damage								
	Witho	out Project	Wit	h Project	Damage reduction benefit				
	Agriculture related	Non Agriculture- related	Agriculture related	Non-Agriculture related	Agriculture related	Non-Agriculture related			
Road and Bridge		31,300		29,100		2,200			
Urban		434,600		342,300		92,300			
Total	0	465,900	0	371,400	0	94,500			

1/Price base: 2022, amortized over 105 years at a discount rate of 2.25% 2/For Site WP-1

Prepared: 02/2022

Table 5a

Estimated Average Annual Watershed Protection Damage Reduction Benefits - All Sites

Papillion	Creek	Watershed,	NE
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	(Dollars) 1/		
Works of Improvement Item Damage red		Damage reduction	benefit, average annual
		Agriculture-related 2/	Non-Agricultural-related
Floodwater Retarding Structure	Recreation	188,800	0
(WP-1)	Ecosystem Services	137,900	0
Sediment Basin (S-1)	Ecosystem Services	104,700	0
Grade Stabilization Sites (6 sites)	Crop Stand Damage	11,400	0
	Land Voiding and Depreciation	109,400	0
	Infrastructure	168,200	0
	Ecosystem Services	106,800	0
	Total	827.200	0

1/Price base: 2022, amortized over 105 years at a discount rate of 2.25%

Prepared: 02/2022

December 2022

2/ Includes rural benefits, as defined by the NWPM



TABLE 6

Comparison of Benefits and Costs

Papillion Creek Watershed, NE

(Dollars) 1

		Avera	ge Annual Bene	fits		Average Annual Cost 3/	Benefit : Cost Ratio
	Flood Dama	age Reduction	Watershed P	rotection Reduction			
Works of Improvement	Agriculture related	Non-Agriculture related	Agriculture related 2/	Non-Agriculture related	Total		
Floodwater Retarding Structure (WP- 1)	0	94,500	326,700	0	421,200	382,700	1.10
Sediment Basin (S-1)	0	0	104,700	0	104,700	104,300	1.00
Grade Stabilization Sites (6 sites)	0	0	395,800	0	395,800	365,400	1.08
					-		-
Total Project (all sites)	0	94,500	827,200	0	921,700	852,400	1.08

1/Price base: 2022, amortized over 105 years at a discount rate of 2.25%

Prepared: 02/2022

2/ Includes rural benefits, as defined by the NWPM

3/ From Table 4



8.0 **REFERENCES**

Applied Weather Associates, LLC. December 2008. Site-Specific Probable Maximum Precipitation (PMP) Study for Nebraska.

Collins, S., & Larry, E. October 2007. United States Forest Service (USFS), Pacific Northwest Research Station. Caring for Our Natural Assets: An Ecosystem Services Perspective.

Cowardin, Lewis. 1979. NWI Wetlands and Deepwater Map Code Diagram. Fish and Wildlife Service. https://www.fws.gov/wetlands/documents/NWI Wetlands and Deepwater Map Code Diagram.pdf

Environmental Protection Agency (EPA). EJSCREEN: Environmental Justice Screening and Mapping Tool. Download EJSCREEN Data. 2019 State Percentile geodatabase. <u>https://www.epa.gov/ejscreen/download-ejscreen-data</u>

FYRA Engineering. October 2018. Papillion Creek Watershed Hydrologic Analysis (FYRA 2018).

Natural Resources Conservation Service (NRCS). August 2007. United States Department of Agriculture. Chapter 10: Two-Stage Channel Design. Part 654 Stream Restoration Design, National Engineering Handbook (NRCS 2007).

Natural Resources Conservation Service (NRCS). March 2019. Technical Release 210-60 Earth Dams and Reservoirs.

Nebraska Dept. of Environmental Quality. April 2018. Water Quality Integrated Report (NDEQ 2018).

Nebraska Dept. of Environmental Quality. Title 117 – Nebraska Surface Water Quality Standards. Revised: April 2012.

Nebraska Department of Natural Resources (NDNR). Classification of Dams - Dam Safety Section. Updated March 2013. <u>https://dnr.nebraska.gov/sites/dnr.nebraska.gov/files/doc/dam-</u> <u>safety/resources/Classification-Dams.pdf</u>

Nebraska Game and Parks Commission (NGPG). Endangered and Threatened Species Listing Action. <u>http://outdoornebraska.gov/listingaction/</u>

Nebraska Game and Parks Commission (NGPG). Nebraska Fishing. <u>https://maps.outdoornebraska.gov/fishing/</u>. Accessed November 2019.

Nebraska Game and Parks Commission (NGPC). Threatened and Endangered Species. Range Maps for Atrisk Species. <u>http://outdoornebraska.gov/endangeredspecies/</u>



Nebraska Wildlife Rehab, Inc. Wildlife Help. <u>https://nebraskawildliferehab.org/wildlife-help/</u>

NOAA National Weather Service. NOAA Atlas 14 Point Precipitation Frequency Estimates: NE. <u>https://hdsc.nws.noaa.gov/hdsc/pfds/pfds map cont.html?bkmrk=ne</u>

Office of Management and Budget (OMB). Circular A-4. Regulatory Analysis. September 2003. <u>https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/circulars/A4/a-4.pdf</u>

Office of Management and Budget (OMB). Circular A-94. Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs. October 1992.

https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/circulars/A94/a094.pdf

Papillion Creek Watershed Partnership. September 2004. Multi-Reservoir Analysis Papillion Creek Watershed. <u>http://papiopartnership.org/wp-</u> content/uploads/2017/11/multi reservoir analysis papillion creek watershed.pdf

Papillion Creek Watershed Partnership. April 2009. Papillion Creek Watershed Management Plan. <u>https://www.papionrd.org/wp-content/uploads/2017/01/2009-Papillion-Creek-Watershed-Plan.pdf</u>

Papillion Creek Watershed Partnership. March 2014. Papillion Creek Watershed Management Plan, March 2014 Update. https://www.papionrd.org/wpcontent/uploads/2016/08/20140328 Final 2014 Papio Watershed Update Executive-Summary.pdf

Papio-Missouri River Natural Resources District (P-MRNRD). June 2018. Papio-Missouri River Basin Water Quality Management Plan. <u>http://papiopartnership.org/wp-content/uploads/2019/04/P-MR-Basin-Water-Quality-Management-Plan FINAL.pdf</u>

P-MRNRD. 2008. West Papillion Levee Restoration Evaluation. Papio-Missouri River Natural Resources District. Omaha, NE.

Sarpy County, Nebraska. 2016 Eastern Nebraska Urban Area LiDAR. Available online. <u>https://gis.sarpy.com/datasets/fd49c0b1d6414828b4034187ff63c6fe</u>

Soil Science Division Staff. 2017. Soil survey manual. C. Ditzler, K. Scheffe, and H.C. Monger (eds.). USDA Handbook 18. Government Printing Office, Washington, D.C. (SSM 2017).

Steinauer, G. and S. Rolfsmeier. 2010. Terrestrial Ecological Systems and Natural Communities of Nebraska. Nebraska Game and Parks Commission, Lincoln, NE. (NGPC 2010)

United States Army Corps of Engineers (USACE). September 2013. Institute for Water Resources (IWR). Using Information on Ecosystem Goods and Services in Corps Planning: An Examination of Authorities, Policies, Guidance, and Practices. (2013-R-07).



United States Army Corps of Engineers (USACE). 2021. Papillion Creek and Tributaries Lakes, Nebraska. Final Feasibility Report and Environmental Assessment.

United States Army Corps of Engineers (USACE), 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0).

United States Census Bureau. American Fact Finder Advanced Search. Accessed Online. <u>https://factfinder.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t</u>

United States Department of Agriculture (USDA). June 1986. Urban Hydrology for Small Watersheds TR-55. <u>https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1044171.pdf</u>

United States Department of Agriculture (USDA), National Agricultural Statistics Service. 2012 Census of Agriculture – County Data. 242 Nebraska.

United States Department of Agriculture (USDA). Natural Resources and Environment. January 2017. Guidance for Conducting Analyses Under the Principles, Requirements, and Guidelines for Water and Land Related Resources Implementation Studies and Federal Water Resource Investments (DM 9500-013).

United States Geological Service (USGS), National Agricultural Statistics Service. 2018 Cropland Data Layer.

United States Geological Service (USGS). National Hydrography Dataset (NHD). <u>https://www.usgs.gov/core-</u> science-systems/ngp/national-hydrography

United States Geological Service (USGS). National Land Cover Dataset 2011. Multi-Resolution Land Characteristics Consortium. <u>https://www.mrlc.gov/data/legends/national-land-cover-database-2011-nlcd2011-legend</u>.

United States Department of Agriculture (USDA). National Resources Conservation Service (NRCS). National Engineering Handbook (NEH), Part 650 – Engineering Field Handbook. Amend. 48 – January 2012. https://directives.sc.egov.usda.gov/viewerFS.aspx?hid=21429

United States Department of Agriculture (USDA). National Resources Conservation Service (NRCS). National Engineering Handbook (NEH), Part 654 - Stream Restoration Design. Issued August 2007. (210-VI-NEH, August 2007).

United States Department of Agriculture (USDA). National Resources Conservation Service (NRCS). National Engineering Handbook (NEH), Part 654. Grade Control Structures in Western Iowa Streams. Case Study 12. Issued August 2007.

United States Department of Agriculture (USDA). National Resources Conservation Service (NRCS). January 2020. Title 180 – National Planning Procedures Handbook (NPPH), Amendment 7.

United States Department of Agriculture (USDA). National Resources Conservation Service (NRCS). June 2017. Title 210 - National Engineering Manual (NEM), Part 510 – Planning. 4th Ed.

United States Department of Homeland Security. FEMA Flood Map Service Center. Available online. <u>https://msc.fema.gov/portal/home</u>

United States. Environmental Protection Agency (EPA). EJScreen Tool. EPA's Environmental Justice Screening and Mapping Tool (Version 2018). Available Online. <u>https://ejscreen.epa.gov/mapper/</u>

United States. Environmental Protection Agency (EPA). September 2015. Title 117 – Nebraska Surface Water Quality Standards.

<u>University of Nebraska-Lincoln. September 2014. Understanding and Assessing Climate Change:</u> <u>Implications for Nebraska. A Synthesis Report to Support Decision Making and Natural Resource</u> <u>Management in a Changing Climate.</u>

U.S. Department of Commerce. May 1961. Technical Paper No. 40. Rainfall Frequency Atlas of the United States for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years.

U.S. Department of Commerce. October 1964. Technical Paper No. 49. Two- to Ten-Day Precipitation for Return Periods of 2 to 10 Years in the Contiguous United States.

U.S. Fish & Wildlife Service (USFWS). ECOS Environmental Conservation Online System. Threatened and Endangered Species. <u>https://ecos.fws.gov/ecp/</u>

U.S. Fish and Wildlife Service (USFWS). National Wetlands Inventory. NE Wetlands East. Last updated October 2018.

U.S. Water Resources Council. March 1983. Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (P&G).

U.S. Water Resources Council. March 2013. Principles and Requirements for Federal Investments in Water Resources.

https://obamawhitehouse.archives.gov/sites/default/files/final_principles_and_requirements_march_2013.p df

U.S. Water Resources Council. 2014. Principles, Requirements, and Guidelines for Water and Land Related Resources Implementation Studies. (PR&G)



Wetland Training Institute, Inc. 2017. Pocket Guide to Hydric Soil Field Indicators.

Zapotocny, C.M. and S. F. Byrd, 2002: An Examination of the Eastern Nebraska and Western Iowa Flash Flood Events of 6-7 August 1999. *National Weather Review*, 26, 1-2.

9.0 LIST OF PREPARERS

The document was prepared by those listed in Table 9-1 with review and guidance throughout the development of this document from those listed in Table 9-2.

Name	Present Title	Experience	Years of Experience	Other
Mike Sotak	Civil Engineer	BS Civil Engineering, 1992 MS Business Administration, 2001	30	PE registration (NE, IA, KS, MO, AZ, SD)
Janel Kaufman	Environmental Engineer	BS Civil Engineering, 2005 MS Civil & Environmental Engineering, 2006	14	PE registration (SC)
Bob Gregalunas	Water Resources Engineer	BS Civil Engineering, 2005	16	PE registration (NE)
Anna Petrow	Environmental Engineer	BS Biological Systems Engineering, 2017	5	El registration
Connor Kelley	Civil Engineer	BS Civil Engineering, 2017	5	El registration
Timothy Haakenstad	Civil Engineer	BS Civil Engineering, 1983	35	PE registration (NE)
Robert Lutz	Civil Engineer	BS Civil Engineering, 2004	16	PE registration (NE, KS)
Adriana Valcu- Lisman	Economist	BS Finance, Insurance, Banking and Capital Markets, 2003 MS Financial Management and Capital Markets, 2005 PhD Economics, 2013	14	

Table 9-1. List of Preparers

Table 9-2. List of Reviewers

Name	Title	Organization
Allen Gehring	State Conservation Engineer	USDA NRCS
Arlis Plummer	Hydraulic Engineer	USDA NRCS Contract Employee
Elisha Mackling	Cultural Resources Specialist	USDA NRCS
Melissa Baier	Archaeologist	USDA NRCS
Richard Vaughn	Watershed Planning Coordinator -	USDA NRCS
	Nebraska	
Ritch Nelson	State Wildlife Biologist, Forester	USDA NRCS
Ted Huscher	Geologist	USDA NRCS
Doug Christensen	Economist	USDA NRCS Contract Employee



10.0 DISTRIBUTION LIST

The Draft Supplemental Plan-EA has been submitted to the NWMC for review. The Draft Plan-EA will be distributed to the list of agencies listed below. A public notice will also be issued stating that the Draft EA is available for public comment and a 30-day comment period will be provided. Agency comments will be evaluated, and a letter will be sent to each agency in response. All documentation will be available in Appendix A.

Distribution List

- USFWS
- NGPC
- USACE
- NDEE
- EPA
- Office of the Governor
- City of Blair
- City of Bennington
- City of Omaha
- Omaha Public Works
- City of Gretna
- Washington County/Blair Public Works
- Washington County Planning and Zoning



11.0 INDEX

Table 11-1 includes topics and associated page numbers that may be of interest to the reader.

Table 11-1. Index

Торіс	Page Numbers
Archeological Resources	17, 34, 67, 74, 86, 87, 89, 102
Threatened and Endangered Species	16, 30, 31, 83, 84
Wetlands and Streams	1, 3, 4, 6, 16, 26, 27, 28, 40, 56, 62, 72, 81, 82, 89, 96,
	99, 100, 101
Installation Cost	5, 42, 43, 46, 60-63, 66, 90, 103, 104, 107-111, 113

11.1 List of Acronyms

ACS	American Community Survey
APE	Area of potential effect
ARA	Affected Resource Area
BGEPA	Bald and Golden Eagle Protection Act
CEQ	Council on Environmental Quality
CERT	Conservation and Environmental Review Tool
CLOMR	Conditional Letter of Map Revision
CWA	Clean Water Act
EA	Environmental Assessment
EAP	Emergency Action Plan
EO	Executive Order
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act
IR	Integrated Report
LID	Low Impact Development
LOMR	Letter of Map Revision
Max LID	Maximum Low Impact Development
MBTA	Migratory Bird Treaty Act
NDEE	Nebraska Department of Environment and Energy
NDEQ	Nebraska Department of Environmental Quality
NDNR	Nebraska Department of Natural Resources
NED	National Economic Development
NEH	National Engineering Handbook
NEPA	National Environmental Policy Act



NeSCAP	Nebraska Stream Condition Assessment Procedure
NGPC	Nebraska Game and Parks Commission
NHD	National Hydrography Dataset
NHPA	National Historic Preservation Act
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollution Discharge Elimination System
NRCS	Natural Resources Conservation Service
NWI	National Wetland Inventory
NWPM	National Watershed Program Manual
OHWM	Ordinary High Water Mark
PCWP	Papillion Creek Watershed Partnership
PEM	Palustrine emergent
P-MRNRD	Papio-Missouri River Natural Resources District
PR&G	Principles, Requirements, and Guidelines for Water and Land Related Resources Implementation Studies (PR&G)
RCPP	Regional Conservation Partnership Program
SAIPE	Small Area Income and Poverty Estimates
SHPO	State Historic Preservation Office
SLO	Sponsor Local Organization
TMDL	Total Maximum Daily Load
USACE	U.S. Army Corps of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WFPO	Watershed Flood Prevention Operations
WOTUS	Waters of the United States



APPENDIX A – COMMENTS AND RESPONSES

This section will include comments and responses on the Draft Plan-EA

United States Department of Agriculture



http://www.ne.nrcs.usda.gov

March 20, 2020

Eliza Hines U.S. Fish and Wildlife Service 9325 South Alda Road Wood River, NE 68883 The U.S. Fish and Wildlife Service concurs with your determinations that the described project will not adversely affect listed species or critical habitat. Contact this office if changes are made or new information becomes available.

Dear Ms. Hines:

Project Leader, Nebraska Field Office Supervisor

This letter is to initiate Section 7 informal consultation pursuant to the Endangered Species Act of 1973 with the U.S. Fish and Wildlife Service (USFWS) for the Papillion Watershed Supplemental Plan administered by the Natural Resources Conservation Service in cooperation with Papio Missouri Natural Resources District.

Background

The original Watershed Work Plan (Work Plan) was completed in 1966 and included 52 grade stabilization structures within the Papillion Creek Watershed in Douglas, Sarpy, and Washington Counties in Nebraska. The Supplemental Plan-EA will include seven structures that were included in the Work Plan with the purpose of grade stabilization. The seven sites proposed in the Supplemental Plan-EA include WP-1 (D-31 in the Work Plan), W-5, D-2, D-78, S-1, S-5, and S-15 (see Figure 1, attached). Flood control will be added as a purpose for some of the proposed structures. The purpose for each structure will be determined as development of the Supplemental Plan-EA progresses.

In most cases, the sites were determined a "No Effect" for a particular endangered species due to being outside of the range of that species. Only the Northern long-eared bat, Western prairie fringed orchid, and proposed Eastern black rail are within range of the project sites. It has been determined that no suitable habitat exists at the sites for Western prairie fringed orchid and Eastern black rail which also results in a "No Effect" for those species. These sites and associated species are not being submitted for consideration as NRCS has the authority to make a "No Effect" determination under ESA regulations. Only the associated species where a "May Affect – Not Likely to Adversely Affect" decision is proposed are listed below.

Proposed Findings

Northern Long-eared Bat: Any tree removal conducted at any of the seven sites will not occur between June 1 and July 31 to reach a "May Affect – Not Likely to Adversely Affect" finding for this species.

NRCS consults in accordance with its' 7(a)(1) obligations and requests concurrence on the 7(a)(2) finding of "Not Likely to Adversely Affect" the federally listed Northern longeared bat for the seven sites listed in the attached documents.

If you need any further information, please contact me at (402) 437-4100 or by e-mail <u>ritch.nelson@usda.gov</u>

Respectfully,

Ritch Nelson State Wildlife Biologist



Environmental Review Report

Project Information

Report Generation Date:	4/1/2020 01:38:17 PM
Project Title:	Supplemental Papio Plan-Environmental Assessment
User Project Number(s):	001-17-07
System Project ID:	NE-CERT-002480
Project Type:	NRCS Projects/Practices
Project Activities:	395 - Stream Habitat Improvement and Management (Ac) -
	riparian/wetland practice
	402 - Dam, Floodwater Retarding (No. and Ac/Ft)
	410 - Grade Stabilization Structure (No)
	638 - Water and Sediment Control Basin (No) - cropland practice
Project Size:	340.61 acres
County(s):	Douglas; Sarpy; Washington
Watershed(s):	Missouri Tributaries
Watershed(s) HUC 8:	Big Papillion-Mosquito
Watershed(s) HUC 12:	Butter Flat Creek-Big Papillion Creek; East Fork Big Papillion Creek-Big
	Papillion Creek; Little Papillion Creek; North Branch West Papillion Creek-
	West Papillion Creek +
Biologically Unique Landscape(s):	None
Township/Range and/or Section(s):	014N010E; 014N011E; 015N011E; 016N011E; 016N012E; 018N011E
Latitude/Longitude:	41.302051 / -96.201120

Contact Information

Organization: Contact Name: Contact Phone: Contact Email: Contact Address: Prepared By: Submitted On Behalf Of: FYRA Engineering Janel Kaufman 4025027131 jkaufman@fyraengineering.com 12702 Westport Pkwy, Ste 300 Omaha NE 68138

P-MRNRD

Project Description

Update to 1960s Watershed Plan, including an EA. Includes one floodwater retarding dam, one sediment basin, four sites with rock grade stabilization structures, and one site with stream restoration.

Introduction

The Nebraska Game and Parks Commission (Commission) and the U.S. Fish and Wildlife Service (Service) have special concerns for endangered and threatened species, migratory birds, and other fish and wildlife and their habitats. Habitats frequently used by fish and wildlife species are wetlands, streams, riparian areas, woodlands, and grasslands. Special attention is given to proposed projects which modify wetlands, alter streams, result in loss of riparian habitat, convert/remove grasslands, or contaminate habitats. When this occurs, the Commission and Service recommend ways to avoid, minimize, or compensate for adverse effects to fish and wildlife and their habitats.

CONSULTATION PURSUANT TO THE NEBRASKA NONGAME AND ENDANGERED SPECIES CONSERVATION ACT (NESCA)

The Commission has responsibility for protecting state-listed endangered and threatened species under authority of the Nongame and Endangered Species Conservation Act (NESCA) (<u>Neb. Rev. Stat.</u> § 37-801 to 37-811). Pursuant to § 37-807 (3) of NESCA, all state agencies shall, in consultation with the Commission, ensure projects they authorize (i.e., issue a permit for), fund or carry out do not jeopardize the continued existence of state-listed endangered or threatened species or result in the destruction or modification of habitat of such species which is determined by the Commission to be critical. If a proposed project may affect state-listed species or designated critical habitat, further consultation with the Commission is required.

Informal consultation pursuant to NESCA can be completed by using the Conservation and Environmental Review Tool (CERT). The CERT analyzes the project type and location, and based on the analysis, provides information about potential impacts to listed species, habitat questions and/or conservation conditions. Project proponents can agree to implement conservation conditions as outlined in the report and applicable to the project type by signing in the designated areas and uploading the signed PDF as part of their "final" project submittal. By agreeing to and implementing the conservation conditions as outlined (if applicable), then further consultation with the Commission is not required. If the report indicates the project may have impacts on listed species, then further consultation with the Commission is required.

TECHNICAL ASSISTANCE AND CONSULTATION PURSUANT TO THE ENDANGERED SPECIES ACT (ESA) The Service has responsibility for conservation and management of fish and wildlife resources for the benefit of the American public under the following authorities: 1) Endangered Species Act of 1973 (ESA); 2) Fish and Wildlife Coordination Act; 3) Bald and Golden Eagle Protection Act; and 4) Migratory Bird Treaty Act. The National Environmental Policy Act (NEPA) requires compliance with all of these statutes and regulations.

Pursuant to section 7(a)(2) of ESA, every federal agency, shall in consultation with the Service, ensure that an action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. If a proposed project may affect federally listed species or designated critical habitat, section 7 consultation is required with the Service. It is the responsibility of the lead federal action agency to fully evaluate all potential effects (direct and indirect) that may occur to listed species and critical habitat in the action area. The lead federal agency provides their effect determination to the Service for concurrence. If federally listed species and/or designated/proposed critical habitat would be adversely affected by implementation of the project, the lead federal agency will need to formally request further section 7 consultation with the Service prior to making any irretrievable or irreversible commitment of federal funds (section 7(d) of ESA), or issuing any federal permits or licenses.

At this time, **the information generated in this report DOES NOT satisfy consultation obligations between the lead federal agency and the Service pursuant to ESA**. For the purposes of ESA, the information in this report should be considered as TECHNICAL ASSISTANCE, and does not serve as the Service's concurrence letter, even if the user signs and agrees to implement conservation conditions in order to satisfy the consultation requirements of NESCA.

Overall Results

The following result is based on a detailed analysis of your project.

• More information needed - refer to the following sections. Answer the habitat question(s) in the section below. Additional consultation with the Nebraska Game and Parks Commission and/or the U.S. Fish and Wildlife Service may or may not be required. Refer to the "Conservation Conditions Agreement" section for additional information.

Additional Information

If working in a cool water stream, please refer to the Cool Water Stream Management Plan - 2016 for additional information and guidance.

Questions and Conservation Conditions

Northern Long-eared Bat

This project is within the range of the state and federally listed threatened northern long-eared bat (*Myotis septentrionalis*).

Habitat Questions for Northern Long-eared Bat:

Are the Project Limits within or adjacent to deciduous and/or pine woodlands with live or dead trees or snags that exhibit peeling bark or have crevices or hollows?

OR

Do the Project Limits include buildings, bridges over drainages (wet or dry), and/or box culverts over 5-feet in height?

____ Unknown for EITHER question

____ No for BOTH questions. Conservation measures are not needed for this species unless otherwise indicated.

<u>x</u> Yes for EITHER question. The following conservation measures must be implemented in order to avoid adverse impacts on northern long-eared bat.

NLEB CM-2: No removal of trees or removal of roosting structures between June 1 and July 31.

River Otter

This project is within or near the modeled distribution of the state-listed threatened river otter (*Lontra canadensis*). Habitat Questions for River Otter:

Do the Project Limits include or occur in a river, stream, pond, canal, sandpit with water or backwater area? OR

Are the Project Limits within 1/2 mile of a lake, pond, or an adjacent upland bank within the topographic floodplain AND is the lake, pond, or adjacent upland bank associated with a river, stream, or backwater area?

_____ Unknown for EITHER question.

_____ No for BOTH questions. Conservation measures are not needed for this species unless otherwise indicated.

<u>x</u> Yes for EITHER question. The following conservation measures must be implemented in order to avoid adverse impacts on river otter:

RO CM-1: Survey for dens according to protocol no more than 10 days prior to ground disturbing activities. If active river otter dens are found during the survey, further consultation with the Nebraska Game and Parks Commission is required prior to commencement of project activities. If the species is not found during the survey, work may proceed.

Western Prairie Fringed Orchid

This project is within the range of the state and federally listed threatened western prairie fringed orchid (*Platanthera praeclara*).

Habitat Questions for Western Prairie Fringed Orchid:

Does your area of potential effect have no cropping history and include a natively vegetated meadow or wet meadow on lower stream terrace or floodplain?

OR

Is your area of potential effect have no cropping history and within 100 feet of a natively vegetated sidehill seep type wetland (identified by the National Wetland Inventory, an official or certified wetland determination, or identified as a stream on a USGS quadrangle map, NWI or soil survey)?

Note: The area of potential effect described in the two previous questions includes the wetland related habitats along with upstream/upslope adjacent areas.

Note: Individuals with the orchid job approval authority may eliminate ("no effect") Grade D Freshwater Wet Meadows and Tallgrass Prairies with proper site inspections and species composition documentation.

____ Unknown for EITHER question

<u>x</u> No for BOTH questions. Conservation measures are not needed for this species unless otherwise indicated.

_____ Yes for EITHER question. The following conservation measures must be implemented in order to avoid adverse impacts on western prairie fringed orchid:

This project **"MAY AFFECT"** western prairie fringed orchid. **FURTHER CONSULTATION IS REQUIRED** even if conservation measures are listed for this or other species. Contact the Nebraska Game and Parks Commission and the U.S. Fish and Wildlife Service prior to proceeding with the project.

WPFO CM-1: Survey according to protocol required during flowering period (June 15 - July 15) prior to ground disturbing activities, herbicide application, and/or conversion from haying to grazing with management for shorter duration or timing. If the species is found during the survey, further consultation with the Nebraska Game and Parks Commission is required prior to commencement of project activities. If the species is not found during the survey, work may proceed.

WPFO CM-2: Year round, no shaping or using heavy equipment causing compaction. During growing season, no repetitive travel and use light equipment (ATV, pickup, small tractor).

Conservation Measures Agreement

Based on the information contained in the report, follow the instructions for A, B or C below.

A) IF one or more of the habitat questions were answered with "Yes", insert an "X" for one of the two options below: <u>x</u> Option 1. For all species for which there is habitat present (as indicated by checking "yes" to a habitat question) I understand and agree to implement and/or incorporate the conservation measures for those species as indicated. By agreeing to implement and/or incorporate the conservation measures for those species as indicated, no further consultation with the Nebraska Game and Parks Commission is required. However, further consultation between the lead federal agency and the U.S. Fish and Wildlife Service (Service) may be required. Contact the Service for additional information. Sign and date on the line below, and also sign and date the "Certification" section. Submit $a_0 copy_0$ of the signed report with any type of permit/application required for the project.

Applicant/project proponent signature

04/01/2020 Date

_____ Option 2. I have concerns regarding one or more of the conservation measures. Sign the "Certification" section below. When submitting the project as "Final" in CERT, please attach a separate document explaining your concerns with the conservation measures and why they cannot be implemented. Then, contact the Nebraska Game and Parks Commission and the U.S. Fish and Wildlife Service for further information.

B) IF one or more habitat questions were answered with "Unknown," then sign the "Certification" section below, submit the project as "Final" in CERT, and contact the Nebraska Game and Parks Commission and the U.S. Fish and Wildlife Service for further information.

C) IF ALL the habitat questions were answered "No" or if the "Overall Results" section indicated the project was unlikely to impact listed species, then sign the "Certification" section below and submit the project as "Final" in CERT. No further consultation with the Nebraska Game and Parks Commission is required. Additional coordination with the U.S. Fish and Wildlife Service may be necessary depending on the determination made by the lead federal agency pursuant to their obligations under ESA. Submit a copy of the signed report with any type of permit/application needed for the project.

Certification

I certify that ALL of the project information in this report (including project location, project size/configuration, project type, project activities, answers to questions) is true, accurate, and complete. If the project type, activities, location, size, or configuration of the project change, or if any of the answers to any questions asked in this report change, then this information is no longer valid and we recommend running the revised project through CERT to get an updated

report. 11/2/

Applicatit/project proponent signature

04/01/2020

Date

Additional Considerations

Bald and Golden Eagle Protection Act

The federal Bald and Golden Eagle Protection Act (Eagle Act) (16 U.S.C. 668-668c) provides for the protection of the bald eagle (*Haliaeetus leucocephalus*) and golden eagle (*Aquila chrysaetos*). Under the Eagle Act, "take" of eagles, their parts, nests or eggs is prohibited. Disturbance resulting in injury to an eagle or a decrease in productivity or nest abandonment by substantially interfering with normal breeding, feeding, or sheltering behavior is a form of "take."

Bald eagles use mature, forested riparian areas near rivers, streams, lakes, and wetlands and occur along all the major river systems in Nebraska. The bald eagle southward migration begins as early as October and the wintering period extends from December-March. The golden eagle is found in arid open country with grassland for foraging in western Nebraska and usually near buttes or canyons which serve as nesting sites. Golden eagles are often a permanent resident in the Pine Ridge area of Nebraska. Additionally, many bald and golden eagles nest in Nebraska from mid-February through mid-July. Disturbances within 0.5-miles of an active nest or within line-of-sight of the nest could cause adult eagles to discontinue nest building or to abandon eggs. Both bald and golden eagles frequent river systems in Nebraska during the winter where open water and forested corridors provide feeding, perching, and roosting habitats, respectively. The frequency and duration of eagle use of these habitats in the winter depends upon ice and weather conditions. Human disturbances and loss of wintering habitat can cause undue stress leading to cessation of feeding and failure to meet winter thermoregulatory requirements. These affects can reduce the carrying capacity of preferred wintering habitat and reproductive success for the species.

To comply with the Eagle Act, it is recommended that the project proponent determine if the proposed project would impact bald or golden eagles or their habitats. This can be done by conducting a habitat assessment, surveying nesting habitat for active and inactive nests, and surveying potential winter roosting habitat to determine if it is being used by eagles. The area to be surveyed is dependent on the type of project; however for most projects we recommend surveying the project area and a ½ mile buffer around the project area. If it is determined that either species could be affected by the proposed project, the Commission recommends that the project proponent notify the Nebraska Game and Parks Commission as well as the Nebraska Field Office, U.S. Fish and Wildlife Service for recommendations to avoid "take" of bald and golden eagles.

Migratory Bird Treaty Act and Nebraska Revised Statute §37-540

We recommend the project proponent compline with the Migratory Bird Treaty Act (16 U.S.C. 703-712: Ch. 128 as amended) (MBTA). The project proponent should also comply with Nebraska Revised Statute §37-540, which prohibits take and destruction of nests or eggs of protected birds (as defined in Nebraska Revised Statute §37-237.01). Construction activities in grassland, wetland, stream, woodland, and river bank habitats that would result in impacts on birds, their nests or eggs protected under these laws should be avoided. Although the provisions of these laws are applicable year-round, most migratory bird nesting activity in Nebraska occurs during the period of April 1 to July 15. However, some migratory birds are known to nest outside of the aforementioned primary nesting season period. For example, raptors can be expected to nest in woodland habitats during February 1 through July 15, whereas sedge wrens, which occur in some wetland habitats, normally nest from July 15 to September 10. If development in this area is planned to occur during the primary nesting season or at any other time which may result in impacts to birds, their nests or eggs protected under these laws, we request that the project proponent arrange to have a qualified biologist conduct a field survey of the affected habitats to determine the absence or presence of nesting migratory birds. If a field survey identifies the existence of one or more active bird nests that cannot be avoided by the planned construction activities, the Nebraska Game and Parks Commission and the Nebraska Field Office, U.S. Fish and Wildlife Service should be contacted immediately. For more information on avoiding impacts to migratory birds, their nests and eggs, or to report active bird nests that cannot be avoided by planned construction activities, please contact the U.S. Fish and Wildlife Service and/or the Nebraska Game and Parks Commission (contact information within report). Adherence to these guidelines will help avoid unnecessary impacts on migratory birds.

Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (FWCA) requires consultation with the U.S. Fish and Wildlife Service (Service) and the State fish and wildlife agency (i.e., Nebraska Game and Parks Commission) for the purpose of preventing loss of and damage to fish and wildlife resources in the planning, implementation, and operation of federal and federaly funded, permitted, or licensed water resource development projects. This statute requires that federal

agencies take into consideration the effect that the water related project would have on fish and wildlife resources, to take action to prevent loss or damage to these resources, and to provide for the development and improvement of these resources. The comments in this letter are provided as technical assistance only and are not the document required of the Secretary of the Interior pursuant to Section 2(b) of FWCA on any required federal environmental review or permit. This technical assistance is valid only for the described conditions and will have to be revised if significant environmental changes or changes in the proposed project take place. In order to determine whether the effects to fish and wildlife resources from the proposed project are being considered under FWCA, the lead federal agency must notify the Service in writing of how the comments and recommendations in this technical assistance letter are being considered into the proposed project.

Section 404 of the Clean Water Act

In general, the Nebraska Game and Parks Commission and the U.S. Fish and Wildlife Service have concerns for impacts to wetlands, streams and riparian habitats. We recommend that impacts to wetlands, streams, and associated riparian corridors be avoided and minimized, and that any unavoidable impacts to these habitats be mitigated. If any fill materials will be placed into waterways or wetlands, the U.S. Army Corps of Engineers Regulatory Office in Omaha should be contacted to determine if a 404 permit is needed.

Agency Contact Information

Nebraska Game and Parks Commission

Shannon Sjolie 2200 North 33rd Street Lincoln, NE 68503 phone: (402) 471-5423 email: <u>shannon.sjolie@nebraska.gov</u>

Melissa Marinovich 2200 North 33rd Street Lincoln, NE 68503 phone: (402) 471-5422 email: melissa.marinovich@nebraska.gov

U.S. Fish and Wildlife Service

Eliza Hines 9325 South Alda Road Wood River, NE 68883 phone: (308) 382-6468 ext. 204 email: <u>eliza_hines@fws.gov</u>



Supplemental Papio Plan-Environmental Assessment Aerial Image Basemap With Locator Map

Township/Range/Section(s): T14R10ES13; T14R10ES23; T14R10ES24; T14R11ES16; T14R11ES17 +

Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey,


Supplemental Papio Plan-Environmental Assessment Topographic Basemap With Sections and Protected Areas

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



Supplemental Papio Plan-Environmental Assessment Web Map As Submitted By User

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

Table 1 Protected Areas in Immediate Vicinity of Project (project review area)

This table has no results.

Table 2 Documented Occurrences in Immediate Vicinity of Project (project review area): Natural communities and special areas

Table 3

This table has no results.

Township-level Documented Occurrences of Species within 1 Mile of Project Review Area									
Scientific Name	Common Name	USFWS	State	SGCN	USFS SRank	GRank			
Acipenser fulvescens	Lake Sturgeon		Т	Tier 1	S1	G3G4			
Allium tricoccum var. burdickii	Ramp			Tier 2	S2	G4G5			
Anaxyrus americanus	American Toad		NC	Tier 2	S1	G5			
Anguilla rostrata	American Eel			Tier 2	SNR	G4			
Anodonta suborbiculata	Flat Floater			Tier 1	S1	G5			
Aralia racemosa	Spikenard			Tier 2	S1	G5			
Arisaema dracontium	Green Dragon			Tier 2	S2	G5			
Arnoglossum atriplicifolium	Pale Indian-plantain			Tier 2	S2	G4G5			
Asclepias amplexicaulis	Clasping-leaf Milkweed			Tier 2	S1	G5			
Asplenium platyneuron	Ebony Spleenwort			Tier 2	S2	G5			
Brachyelytrum erectum	Bearded Short-husk			Tier 2	S2	G5			
Carex albursina	White Bear Sedge			Tier 2	S1	G5			
Carex hirtifolia	Hairy Wood Sedge			Tier 2	S1	G5			
Carex lupulina	Hop Sedge			Tier 2	S1	G5			
Carex radiata	Eastern Star Sedge			Tier 2	S1	G5			
Caulophyllum thalictroides	Blue Cohosh			Tier 2	S1	G5			
Certhia americana	Brown Creeper			Tier 2	S2	G5			
Charadrius melodus	Piping Plover	Т	Т	Tier 1	S2	G3			
Claytonia virginica	Virginia Spring-beauty			Tier 2	S1	G5			
Corallorhiza odontorhiza	Autumn Coral-root			Tier 2	S1?	G5			
Cycleptus elongatus	Blue Sucker			Tier 1	S1	G3G4			

Table 3
Township-level Documented Occurrences of Species within 1 Mile of Project Review Area

Scientific Name	Common Name	USFWS	State	SGCN	USFS	SRank	GRank
Cyclonaias pustulosa	Pimpleback			Tier 1		S2	G5
Cygnus buccinator	Trumpeter Swan			Tier 2	S	S2	G4
Cypripedium parviflorum	Yellow Lady's-slipper			Tier 2		S1	G5
Dasistoma macrophylla	Big-leaf Mullein-foxglove			Tier 2		S1	G4
Eleocharis elliptica	Bog Spikerush					S2S4	G5
Emydoidea blandingii	Blanding's Turtle		NC	Tier 1		S4	G4
Erythronium mesochoreum	Prairie Fawn-lily			Tier 2		S2	G4G5
Galearis spectabilis	Showy Orchis			Tier 2		S1	G5
Geothlypis formosa	Kentucky Warbler			Tier 2		S3	G5
Haliaeetus leucocephalus	Bald Eagle			Tier 2	S	S3	G5
Hybognathus argyritis	Western Silvery Minnow			Tier 1		S2	G4
Hybognathus placitus	Plains Minnow			Tier 1	S	S2	G4
Lampropeltis calligaster	Prairie Kingsnake		NC	Tier 2		S2	G5
Lampsilis teres	Yellow Sandshell			Tier 2		S1	G5
Lasiurus borealis	Eastern Red Bat			Tier 1		S3	G3G4
Lasiurus cinereus	Hoary Bat			Tier 1	S	S3	G3G4
Leucospora multifida	Narrow-leaf Paleseed			Tier 2		S1	G5
Liatris pycnostachya var. pycnostachya	Thickspike Gayfeather			Tier 2		S1S3	G5T5
Lilium michiganense	Turk's Cap Lily					S2S4	G5
Lontra canadensis	River Otter		Т		S	S4	G5
Macrhybopsis gelida	Sturgeon Chub		Е	Tier 1	S	S1	G3
Macrhybopsis hyostoma	Shoal Chub			Tier 2		S3	G5
Macrhybopsis meeki	Sicklefin Chub			Tier 1		S1	G3
Macrhybopsis storeriana	Silver Chub			Tier 2		S2	G5
Microtus pinetorum	Woodland Vole			Tier 2		S1	G5
Monotropa uniflora	Indian-pipe			Tier 2		S1	G5
Myotis lucifugus	Little Brown Myotis			Tier 1		SNR	G3
Myotis septentrionalis	Northern Long-eared Myotis	Т	Т	Tier 1		S1S2	G1G2

Scientific Name	Common Name	USFWS	State	SGCN	USFS	SRank	GRank
Noturus gyrinus	Tadpole Madtom			Tier 2		S3	G5
Panax quinquefolius	American Ginseng		Т	Tier 1		S1	G3G4
Parkesia motacilla	Louisiana Waterthrush			Tier 2		S1	G5
Patis racemosa	Black-seed Ricegrass			Tier 2		S2	G5
Pedicularis canadensis	Canada Lousewort			Tier 2		S1	G5
Penstemon tubiflorus var. tubiflorus	Tube Penstemon			Tier 2		S1	G5T4T5
Perimyotis subflavus	Tricolored Bat			Tier 1		S3	G2G3
Perognathus flavescens perniger	Plains Pocket Mouse			Tier 1		SNR	G5TNR
Platanthera praeclara	Western Prairie Fringed Orchid	Т	Т	Tier 1		S2	G3
Platygobio gracilis	Flathead Chub			Tier 1	S	S2	G5
Polyodon spathula	Paddlefish			Tier 2		S2	G4
Pompeius verna	Little Glassywing			Tier 2		S2S3	G5
Ranunculus recurvatus var. recurvatus	Hooked Buttercup			Tier 2		S2	G5T5
Rhinichthys obtusus	Western Blacknose Dace			Tier 2		S2	G5
Scaphirhynchus albus	Pallid Sturgeon	Е	Е	Tier 1		S1	G2
Sternula antillarum athalassos	Interior Least Tern	Е	E	Tier 1		S2	G4T3Q

 Table 3

 Township-level Documented Occurrences of Species within 1 Mile of Project Review Area

Table 4Potential Occurrences in Immediate Vicinity of Project (project review area):Special status species (Tier 1 at-risk species and Bald and Golden Eagle), based on models or range maps

					-	-			
Scientific Name	Common Name	Data Type	USFWS	State	SGCN	USFS	SRank	GRank	
Ammodramus henslowii	Henslow's Sparrow	Range			Tier 1		S1	G4	
Asio flammeus	Short-eared Owl	Range			Tier 1	S	S2	G5	
Atrytone arogos iowa	Iowa Skipper	Range			Tier 1		S1	G3T3	
Boloria selene nebraskensis	Nebraska Fritillary	Range			Tier 1		SNR	G5T3T4	
Calidris subruficollis	Buff-breasted Sandpiper	Range			Tier 1		S2N	G4	
Catocala nuptialis	Married Underwing	Range			Tier 1		SNR	G3G4	
Catocala whitneyi	Whitney Underwing	Range			Tier 1		S1	G3G4	
Coccyzus erythropthalmus	Black-billed Cuckoo	Range			Tier 1		S3	G5	

Table 4Potential Occurrences in Immediate Vicinity of Project (project review area):Special status species (Tier 1 at-risk species and Bald and Golden Eagle), based on models or range maps

Scientific Name	Common Name	Data Type	USFWS	State	SGCN	USFS	SRank	GRank
Danaus plexippus	Monarch	Range			Tier 1	S	S2	G4
Emydoidea blandingii	Blanding's Turtle	Range		NC	Tier 1		S4	G4
Erynnis martialis	Mottled Duskywing	Range			Tier 1		S2	G3
Euphyes bimacula illinois	Two-spotted Skipper	Range			Tier 1		S3	G4T1T2
Euphyes conspicua buchholzi	Bucholz Black Dash	Range			Tier 1		S1	G4T1
Fundulus sciadicus	Plains Topminnow	Range			Tier 1	S	S3	G4
Haliaeetus leucocephalus	Bald Eagle	Range			Tier 2	S	S3	G5
Hesperia ottoe	Ottoe Skipper	Range			Tier 1	S	S2	G3G4
Hybognathus argyritis	Western Silvery Minnow	Range			Tier 1		S2	G4
Hylocichla mustelina	Wood Thrush	Range			Tier 1		S3	G4
Lanius Iudovicianus	Loggerhead Shrike	Range			Tier 1	S	S3	G4
Lasionycteris noctivagans	Silver-haired Bat	Range			Tier 1		S3	G3G4
Lasiurus borealis	Eastern Red Bat	Range			Tier 1		S3	G3G4
Lasiurus cinereus	Hoary Bat	Range			Tier 1	S	S3	G3G4
Lethe eurydice fumosus	Smoky-eyed Brown	Range			Tier 1		S3	G5T3T4
Lontra canadensis	River Otter	Model		Т		S	S4	G5
Myotis lucifugus	Little Brown Myotis	Range			Tier 1		SNR	G3
Myotis septentrionalis	Northern Long-eared Myotis	Range	Т	Т	Tier 1		S1S2	G1G2
Perimyotis subflavus	Tricolored Bat	Range			Tier 1		S3	G2G3
Perognathus flavescens perniger	Plains Pocket Mouse	Range			Tier 1		SNR	G5TNR
Platanthera praeclara	Western Prairie Fringed Orchid	Range	Т	Т	Tier 1		S2	G3
Problema byssus kumskaka	Byssus Skipper	Range			Tier 1		S1	G4TNR
Speyeria idalia	Regal Fritillary	Range			Tier 1	S	S3	G3?



Preserving the past. Building the future.

September 18, 2020

Britt Weiser USDA – Natural Resources Conservation Service VIA EMAIL

RE: HP# 2009-082-01 Proposed Grade Stabilization Structures, Papillion Creek Watershed; Sarpy, Douglas, and Washington Counties, Nebraska

Mr. Weiser,

Thank you for submitting the cultural resources survey report for the above referenced project for Nebraska State Historic Preservation Office (NeSHPO) review and comment. Our comment on this project and its potential to affect historic properties is required by Section 106 of the National Historic Preservation Act of 1966, as amended, and implementing regulations 36 CFR Part 800.

Based on the information provided, the proposed undertaking is unlikely to affect any cultural resources listed on the National Register of Historic Places or eligible for such a listing. Therefore, the NeSHPO concurs with the determination that no historic properties affected is appropriate for this undertaking and the project should proceed as planned.

Please retain this correspondence and your documented finding in order to show compliance with Section 106 of the National Historic Preservation Act, as amended. If you have any questions, please contact me at john.swigart@nebraska.gov or 402-471-2609.

Sincerely,

John Swigart Preservation Archeologist

1500 R Street Lincoln, NE 68508-1651 P: 402.471.3270 P: 800.833.6747 F: 402.471.3100 history.nebraska.gov

United States Department of Agriculture



History Nebraska RECEIVED

SEP 1 7 2020

NE State Historic Preservation Office http://www.ne.nrcs.usda.gov

HP#2009-082-01

VIA USPS SIGNATURE CONFIRMATION - ELECTRONIC

September 11, 2020

100 Centennial Mall North Lincoln, NE 68508-3866

(402) 437-5300

Jill Dolberg Deputy State Historic Preservation Officer History Nebraska 1500 R St. Lincoln, NE 68508-1651

Subject: Section 106 Consultation Request Regarding Proposed Grade Stabilization Structures, Papillion Creek Watershed; Sarpy, Douglas, and Washington Counties, Nebraska

Ms. Dolberg:

In compliance with Section 106 of the National Historic Preservation Act, as amended, and its implementing regulation 36 CFR Part 800, NRCS is consulting with you regarding the subject undertaking.

Description of Undertaking

The Natural Resources Conservation Service (NRCS) is providing funding to the Papio-Missouri River Natural Resources District (PMRNRD) for the planning of grade stabilization structures at seven locations within the Papillion Creek watershed in Sarpy, Douglas, and Washington Counties, Nebraska. One of the planned structures (WP-1) will also be constructed with this funding. All seven locations were originally addressed in a 1966 NRCS Watershed Work Plan, which focused on grade stabilization projects to address issues with stream degradation and widening. Most of the structures addressed in the original plan have been constructed, and these seven locations are the only feasible sites remaining. An updated Watershed Plan-Environmental Assessment (Plan-EA) is being developed to analyze the environmental impacts of the currently proposed improvements. Additional information regarding the Plan-EA can be found on the project website at <u>https://trello.com/b/I2bEEIiB/papillion-creek-watershed-</u> supplemental-plan-ea.

The seven proposed project locations are identified in Figure 1. Potential improvements at Sites D-2, D-78, S-15, and W-5 include constructing small grade control structures (loose rock structures) and/or drop structures along the drainages to govern stream flow and prevent further downcutting of the streams (Figures 2-18). At Site S-1, proposed improvements include a small dam with permanent pool and a loose rock structure (Figures 19-21). Site S-1 will serve as a sediment basin for a previously planned reservoir, Site DS-19. Site DS-19 is not part of the current undertaking. Streambank restoration is proposed for Site S-5. As part of the proposed design, streambank slopes at S-5 will be cut back to help limit future slumping/collapse and a

2.0

20-foot drop structure will be constructed to raise and stabilize the channel bed (Figures 22-27). Current designs for Site WP-1 include a dam on the lower reaches of the APE to create an approximately 20-acre permanent pool (Figures 28-30). A small sediment basin would also be constructed upstream of the reservoir. The sediment basin would mitigate effects of sediment loads carried out of nearby agricultural fields and housing development areas and increase the lifespan of the dam and pool. The dam would provide flood damage protection for downstream areas. Public recreation facilities such as parking areas, walking trails, picnic shelters, fishing docks, and boat launches are also planned at Site WP-1.

An agency scoping meeting regarding the planning process was to be held on March 23, 2020 but was cancelled for health and safety concerns related to the Covid-19 pandemic. The materials that were to be presented at that meeting are enclosed with this letter. The presentation materials can also be found on the project website (see above for web address).

Area of Potential Effects (APE)

The APE for direct and indirect effects for all seven locations includes a total of 340 acres. The legal descriptions of each APE are provided in Table 1. The APE includes all areas that may be affected by construction including staging areas, borrow areas, potential access routes, and structure footprints for all proposed sites as well as the recreation facilities, inundation pools, and stream mitigation sites proposed for Site WP-1.

Cultural Resource Identification

A cultural resource inventory of the entire APE was completed in October and November 2019 by Buried Past Consulting, LLC. The findings of the inventory are detailed in the enclosed report and summarized below.

No cultural resources or archeological sites were identified within the APE for Sites D-2, D-78, S-5, S-15, WP-1, or W-5. One cultural resource was identified within the APE for Site S-1. Site 25SY417 is a segment of an abandoned railroad line. The line was known as the Chalco-Yutan Cut-off and originally extended from Omaha west to a branch line running north from Ashland to Sioux City, Iowa. In addition to the rail bed, the investigators observed reinforced concrete fence posts along the south side of the rail grade as well as two reinforced concrete box culverts within the APE. The Chalco-Yutan Cut-off was built between 1914 and 1917 and operated from 1921 to 1927. Although the rail line appears to retain good physical integrity, the line was never economically important to the local area and operated for only a short period of time. Buried Past Consulting recommends site 25SY417 as not eligible for the National Register of Historic Places under any criteria. NRCS concurs with this recommendation.

Recommendation of Effects

NRCS is requesting your comments on this undertaking. If there you have questions or need additional information, please contact NRCS Archeologist Melissa Baier at 402.437.4065 or by email at <u>Melissa.Baier@usda.gov.</u>

Sincerely,

BRITT WEISER

Digitally signed by BRITT WEISER Date: 2020.09.11 09:49:46 -05'00'

BRITT WEISER (Acting)

CRAIG DERICKSON State Conservationist

Enclosures:

- A. Table 1: Legal Descriptions of the Areas of Potential Effect
- B. Archeological Survey Report: *Cultural Resources Survey of Seven Grade Control Sites in the Papillion Creek Watershed, Sarpy, Douglas, and Washington Counties, Nebraska* by C. Tod Bevitt and Wendi M. Bevitt
- C. Site form for 25SY417
- D. Figures 1-31: APE Maps
- E. March 23, 2020 Public and Agency Scoping Meeting Presentation

cc:

Melissa Baier, Archeologist, NRCS, Lincoln SO John Moeschen, United States Corps of Engineers, Nebraska Regulatory Office



OTOE MISSOURIA TRIBE OF INDIANS

September 30, 2020

Ms. Melissa Baier USDA Natural Resources Conservation Service Nebraska State Office Federal Building, Room 152 100 Centennial Mall North Lincoln, NE 68508-3866

RE: Section 106 Consultation Request Regarding Proposed Grade Stabilization Structures, Papillion Creek Watershed; Sarpy, Douglas, and Washington Counties, Nebraska

Hawe pi (Good day) Ms. Baier,

Pursuant to Section 106 of the National Historic Preservation Act of 1966 (NHPA), and 36 C.F.R. Part 800, the Otoe-Missouria Tribal Historic Preservation Office has received and reviewed all available information regarding to the abovementioned project.

As the site is within **direct** ancestral lands of the Otoe-Missouria Tribe, the Otoe-Missouria Tribal Historic Preservation Office requests further information. Our office requests the SHPO report once available, affiliated THPO reports from surrounding Tribes, and a copy of the Plan-EA draft. Please email all documentation to <u>ewhitehorn@omtribe.org</u>.

The Otoe-Missouria Tribe has a vital interest in protecting its historic and ancestral cultural resources. The Otoe-Missouria Tribal Historic Office anticipates further review on the planned **Section 106 Consultation Request Regarding Proposed Grade Stabilization Structures, Papillion Creek Watershed; Sarpy, Douglas, and Washington Counties, Nebraska.**

The Otoe-Missouria Tribal Historic Preservation Office thanks you for consulting with the Otoe-Missouria Tribe of Oklahoma. Should you have further questions or concerns, please contact me.

Thank you,

Elsie Whitehoin

Elsie Whitehorn Tribal Historic Preservation Officer Otoe-Missouria Tribe 580-723-4466 ext 202 ewhitehorn@omtribe.org

Pawnee Nation

Wednesday, October 14, 2020

Melissa Baier Archaeologist USDA NRCS Lincoln, Nebraska

NATI **RE:** Proposed Grade Stabilization Structures Papillion Creek Watershed Sarpy, Douglas, and Washington Counties, Nebraska

The Pawnee Nation Office of Historic Preservation has received the information and materials requested for our Section 1065 Review and Consultation. Consultation with the Pawnee Nation is required by Section 106 of the National Historic Preservation Act of 1966 (NHPA), and 36 CFR Part 800.

Given the information provided, you are hereby notified that the proposed project/s is but should not affect the cultural landscape of the Pawnee Nation. Therefore, in accordance with 36CFR800.4(d)(1), you may proceed with your proposed project/s without a cultural monitor from the Pawnee Nation Office of Historic Preservation.

However, be advised that additional undiscovered cultural properties could be encountered, and they must be immediately reported to us under both the National Historic Preservation Act and the Native American Graves Protection and Repatriation Act regulations.

Should you have questions, please do not hesitate to contact me at jreed@pawneenation.org or by phone at 918-762-2180 ext 220. Thank you for your time and consideration.

STOR

IC PRF

Sincerely, Matt Reed Historic Preservation Officer Pawnee Nation of Oklahoma

> Historic Preservation Office Matt Reed Phone: 918.762.2180 E-mail: jreed@pawneenation.org P.O. Box 470 Pawnee, Oklahoma 74058



OTOE MISSOURIA TRIBE OF INDIANS

November 23, 2020

Ms. Melissa Baier USDA Natural Resources Conservation Service Nebraska State Office Federal Building, Room 152 100 Centennial Mall North Lincoln, NE 68508-3866

RE: Concurrence - Section 106 Consultation Request Regarding Proposed Grade Stabilization Structures, Papillion Creek Watershed; Sarpy, Douglas, and Washington Counties, Nebraska

Hawe pi (Good day) Ms. Baier,

The Otoe-Missouria Tribal Historic Preservation Office has reviewed all available information regarding Section 106 Consultation Request Regarding Proposed Grade Stabilization Structures, Papillion Creek Watershed; Sarpy, Douglas, and Washington Counties, Nebraska and concurs with your determination of "no historic properties affected" and findings of no direct impacts or adverse effects to any sacred sites, traditional cultural properties or any other historic property of interest to the Otoe-Missouria Tribe.

However, it is possible that archaeological deposits and/or features associated with prehistoric and early historic era settlement of the area have survived. In the event of any inadvertent discovery of any American Indian remains, funerary objects, or objects of cultural patrimony, please contact the Otoe-Missouria Tribal Historic Preservation Office immediately.

Through this letter, we extend our support to the efforts to protect Otoe-Missouria ancestral and historical sites and for the Otoe-Missouria Tribal Historic Preservation to be actively engaged in future protective and educational efforts around this area.

Thank you for the opportunity to review this project and provide comments. Should you have any questions, please do not hesitate to contact me.

Thank you,

Elsie Whitehorn

Elsie Whitehorn Tribal Historic Preservation Officer Otoe-Missouria Tribe 580-723-4466 ext 202 ewhitehorn@omtribe.org



VIA CERTIFIED MAIL – RETURN RECEIPT REQUESTED

September 10, 2020

Amy Scott Executive Administrative Assistant Iowa Tribe of Oklahoma 335588 E. 750 Rd Perkins, OK 74059

Subject: Section 106 Consultation Request Regarding Proposed Grade Stabilization Structures, Papillion Creek Watershed; Sarpy, Douglas, and Washington Counties, Nebraska

Amy Scott:

In compliance with Section 106 of the National Historic Preservation Act, as amended, and its implementing regulation 36 CFR Part 800, NRCS is consulting with you regarding the subject undertaking.

Description of Undertaking

The Natural Resources Conservation Service (NRCS) is providing funding to the Papio-Missouri River Natural Resources District (PMRNRD) for the planning of grade stabilization structures at seven locations within the Papillion Creek watershed in Sarpy, Douglas, and Washington Counties, Nebraska. One of the planned structures (WP-1) will also be constructed with this funding. All seven locations were originally addressed in a 1966 NRCS Watershed Work Plan, which focused on grade stabilization projects to address issues with stream degradation and widening. Most of the structures addressed in the original plan have been constructed, and these seven locations are the only feasible sites remaining. An updated Watershed Plan-Environmental Assessment (Plan-EA) is being developed to analyze the environmental impacts of the currently proposed improvements. Additional information regarding the Plan-EA can be found on the project website at <u>https://trello.com/b/I2bEEIiB/papillion-creek-watershed-</u> <u>supplemental-plan-ea</u>.

The seven proposed project locations are identified in Figure 1 (Enclosure D). Potential improvements at Sites D-2, D-78, S-15, and W-5 include constructing small grade control structures (loose rock structures) and/or drop structures along the drainages to govern stream flow and prevent further downcutting of the streams (Figures 2-18). At Site S-1, proposed improvements include a small dam with permanent pool and a loose rock structure (Figures 19-21). Site S-1 will serve as a sediment basin for a previously planned reservoir, Site DS-19. Site DS-19 is not part of the current undertaking. Streambank restoration is proposed for Site S-5.

As part of the proposed design, streambank slopes at S-5 will be cut back to help limit future slumping/collapse and a 20-foot drop structure will be constructed to raise and stabilize the channel bed (Figures 22-27). Current designs for Site WP-1 include a dam on the lower reaches of the area of potential effect to create an approximately 20-acre permanent pool (Figures 28-30). A small sediment basin would also be constructed upstream of the reservoir. The sediment basin would mitigate effects of sediment loads carried out of nearby agricultural fields and housing development areas and increase the lifespan of the dam and pool. The dam would provide flood damage protection for downstream areas. Public recreation facilities such as parking areas, walking trails, picnic shelters, fishing docks, and boat launches are also planned at Site WP-1.

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Area of Potential Effects (APE)

The APE for direct and indirect effects for all seven locations includes a total of 340 acres. The legal descriptions of each APE are provided in Table 1 (Enclosure A). The APE includes all areas that may be affected by construction including staging areas, borrow areas, potential access routes, and structure footprints for all proposed sites as well as the recreation facilities, inundation pools, and stream mitigation sites proposed for Site WP-1.

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Recommendation of Effects

NRCS is requesting your comments on this undertaking. If there are questions or additional information is needed, please contact NRCS Archeologist Melissa Baier at 402-437-4065 or by email at Melissa.Baier@usda.gov.

Sincerely,

BRITT Digitally signed by BRITT WEISER Date: 2020.09.10 08:04:08 -05'00' WEISER

BRITT WEISER (Acting)

CRAIG DERICKSON State Conservationist

Enclosures:

- A. Table 1: Legal Descriptions of the Areas of Potential Effect
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- D. Figures 1-31: APE Maps
- E. March 23, 2020 Public and Agency Scoping Meeting Presentation

cc:



VIA CERTIFIED MAIL – RETURN RECEIPT REQUESTED

September 10, 2020

Chris Boyd NAGPRA Coordinator Sac & Fox Nation, Oklahoma 920883 S Highway 99 Building A Stroud, Oklahoma 74079

Subject: Section 106 Consultation Request Regarding Proposed Grade Stabilization Structures, Papillion Creek Watershed; Sarpy, Douglas, and Washington Counties, Nebraska

Chris Boyd:

In compliance with Section 106 of the National Historic Preservation Act, as amended, and its implementing regulation 36 CFR Part 800, NRCS is consulting with you regarding the subject undertaking.

Description of Undertaking

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DS-19 is not part of the current undertaking. Streambank restoration is proposed for Site S-5. As part of the proposed design, streambank slopes at S-5 will be cut back to help limit future slumping/collapse and a 20-foot drop structure will be constructed to raise and stabilize the channel bed (Figures 22-27). Current designs for Site WP-1 include a dam on the lower reaches of the area of potential effect to create an approximately 20-acre permanent pool (Figures 28-30). A small sediment basin would also be constructed upstream of the reservoir. The sediment basin would mitigate effects of sediment loads carried out of nearby agricultural fields and housing development areas and increase the lifespan of the dam and pool. The dam would provide flood damage protection for downstream areas. Public recreation facilities such as parking areas, walking trails, picnic shelters, fishing docks, and boat launches are also planned at Site WP-1.

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Recommendation of Effects

NRCS is requesting your comments on this undertaking. If there are questions or additional information is needed, please contact NRCS Archeologist Melissa Baier at 402-437-4065 or by email at <u>Melissa.Baier@usda.gov.</u>

Sincerely,

Digitally signed by BRITT BRITT WEISER Date: 2020.09.10 WEISER 08:05:20 -05'00'

BRITT WEISER (Acting)

CRAIG DERICKSON State Conservationist

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cc:



VIA CERTIFIED MAIL – RETURN RECEIPT REQUESTED

September 10, 2020

Chairman Edgar B. Kent, Jr. Iowa Tribe of Oklahoma 335588 E. 750 Road Perkins, OK 74059

Subject: Section 106 Consultation Request Regarding Proposed Grade Stabilization Structures, Papillion Creek Watershed; Sarpy, Douglas, and Washington Counties, Nebraska

Honorable Chairman Kent:

In compliance with Section 106 of the National Historic Preservation Act, as amended, and its implementing regulation 36 CFR Part 800, NRCS is consulting with you regarding the subject undertaking.

Description of Undertaking

The Natural Resources Conservation Service (NRCS) is providing funding to the Papio-Missouri River Natural Resources District (PMRNRD) for the planning of grade stabilization structures at seven locations within the Papillion Creek watershed in Sarpy, Douglas, and Washington Counties, Nebraska. One of the planned structures (WP-1) will also be constructed with this funding. All seven locations were originally addressed in a 1966 NRCS Watershed Work Plan, which focused on grade stabilization projects to address issues with stream degradation and widening. Most of the structures addressed in the original plan have been constructed, and these seven locations are the only feasible sites remaining. An updated Watershed Plan-Environmental Assessment (Plan-EA) is being developed to analyze the environmental impacts of the currently proposed improvements. Additional information regarding the Plan-EA can be found on the project website at <u>https://trello.com/b/I2bEEIiB/papillion-creek-watershedsupplemental-plan-ea</u>.

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slumping/collapse and a 20-foot drop structure will be constructed to raise and stabilize the channel bed (Figures 22-27). Current designs for Site WP-1 include a dam on the lower reaches of the area of potential effect to create an approximately 20-acre permanent pool (Figures 28-30). A small sediment basin would also be constructed upstream of the reservoir. The sediment basin would mitigate effects of sediment loads carried out of nearby agricultural fields and housing development areas and increase the lifespan of the dam and pool. The dam would provide flood damage protection for downstream areas. Public recreation facilities such as parking areas, walking trails, picnic shelters, fishing docks, and boat launches are also planned at Site WP-1.

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Recommendation of Effects

NRCS is requesting your comments on this undertaking. If there are questions or additional information is needed, please contact NRCS Archeologist Melissa Baier at 402-437-4065 or by email at Melissa.Baier@usda.gov.

Sincerely,

BRITT WEISER

Digitally signed by BRITT WEISER Date: 2020.09.10 08:06:39 -05'00'

BRITT WEISER (Acting)

CRAIG DERICKSON State Conservationist

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VIA CERTIFIED MAIL – RETURN RECEIPT REQUESTED

September 10, 2020

Chairman Isaac Sherman Omaha Tribe of Nebraska P.O. Box 368 Macy, Nebraska 68039

Subject: Section 106 Consultation Request Regarding Proposed Grade Stabilization Structures, Papillion Creek Watershed; Sarpy, Douglas, and Washington Counties, Nebraska

Honorable Chairman Sherman:

In compliance with Section 106 of the National Historic Preservation Act, as amended, and its implementing regulation 36 CFR Part 800, NRCS is consulting with you regarding the subject undertaking.

Description of Undertaking

The Natural Resources Conservation Service (NRCS) is providing funding to the Papio-Missouri River Natural Resources District (PMRNRD) for the planning of grade stabilization structures at seven locations within the Papillion Creek watershed in Sarpy, Douglas, and Washington Counties, Nebraska. One of the planned structures (WP-1) will also be constructed with this funding. All seven locations were originally addressed in a 1966 NRCS Watershed Work Plan, which focused on grade stabilization projects to address issues with stream degradation and widening. Most of the structures addressed in the original plan have been constructed, and these seven locations are the only feasible sites remaining. An updated Watershed Plan-Environmental Assessment (Plan-EA) is being developed to analyze the environmental impacts of the currently proposed improvements. Additional information regarding the Plan-EA can be found on the project website at <u>https://trello.com/b/I2bEEIiB/papillion-creek-watershed-</u> <u>supplemental-plan-ea</u>.

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As part of the proposed design, streambank slopes at S-5 will be cut back to help limit future slumping/collapse and a 20-foot drop structure will be constructed to raise and stabilize the channel bed (Figures 22-27). Current designs for Site WP-1 include a dam on the lower reaches of the area of potential effect to create an approximately 20-acre permanent pool (Figures 28-30). A small sediment basin would also be constructed upstream of the reservoir. The sediment basin would mitigate effects of sediment loads carried out of nearby agricultural fields and housing development areas and increase the lifespan of the dam and pool. The dam would provide flood damage protection for downstream areas. Public recreation facilities such as parking areas, walking trails, picnic shelters, fishing docks, and boat launches are also planned at Site WP-1.

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Recommendation of Effects

NRCS is requesting your comments on this undertaking. If there are questions or additional information is needed, please contact NRCS Archeologist Melissa Baier at 402-437-4065 or by email at Melissa.Baier@usda.gov.

Sincerely,

Digitally signed by BRITT BRITT WEISER Date: 2020.09.10 08:07:49 -05'00'

BRITT WEISER (Acting)

CRAIG DERICKSON State Conservationist

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VIA CERTIFIED MAIL – RETURN RECEIPT REQUESTED

September 10, 2020

Chairwoman Judith Bender Sac & Fox Tribe of the Mississippi in Iowa 349 Meskwaki Road Tama, IA 52339

Subject: Section 106 Consultation Request Regarding Proposed Grade Stabilization Structures, Papillion Creek Watershed; Sarpy, Douglas, and Washington Counties, Nebraska

Honorable Chairman Bender:

In compliance with Section 106 of the National Historic Preservation Act, as amended, and its implementing regulation 36 CFR Part 800, NRCS is consulting with you regarding the subject undertaking.

Description of Undertaking

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Sincerely,

BRITT WEISER

Digitally signed by BRITT WEISER Date: 2020.09.10 08:12:16 -05'00'

BRITT WEISER (Acting)

CRAIG DERICKSON State Conservationist

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VIA CERTIFIED MAIL – RETURN RECEIPT REQUESTED

September 10, 2020

Chairman John R. Shotton Otoe-Missouria Tribe of Indians, Oklahoma 8151 Hwy 177 Red Rock, OK 74651

Subject: Section 106 Consultation Request Regarding Proposed Grade Stabilization Structures, Papillion Creek Watershed; Sarpy, Douglas, and Washington Counties, Nebraska

Honorable Chairman Shotton:

In compliance with Section 106 of the National Historic Preservation Act, as amended, and its implementing regulation 36 CFR Part 800, NRCS is consulting with you regarding the subject undertaking.

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Sincerely,

Digitally signed by BRITT BRITT WEISER Date: 2020.09.10 WEISER 08:14:33 -05'00'

BRITT WEISER (Acting)

CRAIG DERICKSON State Conservationist

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cc:



VIA CERTIFIED MAIL – RETURN RECEIPT REQUESTED

September 10, 2020

Chief Justin Freeland Wood Sac & Fox Nation, Oklahoma 920883 S Highway 99 Building A Stroud, Oklahoma 74079

Subject: Section 106 Consultation Request Regarding Proposed Grade Stabilization Structures, Papillion Creek Watershed; Sarpy, Douglas, and Washington Counties, Nebraska

Honorable Chairman Wood:

In compliance with Section 106 of the National Historic Preservation Act, as amended, and its implementing regulation 36 CFR Part 800, NRCS is consulting with you regarding the subject undertaking.

Description of Undertaking

The Natural Resources Conservation Service (NRCS) is providing funding to the Papio-Missouri River Natural Resources District (PMRNRD) for the planning of grade stabilization structures at seven locations within the Papillion Creek watershed in Sarpy, Douglas, and Washington Counties, Nebraska. One of the planned structures (WP-1) will also be constructed with this funding. All seven locations were originally addressed in a 1966 NRCS Watershed Work Plan, which focused on grade stabilization projects to address issues with stream degradation and widening. Most of the structures addressed in the original plan have been constructed, and these seven locations are the only feasible sites remaining. An updated Watershed Plan-Environmental Assessment (Plan-EA) is being developed to analyze the environmental impacts of the currently proposed improvements. Additional information regarding the Plan-EA can be found on the project website at <u>https://trello.com/b/I2bEEIiB/papillion-creek-watershed-</u> <u>supplemental-plan-ea</u>.

The seven proposed project locations are identified in Figure 1 (Enclosure D). Potential improvements at Sites D-2, D-78, S-15, and W-5 include constructing small grade control structures (loose rock structures) and/or drop structures along the drainages to govern stream flow and prevent further downcutting of the streams (Figures 2-18). At Site S-1, proposed improvements include a small dam with permanent pool and a loose rock structure (Figures 19-21). Site S-1 will serve as a sediment basin for a previously planned reservoir, Site DS-19. Site DS-19 is not part of the current undertaking. Streambank restoration is proposed for Site S-5.

As part of the proposed design, streambank slopes at S-5 will be cut back to help limit future slumping/collapse and a 20-foot drop structure will be constructed to raise and stabilize the channel bed (Figures 22-27). Current designs for Site WP-1 include a dam on the lower reaches of the area of potential effect to create an approximately 20-acre permanent pool (Figures 28-30). A small sediment basin would also be constructed upstream of the reservoir. The sediment basin would mitigate effects of sediment loads carried out of nearby agricultural fields and housing development areas and increase the lifespan of the dam and pool. The dam would provide flood damage protection for downstream areas. Public recreation facilities such as parking areas, walking trails, picnic shelters, fishing docks, and boat launches are also planned at Site WP-1.

An agency scoping meeting regarding the planning process was to be held on March 23, 2020 but was cancelled for health and safety concerns related to the Covid-19 pandemic. The materials that were to be presented at that meeting are enclosed with this letter. The presentation materials can also be found on the project website (see above for web address).

Area of Potential Effects (APE)

The APE for direct and indirect effects for all seven locations includes a total of 340 acres. The legal descriptions of each APE are provided in Table 1 (Enclosure A). The APE includes all areas that may be affected by construction including staging areas, borrow areas, potential access routes, and structure footprints for all proposed sites as well as the recreation facilities, inundation pools, and stream mitigation sites proposed for Site WP-1.

Cultural Resource Identification

A cultural resource inventory of the entire APE was completed in October and November 2019 by Buried Past Consulting, LLC. The findings of the inventory are detailed in the enclosed report and summarized below.

No cultural resources or archeological sites were identified within the APE for Sites D-2, D-78, S-5, S-15, WP-1, or W-5. One cultural resource was identified within the APE for Site S-1. Site 25SY417 is a segment of an abandoned railroad line. The line was known as the Chalco-Yutan Cut-off and originally extended from Omaha west to a branch line running north from Ashland to Sioux City, Iowa. In addition to the rail bed, the investigators observed reinforced concrete fence posts along the south side of the rail grade as well as two reinforced concrete box culverts within the APE. The Chalco-Yutan Cut-off was built between 1914 and 1917 and operated from 1921 to 1927. Although the rail line appears to retain good physical integrity, the line was never economically important to the local area and operated for only a short period of time. Buried Past Consulting recommends site 25SY417 as not eligible for the National Register of Historic Places under any criteria. NRCS concurs with this recommendation.

Recommendation of Effects

NRCS is requesting your comments on this undertaking. If there are questions or additional information is needed, please contact NRCS Archeologist Melissa Baier at 402-437-4065 or by email at Melissa.Baier@usda.gov.

Sincerely,

Digitally signed by BRITT BRITT WEISER Date: 2020.09.10 WEISER 08:13:35 -05'00'

BRITT WEISER (Acting)

CRAIG DERICKSON State Conservationist

Enclosures:

- A. Table 1: Legal Descriptions of the Areas of Potential Effect
- B. Archeological Survey Report: *Cultural Resources Survey of Seven Grade Control Sites in the Papillion Creek Watershed, Sarpy, Douglas, and Washington Counties, Nebraska* by C. Tod Bevitt and Wendi M. Bevitt
- C. Site form for 25SY417
- D. Figures 1-31: APE Maps
- E. March 23, 2020 Public and Agency Scoping Meeting Presentation

cc:



VIA CERTIFIED MAIL – RETURN RECEIPT REQUESTED

September 10, 2020

Chairman Larry Wright, Jr. Ponca Tribe of Nebraska 2523 Woodbine Street P.O. BOX 288 Niobrara NE 68760

Subject: Section 106 Consultation Request Regarding Proposed Grade Stabilization Structures, Papillion Creek Watershed; Sarpy, Douglas, and Washington Counties, Nebraska

Honorable Chairman Wright:

In compliance with Section 106 of the National Historic Preservation Act, as amended, and its implementing regulation 36 CFR Part 800, NRCS is consulting with you regarding the subject undertaking.

Description of Undertaking

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DS-19 is not part of the current undertaking. Streambank restoration is proposed for Site S-5. As part of the proposed design, streambank slopes at S-5 will be cut back to help limit future slumping/collapse and a 20-foot drop structure will be constructed to raise and stabilize the channel bed (Figures 22-27). Current designs for Site WP-1 include a dam on the lower reaches of the area of potential effect to create an approximately 20-acre permanent pool (Figures 28-30). A small sediment basin would also be constructed upstream of the reservoir. The sediment basin would mitigate effects of sediment loads carried out of nearby agricultural fields and housing development areas and increase the lifespan of the dam and pool. The dam would provide flood damage protection for downstream areas. Public recreation facilities such as parking areas, walking trails, picnic shelters, fishing docks, and boat launches are also planned at Site WP-1.

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Recommendation of Effects
NRCS is requesting your comments on this undertaking. If there are questions or additional information is needed, please contact NRCS Archeologist Melissa Baier at 402-437-4065 or by email at <u>Melissa.Baier@usda.gov.</u>

Sincerely,

Digitally signed by BRITT BRITT WEISER Date: 2020.09.10 WEISER 08:10:42 -05'00'

BRITT WEISER (Acting)

CRAIG DERICKSON State Conservationist

Enclosures:

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cc:



VIA CERTIFIED MAIL – RETURN RECEIPT REQUESTED

September 10, 2020

Chairwoman Tiauna Carnes Sac and Fox Nation of Missouri in Kansas and Nebraska 305 North Main Reserve, Kansas 66434

Subject: Section 106 Consultation Request Regarding Proposed Grade Stabilization Structures, Papillion Creek Watershed; Sarpy, Douglas, and Washington Counties, Nebraska

Honorable Chairman Carnes:

In compliance with Section 106 of the National Historic Preservation Act, as amended, and its implementing regulation 36 CFR Part 800, NRCS is consulting with you regarding the subject undertaking.

Description of Undertaking

The Natural Resources Conservation Service (NRCS) is providing funding to the Papio-Missouri River Natural Resources District (PMRNRD) for the planning of grade stabilization structures at seven locations within the Papillion Creek watershed in Sarpy, Douglas, and Washington Counties, Nebraska. One of the planned structures (WP-1) will also be constructed with this funding. All seven locations were originally addressed in a 1966 NRCS Watershed Work Plan, which focused on grade stabilization projects to address issues with stream degradation and widening. Most of the structures addressed in the original plan have been constructed, and these seven locations are the only feasible sites remaining. An updated Watershed Plan-Environmental Assessment (Plan-EA) is being developed to analyze the environmental impacts of the currently proposed improvements. Additional information regarding the Plan-EA can be found on the project website at <u>https://trello.com/b/I2bEEIiB/papillion-creek-watershed-</u> <u>supplemental-plan-ea</u>.

The seven proposed project locations are identified in Figure 1 (Enclosure D). Potential improvements at Sites D-2, D-78, S-15, and W-5 include constructing small grade control structures (loose rock structures) and/or drop structures along the drainages to govern stream flow and prevent further downcutting of the streams (Figures 2-18). At Site S-1, proposed improvements include a small dam with permanent pool and a loose rock structure (Figures 19-21). Site S-1 will serve as a sediment basin for a previously planned reservoir, Site DS-19. Site DS-19 is not part of the current undertaking. Streambank restoration is proposed for Site S-5.

As part of the proposed design, streambank slopes at S-5 will be cut back to help limit future slumping/collapse and a 20-foot drop structure will be constructed to raise and stabilize the channel bed (Figures 22-27). Current designs for Site WP-1 include a dam on the lower reaches of the area of potential effect to create an approximately 20-acre permanent pool (Figures 28-30). A small sediment basin would also be constructed upstream of the reservoir. The sediment basin would mitigate effects of sediment loads carried out of nearby agricultural fields and housing development areas and increase the lifespan of the dam and pool. The dam would provide flood damage protection for downstream areas. Public recreation facilities such as parking areas, walking trails, picnic shelters, fishing docks, and boat launches are also planned at Site WP-1.

An agency scoping meeting regarding the planning process was to be held on March 23, 2020 but was cancelled for health and safety concerns related to the Covid-19 pandemic. The materials that were to be presented at that meeting are enclosed with this letter. The presentation materials can also be found on the project website (see above for web address).

Area of Potential Effects (APE)

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Cultural Resource Identification

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Recommendation of Effects

NRCS is requesting your comments on this undertaking. If there are questions or additional information is needed, please contact NRCS Archeologist Melissa Baier at 402-437-4065 or by email at <u>Melissa.Baier@usda.gov.</u>

Sincerely,



BRITT WEISER (Acting)

CRAIG DERICKSON State Conservationist

Enclosures:

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VIA CERTIFIED MAIL – RETURN RECEIPT REQUESTED

September 10, 2020

Chairman Timothy Rhodd Iowa Tribe of Kansas and Nebraska 3345 B Thrasher Rd. White Cloud, KS 66094

Subject: Section 106 Consultation Request Regarding Proposed Grade Stabilization Structures, Papillion Creek Watershed; Sarpy, Douglas, and Washington Counties, Nebraska

Honorable Chairman Rhodd:

In compliance with Section 106 of the National Historic Preservation Act, as amended, and its implementing regulation 36 CFR Part 800, NRCS is consulting with you regarding the subject undertaking.

Description of Undertaking

The Natural Resources Conservation Service (NRCS) is providing funding to the Papio-Missouri River Natural Resources District (PMRNRD) for the planning of grade stabilization structures at seven locations within the Papillion Creek watershed in Sarpy, Douglas, and Washington Counties, Nebraska. One of the planned structures (WP-1) will also be constructed with this funding. All seven locations were originally addressed in a 1966 NRCS Watershed Work Plan, which focused on grade stabilization projects to address issues with stream degradation and widening. Most of the structures addressed in the original plan have been constructed, and these seven locations are the only feasible sites remaining. An updated Watershed Plan-Environmental Assessment (Plan-EA) is being developed to analyze the environmental impacts of the currently proposed improvements. Additional information regarding the Plan-EA can be found on the project website at <u>https://trello.com/b/I2bEEIiB/papillion-creek-watershedsupplemental-plan-ea</u>.

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slumping/collapse and a 20-foot drop structure will be constructed to raise and stabilize the channel bed (Figures 22-27). Current designs for Site WP-1 include a dam on the lower reaches of the area of potential effect to create an approximately 20-acre permanent pool (Figures 28-30). A small sediment basin would also be constructed upstream of the reservoir. The sediment basin would mitigate effects of sediment loads carried out of nearby agricultural fields and housing development areas and increase the lifespan of the dam and pool. The dam would provide flood damage protection for downstream areas. Public recreation facilities such as parking areas, walking trails, picnic shelters, fishing docks, and boat launches are also planned at Site WP-1.

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Recommendation of Effects

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Sincerely,

Digitally signed by BRITT BRITT WEISER Date: 2020.09.10 WEISER 08:18:03 -05'00'

BRITT WEISER (Acting)

CRAIG DERICKSON State Conservationist

Enclosures:

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cc:



VIA CERTIFIED MAIL – RETURN RECEIPT REQUESTED

September 10, 2020

Chairman Oliver Little Cook Ponca Tribe of Indians of Oklahoma 20 White Eagle Drive Ponca City, OK 74601

Subject: Section 106 Consultation Request Regarding Proposed Grade Stabilization Structures, Papillion Creek Watershed; Sarpy, Douglas, and Washington Counties, Nebraska

Honorable Chairman Little Cook:

In compliance with Section 106 of the National Historic Preservation Act, as amended, and its implementing regulation 36 CFR Part 800, NRCS is consulting with you regarding the subject undertaking.

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Recommendation of Effects

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Sincerely,



BRITT WEISER (Acting)

CRAIG DERICKSON State Conservationist

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cc:



VIA CERTIFIED MAIL – RETURN RECEIPT REQUESTED

September 10, 2020

Mr. Dwight Howe Cultural Director Ponca Tribe of Nebraska PO Box 288 Niobrara, NE 68760

Subject: Section 106 Consultation Request Regarding Proposed Grade Stabilization Structures, Papillion Creek Watershed; Sarpy, Douglas, and Washington Counties, Nebraska

Mr. Dwight Howe:

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Sincerely,



BRITT WEISER (Acting)

CRAIG DERICKSON State Conservationist

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VIA CERTIFIED MAIL – RETURN RECEIPT REQUESTED

September 10, 2020

Elsie Whitehorn Tribal Historic Preservation Officer Otoe-Missouria Tribe of Indians, Oklahoma 8151 Hwy 177 Red Rock, OK 74651

Subject: Section 106 Consultation Request Regarding Proposed Grade Stabilization Structures, Papillion Creek Watershed; Sarpy, Douglas, and Washington Counties, Nebraska

Elsie Whitehorn:

In compliance with Section 106 of the National Historic Preservation Act, as amended, and its implementing regulation 36 CFR Part 800, NRCS is consulting with you regarding the subject undertaking.

Description of Undertaking

The Natural Resources Conservation Service (NRCS) is providing funding to the Papio-Missouri River Natural Resources District (PMRNRD) for the planning of grade stabilization structures at seven locations within the Papillion Creek watershed in Sarpy, Douglas, and Washington Counties, Nebraska. One of the planned structures (WP-1) will also be constructed with this funding. All seven locations were originally addressed in a 1966 NRCS Watershed Work Plan, which focused on grade stabilization projects to address issues with stream degradation and widening. Most of the structures addressed in the original plan have been constructed, and these seven locations are the only feasible sites remaining. An updated Watershed Plan-Environmental Assessment (Plan-EA) is being developed to analyze the environmental impacts of the currently proposed improvements. Additional information regarding the Plan-EA can be found on the project website at <u>https://trello.com/b/I2bEEIiB/papillion-creek-watershed-</u> <u>supplemental-plan-ea</u>.

The seven proposed project locations are identified in Figure 1 (Enclosure D). Potential improvements at Sites D-2, D-78, S-15, and W-5 include constructing small grade control structures (loose rock structures) and/or drop structures along the drainages to govern stream flow and prevent further downcutting of the streams (Figures 2-18). At Site S-1, proposed improvements include a small dam with permanent pool and a loose rock structure (Figures 19-21). Site S-1 will serve as a sediment basin for a previously planned reservoir, Site DS-19. Site DS-19 is not part of the current undertaking. Streambank restoration is proposed for Site S-5.

As part of the proposed design, streambank slopes at S-5 will be cut back to help limit future slumping/collapse and a 20-foot drop structure will be constructed to raise and stabilize the channel bed (Figures 22-27). Current designs for Site WP-1 include a dam on the lower reaches of the area of potential effect to create an approximately 20-acre permanent pool (Figures 28-30). A small sediment basin would also be constructed upstream of the reservoir. The sediment basin would mitigate effects of sediment loads carried out of nearby agricultural fields and housing development areas and increase the lifespan of the dam and pool. The dam would provide flood damage protection for downstream areas. Public recreation facilities such as parking areas, walking trails, picnic shelters, fishing docks, and boat launches are also planned at Site WP-1.

An agency scoping meeting regarding the planning process was to be held on March 23, 2020 but was cancelled for health and safety concerns related to the Covid-19 pandemic. The materials that were to be presented at that meeting are enclosed with this letter. The presentation materials can also be found on the project website (see above for web address).

Area of Potential Effects (APE)

The APE for direct and indirect effects for all seven locations includes a total of 340 acres. The legal descriptions of each APE are provided in Table 1 (Enclosure A). The APE includes all areas that may be affected by construction including staging areas, borrow areas, potential access routes, and structure footprints for all proposed sites as well as the recreation facilities, inundation pools, and stream mitigation sites proposed for Site WP-1.

Cultural Resource Identification

A cultural resource inventory of the entire APE was completed in October and November 2019 by Buried Past Consulting, LLC. The findings of the inventory are detailed in the enclosed report and summarized below.

No cultural resources or archeological sites were identified within the APE for Sites D-2, D-78, S-5, S-15, WP-1, or W-5. One cultural resource was identified within the APE for Site S-1. Site 25SY417 is a segment of an abandoned railroad line. The line was known as the Chalco-Yutan Cut-off and originally extended from Omaha west to a branch line running north from Ashland to Sioux City, Iowa. In addition to the rail bed, the investigators observed reinforced concrete fence posts along the south side of the rail grade as well as two reinforced concrete box culverts within the APE. The Chalco-Yutan Cut-off was built between 1914 and 1917 and operated from 1921 to 1927. Although the rail line appears to retain good physical integrity, the line was never economically important to the local area and operated for only a short period of time. Buried Past Consulting recommends site 25SY417 as not eligible for the National Register of Historic Places under any criteria. NRCS concurs with this recommendation.

Recommendation of Effects

NRCS is requesting your comments on this undertaking. If there are questions or additional information is needed, please contact NRCS Archeologist Melissa Baier at 402-437-4065 or by email at Melissa.Baier@usda.gov.

Sincerely,



BRITT WEISER (Acting)

CRAIG DERICKSON State Conservationist

Enclosures:

- A. Table 1: Legal Descriptions of the Areas of Potential Effect
- B. Archeological Survey Report: *Cultural Resources Survey of Seven Grade Control Sites in the Papillion Creek Watershed, Sarpy, Douglas, and Washington Counties, Nebraska* by C. Tod Bevitt and Wendi M. Bevitt
- C. Site form for 25SY417
- D. Figures 1-31: APE Maps
- E. March 23, 2020 Public and Agency Scoping Meeting Presentation

cc:



VIA CERTIFIED MAIL – RETURN RECEIPT REQUESTED

September 10, 2020

Johnathan Buffalo Historic Preservation Director Sac & Fox Tribe of the Mississippi in Iowa 349 Meskwaki Road Tama, IA 52339

Subject: Section 106 Consultation Request Regarding Proposed Grade Stabilization Structures, Papillion Creek Watershed; Sarpy, Douglas, and Washington Counties, Nebraska

Johnathan Buffalo:

In compliance with Section 106 of the National Historic Preservation Act, as amended, and its implementing regulation 36 CFR Part 800, NRCS is consulting with you regarding the subject undertaking.

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DS-19 is not part of the current undertaking. Streambank restoration is proposed for Site S-5. As part of the proposed design, streambank slopes at S-5 will be cut back to help limit future slumping/collapse and a 20-foot drop structure will be constructed to raise and stabilize the channel bed (Figures 22-27). Current designs for Site WP-1 include a dam on the lower reaches of the area of potential effect to create an approximately 20-acre permanent pool (Figures 28-30). A small sediment basin would also be constructed upstream of the reservoir. The sediment basin would mitigate effects of sediment loads carried out of nearby agricultural fields and housing development areas and increase the lifespan of the dam and pool. The dam would provide flood damage protection for downstream areas. Public recreation facilities such as parking areas, walking trails, picnic shelters, fishing docks, and boat launches are also planned at Site WP-1.

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Recommendation of Effects

NRCS is requesting your comments on this undertaking. If there are questions or additional information is needed, please contact NRCS Archeologist Melissa Baier at 402-437-4065 or by email at <u>Melissa.Baier@usda.gov.</u>

Sincerely,



BRITT WEISER (Acting)

CRAIG DERICKSON State Conservationist

Enclosures:

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cc:



VIA CERTIFIED MAIL – RETURN RECEIPT REQUESTED

September 10, 2020

Joseph Reed Tribal Historic Preservation Officer Pawnee Nation of Oklahoma P.O. Box 470 Pawnee, OK 74058

Subject: Section 106 Consultation Request Regarding Proposed Grade Stabilization Structures, Papillion Creek Watershed; Sarpy, Douglas, and Washington Counties, Nebraska

Joseph Reed:

In compliance with Section 106 of the National Historic Preservation Act, as amended, and its implementing regulation 36 CFR Part 800, NRCS is consulting with you regarding the subject undertaking.

Description of Undertaking

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The seven proposed project locations are identified in Figure 1 (Enclosure D). Potential improvements at Sites D-2, D-78, S-15, and W-5 include constructing small grade control structures (loose rock structures) and/or drop structures along the drainages to govern stream flow and prevent further downcutting of the streams (Figures 2-18). At Site S-1, proposed improvements include a small dam with permanent pool and a loose rock structure (Figures 19-21). Site S-1 will serve as a sediment basin for a previously planned reservoir, Site DS-19. Site DS-19 is not part of the current undertaking. Streambank restoration is proposed for Site S-5.

As part of the proposed design, streambank slopes at S-5 will be cut back to help limit future slumping/collapse and a 20-foot drop structure will be constructed to raise and stabilize the channel bed (Figures 22-27). Current designs for Site WP-1 include a dam on the lower reaches of the area of potential effect to create an approximately 20-acre permanent pool (Figures 28-30). A small sediment basin would also be constructed upstream of the reservoir. The sediment basin would mitigate effects of sediment loads carried out of nearby agricultural fields and housing development areas and increase the lifespan of the dam and pool. The dam would provide flood damage protection for downstream areas. Public recreation facilities such as parking areas, walking trails, picnic shelters, fishing docks, and boat launches are also planned at Site WP-1.

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Cultural Resource Identification

A cultural resource inventory of the entire APE was completed in October and November 2019 by Buried Past Consulting, LLC. The findings of the inventory are detailed in the enclosed report and summarized below.

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Recommendation of Effects

NRCS is requesting your comments on this undertaking. If there are questions or additional information is needed, please contact NRCS Archeologist Melissa Baier at 402-437-4065 or by email at Melissa.Baier@usda.gov.

Sincerely,



CRAIG DERICKSON State Conservationist

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VIA CERTIFIED MAIL – RETURN RECEIPT REQUESTED

September 10, 2020

Lance Foster Tribal Historic Preservation Officer Iowa Tribe of Kansas and Nebraska 3345 B Thrasher Rd. White Cloud, KS 66094

Subject: Section 106 Consultation Request Regarding Proposed Grade Stabilization Structures, Papillion Creek Watershed; Sarpy, Douglas, and Washington Counties, Nebraska

Lance Foster:

In compliance with Section 106 of the National Historic Preservation Act, as amended, and its implementing regulation 36 CFR Part 800, NRCS is consulting with you regarding the subject undertaking.

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DS-19 is not part of the current undertaking. Streambank restoration is proposed for Site S-5. As part of the proposed design, streambank slopes at S-5 will be cut back to help limit future slumping/collapse and a 20-foot drop structure will be constructed to raise and stabilize the channel bed (Figures 22-27). Current designs for Site WP-1 include a dam on the lower reaches of the area of potential effect to create an approximately 20-acre permanent pool (Figures 28-30). A small sediment basin would also be constructed upstream of the reservoir. The sediment basin would mitigate effects of sediment loads carried out of nearby agricultural fields and housing development areas and increase the lifespan of the dam and pool. The dam would provide flood damage protection for downstream areas. Public recreation facilities such as parking areas, walking trails, picnic shelters, fishing docks, and boat launches are also planned at Site WP-1.

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Recommendation of Effects

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Sincerely,



BRITT WEISER (Acting)

CRAIG DERICKSON State Conservationist

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VIA CERTIFIED MAIL – RETURN RECEIPT REQUESTED

September 10, 2020

President Walter R. Echo-Hawk Pawnee Nation of Oklahoma 881 Little Dee Drive Pawnee, OK 74058

Subject: Section 106 Consultation Request Regarding Proposed Grade Stabilization Structures, Papillion Creek Watershed; Sarpy, Douglas, and Washington Counties, Nebraska

Honorable President Echo-Hawk:

In compliance with Section 106 of the National Historic Preservation Act, as amended, and its implementing regulation 36 CFR Part 800, NRCS is consulting with you regarding the subject undertaking.

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slumping/collapse and a 20-foot drop structure will be constructed to raise and stabilize the channel bed (Figures 22-27). Current designs for Site WP-1 include a dam on the lower reaches of the area of potential effect to create an approximately 20-acre permanent pool (Figures 28-30). A small sediment basin would also be constructed upstream of the reservoir. The sediment basin would mitigate effects of sediment loads carried out of nearby agricultural fields and housing development areas and increase the lifespan of the dam and pool. The dam would provide flood damage protection for downstream areas. Public recreation facilities such as parking areas, walking trails, picnic shelters, fishing docks, and boat launches are also planned at Site WP-1.

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Sincerely,



BRITT WEISER (Acting)

CRAIG DERICKSON State Conservationist

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cc:



VIA CERTIFIED MAIL – RETURN RECEIPT REQUESTED

September 10, 2020

Staci Hesler Tribal Historic Preservation Officer Ponca Tribe of Indians of Oklahoma 121 White Eagle Drive Ponca City, OK 74601

Subject: Section 106 Consultation Request Regarding Proposed Grade Stabilization Structures, Papillion Creek Watershed; Sarpy, Douglas, and Washington Counties, Nebraska

Staci Hesler:

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BRITT WEISER (Acting)

CRAIG DERICKSON State Conservationist

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VIA CERTIFIED MAIL – RETURN RECEIPT REQUESTED

September 10, 2020

Thomas Parker Tribal Historic Preservation Officer Omaha Tribe of Nebraska P.O. Box 368 Macy, NE 68039

Subject: Section 106 Consultation Request Regarding Proposed Grade Stabilization Structures, Papillion Creek Watershed; Sarpy, Douglas, and Washington Counties, Nebraska

Thomas Parker:

In compliance with Section 106 of the National Historic Preservation Act, as amended, and its implementing regulation 36 CFR Part 800, NRCS is consulting with you regarding the subject undertaking.

Description of Undertaking

The Natural Resources Conservation Service (NRCS) is providing funding to the Papio-Missouri River Natural Resources District (PMRNRD) for the planning of grade stabilization structures at seven locations within the Papillion Creek watershed in Sarpy, Douglas, and Washington Counties, Nebraska. One of the planned structures (WP-1) will also be constructed with this funding. All seven locations were originally addressed in a 1966 NRCS Watershed Work Plan, which focused on grade stabilization projects to address issues with stream degradation and widening. Most of the structures addressed in the original plan have been constructed, and these seven locations are the only feasible sites remaining. An updated Watershed Plan-Environmental Assessment (Plan-EA) is being developed to analyze the environmental impacts of the currently proposed improvements. Additional information regarding the Plan-EA can be found on the project website at <u>https://trello.com/b/I2bEEIiB/papillion-creek-watershed-</u> <u>supplemental-plan-ea</u>.

The seven proposed project locations are identified in Figure 1 (Enclosure D). Potential improvements at Sites D-2, D-78, S-15, and W-5 include constructing small grade control structures (loose rock structures) and/or drop structures along the drainages to govern stream flow and prevent further downcutting of the streams (Figures 2-18). At Site S-1, proposed improvements include a small dam with permanent pool and a loose rock structure (Figures 19-21). Site S-1 will serve as a sediment basin for a previously planned reservoir, Site DS-19. Site

DS-19 is not part of the current undertaking. Streambank restoration is proposed for Site S-5. As part of the proposed design, streambank slopes at S-5 will be cut back to help limit future slumping/collapse and a 20-foot drop structure will be constructed to raise and stabilize the channel bed (Figures 22-27). Current designs for Site WP-1 include a dam on the lower reaches of the area of potential effect to create an approximately 20-acre permanent pool (Figures 28-30). A small sediment basin would also be constructed upstream of the reservoir. The sediment basin would mitigate effects of sediment loads carried out of nearby agricultural fields and housing development areas and increase the lifespan of the dam and pool. The dam would provide flood damage protection for downstream areas. Public recreation facilities such as parking areas, walking trails, picnic shelters, fishing docks, and boat launches are also planned at Site WP-1.

An agency scoping meeting regarding the planning process was to be held on March 23, 2020 but was cancelled for health and safety concerns related to the Covid-19 pandemic. The materials that were to be presented at that meeting are enclosed with this letter. The presentation materials can also be found on the project website (see above for web address).

Area of Potential Effects (APE)

The APE for direct and indirect effects for all seven locations includes a total of 340 acres. The legal descriptions of each APE are provided in Table 1 (Enclosure A). The APE includes all areas that may be affected by construction including staging areas, borrow areas, potential access routes, and structure footprints for all proposed sites as well as the recreation facilities, inundation pools, and stream mitigation sites proposed for Site WP-1.

Cultural Resource Identification

A cultural resource inventory of the entire APE was completed in October and November 2019 by Buried Past Consulting, LLC. The findings of the inventory are detailed in the enclosed report and summarized below.

No cultural resources or archeological sites were identified within the APE for Sites D-2, D-78, S-5, S-15, WP-1, or W-5. One cultural resource was identified within the APE for Site S-1. Site 25SY417 is a segment of an abandoned railroad line. The line was known as the Chalco-Yutan Cut-off and originally extended from Omaha west to a branch line running north from Ashland to Sioux City, Iowa. In addition to the rail bed, the investigators observed reinforced concrete fence posts along the south side of the rail grade as well as two reinforced concrete box culverts within the APE. The Chalco-Yutan Cut-off was built between 1914 and 1917 and operated from 1921 to 1927. Although the rail line appears to retain good physical integrity, the line was never economically important to the local area and operated for only a short period of time. Buried Past Consulting recommends site 25SY417 as not eligible for the National Register of Historic Places under any criteria. NRCS concurs with this recommendation.

Recommendation of Effects

NRCS is requesting your comments on this undertaking. If there are questions or additional information is needed, please contact NRCS Archeologist Melissa Baier at 402-437-4065 or by email at <u>Melissa.Baier@usda.gov.</u>

Sincerely,



CRAIG DERICKSON State Conservationist

Enclosures:

- A. Table 1: Legal Descriptions of the Areas of Potential Effect
- B. Archeological Survey Report: *Cultural Resources Survey of Seven Grade Control Sites in the Papillion Creek Watershed, Sarpy, Douglas, and Washington Counties, Nebraska* by C. Tod Bevitt and Wendi M. Bevitt
- C. Site form for 25SY417
- D. Figures 1-31: APE Maps
- E. March 23, 2020 Public and Agency Scoping Meeting Presentation

cc:



APPENDIX B – PROJECT MAP



Figure B-1. Project Map

Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD








APPENDIX C – SUPPORT MAPS



Figure C1.1. D-2 Affected Resource Area Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD









Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD



n

700 🗖 Feet





Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD







Figure C1.4. S-5 Affected Resource Area Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD







Figure C1.5. S-15 Affected Resource Area Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD







Figure C1.6. W-5 Affected Resource A Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD

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Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD



800 _____ Feet





Figure C2.1. S-1 100-Year Flood Papillion Creek Supplemental Watershed Plan-EA

Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD

0

1,000 ______ Feet





Figure C2.2. S-1 500-Year Flood Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD



0

1,000 Feet





100-year Floodplain

Floodway

Figure C2.3. S-5 100-Year Flood

Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD



400 Feet





Figure C2.4. S-5 500-Year Flood Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD

0

400 Feet





Figure C2.5. WP-1 100-Year Flood

Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD



10,000 Feet







Figure C2.5A. WP-1 100-Year Flood Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD



0

2,500 Feet





Figure C2.5B. WP-1 100-Year Flood

Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD



n

2,500







Figure C2.5C. WP-1 100-Year Flood

Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD



n

2,500





Figure C2.5D. WP-1 100-Year Flood Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD



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Figure C2.6. WP-1 500-Year Flood

Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD









Figure C2.6A. WP-1 500-Year Flood Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service

Papio-Missouri River NRD







Figure C2.6B. WP-1 500-Year Flood Papillion Creek Supplemental Watershed Plan-EA

Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD









Figure C2.6C. WP-1 500-Year Flood Papillion Creek Supplemental Watershed Plan-EA

Natural Resources Conservation Service Papio-Missouri River NRD









Figure C2.6D. WP-1 500-Year Flood

Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD









Figure C2.7. S-15 100-year Inundation Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD

500 _____ Feet







Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD







Figure C3.1A. Site D-2 Wetlands and Streams Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD









Natural Resources Conservation Service Papio-Missouri River NRD









Figure C3.1C. Site D-2 Wetlands and Streams Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD









Figure C3.1D. Site D-2 Wetlands and Streams Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD









Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD 300 600

0







180 0

□Feet

Natural Resources Conservation Service

Papio-Missouri River NRD





Papililon Creek Supplemental Watershed Plan Natural Resources Conservation Service Papio-Missouri River NRD 0 75 150







Figure C3.2C. Site D-78 Wetlands and Streams Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD

0 85

170 □ Feet







Figure C3.2D. Site D-78 Wetlands and Streams Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD

0 75 150







Figure C3.2E. Site D-78 Wetlands and Streams Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD









Figure C3.3A. Site S-1 Wetlands and Streams Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD

0 90 180














0 90 180





Figure C3.3D. Site S-1 Wetlands and Streams Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD

0 90 180





0 175 350







0 60 120







Figure C3.4B. Site S-5 Wetlands and Streams Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD







Figure C3.4C. Site S-5 Wetlands and Streams Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD













Figure C3.5A. Site S-15 Wetlands and Streams Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD







Figure C3.5B. Site S-15 Wetlands and Streams Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD

















Figure C3.6A. Site W-5 Wetlands and Streams Index Sheet











Figure C3.6B. Site W-5 Wetlands and Streams Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD











Figure C3.6C. Site W-5 Wetlands and Streams Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD











Figure C3.6D. Site W-5 Wetlands and Streams Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD











Figure C3.6E. Site W-5 Wetlands and Streams Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD











Figure C3.6F. Site W-5 Wetlands and Streams Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD











Figure C3.7. Site WP-1 - NWI Map Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD









Figure C3.7A. Site WP-1 Wetlands and Streams Index Sheet Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD









Figure C3.7B. Site WP-1 Wetlands and Streams Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD











Figure C3.7D. Site WP-1 Wetlands and Streams Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD

0 100 200







Figure C3.7E. Site WP-1 Wetlands and Streams Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD









Figure C3.7F. Site WP-1 Wetlands and Streams Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD









Figure C3.7G. Site WP-1 Wetlands and Streams Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD









Figure C4.1. D-2 Project Extents
Papillion Creek Supplemental Watershed Plan







Figure C4.2. D-78 Project Extents Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD





550





Figure C4.3. S-1 Project Extents









Figure C4.4. S-5 Project Extents









Figure C4.5. S-15 Project Extents

Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD 





Figure C4.6. W-5 Project Extents















FOR PLANNING PURPOSES ONLY NOT FOR CONSTRUCTION














Figure C6.1. S-1 Breach Inundation

Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD



800 _____ Feet





Figure C6.2. Site WP-1 - Breach and Auxiliary Spillway Hydrograph Boundary Papillion Creek Supplemental Watershed Plan-EA Natural Resources Conservation Service Papio-Missouri River NRD









APPENDIX D – INVESTIGATION AND ANALYSIS



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D1.0 INTRODUCTION

This appendix provides supporting information for the formulation, evaluation, and conclusions of this Draft Supplemental Plan-EA. Items of a routine nature are not included; however, citations are included throughout the Draft Supplemental Plan-EA and this Investigation and Analysis report for appropriate manuals, handbooks, research, and other references. USDA NRCS manuals and handbooks, state guidelines, and other reference documents were utilized to guide the planning of this project. These are referenced in Chapter 8.0 of the Draft Supplemental Plan-EA.

The NRCS planning staff and hired consultants worked with other federal, state, and local agencies, individual watershed residents, private professional services consultants, the Sponsor, and NRCS State and National staff specialists throughout the planning process. Interdisciplinary teams were utilized in the assessment and evaluation of present, Future Without Federal Investment, and Future With-Project conditions. This coordinated planning effort produced a forecasted Without Project condition that allowed for the consideration of several alternatives.

D2.0 PREFERRED ALTERNATIVE DESIGN DETAILS

D2.1 Loose Rock Structures

Loose rock structures were designed for the purpose of grade stabilization. The locations of each loose rock structure were selected based on the existing head cuts, estimated future change in grade, and minimization of impacts. Loose rock structures are located at Sites D-2, D-78, S-15, and W-5 and are shown in Figures C4.1, C4.2, C4.5, and C4.6, included in Appendix C. Observed stream characteristics from aerials, LiDAR, and field reconnaissance were used to analyze existing stream conditions. Field reconnaissance was performed at each site in June 2019 and included verifications of headcuts, knickpoints, measurement and characterization of stream geometries, identification of utilities, bed material, and rapid assessment of stream function. Existing grade control structures (most often in the form of culverts and other protected road crossings) were identified to determine potential stream bed loss. Previous analyses within the watershed have determined an estimated stable stream slope grade of 0.0016 feet/feet (0.16%). Potential future stream profiles were developed using the following assumptions:

- Streams will degrade through headcut progression, with the downstream slope driving the elevations
- The future 'stable' stream profile is 0.16 percent
- Existing grade control structures are assumed to remain intact and therefore the elevations upstream of these structures would remain constant from present-day to future conditions
- Culverts are assumed to act as grade control structures
- Maximum future degradation height of 4 feet

Using these assumptions, loose rock structures were positioned to 'catch' future headcuts and maintain future drops of not more than 4 feet. Impacts to wetlands, tributary confluences, existing infrastructure, and existing gullies were all considered and structures were placed to minimize wetland impacts and maximize protection benefits where applicable. The stream setback areas of the existing and future channels were calculated using a 3H:1V channel bank side slopes and a 50-foot-wide buffer from the top of the 3H:1V channel banks. Stream widths were determined from a mix of field reconnaissance recorded values and LiDAR data. 2010 LiDAR data was used for the channel bottom elevation for the existing condition set back areas and the future setback areas were calculated 0.16 percent channel slopes. A preliminary cost to benefit analysis was performed and it was determined that costs begin to outweigh monetary land savings benefits when land protection from future degradation and widening is less than approximately 1 acre. This threshold was used to determine the number of structures at each location.

The loose rock structure is designed for long term stability, low maintenance, and resilience of future infrequent runoff events. The structure includes Nebraska Department of Transportation (NDOT) Type C gradation rock riprap that will be placed along the stream channel bottom and partially up the banks to a bank elevation of the 100-year flood event or top of bank, whichever is lower. The structures are approximately 46 feet long and excavation along channel banks will occur for approximately 40 feet to achieve a 3H:1V channel bank slope above the riprap. Channel banks will be graded back at a 3:1 ratio upstream of the rock structure to allow stream flow to naturally expand without hitting the channel banks and transitioned back towards the existing channel downstream of the structures at a 1:1 ratio based on



stream flow's typical contraction ratio. See Appendix C for a plan and profile view of the stream stabilization structure design.

D2.2 D-2 Rigid Drop Structure

A headcut, approximately 6 feet tall, exists within the channel at Site D-2. The land directly upstream of the drop is currently being used as a crossing for farm equipment. Due to the drop exceeding the 4-foot vertical elevation difference that the loose rock structures are designed to withstand, a rigid drop structure is being proposed at the location of the existing drop. The location of the rigid drop structure is shown in the figure provided in Appendix C. The structure will provide a reinforced crossing for farm equipment and will stop the headcut from progressing further, thus protecting the upstream Hwy 133 embankment from damage. The preliminary design includes crushed aggregate and a geogrid over the existing crossing with an articulated concrete mat over the crushed aggregate and at a 10H:1V slope into the channel. Earthen fill will be placed underneath the articulated concrete mat and 25 feet of riprap will be placed at the downstream end of the drop structure. The articulated concrete mat is 5 feet wide. The channel side slopes will be graded at a 3H:1V slope and the concrete mat will extend on both sides into the channel for a vertical height of 2 feet. Headcut progression and proximity to Hwy 133 will need to be accounted for in final design to ensure proper placement and compliance with NRCS grade stabilization structure (code 410) conservation practice standards. See Figure D2-1 for a profile view of the rigid drop structure at Site D-2.



Figure D2-1. Site D-2 Rigid Drop Structure Profile View

D2.3 S-15 Rigid Drop Structure

An existing drop, approximately 10 feet tall, exists within the northern tributary at Site S-15. Due to the drop exceeding the 4-foot vertical elevation difference that the loose rock structures are designed to withstand, a rigid drop structure is being proposed at the location of the drop instead of a loose rock structure. The location of the rigid drop structure is shown in Appendix C. The proposed design follows NRCS grade stabilization structure (code 410) conservation practice standards and includes placing earthen fill in the 10-foot-deep hole to create a 10H:1V slope to existing ground and use an articulated concrete mat on top of the fill to accommodate the high velocities at this location. The articulated concrete mat and the concrete mat will be graded out to a 3H:1V slope on both sides of the concrete mat and the downstream end of the structure to provide grade control and maintain stability at the structure. The plan and profile view of the rigid drop structure at Site S-15 are shown below in Figures D2-2 and D2-3.







Figure D2-3. Site S-15 Rigid Drop Structure Profile View



D2.4 W-5 Rigid Drop Structure

A 6-foot vertical drop is within the channel at Site W-5 at the site of an abandoned, dilapidated stream crossing. Due to the drop exceeding the 4-foot vertical elevation difference that the loose rock structures are designed to withstand, a rigid drop structure is being proposed at the location of the existing drop. The location of the rigid drop structure is shown in the figure provided in Appendix C. The preliminary design includes crushed aggregate and a geogrid over the existing drop with grouted rock riprap and at a 4H:1V slope in the channel. The channel side slopes will be graded at a 3H:1V slope and the concrete mat will extend on both sides into the channel. See Figure D2-4 for a profile view of the rigid drop structure at Site W-5.





Figure D2-4. Site W-5 Rigid Drop Structure Profile View

D2.5 S-1 Sediment Basin and Rigid Drop Structure

A sediment basin is being proposed at Site S-1, shown in Appendix C. The sediment basin was based on a previously planned sediment basin by the Sponsor, known as the Dam Site 19 North Water Quality Basin (DS-19 NWQB). The DS-19 NWQB is a proposed sediment basin that was preliminarily designed in 2018 and is located upstream of the Sponsor-planned high hazard potential DS-19 regional detention structure. Both are part of the Papillion Creek Watershed Management Plan, developed by the Papillion Creek Watershed Partnership (2009, 2014). The DS-19 Reservoir was evaluated for economic feasibility and environmental impacts in the Papillion Creek and Tributaries Lakes Final Feasibility Report and Environmental Assessment and was included as part of the Recommended Plan with a sediment basin upstream. Detailed watershed analysis was conducted for DS-19 as a flood reduction solution for the Papillion Creek Watershed and construction of the site is reasonably foreseeable. Funding for implementation has been recommended and the Sponsor has begun purchasing land for the site. The location of this alternative's sediment basin was selected based on previous studies, the alternatives analysis provided in this document, and to minimize wetland impacts. 2016 LiDAR was used to find the stage storage volumes and the permanent pool volume was set based on previous studies and the DS-19 design. NRCS sediment basin (code 350) conservation practice standards were followed for the preliminary design. Other alternatives were analyzed as described in Chapter 4 of the Plan-EA.

South 240th Street, a major four lane arterial road, separates DS-19 from the proposed Site S-1. The top of dam elevation is set by the hydraulic routing of a Probable Maximum Flood (PMF) event in accordance with Nebraska Dam Safety Regulations for a high hazard potential dam site, which also matches USDA-NRCS' TR210-60 requirements. The permanent storage volume used for the water quality basin is considered in the downstream dam routings.



The embankment required to impound the water in the water quality basin considered dam safety criteria on its own, being upstream of a major arterial. Breach routings were performed to calculate the maximum release at the top of structure elevation (2,750 cfs at elevation 1181.0 ft), and this was designed to avoid exceedance of the 2,990 cfs culvert capacity of the downstream reinforced box culvert under South 240th Street. To match design policy in the watershed, the water quality basin was designed to safely pass a 500-year frequency, 24-hour event (shown as the freeboard event in table 3). This would require a 150-foot wide broad-crested overflow weir with an armored/concrete channel and energy dissipator.

Working down from the maximum top of structure elevation and auxiliary spillway configuration/elevation, a permanent pool elevation was selected one foot below the auxiliary spillway crest to meet NRCS CPS-350 criteria for a minimum one-foot freeboard between the riser crest and the auxiliary spillway crest. Specific storm frequency requirements are not set forth in CPS-350, but CPS-378 is referenced for principal spillway design criteria. Because the intent of the CPS-378 design criteria is to minimize flow through the auxiliary spillway and avoid the erosion that often accompanies the flow, the design proposed is focused on maximizing sediment trapping efficiency and minimizing the maintenance associated with it. Erosion in the auxiliary spillway is not pertinent here as the auxiliary spillway is a hardened channel and will not suffer from erosion the way an earth cut spillway would. All other listed CPS-350 criteria are met.

Earth fill for the embankment will be taken from the basin's impoundment to provide for additional storage above and beyond what the natural contours provide. This storage will reduce the amount of sediment inflow to the downstream DS-19 Reservoir, improving water quality and extending the life of DS-19.

See Figure D2-5 for a profile view of the sediment basin at Site S-1.

Figure D2-5. Site S-1 Sediment Basin Profile View



WATER QUALITY BASIN CROSS-SECTION

It was assumed that land will be purchased for the embankment and top of dam extents. Additionally, the assumption was made for the cost determination that when the land purchase area encompasses over ³/₄ of the parcel, the whole parcel will be purchased. Unit costs are proved in Section D5.1 and total costs, including land acquisition, permitting, mitigation, and construction observation are provided in Table 4-3a in the Supplemental Plan-EA.

The rigid drop structure location is at an existing channel grade drop and water crossing that frequently washes out. The rigid drop structure would also preserve approximately 3 acres of adjacent farmland and



riparian habitat from degrading due to future headcut progressions and stream widening. Figure D2-6 below shows a profile view of the drop structure.



Figure D2-6. Site S-1 Rigid Drop Structure

D2.6 WP-1 Regional Detention Site, Wet Dam

Flood risk reduction and potential solutions have been studied extensively throughout the watershed. The Papillion Creek Watershed Management Plan (2009, 2014) and the Papillion Creek and Tributaries Lakes Feasibility Report and Environmental Assessment (USACE 2021) include the analysis and recommendation of several dams to provide flood reduction benefits. Due to the costs of dams, the Sponsor budgeting cycles, and the availability of limited outside funds to assist with construction, the dams have often been constructed one at a time. The identified dams were designed to work as a system and create flood damage reduction benefits reflective of that system. The buildout of the structures in the Papillion Creek watershed has continued over several years as financial resources were available, and to meet the demands of development. The effort started nearly forty years ago when the United States Army Corps of Engineers (USACE) constructed some of the larger dams in the watershed and has continued through to present day. Site WP-1 is the latest site programmed for construction that is not included within another federally sponsored planning effort and NEPA analysis.

The WP-1 regional detention basin site is located on Whispering Ridge Creek, a left bank tributary to West Papillion Creek, in Section 5, Township 15 North, Range 11 East, in Douglas County, Nebraska (Figure 1, Appendix B). The creek flows southerly through the project site, which is bordered by Fort Street to the north, North 180th Street to the east, West Maple Street (Nebraska Highway 64) to the south, and agricultural fields to the west. The contributing drainage area at the proposed impoundment is approximately 1.3 square miles (852 acres). The WP-1 regional detention basin is located in the upper reaches of the Papillion Creek Watershed.

The drainage area of WP-1 is entirely confined to the North Branch West Papillion Creek-West Papillion Creek HUC 12 (102300060101). The drainage area of WP-1 is primarily agricultural land with expanding residential development. The soil consists of silt loam to silty clay loam. The topography of the WP-1 drainage area is typical of the upland areas within the watershed, with moderate to steeply sloping hills and deep, incised valleys with relatively steep valley slopes. Whispering Ridge Creek, located upstream of WP-1, is a narrow bottom channel with wooded banks and stream gradient averaging 65 feet per mile, similar to other tributaries within small watersheds in the region.



The dam structure consists of an earthen embankment approximately 900 feet in length. The top of dam (TOD) elevation is set at the 1,194-foot elevation, which is approximately 40 feet above the channel bottom. The structure would require an estimated 202,200 cubic yards (cy) of compacted earthen fill material.

The principal spillway consists of a 4-foot by 12-foot concrete riser and a 48-inch reinforced concrete pressure pipe. An impact basin is proposed at the principal spillway outlet. The elevation of the principal outlet is 1,178 ft. The earth cut, vegetated auxiliary spillway is located at the dam's left abutment with a crest elevation of 1,189.5 feet. The auxiliary spillway would have a 200-foot-wide bottom, 50-foot-long crest, 3H:1V side slopes, a 1.0 percent approach slope, and a 4.5 percent downstream slope.

The WP-1 reservoir would impound a permanent pool at an elevation of 1,178 feet based on a reservoir sustainability ratio of 2.5 percent (the percentage of lake surface area to drainage area). The permanent pool would have a surface area of approximately 21 acres and provide approximately 785 acre-feet of storage. The mean permanent pool depth would be approximately 6 feet, with depths up to 23 feet within the submerged channel alignment. The WP-1 reservoir would provide a total of 1,164 acre-feet of storage volume and a maximum flood pool area of 80 acres at the TOD elevation.

A sediment basin structure consisting of a berm and culvert is located upstream of the dam structure and downstream of Fort Street and was designed to extend the life of the downstream reservoir. The sediment basin will provide an area of shallow inundation for the purposes of improving water quality and decreasing sediment transfer to the main reservoir. The sediment basin would impound a permanent pool of approximately 2 acres in surface area at an elevation of 1,180 feet and would store approximately 3 acrefeet of sediment. The sediment basin would store approximately 28 acre-feet of water between the top of the sediment basin and permanent pool (elevations 1,180 feet and 1,184 feet, respectively).

At the proposed normal pool elevation, the WP-1 reservoir would provide the following:

- Reduction of the 100-year peak discharge (for 2040 land use conditions) from approximately 2,035 cfs to 245 cfs at the principal spillway outflow.
- Reduction in the 500-year peak discharge (for 2040 land use conditions) from approximately 2,866 cfs to 265 cfs at the principal spillway outflow.
- Sediment storage capacity of 94 acre-feet below the principal spillway riser, which exceeds NRCS sediment-storage design criteria (USDA 2008a) and is adopted by the Nebraska Department of Natural Resources (NDNR).
- Permanent storage capacity of approximately 785 acre-feet; Flood control effects and water quality benefits downstream through West Papillion Creek.
- Improved water quality by mitigating stormwater discharge effects through reducing sediment and pollutant loads in downstream receiving waters.

WP-1 is classified as a high hazard dam according to the NeDNR Classification of Dams (NeDNR, 2013) and design specifications described in NRCS Technical Release 210-60 (TR 210-60). 12-hour rainfall depths and distributions for the 10-year, 100-year, and 500-year events were developed by AWA (Applied Weather Associates) for the P-MRNRD and used in the design of the principal and auxiliary spillway. The AWA rainfall data does create higher peak discharges and runoff volumes when compared to the NOAA Atlas 14 values



and Type 2 distribution, which establishes a conservative design approach. The 6-hour Nebraska Statewide Probable Maximum Precipitation (PMP) was used to determine the freeboard hydrograph.

Storm recurrence intervals provide a basis for design calculations. Recurrence intervals quantify the rainfall depth necessary to reach the maximum carrying capacity of a facility or the rainfall depth required when flooding begins in a location. Storm classification is then based upon a scale of 100. For example, a rainfall depth that has a 100 percent chance of occurring every year is a 1-year storm event and a rainfall depth with a 50 percent chance of occurring in a given year is a 2-year storm. This is a consistent relationship for the 20 percent (5-year), 10 percent (10-year), 4 percent (25-year), 2 percent (50-year), 1 percent (100-year), 0.5 percent (200-year), up to the 0.2 percent (500-year). Some design examples would be that surface features such as trails may be become inundated or city streets may be designed to only convey more frequent storms such as a 10-year while flood protection structures are regularly required to meet 100-year or 500-year protection levels.

When designing a flood control dam there are several hydrographs that are developed to help guide design decisions. The principal spillway hydrograph (PSH) is a tool used to help determine the size of the principal spillway. All precipitation events equal to or less than the PSH will flow through the principal spillway without any flow through the auxiliary spillway. The stability design hydrograph (SDH) is used to build hydraulic models to analyze the erodibility of earthen auxiliary spillways, such as the one used at site WP-1. In the case of a dam such as WP-1 there are rainfall values related to dam safety which are the probable maximum precipitation (PMP) storm events that are used to develop the freeboard hydrograph (FBH), which is used for calculating the top of dam elevation and necessary for public safety.

The USACE HEC-HMS program was used to perform reservoir routing. The NRCS Water Resources Site Analysis (SITES) program was used to provide a check for the reservoir routing as well as perform auxiliary spillway stability calculations. Times of concentration and lag times for the site were computed in accordance with the methodology presented in the National Engineering Handbook Part 630 - Hydrology, Chapter 15 - Time of Concentration within the National Engineering Handbook. Curve numbers (CNs) were determined from land use and hydrologic soil group according to the procedure set forth in TR-55. Existing land use was identified using the 2011 National Land Cover data. Proposed land use was estimated based upon the City of Omaha future land used map dated August 26, 2015.

D2.7 Dam Breach Analysis

A dam breach analysis was performed for dam hazard class protection according to the procedures outlined in the NRCS Technical Release 66 (TR-66) and TR 210-60. The breach hydrograph was developed by first computing a breach peak outflow using TR-60 equations with dam embankment and reservoir storage information as inputs. The hydrograph was then created by using the TR-66 attenuation-kinematic (Att-Kin) curvilinear routing equations. The hydrographs were run through a HEC-RAS 1-D, unsteady hydraulic model with the Little Papillion Creek serving as the downstream boundary condition. The breach analysis was performed to a level of detail to sufficiently confirm the hazard classification and restrict development downstream. WP-1 was assigned a high hazard classification based on the criteria contained in the Classification of Dams by the NDNR. The breach inundation map, included in Appendix C, shows sunny day dam breach flows.



D2.8 S-5 Stream Restoration Alternative

Site S-5 project extents include Beadle Creek from the Lillian Street crossing downstream to the confluence of South Branch Papillion Creek. Beadle Creek represents a nearly fully degraded channel throughout these extents, with the creek depth exceeding 20 feet. The area for channel work is limited on both banks by developed properties and valuable infrastructure including residential lots, an interceptor sanitary sewer, and power transmission lines, which leave a maximum allowable channel width of approximately 120 feet at the narrowest point. A culvert crossing at South 180th Street is providing protection from an additional 8- to 10-feet of impending headcut which must continue to provide protection until a permanent solution can be installed. The culvert at South 180th Street is a controlling structure consisting of a 10-foot diameter corrugated metal pipe (CMP) which causes substantial backwater during high flow events. Improving the conveyance capacity of this structure will improve flooding concerns upstream. Sarpy County plans to realign South 180th Street to cross South Branch Papillion Creek and the existing railroad and install a bridge downstream of the existing culvert. Design is underway for both the roadway realignment and bridge.

The design process for S-5 was an iterative approach that balanced the available land rights, infrastructure proximity, flooding impacts, stream stability, public safety, and stream habitat and quality. Photograph D2-1 shows existing conditions along Beadle Creek and Figure D2-6 shows the existing infrastructure and property lines.



Photograph D2-1. Existing Conditions at S-5





Figure D2-6. Site S-5 Existing Infrastructure and Project Limits

Removing the South 180th Street culvert and replacing it with an armored drop structure was considered the only feasible option due to its proximity to the confluence of South Papillion Creek, the existing headcut at the downstream end, and very high unit discharge of over 100 cubic feet per second per linear foot (cfs/lf). This armored drop structure would protect the upstream channel from the approximately 10 foot headcut at the existing culvert and allow for significant energy dissipation within a controlled footprint. While several NRCS structure types are available, the high unit discharge drove the design alternative toward a reinforced-concrete stepped spillway. USBR PAP-0951 and HL-2015-06 were utilized as a basis for an approximate stepped spillway design (shown in Figure D2-7 below) and the exact design will be optimized during final design. As flow characteristics tend toward a smooth spillway as step sizes decrease (thereby minimizing energy dissipation), each step should consist of a 2- or 3-foot drop with a 4- or 6-foot-wide



step (1:2) to ensure adequate interception of the nappe for the vast majority of event discharges with transition to skimming flow occurring during more significant events. The exact transition and energy dissipation will be calculated during final design when step width to height ratio is decided. For this planning effort, this ratio is assumed to be 1:2. Flow is anticipated to be between 6 and 8 feet deep during a 500-year event with a 40-foot-wide base width over the stepped spillway. The sidewalls within the reinforced concrete section will consist of reinforced concrete to a height of 8 to 10 feet to contain the 500-year event and earthen side slopes will be graded at a 3:1 to natural ground above this concrete wall. The steps, while high at 3 feet, are the upper limit of what is considered safe should the public gain access to the site while also maximizing energy dissipation.





A reinforced concrete stilling basin with a 4- to-6-foot tall, slotted end sill is planned at the base of the steps. This is to encourage a hydraulic jump to occur under specific flow conditions, particularly during skimming flow events where unit discharges exceed 50 cfs/lf. The slotted end sill will fill with water during significant events but will not hold water under baseflow conditions. Downstream of the sill is a transition zone to allow flow expansion (via channel width increase) to occur over Class C riprap. This expansion is a potentially turbulent zone necessary to decrease velocities to sub-erosive conditions under most flow events prior to entering South Papillion Creek. Figure D2-8 shows a plan view of the preliminary drop structure and runout. Substantial damage has already occurred downstream of the existing CMP culvert that will be corrected as part of this project. This structure appears to be an ideal hydraulic choice as it minimizes all hydraulic and floodplain impacts upstream and provides the best chance to maximize channel restoration potential within Beadle Creek by elevating channel grade.





Figure D2-8. Site S-5 Preliminary Drop Structure Plan View

Preliminary design of the channel upstream of the drop structure began with analyzing the interim Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS) regulatory model (HEC-RAS V 5.0.7), which is in the process of mapping with FEMA. The HEC-RAS model was ran using the 100-year and 500-year future conditions discharges to provide a flood profile baseline for impact comparison of the design conditions. No design that showed an increase in risk from flood elevations during either the 100- or 500-year events was pursued due to the close proximity of residences.

There are several constraints along the length of Beadle Creek, including power transmission lines and an interceptor sanitary sewer that has been relocated twice previously due to degradation of the Beadle Creek. Combining these infrastructure constraints with the minimal land rights available leads to a constrained footprint for grade stabilization efforts and limits the channel width to less than 120 feet. An optimized cross section was found through iterations within HEC-RAS of cross-sectional shape, area, and slope to maximize flood conveyance while minimizing the potential for erosive conditions. Unfortunately, to provide a no-rise condition for the 500-year event and maintain 500-year flow within the channel, the channel slope is higher than the ideal slope of 0.0008 ft/ft for these soil types (Loess silt, non-cohesive, plasticity index less than15) and is therefore erosive during high flow events. The channel geometry consists of a low flow channel with an 8-foot base width, 3:1 side slopes, and depth of 4 feet (see Figure D2-9) that carries the 5-year discharge. The channel contains two benches approximately 12-feet wide on either side with a 2 percent cross slope allowing another 6 feet of flow depth. The general cross-section utilizes 3:1 side slopes which are inherently stable using area soils and therefore provide significantly increased safety for the public. This yields a top width of approximately 92-feet, which can fully contain the 500-year future discharge.

Average channel velocity of low flow events (5-year) should be less than 4 ft/s. The maximum capacity of the channel (500-year) will have an average velocity of less than 7 ft/s, but velocities may reach 10-12 ft/s at the channel base. An armored solution in the low-flow channel is required due to this high velocity



potential. A permanent turf reinforcement mat (TRM) is an ideal product with low cost and the added benefit of anchoring vegetation while withstanding velocities in excess of 10 ft/s. Although flow conditions during a flood event will have velocity exceeding 10 ft/s, the improved side slopes, decreased channel depth, and significantly increased channel stability will provide a significant increase in human safety.



Figure D2-9. Site S-5 Channel Geometry

It is anticipated that additional degradation will occur upstream from this location prior to construction. This may expand the region for restoration or alter the design of the box culverts. A project is currently under construction at Lillian Street to install a double box culvert which will stop further headcuts from progressing upstream; however, no restoration is being completed as part of this project. The elevation of the Lillian Street crossing is approximately 8 feet too low to allow for a stable channel cross section to be constructed within the 120 foot allowable right of way. There is not a safe way to utilize this culvert and therefore the Lillian Street crossing will need to be reconstructed as part of this project and has been included in the cost estimate. The culverts will be increased from a double to a triple box culvert to allow for the same capacity at a lower hydraulic head, but will provide a smoother flow transition downstream to minimize local scour potential.

D3.0 HIGH HAZARD DAM ALTERNATIVES

A high hazard potential wet dam was considered at Sites W-5, D-78, D-2, and S-15, but was not carried forward for detailed analysis. A rainfall/runoff model using National Oceanic and Atmospheric Administration (NOAA) Atlas 14 precipitation values was used with the storm frequencies for the Principal Spillway Hydrographs (PSH), Auxiliary Spillway Hydrographs (SDH), and Freeboard Hydrographs (FBH) set



in accordance with the high-hazard specifications described in TR-210-60. The 90th percentile, 4th quartile Atlas 14 temporal distribution was used due to its conservative routings with Atlas 14 precipitation data.

A 2.5 percent sustainability factor, which corresponds to a 40:1 drainage area to lake surface area ratio, was used to set the permanent pool elevation. This is a commonly accepted method in the area to ensure storage capacity for the 50-year lifespan and to prevent conditions conducive to frequent algal growth as the structure ages. The NRCS Water Resources Site Analysis Program (SITES) program was used to set structure elevations. To run the Atlas 14 distribution, a HEC-HMS model was developed to provide the inflow hydrograph to input into the SITES program for each run. Times of concentration and lag times for each drainage area were computed in accordance with the methodology in the NRCS TR-55 Urban Hydrology for Small Watersheds (TR-55) document. Curve numbers (CNs) were determined from land use and hydrologic soil group according to the procedure set forth in TR-55. A Muskingum-Cunge reach routing was used using a trapezoidal cross section input to model existing streams when applicable. Land uses were determined based on aerial imagery and future conditions were accounted for by assuming that the future build-out would result in 30 percent impervious area. The 1-day/10-day storm distribution was modeled in SITES using precipitation data from NOAA's Technical Paper No. 40 and Technical Paper No. 49. Elevations for the auxiliary spillway crest and top of dam were rounded up to the nearest half-foot for slightly conservative elevations and local knowledge and past experience from similarly-sized structures and drainage areas were used to calculate approximate costs in order to determine magnitude for cost comparisons.

Figures that show the locations and extents of each high hazard dam alternative that was analyzed are included below. Due to property constraints caused by existing and platted development there is no plausible location at Site S-5 and therefore it is not included in a figure.



Figure D3-1. Site W-5 Wet Dam Alternative











Figure D3-3. Site D-2 Wet Dam Alternative





Figure 3-4. Site S-15 Wet Dam Alternative





D4.0 PR&G GUIDING PRINCIPLES

A checkmark (\checkmark) is included in Table 4-6 for the alternative that best supports the guiding principle. Information is included below to support that decision.

D4.1 Healthy and Resilient Ecosystems

According to PR&G, Federal investments in water resources should protect and restore the functions of ecosystems and mitigate any unavoidable damage to these natural systems and a resilient ecosystem has the capacity to respond to changes. These changes can include processes like the natural evolution of stream functions, climate change, and anthropogenic changes brought on by situations like increased development. Healthy ecosystems enhance both the natural environment and contribute to the economic vitality of the Nation (PR&G, 2013). The following was considered to determine which alternative best supports this principle.

- Does the alternative protect, restore, or improve ecosystem functions?
- Does the alternative improve ecosystem resiliency?
- Does the alternative create a negative impact on the ecosystem?
 - Is the impact temporary? What is the recovery time?
 - Are damages avoided as much as possible?
 - Are damages minimized as much as possible?
 - Are any unavoidable damages mitigated for?

When considering these questions, Alternative 2 best supports this principle due to the protection and stabilization of actively incising streams, enhancement of the natural environment in the form of open water and lacustrine systems, and functional improvements to poorly functioning streams. Alternative 2 also improves ecosystem resiliency, specifically from changes due to impending development, and will both protect the natural environment and improve the economic vitality of the area.

D4.2 Sustainable Economic Development

As stated in PR&G:

Federal investments in water resources should encourage sustainable economic development. Alternative solutions for resolving water resources problems should improve the economic well-being of the Nation for present and future generations through the sustainable use and management of water resources ensuring both water supply and water quality. Sustainable in this context means the creation and maintenance of conditions under which humans and nature can coexist in the present and into future. Federal investments in sustainable economic development activities contribute to the Nation's resiliency.

When considering this guiding principle, it is important to look at environmental, social, and economic factors individually and as a symbiotic system. For example, we must analyze how a proposed solution impacts the existing and potential economic conditions (employment, income, etc.) of an individual or business outright, how that solution impacts the environment on items like pollutant load and habitat



changes, and also how each economic and environmental impact can influence each other. The same can be said for social interests like public safety, unemployment, and poverty rates. If one factor is thriving and the others are waning, the solution would not meet the guiding principle. Alternative 4 offers less environmental, social, and economic opportunities than the other alternatives (besides FWOFA) because there would be no permanent pool for recreation, habitat improvements and stream function, and added safety. Alternative 3 has less of a negative impact than Alternative 4 but does not have the added benefit of increased land values, improved habitat and water quality, and improved safety that come with Alternative 2. Therefore, Alternative 2 best meets this principle when considering these factors.

D4.3 Floodplains

Federal investments should avoid the unwise use of floodplains and flood-prone areas and minimize adverse impacts and vulnerabilities in any case in which a floodplain or flood-prone area must be used (PR&G). This principle should be looked at from the lens of regulations like EO 11988 and 7CFR650.25 and also how this may cause an unintended displacement of flood risk. Alternative 1 does not improve flood risk. Flood risk reduction for Alternatives 2, 3, and 4 are all the same downstream of the structures. Alternative 4 adds a safety risk for rapid inundation of the dry basin in an urbanizing area and therefore does not best support this principle. Alternatives 2 and 3 both best meet this principle.

D4.4 Public Safety

Public safety includes threats to people (both loss of life and injury) from natural events (PR&G). The only nonstructural alternative that was brought forward for detailed analysis was Alternative 1, which does nothing to avoid, reduce, or mitigate risks from flooding or from stream degradation. Alternatives 2, 3, and 4 reduce flood risk downstream of the structures and greatly improve safety at each site by providing grade and bank stabilization. Alternative 4 adds an inherent risk of rapid inundation at a dry dam location located in an are that is rapidly urbanizing and therefore does not best meet this principle. Measures must also be included in solutions that manage and communicate residual risks (PR&G). WP-1 and S-1 will have Emergency Action Plans in place for all Alternatives to address potential risks due to a sudden breach. Alternatives 2 and 3 both best meet this principle.

D4.5 Environmental Justice

None of the alternatives disproportionately adversely impact public safety, human health, or environmental burdens on minorities, Tribal communities, or low-income populations. Consultation with Tribes occurred throughout the planning process and documentation is included in Appendix A. Further documentation on NEPA compliance with respect to environmental justice is included in Sections 5.13 and 5.17.

D4.6 Watershed Approach

Taking a watershed approach to alternative identification, analysis, and decision making is more likely to identify the best solutions to achieve multiple goals over the entire watershed. Using a watershed approach broadens the lens from site-specific issues to more system-wide problems and interconnected solutions. This approach can lead to benefiting a wider range of stakeholders and can also lead to a wider breadth of potential environmental benefits. At a minimum, the indirect and cumulative impacts of certain solutions can be evaluated more thoroughly by taking into account a wider range of various environmental, social,



and economic problems and solutions. The following was considered to determine which alternative best supports this principle.

- How does the alternative work together with other past and current watershed plans and studies?
 - Does the alternative have the potential to impede other watershed stakeholder goals?
 - Does the alternative help to reach other watershed stakeholder goals?
 - Can the alternative be used in conjunction with another watershed plan solutions to meet the same goals and objectives?
- Does the alternative effect communities or resources within and outside of the watershed?
- Does the alternative work to provide solutions to enduring (both in the past and looking into the future) environmental concerns?
- How does the alternative effect current and future habitats, stream functionality, and safety upstream and downstream of the proposed action?

There have been many studies within the Papillion Creek Watershed to evaluate potential solutions for flood risk reduction, stream stability, and improved water quality (see Section 3.4 in the Plan-EA). Alternative 2 best supports the watershed approach principle because of the interconnectedness with other watershed plans at Sites WP-1 and S-1 as well as the overall improved habitat and stream function that the alternative brings upstream and downstream of each site.



D5.0 ECONOMICS

D5.1 Costs

Costs were based on local knowledge and site-specific criteria, including quantities and ease of construction. Unit costs are included in Table D5-1 below. Replacement costs were included in the economic analysis for structures with a design life less than the project life (100 years) and are included in Table D5-3 below.

Table D5-1. Unit Costs

ltem	Unit	Loose Rock Structures (Sites W-5, D- 78, D-2, S-15)	Ramp Structures (Sites W-5, D-2, S-1, S-15)	Dredging of DS-19 (Site S-1)	Stream Restoration (Site S-5)	Sediment Basin (Site S-1)	High Hazard Dam ¹ (Sites W-5, D-78, D-2, S-1, S-15)	Stream Restoration Alternative ¹ (Sites W-5, D-78, D-2, S-1, S-15)
Mobilization	LS			35% of total cost	10% of total cost	10% of total cost	10% of total cost	
Clearing and Grubbing	LS				\$15,000	\$15,000	\$127,700	
Handling of Water	LS	50% of	50% of		\$15,000	\$15,000	\$28,400	50% of Construction
SWPPP	LS	Construction	Construction		\$10,000	\$10,000	\$29,800	Cost
Seeding	AC				\$950	\$950	\$950	
Contingency	LS			20% of total cost	20% of total cost	20% of total cost	20% of total cost	
Earthen Fill	CY		\$12		\$12	\$6.00	\$6.00	
Earthen Excavation	CY	\$16	\$16		\$12	\$4.00	\$4.00	\$16
Rock Riprap - Class "C"	TN	\$90	\$90		\$90	\$90	\$90	\$90
Rock Riprap - Class "B"	TN	\$90	\$90					
Sheet Pile	SF	\$60	\$60		\$60			
Flexamat	SY		\$70					
Turf Reinforcement Matting (Pyramat or Approved Equivalent)	SY				\$12			
Formed Concrete	CY				\$1,200		\$1,000	
RCCP Pipe - 24" Dia.	LF					\$370		
Crushed Aggregate	CY				\$50	\$30	\$40	



Item	Unit	Loose Rock Structures (Sites W-5, D- 78, D-2, S-15)	Ramp Structures (Sites W-5, D-2, S-1, S-15)	Dredging of DS-19 (Site S-1)	Stream Restoration (Site S-5)	Sediment Basin (Site S-1)	High Hazard Dam ¹ (Sites W-5, D-78, D-2, S-1, S-15)	Stream Restoration Alternative ¹ (Sites W-5, D-78, D-2, S-1, S-15)
Articulated Concrete Blocks	SF					\$32		
Geoweb	SF		\$3			\$3		
RCCP Pipe - 48" Dia.	LF						\$640	
PVC Pipe - 6" Dia.	LF					\$10	\$10	
Metal fabrication (Dam Riser)	LS						\$15,400	
Knife/Slide gates (Dam Riser)	EA						\$16,000	
Instrumentation	LS						\$36,000	
Trash Rack	LS					\$5,000	\$5,000	
Dredging	CY			\$15				
Approach Grading	LS				\$70,000			
Lillian Street Culvert	LS				\$400,000			
Land Acquisition	AC	\$60,000	\$60,000	\$60,000	\$60,000	\$60,000	\$60,000	
Access Easements	AC	\$30,000	\$30,000		\$30,000			
Easement for Structure Footprint	AC	\$45,000	\$45,000					
Project Administration	LS	7% of Construction Cost						
Construction Observation	LS	10% of Construction Cost						
Design	LS	15% of Construction Cost						
Permitting	LS	5% of Cons	truction Cost	3% o	f Construction (Cost	5% of Co	onstruction Cost
Mitigation	LS	5% of Cons	truction Cost	2% of Construction Cost	\$35,000	5% of Construction Cost		

¹Not brought forward for detailed analysis

A detailed construction cost estimate is included for Site WP-1 in Table D5-2 below.



Tuble D5 E. WI TRegional Detention E				nate
Item	Quantity	Unit	Unit Cost	Total Cost
Mobilization	1	LS	\$165,000	\$165,000
Construction staking	1	LS	\$10,000	\$10,000
Construction entrance	1	LS	\$3,500	\$3,500
Tree removal for habitat use	2	AC	\$5,000	\$10,000
General clearing and grubbing	1	LS	\$20,000	\$20,000
Strip and salvage top soil	1	LS	\$50,000	\$50,000
Earthwork cut and spoil	15,900	CY	\$8	\$127,200
Earthwork measured as embankment	202,200	CY	\$5	\$1,011,000
NDOT 47B fine aggregate	530	TON	\$70	\$37,100
1.5" crushed aggregate	577	TON	\$70	\$40,400
NDOT type-B riprap	12,865	TON	\$70	\$900,600
NDOT type-A riprap	55	TON	\$70	\$3,900
Toe drain	765	LF	\$13	\$9,900
48" reinforced concrete cylinder pipe	168	LF	\$725	\$121,800
24" reinforced concrete draw down pipe	30	LF	\$50	\$1,500
Concrete baffle riser	1	EA	\$300,000	\$300,000
Concrete impact basin	1	EA	\$270,000	\$270,000
Boat Ramp	1	EA	\$25,000	\$25,000
Picnic shelter	1	EA	\$30,000	\$30,000
Trail (concrete)	7,890	SY	\$70	\$552,300
Fishery improvements	1	LS	\$750,000	\$750,000
Water quality drawdown structure	1	EA	\$35,000	\$35,000
Restroom	1	EA	\$50,000	\$50,000
Seeding and mulching	94	AC	\$3,000	\$282,000
Sediment control (SWPPP)	1	LS	\$12,000	\$12,000
Powerline relocate	1	LS	\$750,000	\$750,000
Fencing	16692	LF	\$7	\$116,800
Site paving	4120	SY	\$115	\$473,800
Lighting	1	LS	\$10,000	\$10,000
Subtotal				\$6,168,800
Contingency (25%)				\$1,542,200
Total Construction				\$7,711,000

Table D5-2. WP-1 Regional Detention Basin (Wet Dam), Construction Cost Estimate

Opinion of Costs provided by Olsson



Table D5-3. Replacement Costs

Site	Replacement Cost		
S-5	\$	3,725,200	
W-5	\$	2,561,200	
S-15	\$	1,115,700	
D-2	\$	1,648,500	
D-78	\$	1,049,200	

D5.2 Benefits

The economic benefits in the approved 1966 Watershed Plan were attributable to the prevented land damage and depreciation of agricultural and urban lands as well as the reduction to infrastructure damages, sediment damages, and other secondary benefits created by the 52 proposed grade control structures. This Supplemental Plan-EA includes grade control structures and introduces the additional purpose of flood damage reduction. Indexing of previous grade control benefits was not applicable in this Supplement due to the changes in land use, practices, and infrastructure since the 1960s and therefore these were calculated using current information at the identified sites. The sections below detail project benefits.

D5.2.1 Previous Flood Damage Reduction Methodology

In the past, USDA-NRCS assessed flood damage reduction benefits with a process that involved multiple USDA-NRCS developed computer programs. Hydrology was first prepared for the watershed using Technical Release-20 (TR-20) which developed discharges at appropriate nodes from which the maximum discharge of runoff was computed for a range of flows, usually 2-, 5-, 10-, 25-, 50- and 100-year event discharges were generated. Discharges were generated for both pre- and post-project conditions to evaluate the change in discharges within the watershed, as determined by the project alternatives being assessed.

Once hydrology was complete, TR-20 output was used as input for the Water Surface Profile 2 (WSP2) hydraulic program which used user-defined channel cross sections (made up of stage-discharge values defined by the user) to translate discharges into water surface elevations at cross sections developed through the downstream (of project) stream network. The location and spacing of the cross sections were determined by identifying representative channel reaches that had similar hydraulic characteristics. WSP2 calculated the changes in the maximum water surface elevations at the cross sections and therefore determined the pre- and post-project conditions for each reach.

Once the hydraulic assessment was complete, the changes in water surface elevations were transposed onto land uses to calculate the change in pre- and post-project water depths for crops, structures, and other land uses. By assigning a land use to the hydraulic cross section, an economic model was developed to determine total changes in water surface elevations for a determined land use or specific structure such as a home, business type, and others. This translation of the hydraulic information into economic information comes from the defining of damage reaches within the ECON agricultural and URB1 economic computer programs. Damage reaches are defined by grouping similar land uses along lengths of stream, similar to how WSP2 defined similar hydraulic conditions along lengths of streams, but the two do not necessarily (or



often) overlap. The ECON and URB1 programs then assess the pre- and post-project changes in water depths and compute damages to crops, pastures, structures, bridges, and others using a depth-damage curve. The information is then annualized using the return frequency of the different storms to create an average annual flood damage reduction benefit. This information is then used in the overall economic assessment, or benefit-cost analysis (BCA). The BCA is calculated for an alternative by comparing the annual benefits attributable to the flood damage reduction benefits to the costs.

D5.2.2 Current Flood Damage Reduction Methodology

Current modeling techniques and new technology allow for an updated process that mimics the original NRCS processes discussed above. Hydrology for the watershed was computed using a HEC-HMS. Unlike TR-20, a variety of hydrologic methods can be used within the software (TR-20 defaults to the SCS Method) to prepare a better calibrated hydrologic model. Changes in hydrology pre-project and post-project were calculated for comparison purposes.

Hydraulic modeling was completed using the HEC-RAS software package. Like WSP2, HEC-RAS creates water surface profiles based on user-defined cross section locations and cross sections are cut using LiDAR or other user-defined input data. Unlike WSP2, the profiles are continuous, and it is not necessary to develop hydraulic reaches of similar section types because HEC-RAS looks at every stream foot as a unique section.

Detailed hydrologic and hydraulic models were developed to determine flood reduction benefits for WP-1 due to the complexity of the floodplain and number of structures impacted. The working regulatory model recently completed by FYRA Engineering as part of the Papillion Creek FEMA Remapping Project (FYRA 2018) provided the baseline hydraulic model of the watershed and only required minor modifications to include the proposed WP-1 flood reduction structure.

Baseline hydrologic simulations could not adequately calculate flood reduction benefits due to the utilized hypothetical storm approach with various storm sizes. As the drainage area to the point of interest increases, the storm size also increases. This requires multiple modeling runs that all utilize a single rainfall depth over the entire watershed. This configuration requires that the temporal distribution of the hypothetical storm is the same throughout the basin, so every watershed receives the same rainfall at the same time. While this method works well for a risk-centered floodplain study, it does not accurately reflect the flood reduction benefits of site-specific projects because the rainfall timing is not realistic, nor is the rainfall distribution.

Utilizing accepted FEMA methodology, the hydrologic model was modified to use a recent storm event in lieu of a hypothetical event. From August 6 to 7 of 1999, a storm event hit the Papillion Creek watershed and western lowa, producing significant rainfall over a large portion of the watershed. This storm was subsequently studied by NOAA (Zapotocny 2002) and further analyzed as part of this study. NEXRAD data was available through National Weather Service and was post-processed using HEC-MetVue. The 1999 raw storm data was analyzed and modified for use in the regulatory HEC-RAS model utilizing a National Weather Service Toolkit, HEC-MetVue, and an accepted meteorological approach to produce flood events of the required magnitude (50-yr, 100-yr, etc.) along the Papillion Creek. To assess the reduction in flooding depths and extents, the resulting discharges were used within the regulatory HEC-RAS model of Papillion



Creek. One-meter digital elevation models from 2019 LIDAR were used for topography and floodplain mapping within HEC-RAS.

D5.2.2.1 Urban

For the urban project economics, the process used is also similar to previous methods. To determine which structures would be inundated, geoprocessing was performed in the ArcMap computer program. Structure extent shapefiles and county parcels were used to establish structure locations and assign corresponding data to structures. Inundation extents were used to determine structure inundation depths. After the initial geoprocessing in ArcMap, damage calculations were performed. The structures are assigned values, both content and structure based on the Douglas and Sarpy County assessor websites and structure types such as one-story residential, two-story residential, and various non-residential types.

Depth-damage curves for structures and contents were taken from USACE HEC-FIA's computer software and *Economic Guidance Memorandum (EGM) 04-01, Generic Depth-Damage Relationships for Residential Structures with Basements* and therefore use types were selected to align with these. Structure and content damages are determined using the depth-damage curves and inundation depths and these are summed for all structures for each storm event. Damage results are then annualized for pre- and post-project conditions. Annualized results are compared to compute flood damage reduction benefits, shown below in Table D5-3.

Damage Type	Damage Type Without Project (\$)		Reduction (\$)
Urban	\$460,290	\$362,636	\$97,654

Table D5-3. Urban Damages and Benefits

D5.2.2.2 Road and Bridge

For the road and bridge project economics, a similar approach to the urban damages analysis was performed. Geoprocessing was performed on shapefiles, terrain, and water surface elevations and then damage calculations were performed. Previously calculated NRCS depth-damage curves for roads and bridges were used to assess damages based on bridge type and replacement values. Each bridge was assigned a bridge type that corresponds to a type aligning with these known depth-damage curves and depths were determined from the difference in bridge deck elevation and water surface elevation. Based on the bridge type and inundation depth, a structure damage can be identified for each storm event at each crossing. The damage results are then annualized for pre- and post-project conditions and the results are compared to compute the flood damage reduction benefit. Annualized road and bridge damages and benefits are shown below in Table D5-4.

Table D5-4. Road and Bridge Damages and Benefits

Damage Type	Without Project (\$)	With Project (\$)	Reduction (\$)
Road and Bridge	\$33,208	\$30,848	\$2,360



D5.2.3 Recreation Benefits

The preferred alternative at Site WP-1 is a flood risk reduction dam with a permanent pool. Recreation is not a stated purpose of the project, but non-Federal funds will add recreation components to the site which will provide incidental benefits to individuals benefitting from activities at the reservoir that are outside of the project intent of flood risk reduction (indirect beneficiaries). Recreation benefits at reservoirs in the Papillion Creek Watershed have been recently analyzed through various studies. There have been multiple accepted methodologies for calculating recreation benefits in Nebraska (and the Papillion Creek Watershed specifically). Two of these include following the Nebraska Resource Development Fund Guidelines and utilizing USACE guidelines for evaluating the effects of project recreation as outlined in the Planning Guidance Notebook, Appendix E (ER 1105-2-100) and Economic Guidance Memorandum, Unit Day Values for Recreation (EG 22-03). USACE guidance was chosen due to the availability of more recent and applicable data, recent Federal use and acceptance in the watershed, and applicability to the scale and type of project at Site WP-1. The USACE Unit Day Value (UDV) method involves assigning points (scored values) for the study area based on five criteria for either 'general' or 'specialized' recreation. Recreation at WP-1 fits into the general recreation category, meaning it is attractive to the majority of outdoor users and does not require a high degree of specialized skill or knowledge. The points for each criterion are then summed and that value is converted to a dollars per visit value (which is the UDV) based on dollar amounts published in the EG 22-03 (2022 values). The UDV is used in conjunction with an estimate of the number of annual visits to determine the annual recreation value. Visitation is estimated based on reservoirs in the region with similar resource and use characteristics, pool size, and previous studies within the watershed. Table D5-5 below shows how the points were determined for Site WP-1. With an estimated annual visitation of 21,668 and a UDV value of \$9.23 (see table), the annual recreation value is estimated at \$200,016.

Criteria	Maximum Points Possible	WP-1 Points	Judgement Factor/Point Rationale		
Recreation Experience	30	6	Several general good quality activities (picnicking, bicycling, walking/running/hiking, fishing, canoeing/kayaking)		
Availability of Opportunity	18	Sites within 30 minutes. High recreation demand as shown in SCORP, rapidly growing counties surround site			
Carrying Capacity	14	8	Adequate facilities, deterioration of resource/experience not expected		
Accessibility	18	15	Good access, major roads (Maple St, 180th St, Fort St) to site. Good access (both roads and ADA) within site.		
Environmental 20 15 High aestheti		High aesthetic quality (water and vegetation)			
Total Points:	100	47	Unit Day Value: \$ 9.23		

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		g.e			



D5.2.4 Infrastructure

As discussed throughout the Supplemental Plan-EA, stream degradation in the watershed has led to and will continue to cause damage to major infrastructure including state highways, county roads, residential roads, sanitary sewers, and power transmission lines. Residential properties and homes near Sites S-5 and W-5 will also be susceptible to encroachment and damage. Repairs to infrastructure and costly attempts to protect residential properties are common within the watershed.

Benefits attributable to future cost avoidances were included with the benefits in the cash flow stream in the economic analysis. These benefits are related to work that will not have to be completed in the future that would have likely been caused by continued degradation of the streams and the impacts on local infrastructure related to continued stream degradation. The year the benefits were applied is a function of assessing the current stability status of the stream segments and a professional judgement on when continued degradation is likely to reach the particular infrastructure component analyzed. Because degradation is primarily event-based and large, unpredictable runoff events can cause more damage than "average annual" impacts on the stream, aerial imagery and other recorded information and personal accounts were used to predict how much time might pass before stream degradation would impact individual infrastructure components. Cost avoidance benefits assume that some level of damage occurs before any preventative maintenance can occur, but repairs would be implemented before replacement would be necessary. For instance, it is assumed that entire highway cross sections would not be destroyed, but rather only a portion of the embankment and the associated utilities would require repair. Costs to buy out residential homes within the projected stream widening footprint were also considered as one-time benefits.

Combined utility protection is expected to be \$42,000 annually for the 50-year lifespan of the grade control structures at S-5 and S-15 based on feedback from communities on existing utility repairs throughout the watershed and the location of utilities along stream corridors. All other benefits are included as one-time cost savings of transmission lines, embankments, and residential homes.

D5.2.5 Ecosystem Service Benefits

The FEMA Benefit-Cost Analysis (BCA) program was used to determine ecosystem service benefits for each project site. FEMA developed the economic value of different land use types by analyzing ecosystem service categories and subcategories along with academic literature of defensible values for each category, which were then reviewed by professional economists for validity. Ecosystem service benefits accrue when land use is either changed or enhanced. Land use types applicable to this project are green open space, riparian areas, and wetlands. Economic valuations for each land use type are shown in Table D5-6 below. Proposed designs, proposed land use, and mitigation plans at each site were used to determine the areas to be included in the ecosystem service calculations. Professional judgement and experience were used to ensure only conservative land totals were included in the analysis. Table D5-6 below includes the land use totals used within the analysis at each site.

Table D5-6. Ecosystem Service Benefits

C'ha	Propos	Annual Danafit			
Site	Green Open Space ¹	Riparian ²	Wetlands ³	Annual Benefit	
WP-1	16.5		1.5	\$146,100	
S-1	6.7		9.6	\$113,360	
S-5		3.0		\$118,640	

¹Economic valuation = \$8,308/acre/year (FEMA BCA)

²Economic valuation = \$39,545/acre/year (FEMA BCA)

³Economic valuation = \$6,010/acre/year (FEMA BCA)

D5.2.6 Land Preservation

Stream degradation and widening not only cause damage to infrastructure and stream ecology. They also cause the loss of vital riparian and agricultural land. Using aerial imagery and a stable slope analysis, the potential riparian land lost, what would be saved by proposed improvement projects in this Supplemental Plan-EA, and timing of potential loss were assessed and valuated. Land preservation benefits were included in the analysis as a one-time benefit at years 5, 6, 15, 20, and 25 based on existing and projected future conditions and expected development timelines. Table D5-7 below shows the assumed acres preserved and associated project year used for the one-time benefit.

Site	Acres Preserved	Project Year for Benefit Analysis
S-1	2.8	5
S-5	10.0	5
W-5	20.0	25
D-78	35.7	20
D-2	12.9	15
S-15	20.8	6

Table D5-7. Land Preservation

Where agricultural production currently exists, losses in crop production related to riparian land lost to degradation and widening were quantified and valuated as a benefit. The value of the crops assumed average annual yield and income per acre for unirrigated fields based on years 2016-2018 and a yearly rotation of corn and soybeans (\$537.55/acre). The rate at which acres are lost from production is based on a linear loss of land throughout the design life of the structures. For example, structures at Site W-5 are expected to save 14-acres of agricultural land over the 50-year project life. At year 50, the 14-acres would produce approximately \$7,530 annually (2019 dollars). Therefore, year 1 after project implementation would see 1/50 of the 14-acres saved yielding a benefit of \$150, year 2 would see a benefit of \$300, and so on for the life of the project. Table D5-8 below shows the amount of farm acres expected to be saved over the life of the project.


Table D5-8. Farmland Preservation

Site	Farm Acres Preserved
WP-1	0
S-1	3
S-5	0
W-5	14
D-78	36
D-2	13
S-15	14

D5.2.7 Project Life

The project life is 100 years and the period of analysis is 105 years, which includes the time for project implementation. All grade stabilization structures were designed to accommodate up to 100-year flow depths and velocities and a design life of 50-years was assumed for all project sites and components except Site WP-1. Replacements costs after 50 years are included in the economic analysis. Maintenance after high flow events will likely be necessary and this was considered in the determination of yearly operations and maintenance costs. Design life of Site WP-1 is 100-years due to the high hazard potential dam facility and use of materials that are consistent with a 100-year design life.

D5.2.8 Annual Equivalents

All benefits and costs were discounted from the year they were planned to incur to the beginning of the period of analysis by converting them to present value equivalents. When the present values were determined, they were amortized over the 105-year period of analysis to establish average annual equivalents. Average annual equivalent costs are \$852,400, including \$117,800 in annual equivalent O&M expenditures. The average annual equivalent benefits are \$921,700, resulting in a benefit to cost ratio of 1.08 for the project. Agriculture-related benefits, including rural benefits as defined by the NWPM, account for 90 percent of the total project benefits. Economic tables, as outlined in the NWPM, are included in Chapter 7.0.

Site WP-1 is the only site that is considered a "water resources project" as defined by Section 506.50 of the NWPM. Average annual equivalent costs for Site WP-1 are \$382,700 and average annual equivalent benefits are \$421,200, yielding a benefit to cost ratio of 1.10. Agriculture related annual benefits (including those to rural communities with populations less than 50,000) are \$326,700, which equates to 78 percent of the total benefits for Site WP-1 and therefore this complies with NWPM 506.0, Section 2. A complete economic analysis was completed for the watershed protection sites as well and benefits and benefit to cost ratios for these are included in Chapter 7.0.

D6.0 AFFECTED ENVIRONMENT

D6.1 Sheet and Rill Erosion

Sheet and Rill erosion was calculated based on land capability class and land use using the Environmental Protection Agency's (EPA) Spreadsheet Tool for Estimating Pollutant Loads (STEPL). Land capability classes were determined from the web soil survey data for Washington, Douglas, and Sarpy Counties. The 2011 United States Geological Survey (USGS) National Land Cover Dataset, and CALMIT and UNL irrigation data was used to find the watershed land use values. Land use values and land capability classes were combined using ESRI ArcGIS 10.7 and clipped to the watershed boundary. Each land capability class was assigned a subwatershed in STEPL to find erosion rates. The sheet and rill erosion rates were developed using STEPL and the Universal Soil Loss Equation (USLE). The land uses, land capability classes, and sheet and rill erosion rates are shown in Table D6-1.

Assumptions and other notes for the USLE calculations are included below.

- 1. A and R values based on Douglas County.
- 2. K factors were calculated by weighing soil type K factors in each land capability class category using factors from EC88-116.
- 3. LS factors based on slopes of soils in each land capability class and a length of 100 feet.
- 4. Default C factors for Douglas County used.
- 5. Default P values for Douglas County used.

Land Canability		Crop	land				Water	
Land (Class	Non- Irrigated	Irrigated	Pastureland	Forest	Urban	Other	Total
	AC	1,542	132	272	13	302	1	2,262
1	Ton/Year	2,4	07	91	0	30	2	2,530
	Tons/AC	1.4	14	0.34	0.02	0.10	1.85	1.12
	AC	38,452	127	5,208	1,265	7,430	53	52,535
2e	Ton/Year	118,	858	3,750	68	727	173	123,575
	Tons/AC	3.0)8	0.72	0.05	0.10	3.25	2.35
	AC	14,282	373	2,071	1,183	4,083	13	22,006
2w	Ton/Year	24,0	080	795	34	319	23	25,252
	Tons/AC	1.6	54	0.38	0.03	0.08	1.74	1.15
	AC	29,326	184	4,404	591	12,129	58	46,692
3e	Ton/Year	240,	022	8,371	84	1,186	499	250,162
	Tons/AC	8.1	13	1.90	0.14	0.10	8.59	5.36
	AC	24,388	218	4,857	499	3,349	46	33,358
4e	Ton/Year	375,	252	17,312	134	262	742	393,702
	Tons/AC	15.	25	3.56	0.27	0.08	16.00	11.80
E.v.	AC	334	0	22	67	0	0	424
SW	Ton/Year	55	50	8	2	0	0	560

Table D6-1. Sheet and Rill Erosion within Papillion Creek Watershed



Land	nd Capability Cropland				Motor			
	lass	Non- Irrigated	Irrigated	Pastureland	Forest	Urban	Other	Total
	Tons/AC	1.6	54	0.39	0.03	0.00	0.00	1.32
	AC	673	0	342	100	445	1	1,560
6e	Ton/Year	26,0)84	3,092	68	35	25	29,303
	Tons/AC	38.	78	9.05	0.68	0.08	39.67	18.79
	AC	851	87	1,529	176	82,880	1,259	86,782
**	Ton/Year	9,2	51	3,519	30	6,474	13,113	32,388
	Tons/AC	9.8	36	2.30	0.17	0.08	10.41	0.37
τοται	AC	109,848	1,121	18,705	3,896	110,617	1,432	245,619
IUTAL	Ton/Year	796,	504	36,940	421	9,032	14,576	857,473

Notes:

**Other land capability class categories and miscellaneous areas

e Erosion and runoff

w Excess water

Sheet and Rill erosion was calculated for each subwatershed by clipping the combined land use values and land capability class shapefile to get unique acreages. The erosion rates calculated in the table above were then used to calculate the tonnage of rill and sheet erosion per subwatershed, shown in Table D6-2.

Subwatershed	Drainage Area (sq. mile)	Total Rill/Sheet Erosion		
D2	0.7	3,735		
D78	1.8	8,070		
WP-1	1.3	5,443		
S5	2.4	1,768		
S15	1.5	3,472		
S1	2.7	9,020		
W5	0.9	4,523		
Structure Totals	11.3	36,031		
Entire Watershed	383.8	857,473		

Table D6-2. Sheet and Rill Erosion by Subwatershed

D6.2 Streambank and Gully Erosion

Visual observations of LiDAR and aerial imagery using ESRI ArcGIS were the primary basis of streambank and gully erosion estimates. Current aerial photos and LiDAR topographic data/maps were used to trace current streambank limits in ArcGIS. Historical streambank limits were derived in the same manner with historical aerial imagery from 1993. The change in area determined from this evaluation was used with observed stream shape and average stream depths to calculate an estimated streambank erosion volume. This volume was converted to weight using a typical clay soil unit weight. Factoring this volume of soil loss over the time between the historical and current aerials generated an annual streambank erosion rate.

Gullies were accounted for by assuming an annual depth of erosion in visually observable ephemeral gullies. This accounts for small gullies that are in tilled fields which could be filled in each year through tillage



operations then reformed as ephemeral gullies during storm events annually. Gullies were observed in historically imagery and then compared to current aerial imagery. The change in length of the gullies from the historic to current imagery was calculated along with an estimated gully geometry to develop a yearly erosion rate for ephemeral gullies. The gully lengths were adjusted to exclude historic gullies that were located in currently developed areas.

The streambank and gully erosion rates are shown below in Table D6-3.

Structuroc	Drainage Area	Annual Erosion Totals (Ton/Y				
Structures	(sq. mile)	Streambank	Gully*			
D2	0.7	41	2			
D78	1.8	145	6			
S1	1.3	126	45			
S5	2.4	386	8			
S15	1.5	218	50			
WP-1	2.7	73	9			
W5	0.9	121	3			
Structure Totals	11.3	1,109	123			
Entire Watershed	383.8	37,589	1,879			

Table D6-3. Stream and Gully Erosion by Subwatershed

*Only scaled to agricultural acres of watershed.

D6.3 Sediment Delivery

Erosion quantities were combined with appropriate delivery ratios and knowledge of local materials, terrains, and conditions to generate sediment yields. Sheet and rill erosion have a low sediment delivery efficiency because overland runoff leaves much material behind as depositions on fields, at field boundaries, in road ditches, and other obstacles. An estimated 25 percent of sheet and rill erosion produced annually moves through the stream system. Ephemeral gully erosion is somewhat more efficient at sediment delivery, due to the close proximity to flow channels with an estimated 65 percent delivery rate. Streambank erosion is much more efficiently delivered, due to the greater carrying capacity of channelized flow with an estimated 90 percent delivery rate.

The streambank and gully sedimentation rates are shown below in Table D6-4.

Ctrustures	Drainage Area	Annual			
Structures	(sq. mile)	Streambank	Gully*	Sheet/Rill	Total
D2	0.7	37	1	934	972
D78	1.8	131	4		2,153
S1	1.3	113	29		1,503
S5	2.4	347	5	442	794
S15	1.5	196	33	868	1097
WP-1	2.7	66	6	2,255	2,327
W5	0.9	109	2	1,131	1,242
Structure Totals	11.3	998	80	9,008	10,086
Entire Watershed	383.8	33,830	1,221	214,368	249,419

Table D6-4. Streambank and Gully Sedimentation Estimates

*Only scaled to agricultural acres of watershed.

D6.4 Historic and Cultural Resources

Section 106 of the National Historic Preservation Act of 1966 (NHPA) requires federal agencies to consider the effects of undertakings (projects the agency assists, funds, permits, licenses, approves, or carries out) on historic properties. Historic properties are cultural resources (archeological sites, buildings, bridges, business districts, culturally significant landscapes, isolated artifacts or features, culturally sacred places, objects of cultural and historic significance, etc.) that are listed on or eligible for listing on the National Register of Historic Places. In order for a cultural resource to be eligible for the National Register of Historic Places (NRHP), it must be associated with events significant to the broad patterns of history; associated with the lives of persons significant in the past; embody distinctive characteristics of a type, period, or method of construction, represent the work of a master, possess high artistic value, or represent a significant and distinguishable entity; and/or must yield or be likely to yield, information important to history or prehistory. If an undertaking will alter, damage, or destroy a historic property, the agency has a responsibility to avoid, minimize, or mitigate the adverse effect. As part of the Section 106 process, a federal agency must identify any cultural resources with the area of potential effect (APE) for the undertaking and evaluate those resources for the NRHP. The APE is the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist.

As part of the planning efforts for the Papillion Creek Supplemental Watershed Plan-EA, Buried Past Consulting, LLC., conducted a literature review of the study area to identify known historic properties and other cultural resources that may be affected by the proposed watershed improvements. The archival research included accessing archaeological site and cultural resource survey records maintained by History Nebraska, examining historic maps, and researching local history. The literature search identified a total of 37 archaeological sites within two miles of the structures proposed in the Plan-EA. Most of the recorded sites consist of Euro-American farmsteads and related features and artifact scatters.

The APE for direct and indirect effects for the seven proposed grade stabilization structures, dam, and sediment basins includes a total of 340 acres. The APE includes all areas that may be affected by construction, including staging areas, borrow areas, potential access routes, and structure footprints for all



proposed sites as well as the recreation facilities, inundation pools, and stream mitigation sites proposed for Site WP-1.

Buried Past Consulting, LLC., conducted a field investigation of the APE in October and November 2019. The field investigation included pedestrian inventory and shovel testing in areas of low visibility. The investigation identified one cultural resource. Site 25SY417 is a segment of an abandoned railroad line known as the Chalco-Yutan Cut-off. In addition to the railroad bed, the investigators observed reinforced concrete fence posts along the south side of the rail grade as well as two reinforced concrete box culverts within the APE.

The Chalco-Yutan Cut-off originally extended west from Omaha to a branch line running north from Ashland to Sioux City, Iowa. The Cut-off was built between 1914 and 1917 and operated from 1921 to 1927. Although the rail line appears to retain good physical integrity, the line was never economically important to the local area and operated for only a short period of time. None of the features observed exhibit any extraordinary designs or unique construction techniques. Buried Past Consulting evaluated site 25SY417 against the criteria of eligibility for the National Register of Historic Places and recommended the site as not eligible. NRCS concurred with this recommendation.

Based on the results of the cultural resource investigations, NRCS determined a finding of No Historic Properties Affected for the measures proposed in the Papillion Creek Supplemental Watershed Plan-EA No. 9 per 36 CFR 800.4(d)(1). NRCS submitted copies of the cultural resource inventory report to the Nebraska State Historic Preservation Office and other consulting parties for review and comment. The Nebraska State Historic Preservation Office concurred that no historic properties would be affected in a letter received September 18, 2020 (Appendix A). The Pawnee Nation of Oklahoma concurred with the determination of no historic properties affected in a letter received October 14, 2020 (Appendix A). The Otoe-Missouria Tribe of Indians concurred with the no historic properties affected determination in a letter received November 23, 2020 (Appendix A).

It is possible that construction activities could result in disturbance to unknown cultural resources through accidental discovery depending on the extent of the resources and their proximity to ground disturbance. If cultural resources are discovered during construction, a stop work order will be issued, and NRCS will proceed in accordance with the regulation on post review discoveries (36 CFR § 800.13).



D7.0 REPRESENTATIVE PHOTOGRAPHS

Representative photographs for each site reach are included below.

Photograph D7-1. Site W-5





Photograph D7-2. Site D-78



Photograph D7-3. Site D-2





Photograph D7-4. Site S-15



Photograph D7-5. Site S-5







Photograph D7-6. Site S-1



Photograph D7-7. Site WP-1



Source: Olsson Associates. Wetland Delineation Report. February 2018.



APPENDIX E – OTHER SUPPORTING INFORMATION

From:	Vanek, Wayne (CTR) - NRCS, Lincoln, NE
То:	Janel Kaufman
Subject:	Supplemental Papillion Creek Watershed Plan-EA - AD1006
Date:	Thursday, February 27, 2020 8:45:32 AM
Attachments:	image001.jpg FormAD1006 D2 APE wv.pdf FormAD1006 D78wv.pdf
	FormAD1006 S1wv.pdf FormAD1006 S5wv.pdf FormAD1006 S15wv.pdf FormAD1006 W5wv.pdf FormAD1006 WP1wv.pdf

?

Subject: FPPA response for: Supplemental Papillion Creek Watershed Plan-EA - AD1006

Date: 2/27/2020

ATTENTION: Janel Kaufman, P.E.

12702 Westport Parkway, Suite 300 | Omaha, NE 68138 Phone: 402.502.7131 | Direct: 402.614.3317 | Cell: 302.747.6190

I have reviewed the project information regarding the **Supplemental Papillion Creek Watershed Plan-EA - AD1006** for which you requested review of impacts to prime and important farmlands as per the Farmland Protection Policy Act (FPPA). This review only covers FPPA concerns and does not include any other environmental concerns such as wetlands or endangered species. For general conservation concerns or questions relating to wetlands under the jurisdiction of the Food Security Act, contact your county Natural Resources Conservation Service office. The AD-1006 forms which you submitted to our office shows that your Part VI section assessment point totals are: Papillion Creek Watershed Plan/WP-1 equate to 42 Papillion Creek Watershed Plan /D78 equates to 61 Papillion Creek Watershed Plan /Site Si equates to 52 Papillion Creek Watershed Plan /Site D2 equates to 18 Papillion Creek Watershed Plan/Site S15 equates to 21

Papillion Creek Watershed Plan/Site W5 equates to 36

The AD-1006 Farmland Conversion Impact Rating form is based on a point system that has 160 points set as the minimum number of "Total Points" that triggers additional in-depth site reviews. The NRCS evaluation portion Part V is on a scale of 0 to 100 points. In the case with this project, the "**Total Points**" in **Part VII** equate to: Papillion Creek Watershed Plan/WP-1 equate to 134

Papillion Creek Watershed Plan /D78 equates to 153 Papillion Creek Watershed Plan /Site S1 equates to 144 Papillion Creek Watershed Plan /Site D2 equates to 156 Papillion Creek Watershed Plan /Site S5 equates to 110 Papillion Creek Watershed Plan/Site S15 equates to 115 Papillion Creek Watershed Plan/Site W5 equates to 128 **Since none of the point totals equate to 160 total points in Part VII, NRCS has determined that your project was found to be cleared of FPPA significant concerns.** We encourage you to continue to be aware of prime and important farmlands in general and the role they play in current and future projects. I am returning the **AD-1006 form** to you for your records.

Wayne Vanek USDA-NRCS Fed. Bldg. Rm. 152 100 Centennial Mall North Lincoln, NE. 68508-3866 402.437.4125 wayne.vanek@ne.usda.gov

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FA	U.S. Departme	nt of Agri SION	culture	ATING			
PART I (To be completed by Federal Agency)	Date O	f Land Evaluatior	Request 02	/25/2020)	
Name of Project Papillion Creek Wate	ershed Plan/Site D2	Federa	Agency Involved	NRCS		-	
Proposed Land Use Grade Stabilization	on Structures	County	and State Doug	las County	Nebraska	1	
PART II (To be completed by NRCS)		Date R	equest Received	By)	Person Co Wayne	ompleting For	m:
Does the site contain Prime, Unique, Statewid	de or Local Important Farmland	1?	YES NO	Acres I	rrigated	Average	Farm Size
(If no, the FPPA does not apply - do not comp	olete additional parts of this for	<i>n)</i>		13,804	ac.	217	
Major Crop(s) Corn/Soybeans	Farmable Land In Govt. Acres: %	Jurisdictio	on	Amount of F Acres:	armland As %	Defined in FP	PA C.
Name of Land Evaluation System Used	Name of State or Local S	Site Asses	ssment System	Date Land E 02/27/2	Evaluation Re	eturned by NF	(CS
PART III (To be completed by Federal Agend	y)			0.11	Alternative	Site Rating	
A. Total Acres To Be Converted Directly					Site B	Site C	Site D
B. Total Acres To Be Converted Indirectly				14.7			
C. Total Acres In Site							
PART IV (To be completed by NRCS) Land	Evaluation Information			14.7			
A. Total Acres Prime And Unique Farmland				1/1 7			
B. Total Acres Statewide Important or Local I	mportant Farmland			14.7			
C. Percentage Of Farmland in County Or Loc	al Govt. Unit To Be Converted						
D. Percentage Of Farmland in Govt. Jurisdict	on With Same Or Higher Relat	ive Value					
PART V (To be completed by NRCS) Land E	Evaluation Criterion			90			
PART VI (To be completed by Federal Agend (Criteria are explained in 7 CFR 658.5 b. For C	cy) Site Assessment Criteria prridor project use form NRCS-	.s) CPA-106	Maximum Points	Site A	Site B	Site C	Site D
1. Area In Non-urban Use			(15)	15			
2. Perimeter In Non-urban Use			(10)	10			
3. Percent Of Site Being Farmed			(20)	11			
4. Protection Provided By State and Local G	overnment		(20)	0			
5. Distance From Urban Built-up Area			(15)	15			
6. Distance To Urban Support Services			(15)	5			
7. Size Of Present Farm Unit Compared To	Average		(10)	0			
8. Creation Of Non-farmable Farmland			(10)	0			
9. Availability Of Farm Support Services			(5)	5			
10. On-Farm Investments			(20)	5			
11. Effects Of Conversion On Farm Support S	Services		(10)	0			
12. Compatibility With Existing Agricultural Us	se		(10)	0			
TOTAL SITE ASSESSMENT POINTS			160	66	0	0	0
PART VII (To be completed by Federal Ag	ency)						
Relative Value Of Farmland (From Part V)			100	90	0	0	0
Total Site Assessment (From Part VI above of	r local site assessment)		160	66	0	0	0
TOTAL POINTS (Total of above 2 lines)			260	156	0	0	0
Site Selected: Site A	Date Of Selection			Was A Loca YE	I Site Assess	NO NO	
Reason For Selection:				1			

FA	U.S. Departme	nt of Agr SION	iculture	RATING			
PART I (To be completed by Federal Agenc	y)	Date C	Date Of Land Evaluation Request 02/25/2020				
Name of Project Papillion Creek Wa	tershed Plan/D78	Federa	Agency Involv				
Proposed Land Use Grade Stabilizat	ion Structures	County	and State Do	uglas County	, Nebraska	1	
PART II (To be completed by NRCS)		Date R NRCS	equest Receive	ed By 20	Person Co Wayne	ompleting For Vanek	m:
Does the site contain Prime, Unique, Statew	de or Local Important Farmlanc	1?	YES NO	Acres I	rrigated	Average	Farm Size
(If no, the FPPA does not apply - do not com	plete additional parts of this for	n)		13,804		217	
Major Crop(s) Corn/Soybeans	Farmable Land In Govt.	Jurisdicti	on	Amount of F	armland As	Defined in FP	PPA C
Name of Land Evaluation System Used	Name of State or Local S	Site Asse	ssment System	Date Land E 02/27/2	Evaluation Re	eturned by NF	RCS
PART III (To be completed by Federal Agen	cy)			011	Alternative	Site Rating	01 5
A. Total Acres To Be Converted Directly				Site A	Site B	Site C	Site D
B. Total Acres To Be Converted Indirectly				35.0			
C. Total Acres In Site				25.0			
PART IV (To be completed by NRCS) Land	Evaluation Information			35.0			
A. Total Acres Prime And Unique Farmland				00.0			
B. Total Acres Statewide Important or Local	mportant Farmland						
C. Percentage Of Farmland in County Or Log	cal Govt. Unit To Be Converted						
D. Percentage Of Farmland in Govt. Jurisdic	tion With Same Or Higher Relat	ive Value	;				
PART V (To be completed by NRCS) Land	Evaluation Criterion			92			
PART VI (To be completed by Federal Agen (Criteria are explained in 7 CER 658.5 b) For C	nverted (Scale of 0 to 100 Point cy) Site Assessment Criteria	S)	Maximur	I Site A	Site B	Site C	Site D
1. Area In Non-urban Use		01 A-100	(15)	15			
2. Perimeter In Non-urban Use			(10)	10			
3. Percent Of Site Being Farmed			(20)	12			
4. Protection Provided By State and Local G	overnment		(20)	0			
5. Distance From Urban Built-up Area			(15)	4			
6. Distance To Urban Support Services			(15)	10			
7. Size Of Present Farm Unit Compared To	Average		(10)	0			
8. Creation Of Non-farmable Farmland			(10)	0			
9. Availability Of Farm Support Services			(5)	5			
10. On-Farm Investments			(20)	5			
11. Effects Of Conversion On Farm Support	Services		(10)	0			
12. Compatibility With Existing Agricultural U	se		(10)	0			
TOTAL SITE ASSESSMENT POINTS			160	61	0	0	0
PART VII (To be completed by Federal Ag	gency)						
Relative Value Of Farmland (From Part V)			100	92	0	0	0
Total Site Assessment (From Part VI above of	or local site assessment)		160	61	0	0	0
TOTAL POINTS (Total of above 2 lines)			260	153	0	0	0
Site Selected: Site A	Date Of Selection			Was A Loca YE	al Site Assess	NO NO	
Reason For Selection:				1			

FÆ	U.S. Departme	nt of Agr SION	iculture	ATING				
PART I (To be completed by Federal Agence	y)	Date C	Date Of Land Evaluation Request 02/25/2020					
Name of Project Papillion Creek Wa	tershed Plan/Site S1	Federa	Agency Involved	NRCS		_		
Proposed Land Use Water Quality Ba	asin	County	and State Sarp	y County, N	lebraska			
PART II (To be completed by NRCS)		Date R NRCS	equest Received	By D	Person C Wavne	ompleting For e Vanek	m:	
Does the site contain Prime, Unique, Statew (If no, the FPPA does not apply - do not com	ide or Local Important Farmland	n)	YES NO	Acres I	rrigated	Average 139 ac	Farm Size	
Major Crop(s) Corn/Soybeans	Farmable Land In Govt.	Jurisdicti	on	Amount of I Acres:	Farmland As %	Defined in FP	'PA	
Name of Land Evaluation System Used	Name of State or Local S	Site Asse	ssment System	Date Land I 02/27/2	Evaluation Ro	eturned by NF	RCS	
PART III (To be completed by Federal Agen	cy)			Sito A	Alternative	e Site Rating	Sito D	
A. Total Acres To Be Converted Directly				14 G	Sile D	Sile C	Sile D	
B. Total Acres To Be Converted Indirectly				0.0				
C. Total Acres In Site				24.5			+	
PART IV (To be completed by NRCS) Land	Evaluation Information			24.0				
A. Total Acres Prime And Unique Farmland				24.5				
B. Total Acres Statewide Important or Local	Important Farmland			21.0				
C. Percentage Of Farmland in County Or Lo	cal Govt. Unit To Be Converted						1	
D. Percentage Of Farmland in Govt. Jurisdic	tion With Same Or Higher Relat	ive Value	9					
PART V (To be completed by NRCS) Land	Evaluation Criterion			92				
Relative Value of Farmland To Be Co PART VI (To be completed by Federal Ager (Criteria are explained in 7 CER 658 5 b. For (nverted (Scale of 0 to 100 Point hcy) Site Assessment Criteria	S)	Maximum	Site A	Site B	Site C	Site D	
1. Area In Non-urban Use			(15)	14				
2. Perimeter In Non-urban Use			(10)	10			1	
3. Percent Of Site Being Farmed			(20)	8				
4. Protection Provided By State and Local G	Government		(20)	0				
5. Distance From Urban Built-up Area			(15)	5				
6. Distance To Urban Support Services			(15)	5				
7. Size Of Present Farm Unit Compared To	Average		(10)	0				
8. Creation Of Non-farmable Farmland	<u> </u>		(10)	0				
9. Availability Of Farm Support Services			(5)	5				
10. On-Farm Investments			(20)	5				
11. Effects Of Conversion On Farm Support	Services		(10)	0				
12. Compatibility With Existing Agricultural U	se		(10)	0				
TOTAL SITE ASSESSMENT POINTS			160	52	0	0	0	
PART VII (To be completed by Federal Ag	gency)							
Relative Value Of Farmland (From Part V)			100	92	0	0	0	
Total Site Assessment (From Part VI above	or local site assessment)		160	52	0	0	0	
TOTAL POINTS (Total of above 2 lines)			260	144	0	0	0	
Site Selected: Site A	Date Of Selection			Was A Loca YE	al Site Asses	sment Used?		
Reason For Selection:				1				

FA	U.S. Departme	nt of Agr SION	riculture	ATING				
PART I (To be completed by Federal Agency	()	Date 0	Of Land Evaluation Request 02/25/2020					
Name of Project Papillion Creek Wat	tershed Plan/Site S5	Feder	leral Agency Involved NRCS					
Proposed Land Use Stream Restorati	on	Count	y and State Sarp	y County, N	ebraska			
PART II (To be completed by NRCS)		Date F	Request Received	By D	Person Co Wayne	ompleting For Vanek	m:	
Does the site contain Prime, Unique, Statewi (If no, the FPPA does not apply - do not com	de or Local Important Farmlanc olete additional parts of this for	l? n)	YES NO	Acres I	Acres Irrigated Average Farm Size			
Major Crop(s) Corn/Soybeans	Farmable Land In Govt. Acres: %	Jurisdict	ion	Amount of F Acres:	armland As	Defined in FP	PA	
Name of Land Evaluation System Used	Name of State or Local S	Site Asse	essment System	Date Land E 2/27/202	Evaluation Re	turned by NR	RCS	
PART III (To be completed by Federal Agend	cy)			014- 4	Alternative	Site Rating	0.4. D	
A. Total Acres To Be Converted Directly				Site A	Site B	Site C	Site D	
B. Total Acres To Be Converted Indirectly				12.0			1	
C. Total Acres In Site				12.6				
PART IV (To be completed by NRCS) Land	Evaluation Information			12.0				
A. Total Acres Prime And Unique Farmland				12.6				
B. Total Acres Statewide Important or Local I	mportant Farmland			12.0				
C. Percentage Of Farmland in County Or Loc	al Govt. Unit To Be Converted						1	
D. Percentage Of Farmland in Govt. Jurisdict	ion With Same Or Higher Relat	ive Valu	e				1	
PART V (To be completed by NRCS) Land I	Evaluation Criterion			92				
Relative Value of Farmland To Be Con PART VI (To be completed by Federal Agen	overted (Scale of 0 to 100 Point cy) Site Assessment Criteria	S)	Maximum	Site A	Site B	Site C	Site D	
(Criteria are explained in 7 CFR 658.5 b. For C	orridor project use form NRCS-	-CPA-10	6) Points					
1. Area In Non-urban Use			(19)	3				
2. Perimeter In Non-urban Use			(10)	5				
3. Percent Of Site Being Farmed			(20)	5				
4. Protection Provided By State and Local G	overnment		(20)	0				
5. Distance From Urban Built-up Area			(15)	0				
6. Distance To Urban Support Services			(13)	0				
7. Size Of Present Farm Unit Compared To	Average		(10)	0				
8. Creation Of Non-farmable Farmland			(10)	0				
9. Availability Of Farm Support Services			(3)	5				
10. On-Farm Investments			(20)	0				
11. Effects Of Conversion On Farm Support	Services		(10)	0				
12. Compatibility With Existing Agricultural U	se		(10)	0				
TOTAL SITE ASSESSMENT POINTS			160	18	0	0	0	
PART VII (To be completed by Federal Ag	ency)							
Relative Value Of Farmland (From Part V)			100	92	0	0	0	
Total Site Assessment (From Part VI above of	or local site assessment)		160	18	0	0	0	
TOTAL POINTS (Total of above 2 lines)			260	110	0	0	0	
Site Selected: Site A	Date Of Selection			YE				
Reason For Selection:								

FÆ	U.S. Departme	nt of Ag SION	ricultu	^{re} PACT RA	TING			
PART I (To be completed by Federal Agence	y)	Date	Of Lan) f Land Evaluation Request 02/25/2020				
Name of Project Papillion Creek Wa	tershed Plan/S15	Feder	deral Agency Involved NRCS					
Proposed Land Use Grade Stabilizati	on Structures	Count	ty and	State Sarpy	/ County, N	ebraska		
PART II (To be completed by NRCS)		Date I	Reque	st Received	By)	Person Co Wavne	ompleting For	m:
Does the site contain Prime, Unique, Statew (If no, the FPPA does not apply - do not com	ide or Local Important Farmlanc	n)	YES	5 NO	Acres Irrigated Average Farm Size 139 ac.			Farm Size
Major Crop(s) Corn/Soybeans	Farmable Land In Govt. Acres: %	Jurisdict	tion		Amount of F Acres:	armland As %	Defined in FP	PA
Name of Land Evaluation System Used	Name of State or Local S	Site Asso	essme	nt System	Date Land E 2/27/20	Evaluation Re	eturned by NF	RCS
PART III (To be completed by Federal Agen	cy)				011	Alternative	Site Rating	01 0
A. Total Acres To Be Converted Directly					Site A	Site B	Site C	Site D
B. Total Acres To Be Converted Indirectly					19.9			
C. Total Acres In Site					10.0			
PART IV (To be completed by NRCS) Land	Evaluation Information				19.9			
A. Total Acres Prime And Unique Farmland					10.0			
B. Total Acres Statewide Important or Local	Important Farmland				19.9			
C. Percentage Of Farmland in County Or Lo	cal Govt. Unit To Be Converted							
D. Percentage Of Farmland in Govt. Jurisdic	tion With Same Or Higher Relat	ive Valu	le					
PART V (To be completed by NRCS) Land	Evaluation Criterion				0.4			
Relative Value of Farmland To Be Co	nverted (Scale of 0 to 100 Point	s)			94			
PART VI (To be completed by Federal Agen (Criteria are explained in 7 CFR 658.5 b. For C	cy) Site Assessment Criteria Corridor project use form NRCS-	CPA-10	06)	Maximum Points	Site A	Site B	Site C	Site D
1. Area In Non-urban Use				(15)	6			
2. Perimeter In Non-urban Use				(10)	10			
3. Percent Of Site Being Farmed				(20)	0			
4. Protection Provided By State and Local G	Bovernment			(20)	0			
5. Distance From Urban Built-up Area				(15)	0			
6. Distance To Urban Support Services				(15)	0			
7. Size Of Present Farm Unit Compared To	Average			(10)	0			
8. Creation Of Non-farmable Farmland				(10)	0			
9. Availability Of Farm Support Services				(5)	5			
10. On-Farm Investments				(20)	0			
11. Effects Of Conversion On Farm Support	Services			(10)	0			
12. Compatibility With Existing Agricultural U	se			(10)	0			
TOTAL SITE ASSESSMENT POINTS				160	21	0	0	0
PART VII (To be completed by Federal Ag	gency)							
Relative Value Of Farmland (From Part V)				100	94	0	0	0
Total Site Assessment (From Part VI above	or local site assessment)			160	21	0	0	0
TOTAL POINTS (Total of above 2 lines)				260	115	0	0	0
Site Selected: Site A	Date Of Selection				Was A Loca YE	s	NO NO	
Reason For Selection:					1			

FA	U.S. Departme	nt of Agric	ulture MPACT RA	ATING						
PART I (To be completed by Federal Agency)		Date Of Land Evaluation Request 02/21/2020								
Name of Project Papillion Creek Wat	ershed Plan/Site W5	Federal Agency Involved NRCS								
Proposed Land Use Grade Stabilization Structures			County and State Washington County. Nebraska							
PART II (To be completed by NRCS)		Date Request Received By			Person Completing Form: Wayne Vanek					
Does the site contain Prime, Unique, Statewide or Local Important Farmland?			Y <u>ES NO</u>	Acres I	rrigated	Average Farm Size				
(If no, the FPPA does not apply - do not complete additional parts of this form)				18,479 ac. 950 ac						
Major Crop(s)	Farmable Land In Govt.	Farmable Land In Govt. Jurisdiction			Amount of Farmland As Defined in FPPA					
Name of Land Evaluation System Used	Name of State or Local S	Name of State or Local Site Assessment System				Date Land Evaluation Returned by NRCS 02/27/2020				
PART III (To be completed by Federal Agency)					Alternative	e Site Rating	Site D			
A. Total Acres To Be Converted Directly				16 Q	Sile D	Sile C	Sile D			
B. Total Acres To Be Converted Indirectly				0						
C. Total Acres In Site				16.9						
PART IV (To be completed by NRCS) Land	Evaluation Information			10.5						
A. Total Acres Prime And Unique Farmland										
B. Total Acres Statewide Important or Local I										
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted										
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value										
PART V (To be completed by NRCS) Land B	Evaluation Criterion			02						
Relative Value of Farmland To Be Converted (Scale of 0 to 100 Points)			Maximum	92						
(Criteria are explained in 7 CFR 658.5 b. For Corridor project use form NRCS-CPA-100			Points	Site A	Site B	Site C	Site D			
1. Area In Non-urban Use			(15)	15						
2. Perimeter In Non-urban Use			(10)	6						
3. Percent Of Site Being Farmed			(20)	0						
4. Protection Provided By State and Local Government			(20)	0						
5. Distance From Urban Built-up Area			(15)	5						
6. Distance To Urban Support Services			(15)	5						
7. Size Of Present Farm Unit Compared To A	Average		(10)	0						
8. Creation Of Non-farmable Farmland			(10)	0						
9. Availability Of Farm Support Services			(5)	5						
10. On-Farm Investments			(20)	0						
11. Effects Of Conversion On Farm Support Services			(10)	0						
12. Compatibility With Existing Agricultural Use			(10)	0						
TOTAL SITE ASSESSMENT POINTS			160	36	0	0	0			
PART VII (To be completed by Federal Agency)										
Relative Value Of Farmland (From Part V)			100	92	0	0	0			
Total Site Assessment (From Part VI above or local site assessment)			160	36	0	0	0			
TOTAL POINTS (Total of above 2 lines)			260	128	0	0	0			
Site Selected: Site A	Date Of Selection			Was A Local Site Assessment Used? YES NO						
Reason For Selection:				1						

FA	U.S. Departme	ent of Agric	culture	ATING						
PART I (To be completed by Federal Agency)		Date Of Land Evaluation Request 02/25/2020								
Name of Project Papillion Creek Wa	tershed Plan/WP-1	Federal Agency Involved NRCS								
Proposed Land Use Wet Dam			County and State Douglas County, Nebraska							
PART II (To be completed by NRCS)			Date Request Received By NRCS 02/21/2020			Person Completing Form: Wavne Vanek				
Does the site contain Prime, Unique, Statewide or Local Important Farmland?			YES NO	Acres Ir	igated Average Farm S		Farm Size			
(If no, the FPPA does not apply - do not com	Siete additional parts of this form)			13,004						
Corn/Soybeans	Acres: %	Acres: %				Acres: % 86,123 ac.				
Name of Land Evaluation System Used	Name of State or Local S	Name of State or Local Site Assessment System				Date Land Evaluation Returned by NRCS 02/27/2020				
PART III (To be completed by Federal Agency)					Alternative	Site Rating				
A. Total Acres To Be Converted Directly				Site A	Site B	Site C	Site D			
B. Total Acres To Be Converted Indirectly				54.Z						
C. Total Acres In Site				07.9						
PART IV (To be completed by NRCS) Land Evaluation Information				07.1						
A. Total Acres Prime And Unique Farmland				87.1						
B. Total Acres Statewide Important or Local Important Farmland				07.1						
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted										
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value										
PART V (To be completed by NRCS) Land	Evaluation Criterion			92						
Relative Value of Farmland To Be Converted (Scale of 0 to 100 Points)			Maximum		Cite D	Cite C	Cite D			
(Criteria are explained in 7 CFR 658.5 b. For Corridor project use form NRCS-CPA-106) Points	Sile A	SILE B	Sile C	Sile D			
1. Area In Non-urban Use			(15)	10						
2. Perimeter In Non-urban Use			(10)	7						
3. Percent Of Site Being Farmed			(20)	20						
4. Protection Provided By State and Local Government			(20)	0						
5. Distance From Urban Built-up Area			(15)	0						
6. Distance To Urban Support Services			(15)	0						
7. Size Of Present Farm Unit Compared To Average			(10)	0						
8. Creation Of Non-farmable Farmland			(10)	0						
9. Availability Of Farm Support Services			(5)	5						
10. On-Farm Investments			(20)	0						
11. Effects Of Conversion On Farm Support Services			(10)	0						
12. Compatibility With Existing Agricultural Use			(10)	0						
TOTAL SITE ASSESSMENT POINTS			160	42	0	0	0			
PART VII (To be completed by Federal Ag	gency)									
Relative Value Of Farmland (From Part V)			100	92	0	0	0			
Total Site Assessment (From Part VI above or local site assessment)			160	42	0	0	0			
TOTAL POINTS (Total of above 2 lines)			260	134	0	0	0			
Site Selected: Site A	Date Of Selection	e Of Selection			VVas A Local Site Assessment Used? YES NO					
Reason For Selection:										