ENVIRONMENTAL ASSESSMENT

For Modifications to Federal Levee Systems R-616-613
(Missouri River Right Bank and Papillion Creek Left Bank) and
R-613 (Papillion Creek Right Bank, Missouri River Right Bank, and
Platte River Left Bank)

Sarpy County, Nebraska

U.S. Army Corps of Engineers
Northwest Division
Omaha District

Prepared for:
Papio-Missouri River Natural Resources District
8901 S. 154th St
Omaha, NE 68138
Contact: Marlin Petermann
402.444.6222

Prepared by:
Felsburg Holt and Ullevig
321 S. 9th Street
Lincoln, NE 68508
Contact: Amy Zlotsky
402.438.7530

FYRA Engineering
12702 Westport Parkway, Suite 300
Omaha, NE 68138
Contact: Lindy Rogers
402.934.8475

Revised December 2017

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDICES

LIST OF ACRONYMS AND ABBREVIATIONS

AAI	All Appropriate Inquiry
AFB	Air Force Base
ASTM	American Society for Testing and Materials
ATR	Agency Technical Review
BA	Biological Assessment
BGEPA	Bald and Golden Eagle Protection Act
BMP	Best Management Practice
BNSF	BNSF Railway
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CNP	Conditional Non-Exceedance Probability
CWA	Clean Water Act
DEA	Draft Environmental Assessment
EA	Environmental Assessment
EAD	Expected Annual Damages
EIS	Environmental Impact Statement
EM	Engineering Manual
ETL	Engineering Technical Letter
EO	Executive Order
ER	Engineering Regulation
FAA	Federal Aviation Administration
FE	Federally Endangered
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
FT	Federally Threatened
FHU	Felsburg Holt & Ullevig
FPPA	Farmland Protection Policy Act
HEC-FDA	Hydrologic Engineering Center - Flood Damage Reduction Analysis
HEC-SSP	Hydrologic Engineering Center Statistical Software Package
HTRW	Hazardous, Toxic, and Radioactive Waste
HMR	Hazardous Materials Report
HUC	hydrologic unit code
I-#	Interstate Number
IMS	Interactive Mapping System
IPaC	Information, Planning, and Conservation System
LUST	Leaking Underground Storage Tank
MBTA	Migratory Bird Treaty Act
mg/l	milligrams per liter
MOU	Memorandum of Understanding
MUD	Metro Utility District
N	Nitrogen
N-#	Nebraska Highway Number
NAAQS	National Ambient Air Quality Standards
NDEQ	Nebraska Department of Environmental Quality

NDOT	Nebraska Department of Transportation (Formerly Nebraska Department of Roads [NDOR])
NEPA	National Environmental Policy Act of 1969
NFA	No Further Action
NFIP	National Flood Insurance Program
NGPC	Nebraska Game and Parks Commission
NLEB	Northern long-eared bat
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NWD-NWO	Northwest Division, Omaha District
OHWM	ordinary high water mark
OPPD	Omaha Public Power District
OW	Open Water
P	Phosphorus
PAL	Provisionally Accredited Levee
PCB	polychlorinated biphenyl
PEA	Programmatic Environmental Assessment
PEMA	Palustrine Emergent Temporarily Flooded
PEMC	Palustrine Emergent Seasonally Flooded
PEMF	Palustrine Emergent Semi-Permanently Flooded
PFOA	Palustrine Forested Temporarily Flooded
PL	Public Law
PM	Particulate Matter
PMRNRD	Papio-Missouri River Natural Resources District
PRRIP	Platte River Recovery Implementation Program
PSSA	Palustrine Scrub Shrub Temporarily Flooded
RCRA	Resource Conservation and Recovery Act
REC	Recognized Environmental Condition
ROD	Record of Decision
RPA	Reasonable and Prudent Alternative
SARA	Superfund Amendments and Reauthorization Act
SE	State Endangered
SF	Superfund
SHPO	State Historic Preservation Office
SOP	Standard Operating Procedure
ST	State Threatened
SWPPP	Storm Water Pollution Prevention Plan
T&E	Threatened and Endangered
TL3	Title 3
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
UP	Union Pacific Railroad
US	United States
USACE	United States Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
EPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Service
VCP	Voluntary Cleanup Program
WOUS	Waters of the United States
WWTP	Wastewater Treatment Plant

1.0 INTRODUCTION

Papio-Missouri River Natural Resources District (PMRNRD) is proposing to implement Modifications to Federal Levee Systems R-616-613 and R-613 within Sarpy County, Nebraska (hereafter called the Project). PMRNRD is the local sponsor for maintenance and operation of these segments of the US Army Corps of Engineers (USACE) Federal Levee System. Currently, the R-616-613 and R-613 Federal Levee Systems do not meet levee design standards, as set by the Federal Emergency Management Agency (FEMA) accreditation criteria to maintain a Zone X (i.e., moderate flood hazard risk) designation on Flood Insurance Rate Maps (FIRMs) (44 Code Federal Regulations [CFR] 65.10, FEMA 2011b). PMRNRD is proposing improvements to the R-616-613 and R-613 Federal Levee Systems to bring the levee systems up to current design standards, necessary to meet FEMA accreditation criteria.

Federal Nexus. The federal nexus for the Project is the request for a Section 408 approval for levee modification (33 United States Code [USC] 408) from the USACE Headquarters (USACE 2014b). The USACE is required to ensure that modifications to the levees are in compliance with the National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality (CEQ) Regulations (40 CFR Parts 1500-1508) (CEQ 2005), USACE Engineering Regulation (ER) 200-2-2 (33 CFR Part 230) (USACE 1988), and related environmental regulatory requirements.

An additional federal nexus is the need for a Section 404 permit for impacts to wetlands and waters of the United States (WOUS).

NEPA Evaluation. This Environmental Assessment (EA) has been prepared to satisfy the requirements of NEPA by providing information on potential adverse and beneficial environmental impacts of the Project, and documenting public involvement and agency coordination. When an EA indicates that no significant impact is likely, then the USACE can release a Finding of No Significant Impact (FONSI) and carry on with the proposed action. When an EA indicates that significant impacts are likely, preparation of an Environmental Impact Statement (EIS) is required.

This EA is being completed in accordance with CEQ regulations in 40 CFR 1506.5(b), which allows an applicant to prepare an EA for federal action. The USACE, Northwest Division - Omaha District Office (NWD-NWO), will independently evaluate and verify the information and analysis undertaken in the EA and take full responsibility for the scope and content contained within.

Project Background. Levee systems provide a structural method for flood risk management to people, property, and infrastructure by containing, controlling, or diverting flood waters for flows up to a pre-determined stage. The R-616-613 and R-613 Federal Levee Systems are 10- to 13-foot high earthen levees, with 9- to 12-foot wide crests, and 60- to 100-foot toe to toe widths. The levees were constructed of locally available soils and are surfaced on top with either a gravel maintenance road or a concrete bike trail. They protect approximately 6,950 acres of land south of Bellevue, Nebraska, including the floodplain surrounding the Papillion Creek and Missouri River confluence, and floodplain north of the Platte River and Missouri River confluence. Construction of the levee systems was completed by the USACE in 1986.

Recent Flood Damage and Repairs. In 2012, emergency maintenance was completed to repair damage caused during the Missouri River Flood of 2011, a high flow event on the Missouri River. The maintenance allowed the levees to function as originally designed.

1.1 Project Location and General Description

Location. The Project location is south of the City of Bellevue in Sarpy County, Nebraska (Figure 1 and Figure 2). The Project is located on FEMA FIRMs 31153C0095G, 31153C0210G, 31153C0220G, and 31153C023G (FEMA 2005). The Project includes the following levee segments:

- R-616 Missouri River Right Bank (west side)
- R-613 Papillion Creek Left Bank (north and east side)
- R-613 Platte River Left Bank (north side)
- R-613 Missouri River Right Bank (west side)
- R-613 Papillion Creek Right Bank (south and west side)

The R-616-613 Federal Levee System begins at a closure section across the double tracks of the BNSF Railway (BNSF) under Nebraska Highway 370 (N-370) west of Payne Drive, which is the levee tieback location. A tieback levee extends from the main levee along the river to higher ground and is part of the line of protection. The tieback continues to follow N-370 until it meets the R-616 Missouri River Right Bank Segment at Payne Drive. The levee follows Payne Drive south and continues along the right bank of the Missouri River until the downstream tieback along Papillion Creek. The R-613 Papillion Creek Left Bank Segment runs along the left (north/northeast) bank of Papillion Creek until the upstream tieback at Capehart Road.

The R-613 Federal Levee System begins at a closure section at the BNSF crossing under the US Highway 75 (US-75) viaduct over La Platte Road, which is the start of the levee tieback location. The tieback levee continues south along US-75 to the R-613 Platte River Left Bank Segment. The levee continues east along the Platte River until intersecting with the R-613 Missouri River Right Bank (west) Segment on the north side of the Platte River and Missouri River confluence. The R-613 Missouri River Right Bank (west) Segment occurs along the Missouri River until intersecting with Papillion Creek. The R-613 Papillion Creek Right Bank Segment then runs north and west along the right (south/southwest) bank of Papillion Creek until the intersection of Whitted Creek near Station 494+00.

Description of Watersheds. The levees are located in the floodplain of the Missouri River near the confluence with Papillion Creek and the Platte River. The Missouri River extends 2,321 miles from Three Forks, Montana, where the Jefferson, Madison, and Gallatin rivers converge, to the Mississippi River just upstream from St. Louis, Missouri. This large river flows generally east and south, and is reported to drain approximately 530,000 square miles, including the entire state of Nebraska. The area of the Missouri River that parallels the R-616 and R-613 Missouri River Right Bank Segment (Keg-Weeping Water [hydrologic segment code (HUC) 8, 10240001] and Big Papillion-Mosquito [HUC 8, 10230006] watersheds) is channelized and chutes, backwater areas, and sandbars are minimal in this location. The width of this channel ranges between 500 and 700 feet with bank elevations ranging between 6.5 and 13 feet above the river elevation.

The Platte River extends approximately 310 miles from the North Platte River tributary to the Missouri River, south of Bellevue, Nebraska. This braided river flows generally east, and the watershed, including the North Platte River, is reported to drain approximately 90,000 square miles, including a large portion of Nebraska. The area of the Platte River that parallels the R-613 Platte River Left Bank Segment is part of the Lower Platte River watershed (HUC 8, 10200202), which starts at the confluence with the Loup River and continues until the Missouri River confluence. The Lower Platte River consists of a large, shallow, meandering river bottom with shifting sandbars and many areas with sandy beaches, backwaters, and sloughs. The width of this channel varies widely within the action area with 2014 Google Earth aerial images showing a range of 750 to 1,300 feet across, and bank elevations ranging between 1 and 6 feet above the river elevation.

Papillion Creek is part of the Big Papillion-Mosquito watershed (HUC 8, 10230006), which covers approximately 402 square miles of drainage area extending from northern Washington County southward through Douglas and Sarpy counties and ultimately discharges to the Missouri River south of Bellevue, Nebraska. This creek flows generally south and east. The area of Papillion Creek that parallels the R-613 Papillion Creek Left and Right Bank Segments is channelized with minimal sandbar formation and wetland habitat limited to areas with a narrow fringe of reed canarygrass (*Phalaris arundinacea*). The width of this channel ranges between 75 and 150 feet with bank elevations ranging between 5 and 15 feet above the creek elevation.

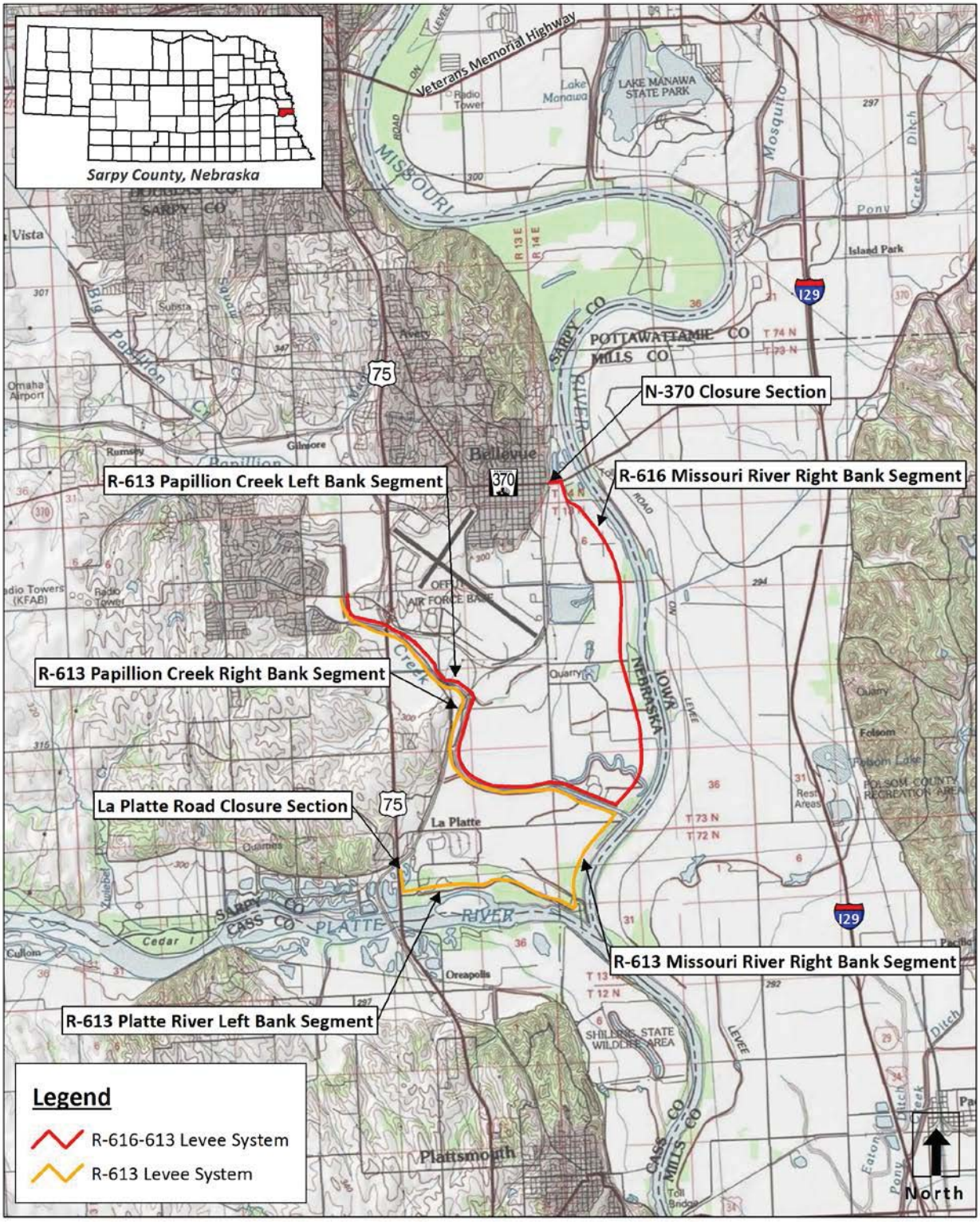
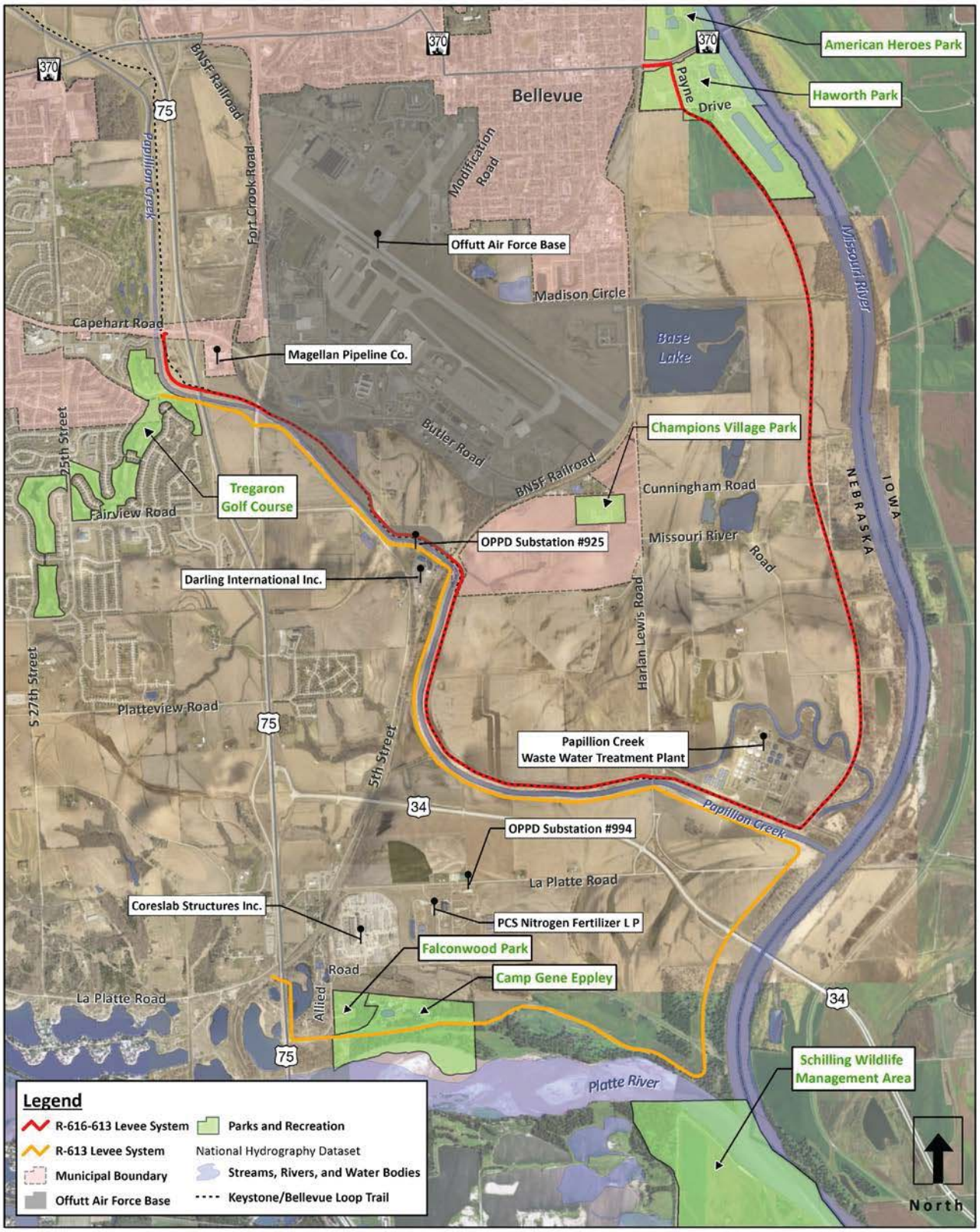


Figure 1 – TOPOGRAPHIC VICINITY MAP



Aerial Imagery Source: *Douglas and Sarpy Counties 2016 Orthos and USDA Farm Service Agency National Agricultural Imagery Program 2016 (Esri aerial imagery service, 2017)*

Figure 2 – AERIAL PHOTO LOCATION MAP

Land Uses. The levee systems extend through a landscape dominated by agricultural land uses. Other land uses in the Project area include recreational, industrial, and transportation uses. There are very few residential properties in the Project vicinity; several of the properties have been or are in the process of being purchased by PMRNRD.

Along the R-616-613 levee system, recreational uses include Haworth Park, American Heroes Park, and the Bellevue Loop Trail that runs along the levee bench or the levee top. Industrial facilities are the City of Omaha Papillion Creek Wastewater Treatment Plant (WWTP), Offutt Air Force Base (AFB), and Magellan Pipeline Co. terminal. Nearby transportation facilities include BNSF, Union Pacific Railroad (UP), N-370, US-75, Fort Crook Road, and Harlan Lewis Road.

Along the R-613 levee system, recreational uses are Tregaron Golf Course, Falconwood Park, and Camp Gene Eppley. Industrial facilities include Darling International (rendering plant) and Coreslab (pre-cast concrete manufacturing facility). Nearby transportation properties include US-75, U.S. Highway 34 (US-34), Fort Crook Road, Harlan Lewis Road, Allied Road, and La Platte Road.

1.2 Regulatory Background

FEMA Accreditation. FEMA accreditation criteria are set forth in 44 CFR 65.10 (FEMA 2011b). FEMA accreditation is important because the National Flood Insurance Program (NFIP) enacted by Congress in 1969 requires different levels of insurance for home and business owners who reside within certain FIRM flood hazard zones (NFIP 2014). Changes in FIRM flood hazard zones can impact property values, flood insurance criteria and rates, floodplain permitting standards, and development costs. When a community with an existing mapped levee is being remapped, the levee sponsor must provide the proper documentation to certify that the levee meets at least the minimum criteria set forth in 44 CFR 65.10 to receive accreditation (FEMA 2011c). Levees that are found to be out of compliance or levees that lack sufficient information to show certifiability will be decertified (FEMA 2006). It is important to note that levee accreditation does not guarantee protection from a given flood event.

FEMA Provisional Accreditation. FEMA can designate a levee system as a Provisionally Accredited Levee (PAL) to assist levee sponsors who may need additional time to provide certification documentation (FEMA 2011c). Once a levee has been given a PAL designation, the levee sponsor must provide documentation for compliance within a 2-year time frame. It is reasonable to expect a PAL designation from FEMA could be issued for these levee systems within the foreseeable future.

USACE Section 408 Standards. Pursuant to Section 408, proposed alterations to a USACE Federal Levee System must meet current USACE engineering design and construction standards, which may differ from FEMA accreditation standards that are based on flood risk management. To meet USACE Section 408 standards, the Project cannot have a significant flood risk impact on adjacent levee systems. In addition to the FEMA accreditation standards, the USACE Agency Technical Review (ATR) team for the Project has stated that the design guidelines from Engineering Manual (EM) 1110-2-1913 must be followed and a hydrologic and hydraulics system performance analysis is needed (USACE 2000). Engineering Circular (EC) 1165-2-216 also provides standards that the ATR team will use to determine if the usefulness of the project has been impaired, if the proposed alterations are injurious to the public interest (are the project benefits commensurate with the risks), and if the proposed project meets all legal and policy requirements. 33 CFR 408 must also be adhered to ensure the usefulness of the project is not impaired.

USACE Authority under PL 84-99. This federal law provides the USACE legal authority to conduct emergency preparation, response and recovery activities and to supplement local efforts in the repair of flood damage reduction projects that are damaged by floods. To be eligible for this rehabilitation assistance, levees must be technically sound, well maintained, and provide reliable flood protection. The USACE inspects eligible levee systems routinely and any corrective measures must be completed to maintain eligibility.

Section 404 Compliance. Section 404 of the Clean Water Act (CWA) authorizes the USACE to issue permits for the discharge of dredged or fill materials into waters of the United States (WOUS), including wetlands (33 USC 1344). The evaluation in Section 2 is provided in accordance with Section 404(b)(1) (40 CFR 230: *Guidelines for Specification of Disposal Sites for Dredged and Fill Material,* referred to hereafter as Guidelines) of the Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500) as amended by the CWA of 1977 (Public Law 95-217). Additionally, consideration

of Department of the Army regulatory programs (especially Section 10 of the River and Harbor Act of 1899 and Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972) were incorporated into the evaluation process.

Except as provided under CWA Section 404 (b)(2), no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences (40 CFR 230.10(a)). Therefore, if a project is not water dependent (e.g., a port or marina facility that requires access to or locating in special aquatic sites to fulfill the basic purpose) and the project proposes to discharge into a WOUS or special aquatic site (e.g., wetlands, mud flats, vegetated shallows, etc.), then the Guidelines require the USACE to presume that a less environmentally damaging practicable alternative exists, unless the permit applicants can clearly demonstrate otherwise (40 CFR 230.10[a][2]). An alternative is "practicable" if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of the overall project purposes (40 CFR 2301.10(a)(2).

1.3 Project Need

The Project is needed based on the following:

(1) Inability to meet re-certification criteria for FEMA accreditation (for the needs listed below) and maintain the same certification as the existing levee.

(2) Inadequate hydraulic capacity of the channels and resulting inability of the levee segments to meet FEMA freeboard standards for accreditation (i.e., the additional feet above the base flood elevation to compensate for unknown factors as a measure of safety).

(3) Insufficient foundation seepage protection to meet current USACE design criteria which is required for FEMA accreditation.

(4) Deteriorating conditions at several levee drainage penetration locations requiring maintenance to allow FEMA accreditation and continued eligibility in the PL 84-99 rehabilitation program

Need for Levee Re-Certification and Accreditation. FEMA accreditation criteria provide the minimum design, operation, and maintenance standards levee systems must meet and continue to meet to be recognized as providing protection from the base flood on a FIRM (FEMA 2011b). While the R-616-613 and R-613 Federal Levee Systems are shown as providing flood protection on effective FIRMs (Zone X shaded) and are certified to past design standards, they are not accredited.

The FEMA Flood Map Modernization (Map Mod) program is a presidential initiative, funded by Congress, to improve and update the nation's flood maps and to determine if levees are in compliance with FEMA regulations. Levee sponsors must provide appropriate data and certification documentation to demonstrate the levee is compliant with 44 CFR 65.10 criteria for the levee to be certified. Without levee improvements, the levees will be found to be out of compliance (FEMA 2006), and the areas behind the levees will be remapped without levee protection. This remapping would result in increased flood insurance costs to existing structures and would modify the currently mapped FEMA flood zone designations and Special Flood Hazard Areas. At the local level, the remapping of Special Flood Hazard Areas will affect development restrictions tied to specific areas.

Inadequate Hydraulic Capacity. As shown in Figure 3 and Figure 4, levee height inadequacies occur along the R-613 Papillion Creek Left Bank segment of the R-616-613 Levee System, and throughout the R-613 Levee System. Improvements are needed to raise the embankments as much as 3 feet in some locations.

Insufficient Seepage Protection. A detailed seepage analysis showed that a large portion of the R-616-613 and R-613 Federal Levee Systems had insufficient seepage protection (FYRA 2017b). Several seepage berm areas along both Levee Systems do not meet the standards set out in EM 1110-2-1913, including exit gradients no greater than 0.5 at the levee toe, 150-foot width berms from the levee centerline, 5-foot berm thickness at the levee toe, and 2-foot thickness at the seepage berm land side edge (USACE 2000).

Deteriorating Levee Drainage Penetration Locations. Over half of the levee drainage penetrations (also referred to as culverts) along the R-613 Papillion Left and Right Bank Segments are in need of repair or replacement. The remaining levee drainage penetrations along these same segments are in need of bank stabilization maintenance. These repairs to drainage penetrations and outlet bank conditions are required for the levee systems to be re-certified and accredited, and for the levee systems to maintain continued eligibility in the PL 84-99 rehabilitation program.

1.4 Project Purpose

Authorized Purpose of the Levee Systems. Federal Levee Systems R-616-613 and R-613 are part of the comprehensive plan for the Missouri River Basin as authorized by the Flood Control Act of 1944 (Public Law 534, 78th Congress, 2nd Session). As stated in the Flood Control Act of 1944, the act "authorized the construction of certain public works on rivers and harbors for flood control, and for other purposes". The authorized purpose of these levee systems is to provide flood control.

- Federal Levee System R-616-613 provides flood protection for 3,950 acres of Missouri River flood plain, including a portion of Offutt AFB (USACE 1976).
- Federal Levee System R-613 provides flood protection for 3,000 acres (USACE 1966).

Basic Purpose. The basic purpose of the project is to be determined by USACE, and for the water dependency test for the 404(b)(1) evaluation. We tentatively assume that the basic purpose is levee re-certification, accreditation and continued eligibility in the PL 84-99 rehabilitation program.

Applicant Purpose. The applicant purpose is to make levee improvements to meet standards for re-certification and FEMA accreditation as set forth in 44 CFR 65.10, and to meet USACE standards to maintain continued eligibility in the PL 84-99 rehabilitation program. More specifically, for levees to be recognized by FEMA as certified, criteria in 44 CFR 65.10 states that levees shall meet current design and flood risk management standards and sound engineering design. Where specific design guidelines are lacking, FEMA suggests that USACE guidelines be followed when demonstrating sound engineering design, specifically closures, embankment protection, embankment and foundation stability, and settlement. Improvements would result in (1) a level of protection comparable to that shown on current FIRMs for the areas behind the levees, and (2) compliance with standards for Section 408 (33 USC 408) alterations of USACE civil works projects (FEMA 2011b, USACE 2014b). Accreditation allows FEMA to indicate on FIRMs that flood protection is provided to the areas behind the levees.

Overall Purpose. The overall project purpose is used in screening for the 404(b)(1) analysis. The overall project purpose is to make levee improvements to provide levees that will be certifiable and FEMA accredited.

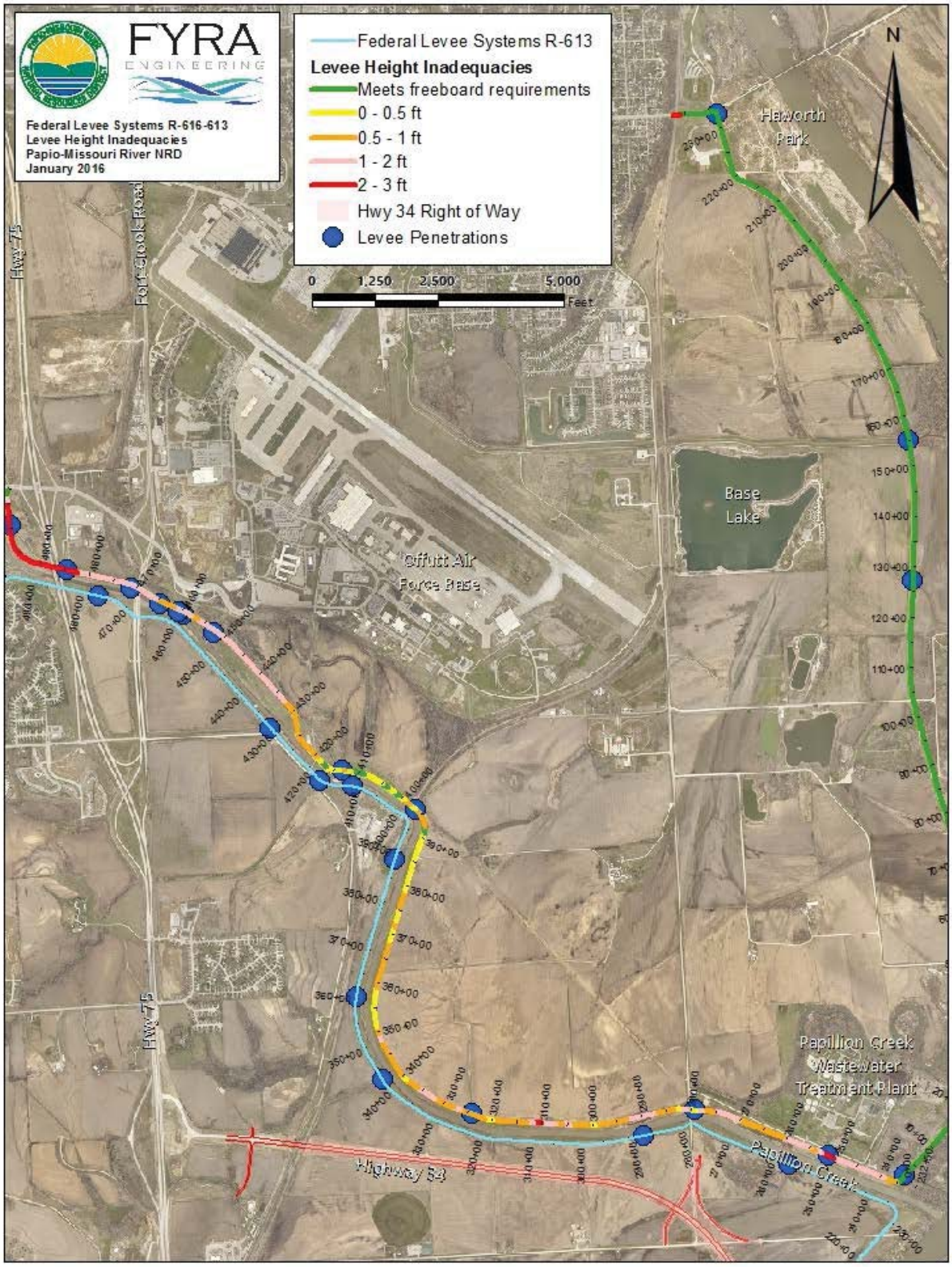


Figure 3 – R-616-613 AREAS WITH INADEQUATE FREEBOARD

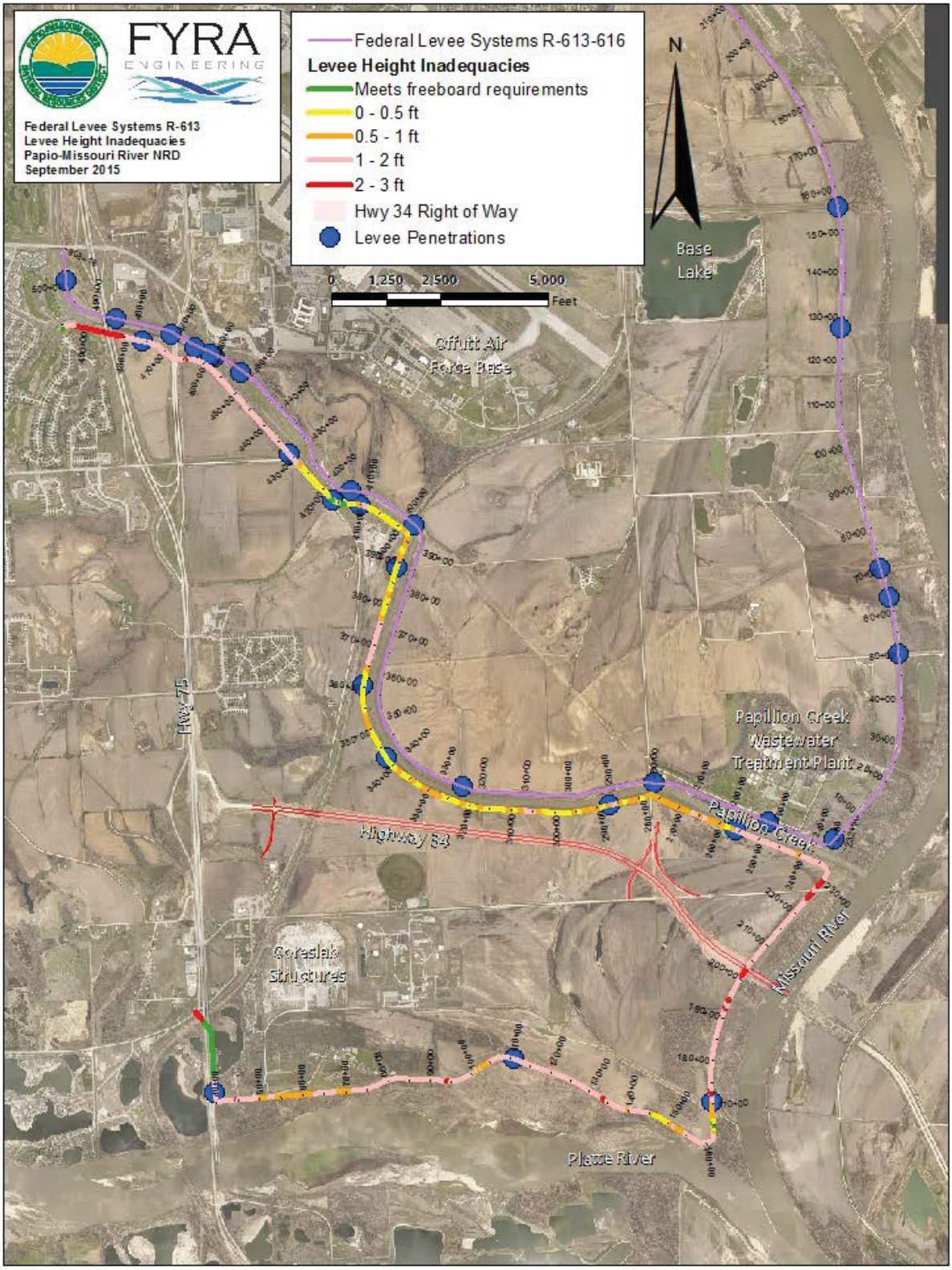


Figure 4 – R-613 AREAS WITH INADEQUATE FREEBOARD

1.5 Prior Reports

Over the past 15 years, there have been numerous efforts in the Project vicinity to maintain the protection of people, property, and infrastructure. These efforts have included consideration of improving the existing Federal Levee Systems along the Missouri River and its major tributaries. The following documents relate to these efforts and environmental considerations in the Project vicinity:

- The USACE–NWD-NWO finalized a Programmatic Environmental Assessment (PEA) and Finding of No Significant Impact for Public Law (PL) 84-99 Emergency Levee Rehabilitation Program and Advanced Measures Civil Emergency Management Program on 27 December 2011, and that document is incorporated by reference herein as the PEA (USACE 2011b). The PEA provided the necessary information to evaluate the potential environmental impacts of NWO's PL 84-99 levee rehabilitation program and advance measures responses. The PEA established a framework for evaluating potential impacts to resources that may occur from site-specific activities during levee repair projects.
- The USACE-NWD-NWO finalized a Finding of No Significant Impact for a Tiered EA for PL 84-99 Emergency Levee Rehabilitation Program and Advanced Measures Civil Emergency Management Program for the R-616 Levee Segment on 25 March 2012 (USACE 2012a) and for the R-613 Levee Segment on 4 April 2012 (USACE 2012b). These EAs were prepared to describe the environmental consequences for individual site-specific projects, in relation to the above PEA.
- The U.S. Fish and Wildlife Service (USFWS) issued an amended Biological Opinion on the Operation of the Missouri River Main Stem Reservoir System, Operation and Maintenance of the Missouri River Bank Stabilization and Navigation Project, and Operation of the Kansas River Reservoir System on 16 December 2003 (USFWS 2003). In 1989, the USACE initiated consultation with the USFWS regarding operation of the Missouri River Main Stem Reservoir System and over the next eleven years informal and formal Section 7 (of the Endangered Species Act) consultation continued until a final Biological Opinion was completed by USFWS in 2000 (USFWS 2000). The USFWS provided the USACE with a Reasonable and Prudent Alternative (RPA) to their action that, if implemented, would preclude jeopardizing the survival of the interior least tern, piping plover, and pallid sturgeon.
- The USFWS issued a Biological Opinion on the Platte River Recovery Implementation Program (PRRIP) on 16 June 2006 (USFWS 2006). The PRRIP was initiated to aid in the protection and conservation of threatened and endangered species that utilize the Platte River. The USFWS concluded that the PRRIP's activities would need to be monitored using the proposed PRRIP Adaptive Management Plan to avoid jeopardizing the survival of the bald eagle, interior least tern, piping plover, pallid sturgeon, western prairie fringed orchid, and whooping crane.

Two highway improvement studies also relate to the Project because of their timing and proximity to the Project area:

- The U.S. Department of Transportation Federal Highway Administration (FHWA) finalized a Record of Decision (ROD) for the Bellevue Bridge Study in Mills County, Iowa, and Sarpy County, Nebraska on 14 December 2007 (FHWA 2007b). The Final EIS and Draft EIS related to this document also contain pertinent information involving construction within close proximity of the Proposed Action on the right bank of the Missouri River (FHWA 2007a).
- The Nebraska Department of Transportation (NDOT) prepared a Final EIS for the US-75 Roadway Improvement project in Otoe, Cass, and Sarpy counties in 1979. The FHWA finalized a ROD for the Final Supplemental EIS, US-75 from Bellevue to Nebraska City, Nebraska, for this same project on 25 May 2001 (NDOT 2001). An additional NEPA analysis for the US-75 Plattsmouth to Bellevue project was initiated by NDOT and FHWA in 2009 to address construction updates and project evaluations for this specific segment of the original project (NDOT 2010b).

1.6 Public Notification

PMRNRD has provided information concerning the Project on their website since 2011, and other public documents associated with the Project, including Sarpy County Board of County Commissioner resolutions and meeting minutes, have been available on the internet since 2012. The Project is featured on the FYRA Engineering website indicating the location

and proposed levee modifications. Several media articles highlighting the Project have been included in local newspapers since 2013. A summary of these documents and articles are listed below and are included in Appendix A.

- 2012. The Sarpy County Board of Commissioners voted to approve a resolution to support the submittal of a disaster relief opportunity grant application by PMRNRD for engineering services for the Project.
- 2013. An Omaha World Herald article discussed several levees being considered for FEMA accreditation, including the R-616-613 and R-613 Federal Levee Systems. A PMRNRD representative indicated the R-616-613 and R-613 Federal Levee Systems are structurally sound and well-maintained, but they do not meet FEMA accreditation standards; therefore, PMRNRD and FYRA Engineering started working on a geotechnical review and design plans for the Project.

  Spectrum, the PMRNRD newsletter, highlighted the Project on the front page indicating that the "necessary engineering studies in preparation of possible future levee enhancements" were being completed.
- 2014. An Omaha World Herald article reviewed candidates for the upcoming PMRNRD Board election. The important topics discussed by the candidates included the funding and support of the Project.
- 2015. The Sarpy County Board of Commissioners voted to approve a Memorandum of Understanding (MOU) with the PMRNRD, City of Omaha, and City of Bellevue regarding the construction and upgrading of Missouri River Levee System Units R-616 and R-613. The MOU outlined the monetary contributions of each party to assist in funding the Project. An informational document was provided to the board prior to the meeting by PMRNRD.

  A joint levee sponsor meeting was held on Thursday, 10 December 2015 at the USACE Omaha District office. The meeting was to inform levee district sponsors, owners, and operators about the proposed modifications to Federal Levee Systems R-616-613 and R-613 and to describe the process in which input can be provided. Meeting minutes from this meeting are included in Appendix A.
- 2016. Several local newspaper articles and editorials reported on legislature appropriations and budget amendments to support the costs of the Project. The importance of the levee improvements with regards to flood protection, maintenance of flood insurance costs to existing structures, and ongoing flood protection to continue support of economic development in the local community. A March 31 Omaha World Herald article announced that Governor Pete Ricketts approved the state budget packet, which included funds for the Project.

  A joint levee sponsor meeting was held on Wednesday, 18 May 2016 at the City Hall in Glenwood, Iowa to update levee district sponsors, owners, and operators about the proposed modifications to Federal Levee Systems R-616-613 and R-613 and to answer additional questions they may have about the project. The list of items that were discussed is included in Appendix A.

  A final joint levee sponsor meeting was held on Tuesday, 20 December 2016 to discuss the results of the project performance evaluation and the project status. A response letter regarding these joint levee sponsor meetings was received by the project sponsor on 30 December 2016 and is included in Appendix A.

USACE Public Involvement. Prior to a decision on whether to prepare a FONSI or EIS, the USACE will place the Draft Environmental Assessment (DEA) on their website and provide a 30-day comment period for public and resource agency review.

2.0 EVALUATION OF ALTERNATIVES

NEPA requires that feasible and prudent alternatives, including a No Action Alternative, are developed and evaluated. Alternatives are then screened to identify those actions that would meet the purpose and need of the Project and minimize potential impacts to the environment.

For the Project, the development of alternatives considered on-site, off-site, and non-structural alternatives within the Missouri River, Papillion Creek, and Platte River watersheds, as well as a no action alternative. All alternative solutions were required to provide certifiable levees that can be FEMA accredited and addressed both inadequate hydraulic capacity and insufficient foundation seepage protection. The solutions also required that the levees maintained continued eligibility in the PL 84-99 rehabilitation program.

Hydraulic Capacity. The hydraulic capacity of the river systems can be increased by five methods:

- Raising the levee height of the current levee systems to allow a deeper flow depth to pass more water
- Widening the conveyance channel (by setting back the levees)
- Decreasing flow resistance of the channel and overbanks
- Dredging of the river bottom to increase the conveyance area
- Reducing the design discharge through the Project which would require hydrologic changes in the watershed (such as upstream dams)

Seepage Protection. Chapter 5 of USACE Guidance EM 1110-2-1913, *Design and Construction of Levees*, discusses the phenomenon of seepage through levee corridors and offers potential mitigation measures to address seepage. By virtue of creating seepage paths that enlarge with continued flow due to pressure and carrying soils along the way, excessive seepage can cause boils that can continue to grow and are capable of breaching a levee embankment. The most common mitigation measures for seepage can be categorized into three alternatives:

- Seepage berms
- Relief wells
- Cutoff walls

The solutions are not mutually exclusive in that a viable measure may incorporate one or more other measures to collectively meet design criteria.

Screening Levels. Three levels of screening have been used to evaluate the Project alternatives. These correspond to criteria for the 404(b)(1) analysis:

- Level 1: Purpose
- Level 2: Practicability
- Level 3: Aquatic Resources

The first level of screening assessed whether an alternative met the overall project purpose. This purpose consists of providing levees that will be certifiable and FEMA accredited, which includes meeting the standards set out by Section 408 and FEMA. Alternatives that did not meet the first level of screening were not carried forward to the second level of screening.

The second level of screening assessed the practicability of alternatives based on a logistics factor evaluating the constructability of the alternative and a cost factor comparing overall construction costs. Construction capability factors considered Project risk of failure, reliability, and implementation feasibility. No technology factors were identified for the Project. Alternatives that did not meet the second level of screening were not carried forward into the third level of screening.

The third level of screening addressed impacts to aquatic resources (specifically, wetlands and WOUS). Alternatives that did not meet the third level of screening were not carried forward for further evaluation of environmental impacts (Section 3.0).

2.1 Components of On-site, Off-site, and Non-structural Alternatives

On-site Alternatives. On-site alternatives consist of combinations of methods to address inadequacies of the existing levees and other constraining factors, such as the need to maintain flows at drainage penetrations, and limited right-of-way (i.e., PMRNRD does not have condemnation rights on property owned by the federal government, such as Offutt AFB). The following sections describe each method separately and are provided as a reference for the 16 on-site alternatives that follow.

(It should be noted that all of the on-site alternatives include one culvert replacement, four culvert outlet replacements, and ten culvert repairs that are needed along Papillion Creek, in addition to bank stabilization at 22 culverts. These activities are an unavoidable constraint to rehabilitate aging structures that are in need of repair.)

Raise Levee Embankment. The levees can be raised by placement of additional fill material on top of the existing levee embankment. The existing levee must be prepared for the additional fill by stripping all vegetation and topsoil; then additional fill can be placed so that it bonds with the existing embankment material. Locally available soil material can be used. The USACE has required that a minimum top width of 12 feet be constructed if the existing top width is less. There are three options for raising the levees using additional embankment: extending the land (i.e., protected) side slope to the new top width (Figure 5), constructing a "piggy back" levee (Figure 6), or extending the river side slope (Figure 7). The levee channel, surrounding infrastructure, and land rights constraints affect the viability of each construction option.

Extending the land side slope requires additional fill to be placed along the river side of the levee. This would reduce the hydraulic capacity by narrowing the channel top width depending on the height of the levee raise; therefore, this option is not recommended due to the need to mitigate the loss in hydraulic capacity. The "piggy back" levee would place a new 12-foot wide levee at the required height on the land side of the existing levee. The "piggy back" levee would require additional fill on the land side, require additional drainage penetrations through the levee, increase land rights and utility conflicts, and greatly increase impacts on the environment, including increased tree removal and fill in wetland areas. This option is not recommended. Extending the river side slope minimizes fill and disturbance to the channel interior and is the recommended construction method.

> Levee Raises for Both Federal Systems. All alternatives to raise the levee embankments are proposed to extend the river side slope. Locations of the raises are shown on Figure 3 and Figure 4.

Construct Floodwall on Top of Levee. Floodwalls are structural solutions to hydraulic capacity problems. The walls are designed to provide additional hydraulic capacity in flood conveyance systems. Because they are generally more expensive than embankment raises, they are usually used in situations with limited land rights. The walls are usually built of reinforced concrete, or steel sheet pile, depending on the depth of the wall and the surrounding soils and infrastructure. The USACE has requested that all walls be constructed of reinforced concrete and prefers a "T" wall configuration. There are several designs for a reinforced concrete wall, but they generally differ in structural comparison, not impacts to the surrounding area.

The floodwall can be placed anywhere along the levee corridor, but placing the wall on top of the levee greatly reduces the materials necessary to construct the floodwall since the goal is to reach a certain elevation with the top of the wall (i.e., freeboard requirements). Floodwall construction on top of the levee requires partial removal of the embankment and backfill. Placement of the floodwall along the entire levee corridor is not recommended due to increased cost of construction, increased flood risk during construction associated with temporary embankment removal, and limited access to the river side of levee for future routine and flood maintenance.

> Floodwall at Limited Locations. A portion of the R-613 Papillion Creek Left Bank Levee Segment parallels the UP Railroad and Offutt AFB where additional right-of-way is not available for purchase or construction. PMRNRD does not have condemnation rights concerning federal government property. For all alternatives that include a levee raise or widening of the existing channel, construction of a floodwall on top of the levee is proposed to address hydraulic capacity inadequacies at this "limited location."

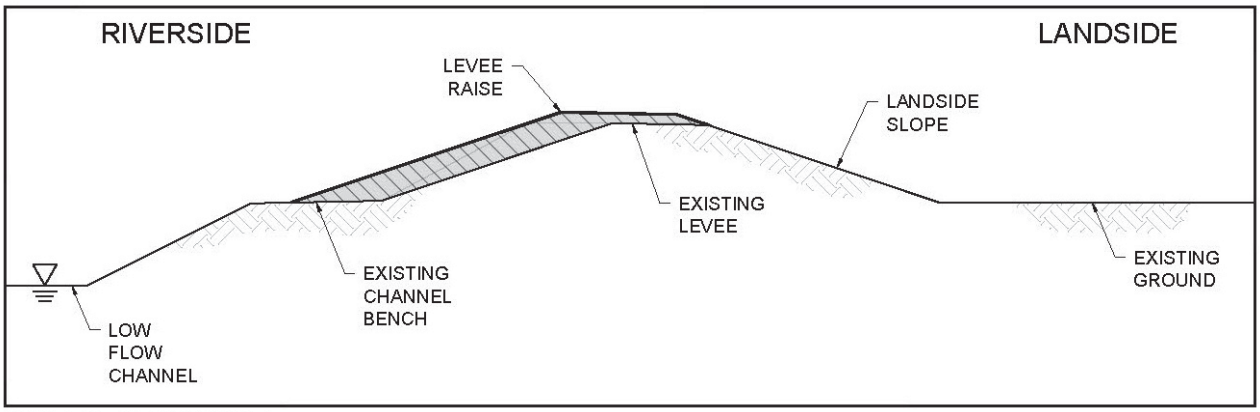


Figure 5 – EXTENDING THE LAND SIDE SLOPE OF THE LEVEE

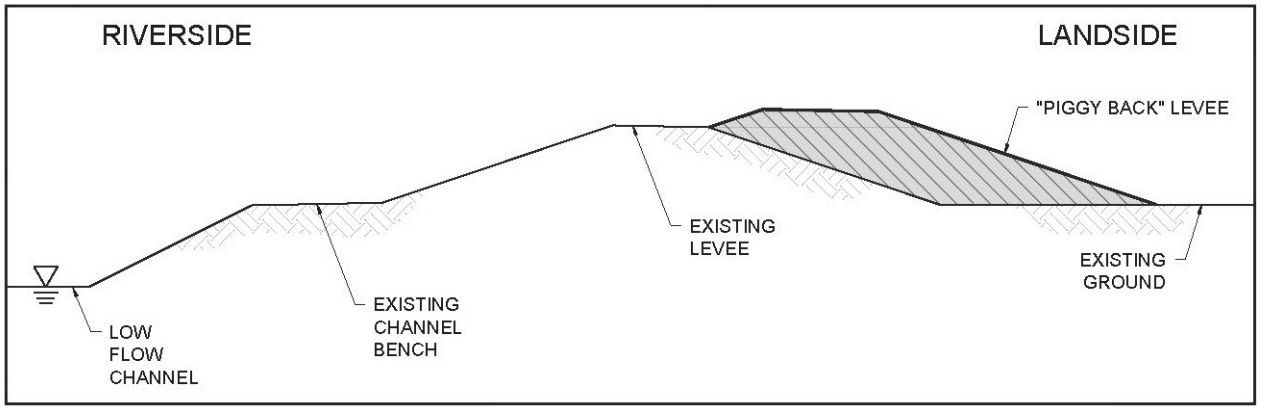


Figure 6 – "PIGGY BACK" LEVEE ON THE LAND SIDE SLOPE OF THE LEVEE

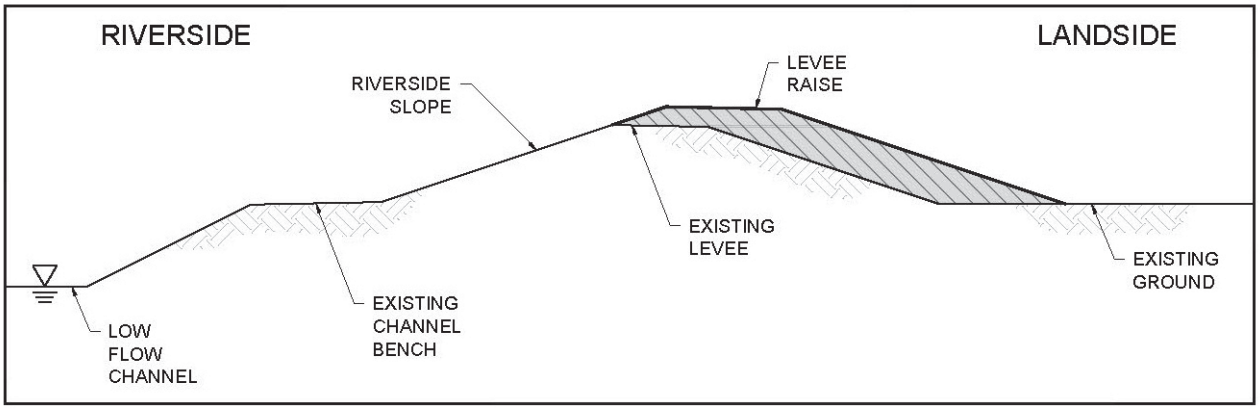


Figure 7 – EXTENDING THE RIVER SIDE SLOPE OF THE LEVEE

Widening the Existing Channel. Hydraulic capacity could be improved by increasing the distance between the levees on either side of the creek or river channels; thereby widening the conveyance channel (and decreasing the area of protection). One or both of the levees would be offset (the old levee would be removed, and a new levee would be constructed further away from the channel) to create additional hydraulic capacity. Because the offset levees would be re-constructed, the increase in hydraulic capacity would not require them to be constructed higher than the existing levees. This alternative would require a major re-evaluation of the value of the Project because of the reduced protected area (i.e., land side of the levee). Also, the Project would likely be re-formulated according to USACE Planning criteria to utilize this alternative.

During the alternatives analysis phase of this project a levee setback for a portion of the R-613 Federal Levee System was also evaluated and studied. This levee setback would have taken place near the confluence of the Platte and Missouri Rivers and would move portions of the R-613 Platte and Missouri River Levee Segments back (away) from the river systems. During the evaluation period, the project sponsor coordinated with many private, local, state and federal agencies to locate and discuss funding of this setback which would provide localized increases in hydraulic capacity as well as returning 400 acres to the active river floodplain. The final determination of the USACE-NWO was that while this would allow for an increase in environmental benefits over the existing configuration, this setback would likely provide limited floodplain connectivity, allow no potential for shallow water habitat benefits, contain possible contaminants, and could impact sedimentation within the Missouri River navigation channel. Without the support of the USACE-NWO, this levee setback was abandoned.

> Widening the Existing Channel at Limited Location. A portion of the R-613 Papillion Creek Left Bank Levee Segment parallels the UP Railroad and Offutt AFB, where additional right-of-way is not available for purchase or construction, so standard levee raises are not feasible. In this system stretch, R-613 Papillion Creek Right Bank does not require increased seepage protection and additional right-of-way can be acquired on the right bank. Widening the existing levee channel in this location does provide the necessary hydraulic capacity to offset levee raises in this stretch and limit the floodwall construction. For all alternatives that include a levee raise, channel widening, in addition to the construction of a floodwall on top of the levee, is proposed to address hydraulic capacity inadequacies at this "limited location." The widening would occur above the ordinary high water mark of Papillion Creek in an area of sediment deposition between the Fort Crook Road bridge and the abandoned Wagon Trail bridge (Figure 4, between Stations 433+00 and 463+00).

Modifications to Channels and Overbanks. Reducing flow resistance by removal of large woody vegetation within the channel and replacing overbank vegetation with short turf provides some increases to hydraulic capacity. This alternative has limited applicability for the Project as the Papillion Creek channel is already relatively free of large woody vegetation, and clearing riparian woodlands along the Missouri and Platte Rivers would result in habitat loss. Dredging of the channel bottom would increase the flow area of the channel and allow for increases in hydraulic capacity,

Improve Seepage Berms. Seepage mitigation berms, or "seepage berms," are embankments constructed on the land side of the levee. The berms can vary in height, but are usually not as tall as the levee, and are of varying widths. The purpose of the berms is to provide levee embankment protection against seepage pressures by adding weight to the existing ground surface, keeping the seepage pressures from exiting the foundation near the toe of the levee embankment, and minimizing the risk of potential damage.

The embankments can be constructed with most types of soil. In USACE's EM 1110-2-1913, guidance shows how different "zones" in the berms may be comprised of different materials with varying organic content and cohesiveness (USACE 2000). In the past, berms had been farmed when they were situated in agricultural fields, but current USACE guidance is to seed them with grass and remove them from crop production. Seepage mitigation berms are not to be confused with stability berms, which may exist on the land side of the levee to protect the levee from embankment slope failures.

> USACE ATR Team Design Standard (wider, thinner). EM 1110-2-1913 requires minimum 150-foot (from levee centerline) for seepage berm widths in all locations where land is available for construction, as well as a 5-foot thickness at the levee toe, and 2-foot thickness at the seepage berm land side edge. In general, waivers from this standard are usually only granted in urban areas.

Alternative USACE Design Standard (narrower, thicker). A reduced levee berm footprint can be designed to provide the required seepage mitigation measures by constructing a narrower, thicker berm. This option was originally allowed under USACE Engineering Technical Letter (ETL) 1110-2-569 guidance (USACE 2005). However, this guidance has been rescinded and the USACE ATR Team has stated that the design guidelines from EM 1110-2-1913 should be followed to ensure sufficient exit gradients.

Combination Design Standard. In order to minimize impacts, a combination alternative was developed. This alternative would follow the USACE ATR Team design recommendations except at areas where wetland impacts could be substantially reduced by placing narrower, thicker berms (which still meet USACE design standards, including exit gradients) and required factors of safety, but do not meet the requirements set forth in EM 1110-2-1913 (Appendix B).

Install Relief Wells. Pressure relief wells, or "relief wells," are screened conduits that are drilled into the foundation near the levee, usually around the land side toe, to provide a path of least resistance for seepage that is under pressure in the levee's foundation to pass up above ground. Higher pressures often build in lower, more porous foundation strata, such as sands. The pressure source is higher water levels in the river side of the levee (channel) and is kept below ground by confining (often clay) layers above. The goal is to relieve the pressure in the foundation in a controlled manner and keep it from coming up through the clay or levee embankment forcibly, and possibly causing damage.

Relief wells are usually installed along the levee corridor at a spacing determined by the capacity of the relief well and the hydrogeological properties of the soils around them. In the past, relief wells were made of less expensive materials and used wood stave screening internally, but now are usually required to be constructed entirely of stainless steel to avoid corrosion and plugging of the relief well over time, which can cause a reduction in capacity and affect the intended seepage mitigation for which they are designed.

Relief Wells at Drainage Locations. Logistically, seepage berms cannot extend across the drainage penetrations; therefore, relief wells would be installed at these locations for all alternatives that include seepage berms.

Install Cutoff Wall. Cutoff walls, or "walls" for short, are non-native materials such as plastic or steel sheet piles, poured or mixed cementitious materials such as concrete slurries or non-cementitious mixtures such as bentonite grout. The wall material is usually either driven (in the case of sheet piles) or trenched and filled into levee corridors, usually parallel to the levee centerline, to intercept seepage paths and prevent seepage from passing through the levee embankment or under the levee through the levee foundation. They essentially form a water-tight seal effective enough to reduce any risk related to levee failure due to seepage passing through the levee.

Cutoff walls are most effective when constructed down through the levee foundation to an impervious layer or bedrock. The goal of the cutoff wall is to force seepage down and under the wall before surfacing on the land side of the levee. The additional length that the seepage must travel creates additional friction along the seepage path and therefore reduces the force, or dynamic head, the seepage may possess when it reaches the ground surface (which may be the levee toe) on the land side of the levee. Depending on a variety of design considerations, cutoff walls that are not constructed to bedrock (or the targeted impervious layer) may provide sufficient protection and are called "partial" cutoff walls.

These levee systems have penetrations of varying types sporadically along the entire levee corridor. These penetrations include but are not limited to gravity drainage culverts, gas lines, Metro Utility District (MUD) sludge lines, and communication fibers. Placement of cutoff walls would not be allowable in the areas of any levee penetrations and seepage mitigation would need to include construction of relief wells or seepage berms instead of the cutoff wall at the locations of the penetrations.

Partial Cutoff Walls. The R-616-613 and R-613 levee foundations consist of silts and clays overlying sand of varying depths above limestone bedrock. Due to the highly porous nature of the sand formations in the levee foundation, partial cutoff walls offer little to no benefit, even when used in conjunction with other seepage mitigation measures; therefore, partial cutoff walls were not considered for further screening.

Full Cutoff Walls. In order to provide adequate seepage mitigation, design models indicated that any walls used for seepage protection would require construction to the full depth to the foundation bedrock (which is the cutoff wall construction method referred to in this analysis).

Off-site Alternative – Upstream Storage. Off-site alternatives are solutions that are not located along the Federal Levee Systems R-616-613 and R-613. In order to minimize the need for on-site improvements, the design discharge could be reduced by providing upstream storage to attenuate (reduce) the peak discharges. Storage could be provided using structural solutions (such as dams and smaller detention) or floodplain storage along the channel corridor. However, floodplain storage has already been maximized in the hydrologic routings performed by the USACE (USACE 2014a); therefore, additional storage remains the only alternative to further reduce peak discharges. The Papillion Creek Watershed Partnership has analyzed the available options to reduce the peak discharges and have documented their work in the Papillion Creek Watershed Management Plan (PCWP 2009 and 2014).

Non-structural Alternative. Non-structural alternatives are measures that modify public policy, management practices, regulatory policy, or property to reduce human exposure or vulnerability to flood hazards without altering the nature or extent of flooding. The impacts of a flood hazard can by modified by reducing an area's susceptibility to flood damage or reducing hazardous uses of the floodplain.

2.2 Purpose and Practicability Screening of Alternatives

As discussed previously, the alternatives consist of combinations of methods (Section 2.1). For example, several groups of alternatives would have associated partial repair methods due to constraining factors. Alternatives 1 through 15 require installation of relief wells at drainage locations. Alternatives 1 through 5 require floodwalls and widening of the Papillion Creek channel at limited locations adjacent to Offutt AFB as described previously.

2.2.1 Alternative 1: Raise Levee Embankment and Improve Seepage Berms per USACE ATR Team Design Standards

This alternative uses a combination of several construction methods to address levee inadequacies and other constraining factors. The USACE ATR Team recommended design for seepage berm construction would have a larger footprint due to the berm construction utilizing a wider and thinner layer of fill material.

Overall Purpose Screening.

- This alternative would meet FEMA design, operation, and maintenance standards and USACE 408 requirements (i.e., EM 1110-2-1913) per the USACE ATR Team to reduce flood risk.
- This alternative would provide certifiable levees that can be FEMA accredited.
- This alternative would provide continued eligibility in the PL 84-99 rehabilitation program.
- This alternative meets the Overall Purpose of the Project and was carried forward for practicability screening.

Practicability Screening.

- Installing relief wells at drainage locations along the levee addresses seepage mitigation needs because constructing a seepage berm across the drainage path is not feasible.
- Raising the levee embankment for the majority of the levee system is substantially less expensive than constructing a floodwall on top of the levee or widening the channels to address hydraulic capacity inadequacies.
- Constructing improved seepage berms for the majority of the levee system is substantially less expensive than installing relief wells or installing a cutoff wall to address insufficient foundation seepage protection.
- Construction of this alternative is approximately half or a third of the cost of all other alternatives, except for Alternative 3 (see Figure 8).

Alternative Carried Forward. This alternative met the factors used for practicability screening and was carried forward to the aquatic resource screening (Section 2.4).

2.2.2 Alternative 2: Raise Levee Embankment and Improve Seepage Berms per Alternative USACE Design Standards

This alternative uses a combination of several construction methods to address levee inadequacies and other constraining factors. As a minimization effort to reduce wetland impacts, this alternative would use the USACE ETL 1110-2-569 guidance for the seepage berm construction resulting in a smaller footprint due to the use of a narrower and thicker layer of fill material.

Overall Purpose Screening.

- The seepage analysis using the smaller seepage berm design does not meet the design guidelines set forth in EM 1110-2-1913, including sufficient exit gradients, which is unacceptable for Section 408 requirements.
- This alternative would NOT provide certifiable levees that can be FEMA accredited.
- This alternative would provide continued eligibility in the PL 84-99 rehabilitation program until seepage deficiencies were noted during levee inspections.

Elimination from Further Consideration. This alternative does NOT meet the Overall Purpose of the Project and was NOT carried forward for practicability screening.

2.2.3 Alternative 3: Raise Levee Embankment and Improve Seepage Berms per Combination Design Standards

This alternative uses a combination of several construction methods to address levee inadequacies and other constraining factors. As a minimization effort to reduce wetland impacts, seepage berm construction would follow the USACE ATR Team recommendations except at one location where wetland impacts could be reduced substantially by using narrower, thicker berms allowed with USACE ETL 1110-2-569 guidance.

Overall Purpose Screening.

- The seepage analysis using a narrower, thicker seepage berm design, in a select location, results in exit gradients that meet the current USACE minimum criteria. This alternative also meets FEMA design, operation, and maintenance standards and modified USACE 408 requirements to reduce flood risk.
- This alternative would provide certifiable levees that can be FEMA accredited.
- This alternative would provide continued eligibility in the PL 84-99 rehabilitation program.
- This alternative meets the Overall Purpose of the Project and was carried forward for practicability screening.

Practicability Screening.

- Installing relief wells at drainage locations along the levee addresses seepage mitigation needs because constructing a seepage berm across the drainage path is not feasible.
- Raising the levee embankment for the majority of the levee system is substantially less expensive than constructing a floodwall on top of the levee or widening the channels to address hydraulic capacity inadequacies.
- Constructing improved seepage berms for the majority of the levee system is substantially less expensive than installing relief wells or installing a cutoff wall to address insufficient foundation seepage protection.
- Construction of this alternative is approximately half or a third of the cost of all other alternatives, except for Alternative 1 (Figure 8).

Alternative Carried Forward. This alternative met the factors used for the practicability screening and was carried forward to the aquatic resource screening (Section 2.4).

2.2.4 Alternative 4: Raise Levee Embankment and Install Relief Wells

This alternative uses a combination of construction methods to address levee inadequacies.

Overall Purpose Screening.

- This alternative would meet FEMA design, operation, and maintenance standards and USACE 408 requirements to reduce flood risk.
- This alternative would provide certifiable levees that can be FEMA accredited.
- This alternative would provide continued eligibility in the PL 84-99 rehabilitation program.
- This alternative meets the Overall Purpose of the Project and was carried forward for practicability screening.

Practicability Screening.

- Installing relief wells along the entire length of the levee system increases the Project risk and reduces the Project reliability compared to constructing improved seepage berms for the majority of the levee system to address insufficient foundation seepage protection.
- Raising the levee embankment for the majority of the levee system is substantially less expensive than constructing a floodwall on top of the levee or widening the channels to address hydraulic capacity inadequacies.
- Installing relief wells along the entire length of the levee system is less expensive than installing a cutoff wall to address insufficient foundation seepage protection.
- Installing relief wells is substantially more expensive than constructing improved seepage berms for the majority of the levee system to address insufficient foundation seepage protection.
- Construction of this alternative is more than two times the cost of Alternatives 1 and 3 (Figure 8).

Elimination from Further Consideration. This alternative does NOT meet the factors used for the practicability screening and was NOT carried forward to the aquatic resource screening.

2.2.5 Alternative 5: Raise Levee Embankment and Install Full Cutoff Wall

This alternative uses a combination of construction methods to address levee inadequacies and other constraining factors, such as sand formations in the levee foundation.

Overall Purpose Screening.

- This alternative would meet FEMA design, operation, and maintenance standards and USACE 408 requirements to reduce flood risk.
- This alternative would provide certifiable levees that can be FEMA accredited.
- This alternative would provide continued eligibility in the PL 84-99 rehabilitation program.
- This alternative meets the Overall Purpose of the Project and was carried forward for practicability screening.

Practicability Screening.

- Installing relief wells at drainage locations along the levee addresses seepage mitigation needs because constructing a cutoff wall across the drainage path is not feasible.
- Raising the levee embankment for the majority of the levee system is substantially less expensive than constructing a floodwall on top of the levee or widening the channels to address hydraulic capacity inadequacies.

- Installing a cutoff wall along the entire length of the levee system (with relief wells or seepage berms at penetration locations) is substantially more expensive than installing relief walls or constructing improved seepage berms to address insufficient foundation seepage protection.
- Construction of this alternative is more than two times the cost of Alternatives 1 and 3 (Figure 8).

Elimination from Further Consideration. This alternative does NOT meet the factors used for the practicability screening and was NOT carried forward to the aquatic resource screening.

2.2.6 Alternative 6: Construct Floodwalls on Top of Levees and Improve Seepage Berms per USACE ATR Team Design Standards

This alternative uses a combination of construction methods, including wider, thinner seepage berms, to address levee inadequacies.

Overall Purpose Screening.

- This alternative would meet FEMA design, operation, and maintenance standards and USACE 408 requirements (i.e., EM 1110-2-1913) to reduce flood risk.
- This alternative would provide certifiable levees that can be FEMA accredited.
- This alternative would provide continued eligibility in the PL 84-99 rehabilitation program.
- This alternative meets the Overall Purpose of the Project and was carried forward for practicability screening.

Practicability Screening.

- Installing relief wells at drainage locations along the levee addresses seepage mitigation needs because constructing a seepage berm across the drainage path is not feasible.
- Constructing a floodwall on top of the levee for the entire system is substantially more expensive than raising the levee embankment to address hydraulic capacity inadequacies.
- Constructing a floodwall on top of the levee for the entire system is marginally more expensive than widening the channels to address hydraulic capacity inadequacies.
- Constructing improved seepage berms for the majority of the levee system is substantially less expensive than installing relief wells or installing a cutoff wall to address insufficient foundation seepage protection.
- Construction of this alternative is approximately two times the cost of Alternatives 1 and 3 (Figure 8).

Elimination from Further Consideration. This alternative does NOT meet the factors used for the practicability screening and was NOT carried forward to the aquatic resource screening.

2.2.7 Alternative 7: Construct Floodwalls on Top of Levees and Improve Seepage Berms per Alternative USACE Design Guidance

This alternative uses a combination of construction methods, including narrower, thicker seepage berms, to address levee inadequacies.

Overall Purpose Screening

- The seepage analysis using the smaller seepage berm design does not meet the design guidelines set forth in EM 1110-2-1913, including sufficient exit gradients, which is unacceptable for Section 408 requirements.
- This alternative would NOT provide certifiable levees that can be FEMA accredited.

Elimination from Further Consideration. This alternative does NOT meet the Overall Purpose of the Project and was NOT carried forward for practicability screening.

2.2.8 Alternative 8: Construct Floodwalls on Top of Levees and Improve Seepage Berms per Combination USACE Design Guidance

This alternative uses a combination of several construction methods to address levee inadequacies and other constraining factors. As a minimization effort to reduce wetland impacts, seepage berm construction would follow the USACE ATR Team recommendations except at one location where wetland impacts could be substantially reduced by using narrower, thicker berms allowed with USACE ETL 1110-2-569 guidance.

Overall Purpose Screening.

- The seepage analysis using a narrower, thicker seepage berm design, in a select location, results in exit gradients that meet the current USACE minimum criteria. This alternative also meets FEMA design, operation, and maintenance standards and modified USACE 408 requirements to reduce flood risk.
- This alternative would provide certifiable levees that can be FEMA accredited.
- This alternative would provide continued eligibility in the PL 84-99 rehabilitation program.
- This alternative meets the Overall Purpose of the Project and was carried forward for practicability screening.

Practicability Screening.

- Installing relief wells at drainage locations along the levee addresses seepage mitigation needs because constructing a seepage berm across the drainage path is not feasible.
- Constructing a floodwall on top of the levee for the entire system is substantially more expensive than raising the levee embankment to address hydraulic capacity inadequacies.
- Constructing a floodwall on top of the levee for the entire system is marginally more expensive than widening the channels to address hydraulic capacity inadequacies.
- Constructing improved seepage berms for the majority of the levee system is substantially less expensive than installing relief wells or installing a cutoff wall to address insufficient foundation seepage protection.
- Construction of this alternative is approximately two times the cost of Alternatives 1 and 3 (Figure 8).

Elimination from Further Consideration. This alternative does NOT meet the factors used for the practicability screening and was NOT carried forward to the aquatic resource screening.

2.2.9 Alternative 9: Construct Floodwalls on Top of Levees and Install Relief Wells

This alternative uses a combination of construction methods to address levee inadequacies.

Overall Purpose Screening

- This alternative would meet FEMA design, operation, and maintenance standards and USACE 408 requirements to reduce flood risk.
- This alternative would provide certifiable levees that can be FEMA accredited.
- This alternative would provide continued eligibility in the PL 84-99 rehabilitation program.
- This alternative meets the Overall Purpose of the Project and was carried forward for practicability screening.

Practicability Screening

- Installing relief wells along the entire length of the levee system increases the Project risk and reduces the Project reliability compared to constructing improved seepage berms for the majority of the levee system to address insufficient foundation seepage protection.
- Constructing a floodwall on top of the levee for the entire levee system is substantially more expensive than raising the levee berm to address hydraulic capacity inadequacies.
- Constructing a floodwall on top of the levee for the entire system is marginally more expensive than widening the channels to address hydraulic capacity inadequacies.
- Installing relief wells along the entire length of the levee system is less expensive than installing a cutoff wall to address insufficient foundation seepage protection.
- Installing relief wells is substantially more expensive than constructing improved seepage berms for the majority of the levee system to address insufficient foundation seepage protection.
- Construction of this alternative is more than three times the cost of Alternatives 1 and 3 (Figure 8).

Elimination from Further Consideration. This alternative does NOT meet the factors used for the practicability screening and was NOT carried forward to the aquatic resource screening.

2.2.10 Alternative 10: Construct Floodwalls on Top of Levees and Install Full Cutoff Wall

This alternative is a combination of construction methods to address levee inadequacies.

Overall Purpose Screening

- This alternative would meet FEMA design, operation, and maintenance standards and USACE 408 requirements to reduce flood risk.
- This alternative would provide certifiable levees that can be FEMA accredited.
- This alternative would provide continued eligibility in the PL 84-99 rehabilitation program.
- This alternative meets the Overall Purpose of the Project and was carried forward for practicability screening.

Practicability Screening

- Installing relief wells at drainage locations along the levee addresses seepage mitigation needs because constructing a cutoff wall across the drainage path is not feasible.
- Constructing a floodwall on top of the levee for the entire levee system is substantially more expensive than raising the levee berm to address hydraulic capacity inadequacies.
- Constructing a floodwall on top of the levee for the entire system is marginally more expensive than widening the channels to address hydraulic capacity inadequacies.
- Installing a cutoff wall along the entire length of the levee system (with relief wells or seepage berms at penetration locations) is substantially more expensive than installing relief walls or constructing improved seepage berms to address insufficient foundation seepage protection.
- Construction of this alternative is more than three times the cost of Alternatives 1 and 3 (Figure 8).

Elimination from Further Consideration. This alternative does NOT meet the factors used for the practicability screening and was NOT carried forward to the aquatic resource screening.

2.2.11 Alternative 11: Widen the Existing Channel and Improve Seepage Berms per USACE ATR Team Design Standards

This alternative uses a combination of construction methods, including wider, thinner seepage berms, to address levee in adequacies by offsetting levees on one or both sides of the channels.

Overall Purpose Screening.

- This alternative would meet FEMA design, operation, and maintenance standards and USACE 408 requirements (i.e., EM 1110-2-1913) per the USACE ATR Team to reduce flood risk.
- This alternative would provide certifiable levees that can be FEMA accredited.
- This alternative would provide continued eligibility in the PL 84-99 rehabilitation program.
- This alternative meets the Overall Purpose of the Project and was carried forward for practicability screening.

Practicability Screening.

- Installing relief wells at drainage locations along the levee addresses seepage mitigation needs because constructing a seepage berm across the drainage path is not feasible.
- Modifying the surrounding infrastructure (major highways, sewer mains, bridges, and railroad crossings, etc.), in addition to the cost of additional right-of-way, would be a substantial expense.
- Widening the existing channel for the majority of the levee system is substantially more expensive than raising the levee embankment to address hydraulic capacity inadequacies.
- Widening the existing channel for the majority of the levee system is marginally less expensive than constructing a floodwall on top of the levee to address hydraulic capacity inadequacies.
- Constructing improved seepage berms for the majority of the levee system is substantially less expensive than installing relief wells or installing a cutoff wall to address insufficient foundation seepage protection.
- Construction of this alternative is approximately two times the cost of Alternatives 1 and 3 (Figure 8).

Elimination from Further Consideration. This alternative does NOT meet the factors used for the practicability screening and was NOT carried forward to the aquatic resource screening.

2.2.12 Alternative 12: Widen the Existing Channel and Improve Seepage Berms per Alternative USACE Design Standards

This alternative uses a combination of construction methods, including narrower, thicker seepage berms, to address levee in adequacies by offsetting levees on one or both sides of the channels.

Overall Purpose Screening.

- The seepage analysis using the smaller seepage berm design does not meet the design guidelines set forth in EM 1110-2-1913, including sufficient exit gradients, which is unacceptable for Section 408 requirements.
- This alternative would NOT provide certifiable levees that can be FEMA accredited.
- This alternative would provide continued eligibility in the PL 84-99 rehabilitation program until seepage deficiencies were noted during levee inspections.

Elimination from Further Consideration. This alternative does NOT meet the Overall Purpose of the Project and was NOT carried forward for practicability screening.

2.2.13 Alternative 13: Widen the Existing Channel and Improve Seepage Berms per Combination Design Standards

This alternative uses a combination of construction methods to address levee in adequacies and other constraining factors by offsetting levees on one or both sides of the channels. As a minimization effort to reduce wetland impacts, seepage berm construction would follow the USACE ATR Team recommendations except at one location where wetland impacts could be substantially reduced by using narrower, thicker berms allowed with USACE ETL 1110-2-569 guidance.

Overall Purpose Screening.

- The seepage analysis using a narrower, thicker seepage berm design, in a select location, results in exit gradients that meet the current USACE minimum criteria. This alternative also meets FEMA design, operation, and maintenance standards and modified USACE 408 requirements to reduce flood risk.
- This alternative would provide certifiable levees that can be FEMA accredited.
- This alternative would provide continued eligibility in the PL 84-99 rehabilitation program. This alternative meets the Overall Purpose of the Project and was carried forward for practicability screening.

Practicability Screening.

- Installing relief wells at drainage locations along the levee addresses seepage mitigation needs because constructing a seepage berm across the drainage path is not feasible.
- Modifying the surrounding infrastructure (major highways, sewer mains, bridges, and railroad crossings, etc.), in addition to the cost of additional right-of-way, would be a substantial expense.
- Widening the existing channel for the majority of the levee system is substantially more expensive than raising the levee embankment to address hydraulic capacity inadequacies.
- Widening the existing channel for the majority of the levee system is marginally less expensive than constructing a floodwall on top of the levee to address hydraulic capacity inadequacies.
- Constructing improved seepage berms for the majority of the levee system is substantially less expensive than installing relief wells or installing a cutoff wall to address insufficient foundation seepage protection.
- Construction of this alternative is approximately two times the cost of Alternatives 1 and 3 (Figure 8).

Elimination from Further Consideration. This alternative does NOT meet the factors used for the practicability screening and was NOT carried forward to the aquatic resource screening.

2.2.14 Alternative 14: Widen the Existing Channel and Install Relief Wells

This alternative uses a combination of construction methods to address levee in adequacies and other constraining factors by offsetting levees on one or both sides of the channels and installing relief wells.

Overall Purpose Screening.

- This alternative would meet FEMA design, operation, and maintenance standards and USACE 408 requirements to reduce flood risk.
- This alternative would provide certifiable levees that can be FEMA accredited.
- This alternative would provide continued eligibility in the PL 84-99 rehabilitation program.
- This alternative meets the Overall Purpose of the Project and was carried forward for practicability screening.

Practicability Screening.

- Installing relief wells along the entire length of the levee system increases the Project risk and reduces the Project reliability compared to constructing improved seepage berms for the majority of the levee system to address insufficient foundation seepage protection.
- Modifying the surrounding infrastructure (major highways, sewer mains, bridges, and railroad crossings, etc.), in addition to the cost of additional right-of-way, would be a substantial expense.
- Widening the existing channel for the majority of the levee system is substantially more expensive than raising the levee embankment to address hydraulic capacity inadequacies.
- Widening the existing channel for the majority of the levee system is marginally less expensive than constructing a floodwall on top of the levee to address hydraulic capacity inadequacies.
- Installing relief wells along the entire length of the levee system is less expensive than installing a cutoff wall to address insufficient foundation seepage protection.
- Installing relief wells is substantially more expensive than constructing improved seepage berms for the majority of the levee system to address insufficient foundation seepage protection.
- Construction of this alternative is more than two times the cost of Alternatives 1 and 3 (Figure 8).

Elimination from Further Consideration. This alternative does NOT meet the factors used for the practicability screening and was NOT carried forward to the aquatic resource screening.

2.2.15 Alternative 15: Widen the Existing Channel and Install Full Cutoff Wall

This alternative uses a combination of construction methods to address levee inadequacies and other constraining factors by offsetting levees on one or both sides of the channels and installing cutoff walls.

Overall Purpose Screening.

- This alternative would meet FEMA design, operation, and maintenance standards and USACE 408 requirements to reduce flood risk.
- This alternative would provide certifiable levees that can be FEMA accredited.
- This alternative would provide continued eligibility in the PL 84-99 rehabilitation program.
- This alternative meets the Overall Purpose of the Project and was carried forward for practicability screening.

Practicability Screening

- Installing relief wells at drainage locations along the levee addresses seepage mitigation needs because constructing a cutoff wall across the drainage path is not feasible.
- Modifying the surrounding infrastructure (major highways, sewer mains, bridges, and railroad crossings, etc.), in addition to the cost of additional right-of-way, would be a substantial expense.
- Widening the existing channel for the majority of the levee system is substantially more expensive than raising the levee embankment to address hydraulic capacity inadequacies.
- Widening the existing channel for the majority of the levee system is marginally less expensive than constructing a floodwall on top of the levee to address hydraulic capacity inadequacies.
- Installing a cutoff wall along the entire length of the levee system (with relief wells or seepage berms at penetration locations) is substantially more expensive than installing relief walls or constructing improved seepage berms to address insufficient foundation seepage protection.

- Construction of this alternative is approximately three times the cost of Alternatives 1 and 3 (Figure 8).

Elimination from Further Consideration. This alternative does NOT meet the factors used for the practicability screening and was NOT carried forward to the aquatic resource screening.

2.2.16 Alternative 16: Provide Channel and Overbank Modifications

This alternative modifies the channel and overbank by removing woody vegetation and replacing the overbank with short turf or by dredging the channel bottom.

Overall Purpose Screening.

- The modifications to the channel and overbank increase the hydraulic capacity by reducing the flow resistance (n value) within the channel. A comparison of the water surface elevations within Papillion Creek at each station with the existing vegetation versus the short turf at an n value of 0.03 resulted in minor decreases in water surface elevation ranging from 0.0 to 0.34 feet.
- Dredging of the channel bottom includes the removal of sediment and debris from the bottom of the system to increase the depth of the channel. Channel dredging on the Papillion Creek is not feasible due to the compact cross section of the channel and the relatively small width of the low flow channel. Dredging within the Papillion Creek would also compromise the stability of the channel banks and likely affect the performance of the existing levee prism. The Platte River is a unique corridor which includes highly dynamic sandbars that are extremely sensitive to changes within the channel. Dredging in the Platte River would not likely remain effective in reducing hydraulic capacity because of the dynamic nature of its sediment deposition and would not be a long-term solution. Along the Missouri River, navigation remains and authorized purpose of the river and the USACE's responsibility. The USACE maintains an 8 to 9-foot depth navigation channel within the Missouri River through release of water from the Mainstem Reservoir System, therefore dredging is not required for navigation purposes. While the Missouri River channel would be the most likely candidate of the three systems for dredging outside of the navigation channel, it is believed that the USACE would highly discourage any dredging that would result in sediment removal from the river cross section. Cumulatively, dredging would not provide a sufficient increase in hydraulic capacity to meet FEMA accreditation standards.
- The foundation seepage protection was not addressed with this alternative because the increase in hydraulic capacity is NOT sufficient to meet FEMA accreditation standards.
- This alternative would NOT provide a certifiable levee that can be FEMA accredited because the levee embankments would still need to be raised to provide adequate hydraulic capacity.
- This alternative would provide continued eligibility in the PL 84-99 rehabilitation program.

Elimination from Further Consideration. This alternative does NOT meet the factors used for the overall purpose screening and was NOT carried forward to practicability or aquatic resource screening.

2.2.17 Alternative 17: Provide Upstream Storage

This alternative uses off-site floodplain storage upstream of the Project to address inadequate hydraulic capacity.

Overall Purpose Screening.

- This alternative would provide flood reduction benefits in the upstream reaches of the Papillion Creek system, but would have a diminishing effect on peak discharges at the locations of the Project.
- The foundation seepage protection was not addressed with this alternative because the increase in hydraulic capacity is NOT sufficient to meet FEMA accreditation standards.

- This alternative would NOT provide a certifiable levee that can be FEMA accredited because the levee would still need to be raised to provide adequate hydraulic capacity.
- This alternative would NOT provide continued eligibility in the PL 84-99 rehabilitation program because the drainage penetrations would not be rehabilitated as required.

Elimination from Further Consideration. This alternative does NOT meet the factors used for the overall purpose screening and was NOT carried forward to practicability or aquatic resource screening.

2.2.18 Alternative 18: Provide Non-Structural Restrictions and Acquire Lands

This alternative uses flood risk management measures, such as land use restrictions, enhanced building restrictions or buyouts of buildings and property, to reduce the potential for damage and loss of life during flood events. This option is not feasible for the R-616-613 Federal Levee System because of critical infrastructure within this system (i.e., Offutt Air Force Base and the Papillion Creek Wastewater Treatment Plant). Purchase of the land within the R-613 Federal Levee System is a viable option and would require the purchase of over 2,150 acres of land.

Overall Purpose Screening.

- This alternative would not allow the local sponsor and present landowners to continue existing use of the associated land within the R-613 Federal Levee System and would likely place portions of U.S. Highway within a floodway and extended floodplain.
- This alternative would provide a certifiable levee that can be FEMA accredited for the R-616-613 Federal Levee System, but NOT for the R-613 Federal Levee System.
- This alternative would NOT provide continued eligibility in the PL 84-99 rehabilitation program because the drainage penetrations would not be rehabilitated as required.

Practicability Screening.

- This alternative would NOT meet FEMA design, operation, and maintenance standards, or USACE 408 requirements for the R-613 Federal Levee System.
- This alternative would NOT provide certifiable levees that can be FEMA accredited for the R-613 Federal Levee System.
- Purchasing all the land within the R-613 Federal Levee System and raising levee embankment and improving seepage berms per combination design standards for the R-616-613 Federal Levee System is substantially more expensive than raising levee embankments and improving seepage berms per combination design standards for both levee systems.

Elimination from Further Consideration. This alternative does NOT meet the factors used for the practicability screening and was NOT carried forward to the aquatic resource screening.

2.2.19 Alternative 19: No Action Alternative

Overall Purpose Screening.

- This alternative would NOT meet FEMA design, operation, and maintenance standards, or USACE 408 requirements.
- This alternative would NOT provide certifiable levees that can be FEMA accredited.
- This alternative would NOT provide continued eligibility in the PL 84-99 rehabilitation program because the drainage penetrations would not be rehabilitated as required.

Alternative Carried Forward. The No Action Alternative does not meet the Overall Purpose of the Project; however, this alternative was carried forward for further practicability and aquatic resource screening, and is discussed in subsequent sections in order to establish a baseline for comparison of the proposed action.

2.3 Summary of Purpose and Practicability Screening

Screening levels one (Purpose) and two (Practicability) are summarized in **Table 1.** While 12 of the 19 alternatives met the project purpose, only two met the practicability screening based on project costs and logistics. **Figure 8** is a comparison of construction costs ranging from a low of approximately $20 million to a high of approximately $80 million. Alternatives that passed the Purpose and Practicability Screenings were **Alternative 1** (Raise levee embankment and improve seepage berms per USACE ATR team design standards) and **Alternative 3** (Raise levee embankment and improve seepage berms per combination design standards). These alternatives were carried forward to the Aquatic Resources Screening (Level 3).

Table 1
ALTERNATIVES ANALYSIS: SUMMARY OF THE PURPOSE AND PRACTICABILITY SCREENINGS

	ALTERNATIVES	Meets Purpose	Meets Practicability	
		OVERALL PROJECT PURPOSE *To provide levees that will be certifiable and FEMA accredited.*	LOGISTICS FACTOR *Construction Capability*	COST FACTOR *Construction Costs (Estimated Overall Cost in Millions)*
1	Raise Levee Embankment & Improve Seepage Berms per USACE ATR Team Design Standards	Yes	Yes	Yes ($22.6)
2	Raise Levee Embankment & Improve Seepage Berms per Alternative USACE Design Standards	No	N/A	N/A
3	Raise Levee Embankment & Improve Seepage Berms per Combination Design Standards	Yes	Yes	Yes ($22.6)
4	Raise Levee Embankment & Install Relief Wells	Yes	No	No[1] ($49.9)
5	Raise Levee Embankment & Install Full Cutoff Wall	Yes	Yes	No[1] ($60.4)
6	Construct Floodwall on Top of Levees & Improve Seepage Berms per USACE ATR Team Design Standards	Yes	Yes	No[1] ($40.9)
7	Construct Floodwall on Top of Levees & Improve Seepage Berms per Alternative USACE Design Standards	No	N/A	N/A
8	Construct Floodwall on Top of Levees & Improve Seepage Berms per Combination Design Standards	Yes	Yes	No[1] ($40.8)
9	Construct Floodwall on Top of Levees & Install Relief Wells	Yes	No	No[1] ($68.1)
10	Construct Floodwall on Top of Levees & Install Full Cutoff Wall	Yes	Yes	No[1] ($78.7)
11	Widen the Existing Channel & Improve Seepage Berms per USACE ATR Team Design Standards	Yes	Yes	No[1] ($39.4)
12	Widen the Existing Channel & Improve Seepage Berms per Alternative USACE Design Standards	No	N/A	N/A
13	Widen the Existing Channel & Improve Seepage Berms per Combination Design Standards	Yes	Yes	No[1] ($39.3)
14	Widen the Existing Channel & Install Relief Wells	Yes	No	No[1] ($57.6)
15	Widen the Existing Channel & Install Full Cutoff Wall	Yes	Yes	No[1] ($66.6)
16	Provide Channel and Overbank Modifications	No	N/A	N/A
17	Provide Upstream Storage	No	N/A	N/A
18	Provide Non-Structural Restrictions and/or Acquire Land	No for R-613/ Yes for R-616-613	Yes	No[1] ($39.9)
19	No Action	No	N/A	N/A

[1] *See **Figure 8** for Overall Construction Costs comparison.*

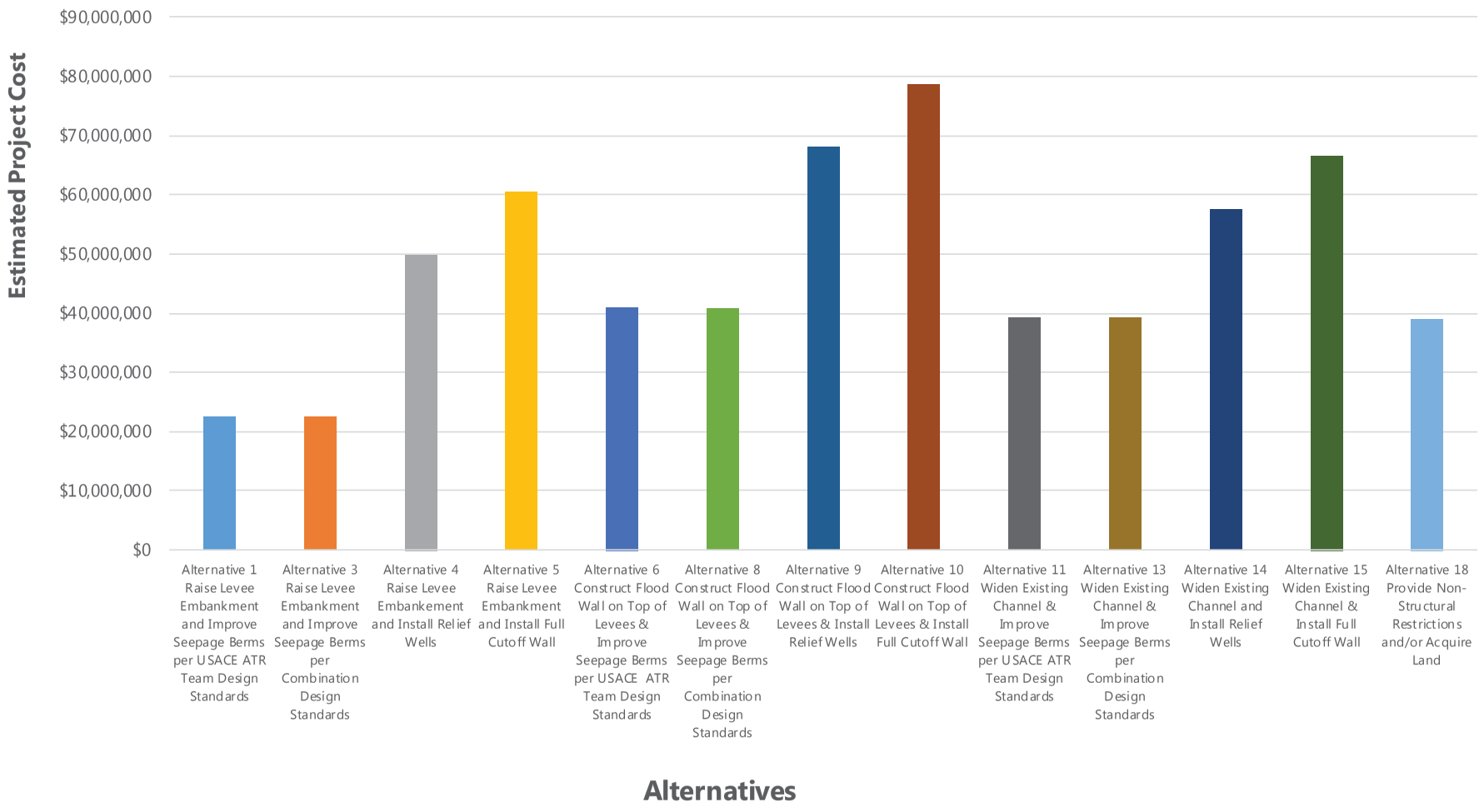


Figure 8 – OVERALL CONSTRUCTION COSTS FOR ALTERNATIVES MEETING THE PROJECT PURPOSE

2.4 Aquatic Resources Screening of Alternatives

Alternatives 1 and 3 were further evaluated in a third screening for impacts to aquatic resources (WOUS, including wetlands). This section presents the existing aquatic resource conditions and the expected outcomes or impacts of each alternative carried forward, except for the No Action Alternative (see Section 3.10).

Existing Conditions. Felsburg Holt & Ullevig (FHU) completed a wetland delineation for the Project on 1 October 2015 and 28-29 September 2017 (FHU 2017). The area of the delineations is shown in Figure 9 and encompasses more than the expected Project footprint. On the land side, the delineation generally covered 150 feet from the expected limits of construction. The river side was delineated along portions of the Papillion Creek Left Bank and Right Bank Segments.

Based on the delineations, there are approximately 8.36 acres of wetlands located along the land side of the R-616-613 Federal Levee System; 23.29 acres of wetlands located along the land side of the R-613 Federal Levee System; 5.51 acres of wetlands located along the river side of the R-613 Papillion Creek Left and Right Bank Segments; and a total of 37.16 acres of wetlands for the entire delineated area. The field investigation identified several wetland types:

Palustrine Emergent Temporarily or Seasonally Flooded (PEMA/PEMC) Wetlands. Palustrine emergent wetlands were the most abundant type in the delineation area. The majority of these wetlands are of low to moderate quality because they are generally small and fragmented and support a low diversity of native plant species. PEMA/PEMC wetlands can be divided into four general categories in the environmental study area:

- *Vegetated Drainage Ditches and Fringe Wetlands* – Many wetlands occur in vegetated ditches that convey drainage under the levees or adjacent to the levees, or as fringe wetlands along channels or open water locations. Nearly all of the wetlands identified along the Missouri River levee are of this type.
- *Depressions* – Isolated depressions are found throughout the delineation area. These are generally located along the toe of the levee slopes, where no drainage outlet is present. Other depressions occur in areas bounded on at least two sides by manmade structures, such as between the waste water treatment facility service road and gravel lot, and the Papillion Creek levee.
- *Seep Wetlands* – Along the river side of Papillion Creek, wetlands occur in isolated pockets on the upper benches of the channel where they appear to be maintained by seepage from wetlands on the land side of the levee. These wetlands appear as patches of reed canarygrass with standing water and obligate hydrophytes present.
- *Farmed Wetlands* – Farmed wetlands are located in fields adjacent to Papillion Creek and one farmed wetland was located at the confluence of the Missouri and Platte rivers.

Palustrine Emergent Semi-Permanently Flooded (PEMF) Wetlands. A closed depression area near the Missouri River levee, north of Papillion Creek and south of Cunningham Road, appears to be semi-permanently flooded in most years.

Palustrine Scrub-Shrub (PSS) Wetlands. Shrub/scrub wetland is located in a depression between the east roadside ditch of Fort Crook Road and an agricultural field south of Papillion Creek.

Palustrine Forested (PFO) Wetlands. Forested wetland is located along a natural drainageway at the confluence of the Missouri and Platte rivers, land side of the levee.

Open Water (OW). There are two open water (OW) resources in the delineation area. One pond is an oxbow lake located on the land side of R-616 Missouri River Right Bank Segment, north of Papillion Creek. A small sandpit lake is located near the west end of the R-613 Platte River Left Bank Segment on the land side. Both open water areas support a vegetated PEMA/PEMC fringe.

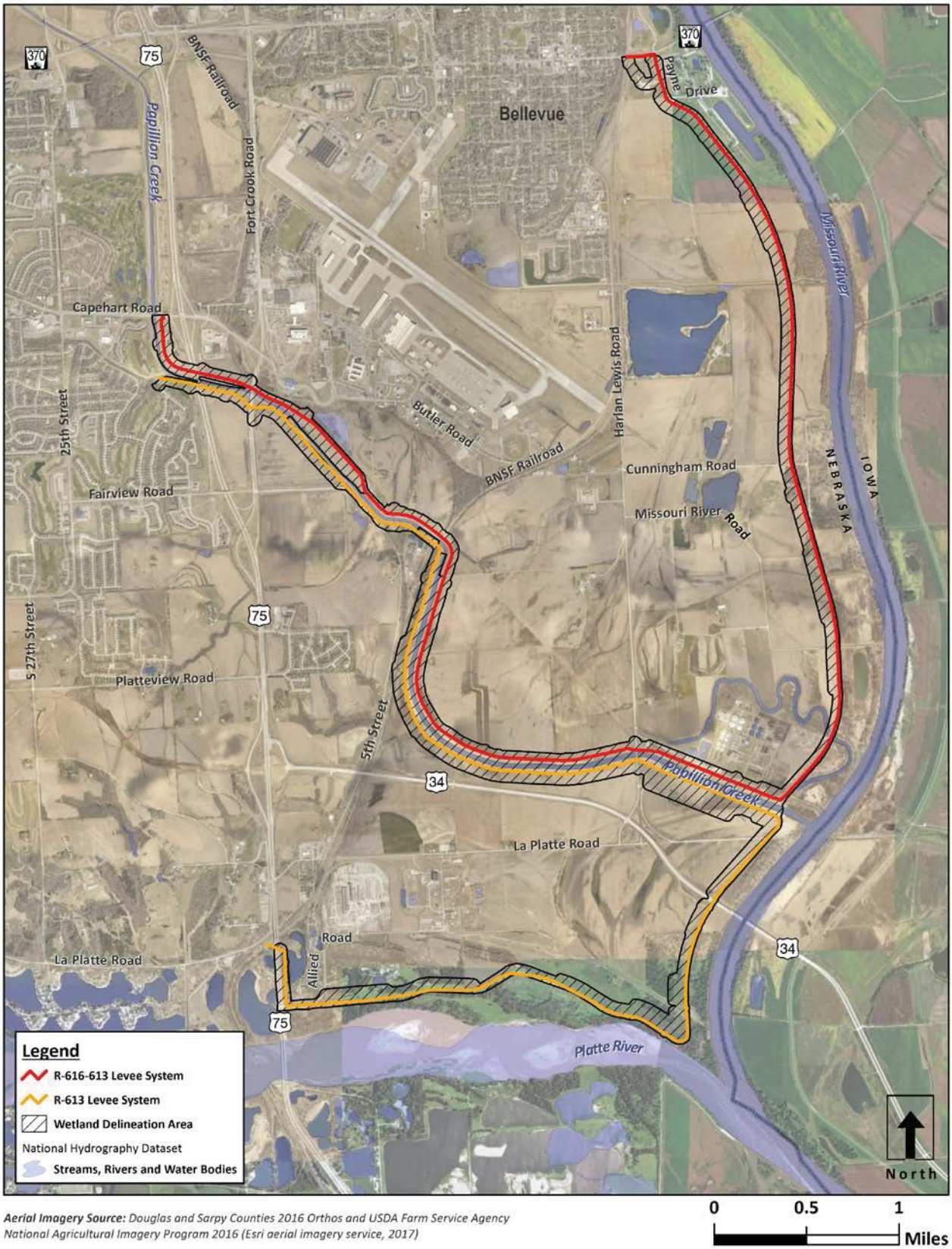


Figure 9 – WETLAND DELINEATION AREA

WOUS Channels. While the Missouri and Platte rivers are WOUS, they are outside the delineation area. Channels with bed and bank characteristics, and defined ordinary high water mark (OHWM), occur in some of the drainage ditches associated with levee drainage penetrations on the land side of the levee.

OHWM on Papillion Creek. Papillion Creek has experienced thalweg degradation over the years, which is likely from a combination of upstream development and Missouri River changes contributing to an increase in side-slope sloughing. Due to the steep nature of the side slopes of the Papillion Creek channel lower banks, a conservative estimation was made utilizing the 1.6-year flood event to ascertain the approximate OHWM elevation along Papillion Creek. The USACE Hydrologic Engineering Center Statistical Software Package (HEC-SSP) was utilized to compute the 1.6-year stage from the Fort Crook Road U.S. Geological Service (USGS) Gage (USGS 06610795 Papillion Creek at Fort Crook, Nebraska). The 1.6-year stage was used to interpolate a corresponding average discharge for the hydraulic cross section at the Fort Crook gage location (see the Papillion Creek Hydraulic Report for information on the HEC-RAS Model for this analysis). The same hydraulic model was then used to route the 1.6-year discharge and develop elevations along the entire length of the creek, downstream from Capehart Road. It is recognized that the Missouri River also provides a 1.6-year elevation that could impact a downstream portion of the Papillion Creek; however, the Papillion Creek modeled 1.6-year event did not drop below the 1.6-year event on the Missouri River.

Impacts of Alternative 1 (Raise levee embankment and improve seepage berms per USACE ATR team design standards). Wetland fills would be expected in areas with levee embankment raises and improvements to seepage berms. Channel impacts would be expected along Papillion Creek where bank stabilization is needed for drainage penetration outlet repairs and replacements. This alternative would also require cut in wetlands on the river side of Papillion Creek to restore the original design cross sections and to improve hydraulic capacity of the channel. Unavoidable impacts for each levee system are listed in Table 2 and total 6.370 acres of PEMA/PEMC, 0.022 acres of PEMF, 0.900 acres of Farmed PEM, 0.008 acres of PSSA, and 0.711 acres of PFOA wetlands, in addition to 1143 linear feet of channel.

Impacts of Alternative 3 (Raise levee embankment and improve seepage berms per combination design standards). Wetland fills would be expected in areas with levee embankment raises and improvements to seepage berms; however, the use of narrower, thicker berms would reduce the fill area. Channel impacts would be expected along Papillion Creek where bank stabilization is needed for drainage penetration outlet repairs and replacements. This alternative also would require cut in wetlands on the river side of Papillion Creek to remove sediment deposits, and restore the original design cross sections to improve hydraulic capacity of the channel. Unavoidable impacts for each levee system are listed in Table 2 and total 6.065 acres of PEMA/PEMC, 0.022 acres of PEMF, 0.892 acres of Farmed PEM, 0.008 acres of PSSA, and 0.026 acres of PFOA wetlands, in addition to 1143 linear feet of channel. Wetland and channel impact locations are shown on map figures in Appendix C.

2.5 Summary of Aquatic Resources Screening

Minimization efforts to avoid wetland impacts using narrower and thicker seepage berms in limited areas (combination method), resulted in Alternative 3 having fewer wetland impacts than Alternative 1 (which follows the stricter USACE seepage berm standard). Table 2 summarizes impacts from both alternatives and shows while channel impacts are identical, wetland impacts are approximately 7.013 ac for Alternative 3 compared to approximately 8.011 ac for Alternative 1. Therefore, Alternative 3 was selected as the Preferred Alternative (Proposed Action) and carried forward for further evaluation in the EA along with Alternative 19 (No Action). This alternatives analysis also demonstrates that Alternative 3, the Proposed Action, would be the least environmentally damaging practicable alternative (LEDPA). Further information on the environmental impacts analyses is provided in Section 3.0.

Table 2
ALTERNATIVES ANALYSIS: SUMMARY OF AQUATIC RESOURCES SCREENING

APPROXIMATE STATION(S) (and Type of Aquatic Resource)	MAP SHEET NUMBER (Appendix C)	AQUATIC RESOURCE IMPACTS (Wetland impacts in acres [ac]; Channel impacts in feet [ft])		DESCRIPTION OF IMPACT
		ALT 1	ALT 3	
R-616-613 Federal Levee System				
49+62 to 50+09 (PEMA/PEMC, Wetland 18)	1	0.024 ac	0.024 ac	Fill for levee embankment and seepage berm improvements
70+85 to 70+92 (PEMA/PEMC, Wetland 16)	1	0.001 ac	0.001 ac	Fill for levee embankment and seepage berm improvements
76+27 to 77+45 (PEMA/PEMC, Wetland 14)	1	0.058 ac	0.058 ac	Fill for levee embankment and seepage berm improvements
94+49 to 95+67 (PEMA/PEMC, Wetland11A)	2	0.045 ac	0.045 ac	Fill for levee embankment and seepage berm improvements
94+65 to 95+50 (PEMF, Wetland 11B)	2	0.022 ac	0.022 ac	Fill for levee embankment and seepage berm improvements
127+03 to 127+62 (PEMA/PEMC, Wetland 7)	2	0.023 ac	0.023 ac	Fill for levee embankment and seepage berm improvements
236+35 to 237+10 (PEMA/PEMC, Wetland 22)	3	0.047 ac	0.047 ac	Fill for levee embankment and seepage berm improvements
240+13 to 241+66 (PEMA/PEMC, Wetland 25)	3	0.093 ac	0.093 ac	Fill for levee embankment and seepage berm improvements
249+90 (channel)	3	50 ft	50 ft	Rip rap for bank stabilization
272+68 to 274+64 (PEMA/PEMC, Wetland 32)	3 & 4	0.037 ac	0.037 ac	Fill for levee embankment and seepage berm improvements
278+07 to 278+59 (PEMA/PEMC, Wetland 34)	4	0.010 ac	0.010 ac	Fill for levee embankment and seepage berm improvements
278+51 to 278+87 (PEMA/PEMC, Wetland 35)	4	0.021 ac	0.021 ac	Excavation, fill, and rip rap for culvert extension and reconstructing head walls at drainage penetration culvert repair
278+51 to 278+87 (Channel 35)	4	33 ft	33 ft	Fill for culvert extension.
278+64 (channel)	4	50 ft	50 ft	Rip rap for bank stabilization
290+27 to 292+95 (PEMA/PEMC, Wetland 37)	4	0.236 ac	0.236 ac	Excavation to restore original design cross sections and to improve hydraulic capacity of the channel
323+58 (channel)	5	50 ft	50 ft	Rip rap for bank stabilization
395+80 (channel)	7	50 ft	50 ft	Rip rap for bank stabilization
395+80 to 395+93 (PEMA/PEMC, Wetland 49)	7	0.004 ac	0.004 ac	Excavation and fill for drainage penetration ditch reshaping
412+91 (channel)	7	50 ft	50 ft	Rip rap for bank stabilization
426+29 to 426+72 (PEMA/PEMC, Wetland 51)	7	0.052 ac	0.052 ac	Excavation to restore original design cross sections and to improve hydraulic capacity of the channel

APPROXIMATE STATION(S) (and Type of Aquatic Resource)	MAP SHEET NUMBER (Appendix C)	AQUATIC RESOURCE IMPACTS (Wetland impacts in acres [ac]; Channel impacts in feet [ft])		DESCRIPTION OF IMPACT
		ALT 1	ALT 3	
429+34 to 441+28 (PEMA/PEMC, Wetland 53)	7	3.406 ac	3.406 ac	Excavation to restore original design cross sections and to improve hydraulic capacity of the channel
442+11 to 442+59 (PEMA/PEMC, Wetland 53)	7	0.056 ac	0.056 ac	Excavation to restore original design cross sections and to improve hydraulic capacity of the channel
451+61 (channel)	8	50 ft	50 ft	Rip rap for bank stabilization
458+75, 459+81, 460+02 (channel)	8	150 ft	150 ft	Rip rap for bank stabilization
463+75 (channel)	8	50 ft	50 ft	Rip rap for bank stabilization
470+52 (channel)	8	50 ft	50 ft	Rip rap for bank stabilization
483+88 (channel)	8	50 ft	50 ft	Rip rap for bank stabilization
499+75 (channel)	8	50 ft	50 ft	Rip rap for bank stabilization
Wetland Subtotal		4.135 ac	4.135 ac	
Channel Subtotal		683 ft	683 ft	
				R-613 Federal Levee System
117+74 to 119+73 (PEMA/PEMC, Wetland 149)	9	0.043 ac	0.043 ac	Fill for levee embankment and seepage berm improvements
178+86 to 192+18 (PEMA/PEMC, Wetland 139)	9	0.857 ac	0.552 ac	Fill for levee embankment and seepage berm improvements
181+28 to 183+60 (PFOA, Wetland 141)	9	0.711 ac	0.026 ac	Fill for levee embankment and seepage berm improvements
192+18 to 192+50 (Farmed PEM, Wetland 137)	9	0.008 ac	-	Fill for levee embankment and seepage berm improvements
242+29 to 242+98 (PEMA/PEMC, Wetland 130)	3	0.019 ac	0.019 ac	Fill for levee embankment
243+06 to 243+25 (PEMA/PEMC, Wetland 130)	3	0.004 ac	0.004 ac	Fill for levee embankment
243+09 to 246+14 (Farmed PEM, Wetland 132)	3	0.302 ac	0.302 ac	Fill for levee embankment and seepage berm improvements
256+37 (channel)	3	50 ft	50 ft	Rip rap for bank stabilization
256+03 to 256+57 (PEMA/PEMC, Wetland 127)	3	0.005 ac	0.005 ac	Fill for levee embankment and seepage berm improvements
274+39 to 275+77 (Farmed PEM, Wetland 124)	4	0.310 ac	0.310 ac	Fill for levee embankment and seepage berm improvements
286+90 (channel)	4	50 ft	50 ft	Rip rap for bank stabilization
303+35 to 304+37 (Farmed PEM, Wetland 121)	4	0.170 ac	0.170 ac	Fill for levee embankment and seepage berm improvements
315+23 to 324+32 (PEMA/PEMC, Wetland 119)	5	0.504 ac	0.504 ac	Fill for levee embankment and seepage berm improvements
339+59 to 340+51 (Farmed PEM, Wetland 117)	5	0.110 ac	0.110 ac	Fill for levee embankment and seepage berm improvements
343+02 (channel)	5	50 ft	50 ft	Rip rap for bank stabilization

APPROXIMATE STATION(S) (and Type of Aquatic Resource)	MAP SHEET NUMBER (Appendix C)	AQUATIC RESOURCE IMPACTS (Wetland impacts in acres [ac]; Channel impacts in feet [ft])		DESCRIPTION OF IMPACT
		ALT 1	ALT 3	
360+79 to 361+00 (PEMA/PEMC, Wetland 111)	5	0.020 ac	0.020 ac	Excavation and fill for culvert extension and drainage penetration ditch reshaping
360+84 (channel)	5	50 ft	50 ft	Rip rap for bank stabilization
361+57 to 361+72 (PEMA/PEMC, Wetland 112)	5	0.009 ac	0.009 ac	Fill for levee embankment and seepage berm improvements
362+74 to 367+70 (PEMA/PEMC, Wetland 109)	6	0.375 ac	0.375 ac	Excavation to restore original design cross sections and to improve hydraulic capacity of the channel
379+41 to 380+32 (PEMA/PEMC, Wetland 108)	6	0.013 ac	0.013 ac	Fill for levee embankment
385+65 to 387+77 (PEMA/PEMC, Wetland 109)	6	0.145 ac	0.145 ac	Excavation to restore original design cross sections and to improve hydraulic capacity of the channel
389+41 (channel)	6	50 ft	50 ft	Rip rap for bank stabilization
409+34 to 410+45 (PEMA/PEMC, Wetland 101)	7	0.013 ac	0.013 ac	Fill for levee embankment
410+66 (channel)	7	50 ft	50 ft	Rip rap for bank stabilization
415+83 to 416+14 (PEMA/PEMC, Wetland 99)	7	0.004 ac	0.004 ac	Fill for levee embankment
417+07 (channel)	7	50 ft	50 ft	Rip rap for bank stabilization
431+43 (channel)	7	50 ft	50 ft	Rip rap for bank stabilization
432+96 to 433+55 (PEMA/PEMC, Wetland 94)	7	0.006 ac	0.006 ac	Fill for levee embankment
451+30 to 459+65 (PEMA/PEMC, Wetland 93)	8	0.194 ac	0.194 ac	Fill for levee embankment
465+94 to 466+12 (PEMA/PEMC, Wetland 161)	8	0.039 ac	0.039 ac	Fill for access road embankment
465+97 to 466+04 (PSSA, Wetland 160)	8	0.008 ac	0.008 ac	Fill for access road embankment
476+51 to 476+94 (PEMA/PEMC, Wetland 86)	8	0.007 ac	0.007 ac	Excavation, fill, and culvert extension at drainage penetration culvert repair
476+61 (channel)	8	50 ft	50 ft	Rip rap for bank stabilization
476+67 (Channel 86)	8	10 ft	10 ft	Fill for culvert extension.
Wetland Subtotal		3.878 ac	2.878 ac	
Channel Subtotal		460 ft	460 ft	
WETLAND TOTAL		8.011 ac	7.013 ac	
CHANNEL TOTAL		1143 ft	1143 ft	

2.6 Alternatives to be Carried Forward

This section provides a description of the two alternatives carried forward for environmental review: Alternative 3, the Proposed Action, and Alternative 19, the No Action alternative.

2.6.1 Alternative 3 – Proposed Action

The Proposed Action includes several construction components to address inadequate hydraulic capacity and insufficient seepage protection of the R-616-613 and R-613 Federal Levee Systems. These modifications will allow the levee systems to be certifiable, meet FEMA accreditation criteria, and provide continued eligibility in the PL 84-99 rehabilitation program. Levee rehabilitation would include:

- Raising the levee embankment
- Improving seepage berms per the USACE ATR team design recommendations except at one location where wetland impacts would be reduced substantially by using shorter, thicker berms
- Installing relief wells or extending drainage penetrations at select drainage locations
- Widening the existing levee channel at limited locations
- Floodwall installation at limited locations

Construction components are detailed below.

R-616-613 Federal Levee System. To address inadequate hydraulic capacity, the levee embankment crest would be widened up to 12 feet in locations of crest raises and raised to meet freeboard requirements (Figure 3) by extending the river side slope, which minimizes fill and disturbance to the leveed channel interior (i.e., the river or stream channel) (Figure 7). A floodwall approximately 1.5 feet in height would be placed on top of the levee crest on the R-613 Papillion Creek Left Bank Segment that parallels the UP Railroad and Offutt AFB to address inadequate hydraulic capacity. The floodwall would be used instead of raising the levee crest because additional right-of-way is not available for purchase or construction and PMRNRD does not have condemnation rights for federal property. These embankment alterations would also include concrete bike path removal and replacement. The R-616 Missouri River Right Bank would not be raised because it already provides adequate freeboard required for certification and FEMA accreditation.

To address insufficient foundation seepage protection, land side seepage berm construction (some on top of existing seepage berms) would be implemented, in which the USACE design standards require a minimum 150-foot width from the levee centerline. Table 3 shows the footprint (in feet) that is proposed for all levee berms and levee fixes.

Modifications to the R-616-613 closure section (under N-370, Figure 1), currently being coordinated with BNSF, would require permanent footings and removable supports to accommodate a stop log closure across the tracks.

Drainage penetration culvert (also referred to as drainage penetration) replacement and repairs are anticipated along the R-613 Papillion Creek Left Bank Segment (Figure 1). Clearing, grubbing, surveying, and staking would occur to prepare for culvert installation, repair, and replacement, including bank stabilization and shaping along Papillion Creek. These culvert improvements consist of the following:

- One culvert replacement
- Three culvert outlet replacements (along Offutt AFB)
- Five culvert repairs
- Four culverts receiving bank stabilization

No replacements or repairs are planned for the six drainage penetration culverts on the R-616 Missouri River Right Bank Segment.

Table 3
EXISTING AND FUTURE FOOTPRINT
R-616-613 FEDERAL LEVEE SYSTEM

LEVEE STATION	EXISTING (feet)	PROPOSED (feet)	EXPANSION (feet)	LEVEE STATION	EXISTING (feet)	PROPOSED (feet)	EXPANSION (feet)
00+00	147	147	0	260+00	73	97	24
10+00	117	117	0	270+00	81	110	29
20+00	120	120	0	280+00	34	143	109
30+00	120	120	0	290+00	72	72	0
40+00	209	209	0	300+00	88	90	2
50+00	218	218	0	310+00	68	78	10
60+00	203	203	0	320+00	97	101	4
70+00	201	201	0	330+00	73	79	6
80+00	201	201	0	340+00	70	73	3
90+00	214	214	0	350+00	71	77	6
100+00	200	200	0	360+00	83	83	0
110+00	196	196	0	370+00	95	95	0
120+00	201	201	0	380+00	85	204	119
130+00	206	206	0	390+00	108	108	0
140+00	203	203	0	400+00	114	117	3
150+00	250	250	0	410+00	118	118	0
160+00	319	319	0	420+00	98	98	0
170+00	296	296	0	430+00	125	126	1
180+00	295	295	0	440+00	112	132	20
190+00	201	201	0	450+00	122	122	0
200+00	280	280	0	460+00	74	74	0
210+00	177	177	0	470+00	102	114	12
220+00	305	305	0	480+00	106	130	24
230+00	118	118	0	490+00	77	89	12
240+00	88	207	119	500+00	105	105	0
250+00	72	104	32				

R-613 Federal Levee System. To address inadequate hydraulic capacity, the levee embankment crest would be widened between 12 to 14 feet and raised to meet freeboard requirements (Figure 4) by extending the river side slope (Figure 7), which minimizes fill and disturbance to the leveed channel interior. In the section where the channel parallels the UP Railroad on the left bank, the R-613 Papillion Creek Right Bank Segment will be setback to widen the channel and minimize the floodwall extents on R-613 Papillion Creek Left Bank.

To address insufficient foundation seepage protection, land side seepage berm construction (some on top of existing seepage berms) would be implemented, in which the USACE design standards require a 150-foot width from the levee centerline, except at areas where wetland impacts could be reduced by placing shorter, thicker berms. Table 4 shows the footprint (in feet) that is proposed for all levee berms and levee fixes.

Table 4
EXISTING AND FUTURE FOOTPRINT
R-613 FEDERAL LEVEE SYSTEM

LEVEE STATION	EXISTING (feet)	PROPOSED (feet)	EXPANSION (feet)	LEVEE STATION	EXISTING (feet)	PROPOSED (feet)	EXPANSION (feet)
20+00	39	53	14	260+00	156	156	0
30+00	0	47	47	270+00	156	156	0
40+00	0	248	248	280+00	78	202	124
50+00	52	55	3	290+00	100	205	105
60+00	261	261	0	300+00	83	212	129
70+00	236	236	0	310+00	84	210	126
80+00	151	151	0	320+00	78	206	128
90+00	151	151	0	330+00	78	202	124
100+00	70	70	0	340+00	80	201	121
110+00	70	70	0	350+00	81	206	125
120+00	70	70	0	360+00	92	210	118
130+00	70	156	86	370+00	88	95	7
140+00	70	156	86	380+00	100	104	4
150+00	321	321	0	390+00	72	72	0
160+00	321	321	0	400+00	88	92	4
170+00	341	341	0	410+00	115	117	2
180+00	84	108	24	420+00	79	79	0
190+00	83	108	25	430+00	76	76	0
200+00	84	158	74	440+00	97	126	29
210+00	114	156	42	450+00	101	129	28
220+00	115	156	41	460+00	102	118	16
230+00	247	247	0	470+00	94	94	0
240+00	248	248	0	480+00	93	93	0
250+00	156	156	0	490+00	82	84	2

Modifications to the R-613 Platte River Left Bank Segment closure section (under US-75, Figure 1) are currently being coordinated with BNSF and UP Railroad, with a temporary sandbag closure proposed. Drainage penetration culvert replacements and modifications to the closure section are required to accommodate the freeboard requirements. The existing levee tieback, which runs under the southbound lane of US-75, is anticipated to shift to the east to fall under the NDOT proposed Allied Road cross section until it meets the R-613 Platte River Left Bank Segment (south of existing Allied Road). A tieback levee extends from the main levee along a river or stream channel to higher ground and is part of the line of protection. Clearing, grubbing, surveying, and staking would occur to prepare for a new pipe culvert to be installed along the section parallel to Allied Road. One relief well would be replaced at a drainage penetration inlet on the R-613 Platte River Left Bank Segment.

No replacements or repairs are planned for drainage penetration culverts on the R-613 Missouri River Right Bank Segment.

Additional improvements on the R-613 Papillion Creek Right Bank Segment would include minor concrete golf path removal at Tregaron Golf Course (west of US-75, on the land side of the levee). Drainage penetration culvert outlet replacement and repairs are anticipated along the R-613 Papillion Creek Right Bank Segment. Surveying and staking would occur to prepare for culvert installation, repair, and outlet replacement, along with bank stabilization and shaping within Papillion Creek.

These culvert improvements consist of the following:

- One culvert outlet replacement
- Five culvert repairs
- Three culverts receiving bank stabilization

Four relief wells would be replaced at drainage penetrations on R-613 Papillion Creek Right Bank Segment.

R-616-613 and R-613 Federal Levee Systems. The following proposed construction activities would apply to both the R-616-613 and R-613 Federal Levee Systems. On the land side, grading and tree removal would occur up to 15 feet beyond the footprint of the levee and/or seepage berm improvements. On the river side, tree removal would occur within 15 feet of the existing levee toe. Minimal embankment shaping at access ramp locations would also occur on the river side. Along Papillion Creek, plans to re-grade on the river side of the levees include reshaping the channel bench areas to remove sediment deposits and restore the original design cross section to improve hydraulic capacity of the channel. Soil removed from these channel bench areas has been proposed for use as fill material for levee embankment and seepage berm modifications.

Bulldozers and graders would be used to place fill for the embankments and seepage berms. All disturbed areas beyond the levee toe would be seeded with a native grass mixture containing little bluestem (*Schizachyrium scoparium*), sideoats grama (*Bouteloua curtipendula*), blue grama (*B. gracilis*), western wheatgrass (*Pascopyrum smithii*), Virginia wildrye (*Elymus virginicus*), Canada wildrye (*Elymus canadensis*), switchgrass (*Panicum virgatum*), and tall fescue (*Schedonorus arundinaceus*), as well as a cover crop of oats. The levee embankment would be reseeded with a smooth brome, tall fescue, and switchgrass mix. Several methods of erosion control would be used during levee improvements, such as barriers and wattles, erosion checks, inlet/outlet protection, mulching, post-construction erosion control, rolled erosion control, and vegetation. There would be minor gate/fence removal and replacement, and minor access road/turnaround grading. Areas without a concrete bike trail would be resurfaced with crushed rock. The removal and replacement of culverts would adhere to the following timing restrictions, which are mandated by USACE for continuous flood protection:

- Breaching of the levee for penetration removal and replacement during the summer months (April 1 through August 1) is not permissible unless a full height ring levee section is constructed.
- Breaching during the winter months will be permitted and will require an emergency action plan and construction of a 10-year temporary ring levee constructed with a base geometry to allow raising to full height should it be required.

Borrow Material. The source of borrow for the Project is anticipated to be on-site, and taken from high bench areas of sediment deposition along Papillion Creek where the channel will be widened to the original design cross section to increase hydraulic capacity (see Appendix D for Construction Plan Sheets). All excavation will be above the OHWM. Borrow will be stockpiled in upland locations as shown on Figure 10 until needed for construction of the levee raises and seepage berms. The lowered embankment areas along Papillion Creek would be reshaped similar to the existing irregular topography, and seeded in native grasses.

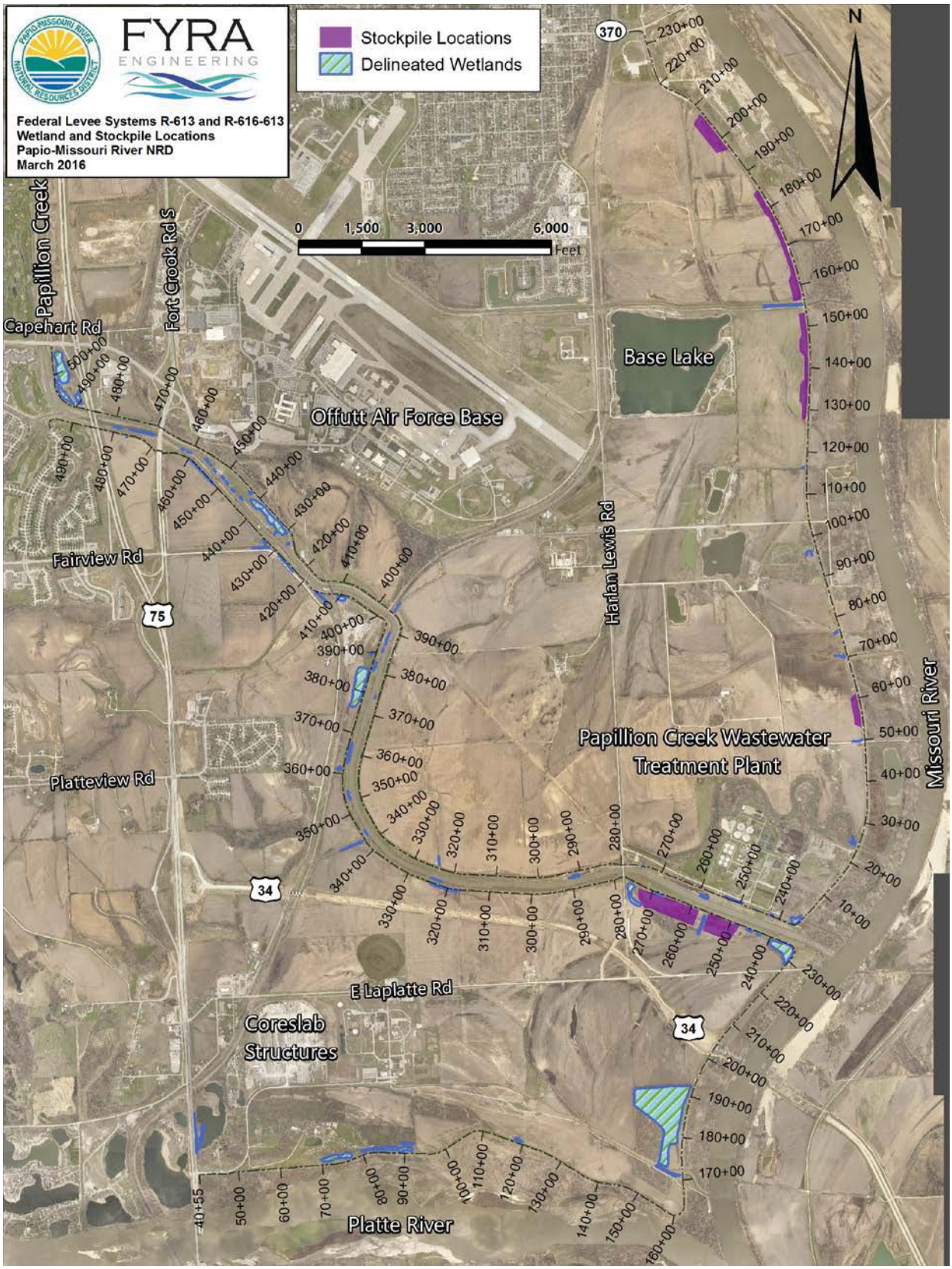


Figure 10 – STOCKPILE LOCATIONS

Avoidance, Minimization, and Mitigation/Offset of Impacts. The following best management practices (BMPs) will be used to avoid or minimize impacts to resources associated with the Proposed Action (section and resource indicated in parentheses):

- Wetting construction areas, reducing equipment idling, and covering or mulching staging areas (Section 3.3, Air)
- Limiting construction to daylight and reducing equipment idling (Section 3.4, Noise)
- Cleaning of equipment before travel to and from construction areas and seeding disturbed areas with native seed mixtures (Section 3.5, Vegetation and Invasive Species)
- Implementing erosion control methods (barriers and wattles, erosion checks, inlet/outlet protection, mulching, post-construction erosion control, rolled erosion control, and vegetation), containing spillage of contaminants, and preparation of a Storm Water Pollution Prevention Plan (SWPPP) (Section 3.9, Water Quality)
- Requiring the contractor to monitor and report hazardous materials concerns, in addition to inspecting materials removed from the ground that would come into contact with workers (Section 3.15, Hazardous Materials)
- Stopping work if contaminated or hazardous materials are encountered during construction or caused by construction activities (Section 3.15, Hazardous Materials)

Impacts to bench wetlands on the river side of Papillion Creek will be temporary and are expected to reestablish on-site. Wetland impacts on the land side of the levees will be offset by the creation of wetlands at an off-site permittee responsible site located within the Papillion Creek watershed along West Papillion Creek at Rumsey Station just outside the recommended 5-mile Offutt AFB Aircraft Strike Hazard zone. Compensatory mitigation would ensure a no net-loss of wetlands and WOUS and is discussed further in Section 3.10.

Conservation measures to avoid and minimize impacts to protected species, such as bald eagles, migratory birds, interior least terns, piping plovers, northern long-eared bats, and river otters, will include surveys to determine presence or absence. If presence is confirmed, then work will stop or procedures will be implemented as further outlined in Sections 3.12 and 3.14 and Table 7. The timing of specific construction activities will be modified as follows:

- Work, including flow modifications or disturbance, within the Papillion Creek channel will be restricted to August 1 to January 30 to avoid impacts to lake sturgeon, pallid sturgeon, and sturgeon chub, which are threatened and endangered species.
- The removal of trees will be scheduled between September 11 and March 31 to avoid impacts to northern long-eared bats and protected bird species; however, the presence of a bald eagle nest would require further procedures to be followed, which are provided in Section 3.14. If the construction activities cannot be scheduled during this time frame, then a qualified biologist will perform a survey of these forested areas.

2.6.2 Alternative 19 – No Action

Under the No Action Alternative, it is assumed levee system improvements would not be made and the Federal Levee Systems R-616-613 (Missouri River Right Bank and Papillion Creek Left Bank) and R-613 (Papillion Creek Right Bank, Missouri River Right Bank, and Platte River Left Bank) would not be certifiable or meet FEMA accreditation criteria. The No Action Alternative does not meet the purpose and need of obtaining a certifiable levee that can be FEMA accredited, as set forth in 44 CFR 65.10 (FEMA 2011b) and does not provide continued eligibility in the PL 84-99 program. This alternative was carried forward for analysis and is discussed in subsequent sections to establish a baseline for comparison of the Proposed Action.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section presents the beneficial and adverse environmental impacts of the Proposed Action Alternative and the No Action Alternative. Each section is organized by environmental resource and presents the existing conditions of the resource and the expected outcomes or impacts (direct and indirect effects) of each alternative with respect to the associated environmental resource. Also discussed are mitigation measures, including BMPs, which would avoid, minimize, or compensate for adverse impacts of the alternative. Impacts are quantified as temporary or permanent whenever possible. Significance has been analyzed in this document in terms of both context, such as impacts on society, regions, interests, or locality, and intensity, such as the magnitude and duration of adverse impacts. Qualitative descriptions concerning the intensity of impacts are explained by accompanying text where used:

Magnitude of Adverse Impacts.

No impact	Resource not measurably effected
Minor	Noticeable impacts to the resource, but the resource is still mostly functional
Moderate	The resource is impaired, so that it cannot function normally (significant if long-term impact)
Major	The resource is significantly impaired so that it is no longer functional in the Project area

Duration of the Impact.

Short-term	Effects caused by the construction and/or implementation of an alternative that cease to continue either before or soon after the completion of the alternative
Long-term	Effects caused by the construction and/or implementation of an alternative that continues or occurs after the completion of the alternative either indefinitely or until future actions are taken to alter the resource

Impacts to threatened and endangered species are assessed using terminology outlined in the Endangered Species Act of 1973, as amended (16 USC 1531 et seq.); therefore, the above qualitative descriptions will not apply to Section 3.11.

Current USACE construction guidelines for levee repairs have been developed to avoid and/or minimize adverse impacts to the environment to the greatest extent practicable, and where possible, take advantage of borrow acquisition activities to enhance the ecosystem overall. The Standard Operating Procedure (SOP) for Selection of Borrow Sites was used as a guideline to determine appropriate borrow areas for the levee repairs, but as stated, this SOP is a flexible guidance (Appendix E). A portion of this levee system includes tie back levees (R-613 Papillion Creek Left Bank and Right Bank) which do not seem to be comparable to the levees described in the SOP. The channel benches within the narrow tie back levees have experienced a substantial amount of river side sedimentation which is proposed to be removed to restore the channel to the original design cross section, maintain the original hydraulic capacity of the channel, and provide borrow material for construction of the seepage berms and levee modifications. The removal of the bench material will be done by extending the existing river side levee toe downward to the original design elevation along the existing levee river side slope of 3:1 (maximum).

Irreversible or Irretrievable Resource Commitments. NEPA guidelines (40 CFR 1502.16) require the analysis of significant irreversible or irretrievable effects associated with the Proposed Action. Irreversible impacts are those that cause, through direct or indirect effects, use or consumption of resources in such a way that they cannot be restored or returned to their original condition despite mitigation. An irretrievable impact or commitment of resources occurs when a resource is removed or consumed.

Construction of the Proposed Action would use fuels, electricity, and construction materials, such as aggregate for concrete, which would be nonrenewable and irretrievable; however, the use of these resources would not be significant because of the current availability, supply, and relatively small consumption of the resources. The irreversible conversion of 98.6 acres of farmland to seepage berm and levee right-of-way would be expected with the Proposed Action; however, this impact was not considered significant by the Natural Resources Conservation Service (NRCS). No other irreversible or irretrievable resource commitments were identified concerning the Proposed Action.

Summary of Environmental Consequences. Overall impacts for each alternative, after the implementation of conservation and mitigation measures to reduce impacts, are summarized in Table 5. The Proposed Action is the Preferred Alternative because it would: provide levees that will be certifiable and FEMA accredited; provide continued eligibility in the PL 84-99 rehabilitation program; be a practicable alternative; have less adverse impacts to the aquatic ecosystem compared to other practicable alternatives; and avoid significant adverse environmental consequences with the implementation of avoidance, minimization, and conservation measures. The affected environment and environmental consequences are analyzed in Sections 3.1 through 3.15.

The resources described in Sections 3.1 through 3.15 are those recognized as protected or regulated by laws, executive orders, regulations, and other standards of national, state, or regional agencies and organizations (see Section 7.0). The resources addressed in this section include: cultural resources, environmental justice, air, noise, vegetation and invasive species, prime farmland, floodplain protection, economics, water quality, wetlands, threatened and endangered species, fish and wildlife, raptors and migratory birds, hazardous materials and recreational resources.

Table 5
SUMMARY OF ENVIRONMENTAL CONSEQUENCES BY ALTERNATIVE

HUMAN AND NATURAL ENVIRONMENTAL RESOURCES	ALTERNATIVE 3: PROPOSED ACTION	ALTERNATIVE 19: NO ACTION
Cultural Resources (Section 3.1)	No impact	No impact
Environmental Justice (Section 3.2)	No impact	No impact
Air (Section 3.3)	Minor, short-term adverse effects of dust particles on air quality, but no significant impacts	No impact
Noise (Section 3.4)	Minor, short-term adverse effects of construction noise, but no significant impacts	No impact
Vegetation and Invasive Species (Section 3.5)	Minor, short-term adverse effects of soil disturbance and potential invasive species transfer, but no significant impacts	Unknown impacts of potential inundation
Prime Farmland (Section 3.6)	Minor, long-term adverse effects of land conversion, but no significant impacts	Unknown impacts of potential inundation
Floodplain Protection (Section 3.7)	Minor, long-term beneficial effects of comparable flood risk reduction, but no significant impacts	Unknown impacts of future re-mapping of FIRM zones
Economics (Section 3.8)	Moderate, long-term beneficial effects of comparable flood risk reduction and economic development with beneficial impacts	Moderate, long-term adverse effects of re-mapping of FIRM zones with significant impacts
Water Quality (Section 3.9)	Minor, short-term adverse effects of channel alteration and erosion, but no significant impacts	Unknown impacts of potential inundation
Wetlands (acres) (Section 3.10)	2.687 acres PEMA/PEMC, 0.022 acre PEMF, 0.008 acre PSSA, and 0.026 acre PFOA wetlands on land side for levee embankment, seepage berm, and drainage penetrations improvements; and 4.270 acres PEMA/PEMC wetlands (seep wetlands) on river side for bench restoration Minor, long-term adverse effects of filling wetlands; however, no net-loss of wetlands would occur due to creation of offset wetlands and in-place formation of seep wetlands; no significant impact	Unknown impacts of potential inundation
WOUS (linear feet of channel) (Section 3.10)	1143 feet along Papillion Creek for bank stabilization Minor, long-term adverse effects of bank stabilization, but no significant impact	Unknown impacts of potential inundation
Threatened & Endangered Species[1] (Section 3.11)	May affect, not likely to adversely affect	Unknown affect determination
Fish and Wildlife (Section 3.12)	Minor, short-term adverse effects of habitat disturbance or avoidance, but no significant impacts	Unknown impacts of potential inundation
Raptors and Migratory Birds (Section 3.13)	Minor, short-term adverse effects of habitat disturbance or avoidance, but no significant impacts	Unknown impacts of potential inundation
Hazardous Materials (Section 3.14)	Minor, short-term adverse effects of contamination or exposure, but no significant impacts	Unknown impacts of potential inundation
Recreational Resources (Section 3.15)	Moderate, short-term adverse effects of trail removal and replacement; minor, long-term benefits to trail users with no significant impacts	Unknown impacts of potential inundation

[1]Affect determinations for threatened and endangered species follow the terminology outlined in the Endangered Species Act of 1973, as amended (16 USC 1531 et seq.).

3.1 Cultural Resources

Section 106 of the National Historic Preservation Act (16 USC § 470) and the Archeological Resources Protection Act (16 USC 470, et seq.) require Federal agencies to take into account the effects of their undertakings on cultural resources, including archaeological sites and historic properties eligible for the National Register of Historic Place (National Register).

Existing Conditions. There are no documented historic properties or archeological sites within 200 feet of the levees, which encompasses the expected construction footprint. A larger search of the area found several historic properties within a mile of the Proposed Action (Mead and Hunt 2003, NSHS 2014) and are as follows:

- Two eligible historic properties approximately 0.25 mile to the northwest of the R-616 Missouri River Right Bank Segment, Fontenelle Bank (2212 Main Street) and Hamilton (William) House (2003 Bluff Street)
- Two eligible historic properties approximately 0.5 mile to the north of the R-616 Missouri River Right Bank Segment, Old Log Cabin (1805 Hancock Street) and the Presbyterian Church (2002 Franklin Street)
- Two National Register properties approximately 0.75 mile to the northeast of the R-613 Papillion Creek Left Bank Segment, the Blacksmith Shop and the Fort Crook Historic District, both located on the Offutt AFB
- One eligible historic bridge approximately 0.25 mile to the northeast of the R-616 Missouri River Right Bank Segment, Bellevue Bridge over the Missouri River

All of the above properties are outside of the area protected by the levee and are not located within the Missouri or Platte River and Papillion Creek floodplains, except for the Bellevue Bridge, which occurs in an area not protected by the R-616-613 Levee System. Therefore, this bridge is not further considered in this impact analysis.

Impacts of Alternative 3 – Proposed Action. Construction of the Proposed Action would not cause damage to or reduce the quality of any known cultural resources, including historic properties within a mile of the levees. The Bellevue Bridge would not be impacted by this alternative because it occurs outside of the levee protection area; therefore, it is not considered in this impact analysis. The Proposed Action would rehabilitate the levee systems and maintain a comparable level of protection reflected on current floodplain maps. The Nebraska State Historical Preservation Office (SHPO) concurred that the Project area does not contain any recorded historic resources and that the Proposed Action would have no effect on archaeological, architectural, or historic properties (Appendix F).

In the event of an unanticipated discovery of cultural resources, work would be halted immediately and an archeologist would be notified. The work would not continue until the area is inspected by an archeologist. If he or she determines that the discovery requires further consultation, Nebraska SHPO would be notified.

The Proposed Action would have no impact on cultural resources because no historic properties or archeological sites occur within the proposed construction footprint.

Impacts of Alternative 19 – No Action. Under the No Action Alternative, levee construction would not occur; thus, there would be no direct impacts from construction to cultural resources. The documented cultural resources would be expected to remain similar to existing conditions. However, if the levee embankments are not raised and seepage protection is not improved, then it remains likely that the levee would perform to a lesser degree than reflected on current floodplain maps, the land side of the levee may become inundated, and archeological sites could become unearthed. Documented historic or cultural properties would not be impacted by this alternative because they occur outside of the levee protection area and would not become inundated if a flood exceeded the levee freeboard.

Under the No Action Alternative, no impacts would be expected because the cultural resources identified within the vicinity of the Project are not within the levee protection area and would not be impacted by flood stages exceeding the levee freeboard.

3.2 Environmental Justice

Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations, directs federal agencies to incorporate environmental justice in their decision making process. Federal agencies are directed to identify and address, as appropriate, any disproportionately high and adverse environmental effects of their programs, policies, and activities on minority or low-income populations. A minority population is identified as an area with 50% or more of the population consisting of minority individuals or an area where the percent of minority individuals is meaningfully greater than the general population, as compared to a similar, appropriate geographic unit.

FHWA Order 6640.23A defines "Minority," "Low-Income," and an "Adverse effect" as follows:

- Low-Income – A person whose median household income is at or below the Department of Health and Human Services poverty guidelines.
- Minority – A person who is:
  - *Black* – a person having origins in any of the black racial groups of Africa
  - *Hispanic or Latino* – a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race
  - *Asian American* – a person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent
  - *American Indian and Alaskan Native* – a person having origins in any of the original people of North America, South America (including Central America), and who maintains cultural identification through tribal affiliation or community recognition
  - *Native Hawaiian and Other Pacific Islander* – a person having origins in any of the original peoples of Hawaii, Guam, Samoa or other Pacific Islands
- Adverse effect – An adverse effect that:
  - is predominantly borne by a minority population and/or a low-income population; or
  - would be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that would be suffered by the non-minority population and/or non-low-income population.

Existing Conditions. A small proportion of low-income and minority groups are present within the area protected by the levees. Demographic data from the 2010 U.S. Census Bureau indicated the proportion of minority groups for most of the area protected by the levees is 12.6% of the total population (census tract 102.08, block group 1) with northern areas having a higher proportion (27%) (US Census Bureau 2010) (Figure 11). The state of Nebraska has a minority population of 13.9%. The levee protects over 600 households, of which 8.0% were estimated to have incomes below the poverty line with a small northern area having a proportion as high as 24.4% (US Census Bureau 2013) (Figure 12). The percent of individuals below the poverty line in Nebraska is 12.4%.

Impacts of Alternative 3 – Proposed Action. Construction of the Proposed Action would not cause minority, low-income, or other protected populations to be disproportionately displaced or negatively affected. The Proposed Action would rehabilitate the levee systems and reduce the risk of damage caused by flooding, which would equally benefit people of all socioeconomic conditions and ethnic backgrounds residing and working in the land side of the levee.

Under the Proposed Action, no impacts would be expected to disproportionately affect low-income and minority groups because the levee protection area does not consist of a minority population or a substantial low-income population relative to similar rural areas.

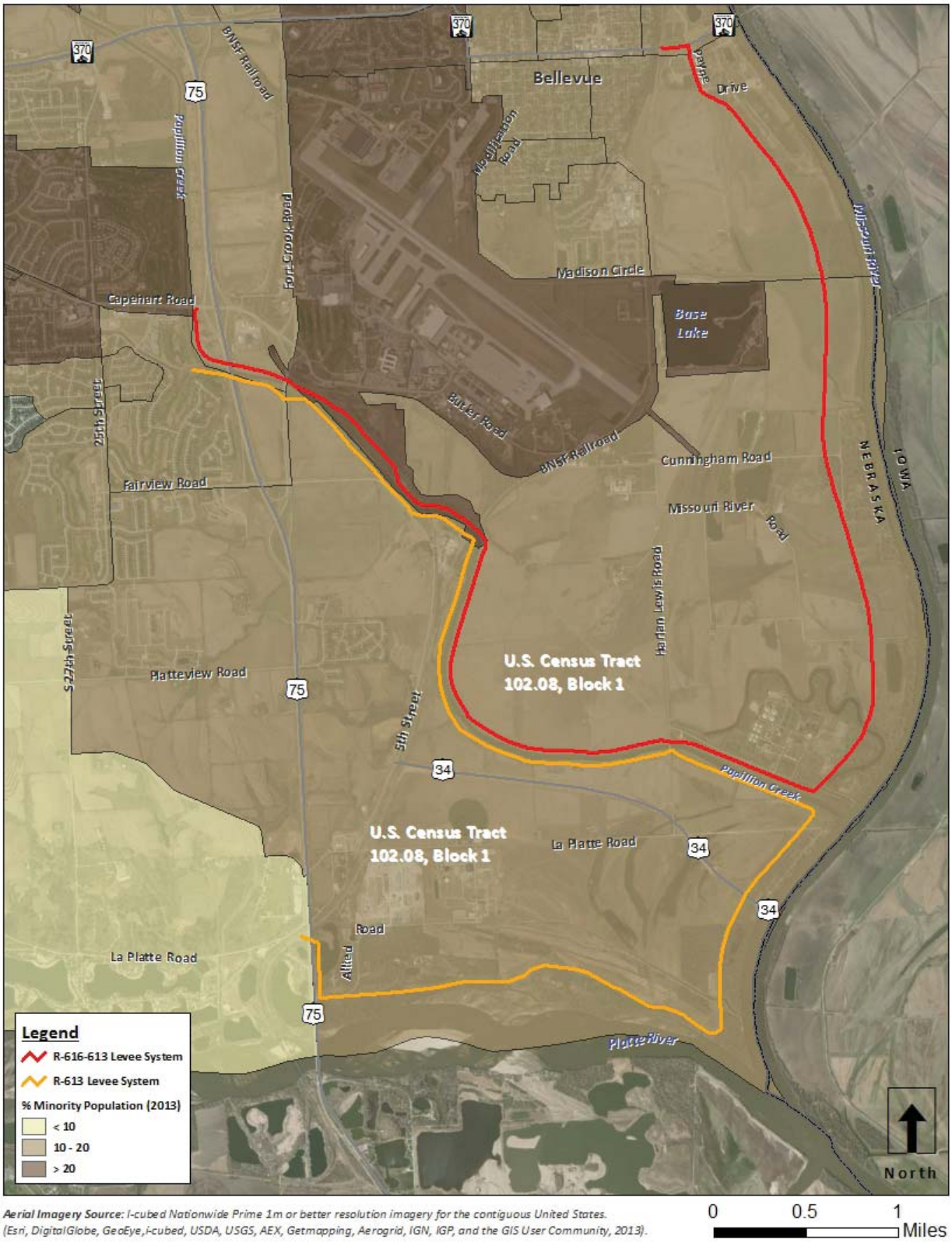


Figure 11 – PERCENT MINORITY POPULATION MAP

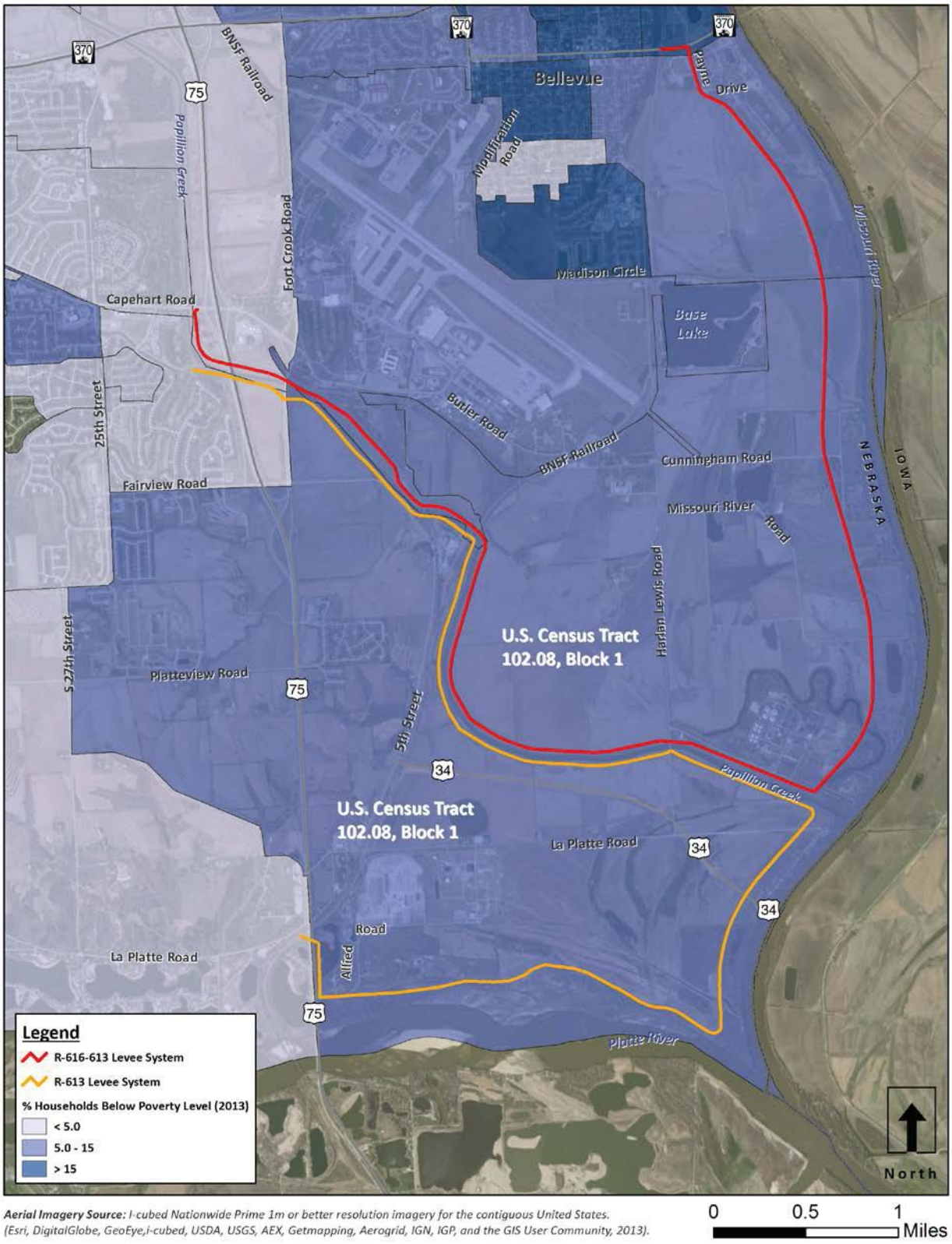


Figure 12 – PERCENT OF HOUSEHOLDS WITH INCOME BELOW THE POVERTY LINE MAP

Impacts of Alternative 19 – No Action. Under the No Action Alternative, levee construction would not occur within the area of concern, which is the levee protection area. Relative proportions of minority and low-income groups within the vicinity of the Project would be expected to remain similar to existing conditions. However, if the levee embankments are not raised and seepage protection is not improved, then it remains likely that the levee would perform to a lesser degree than reflected on current floodplain maps and the land side of the levee may become inundated. The area of concern does not consist of a minority population because the proportion of minority individuals is lower than or similar to the general population, which is also below 50%. Also, the area of concern does not consist of a high proportion of low-income households relative to the general population.

Under the No Action Alternative, no impacts would be expected to disproportionately affect low-income and minority groups because there are no minority or substantial low-income populations within the levee protection areas relative to similar rural areas. Although future flooding is uncertain, it would equally affect all residents within the levee protection area.

3.3 Air

Air is considered institutionally important because of the Clean Air Act (CAA) of 1963, as amended (42 USC § 7401 – 7671). It is publicly important because of the desire for clean air expressed by virtually all citizens. The CAA is intended to "protect and enhance the quality of the Nation's air resources so as to promote the public health and welfare and the productive capacity of its population". The CAA directs the attainment and maintenance of National Ambient Air Quality Standards (NAAQS) (40 CFR Part 50). The U.S. Environmental Protection Agency (EPA) also implements the NAAQS and determines attainment of federal air quality standards on a short- and long-term basis. The six principal pollutants, also known as "criteria" pollutants, are: ozone, lead, particulate matter (PM), carbon monoxide, nitrogen dioxide, and sulfur dioxide. PM-10 (10 micrometers in size) includes dust, dirt, soot, smoke and liquid droplets directly emitted into the air by sources such as construction activity and natural windblown dust. Counties where the levels of a particular pollutant exceed EPA standards are deemed 'non-attainment counties.'

Existing Conditions. Currently, there are no counties with a non-attainment status within the State of Nebraska.

Impacts of Alternative 3 – Proposed Action. PM-10 contributions would result from the operation of heavy machinery, increases in dust in the Project area during construction operations, and wind-blown particles stemming from stock-piled construction materials.

BMPs to minimize PM-10 particles would be implemented during construction activities. These techniques would include wetting the construction area to minimize dust, avoid idling of construction machinery when not performing needed tasks, and covering or mulching staging areas during or following construction activities.

Under the Proposed Action, implementation of BMPs would minimize dust from construction related activities resulting in insignificant impacts on air quality. Minor, short-term adverse effects would be expected, and adverse conditions would cease after construction is completed.

Impacts of Alternative 19 – No Action. Under the No Action Alternative, levee construction would not occur; thus, air quality conditions would be expected to remain similar to existing conditions unless affected by other federal, state, or private actions.

The No Action Alternative would have no impact on air quality because the air quality would likely remain similar to existing conditions.

3.4 Noise

Noise pollution is defined as unwanted sound that interferes with normal activities or in some way reduces the quality of the environment. The Noise Control Act of 1972 (42 USC 4901 et seq.), as amended by the Quiet Communities Act of 1978 (PL 95-609), was established to promote an environment for all Americans free from noise that jeopardizes their health and welfare by requiring coordination between federal agencies on noise control. Additionally, the Bald and Golden Eagle Protection Act, Migratory Bird Treaty Act, Endangered Species Act, Fish and Wildlife Coordination Act, and Nebraska Nongame and Endangered Species Conservation Act each serve to protect animals from harm, which could be caused by noise pollution.

The magnitude and frequency of ambient noises vary considerably depending on the amount of development in a given area. Noise sources in agricultural areas are predominately: wind, wildlife, and agricultural equipment (tractors and combines). In urban areas, most noise comes from transportation, construction, industrial, and human sources.

Responses to noise differ, depending on the receptor's location and sensitive, the time of day, and the type or characteristics of the noise. According to the Occupational Safety and Health Standards (29 CFR 1910), action should be taken to mitigate noise levels when noise pollution exceeds 85 decibels over an eight-hour time frame.

Existing Conditions. Sources of noise within 0.25 mile of the levee units, which is mostly a rural area, would include parks, recreational areas, roadways, hunting activities, industrial business operations, agricultural activities, and air traffic. Some urban areas within 0.25 mile of the levee segments would have increased noise associated with road traffic, businesses, agricultural activities, air traffic, and potentially other construction. In 2012, Offutt AFB reported that controlling noise pollution below 65 decibels was an acceptable level for the surrounding environmental setting (Offutt AFB 2012).

Receptors of noise near the Project would be found in many of the same places that sources of noise are expected to occur, such as parks, recreational areas, and commercial or industrial businesses, but would also include private residences and Bellevue Loup trail users. Animals within the area are likely adapted to the current level of noise pollution or already avoid areas with unsuitable noise levels.

Impacts of Alternative 3 – Proposed Action. Noise from construction and movement of vehicles and workers may cause temporary human disturbance and temporary displacement of some wildlife species; however, noise impacts would be similar to noise generated from agricultural activities. Construction work is estimated to range around 100 decibels over an eight-hour time frame.

BMPs would be implemented to reduce construction noise. These techniques would include limiting construction to daylight only and not idling equipment when it is not in use.

Under the Proposed Action, implementation of BMPs would minimize noise pollution resulting in insignificant impacts on humans and wildlife. Minor, short-term adverse effects would be expected, and adverse conditions would cease after construction is completed.

Impacts of Alternative 19 – No Action. Under the No Action Alternative, levee construction would not occur; thus, noise pollution would be expected to remain similar to existing conditions unless affected by other federal, state, or private actions.

The No Action Alternative would have no impact on noise pollution levels because noise levels would likely remain similar to existing conditions.

3.5 Vegetation and Invasive Species

According to EO 13112, Federal agencies may not authorize, fund, or carry out actions that are likely to cause or promote the introduction or spread of invasive species. Invasive species are defined as non-native species that adversely affect the economy, the environment, or human health where they establish; whereas, nuisance species are defined as any plant not economically essential to the welfare of the people in Nebraska or found to be detrimental to the agricultural interests of Nebraska, as determined by the Department of Agriculture. Noxious weeds, which are often both invasive and a nuisance, are designated by the Director of Agriculture in Nebraska. The Nebraska Department of Agriculture regulates the movement and care of plants and plant pests within the state to prevent and minimize the adverse effects of invasive, noxious, or nuisance plants or pests under the Plant Protection and Plant Pest Act (Title 25, Chapter 13, Nebraska Administrative Code, Sections 2-1072 to 2-10117) (NDA 2013b) and Noxious Weed Control Act (Title 25, Chapter 13, Nebraska Administrative Code, Sections 2-945.01 to 2-968) (NDA 2013a). These regulations are in place to prevent and minimize the economic, ecological, and human health impacts caused by invasive and nuisance species.

The Nebraska noxious weed list currently includes 11 plants that occur statewide (NWCA 2015):

- Musk thistle (*Carduus nutans*)
- Plumeless thistle (*Carduus acanthoides*)
- Knapweed (*Centaurea diffusa*, *C. maculosa*, and *C. stoebe*)
- Canada thistle (*Cirsium arvense*)
- Leafy spurge (*Euphorbia esula*)
- Japanese knotweed (*Fallopia japonica*)
- Giant knotweed (*Fallopia sachalinensis*)
- Sericea lespedeza (*Lespedeza cuneata*)
- Purple loosestrife (*Lythrum salicaria*)
- Common reed (*Phragmites australis*)
- Saltcedar (*Tamarix* spp.)

Existing Conditions. Historically, this area of the Missouri River floodplain was dominated by tallgrass prairie with areas of marshes, wet meadows, and riparian deciduous forests. Currently, the floodplain is dominated by corn and soybeans agricultural fields and a mix of residential and industrial properties. In addition to agricultural crops, vegetation includes mowed lawn grasses, grassy brome fields, weedy fallow fields, riparian floodplain forest, and adjacent wetlands. Some remnants of tallgrass prairie likely occur in fragmented patches. Scattered riparian deciduous woodlands occur along the Missouri River and Platte River; however, many trees (mature cottonwoods and willows) were killed during the 2011 flooding along the river side of the R-613 Platte River Left Bank Segment and R-613 Missouri River Right Bank Segment. The levee crests and slopes support a cover of smooth brome grass (*Bromus inermis*).

It is likely that musk thistle, Canada thistle, leafy spurge, knapweed, and several other agricultural nuisance plants occur within 0.25 mile of the levee segments. The river side of the levees at the confluence of the Platte River and Missouri River and upstream areas of Papillion Creek have Japanese hops (*Humulus japonicus*) growing, which is a non-native plant that is known to become invasive in riparian and floodplain habitats because of its rapid growth and ability to quickly spread and out-compete native vegetation.

Invasive tree and shrub species that could be found within the Project area include red cedar (*Juniperus virginiana*), European buckthorn (*Rhamnus cathartica*), Russian olive (*Elaeagnus angustifolia*), and Amur maple (*Acer ginnala*). Invasive terrestrial species (NISC 2015), including watch list species (NWCA 2014), that may also be transported to new locations from construction equipment include the above noxious weeds and the following:

- Russian knapweed (*Acroptilon repens*)
- Garlic mustard (*Alliaria petiolata*)
- Australian beardgrass (*Bothriochloa bladhii*)
- Yellow bluestem (*Bothriochloa ischaemum*)
- Brome grass (*Bromus* spp.)
- Black knapweed (*Centaurea moncktonii*)
- Yellow star thistle (*Centaurea solstitalis*)
- Sweet autumn virgin's bower (*Clematis terniflora*)
- Houndstongue (*Cynoglossum officinale*)
- Cutleaf teasel (*Dipsacus laciniatus*)
- Sickleweed (*Falcaria vulgaris*)
- Goat's-rue (*Galega officinalis*)
- Yellow bedstraw (*Galium verum*)
- Japanese honeysuckle (*Lonicera japonica*)
- Kudzu (*Pueraria montanta*)
- Hoary cress (*Cardaria draba*)
- St. John's wart (*Hypericum perforatum*)
- Crown vetch (*Securigera varia*)

Invasive aquatic species that are a concern and that have the potential to be introduced into new water bodies by contaminated construction equipment include several fish or amphibian diseases and the following organisms (NISC 2015):

- Asian clam (*Corbicula fluminea*)
- Zebra mussels (*Dreissena polymorpha*)
- Quagga mussels (*Dreissena bugensis*)
- Water hyacinth (*Eichhornia crassipes*)
- Eurasian watermilfoil (*Myriophyllum spicatum*)
- Reed canarygrass

Impacts of Alternative 3 – Proposed Action. Under the Proposed Action, bulldozers and graders would be used to clear and grub vegetation, including trees, on the levee embankment, within 15 feet of the levee construction footprint, and where culvert repair/replacement is needed. Therefore, vehicles and construction equipment brought into the area could facilitate the spread and establishment of invasive species by transporting whole organisms, such as plant pests or aquatic mussels, or reproductive materials, such as eggs or plant vegetative structures. Also, cleared land and bare soil are more susceptible to colonization by early successional plants or aggressive weeds, which may be non-native or considered invasive. The Proposed Action would rehabilitate the levee systems and maintain a comparable level of protection reflected on current floodplain maps which would reduce the potential risk of vegetation changes caused by flooding.

BMPs to minimize the spread or introduction of invasive species would require that all construction equipment be cleaned prior to being brought onto construction sites to ensure land equipment is free of soil and vegetative debris that may contain invasive plant species' seeds or pest insects and equipment used in Papillion Creek or drainage ditches is free of aquatic organisms or eggs. Also, disturbed areas would be seeded with a reputable native seed mixture and mulched, as required, to minimize the likelihood that invasive plants would colonize soils that have been disturbed.

Under the Proposed Action, insignificant impacts would be expected because the implementation of BMPs would minimize the spread or establishment of invasive species and restore or enhance the vegetation cover of disturbed areas resulting in minor, short-term adverse effects. Additionally, the Proposed Action would decrease the risk of inundation and the probability of needing corrective actions after a major flood event by the county, state, and property owners to eliminate exotic and invasive species.

Impacts of Alternative 19 – No Action. Under the No Action Alternative, levee construction would not occur; thus, there would be no direct impacts from construction that could disturb the existing vegetation or introduce or proliferate invasive species. Plant and aquatic communities within the vicinity of the Project would be expected to remain similar to existing conditions. However, if the levee embankments are not raised and seepage protection is not improved, then it remains likely that the levee would perform to a lesser degree than reflected on current floodplain maps, the land side of the levee may become inundated, and the inundation may increase the spread of invasive species. Since the risk of inundation is uncertain and corrective actions after a major flood event by the county, state, and property owners may minimize the spread or establishment of invasive species, the magnitude and duration of adverse effects is unknown and could be comparable to past flood events.

Under the No Action Alternative, unknown impacts of flooding could potentially increase the spread or establishment of invasive species resulting in adverse effects.

3.6 Prime Farmland

The Farmland Protection Policy Act (FPPA) was established to avoid significant, irreversible losses of farmland (directly or indirectly). The U.S. Department of Agriculture (USDA), as facilitated by the NRCS, requires the use of a rating form to ensure that prime farmlands are protected from large development projects that would convert a significant number of acres, especially in areas with contiguous, valuable agricultural lands. A score above 260 points triggers additional in-depth site reviews.

Existing Conditions. The USDA's Web Soil Survey website indicated approximately 5,619 acres of the land within the Missouri River floodplain (north of the Platte River, east of US-75, and south of N-370) are classified as prime farmland, prime farmland (if drained), or farmland of statewide importance (Figure 13). Within the same area, there are approximately 10,692 acres zoned for agriculture use.

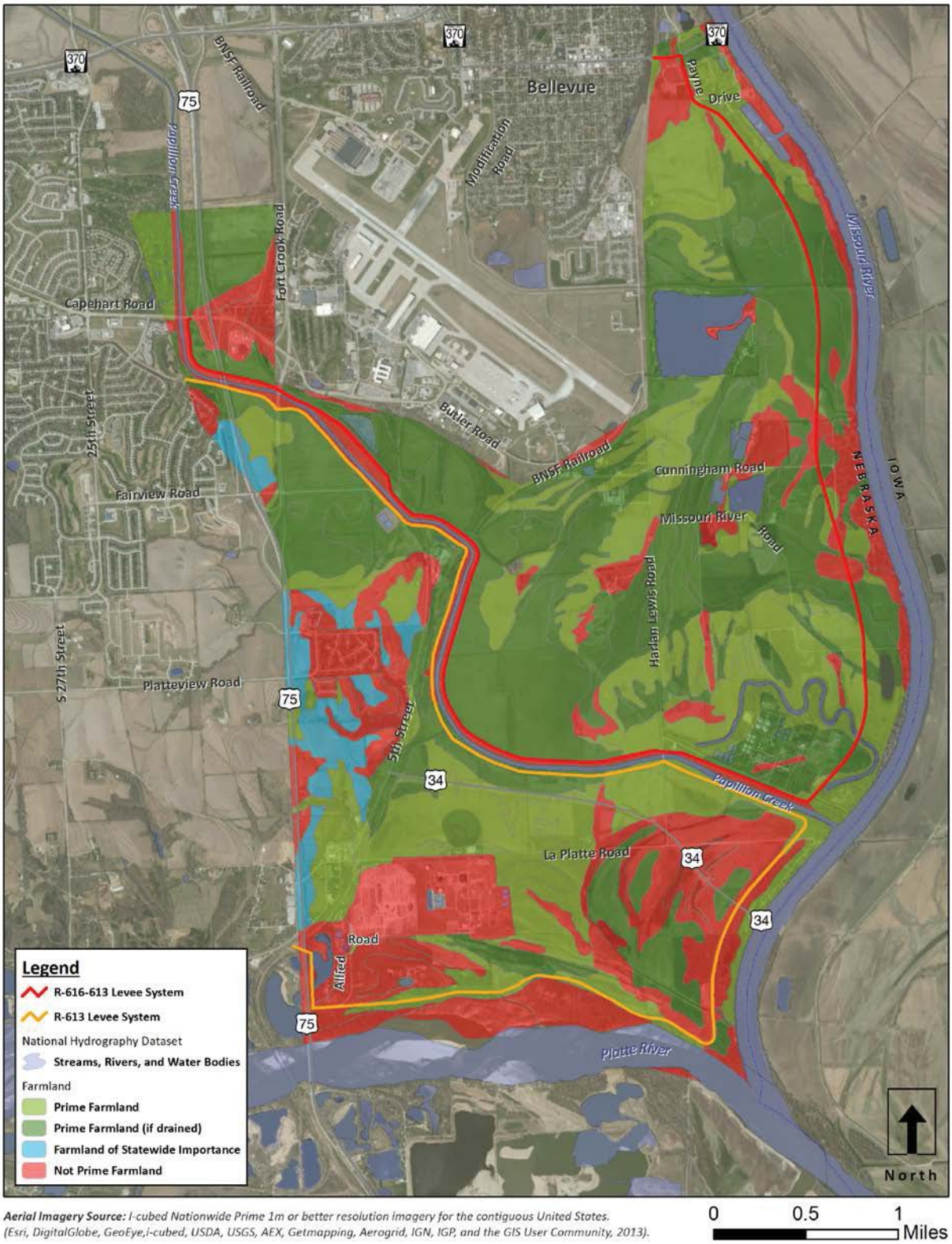


Figure 13 – USDA FARMLAND CLASSIFICATIONS MAP

Impacts of Alternative 3 – Proposed Action. Improvements to levee seepage berms would result in the direct loss of 98.6 acres in agricultural production. Following seepage berm improvements, these acres would be re-planted with a native grass mixture and be maintained as grassland habitat.

The NRCS performed an evaluation using the NRCS-CPA-106 Farmland Conversion Impact Rating for Corridor Type Projects form and indicated that the Project would have no significant impacts under FPPA (Appendix G). The total points calculated for impacts to prime and unique farmland for the Project was 128.

Under the Proposed Action, insignificant impacts would be expected because the irreversible land conversion would be minor, although long-term, and the NRCS concluded that the impacts would not be significant.

Impacts of Alternative 19 – No Action. Under the No Action Alternative, levee construction would not occur; thus, there would be no impact on prime farmlands from construction that could remove farmland from production. Prime farmland within the vicinity of the Project would be expected to remain similar to existing conditions. However, if the levee embankments are not raised and seepage protection is not improved, then it remains likely that the levee would perform to a lesser degree than reflected on current floodplain maps, the land side of the levee may become inundated, and the inundation may alter prime farmland topsoil. Since the risk of inundation is uncertain and corrective actions after a major flood event by the county, state, and property owners may minimize loss of prime farmland, the magnitude and duration of adverse effects is unknown and could be comparable to past flood events.

Under the No Action Alternative, unknown impacts of flooding could potentially alter prime farmland resulting in adverse effects.

3.7 Floodplain Protection

EO 11988, Floodplain Management Guidelines, outlines the responsibilities of Federal agencies in the role of floodplain management. Each agency shall evaluate the potential effects of actions on floodplains and should avoid undertaking actions that directly or indirectly support floodplain development that could adversely affect the risk of flood. More specifically, ER 1165-2-26 Implementation of EO 11988 on Flood Plain Management (USACE 1984) outlines general procedures to be followed for implementing EO 11988. According to ER 1162-2-26, the intent of EO 11988 is to restore and preserve the natural and beneficial values associated with floodplains, and reduce the hazard and risk associated with floods. Floodways and the base floodplain are generally designated on FEMA FIRMs. A base flood is defined as a flood which has a 1-percent chance of occurrence in any given year (also known as a 100-Year flood). The base floodplain corresponds to several Special Flood Hazard Areas, such as zones A, AH or AE (Figure 14), and includes floodway. Floodways are land areas that must be reserved in an open manner, unconfined or unobstructed either horizontally or vertically to provide for the discharge of the base flood so the cumulative increase in water surface elevation from encroachment does not exceed one foot as set by the NFIP (USACE 1984). Within an accredited leveed channel, the floodway is generally designated as the area between existing levees (Figure 15).

Existing Conditions. The area river side of the levee segments is considered floodway (Figure 14 and Figure 15). Within the extents of the Project, the Missouri and Platte River floodways do not have substantial human structure encroachment; Papillion Creek floodway does not have any human structure encroachment. Sedimentation has filled areas within the floodway of all three systems; however, the Papillion Creek channel has seen a substantial decrease in the channel's hydraulic capacity because of sediment deposition on the channel benches.

Current FIRMs show that most of the area on the land side of the levee is designated as Zone X (shaded) (i.e., areas protected from the 1% annual chance flood by the levee) and are not part of the base floodplain (Figure 14); however, some areas that experience interior ponding, such as the land side of the levee near the Papillion Creek and Missouri River confluence, are mapped as Zone AH, subject to flood depth of one to three feet in a 100-year flood, and are part of the base floodplain. The interior drainage system (i.e., land side of the levees) relies on drainage penetrations, of which several are in need of repairs.

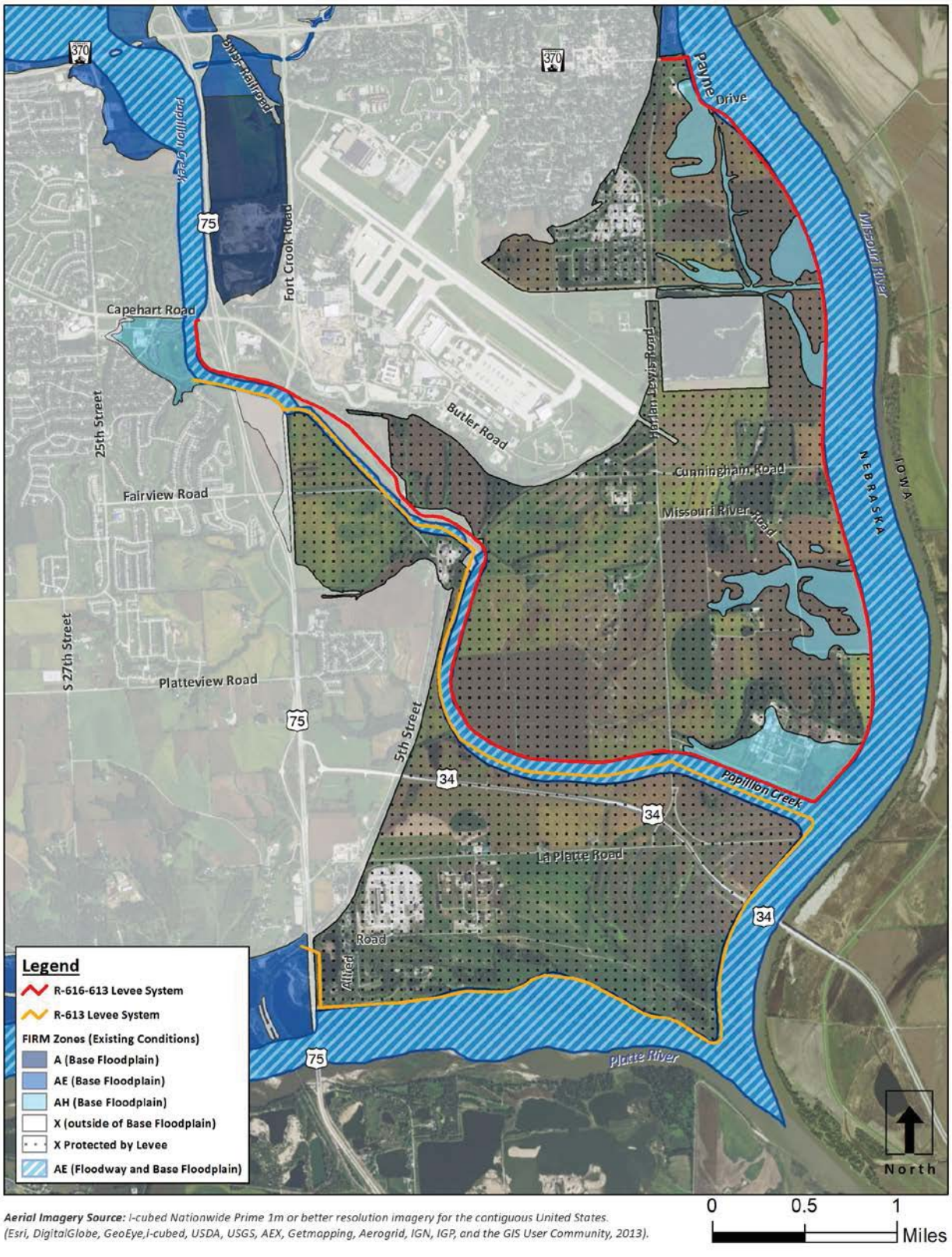


Figure 14 – FIRM ZONES IN LEVEE AREA

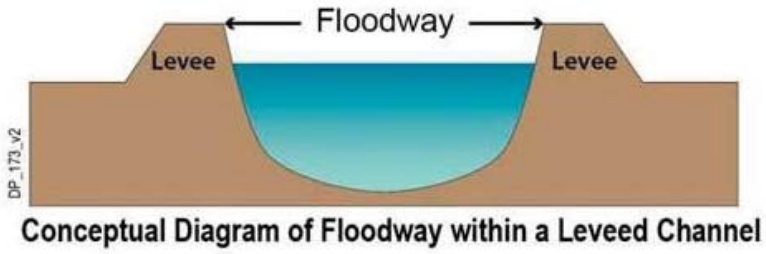


Figure 15 – ILLUSTRATION OF FLOODWAY IN A LEVEE SYSTEM

In 1975, the Phase II General Design Memorandum No. L-611-614-1 was issued for construction of a left bank levee system to provide protection for Mills County, Iowa side of the Missouri River. Missouri River Levee System L-611-614 was constructed in three phases between 1980 and 1987. At the time of construction, the downstream portion of the L-611-614 levee system was constructed to a higher elevation than the R-613 Missouri River right bank segment which is adjacent to the left bank system.

Impacts of Alternative 3 – Proposed Action. The Proposed Action would rehabilitate the levee systems and maintain a comparable level of protection reflected on current FIRMs. Future re-mapping by FEMA would cause very little change to flood zone designations on the land side of the levee, except in areas with interior ponding.

General procedures outlined in ER 1165-2-26 (USACE 1984) which are to be followed when implementing EO 11988 are listed below:

Step a. Determine if the proposed action is in the base floodplain. The Proposed Action does occur within the base floodplain of the Platte River, Missouri River and Papillion Creek as shown on the effective FEMA FIRM panels 31153C0095G, 31153C0210G. 31153C0220G and 31153C0230G. The following levee segments have base floodplain on the land side of the levee: R-616 Missouri River Right Bank, R-613 Papillion Creek Left Bank, and R-613 Papillion Creek Right Bank (Figure 14). The base floodplain areas shown on the land side of the river are areas of interior ponding which occur from closed drainage penetrations during flood events. Raising the levee embankment and widening the levee crest to 12 feet occurs by extending the river side slope (Figure 7, Section 2.1). This places the Proposed Action within land side base floodplain areas due to interior ponding which are adjacent to the land side levee toe. Seepage berm improvements would begin at the proposed land side levee toe and would also occur in the base land side floodplain areas due to interior ponding which are adjacent to the land side levee toe. In all cases where the Proposed Action will occur in the base land side floodplain area, this area will not be decreased, but will rather be shifted land side to begin at the proposed land side levee toe. Minor grading and shaping improvements at existing levee ramp locations would occur within the base floodplain (i.e., floodway) on the river side of the levee, in addition to bench grading along the R-613 Papillion Creek Right and Left Bank Segments.

Step b. If the action is in the base floodplain, identify and evaluate practicable alternatives to the action or to location of the action in the base floodplain. Several alternatives were considered that would move construction activities outside of the base floodplain or limit the proposed action occurring in the base floodplain. Alternatives 4-10, and 18 were all considered and investigated; however, none of these alternatives were practicable. The overall purpose of the Project, to provide levees that will be certifiable and FEMA accredited, ties the Project location to adjacent floodplains; therefore, there are no practicable alternatives to the Proposed Action outside of the base floodplain. Alternative 18 was unique in that it would provide a certifiable levee that can be FEMA accredited for the R-616-613 Federal Levee System (which protects critical infrastructure) by raising levee embankments and improving seepage berms, but it would not provide a certifiable levee that can be FEMA accredited for the R-613 Federal Levee System. Instead, this alternative looked at flood risk management measures, such as land use restrictions, enhanced building restrictions or buyouts of existing properties within the protected area of the R-613 Federal Levee System in order to reduce the potential for damage and loss of life during flood events. When evaluating the flood risk management measures to investigate, elevation of existing infrastructure was not considered viable as the cost of elevating US-34 and other existing structures would be much greater than the cost of purchasing all of the protected land. Enhanced building restrictions were not seen as a viable flood risk management measure either, because this can only be applied to future infrastructure projects and does not protect existing infrastructure from the risk of flooding. As

shown in the practicability screening for this alternative, purchasing all the land protected by R-613 was a significantly higher cost alternative than constructing raised levee embankments and improved seepage berms along the R-613 Federal Levee System, so this alternative was not moved forward in the screening process. Although it was known that constructing raised levee embankments and improved seepage berms along R-613 passed some additional risk to R-616 and L-611-614, a determination of the approximate change in Expected Annual Damages (EAD) within the project performance report justifies the choice to proceed forward with modifications to R-613 as the preferred alternative because the increased risk was deemed insignificant by the project sponsor. Table 5.0.2 from the project performance report shows a decrease in EAD to R-616 of $1,287,400, a decrease in EAD to R-613 of $365,900 compared to the minor increase in EAD along L-611-614 of $1,600. The USACE 408 review process will continue to review the sponsor's determination of insignificance. For these reasons, it was determined that selected Project design was the only practicable alternative.

Section 2.0 discusses the alternatives analysis, and in coordination with Section 3.0, discusses conservation, economics, natural and beneficial values served by floodplains, impact of floods on human safety, locational advantage, the functional need for locating the development in the floodplain, historic values, fish and wildlife habitat values, endangered and threatened species, Federal and State designations of wild and scenic rivers, refuges, etc. and, in general, the needs and welfare of the people.

Step c. If the action must be in the floodplain, advise the general public in the affected area and obtain their views and comments. The general public has been advised about the Project as detailed in Section 1.6 and Appendix A. Various public meetings and media releases discussing and informing the public about the project are detailed in Section 1.6 and Appendix A. Public views and comments have been requested as part of the public review process for the Project. Comments received to-date have been considered; additional comments received will be addressed in the Final EA. As discussed in Section 1.6, numerous meetings were held with the L-611-614 levee sponsors to present the results of the project performance analysis and the risk increase to L-611-614 associated with modifications to the R-613 system. The L-611-614 sponsor's comments were received and are included in Appendix A. The comments address the fact that the analysis was done using data from the As-Built plans for the project and not recent surveys of the L-611-614 levee. The comments also address the ambiguity of significance and insignificance as there is no definitive way to define either. As discussed in the *Project Performance Analysis* (FYRA 2017) report in detail, the L-611-614 sponsor's comments were considered, but it is discussed that the increase of risk to adjacent landowners is insignificant for several reasons (including the overall system reduction in AED) and that the risk increase would never be realized during a flooding event. The National Flood Insurance Program mandates that floodplain development permits be obtained for any new construction and repairs on property located in flood-hazard areas. This permit process ensures that all proposed work complies with current codes and flood ordinances protects residents, communities, and structures will provided ongoing education to the public about floodplains. This permit process also provides a permanent record that can be passed on to future residents and community leaders to ensure future compliance and protection. Along with these other types of public advisement, the USACE is required to provide a 30-day public review period of this Draft Environmental Assessment (DEA) prior to a decision on whether to prepare a FONSI or EIS. The USACE will place the DEA on their website and provide a 30-day comment period for public and resource agency review.

Step d. Identify beneficial and adverse impacts due to the action and any expected losses of natural and beneficial floodplain values. Beneficial impacts to the floodplain will be realized with the removal of bench material from segments of the R-613 Papillion Creek Right and Left Bank Segments. Removal of bench material within the Papillion Creek would improve the ability of the floodplain to convey flood waters (i.e., improve hydraulic conductivity of the channel) and be considered a beneficial impact as it helps to provide levees that are certifiable and FEMA accreditable. The proposed modifications for the Project would ensure that equal flood stage protection along the Missouri River is provided within the project reach. A full analysis of flood risk impacts, due to the modification of R-613, on adjacent levee systems (upstream, downstream or adjacent to these levee systems, including L-611-614) has been completed using Hydrologic Engineering Center - Flood Damage Reduction Analysis (HEC-FDA) and is included in a technical memo, *Project Performance – Federal Levee Systems R-613 and R-616-613* (FYRA 2017). As stated in the project performance report, the project provides beneficial impacts to the areas upstream along Papillion Creek and increases the Conditional Non-Exceedance Probability (CNP) of the system both upstream and within Project extents. These beneficial impacts are also realized upstream and within Project extents along the Platte River with an increase in the CNP. The Project also shows beneficial impacts along the R-613 Missouri River Left Bank levee segment and results in an increase in the CNP through this segment which is in line with providing a levee that is certifiable and FEMA accreditable. As discussed above in step b, assessing the changes in Expected

Annual Damages (EAD) due to construction of the Project shows the overall project benefit in dollar amounts. Table 5.0.2 of the project performance report shows the numbers and calculations in detail. R-616 will see a decrease in EAD of $1,287,400, R-613 will see a decrease in EAD of $365,900 and L-611-614 will see an increase in EAD of $1,600 which results in a combined decrease in AED of $1,651,700. This benefit clearly shows that the Project will reduce the hazard and risk associate with floods, and minimize the impacts of floods on human safety, health and welfare.

There are several project actions that will result in neither beneficial nor adverse impacts to floodplain values. As stated in step b, there are small areas designated as Zone AH floodplain due to interior ponding along the Missouri River and Papillion Creeks. These areas would receive fill for levee embankment raises, crest widening, seepage berm protection improvements, and temporary spoil piles. These floodplain areas, however, would not be eliminated or reduced but would rather shift to adjacent areas, which include levee right-of-way, farmland, and parts of Hayworth Park and the Papillion Creek Waste Water Treatment Plant (not impacting operations). The current areas within and adjacent to the Zone AH, where the floodplain will be shifted, have minimal natural and beneficial floodplain values; therefore, there would be no adverse impacts associated with floodplain values with the proposed action. Seepage berm protection improvements constructed outside of, but adjacent to, the base floodplain would not affect the base floodplain. Moving the north closure section of the R-616 Missouri River Right Bank Segment on N-370 would have no impact on the ability of the floodplain to convey flood waters because these modifications would be in the footprint, or hydraulic shadow, of existing improvements. There would be no adverse impacts to regulatory base flood elevations or the resulting floodplain as a result of these improvements.

As discussed in *Project Performance – Federal Levee Systems R-613 and R-616-613* (FYRA 2017), the modeling along the Missouri River does exhibit a decrease to CNP adjacent to the Project which does produce an adverse impact to adjacent levees, however modeling results showed that the impacts from the project resulted in no increases to the base flood elevation upstream, downstream or adjacent to the project. While this project would result in slight elevation increases in water surface elevations (0.03 feet maximum increase) for the 200-year and less frequent events, these impacts would only increase flood depths within L-611-614 system by 0.02 feet and 0.05 feet for the R-616-613 system for the 500-year and less frequent events. These increases in ponding depths would not increase damages by a calculable amount or alter the population at risk therefore the project sponsor, PMRNRD, has deemed the impacts as insignificant. Also, as described in the L-611-614 Design Memorandum, the design and expected performance of L-611-614 and R-616 was based on a fully confined Missouri River floodway of 3,000-foot width (FYRA 2017). Nowhere in the original design did the performance of either levee system take into account the potential for R-613 to overtop; in fact, R-613 was assumed to be infinitely high for the design of both levee systems. Therefore, the Project Performance report was written and computes the impacts in accordance with EM 1110-2-1619, however these impacts are not real as the performance potential of R-616 and L-611-614 cannot be reduced by raising R-613 because these systems were designed assuming R-613 was infinitely high. The above stated adverse impacts should instead be seen as benefits of keeping R-613 low and actually allow L-611-614 and R-616 to outperform their original design objectives. Along the Platte River an increase in water surface elevation within the project extents of 0.02 feet for the 200-year event and 0.10 feet for the 500-year event does occur, but does not adversely impact the CNP or any ponding areas as none exist within the area of the increase. The USACE 408 review process will continue to review the sponsor's determination of insignificance. As discussed in Section 3.2, alternatives such as the R-613 levee setback were studied which could have offset this minor increase in CNP to the L-611-614 system, however this alternative was rejected as a viable option for reasons discussed in Section 3.2 and the alternative was not able to be carried forward.

Other beneficial and adverse impacts due to the Proposed Action are described within Section 3.0 of this Environmental Assessment. Base floodplain areas, which include Zones AH and AE floodway, are not targeted for current or future development under the Proposed Action. There are no expected losses of natural and beneficial floodplain values.

Step e. If the action is likely to induce development in the base floodplain, determine if a practicable non-floodplain alternative for the development exists. Completion of the Proposed Action would maintain a comparable level of protection reflected on current floodplain maps and development is expected in the area with or without the Proposed Action. The protected area is currently mapped as a Zone X shaded which does not prohibit or restrict floodplain development in any way, although the shading does denote unknown risk for interior drainage/ponding and significant flood events above the base flood event (100-year event). With FEMA accreditation, the cost and criteria for flood insurance, property values, and development potential of most Zone X shaded areas on the land side of the levee would remain similar to current conditions. With the continuation of current economic conditions, including development costs, the Proposed Action would have no effect on development (would not increase or decrease). With the recent completion of US-34 and the presence of existing

transportation corridors, Sarpy County and the Metropolitan Planning Agency have planned development of industrial and manufacturing facilities (see Section 3.8 - Figure 17) within the area and these plans will guide development with or without the Proposed Action. The Proposed Action will provide increased protection to the area and any future development compared to the No Action alternative (see Section 3.8 – Table 6).

Step f. Determine viable methods to minimize any adverse impacts of the action including any likely induced development for which there is no practicable alternative and methods to restore and preserve the natural and beneficial floodplain values. Steps a and b discuss the portion of the Proposed Action that would affect the floodplain and describes how the extended levee footprint occurs within the floodplain in some locations along the project. This is mitigated by the fact that FEMA re-mapping efforts as a result of the Project will likely increase floodplain extents with the mapping of interior ponded areas. The area added due to interior ponding will be significantly greater than the area removed from the extension of the levee footprint into currently mapped floodplain areas. This is a benefit to floodplain preservation and restoration.

As stated in step d, project performance modeling and report (FYRA 2017) shows the Project provides benefits in the way of a decrease in the CNP upstream and within the project extents of the Papillion Creek and the Platte River for reduced flooding. Benefits (decrease in CNPs) were also shown along the R-613 Missouri River levee segment. Impacts were shown along the Missouri River to the R-616 and L-611-614 levees, but the impacts would result in a minor increase in water surface elevations (0.03 feet for the 200-year and less frequent events) and interior ponding depths (0.02 feet for L-611-614 and 0.05 feet for R-616 for the 500-year and less frequent events). Impacts were also shown along the Platte River with a raise in WSE of 0.1 feet for the 200-year event and 0.02 feet for the 500-year event. A setback along R-613 would have eliminated these impacts; however, after several years of investigations and meetings, this alternative was rejected as a viable option for reasons discussed in Section 2.1, and the alternative was not able to be carried forward. It is also believed that the mitigation for such a small increase in WSE or ponding elevation is not feasible from a project construction standpoint and would likely result in increased risk to the right-bank levees or insufficient protection to the left-bank levees due to construction tolerances. Based on this rationale, the impacts to R-616 and L-611-614 have been deemed insignificant by the project sponsor. The USACE 408 review process will continue to review the sponsor's determination of insignificance.

Step g. If the final determination is made that no practicable alternative exists to locating the action in the floodplain, advise the general public in the affected area of the findings. PMRNRD has advised the general public in the affected area through their public review process.

Step h. Recommend the plan most responsive to the planning objectives established by the study and consistent with the requirements of the EO. Alternative 3 - Raise Levee Embankment & Improve Seepage Berms per Combination Design Standards (Proposed Action) is recommended as the plan most responsive to the planning objectives.

For all the reasons discussed above, the Proposed Action would have insignificant impacts on floodplain protection. The Proposed Action follows the objective of the EO by avoiding development in the floodplain unless it was the only practicable alternative and minimizing action within the floodplain, reducing the hazard and risk associate with floods, minimizing the impacts of floods on human safety, health and welfare, and preserving the natural and beneficial values of the base floodplain. Minor, long-term beneficial effects would be expected because the levee improvements would continue to maintain a comparable level of protection reflected on current floodplain maps.

Impacts of Alternative 19 – No Action. The No Action Alternative is feasible; however, it does not address the overall Project purpose and need (see Section 1.3). The Proposed Action also does not follow the objective of the EO as it increases the hazard and risk associated with floods and does not minimize the impacts of floods on human safety. The No Action Alternative also provides an ongoing adverse impact to the R-613 Federal Levee System that has been in place and unmitigated for over 30 years from construction of L-611-614 Federal Levee System. L-611-614 was constructed to an elevation greater than the existing R-613 system and the inherent impact is even discussed in the L-611-614 Design Memorandum. The No Action Alternative does not mitigate the unabated risk currently present in the R-613 Federal Levee System. Under the No Action Alternative, levee construction would not occur; thus, there would be no direct impacts from construction to current floodplain protection. However, if levee embankments are not raised and seepage protection is not improved, then these levees will be shown as decertified when FEMA re-maps this area. With FEMA re-mapping, areas that are shown on the existing FEMA FIRMs as Zone X shaded would be re-mapped as either Special Flood Hazard Areas or Zone D. Due to increased hydrology within the watershed as identified by the USACE (USACE 2014a), it is probable that

additional areas outside of the current Zone X shaded would also be re-mapped as Zone D or Special Flood Hazard Areas. This means the re-mapped Special Flood Hazard Areas would be designated as base floodplain and become regulated under EO 11988. Although the potential FIRM changes could designate more floodplain, the natural values associated with floodplains, such as water quality, wildlife resources, and natural moderation of floods, would not improve because the existing levee would still create a barrier between the waterways and the re-mapped floodplain. Development within the floodplain could occur with the No Action Alternative but would require that development follows the stringent floodplain development requirements set forth by governing agencies.

Under the No Action Alternative, unknown impacts of future re-mapping of FIRM zones could alter floodplain protection and designate substantially more floodplain areas on the land side of the levee.

Determination by the Omaha District Flood Risk and Floodplain Management Section. The Omaha District Flood Risk and Floodplain Management Section (FRFM) is responsible for coordinating compliance of Executive Order 11988 for all Section 408 proposals within the District. The 14 August 2017 EO 11988 Compliance Memo prepared by the Omaha District FRFM is attached to this Environmental Assessment as Appendix H. While the determination provided in Appendix H presents a different approach to the compliance than the determination outlined within this section, both determinations reach the same conclusion and find the Proposed Action in compliance with EO 11988.

3.8 Economics

The NFIP enacted by Congress in 1968 was created to mitigate future flood losses and provide affordable flood insurance within Special Flood Hazard Areas of local communities or counties that have agreements with the federal government to adopt and enforce floodplain management ordinances (NFIP 2014). FEMA provides FIRMs that identify Special Flood Hazard Areas, which are used to determine the cost or availability of flood insurance (Figure 16).

Development may take place within a Special Flood Hazard Area, provided that development complies with local floodplain management ordinances, which must meet the minimum Federal requirements. Flood insurance is required for insurable structures within specifically defined areas that can be inundated by the flood event having a 1-percent chance of being equaled or exceeded in any given year, such as designated Zones A, AH, or AE. The flood insurance requirements help protect Federal financial investments and assistance used for acquisition and/or construction purposes within communities participating in the NFIP (FEMA 2011a). Zones A, AH, or AE also have increased permitting requirements, which can increase development and improvement costs. For designated Zone X areas, it is recommended, but not required, that property owners purchase flood insurance (FEMA 2011a). There is also a special Zone D designation for areas on the land side of a levee that do not fully meet FEMA accreditation standards. FEMA requires leveed systems to provide flood risk reduction for a 100-year flood event, and additional freeboard which varies from 3 feet (minimum) to 4 feet (maximum). Zone D areas are defined as undetermined, but possible, flood hazards and are not considered a Special Flood Hazard Area. Flood insurance is available, but not required (unless by loan lender), in Zone D; however, the rates are commensurate with Special Flood Hazard Area zones. This means Zone D flood insurance premiums are higher than standard Zone X premiums.

A number of factors are considered in determining the premium for flood insurance coverage, including the amount of coverage purchased, deductible amount, flood zone, location, age of building, building occupancy, design of building and its foundation, and in some cases the base flood elevation. There are “grandfather rules” that allow policies to be rated based on the FIRM that was in effect when the structure was built (FEMA 2011a).

Overall, the economic issues related to all levee systems in regard to the local economy include costs and requirements of flood insurance, changes in property values, impacts to development and economic impacts from damages due to flooding.

Existing Conditions. The R-616-613 and R-613 Federal Levee Systems currently protect 6,950 acres of land comprised of households, farmland, portions of Offutt AFB, industrial facilities, utilities, railroad, recreation areas, and roadways. Based on the Sarpy County Open Data Bank website and Papillion Creek Watershed Management Plan 2014 (PCWP 2014), the land protected by the levee systems (land side) is zoned for agricultural farming, light to heavy and general manufacturing; light industrial use; commercial use; residential, or is a federal government property (Figure 17). Currently, many areas zoned for manufacturing and industrial uses along Papillion Creek are Limited Liability Company (LLC) farms or private property (Figure 18). Along the Platte River, large areas are already developed or owned by industrial or manufacturing companies; however, the acquisition of over 700 acres is planned for conservation efforts (Section 4.5). The newly-constructed US-34

corridor provides increased access through the area between Papillion Creek and the Platte River to the Iowa side of the Missouri River. The corridor within the levee protection area consists of a new junction between US-34, La Platte Road, and Harlan Lewis Road.

Effective FEMA digital FIRMs (FEMA 2005) were used to identify flood insurance zones within the Project area (Figure 16). On the land side of the levees, there are approximately 5,088 acres currently designated as a Zone X shaded, a flood area protected by levees from a 100-year flood. There are approximately 600 households within Zone X shaded (U.S. Census 2010); these households are not required to purchase flood insurance unless mandated by a lender. Development pursuits on the land side of the levee in the Zone X shaded area are possible because there are limited floodplain permitting requirements with this FIRM designation and if required, flood insurance is less costly than Zone AH, AE, or D areas. Other small areas on the land side (approximately 419 acres), which include the Papillion Creek WWTP and some households, are designated as Zone AH where flood insurance is required for properties which carry mortgages from federally regulated or insured lenders. On the river side of the levees, the land is designated as floodway and has development restrictions. Table 6 illustrates the recurrence intervals of flood events that would overtop the existing (Alternative 19 – No Action) and the proposed (Alternative 3 – Proposed Action) levee conditions.

Table 6
APPROXIMATE RECURRENCE INTERVAL (YEARS)
OF STORM EVENTS EXCEEDING THE LEVEE FLOOD STAGE

RECEIVING WATERBODY	EXISTING CONDITIONS		PROPOSED CONDITIONS	
	R-616-613	R-613	R-616-613	R-613
Missouri River	400	158	400	400
Papillion Creek	46	46	500+	500+
Platte River	N/A	500+	N/A	500+

Information shown is derived from the Hydrologic Engineering Center - Flood Damage Reduction Analysis (HEC-FDA) model which is referenced in *Project Performance – Federal Levee Systems R-613 and R-616-613* (FYRA 2017).

Impacts of Alternative 3 – Proposed Action. Completion of the Proposed Action would maintain a comparable level of protection reflected on current floodplain maps. The levee segments would meet the FEMA accreditation criteria. Flood insurance designations on FIRMs would be updated as part of the re-mapping process to accurately reflect current hydrological and hydraulic conditions and maintain levee protection from a base flood (100-year flood); however, zone revisions to Special Flood Hazard Area status, such as Zone AH, could still occur in areas on the land side of the levees because of interior ponding. With FEMA accreditation, the cost of and criteria for flood insurance, property values, and development potential of most Zone X shaded areas on the land side of the levee would remain similar to current conditions, despite some areas with increased base floodplain boundaries in areas with interior ponding. With the continuation of current economic conditions, including development costs, the Proposed Action would have no effect (would not increase or decrease) on development in Zone X shaded areas on the land side of the levee segments, but would not induce development in the base floodplain (i.e., Zones AH or AE floodway). The planned development of industrial and manufacturing facilities in associated land use zones (Figure 17) that coincide with the Zone X shaded designation on the land side of the levee would provide jobs and stimulate the local economy. Commercial development along the new US-34 alignment is also expected. Completion of the Proposed Action would also provide a levee system with increased seepage protection and a higher levee crest. During the 2011 flood, the largest emergency repair and flood fighting costs incurred by local government agencies was for seepage repair and mitigation, sandbagging the levee crest and personnel needed to perform this work. The project sponsor spent $500,000 alone on contracts for seepage mitigation alone. This does not include any sandbagging or personnel costs associated with the flood. It is expected that the increased seepage protection and higher levee crest on the Proposed Action would significantly reduce the costs incurred during flooding and would save local government agencies (project sponsor, City of Bellevue and Sarpy County, Nebraska) large amounts of money.

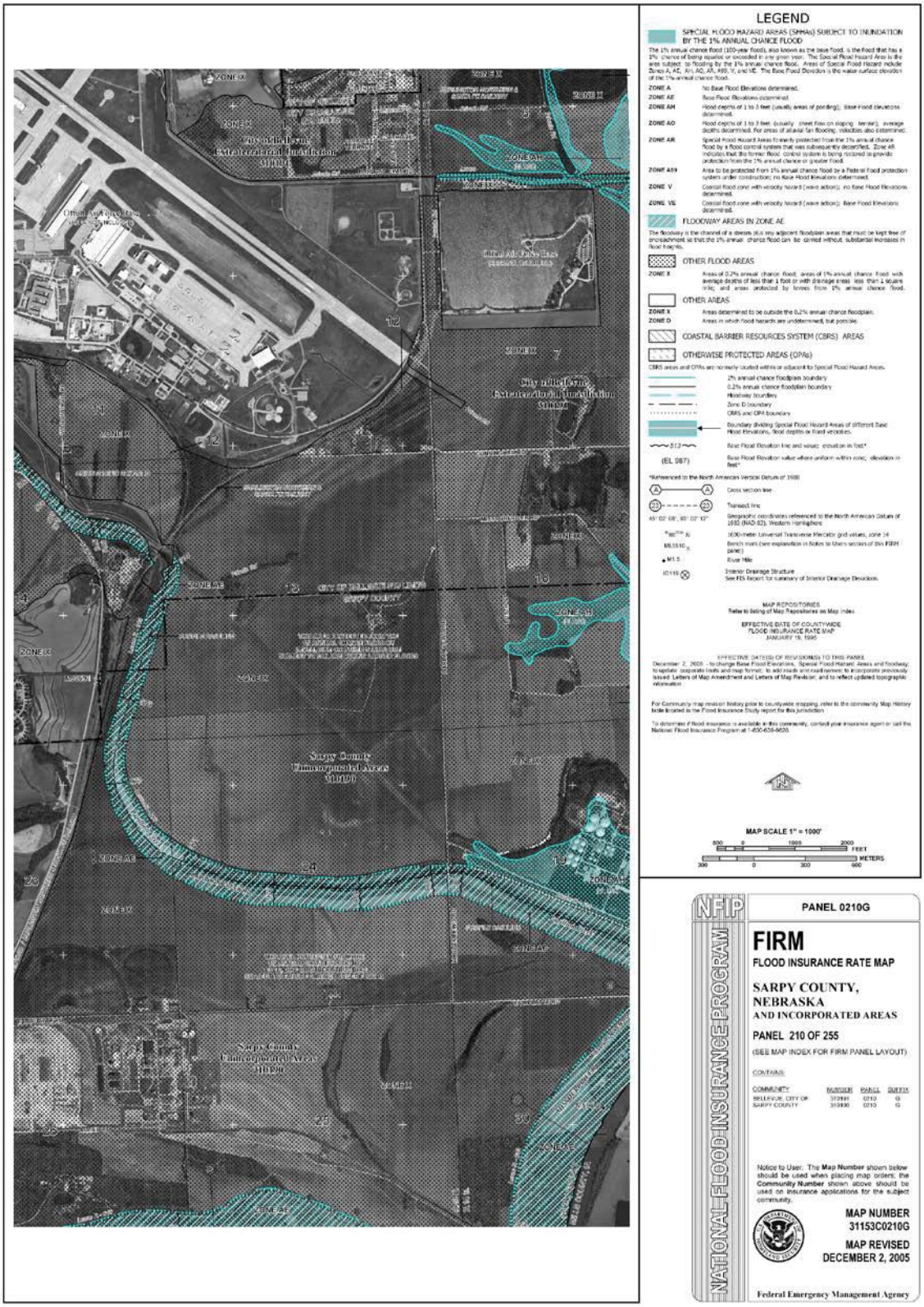


Figure 16 – FEMA FLOOD INSURANCE RATE MAP (FIRM) FOR PART OF THE LEVEE AREA

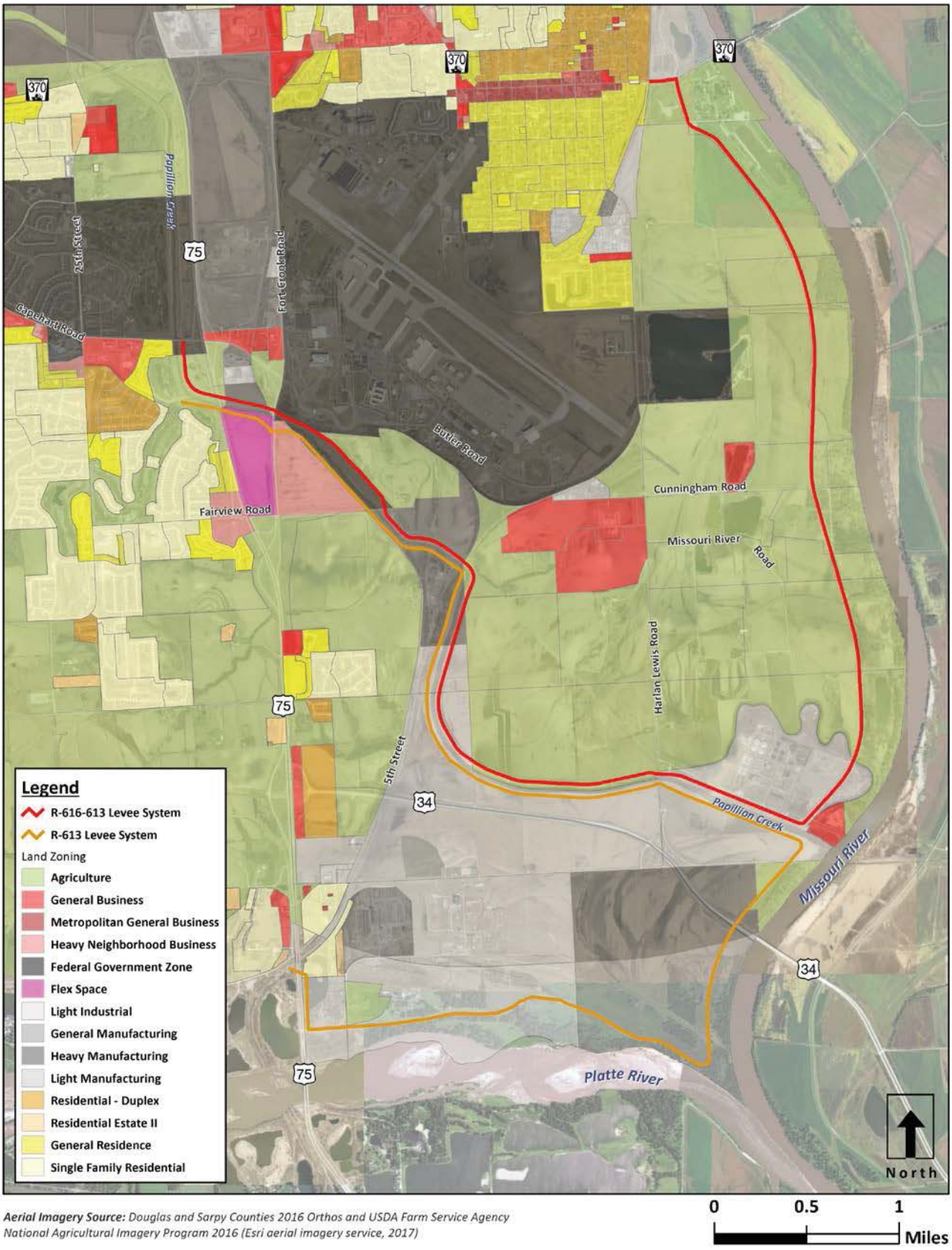


Figure 17 – CURRENT SARPY COUNTY LAND ZONING MAP

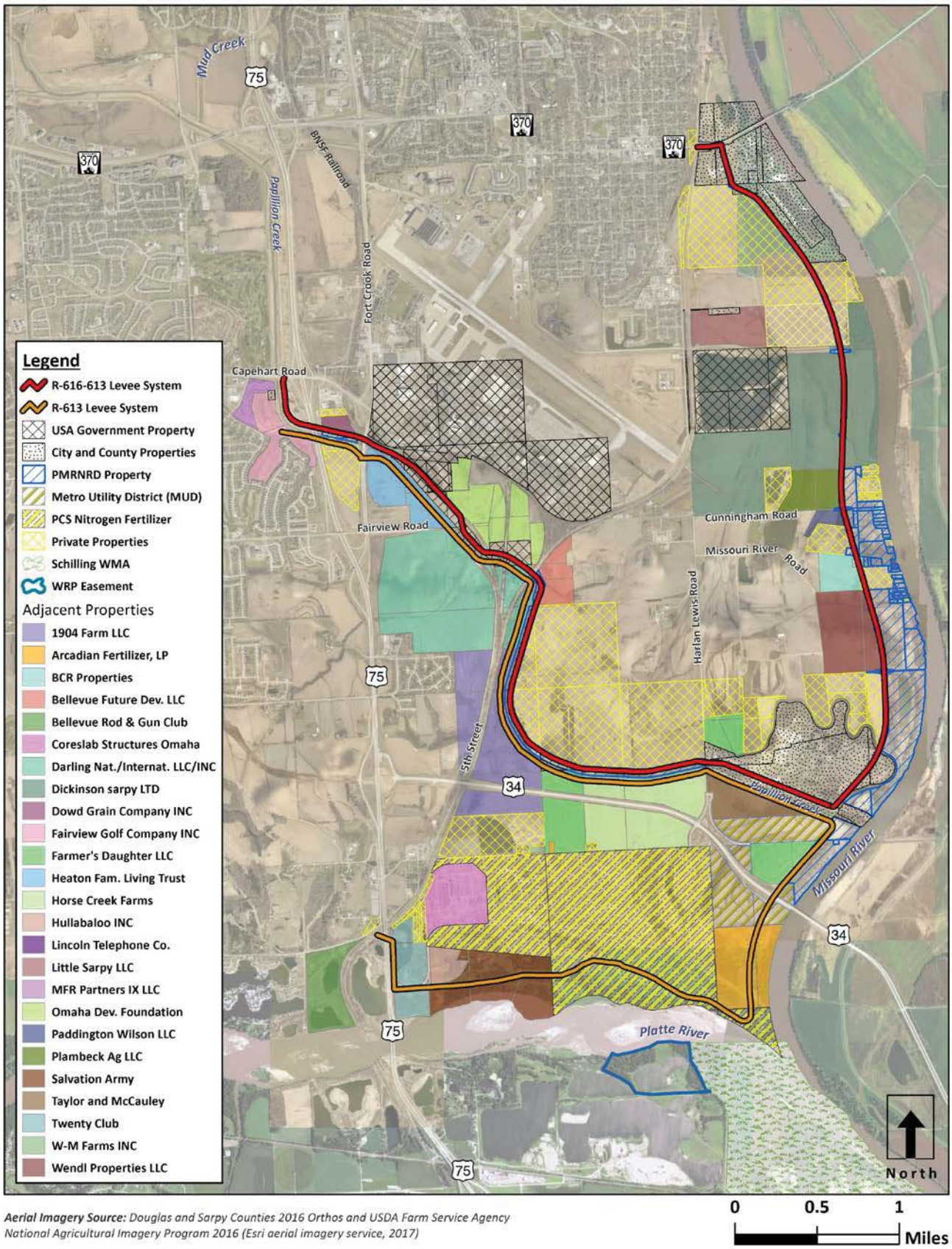


Figure 18 – PROPERTIES ADJACENT TO THE LEVEE SYSTEMS

The Proposed Action would have beneficial impacts on the local economy with no short-term adverse or beneficial effects under the current FIRM designations, but moderate, long-term beneficial effects with the re-mapping of FIRMs because economic development would be maintained in areas that currently allow for development (Zone X), the levees would be certifiable for FEMA accreditation, and the level of protection that exists on current FIRMs would be maintained. Long-term beneficial effects would also be seen with a decreased cost in flood related emergency repairs and flood fighting for future events.

Impacts of Alternative 19 – No Action. Under the No Action alternative, levee construction would not occur, and it is assumed the levee systems would not meet FEMA accreditation criteria. Therefore, these levees will be shown as decertified when FEMA re-maps this area and FIRM zones on the land side of both levee systems would be updated without the levee protection from a 100-year flood. Due to increased hydrology (USACE 2014a), areas designated as Zone X would likely be revised to Special Flood Hazard Area zones or Zone D (i.e., unknown flood hazard) (FEMA 2011d). These actions would reduce property values, increase development costs due to floodplain permit requirements, discourage new development, increase risk to areas that are already developed, and in some areas, increase costs of and require additional flood insurance. Current property owners may not experience substantial changes in flood insurance requirements because of "grandfather rules"; however, there could be undesirable rate changes in flood insurance costs. Without the levee improvements (No Action Alternative), the base floodplain boundary could expand with FEMA re-mapping or become Zone D and increase development costs in areas already planned for development, such as the US-34 corridor. Portions of US-34 could also be included in the expanded base floodplain boundary and may result in decreased economic benefits to the local and surrounding areas by restricted usage of this major thoroughfare. Under the No Action alternative, the levee would be expected to incur damage from seepage during flooding events. These seepage damages would likely require emergency repairs. It is also expected that sandbagging will be required for flooding events under the No Action alternative. The economic costs to local government agencies associated with the emergency repairs and flood fighting actions would be similar to the amount that was seen during the 2011 flood and could be in excess of $500,000.

Under the No Action Alternative, significant impacts would be expected with no short-term adverse effects on the local economy with the current FIRMs, but moderate, long-term adverse effects on the local economy with re-mapping of FIRMs. Impacts could include increased flood insurance requirements and associated costs, decreased property values because of re-mapped flood risk, and increased development restrictions on areas that did not previously have these restrictions.

3.9 Water Quality

Water Quality is regulated under the Federal Water Pollution Control Act Amendments of 1972 (Clean Water Act [CWA]) (33 USC §1251 et seq.). The objective is to restore and maintain the chemical, physical, and biological integrity of the nation's waters by preventing point and non-point pollution sources, providing assistance to publicly owned treatment works for the improvement of wastewater treatment, and maintaining the integrity of wetlands. Protection of water quality is important because of the need for a reliable drinking water supply, for swimming and recreating, for fish and shellfish consumption, for adequate agricultural supply, for habitat for fish and wildlife, and other beneficial uses. Clean water is pivotal in the protection of human health and the environment.

Every 2 years, Nebraska prepares a report to describe the status and trends of existing water quality and identifies impairments, including pollution problems and sources, and designated beneficial uses based on the characteristics of the water resource (Section 305(b) of the CWA) (NDEQ 2014a). Beneficial uses, as defined by Title 117 – Nebraska Surface Water Quality Standards, are primary contact recreation; aquatic life; water supply, including public drinking water, agriculture, and industrial; and aesthetics (NDEQ 2012b). The 2014 Water Quality Integrated Report provides waterbody categories to better classify and convey the collected information (NDEQ 2014a). Category 1 waterbodies are identified as having all designated use qualifications met. Category 5 waterbodies have one or more beneficial uses that are determined to be impaired by one or more pollutants and all of the total maximum daily loads (TMDLs) have not been developed. Category 5 waters constitute the Section 303(d) list subject to EPA approval/disapproval.

Existing Conditions. Nebraska's water quality standards identify the Missouri River from the Big Sioux River to the Platte River as designated Segment MT1-10000 (parallel to levee segments R-613 Missouri River Right Bank and R-616 Missouri River Right Bank). The State of Nebraska had issued a fish consumption advisory for the Missouri River downstream of Gavins Point Dam and was designated as a Category 5 waterbody in the 2012 Water Quality Integrated Report (NDEQ

2012a). The identified parameters of concern were Cancer Risk & Hazard Index Compounds, specifically Dieldrin and polychlorinated biphenyls (PCBs). However, the fish consumption advisory was removed based on recent fish tissue sampling that indicated the waterbody is meeting water quality standards for fish consumption and was delisted as a 303(d) impaired water (EPA 2014a). The 2014 Water Quality Integrated Report lists this segment of the Missouri River as a Category 1 with 'supported beneficial use' for recreation; aquatic life; public drinking, agricultural, and industrial water supply; and aesthetics (NDEQ 2014a).

Nebraska's water quality standards identify the Platte River from the Missouri River to approximately 32 miles upstream as designated Segment LP1-10000 (levee segment R-613 Platte River Left Bank). This area of the Platte River is listed as a Category 5 in the 2014 Water Quality Integrated Report (NDEQ 2014a). Aquatic life use for this segment was listed as impaired (fish consumption advisory) due to the Hazard Index Compound selenium. It is listed as 'supported beneficial use' for recreation, public drinking water supply, agricultural water supply, and aesthetics.

Nebraska's water quality standards identify Papillion Creek from the Missouri River to approximately 8 miles upstream as designated Segment MT1-10100 (levee segments R-613 Papillion Creek Right Bank and R-613 Papillion Creek Left Bank). This area of Papillion Creek is listed as a Category 5 in the 2014 Water Quality Integrated Report (NDEQ 2014a). The creek is listed as impaired for recreation and aquatic life due to *E. coli* and selenium, respectively. It is listed as 'supported beneficial use' for agricultural water supply and aesthetics.

Excess nutrients, such as nitrogen and phosphorus, in the waterways surrounding the levee systems likely comes from cropland runoff and discharges from WWTPs. For example, effluent from the Papillion Creek WWTP discharges into the Missouri River and creates a mixing zone with reduced water quality that extends 5,000 feet downstream.

Impacts of Alternative 3 – Proposed Action. Although the project occurs in close proximity to the Missouri and Platte Rivers, no dredge or fill activities are required within these channels. The Proposed Action would continue to provide gated catchment to contain accidental release of contaminants and serve as a settling basin for increased sediment transport caused by human land uses within the land side of the levees. The Proposed Action would rehabilitate the levee systems and maintain a comparable level of protection reflected on current floodplain maps.

Replacement of drainage penetrations and culvert outlets along Papillion Creek are needed to rehabilitate and maintain the function of these drainage points. Construction includes the placement of rock riprap along the side of the levee, and placement of geo-fabric and rock riprap along the already engineered channel. These modifications are not anticipated to have a substantial effect on the chemistry and/or physical characteristics of receiving waters. Given that fill material will consist of natural embankment material, geo-textile, and quarried stone, construction is not anticipated to introduce a substantial amount of organic material or nutrients. Spillage of contaminants from the construction site into waterways would be minimal due to the location of the majority of the work on the land side of the levee, and proposed BMPs.

Minor changes to the physical movement of high water in Papillion Creek is anticipated from placement of riprap to stabilize levees and banks, which is intended to maintain the position of the existing channel. This activity would not obstruct flow, nor would it change direction of flow. Normal water-level fluctuations also are not expected to change.

BMPs to avoid and minimize water quality impacts would include several methods of erosion control: waddle barriers, erosion checks, inlet/outlet protection, mulching, post-construction erosion control, rolled erosion control, and vegetation. Also, the CWA requires preparation and submission of a general storm water permit (National Pollutant Discharge Elimination System [NPDES]) to NDEQ (NDEQ 2005) and preparation of a SWPPP before construction activities can begin. The SWPPP would be based on BMPs, such as seeding/mulching bare slopes as soon as practicable and measures to contain spillage of any contaminants into waterways.

Under the Proposed Action, implementation of BMPs would minimize erosion from construction related activities and minimize storm water runoff resulting in insignificant impacts on the water quality of Papillion Creek. Minor, short-term adverse effects would occur in a relatively small footprint of the discharge area (< 1%) compared to the overall area of the creek and direct adverse conditions would cease after construction is completed. Additionally, the Proposed Action would decrease the risk of inundation and the probability of needing corrective actions after a major flood event by the county, state, and property owners to restore aquatic habitats.

Impacts of Alternative 19 – No Action. Under the No Action Alternative, levee construction would not occur; thus, there would be no direct impacts from construction that could alter water quality within the Missouri River, Papillion Creek, and the Platte River. Water quality within these watersheds would be expected to remain similar to existing conditions. However, if the levee embankments are not raised and seepage protection is not improved, then it remains likely that the levee would perform to a lesser degree than reflected on current floodplain maps, the land side of the levee may become inundated, and the inundation may damage properties including the Papillion Creek WWTP, residential areas, commercial establishments, and industrial sites. This inundation could possibly result in the release of wastes such as raw sewage, petroleum products, household chemicals, and industrial chemicals. These materials, although likely to be diluted, could temporarily impair surrounding aquatic habitats by either inundation or contamination. Since the risk of inundation is uncertain and corrective actions after a major flood event by the county, state, and property owners may minimize the damage to water quality, the magnitude and duration of adverse effects is unknown and could be comparable to past flood events.

Under the No Action Alternative, unknown impacts of flooding could potentially alter water quality resulting in adverse effects.

3.10 Wetlands

Wetland resources are afforded protection under the CWA, as amended, and EO 11990 of 1977 (Protection of Wetlands). Wetlands and riparian areas are important because they provide habitat for various species of plants, fish, and wildlife; serve as ground water recharge areas; provide storage areas for storm and flood waters; serve as natural water filtration areas; and provide protection from wave action, erosion, and storm damage.

Existing Conditions. The existing conditions were presented in Section 2.4.

Table 7
SUMMARY OF WETLAND AND CHANNEL IMPACTS AND COMPENSATORY MITIGATION PLAN

TYPE/LOCATION	IMPACTS	NOTES	PERMITTEE-RESPONSIBLE COMPENSATORY MITIGATION
Seep Wetlands (PEMA and PEMC) / River side of R-613 Papillion Creek within cut sections on high bench to restore original design and increase hydraulic capacity of channel	4.270 acres	These wetlands are expected to reform in seep areas on channel benches following reshaping to recreate micro-topography and reseeding with a floodplain mixture.	None
PEMA and PEMC / Land side along all levee segments	2.687 acres	Off-site mitigation will be within Papillion Creek watershed at Rumsey Station site.	Mitigated Off-site – In-kind Establishment 2:1 Ratio
PEMF / **Land side of the R-616 Missouri River Right Bank segment**	0.022 acre	Off-site mitigation will be within Papillion Creek watershed at Rumsey Station site.	Mitigated Off-site – In-kind Establishment 2:1 Ratio
PSSA / **Land side of R-613 Papillion Creek Right Bank Segment and east of Fort Crook Road**	0.008 acre	Off-site mitigation will be within Papillion Creek watershed at Rumsey Station site.	Mitigated Off-site – In-kind Establishment 2:1 Ratio
PFOA / Land side at Missouri River confluence with Platte River	0.026 acre	Off-site mitigation will be within Papillion Creek watershed at Rumsey Station site.	Mitigated Off-site - In-kind Establishment 2:1 Ratio
Channels (WOUS) / Papillion Creek and tributaries at drainage penetrations in areas originally containing rip rap cover	1143 linear feet	Following placement of rip rap, rock surfaces below OHWM are expected to become silted and reestablished with algal communities. No loss of channel length.	None

Impacts of Alternative 3 – Proposed Action. Construction of the Proposed Action would require fill in wetland locations land side of the levee, and minimal bank shaping and rock placement along Papillion Creek in two locations. The proposed action would also require cut in wetland locations river side of the R-613 Papillion Creek Left and Right Bank Segments to restore the original design cross section and increase hydraulic capacity of the channel. Several engineering options were evaluated to avoid and/or minimize these impacts (Section 2.0). Unavoidable impacts for each levee system listed in Table 7 and described below:

R-616-613 Federal Levee System

- 0.363 acre of PEMA/PEMC (including Farmed PEM) and 0.022 acre of PEMF wetlands on the land side would be filled for construction of embankments, seepage berms, or drainage penetrations as part of the repairs and improvements to the R-616-613 levee system (Table 2). Fill material would be free from chemical, biological, or other pollutants.
- 3.750 acres of PEMA/PEMC wetlands on the river side of the R-613 Papillion Creek Left Bank Segment would be excavated to restore the original channel design cross sections and to improve hydraulic capacity of the channel. Following excavations to remove sediment deposition, the lowered embankment areas would be restored to a similar irregular topography and reseeded in a floodplain mix. It is expected that wetlands will reestablish in the same seep areas.
- Nine drainage penetration culverts would be repaired or replaced along Papillion Creek with 25 feet of bank stabilization (i.e., rip rap) on each side of each repair/replacement. In addition, bank stabilization measures would be placed at four culvert locations for a total of 650 linear feet of bank shaping below the OHWM. This would require 1479.6 cubic yards of rip rap consisting of Class C rock (i.e., no more than 10% of the rock would be less than 10 pounds; no more than 50% of the rock would be less than 150 pounds; and 100% of the rock would be less than 700 pounds) to be placed below the OHWM. The proposed work would occur in an area originally containing rock riprap cover. As part of the drainage penetration culvert replacements, a portion of a tributary (of Papillion Creek) would be culverted due to a culvert extension resulting in 33 linear feet of impact.

R-613 Federal Levee System

- 2.324 acres of PEMA/PEMC (including Farmed PEM), 0.008 acre of PSSA, and 0.026 acre of PFOA wetlands on the land side would be filled for construction of embankments, seepage berms, or drainage penetrations as part of the repairs and improvements to the R-613 levee system (Table 2). Fill material would be free from chemical, biological, or other pollutants.
- 0.520 acre of PEMA/PEMC wetlands on the river side of the R-613 Papillion Creek Right Bank Segment would be excavated to restore the original channel design cross sections and to improve hydraulic capacity of the channel. Following excavations to remove sediment deposition, the lowered embankment areas would be restored to a similar irregular topography and reseeded in a floodplain mix. It is expected that wetlands will reestablish in the same seep areas.
- Six drainage penetration culverts would be repaired or replaced along Papillion Creek with 25 feet of bank stabilization (i.e., rip rap) on each side of each repair/replacement. In addition, bank stabilization measures would be placed at three culvert locations, for a total of 450 linear feet of bank shaping below the OHWM. This would require 1267 cubic yards of riprap consisting of Class C rock to be placed below the OHWM. The proposed work would occur in an area originally containing rock riprap cover. As part of the drainage penetration culvert replacements, a portion of a tributary (of Papillion Creek) would be culverted due to a culvert extension resulting in 10 linear feet of impact.

Total Project Impacts. In total, the Proposed Action would impact 2.687 acres of PEMA/PEMC, 0.022 acre of PEMF, 0.008 acre of PSSA, and 0.026 acre of PFOA wetlands on the land side of the levee systems. On the river side, excavation to improve hydraulic capacity of the channel would impact 4.270 acres of PEMA/PEMC seep wetlands. Bank stabilization would alter the substrate along 1100 linear feet of Papillion Creek. Drainage penetration culvert extensions would culvert 43 linear feet of two tributaries of Papillion Creek. Channel impacts from bank stabilization and culverting total 1143 linear feet. No loss of channel length is expected. These impacts would be authorized under a Section 404 Individual Permit.

Compensatory Mitigation. A compensatory mitigation plan is proposed to ensure a no net-loss of wetlands and WOUS, and is summarized in Table 7. Wetland impacts on the river side will be temporary and are expected to reestablish on-site following reshaping and reseeding. Wetland impacts on the land side will be offset by the creation of wetlands at an off-site permittee responsible site along West Papillion Creek at Rumsey Station just outside the recommended 5-mile Offutt AFB Aircraft Strike Hazard zone. The site is owned by PMRNRD and has been used previously for off-site permittee responsible mitigation. A mitigation plan for construction and establishment of additional wetland acres is being prepared by PMRNRD, and has been presented to the USACE-Omaha District Regulatory office.

In addition to mitigation monitoring at the Rumsey Station site, PMRNRD is willing to monitor the restored areas on the upper bench of Papillion Creek. However, all lands river side of the levee on Papillion Creek may require future maintenance of the channel.

Under the Proposed Action, impacts to wetlands and WOUS are considered insignificant because alterations would be minor, although long-term, and are being offset to ensure a no net-loss of wetlands and WOUS. Additionally, the Proposed Action would decrease the risk of inundation and the probability of needing corrective actions after a major flood event by the county, state, and property owners to restore wetlands.

Impacts of Alternative 19 – No Action. Under the No Action Alternative, levee construction would not occur; thus, there would be no direct impacts from construction that could impair or degrade WOUS or wetlands. WOUS and wetlands within the vicinity of the Project would be expected to remain similar to existing conditions. However, if the levee embankments are not raised and seepage protection is not improved, then it remains likely that the levee would perform to a lesser degree than reflected on current floodplain maps, the land side of the levee may become inundated, and the inundation may damage properties including the Papillion Creek WWTP, residential areas, commercial establishments, and industrial sites. This could possibly result in the release of wastes such as raw sewage, petroleum products, household chemicals, and industrial chemicals. These materials, although likely to be diluted, could temporarily impair surrounding wetlands by either inundation or contamination. Since the risk of inundation is uncertain and corrective actions after a major flood event by the county, state, and property owners may minimize the damage to WOUS or wetlands, the magnitude and duration of adverse effects is unknown and could be comparable to past flood events.

Under the No Action Alternative, unknown impacts of flooding could potentially impair WOUS or wetlands resulting in adverse effects.

3.11 Threatened and Endangered Species

Threatened and endangered species are afforded protection under the Endangered Species Act of 1973, as amended (16 USC §1531 et seq.), and compliance with Section 7 of the Endangered Species Act assures that, through consultation (or conferencing for proposed species) with the USFWS, federal actions do not jeopardize the continued existence of any threatened, endangered or proposed species, or result in the destruction or adverse modification of critical habitat. Under provisions of Section 7 of the Endangered Species Act, PMRNRD provided the following:

- A Biological Evaluation was prepared to identify existing conditions and impacts from the proposed alternatives (FHU 2014), and was submitted to Nebraska Games and Parks Commission (NGPC) and USFWS.
- Following receipt of comments from these agencies, a Biological Assessment (BA) was submitted to USFWS on 26 April 2016 (FHU 2016). The BA provided additional information requested by USFWS, including modelling efforts to evaluate potential effects to the hydrological cycle, sediment and nutrient loading, sediment cycling/transport and introduction of contaminants and their potential cumulative impacts on the interior least term, piping plover and pallid sturgeon.
- Following receipt of comments from USFWS dated 3 October 2016, a conference call was conducted on 29 November 2016 between USFWS, USACE and PMRNRD to discuss USFWS concerns that environmental contaminants resulting from development of the area encompassed by the R-613 levee may adversely affect the pallid sturgeon in the Missouri and Platte River confluence area. Additional information was provided on activities to protect the confluence area through existing regulatory requirements and BMPs, and by project specific mitigation measures. This included a good faith effort to continue on-going efforts to purchase properties from PCS Nitrogen and MUD for use as conservation lands.

- Following further discussion between USFWS and PMRNRD on 13 December 2016, it was agreed that if the properties could not be purchased through negotiations within 3 years of completion of the R-613 project, PMRNRD would utilize any and all legal means at its disposal to acquire 150 acres for use as conservation lands.
- Based on these discussions, the supplemental information was provided to USFWS in a draft letter from USACE dated 14 December 2017. The letter addressed activities to protect the confluence area by existing regulatory requirements and BMPs, and by project specific mitigation measures, including the agreed upon stipulation regarding the purchase of 150 acres.
- Based on discussions with USFWS on 21 December, the agency agreed that the proposed measures outlined in the draft letter were acceptable, and USFWS would provide concurrence. USFWS stated that they would provide suggested edits and wording for the document. This information was received on 23 January 2017.
- A revised letter was resubmitted to USFWS on 10 February 2017. On 23 February, USFWS and PMRNRD discussed the letter; USFWS indicated that they had one minor edit for the letter and would provide that shortly.
- PMRNRD tried contacting USFWS many inquire about the letter and concurrence prior to a requested 17 March 2017 deadline from USACE.
- On 10 March 2017, USFWS stated they would provide the letter early the following week. As of 17 March, nothing had been received from USFWS.
- Supplemental information, including a concurrence request, was provided by USACE to USFWS on 22 March 2017.

This section summarizes the findings and conclusions of the BA. Appendix J contains correspondence from the USFWS and NGPC concerning the impact determinations for the Proposed Action.

Existing Conditions. Amy Zlotsky, Adam Behmer, and Carin Richardson (FHU Environmental Scientists) conducted a brief field review of the Project area on 25-27 September, 2 and 5 October 2012, and 12 September 2013, to assess the Project area for the presence of suitable habitat for federally and state listed threatened and endangered species. Also, information on the potential absence/presence of threatened and endangered species was collected using materials in the Nebraska Biological Evaluation Process for the Federal-Aid Transportation Program, county lists from the NGPC and USFWS, and the USFWS Information, Planning, and Conservation System (IPaC) website's project scoping tool (NGPC 2015, USFWS 2015, USFWS 2016a). The following previous emergency levee repair reports related to the Project were also utilized:

- The USACE–NWD-NWO approved Programmatic EA (2011) determined that with conservation measures, the general levee repair activities **may affect, but were not likely to adversely affect** the interior least tern, piping plover, pallid sturgeon, western prairie fringed orchid and whooping crane.
- The USACE-NWD-NWO approved Tiered EA (2012) determined that with conservation measures, the site-specific activities would have **no effect** on the interior least tern, piping plover, pallid sturgeon, western prairie fringed orchid and whooping crane.

Table 8 identifies federal and state listed species likely to be present in Sarpy County, according to NGPC and USFWS sources (NGPC 2015, USFWS 2015, USFWS 2016a). No critical habitat has been designated for these species in Nebraska.

Several species in Table 8 are not likely to occur in the Project area because suitable habitat does not occur in the Project area or the species range does not include the Project area. Each of these species is described below.

- *American Ginseng* – Suitable habitat for the American ginseng consists of mature upland woodland along river bluffs, such as the Missouri River. Within the Project action area, there are no river bluffs dominated by mature upland woodland, such as bur oak (*Quercus macrocarpa*). Within the Project area, there are no mature deciduous oak-hickory woodland stands; therefore, additional information concerning the American ginseng is not provided.
- *Western Prairie Fringed Orchid* – Suitable habitat for the western prairie fringed orchid consists of natively vegetated grasslands, sidehill seeps, and wet meadows. Within the Project action area, these habitats do not occur; therefore, additional information concerning the western prairie fringed orchid is not provided.

Table 8
ENDANGERED AND THREATENED SPECIES LISTED FOR SARPY COUNTY

COMMON NAME	SCIENTIFIC NAME	STATUS[1]
American ginseng	*Panax quinquefolium*	ST
Interior least tern	*Sternula antillarum athalassos*	FE, SE
Lake sturgeon	*Acipenser fulvescens*	ST
Northern long-eared bat	*Myotis septentrionalis*	FT, ST
Pallid sturgeon	*Scaphirhynchus albus*	FE, SE
Piping plover	*Charadrius melodus*	FT, ST
River otter	*Lontra canadensis*	ST
Sturgeon chub	*Macrhybopsis gelida*	SE
Western prairie fringed orchid	*Platanthera praeclara*	FT, ST

[1]FE = Federally Endangered, FT = Federally Threatened, SE = State Endangered, ST = State Threatened

The remaining species in Table 8 are likely to occur either within the limits of construction or within 0.25 mile of the land and river side of the levees, which includes the Missouri and Platte Rivers, and Papillion Creek. Each of these species is described below. Species with similar habitat requirements were grouped for simplicity.

- *Interior Least Tern and Piping Plover* – Suitable nesting habitat for the interior least tern and piping plover are very similar and consists of sparsely vegetated sandbars, sandy shorelines, and aggregate mining spoil piles near rivers or lakes. Nesting and breeding occurs in Nebraska from mid- to late-April until the birds return to their overwintering grounds (outside of Nebraska) three to four months later.

  The Lower Platte River channel contains exposed sandbars and sandy shoreline, which are considered suitable nesting habitat for these bird species. Surveys conducted between 2010 and 2014 reported the presence of interior least tern and piping plover nests of the Platte River. Surveys conducted between 2010 and 2014 reported the presence of piping plover nests along the Platte River at on-river locations adjacent to the R-613 Platte River Left Bank Segment and both interior least tern and piping plover nests at off-river locations on the south side of the Platte River (outside of the Project area). The distance between the Project alignment and the Platte River shoreline varies from 0.03 mile to 0.25 mile. Tree stands occur on most of this corridor between the Project and suitable habitat, except between R-613 Platte River Left Bank Segment stations 90+00 and 1500+00, and 130+00 and 140+00, where there are few trees.

  The Missouri River and Papillion Creek within the Project area generally do not have sandbars or off-river habitats suitable for interior least tern or piping plover nesting.

- *Lake Sturgeon, Pallid Sturgeon, and Sturgeon Chub* – Suitable habitat for lake sturgeon, pallid sturgeon, and sturgeon chub are very similar and consists of large, free-flowing riverine ecosystems that are ideally connected to or contain floodplains, backwaters, chutes, sloughs, islands, and sandbars. Tributaries of large rivers also likely provide seasonal or long-term habitat for spawning, refuge, and forage.

  The general waterway characteristics of the Missouri and Platte Rivers indicate suitable habitat for these fish species is present; however, the Missouri River within the Project area has few areas with backwaters, chutes, sloughs, islands, or sandbars. Surveys conducted between 2000 and 2009 confirm the presence of pallid sturgeon and sturgeon chub near the Project area in the Missouri and Platte Rivers.

  Papillion Creek, a channelized tributary to the Missouri River with little natural habitat, would not likely contain consistent suitable habitat for these fish species; however, the downstream reach connected to the Missouri River (i.e., between stations R-613 230+00 to 330+00) may provide suitable refuge and reproductive staging areas because of the adequate channel size and lower stream velocity. Conversely, the effluent of the Papillion Creek WWTP is released into the Missouri River near the Papillion Creek and Missouri River confluence, which may

adversely affect the water quality in the Project area and minimize the occurrence of these fish within the downstream reach of Papillion Creek.

- *Northern Long-Eared Bat* – Suitable summer roosting habitat for the northern long-eared bat consists of trees (3 inches or greater diameter at breast height), and other structures that provide protection, such as bridges and buildings. Isolated trees of the appropriate size are considered suitable habitat when they provide exfoliating bark, crevices, cavities, or cracks, and are less than 1000 feet from the next nearest suitable roost tree within a wooded area. Winter hibernacula habitat is generally limited to caves and mines.

  White-nose syndrome is a fungal disease known to attack northern-long eared bats, especially during the hibernation (USFWS 2016c). The disease causes bat mortality through abnormal behavior that triggers the infected bat to deplete fat stores, which leads to death. This disease has been confirmed in northern-long eared bats in southeast Nebraska.

  Mature tree stands and structures, including large culverts, would provide suitable habitat for the northern long-eared bat along the R-616 and R-613 Missouri River Right Bank Segments and the R-613 Platte River Left Bank Segment. The area with the highest probability of northern long-eared bat occurrence is near the Platte and Missouri River confluence where there is a nearly contiguous stand (more than 200 acres) of mature or dead cottonwoods (*Populus deltoides*) and willows (*Salix* spp.) and optimal foraging habitat.

  While the area along the R-613 Papillion Creek Right and Left Bank Segments has bridges and other structures that could be considered opportunistic roosting habitat, the Project action area lacks mature stands of trees that are needed to support additional roosting and foraging activities. Therefore, the area along Papillion Creek within the Project action area would be considered sub-optimal to moderate habitat.

  No habitat for winter hibernacula appears to be present within the Project area. The Project area is located within the white-nose syndrome zone (USFWS 2016c).

- *River Otter* – Suitable habitat for the river otter consists of waterways, including streams, lakes, ponds, swamps, marshes, and estuaries, which have timber nearby, an abundance of available food, and ideally beaver presence. In some areas, river otter presence has been positively correlated with woodland cover.

  Areas along the Missouri and Platte Rivers within the Project area contain suitable habitat for river otters. These include levee drainage ditches and ponds with varying amounts of woodland cover and fish as a readily available food source. Papillion Creek is channelized and has low quality riparian vegetation and minimal tree establishment along its banks and levee drainage ditches. This indicates little suitable habitat is present and decreases the probability of river otter occurrence along its banks in the Project area.

Impacts of Alternative 3 – Proposed Action. The Proposed Action would rehabilitate the levee systems and maintain a comparable level of protection reflected on current floodplain maps. The proposed construction and operation activities could cause direct effects on threatened and endangered species or their habitat, including:

- Temporary disruption of foraging and nesting behaviors caused by construction noise and visual disturbances (interior least tern and piping plover)
- Temporary disruption of foraging and spawning, and refuge displacement caused by construction noise, construction disturbance (e.g., culvert replacement, bank shaping, and riprap placement), and sedimentation/water quality (lake sturgeon, pallid sturgeon, and sturgeon chub)
- Temporary disruption of foraging and roosting behaviors, and temporary loss of roosting habitat caused by construction noise and construction disturbance (e.g., removal of vegetation and presence of prey) (northern long-eared bat)
- Permanent removal of potential roosting/staging trees (northern long-eared bat)
- Temporary avoidance of foraging and travel near the construction area caused by construction noise, construction disturbance (e.g., clearing and grubbing of vegetation, bank shaping, and riprap placement), and removal or repair of drainage penetrations (river otter)

A Final 4(d) Rule is in place for addressing impacts to northern long-eared bats (USFWS 2016b). This rule prohibits removal of trees within 150 feet of maternity roosts during the pup season. Depending on the location of tree removal activities within the Project area, the USFWS may recommend surveys, and restrictions on tree removal activities during the pup season would be required should maternity roosts be present.

A summary of the effect determinations and proposed conservation conditions for threatened and endangered species are provided in Table 9. Species with similar habitat requirements and potential impacts were grouped for simplicity. Additionally, the Proposed Action would decrease the risk of inundation and the probability of needing corrective actions after a major flood event by the county, state, and property owners to restore habitat.

The NGPC concurred that the proposed Project would result in a May Affect, Not Likely to Adversely Affect determination for these species provided proposed conservation measures are implemented (Appendix J). PMRNRD intends to fully implement these measures. If any threatened and endangered species are found within the Project area either by a construction worker or a qualified biologist conducting a survey, then NGPC and USFWS would be contacted for further coordination.

The USFWS concurred that the proposed Project would result in a May Affect, Not Likely to Adversely Affect determination for these species provided proposed conservation measures are implemented, except for the pallid sturgeon. USFWS expressed concern that environmental contaminants resulting from development of the area encompassed by the R-613 levee may adversely affect the pallid sturgeon in the Missouri and Platte River confluence area. This issue is addressed in more detail in Section 4.0, Cumulative Impacts. Findings of the cumulative impacts analysis indicated that when existing protective measures to implement storm water management and limit development are considered along with project specific mitigation measures, the level of contaminants from runoff from future development behind the R-613 levee would be minimized to a level that would have insignificant and discountable effects on the pallid sturgeon.

Based on discussions on 21 December, the agency agreed that the proposed measures offered by PMRNRD were acceptable, and USFWS would provide concurrence. A concurrence letter from USFWS was received 24 April 2017 for a May Affect, Not Likely to Adversely Affect determination provided proposed conservation measures (Table 9) are implemented (Appendix J).

Impacts of Alternative 19 – No Action. Under the No Action Alternative, levee construction would not occur; thus, there would be no direct impacts from construction that could harm threatened and endangered species or alter habitat. Habitat suitable for threatened and endangered species within the vicinity of the Project would be expected to remain similar to existing conditions. However, if the levee embankments are not raised and seepage protection is not provided, there remains the likelihood that the levee will not perform, and the protected side of the levee may become inundated and damage properties including the Papillion Creek WWTP, residential areas, commercial establishments, and industrial sites. This could possibly result in the release of wastes such as raw sewage, petroleum products, household chemicals, and industrial chemicals. These materials, although likely to be diluted, could temporarily impair surrounding habitat by either inundation or contamination. Since the risk of inundation is uncertain and corrective actions after a major flood event by the county, state, and property owners may minimize damage to threatened and endangered species habitat, the magnitude and duration of adverse effects is unknown and could be comparable to past flood events.

Under the No Action Alternative, unknown impacts of flooding could potentially alter threatened and endangered species habitat resulting in an unknown affect determination for the species likely to occur within the Project area.

Table 9
EFFECT DETERMINATIONS AND CONSERVATION MEASURES
FOR THREATENED AND ENDANGERED SPECIES

COMMON NAME	EFFECT DETERMINATION	REASON FOR DETERMINATION AND PROPOSED CONSERVATION MEASURES
Interior Least Tern and Piping Plover	May affect, not likely to adversely affect	The absence of sandbars and off-river habitats along the R-616 and R-613 Missouri River Right Bank Segments and R-613 Papillion Creek Right and Left Bank Segments makes these areas unsuitable for nesting. There is suitable habitat between R-613 Platte River Left Bank Segment stations 90+00 and 100+00, and 130+00 and 140+00, where sight and sound may cause nesting disturbance. A qualified biologist would conduct surveys according to protocol to determine if the species is present along the Platte River, parallel to R-613 Platte River Left Bank Segment stations 90+00 and 100+00, and 130+00 and 140+00. The timing of the surveys depends on the construction start and end dates between April 15 and August 15 (i.e., the nesting season), and would be planned accordingly. If either bird species is found nesting within 0.25 mile of the above locations, then work would stop along the R-613 Platte River Left Bank Segment stations 90+00 and 100+00, and 130+00 and 140+00, until the birds have vacated the area. If no nests are observed by July 31, then no further surveys are needed; however, if work is scheduled to begin after July 31 and before August 15, then a survey is needed to confirm the absence of nesting birds.
Lake Sturgeon, Pallid Sturgeon, and Sturgeon Chub	May affect, not likely to adversely affect	Papillion Creek likely does not support consistent suitable habitat for these fish but may provide suitable refuge and reproductive staging areas within the downstream reaches of Papillion Creek. Habitat disturbance and increased sedimentation are concerns associated with the bank stabilization in several short areas (each 50 linear feet) of Papillion Creek. No flow modifications or disturbances from construction activities will occur in the creek or drainage penetration ditches from February 1 through July 31, the spawning period for the pallid sturgeon. Any upland soil disturbances will be designed to avoid or minimize sedimentation by using BMPs. This will minimize impacts to aquatic species. Should a reportable spill or release of regulated substance occur on the land side of the R-613 or R-613-613 levees, the project Operation and Maintenance Manual will direct PMRNRD or Sarpy County personnel to close the slide gates on the land side of the drainage penetrations to prevent the spill from reaching the confluence area.
Northern Long-Eared Bat	May affect, not likely to adversely affect	Habitat disturbance is a concern associated with tree removal. The Project is located within the white-nose syndrome zone. Tree removal would be scheduled to occur between November 1 and March 31 to avoid impacts to the northern long-eared bat during the roosting period. If tree removal would be scheduled within the roosting period (April 1 to October 31), then a qualified biologist would perform a survey of these forested areas. If the presence of an occupied maternity roost is confirmed in trees, then work would stop within 150 feet of the identified roost. If northern long-eared bat presence continues after November 1, then further USFWS coordination would be needed. If absence is confirmed as of November 1, then construction may continue.
River Otter	May affect, not likely to adversely affect	The Project does not include the Platte and Missouri Rivers; however, some drainage penetration ditches are connected intermittently to the Platte and Missouri Rivers. Also, there are drainage penetration ditches with intermittent water flow connected to Papillion Creek within the Project area. River otters may use these channels when traveling over their home range and seeking out food. A qualified biologist would survey according to protocol no more than 10 days before construction. If no active den sites are found, then the Project can proceed. If active dens sites are found, then disturbance activities within 0.5 mile should stop and NGPC biologists should be contacted for further consultation.

3.12 Fish and Wildlife

Fish and wildlife that are not listed as threatened or endangered are protected under the Fish and Wildlife Coordination Act (16 USC 661-667e) and Nebraska Nongame and Endangered Species Conservation Act (Neb. Rev. Stat. 37-801 to 37-811).

Existing Conditions. Many species of fish and wildlife are likely to occur either within the limits of construction or within 0.25 mile of the levee, which includes the Missouri and Platte Rivers, and Papillion Creek.

Several of the notable species or groups of species are described below.

- *Fish and Aquatic Wildlife* – Within the Missouri and Platte Rivers and Papillion Creek, many large and small fish species have been identified, including bass (*Morone* and *Micropterus* spp.), bluegill (*Lepomis macrochirus*), bullhead (*Ameirurus* spp.), catfish (*Ictalurus* spp.), common carp (*Cyprinus carpio*), crappie (*Pomoxis* spp.), creek chub (*Semotilus atromaculatus*), drum (*Aplodinotus grunniens*), walleye (*Stizostedium vitreum*), and various shiners and minnows. Other aquatic organisms, such as turtles, amphibians, crustaceans, and macroinvertebrates are likely to occur within these waterways to feed, breed, and find shelter on or between the channel and bank substrates.
- *Terrestrial Wildlife* – Most wildlife on the land side of the levees are likely adapted to agricultural settings, such as white-tail deer (*Odocoileus virginianus*), mice (numerous species), rabbits (*Sylvilagus* spp.), snakes (numerous species), eastern wild turkeys (*Meleagris gallopavo*), ring-necked pheasants (*Phasianus colchicus*), and crows (*Corvus brachyrhynchos*). The presence of businesses, residential homes, and industrial properties likely support the presence of nuisance animals, such as skunks (*Mephitis mephitis*), raccoons (*Procyon lotor*), and opossums (*Didelphis virginiana*). Other wildlife species likely occur in patches of natural habitat (e.g., ponds, woodlands, and wetlands) along the Missouri and Platte Rivers, include squirrels (*Sciurus* spp.), frogs (numerous species), and beavers (*Castor canadensis*).

Impacts of Alternative 3 – Proposed Action. The Proposed Action would rehabilitate the levee systems and maintain a comparable level of protection reflected on current floodplain maps. The proposed construction and operation activities could cause direct effects on fish and wildlife including temporary disruption of normal behaviors, and temporary loss or avoidance of habitat caused by construction noise and construction disturbance, including clearing and grubbing of vegetation, soil disturbance using heavy machinery, bank shaping and riprap placement in Papillion Creek, and drainage penetration replacement and repairs; however, these impacts would only last until construction activities have ceased and vegetation is re-established.

Under the Proposed Action, implementation of BMPs for water quality, as well as other avoidance, minimization, and conservation measures for threatened and endangered species, would minimize disturbance to fish and wildlife within the vicinity of the Project resulting in insignificant impacts. Minor, short-term adverse effects would be expected, and direct adverse conditions would cease after construction and vegetation seeding to restore previous habitat is completed. Additionally, the Proposed Action would decrease the risk of inundation and the probability of needing corrective actions after a major flood event by the county, state, and property owners to restore habitat.

Impacts of Alternative 19 – No Action. Under the No Action Alternative, levee construction would not occur; thus, there would be no direct impacts from construction that could alter fish and Wildlife habitat within the Project area. Fish and wildlife habitat within the vicinity of the Project would be expected to remain similar to existing conditions. However, if the levee embankments are not raised and seepage protection is not improved, then it remains likely that the levee would perform to a lesser degree than reflected on current floodplain maps, the land side of the levee may become inundated, and the inundation may damage properties including the Papillion Creek WWTP, residential areas, commercial establishments, and industrial sites. This could possibly result in the release of wastes such as raw sewage, petroleum products, household chemicals, and industrial chemicals. These materials, although likely to be diluted, could temporarily impair surrounding habitat by either inundation or contamination. Since the risk of inundation is uncertain and corrective actions after a major flood event by the county, state, and property owners may minimize damage to fish and wildlife habitat, the magnitude and duration of adverse effects is unknown and could be comparable to past flood events.

Under the No Action Alternative, unknown impacts of flooding could potentially alter fish and wildlife habitat resulting in adverse effects.

3.13 Raptors and Migratory Birds

The Bald and Golden Eagle Protection Act (BGEPA) (16 USC § 668-668d) and Migratory Bird Treaty Act (MBTA) (16 USC 703–712) ensure protection for many raptor and bird species. Any activity, intentional or unintentional, resulting in take of protected bird species, including eagles, is prohibited unless otherwise permitted by USFWS (50 CFR Sec. 10.12 and 16 USC Sec. 668(a)). The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. Take includes harm to the living bird (directly or indirectly), any part of the bird, its nests, or eggs.

Existing Conditions. The variety of grassland, cropland, wetland, forest, and open water areas within 0.25 mile of the levees provides habitat for many species of birds. Eagles, raptors, and migratory birds are specifically protected by the BGEPA and MBTA; therefore, each is discussed below.

- *Eagles* – It has been determined that suitable habitat for bald eagles (*Haliaeetus leucocephalus*) does exist within 0.5 mile of the Project area. Golden eagles use prairie habitats in the western part of Nebraska and there is no suitable habitat for golden eagles in the Project area; therefore, additional information concerning golden eagles is not provided.
- *Raptors* – The Papillion Creek banks lack trees and are dominated by non-native vegetation, which provides only sub-optimal habitat; whereas, the Missouri and Platte River banks provide a variety of habitat types suitable to raptors. Other raptor species likely to occur within limits of construction or within 0.25 mile of the land and river side of the levees include red-tailed hawks (*Buteo jamaicensis*), American kestrels (*Falco sparverius*), Swainson's hawks (*Buteo swainsoni*), peregrine falcons (*Falco peregrinus*), and several owl species including great-horned owls (*Bubo virginianus*). Raptor species likely use the site primarily for roosting, nesting, feeding, and perching habitat.
- *Migratory Birds* – Over 23 species of migratory birds could utilize trees, shrub-scrub, and grassland habitats within 0.25 mile of the levees for breeding and nesting (USFWS 2016a).

Impacts of Alternative 3 – Proposed Action. The Proposed Action would rehabilitate the levee systems and maintain a comparable level of protection reflected on current floodplain maps. Construction of the Proposed Action could temporarily cause raptors, including bald eagles, and other migratory birds within 0.5 mile of the Project area to avoid the construction area; however, the avoidance would only last until construction activities have ceased and vegetation is re-established. Tree removal would reduce the number of potential nesting locations; however, the relative number of trees being removed is negligible compared to the remaining available habitat.

Conservation measures to avoid and minimize adverse impacts to protected bird species would include a qualified biologist conducting bird surveys prior to construction to determine the presence or absence of nesting/roosting birds or bald eagle nests. The implementation of surveys and conservation measures ensure that no raptors, including bald eagles, or other migratory birds nesting within the Project area would be directly displaced from their active nest by construction activities. The time frame for surveys and recommended avoidance measures are as follows:

- *February 1 to September 10* – Eagles, raptors, and other migratory birds could be nesting (i.e., primary nesting season); therefore, a survey, at least 14 days prior to the start of construction, would be needed to confirm presence/absence of eagle nests and presence/absence of raptor or other migratory bird nests (note: some may be ground nesting birds). Areas with eagle nests (active or inactive) or raptor/migratory bird nests (active only) would delay construction and removing trees because of the potential for take or harm of these protected species. Trees with raptor or other migratory bird nests and absence of eagle nests could be removed after sufficient observations by a qualified biologist that the nest is no longer active or after September 10th. If bird nests are absent, then trees, brush, and herbaceous vegetation (i.e., clearing and grubbing) can be removed within 14 days of the bird survey.

- *September 11 to January 31* – Eagles may be overwintering; therefore, a survey, at least 14 days prior to the start of construction, would be needed to confirm presence/absence of eagle nests or winter roosts. Winter roosts may be transitory with 3 or more eagles within 100 meters of each other or communal roosts with 6 or more eagles in a small area for extended periods of times (or sometimes for multiple years). Trees with eagle nests (active or inactive) or winter roosts cannot be removed because of the potential for take or harm of protected species and further consultation with USFWS may be needed. If eagle nests are absent, then trees, brush, and herbaceous vegetation (i.e., clearing and grubbing) can be removed during this period because it is outside of the nesting season of raptors, migratory birds, and northern long-eared bats.

Once clearing and grubbing has been completed, it is assumed that raptors and other migratory birds would avoid the Project area for nesting; however, if an active nest is found during the construction period in an area expected to undergo construction activities, then work must avoid removing that tree and ensure that the activities do not harm the nesting activities until the active nest either fails or the fledglings depart from the nest.

Under the Proposed Action, implementation of surveys and avoidance of nesting periods (conservation measures) would minimize disturbance to and avoid displacement of bald eagles, raptors, or other migratory birds within the vicinity of the Project resulting in insignificant impacts. Minor, short-term adverse effects would be expected, and direct adverse conditions would cease after construction and vegetation seeding to restore previous habitat is completed. Additionally, the Proposed Action would decrease the risk of inundation and the probability of needing corrective actions after a major flood event by the county and state to restore habitat.

Impacts of Alternative 19 – No Action. Under the No Action Alternative, levee construction would not occur; thus, there would be no direct impacts from construction that could disturb or harm protected bird species or active nests. Protected bird species and active nests within the vicinity of the Project would be expected to remain similar to existing conditions. However, if the levee embankments are not raised and seepage protection is not improved, then it remains likely that the levee would perform to a lesser degree than reflected on current floodplain maps, the land side of the levee may become inundated, and the inundation may damage properties including the Papillion Creek WWTP, residential areas, commercial establishments, and industrial sites. This could possibly result in the release of wastes such as raw sewage, petroleum products, household chemicals, and industrial chemicals. These materials, although likely to be diluted, could temporarily impair surrounding habitat by either inundation or contamination. Since the risk of inundation is uncertain and corrective actions after a major flood event by the county, state, and property owners may minimize damage to bird habitat, the magnitude and duration of adverse effects is unknown and could be comparable to past flood events.

Under the No Action Alternative, unknown impacts of flooding could potentially damage bird habitat resulting in adverse effects.

3.14 Hazardous Materials

The Resource Conservation and Recovery Act (RCRA) of 1976 (42 USC § 6901) was enacted to ensure safe and environmentally responsible management of hazardous and nonhazardous solid waste, and to promote resource recovery techniques to minimize waste volumes. Hazardous materials is an all-inclusive term for materials that are regulated as solid waste, hazardous waste, and other wastes contaminated with hazardous substances, radioactive materials, petroleum fuels, toxic substances, and pollutants. The Hazardous Waste and Solid Waste Amendments of 1984 (42 USC § 6901) to RCRA authorize regulations or require that regulations be promulgated on waste minimization, land disposal of hazardous wastes, and underground storage tanks. Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 (16 USC §1531 et seq.) provides a statutory framework for the cleanup of waste sites containing hazardous substances and, as amended by the Superfund Amendments in 1986 and Reauthorization Act, provides an emergency response program in the event of a release or the threat of a release of a hazardous substance to the environment.

The USACE is obligated under ER 1165-2-132 to assume responsibility for the reasonable identification and evaluation of all Hazardous, Toxic, and Radioactive Waste (HTRW) contamination within the vicinity of proposed actions. ER 1165-2-132 identifies that HTRW policy is to avoid the use of Project funds for HTRW removal and remediation activities (USACE 1992). The Nebraska Environmental Quality Council oversees the regulation and permitting of hazardous waste management (NDEQ 2014b).

Existing Conditions. A Hazardous Materials Report (HMR) in general accordance with American Society for Testing and Materials (ASTM) E1527-13 (ASTM 2013) has been completed and is summarized below (Appendix K). This summary is not intended for use as documentation of due diligence under All Appropriate Inquiry (AAI) (EPA 2005) and therefore, is not intended to follow or replace ASTM E1527-13 Standard Practice for Phase I environmental site assessments for liability protection under AAI. The purpose of the report and summary is to identify potential existing issues during the advanced planning and environmental documentation stages of Project development.

The hazmat study area includes the footprint of the existing levees and a 0.125-mile buffer around the levees to account for proposed acquisition of right-of-way. Additional properties were investigated within a mile of the levees to assess potential recognized environmental conditions (RECs), which includes sites with "the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property" (as defined by ASTM). Sites identified with RECs do not include sites with *de minimis* conditions, which are defined by ASTM as "conditions that generally do not present a material risk of harm to public health or the environment and that generally would not be subject of an enforcement action if brought to the attention of appropriate governmental agencies".

The HMR was completed using information obtained from a site visit (12 September 2013), file reviews at Nebraska Department of Environmental Quality (NDEQ) (9 October 2013), accessing the NDEQ Interactive Mapping System (IMS), and requesting an Environmental Data Resources Inc. regulatory database report.

No Further Action Sites – Six sites investigated were considered unlikely to cause a materials management or worker health and safety issues related to Project construction based on No Further Action (NFA) letters issued by NDEQ; however, due to the sites' locations being up-gradient, cross-gradient or adjacent to the Project location, any work should be closely monitored for signs of soil and/or ground water contamination during construction activities (Figure 19). These sites are described below.

- American Heroes Park was formerly the Kramer Power Plant, a coal operation, from 1947 until 1987. A Phase I investigation of soil and groundwater was conducted in 1989; a Phase II investigation was conducted in 1990. It was found that the hydrocarbon contamination had not migrated laterally or vertically. The NFA letter was signed February 2000 and the monitoring wells were abandoned in February 2001.
- Haworth Park had a leaking underground storage tank (LUST); an investigation was completed and the NFA letter was issued in March 2013.
- Papillion Creek WWTP had a 16,000-gallon heating oil spill occur in 1986. Recovery wells were installed and used until 1995. The NFA letter was issued 28 August 2000, and the wells were closed 22 November 2000.
- Omaha Public Power District (OPPD) Substation #925 has had no spills reported at this location.
- OPPD Substation #994 had a spill of 5,900 gallons of transformer oil; the impacted soils were excavated and the nature and extent of the contamination appeared to be a *de minimis* condition. NDEQ issued the NFA letter on 16 Sep 2010.
- Coreslab Structures Inc. had two tanks (one 3,000 gallon and one 5,000 gallon) removed in 13 Dec 1988. A Phase II site assessment was completed 30 March 2000; the nature and extent of petroleum contamination appeared to be a *de minimis* condition. NDEQ issued the NFA letter on 5 January 2001.

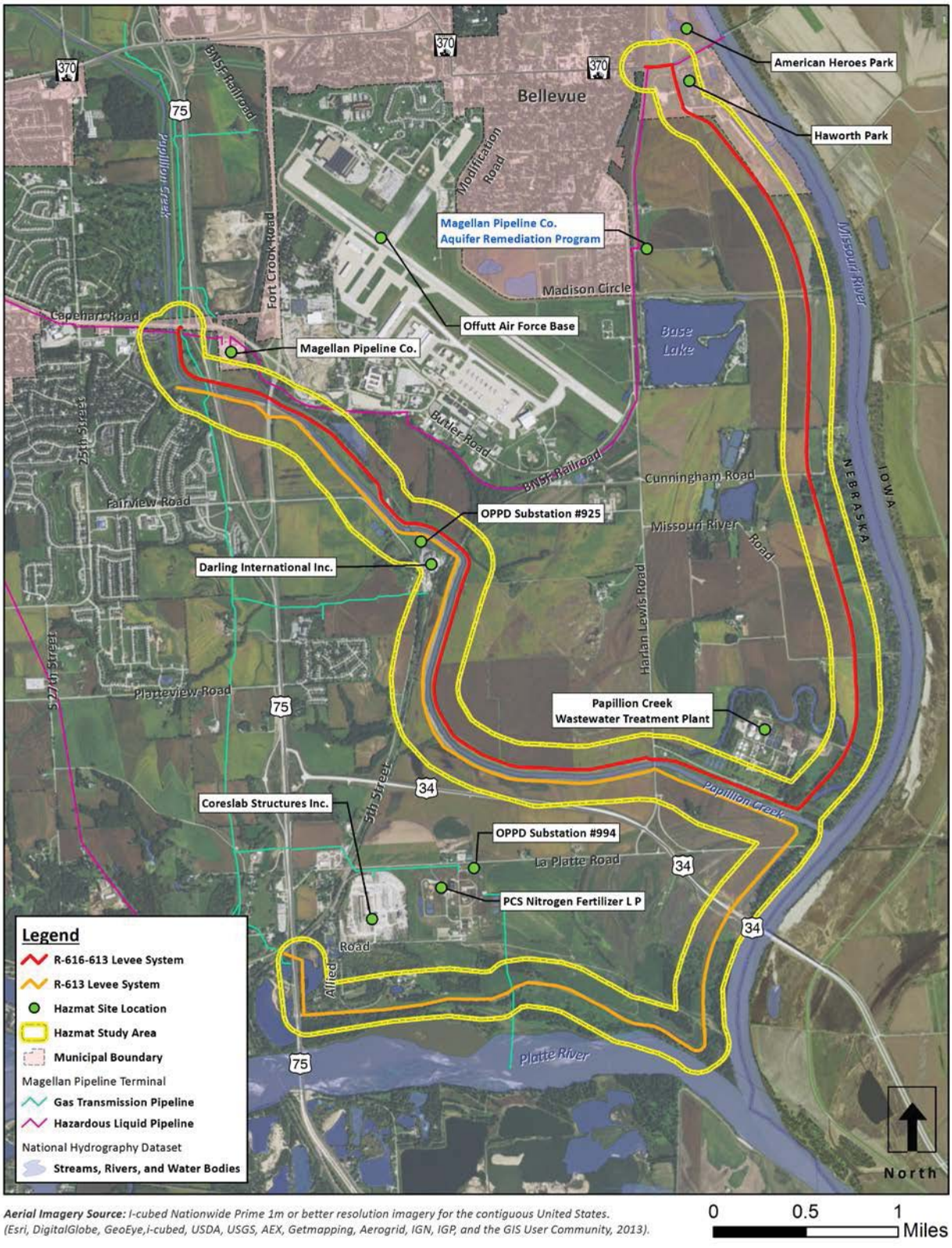


Figure 19 – SITES WITH POTENTIAL HAZARDOUS MATERIALS IMPACTS ON THE PROJECT

On-Going Remediation Sites – Three sites investigated did not have NFA letters issued and the review of available information indicated each site were still implementing remediation or monitoring efforts (Figure 19). These sites are described below.

- Darling International has documented inactive LUSTs, including three tanks (12,000-gallon diesel, 8,000-gallon diesel, and 2,000-gallon gasoline) that were removed 15 Oct 1990; two 15,000-gallon fuel oil tanks that were removed 25 June 1991; and two 15,000-gallon fuel oil tanks were left in place. A site assessment was done after each removal for contaminated soils and groundwater. Monitoring revealed contamination levels well below the state of Nebraska's maximum contaminant level; thus, contaminated groundwater had not migrated to any of the monitoring wells (30 Jul 1991). There are currently no active groundwater monitoring wells near the site. The NDEQ IMS reported Darling International as an active Superfund Amendments and Reauthorization Act (SARA) Title 3 (TL3) chemical reporting inventory site.

  The site is considered unlikely to cause a materials management or worker health and safety issue related to Project construction due to site's inactive status. However, based on the site's location being up- to cross-gradient and adjacent to the Project location any work should be closely monitored for signs of soil and/or groundwater contamination during construction activities.

- Magellan Pipeline Co. (aka Magellan Midstream Partners) is participating in an aquifer remediation program (injection of calcium peroxide enhancing biological activity and thus promoting natural attenuation). The location of the remediation is east of Harlan Lewis Road and approximately 0.25 mile north of Base Lake (over 4,000 feet west of the R-616 Missouri River Right Bank Segment). Groundwater monitoring was to continue for 24 months following the remediation activities, which were expected to occur by 31 December 2013.

  The site is considered unlikely to cause a materials management or worker health and safety issue related to Project construction due to distance from the Project location; however, any work should be closely monitored for signs of soil and/or groundwater contamination during construction activities.

- Offutt AFB has had multiple LUSTs and multiple Superfund (SF) sites. Thirty-six LUSTs are inactive. Six sites (Fire Training Area 3, Old Jet Engine Test Stand, Landfill 4, Landfill 5, Hardfill 2 Composite, and Building 301) are undergoing long-term monitoring for vinyl chloride, trichloroethylene, and dichloroethylene contamination. The contamination migrated off the base to the southeast; extending south almost to Missouri River Road, but still over 3,500 feet from the levee. The Environmental Restoration Team Lead was contacted to confirm no contamination is within 1,000 feet of the levee (personal communication with E. Zuelke 31 October 2013).

  This site is considered unlikely to cause a materials management or worker health and safety issue related to Project construction due to the distance from the Project location (>3,500 feet); however, due to the site's location up- to cross-gradient and adjacent to the Project location any work should be closely monitored for signs of soil and/or groundwater contamination during construction activities.

REC Site – Based on the active status and topographic position (adjacent and up-gradient) to the Project, the PCS Nitrogen facility property is considered a REC as defined by ASTM Standard E1527-13 (ASTM 2013) (Figure 19). This site is described below.

- PCS Nitrogen Fertilizer L.P. (hereafter PCS Nitrogen facility) was a nitrogen fertilizer manufacturing plant from 1952 to 1999. According to the Phase I Environmental Site Assessment Report, the layout of the facility consisted of two ammonia synthesis trains, two nitric acid synthesis trains, a urea plant, an ammonia nitrate plant, and a solutions production area (Tetra Tech 2008). Two major releases have resulted in a nitrate and ammonia plume that were adequately investigated and monitored, including a release of 2.8 million gallons of nitrogen-based fertilizer in 1973 and a release of 10,000 gallons of nitrogen-based chemicals in 1997. PCS Nitrogen facility is implementing long-term monitoring to address the ammonia and nitrate groundwater contamination.

A Phase II Environmental Site Assessment was prepared for the PCS Nitrogen facility in January 2011 (Olsson Associates 2011). Soil samples were taken from 10 areas, which identified the former electrical substation with contaminants above the regulatory limits for PCBs. Groundwater samples were taken from four areas. The samples showed perchlorate levels above the NDEQ guidelines at three of the areas (U.S. Environmental Protection Agency [EPA] currently has no maximum contaminant level for perchlorate), including the drainage ditch, septic leach field, and down-gradient of the landfill, and presence of metals (arsenic, barium, cadmium, chromium, lead, and selenium) above EPA MCLs at two of the areas, including the septic leach field, and down-gradient of the landfill.

As of 2011, groundwater analytical data indicate that groundwater contaminated with nitrate is migrating east and discharging into the Missouri River at concentrations below the Nebraska Title 117 standard of 10 milligrams per liter (mg/l) for nitrates in surface waters that serve as public drinking water supplies and the agricultural standard of 100 mg/l nitrate.

The NDEQ IMS database indicated the PCS Nitrogen facility as an active Superfund Site. An NDEQ letter dated 7 February 2013 described the additional work necessary to receive a No Further Action letter for PCS Nitrogen facility under Nebraska's Voluntary Cleanup Program (VCP). As of March 2015, the PCS Nitrogen facility had not applied for the VCP program (NDEQ 2015).

Impacts of Alternative 3 – Proposed Action. The Proposed Action would rehabilitate the levee systems and maintain a comparable level of protection reflected on current floodplain maps. The PCS Nitrogen facility's contaminant plume has the potential to be a concern related to Project construction; therefore, construction activities of the Proposed Action between R-613 Platte River Left Bank Segment's stations 95.00 to 116.00 (the area identified within the contaminant plume) would potentially encounter contaminated materials. Additionally, the potential exists to have contaminants present resulting from minor spillage during fueling and service associated with construction equipment.

BMPs to avoid and minimize the spread of hazardous material contamination include:

- The contractor is required to conduct their own monitoring at Project start-up, and adjust worker protection and work practices according to the results. The contractor shall indicate that they are aware that nitrate contamination in groundwater may be encountered while performing excavation activities east or south of PCS Nitrogen facility and include this information in their worker health and safety plans. While performing construction activities from R-613 Platte River Left Bank Segment's stations 95.00 to 116.00 the Contractor must inspect any materials which are removed from the ground or which may come into contact with workers.
- If contaminated soils and/or water or hazardous materials are encountered during construction, then all work within the immediate area of the discovered hazardous material would stop until USACE is notified and a plan to properly dispose of the contaminated materials has been developed.
- Should contamination be found on the Project during construction from minor spillage during fueling, service or operation, then USACE and NDEQ would be contacted for consultation and appropriate actions would be taken. If necessary, a remediation plan would be developed for the Project.

Under the Proposed Action, implementation of BMPs and environmental commitments would minimize hazardous materials contamination or exposure resulting in insignificant impacts. Minor, short-term adverse effects would be expected, and direct adverse conditions would cease after construction is completed. Additionally, the Proposed Action would decrease the risk of inundation and the probability of needing corrective actions after a major flood event by the county and state to remediate contaminated sites.

Impacts of Alternative 19 – No Action. Under the No Action Alternative, levee construction would not occur; thus, there would be no direct impacts from construction that could cause hazardous materials contamination. Hazardous materials concerns within the vicinity of the Project would be expected to remain similar to existing conditions. For example, long-term monitoring would continue involving the ammonia and nitrate groundwater contamination and it is assumed PCS Nitrogen Fertilizer would continue efforts under Nebraska's VCP to receive a NFA letter. However, if the levee embankments are not raised and seepage protection is not improved, then it remains likely that the levee would perform to a lesser degree than reflected on current floodplain maps, the land side of the levee may become inundated, and the inundation may damage properties including the Papillion Creek WWTP, residential areas, commercial establishments, and industrial sites. This could possibly result in the release of wastes such as raw sewage, petroleum products, household chemicals, and industrial chemicals. The release of these hazardous materials would be detrimental and could temporarily damage the natural and human environment. Since the risk of inundation is uncertain and corrective actions after a major flood event by the county, state, and property owners may minimize damage associated with hazardous materials, the magnitude and duration of adverse effects is unknown and could be comparable to past flood events.

Under the No Action Alternative, unknown impacts of flooding could potentially cause hazardous materials contamination resulting in adverse effects.

3.15 Recreational Resources

Existing Conditions. The public recreational resources within the Project area consist of Bellevue Loop Trail, Haworth Park, and Tregaron Golf Course sidewalk and cart path. The Bellevue Loop Trail currently exists on the levee crest for the length of the R-616-613 Federal Levee System (Figure 2). The north end of the R-616 Missouri River Right Bank Segment crosses through Haworth Park, south of N-370. The golf course is located parallel to the north end of the R-613 Papillion Creek Right Bank Segment on the land side. Two privately-owned recreational resources, Camp Gene Eppley and Falconwood Park, occur adjacent to the R-613 Platte River Left Bank Segment, east of Allied Road.

Impacts of Alternative 3 – Proposed Action. The Proposed Action would remove and replace sections of the current Bellevue Loop Trail, which would limit access to this resource during the construction period. Removal and replacement of sections has been sequenced so that only 1 segment is closed at a specific time. Trail closure signs will be placed well in advance of closed segments so users are aware of closures. The trail would be re-established on the levee crest and in portions of the levee bench. Construction adjacent to the golf course path may disrupt users and reduce use of the path; however, these adverse effects would be short-term and would not prevent the use of the golf course path. No impacts are expected on the Camp Gene Eppley and Falconwood park properties.

With the implementation of BMPs for noise pollution and air, effects of the Proposed Action would be minimized to insignificant impacts on recreational resources. Moderate, short-term adverse effects would be expected, and direct adverse conditions would cease after construction is completed. The Proposed Action would decrease the risk of inundation and the probability of needing corrective actions after a major flood event by the county and state to repair trails. Additionally, the completion of the Proposed Action would provide minor, long-term benefits to trail users because the aging trail would be replaced with new concrete.

Impacts of Alternative 19 – No Action. Under the No Action Alternative, levee construction would not occur; thus, there would be no direct impacts from construction that could alter recreational property. Recreational property within the vicinity of the Project would be expected to remain similar to existing conditions. However, if the levee embankments are not raised and seepage protection is not improved, then it remains likely that the levee would perform to a lesser degree than reflected on current floodplain maps, the land side of the levee may become inundated, and the inundation may damage trails, parks, camp property, and Tregaron Golf Course. Since the risk of inundation is uncertain and corrective actions after a major flood event by the county, state, and property owners may minimize damage to trails and the golf course path, the magnitude and duration of adverse effects is unknown and could be comparable to past flood events.

Under the No Action Alternative, unknown impacts of flooding could potentially alter recreational property resulting in adverse effects.

4.0 CUMULATIVE IMPACTS

Cumulative impacts are impacts on the environment which result from the incremental impact of the action when added to other past, present and reasonably foreseeable actions, regardless of what agency or person undertakes such other actions.

Through informal consultation, the USFWS expressed concern that the Project would have potential cumulative impacts on the pallid sturgeon, interior least tern, and piping plover (Appendix J). USFWS suggested that levee modifications, in combination with the recent construction of the US-34 bridge, would result in significant changes in the area from agricultural to commercial and industrial land uses. Specifically, the US-34 project includes several exits on the Nebraska side of the river, which increases accessibility to surrounding agricultural properties. Their primary concerns are potential modifications to nutrient and sediment cycling, changes in hydrologic cycles, introduction of contaminants, and modifications to the sediment transport regime. Coordination with USFWS is ongoing, an interagency site visit and meeting are planned following submittal of the Section 404 permit application and Section 408 NEPA materials to the USACE.

The cumulative impacts analysis specifically evaluated potential effects to nutrient and sediment cycling, changes in hydrologic cycles, introduction of contaminants, and modifications to the sediment transport regime, and potential cumulative impacts on the interior least tern, piping plover, and pallid sturgeon. The analysis included review of:

- Past, present and future activities, including water control projects, changes in land use, and conservation efforts
- Road projects, including their impacts and conservation conditions
- Development plans, including existing and future land use zoning, potential areas of induced development, potential areas of restricted development, and stormwater drainage modeling to assess potential changes in the hydrologic cycle, and sediment and nutrient transport regimes
- Flood risk impacts on adjacent levee systems

4.1 Past, Present, and Future Activities

The geographical area and temporal period of consideration for the cumulative impacts evaluation is within and along the floodplain of the Missouri River and its tributaries over the course of the last century and the foreseeable future. Activities considered in the cumulative impacts evaluation include early agricultural development; urbanization of the Omaha metro area and Papillion Creek watershed; recognized stream channel, riparian, and floodplain losses; and other human alterations, as well as more recent efforts to restore habitat and preserve open spaces. More local activities have included or will include:

- Construction of large water control projects to manage the Missouri River and its tributaries, including the USACE Missouri River Bank Stabilization and Navigation Project to address the loss of an estimated 522,000 acres of aquatic and terrestrial habitat between 1912 and 2003 (USACE 1981); the R-616-613 and R-613 Federal Levees Systems in the 1970s; Papillion Creek Watershed Plan reservoir projects; and the Bellevue/Offutt Drainageway project
- Operation and maintenance of the Bellevue/Offutt Drainageway project
- Conversion of native communities to agricultural, commercial, industrial, recreation, and residential land uses on the land side of levees
- Abandonment of industrial properties, including the PCS Nitrogen Fertilizer facility
- Urbanization within Sarpy County and the lower Papillion Creek watershed including Offutt AFB, Papillion Creek WWTP, and other industrial users
- Bimodal spring pulses from Gavins Point Dam, as part of the Missouri River Master Water Control plan (USACE 2006)
- Purchase of over 300 acres of river side properties along the R-616 and R-613 Missouri River Right Bank Segments by PMRNRD to restore or preserve natural communities
- Future urbanization on the land side of the levees in areas located outside the base floodplain

- Future renovation of Offutt AFB runways
- Future flood risk management actions, including construction of additional reservoirs in the Papillion Creek watershed (PMRNRD 2015)
- Future construction of pedestrian trails, including the Platte River Connector Trail (also referred to as the La Platte Link Trail) and Nebraska Riverfront Trail (PMRNRD 2015)
- Future improvements to American Heroes Park in Bellevue, Nebraska (north of the R-616 Missouri River Right Bank Segment), including stocking the lake with fish, adding a fishing dock, and constructing an amphitheater

Land Side of Levee Segments. Prior to levee construction, which was completed in 1971, the surrounding floodplain of the Project area had seasonal connections to the surrounding waterways (i.e., Missouri River, Papillion Creek, and Platte River) contributing to the natural nutrient cycling and sediment transport regimes, as well as the hydrologic cycle of these aquatic ecosystems. Since the completion of levee construction, the floodplain within the land side of the levee has a very restricted connection to the surrounding aquatic ecosystems and their nutrient cycling and sediment transport regimes.

River Side of Levee Segments. The Missouri River and Papillion Creek have been altered by past actions such as bank stabilization, dams, roads/bridges, agricultural and urban levees, channelization, water withdrawal for human and agricultural use, urbanization and other human uses. USACE built several dams on Papillion Creek following extensive flooding in 1964 and 1965, and additional flood risk management efforts have resulted in the channelization of most of this stream. These activities have substantially altered the terrestrial and aquatic ecosystem of these waterways. Some examples of alterations that have occurred include: wetland losses, development of the floodplain, conversion of riparian habitat to agricultural and urban development, and the cut-off of the floodplain from the river.

The river sides of the R-616 and R-613 Missouri River Right Bank Segments and the R-613 Papillion Creek Left and Right Bank Segments have limited connections to the river and creek channels because of steep banks and channelization of the waterways. Over time, these limited connections have reduced the cycling of nutrients and altered the natural sediment transport regime.

The river sides of the R-613 Missouri River Right Bank Segment, just north of the Platte River confluence, and the R-613 Platte River Left Bank Segment have not experienced as much down-cutting and have a more natural connection to the floodplain and likely contribute to the nutrient cycling and sediment transport regimes of these aquatic ecosystems.

4.2 Road Construction

One completed and two on-going road projects occur in the Project vicinity (see Figure 2 for the general location of roadways). These projects would result in increased access to developable areas on the land side of the levee systems. These projects are described below.

US-34, Bellevue Bridge Project. Based on the evaluations and analyses recorded in the Final EIS, FHWA signed a ROD on December 14, 2007 to approve the building of the Bellevue Bridge project connecting Interstate 29 (I-29) in Iowa to US-75 in Nebraska via US-34 (FHWA 2007b). The bridge construction is complete and was opened on October 22, 2014. The bridge was constructed over the R-613 Missouri River Right Bank Segment approximately 0.5 mile south of the Papillion confluence and 0.75 mile north of the Platte River confluence. Agency coordination resulted in the acquisition of a 167-acre conservation easement on the Iowa side of the bridge to offset direct and cumulative adverse impacts to the pallid sturgeon and bald eagle in Nebraska and Iowa (Appendix L). Additional conservation measures were developed to minimize and avoid impacts to migratory birds, wildlife habitat, interior least terns, piping plovers, pallid sturgeon, lake sturgeon, and sturgeon chub. Wetland impacts were estimated to be a total of 9 acres, of which 4.97 would be on the Nebraska side, and would be mitigated through the NDOT Oreapolis Wetland Mitigation Bank at a 2:1 ratio for a total of 9.94 acres (NDOT 2011). No stream mitigation was required.

US-75, Plattsmouth to Bellevue Project. A section of US-75 immediately north of the Platte River and west of the R-613 Platte River Left Bank Segment was widened to four lanes. Future plans include constructing a new interchange at the relocated Platteview Road/US-34 and continuing the four lanes to Bellevue. Conservation measures were developed to minimize and avoid impacts to migratory birds, wildlife habitat, interior least terns, piping plovers, pallid sturgeon, lake sturgeon, sturgeon chub, and river otter. The 2010 Reevaluation of the Supplemental EIS stated the project may affect, but is not likely to adversely affect, threatened and endangered species with the implementation of conservation measures (NDOT 2010b). No adverse cumulative impacts were identified, and it was noted that the US-34 ROD had previously considered the US-75 Plattsmouth to Bellevue Project which was also found to have no adverse cumulative impacts with implementation conservation measures and purchase of a conservation easement (Appendix L). There are an estimated 0.64 acres of PEM wetland impacts near the Platte River and the R-613 Platte River Left Bank Segment. Overall, the project was expected to permanently impact 7.06 acres of wetland (PEM, PFO, and PSS) and 5,679 linear feet of stream channel. Wetland and stream impacts would be mitigated at the NDOT Oreapolis Wetland Mitigation Bank at a 2:1 ratio for a total of 14.12 acres (NDOT 2010a). No stream channel impacts were expected on the Platte River.

Allied Road. NDOT has proposed future improvements to Allied Road associated with the US-75 Plattsmouth to Bellevue Plan near the west end of the R-613 Platte River Left Bank Segment. Road construction would cause temporary disturbances similar to those expected to occur with the Proposed Action. NDOT would require conservation measures for Allied Road for the same species evaluated for the US-75 Plattsmouth to Bellevue project (interior least tern and piping plover, pallid and lake sturgeon, bald eagle, and migratory birds) (NDOT 2010b).

The following additional road projects would occur farther away from the Project, but could affect the overall traffic volumes on roadways within the Project area, such as US-34:

- Widening of US-75 to six lanes from N-370 to Interstate 80 (I-80)
- Plattsmouth Bridge construction connecting US-75 in Nebraska to I-29 in Iowa via a bridge crossing near Plattsmouth, Nebraska
- Improvements to the Council Bluffs Interstate System, including added mainline miles and interchanges for I-80, I-29, and Interstate 480
- Widening of US-275 in Council Bluffs between the Missouri River bridge and I-29 to four lanes
- South Omaha Veterans Memorial Bridge Study – project would implement improvements to the South Omaha Veterans Memorial Bridge in both Nebraska and Iowa

4.3 Development

Figure 20 shows the proposed future land use zoning identified in the Sarpy County Comprehensive Plan (Sarpy County 2017); changes from the current zoning are described below:

- Along the R-616 and R-613 Missouri River Right Bank Segments: agriculture zones changed to parks, recreation, and open space on the river side for the length of the levee; and general manufacturing zones changed to parks, recreation, and open space on the land side of the levee near the confluence with the Platte River
- Along the R-613 Papillion Creek Left and Right Bank Segments: agriculture zones changed to light industry/industrial, flex space, commercial and residential; some industrial/manufacturing changed to agriculture; and agriculture and light industrial changed to parks, recreation, and open space at the confluence with the Missouri River
- Along the R-613 Platte River Left Bank Segment: light industrial zone east of US-75 and general manufacturing zone near the confluence with the Missouri River changed to parks, recreation, and open space

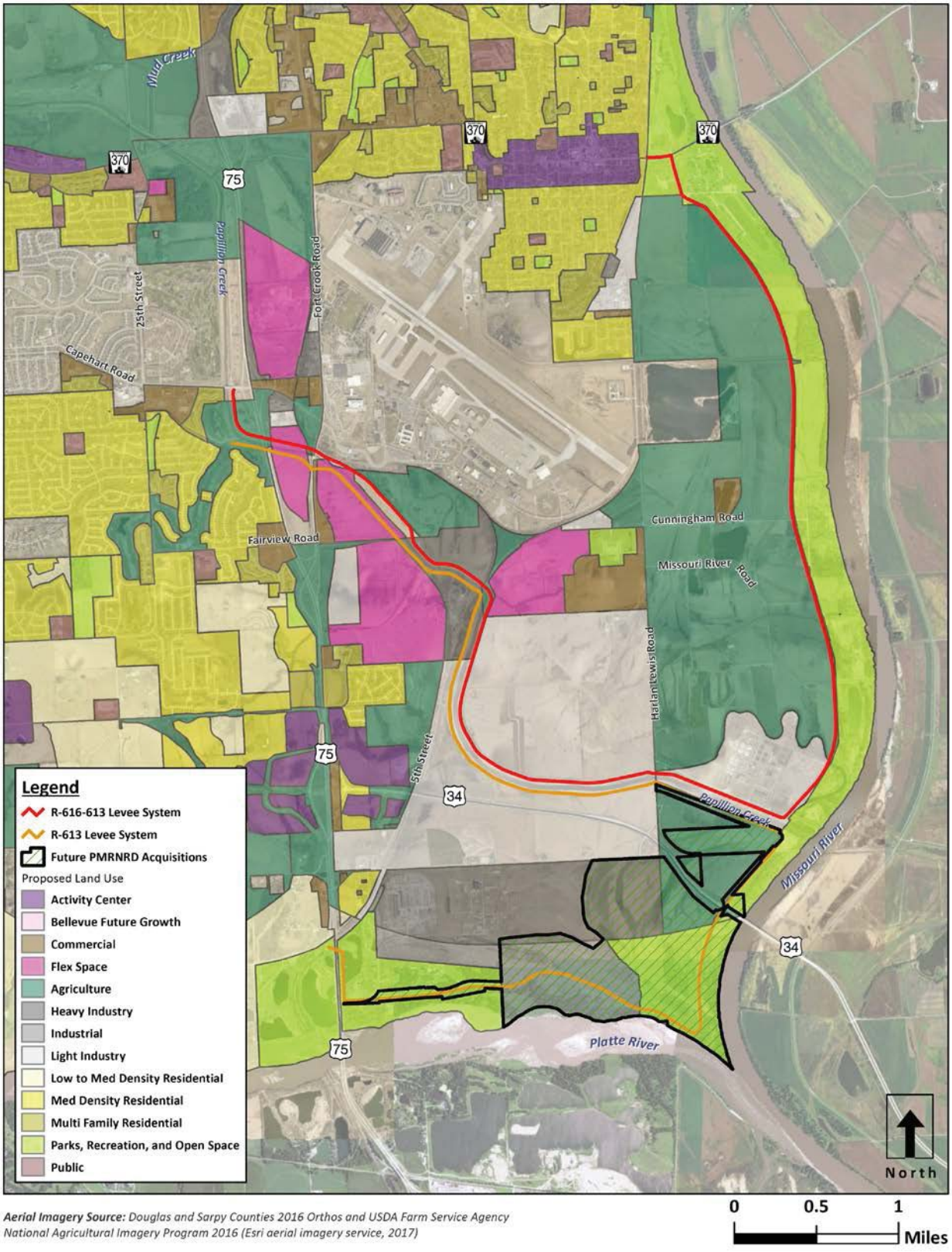


Figure 20 – PROPOSED FUTURE SARPY COUNTY LAND USE ZONING AND PROPERTIES IDENTIFIED FOR FUTURE PMRNRD ACQUISITION

The construction of US-34 has likely increased the value of property along its corridor and is a focus for commercial development. As indicated in the economics evaluation (Section 3.8), the Proposed Action would support economic development in Zone X shaded areas, which could include commercial businesses along the newly established US-34 corridor. FEMA accreditation of the levees and remapping of FIRM zones would maintain the potential for development and could induce development within the levee-protected Zone X, but would continue to restrict development in the base floodplain. Management of economic growth is primarily performed at the local or county level through the zoning process.

Costs. Current FIRMs show that most of the area on the land side of the levee is designated as Zone X (i.e., areas protected from the 1% annual chance flood by the levee structure) (Figure 14), which generally does not require floodplain insurance or special permitting because it is considered outside the floodplain. Some areas that experience interior ponding, such as the land side of the levee near the Papillion Creek and Missouri River confluence, are mapped as Zone AH, which is a Special Flood Hazard Area that would have increased permitting requirements and requires the purchase of floodplain insurance for properties which carry mortgages from federally regulated or insured lenders. With the Proposed Action and FEMA accreditation, costs associated with development in these FIRM zones would remain similar to current costs because the base floodplain boundaries would closely correlate to the base floodplain boundaries shown on current FIRMs.

Restrictions. Offutt AFB and the Federal Aviation Administration (FAA) restrict or prohibit the development or use of land areas that could be hazardous to aircraft operations (FAA 2007, Offutt AFB 2007). The following uses or development are restricted within the vicinity of the Missouri and Platte River confluence.

- Construction of structures that extend more than 500 feet above the ground
- Uses that release into the air any substance that would impair visibility or otherwise interfere with the operation of aircraft (i.e., steam, dust, or smoke)
- Uses that produce light emissions, either direct or indirect (reflective), which would interfere with pilot vision
- Uses that attract birds or waterfowl, including but not limited to, operation of sanitary landfills, maintenance of feeding stations, the growing of certain vegetation, or creation of wetlands

These restrictions limit the type and amount of industrial facilities that can be located near the confluence of the Missouri and Platte Rivers but also limits efforts to restore natural floodplain habitats that could attract birds or waterfowl.

Agricultural Land Conversion. On the land side of the levees, the future conversion of agricultural lands to other land uses is possible and changes to the nutrient load and sediment cycling/transport would be expected, in addition to the hydrologic cycle. The decrease in crop cover would decrease transpiration, increase evaporation, and increase stormwater runoff, but there would be decreased amounts of agrochemicals carried in the water. Much of the nutrients and sediments carried in runoff would continue to be deposited or retained land side of the levees because of the gated catchment system of drainage penetrations and relief wells, whereas some nutrients and sediment would continue to pass through the levee penetrations to adjacent waterways (e.g., Platte River). There would be a continued risk for the introduction of contaminants into stormwater, assuming that accidental releases of regulated substances would occur with further industrial development.

Modeling Efforts. Two potential scenarios were modelled (Appendix L) to determine how future growth or development of the land side of the levees would impact the hydrologic cycle, sediment cycling/transport, and nutrient load associated with stormwater runoff within the area of the Platte and Missouri River confluence; these were:

- Existing Conditions without Proposed Action (Existing): The modeled stormwater drainage was assessed for the existing conditions to establish a baseline for comparison.
- Future Development with Proposed Action (Future): The modeled stormwater drainage was assessed for the expected future conditions with increased industrial development (full build-out of zoning areas) and FEMA accredited levees.

Runoff volumes for three rainfall events were modeled over a 24-hour period (Figure 21). Although runoff increases under expected future conditions, the change is not substantial relative to the size of the receiving waterbody (Table 10). For example, base flow within a 24-hour period for the Platte River is 16,780 acre-feet and for the Missouri is 88,500 acre-feet. In comparison, runoff volume for a 5-year event would change the base flow of either the Platte or Missouri River by less than 1 percent.

Table 10
MODELED 24-HOUR PERIOD INTERIOR DRAINAGE RUNOFF VOLUMES
(ACRE-FEET)

RECEIVING WATERBODY	BASE FLOW	1-YEAR EVENT		2-YEAR EVENT		5-YEAR EVENT	
		EXISTING	FUTURE	EXISTING	FUTURE	EXISTING	FUTURE
Platte River	16,780	11.9	14.4	19.5	22.7	33.2	37.4
Missouri River	88,500	275.4	282.3	418.5	427.9	664.0	677.7

Stormwater runoff also carries sediment and nutrients into receiving waters; therefore, the concentrations (milligrams per liter [mg/l]) and relative loads (pounds per day [lbs/day]) of the Total Suspended Solids (TSS), Phosphorus (P), and Nitrogen (N) were modeled using the above volumes. The NDEQ average sampling concentrations for the Platte River at Louisville and Missouri River at Omaha were used as a comparative baseline and are also included in Table 11. The sediment concentration would increase by 2.7 times within the Platte River; however, there is only one drainage penetration on the R-613 Platte River Left Bank Segment that drains interior stormwater towards the Platte River and it currently drains onto land (Figure 21). As expected, decreased agricultural land use results in reduced concentrations of P and N.

Table 11
MODELED INTERIOR DRAINAGE RUNOFF SEDIMENT AND NUTRIENT CONCENTRATIONS

RECEIVING WATERBODY	TSS (mg/l)			PHOSPHORUS (mg/l)			NITROGEN (mg/l)		
	NDEQ	EXISTING	FUTURE	NDEQ	EXISTING	FUTURE	NDEQ	EXISTING	FUTURE
Platte	293.3	273	725	1026.9	454.1	310.0	2.4	2.2	2.1
Missouri	161.4	383	512	372.9	417.5	382.4	1.2	4.0	3.3

Sediment and nutrient loads (Table 12) were calculated by applying the concentrations (Table 11) to volume of runoff (Table 10). Also, the reported pounds per year for TSS, P, and N from the Papillion Creek WWTP effluent was included (EPA 2014b). None of the effluents exceed the yearly limits, as per the facility's NPDES permit (NE0112810).

Table 12
CALCULATED INTERIOR DRAINAGE SEDIMENT AND NUTRIENT LOADS

RECEIVING WATERBODY	STORM EVENT	TSS (lbs/day)		PHOSPHORUS (lbs/day)		NITROGEN (lbs/day)	
		EXISTING	FUTURE	EXISTING	FUTURE	EXISTING	FUTURE
Platte	1-Year Event	8,854	28,348	15	12	72	82
	2-Year Event	14,448	44,662	24	19	118	130
	5-Year Event	24,610	73,676	41	32	200	214
Missouri	1-Year Event	286,830	393,403	313	294	2,996	2,547
	2-Year Event	435,770	596,338	475	445	4,551	3,861
	5-Year Event	691,449	944,345	754	705	7,221	6,114
Missouri (Papillion Creek WWTP)	2014 Report	2,159,800 lbs/year		596,658 lbs/year		3,384,114 lbs/year	

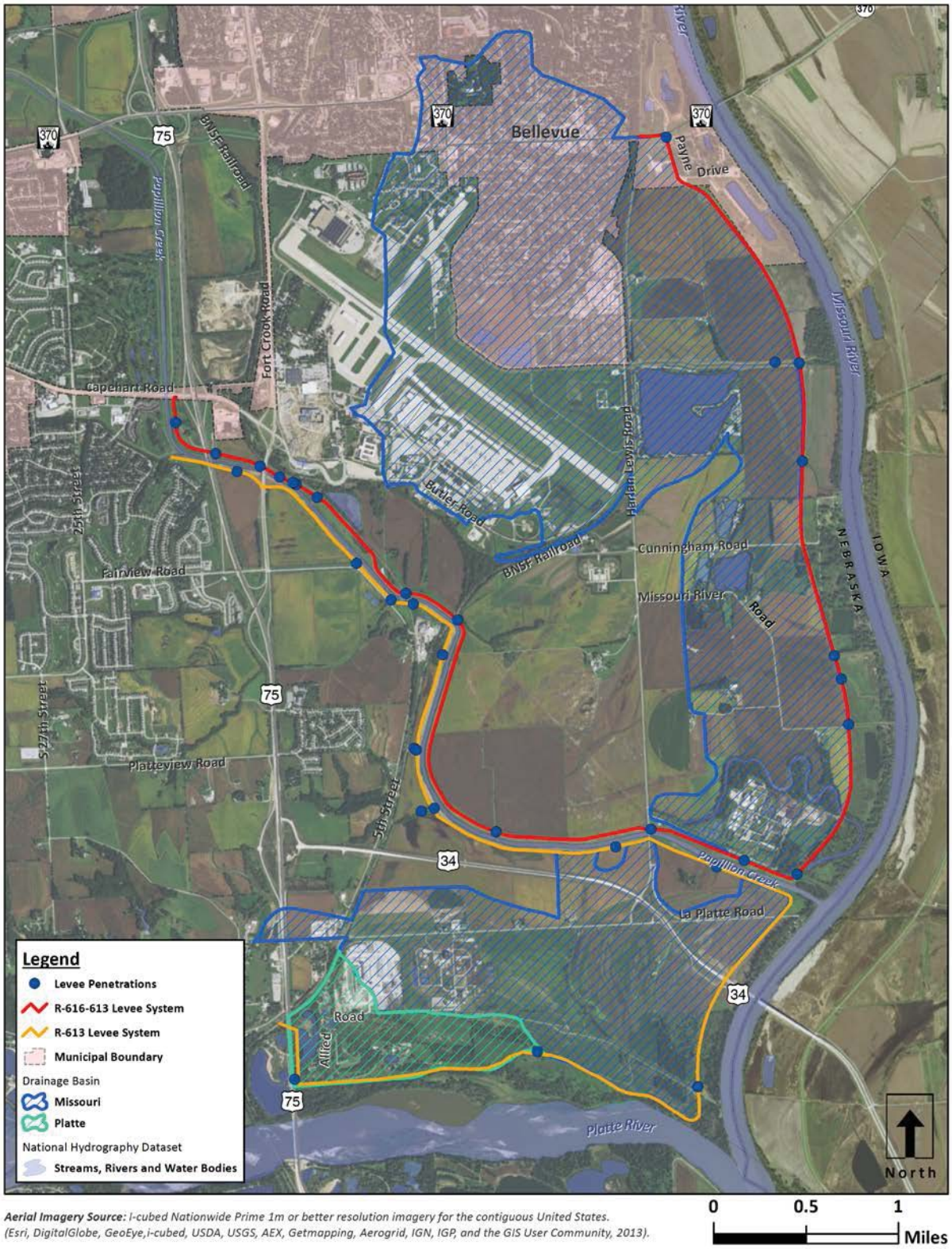


Figure 21 – INTERIOR DRAINAGE OF LEVEE SYSTEMS

To put into perspective the impacts of sediments and nutrients loads entering the receiving waters, concentration loads were divided into the total volume of water in each receiving water body over a 24-hour time period (Table 13). For example, a 1-Year rainfall event over the course of 24 hours would increase the Platte River's TSS load by 0.07% and 0.21% for existing and future conditions, respectively.

Table 13
CALCULATED 24-HOUR PERIOD INTERIOR DRAINAGE SEDIMENT AND NUTRIENT LOAD INCREASES BY STORM EVENT

RECEIVING WATERBODY	STORM EVENT	SEDIMENT AND NUTRIENT CONCENTRATION	TSS (mg/l)		PHOSPHORUS (mg/l)		NITROGEN (MG/L)	
			EXISTING	FUTURE	EXISTING	FUTURE	EXISTING	FUTURE
Platte	1-Year Event	Load	0.19	0.62	0.00032	0.00027	0.0016	0.0018
		Increase	0.07%	0.21%	0.00003%	0.00003%	0.0652%	0.0745%
	2-Year Event	Load	0.32	0.98	0.00053	0.00042	0.00258	0.00284
		Increase	0.11%	0.33%	0.00005%	0.00004%	0.1064%	0.1173%
	5-Year Event	Load	0.54	1.61	0.00090	0.00069	0.00439	0.00469
		Increase	0.18%	0.55%	0.0001%	0.0001%	0.1813%	0.1936%
Missouri	1-Year Event	Load	1.19	1.36	0.00130	0.00102	0.0125	0.0088
		Increase	0.74%	0.84%	0.0003%	0.0003%	1.0629%	0.7535%
	2-Year Event	Load	1.81	1.94	0.00198	0.00145	0.01892	0.01259
		Increase	1.12%	1.21%	0.0005%	0.0004%	1.6148%	1.0749%
	5-Year Event	Load	2.87	2.86	0.00313	0.00213	0.03002	0.01851
		Increase	1.78%	1.77%	0.0008%	0.0006%	2.5622%	1.5804%

4.4 Flood Risk Management

Any future modifications to the Missouri River Levee Segment L-611-614 (i.e., left bank levees) could cause adverse impacts to the R-616-613 and R-613 Levee Systems and the flood risk associated with these systems; therefore, it is imperative that all modifications to adjacent, upstream, and downstream levees are studied to assure that there is no risk to the Right or Left Bank system, including the surrounding communities and properties. A full analysis of flood risk impacts, due to the modification of R-613 and R-616-613, on adjacent levee systems (upstream, downstream or adjacent to these levee systems, including L-611-614 and R-616) has been completed using HEC-FDA and is included in a technical memo, *Project Performance – Federal Levee Systems R-613 and R-616-613* (FYRA 2017). The proposed modifications for the Project would ensure that the Missouri River Left and Right Bank Segments are constructed to the same elevation and would provide equal flood risk protection for both sides of the Missouri River. No modifications are currently planned for the L-611-614 Levee System. As stated in the technical memo and in Section 3.7 of this report, due to construction of R-613, the impacts to L-611-614 and R-616 are deemed as insignificant by the project sponsor.

4.5 Avoidance, Minimization, and Mitigation

The R-613 project will incorporate future actions to allow for protection of the confluence area consisting of: a) existing regulatory requirements and best available management practices (BMPs) that will be implemented; and b) project specific mitigation measures that have been or will be implemented within the area encompassed by the R-613 project.

4.5.1 Development Limited by Flood Zone Re-Designation: Future development behind the levee will be subject to the following two regulations affecting development within the 100-year base flood elevation. These regulations will apply to any type of development. As described, flood zone re-designation will limit development in the R-613 project area, and thus, limit potential sources of environmental contaminant discharges.

> FEMA Re-designation to Zone AH. Modeled data for flood conditions shows that up to 5 feet of interior ponding will occupy approximately half of the area behind the levee (generally corresponding to the lands at the confluence that are of most concern to USFWS because of their close proximity to the confluence and their wetland designation, (see Figure 21). This area will be remapped by FEMA as Zone AH once the R-613 project is completed. This designation will require that any fill or development in the area demonstrate a no-rise in flood elevations. Under such a requirement, interior ponding areas will remain as flood storage and serve as a sediment deposition and nutrient

filtration area. As a result, little, if any development is expected to occur in these areas. The ponding will occur in drainage swales above the drainage penetrations and in extremely flat, shallow locations. These swales will be undulating and vegetated, and typically rainfall will infiltrate or evaporate before draining to the penetration points, except under heavy rainfall or flooding conditions.

Local Regulations for Zone AH. Once remapped, Sarpy County and the City of Bellevue have jurisdiction to manage Zone AH as a floodway, including implementation of development restrictions which require any proposed fill to be offset by providing additional storage volume within the sub-basin to demonstrate no-rise in flood elevations. Other requirements will include mandatory purchase of costly flood insurance, and stricter building codes. All of these requirements will increase development costs making the area unattractive for development.

4.5.2 Development Limited by the Presence of Wetlands: Future development behind the levee will be subject to at least two regulations protecting wetlands. The extensive amount of wetlands present in the area of the old channel scars, combined with the difficulty in obtaining approval for impacts to more than 0.5 acres of wetlands, will further increase development costs in the area of most interest to USFWS. As such, regulations protecting wetlands will limit development in the R-613 project area, and thus, potential sources of environmental contaminants would be avoided/minimized due to these legal protections.

USACE Section 404 Permit Program. Development in wetlands will be limited by USACE regulations and will require a 404 permit for fill activities. If impacts exceed 0.5 acre, an Individual Permit and alternatives analysis will be required to determine if there are other alternatives that would be less environmentally damaging to wetlands. If the analysis finds an alternative with less wetland impacts, that alternative would be put forth as the preferred alternatives. Compensation through wetland mitigation for any impacts to wetlands would be required. Because the lands within the R-613 levee is within a 5-mile radius of Offutt AFB and within an Aircraft Strike Hazard Zone, wetland construction or rehabilitation would be prohibited in order to avoid the risk of avian collisions with military aircraft. Thus, offsite wetland mitigation would be required. Offsite mitigation would likely be more expensive and may require purchase of wetland credits from an approved wetland bank. Thus, development in the presence of wetlands would increase costs making the area unattractive to developers.

NDEQ Section 401 Water Quality Certification. The need for an Individual Permit from USACE would trigger the requirement to obtain water quality certification from the NDEQ, providing yet another level of checks for impacts to waters of the State, including endangered and threatened species.

4.5.3 Water Quality Protection through Federal and State Wastewater and Stormwater program regulations: Future development anywhere in Sarpy County, regardless of zoning or land use designation, will be subject to at least three existing stormwater/water quality regulations. Abiding by these applicable regulations will protect water quality by ensuring urban runoff is properly addressed before it reaches the rivers.

NDEQ National Pollutant Discharge Elimination System (NPDES) Stormwater Program: This program requires all stormwater discharges associated with municipal storm water systems, and construction and industrial activities receive authorization through issuance of a NPDES permit. All NPDES permits address endangered and threatened species and critical habitat protection. Authorization under a NPDES permit is only granted if discharge activities will not adversely affect any state or federally-listed endangered or threatened species and not result in the modification or destruction of critical habitat. A *not likely to adversely affect* determination is made in consultation with Nebraska Game and Parks Commission for species of state importance. Actions with discharges that would adversely affect state or federally-list species and their critical habitat do not receive authorization under an NPDES permit.

The City of Bellevue's and Sarpy County's NPDES General Stormwater Discharge Permit for Construction Activities would authorize discharges from construction and development activity in the R-613 project area to Waters of the State only if found to result in minimum impacts. The permit includes a Storm Water Pollution Prevention Plan (SWPPP) that incorporates NDEQ Title 119 (Neb. Rev. Stat. §81-1505) requirements, which requires the implementation of BMPs that avoid/minimize sedimentation and erosion during construction. Per NDEQ Title 119 and EPA recommendation, BMPs outlined in the SWPPP will be implemented with continual inspection and maintenance to ensure water quality parameters are not exceeded in nearby waterways.

City of Bellevue and Sarpy County Zoning and Storm Water Management Regulations: These regulations require a Post-Construction Storm Water Management Plan (PCSWMP) for land development and/or significant redevelopment projects with the potential to add pollutants to storm water or to affect the flow rate or velocity of storm water runoff after construction is completed. These regulations are triggered by the creation of 5,000 square feet (0.11 acre) or more of impervious surface and is discussed further in Section 38.21 of the regulations. The PCSWMP includes management provisions such as Low Impact Development (LID) and BMPs to provide water quality control as well as long-term maintenance of the controls for the first 0.5-inch of runoff, and temporary erosion and sediment control BMPs during construction. Together, these storm water management regulations provide control for over 90% of the average annual wet weather events by restricting a majority of the sediment, nutrients and other contaminants commonly found in urban storm water runoff from reaching protected waterbodies. As such, the PCSWMP would provide protection to Endangered and Threatened Species and Critical Habitat during the post construction phase of the R-613 project. Additionally, the PCSWMP would apply to future construction associated with development within the R-613 area.

Papillion Creek Watershed Partnership Storm Water Management Policies: The redevelopment of existing industrial or manufacturing properties land side of the levees would likely improve environmental conditions by providing local agencies the opportunity to implement institutional controls that are currently not in place. Pursuant to the inter-local agreement for the partnership, all new developments and significant redevelopments are regulated by the policies. Please refer to Attachment 2 for a list of policies and institutional controls.

4.5.4 Further Acquisition of Conservation Lands: Since 2010, PMRNRD has been working diligently with the Omaha Chamber of Commerce, City of Bellevue, Sarpy County, Back to the River, and the State of Nebraska on multiple efforts to facilitate and coordinate land acquisition both landward and riverward of the R-613 levee (Figure 20; Table 14). Along with PMRNRD, several state and federal agencies have ongoing efforts underway to preserve and restore habitat on both the land and river side of several levee systems within the vicinity of the Platte and Missouri River confluence (Table 14). It is estimated that these areas total in excess of 6,500 acres of protected land. Some of these projects are part of the Missouri River Recovery Program's habitat mitigation (Figure 22) extending from Sioux City to the Mississippi confluence (MMRP 2013). These protected lands are leading to the creation of a corridor of large tracts of public lands managed for conservation purposes and unavailable for industrial or commercial development.

The river side areas of the levee systems continue to provide important habitat for riverine and floodplain species. In recognition of its importance PMRNRD has been actively acquiring and preserving bottomland habitat along the Platte and Missouri Rivers. PMRNRD has already purchased more than 300 acres along the R-616 Missouri River Right Bank Segment north of Papillion Creek in support of conservation goals and floodplain management efforts through the Floodway Purchase Program (Figure 18) (PMRNRD 2016). Additionally, the enrollment of lands in conservation easements and purchase of land by the PMRNRD, especially on the river side of the levees, help provide protection for important habitat forming processes for the pallid sturgeon, which is a specific recovery task outlined in the Pallid Sturgeon's Revised Recovery Plan (*Section 1.1.6*) (USFWS 2014).

The land side of the levee systems also provides important habitat for riverine and floodplain species, in addition to providing an environmental buffer that assists in protecting river side habitat.

PCS Nitrogen Property: A considerable amount of effort has been put forth to acquire 585 acres of the PCS Nitrogen property. Efforts included a successful grant award of $1.6 million from the Nebraska Environmental Trust for this purpose. PMRNRD has experienced delays in acquisition because PCS wishes to sell the entire property to one buyer. In September 2016, PMRNRD and the other stakeholders engaged the PCSCEO, PCS executives, and legal counsel in efforts to expedite the sale to local ownership via a public/private partnership. The map of interior ponding was recently provided to PCS to help them understand future development constraints. In December, PCS selected a broker to begin the property acquisition negotiations. PMRNRD and the stakeholder group continue to work closely with the PCS team to acquire the site in the very near future and have identified additional funding streams to complete a future transaction. More than 6.39 acres of PFO wetland and 5.60 acres of PEM wetland (FHU 2017) would be preserved with the purchase of the PCS Nitrogen property.